2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group







Prepared by

Lower Colorado Regional Water Planning Group

With Funding Assistance From

Texas Water Development Board

Prepared For

Texas Water Development Board

With Assistance From

INTERA Incorporated, Freese and Nichols,
Plummer and Associates, and ICF

REGION K

THE LOWER COLORADO REGIONAL WATER PLANNING GROUP

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List of Acronyms

Acronym	Definition
ac-ft/yr	acre-feet per year
ASR	Aquifer Storage and Recovery
BBASC	Basin and Bay Area Stakeholder Committees
BBEST	Bay and Basin Area Expert Science Teams
BCRWWTP	Brushy Creek Regional Wastewater Treatment Plant
BFZ	Balcones Fault Zone
BSEACD	Barton Springs Edwards Aquifer Groundwater Conservation District
BMP	Best Management Practices
COA	Certificate of Adjudication
CT	Contact Time
DCP	Drought Contingency Plan
DFC	Desired Future Conditions
DOR	Drought of Record
DPR	Direct Potable Reuse
DWDOR	Drought Worse than the Drought of Record
EPA	Environmental Protection Agency
ET	Evapotranspiration
EQIP	Environmental Quality Incentives Program
FNSI	Finding of No Significant Impact
GAM	Groundwater Availability Model
GCM	Global Circulation Models
GCD	Groundwater Conservation District
GBRA	Guadalupe-Blanco River Authority
GMA	Groundwater Management Area
GPCD	gallons per capita per day
gpm	gallons per minute

Acronym	Definition
GST	Ground Storage Tank
HB	House Bill
HOA	Homeowners Association
IBT	Inter-Basin Transfer
IPP	Initially Prepared Plan
LCRA	Lower Colorado River Authority
LCRWPA	Lower Colorado Regional Water Planning Area
LCRWPG	Lower Colorado Regional Water Planning Group
LSWP	LCRA-San Antonio Water System Water Project
MAG	Modeled Available Groundwater
MGD	Million Gallons per Day
MUD	Municipal Utility District
MBHE	Matagorda Bay Health Evaluation
MWP	Major Water Providers
NASS	National Agriculture Statistics Service
NRCS	Natural Resources Conservation Service
O&M	Operations and Maintenance
OCR	Off-Channel Reservoir
PUA	Public Utility Agency
RO	Reverse Osmosis
ROR	Run-of-River
RCPP	Regional Conservation Partnership Program
RWPA	Regional Water Planning Area
RWPG	Regional Water Planning Group
RWP	Regional Water Plan
Region K	Lower Colorado Regional Water Planning Area
SAR	South Austin Region
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition

Acronym	Definition
SE	Steam-Electric
SAWS	San Antonio Water System
SUD	Special Utility District
SWCD	Soil and Water Conservation District
SWIFT	State Water Implementation Fund for Texas
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TSSWCB	Texas State Soil and Water Conservation Board
TLAP	Texas Land Application Permit
TPDES	Texas Pollutant Discharge Elimination System
TWDB	Texas Water Development Board
UF	Ultrafiltration
UV	Ultraviolet
UWCD	Underground Water Conservation District
WAM	Water Availability Model
WCP	Water Conservation Plan
WCAC	Water Conservation Advisory Council
WCID	Water Control and Improvement District
WMS	Water Management Strategy
WMSP	Water Management Strategy Project
WSC	Water Supply Corporation
WSEP	Water Supply Enhancement Plan
WQMP	Water Quality Management Plan
WSI	WaterSMART Initiative
WTPUA	West Travis County Public Utility Authority
WTP	Water Treatment Plant
WUG	Water User Group
WWTP	Wastewater Treatment Plant

Executive Summary







2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Executive Summary

The Lower Colorado Regional Water Planning Area, also referred to as "Region K," is one of 16 areas established by the 1997 Texas legislature Senate Bill 1 for the purpose of State water resource planning at a regional level on five-year planning cycles. Following the guidelines provided by the Texas Water Development Board (TWDB), the Lower Colorado Regional Water Planning Group developed this Initially Prepared 2026 Region K Water Plan covering the 2030 to 2080 time period. This plan has been submitted to the TWDB for review. The Final 2026 Region K Water Plan will be submitted to the TWDB in October 2025 for integration into the statewide water plan.

The Plan includes a description of the region, population and water demand projections, water supply analyses, water management strategies for ensuring supplies during Drought of Record (DOR) conditions, water conservation and drought management plans consistent with the state's long-term resource protection goals, policy recommendations related to improving water management and preserving the environment, and public involvement activities. The LCRWPG, representing the twelve TWDB-required interest groups and one additional regional interest group, was responsible for the development of the Initially Prepared 2026 Region K Water Plan.

Plan data developed for the 2026 Region K Water Plan was entered into the TWDB database DB27. Summaries of the DB27 report tables are available via the hyperlinks provided at the end of this Executive Summary, as required by the Second Amended General Guidelines for Development of the 2026 Regional Water Plans.

ES.1 Task 1 – Planning Area Description

Task 1 was intended to collect data and to provide a physical, social, and economic description of the Lower Colorado Regional Water Planning Area. The Lower Colorado Region consists of all or parts of 14 counties roughly consistent with the Lower Colorado River Basin. The geographical boundaries of the LCRWPA, designated as Region K, are shown in **Figure 1.2** in **Chapter 1**.

Primary sources of water for the Region K area are the Colorado River; the Gulf Coast, Carrizo-Wilcox, Edwards Balcones Fault Zone (BFZ), Trinity, and Edwards-Trinity (Plateau) aquifers; and several minor aquifers. The majority of the region lies within the Colorado River Basin, with small portions of the Brazos, Guadalupe, and Lavaca River Basins, and the Brazos-Colorado and Colorado-Lavaca Coastal Basins.

The system of Highland Lakes managed by the Lower Colorado River Authority (LCRA) is a major hydrologic feature of the region that provides flood control, power generation, water supply, and recreational benefits. The Arbuckle Reservoir is a new LCRA off-channel reservoir that will increase LCRA's water supply yield, particularly for uses near the coast.

ES.2 Task 2 –Water Demand Projections

Task 2 was intended to prepare population and water demand projections for Region K. **Chapter 2** summarizes this data and discusses the procedures used to obtain revised population and demand projections. The biggest change for this cycle was the 2020 United States Census, which formed the basis of population estimates and thus was foundational for estimating future water demands in the region. The population trends in the region predicted by the Texas Demographic Center are characterized by high growth primarily in the urban or near-urban areas, especially in and around Austin, including Travis, Hays, Williamson, and Bastrop counties. Total regional population projections estimate a near-doubling of population to more than 3.2 million people by 2080.

Total water demand for Region K is projected to increase 27 percent from approximately 1.14 million acre-feet per year in 2030 to approximately 1.45 million acre-feet per year by 2080 (**Table ES.1**). While demands such as municipal and manufacturing are anticipated to increase due to population growth and economic activity, other water demand categories are projected to stay constant or decline. The distribution of water demands in the region for all decades is shown in Table ES.1, by type of use, as projected for the years 2030 through 2080.

Table ES.1: Water Demand Projections by Type of Use for the Lower Colorado Region (acre-feet/year)

Basin	2030	2040	2050	2060	2070	2080
Municipal	380,187	451,187	519,431	589,880	663,091	743,729
Irrigation	569,177	554,606	540,430	526,636	513,214	500,156
Livestock	10,988	10,988	10,988	10,988	10,988	10,988
Manufacturing	58,602	62,067	65,567	69,104	70,177	71,293
Mining	10,531	9,324	10,123	11,008	11,900	11,854
Steam-Electric Power	109,451	109,451	109,451	109,451	109,451	109,451
Total for Region K	**1,138,936**	**1,197,623**	**1,255,990**	**1,317,067**	**1,378,821**	**1,447,471**

ES.3 Task 3 – Water Supply Analysis

The availability of surface water and groundwater supplies were determined as part of Task 3. Water supplies in Region K are available from eleven aquifer systems, alluvial groundwater, six river and coastal basins, and from reuse.

The Colorado River Basin makes up the single largest source of surface water for the region with large volumes of water available from both run-of-river (ROR) diversion rights and water stored in reservoirs. Surface water supplies for DOR conditions for the Colorado River Basin were determined using a modified version of the Texas Commission on Environmental Quality (TCEQ) WAM (Water Availability Model) Run 3 that was developed originally during the 2011 planning cycle and has been updated for use in the 2026 planning cycle. This model predicts surface water availability under DOR conditions and assumes maximum permitted surface water diversions with no return flows to streams.

Groundwater supply availability estimates were developed from the best information available from the Water User Groups themselves, TWDB groundwater pumping data, local information from Groundwater Conservation Districts , or information from the 2021 Region K Plan. Early in this regional water planning cycle, the Groundwater Management Areas in the region adopted their updated Desired Future Condition for their aquifers, and the TWDB established the Modeled Available Groundwater values for these aquifers. If a Modeled Available Groundwater has been established for a particular aquifer, the TWDB requires that the Modeled Available Groundwater be considered the maximum amount of groundwater available for the regional water planning process. In cases where a Modeled Available Groundwater is not established for an aquifer, other analyses were used or the local Groundwater Conservation District or Groundwater Management Area representative was consulted regarding an appropriate availability volume. Documentation of these methodologies is included in **Chapter 3**.

The TWDB guidelines for regional water planning process require that a summary of the water sources available to the region be presented. This information is presented graphically in **Figure ES.1** and is summarized in **Table ES.2**. As indicated, under current conditions, a total of approximately 1.3 million acre-feet (ac-ft) of water is available annually to the LCRWPA under DOR conditions. Of this amount, approximately 65 percent is from surface water sources and 34 percent is from groundwater sources. The remainder is reuse.

Figure ES.1: Total Water Available to Region K During a Drought of Record

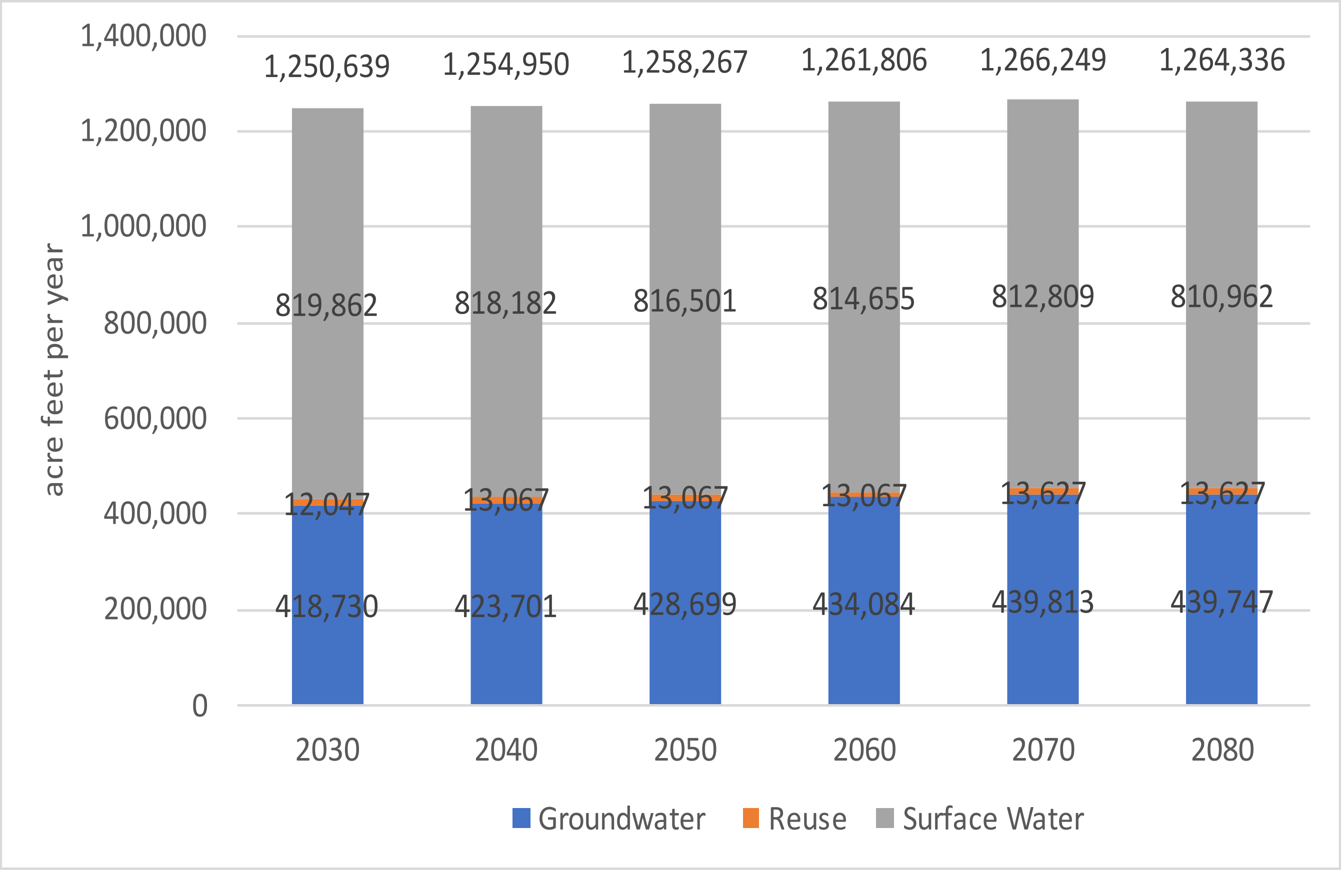

Table ES.2: Total Water Available to the Lower Colorado Regional Planning Area During a Drought of Record (acre-feet/year)

Source	2030	2040	2050	2060	2070	2080
Groundwater	418,730	423,701	428,699	434,084	439,813	439,747
Reuse	12,047	13,067	13,067	13,067	13,627	13,627
Surface Water	819,862	818,182	816,501	814,655	812,809	810,962
Total	**1,250,639**	**1,254,950**	**1,258,267**	**1,261,806**	**1,266,249**	**1,264,336**

ES.4 Task 4 – Identification of Water Needs

Task 4 was to determine the surpluses and shortages resulting from a comparison of the demands estimated in Task 2 with the supplies estimated in Task 3. **Chapter 4** summarizes the comparison of water demands to the water supplies in two different ways: (1) a comparison of water demands and supplies on a county-by-county basis, and (2) a comparison of the water demands and supplies for the two designated Major Water Providers within Region K – LCRA and Austin.

The comparison of supplies and demands identified 33 WUGs that have projected water supply shortages, or "needs," by the year 2030, and an additional 15 WUGs with projected water supply shortages by the year 2080. The estimated water need is approximately 319,000 ac-ft/yr in 2030 and 498,000 ac-ft/yr in 2080. This identified shortage is based on conservative water availability estimates, which assume (1) only water that is available during a repeat of the historical Drought of Record (DOR), (2) that all water rights in the basin are being fully and simultaneously utilized, and (3) excludes both water available from the LCRA on an interruptible basis and water projected to potentially be available, as a water management strategy for planning purposes, as a result of municipal return flows to the Colorado River.

Based on these assumptions, water needs have been identified in four of the six water use categories. **Table ES.3** shows the magnitude of the identified needs by water use category for the decades spanning 2030 to 2080.

Table ES.3: Identified Amount of Water Needs in Region K (acre-feet/year)

Total by Water Use Type	2030	2040	2050	2060	2070	2080
Irrigation	(302,217)	(287,925)	(274,021)	(260,492)	(247,327)	(234,520)
Livestock	0	0	0	0	0	0
Manufacturing	(1,485)	(1,778)	(2,082)	(2,397)	(2,723)	(3,063)
Mining	(2,990)	(1,357)	(1,739)	(2,318)	(2,895)	(3,428)
Municipal	(12,585)	(35,383)	(58,979)	(109,024)	(179,358)	(257,135)
Steam-Electric Power	0	0	0	0	0	0
Total	**(319,277)**	**(326,443)**	**(336,821)**	**(374,231)**	**(432,303)**	**(498,146)**

ES.5 Task 5 – Evaluation and Recommendation of Water Management Strategies and Water Conservation Recommendations

The objective of water management strategies is to meet needs that are identified in the planning region. A process for identifying and evaluating the feasibility of water management strategies was developed in Task 5. Potential strategies were presented in a form so that potential alternatives were identified and evaluated in accordance with local desires and needs. Water management strategies were recommended to provide for the majority of water needs identified as part of the Task 4 effort. Many of the shortages were met by reducing demands using conservation, drought management, and reuse, while many others involved the expansion of existing contracts or creation of new contracts involving surface water. Other strategies will require the implementation and construction of additional infrastructure, from small (e.g., a single groundwater well) to large (e.g., off-channel reservoirs). If a project sponsor wishes to be considered for certain types of State funding, the project that the funding is requested for must be included in the Regional and State Water Plan.

Further discussion of recommended and alternative water management strategies is included in **Chapter 5**. In addition, a section was included in Chapter 5 to discuss recommended conservation strategies. Water conservation plans are required for any entity seeking a TWDB loan, a new or amended surface water right, or current holders of existing surface water diversion permits under certain circumstances.

Recommended Water Management Strategies are described in Chapter 5 in the following categories:

- Return Flows
- Conservation
- Drought Management (covered more extensively in **Chapter 7**)
- Major Water Provider Management Strategies
- Municipal Water Management Strategies
- Irrigation Water Management Strategies
- Manufacturing Water Management Strategies
- Mining Water Management Strategies
- Steam Electric Power Water Management Strategies

In addition, several alternative water management strategies are discussed that were ultimately not recommended. At the beginning of Chapter 5, there is a table that lists the WUGs with proposed strategies in alphabetical order and identifies which water management strategies are included for them and what sections to find them in.

ES.6 Task 6 – Impacts of the Regional Water Plan

The purpose of Task 6 was to determine the effects and impacts of water management strategies on water resources, agricultural resources, and natural resources. These impacts are described in **Chapter 6**. In addition, determination of social and economic impacts resulting from voluntary redistribution of water from rural regions to population centers was discussed. This activity was part of a consensus-based planning effort to include local concerns in the statewide water supply planning process.

For the 2026 Region K Plan, many of the recommended water management strategies that impact the Colorado River and Matagorda Bay utilize water under existing water rights or utilize water such as wastewater effluent that was already assumed to be used 100 percent under the required surface water availability modeling guidelines. Thus, those strategies are unlikely to create impacts not already being shown under the conservative assumptions used to estimate supplies.

Return flows are likely to show the largest impact to the instream flows and bay and estuary inflows. They provide a consistent source of flow in the river, even when a portion of the return flows are reused. Return flows are a source of flow that is not included in the surface water availability modeling, and so would show a positive impact to the system as a water management strategy.

The recommendation by Region K of strategies such as conservation, reuse, and drought management will reduce demands, which will help to maintain water stream and springflows, as well as groundwater levels in the region, especially during times of drought. In addition, recommended strategies such as off-channel reservoirs and aquifer storage and recovery may aid in balancing peak demands for surface water and groundwater, which could also help maintain environmental flows in the region.

Several of the larger strategies recommended in the Initially Prepared 2026 Region K Water Plan have been included in a cumulative impacts analysis on environmental flows. The strategy evaluation began with the creation of a base model (Region K Cutoff Model – strategy version.) The results from the model runs from this base model were compared to the results from the model runs from the base model with the addition of select water management strategies. As mentioned earlier, the return flow strategies provide positive impacts to the instream flow and freshwater inflow to Matagorda Bay, while the other strategies tend to have either negligible impacts or in some cases may remove some flows from the river and bay.

ES.7 Task 7 – Drought Response Information, Activities and Recommendations

The purpose of Task 7 is to present all necessary requirements for drought response, management, and contingency plans. Drought Contingency Plans (DCPs) are required of certain water right owners and applicants. These documents have become integral to providing a reliable supply of water throughout the State.

The TCEQ, in accordance with the Texas Administrative Code (TAC), requires all wholesale public water suppliers, retail public suppliers, and irrigation districts to prepare and submit DCPs meeting the requirements of 30 TAC Chapter§288(b) and to update these plans at least every five (5) years. Drought Contingency Plans for all WUGs, as available, were reviewed for information on their drought triggers and responses and potential for emergency interconnects. This information is included in Chapter 7.

The LCRWPG acknowledges that the Major Water Providers in Region K have extensive knowledge regarding surface water sources in the region, and these providers may play a leadership role developing appropriate drought response actions for themselves and their customers. One area the LCRWPG feels could potentially be improved upon is the coordination and uniformity of Drought Stage levels for all users of a particular source. It has been acknowledged that there can be some confusion when two (2) water users of the same water source are at different Drought Stage levels, even if they are implementing similar drought responses.

Throughout the region, the DCPs for groundwater users are developed specifically to their use and location. Aquifer characteristics can vary across the region, and it can be difficult to require the same triggers for all users of a particular groundwater source that covers several counties. The LCRWPG acknowledges that the municipalities and water utilities that rely upon groundwater should have the best knowledge to develop their Drought Contingency Plan triggers and responses. Even so, the LCRWPG encourages ongoing coordination between groundwater users, Groundwater Conservation Districts, and the Groundwater Management Areas to monitor local conditions for necessary modifications to the Drought Contingency Plans.

Region-specific model Drought Contingency Plan templates are included as an Appendix to Chapter 7. Based on recommendations from the Drought Preparedness Council, templates are provided for Utility/Water Suppliers, Irrigation Users, Wholesale Water Providers, and Steam-Electric Uses.

ES.8 Task 8 – Recommendations Regarding Legislative and Regional Policy Issues

A discussion of Region K's legislative, administrative, and regulatory recommendations are provided as part o Task 8. There were no unique ecological stream segments identified by the LCRWPG for this planning cycle. The LCRWPG hopes to review those identified for potential further study in more detail next planning cycle. No new potential reservoir sites are recommended by the LCRWPG for this planning cycle.

Several policy issues have been updated and adopted by the LCRWPG concerning regulatory and legislative issues. These recommendations are listed below and are described in detail in **Chapter 8**.

- Management of Surface Water Resources: Inter-Basin Transfers and Model Linking
- Environmental – Instream Flows and Freshwater Inflows to Bays and Estuaries
- Groundwater
- Potential Impacts to Agricultural and Rural Water Supplies
- Agricultural Water Conservation
- Municipal/Industrial Conservation
- Brush Management
- Inflows to Highland Lakes
- Education on Water
- Coordination of Planning Cycles for Determination of Desired Future Conditions by GCDs and Generation of the Regional Water Plan by Regional Water Planning Groups
- Recommended Improvements to the Regional Planning Process (SB 1 – 75th Legislature)
- Radionuclides in the Hickory and Marble Falls Aquifers
- Planning for Droughts worse than the Drought of Record

ES.9 Task 9 – Implementation and Comparison to Previous Regional Water Plan

The purpose of Task 9 is to compare the current plan to the previous plan, report the level of implementation of the previous plan, and review progress towards regionalization. This information is provided in **Chapter 9**, including (1) a discussion and survey of water management strategy projects that were recommended in the 2021 Regional Water Plan, and those that have since been implemented or have started the process, and (2) a summary comparison of the 2026 Regional Water Plan to the 2021 Regional Water Plan with respect to population, demands, water availability and supplies, and water management strategies.

A review of the progress that Region K has made towards more "regionalization" is also provided in Chapter 9. The 2026 Region K Water Plan has recommended a number of water management strategies that encourage cooperation between water user groups and that have the ability to benefit a large part of the region. Recommended strategies in the 2026 Region K Water Plan that make progress towards "regionalization" include utilization of return flows within the basin, proposed LCRA and Austin off-channel reservoirs, and importing return flows from Williamson County.

ES.10 Task 10 – Public Participation and Plan Adoption

The primary purpose of Task 10 is to ensure that the Regional Planning Process is conducted in a manner that encourages public participation and opportunity to engage in the planning process. Region K made a commitment to conducting public outreach as a part of their duties as Planning Group members. Those elements are described in **Chapter 10**. Major aspects of this effort included:

- Holding 25 open regular meetings of the Planning Group over the 5 year planning cycle
- Holding a public meeting to receive input by the public and referring to that input throughout the planning process
- Holding a Water Planning 101 meeting for new members and open to the public
- Holding a public hearing to receive public comments on the Initially Prepared Plan (IPP)
- Making the IPP available to the public through the Region K website and placing copies of the IPP in libraries and county clerk offices throughout the region
- Serving as speakers at various civic and interest group meetings
- Conducting surveys
- Maintaining a web page
- Using committees to assist in the development of the plan. Committee meetings were open to the public and allowed for dialogue between the public and members of the committees.
- Developing policy statements

All of these efforts made information and updates on the regional water planning process available to thousands of people throughout the entire region. Additional information concerning public involvement can be found in **Chapter 10**.

DB27 Reports

DB27 reports for Region K that summarize all of the data associated with the plan are available to view through the TWDB Database Reports application. The reports can be accessed by following the instructions below:

1. Navigate to the TWDB Database Reports application at https://www3.twdb.texas.gov/apps/SARA/reports/list
2. Enter "2026 Regional Water Plan" into the "Report Name" field to filter to all DB2 reports associated with the 2026 Regional Water Plans
3. Click on the report name hyperlink to load the desired report
4. Enter planning region letter parameter, click "view report".

The list of available reports is as follows:

1. WUG Population
2. WUG Demand
3. Source Total Availability
4. Water User Group Existing Water Supply
5. Water User Group Needs or Surplus
6. WUG Second-Tier Identified Water Need
7. WUG Data Comparison to 2021 RWP
8. Source Data Comparison to 2021 RWP
9. WUG Unmet Needs
10. Recommended WUG Water Management Strategies
11. Recommended Projects Associated with Water Management Strategies
12. Alternative WUG Water Management Strategies
13. Alternative Projects Associated with Water Management Strategies
14. WUG Management Supply Factor
15. Recommended WMS Supply Associated with New/Amended IBT Permit
16. Recommended WMS with New/Amended IBT Permit & Conservation
17. Sponsored Recommended WMS Supplies Unallocated to WUGs
18. Major Water Provider Existing Sales and Transfers
19. Major Water Provider WMS Summary

Chapter 1.

Introduction and Description of the Lower Colorado Regional Water Planning Area

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Appendix

Chapter 1. Introduction and Description of the Lower Colorado Regional Water Planning Area

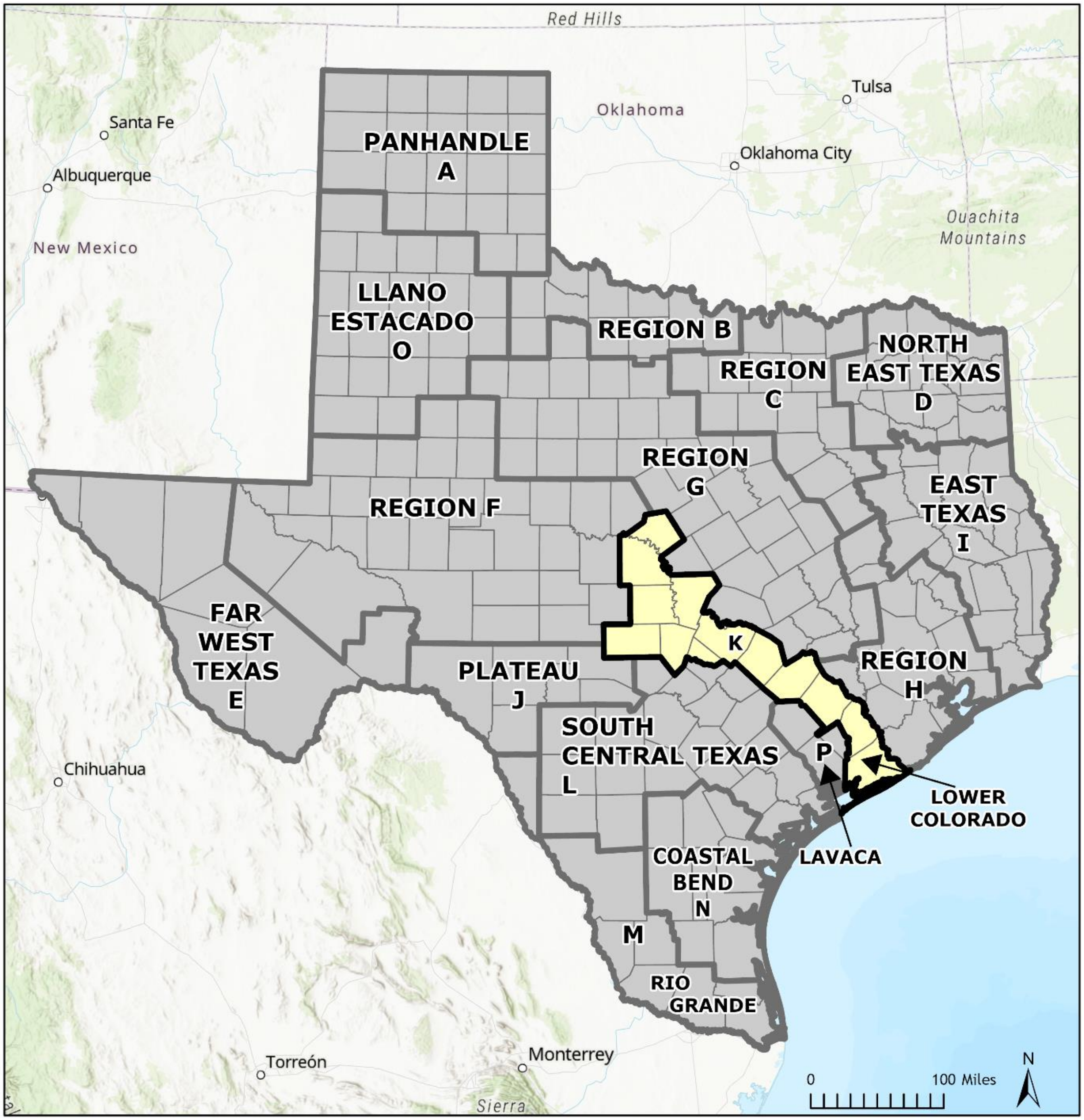
The Lower Colorado Regional Water Planning Area, also referred to as "Region K," is one of 16 areas established by the 1997 Texas legislature Senate Bill 1 for the purpose of State water resource planning at a regional level on five-year planning cycles (**Figure 1.1**). The first regional water plan was adopted in 2001. Since that time, the regional plans have been updated in 2006, 2011, 2016, and 2021. This plan, the 2026 Regional Water Plan, is the result of the 6th cycle of regional water planning.

Pursuant to the formation of Region K, the Lower Colorado Regional Water Planning Group was formed and charged with the responsibility to evaluate the region's population projections, water demand projections, and existing water supplies for a 50-year planning horizon. The Regional Water Planning Group identifies water shortages under drought of record conditions and recommends water management strategies. This planning is performed in accordance with regional and state water planning requirements of the Texas Water Development Board (TWDB).

This chapter provides details about Region K that are relevant to water resource planning, including the following items, as required by TWDB in the Scope of Work for this Plan:

1. Physical description of the Planning Area
2. Social and economic aspects of a region such as information on current population, economic activity and economic sectors heavily dependent on water resources
3. Current water use and major water demand centers
4. Current groundwater, surface water, and reuse supplies including major springs that are important for water supply or protection of natural resources
5. Major Water Providers and Wholesale Water Providers
6. Agricultural and natural resources
7. Identified water quality problems
8. Identified threats to agricultural and natural resources due to water quantity problems or water quality problems related to water supply
9. Summary of existing local and regional water plans
10. The identified historic drought(s) of record within the planning area
11. Current preparations for drought within Region K
12. Information compiled by the TWDB from water loss audits performed by Retail Public Utilities pursuant to 31 TAC §358.6 (relating to Water Loss Audits)
13. An identification of each threat to agricultural and natural resources and a discussion of how that threat will be addressed or affected by the water management strategy evaluated in the Plan

Figure 1.1 TWDB Designated Regional Planning Areas



Source: Texas Water Development Board

1.1 General Introduction

The Lower Colorado Regional Water Planning Area (Region K) consists of all or portions of the following 14 counties (**Figure 1.2**):

- Bastrop
- Blanco
- Burnet
- Colorado
- Fayette
- Gillespie
- Hays (partial)
- Llano
- Matagorda
- Mills
- San Saba
- Travis
- Wharton (partial)
- Williamson (partial)

By statute, the Planning Group consists of members from at least 12 of the following statutorily required interests: public, counties, municipalities, industries, agriculture, environmental, small business, electric-generating utilities, river authorities, water districts, water utilities, and groundwater management areas. These members collectively represent the water supply interests of the entire region (**Table 1.1a**). The Planning Group formed several committees (**Table 1.1b**) to support Planning Group activities and meet State requirements for planning.

Figure 1.2 Region K Planning Area

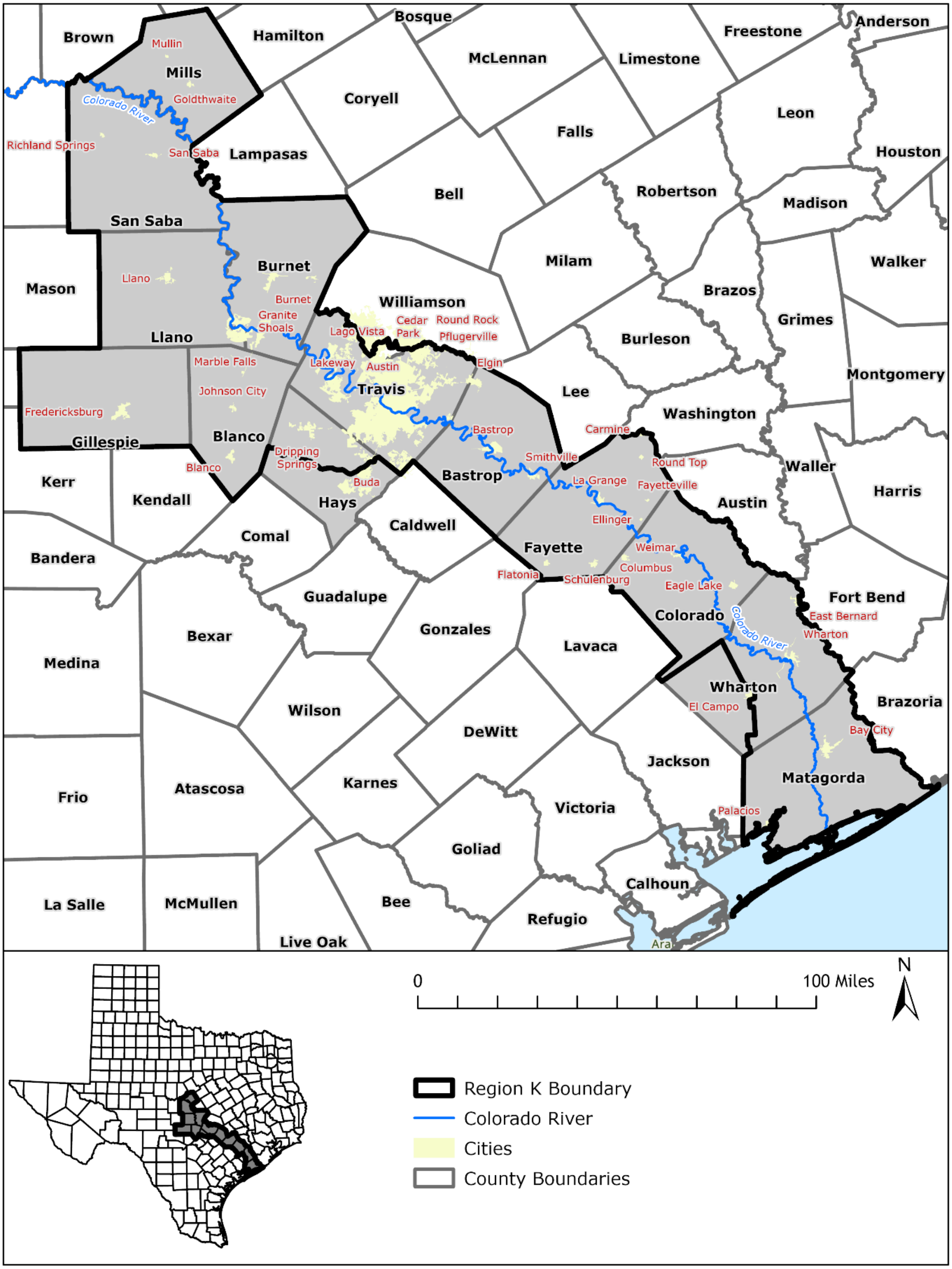


Table 1.1a Region K Planning Group Members

Members				
Interest	**Name**	**Entity**	**County**	**Alternate**
Agricultural	Kevin Churchwell	---	---	Vacant
	Paul Sliva	Farmer	Matagorda	Vacant
Counties	Jim Luther	Commissioners Court	Burnet	Linda Raschke
	Jody Fauley	Commissioners Court	San Saba	Greg McGregor
	Emil Uecker	Commissioners Court	Blanco	Vacant
Electric Generating Utility	Robert Nies	STP Nuclear Operations Company	Matagorda	Elizabeth Jones
Environmental	Ann McElroy	Water Advocate	San Saba	Jason Homan
	Jennifer Walker	National Wildlife Federation	Travis	Tom Entsminger
Groundwater District	David Van Dresar	Fayette County Groundwater Conservation District	Fayette	Vacant
Groundwater Management Areas	Paul Babb	Groundwater Management Area 7, Hill Country Underground Water Conservation District	Gillespie	Kay Wischkaemper
	Mitchell Sodek	Groundwater Management Area 8, Central Texas Groundwater Conservation District	Burnet	Paul Babb
	Charlie Flatten	Groundwater Management Area 9, Blanco-Pedernales Groundwater Conservation District	Blano	Lane Cockrell
	Tim Loftus	Groundwater Management Area 10, Barton Springs Edwards Aquifer Conservation District	Travis	Brittiny Moore
	Jim Totten	Groundwater Management Area 12, Lost Pines Groundwater Conservation District	Colorado	Vacant
	Jim Brasher	Groundwater Management Area 15, Colorado County Groundwater Conservation District	Colorado	Vacant
Industry	Barbara Johnson	---	Travis	Terry Bray
Municipalities	Teresa Lutes	Austin Water	Travis	Marisa Flores Gonzalez
Public Interest	Carol Olewin	League of Women Voters	Travis	Mary Ann Baker
Recreation	David Lindsay	Retired, Central Texas Water Coalition	Travis	Sue Thornton & Shannon Hamilton
River Authority	Monica Masters	Lower Colorado River Authority	Travis	Tom Hegemier
Small Business	Daniel Berglund	Farmer/Coastal Bend Groundwater Conservation District	Wharton	Neil Hudgins
	Rob Ruggiero	Consulting Hydrogeologist	Travis	Marcus Richardson
Small Municipalities	Lauri Gillam	City of Pflugerville	Travis	Earl Foster
	Mike Reagor	City of Llano	Llano	Josh Becker
Water Utilities	Christianne Castleberry	Consulting Engineer/Texas AWWA Volunteer Advisor	Travis	Earl Wood
Non-Voting Members	Carol Faulkenberry	Texas Department of Agriculture	n/a	Vacant
	Vacant	Texas Parks & Wildlife Department	n/a	Monica Polgar
	Melissa Grote	Texas State Soil & Water Conservation Board	n/a	Vacant
	Lann Bookout	Texas Water Development Board	n/a	Vacant

Source: Lower Colorado Regional Water Planning Group

Table 1.1b Region K Committee Members

Committees		
Executive Committee		
Chair – David Van Dresar Vice Chair – Monica Masters	Secretary – Theresa Lutes At-Large – Daniel Berglund	At-Large – Jim Luther At-Large –Carol Olewin
Bylaws Committee	**Legislation & Policy Committee**	**Nominating Committee**
Chair – Barbara Johnson Member – Jim Brasher Member – Dave Lindsay Member – Teresa Lutes Member – Carol Olewin	Chair – Barbara Johnson Member – Jim Brasher Member – Dave Lindsay Member – Teresa Lutes Member – Monica Masters Member – Paul Silva Member – Jennifer Walker	Chair – Ann McElroy Member – Jim Brasher Member – Jody Fauley Member – Carol Olewin Member – Jennifer Walker
Population & Water Demand Committee	**Water Management Strategies Committee**	**Water Modeling Committee**
Chair – Lauri Gillam Member – Daniel Bergland Member – Christianne Castleberry Member – Barbara Johnson Member – Dave Lindsay Member – Teresa Lutes Member – Monica Masters Member – Ann McElroy Member – Jennifer Walker	Chair – Lauri Gillam Member – Daniel Bergland Member – Christianne Castleberry Member – Barbara Johnson Member –Dave Lindsay Member – Teresa Lutes Member – Monica Masters Member – Carol Olewin Member – Mike Reagor Member – Jennifer Walker	Chair – Teresa Lutes Member – Jim Brasher Member – Christianne Castleberry Member – Lauri Gillam Member – Barbara Johnson Member –Dave Lindsay Member – Monica Masters Member – Carol Olewin Member – Mike Reagor Member – Mitchell Sodek

1.1.1 Physical Description

The majority of Region K lies within the Colorado River Basin, which has its headwaters in far eastern New Mexico and extends approximately 900 miles to Matagorda Bay at the Texas Gulf Coast (**Figure 1.3**). The Region is contained within the Great Plains and Coastal Plains physiographic provinces (**Figure 1.4**). The Colorado River Basin is bordered by the Brazos River Basin to the north and east, and by the Guadalupe River and Lavaca River Basins to the south and west, with several Coastal Basins located at the River Basin margins along the Gulf Coast. The total drainage area of the Colorado River is 42,318 square miles, including 11,403 square miles that are considered non-contributory to the river's water supply. There are six major tributaries with drainage areas greater than 1,000 square miles that contribute to the Colorado River: Beall's Creek and the Concho River in the Upper Colorado River Basin; and the San Saba, Llano, and Pedernales Rivers as well as Pecan Bayou in the Lower Colorado River Basin. These major tributaries and approximately 90 percent of the entire contributing drainage for the river occur upstream of Mansfield Dam near Austin. Mansfield Dam is the primary regulator of water flow from its location south to the Gulf of Mexico. Downstream of Austin, there are only two tributaries with drainage areas greater than 300 square miles: Onion Creek in Travis County and Cummins Creek in Colorado County.

The northernmost boundary of Region K lies in the Central Texas section of the Great Plains physiographic province (Figure 1.4). It is here that the Colorado River intersects the Llano Uplift; a broad, low relief but highly structured area exposing early Paleozoic and Precambrian igneous and metamorphic formations. In the northwestern portion of the region, the major southern tributaries and the Colorado River drain the Edwards Plateau section of the Great Plains province, which is characterized by Cretaceous-aged limestone formations overlain by Tertiary-aged sediments. The Colorado River meanders through these limestone deposits in relatively steep narrow canyons in this area; however, there are also flat-topped remnants of the once more extensive Edwards Plateau. At the eastern edge of the Edwards Plateau, the Edwards aquifer outcrops at several locations along the Balcones Fault Zone (shown as the Balcones Escarpment on Figure 1.4), creating aquifer recharge zones and associated natural discharge points or springs, such as Barton Springs in Travis County. Typical soils (**Figure 1.5**) of the Llano Uplift are reddish-brown to brown, neutral to slightly acidic, calcareous, sandy loams. Soils mapped on the Edwards Plateau section typically consist of dark, deep to shallow, stony, calcareous clays.

Figure 1.3 Colorado River Basin and Region K Planning Area

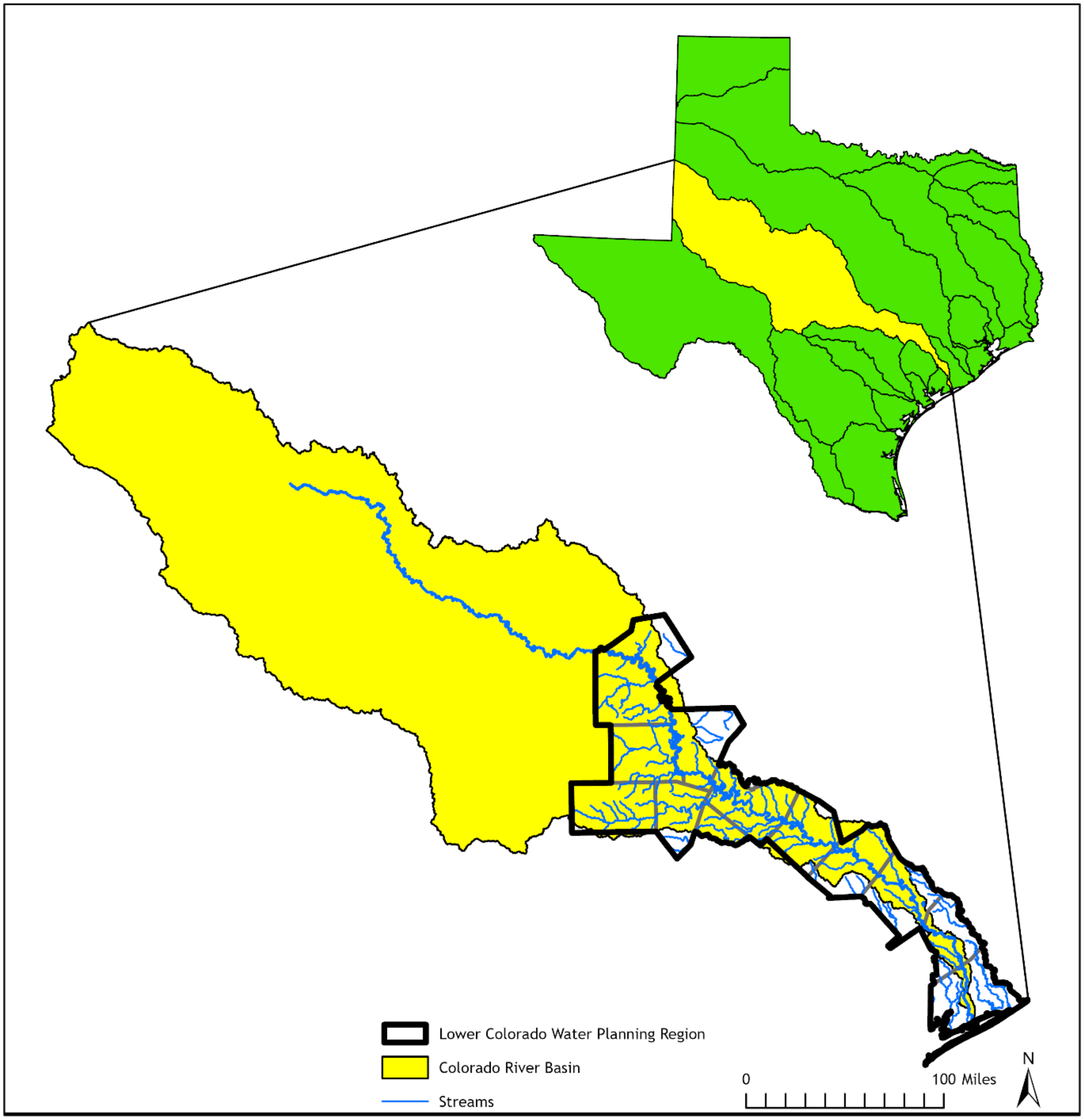
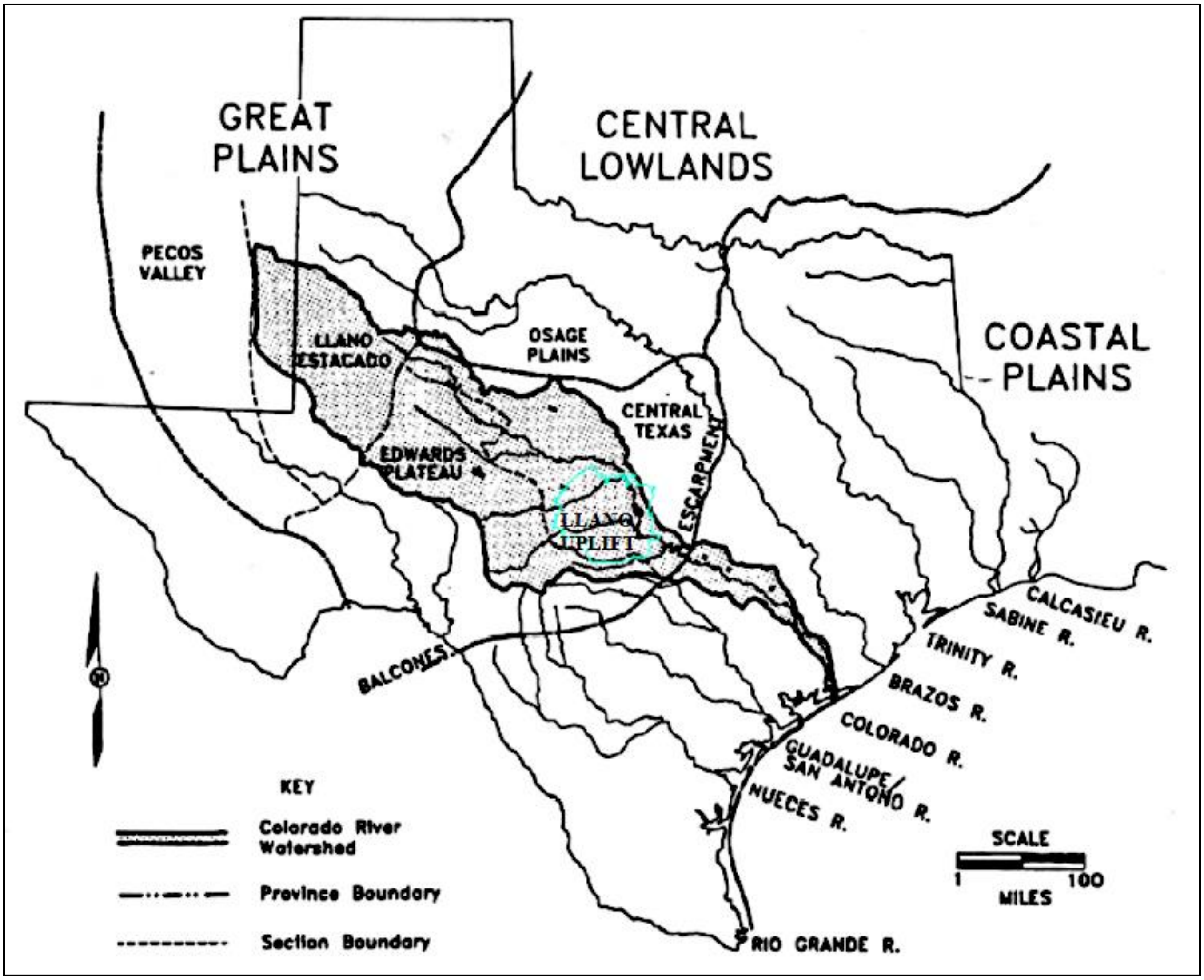
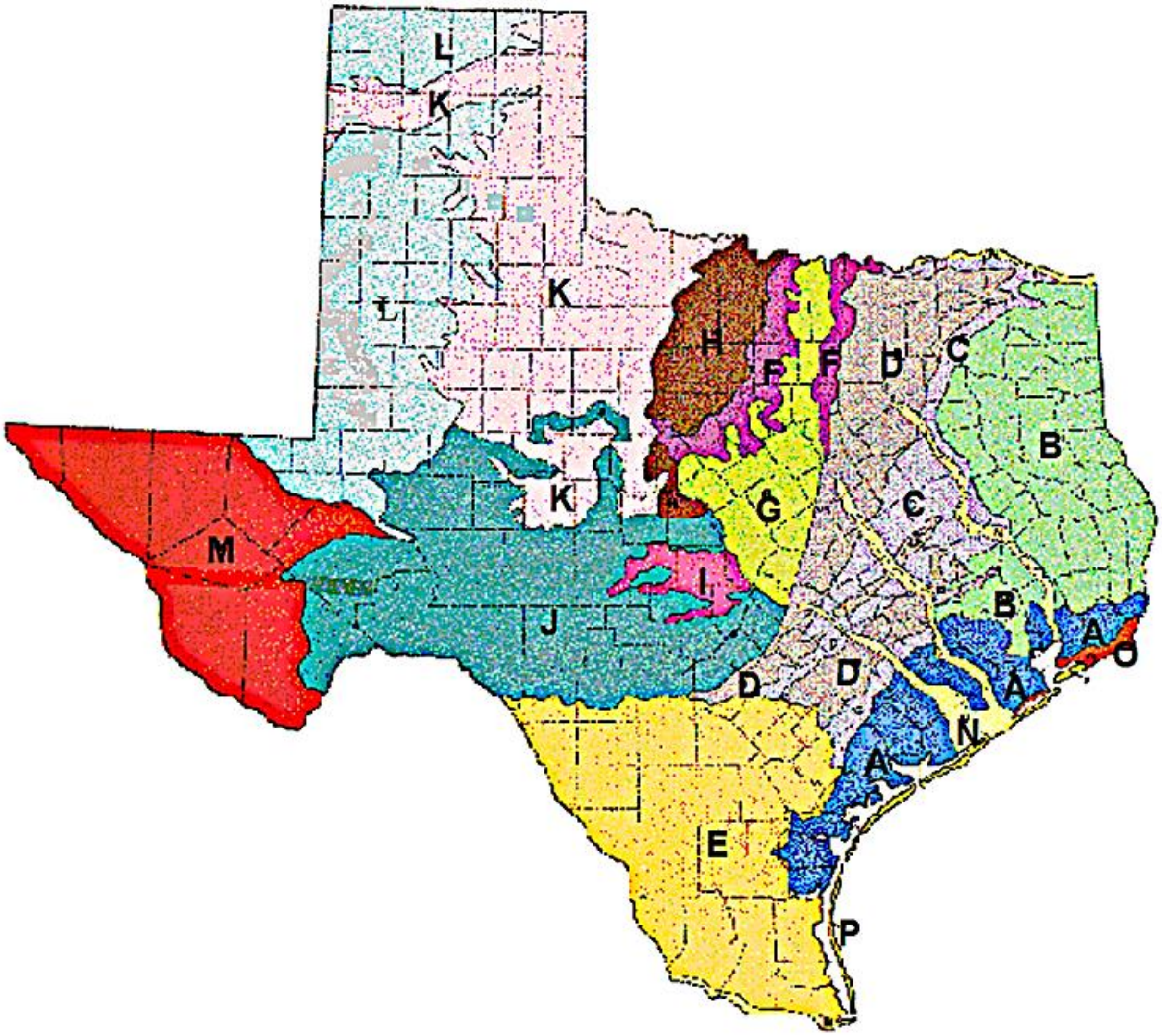


Figure 1.4 Physiographic Provinces of Region K



Source: Modified from Conner and Suttkus, 1977

Figure 1.5 Soils of Texas



A. Dark-colored, neutral to slightly acid clay loams & clays; some lighter colored sandy loams; acid soils mostly east of Trinity River.

B. Light-colored, acid sandy loams, clay loams, & sands; some red soils & clays.

C. Light-brown to dark-gray, acid sandy loams, clay loams, & clays.

D. Dark-colored calcareous clays; some grayish-brown, acid sandy loams & clay loams along eastern edge of the major prairie & interspersed in minor prairies.

E. Dark calcareous to neutral clays & clay loams; reddish-brown, neutral to slightly acid sandy loams; grayish-brown, neutral sandy loams & clay loams; some saline soils near coast.

F. Light-colored, acid loamy sands & sandy loams.

G. Dark-colored, deep to shallow clay loams, clays, & stony calcareous clays over limestone.

H. Reddish-brown to grayish-brown, neutral to slightly acid sandy loams & clay loams; some stony soils.

I. Reddish-brown to brown, neutral to slightly acid, gravelly & stony sandy loams.

J. Dark, calcareous stony clays & clay loams.

K. Dark-brown to reddish-brown, neutral to slightly calcareous sandy loams, clay loams, & clays.

L. Dark-brown to reddish-brown neutral sands, sandy loams, & clay loams; some very shallow calcareous clay loams.

M. Light reddish-brown to brown sands; clay loams & clays (mostly calcareous, some saline) & rough stony lands.

N. Light-brown to reddish-brown, acid sandy loams; acid & calcareous clay loams & clays.

O. Light- & dark-colored, acid sands, sandy loams, & clays.

P. Tan, loose sand & shell material.

Source: Bureau of Economic Geology, 1977

The lower portion of the region, which extends from the Balcones Fault Zone to the Gulf Coast, lies within the Coastal Plains province. The Western Gulf Coast section has low topographic relief ranging from low hills in the west to coastal flats in the east. Surface geologic units along this portion of the Colorado River include a relatively narrow band of Upper Cretaceous formations just southeast of the Balcones Fault Zone, followed by a belt of Tertiary deposits that outcrop from Bastrop County southeast to Colorado County. The remaining geologic units, from Colorado County to the Gulf of Mexico, are Quaternary-aged deposits. Sediments in the Western Gulf Coast section are composed primarily of marine deposits such as limestones, marls, and shales; however, the river valley also contains significant fluvial (river) terrace deposits of granitic assemblage, quartz and quartzite, chert, limestone, sandstone, siltstone, hornblende schist, silicified wood, and rip-up clasts. Colorado Basin soils in the Western Gulf Coast section are typically dark, neutral to slightly acidic, clay loams, and clays. Near the coast, soils become light, acidic sands, and darker, loamy to clayey soils.

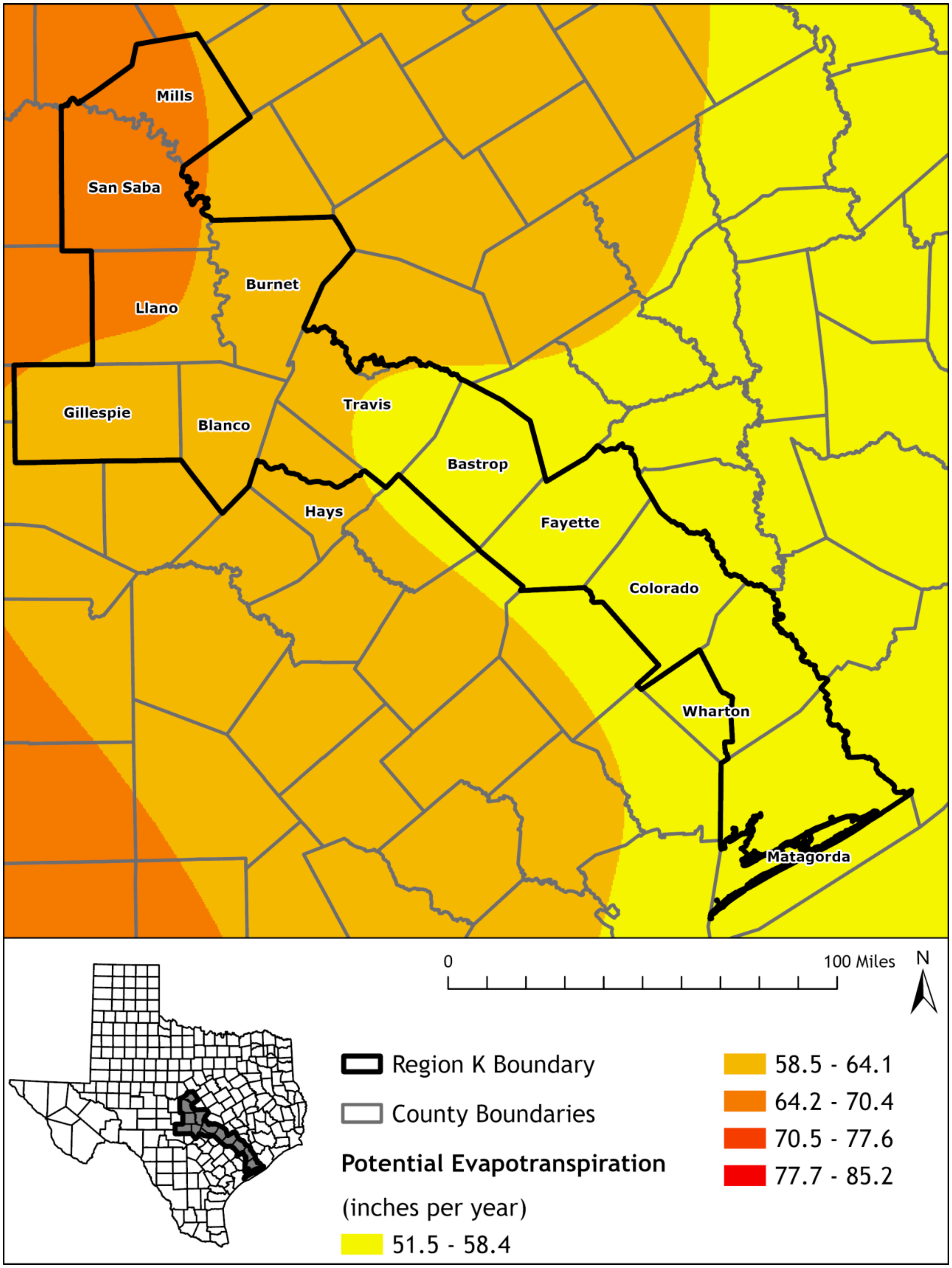
1.1.2 Climate

The climate across the State of Texas varies considerably, with gradual changes from east to west. In general, average temperatures, rainfall, and the length of the growing season decrease from the east to the north and west. Upper atmospheric winds (jet streams) affect the large-scale weather patterns throughout the state. The polar jetstream affects the movement of cold arctic air masses from December through February. The moist warm air masses are brought to Texas from the Pacific Ocean by the subtropical jetstream, whose influence is most prevalent during the spring and fall.

Region K lies entirely within the warm-temperate/subtropical climate zone. The constant flow of warm tropical maritime air from the Gulf of Mexico produces a humid, subtropical climate with hot summers across the lower third of the region. This maritime air combines with cooler and drier continental air further inland, which results in a subtropical climate with dry winters and humid summers in the remainder of the region. Winters in Region K typically are mild with frequent, short duration surges of colder continental air masses and strong northerly winds. Average annual potential evapotranspiration in Region K varies from 51 inches at the coast to as much as 85 inches in the westernmost portion of the region (**Figure 1.6**).

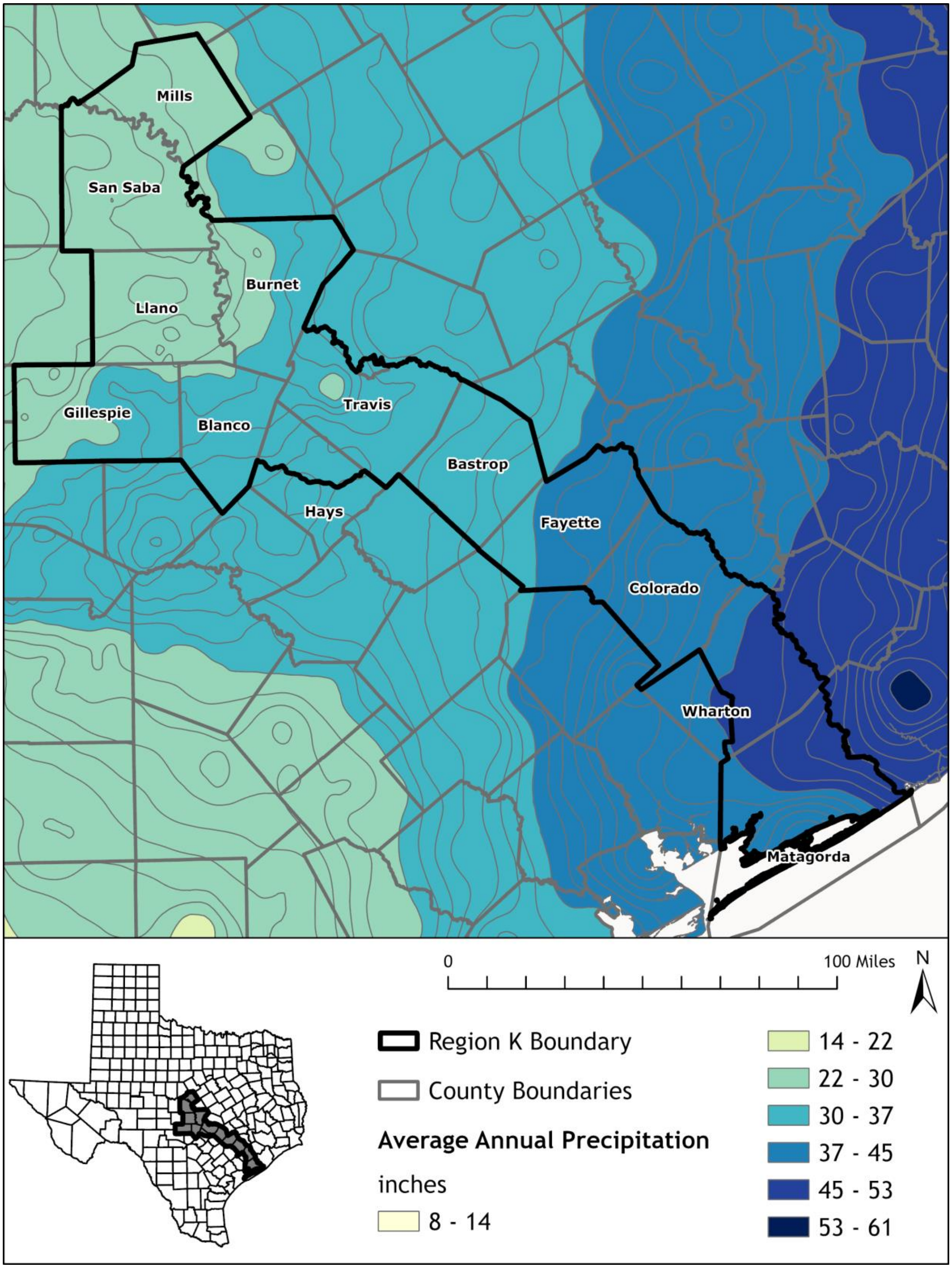
The amount of rainfall varies across the Region from an average of 48 inches at the coast to 24 inches in the northwestern portion of the region (**Figure 1.7**). The rainfall distribution pattern in this region has two peaks: spring is typically the wettest season with a peak in May, and a second peak usually occurs in September and October, coinciding with the tropical cyclone season in the late summer/early fall. The spring rains are typified by convective thunderstorms that produce high intensity, short duration precipitation events with rapid runoff. These thunderstorms are generally caused by successive frontal systems that move through the state. These weak cold air masses are overrun by warm Gulf moisture, and the line of instability that develops where the two air masses collide produces thunderstorms. The fall seasonal rains are primarily governed by tropical storms and hurricanes that originate in the Caribbean Sea or the Gulf of Mexico and make landfall on the coast from Louisiana to Mexico. As the storm moves inland, the coverage area for a single tropical cyclone event can be quite large and the storm severe, with wind and flood damage common. Fall cold fronts can also bring widespread, heavy rain events.

Figure 1.6 Average Annual Potential Evapotranspiration



Source: Scanlon and others (2005).

Figure 1.7 Average Annual Precipitation

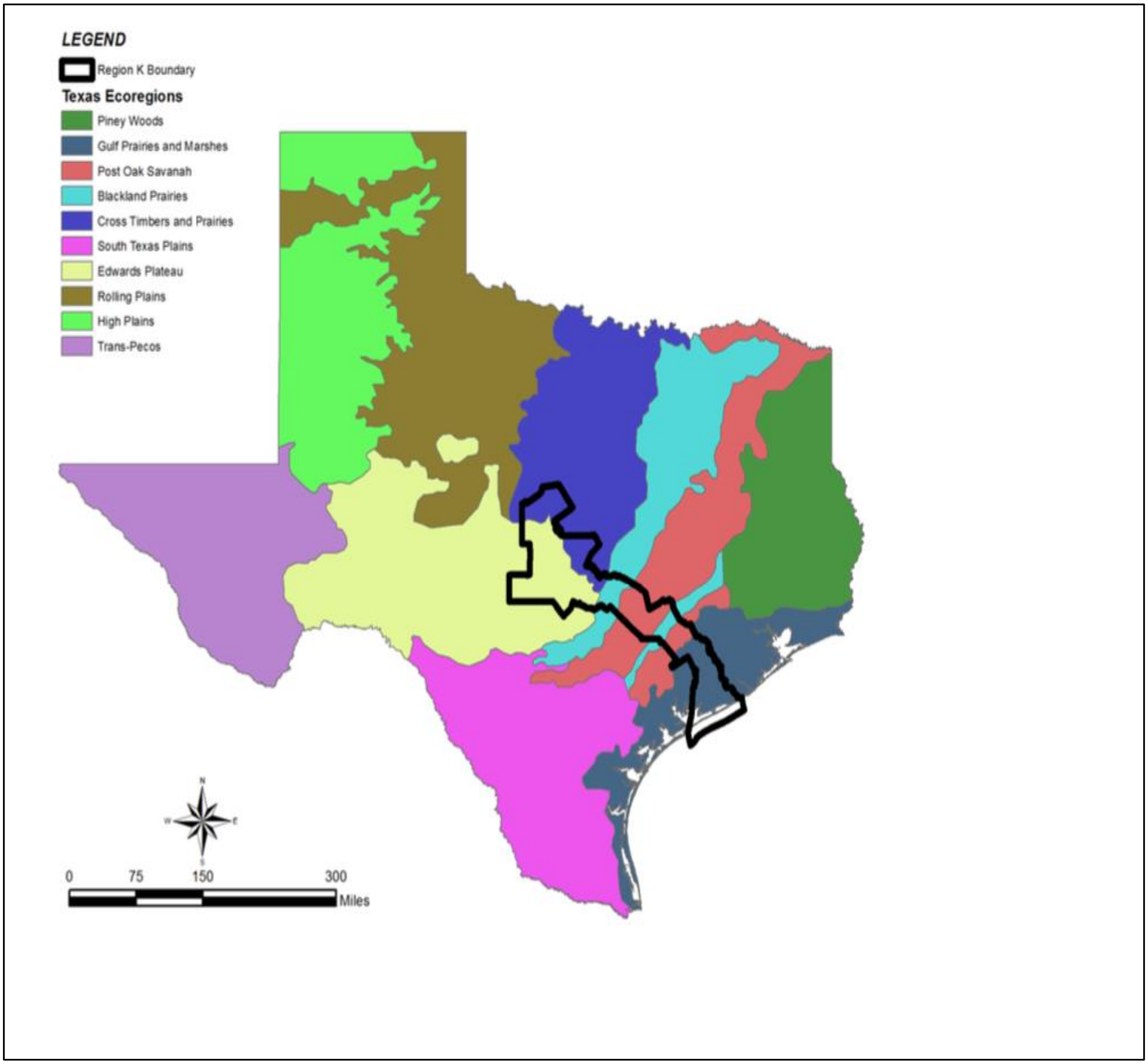


Source: Texas Water Development Board

1.1.3 Vegetation

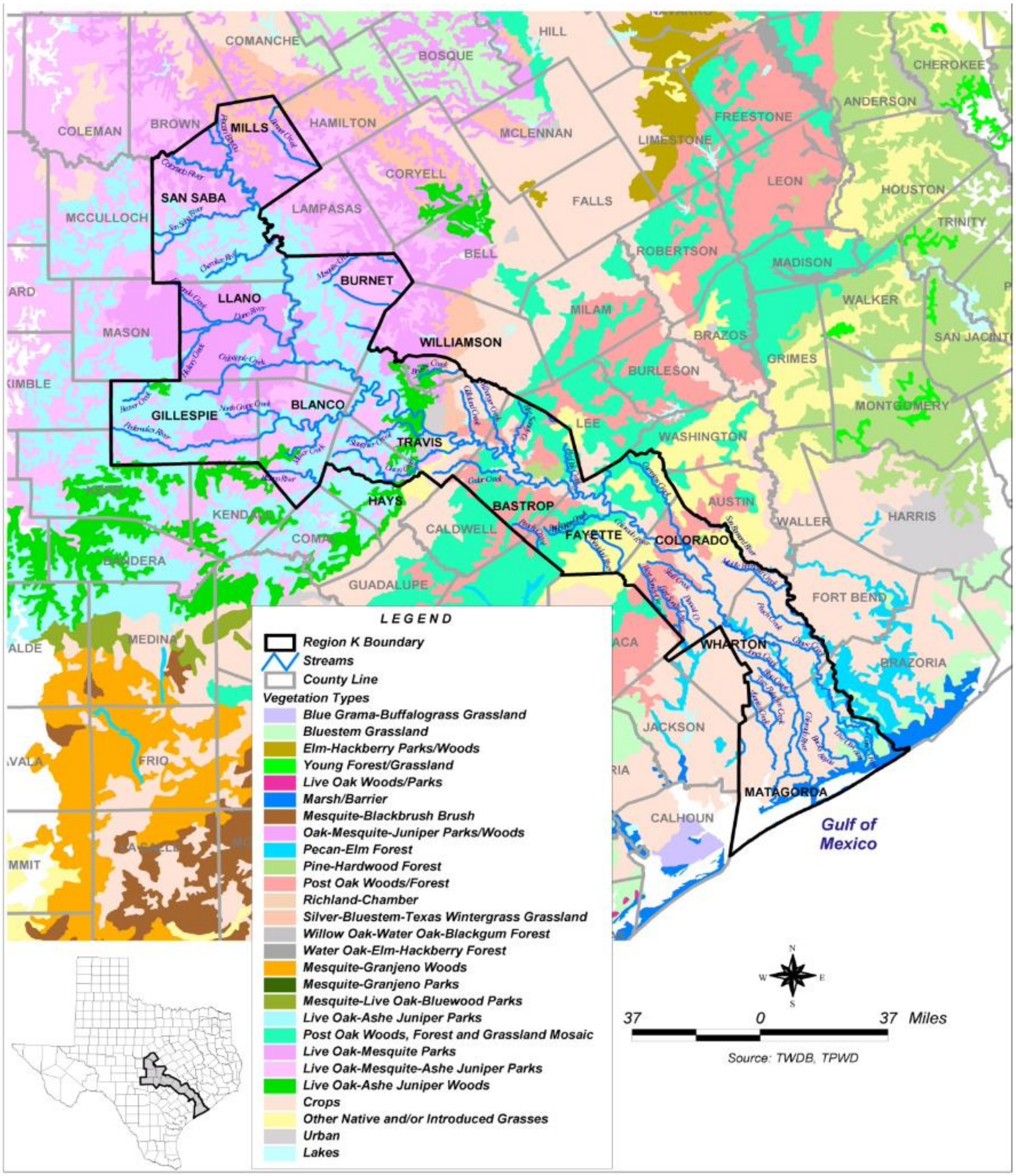
Natural regions, or vegetational areas, are based on the interaction of geology, soils, physiography, and climate. There are 10 vegetational areas that cross the State of Texas and five of these intersect Region K (**Figure 1.8**). These vegetational areas are the Cross Timbers and Prairies, the Edwards Plateau, the Blackland Prairies, the Post Oak Savannah, and the Gulf Prairies and Marshes (Hatch and others, 1990). Each of these vegetational areas is described below. Dominant plant species throughout Region K are shown in **Figure 1.9**.

Figure 1.8 Vegetational Areas of Texas



Source: Texas Parks and Wildlife

Figure 1.9 Dominant Plant Species



Cross Timbers and Prairies

The Cross Timbers and Prairies vegetational area includes all of Mills County, most of Burnet County, the north portions of San Saba and Travis counties, and the section of Williamson County within the Lower Colorado Planning Region. This region falls within the southern extension of the Central Lowlands and the western edge of the Coastal Plains physiographic provinces. There are sharp contrasts in topography, soils, and vegetation in this region due to the wide variety of geologic formations in the area. Elevations range from 500 to 1,500 feet above mean sea level. Cross Timber soils are typically of the orders Mollisol and Alfisol. In the East and West Cross

Timbers subregions, soils range from light, slightly acid loamy sands and sandy loams with yellowish-brown to red clayey subsoils in the upland areas to dark, neutral to calcareous clayey bottomland soils, and loamy alluvial soils along minor streambeds. The North Central Prairies subregion is interspersed with sandstone and shaley ridges and hills. Uplands are brown sandy loam to silt loam, slightly acid soils that overlay red to gray, neutral to alkaline clayey subsoils. The bottomlands have brown to dark gray, loamy, and clayey, neutral to calcareous, and alluvial soils.

The Cross Timbers and Prairies support tallgrasses such as big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), and Canada wildrye (*Elymus canadensis*), with minor populations of midgrasses and shortgrasses such as sideoats grama (*Bouteloua curtipendula*), blue grama (*B. gracilis*), hairy grama (*B. hirsuta*), Texas wintergrass (*Stipa leucotricha*), and buffalograss (*Buchloe dactyloides*). Overgrazing has allowed the midgrasses and shortgrasses to increase their range and has allowed the invasion of scrub oak (*Quercus turbinella*), honey mesquite (*Prosopis glandulosa*), and Ashe juniper (*Juniperus ashei*) in upland areas, as well as hairy tridens (*Erioneuron pilosum*), Texas grama (*Bouteloua rigidiseta*), red Bottomland trees including pecan (*Carya illinoensis*), oak (*Quercus*), and elm (*Ulmus*), with the invasion of mesquite. Typical shrubs and vines include skunkbush (*Rhus aromatica*), saw greenbriar (*Smilax bona-nox*), bumelia (*Bumelia lanuginosa*), and poison ivy (*Rhus toxicodendron*). White-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), squirrel (*Sciurus spp*.), bob white quail (*Colinus virginianus*), and mourning dove (*Zenaida macroura*) are plentiful.

Edwards Plateau

The Edwards Plateau vegetational area consists of an area of West Central Texas commonly known as the “Hill Country” and includes the majority of Hays County within the Region K; all of Llano, Gillespie, and Blanco counties; most of San Saba County; southern Burnet County; and western Travis County. The geologic formation known as the Balcones Escarpment forms the eastern and southern boundary of this region. Elevations range from 1,200 feet to over 3,000 feet above mean sea level, and the landscape is deeply dissected, hilly, rough, and well drained. Edwards Plateau soils are typically shallow Entisols, Mollisols, or Alfisols that have a variety of surface textures and are underlain by limestone.

Historically, the natural vegetation of the Edwards Plateau was grassland or open savannah-type plains with trees or brush along rocky slopes and streambeds. Tallgrasses such as cane bluestem (*Bothriochloa barbinodis*), big bluestem, little bluestem, Indiangrass, and switchgrass, are still common today along rocky outcrops and protected areas with good soil moisture. In areas with more shallow soils, tallgrasses have been replaced by midgrasses and shortgrasses such as sideoats grama, Texas grama, and buffalograss. Typical wildflowers are Engelmann daisy (*Engelmannia pinnatifida*), orange zexmania (*Wedelia hispida*), western ragweed (*Ambrosia psilostachya*), and sneezeweed (*Helenium quadridentatum*). Areas disturbed by over-grazing have been invaded by pricklypear (*Opuntia*), bitterweed (*Hymenoxys odorata*), broadleaf milkweed (*Asclepias latifolia*), smallhead sneezeweed (*H. microcephalum*), broomweeds (*Amphiachyris* and *Gutierrezia*), prairie coneflower (*Ratibida columnifera*), mealycup sage (*Salvia farinacea*), and tasajillo (*Opuntia leptocaulis*). Common woody species are live oak (*Quercus virginiana*), sand shin oak (*Quercus havardii*), post oak (*Quercus stellata*), mesquite, and juniper.

Land suitable for cultivation occurs only along narrow streams and divides within the Edwards Plateau region, and, in these areas, tree orchards are common. The majority of the region is utilized as rangeland for the production of livestock and wildlife. This area was once one of the major wool and mohair producers in the country, providing up to 98 percent of the nation’s mohair. Over the last three decades, however, many factors have contributed to the decline of the fiber industry, including labor/shearer shortages, prices, changing land use, increase of predators (coyotes), and the loss of federal subsidies which had been paid by tariffs and opened foreign markets. The Edwards Plateau also supports the highest deer densities in North America, and exotic big game ranches have increased across the region.

Blackland Prairies

Within Region K, the Blackland Prairies vegetational area occurs in eastern Travis County, several small sections of Bastrop County, portions of Fayette and Colorado counties, and a small area of Hays County. The characteristic topography is gently rolling hills to nearly level with well-defined contours for rapid surface drainage. Elevation varies from 250 to 700 feet above mean sea level. Major soil orders include Vertisols and Alfisols, which are naturally very productive and fertile. Upland soils are dark, calcareous, and clayey. Bottomland soils are typically reddish-brown to dark gray, slightly acid to calcareous, loamy to clayey to alluvial.

The Blackland Prairie once supported a tallgrass prairie dominated by big bluestem, little bluestem, Indiangrass, tall dropseed (*Sporobolus asper*), and Silveus dropseed (*S. silveanus*). Minor species including sideoats grama, hairy grama, Mead's sedge (*Carex meadii*), Texas wintergrass, and buffalograss have increased due to grazing pressure. Erosion and agricultural activities have decreased the productivity of these soils. Common wildflowers include asters (*Aster*), prairie bluet (*Hedyotis nigricans*), prairie-clover (*Petalostemon*), and late coneflower (*Rudbeckia serotina*). Typical legumes are snoutbeans (*Rhynchosia*), and vetch (*Vicia*). Areas disturbed by grazing and agriculture have been invaded by mesquite, huisache (*Acacia smallii*), oak, and elm trees. Oak, elm, cottonwood (*Populus deltoides*), and native pecan can be found in moist drainage areas. Isolated areas of Blackland Prairies are intermingled within the Post Oak Savannah vegetation area. In the latter 19th and early 20th centuries, most of the Blackland Prairies vegetational area had been converted to cropland. Pastureland and livestock forage cropland began to increase in the 1950s, and by the year 2000 only 50 percent of the area was used for cropland. Significant game species include dove, bobwhite quail, and squirrel.

Post Oak Savannah

The Post Oak Savannah vegetational area within Region K occurs in most of Bastrop, Colorado, and Fayette counties. The region is characterized by gently rolling, moderately dissected wooded plains with elevations between 300 feet and 800 feet above mean sea level. There are several areas of Blackland Prairie intermingled in the southern portion of the Post Oak Savannah. Typically, shallow upland soils are gray, slightly acid sandy loams that overlay gray, mottled, or red, firm clayey subsoils. Infiltration-resistant claypan layers occur at varying soil depths, which impedes the percolation of moisture. Bottomland soils are reddish-brown to dark gray, slightly acid to calcareous, loamy to clayey alluvial.

Typically, short oak trees, such as post oak and blackjack oak (*Q. marilandica*), are interspersed among the tallgrass species of little bluestem, silver bluestem (*Bothriochloa saccharoides*), Indiangrass, switchgrass, and midgrass and shortgrass species of Texas wintergrass (*Stipa leucotricha*), purpletop (*Tridens flavus*), narrowleaf woodoats (*Chasmanthium sessiliflorum*), and beaked panicum (*Panicum anceps*). Elms, junipers, hickories (*Carya*), and hackberries (*Celtis*) are also common trees here. Shrubs and vines such as yaupon (*Ilex vomitoria*), American beautyberry (*Callicarpa americana*), coralberry (*Symphoricarpos orbiculatus*), greenbriar (*Smilax*), and grapes (*Vitis*) are typical. Historically, periodic wildfires have suppressed the overgrowth of brush and trees; in their absence, thickets tend to form. Wildflowers characteristic of the true prairie species include wild indigo (*Babtisia*), indigobush (*Amorpha fruticosa*), senna (*Cassia*), tickleclover (*Desmodium*), lespedezas (*Lespedeza*), prairie-clovers, western ragweed, crotons (*Croton*), and sneezeweeds.

The Post Oak Savannah was extensively cultivated through the 1940s; however, today many acres have been returned to native habitat or tame pastureland, which have been seeded with nonnative species such as bermudagrass, bahiagrass, weeping lovegrass, and clover. The region supports game species such as deer, squirrel, and quail.

The Bastrop County Complex fire, which ignited on September 4, 2011, struck Bastrop County and destroyed over 1,600 residential structures and impacted 32,000 acres of land and habitat. According to Texas Parks and Wildlife officials, only 50 to 100 acres of the Bastrop State Park's 6,565-acre premises remained undamaged following the wildfire. The endangered Houston toad was believed to have lost the vast majority of its habitat in the fire. The Lost Pines Forest, a disjunct population of loblolly pine trees thought to have originated in or before the Pleistocene era, was heavily affected by the fire.

Gulf Prairies and Marshes

The Gulf Prairies and Marshes vegetational area encompasses all of Matagorda County, the entire portion of Wharton County within Region K, and the eastern tip of Colorado County. This is a 30- to 80-mile-wide strip of lowlands adjacent to the Texas coast from the Louisiana border to the Mexico border. The landscape consists of low, wet coastal marshes, and nearly flat, undissected plains with elevations from sea level to 250 feet. Marsh soils are typically dark, poorly drained, saline and sodic, sandy loams, and clays, and light neutral sands. Prairie soils are characterized by dark, neutral to slightly acid clay loams, and clays, with a narrow belt of light acid sands and darker loamy to clayey soils along the coast. Bottomland and delta soils are typically reddish-brown to dark gray, slightly acid to calcareous, loamy to clayey alluvial.

Original Gulf Prairie vegetation consisted of tallgrasses and post oak savannah. Today, however, trees and shrubs such as honey mesquite, oaks, acacia, and bushy sea-ox-eye (*Borrichia frutescens*) have formed thickets in many areas. Characteristic tallgrasses include gulf cordgrass (*Spartina spartinae*), big bluestem, little bluestem, Indiangrass, eastern gamagrass (*Tripsacum dactyloides*), gulf muhly (*Muhlenbergia capillaris*), tanglehead (*Heteropogon contortus*), as well as *Panicum* and *Paspalum* species. Typical wildflowers include asters, Indian paintbrush (*Castilleja indivisa*), poppy mallows (*Callirhoe*), phloxs (*Phlox*), bluebonnets (*Lupinus*), and evening primroses (*Oenothera*). Common invaders such as yankeeweed (*Eupatorium compositifolium*), broomsedge bluestem (*Andropogon virginicus*), smutgrass (*Sporobolus indicus*), western ragweed, tumblegrass (*Schedonnardus paniculatus*), threeawns (*Aristida*), pricklypear, and many annual wildflowers and grasses have increased their ranges. Saline Gulf Marsh areas support species of sedges (*Carex* and *Cyperus*), rushes (*Juncus*), bulrushes (*Scirpus*), cordgrasses (*Spartina*), seashore saltgrass (*Distichlis spicata*), common reed (*Phragmites australis*), marshmillet (*Zizaniopsis miliacea*), longtom (*Paspalum lividum*), seashore dropseed (*Sporobolus virginicus*), and knotroot bristlegrass (*Setaria geniculata*). Marshmillet and maidencane (*Panicum hemitomon*) are two important freshwater grass species found in the upper coast. Typical aquatic forbs include pepperweeds (*Lepidium*), smartweeds (*Polygonum*), docks (*Rumex*), bushy seedbox (*Ludwigia alternifolia*), green parrotfeather (*Myriophyllum pinnatum*), pennyworts (*Hydrocotyle*), water lilies (*Nymphaea*), narrowleaf cattail (*Typha domingensis*), spiderworts (*Tradescantia*), and duckweeds (*Lemna*). Common halophytic herbs and shrubs found on the salty sands of the coast include spikesedges (*Eleocharis*), fimbries (*Fimbrystalis*), glassworts (*Salicornia*), sea-rockets (*Cakile*), maritime saltwort (*Batis maritima*), morning glories (*Ipomoea*), and bushy sea-ox-eye. The low coastal marshes of the Gulf Prairies and Marshes vegetational area provide excellent habitat for upland game and waterfowl.

Higher elevations of the marshes are used for livestock and wildlife production. These coastal marshes and barrier islands contain most of the State's National Seashore parks. Urban, industrial, and recreational developments have been increasing in this region, and cultivation has never been of much importance due to the saline soils and recurrent flooding of the area. However, approximately one-third of the inland prairies region is cultivated. This is also the major area of irrigated crop production, consisting primarily of rice cultivation, for the entire Lower Colorado Region. Bermudagrass and several bluestem species are common in tamed pasturelands.

1.1.4 Social and Economic Aspects

Previous plans have documented steady increases in the population of Region K since 1950 (see for example, the 2021 Region K Plan). The most recently available TWDB data confirm continued steady increases in the Region K population from approximately 1.13 million in 2000 to approximately 1.76 million in 2020 (**Figure 1.10**). Population growth is expected for the entire State of Texas as well as in Region K, as discussed further in **Chapter 2** (Project Populations and Water Demand).

In 2020, more than 70 percent of the Region K population was in Travis County (**Table 1.2**). Three other counties in Region K had a population over 50,000 in 2020, including Bastrop, Hays, and Williamson counties, all of which are adjacent to Travis County. Burnet County had almost 50,000 in 2020, and the remaining nine counties in the region had population of less than 40,000. Mills and San Saba counties, in the far northeast of the Region, had the lowest population in the region with less than 10,000 each.

Figure 1.10 Historic Planning Area Population, 2000-2020

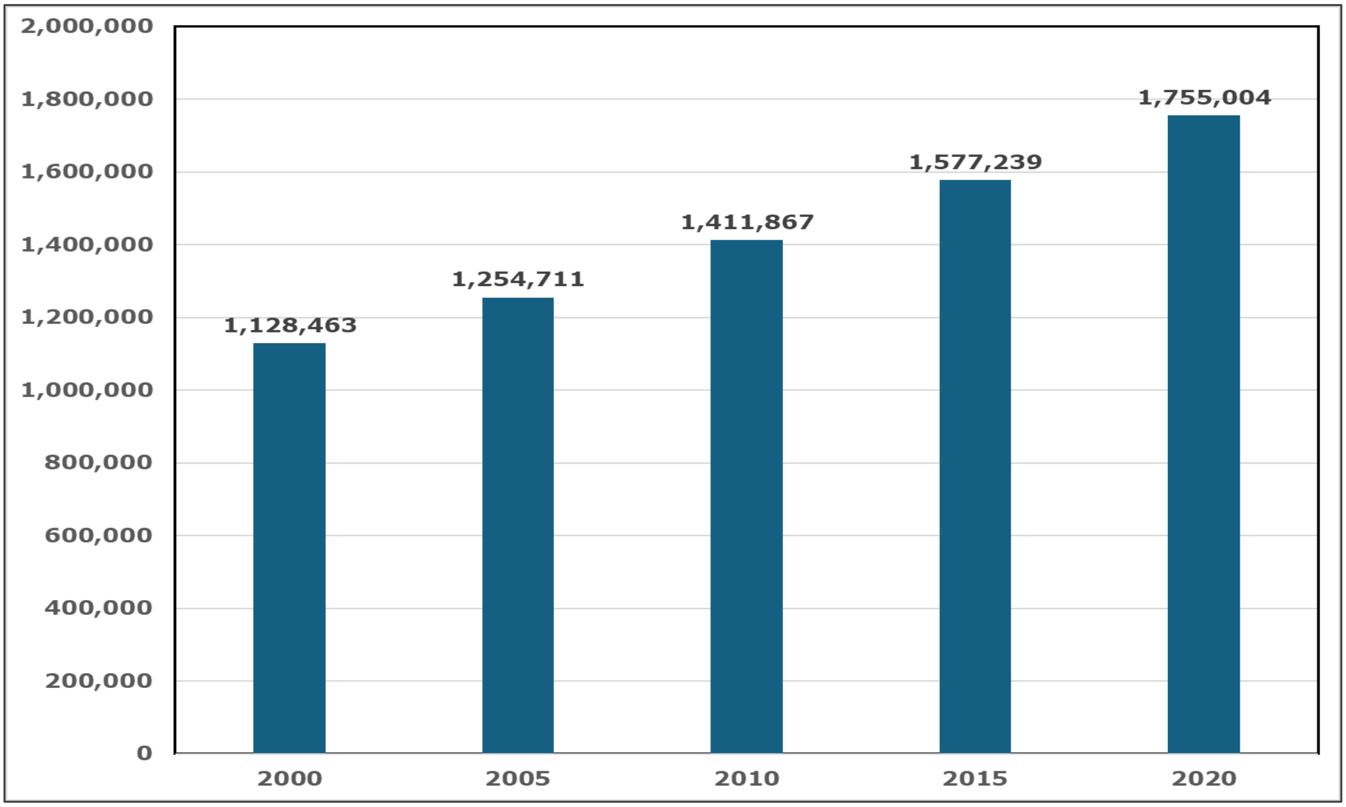


Table 1.2 Historic Census Based Population by County, 2020

County	Population	Population (% of Region)
Bastrop	97,216	6
Blanco	11,374	1
Burnet	49,130	3
Colorado	20,557	1
Fayette	24,435	1
Gillespie	26,725	2
Hays*	64,606	4
Llano	21,243	1
Matagorda	36,255	2
Mills	4,456	< 1
San Saba	5,730	< 1
Travis	1,290,188	74
Wharton*	25,162	1
Williamson*	77,893	4
Region K Total	1,754,970	100

**partial county population, adjusted by TWDB*

Source: Historical Census-Based Population Estimates from TWDB

Since 2000, recent population growth of the Austin metropolitan area has expanded beyond Travis County into Bastrop Hays, and Williamson counties. With the construction of the SH 130 and SH 45 corridors in Travis County, travel between counties has become easier and thus is facilitating increased population growth within a larger radius of the City of Austin. Increased development surrounding the corridors is projected to continue for the next several decades. Areas surrounding the Highland Lakes are also seeing larger increases in population growth, specifically Burnet and Llano counties.

The primary economic activities in Region K include agriculture, government/services, manufacturing, mining, tourism, and trades. Economic activities vary by county, as shown in **Table 1.3,** along with specifics of mining and agricultural activities.

Table 1.3 Economic Sectors Heavily Dependent on Water Resources

County	Economic Activities	Mineral Deposits	Agriculture
Bastrop	government/services, tourism, agribusiness, bio-technology research, computer-related industries, commuters to Austin	clay, lignite	hay, beef cattle, nursery/turf grass, pecans, vegetables, pine, oak
Blanco	tourism, agribusiness/nursery, ranch supplies, hunting/fishing	insignificant	cattle, sheep, goats, hay, vegetables, peaches, grapes, pecans, greenhouse nurseries
Burnet	tourism, stone processing, hunting	granite, limestone	cattle, goats, grapes, hay, hunting
Colorado	agribusiness, oil and gas services, gravel mining	gas, oil, gravel	rice, cattle, corn, cotton, soybeans, sesame, hay, pecans, nurseries
Fayette	agribusiness, electrical power generation, mineral production, small manufacturing, government/services, tourism	oil, gas, sand, gravel, bentonite, clay	beef cattle, corn, sorghum, peanuts, hay, pecans, dairies
Gillespie	tourism, government/services, agriculture, wine and specialty foods, hunting	sand, gravel	beef cattle, wine, hay, peaches, hunting
Hays (p)	education, tourism, retirement, some manufacturing	sand, gravel, cement	beef cattle, goats, exotic wildlife, greenhouse nurseries, hay, corn, sorghum, wheat, cotton
Llano	tourism, retirement, ranch trading center, vineyards	granite, vermiculite, llanite	beef cattle, sheep, goats
Matagorda	nuclear power plant, petrochemicals, agribusiness	gas, oil	cattle, rice, cotton, sorghum, soybeans, aquaculture
Mills	agribusiness, hunting	insignificant	beef cattle, dairies, sheep, goats, hay
San Saba	pecan processing plants, tourism, hunting	limestone, sand stone	cattle, sheep, goats, pecans, wheat, hay, hunting
Travis	government/services, education, technology, research and industry	lime, stone, sand, gravel, oil, gas	cattle, nursery crops, hogs, sorghum, corn, cotton, small grains, pecans
Wharton (p)	oil, agribusiness, hunting, varied manufacturing, government/services	oil, gas	leading rice producing county, cotton, milo, corn, sorghum, soybeans, turf grass, eggs, cattle, aquaculture
Williamson (p)	agribusiness, varied manufacturing, government/services, education	building stone, sand, gravel	beef cattle, sorghum, cotton, corn, wheat, hay, nursery crops

(p) = a portion of the county lies within Region K

Sources: Texas State Historical Association (Texas Almanac 2018-2019); Texas Comptroller of Public Accounts, Texas Economy.

Agriculture plays a major role in most of the counties in Region K. Livestock accounts for a significant portion of the region's agricultural cash receipts, and important crops include rice, hay, wheat, and cotton. The counties located in the northwestern portion of the planning region depend heavily on livestock production. Rice is the major crop produced in the southernmost counties of Colorado, Wharton, and Matagorda.

The manufacturing sector consists primarily of the technology and semiconductor industries, in the mid-region counties of Bastrop, Travis, and Williamson. The largest single manufacturing industry in the coastal counties is petroleum refining and petrochemicals. Electrical generation is a notable industry in Matagorda County. The South Texas Project Electric Generating Station provides generation capacity to serve more than 2 million homes as well as being the largest employer and source of revenue for the county. At the same time, there has been significant economic growth in food processing, lumber, wood products, and construction supplies for the coastal counties. The tourism industry represents an important economic sector that is heavily dependent on water resources in Llano, Burnet, and Travis counties.

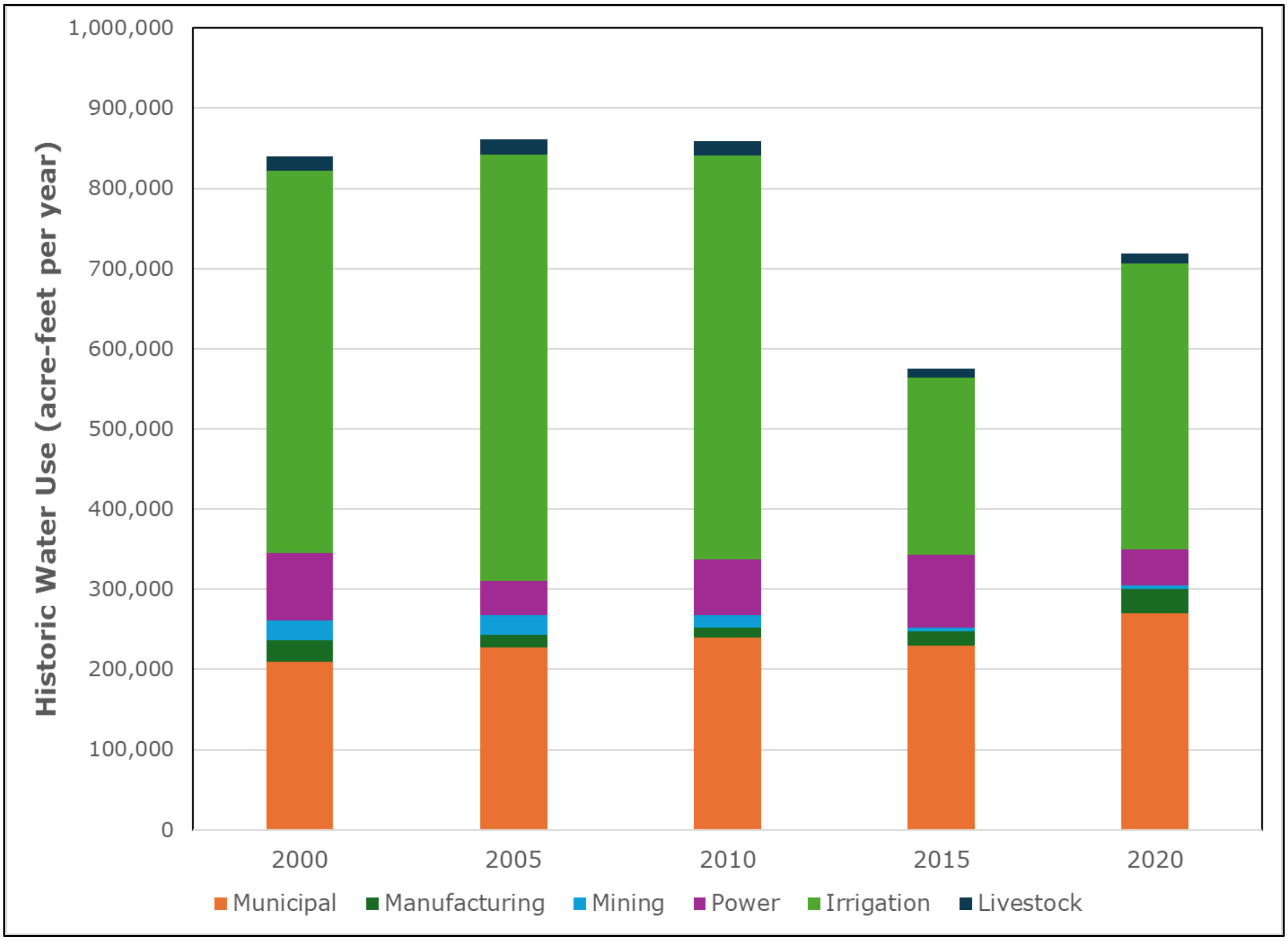
1.2 Current Water Use and Major Demand Centers

For purposes of this discussion, the period of 2000 to 2020 was used to evaluate historic and current water use because that is the most recently available data set using standardized and comparable methodologies. Total water use in Region K decreased from 840,300 acre-feet in 2000 to 718,800 acre-feet in 2020 (**Figure 1.11**). During the 2000 to 2020 time period, the lowest water use was in 2015, following the prolonged 2011 to 2015 drought, when surface water supplies were extremely limited. Historically, irrigation has been the largest use category in Region K (**Figure 1.12**), typically accounting for over half of all water use in the region. However, exceptions do occur during extreme drought years such as 2015, when surface water supplies for irrigation were necessarily limited. During 2015, municipal use accounted for slightly more than irrigation use.

From 2000 to 2020, 38 to 62 percent of water use in the region was for irrigation, with the total percentage decreasing overall during that time period. For the same period, 25 to 40 percent of water use in the region was municipal, with the total percentage of municipal use increasing. Water use for power generation (steam-electric generation) is the third largest use category in Region K, varying from 5 to 16 percent over the 2000 to 2020 period, with the highest use during the extreme heat and drought of 2015. Manufacturing use varied from 1 to 5 percent over the 2000 to 2020 period. Mining use decreased from three percent in 2000 to 1 percent in 2020. Livestock use has remained constant at about 2 percent of use from 2000 to 2020.

In 2020, about 50 percent of water use in the region was for irrigation, 38 percent for municipal, with less than 13 percent used for manufacturing, power generation (steam-electric), mining, and livestock (**Table 1.4**). Approximately 91 percent of irrigation use was in the three most downstream counties: Colorado, Matagorda, and Wharton. About 74 percent of municipal use was in Travis County, with an additional 16 percent of municipal use in the adjacent counties of Bastrop, Burnet, Hays, and Williamson. Almost all of manufacturing use (95 percent) was in Travis and Matagorda counties. The majority of mining use (61 percent) was in Colorado County. About 64 percent of power (steam-electric) use was in Fayette and Matagorda counties. Livestock use was more evenly distributed across the counties of Region K.

Figure 1.11 Historic Use by Decade and Category, 2000 to 2020



Source: Texas Water Development Board

Historically, Travis County has been the largest demand center in the region. In 2020, Travis County accounted for 31 percent of water use in the region, with the majority of that use for municipal purposes (90 percent, Table 1.4). As previously discussed, manufacturing water use is an important and growing use in Travis County. The next three largest demand centers are the three most downstream counties in the Gulf Coast region: Colorado, Matagorda, and Wharton, which use 15, 17, and 20 percent of total water in the region, respectively.

Based on the above discussion, the major demand centers for the Region K include the following:

- Irrigation use in Colorado, Matagorda, and Wharton counties
- Municipal use in Travis County
- Municipal use in Bastrop, Burnet, Hays, and Williamson counties
- Manufacturing use in Matagorda and Travis counties
- Steam-electric (power) use in Fayette and Matagorda counties

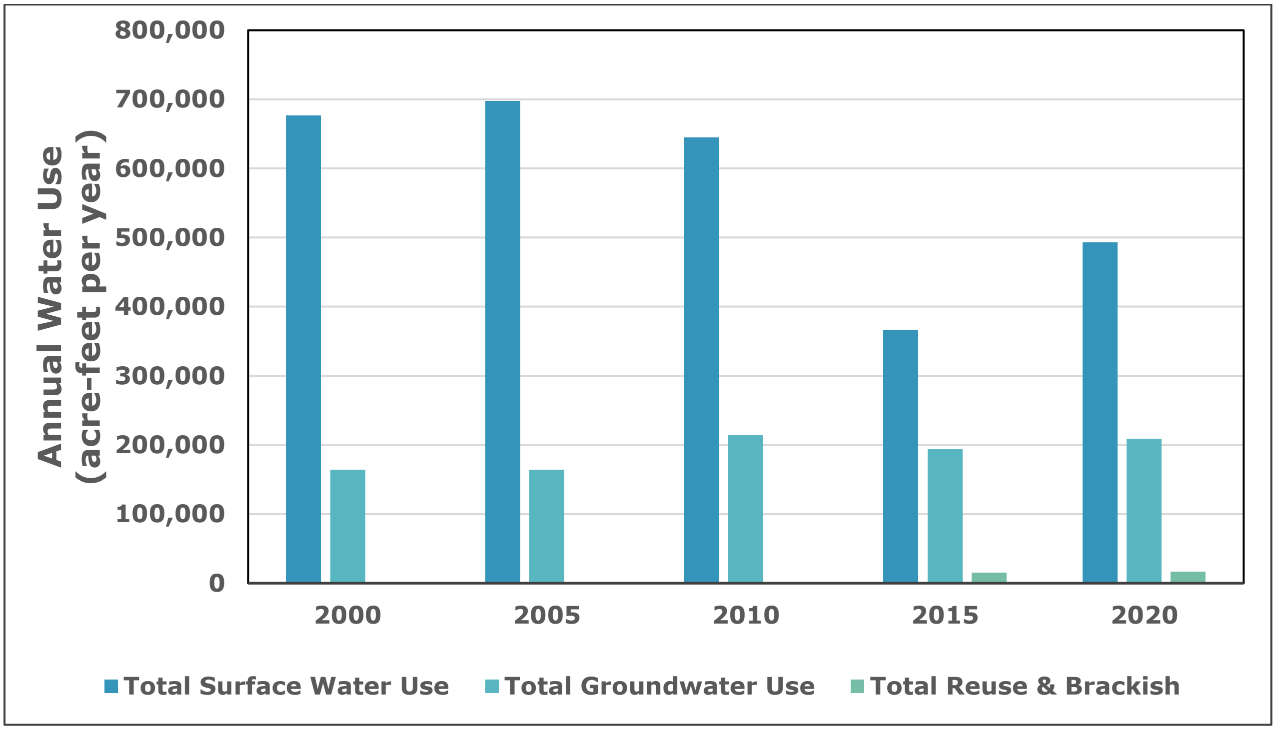
Table 1.4 Water Use by County and Category, 2020

County	Irrigation	Livestock	Manufacturing	Mining	Municipal	Steam Electric	County Total	Percentage
Bastrop	6,226	1,407	351	260	13,076	7,197	**28,517**	4.0%
Blanco	2,298	388	0	4	1,722	0	**4,412**	0.6%
Burnet	2,060	950	120	195	9,284	0	**12,609**	1.8%
Colorado	100,106	1,349	553	3,033	3,093	0	**108,134**	15.1%
Fayette	1,109	1,741	275	610	3,167	14,615	**21,517**	3.0%
Gillespie	3,070	1,120	121	18	4,518	0	**8,847**	1.2%
Hays	432	111	41	464	10,547	0	**11,595**	1.6%
Llano	670	653	2	238	4,467	1,193	**7,223**	1.0%
Matagorda	87,645	957	14,226	0	4,960	14,096	**121,884**	17.0%
Mills	5,148	872	0	4	698	0	**6,722**	0.9%
San Saba	9,540	1,008	17	0	1,663	0	**12,228**	1.7%
Travis	2,435	394	14,616	58	198,167	4,939	**220,609**	30.7%
Wharton	136,380	782	49	0	3,471	2,383	**143,065**	19.9%
Williamson	0	17	11	63	10,767	0	**10,858**	1.5%
Category Total	**357,119**	**11,749**	**30,382**	**4,947**	**269,600**	**44,423**	**718,220**	
Percentage	49.7%	1.6%	4.2%	0.7%	37.5%	6.2%		

Source: Texas Water Development Board

Surface water supplied 64 to 81 percent of total water used in Region K from 2000 to 2020, making it by far the largest source of water in the region (Figure 1.12). Surface water is the largest source for every category of use except for irrigation during extreme drought years (Figure 1.11). During extreme drought years, such as 2015, groundwater use for irrigation slightly exceeded surface water use for irrigation, and total surface water use is less than during non-drought years. Total surface water use varied from a low of 366,600 acre-feet in 2015 to high of 697,200 acre-feet in 2005. Surface water use has decreased from 676,300 acre-feet in 2000 to 493,400 acre-feet in 2020.

Figure 1.12 Historic Water Use by Source, 2000 to 2020



Source: Texas Water Development Board

Groundwater use in Region K has been increasing, from a total of 164,000 acre-feet for all categories in 2000 to 209,300 acre-feet in 2020. Groundwater use ranged from 19 to 34 percent of total use in Region K, with the highest percentage of groundwater being used in 2015.

TWDB began tracking reuse (and brackish water use) as a distinct source in 2015. Since that time, it has grown from 14,200 acre-feet in 2015 to 16,200 acre-feet in 2020.

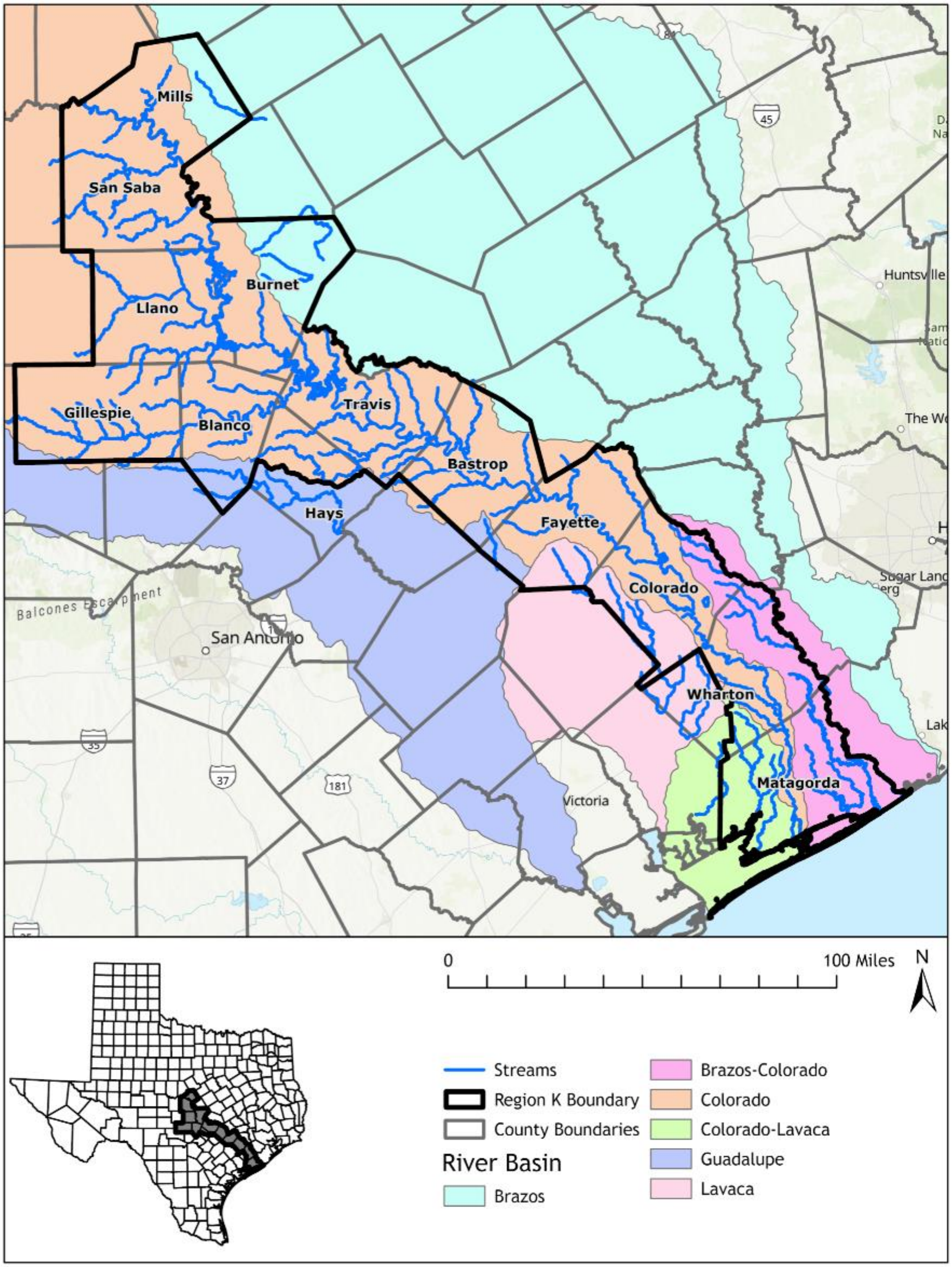
1.3 Sources of Water

As discussed in Section 1.2 above, surface water is the dominant source of water in Region K. Groundwater is an essential secondary supply with growing importance, particularly during drought periods. Water reuse provides a small but growing source of water to the region, particularly in urban areas with larger wastewater treatment plants. Further details of the region's sources are provided in the following sections.

1.3.1 Surface Water Sources

The primary surface water feature of Region K is the Colorado River (**Figure 1.13**). The major sources of surface water supplies in the region are the Highland Lakes system and the run-of-the-river water from the Colorado River. Run-of-the-river water rights allow permit holders to divert water directly from a watercourse up to their permitted amounts if the water is present in the river after senior priority rights are satisfied. In addition to the main stem of the Colorado River, run-of-river water rights on tributaries and off-channel storage are also utilized by several water user groups. In addition, a small portion of the planning region's surface water supply comes from local supplies within adjacent river basins.

Figure 1.13 Surface Water Hydrology



There are 15 reservoirs within the Region K boundaries, including:

- Goldthwaite Reservoir
- Blanco Reservoir
- Llano River Reservoir (note Llano Park Lake and Llano City Lake are both represented)
- South Texas Project Nuclear Operating Company Reservoir
- Cedar Creek Reservoir
- Lake Bastrop
- Lady Bird Lake
- Lake Walter E. Long
- the Highland Lakes system (Lakes Buchanan, Inks, Lyndon B. Johnson, Marble Falls, Travis, and Austin)
- Arbuckle Reservoir

The major Colorado River run-of-the-river water rights holders (based on firm yield) in Region K are the Lower Colorado River Authority, City of Austin, and South Texas Project Nuclear Operating Company. The City of Corpus Christi, located in Region N, and the Colorado River Municipal Water District, located in Region F immediately upstream of Region K, are also major water right holders on the Colorado River.

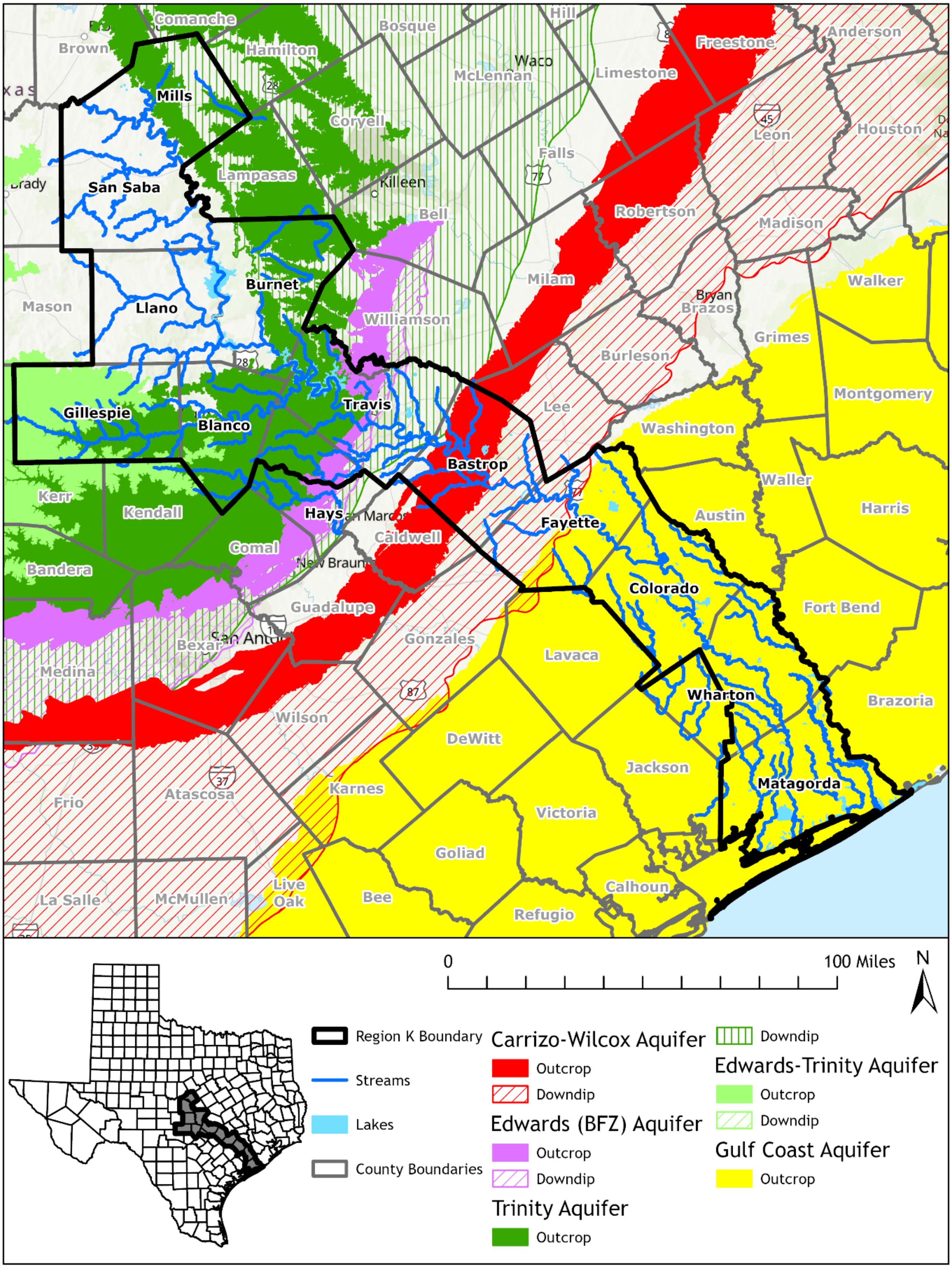
1.3.2 Groundwater Sources

TWDB has identified nine major aquifers that can produce large quantities of fresh water over a large area, and 21 minor aquifers that yield smaller amounts of fresh water over smaller geographic areas. Of these 30 aquifers, five major and six minor aquifers occur within Region K. The five major aquifers (**Figure 1.14**) are as follows:

- Carrizo-Wilcox Aquifer
- Edwards (Balcones Fault Zone) Aquifer
- Edwards-Trinity (Plateau) Aquifer
- Gulf Coast Aquifer
- Trinity Aquifer

These aquifers tend to run in curved belts northeast to southwest across the state. In Gillespie County, the Edwards-Trinity (Plateau) and Trinity aquifers have been determined to be undifferentiated for planning purposes and have been combined into one aquifer in this plan, referred to as the Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer. Following is brief description of each of the major aquifers as well as overview of the minor aquifers present in Region K.

Figure 1.14 Major Aquifers



Source: Texas Water Development Board

Trinity Aquifer

The northernmost major aquifer in Region K is the Trinity, which has both unconfined water table and pressurized artesian zones, and covers portions of Mills, Burnet, Gillespie, Blanco, Travis, Hays, and Bastrop counties (Figure 1.14). Within the region, the Trinity Aquifer contains two major early Cretaceous-age formations: the Antlers formation, which consists of a maximum of 900 feet of sand and gravel, with clay beds in the middle section; and the Travis Peak formation, which contains calcareous sands and silts, conglomerates, and limestones.

Edwards-Trinity (Plateau) Aquifer

West of the Trinity aquifer in Gillespie County is a small eastern water-table portion of the Edwards-Trinity (Plateau) Aquifer (Figure 1.14). Within the planning region, the Edwards-Trinity (Plateau) Aquifer contains saturated sediments of lower Cretaceous-age formations and overlying limestones and dolomites. Maximum saturated thickness of the aquifer is 800 feet; however, the eastern portion of the aquifer in Gillespie County is thinner.

Edwards (Balcones-Fault Zone) Aquifer

Overlying a portion of the Trinity artesian zone is the Edwards (Balcones Fault Zone) Aquifer, which covers portions of Hays, Travis, and Williamson counties within Region K (Figure 1.14). In this area, the aquifer contains both unconfined and artesian zones and feeds the well-known recreational Barton Springs, which contributes an estimated average of 50 cubic feet per second of flow to the Colorado River. The Edwards (Balcones Fault Zone) is primarily composed of early Cretaceous-age limestone deposits that have a thickness ranging between 200 and 600 feet. This aquifer has a high permeability and transmissivity, making it heavily dependent on consistent recharge and extremely sensitive to environmental stresses.

Carrizo-Wilcox Aquifer

The Carrizo-Wilcox Aquifer is located southeast of the Trinity in portions of Bastrop and Fayette counties (Figure 1.14). This aquifer contains both water-table and artesian zones and consists of two hydrologically connected formations, the Wilcox Group and the overlying Carrizo formation, which are predominantly composed of Tertiary age sand that is imbedded with gravel, silt, clay, and lignite. The thickness of the artesian zone ranges from 200 to 3,000 feet.

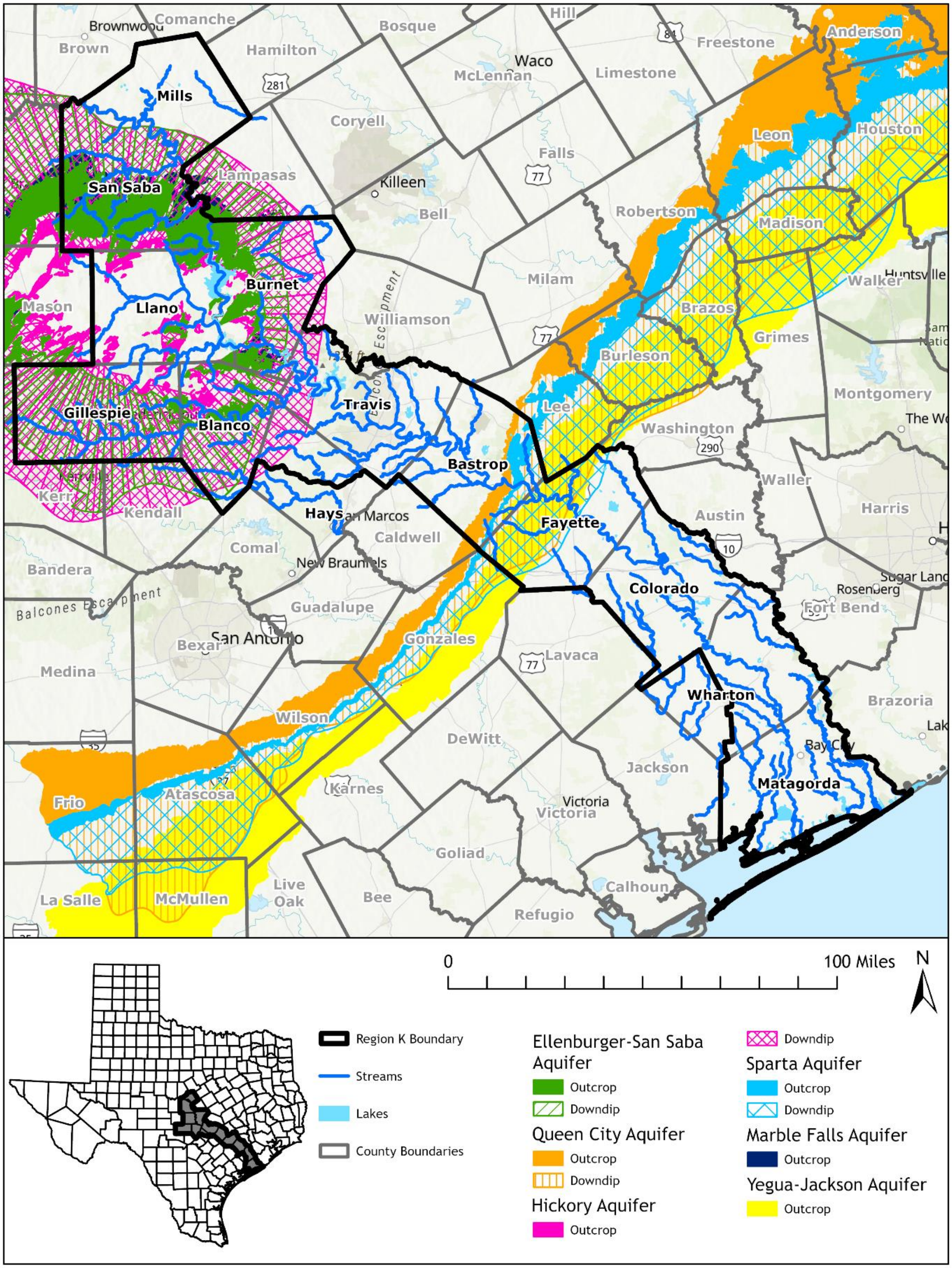
Gulf Coast Aquifer

The southernmost and largest major aquifer within Region K is the Gulf Coast Aquifer, which stretches continuously from southeastern Fayette County through Matagorda County (Figure 1.14). This portion of the aquifer is described as a leaky artesian system, which is composed of Cenozoic age complex interbedded clays, silts, sands, and gravel. In some areas near the Gulf Coast, heavy pumping has caused the intrusion of saltwater into aquifer layers that previously had good water quality. The physical characteristics of this aquifer make it susceptible to dewatering, or a permanent compaction of the clay layer and loss of water storage capacity, as a result of overuse of the aquifer. This compaction can also cause subsidence of surface land overlying the aquifer, which can contribute to flood and structural damage in the area.

Minor Aquifers

The minor aquifers occurring within Region K are the Ellenburger-San Saba, Hickory, Marble Falls, Queen City, Sparta, and Yegua-Jackson (**Figure 1.15**). All six of these aquifers contain unconfined zones and pressurized artesian zones. The Ellenburger-San Saba, Hickory, and Marble Falls aquifers occur in the northwestern portion of the planning region, have discontinuous circular coverage areas, and overlap one another.

Figure 1.15 Minor Aquifers



Source: Texas Water Development Board

The Hickory Aquifer is composed of the Hickory Sandstone Member of the Cambrian Riley Formation, which contains some of the oldest sedimentary rocks found in Texas. This aquifer has a maximum thickness of 480 feet.

The Ellenburger-San Saba Aquifer has the same general shape as the Hickory and is composed of late Cambrian age limestone and dolomite. San Saba Springs is thought to be supplied primarily by the Ellenburger-San Saba and Marble Falls aquifers, which may be hydrologically connected in some areas.

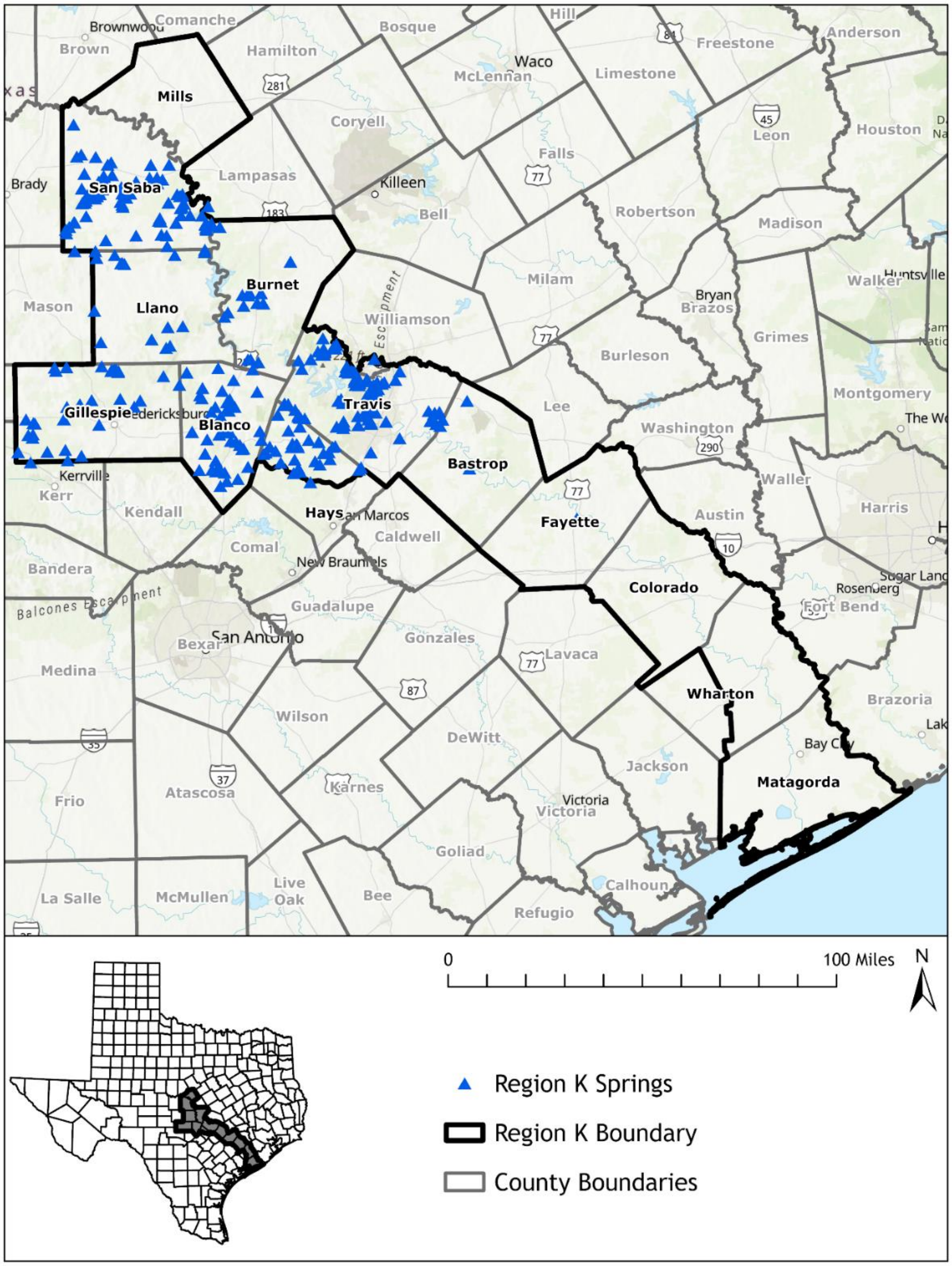
The Marble Falls Aquifer occurs in several disconnected outcrops of Pennsylvanian-age limestone that form fractures, solution cavities, and channels. The maximum thickness of this aquifer is 600 feet. Numerous large springs are fed by the Marble Falls Aquifer, which provide a substantial portion of baseflow to the San Saba River and Colorado River in San Saba County.

The Queen City, Sparta, and Yegua-Jackson aquifers overlap one another across southeastern Bastrop and northwestern Fayette counties. The Queen City aquifer is composed of Tertiary-age sand, loosely cemented sandstone, and interbedded clay. The maximum thickness of this aquifer is less than 500 feet. The Sparta Aquifer overlies the downdip portion of the Queen City Aquifer and consists of Tertiary age sand and interbedded clay. The Yegua-Jackson aquifer consists of interbedded sands, silts, and clays.

1.3.3 Major Springs

There are many springs present in Region K (**Figure 1.16**), where groundwater transitions to surface water flow (TWDB, 1975). While none of these springs represent a major supply on an individual basis, they do contribute to overall surface water supply in the form of tributary flow to the Colorado River. Additionally, the springs provide important ecological benefits, especially during periods when other sources of surface water are low. Generally, most of these springs are located upstream from the Balcones Fault Zone, in the upper part of the region. Overall, there are approximately 43 major and significant springs in Region K, with almost half of those (19 of 43) in San Saba County. Other counties with significant springs include Bastrop, Blanco, Burnet, Fayette, Gillespie, Hays, Llano, and Travis.

Figure 1.16 U.S. Geological Survey Identified Springs



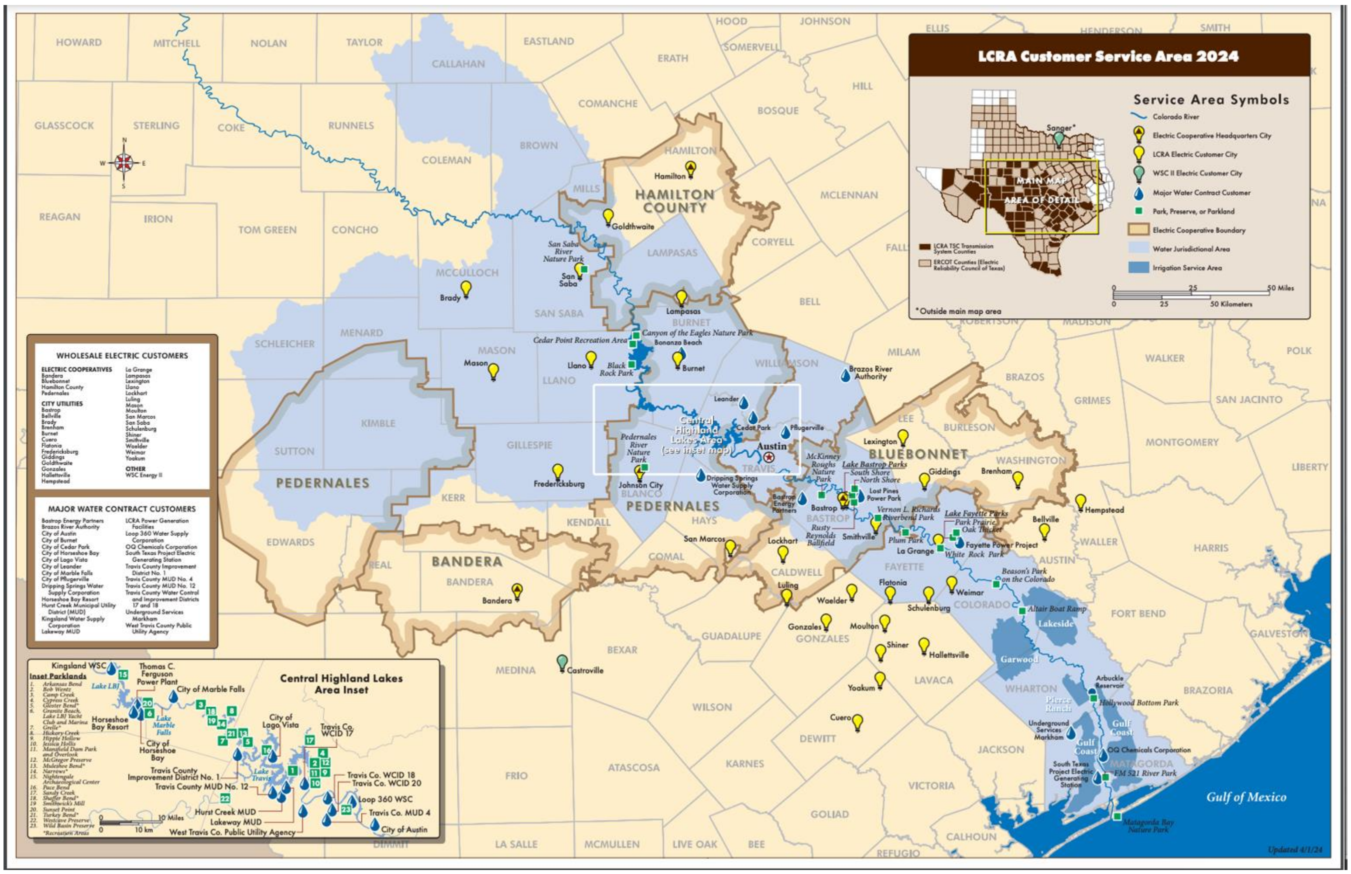
1.3.4 Reuse Sources

Reuse of effluent from wastewater treatment plants is a small but growing resource in the region. The largest reuse sources are collocated with the largest wastewater treatment plants in the urban areas of the region, generally in and near Travis County. There are ten Water User Groups with current reported reuse supplies in Region K. The City of Austin has the largest reuse program with about 5,400 acre-feet per year of reuse reported in their 2022 water use survey. A detailed description of their reuse plans is available in their Water Forward Plan, which is available online at https://www.austintexas.gov/department/reuse-water-forward.

1.4 Major Water Providers and Wholesale Water Providers

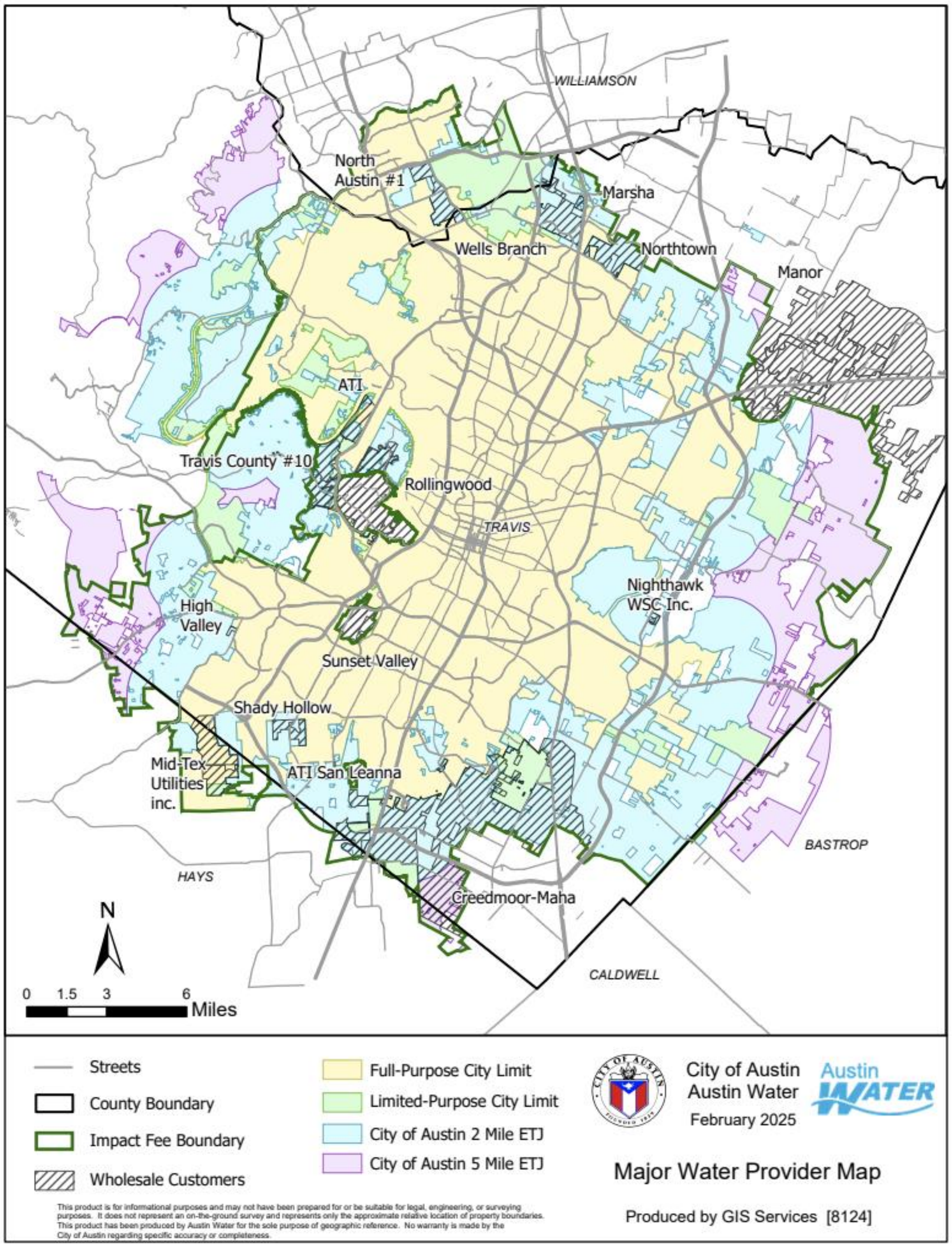
As part of the planning process, each regional planning group identifies or designates Major Water Providers and Wholesale Water Providers. Major Water Providers (MWPs) are defined as a Water User Group or Wholesale Water Provider of particular significance to the region's water supply, as determined by the regional planning group. Wholesale Water Providers (WWP) are defined as persons or entities having contracts to sell any volume of water wholesale. There are two Major Water Providers within Region K: the Lower Colorado River Authority and Austin Water. The Lower Colorado River Authority provides water for municipal, agricultural (irrigation), manufacturing, steam-electric, mining and other uses within all or part of a 35-county service area. Lower Colorado River Authority's current service area allows it to provide water to entities in each of the 14 counties within the Lower Colorado Regional Planning Area (**Figure 1.17**). Austin Water supplies water for municipal, manufacturing, and steam-electric uses in portions of Travis, Williamson, and Hays counties (**Figure 1.18**).

Figure 1.17 Lower Colorado River Authority Supply Service Area



Source: Lower Colorado River Authority

Figure 1.18 Austin Water Supply Service Area

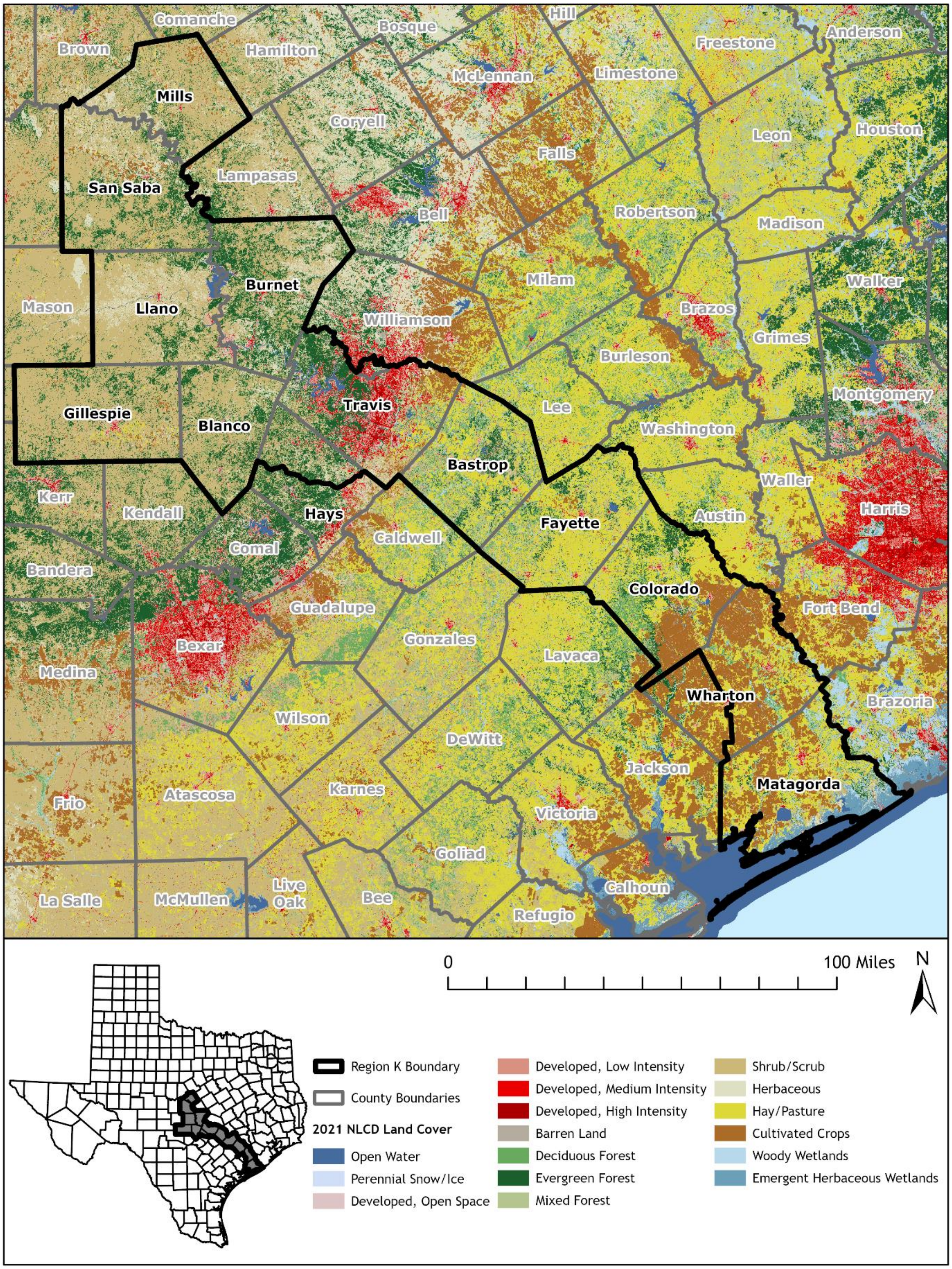


Source: Austin Water, 2025

1.5 Agricultural and Natural Resources

Cultivated crop land use in Region K consists primarily of agricultural land in Matagorda, Wharton, Colorado, Fayette, and eastern Travis counties (**Figure 1.19**). Forestland runs through the middle of Colorado and Fayette counties, western Travis and Burnet counties, southeastern Llano County, and a significant portion of Gillespie and Hays counties. Shrub/scrub and grassland predominates in Mills, San Saba, northwestern Llano, and eastern Burnet counties. Blanco County is primarily a mixture of forestland and rangeland. Bastrop County is a mixture of forestland, agricultural land, and rangeland. A significant concentration of urban-only land use occurs in the Austin metropolitan area.

Figure 1.19 Land Use Distribution



The State of Texas has 119 state parks, state historic sites, and state natural areas. Eleven of these, with a total of 23,225 acres, occur within the counties of Region K (**Table 1.5**). The Texas State Park System offers a variety of recreational and educational opportunities, including camping, hiking, fishing, boating, water skiing, swimming, wildlife viewing, picnicking, and tours of nature exhibits and historical sites.

Table 1.5 State Parks in Region K

Name	County	Acreage	Description
Bastrop State Park	Bastrop	6,600	Established between 1933 and 1935 and contains the "Lost Pines" isolated region of loblolly pine and hardwoods. The Bastrop County Complex fire in September 2011 affected 96 percent of the park, including significant impact to the Lost Pines ecosystem and the loblolly pines.
Blanco State Park	Blanco	105	Established in 1933 along the Blanco River and has fishing for winter rainbow trout, perch, catfish, and bass.
Buescher State Park	Bastrop	1,017	Established between 1933 and 1936 and was part of Stephen F. Austin's colonial grant; an estimated 250 species of birds can be found in the park.
Colorado Bend State Park	San Saba	5,328	Established in 1984 and part is in Lampasas Co.; contains scenic Gorman Falls and is home to rare and endangered species including the golden-cheeked warbler, and black-capped vireo.
Enchanted Rock State Natural Area	Gillespie and Llano	1,644	Established in 1978 along Big Sandy Creek and contains a large granite outcrop that is the second largest batholith in the U.S. Enchanted Rock is also a national natural landmark and a national historic site.
Inks Lake State Park	Burnet	1,200	Established in 1940 along Inks Lake.
Longhorn Cavern State Park	Burnet	646	Established between 1932 and 1937 and was dedicated as a natural landmark in 1971. The cave has been used as a shelter since prehistoric times.
LBJ State Park & Historic Site	Gillespie	718	Established in 1965 along the banks of the Pedernales River; contains LBJ's home and a portion of the official Texas Longhorn herd, as well as bison, deer, and wild turkey; living-history demonstrations at the restored Sauer-Beckmann house.
McKinney Falls State Park	Travis	715	Established in 1976.
Monument Hill & Kreische Brewery State Historic Sites	Fayette	40	Established in 1907/1977. Memorial to the Salado Creek Battle in 1842 and the "black bean lottery" of the Mier Expedition; and one of the first breweries in the state.
Pedernales Falls State Park	Blanco	5,212	Established in 1970 and has typical Edwards Plateau terrain with live oaks, deer, turkey, and stone hills.

There are 19 national wildlife refuges in Texas, and four of these occur within Region K. Refuges function to preserve and protect critical wildlife habitat for unique, rare, threatened, and/or endangered species. Many refuges allow bird and wildlife viewing, hunting, and fishing during specific times of the year. In addition, the Texas Parks & Wildlife Department currently manages 52 Wildlife Management Areas in the state with a total of 756,464 acres. Two Wildlife Management Areas lie within Region K and encompass approximately 7,500 acres.

These areas preserve and manage quality wildlife habitat and can allow compatible activities such as research, hunting, fishing, hiking, camping, bicycling, and horseback riding. **Table 1.6** lists the wildlife refuges and management areas within Region K.

Table 1.6 Wildlife Refuges/Management Areas in Region K

Name	County	Acreage	Description
National Wildlife Refuges			
Attwater Prairie Chicken[1]	Colorado	10,541	Established in 1972 to preserve habitat for the endangered Attwater Prairie Chicken, which includes native tallgrass prairie, potholes, sandy knolls, marshes, and some wooded areas.
Balcones Canyonlands[2]	Travis	27,500	Established in 1992 northwest of Austin to protect the nesting habitat of two endangered bird species: golden-cheeked warbler and the black-capped vireo.
Big Boggy[3]	Matagorda	4,526	Established in 1983 along the coast of Texas in southeastern Matagorda County to conserve key coastal wetlands for Neotropical migratory birds and shorebirds in spring and fall, as well as for wintering fowl and year-round wildlife.
San Bernard[4]	Matagorda	54,000	Established in 1968 near Freeport which attracts white-fronted and Canada geese and several species of duck.
Wildlife Management Areas			
Mad Island[5]	Matagorda	7,200	This area allows scheduled hunting and wildlife viewing.
D. R. Wintermann Wildlife Management Area[6]	Wharton	246	This area has limited access.

Region K hosts a diversity of plant and animal wildlife species. In addition to the more commonly found species, each county within Region K provides habitat for several threatened or endangered animal and plant species. Endangered species are those at risk of extinction. Threatened species are those likely to become endangered in the future. These designations are made at the state and federal level by the Texas Parks and Wildlife Department and the U.S. Fish and Wildlife Service. State and federal threatened and endangered species listings for each county in Region K are presented in **Appendix 1.A**. Rare species that are not listed as threatened or endangered are also included.

1.6 Identified Water Quality Problems

The primary water quality issue for all of the surface water stream segments and the major groundwater aquifers in the Lower Colorado Region is the increasing potential for water contamination due to nonpoint source pollution. Nonpoint source pollution is precipitation runoff that, as it flows over the land, picks up various pollutants that adhere to plants, soils, and man-made objects and eventually infiltrates into the groundwater table or flows into a surface water stream. As additional land in the Colorado River watershed and aquifer recharge zones is developed, the runoff from precipitation events will pick up increasing amounts of pollution. Another nonpoint source of pollution is the accidental spill of toxic chemicals near streams or over recharge zones that will send a concentrated pulse of contaminated water through stream segments and/or aquifers. Public water supply groundwater wells that currently use only chlorination for water treatment, and domestic groundwater wells that may not treat the water before consumption, may be especially vulnerable to nonpoint source pollution, depending on how directly influenced they are by surface or near-surface contamination. Habitats of threatened and endangered species that live in and near springs and certain stream segments may be vulnerable as well. Nonpoint sources of pollution are difficult to control, and there has been increased awareness and research of this issue as well as interest in the initiation of abatement programs. The water management strategies recommended in this plan will not necessarily impact the water quality levels in the region, but as population growth and development occurs, more opportunities for nonpoint source pollution may exist.

The Texas Commission on Environmental Quality categorizes the physical use of a stream into various defined uses such as “general use,” “aquatic life use,” “recreational contact use,” and “public water supply use.” Assessments of the basin conducted by Texas Commission on Environmental Quality determine whether or not a stream segment will support its use. Segments which do not support its designated or assumed use are classified as impaired. Additionally, these assessments will identify segments that are of concern for not meeting the use but are not at the time of the assessment considered impaired. The most recent listed segments are available at https://www.tceq.texas.gov/gis/segments-viewer.

1.7 Identified Threats to Agricultural and Natural Resources

Threats to agricultural and natural resources in Region K are present from both too much water and from too little water. Too much water can be an issue during high river flows and during flooding episodes. The Highland Lakes provide the primary surface water storage and flood control capabilities for Region K.

In addition to managing the Highland Lakes for water supply, the Lower Colorado River Authority also operates the lakes for flood control purposes. When flooding on the lakes or their tributaries is imminent, the Lower Colorado River Authority works to manage the floodwaters by holding or moving water as needed through a series of dams along the Highland Lakes. Flood Operations take precedence over scheduled water supply and environmental release operations. Of the six Highland Lakes, only Lake Travis – formed by Mansfield Dam – is designed to hold back floodwaters that otherwise would flood Austin and downstream communities. Lake Travis has a large flood pool that can temporarily store some floodwaters flowing into the lakes upstream of Mansfield Dam.

As mentioned previously, the primary threat to agriculture in Region K is water shortages for irrigation that are anticipated to occur in Matagorda, Wharton, and Colorado counties during drought. The water supply available for irrigation is from three sources: run-of-river supplies, stored water from the Highland Lakes and the anticipated Arbuckle Reservoir, and groundwater. When the Colorado River’s natural flows are insufficient to meet irrigation demands, allocations of stored water from the Highland Lakes under the LCRA Water Management Plan can be made by to supplement the available downstream run-of-river supplies. The water supplied from the Highland Lakes storage is an interruptible supply and is subject to curtailment in accordance with policies and procedures specified in LCRA’s Water Management Plan. Under drought conditions, there are substantial shortages of water for irrigation in Matagorda, Wharton, and Colorado counties. The shortages will be addressed through water management strategies such as conservation, discussed in **Chapter 5** of this Plan. Details related to drought responses associated with the LCRA Water Management Plan are discussed in **Chapter 7** of this Plan.

Water quantity is also a concern during drought conditions in terms of instream flows and freshwater inflows to Matagorda Bay. The reaches below the Highland Lakes downstream to the mouth of the Colorado River have been studied by the LCRA, and “Subsistence” instream flows have been determined as firm demands on water resources. Instream flows have been maintained by LCRA at or above the minimum “Subsistence” flow in accordance with the 2015 Water Management Plan. “Base” (Base-Dry and Base-Average) instream flows, also determined by the LCRA study, provide flows to support an optimal range of habitat complexity for a well-balanced, native aquatic community within a stream reach. LCRA has maintained these flow regimes whenever water resources are adequate, but “Base” flows are classified as interruptible demands that have been reduced during drought conditions.

The Highland Lakes provide the primary surface water storage and flood control capabilities for Region K. The issue of providing maintenance of these reservoirs to retain the maximum water storage capacity may become important as natural sedimentation processes decrease the volume of water each reservoir can hold.

As mentioned above, Lake Travis is the only reservoir in the Highland Lakes with flood control storage. LCRA conducts flood operations at Mansfield Dam according to the U.S. Army Corps of Engineers (USACE) Water Control Manual for Mansfield Dam and Lake Travis. The Water Control Manual limits flood releases from Mansfield Dam based on key Lake Travis elevations and expected conditions along the Colorado River downstream of Mansfield Dam. Under the USACE requirements, Flood Operations at Mansfield Dam are determined by specified ranges of observed or forecasted lake levels; the pool condition (i.e., rising or falling); the month of the year; and stage and flow criteria at three designated downstream locations. When the pool is rising, forecasted lake levels (based on actual water on the ground) are used in determining flood release requirements. When the pool is falling, observed lake levels are used in determining release requirements. The amount of release from Mansfield Dam increases with higher ranges of lake level and as long as downstream stage and flow limitations are not exceeded.

One of the major groundwater quantity concerns involves the Barton Springs segments of the Edwards Aquifer Balcones Fault Zone (BFZ), which is a karst formation that responds quickly to changes in the environment due to its highly permeable and transmissive characteristics. South of the artesian zone of the Edwards Aquifer, there exists an interface, or “bad water line,” that separates the good quality groundwater from a layer of water that is not usable for human consumption, without further treatment, due to the high total dissolved solids (TDS) content. This line, which is also referred to as the saline-water line or freshwater/saline-water interface, marks the interface where the groundwater reaches a TDS concentration of 1,000 milligrams per liter (mg/L). Research is currently being conducted to determine the effects that pumping large quantities of aquifer water will have on its location. Water management strategies recommended in Chapter 5 discuss Aquifer Storage and Recovery (ASR) opportunities in this aquifer, as well as desalination of water produced from the saline zone.

A second major issue in the Barton Springs segments of the Edwards Aquifer (BFZ) is the amount of discharge from the artesian zone through Barton Springs. Increased groundwater pumping from the aquifer during drought conditions decreases all spring discharges, which can potentially impact the state- and federally listed threatened and endangered species that depend on the springs for habitat, such as the Barton Springs salamander, and can potentially affect water supply availability downstream. Because the Barton Springs Edwards Aquifer Conservation District has considered maintenance of certain minimum springflows in setting its Desired Future Conditions, so long as recommended water management strategies stay within the Modeled Available Groundwater (MAG) volume, impacts to the minimum springflows are expected to be negligible.

The primary water quantity issue in the Gulf Coast Aquifer is subsidence, which is the dewatering of the interlayers of clay within the aquifer as a result of continued or long-term over-pumping. The resultant compaction of the clay causes a loss of water storage capacity in the aquifer, which in turn causes the land surface to sink, or subside. Once the ability of the clay to store water is gone, it can never be restored. The implementation of water conservation practices and conversion to other sources are currently the only remedies for this situation. Saltwater intrusion from the Gulf of Mexico into the Gulf Coast Aquifer is also a potential concern due to groundwater pumping rates that are greater than the recharge rates of the aquifer. Recommended water management strategies in this Plan stay within the MAG volume, and over-pumping is not encouraged.

The primary water quantity concern with the Trinity Aquifer is the anticipated water-level decline during drought conditions due to increased demand that will be placed on the aquifer's resources. For example, Studies indicate that water levels in the portion of the aquifer that lies within Region K in the Dripping Springs area of Hays County could decline more than 100 feet by the year 2040. Other portions of Hays County, as well as Blanco and Travis counties, may experience moderate water-level declines between 50 to 100 feet by the year 2040. Most of the streams gain water as they pass over the Trinity aquifer and in consequence may be affected by the declining water levels in the underlying aquifer. In addition, drought conditions may further decrease the base flow of the streams. Recommended water management strategies in this Plan stay within the MAG volume for the Trinity Aquifer in Region K.

The primary water quantity concern with the Carrizo-Wilcox Aquifer is the water-level decline that could occur by the year 2070 due to increased pumping. The Carrizo-Wilcox Aquifer is in Bastrop and Fayette counties, within Region K. The area in and around the Carrizo-Wilcox Aquifer is expected to see continued population growth and increases in water demand. Current usage could cause water level decline of up to 240 feet in Bastrop County, depending on the formation, and up to 110 feet of decline in Fayette County. Projected demands show that additional groundwater will be needed and some water users in Bastrop County may need to look at surface water as an option in the future. The relationships that currently exist between surface and groundwater may also change. Some model simulations indicate that the Colorado River, which currently gains water from the Carrizo-Wilcox Aquifer within certain portions of Bastrop County, may begin to lose water to the aquifer by the year 2050. Recommended water management strategies in this Plan stay within the MAG volume.

Region K Planning Group passed a resolution regarding the "mining of groundwater" on February 9, 2000, which strongly opposes the over-utilization of groundwater, including the mining of groundwater, within its region at rates that could lead to eventual harm to the groundwater resources, except during limited periods of extreme drought. The Region K Planning Group defines groundwater mining as "the withdrawal of groundwater from an aquifer at an annualized rate, which exceeds the average annualized recharge rate to an aquifer where the recharge rate can be scientifically derived with reasonable accuracy." This resolution addresses the concerns listed above for the Barton Springs segments of the Edwards (BFZ), Gulf Coast, Trinity, and Carrizo-Wilcox aquifers that are located within Region K.

1.8 Summary of Existing Local and Regional Water Plans

There are many existing and ongoing planning processes at local and regional levels within Region K. Many local and regional groups within Region K conduct long term water supply planning and establish water conservation plans. As part of this regional planning process, the Region K planning group has made every effort to consult with and include plans from:

- Lower Colorado River Authority: Water Management Plan
- Austin Water: Water Forward Plan
- Groundwater Conservation District Plans
- Groundwater Management Area Plans

Because regional water planning is intended to be a bottom-up process, the Region K Planning Group used knowledge from its own members as well as publicly available local plans to develop the details of the 2026 Region K Water Plan. Documents from local planning efforts, including the City of Austin *Water Forward Plan*[1], *Regional Water Supply Study for the City of Wharton and East Bernard*[2], *Water and Wastewater Facilities Plan for the portion of Hays County, Texas West of the I-35 Corridor*[3], the *Bastrop Regional Water Supply Facilities Planning Study*[4], and the *Burnet-Llano County Regional Water Facility Study*[5], helped shape the water management strategies that were recommended by the Region K planning group. These local plans also provided a few potential regionalization concepts for water and wastewater services that the Region K planning group considered during the planning process. The Lower Colorado River Authority 2020 Water Management Plan is also referenced for several chapters in this 2026 Region K Plan. Additional publicly available local plans that were referenced for the planning process are discussed below in the next few sections.

Groundwater planning happens at the local level in Groundwater Conservation Districts and at the regional level in Groundwater Management Areas. There are 12 Groundwater Conservation Districts (**Table 1.7** and **Figure 1.20**) and six Groundwater Management Areas within Region K (**Figure 1.21**). Each Groundwater Conservation District is shown in Table 1.7, along with the aquifers that they manage and the counties in which they are located.

Groundwater Conservation Districts are required to meet at least annually to decide on “desired future conditions” for the aquifers within their Groundwater Management Area. A desired future condition is a quantifiable future groundwater condition. These conditions, called metrics, can be a particular groundwater level, level of water quality, volume of spring flow, etc. Based on the adopted desired future condition, the TWDB is responsible for providing each groundwater conservation district and regional water planning group, located wholly or partly in the management area, with a modeled available groundwater volume that will be used for planning and groundwater management purposes. Groundwater availability models and other data or information help in establishing modeled available groundwater for the relevant aquifers within the management area.

[1] *Water Forward Integrated Water Resource Plan*, Austin Water, November 2024.
[2] *Regional Water Supply Study for the City of Wharton and East Bernard,* TWDB Contracted Report, Halff, April 2017.
[3] *Water and Wastewater Facilities Plan for the portion of Hays County, Texas West of the I-35 Corridor*, TWDB Contracted Report, HDR Engineering, January 2011.
[4] *Bastrop Regional Water Supply Facilities Planning Study,* TWDB Contracted Report, K Friese & Associates, Inc., October 2011.
[5] *Burnet-Llano County Regional Water Facility Study,* TWDB Contracted Report, Susan Roth, CDM, December 2011.

Table 1.7 Groundwater Conservation Districts in Region K

Groundwater Conservation District [1]	Lower Colorado Region County	Aquifers Managed [2]
Barton Springs/Edwards aquifer Conservation District	Hays, Travis	Edwards (Balcones Fault Zone) & Trinity aquifers, & Alluvial Deposits
Blanco-Pedernales Groundwater Conservation District	Blanco	Trinity, Edwards-Trinity, Ellenburger, Hickory and Marble Falls aquifers
Central Texas Groundwater Conservation District	Burnet	Trinity, Marble Falls, Ellenburger-San Saba, Hickory
Coastal Bend Groundwater Conservation District	Wharton	Gulf Coast aquifer
Coastal Plains Groundwater Conservation District	Matagorda	Gulf Coast aquifer
Colorado County Groundwater Conservation District	Colorado	Gulf Coast aquifer
Fayette County Groundwater Conservation District	Fayette	Gulf Coast, Carrizo-Wilcox, Queen City, Sparta aquifer, Yegua- Jackson and Colorado River Alluvium
Hays-Trinity Groundwater Conservation District	Hays	Trinity aquifer
Hickory UWCD #1	San Saba	Hickory aquifer, Ellenberger-San Saba, & Marble Falls aquifers
Hill Country UWCD	Gillespie	Edwards-Trinity, Ellenberger-San Saba, & Hickory aquifers
Lost Pines Groundwater Conservation District	Bastrop	Carrizo-Wilcox aquifer
Southwestern Travis County Groundwater Conservation District [3]	Travis	Trinity aquifer

Source: TWDB

[1] UWCD = Underground Water Conservation District;

[2] Water systems managed: Only portions of the indicated aquifer systems are located within a Groundwater Conservation District's jurisdiction.

[3] Groundwater Conservation District confirmed in November 2019.

Figure 1.20 Groundwater Conservation Districts within Region K

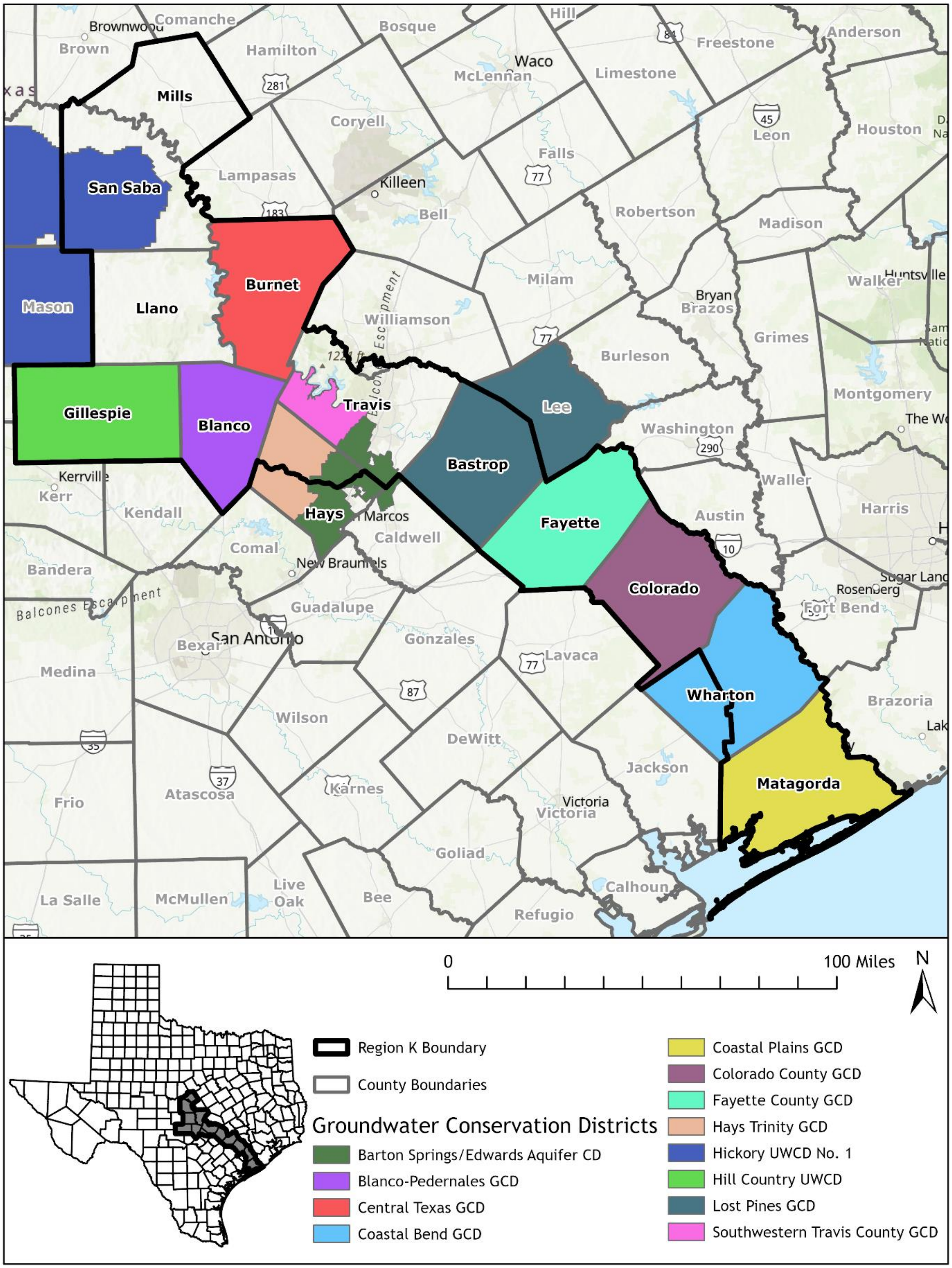
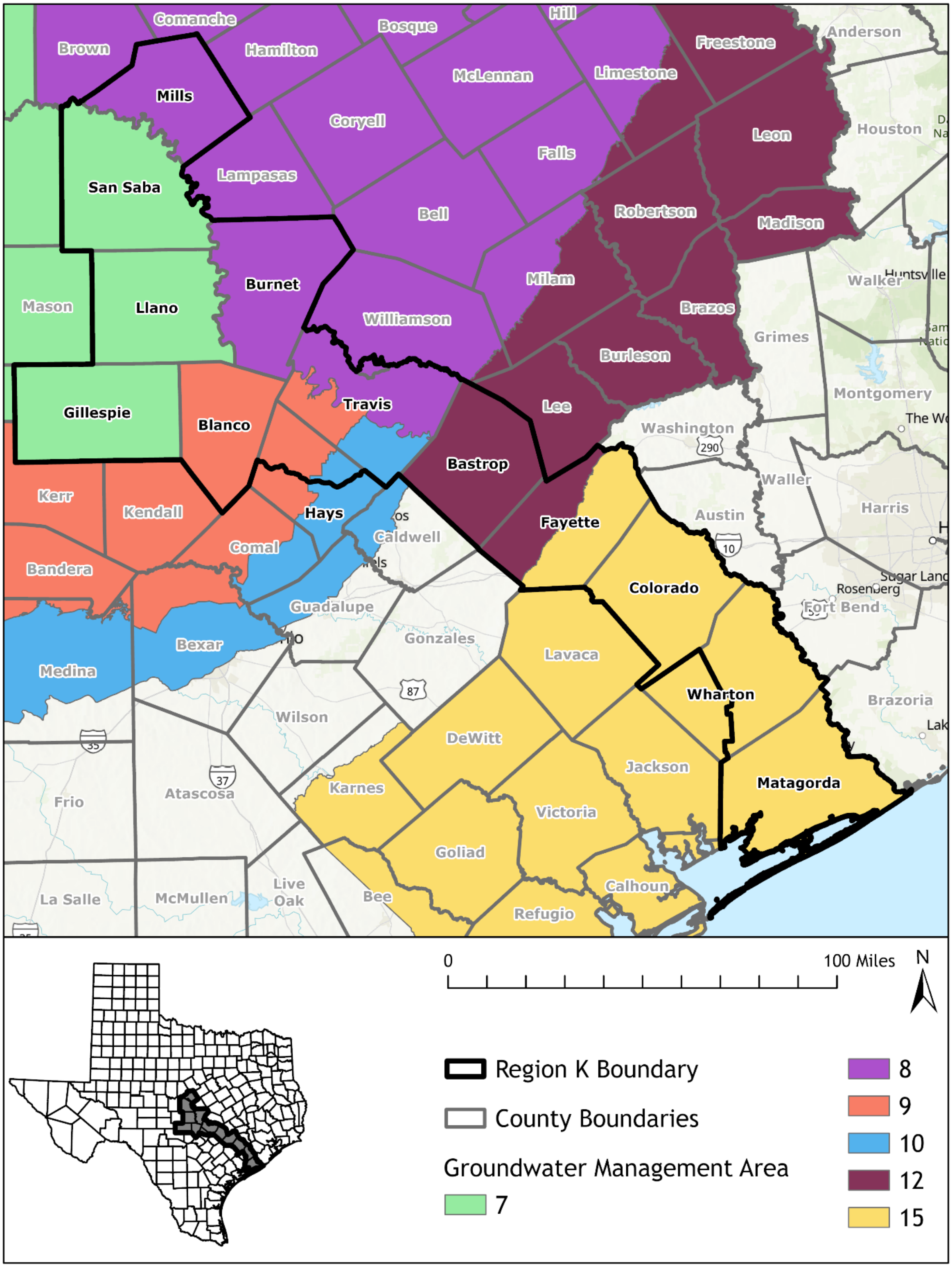


Figure 1.21 Groundwater Management Areas within Region K



1.9 Identified Historic Drought of Record

The hydrologic characteristics of the Colorado River are closely linked to the precipitation patterns that occur in the river basin, especially the cycles of floods and droughts, which are common in Texas. Major flood and drought events are those with statistical recurrence intervals greater than 25 years and 10 years, respectively. Streamflow gaging data collection began in the early 1900s, and the data show that there has been a major drought in almost every decade of the last 100 years. Droughts in Texas are primarily the result of the presence of a strong subtropical high-pressure cell which becomes stationary over the state and prevents low-pressure fronts from passing through the state. Major droughts can cause stock ponds and small reservoirs to go dry, and large reservoirs, such as the Highland Lakes, can drop their storage levels to less than one-third their capacity.

The average annual runoff during the period from 1941 to 1970 ranged from 350 acre-feet per square mile near the mouth of the Colorado River to less than 50 acre-feet per square mile in the westernmost portion of the basin's contributing zone, which equates to an overall basin average of 81 acre-feet per square mile. During this 30-year time period, there were three major statewide droughts: 1947 to 1948, 1950 to 1957, and 1960 to 1967. These periods of drought saw average annual runoff values decrease 72 to 80 percent, to 16 to 23 acre-feet per square mile, which resulted in record low flows in the Colorado River. The most severe of these droughts occurred from 2007 to 2016, in which 95 percent of the counties in the state were declared disaster areas by the U.S Department of Agriculture. The second most severe drought was from 1950 to 1957, in which 94 percent of the counties in the state were declared disaster areas. Considering the 1940 to 2016 time period, the drought of record for Region K is the period 2007 to 2016, and this drought of record period was used in this regional water planning effort for estimating reservoir firm yields. In some, if not all cases, the lowest single-year flows in the period of record occurred in 2011, and this critical year period defines the availability of water from run-of-river water rights. This is discussed in more detail in Chapter 7 of this Plan.

1.10 Current Drought Preparations

Certain water supply entities are required to develop Water Conservation Plans and/or Drought Contingency Plans by Senate Bill 1. Both types of plans contribute to drought preparedness. Both types of plans must be submitted to Texas Commission on Environmental Quality for review and certification. Texas Commission on Environmental Quality receives the plans, reviews them for minimum criteria according to Texas Commission on Environmental Quality's Chapter 288 Rules that reflect Senate Bill 1 requirements. Finally, Texas Commission on Environmental Quality sends the water supply entity a letter of certification that its plan contains the necessary minimum criteria components. It should be noted that Texas Commission on Environmental Quality has not subjectively critiqued the quality of the water management, water conservation, or drought contingency plans; it only determined whether or not minimum criteria have been met. Each water supply entity is required to update their respective plan every five years, so that the plan will improve as the water supply entity gains experience in managing its water resources. TWDB also receives copies of each certified plan for review with respect to TWDB's water planning efforts. However, there are no rules requiring action by TWDB.

Water Conservation Plans are required for irrigation water rights of at least 10,000 acre-feet per year, non-irrigation (municipal, industrial, mining, recreational) water rights of at least 1,000 acre-feet per year and retail public water suppliers which serve 3,300 connections or more. In addition, the Lower Colorado River Authority requires all of its water contract holders to have a Water Conservation Plan. The Lower Colorado River Authority staff reviews and approves individualized plans for all municipal customers with standard water contracts and for all irrigation customers with standard water contracts over 20 acre-feet. The intent of the

Water Conservation Plan is to develop and implement programs that will reduce water use within each of the major water user groups, primarily through advances in technology, reducing distribution system water losses, increasing irrigation efficiency through required or voluntary means, educating customers, and encouraging voluntary participation in water use efficiency efforts. The majority of water use in Region K is in the agricultural irrigation and municipal sectors, and the majority of the Water Conservation Plans have targeted these two categories of water use groups. The remainder of entities holding water rights in Region K are not required to develop or submit a Water Conservation Plan unless they petition Texas Commission on Environmental Quality for an amendment to their water right or apply for a capital improvement loan with TWDB. In addition, Chapter 288 of the Texas Commission on Environmental Quality Rules requires wholesale water supply purchasers to submit Water Conservation Plans to their wholesale supplier. More details on Water Conservation Plans are provided in Chapter 5 of this Plan.

Drought Contingency Plans are required to specify how a water supply entity will contract and supply dependable stored water supplies to its customers during a repeat of the drought of record, which is the period 2007–2016 for Region K. Triggering conditions for water shortages during a drought must be defined, and the actions that will be taken by the water supplier to mitigate the adverse effects of these water shortages must be specified. The major goals of Drought Conservation Plans are to extend the supplies of dependable water, preserving essential water uses, protecting public health and safety, and establishing equitable distributions of water among the water supplier's customers.

1.11 Water Loss Audits

House Bill 3338, passed by the 78th Texas Legislature (2003), requires that all retail public utilities providing potable water to file water loss audits with the TWDB once every five years. The first water loss audits were submitted in March 2006. The water audit reporting requirements follow the International Water Association and American Water Works Association Water Loss Control Committee methodology.

The primary purposes of a water loss audit are to account for all water being used and to identify potential areas where water can be saved by identifying and eliminating water losses. Water losses are classified as either apparent losses or real losses. Apparent losses include water that has been used but not tracked due to a combination of inaccurate meters, accounting procedures or billing adjustments, and unauthorized consumption. Real losses are actual water losses from the system due to pipe breaks and leaks, spills, and overflows.

In Region K, 64 public water suppliers submitted water loss audits for 2022 (**Table 1.8**). Generally, water losses in Region K are lower than for the State as shown by comparison of median and average values in the table.

Table 1.8 Summary of Reported Water Loss Audits by Region, 2022

Region	Region K		Statewide	
Number of Audits Submitted	**64**		**741**	
	Median	**Average**	**Median**	**Average**
Real loss in gallons per mile per day	520.94	704.88	560.57	923.28
Real loss in gallons per connection per day	23.42	34.95	34.30	50.55
Apparent loss in gallons per connection per day	5.83	8.27	6.38	8.52
Water loss in gallons per connection per day	29.39	43.22	42.71	59.07
Infrastructure leakage index (>= 3,000 connections)	2.53	3.18	2.26	2.85
Total gallons per capita per day	106	132	117	136
Gallons per capita per day loss	12	16	16	23
Real loss cost	$ 4,616	$ 113,247	$ 30,069	$ 390,661
Apparent loss cost	$ 7,256	$ 163,557	$ 18,400	$ 156,761

Source: https://www.twdb.texas.gov/conservation/municipal/waterloss/historical-annual-report.asp

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Chapter 2.

Current and Projected Population and Water Demand

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Chapter 2. Current and Projected Population and Water Demand

The initial step of the overall planning effort is to quantify existing and future water demands, as described in this chapter. The Texas Water Development Board (TWDB) developed draft population and water demand projections for the 50-year planning horizon (2030 through 2080). Each planning cycle, TWDB provides draft projections to each regional planning group for review. Each regional planning group works with TWDB to refine the draft demand projections based on local or regional knowledge and may submit requests for revisions. If the revision requests meet TWDB guidelines and provide appropriate justification, TWDB will approve and adopt the revised projections for use in the planning process.

A brief overview of the methodology for updating demand projections for this round of planning is provided within this chapter. Complete details are available on the TWDB website at https://www.twdb.texas.gov/waterplanning/data/projections/methodology/index.asp.

In subsequent chapters of this plan, demand projections are compared with estimates of currently available water supplies (**Chapter 3**) to identify water needs (**Chapter 4**) and water management strategies to meet these needs (**Chapter 5**).

For this planning cycle, TWDB distributed draft demand projections to the regional planning groups via a series of formal communications from January 2022 through May 2023:

- January 2022 – Draft livestock, manufacturing, and steam-electric power demand projections
- August 2022 – Draft irrigation and mining demand projections
- January 2023 – Draft municipal demand projections for the full-migration scenario
- February 2023 – Draft municipal demand projections for the half-migration scenario
- May 2023 – Revised plumbing code savings

These TWDB communications included details of the projection methodologies and specific steps that regional planning groups must follow to request revisions to the projections, if determined necessary by the planning groups. The Region K Population and Water Demand Committee analyzed all TWDB-provided draft population and water demand projections. Upon review of the draft projections, the committee recommended revisions to the population and water demand projections for all water use categories except Livestock and Steam-Electric. Once requested revisions were submitted to TWDB and the requests were reviewed by the Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, and the Texas Department of Agriculture, final projections were considered for approval and adopted by TWDB's Board in the Fall of 2023. Further details are provided in the subsections which follow.

As part of the planning process, TWDB rules require that projection analyses be performed for each identified municipal and non-municipal Water User Group. Municipal Water User Groups are defined as:

a. Privately owned utilities that provide an average of more than 100 acre-feet per year for municipal use for all owned water systems;
b. Water systems serving institutions or facilities owned by the state or federal government that provide more than 100 acre-feet per year for municipal use;

c. All other Retail Public Utilities not covered in (a) and (b) that provide more than 100 acre-feet per year for municipal use;
d. Collective Reporting Units, or groups of Retail Public Utilities that have a common association and are requested for inclusion by the RWPG; and
e. Municipal and domestic water use, referred to as County-Other, not included in (a)-(d).

Non-municipal Water User Groups include manufacturing, irrigation, steam-electric power generation, mining, and livestock water use. Demand for each non-municipal category are further subdivided and identified by county (i.e., Burnet County Mining, Travis County Manufacturing, etc.).

As part of the planning process, each regional planning group identifies or designates Major Water Providers and Wholesale Water Providers. Major Water Providers are defined as a Water User Group or Wholesale Water Provider of particular significance to the region's water supply, as determined by the regional planning group. Wholesale Water Providers are defined as persons or entities having contracts to sell any volume of water wholesale. There are two Major Water Providers within Region K: the Lower Colorado River Authority and the City of Austin. Associated water demands for these Major Water Providers are identified within this plan and discussed in detail in **Section 2.4** of this chapter.

2.1 Population Projections

Historically, the primary driver for increases in total municipal water demand has been population growth. However, the growing use of conservation strategies (as further discussed in Chapter 5 of this plan) has dampened the rate of increased water use; in other words, conservation strategies have resulted in smaller unit increases in water use for a given amount of population increase.

Establishing accurate population estimates and projections is a fundamental step in the regional water planning process. Estimated population growth is of particular importance in Region K, where strong population growth is occurring and is anticipated to continue, with the largest increases in population occurring in the City of Austin and surrounding metropolitan areas.

TWDB draft population projections were based on Texas Demographic Center projections. These projections included both full-migration and half-migration scenarios extending to 2060. The full-migration scenario was used to extend the projections through 2080. Projections for individual Water User Groups were developed by sub-allocating the population from region-county projections to each Water User Group. For the first time in the history of regional water planning, TWDB's draft population projections followed the trends projected by the Texas Demographic Center, including declines. For previous planning cycles, population projections reflected zero growth even when the Texas Demographic Center projected declines.

The Population and Water Demand Committee for the Lower Colorado Regional Water Planning Group relied on regional knowledge and solicited input from county and Water User Group representatives to determine the need for revisions to the TWDB draft population projections. TWDB required that revision requests be supported by specific data criteria, such as evidence of an undercount by the US Census Bureau or expansion of a service area due to annexation activities. Region K requested revisions to certain population projections based on the information received. TWDB reviewed the request and approved the majority of the requested population revisions. Further details are provided in **Appendix 2.A,** which contains the population and demand revision requests as submitted to TWDB. The final TWDB-approved population projections are summarized in the following section and provided in **Appendix 2.B**.

Projections of population growth in the Lower Colorado Region indicate a nearly 96 percent increase in total population from approximately 2.2 million in 2030 to 4.3 million in the year 2080 (**Figure 2.1**). Population in half of the counties is projected to grow over the planning period, with Travis County accounting for most of the total regional population (**Table 2.1**). As the greater Austin metropolitan area grows, counties such as Bastrop, Hays, and Williamson account for substantial population increases in the planning region. Notably, slower population growth and even population decline is projected in the other Region K counties, including but not limited to Colorado, Matagorda, Mills, and San Saba counties.

Figure 2.1 Population Projections for Region K (2030-2080)

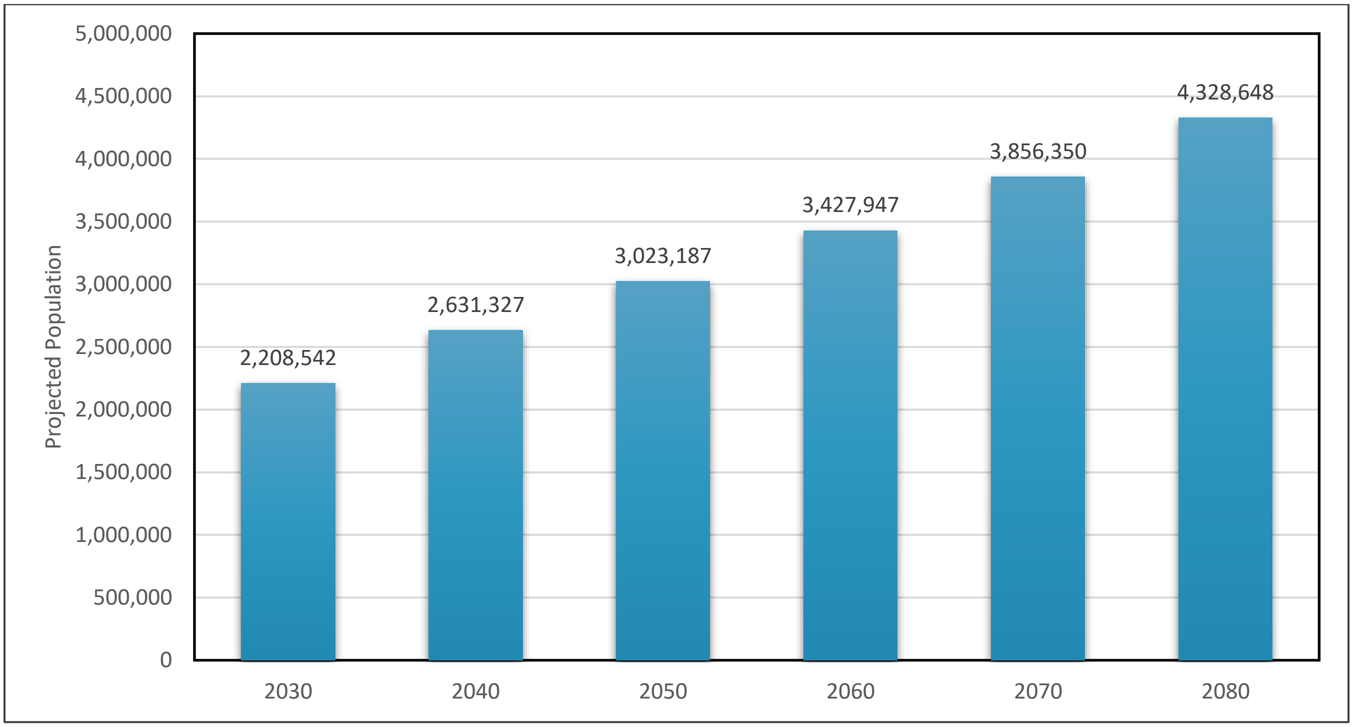


Table 2.1 Projected Population by County

County	2030	2040	2050	2060	2070	2080
Bastrop	120,901	150,018	184,520	223,711	268,126	318,461
Blanco	11,851	11,951	11,731	11,518	11,277	11,004
Burnet	55,262	60,627	65,257	70,323	76,064	82,570
Colorado	19,985	19,396	18,742	18,145	17,468	16,701
Fayette	24,270	23,782	23,237	23,121	22,990	22,842
Gillespie	28,366	29,831	31,307	33,419	35,813	38,526
Hays	95,467	137,717	193,353	268,868	354,449	451,437
Llano	23,089	23,892	24,399	25,729	27,236	28,944
Matagorda	35,212	34,061	32,705	31,115	29,313	27,271
Mills	4,177	3,870	3,550	3,350	3,140	2,919
San Saba	5,439	5,159	4,906	4,736	4,557	4,369
Travis	1,655,086	1,969,741	2,230,906	2,474,606	2,720,449	2,985,821
Wharton	25,098	24,970	24,550	24,030	23,441	22,773
Williamson	104,339	136,312	174,024	215,276	262,027	315,010
Total	2,208,542	2,631,327	3,023,187	3,427,947	3,856,350	4,328,648

The regional planning area covers a portion of four major river basins and two coastal basins, and population projections for each basin are shown in **Table 2.2**. Of the six basins within Region K, the majority resides in the Colorado River Basin throughout the planning horizon. In the year 2080, approximately 91 percent of the total population is projected to reside within the Colorado River Basin, constituting a substantial demand on the water resources within that basin.

Table 2.2 Projected Population by Basin

Basin	2030	2040	2050	2060	2070	2080
Brazos River	116,510	149,795	189,722	233,476	283,099	339,356
Brazos-Colorado Coastal	44,471	43,876	42,998	41,991	40,842	39,514
Colorado River	2,018,198	2,408,996	2,762,895	3,125,965	3,507,030	3,925,634
Colorado-Lavaca Coastal	10,080	9,419	8,634	7,717	6,687	5,542
Guadalupe River	8,482	8,888	9,082	9,314	9,614	9,969
Lavaca River	10,801	10,353	9,856	9,484	9,078	8,633
Total for Region K	2,208,542	2,631,327	3,023,187	3,427,947	3,856,350	4,328,648

2.2 Water Demand Projections

Total water demand for the Lower Colorado Region is projected to increase 27 percent from approximately 1.14 million acre-feet per year in 2030 to approximately 1.45 million acre-feet per year by 2080 (**Figure 2.2a***)*. Municipal, manufacturing, and mining demands are projected to grow due to population growth and associated economic activity (**Figures 2.2b** and **2.3**). However, several other categories of water use demand are projected to decline or remain constant (Figures 2.2b and 2.3). For instance, irrigation water demand constitutes 50 percent of the region's total water demand in 2030, but will decrease to only 35 percent of the region's total demand by 2080.

Figure 2.2a Projected Total Water Demand

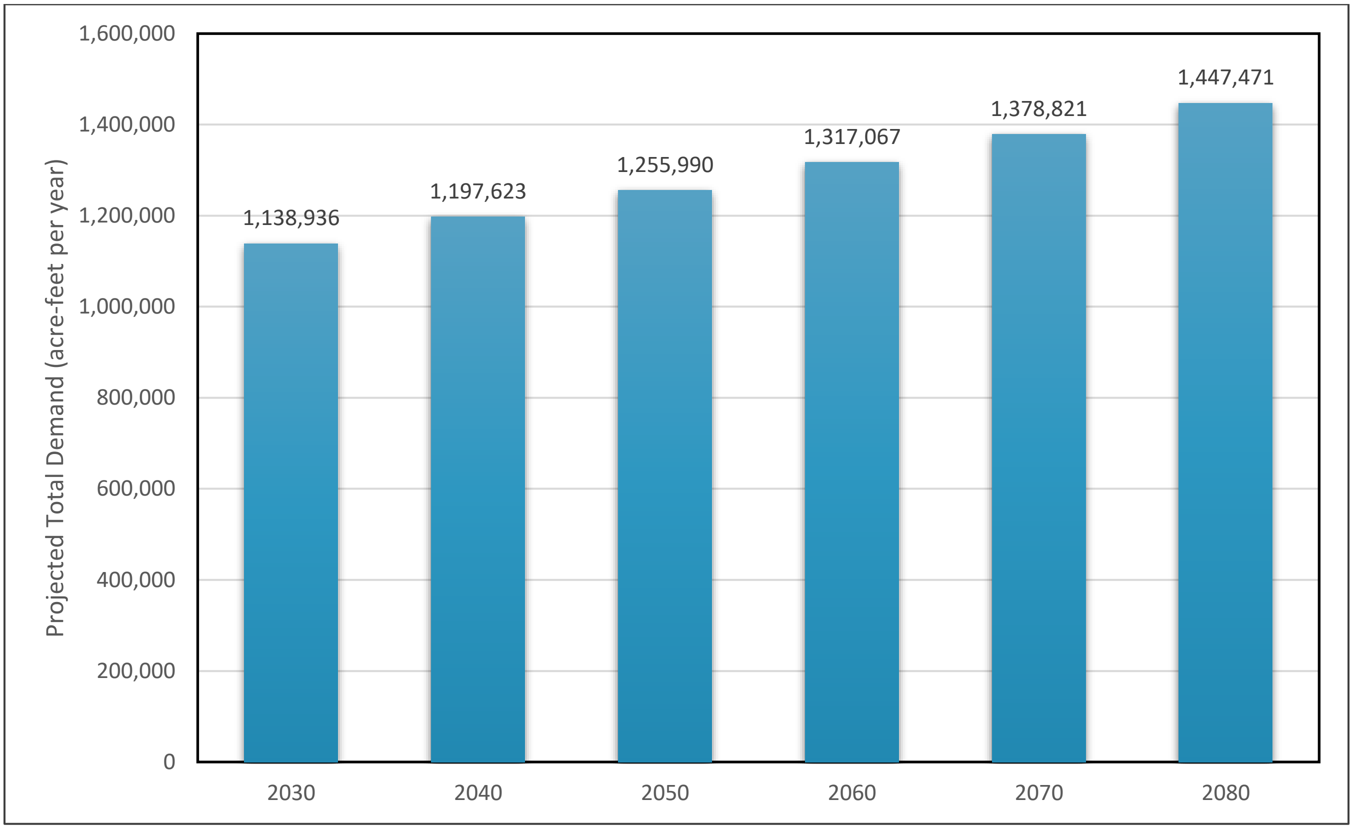


Figure 2.2b Projected Total Water Demand by Type of Use

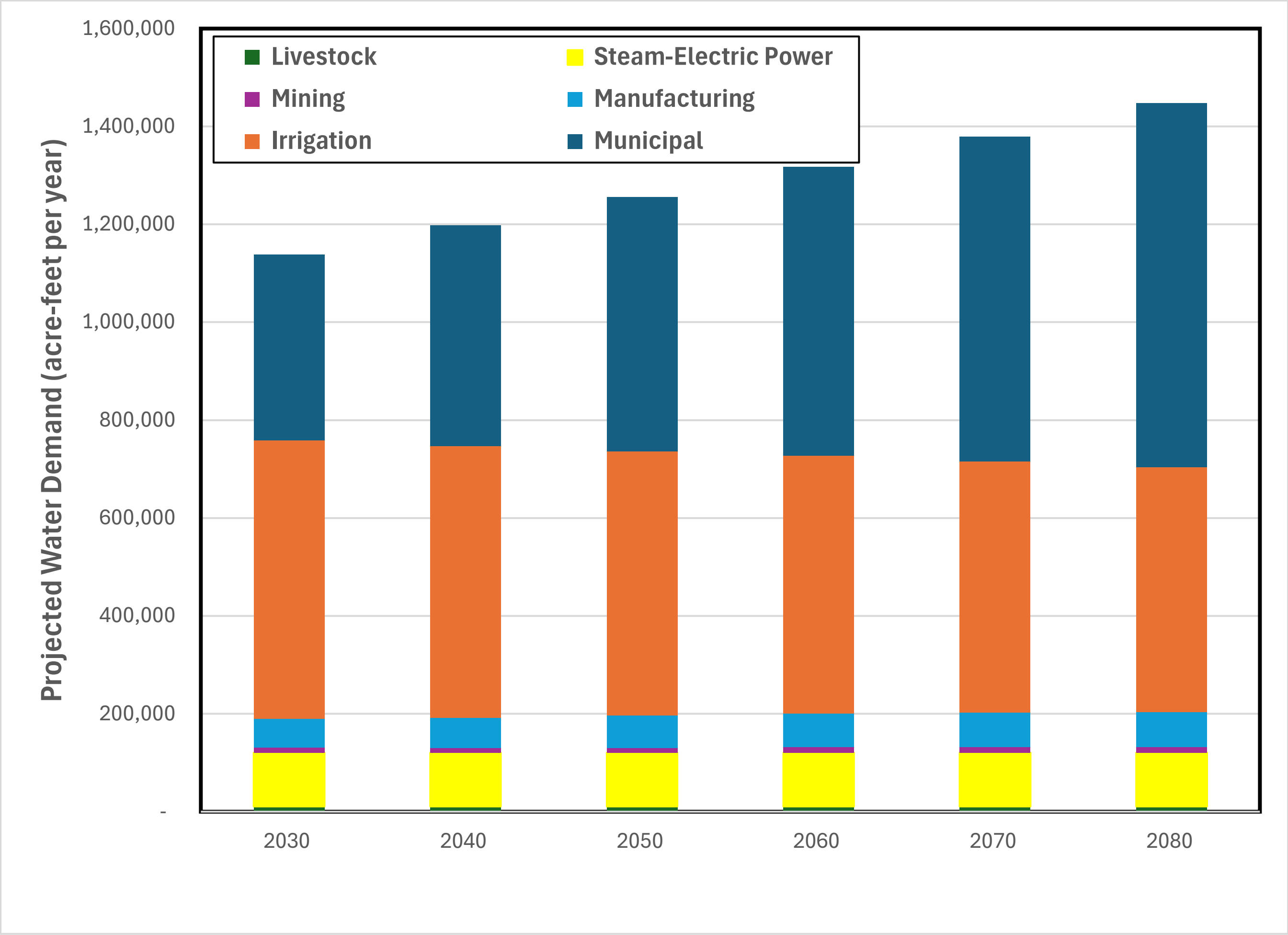
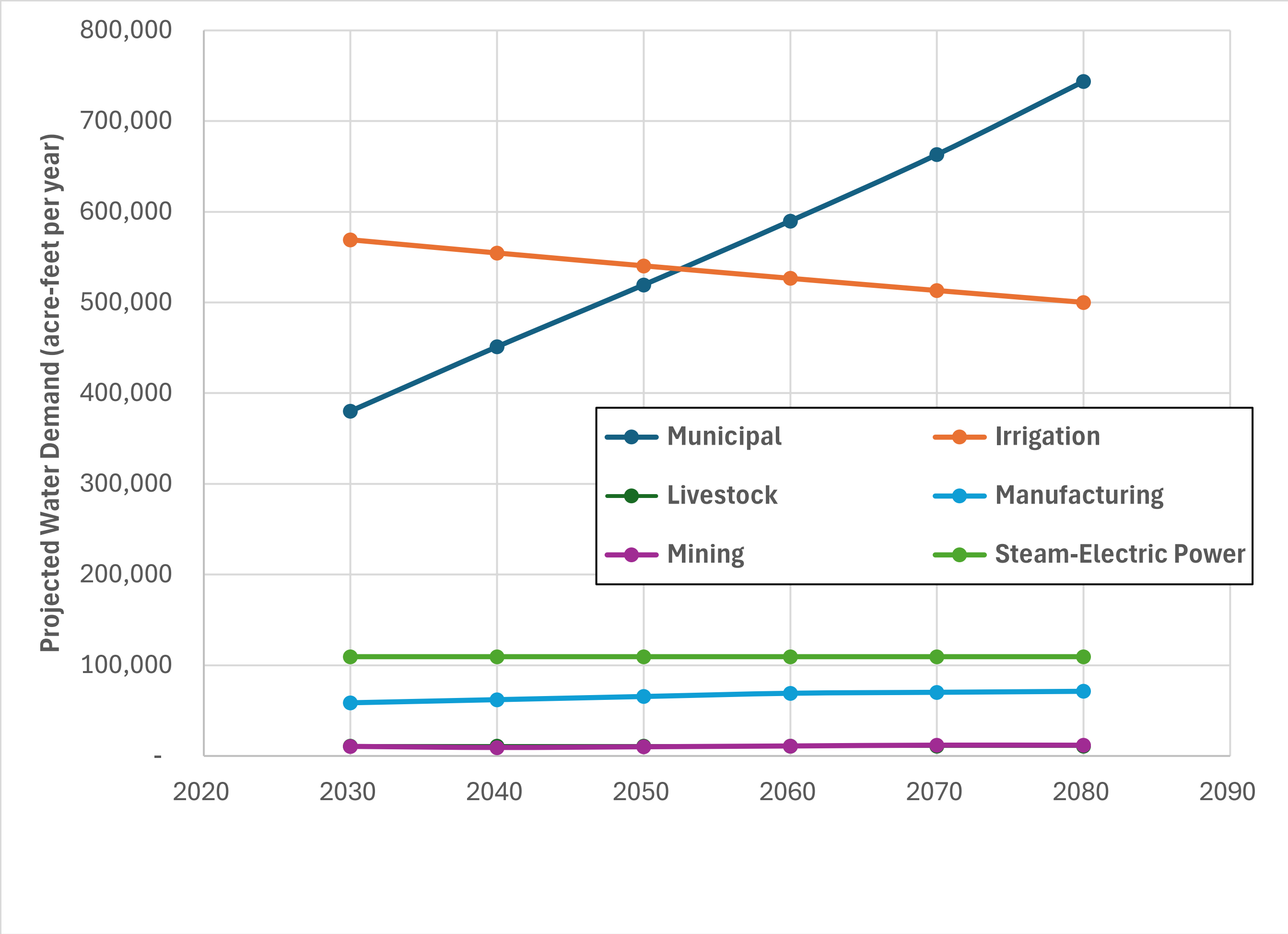


Figure 2.3 Projected Water Demand by Type of Use



2.2.1 Municipal Demand Projections

Municipal water use includes both residential and commercial use. Residential use includes single and multi-family housing. Commercial use is composed of water used by small businesses, institutions, and public offices. It does not include water used by industry. After population projections were established for each Water User Group (as identified in **Section 2.1**), the second key variable in the TWDB's municipal water demand projections methodology is per capita daily use, which represents the average number of gallons of water used per person per day (also noted commonly as gallons per capita daily and abbreviated as the unit GPCD). Municipal water demand projections are the product of population projections and per capita daily use projections for each water user group.

For the 2026 planning cycle, the baseline GPCDs represent historical "dry-year" water use minus accumulated plumbing code savings ($GPCD_{base}$). The GPCD was drafted for Water User Groups by carrying over the GPCD from the 2021 Regional Water Plans (RWPs) minus estimated accumulated plumbing code savings. The baseline GPCDs in the 2021 RWPs were carried over from the 2016 RWP and mostly represented the historically dry year 2011, although some Water User Group baseline GPCDs in the 2021 RWPs were revised by the planning groups to use more recent "dry-year" utility-based water use. All new Water User Groups in the 2026 RWPs baseline GPCD were drafted using 2018 net water use from the TWDB Water Use Survey and estimated population from the U.S. Census Bureau. When calculating the $GPCD_{base}$ or the projected per-person water use values, the TWDB staff applied a minimum of 60 GPCD for each Water User Group. In addition to the GPCD revisions, there were a few requests from Water User Groups to revise the water demand projections that were not related to population or GPCD changes (Appendix 2.A).

These municipal water demand projections were adopted by TWDB for use in the 2026 Lower Colorado Regional Water Plan and are presented for each municipal Water User Group by county, river basin, and decade in Appendix 2.B. The GPCD values and the calculated municipal water demand savings due to plumbing codes and water-efficient appliances for Region K can be found in **Appendix 2.C**.

Municipal water demand for the Lower Colorado Region is projected to increase by approximately 363,500 acre-feet per year from 2030 through 2080, as shown in **Figure 2.4**. Due to the TWDB's water efficiency savings assumptions associated with plumbing code (passive) savings, Water User Groups' GPCD reduces somewhat significantly between the Water User Groups' baseline GPCD year and the year 2030. A small additional increment of plumbing code savings is incorporated in the 2040 GPCD, but no additional plumbing code savings are included beyond 2040. The increases or decreases in demand projections after 2040 are solely proportional to the projected change in population. The most substantive municipal demand increases are projected to occur in the City of Austin and surrounding metropolitan areas, including Travis, Bastrop, Hays, and Williamson counties. The distribution of municipal water demand projections for all 14 counties in the Lower Colorado Region is presented in **Table 2.3**.

The majority of current and projected municipal water demand is located in the Colorado River Basin, approximately 93 percent by 2080. These municipal water demand projections correlate with the population centers of the region and are shown by river basin in **Table 2.4**.

Figure 2.4 Municipal Demand Projections

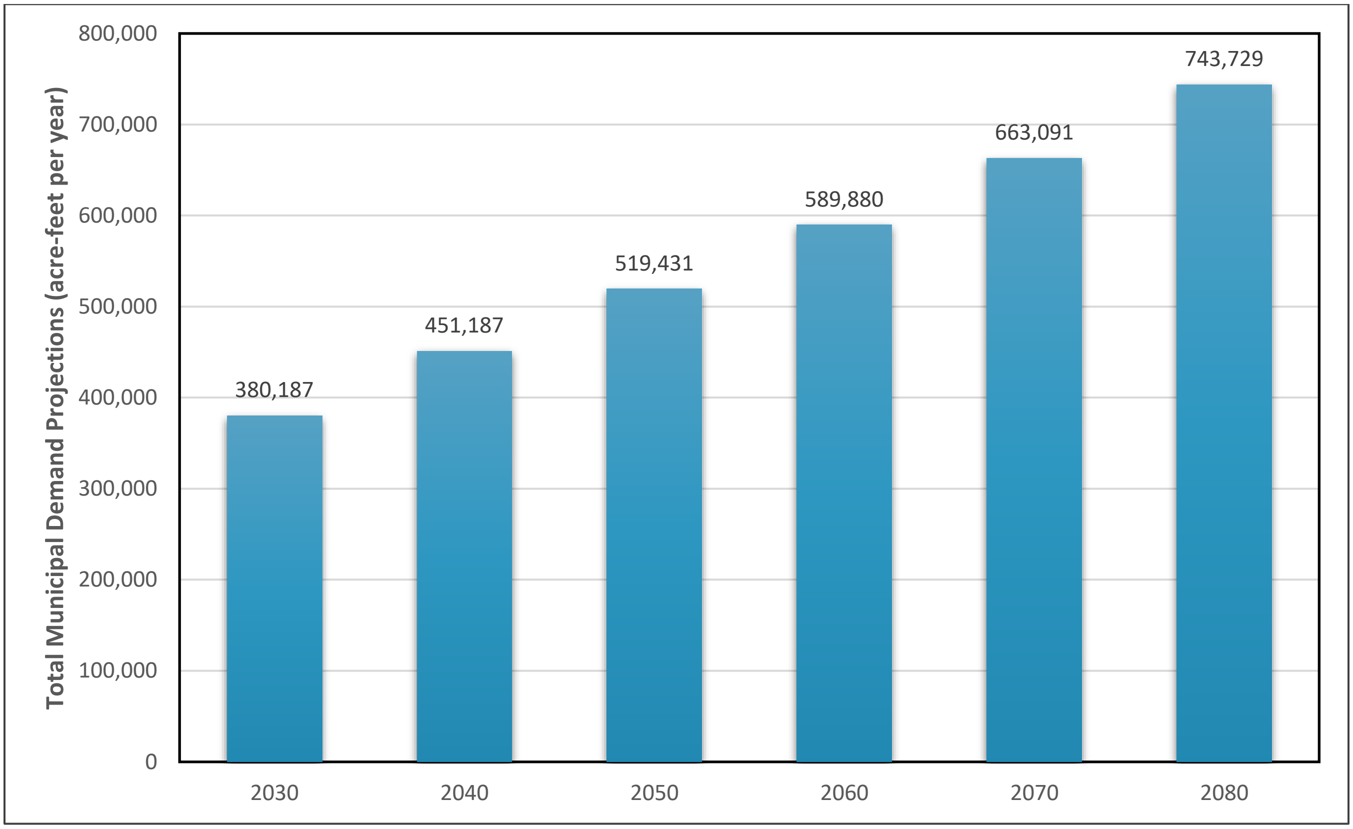


Table 2.3 Municipal Demand Projections by County

County	2030	2040	2050	2060	2070	2080
Bastrop	19,160	23,658	29,089	35,281	42,435	50,636
Blanco	1,620	1,632	1,609	1,589	1,565	1,537
Burnet	11,227	12,647	13,522	14,481	15,565	16,772
Colorado	3,214	3,129	3,046	2,967	2,878	2,773
Fayette	3,799	3,720	3,651	3,642	3,633	3,621
Gillespie	5,016	5,202	5,411	5,705	6,039	6,419
Hays	17,856	25,314	35,046	47,767	61,814	77,741
Llano	4,361	4,507	4,608	4,871	5,170	5,507
Matagorda	4,511	4,374	4,240	4,083	3,904	3,698
Mills	951	910	869	843	814	783
San Saba	1,703	1,639	1,587	1,551	1,519	1,491
Travis	285,882	338,313	384,281	427,734	470,613	516,889
Wharton	3,720	3,683	3,608	3,522	3,426	3,316
Williamson	17,167	22,459	28,864	35,844	43,716	52,546
Total	**380,187**	**451,187**	**519,431**	**589,880**	**663,091**	**743,729**

Table 2.4 Municipal Demand Projections by Basin

Basin	2030	2040	2050	2060	2070	2080
Brazos River	19,442	25,055	31,902	39,379	47,821	57,298
Brazos-Colorado Coastal	6,239	6,144	6,033	5,910	5,770	5,608
Colorado River	350,386	415,960	477,591	540,799	605,828	677,279
Colorado-Lavaca Coastal	1,120	1,047	965	871	766	646
Guadalupe River	1,156	1,204	1,229	1,259	1,299	1,349
Lavaca River	1,844	1,777	1,711	1,662	1,607	1,549
Total	**380,187**	**451,187**	**519,431**	**589,880**	**663,091**	**743,729**

2.2.2 Manufacturing Demand Projections

For regional water planning purposes, manufacturing water use is considered to be the cumulative water demand by county and river basin for all industries within each North American Industry Classification System manufacturing sector as calculated by the TWDB. The TWDB's manufacturing water use estimates are obtained from manufacturing facilities that complete TWDB Water Use Surveys and from manufacturing use volumes reported by surveyed municipal water suppliers. Facilities with smaller uses that are supplied by municipal utilities and cannot easily be tracked separately are included in municipal water demands. For some WUGs, this inclusion accounts for a significant difference between the residential GPCD and the total GPCD. The Water Use Survey captures manufacturing use volumes that are either self-supplied (from groundwater, brackish groundwater, surface water, reuse water sources), or purchased from a utility. Any water sold to another user is subtracted to arrive at net use.

For this planning cycle, TWDB developed the draft manufacturing water demand projections for 2019 based on the highest water use volume for each county from 2015-2019 (subtotal baseline water demand), using data from the annual water use survey plus an estimate of non-surveyed water use. Non-surveyed water use was determined using the U.S. Census Bureau's County Business Patterns for 2019 and an inventory of the industries from the Water Use Survey. An estimate of unaccounted water use by the North American Industry Classification System sector was allocated to each county based on the County Business Patterns data. The combined subtotal baseline plus the unaccounted water use results in the baseline water demand for the year 2019. The board then applied the statewide annual historical water use rate of change from 2010 to 2019 as a proxy to adjust the baseline for the 2030 demand.

The 2026 regional water plan projections departed from the approach used in the previous planning cycle, where the manufacturing demands were held constant from 2030 to 2070. For the long-term projection of manufacturing demand, a statewide manufacturing growth proxy of 0.37 percent per year was applied to each county to project increases in manufacturing water demand per decade from 2040 to 2080.

Region K requested specific modifications to the baseline and future decade projections for Burnet County, Matagorda County, and Travis County based on local knowledge of manufacturing demands in these counties. Further details are provided in Appendix 2.A, which contains the "Region K – Non-Municipal Demands Projections" Memorandum submitted to the TWDB along with the requested adjustment in the demand projections.

These manufacturing water demand projections were adopted by the TWDB for use in the 2026 Lower Colorado Regional Water Plan and are presented by county, river basin, and decade in Appendix 2.B.

Annual manufacturing water demand in the Lower Colorado Region is projected to increase from 58,602 acre-feet per year in 2030 to 71,293 acre-feet per year in 2080. These demands are predominantly associated with existing and future anticipated industries in Travis County and Matagorda County. The projected total regional manufacturing demand is shown in **Figure 2.5** and projected manufacturing water demand by county is shown in **Table 2.5**.

Figure 2.5 Lower Colorado Region Manufacturing Demand Projections

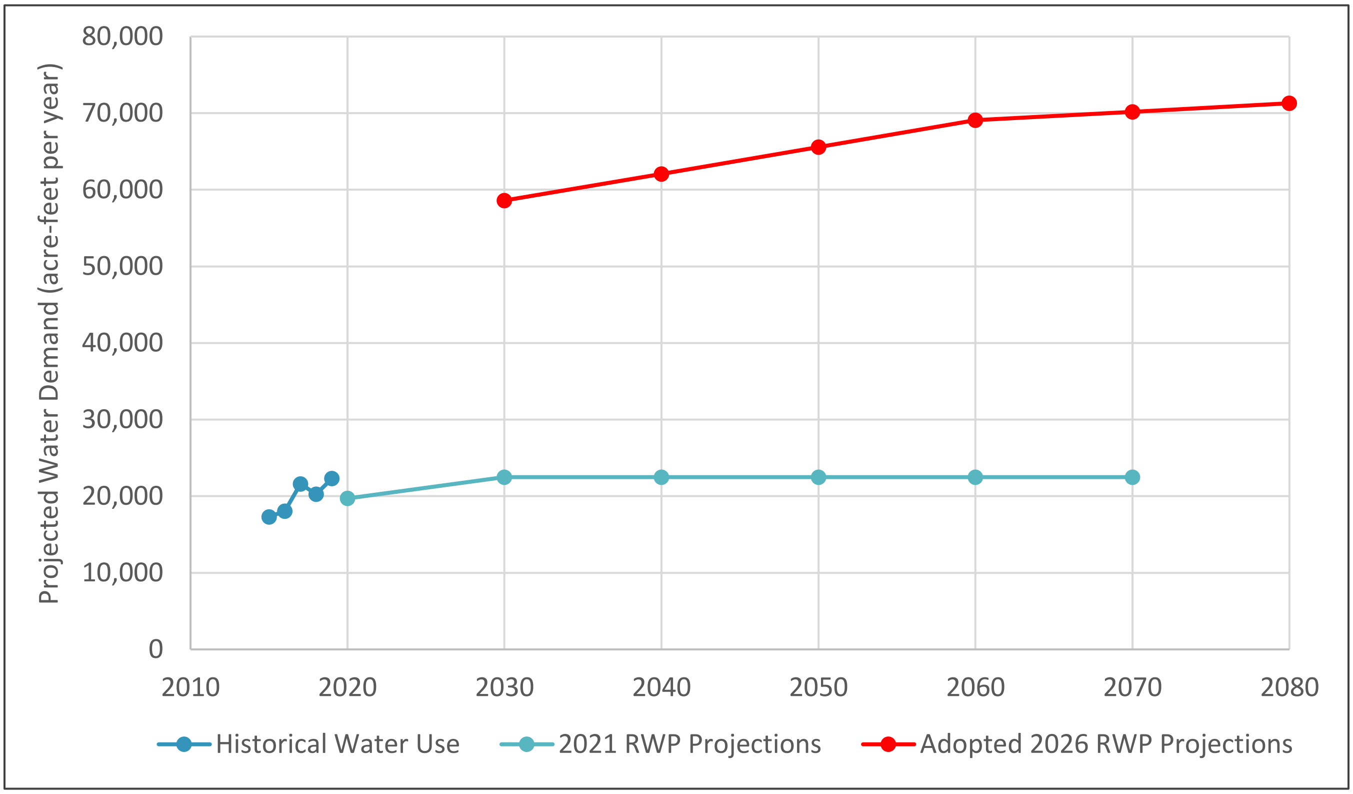


Table 2.5 Manufacturing Demand Projections by County (ac-ft/yr)

County	2030	2040	2050	2060	2070	2080
Bastrop	414	429	445	461	478	496
Blanco	16	17	18	19	20	21
Burnet	556	562	568	574	580	587
Colorado	593	615	638	662	686	711
Fayette	399	414	429	445	461	478
Gillespie	388	402	417	432	448	465
Hays	78	85	92	99	106	114
Llano	3	3	3	3	3	3
Matagorda	36,678	36,951	37,234	37,528	37,832	38,148
Mills	2	2	2	2	2	2
San Saba	19	20	21	22	23	24
Travis	19,363	22,470	25,599	28,752	29,429	30,131
Wharton	79	82	85	88	91	94
Williamson	14	15	16	17	18	19
Total	**58,602**	**62,067**	**65,567**	**69,104**	**70,177**	**71,293**

2.2.3 Irrigation Demand Projections

For this planning cycle, the methodology proposed by the TWDB to develop the draft irrigation water demand projections was to take the average irrigation water use estimate by county for the years 2015-2019 (baseline irrigation demand) and hold it constant for the 2030 to 2080 planning decades, unless constrained by the modeled available groundwater.

The Region K Population and Water Demand Committee met several times to review and discuss the draft irrigation water demand projections, specifically with respect to the demands for Colorado County, Matagorda County, and Wharton County (Region K portion), and determined that the draft irrigation demand projections were not representative of a dry/drought year irrigation demand. For these three counties, the TWDB Draft irrigation demand would be about 57 percent of the irrigation demand projected for the region in the 2021 planning cycle. The Region K Population and Water Demand Committee was concerned that the TWDB demand methodology did not adequately address the following elements:

- Canal system losses and on-farm distribution system losses.
- Actual water use for irrigation of both first and second crop rice.
- Water use for other crops and uses not specifically captured by the Farm Service Agency data.
- Concern that the Farm Service Agency data is incomplete or not adequately reported.

A methodology was proposed that would separately address surface water demand and groundwater demand. This methodology is documented in the Memorandum "Region K Non-Municipal Demands – Irrigation" which is included in Appendix 2.A. The Committee also adopted a decadal decrease of 2.7 percent to be applied to projected irrigation water demands instead of keeping the projections flat. This percent decrease is consistent with observed historical increases in irrigation efficiency.

The proposed irrigation water demand projections were adopted by the TWDB for use in the 2026 Lower Colorado Regional Water Plan and are presented by county, river basin, and decade in Appendix 2.B.

Irrigation water demand for the Lower Colorado Region is projected to decrease from 569,177 acre-feet per year in 2030 to 500,155 acre-feet per year in 2080. Irrigation water demand is concentrated in Colorado, Matagorda, and Wharton counties and is largely used to meet irrigation needs for rice farming. Over the next 50 years, a decrease in irrigation water demand is projected due to improvements in irrigation efficiency and reductions in irrigated acres due to urbanization, although economics and world agricultural conditions play a role that could either increase or decrease irrigation demands. Projected regional irrigation demands are shown in **Figure 2.6** and demands by county are shown in **Table 2.6.**

Figure 2.6 Lower Colorado Region Irrigation Demand Projections

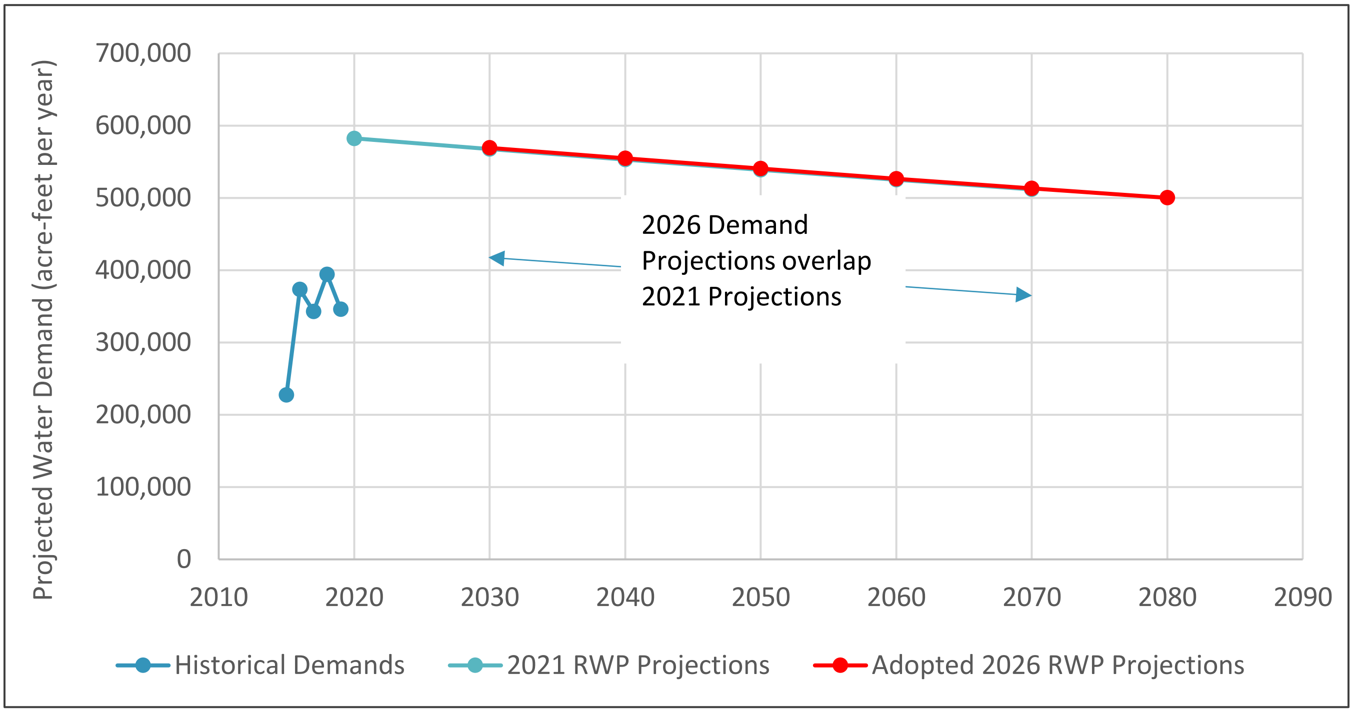


Table 2.6 Irrigation Demand Projections by County

County	2030	2040	2050	2060	2070	2080
Bastrop	4,761	4,761	4,761	4,761	4,761	4,761
Blanco	1,914	1,914	1,914	1,914	1,914	1,914
Burnet	1,991	1,991	1,991	1,991	1,991	1,991
Colorado	162,081	157,704	153,446	149,303	145,272	141,350
Fayette	723	723	723	723	723	723
Gillespie	2,458	2,458	2,458	2,458	2,458	2,458
Hays	383	383	383	383	383	383
Llano	648	648	648	648	648	648
Matagorda	165,964	161,483	157,123	152,881	148,753	144,737
Mills	4,515	4,515	4,515	4,515	4,515	4,515
San Saba	8,087	8,087	8,087	8,087	8,087	8,087

County	2030	2040	2050	2060	2070	2080
Travis	4,061	4,061	4,061	4,061	4,061	4,061
Wharton	211,591	205,878	200,320	194,911	189,648	184,528
Williamson	0	0	0	0	0	0
Total	**569,177**	**554,607**	**540,430**	**526,636**	**513,214**	**500,155**

The Lower Colorado Region's irrigation water demand projections are concentrated in the Brazos-Colorado and Colorado-Lavaca Coastal Basins and the Colorado and Lavaca River Basins and are presented by basin in Appendix 2.B.

2.2.4 Steam-Electric Power Demand Projections

For this planning cycle, the methodology the TWDB used to develop the draft 2030 steam-electric power water demand projections uses the highest water demand volume from 2015-2019 Water Use Survey, adjusted by near-term additions and retirements of generating facilities and holding the projected water demand constant through 2080.

The Lower Colorado Regional Water Planning Group Population and Water Demand Committee reviewed the draft projections and determined that the proposed projections for 2030-2080 should be recommended to the planning group for adoption. Some consideration was given to reducing water demand for steam electric power generation in Fayette County and Travis County due to potential generator shut-downs, but the group elected to retain these demands for potential replacement power generation water demand that will be needed to support a growing population and increases in manufacturing demand for power. Further details are provided in Appendix 2.A.

These steam-electric power water demand projections were adopted by the TWDB for use in the 2026 Lower Colorado Regional Water Plan and are presented by county, river basin, and decade in Appendix 2.B.

Steam-electric power water demand is projected to remain constant at 109,451 acre-feet per year from 2030 to 2070 (**Figure 2.7**). Projected steam-electric power water demand for each county is shown in **Table 2.7**. The majority of steam-electric power water demand is in Matagorda County, which makes up over 60 percent of total steam-electric power water demand in Region K. Fayette County is the next largest steam-electric power water demand center in Region K, followed by Bastrop, Wharton, and Travis counties.

Figure 2.7 Region K Steam-Electric Demand Projections

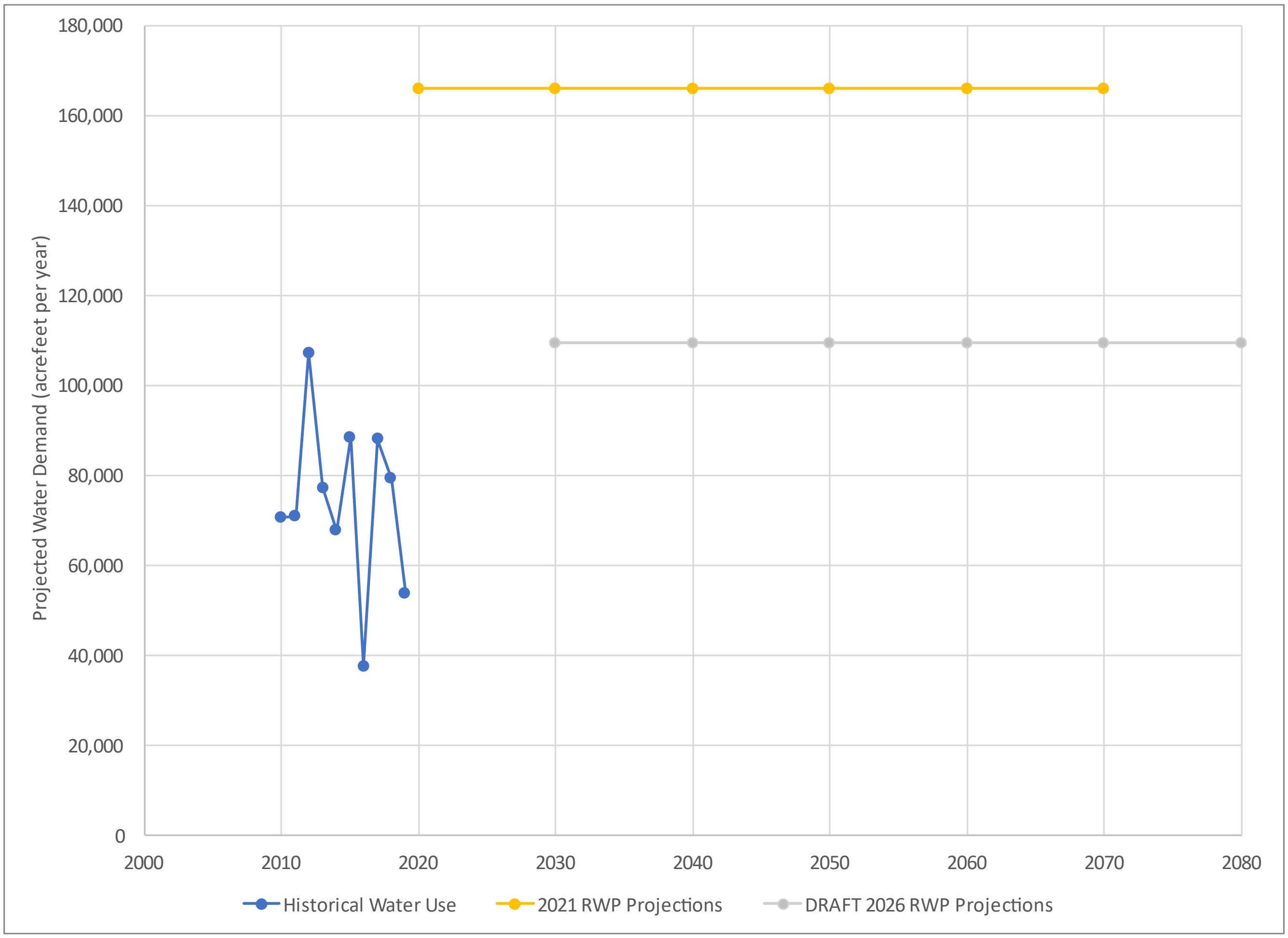


Table 2.7 Steam-Electric Demand Projections by County

County	2030 2080
Bastrop	7,764
Blanco	0
Burnet	0
Colorado	226
Fayette	20,052
Gillespie	0
Hays	0
Llano	1,927
Matagorda	67,453
Mills	0
San Saba	0
Travis	4,116
Wharton	7,913
Williamson	0
Total	**109,451**

The majority of the Lower Colorado Region's steam-electric power generation facilities are located along the Colorado River, and nearly all steam-electric power water demands are within the Colorado River Basin.

2.2.5 Livestock Demand Projections

The draft livestock water demand projections for the 2026 Regional Water Plans were based upon the five-year average annual water use estimates (2015 through 2019), by county, developed by the TWDB for the various livestock species. Additionally, TWDB incorporated the average historical use from livestock-related facilities (e.g., finfish farming and fish hatcheries, aquaculture) during the 2015-2019 period into the livestock demand projections. In Region K, this included demand from the Inks Dam National Fish Hatchery in Burnet County. Livestock water demand increase rates, if any, approved during the previous water planning cycle were applied to the five-year average annual water use estimates for counties in Region K to project their demands from 2030 to 2080. In all Region K counties, the projected demand was estimated to be the five-year average annual water use from 2015 to 2019 and was held constant from 2030 to 2080.

The Lower Colorado Regional Water Planning Group did not request any revisions to the TWDB draft livestock water demand projections. These livestock water demand projections were adopted by the TWDB for use in the 2026 Lower Colorado Regional Water Plan and are presented by county, river basin, and decade in **Appendix 2.B**.

Livestock water demand for the Lower Colorado Region represents a small portion of total regional water demand and is projected to remain constant over the 50-year planning period. This constant projected demand of 10,988 acre-feet per year is reflected in **Figure 2.8**. Livestock water demand by county is presented in **Table 2.8**, with rural counties generally showing more livestock water demand.

Figure 2.8 Lower Colorado Region Livestock Demand Projections

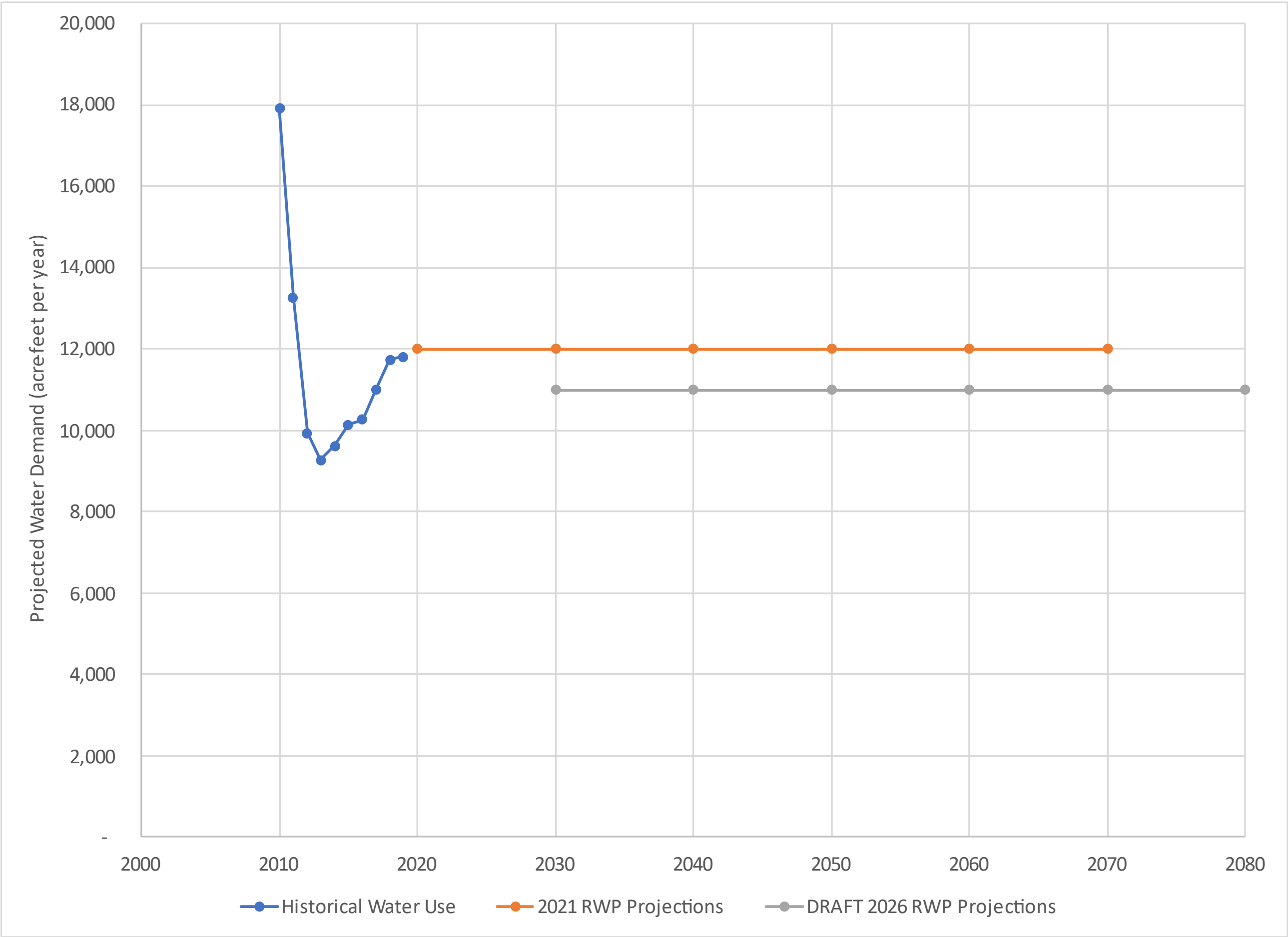


Table 2.8 Livestock Demand Projections by County

County	2030 2080
Bastrop	1,250
Blanco	355
Burnet	795
Colorado	1,279
Fayette	1,693
Gillespie	1,002
Hays	116
Llano	628
Matagorda	959
Mills	822
San Saba	893
Travis	400
Wharton	780
Williamson	16
Total	**10,988**

2.2.6 Mining Demand Projections

The TWDB draft mining water demand projections for the 2026 Regional Water Plans were developed from the 2022 TWDB Mining Water Use Study (Reedy and Scanlon, 2022). The study used different methods to develop projections for each mining water use category: oil and gas, aggregate mining, and coal mining. These methods are outlined in greater detail in the 2022 TWDB Mining Water Use Study. The Mining Water Use Study projects mining use in Region K to increase from 7,103 acre-feet per year in 2030 to 9,748 acre-feet per year in 2080 due to increased projected demand for water by aggregate mining while the demand for water to support oil and gas mining is projected to decrease.

The Region K Population and Water Demand Committee reviewed the draft projections and determined that revisions should be requested for Burnet, Hays, and Llano counties (**Appendix 2.C**). The Region K planning group approved and submitted the request for revisions to TWDB. TWDB approved and adopted the revised mining demand projections.

Mining water demands for the Lower Colorado Region are projected to increase from 10,531 acre-feet per year in 2030 to 11,854 acre-feet per year by 2070 (**Figure 2.9**). The projected mining water demand for each county is shown in **Table 2.9**. As in other areas of Texas, hydraulic fracturing activities are expected to influence mining water demands in the future, although this activity is difficult to anticipate and quantify in many instances.

Figure 2.9 Lower Colorado Region Mining Demand Projections

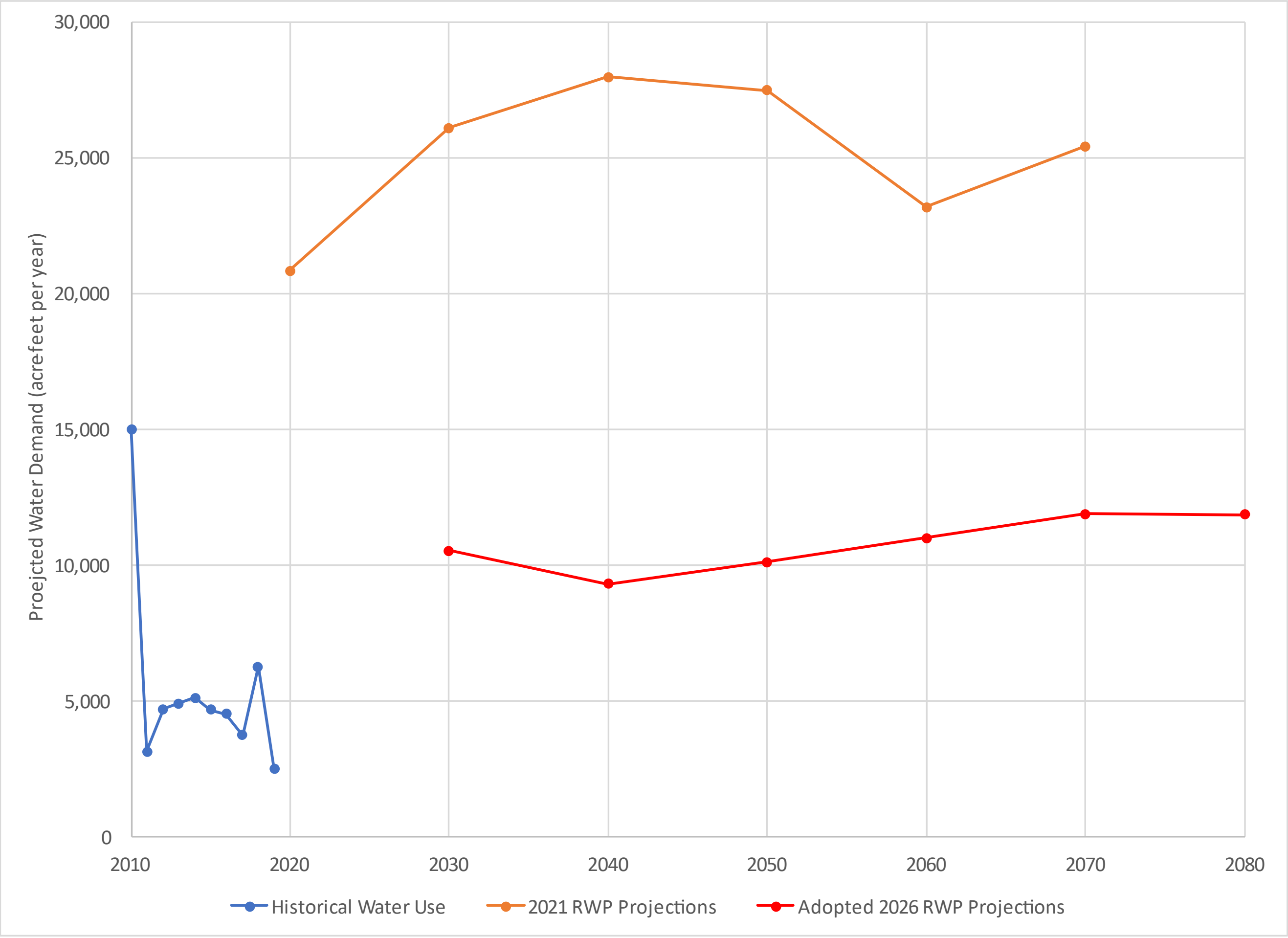


Table 2.9 Mining Demand Projections by County

County	2030	2040	2050	2060	2070	2080
Bastrop	388	467	567	694	852	1,050
Blanco	9	9	10	10	10	10
Burnet	1,029	1,245	1,427	1,602	1,755	1,887
Colorado	2,773	2,857	2,977	3,078	3,176	3,263
Fayette	934	934	934	934	934	2
Gillespie	19	20	21	23	24	25
Hays	959	983	1,005	1,038	1,074	1,113
Llano	2,214	250	246	254	262	271
Matagorda	1	1	1	1	1	1
Mills	108	111	115	120	124	130
San Saba	-	-	-	-	-	-
Travis	551	622	676	722	772	830
Wharton	2	2	2	2	2	2
Williamson	1,544	1,823	2,142	2,530	2,914	3,270
Total	**10,531**	**9,324**	**10,123**	**11,008**	**11,900**	**11,854**

Mining water demand in the Lower Colorado Region is predominantly located in the Colorado River Basin, and the demands by river basin are shown in Appendix 2.B.

2.3 Environmental Water Demands

Although there is not an environmental water use category in TWDB rules for regional water planning, environmental water demands are recognized as a significant consideration by the Lower Colorado Regional Water Planning Group. Environmental water demands are considered important to preserve a healthy aquatic ecosystem within the region. Lower Colorado River Authority (LCRA) considers environmental demands as a portion of a 33,460 acre-feet per year commitment from 2030 to 2080. They have allocated this amount to address the LCRA commitment to satisfy environmental flows, even though most surface water rights in the Colorado river basin pre-date the environmental flows requirements. As such, those permits for diversion of surface water do not explicitly address instream flow requirements. While no other quantitative environmental demand is explicitly considered as part of the planning process, environmental flows are an important consideration when evaluating water management strategies, as discussed later in Chapter 5.

2.4 Demands for Major Water Providers

The two Major Water Providers for the 2026 Region K Plan are the City of Austin and the Lower Colorado River Authority. Associated water demands for these Major Water Providers are identified within the Plan. Austin is also a water customer of the Lower Colorado River Authority; together, these entities supply a large portion of the Lower Colorado Region's water needs.

The intent of TWDB water planning requirements is to ensure that there is an adequate future supply of water for each entity that receives all or a significant portion of its current water supply from another entity. This requires an analysis of projected water demands and currently available water supplies for the primary supplier, each of its wholesale customers, and all of the suppliers in the aggregate as a "system." For example, a utility that serves both retail customers within its service area, as well as other nearby public water systems, would need to have a supply source(s) that is adequate for the combined total of future retail water sales and future wholesale water sales. If there is a "system" deficit currently or in the future, then recommendations are to be included in the regional water plan with regard to strategies for meeting the "system" deficit.

2.4.1 Austin Water Demand Projections

Austin Water provides water on both a retail and wholesale basis for municipal, manufacturing, and steam-electric water uses. The utility's existing service area covers portions of Travis, Williamson, and Hays counties, as shown in Figure 1.19. Municipal and manufacturing water demands for the Austin utility are presented in **Table 2.10**. These water demands consist of Austin's retail and wholesale service area water demands and commitments. The wholesale commitments represent contract amounts as reported by Austin. For a complete list of the City's wholesale water commitments, refer to Chapter 3.

Table 2.10 Projected Municipal and Manufacturing Demands and Supply Commitments for Austin Service Area

City of Austin Service Area Water User Groups (WUGs) retail and wholesale	County	Water Demands / Supply Commitments					
		2030	2040	2050	2060	2070	2080
Austin	Hays	22	26	30	34	38	42
Wholesale Commitments:	**Hays**	**119**	**0**	**0**	**0**	**0**	**0**
Mid-Tex Utility	Hays	119	0	0	0	0	0
Austin	Travis	191,812	223,243	255,604	287,768	317,536	348,767
County-Other	Travis	0	0	0	0	0	0
Manufacturing* (COA portion is 100%)	Travis	19,363	22,470	25,599	28,752	29,429	30,131
Wholesale Commitments:	**Travis**	**3,943**	**0**	**0**	**0**	**0**	**0**
Creedmoor-Maha WSC*	Travis	238	0	0	0	0	0
Mid-Tex Utility	Travis	208	0	0	0	0	0
North Austin MUD#1	Travis	96	0	0	0	0	0
Northtown MUD	Travis	665	0	0	0	0	0
Rollingwood	Travis	401	0	0	0	0	0
Shady Hollow MUD	Travis	585	0	0	0	0	0
Sunset Valley	Travis	286	0	0	0	0	0
Wells Branch MUD	Travis	1,464	0	0	0	0	0
Austin	Williamson	16,159	21,070	27,735	34,595	41,937	49,401
County-Other (All COA Retail)	Williamson	0	369	90	206	735	2,101
Manufacturing	Williamson	14	15	16	17	18	19
Wholesale Commitments:	**Williamson**	**924**	**0**	**0**	**0**	**0**	**0**
North Austin MUD#1	*Williamson*	*889*	*0*	*0*	*0*	*0*	*0*
Wells Branch MUD	*Williamson*	*35*	*0*	*0*	*0*	*0*	*0*
Total		232,356	267,193	309,074	351,372	389,693	430,461

* These WUGs also have other sources of supply.

Austin's projected steam-electric water demands in Fayette and Travis counties are presented in **Table 2.11**. Austin's portion of the South Texas Project demand is included in the South Texas Project total steam-electric demand in Matagorda County.

Table 2.11 Projected Steam-Electric Water Demands for Austin Service Area

Austin Service Area Water User Groups	County	2030	2040	2050	2060	2070	2080
Steam-Electric*	Fayette**	10,300	10,300	10,300	10,300	10,300	10,300
Steam-Electric*	Travis	4,116	4,116	4,116	4,116	4,116	4,116
Steam-Electric Total		**14,416**	**14,416**	**14,416**	**14,416**	**14,416**	**14,416**

** COA's portion of the STP demand is included in the STP total steam-electric demand in Matagorda County*

*** COA portion - based on estimated supply levels and approved projections.*

2.4.2 Lower Colorado River Authority Demand Projections

The Lower Colorado River Authority supplies water for municipal, agricultural (irrigation), manufacturing, steam-electric, mining, and other water uses. The Lower Colorado River Authority currently supplies water to entities in Bastrop, Burnet, Colorado, Fayette, Hays, Lampasas (Region G), Llano, Matagorda, San Saba, Travis, Wharton, and Williamson (the portion of Williamson in Region G) counties. A summary of Lower Colorado River Authority firm commitments to water user groups in the Lower Colorado Region (Region K) and Region G is provided in **Table 2.12**. Projected irrigation demands in the Lower Basin using water supplies from Lower Colorado River Authority is provided in **Table 2.13**.

Most of Williamson County is outside the Lower Colorado River watershed, but House Bill 1437 authorizes Lower Colorado River Authority to provide water to entities in the county in some circumstances.

The Texas Legislature passed HB 1437 in 1999. The bill authorizes Lower Colorado River Authority to transfer up to 25,000 acre-feet per year of water to Williamson County if the transfer results in "no net loss" of water to the lower Colorado River basin. "No net loss" means an amount of water equal to that transferred is conserved, replaced, or offset. Lower Colorado River Authority has a contract with the Brazos River Authority for 25,000 acre-feet of water, as shown below in Table 2.12. The water demands associated with this water supply are not included in Region K but are accounted for in the Region G *Brazos Regional Water Plan*. Accounting related to this provision is included in an annual report produced by Lower Colorado River Authority (*2023 Annual Report: House Bill 1437 Agricultural Water Conservation Program*).

HB 1437 also establishes a conservation surcharge on water contracted under this bill. The surcharge funds conservation projects that result in "no net loss" of water to the basin. Water conserved using this mechanism will be reflected in the regional water plan either within the projected water demands or as water management strategies used to meet water needs.

The municipal County-Other water commitments actually consist of water that is supplied to several smaller retail water customers.

Table 2.12 Lower Colorado River Authority Expected Firm Water Commitments

County/WUG	LCRA Firm Commitments[1] (ac ft per year)					
	2030	2040	2050	2060	2070	2080
Austin[2]	137,891	137,668	137,668	137,668	137,668	137,668
Brazos River Authority	25,000	25,000	25,000	25,000	25,000	25,000
Briarcliff	400	400	400	400	400	400
Burnet	4,100	4,100	4,100	4,100	4,100	4,100
Cedar Park	23,000	23,000	23,000	23,000	23,000	23,000
Corix Utilities Texas Inc	1,140	1,140	1,140	1,140	1,140	1,140
Cottonwood Shores	495	495	495	495	495	495
County-Other, Bastrop	744	744	744	744	744	744
County-Other, Burnet	1,141	1,141	1,141	1,141	1,141	1,141
County-Other, Fayette	27	27	27	27	27	27
County-Other, Gillespie	66	66	66	66	66	66
County-Other, Hays	2,546	2,546	2,546	2,546	2,546	2,546
County-Other, Llano	692	692	692	692	692	692
County-Other, San Saba	20	20	20	20	20	20
County-Other, Travis	12,706	12,706	12,706	12,706	12,706	12,706
Cypress Ranch WCID 1	436	436	436	436	436	436
Environmental Commitments[3]	33,440	33,440	33,440	33,440	33,440	33,440
Granite Shoals	830	830	830	830	830	830
Horseshoe Bay	4,450	4,450	4,450	4,450	4,450	4,450
Hurst Creek MUD	1,200	1,200	1,200	1,200	1,200	1,200
Irrigation, Bastrop	782	782	782	782	782	782
Irrigation, Burnet	377	377	377	377	377	377
Irrigation, Colorado (Garwood)[4]	100,000	100,000	100,000	100,000	100,000	100,000
Irrigation, Llano	1,665	1,665	1,665	1,665	1,665	1,665
Irrigation, Travis	3,465	3,465	3,465	3,465	3,465	3,465
Jonestown WSC	750	750	750	750	750	750
Kingsland WSC	1,150	1,150	1,150	1,150	1,150	1,150
Lago Vista	4,500	4,500	4,500	4,500	4,500	4,500
Lakeway MUD	3,069	3,069	3,069	3,069	3,069	3,069
Leander	31,000	31,000	31,000	31,000	31,000	31,000
Loop 360 WSC	1,250	1,250	1,250	1,250	1,250	1,250
Manufacturing, Burnet	400	400	400	40	400	400
Manufacturing, Fayette	70	70	70	70	70	70
Manufacturing, Matagorda	33,802	33,802	33,802	33,802	33,802	33,802
Manufacturing, Travis	276	276	276	276	276	276
Marble Falls	7,000	7,000	7,000	7,000	7,000	7,000
Pflugerville	24,000	24,000	24,000	24,000	24,000	24,000
Steam-Electric Power, Bastrop	4,544	4,544	4,544	4,544	4,544	4,544
Steam-Electric Power, Fayette	30,500	30,500	30,500	30,500	30,500	30,500
Steam-Electric Power, Matagorda[5]	24,544	24,544	24,544	24,544	24,544	24,544

County/WUG	LCRA Firm Commitments[1] (ac ft per year)					
	2030	2040	2050	2060	2070	2080
Sunrise Beach Village	200	200	200	200	200	200
Travis County MUD 10	96	96	96	96	96	96
Travis County MUD 4	4,316	4,316	4,316	4,316	4,316	4,316
Travis County WCID 10	3,644	3,644	3,644	3,644	3,644	3,644
Travis County WCID 17	11,300	11,300	11,300	11,300	11,300	11,300
Travis County WCID 18	1,400	1,400	1,400	1,400	1,400	1,400
Travis County WCID 20	534	534	534	534	534	534
Travis County WCID Point Venture	285	285	285	285	285	285
Undine Development	203	203	203	203	203	203
West Travis County Public Utility Agency[6]	13,950	13,950	13,950	13,950	13,950	13,950
Headwaters at Barton Creek[6]	506	506	506	506	506	506
Reunion Ranch[6]	350	350	350	350	350	350
Hays County WCID 1[6]	717	717	717	717	717	717
Hays County WCID 2[6]	684	684	684	684	684	684
Travis County MUD 12 (Rough Hollow)[6]	1,680	1,680	1,680	1,680	1,680	1,680
Lazy Nine MUD 1[6]	974	974	974	974	974	974
Dripping Springs WSC[6]	1,126	1,126	1,126	1,126	1,126	1,126
Senna Hills MUD[6]	404	404	404	404	404	404
Travis County MUD 18[6]	336	336	336	336	336	336
Total	**566,173**	**565,950**	**565,950**	**565,950**	**565,950**	**565,950**

[1] The firm commitments listed in this table are based on the LCRA contractual obligations as of October 1, 2024.

[2] The values in this line item are based on the Region K Cutoff Model results, reflecting the amount of LCRA backup supplies required to supplement Austin's municipal water rights, up to a maximum of 325,000 acre-feet per year.

[3] The amount of firm water allocated for environmental purposes is not available for consumptive use.

[4] This line item includes 100,000 ac-ft per year reserved for irrigation use under LCRA's purchase agreement with the Garwood Agricultural Division.

[5] The Matagorda Steam Electric value is based on the Region K Cutoff Model results, showing the average annual amount of LCRA backup supplies required to supplement the STPNOC/LCRA water right.

[6] West Travis County PUA has contracts with multiple Water User Groups (WUGs) in Hays and Travis Counties for treatment and transport/delivery of water. These WUGs also have firm water contracts with and are supplied through LCRA. Some water users with contracts with LCRA and West Travis County PUA are not named WUGs and are included in the County-Other totals, including Eanes ISD (included in the County-Other, Travis), the City of Dripping Springs (included in County-Other, Hays), and Lake Pointe MUD (included in County-Other, Travis).

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Chapter 3.

Evaluation of Current Water Supplies in the Region

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Chapter 3. Evaluation of Current Water Supplies in the Region

A key task in the preparation of the Lower Colorado Regional Water Plan (Region K Plan) is to determine the current available water supplies within the region. This information, when compared to the water demand projections, is critical in projecting water supply needs and surpluses for the region, including the amount of need, when a need is expected to occur, and the county in which the need is expected.

As presented in Chapter 2, the expected water demand in the Lower Colorado Regional Water Planning Area (Region K) is projected to increase by approximately 17 percent, while the population is projected to nearly double over the next 50 years. Therefore, the need to accurately identify available water supplies is a critical component of developing the regional plan.

The methods used to develop estimates of currently available water supplies for Region K are described in this chapter, along with summary of regional water supplies by county, major water providers, and the six TWDB-specified water-use categories.

TWDB guidance states that the estimates of currently available water supplies shall reflect water that is reliably available during a repeat of Drought of Record conditions. The definition of Drought of Record is “the period of time when historical records indicate that natural hydrological conditions would have provided the least amount of water supply,” per TAC Title 31, Part 10, Chapter 357, Subchapter A, Rule 357.10. Specific methods used to determine available supply vary depending upon whether it is a groundwater or surface water resource. A summary of relevant TWDB guidelines and methods for estimating available water supply are presented in the following sections.

According to TWDB guidelines, there are five basic types of water supplies within Region K:

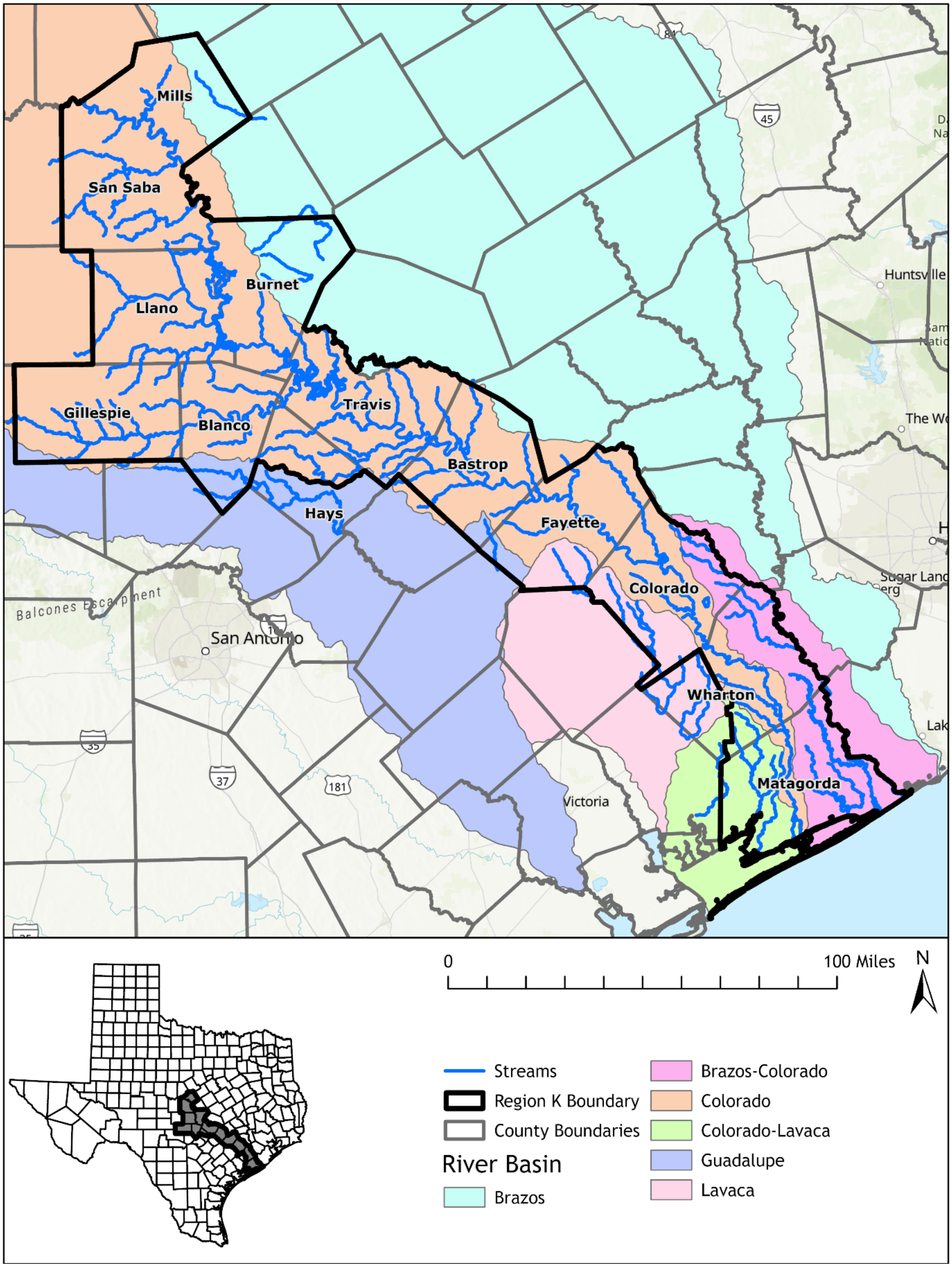
1. Surface water supplies
2. Groundwater supplies
3. Supplies available through contractual arrangements
4. Supplies available through the operation of a system of reservoirs or other supplies
5. Reclaimed water

Supplies from the last three categories originated from either surface or groundwater sources; therefore, all available water supplies are discussed in terms of their origin source: either surface or groundwater.

3.1 Surface Water Availability

Region K extends across six different river basins, including the Brazos, Brazos-Colorado Coastal, Colorado, Colorado-Lavaca Coastal, Lavaca, and Guadalupe River Basins (**Figure 3.1**). Available water sources from each river basin, along with the methods used to determine availability, are presented in the following subsections.

Figure 3.1 River Basins within the Lower Colorado Regional Water Planning Area (Region K)



Surface water sources include rivers, streams, creeks, lakes, ponds, and tanks. In the State of Texas, all waters contained in a watercourse (defined as having a defined bed and banks, a current of water, and a permanent source of supply, and includes rivers, natural streams, and lakes, and the storm water, flood water, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed) are waters of the State and thus belong to the State. The State grants individuals, municipalities, water suppliers, industries, and others the right to divert and beneficially use this water through water rights permits. Water rights are considered property rights and can be bought, sold, or transferred with State approval. All of these permits are issued based on the concept of prior appropriation, or "first-in-time, first-in-right." Water rights issued by the State generally fall into two major categories:

- Run-of-River Rights – Allow diversions of water directly from a water body as long as there is water in the watercourse and that water is not needed to meet a senior downstream water right or reserved for environmental flows. Availability is greatly impacted by drought conditions, particularly in the upper portions of a river basin.
- Stored Water Rights – Allow the impoundment of water by an owner in a reservoir. Water can be stored in a reservoir as long as the inflow is not needed to meet a senior downstream water right or reserved for environmental flows. Legally stored water not needed for senior water rights or environmental flows at the time of impoundment cannot be called on by senior water rights at a later date for other uses. Water stored in the reservoir can be withdrawn by the permittee at a later date to meet its or its customers' water demands. The storage of water in a reservoir gives the permittee a buffer against drought conditions.

A list of active water rights within Region K is provided in **Appendix 3.A**.

For certain uses, such as domestic and livestock use, waters of the State may be used without a water right permit. Landowners are also allowed to construct impoundments on their own property with up to 200 acre-feet of storage for domestic and livestock or certain wildlife management purposes (see Section 11.142, Texas Water Code). For purposes of this Regional Water Plan, these types of water sources are generally referred to as "Local Supply Sources." Many individuals with land along a river or stream that have a riparian right can divert a reasonable amount of water for domestic and livestock uses without a permit. In general, water captured or diverted for domestic and livestock purposes is difficult to quantify.

Surface water availability was determined using the Water Availability Models as per the TWDB guidelines. The Water Availability Models were developed for the purpose of reviewing and granting new surface water rights permits using a hypothetical repetition of historical hydrology. The results from the modeling for regional water planning are used for planning purposes only and do not affect the right of an existing water right holder to divert and use the full amount of water authorized by its permit. The Water Availability Model uses the following assumptions to determine the surface water available from each source:

- Surface water *source* availability is estimated based on a "firm yield" analysis. For an individual reservoir, firm yield is defined as the maximum water volume a reservoir can provide each year under a repeat of the Drought of Record using anticipated sedimentation rates and assuming that: all senior water rights divert at their full authorized amounts, no return flows, and all applicable permit conditions are met (for example, environmental flow commitments). A reservoir system, such as the Highland Lakes, uses the same assumptions, except the firm yield volume would be based on the average annual withdrawals during a simulated repeat of Drought of Record conditions. In addition, the firm yield calculations for Region K do not assume any reserve water in the reservoir during a Drought of Record. For run-of-river water rights, the yield corresponds to the amount of water available in the worst single hydrologic year on record (which is currently 2011 for the majority of run-of-river water rights in Region K).

- Water *supply* availability is based on the infrastructure that is currently in place. For example, water in a reservoir without an existing intake and pipeline to convey the water would not be considered a current supply.

3.1.1 Colorado River Basin

The majority of the Region K Planning Area lies within the Colorado River Basin. The primary sources of surface water within this basin are the Highland Lakes and run-of-river water from the Colorado River. However, several Water User Groups obtain water from tributaries or small off-channel reservoirs, including stock ponds.

For planning purposes, surface water availability was determined by using a modified version of the Texas Commission on Environmental Quality's Water Availability Model Run 3 to better reflect current and future water conditions in the region. The TWDB water planning guidelines provide regional planners with the flexibility to request variances (termed Hydrologic Variance Requests) to the standard water supply modeling framework to address local issues related to current or future water supply modeling assumptions. This is the fifth planning cycle in which the TWDB has approved Region K to use a modified version of the Texas Commission on Environmental Quality Colorado River Basin Water Availability Model Run 3 to determine surface water availability in the region. The modified version of the Water Availability Model is termed the Region K Supply Evaluation Model (previously termed the Region K Cutoff Model). This model was initially developed during the 2011 planning cycle. It was updated for use during the 2016, 2021 planning cycle and, most recently, for use during this 2026 planning cycle.

The Region K Supply Evaluation Model divides the Colorado River Basin into two parts: an upper basin and a lower basin. The dividing points between the upper and lower basins are the dams for Ivie Reservoir and Lake Brownwood. Most of the area in the upper basin part of the Region K Supply Evaluation Model is in Region F. Within the Region K Supply Evaluation Model, water is first distributed to water rights in the upper basin (Region F) based on the relative priority of those rights to each other, without passing any water to senior rights in the lower basin (Region K). Next, the water rights below Ivie Reservoir and Lake Brownwood are modeled based on their priority dates. As a result, no water rights downstream of the dividing points make prior appropriation calls on water rights upstream of the dividing points. All the water rights are represented with their full authorization amounts. This model reflects the actual and historical water management of the basin and existing contractual agreements between Lower Colorado River Authority and certain upper basin water right holders.[1]

All model runs used the January 2021 version of the Water Rights Analysis Package Simulation Model, developed by Dr. Ralph Wurbs at Texas A&M University.

The Region K Planning Group formed a Water Modeling Committee (Table 1.1b) to review and provide feedback on the modeling (primarily surface water modeling) being developed by the Technical Consultant team. This Region K Water Modeling Committee met a total of six times this planning cycle and Committee meeting minutes are provided in **Appendix 3.B**. A description of the Region K Supply Evaluation Model can be found in **Appendix 3.C**, along with the Hydrologic Variance Request and approval letters from TWDB allowing the use of the Region K Supply Evaluation Model. The model used prior to the 2011 planning cycle is discussed in detail in the 2006 and 2011 Region K plans. A table describing the hydrologic models used for developing supplies, evaluating strategies and assessing cumulative impacts can be found in **Appendix 3.D**.

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[1] The City of Junction (Lake Junction) and City of Brady, (Brady Creek Lake) water rights are not included in the Region K Supply Evaluation Model under the cutoff assumption, due to the fact that these entities do not have existing formal agreements in place regarding prior appropriation calls on water impoundments.

3.1.1.1 Highland Lakes System

Lower Colorado River Authority operates the Highland Lakes System, consisting of Lakes Buchanan, Inks, LBJ, Marble Falls, Travis and Austin. Lakes Buchanan and Travis are major water supply reservoirs, while the other lakes are generally used as pass-through lakes. Lower Colorado River Authority holds the water rights for each lake except for Lake Austin, which is owned by the City of Austin but operated by Lower Colorado River Authority.

Lower Colorado River Authority operates the Highland Lakes as a system to provide reliable water to its customers. Lower Colorado River Authority has developed a "Water Management Plan for Lakes Buchanan and Travis" in response the final order of adjudication of water rights for Lakes Buchanan and Travis. The Water Management Plan was originally adopted in 1989 and has been amended several times, with the most recent update in 2020. In the Water Management Plan, Lower Colorado River Authority determines the combined firm yield of Lakes Buchanan and Travis through a simulated repeat of historical drought conditions. The Region K Supply Evaluation Model includes the operating rules for Lakes Buchanan and Travis that reflect combined firm yield operations from the Water Management Plan.

The Lower Colorado River Authority's approved 2020 Water Management Plan also provides the basis for determining the amount of interruptible water supply that can be made available in any given year while protecting the availability of water for firm demands in a simulated repeat of Drought of Record conditions. For the firm yield analysis for the Regional Water Plan, the Region K Supply Evaluation Model does not incorporate the Lower Colorado River Authority interruptible supplies or explicit modeling of environmental flow support. Firm yield is defined as the maximum water volume a reservoir can provide each year under a repeat of the Drought of Record using anticipated sedimentation rates and assuming that all senior water rights are totally utilized and all applicable permit conditions are met. The Lower Colorado River Authority 2020 Water Management Plan is an operational plan that does not assume the full utilization of Lower Colorado River Authority's water rights for meeting near-term projected demands of its firm water supply (i.e., municipal, industrial, and other use categories). Interruptible supplies are available because the firm yield of the system is not used. The Region K Supply Evaluation Model assumes firm yield operation. Therefore, the Region K Supply Evaluation Model does not incorporate the interruptible supply components of the Lower Colorado River Authority 2020 Water Management Plan. Environmental flow support is represented by the commitment of 33,440 acre-feet per year of the firm yield of the system.

The firm yield of the Highland Lakes system was determined using the Region K Supply Evaluation Model and adding up the various components of the firm yield of the system. **Table 3.1** shows the components that make up the firm yield of the Highland Lakes System, which includes contracts that are used for firm water supply contracts as well as contracts that are used to back up water rights by the City of Austin and the South Texas Project Nuclear Operating Company. The firm yields were calculated as the average annual diversion over the 7.5-year Drought of Record period (October 2007 to April 2015) of the Highland Lakes system for the decades 2030 through 2080. The Drought of Record is the period during which the reservoir storage goes from completely full to empty within the simulation period. As shown in Table 3.1, the Highland Lakes yield decreases over time due to sedimentation of the supply reservoirs.

Table 3.1 Components of the Highland Lakes Firm Yield

Entity or Use	Components of the Highland Lakes Firm Yield (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Water Available for Lower Colorado River Authority Firm Contracts and Environmental Commitments[1]	281,074	279,393	277,712	275,866	274,020	272,173
Lower Colorado River Authority Backup of South Texas Project Nuclear Operating Company Run-of-River Water Right	24,544	24,544	24,544	24,544	24,544	24,544
Lower Colorado River Authority Backup of City of Austin Municipal Run-of-River Water Rights[2]	102,591	102,480	102,369	102,369	102,369	102,369
Lower Colorado River Authority Backup of Interruptible Run-of-River Contracts	0	0	0	0	0	0
Total Highland Lakes Firm Yield	**408,209**	**406,417**	**404,625**	**402,779**	**400,933**	**399,086**
Environmental Flow Commitment	(33,440)	(33,440)	(33,440)	(33,440)	(33,440)	(33,440)
Total Highland Lakes Firm Yield Available for Consumptive Use[3]	374,769	372,977	371,185	369,339	367,493	365,646

Notes:
Modeling was conducted using the Colorado Water Availability Model, Run 3 provided by Texas Commission on Environmental Quality (October 2023), with the modifications associated with the Region K Supply Evaluation Model discussed in Section 3.1.1. The hydrology data extends through 2016.
The Drought of Record refers to the period during which reservoir storage goes from full to empty within the simulation period. According to the Texas Commission on Environmental Quality Water Availability Model, the Drought of Record for the Colorado Water Availability Model is between October 2007 and April 2015.
The firm yield is estimated using the average annual available yield during the Drought of Record period.
[1] Includes firm water supplies for municipal, industrial, irrigation, and other water contracts. The firm water allocated for environmental purposes is 33,440 acre-feet/year. This amount is included in this line item.
[2] Amount shown does not include the additional firm water provided by a contractual commitment with Lower Colorado River Authority for Austin's full municipal water supply of 325,000 acre-feet/year.
[3] The firm water allocated for environmental purposes (33,440 acre-feet/year) is excluded from this line item to show the firm yield available for consumptive use allocation purposes.

3.1.1.2 Reservoirs in the Colorado Basin

The estimated firm yields for all existing reservoirs within the Colorado River Basin is shown in **Table 3.2.**

Table 3.2 Reservoir Yields in the Colorado Basin

Reservoir Name or Owner	Reservoir Yields in the Colorado Basin (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Highland Lakes[1]	408,209	406,417	404,625	402,779	400,933	399,086
Arbuckle Reservoir[2]	*	*	*	*	*	*
Goldthwaite	0	0	0	0	0	0
Llano	120	120	120	120	120	120
Walter E. Long (Decker Lake)	0	0	0	0	0	0
Lake Bastrop	0	0	0	0	0	0
Lake Fayette	0	0	0	0	0	0
Lometa	0	0	0	0	0	0
South Texas Project Nuclear Operating Company Reservoir[3]	66,350	66,350	66,350	66,350	66,350	66,350
Lower Colorado River Authority Backup to South Texas Project[4]	(24,544)	(24,544)	(24,544)	(24,544)	(24,544)	(24,544)
Total	**450,135**	**448,343**	**446,551**	**444,705**	**442,859**	**441,012**

Notes:
Modeling was conducted using the Colorado Water Availability Model, Run 3 provided by Texas Commission on Environmental Quality (October 2023). The hydrology data extend through 2016. The Water Rights Analysis Package Simulation Model, developed by Dr. Ralph Wurbs at Texas A&M University, was utilized to simulate water availability, using the January 2021 version of the program.
The Texas Commission on Environmental Quality Region K Model was modified based on the assumption of the Region K Supply Evaluation Model as discussed in Section 3.1.1.
[1] The firm water reserved for environmental commitments (33,440 acre-feet/year) is included in this line item.
[2] The Arbuckle Reservoir is associated with the Gulf Coast run-of-river water right (CA 14-5476), with the availability shown in Table 3.3.
[3] This line item shows the yield with Lower Colorado River Authority contract backup. Stand-alone yield without Lower Colorado River Authority contract backup is 35,500 acre-feet/year.
[4] This line item represents the backup releases from Lower Colorado River Authority to firm up the South Texas Project supplies. This value is deducted from the total reservoir yield, as it is already accounted for in the Highland Lakes yield shown in Line 1 of the table.

The Highland Lakes firm yield is discussed in **Section 3.1.1.1.** The firm yields of other reservoirs in Region K located within the Colorado River Basin were also evaluated using the Region K Supply Evaluation Model. A discussion on model results shown in Table 3.2 follows:

- Lower Colorado River Authority's new lower basin off-channel reservoir (Arbuckle) has been included in the 2026 Region K Water Plan as an existing supply reservoir. The reservoir is located in Wharton County and has a storage capacity of 40,000 acre-feet, with water pumped from the Colorado River to fill it, allowing the capture and storage of a significant amount of water downstream of the Highland Lakes. The benefits of the reservoir are accounted for under the Gulf Coast run-of-river water right (see **Section 3.1.1.3**).
- The City of Goldthwaite owns and operates a two-reservoir system as part of its water supply facilities. The reservoirs include a small reservoir with a capacity of 40 acre-feet adjacent to the river and a larger

reservoir with a capacity of 200 acre-feet, both of which are located off-channel. The city pumps water from the Colorado River into the smaller reservoir and then pumps it into the larger reservoir, from which water is drawn for treatment. Based on the limited storage available, it is estimated that the Goldthwaite reservoir system does not have a reliable supply in Drought of Record conditions (a firm yield of 0 acre-feet/year).

- The City of Llano owns and operates two reservoirs on the Llano River: City Lake and City Park Lake, both of which are formed by small channel dams. The two reservoirs have an authorized storage capacity of 700 acre-feet. Llano has two run-of-river water rights (CoA 14-1650 and 14-1655) on the Llano River that provide firm water during the Drought of Record of 120 acre-feet/year, as shown in Table 3.2. Llano is one of the water right holders that have their Drought of Record water availability significantly affected by the Water Availability Model modeling assumption that senior water right holders simultaneously divert and totally consume the water up to their full authorizations.
- Lake Walter E. Long (Decker Lake) is owned and operated by the City of Austin. The lake is formed by a dam on Decker Creek, which is a tributary to the Colorado River in Travis County. The City of Austin supplements the water supply to Decker Lake by pumping water from the Colorado River using the City's run-of-river rights and a water supply contract with Lower Colorado River Authority. Therefore, because the water from Decker Lake has already been accounted for in run-of-river and Lower Colorado River Authority contract amounts, the firm yield of the lake itself due to the Region K Supply Evaluation Model is considered to be 0 acre-feet/year.
- Lake Bastrop is owned and operated by the Lower Colorado River Authority. The lake is formed by a dam on Spicer Creek, which is a tributary to Piney Creek and the Colorado River in Bastrop County. Currently, Lower Colorado River Authority uses water from Lake Bastrop for cooling purposes at its Sim Gideon Power Plant and the Lost Pines 1 Power Project (collectively called the Lost Pines Power Park). Lake Bastrop is primarily supplied from groundwater, although Lower Colorado River Authority can supplement the water supply at this lake by pumping water released from the Highland Lakes from the Colorado River into Lake Bastrop. The groundwater supply is included as a groundwater source from the Carrizo-Wilcox Aquifer in Bastrop County. Lower Colorado River Authority's groundwater production permit from the Lost Pines Groundwater Conservation District to use groundwater from the Simsboro formation at this site for industrial purposes is for 10,000 acre-feet/year, with a 5-year average of 4,500 acre-feet/year. Because the water from Lake Bastrop has already been accounted for in groundwater and Lower Colorado River Authority Highland Lakes supplies, the firm yield of the lake itself is considered to be 0 acre-feet/year.
- Lake Fayette is owned and operated by the Lower Colorado River Authority. The lake is formed by a dam on Cedar Creek, which is a tributary to the Colorado River in Fayette County. The Lower Colorado River Authority uses water from Lake Fayette for cooling purposes at the Fayette Power Project. The Lower Colorado River Authority supplements the water supply at this lake by pumping water into the reservoir from the Colorado River. A portion of the water pumped is run-of-river water rights held by the City of Austin, which is co-owner in certain facilities at the Fayette Power Project. The remainder of the water pumped into the reservoir is stored water released from the Highland Lakes and/or water can be provided under the Garwood water right permit CA 14-5434. Therefore, because the water from Lake Fayette has already been accounted for in run-of-river and Lower Colorado River Authority Highland Lake amounts, the firm yield of the lake itself is considered to be 0 acre-feet/year.
- Lometa Reservoir is owned by Lower Colorado River Authority and is operated under a long-term agreement with an operating company. The reservoir is formed by a dam on Salt Creek, a tributary to the Colorado River in Lampasas County. Water from Lometa Reservoir is used for municipal purposes within the service area of the Lometa Water System. The reservoir was authorized to have a normal

maximum operating capacity of 554.6 acre-feet. A maximum of 882 acre-feet of water is available for diversion from the Colorado River through an upstream firm water supply contract with Lower Colorado River Authority, including 476 acre-feet for municipal demands and 406 acre-feet to offset evaporative losses. Because this amount is included as part of the Highland Lakes firm yield, the reported firm yield of the Lometa Reservoir is 0 acre-feet/year.

- South Texas Project Nuclear Operating Company operates an off-channel cooling reservoir for the South Texas Project Electric Generating Station in Matagorda County. The Main Cooling Reservoir associated with the South Texas Project Electric Generating System has a surface area of approximately 7,000 acres. At its authorized maximum design operating level, the reservoir holds 202,600 acre-feet per year. Reservoir water is withdrawn from the Colorado River adjacent to the site. Pumping from the river is intermittent, and this diversion normally occurs during periods of higher river flow. The Region K Supply Evaluation Model estimates a firm yield of 66,350 acre-feet per year, assuming water stored in the Highland Lakes system is released to back up the South Texas Project Nuclear Operating Company supplies during periods of low river flow. Without any backup releases from the Highland Lakes system, the standalone firm yield of the South Texas Project Nuclear Operating Company reservoir and its associated run-of-river rights is 35,500 acre-feet per year. Because South Texas Project Nuclear Operating Company has a water supply contract with Lower Colorado River Authority for the South Texas Project Nuclear Operating Company reservoir, the average annual backup releases from the Highland Lakes during the Drought of Record for the Highland Lakes system are included in the Highland Lakes system yield and are subtracted when determining the total yield of Colorado Basin reservoirs in Table 3.2.

3.1.1.3 Run-of-River Supplies

In Texas, the use of water during drought conditions is controlled by the priority system, with the oldest water rights having first call on the flows in the river. The Texas Commission on Environmental Quality Water Availability Models simulate the amount of water available to all permanent water rights, including both reservoir and run-of-river rights according to the doctrine of prior appropriation, assuming that all permanent water rights are appropriating water at their full authorized diversions. For Region K, the Water Availability Models were used to estimate supplies for Water User Groups that use run-of-river supplies. It should be noted that very few run-of-river water rights are fully reliable during Drought of Record conditions using these assumptions. Also, historical use from some run-of-river waters may be higher than shown here because at the time, senior water rights were not making calls for upstream water.

Table 3.3 shows the Drought of Record water availability for the major run-of-river rights along the Colorado River within Region K. The Region K Supply Evaluation Model was used to determine the values in the table. The water availability presented in Table 3.3 for most of the major run-of-river rights is the amount of run-of-river water that would be available during the driest year of the analysis period, which is usually 2011. The Garwood, Lakeside (#1 & 2), Gulf Coast, and Pierce Ranch operations each have both run-of-river and supplemental interruptible supplies from the Highland Lakes. The run-of-river supplies for the run-of-river rights are based on the year with the lowest available water, which for these rights is 2011. Interruptible supplies are assumed not to be available during Drought of Record conditions with the Highland Lakes operating at their firm yield and thus are not included in this analysis.

Austin has two municipal water rights shown in the table, CoA 14-5471 and CoA 14-5489. The water availability for the Austin water rights is based on the average annual water availability during the Drought of Record period (October 2007- April 2015). This average availability was used since Austin has contracted with Lower Colorado River Authority to supply stored water to firm up its run-of-river water rights during drought conditions. Because the Highland Lakes firm yield is averaged over the Drought of Record, including the stored water released for Austin, it is appropriate to average the water rights' availability over the same period. Austin also has steam-electric water rights, as shown in the table. The steam-electric water use portion of water right CoA 14-5489 is backed up by a contract with Lower Colorado River Authority, so an average during the Drought of Record was used. The steam-electric water use portion of water right CA 14-5471 is not backed up by the Lower Colorado River Authority, so the water availability for this right was determined by using the minimum amount of water available in any year during the analysis period. **Section 3.3.2** provides details of how Austin can receive up to 325,000 acre-feet/year of firm water for municipal and other beneficial water uses, if needed.

Table 3.3 Major Run-of-River Rights in the Colorado Basin

Water Right Number	Water Right Holder	Maximum Permitted Diversion (acre feet/year)	Priority Date	Region K Supply Evaluation Model (acre feet per year)	
				2030	2080
CA 14-5434 (Garwood)	Lower Colorado River Authority	133,000	11/1/1900	121,611	121,611
			Sub-Total	***121,611***	***121,611***
CA 14-5475 (Lakeside)	Lower Colorado River Authority	52,500	1/4/1901	3,340	3,340
CA 14-5475 (Lakeside)	Lower Colorado River Authority	55,000	9/2/1907	4,748	4,748
CA 14-5475 (Lakeside)	Lower Colorado River Authority	78,750	11/1/1987	0	0
			Sub-Total	***8,088***	***8,088***
CA 14-5476 (Gulf Coast[1])	Lower Colorado River Authority	228,570	12/1/1900	43,121	43,121
CA 14-5476 (Gulf Coast)	Lower Colorado River Authority	33,930	11/1/1987	0	0
			Sub-Total	***43,121***	***43,121***
CA 14-5477 (Pierce Ranch)	Lower Colorado River Authority	55,000	9/1/1907	1,149	1,149
			Sub-Total	***1,149***	***1,149***
CA 14-5471	City of Austin (mun)[2,3]	250,000	6/1/1913	174,845	174,845
CA 14-5471	City of Austin (mun)[2]	22,403	6/27/1914	7,125	7,125
CA 14-5471	City of Austin (SE)	24,000	6/27/1914	0	0
CA 14-5489	City of Austin (mun)[2]	20,300	8/20/1945	5,139	5,362
CA 14-5489	City of Austin (SE)[2]	16,156	8/20/1945	4,906	5,084
	City of Austin Sub-Total			***192,015***	***192,416***
CA 14-5434	City of Corpus Christi[4]	35,000	11/2/1900	27,794	27,794
	City of Corpus Christi Sub-Total			***27,794***	***27,794***
Totals		**1,004,609**		**393,778**	**394,179**

Notes

Modeling was conducted using the Colorado Water Availability Model Run 3, provided by Texas Commission on Environmental Quality (October 2023), with the modifications associated with the Region K Supply Evaluation Model discussed in Section 3.2.1. The hydrology data extend through 2016.

Water availability reflects the driest year in the period of record (1940-2016) unless otherwise noted and does not include return flows.

[1] The Gulf Coast water right is associated with diverting water for storage in the Arbuckle Reservoir.

[2] The water availability was averaged over the Drought of Record (October 2007 to April 2015) period because of Lower Colorado River Authority backup water.

[3] Lower Colorado River Authority's water rights with a priority date junior to November 15, 1900, are subordinated in accordance with the City of Austin Certificate of Adjudication 14-5471, Amendment A.

[4] The water availability for this run-of-river water right was determined using the minimum water available in any year during the Drought of Record, based on the unmodified Texas Commission on Environmental Quality Water Availability Model (October 2023).

3.1.1.4 Other Surface Water Sources

In addition to major run-of-river rights, there are several smaller run-of-river rights in Region K. The Drought of Record supply for these small run-of-river rights in the Colorado Basin is given in **Table 3.4**.

Table 3.4 Other Surface Water Sources in the Colorado Basin

Use Category	Surface Water Availability in Colorado Basin (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Irrigation - Mills	191	191	191	191	191	191
Irrigation - San Saba	429	429	429	429	429	429
Irrigation - Llano	15	15	15	15	15	15
Irrigation - Gillespie	30	30	30	30	30	30
Irrigation - Burnet	0	0	0	0	0	0
Irrigation - Blanco	0	0	0	0	0	0
Irrigation - Hays	0	0	0	0	0	0
Irrigation - Travis	0	0	0	0	0	0
Irrigation - Bastrop	23	23	23	23	23	23
Irrigation - Fayette	8	8	8	8	8	8
Irrigation - Colorado	0	0	0	0	0	0
Irrigation - Wharton	0	0	0	0	0	0
Irrigation - Matagorda	0	0	0	0	0	0
Livestock - Basinwide[1]	7,579	7,579	7,579	7,579	7,579	7,579
Totals	**8,275**	**8,275**	**8,275**	**8,275**	**8,275**	**8,275**

Data source: Modeling was conducted using the Colorado Water Availability Model Run 3, provided by Texas Commission on Environmental Quality (October 2023), with the modifications associated with the Region K Supply Evaluation Model discussed in Section 3.2.1. The hydrology data extend through 2016. Water availability reflects the driest year during the period of record.

[1]The water availability for livestock is based on the TWDB estimated historical use in the Colorado Basin.

3.1.2 Brazos River Basin

A portion of Region K is located within the Brazos River Basin. This area is limited to portions of Bastrop, Burnet, Fayette, Mills, Travis, and Williamson counties (Figure 3.1). The portion of Williamson County in Region K is completely contained within the City of Austin service area. The remainder of Williamson County is in Region G.

Surface water sources for these areas are limited to local run-of-river supplies and unpermitted local sources. There are no major reservoirs within the Region K portion of the Brazos River Basin. A summary of the surface water available to Region K from the Brazos River Basin is presented in **Table 3.5**.

Table 3.5 Surface Water Sources in the Brazos River Basin

County	Use Type	Surface Water Availability in Brazos Basin (acre feet per year)					
		2030	2040	2050	2060	2070	2080
Basinwide	Irrigation[1]	83	83	83	83	83	83
Basinwide	Livestock[2]	908	908	908	908	908	908
	Totals	**991**	**991**	**991**	**991**	**991**	***991***

Data Source: Modeling was conducted using the Brazos Water Availability Model Run 3, provided by Texas Commission on Environmental Quality (October 2023). The hydrology data extend through 2018.

[1] Water availability reflects the driest year during the period of record (1940-2018) in the Texas Commission on Environmental Quality Water Availability Model (2023) for the Brazos Basin.

[2] The water availability for livestock is based on the estimated historical use across the Brazos Basin.

3.1.3 Brazos-Colorado Coastal Basin

A portion of Region K is located within the Brazos-Colorado Coastal Basin. This area is limited to portions of Colorado, Matagorda, and Wharton counties (Figure 3.1). Surface water sources for these areas are limited to unpermitted local sources and run-of-river water rights from the San Bernard River. There are no major reservoirs within the Region K portion of the Brazos-Colorado Coastal Basin. Note that although the Brazos-Colorado Coastal Basin is included in the Colorado Water Availability Model, the hydrology has not been extended and is only available through 1998. A summary of the surface water available to Region K from the Brazos-Colorado Coastal Basin is presented in **Table 3.6**.

Table 3.6 Surface Water Sources in the Brazos-Colorado Coastal Basin

County	Use Type	Surface Water Availability in Brazos Colorado Basin (acre feet per year)					
		2030	2040	2050	2060	2070	2080
Basinwide	Irrigation[1]	1,060	1,060	1,060	1,060	1,060	1,060
Basinwide	Livestock[2]	1,187	1,187	1,187	1,187	1,187	1,187
	Totals	**2,247**	**2,247**	**2,247**	**2,247**	**2,247**	**2,247**

Notes

Modeling was conducted using the Colorado Water Availability Model Run 3, provided by Texas Commission on Environmental Quality (October 2023).

[1] Water availability reflects the driest year during the period of record (1940-1998) in Texas Commission on Environmental Quality Water Availability Model (2023) for the Brazos-Colorado Basin.

[2] The water availability for livestock is based on the estimated historical use across the Brazos-Colorado Basin.

3.1.4 Colorado-Lavaca Coastal Basin

A portion of Region K is located within the Colorado-Lavaca Coastal Basin. This area is limited to portions of Matagorda and Wharton counties (Figure 3.1). Surface water sources for these areas are limited to unpermitted local sources and run-of-river rights. There are no major reservoirs (other than the South Texas Project Reservoir described in Section 3.1.1.2) within the Region K portion of the Colorado-Lavaca Coastal Basin, and there are no Water User Groups with rights to water from reservoirs in the Colorado-Lavaca Coastal Basin. Return flows originating in the Colorado Basin from agriculture are sent to the Colorado-Lavaca Coastal Basin for use, but since the Region K Supply Evaluation Model assumes full utilization of water rights and no return flows unless explicitly stated in the water right, these return flows were not taken into consideration for the Region K water availability analysis. A summary of the surface water available to Region K from the Colorado-Lavaca Coastal Basin is presented in **Table 3.7**.

Table 3.7 Surface Water Availability in the Colorado-Lavaca Coastal Basin

County	Use Type	Surface Water Availability in Colorado Lavaca Basin (acre feet per year)					
		2030	2040	2050	2060	2070	2080
Basinwide	Irrigation[1]	6,971	6,971	6,971	6,971	6,971	6,971
Basinwide	Livestock[2]	454	454	454	454	454	454
	Totals	**7,425**	**7,425**	**7,425**	**7,425**	**7,425**	**7,425**

Notes:
Modeling was conducted using the Colorado-Lavaca Water Availability Model Run 3, provided by Texas Commission on Environmental Quality (October 2023). The hydrology data extend through 1996.
[1] Water availability reflects the driest year during the period of record (1940-1996) in Texas Commission on Environmental Quality Water Availability Model for the Colorado-Lavaca Basin.
[2] Livestock availability is based on the estimated historical use across the Colorado-Lavaca Basin.

3.1.5 Lavaca River Basin

A portion of Region K is located within the Lavaca River Basin. This area is limited to portions of Colorado and Fayette Counties. Surface water sources for these areas are limited to unpermitted local sources and run-of-river rights. There are no major reservoirs within the Region K portion of the Lavaca River Basin, and there are no Water User Groups with rights to water from reservoirs in the Lavaca River Basin. A summary of the surface water available to Region K from the Lavaca River Basin is presented in **Table 3.8**.

Table 3.8 Surface Water Availability in the Lavaca River Basin

County	Use Type	Surface Water Availability in Lavaca Basin (acre feet per year)					
		2030	2040	2050	2060	2070	2080
Basinwide	Irrigation[1]	270	270	270	270	270	270
Basinwide	Livestock[2]	635	635	635	635	635	635
	Totals	**905**	**905**	**905**	**905**	**905**	**905**

Notes
Modeling was conducted using the Lavaca Water Availability Model Run 3, provided by Texas Commission on Environmental Quality (October 2023). The hydrology data extend through 1996.
[1] Water availability reflects the driest year during the period of record (1940-1996) in Texas Commission on Environmental Quality Water Availability Model for the Lavaca Basin.
[2] Livestock availability is based on the estimated historical use across the Lavaca Basin.

3.1.6 Guadalupe River Basin

A portion of Region K is located within the Guadalupe River Basin. This area is limited to portions of Bastrop, Blanco, Fayette, Gillespie, Hays, and Travis counties. Most of the surface water sources for these areas are limited to unpermitted local sources, run-of-river supplies, and two small municipal reservoirs. There are no major reservoirs within the Region K portion of the Guadalupe River Basin. However, the City of Blanco owns and operates two small, on-channel reservoirs on the Blanco River with a combined storage capacity of 168 acre-feet.

Based on the Guadalupe-San Antonio River Basin Water Availability Model Run 3 from Texas Commission on Environmental Quality, dated October 2014, the firm yield of the Blanco reservoirs is 545 acre-feet (water right C3877_1). **Table 3.9** contains a summary of the surface water available to Region K from the Guadalupe River Basin.

Table 3.9 Surface Water Availability in the Guadalupe River Basin

County	Use Type	Surface Water Availability in Guadalupe Basin (acre feet per year)					
		2030	2040	2050	2060	2070	2080
Basinwide	Irrigation[1]	104	104	104	104	104	104
Blanco Reservoirs	Multiple	545	545	545	545	545	545
Basinwide	Livestock[2]	225	225	225	225	225	225
	Totals	**874**	**874**	**874**	**874**	**874**	**874**

Notes:
Modeling was conducted using the Guadalupe-San Antonio Water Availability Model Run 3, provided by Texas Commission on Environmental Quality (October 2023). The hydrology data extend through 1989.
[1] Water availability reflects the driest year during the period of record (1934-1989) in Texas Commission on Environmental Quality Water Availability Model for the Guadalupe-San Antonio Basin.
[2] Livestock availability is based on the estimated historical use across the Guadalupe Basin.

3.2 Groundwater Availability

Available groundwater is the volume of groundwater that can be withdrawn from an individual aquifer. It is determined by the Modeled Available Groundwater estimates, which are developed by the TWDB. The Modeled Available Groundwater, which is considered the maximum amount of groundwater available for the regional water planning process from a particular aquifer, is documented in TWDB reports listed for each individual aquifer in the subsections below.

The Modeled Available Groundwater values are based on the Desired Future Conditions, which are submitted by the Groundwater Management Areas. Each individual Groundwater Management Area proposes and adopts their Desired Future Conditions in accordance with the principle by which the aquifer is being managed or an assumed management approach. That managing principle, typically stated as a sustainability goal, can be stated in various ways, and the mechanism through which availabilities are being determined throughout Texas is evolving. The Desired Future Conditions for Region K aquifers are described in the following subsections.

The Groundwater Management Areas in Region K adopted their Desired Future Conditions for their aquifers no later than January 2022, during the early phases of this current planning cycle. The TWDB established the Modeled Available Groundwater values based on the adopted Desired Future Conditions.

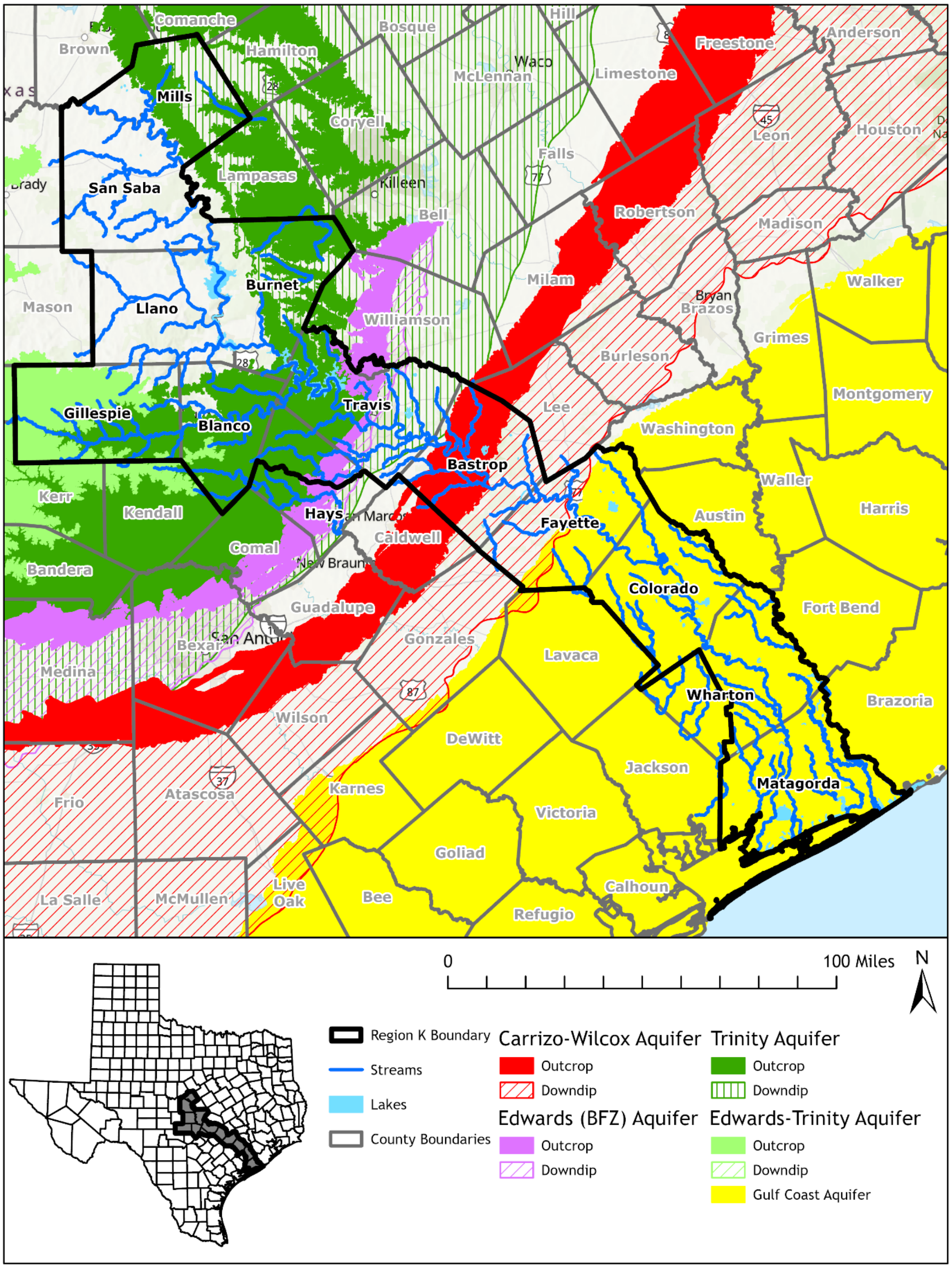
If a Modeled Available Groundwater has been established for a particular aquifer, the TWDB requires that the Modeled Available Groundwater be considered the maximum amount of groundwater available for the regional water planning process. In cases where a Modeled Available Groundwater is not established for an aquifer, the local Groundwater Conservation District or Groundwater Management Area representative was consulted regarding an appropriate availability volume.

If a Groundwater Management Area determines that aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a Desired Future Condition, the aquifer can be classified "non-relevant" for joint groundwater planning purposes. When an aquifer or portion of an aquifer is identified as "non-relevant" and does not have a Modeled Available Groundwater value associated with it, it is up to the planning group to determine the water availability of that aquifer or portion of aquifer for regional water planning purposes.

3.2.1 Major Aquifers

The major aquifers in Region K are the Edwards-Trinity (Plateau), Trinity Group, Edwards (Balcones Fault Zone), Carrizo-Wilcox, and the Gulf Coast (**Figure 3.2**). These five aquifers provide a significant component of the groundwater supply used within Region K. Most of the cities with groundwater supplies in the planning region draw their water supply from one of the five major aquifers. Descriptions and availability volumes of each major aquifer are provided in the following sections.

Figure 3.2 Major Aquifers



3.2.1.1 Gulf Coast Aquifer System

The Gulf Coast Aquifer System forms an irregularly shaped belt along the Gulf of Mexico from Florida to Mexico. (Figure 3.2). In Texas, the aquifer provides water to all or parts of 54 counties and extends from the Rio Grande northeastward to the Louisiana-Texas border. Groundwater use from the Gulf Coast Aquifer System within

Region K occurs in Colorado, Fayette, Matagorda, and Wharton counties. TWDB records indicate that irrigation use accounts for the majority of groundwater pumpage from the Gulf Coast Aquifer System.

The Gulf Coast Aquifer System consists of complex interbedded clays, silts, sands, and gravels, which are hydrologically connected to form a large, leaky artesian aquifer system. The system has four major subdivisions in Region K. The Jasper Aquifer is the lowermost or most landward component of the aquifer system. The Jasper Aquifer is composed of the Oakville Sand and may also include upper portions of the Catahoula Sandstone. The Burkeville confining layer separates the top of the Jasper Aquifer from the bottom of the Evangeline Aquifer. The Evangeline Aquifer is composed of the Fleming and Goliad Sands. The Chicot Aquifer, or upper component of the Gulf Coast Aquifer system, consists of the Lissie, Willis, and Beaumont formations; and overlying alluvial deposits. Maximum total sand thickness ranges from about 700 feet in the south to 1,300 feet in the northern extent.

Water quality is generally good in the shallower portion of the Gulf Coast Aquifer System. Groundwater containing less than 500 mg/L dissolved solids is usually encountered to a maximum depth of 3,200 feet in the aquifer from the San Antonio River Basin northeastward to Louisiana.

Within Region K, the Gulf Coast Aquifer System is part of Groundwater Management Area 15. The Desired Future Condition for the Central Gulf Coast Aquifer, adopted by Groundwater Management Area 15 on October 14, 2022, is summarized as follows (same as 2021 planning cycle):

- No more than 13 feet of average drawdown by 2080 relative to January 2000 conditions.

The TWDB used the Desired Future Condition established by Groundwater Management Area 15 to determine the Modeled Available Groundwater for the Gulf Coast Aquifer System (**Table 3.10**), documented in the TWDB report GR 21-020 MAG, dated August 16, 2022.

Table 3.10 Water Availability for the Gulf Coast Aquifer System

County	Basin	Salinity	2030	2040	2050	2060	2070	2080
Colorado	Brazos-Colorado	Fresh	15,401	15,401	15,401	15,401	15,401	15,401
Colorado	Colorado	Fresh	20,352	20,352	20,352	20,352	20,352	20,352
Colorado	Lavaca	Fresh	36,830	36,830	36,830	36,830	36,830	36,830
		County Subtotal	**72,583**	**72,583**	**72,583**	**72,583**	**72,583**	**72,583**
Fayette	Brazos	Fresh	19	21	22	24	26	26
Fayette	Colorado	Fresh	4,894	5,041	5,196	5,370	5,406	5,392
Fayette	Lavaca	Fresh	2,481	2,621	2,793	2,993	3,228	3,172
		County Subtotal	**7,394**	**7,683**	**8,011**	**8,387**	**8,660**	**8,590**
Matagorda	Brazos-Colorado	Fresh	15,321	15,321	15,321	15,321	15,321	15,321
Matagorda	Colorado	Fresh/ Brackish	3,219	3,219	3,219	3,219	3,219	3,219
Matagorda	Colorado-Lavaca	Fresh	20,352	20,352	20,352	20,352	20,352	20,352
		County Subtotal	**38,892**	**38,892**	**38,892**	**38,892**	**38,892**	**38,892**
Wharton	Brazos-Colorado	Fresh	50,560	50,560	50,560	50,560	50,560	50,560
Wharton	Colorado	Fresh	35,934	35,934	35,934	35,934	35,934	35,934
Wharton	Colorado-Lavaca	Fresh	16,207	16,207	16,207	16,207	16,207	16,207
Wharton	Lavaca	Fresh	579	579	579	579	579	579
		County Subtotal	**103,280**	**103,280**	**103,280**	**103,280**	**103,280**	**103,280**
		Aquifer Subtotal	**222,149**	**222,438**	**222,766**	**223,142**	**223,415**	**223,345**

3.2.1.2 Carrizo-Wilcox Aquifer

The Wilcox Group and the overlying Carrizo Formation of the Claiborne Group form a hydrologically connected system known as the Carrizo-Wilcox Aquifer. This aquifer extends from the Rio Grande in South Texas northeastward into Arkansas and Louisiana, providing water to all or parts of 60 counties in Texas. The Carrizo Sand and Wilcox Group occur at the surface along an outcrop band that parallels the Gulf Coast and dip beneath the land surface toward the coast, except in the East Texas structural basin adjacent to the Sabine Uplift where the formations form a trough.

Use of water from the Carrizo-Wilcox Aquifer in Region K occurs in Bastrop County and a portion of Fayette County (Figure 3.2). TWDB records indicate that municipal use accounts for the majority of groundwater pumpage from the aquifer.

The Carrizo-Wilcox Aquifer is predominantly composed of sand, locally interbedded with gravel, silt, clay, and lignite deposited during the Tertiary Period. North of the Colorado River, the Wilcox Group is generally divided into three distinct subdivisions. From the oldest and deepest to youngest these are the Hooper, Simsboro, and Calvert Bluff formations. Of the three, the Simsboro Formation typically contains the most massive and coarsest sands and produces the largest quantities of water. South of the Colorado River, the Simsboro is absent as a distinct unit. The Wilcox portion of the aquifer varies significantly in thickness in the downdip artesian portion from 400 feet in portions of Fayette County (south of the Colorado River) to as much as 1,600 feet in Bastrop County. The Carrizo portion of the aquifer also varies in thickness in the downdip artesian portion from 200 to 400 feet across Region K.

Water from the Carrizo-Wilcox is fresh to slightly saline with quality problems limited to localized areas. In the outcrop the water is hard yet usually low in dissolved solids. Downdip, the water is softer, has a higher temperature, and contains increasing amounts of dissolved solids down-gradient. Hydrogen sulfide and methane may occur locally.

The Carrizo-Wilcox Aquifer in Bastrop and Fayette counties is within Groundwater Management Area 12. The Desired Future Conditions for the Carrizo-Wilcox Aquifer, adopted by Groundwater Management Area 12 on November 30, 2021, are summarized as follows:

- Carrizo Aquifer: No more than 134 feet of average drawdown between 2011 and 2070 within the Lost Pines Groundwater Conservation District (Bastrop County).
- Carrizo Aquifer: No more than 140 feet of average drawdown between 2011 and 2070 within the Fayette County Groundwater Conservation District (Fayette County).
- Simsboro (Middle Wilcox) Aquifer: No more than 240 feet of average drawdown between 2011 and 2070 within the Lost Pines Groundwater Conservation District (Bastrop County).

The TWDB used the Desired Future Conditions established by Groundwater Management Area 12 to determine the Modeled Available Groundwater for the Carrizo-Wilcox Aquifer (**Table 3.11**). Details are documented in the TWDB report GR 21-017 MAG, dated November 1, 2022.

Table 3.11 Water Availability for the Carrizo-Wilcox Aquifer

County	Basin	Salinity	2030	2040	2050	2060	2070	2080
Bastrop	Brazos	Fresh	9,433	9,600	9,789	10,009	10,273	10,273
Bastrop	Colorado	Fresh	36,968	41,247	45,467	49,888	54,626	54,626
Bastrop	Guadalupe	Fresh	262	322	404	519	680	680
		County Subtotal	**46,663**	**51,169**	**55,660**	**60,416**	**65,579**	**65,579**
Fayette	Colorado	Fresh	4,875	4,875	4,875	4,875	4,875	4,875
Fayette	Guadalupe	Fresh	280	280	280	280	280	280
		County Subtotal	**5,155**	**5,155**	**5,155**	**5,155**	**5,155**	**5,155**
		Total	**51,818**	**56,324**	**60,815**	**65,571**	**70,734**	**70,734**

3.2.1.3 Edwards (Balcones Fault Zone) Aquifer

The Edwards (Balcones Fault Zone) Aquifer covers approximately 4,350 square miles in parts of 11 counties. It forms a narrow belt extending along the base of the Balcones Escarpment from Kinney County through the San Antonio area northeastward to the Leon River in Bell County. A groundwater divide near Kyle in Hays County hydrologically separates the aquifer into the San Antonio and Barton Springs segments. The Colorado River divides the Barton Springs and Northern segments, which are also considered hydrologically separate. The name Edwards (Balcones Fault Zone) Aquifer distinguishes this aquifer from the Edwards-Trinity (Plateau) Aquifer and Edwards-Trinity (High Plains) Aquifer.

Groundwater use from the Edwards (Balcones Fault Zone) Aquifer within Region K occurs in Hays, Travis, and Williamson counties (Figure 3.2). TWDB records indicate that municipal use accounts for the majority of groundwater pumpage from the aquifer. Large springs feed several recreational areas and serve as habitat to several endangered species of plants and animals. Major river systems derive a significant amount of baseflow from Edwards (Balcones Fault Zone) Aquifer spring flows that are utilized outside the Edwards region mainly for industrial and agricultural needs.

The Edwards (Balcones Fault Zone) Aquifer is composed of limestone and dolomite deposited during the Cretaceous Period. The aquifer exists under water-table conditions in the outcrop and under artesian conditions where it dips into the subsurface and is confined below the overlying Del Rio Clay. The Edwards (Balcones Fault Zone) Aquifer consists of the Georgetown Limestone and formations of the Edwards Group within Region K. Across the Edwards (Balcones Fault Zone) Aquifer region, the aquifer thickness ranges from 200 to 600 feet.

Aquifer recharge occurs by the percolation of water on the aquifer outcrop (recharge zone). The recharge may occur by several methods: surface water percolating from streams and rivers draining the Edwards Plateau and which cross the outcrop; the percolation of rainfall runoff in ephemeral streams crossing the outcrop; and by direct infiltration of precipitation on the outcrop. This recharge reaches the aquifer through solution cavities, fracture crevices, faults, and sinkholes in the recharge zone. Unknown amounts of groundwater may enter the aquifer as lateral underflow from the Glen Rose Formation. Water in the aquifer generally moves from the recharge zone down-gradient and laterally toward natural discharge points such as Comal, San Marcos, Barton, and Salado springs.

A hydrologic divide occurs in the aquifer near Kyle in Hays County that separates the San Antonio segment of the aquifer from the Barton Springs and Northern segments of the aquifer. The Barton Springs segment is hydrologically bounded to the north by the Colorado River. The northern segment of the aquifer includes the area north of the Colorado River to Bell County. The area included in Region K is the area north of the Kyle groundwater divide and includes a portion of the Northern segment.

Groundwater moving through the aquifer system has dissolved large amounts of rock to create highly permeable zones in certain aquifer subdivisions and solution channels. Highly fractured areas near faults may be preferentially enhanced by solutioning to form conduits capable of transmitting large amounts of water. The solution features may facilitate rapid flow and augment the relatively high storage capacity of the aquifer. Due to the honeycombed and cavernous character of the aquifer, well yields are moderate to large. Several wells yield in excess of 16,000 gallons per minute (gal/min) and one well drilled in Bexar County flowed 37,000 gal/min from a 30-inch-diameter casing. The aquifer is significantly less permeable farther downdip where the concentration of dissolved solids in the water may abruptly exceed 1,000 milligrams per liter (mg/L).

The chemical quality of water in the aquifer is typically fresh, although hard, with dissolved solids concentrations averaging less than 500 mg/L. The downdip's relatively sharp interface between fresh and slightly saline water represents the extent of water containing less than 1,000 mg/L and is popularly known as the "Bad Water Line." Within a relatively short distance down-gradient of the Bad Water Line, the groundwater becomes increasingly mineralized. This area is known as the Saline Zone of the Edwards (Balcones Fault Zone) Aquifer. The position of the bad water line generally coincides with the alignment of Interstate Highway 35 in Region K. The connection between the freshwater and saline zones is considered to be somewhat limited based on the fact that droughts and pumping have not caused the freshwater zone to become significantly more saline.

Due to its highly permeable nature in the fresh water zone, the Edwards (Balcones Fault Zone) Aquifer responds quickly to changes and extremes in stress placed upon the system. This is indicated by the rapid fluctuations in water levels over relatively short periods of time. During times of adequate rainfall and recharge, the Edwards (Balcones Fault Zone) Aquifer is able to supply sufficient amounts of water for all demands as well as sustain springflows at many locations throughout its extent. However, when recharge is low, water withdrawn from wells and water discharged at the springs comes mainly from aquifer storage. If these conditions persist, water in storage within the aquifer continues to be depleted with corresponding water-level declines and reduced springflows.

Within Region K, the Edwards (Balcones Fault Zone) Aquifer is part of two Groundwater Management Areas: Groundwater Management Areas 8 and 10. The northern segment of the Edwards (Balcones Fault Zone) Aquifer is part of Groundwater Management Area 8. Availability for the northern segment of the Edwards (Balcones Fault Zone) Aquifer was established by the TWDB based on Desired Future Conditions adopted by Groundwater Management Area 8 on November 4, 2021. The Desired Future Conditions for Travis and Williamson counties within Groundwater Management Area 8 are as follows (same as 2021 planning cycle):

- Maintain at least 42 acre-feet per month of aggregated stream/spring flow during a repeat of the Drought of Record in Travis County.
- Maintain at least 60 acre-feet per month of aggregated stream/spring flow during a repeat of the Drought of Record in Williamson County.

Availability for the southern portion of the Edwards (Balcones Fault Zone) Aquifer for the freshwater and saline zones was established by the TWDB based on Desired Future Conditions adopted by Groundwater Management Area 10 on October 16, 2021. The Desired Future Conditions for the Edwards (Balcones Fault Zone) Northern Subdivision and Edwards (Balcones Fault Zone) Northern Subdivision Saline Zone in Hays and Travis counties within Groundwater Management Area 10 are as follows (same as 2021 planning cycle):

Edwards (Balcones Fault Zone) Northern Subdivision:

- Springflow at Barton Springs during average recharge conditions shall be no less than 49.7 cubic feet per second averaged over an 84-month (7-year) period;
- During extreme drought conditions, including those as severe as a recurrence of the 1950s Drought of Record, springflow of Barton Springs shall be no less than 6.5 cubic feet per second averaged on a monthly basis.

Edwards (Balcones Fault Zone) Northern Subdivision Saline Zone:

- No more than 75 feet of regional average potentiometric surface drawdown due to pumping when compared to pre-development conditions.

The TWDB used the Desired Future Conditions established by Groundwater Management Areas 8 and 10 to determine the Modeled Available Groundwater for the Edwards (Balcones Fault Zone) Aquifer (**Table 3.12**). Details are documented in TWDB reports GR 21-013 MAG, dated November 1, 2022, and GR 21-015 MAG, dated April 12, 2023.

Table 3.12 Water Availability for the Edwards (Balcones Fault Zone) Aquifer

County	Basin	Salinity	2030	2040	2050	2060	2070	2080
Hays	Colorado	Fresh	7,037	7,037	7,037	7,037	7,037	7,037
Hays	Colorado	Saline	66	66	66	66	66	66
		County Subtotal	**7,103**	**7,103**	**7,103**	**7,103**	**7,103**	**7,103**
Travis	Brazos	Fresh	275	275	275	275	275	275
Travis	Colorado	Fresh	3,578	3,578	3,578	3,578	3,578	3,578
Travis	Colorado	Fresh/ Brackish	4,962	4,962	4,962	4,962	4,962	4,962
Travis	Colorado	Saline	5,199	5,199	5,199	5,199	5,199	5,199
Travis	Guadalupe	Saline	290	290	290	290	290	290
		County Subtotal	**14,304**	**14,304**	**14,304**	**14,304**	**14,304**	**14,304**
Williamson	Brazos	Fresh	6	6	6	6	6	6
Williamson	Colorado	Fresh	4	4	4	4	4	4
		County Subtotal	**10**	**10**	**10**	**10**	**10**	**10**
		Total	**21,417**	**21,417**	**21,417**	**21,417**	**21,417**	**21,417**

3.2.1.4 Trinity Aquifer

The Trinity Aquifer consists of Cretaceous-age rocks of the Trinity Group. The formations of the Trinity Group crop out in a band from the Red River in northern Texas to the Hill Country of South-Central Texas and provide water in all or parts of 55 counties. Trinity Group deposits also occur as far west as the Panhandle and Trans-Pecos regions where they are included as part of the Edwards-Trinity (High Plains) and Edwards-Trinity (Plateau) aquifers. Within much of Region K, the Trinity Aquifer is exposed at the land surface as the erosion-dissected margin of the Edwards Plateau.

Groundwater use from the Trinity Aquifer in Region K occurs in Blanco, Burnet, Gillespie, Hays, Mills, Travis, and Williamson counties (Figure 3.2). TWDB records indicate that municipal use accounts for the majority of groundwater pumpage from the aquifer. The Trinity Aquifer is composed of sand, clay, and limestone deposited during the Cretaceous Period. The aquifer in Region K is subdivided into the Upper, Middle, and Lower Trinity aquifers. The Upper Trinity is composed of the Upper Glen Rose Formation. The Middle Trinity Aquifer is composed of the Lower Glen Rose Formation and the Hensell Sand and Cow Creek Limestone of the Travis Peak Formation. The Hammett Shale of the Travis Peak Formation is a confining zone between the Middle and Lower Trinity aquifers. The Lower Trinity Aquifer is composed of the Sligo Limestone and the Hosston Formation (sand and conglomerate). The Glen Rose Formation and the Cow Creek Limestone are karsted but not as heavily solutioned as the Edwards (Balcones Fault Zone) Aquifer. There are evaporite mineral beds (principally anhydrite) associated with the contact of the Upper and Lower Glen Rose Formation that contribute to water quality issues in the certain areas of the Trinity Aquifer within Region K. The formations of the Trinity Aquifer thin from down-dip areas toward the outcrop. In some areas of Region K this thinning is pronounced. At the Balcones Escarpment the Trinity may be significantly displaced by the throw of faults associated with the Balcones Fault Zone. Trinity Aquifer well yields typically range from less than 20 to more than 300 gallons per minute. The yields of wells in the Upper and Middle Trinity aquifers may be closely associated with the degree of local karst or solutioning features. The yield of wells from the Lower Trinity Aquifer may be generally greater than the average yields of Upper or Lower Trinity aquifer wells.

Water quality from the Trinity Aquifer is acceptable for most municipal and industrial purposes; however, excess concentrations of certain constituents in many places exceed drinking water standards. Heavy pumpage and water level declines in this region have contributed to deteriorating water quality in the aquifer. Wells completed in the Middle Trinity (especially the Hensell Sand) may exhibit levels of sodium, sulfate, and chloride, which are believed to be the result of leakage from the overlying Glen Rose. This is less likely to be true for wells completed in the Lower Trinity. The Hammett Shale acts as an aquitard and effectively prevents leakage from the overlying formations. In some areas, poor quality water occurs in and near wells that have not been properly cased. These wells may have deteriorated casings, insufficient casing or cement, or the casing may have been perforated at multiple depths in an effort to maximize the well yield. These wells serve as a conduit for poor quality water originating in the evaporite beds near the contact of the Upper and Lower Glen Rose Formations. Water quality declines in the downdip direction of all of the Trinity water-bearing units.

Within Region K, the Trinity Aquifer is present in three Groundwater Management Areas: Groundwater Management Area 8, Groundwater Management Area 9, and Groundwater Management Area 10.

Trinity Aquifer - Groundwater Management Area 8

The Desired Future Conditions for the Trinity Aquifer in Burnet, Mills, Travis, and Williamson counties, adopted by Groundwater Management Area 8 on November 4, 2021, are summarized as follows:

Burnet County

- Average drawdown of the Glen Rose Aquifer should not exceed approximately 2 feet from January 1, 2010, through December 31, 2080.
- Average drawdown of the Hensell Aquifer should not exceed approximately 7 feet from January 1, 2010, through December 31, 2080.
- Average drawdown of the Hosston Aquifer should not exceed approximately 21 feet from January 1, 2010, through December 31, 2080.

Mills County

- Average drawdown of the Paluxy Aquifer should not exceed approximately 1 foot from January 1, 2010, through December 31, 2080.

- Average drawdown of the Glen Rose Aquifer should not exceed approximately 1 foot from January 1, 2010, through December 31, 2080.
- Average drawdown of the Hensell Aquifer should not exceed approximately 2 feet from January 1, 2010, through December 31, 2080.
- Average drawdown of the Hosston Aquifer should not exceed approximately 13 feet from January 1, 2010, through December 31, 2070.

Travis County

- Average drawdown of the Glen Rose Aquifer should not exceed approximately 90 feet from January 1, 2010, through December 31, 2080.
- Average drawdown of the Hensell Aquifer should not exceed approximately 68 feet from January 1, 2010, through December 31, 2080.
- Average drawdown of the Hosston Aquifer should not exceed approximately 225 feet from January 1, 2010, through December 31, 2080.

Williamson County

- Average drawdown of the Glen Rose Aquifer should not exceed approximately 78 feet from January 1, 2010, through December 31, 2080.
- Average drawdown of the Hensell Aquifer should not exceed approximately 89 feet from January 1, 2010, through December 31, 2080.
- Average drawdown of the Hosston Aquifer should not exceed approximately 225 feet from January 1, 2010, through December 31, 2080.

Trinity Aquifer - Groundwater Management Area 9

The groundwater availability estimate values for the Trinity Aquifer in Blanco, Hays, and Travis counties are based on Desired Future Conditions submitted by Groundwater Management Area 9. The Desired Future Condition for the Trinity Aquifer within Groundwater Management Area 9 is as follows (same as 2021 planning cycle):

- Average drawdown of approximately 30 feet through 2060, as compared to 2008 water levels.

Trinity Aquifer - Groundwater Management Area 10

The groundwater availability estimate values for the Trinity Aquifer in a portion of Travis County and a portion of Hays County are based on Desired Future Conditions submitted by Groundwater Management Area 10. The Desired Future Condition for the Trinity Aquifer within Groundwater Management Area 10 is as follows (same as 2021 planning cycle):

- Average drawdown not to exceed 25 feet during average recharge conditions (including exempt and non-exempt use).

The TWDB used the Desired Future Conditions established by Groundwater Management Area 8, Groundwater Management Area 9, and Groundwater Management Area 10 to determine the Modeled Available Groundwater for the Trinity Aquifer (**Table 3.13**). Details are documented in the TWDB reports GR 21-013 MAG, dated November 1, 2022; GR 21-014 MAG, dated December 8, 2022; and GR 21-105 MAG, dated April 12, 2023.

Table 3.13 Water Availability for the Trinity Aquifer

County	Basin	Salinity	2030	2040	2050	2060	2070	2080
Blanco	Colorado	Fresh	1,322	1,322	1,322	1,322	1,322	1,322
Blanco	Guadalupe	Fresh	1,251	1,251	1,251	1,251	1,251	1,251
		County Subtotal	**2,573**	**2,573**	**2,573**	**2,573**	**2,573**	**2,573**
Burnet	Brazos	Fresh	3,363	3,363	3,363	3,363	3,363	3,363
Burnet	Colorado	Fresh	527	527	527	527	527	527
		County Subtotal	**3,890**	**3,890**	**3,890**	**3,890**	**3,890**	**3,890**
Hays	Colorado	Fresh	5,887	5,887	5,887	5,887	5,887	5,887
		County Subtotal	**5,887**	**5,887**	**5,887**	**5,887**	**5,887**	**5,887**
Mills	Brazos	Fresh	806	806	806	806	806	806
Mills	Colorado	Fresh	1,653	1,653	1,653	1,653	1,653	1,653
		County Subtotal	**2,459**	**2,459**	**2,459**	**2,459**	**2,459**	**2,459**
Travis	Brazos	Fresh	1	1	1	1	1	1
Travis	Colorado	Fresh	7,519	7,519	7,519	7,519	7,519	7,519
Travis	Colorado	Fresh/ Brackish	8,542	8,530	8,515	8,485	8,485	8,485
Travis	Guadalupe	Fresh	8	8	8	8	8	8
		County Subtotal	**16,070**	**16,058**	**16,043**	**16,013**	**16,013**	**16,013**
Williamson	Colorado	Fresh	15	15	15	15	15	15
		County Subtotal	**15**	**15**	**15**	**15**	**15**	**15**
Hays	Colorado	Fresh	410	410	410	410	410	410
		County Subtotal	**440**	**440**	**440**	**440**	**440**	**440**
		Total	**31,334**	**31,322**	**31,307**	**31,277**	**31,277**	**31,277**

3.2.1.5 Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifer

Starting in the 2021 planning cycle, the Edwards-Trinity (Plateau), Pecos Valley, and Trinity aquifers were considered by Groundwater Management Area 7 to be undifferentiated and were combined together when determining the Desired Future Conditions. TWDB used a single-layer alternative groundwater flow model to determine the Modeled Available Groundwater for the combined aquifer.

The Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifer underlies the Edwards Plateau east of the Pecos River and the Stockton Plateau west of the Pecos River, providing water to all or parts of 38 counties. The aquifer extends from the Hill Country of Central Texas to the Trans-Pecos region of West Texas.

In Region K, Groundwater use from the Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifer is limited to Gillespie County. TWDB records indicate that municipal use accounts for the majority of groundwater pumpage from the aquifer (Figure 3.2). The aquifer consists of saturated sediments of lower Cretaceous age Trinity Group formations and overlying limestones and dolomites of the Comanche Peak, Edwards, and Georgetown Formations. Springs issuing from the aquifer form the headwaters for the Pedernales, Llano, and San Saba Rivers.

The aquifer generally exists under water table conditions; however, where the Trinity is fully saturated, and a zone of low permeability occurs near the base of the overlying Edwards, artesian conditions may exist. Reported well yields commonly range from less than 50 gallons per minute, where saturated thickness is thin, to more than 1,000 gallons per minute, in areas outside of Region K where large-capacity wells are completed in jointed and cavernous limestone.

Natural chemical quality of Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifer water ranges from fresh to slightly saline. The water is typically hard and may vary widely in concentrations of dissolved solids, composed mostly of calcium and bicarbonate. The salinity of the groundwater tends to increase toward the west. Water quality of springs issuing from the aquifer in the southern and eastern border areas is typically excellent.

Within Region K, the Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifer is present within Gillespie County (although the Pecos Valley portion is not present in Gillespie County). It is managed by Groundwater Management Area 7. The Desired Future Condition for the aquifer, adopted by Groundwater Management Area 7 on August 19, 2021, is summarized as follows:

- Total drawdown not to exceed 5 feet in 2070 as compared to 2010 water levels.

The TWDB used the Desired Future Condition established by Groundwater Management Area 7 to determine the Modeled Available Groundwater for the Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifer (**Table 3.14**). Details are documented in the TWDB report GR 21-012 MAG, dated August 12, 2022.

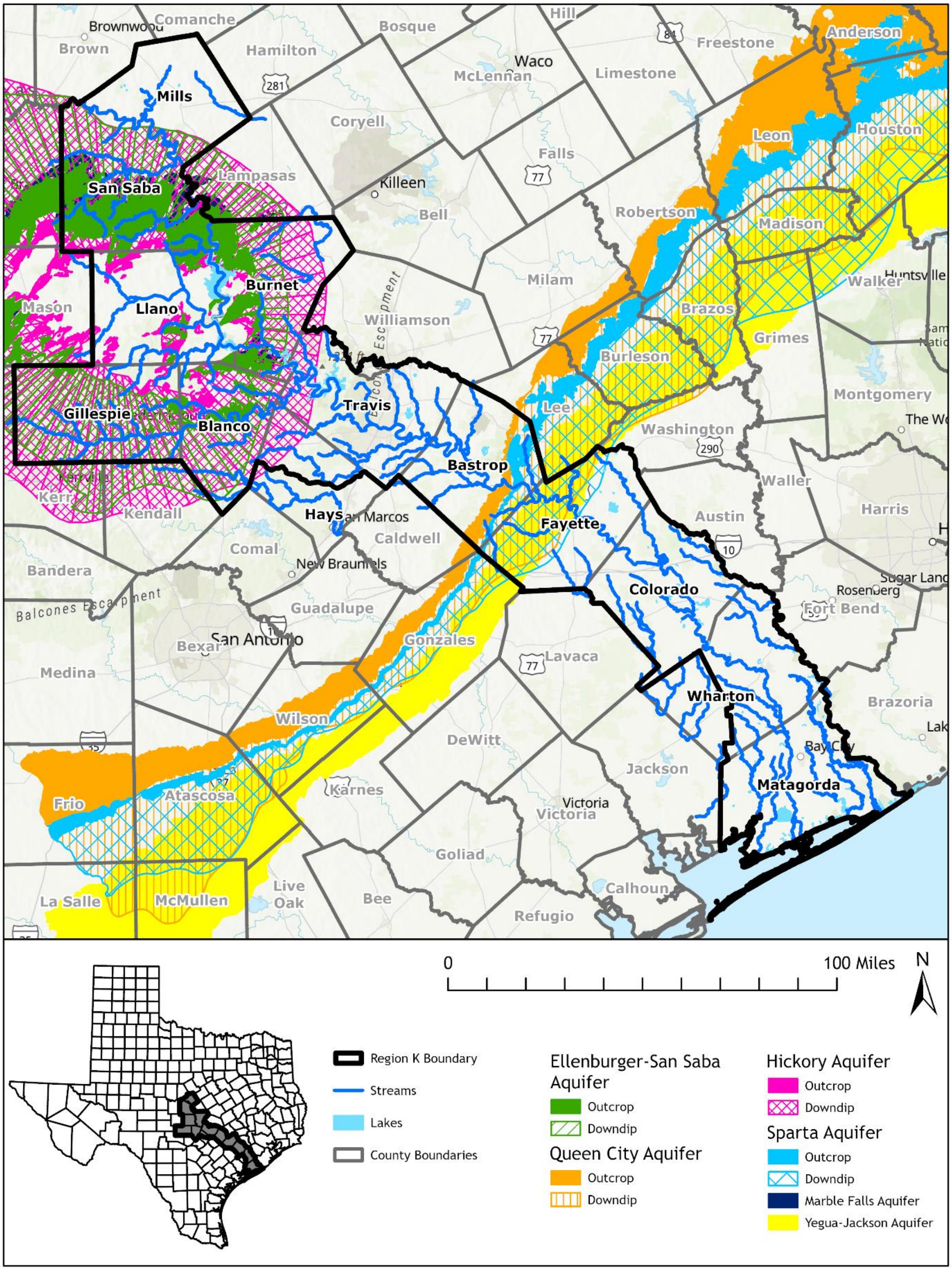
Table 3.14 Water Availability for the Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifer

County	Basin	2030	2040	2050	2060	2070	2080
Gillespie	Colorado	4,843	4,843	4,843	4,843	4,843	4,843
Gillespie	Guadalupe	136	136	136	136	136	136
	Total	**4,979**	**4,979**	**4,979**	**4,979**	**4,979**	**4,979**

3.2.2 Minor Aquifers

The seven minor aquifers in Region K are the Hickory, Queen City, Sparta, Ellenburger-San Saba, Marble Falls, Cross Timbers, and Yegua-Jackson aquifers (**Figure 3.3**). The Cross Timbers Aquifer was recently declared a minor aquifer by the TWDB and was not included in previous planning cycles. These aquifers provide water supply to many of the cities and towns in the hill country of Central Texas, or in the case of the Sparta and Queen City aquifers, to farms, ranches, and small towns in Bastrop and Fayette counties.

Figure 3.3 Minor Aquifers



There are also Water User Groups in Region K that rely on alluvial aquifers for supply. These supplies are referred to as “Other Aquifer” since the actual aquifers have not been identified or named and the extent of the aquifer supply has not been determined. Other Aquifer supplies are discussed further in **Section 3.2.2.7.**

3.2.2.1 Hickory Aquifer

The Hickory Aquifer underlies approximately 5,000 square miles in parts of 19 counties within the Llano Uplift region of Central Texas. Discontinuous outcrops of the Hickory sandstone overlie and flank the exposed Precambrian rocks that form the central core of the Uplift. The downdip artesian portion of the aquifer encircles the Uplift and extends to maximum depths approaching 4,500 feet.

Groundwater use from the Hickory Aquifer within Region K occurs in Blanco, Burnet, Gillespie, Llano, and San Saba counties (Figure 3.3). TWDB records indicate that irrigation is the largest use category of groundwater pumpage from the aquifer.

The Hickory Aquifer, like the Marble Falls and Ellenburger-San Saba aquifers, was formed by the Llano Uplift, a distinct area of the state that includes portions of 19 counties. The Hickory Sandstone member of the Cambrian Riley Formation is composed of some of the oldest sedimentary rocks found in Texas. In most of the northern and western portions of the aquifer, the Hickory Sandstone Member can be differentiated into lower, middle, and upper units, which reach a maximum thickness of 480 feet in southwestern McCulloch County just northwest of Region K. In the southern and eastern extent of the aquifer, the Hickory Sandstone Member consists of only two units, which range in thickness from about 150 to 400 feet.

The Hickory Aquifer has been compartmentalized by block faulting. The vertical displacement of faults ranges from a few feet to as much as 2,000 feet. Significant lateral displacement is also associated with these faults. Throughout its extent, the thickness of the aquifer is affected by the relief of the underlying Precambrian surface. Both of these elements have contributed to the significant variability that occurs in groundwater availability, movement, quality, and productivity.

Large wells used for irrigation and municipal supply may range from 200 to 500 gal/min. Some exceptional wells have been reported to have yields in excess of 1,000 gal/min. These would typically occur outside of Region K, northwest of the Llano Uplift.

In general, the quality of water from the Hickory Aquifer could be described as moderate to low quality. The total dissolved solids concentrations vary from 300 to 500 mg/L. In some areas, the groundwater may have dissolved solids concentrations as high as 3,000 mg/L. The water may contain alpha particle and total radium concentrations that may exceed safe drinking water levels soon to be issued by the EPA. Radon gas may also be entrained. Most of the radioactive groundwater is thought to be produced from the middle Hickory unit, while the upper Hickory unit produces water that exceeds safe drinking water concentrations for iron. High nitrate levels may be found in the shallower portions of the aquifer where there may be interaction with surface activities such as fertilizer applications and septic systems.

The Hickory Aquifer spans several counties and several Groundwater Management Areas. The Desired Future Conditions for the Hickory Aquifer are as follows:

- Burnet County (Groundwater Management Area 8) – Desired Future Condition adopted on November 4, 2021: Average drawdown of the Hickory Aquifer should not exceed 11 feet from January 1, 2010, through December 31, 2080.
- Gillespie County (Groundwater Management Area 7) – Desired Future Condition adopted on August 19, 2021: Total net decline in water levels shall not exceed 9 feet below 2010 water levels in the aquifer by 2070.

- Mills County (Groundwater Management Area 8) – Desired Future Condition adopted on November 4, 2021: Average drawdown of the Hickory Aquifer should not exceed 9 feet from January 1, 2010, through December 31, 2080.
- San Saba County (Groundwater Management Area 7) – Desired Future Condition adopted on August 19, 2021: Total net decline in water levels shall not exceed 6 feet below 2010 water levels in the aquifer by 2070.

Groundwater Management Areas 7 and 9 declared the aquifer as "non-relevant" for Llano and Blanco counties, respectively.

The TWDB used the adopted Desired Future Conditions to determine the Modeled Available Groundwater for the Hickory Aquifer (**Table 3.15**), documented in the following reports.

- The Groundwater Management Area 7 Hickory Aquifer Modeled Available Groundwater is documented in TWDB report GR 21-021 MAG, dated August 12, 2022.
- The Groundwater Management Area 8 Hickory Aquifer Modeled Available Groundwater is documented in TWDB report GR 21-013 MAG, dated November 1, 2022.

As part of TWDB's informal comments on the Region K Technical Memorandum of the 2021 planning cycle, the TWDB staff conducted a modeling analysis related to the Llano Uplift aquifers and provided Desired Future Condition-compatible "non-relevant" groundwater availability values for the Hickory Aquifer in Blanco County and Llano County (Table 3.15). Those numbers were used for this planning cycle as well.

Table 3.15 Water Availability for the Hickory Aquifer

County	Basin	2030	2040	2050	2060	2070	2080
Blanco	Colorado	283	284	283	284	283	284
Blanco	Guadalupe	43	43	43	43	43	43
Burnet	Brazos	1,237	1,237	1,237	1,237	1,237	1,237
Burnet	Colorado	2,178	2,178	2,178	2,178	2,178	2,178
Gillespie	Colorado	1,751	1,751	1,751	1,751	1,751	1,751
Llano	Colorado	1,609	1,609	1,609	1,609	1,609	1,609
Mills	Brazos	7	7	7	7	7	7
Mills	Colorado	29	29	29	29	29	29
San Saba	Colorado	7,680	7,680	7,680	7,680	7,680	7,680
	Total	**14,817**	**14,818**	**14,817**	**14,818**	**14,817**	**14,818**

3.2.2.2 Queen City Aquifer

The Queen City Aquifer extends in a band across most of the State from the Frio River in South Texas northeastward into Louisiana. The southwestern boundary is placed at the Frio River because of a facies change in the formation, which results in reduced amounts of poorer quality water produced from this interval southwest of the Frio River. Within Region K, the Queen City Aquifer is located within Bastrop and Fayette counties (Figure 3.3). TWDB records indicate that irrigation and livestock use account for the majority of groundwater pumpage from the aquifer.

The Queen City Aquifer is composed of sand, loosely cemented sandstone, and interbedded clay units of the Queen City Formation of the Tertiary Claiborne Group. These rocks slope downward or dip gently to the south and southeast toward the Gulf of Mexico. The total thickness of this aquifer is usually less than 500 feet in Region K. The Queen City Aquifer generally parallels the Carrizo Aquifer and, like the Carrizo, has both a water table and artesian portion. Well yields are generally low with a few exceeding 400 gal/min.

Throughout most of Region K, the chemical quality of the Queen City Aquifer water is excellent, but water quality may deteriorate fairly rapidly downdip. The water may be fairly acidic (low pH), have high iron concentrations, or contain hydrogen sulfide gas. All of these conditions are relatively easy to remedy with standard water treatment methods.

The Queen City Aquifer in Bastrop and Fayette counties is within Groundwater Management Area 12. The Desired Future Conditions for the Queen City Aquifer, adopted by Groundwater Management Area 12 on November 30, 2021, are summarized as follows:

- No more than 28 feet of average drawdown between 2011 and 2070 within the Lost Pines Groundwater Conservation District (Bastrop County).
- No more than 73 feet of average drawdown between 2011 and 2070 within the Fayette County Groundwater Conservation District (Fayette County).

The TWDB used the Desired Future Conditions established by Groundwater Management Area 12 to determine the Modeled Available Groundwater for the Queen City Aquifer (**Table 3.16**). Details are documented in TWDB report GR 21-017_MAG, dated November 1, 2022.

Table 3.16 Region K Water Availability for the Queen City Aquifer

County	Basin	2030	2040	2050	2060	2070	2080
Bastrop	Brazos	45	49	54	60	66	66
Bastrop	Colorado	410	453	500	552	610	610
Bastrop	Guadalupe	64	71	78	86	95	95
Fayette	Colorado	1,879	1,891	1,905	1,919	1,935	1,935
Fayette	Guadalupe	836	846	856	867	878	878
	Total	**3,234**	**3,310**	**3,393**	**3,484**	**3,584**	**3,584**

3.2.2.3 Sparta Aquifer

The Sparta Aquifer extends in a narrow band across the state from the Frio River in South Texas northeastward to the Louisiana border in Sabine County. The southwestern boundary is placed at the Frio River because of a facies change in the formation, which makes it difficult to delineate the boundaries of the Sparta and contiguous formations southwestward. The facies change results in reduced amounts of water and poorer quality water produced from the interval.

Groundwater use from the Sparta Aquifer within Region K occurs in Bastrop and Fayette counties (Figure 3.3). TWDB records indicate that municipal, irrigation, livestock, and mining use account for the groundwater pumpage from the aquifer.

The Sparta Formation, like the Queen City, is part of the Claiborne Group. The aquifer consists of sand and interbedded clay with more massive sand beds in the basal section. Rocks composing the Sparta Formation also dip gently to the south and southeast toward the Gulf Coast, with a total thickness that can reach up to 300 feet.

Yields of individual wells are generally low to moderate, but high-capacity wells, producing 400 to 500 gal/min, are possible. The water occurs under water table conditions near the outcrop but becomes confined and is under artesian conditions downdip. Usable quality water may be recovered from as much as 2,000 feet below the surface.

Usable quality water is commonly found within the outcrop and for a few miles downdip. The water quality in most of this aquifer is excellent, but the quality does decrease in the downdip direction. In some areas, the water can contain iron concentrations exceeding the safe drinking water standards.

The Sparta Aquifer in Bastrop and Fayette counties is within Groundwater Management Area 12. The Desired Future Conditions of the Sparta Aquifer, adopted by Groundwater Management Area 12 on May 25, 2017, is summarized as follows:

- No more than 22 feet of average drawdown between 2011 and 2070 within the Lost Pines Groundwater Conservation District (Bastrop County).
- No more than 43 feet of average drawdown between 2011 and 2070 within the Fayette County Groundwater Conservation District (Fayette County).

The TWDB used the Desired Future Conditions established by Groundwater Management Area 12 to determine the Modeled Available Groundwater for the Sparta Aquifer (**Table 3.17**). Details are documented in TWDB report GR 21-017_MAG, dated November 1, 2022.

Table 3.17 Water Availability for the Sparta Aquifer

County	Basin	2030	2040	2050	2060	2070	2080
Bastrop	Brazos	60	71	86	103	125	125
Bastrop	Colorado	370	450	547	672	830	830
Bastrop	Guadalupe	7	8	11	13	17	17
Fayette	Colorado	1,618	1,617	1,617	1,640	1,657	1,657
Fayette	Guadalupe	1,161	1,166	1,179	1,188	1,196	1,196
	Total	**3,216**	**3,312**	**3,440**	**3,616**	**3,825**	**3,825**

3.2.2.4 Ellenburger-San Saba Aquifer

The Ellenburger-San Saba Aquifer underlies about 4,000 square miles in parts of 15 counties in the Llano Uplift area of Central Texas. Discontinuous outcrops of the aquifer generally encircle older rocks in the core of the uplift. The remaining downdip portion contains fresh to slightly saline water to depths of approximately 3,000 feet below land surface.

Groundwater use from the Ellenburger-San Saba Aquifer within Region K occurs in Blanco, Burnet, Gillespie, Llano, Mills, and San Saba counties (Figure 3.3). TWDB records indicate that municipal use accounts for the majority of groundwater pumpage from the aquifer.

The Ellenburger-San Saba Aquifer occurs in limestone and dolomite facies of the San Saba Member of the Wilbern Formation of the Late Cambrian Age; and in the Honeycut, Gorman, and Tanyard Formations of the Ellenburger Group. In the southeastern portion of the aquifer, these units have a combined maximum thickness of about 2,700 feet while, in the northeastern portion of the aquifer, maximum combined thickness is about 1,100 feet. In some areas, where the overlying confining beds are thin or nonexistent, the aquifer may be hydrologically connected to the Marble Falls Aquifer.

Most of the water is under artesian conditions, even in the outcrop areas where impermeable carbonate rocks in the upper portion of the Ellenburger-San Saba function as confining layers. The aquifer is compartmentalized by block faulting with the fractures forming various sized cavities, which are the major water-bearing features.

The maximum capacity of wells used for municipal and irrigation purposes generally range from 200 to 600 gal/min. Most other wells produce less than 100 gal/min. The variable flow properties of the aquifer make it difficult to consistently obtain higher yield wells in some areas. Locations in Region K that have experienced this difficulty include the cities of Fredericksburg and Bertram.

Water produced from the aquifer may have dissolved concentrations that range from 200 mg/L to as high as 3,000 mg/L, but in most cases is usually less than 1,000 mg/L. The quality of water declines rapidly in the downdip direction.

The Ellenburger-San Saba Aquifer spans several counties and several Groundwater Management Areas. The Desired Future Conditions for the Ellenburger-San Saba Aquifer are as follows:

- Burnet County (Groundwater Management Area 8) – Desired Future Condition adopted on July 26, 2022: Average drawdown of the Ellenburger-San Saba Aquifer should not exceed 12 feet from January 1, 2010, through December 31, 2080.
- Gillespie County (Groundwater Management Area 7) – Desired Future Condition adopted on August 19, 2021: Total net decline in water levels shall not exceed 8 feet below 2010 water levels in the aquifer by 2070.
- Mills County (Groundwater Management Area 8) – Desired Future Condition adopted on November 4, 2021: Average drawdown of the Ellenburger-San Saba Aquifer should not exceed 9 feet from January 1, 2010, through December 31, 2080.
- San Saba County (Groundwater Management Area 7) – Desired Future Condition adopted on August 19, 2021: Total net decline in water levels shall not exceed 5 feet below 2010 water levels in the aquifer by 2070.

Groundwater Management Areas 7 and 9 declared the aquifer as “non-relevant” for Llano and Blanco counties, respectively.

The TWDB used the adopted Desired Future Conditions to determine the Modeled Available Groundwater for the Ellenburger-San Saba Aquifer (**Table 3.18**), documented in the following reports.

- The Groundwater Management Area 7 Hickory Aquifer Modeled Available Groundwater is documented in TWDB report GR 21-021 MAG, dated August 12, 2022.
- The Groundwater Management Area 8 Hickory Aquifer Modeled Available Groundwater is documented in TWDB report GR 21-013 MAG, dated November 1, 2022.

As part of TWDB's informal comments on the Region K Technical Memorandum, the TWDB staff conducted a modeling analysis related to the Llano Uplift aquifers and provided Desired Future Condition-compatible “non-relevant” groundwater availability values for the Ellenburger-San Saba Aquifer in Blanco County and Llano County (Table 3.18). Those numbers were used for this planning cycle as well.

Table 3.18 Region K Water Availability for the Ellenburger-San Saba Aquifer

County	Basin	2030	2040	2050	2060	2070	2080
Blanco	Colorado	1,104	1,107	1,104	1,107	1,104	1,107
Blanco	Guadalupe	161	161	161	161	161	161
Burnet	Brazos	3,825	3,825	3,825	3,825	3,825	3,825
Burnet	Colorado	7,010	7,010	7,010	7,010	7,010	7,010
Gillespie	Colorado	6,294	6,294	6,294	6,294	6,294	6,294
Llano	Colorado	395	395	395	395	395	395
Mills	Brazos	93	93	93	93	93	93
Mills	Colorado	406	406	406	406	406	406
San Saba	Colorado	7,890	7,890	7,890	7,890	7,890	7,890
	Total	**27,178**	**27,181**	**27,178**	**27,181**	**27,178**	**27,181**

3.2.2.5 Marble Falls Aquifer

The Marble Falls Aquifer occurs in several separated outcrops, primarily along the northern and eastern flanks of the Llano Uplift region of Central Texas. The downdip portion of the aquifer is of unknown extent.

Current groundwater use from the Marble Falls Aquifer within Region K occurs in Burnet and San Saba counties (Figure 3.3). TWDB records indicate that mining use accounts for the majority of groundwater pumpage from the aquifer.

This aquifer occurs in the fractures, solution cavities, and channels of the limestone rocks of the Marble Falls Formation of the Pennsylvanian Bend Group. The maximum thickness of the formation is 600 feet. Numerous large springs discharge from the aquifer and provide a significant portion of the baseflow of the San Saba River in McCulloch and San Saba counties and to the Colorado River in San Saba and Lampasas counties. The aquifer contributes flow to the San Saba springs, which is the source of drinking water for the City of San Saba. In some areas where the confining layers are thin or nonexistent, the Marble Falls Aquifer may be hydrologically connected to the San Saba-Ellenburger Aquifer. Some wells have been known to produce as much as 2,000 gal/min; however, most wells produce at rates significantly less than this amount.

The water produced from this aquifer is suitable for most purposes, but some wells in Blanco County have produced water with high nitrate concentrations. The downdip portion of the aquifer is not extensive, but in these areas the water becomes highly mineralized. Because the limestone formation comprising this aquifer is relatively shallow, it is susceptible to pollution by surface uses and activities.

The Marble Falls Aquifer spans several counties and several Groundwater Management Areas. The Desired Future Conditions for the Marble Falls Aquifer, adopted by Groundwater Management Area 8 on November 4, 2021, are summarized as follows:

- No more than 11 feet of average drawdown in Burnet County from January 1, 2010, through December 31, 2080.
- No more than 9 feet of average drawdown in Mills County from January 1, 2010, through December 31, 2080.

Groundwater Management Areas 7 and 9 declared the aquifer as “non-relevant” for San Saba and Blanco counties, respectively.

The TWDB used the adopted Desired Future Conditions to determine the Modeled Available Groundwater for the Marble Falls Aquifer (**Table 3.19**), documented in the TWDB report GR 21-013 MAG, dated November 1, 2022.

Availability of the Marble Falls Aquifer in Blanco County was determined based on the estimated recharge listed in the Groundwater Availability Model Run 18-003 Blanco-Pedernales Groundwater Conservation District Groundwater Management Plan (TWDB, April 3, 2018).

As part of TWDB's informal comments on the Region K Technical Memorandum from the previous planning cycle, the TWDB staff conducted a modeling analysis related to the Llano Uplift aquifers and provided Desired Future Condition-compatible “non-relevant” groundwater availability values for the Marble Falls Aquifer in San Saba County (Table 3.19).

Table 3.19 Water Availability for the Marble Falls Aquifer

County	Basin	2030	2040	2050	2060	2070	2080
Blanco	Colorado	21	21	21	21	21	21
Burnet	Brazos	1,384	1,384	1,384	1,384	1,384	1,384
Burnet	Colorado	1,354	1,354	1,354	1,354	1,354	1,354
Llano	Colorado	1	1	1	1	1	1
Mills	Brazos	1	1	1	1	1	1
Mills	Colorado	24	24	24	24	24	24
San Saba	Colorado	4,343	4,355	4,343	4,355	4,343	4,343
	Total	**7,128**	**7,140**	**7,128**	**7,140**	**7,128**	**7,128**

3.2.2.6 Yegua-Jackson Aquifer

The Yegua-Jackson Aquifer extends in a narrow band from the Rio Grande Valley across the state to the Sabine River and Louisiana. It covers 10,904 square miles and exists within 34 counties.

The Yegua-Jackson Aquifer includes water bearing parts of the Yegua Formation and the Jackson Group. Within Region K, the Yegua Formation outcrops in Fayette County in a band approximately four to eight miles wide along the Bastrop-Fayette County line. The formation downdips at a rate of 150 feet per mile and reaches its deepest depth of 2,800 feet below mean sea level along the Fayette-Lavaca County line. The yields of most wells in the Yegua-Jackson are generally small, ranging from less than 50 gallons per minute to over 300 gallons per minute. Groundwater use in Fayette County is primarily by rural landowners for domestic and livestock water supply.

The Jackson Group Formation outcrops in Fayette County within Region K in a band approximately 3 to 8 miles wide along the northeasterly line from Flatonia to La Grange (Figure 3.3). The formation dips within Fayette County at a rate of approximately 150 feet per mile and reaches its deepest depth of 2,200 feet below mean sea level near Fayetteville. Groundwater from the Jackson Group in Fayette County is used by the cities of Ledbetter, Flatonia, and Schulenburg as well as rural property owners.

The Yegua-Jackson Aquifer’s geologic units consist of complexly interbedded sand, silt, and clay layers originally deposited as fluvial and deltaic sediments. Most groundwater is produced from the sand units of the aquifer with the more significant productivity occurring in areas of more extensive fluvial channel sands and thick deltaic sands. Usable quality groundwater is generally limited to sands in the outcrop or slightly downdip. Net freshwater sands are generally less than 200 feet deep at any location within the aquifer.

Where the thicker, more extensive sand layers occur in the outcrop and slightly downdip, significant amounts of fresh to slightly saline water are available. Water quality varies greatly within the aquifer, and shallow occurrences of poor-quality water are not uncommon. The chemical quality of the groundwater is variable due to the variability of the composition of the sediments that make up the aquifer and the variability of how easily water moves through the aquifer. In all areas, the aquifer becomes highly mineralized downdip.

The Yegua-Jackson Aquifer in Fayette County is within Groundwater Management Area 12. The Desired Future Conditions for the Yegua-Jackson Aquifer, adopted by Groundwater Management Area 12 on November 30, 2021, are summarized as follows: No more than 81 feet of average drawdown between 2011 and 2070 within the Fayette County Groundwater Conservation District (Fayette County).

The TWDB used the Desired Future Conditions established by Groundwater Management Area 12 to determine the Modeled Available Groundwater for the Yegua Jackson Aquifer (**Table 3.20**). Details are documented in TWDB report GR 21-017_MAG, dated November 1, 2022.

Table 3.20 Region K Water Availability for the Yegua-Jackson Aquifer

County	Basin	2030	2040	2050	2060	2070	2080
Fayette	Colorado	7,644	7,644	7,643	7,643	7,643	7,643
Fayette	Guadalupe	727	727	727	727	727	727
Fayette	Lavaca	1,613	1,613	1,613	1,613	1,613	1,613
	Total	**9,984**	**9,984**	**9,983**	**9,983**	**9,983**	**9,983**

3.2.2.7 Other Aquifers

"Other Aquifer" refers to alluvial aquifer water supplies that have not been identified, named, or studied. These alluvial aquifers are being used by a few Water User Groups in Region K as supply sources. The most likely source of these Other Aquifer supplies in Region K is the Colorado River Alluvium and related terrace deposits. Other Aquifer supplies were only considered for counties where Water User Groups specifically list alluvial aquifer type supplies as a source or where municipal or industrial Water User Groups could potentially utilize these alluvial supplies (**Table 3.21**).

The availability of Other Aquifer supplies is not based on Modeled Available Groundwater and instead was determined based on current groundwater pumping reported in the TWDB historical groundwater use report for 2011, as well as permit data from Groundwater Conservation Districts, where applicable (Table 3.21). Specific methodologies for each county and basin are the same as those used for the 2021 and 2016 Plans and are listed as follows:

- Other Aquifer (Bastrop County, Colorado Basin): The availability was determined based on Texas Commission on Environmental Quality Drinking Water Watch (DWW) database listed total production for City of Bastrop, along with published TWDB historical groundwater pumpage data for Bastrop County Water Control Improvement District 2 and Mining in Bastrop County, Colorado Basin.
- Other Aquifer (Burnet County, Brazos Basin): The availability was determined based on mining groundwater usage listed in the TWDB historical groundwater pumpage data.

- Other Aquifer (Burnet County, Colorado Basin): The availability was determined based on discussion with Central Texas Groundwater Conservation District regarding alluvial permits and Granite/Granite Gravel Aquifer permits, as well as published TWDB historical groundwater pumpage data for other/unknown aquifers for exempt uses.
- Other Aquifer (Fayette County, Colorado Basin): The availability was determined based on discussion with Fayette County Groundwater Conservation District regarding alluvial supplies during the 2016 planning cycle.
- Other Aquifer (Llano County, Colorado Basin): The availability was determined based on review of published TWDB historical groundwater pumpage data for County-Other, Kingsland Water and Sanitation District, and Livestock in Llano County.
- Other Aquifer (Travis County, Colorado Basin): The availability was determined based on review of published TWDB historical groundwater pumpage data for water uses in Travis County. In addition, the Texas Commission on Environmental Quality DWW database lists the source of the City of Manor’s groundwater wells as alluvial.
- Other Aquifer (Travis County, Guadalupe Basin): The availability was determined based on review of published TWDB historical groundwater pumpage data for water uses in Travis County.

Table 3.21 Region K Water Availability for Other Aquifer Sources

Minor Aquifer Source	County	Basin	2030	2040	2050	2060	2070	2080
Cross Timbers Aquifer	Mills	Colorado	20	20	20	20	20	20
Cross Timbers Aquifer	San Saba	Colorado	19	19	19	19	19	19
Colorado River Alluvium Aquifer	Travis	Colorado	1,660	1,660	1,660	1,660	1,660	1,660
Other Aquifer	Bastrop	Colorado	5,340	5,340	5,340	5,340	5,340	5,340
Other Aquifer	Burnet	Brazos	433	433	433	433	433	433
Other Aquifer	Burnet	Colorado	3,672	3,672	3,672	3,672	3,672	3,672
Other Aquifer	Fayette	Colorado	834	834	834	834	834	834
Other Aquifer	Llano	Colorado	646	646	646	646	646	646
Other Aquifer	Travis	Colorado	3,770	3,770	3,770	3,770	3,770	3,770
Other Aquifer	Travis	Guadalupe	112	112	112	112	112	112
		Total	**16,467**	**16,467**	**16,467**	**16,467**	**16,467**	**16,467**

3.3 Current Available Reclaimed Water

Another category of water for use in the Colorado Basin is reclaimed water. Reclaimed water is wastewater effluent that has been treated to a level that is safe to be directly used to meet various water needs. At this time, reclaimed water in Region K is used for non-potable uses only, such as irrigation or industrial uses. Reclaimed water is currently used by Austin, Burnet, Horseshoe Bay, Hurst Creek Municipal Utility District, Lago Vista, Marble Falls, Travis County Water Control and Improvement District 17, West Travis County Public Utility Agency, and Manufacturing in Travis County. **Table 3.22** contains a summary of the reclaimed water supplies that are currently being used, as reported through Water User Group surveys. Note that the availability estimate is limited to what has been reported as being currently used by Water User Groups in each county through the surveys.

Table 3.22 Reclaimed Water Sources in the Colorado River Basin

County	Type	2030	2040	2050	2060	2070	2080
Burnet	Direct	1,591	1,591	1,591	1,591	1,591	1,591
Hays	Direct	100	1,120	1,120	1,120	1,680	1,680
Llano	Direct	480	480	480	480	480	480
Travis	Direct	9,778	9,778	9,778	9,778	9,778	9,778
	Total	**11,949**	**12,969**	**12,969**	**12,969**	**13,529**	**13,529**

3.4 Regional Water Availability

The TWDB guidelines for regional water planning process require that a summary of the water sources available to the region be presented. Detailed information concerning water source availability for the region can be found in DB27 Report 3, as described in the Executive Summary (DB27 Reports). This information is presented graphically in **Figure 3.4** and is summarized in **Table 3.23**. As indicated, under current conditions, a total of approximately 1.25 million acre-feet of water are available annually to Region K under Drought of Record conditions. Of this amount, approximately 65 percent is from surface water sources and 33 percent is from groundwater sources.

Figure 3.4 Total Water Available in Region K During Drought of Record

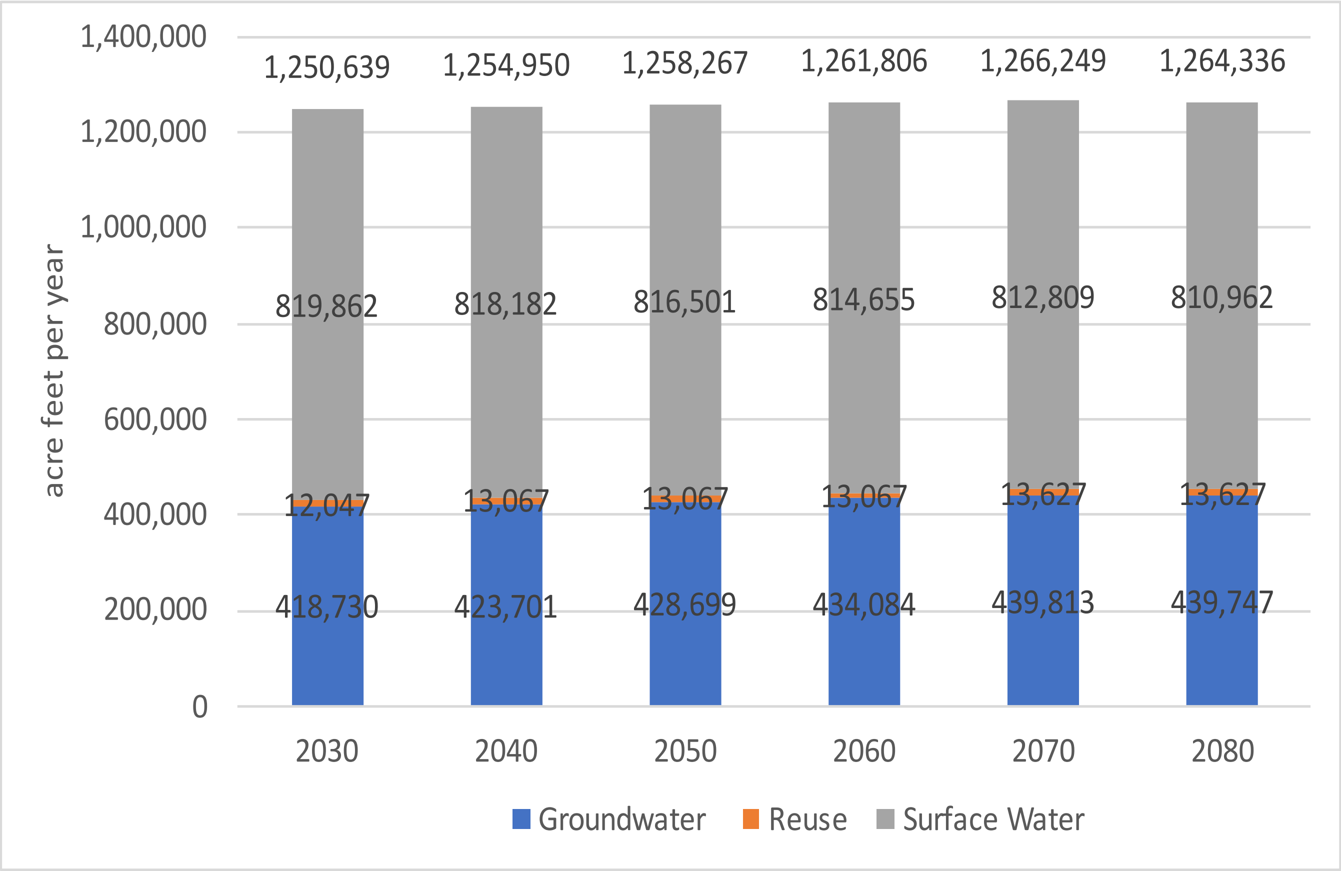


Table 3.23 Total Water Available in Region K During Drought of Record

Source	2030	2040	2050	2060	2070	2080
Groundwater	418,730	423,701	428,699	434,084	439,813	439,747
Reuse	12,047	13,067	13,067	13,067	13,627	13,627
Surface Water	819,862	818,182	816,501	814,655	812,809	810,962
Total	**1,250,639**	**1,254,950**	**1,258,267**	**1,261,806**	**1,266,249**	**1,264,336**

3.5 Major Water Providers

The Regional Water Planning Groups are required to prepare estimates of the water available to the Major Water Providers within each region. As discussed in Section 1.4, there are two Major Water Providers in Region K: the Lower Colorado River Authority and Austin Water. The water supplies available to these two entities are discussed in the following sections.

3.5.1 Lower Colorado River Authority Water Availability

Lower Colorado River Authority owns the rights to significant quantities of water within Region K. The majority of water that is available to Lower Colorado River Authority during a repeat of the Drought of Record is associated with the Highland Lakes System. Lower Colorado River Authority also has two additional smaller reservoirs that it operates in association with two power-generating facilities (Fayette Power Project and Sim Gideon/Lost Pines Power Park), although no water availability is specifically associated with those reservoirs for regional water planning purposes. Lower Colorado River Authority has developed groundwater supplies in Bastrop County as another source of water for the Sim Gideon/Lost Pines Power Park. In addition, Lower Colorado River Authority owns many of the senior run-of-river water rights in the lower basin. Lower Colorado River Authority recently constructed the Arbuckle Reservoir in Wharton County, but the water availability associated with that reservoir is included under the Lower Colorado River Authority-Gulf Coast water right. **Table 3.24** contains a summary of the water that is available to Lower Colorado River Authority.

Table 3.24 Total Water Available to the Lower Colorado River Authority

Water Right Holder/Source	Total Water Available to the Lower Colorado River Authority (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Lakes Buchanan and Travis (COAs 14-5478, 14-5482)[1]	408,209	406,417	404,625	402,779	400,933	399,086
Garwood (COA 14-5434)	121,611	121,611	121,611	121,611	121,611	121,611
Gulf Coast (COA 14-5476)[2]	43,121	43,121	43,121	43,121	43,121	43,121
Lakeside (COA 14-5475)	8,088	8,088	8,088	8,088	8,088	8,088
Pierce Ranch (COA 14-5477)	1,149	1,149	1,149	1,149	1,149	1,149
Carrizo-Wilcox Aquifer[3]	4,544	4,544	4,544	4,544	4,544	4,544
Totals	**586,722**	**584,930**	**583,138**	**581,292**	**579,446**	**577,599**

Notes

Data Source: Modeling was conducted using the Colorado Water Availability Model, Run 3 provided by Texas Commission on Environmental Quality (October 2023), with the modifications associated with the Region K Supply Evaluation Model discussed in Section 3.2.1. The hydrology data extend through 2016.

[1] The firm water includes Lower Colorado River Authority's environmental commitments of 33,440 acre-feet/year not available for

consumptive use allocation.

[2] The benefit of Arbuckle Reservoir is included in the Gulf Coast water right.

[3] Lower Colorado River Authority has a permit for Carrizo-Wilcox Aquifer groundwater in Bastrop County. The amount shown in this table represents the five-year average production of that permit, not the permitted amount. The water from the Carrizo-Wilcox Aquifer is used for the Sim Gideon Power Plant and Lost Pines Power Plant.

Lower Colorado River Authority makes most of this water available to its customers for various uses through firm water sales contracts (commitments). Existing firm customer contracts are assumed to be renewed through the planning period. In addition, Lower Colorado River Authority operates three agricultural divisions (Lakeside, Garwood, and Gulf Coast) in the lower basin and provides water to operations tied to the Pierce Ranch water right. These divisions and Pierce Ranch provide irrigation water, subject to interruption, for agricultural crop (rice and other crops) production in Colorado, Wharton, and Matagorda counties. The supply to the Garwood division is assumed to be 100,000 acre-feet/year based on Lower Colorado River Authority's arwood Purchase Agreement. **Table 3.25** shows a summary of current Lower Colorado River Authority firm water supply commitments by Water User Groups. The firm commitments from Lower Colorado River Authority total 566,173 acre-feet/year in 2030 (which includes environmental commitments including potential out-of-basin transfers up to 79,000 acre-feet/year) and decrease over the planning period to 565,950 acre-feet/year in 2080. Lower Colorado River Authority also has interruptible irrigation contracts with entities in Colorado, Matagorda, and Wharton counties.

Table 3.25 Lower Colorado River Authority Current Firm Water Commitment Summary

County/Water User Group	Lower Colorado River Authority Firm Commitments[1] (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Austin[2]	137,891	137,668	137,668	137,668	137,668	137,668
Brazos River Authority[3, 4]	25,000	25,000	25,000	25,000	25,000	25,000
Briarcliff	400	400	400	400	400	400
Burnet	4,100	4,100	4,100	4,100	4,100	4,100
Cedar Park[3]	23,000	23,000	23,000	23,000	23,000	23,000
Corix Utilities Texas Inc	1,140	1,140	1,140	1,140	1,140	1,140
Cottonwood Shores	495	495	495	495	495	495
County-Other, Bastrop	744	744	744	744	744	744
County-Other, Burnet	1,141	1,141	1,141	1,141	1,141	1,141
County-Other, Fayette	27	27	27	27	27	27
County-Other, Gillespie	66	66	66	66	66	66
County-Other, Hays	2,546	2,546	2,546	2,546	2,546	2,546
County-Other, Llano	692	692	692	692	692	692
County-Other, San Saba	20	20	20	20	20	20
County-Other, Travis	12,706	12,706	12,706	12,706	12,706	12,706
Cypress Ranch WCID 1	436	436	436	436	436	436
Environmental Commitments[5]	33,440	33,440	33,440	33,440	33,440	33,440
Granite Shoals	830	830	830	830	830	830
Horseshoe Bay	4,450	4,450	4,450	4,450	4,450	4,450
Hurst Creek MUD	1,200	1,200	1,200	1,200	1,200	1,200
Irrigation, Bastrop	782	782	782	782	782	782

County/Water User Group	Lower Colorado River Authority Firm Commitments[1] (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Irrigation, Burnet	377	377	377	377	377	377
Irrigation, Colorado (Garwood)[6]	100,000	100,000	100,000	100,000	100,000	100,000
Irrigation, Llano	1,665	1,665	1,665	1,665	1,665	1,665
Irrigation, Travis	3,465	3,465	3,465	3,465	3,465	3,465
Jonestown WSC	750	750	750	750	750	750
Kingsland WSC	1,150	1,150	1,150	11,15	1,150	1,150
Lago Vista	4,500	4,500	4,500	4,500	4,500	4,500
Lakeway MUD	3,069	3,069	3,069	3,069	3,069	3,069
Leander[3]	31,000	31,000	31,000	31,000	31,000	31,000
Loop 360 WSC	1,250	1,250	1,250	1,250	1,250	1,250
Manufacturing, Burnet	400	400	400	40	400	400
Manufacturing, Fayette	70	70	70	70	70	70
Manufacturing, Matagorda	33,802	33,802	33,802	33,802	33,802	33,802
Manufacturing, Travis	276	276	276	276	276	276
Marble Falls	7,000	7,000	7,000	7,000	7,000	7,000
Pflugerville	24,000	24,000	24,000	24,000	24,000	24,000
Steam-Electric Power, Bastrop	4,544	4,544	4,544	4,544	4,544	4,544
Steam-Electric Power, Fayette[7]	30,500	30,500	30,500	30,500	30,500	30,500
Steam-Electric Power, Matagorda[8]	24,544	24,544	24,544	24,544	24,544	24,544
Sunrise Beach Village	200	200	200	200	200	200
Travis County MUD 10	96	96	96	96	96	96
Travis County MUD 4	4,316	4,316	4,316	4,316	4,316	4,316
Travis County WCID 10	3,644	3,644	3,644	3,644	3,644	3,644
Travis County WCID 17	11,300	11,300	11,300	11,300	11,300	11,300
Travis County WCID 18	1,400	1,400	1,400	1,400	1,400	1,400
Travis County WCID 20	534	534	534	534	534	534
Travis County WCID Point Venture	285	285	285	285	285	285
Undine Development	203	203	203	203	203	203
West Travis County Public Utility Agency[9]	13,950	13,950	13,950	13,950	13,950	13,950
Headwaters at Barton Creek[9]	506	506	506	506	506	506
Reunion Ranch[9]	350	350	350	350	350	350
Hays County WCID 1[9]	717	717	717	717	717	717
Hays County WCID 2[9]	684	684	684	684	684	684
Travis County MUD 12 (Rough Hollow)[9]	1,680	1,680	1,680	1,680	1,680	1,680
Lazy Nine MUD 1[9]	974	974	974	974	974	974
Dripping Springs WSC[9]	1,126	1,126	1,126	1,126	1,126	1,126
Senna Hills MUD[9]	404	404	404	404	404	404
Travis County MUD 18[9]	336	336	336	336	336	336
Total	**566,173**	**565,950**	**565,950**	**565,950**	**565,950**	**565,950**

Notes

[1] The firm commitments listed in this table are based on the Lower Colorado River Authority contractual obligations as of October 1, 2024. Also see note 4.

[2] The values in this line item are based on the Region K Supply Evaluation Model results, reflecting the amount of Lower Colorado River Authority backup supplies required to supplement Austin's municipal water rights, up to a maximum of 325,000 acre-feet per year.

[3] The commitments to Brazos River Authority, Cedar Park and Leander are associated with the three entities partnering on the Brushy Creek Regional Utility Authority (BCRUA) project, which has been supplying water from the Highland Lakes in the Colorado River Basin to the three entities in the Brazos River Basin.

[4] Chapter 5 of this plan outlines a Water Management Strategy for returning 25,000 ac-ft/yr of water from the Brazos River Basin to the Colorado River Basin, per HB 1437 (1999). Chapter 5 of the 2026 Brazos Region G Plan contains a Water Management Strategy for expanding infrastructure connected with BCRUA.

[5] The amount of firm water allocated for environmental purposes is not available for consumptive use.

[6] This line item includes 100,000 acre-feet/year currently made available for irrigation use consistent with Lower Colorado River Authority's purchase of the Garwood water right.

[7] The Lower Colorado River Authority generation commitment is not exclusive to Fayette County. Up to 23,000 acre-feet/year of this amount can and will be used elsewhere such as the Lower Colorado River Authority Ferguson power plant in Llano County but will be primarily used by Fayette power plant in Fayette County.

[8] The Matagorda Steam Electric value is based on the Region K Supply Evaluation Model results, showing the average annual amount of Lower Colorado River Authority backup supplies required to supplement the South Texas Project Nuclear Operating Company/Lower Colorado River Authority water right.

[9] West Travis County Public Utility Agency has contracts with multiple Water User Groups in Hays and Travis counties for treatment and transport/delivery of water. These Water User Groups also have firm water contracts with and are supplied through Lower Colorado River Authority. Some water users with contracts with Lower Colorado River Authority and West Travis County Public Utility Agency are not named Water User Groups and are included in the County-Other totals, including Eanes ISD (included in the County-Other, Travis), the City of Dripping Springs (included in County-Other, Hays), and Lake Pointe MUD (included in County-Other, Travis).

Based on the current 2020 Lower Colorado River Authority Water Management Plan, Lower Colorado River Authority releases stored water on an interruptible basis when the levels in the Highland Lakes are above prescribed levels at certain times of the beginning of the year. During Drought of Record conditions, this water may not be available for users or is available in limited quantities. Therefore, in accordance with the TWDB guidance, interruptible water supplied by Lower Colorado River Authority is not being considered as "currently available water supply." The availability of interruptible water will be addressed in **Chapter 5** discussing management strategies to meet identified water shortages.

3.5.2 Austin Water Availability

Austin has run-of-river water rights to divert and use water from the Colorado River (**Table 3.26**). Hydrologic conditions are such that Austin's full authorized diversion amount of water is not available to Austin under these water rights. As a result, Austin has entered into a contract with Lower Colorado River Authority to firm up these water rights with water stored in the Highland Lakes. In addition, Austin uses reclaimed water (reuse) to currently meet a portion of its demands.

Table 3.26 Austin Water Availability (acre-feet/year)

Water Right/ Agreement	Water Right Holder	Water Supply Source	Water Availability During Drought of Record (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
CA 14-5471	City of Austin	RoR-Municipal	174,845	174,84,5	174,845	174,845	174,845	174,845
CA 14-5471	City of Austin	RoR-Municipal	7,125	7,125	7,125	7,125	7,125	7,125
CA 14-5489	City of Austin	RoR-Municipal	5,139	5,139	5,251	5,251	5,362	5,362
City of Austin Municipal & Manufacturing RoR Subtotal			**187,109**	**187,109**	**187,221**	**187,221**	**187,332**	**187,332**
CA 14-5471	LCRA Backup	Highland Lakes	75,155	75,155	75,155	75,155	75,155	75,155
CA 14-5471	LCRA Backup	Highland Lakes	15,278	15,278	15,278	15,278	15,278	15,278
CA 14-5489	LCRA Backup	Highland Lakes	15,161	15,161	15,049	15,049	14,938	14,938
Remaining Contract	LCRA Backup	Highland Lakes	32,297	32,297	32,297	32,297	32,297	32,297
LCRA Municipal and Mfg. Backup Subtotal			137,891	137,891	137,779	137,779	137,668	137,668
Austin Reclaimed Water (Reuse)			5,401	5,401	5,401	5,401	5,401	5,401
Municipal and Manufacturing Total			**330,401**	**330,401**	**330,401**	**330,401**	**330,401**	**330,401**
CA 14-5471	City of Austin	RoR-Steam Electric	0	0	0	0	0	0
CA 14-5489[1]	City of Austin	RoR-Steam Electric	4,906	4,995	5,084	5,084	5,084	5,084
City of Austin Steam Electric RoR Subtotal			**4,906**	**4,995**	**5,084**	**5,084**	**5,084**	**5,084**
Fayette Contract	LCRA Backup	Highland Lakes	7,500	7,500	7,500	7,500	7,500	7,500
Decker Contract[1]	LCRA Backup	Highland Lakes	11,250	11,161	11,072	11,072	11,072	11,072
Steam Electric Total			**23,656**	**23,656**	**23,656**	**23,656**	**23,656**	**23,656**

[1] The 14-5489 Austin steam electric water right and the LCRA backup associated with Decker Lake sum to 16,156 ac-ft/yr.

Austin provides treated water to customers within its service area. In addition, the City has contracts to provide treated water on a wholesale basis to cities, districts, and water supply corporations in surrounding areas. **Table 3.27** contains a summary of the Austin water commitments. Contracts that are expected to terminate, not be renewed, and may subsequently be supplied by Lower Colorado River Authority during the planning period are identified as such in the table below by showing zero acre-feet/year of supply in the applicable decades. Details related to water management strategies for new Lower Colorado River Authority contracts are provided in Chapter 5. Austin will continue to treat and deliver the Lower Colorado River Authority contracted water for those entities.

Table 3.27 Austin Water Commitment Summary (acre-feet/year)

City of Austin Service Area Water User Groups (WUGs) Retail and Wholesale	County	Water Demands / Supply Commitments					
		2030	2040	2050	2060	2070	2080
Austin	Hays	22	26	30	34	38	42
Wholesale Commitments:	**Hays**	**119**	**0**	**0**	**0**	**0**	**0**
Mid-Tex Utility	Hays	119	0	0	0	0	0
Austin	Travis	191,812	223,243	255,604	287,768	317,536	348,767
County-Other	Travis	0	0	0	0	0	0
Manufacturing* (COA portion is 100%)	Travis	19,363	22,470	25,599	28,752	29,429	30,131
Wholesale Commitments:	**Travis**	**3,943**	**0**	**0**	**0**	**0**	**0**
Creedmoor-Maha WSC*	Travis	238	0	0	0	0	0
Mid-Tex Utility	Travis	208	0	0	0	0	0
North Austin MUD#1	Travis	96	0	0	0	0	0
Northtown MUD	Travis	665	0	0	0	0	0
Rollingwood	Travis	401	0	0	0	0	0
Shady Hollow MUD	Travis	585	0	0	0	0	0
Sunset Valley	Travis	286	0	0	0	0	0
Wells Branch MUD	Travis	1,464	0	0	0	0	0
Austin	Williamson	16,159	21,070	27,735	34,595	41,937	49,401
County-Other (All COA Retail)	Williamson	0	369	90	206	735	2,101
Manufacturing	Williamson	14	15	16	17	18	19
Wholesale Commitments:	**Williamson**	**924**	**0**	**0**	**0**	**0**	**0**
North Austin MUD#1	*Williamson*	*889*	*0*	*0*	*0*	*0*	*0*
Wells Branch MUD	*Williamson*	*35*	*0*	*0*	*0*	*0*	*0*
Total		232,356	267,193	309,074	351,372	389,693	430,461

* These WUGs also have other sources of supply.

Steam-Electric**	Fayette***	10,300	10,300	10,300	10,300	10,300	10,300
Steam-Electric***	Travis	4,116	4,116	4,116	4,116	4,116	4,116
Steam-Electric Total		**14,416**	**14,416**	**14,416**	**14,416**	**14,416**	**14,416**

** COA's portion of the STP demand is included in the STP total steam-electric demand in Matagorda County

*** COA portion - based on estimated supply levels and approved projections.

3.6 Water Supplies Available to Water User Groups

Estimates of the total available supply of water within Region K during a repeat of the Drought of Record conditions are presented in Section 3.2. However, the availability of this water to each of the Water User Groups is dependent upon the Water User Group's location and the infrastructure capacity or permits/contracts that are in place to move the water where it is needed. The following sections discuss the currently available water supplies for each of the water user groups within Region K. The water supply amounts presented in this section are a total of permitted/contracted amount and/or infrastructure capacity for the Water User Groups in Region K. Firm contracts are assumed to be renewed through the planning period, unless identified specifically in Table 3.25. The amount presented in Section 3.2 (Table 3.24) is the total water available for Region K established through modeling effort or regulatory limit.

The amount of total water supply available to the Water User Groups in Region K is less than the total available water to the region presented in Table 3.24, since the water supply for the Water User Groups is limited by current supplies owned or controlled by each Water User Group, location relative to the source, and infrastructure limitations. There is water available in Region K that is not currently being used by Water User Groups because they do not have the needs right now, or they do not have the means to utilize the source at this time. The following sections present the amount of water supply that is currently available to the Water User Groups (current permits/contracts and infrastructure capacities).

3.6.1 Surface Water Supplies Available to Water User Groups

As previously stated, there are four primary categories of surface water to be considered. The categories include water stored in reservoirs, run-of-river water rights, local surface water supplies, and reclaimed water. The surface water supplies are available to the water user groups by a variety of methods. Many users of water throughout the basin have contracts with one of the three designated Major Water Providers within the Region. Other users of surface water generally obtain water from small reservoirs or from other local sources such as stock ponds. Surface water information was also obtained from the Texas Commission on Environmental Quality Water Utility Database (plant production capacities).

Information concerning the available surface water supply for each county within Region K is presented in **Table 3.28.** Detailed information concerning water supply availability for individual Water User Groups can be found in DB27 Report 4, as described in the Executive Summary (DB27 Reports).

Table 3.28 Summary of Available Surface Water Supply to Water User Groups by County (acre-feet/year)

Water User Group by County	2030	2040	2050	2060	2070	2080
Bastrop County	5,608	5,608	5,608	5,608	5,608	5,608
Blanco County	876	876	875	874	873	873
Burnet County	8,715	8,793	8,847	8,896	8,948	8,986
Colorado County	59,898	59,898	59,898	59,898	59,898	59,898
Fayette County	30,495	30,495	30,495	30,495	30,495	30,495
Gillespie County	66	66	66	66	66	66
Hays County	12,943	13,228	13,801	14,452	14,936	15,311
Llano County	8,114	8,004	7,895	7,831	7,754	7,663
Matagorda County	98,799	98,799	98,799	98,799	98,799	98,799
Mills County	917	914	911	907	904	899
San Saba County	563	562	561	560	559	558
Travis County	389,060	386,656	383,155	375,414	366,989	357,709
Wharton County	25,538	25,538	25,538	25,538	25,538	25,538
Williamson County	17,166	21,523	27,909	34,886	42,759	51,589
Grand Total	**658,758**	**660,960**	**664,358**	**664,224**	**664,126**	**663,992**

A new requirement for 2026 is separate reporting of local surface water supplies. The primary water use in Region K for local surface water supplies is livestock watering. Ranchers either divert water from streams on or adjacent to their properties (under riparian rights), or capture runoff in natural depressions or dug "tanks" and use it for livestock watering. **Table 3.29** shows the local surface water supplies estimated to be used in Region K by basin and county, with a region-wide total of 10,210 acre-feet per year.

Table 3.29 Summary of Livestock Local Surface Water Supplies (acre-feet/year)

Basin	County	2030	2040	2050	2060	2070	2080
Brazos	**Basin Total**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**
	Bastrop	94	94	94	94	94	94
	Burnet	630	630	630	630	630	630
	Mills	321	321	321	321	321	321
	Williamson	-	-	-	-	-	-
Brazos-Colorado	**Basin Total**	**1,238**	**1,238**	**1,238**	**1,238**	**1,238**	**1,238**
	Colorado	203	203	203	203	203	203
	Matagorda	664	664	664	664	664	664
	Wharton	371	371	371	371	371	371
Colorado	**Basin Total**	**5,921**	**5,921**	**5,921**	**5,921**	**5,921**	**5,921**
	Bastrop	696	696	696	696	696	696
	Blanco	101	101	101	101	101	101
	Burnet	582	582	582	582	582	582
	Colorado	860	860	860	860	860	860
	Fayette	1,370	1,370	1,370	1,370	1,370	1,370
	Gillespie	-	-	-	-	-	-
	Hays	60	60	60	60	60	60
	Llano	414	414	414	414	414	414
	Mills	360	360	360	360	360	360
	San Saba	900	900	900	900	900	900
	Travis	463	463	463	463	463	463
	Wharton	115	115	115	115	115	115
Colorado-Lavaca	**Basin Total**	**788**	**788**	**788**	**788**	**788**	**788**
	Matagorda	708	708	708	708	708	708
	Wharton	80	80	80	80	80	80
Guadalupe	**Basin Total**	**367**	**367**	**367**	**367**	**367**	**367**
	Bastrop	72	72	72	72	72	72
	Blanco	129	129	129	129	129	129
	Fayette	142	142	142	142	142	142
	Gillespie	-	-	-	-	-	-
	Travis	24	24	24	24	24	24
Lavaca	**Basin Total**	**851**	**851**	**851**	**851**	**851**	**851**
	Colorado	465	465	465	465	465	465
	Fayette	386	386	386	386	386	386
	Grand Total	**10,210**	**10,210**	**10,210**	**10,210**	**10,210**	**10,210**

Notes: The magnitude of these supplies was originally estimated in the 2001 plan and has been periodically updated in successive plans. In the current plan, the magnitude was generally kept similar to the previous plan. In some cases, the estimated amounts were decreased if there was evidence that groundwater supplies for livestock constituted a significant fraction of the demand. None of these local surface water supplies for livestock are directly associated with a permit, and none of the supplies can be demonstrated to be firm.

A second and smaller use for local surface water supplies is aggregate mining. Because the mining lowers the ground level and creates large pits on the site, runoff during rain events tends to collect on site in these pits. Many of these pits also interact with the groundwater table, i.e., if the pit is emptied, groundwater may seep into the pit at a rate determined by the number of flowing fractures intersected by the pit. **Table 3.30** shows a summary of the estimated local surface water supplies used for aggregate mining in Region K.

Table 3.30 Summary of Local Surface Water Supplies for Mining (acre-feet/year)

Basin	County	2030	2040	2050	2060	2070	2080
Brazos	**Basin Total**	**966**	**966**	**966**	**966**	**966**	**966**
	Burnet	966	966	966	966	966	966
Colorado	**Basin Total**	**525**	**525**	**525**	**525**	**525**	**525**
	Burnet	250	250	250	250	250	250
	Llano	275	275	275	275	275	275
	Grand Total	1,491	1,491	1,491	1,491	1,491	1,491

Note: A recent analysis that was completed as part of a groundwater permit for Texas Materials in Burnet County concluded that about 50% of pit water use was comprised of groundwater, with the remaining 50% surface water, over the 2011 drought. The volumes in the table were based on this estimate and a similar analysis from the 2021 plan. None of these local surface water supplies are directly associated with a permit, and none of the supplies can be demonstrated to be firm.

3.6.2 Groundwater Supplies Available to Water User Groups

Groundwater supplies were allocated to the various Water User Groups within Region K using data from various sources. Information provided by the Water User Group was entered when available. Permit information was entered for various groundwater conservation districts, and supplies were estimated based upon the Texas Commission on Environmental Quality Water Utility Database information (well production capacities). In addition, in cases where total supplies exceeded the Modeled Available Groundwater, Water User Group supplies were cut back proportionally to prevent over-allocation.

Information concerning the available groundwater supply for each county within Region K is presented in **Table 3.31.** Detailed information concerning water supply availability for individual Water User can be found in DB27 Report 4, as described in the Executive Summary (DB27 Reports).

Table 3.31 Summary of Available Groundwater Supply to Water User Groups by County (acre-feet/year)

Total by County	2030	2040	2050	2060	2070	2080
Bastrop County	26,792	27,065	27,684	28,385	29,315	30,359
Blanco County	3,448	3,448	3,446	3,445	3,445	3,444
Burnet County	8,093	8,094	8,094	8,095	8,095	8,096
Colorado County	60,196	60,196	60,196	60,196	60,196	60,196
Fayette County	6,960	6,975	7,042	7,063	7,083	7,151
Gillespie County	9,316	9,316	9,316	9,316	9,316	9,316
Hays County	9,312	9,258	9,233	9,278	9,529	9,809
Llano County	1,583	1,583	1,583	1,583	1,583	1,583
Matagorda County	37,095	37,095	37,094	37,093	37,092	37,091
Mills County	2,459	2,459	2,459	2,459	2,459	2,459
San Saba County	9,219	9,198	9,184	9,172	9,168	9,173
Travis County	24,635	27,655	29,916	32,306	34,497	36,922
Wharton County	102,797	102,771	102,751	102,726	102,699	102,673
Williamson County	770	770	770	770	770	770
Grand Total	**302,675**	**305,883**	**308,768**	**311,887**	**315,247**	**319,042**

3.6.3 Water User Group Water Supply Summary

There is water available in Region K that is not currently being used by Water User Groups because they do not have the needs right now, or they do not have the means to utilize the source at this time. **Table 3.32** shows the amount of water supply that is currently available to the Water User Groups (current permits/contracts and infrastructure capacities). As the contracts and permits expire, it is assumed they will be renewed at their currently contracted amount. Note that Table 3.32 represents the sum of the surface water supplies (Table 3.28) groundwater supplies (Table 3.31) plus a small amount of reuse.

Table 3.32 Total Available Supply (acre-feet/years)

Total by County	2030	2040	2050	2060	2070	2080
Bastrop County	32,400	32,673	33,292	33,993	34,923	35,967
Blanco County	4,325	4,325	4,322	4,320	4,319	4,318
Burnet County	18,591	18,673	18,731	18,780	18,831	18,870
Colorado County	120,094	120,094	120,094	120,094	120,094	120,094
Fayette County	37,455	37,470	37,537	37,558	37,578	37,646
Gillespie County	9,382	9,382	9,382	9,382	9,382	9,382
Hays County	22,272	22,504	23,052	23,748	24,483	25,137
Llano County	10,083	9,970	9,857	9,794	9,718	9,627
Matagorda County	135,894	135,894	135,893	135,892	135,891	135,890
Mills County	3,376	3,373	3,370	3,366	3,363	3,358
San Saba County	9,782	9,760	9,745	9,732	9,727	9,731
Travis County	420,823	421,440	420,200	414,849	408,615	401,759
Wharton County	128,335	128,309	128,289	128,264	128,237	128,211
Williamson County	17,936	22,293	28,679	35,656	43,529	52,359
Grand Total	**970,748**	**976,160**	**982,443**	**985,428**	**988,690**	**992,349**

References

No references were used in this Chapter.

Chapter 4.

Analysis of Water Needs

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Appendix

Chapter 4. Analysis of Water Needs

Water needs (shortages) were identified by comparing projected water demands with existing water supplies to determine whether entities will experience water surpluses or water needs (shortages). Water needs are identified through two tiers of analysis: first- and second-tier analysis. First-tier water needs are identified through comparison of projected water demands (Chapter 2) and estimated current water supplies during the Drought-of-Record conditions (Chapter 3). Second-tier water needs are defined as those needs remaining after conservation and direct reuse strategies have been implemented. Complete listings of first-tier and second-tier water needs by water user group can be found through the hyperlinked reports at the end of the **Executive Summary**, Reports 5 and 6, respectively.

As discussed in **Chapter 3**, allocations of existing water supplies were based on the most restrictive of several factors, including current water rights, contracts, water treatment capacities, available yields for surface water during Drought of Record, and production capacities for groundwater. In addition, available groundwater use is limited by the modeled available groundwater established during the joint-planning process. The allocation process did not directly address water quality issues, which were found to be minimal for the Lower Colorado Regional Water Planning Area (Region K). Nonetheless, water quality issues could potentially impact usability of some water supplies.

4.1 Identification of Water Needs

As presented in Chapter 3, it is estimated that Region K has approximately 1.25 million acre-feet of available supplies. However, not enough infrastructure has yet been developed to access all of that available water. Undeveloped (or unconnected) water supplies are identified by comparing the supplies developed for each individual entity to use to the total regional water supply sources. Additional details on supply versus demand (DB27 Report) are provided at the end of the **Executive Summary**, which contains hyperlinks to Report 5 “2026 Regional Water Plan 5 - Water User Group Needs or Surplus.”

The identified needs are based on conservative water availability estimates, which

- assume only water that is available during a repeat of the historical Drought of Record,
- assume that all water rights in the basin are being fully and simultaneously utilized,
- exclude both water available from the Lower Colorado River Authority (LCRA) on an interruptible basis and water projected to potentially be available, for planning purposes, as a result of return flows to the Colorado River, and
- assume groundwater availability is limited to the modeled available groundwater (MAG) based on desired future conditions (DFC).

In Region K, there are 33 Water User Groups with identified water needs in 2030. By 2080, there are 58 Water User Groups with identified water needs **(Table 4.1**). The total water needs in 2030 are about 321,000 acre-feet/year, increasing to about 500,000 acre-feet/year by 2080. Note that in this section, a parentheses is used for tabulated needs, to differentiate them from surpluses, when both needs and surpluses are presented in the same table.

Table 4.1 Summary of Identified Water Needs

	2030	2040	2050	2060	2070	2080
Number of WUGs with Needs	33	49	51	56	56	58
Total Needs for Region K (acre-feet per year)	(319,277)	(326,443)	(336,821)	(374,231)	(432,303)	(498,146)

The needs are broken down by water use category in **Table 4.2**. Needs have been identified in four of the six water use categories, where livestock and steam-electric power are not projected to have needs. Because steam-electric power demand is not expected to increase in the future, this is an expected result. The lack of livestock needs are dependent on some of the demands being met by local supplies, as detailed in Chapter 3. There is some uncertainty in estimating the volumes of local supplies, so the lack of projected need should be considered in that context.

The majority of the identified needs fall into two main categories. The first is associated with rice irrigation demands in the lower three counties of Colorado, Matagorda, and Wharton. It is estimated that irrigators in these three counties would experience a need of approximately 298,000 acre-feet per year under 2030 demand conditions. This shortage is estimated to decrease to 230,000 acre-feet per year in 2080 due to declining demands. The irrigation needs in Colorado, Matagorda, and Wharton counties account for 16, 44, and 33 percent of the total identified water needs for Region K, respectively. As demand for irrigation decreases from 2030 to 2080, and municipal demands increase over the same period, these percentages decrease. By 2080, identified water needs for Colorado, Matagorda, and Wharton counties accounts for only 6, 24, and 16 percent of total identified water needs for Region K.

Other irrigation needs in the region, outside of those three counties, make up a minor portion of the overall irrigation needs. These estimated shortfalls are based on the available supply determined in Chapter 3. In accordance with Texas Water Development Board (TWDB) rules, the available supply of water for irrigation was estimated based on the available run-of-river (ROR) water rights and groundwater supplies in the area. The interruptible supply of water provided by the LCRA and return flows were not considered in these calculations.

The second largest need falls in the municipal category. This is due to projected population growth, primarily in the urban and urbanizing areas of the region. Much of these needs will be met by LCRA, which is the largest wholesale water provider in the region, and Austin, which is the largest retail water provider in the region. Some of the needs will be met by expanding other local water sources, including groundwater or reuse. The projected strategies for meeting most of the needs are discussed in Chapter 5.

Table 4.2 Summary of Projected Regional Needs by Water Use Type

Total by Water Use Type (acre feet per year)	2030	2040	2050	2060	2070	2080
Irrigation	(302,217)	(287,925)	(274,021)	(260,492)	(247,327)	(234,520)
Livestock	0	0	0	0	0	0
Manufacturing	(1,485)	(1,778)	(2,082)	(2,397)	(2,723)	(3,063)
Mining	(2,990)	(1,357)	(1,739)	(2,318)	(2,895)	(3,428)
Municipal	(12,585)	(35,383)	(58,979)	(109,024)	(179,358)	(257,135)
Steam-Electric Power	0	0	0	0	0	0
Total	**(319,277)**	**(326,443)**	**(336,821)**	**(374,231)**	**(432,303)**	**(498,146)**

4.2 First-tier Water Needs by County

First-tier water needs were identified by simple comparison of projected water demands (Chapter 2) with existing water supplies for Water User Groups and Water User Group Customers of Major Water Providers within the Region (Chapter 3) to determine which entities will experience needs (shortages). First-tier water needs by county are presented in **Table 4.3** for each decade of the planning horizon. The sign convention in Table 4.3 uses a parentheses to denote a need (shortage). Note that many individual WUGs have surpluses in some decades, but those surpluses are not considered to offset needs of other WUGs, when summing the needs by county. Of the 14 counties in Region K, all counties have identified water needs in 2030 that continue through 2080.

Table 4.3 Summary of Projected First-tier Water Needs by County Excluding Surpluses (acre-feet/year)

County	2030	2040	2050	2060	2070	2080
Bastrop	(3,455)	(7,622)	(12,354)	(17,613)	(23,719)	(31,070)
Blanco	(47)	(48)	(50)	(58)	(82)	(108)
Burnet	(1,289)	(1,924)	(2,373)	(3,038)	(3,836)	(4,735)
Colorado	(52,430)	(48,048)	(43,785)	(39,638)	(35,603)	(31,678)
Fayette	(52)	(82)	(74)	(125)	(183)	(201)
Gillespie	(200)	(333)	(480)	(688)	(927)	(1,197)
Hays*	(1,673)	(5,547)	(13,804)	(25,768)	(39,116)	(54,428)
Llano	(2,874)	(961)	(987)	(1,085)	(1,289)	(1,656)
Matagorda	(142,266)	(138,058)	(133,979)	(130,031)	(126,207)	(122,507)
Mills	(3,351)	(3,352)	(3,355)	(3,359)	(3,359)	(3,360)
San Saba	(1,310)	(1,310)	(1,309)	(1,308)	(1,308)	(1,307)
Travis	(5,133)	(18,181)	(28,241)	(60,242)	(110,018)	(163,755)
Wharton*	(104,385)	(98,951)	(93,665)	(88,521)	(83,515)	(78,646)
Williamson*	(812)	(2,026)	(2,365)	(2,757)	(3,141)	(3,498)
Total	**(319,277)**	**(326,443)**	**(336,821)**	**(374,231)**	**(432,303)**	**(498,146)**

**The counties marked with an asterisk are split between two water planning regions. The data presented in this table represents only the portion of those counties that are within the boundaries of Region K.*

While the results in Table 4.3 do not consider surpluses, looking at an overall county balance which does include surpluses can give an idea of whether there are opportunities to shift water across categories or between WUGs in order to meet some needs. Note that the movement of surplus water could be impractical or cost-prohibitive in many cases. **Table 4.4** shows the difference between supplies and demands, including surpluses, summed by county. Two counties, Blanco County and Llano County, show a small overall surplus in the 2080 decade. Blanco County shows only a small first-tier need in Table 4.3, so the small surplus is not unexpected. The Llano County surplus is due to a surplus in the irrigation category, which may be due to an inconsistency in the way demands and supplies were calculated.

Table 4.4 Summary of Projected Surpluses and Deficits by County (acre-feet/year)

County	2030	2040	2050	2060	2070	2080
Bastrop	(1,337)	(5,656)	(10,584)	(16,218)	(22,617)	(29,990)
Blanco	411	398	416	433	455	481
Burnet	2,993	1,433	428	(663)	(1,855)	(3,162)
Colorado	(50,072)	(45,716)	(41,518)	(37,421)	(33,423)	(29,508)
Fayette	9,855	9,934	10,055	10,069	10,082	11,077
Gillespie	499	298	73	(238)	(589)	(987)
Hays*	2,880	(4,377)	(13,590)	(25,655)	(39,010)	(54,330)
Llano	302	2,007	1,797	1,463	1,080	643
Matagorda	(139,672)	(135,327)	(131,117)	(127,013)	(123,011)	(119,106)
Mills	(3,022)	(2,987)	(2,953)	(2,936)	(2,914)	(2,894)
San Saba	(920)	(879)	(843)	(821)	(795)	(764)
Travis	106,450	51,458	1,067	(50,936)	(100,776)	(154,668)
Wharton*	(95,750)	(90,029)	(84,419)	(78,952)	(73,623)	(68,422)
Williamson*	(805)	(2,020)	(2,359)	(2,751)	(3,135)	(3,492)
Total	**(168,188)**	**(221,463)**	**(273,547)**	**(331,639)**	**(390,131)**	**(455,122)**

**The counties marked with an asterisk are split between two water planning regions. The data presented in this table represents only the portion of those counties that are within the boundaries of Region K.*

In the following subsections, summaries of needs identified for each county within Region K are provided. Individual Water User Groups with identified water supply needs are shown with parentheses indicating a need, and zero indicating a surplus or balance between supplies and demands. This information is included in the TWDB DB27 report entitled WUG Needs Report (**Appendix 4.A**).

4.2.1 Bastrop County

Identified water needs in Bastrop County are about 3,500 acre-feet per year in 2030 and increase to 31,000 acre-feet per year in 2080 (**Table 4.5**). All identified needs are municipal and the majority of those are for Aqua WSC. Bastrop County Water Control and Improvement District 2, Creedmoor-Maha WSC, and Elgin have some identified needs as does County-Other. There were no non-municipal needs identified for Bastrop County through 2080.

Table 4.5 First-Tier Water Needs for Bastrop County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Aqua WSC*	(3,446)	(6,815)	(10,744)	(15,214)	(20,273)	(26,002)
Bastrop County WCID 2	(9)	(117)	(248)	(397)	(565)	(756)
County-Other	0	0	0	0	(625)	(2,056)
Creedmoor-Maha WSC*	0	0	0	0	0	0
Elgin	0	(690)	(1,362)	(2,002)	(2,256)	(2,256)
Total Bastrop County	(3,455)	(7,622)	(12,354)	(17,613)	(23,719)	(31,070)

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.2 Blanco County

Identified water needs in Blanco County are about 47 acre-feet per year in 2030 and increase to about 108 acre-feet per year in 2080 (**Table 4.6**). Identified needs are for municipal Water User Groups including Corix Utilities Texas Inc and Johnson City.

Table 4.6 First-tier Water Needs for Blanco County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Canyon Lake Water Service*	(15)	(15)	(17)	(18)	(19)	(19)
Corix Utilities Texas Inc*	(32)	(33)	(33)	(34)	(34)	(35)
Johnson City	0	0	0	(6)	(29)	(54)
Total Blanco County	**(47)**	**(48)**	**(50)**	**(58)**	**(82)**	**(108)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.3 Burnet County

Identified water needs in Burnet County begin at approximately 1,300 acre-feet per year in 2030 and increase to just over 4,800 acre-feet per year in 2080 **(Table 4.7**). The majority of identified needs are for municipal Water User Groups including Bertram, Corix Utilities Texas Inc, Marble Falls, and Meadowlakes, plus some small needs for County-Other and Kingsland WSC.

Identified needs for manufacturing increases from 129 acre-feet per year in 2030 to 160 acre-feet per year in 2080. Starting in 2050, identified needs for mining are 37 acre-feet per year, increasing to 475 acre-feet per year in 2080.

Table 4.7 First-tier Water Needs for Burnet County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Bertram	(628)	(964)	(1,256)	(1,592)	(1,970)	(2,397)
Corix Utilities Texas Inc*	(147)	(219)	(283)	(350)	(430)	(520)
Cottonwood Shores	0	0	0	0	0	(7)
County-Other	0	0	0	0	(47)	(160)
Horseshoe Bay	0	0	0	(22)	(63)	(110)
Kingsland WSC	0	0	(7)	(41)	(83)	(136)
Manufacturing	(129)	(135)	(141)	(147)	(153)	(160)
Marble Falls	0	(173)	(175)	(177)	(178)	(181)
Meadowlakes	(385)	(433)	(474)	(519)	(569)	(589)
Mining	0	0	(37)	(190)	(343)	(475)
Total Burnet County	**(1,289)**	**(1,924)**	**(2,373)**	**(3,038)**	**(3,836)**	**(4,735)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.4 Colorado County

Identified water needs in Colorado County decrease from approximately 52,000 acre-feet per year in 2030 to 32,000 acre-feet per year in 2080 (**Table 4.8**). Almost all of the identified needs for Colorado County are for irrigation. Demand for irrigation is expected to decline; thus, identified needs decrease with time. Other minor identified needs in Colorado County are from Corix Utilities Texas Inc.

Table 4.8 First-tier Water Needs for Colorado County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Corix Utilities Texas Inc*	(21)	(16)	(11)	(7)	(3)	0
Irrigation	(52,409)	(48,032)	(43,774)	(39,631)	(35,600)	(31,678)
Total Colorado County	**(52,430)**	**(48,048)**	**(43,785)**	**(39,638)**	**(35,603)**	**(31,678)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.5 Fayette County

Identified water needs in Fayette County are an extremely small portion of total needs for Region K and range between 52 and 201 acre-feet per year (**Table 4.9**). Identified needs are for Fayette WSC.

Table 4.9 First-tier Water Needs for Fayette County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Fayette WSC*	(52)	(82)	(74)	(125)	(183)	(201)
Total Fayette County	**(52)**	**(82)**	**(74)**	**(125)**	**(183)**	**(201)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.6 Gillespie County

Identified water needs in Gillespie County are 200 acre-feet per year in 2030 and increase to about 1,200 acre-feet per year in 2080 (**Table 4.10**). The identified needs include County-Other, Irrigation, and Manufacturing.

Table 4.10 First-tier Water Needs for Gillespie County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
County-Other	(69)	(188)	(320)	(513)	(736)	(989)
Irrigation	(75)	(75)	(75)	(75)	(75)	(75)
Manufacturing	(56)	(70)	(85)	(100)	(116)	(133)
Total Gillespie County	**(200)**	**(333)**	**(480)**	**(688)**	**(927)**	**(1,197)**

4.2.7 Hays County

Identified water needs in Hays County in 2030 are about 1,700 acre-feet per year and increase to about 54,400 acre-feet per year in 2080 (**Table 4.11**). The majority of identified needs later in the predicted period are municipal needs in the County-Other category.

Table 4.11 First-tier Water Needs for Hays County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Buda	0	(41)	(906)	(1,766)	(2,765)	(3,923)
Canyon Lake Water Service*	(34)	(38)	(42)	(46)	(47)	(48)
County-Other	0	0	(2,271)	(7,520)	(14,312)	(21,991)
Dripping Springs WSC	(551)	(1,793)	(3,603)	(4,689)	(4,689)	(4,689)
Goforth SUD*	0	0	0	(133)	(186)	(250)
Hays	0	(52)	(145)	(273)	(417)	(580)
Hays County WCID 1	(86)	(84)	(84)	(84)	(84)	(84)
Hays County WCID 2	(93)	(91)	(91)	(91)	(91)	(91)
Mid-Tex Utilities	0	(171)	(240)	(334)	(440)	(560)
Mining	(152)	(176)	(198)	(231)	(267)	(306)
Reunion Ranch WCID	0	(104)	(287)	(537)	(819)	(1,140)
West Travis County PUA	(757)	(2,997)	(5,937)	(10,064)	(14,999)	(20,766)
Total Hays County	**(1,673)**	**(5,547)**	**(13,804)**	**(25,768)**	**(39,116)**	**(54,428)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.8 Llano County

Identified water needs in Llano County are about 2,900 acre-feet per year in 2030, decreasing to 1,650 acre-feet per year in 2080 (**Table 4.12**). Most needs are municipal and the majority of those are for Llano and Corix Utilities Texas. In addition, there is a need in 2030 for mining.

Table 4.12 First-tier Water Needs for Llano County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Corix Utilities Texas Inc*	(260)	(277)	(290)	(304)	(321)	(340)
Horseshoe Bay	0	0	0	0	0	(134)
Kingsland WSC	0	0	0	(85)	(272)	(486)
Llano	(675)	(684)	(697)	(696)	(696)	(696)
Mining	(1,939)	0	0	0	0	0
Total Llano County	**(2,874)**	**(961)**	**(987)**	**(1,085)**	**(1,289)**	**(1,656)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.9 Matagorda County

Identified water needs in Matagorda County are about 142,000 acre-feet per year in 2030 and decrease to 122,000 acre-feet per year in 2080 (**Table 4.13**). The majority of identified needs for Matagorda County are for irrigation. Irrigation needs decline over the planning horizon with expected decrease in demand. Manufacturing contributes to a small component of identified needs in Matagorda County.

Table 4.13 First-tier Water Needs for Matagorda County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Corix Utilities Texas Inc*	(2)	(2)	0	0	0	0
Irrigation	(140,964)	(136,483)	(132,123)	(127,881)	(123,753)	(119,737)
Manufacturing	(1,300)	(1,573)	(1,856)	(2,150)	(2,454)	(2,770)
Total Matagorda County	**(142,266)**	**(138,058)**	**(133,979)**	**(130,031)**	**(126,207)**	**(122,507)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.10 Mills County

Identified water needs in Mills County are relatively steady throughout the planning horizon, starting at about 3,350 acre-feet per year in 2030 with only a slight increase to 3,360 acre-feet per year in 2080 (**Table 4.14**). The majority of identified needs are for irrigation, plus smaller needs in municipal and mining.

Table 4.14 First-tier Water Needs for Mills County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Corix Utilities Texas Inc*	(55)	(54)	(53)	(52)	(48)	(43)
Goldthwaite	(108)	(107)	(107)	(107)	(107)	(107)
Irrigation	(3,084)	(3,084)	(3,084)	(3,084)	(3,084)	(3,084)
Mining	(104)	(107)	(111)	(116)	(120)	(126)
Total Mills County	**(3,351)**	**(3,352)**	**(3,355)**	**(3,359)**	**(3,359)**	**(3,360)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.11 San Saba County

Identified water needs in San Saba County remain relatively constant throughout the planning horizon at about 1,300 acre-feet per year (**Table 4.15**). Most of the identified needs for San Saba County are for irrigation with a small amount for municipal needs of Corix Utilities.

Table 4.15 First-tier Water Needs for San Saba County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Corix Utilities Texas Inc*	(10)	(10)	(9)	(8)	(8)	(7)
Irrigation	(1,300)	(1,300)	(1,300)	(1,300)	(1,300)	(1,300)
Total San Saba County	**(1,310)**	**(1,310)**	**(1,309)**	**(1,308)**	**(1,308)**	**(1,307)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.12 Travis County

Identified water needs in Travis County are approximately 5,100 acre-feet per year in 2030 and increase to 164,000 acre-feet per year in 2080 (**Table 4.16**). All identified needs are municipal. There were no non-municipal needs identified for Travis County through 2080.

Of the municipal needs identified for Travis County, the largest needs in later decades are for Austin, although they do not show needs until 2060. Other significant needs include Travis County WCID 17 (ranging from about

26 percent of total needs in Travis County in 2030 to 9 percent of total needs in 2080), West Travis County Public Utility Agency (ranging from about 17 percent of total needs in Travis County in 2030 to 10 percent of total needs in Travis County by 2080), Cedar Park, Manor, and Windermere Utility.

Table 4.16 First-tier Water Needs for Travis County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Aqua WSC*	(101)	(182)	(296)	(374)	(468)	(579)
Austin	0	0	0	(20,971)	(59,292)	(100,060)
Barton Creek WSC	(76)	(106)	(133)	(161)	(193)	(228)
Briarcliff	(76)	(181)	(274)	(366)	(470)	(588)
Canyon Lake Water Service*	(34)	(38)	(42)	(46)	(48)	(48)
Cedar Park*	(216)	(269)	(295)	(295)	(295)	(295)
Creedmoor-Maha WSC*	0	0	0	0	0	0
Elgin	0	(466)	(1,054)	(1,675)	(1,886)	(1,886)
Goforth SUD*	0	0	0	(10)	(12)	(15)
Hornsby Bend Utility	(15)	(249)	(461)	(670)	(907)	(1,177)
Jonestown WSC	(111)	(279)	(484)	(729)	(1,023)	(1,376)
Lago Vista	0	(1,084)	(3,522)	(5,853)	(6,397)	(6,941)
Leander*	(1,805)	(2,977)	(3,073)	(2,905)	(2,787)	(2,702)
Manor	(500)	(927)	(1,402)	(1,711)	(2,546)	(3,567)
Mid-Tex Utilities	0	(286)	(354)	(421)	(497)	(583)
North Austin MUD 1	0	(95)	(95)	(95)	(95)	(95)
Northtown MUD	0	(699)	(728)	(761)	(797)	(838)
Pflugerville	0	0	0	(1,438)	(4,278)	(7,502)
Rollingwood	0	(405)	(410)	(417)	(426)	(434)
Round Rock*	0	(28)	(45)	(65)	(97)	(173)
Shady Hollow MUD	0	(595)	(607)	(621)	(637)	(654)
Sunset Valley	0	(244)	(244)	(244)	(244)	(244)
Travis County MUD 10	(5)	(41)	(72)	(103)	(137)	(176)
Travis County MUD 2	(9)	(146)	(270)	(393)	(533)	(691)
Travis County MUD 4	0	0	0	0	0	(264)
Travis County WCID 10	0	(61)	(267)	(487)	(734)	(1,013)
Travis County WCID 17	0	(2,024)	(4,401)	(6,753)	(9,423)	(12,453)
Travis County WCID 20	(221)	(220)	(220)	(220)	(220)	(220)
Travis County WCID Point Venture	(125)	(210)	(314)	(440)	(593)	(778)
Wells Branch MUD	0	(1,511)	(1,511)	(1,511)	(1,511)	(1,511)
West Travis County Public Utility Agency	(1,190)	(4,162)	(6,966)	(9,806)	(12,772)	(15,967)
Williamson County WSID 3*	(11)	(22)	(27)	(27)	(26)	(23)
Windermere Utility	(638)	(674)	(674)	(674)	(674)	(674)
Total Travis County	**(5,133)**	**(18,181)**	**(28,241)**	**(60,242)**	**(110,018)**	**(163,755)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*
MUD = Municipal Utility District; SUD = Water Utility District; WSC = Water Supply Corporation; WCID = Water Control and Improvement District; WSID = Water, Sewer, Irrigation, and Drainage

4.2.13 Wharton County

Identified water needs in Wharton County are about 104,000 acre-feet per year in 2030 and decrease to about 79,000 acre-feet per year in 2080 (**Table 4.17**). The only need in Wharton County is irrigation.

Table 4.17 First-tier Water Needs for Wharton County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Irrigation*	(104,385)	(98,951)	(93,665)	(88,521)	(83,515)	(78,646)
Total Wharton County	**(104,385)**	**(98,951)**	**(93,665)**	**(88,521)**	**(83,515)**	**(78,646)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.2.14 Williamson County

Identified water needs in Williamson County are about 800 acre-feet per year in 2030 and increase to 3,500 acre-feet per year in 2080 (**Table 4.18**). The majority of need in Wharton County are for mining with some municipal.

Table 4.18 First-tier Water Needs for Willamson County (acre-feet per year)

Water User Group	2030	2040	2050	2060	2070	2080
Brushy Creek MUD*	(17)	(17)	(18)	(18)	(18)	(19)
Mining*	(795)	(1,074)	(1,393)	(1,781)	(2,165)	(2,521)
North Austin MUD 1	0	(884)	(884)	(884)	(884)	(884)
Wells Branch MUD	0	(51)	(70)	(74)	(74)	(74)
Total Williamson County	**(812)**	**(2,026)**	**(2,365)**	**(2,757)**	**(3,141)**	**(3,498)**

**A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.*

4.3 Major Water Provider Needs

As previously discussed, the Lower Colorado River Authority (LCRA) and Austin have been identified as major water providers within Region K. The following sections present a comparison of the water supplies for these two entities and their water supply commitments.

4.3.1 Lower Colorado River Authority (LCRA)

The Lower Colorado River Authority currently has three sources for its water supply: (1) combined storage of Lakes Buchanan and Travis, (2) run-of-river (ROR) water rights in the lower portion of the basin, and (3) groundwater in Bastrop County. LCRA has commitments (contracts) to provide firm water to entities throughout Region K. In addition, LCRA uses water at its electric generating facilities. LCRA also provides water for agricultural irrigation and environmental needs of the river, bay, and estuary in accordance with the LCRA 2020 Water Management Plan. **Table 4.19** provides a summary of LCRA's firm water supplies and water commitments throughout the entire Colorado River basin. As discussed in Chapter 3, surface water availability described in the Region K Water Plan is on a firm water basis. Firm water is water that can be supplied reliably through a repeat of the driest conditions on record. LCRA also provides interruptible water supply for agriculture irrigation agriculture in the lower counties of the basin when available, but this supply is cut back or cut off during times of drought or shortage. Information presented in this section summarizes LCRA's firm supplies and commitments.

Table 4.19 LCRA Total System Summary

	LCRA Total System Summary (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Source[1]	586,729	584,935	583,138	581,292	579,446	577,599
Commitments[2,3]	566,170	565,955	565,950	565,950	565,950	565,950
Surplus	20,549	18,980	17,188	15,342	13,496	11,649

Notes

[1] This includes firm water supplies from the Highland Lakes system; the 33,440 acre-feet per year reserved for environmental commitments; water available under Garwood (COA 5434), Gulf Coast (COA 5476), Lakeside (COA 5475), and Pierce Ranch (COA 5477) water rights; and water from the Carrizo-Wilcox Aquifer used by LCRA power generation facilities, including the Sim Gideon and Lost Pines Power Plants (see section 3.25 for the LCRA source discussion).

[2] This line item includes the environmental commitments of 33,440 acre-feet per year; the City of Austin commitment, based on the Region K Supply Evaluation Model results for the amount of LCRA backup supplies needed to supplement Austin's municipal water rights up to a maximum of 325,000 acre-feet per year; the Matagorda Steam Electric commitment, based on the average annual amount of LCRA backup supplies required to supplement the STPNOC/LCRA water right in the Region K Supply Evaluation Model; and 100,000 acre-feet per year currently made available for irrigation use with LCRA's purchase of the Garwood water right.

[3] This line item includes LCRA's existing firm customers as of October 1, 2024. See Table 3.26 for a list of LCRA firm commitments.

As shown in Table 4.19, LCRA total firm water supplies in their system exceed their total commitments throughout the planning decades (2030-2080). However, the LCRA system has spatial constraints with respect to locations of supplies. For example, water supply from Lakes Buchanan and Travis can be used to meet demands throughout the Lower Colorado River Basin, but supplies from the lower portion of the basin, such as downstream run-of-river right diversion points and the Arbuckle Reservoir, cannot be used to meet upstream demands with existing infrastructure. Given these spatial constraints, the LCRA system is divided into Upper Reaches and Lower Reaches to identify potential water supply needs. The Upper Reaches include sources and customers located upstream of the Wharton gage (USGS ID 0816200, Colorado River at Wharton, TX). The available supply in the Upper Reaches consists of the firm yield of Lakes Buchanan and Travis and LCRA's ROR supplies with amendments that allow diversions in the Upper Reaches. The Lower Reaches start downstream of the Wharton gage, where supply from all LCRA sources is accessible, including the Arbuckle Reservoir. **Table 4.20** provides a summary of the LCRA current customer commitments and available supplies in the Upper Reaches.

Table 4.20 LCRA Available Supply and Current Customer Commitments in Upper Reaches Summary

	LCRA Upper Reaches Supply and Commitments Summary (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Lakes Buchanan and Travis (COAs 5478, 5482)[1]	408,209	406,417	404,625	402,779	400,933	399,086
Supply from Garwood in Upper Reaches[2]	21,611	21,611	21,611	21,611	21,611	21,611
Total LCRA Firm Water Supply in Upper Reaches[3]	**429,820**	**428,028**	**426,236**	**424,390**	**422,544**	**420,697**
Existing Commitments in Upper Reaches[4]	403,283	403,060	403,060	403,060	403,060	403,060
Existing Surplus in Upper Reaches	26,537	24,968	23,176	21,330	19,484	17,637

Notes

[1] This line item includes the 33,440 acre-feet per year reserved for environmental commitments.

[2] Under Certificate of Adjudication (COA) 14-5434 (the Garwood water right), LCRA is authorized to divert water at various points along the Colorado River from Lake Travis to Bay City, TX. The calculated firm supply from the Garwood water right is 121,611 acre-feet per year. It is assumed that up to 100,000 acre-feet per year of supply from this water right is reserved for irrigation use in accordance with LCRA's purchase agreement with the Garwood Agricultural Division, while the remaining 21,611 acre-feet of water is available for use upstream.

[3] Firm water is the water that can be supplied reliably through a repeat of the driest conditions on record. This line item adds available supply from Lakes Buchanan and Travis and Garwood supply in the upper reaches.

[4] The firm water commitments are detailed in Tables 2.12 and 3.25. This line item includes the Highland Lakes supply reserved for environmental commitments of 33,440 acre-feet per year.

The total available yield in the Upper Reaches, as shown in Table 4.20, includes Lakes Buchanan and Travis as well as 21,611 acre-feet per year from the Garwood water right (CA 14-5434). As discussed in Chapter 3, the firm yield of the Garwood water right is 121,611 acre-feet per year. The Garwood water right has been amended to allow upstream diversion at various points, but 100,000 acre-feet per year is currently reserved for use by the Garwood Irrigation Division under the Garwood Purchase Agreement. Therefore, for this supply analysis, it is assumed that 100,000 acre-feet per year is reserved for irrigation users in the lower counties in Region K and the remaining yield is available in the Upper Reaches throughout the planning horizon.

Austin, an LCRA firm customer, currently sells water partially sourced from the LCRA system to several municipal customers. These customers are all located in the Upper Reaches of the LCRA system. Based on feedback received from LCRA and Austin, it is assumed that current Austin wholesale municipal customers will enter into firm contracts directly with LCRA by the end of the 2030 decade and LCRA will provide supply to meet their projected future demands. Some of these customers have alternative water supply sources (e.g., groundwater). In these cases, projected demands for these customers were reduced by the existing supply available from their alternative sources to identify their projected supply needed from LCRA. A list of these customers and their projected supply needed from LCRA are shown in **Table 4.21**.

To identify additional water supply needed in the Upper Reaches of the LCRA system in the future, projected demands of LCRA's firm customers (Appendix 2.B) were compared to their current firm contracts with LCRA (see Table 3.25). This analysis identified several customers with demands that exceed their current commitments with LCRA at some point in the planning horizon (2030-2080). It is assumed that these customers will need to amend their existing contracts with LCRA to have sufficient supply to meet their projected future demands. Table 4.21 lists LCRA's current customers with demands exceeding their current commitments and the additional supply they would need from LCRA on a decadal basis (2030-2080) to meet their projected future demands. Some of these customers have alternative water supply sources (e.g., groundwater). In these cases, projected demands for these customers were reduced by the existing supply available from their alternative sources to identify the additional supply they would need from LCRA. Additionally, some of these customers might be sponsors of a strategy or multiple strategies that do not require water from LCRA (e.g., reuse). In these cases, projected demands for these customers were reduced by the volume of strategies not sourced from LCRA to identify the additional supply they would need from LCRA.

Table 4.21 compares LCRA's supplies in the Upper Reaches to their existing firm contracts in the Upper Reaches plus projected additional supply needed from Austin's wholesale customers and their existing firm customers. As shown in the table, the existing LCRA supply in the Upper Reaches will not be sufficient to meet the total existing firm contracts plus projected additional firm supply needed for customers in the Upper Reaches between 2040 and 2050. Water management strategies that provide water supply to the LCRA Upper Reaches will be necessary to meet the customer needs. The water management strategies for wholesale water providers and water user groups with unmet future needs are discussed in **Chapter 5**.

Table 4.21 Additional Supply Needed in LCRA Upper Reaches

WUG Name	Additional Supply Needed in LCRA Upper Reaches[1] (ac ft per year)					
	2030	2040	2050	2060	2070	2080
Existing Commitments in Upper Reaches (acre-feet per year)	**403,283**	**403,060**	**403,060**	**403,060**	**403,060**	**403,060**
Existing Austin Wholesale Customers to Obtain Firm Raw Water Contracts from LCRA[2]						
Wells Branch MUD	0	1,562	1,581	1,585	1,585	1,585
North Austin MUD 1	0	979	979	979	979	979
Creedmoor-Maha WSC	0	0	0	351	1396	2466
Northtown MUD	0	699	728	761	797	838
Mid-Tex Utilities	0	457	594	755	937	1,143
Shady Hollow MUD	0	595	607	621	637	654
Rollingwood	0	405	410	417	426	434
Sunset Valley	0	284	284	284	284	284
Total Austin Wholesale Customer Demands	**0**	**4,981**	**5,183**	**5,753**	**7,041**	**8,383**
Existing Commitments in Upper Reaches + Existing Austin Customers Transferring to LCRA	**403,283**	**408,041**	**408,243**	**408,813**	**410,101**	**411,443**
Additional Supply Needs from LCRA Existing Customers[3]						
Briarcliff	76	181	274	366	470	588
Cedar Park[4]	385	583	678	656	635	614
Cottonwood Shores	-	-	-	-	-	7
Jonestown WSC	111	279	484	729	1,023	1,376
Kingsland WSC	-	-	-	126	355	622
Lago Vista	-	1,084	3,522	5,853	6,397	6,941
Leander	-	-	236	252	252	252
Manufacturing, Burnet	144	150	156	162	168	175
Manufacturing, Matagorda	1,300	1,573	1,856	2,150	2,454	2,770

WUG Name	Additional Supply Needed in LCRA Upper Reaches[1] (ac ft per year)					
	2030	2040	2050	2060	2070	2080
Pflugerville[5]	-	-	-	-	-	1,527
Travis County MUD 10	5	41	72	103	137	176
Travis County WCID 10	-	61	267	487	734	1,013
Travis County WCID 17	-	2,024	4,401	6,753	9,423	12,453
Travis County WCID 20	221	220	220	220	220	220
Travis County WCID Point Venture	125	210	314	440	593	778
West Travis County Public Utility Agency[6]	1,771	6,951	12,635	19,520	27,328	36,185
Reunion Ranch WCID[7]	-	104	287	537	819	1,140
Hays County WCID 1[7]	86	84	84	84	84	84
Hays County WCID 2[7]	93	91	91	91	91	91
Dripping Springs WSC[7]	551	1,793	3,603	4,689	4,689	4,689
Additional Supply Need for LCRA Existing Customers	**4,924**	**15,485**	**29,236**	**43,274**	**55,928**	**71,757**
Total Projected Demands in Upper Reaches (Existing Commitments + Needs from Existing Customers + Demands from Existing Austin Wholesale Customers)	**408,207**	**423,486**	**437,439**	**452,047**	**465,989**	**483,160**
Total Available Supply in Upper Reaches	**429,820**	**428,028**	**426,236**	**424,390**	**422,544**	**420,697**
Total Surplus/(Need) in Upper Reaches	**21,613**	**4,502**	**(11,243)**	**(27,697)**	**(43,485)**	**(62,503)**

[1] This table does not account for supplies from Water Management Strategies (WMSs) that benefit LCRA's existing customers; therefore, the values reflect the maximum needs based on projected demands.

[2] The WUGs listed in this category are the current City of Austin wholesale customers that use water from lakes Travis and Buchanan and/or Colorado run-of-river as their source. It is assumed that these Austin wholesale customers will enter into firm water supply contracts with LCRA potentially between 2030 and 2040. All contracts are contingent upon both parties reaching mutually agreeable contract terms. Inclusion in this table does not guarantee water supply or contracts from LCRA.

[3] The WUGs listed in this category are projected to have demands that exceed their existing firm commitments with LCRA (as of October 2024). The volumes shown for each WUG reflect their projected demands beyond their existing firm commitments with LCRA and other existing water supply sources (e.g., groundwater). This is the estimated additional water supply WUGs may seek from LCRA. All contracts are contingent upon both parties reaching mutually agreeable contract terms. Inclusion in this table does not guarantee water supply or contracts from LCRA. The volumes shown do not reflect the second-tier needs identified for the WUGs, described in Table 4.24, which accounts for their existing infrastructure constraints. Some WUGs might be sponsoring WMS(s) that are not sourced from LCRA that could reduce the need from LCRA.

[4] Cedar Park serves multiple wholesale customers including Block House MUD, Williamson Travis County MUD, Williamson County-Other, and Williamson County Manufacturing. The projected demands from these customers are included in this line item.

[5] Windermere Utility is currently a wholesale customer of both Austin and Pflugerville. As mentioned in footnote 2, it is assumed that their wholesale contract with Austin will become a firm contract with LCRA by 2030. Based on historical use, it is assumed that this contract will be up to 2% of their total projected demand. Windermere Utility's remaining unmet demands are assumed to be met through Pflugerville.

[6] West Travis County PUA serves wholesale customers that do not have firm contracts with LCRA, including Barton Creek WSC. The projected demands from these customers are included in this line item.

[7] This is a West Travis County PUA wholesale customer. It is assumed these WUGs could amend their contracts with LCRA to have sufficient supply to meet their projected demands.

When comparing the firm available supply in the LCRA system to LCRA's total current firm contracts, LCRA does not have sufficient water supply during a repeat of the DOR to meet all projected surface water irrigation demands. This analysis does not include interruptible water supplies projected to be available over the planning horizon through the implementation of the Water Management Plan (WMP) or projected return flows.

4.3.2 Austin

Austin (Austin Water) currently has two major sources for its surface water. These sources include their run-of-river water rights and a contract with LCRA to receive firm water from any source under the LCRA water rights system. A minor source of water is reclaimed water from direct reuse.

Austin's largest demand is from municipal retail and wholesale, with the dominant demands due to serving their retail customers. Retail municipal demand is the largest and fastest growing demand for Austin. **Table 4.22** shows a summary of Austin's current supplies and projected demands for municipal and manufacturing, along with a projection of first-tier needs. Needs appear in 2060 and grow to about 100,000 acre-feet per year by 2080.

Table 4.22 Austin Supply and Demand Summary for Municipal and Manufacturing Demands with Future First-tier Needs

	Austin Supply and Demand Summary (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Surface Water Supply	325,000	325,000	325,000	325,000	325,000	325,000
Reuse Supply	5,401	5,401	5,401	5,401	5,401	5,401
Total Supplies	**330,401**	**330,401**	**330,401**	**330,401**	**330,401**	**330,401**
Manufacturing Demand	19,377	22,485	25,615	28,769	29,447	30,150
Municipal Demand	212,979	244,708	283,459	322,603	360,246	400,311
Total Mun. and Mfg. Demand	**232,356**	**267,193**	**309,074**	**351,372**	**389,693**	**430,461**
Surplus/(Deficit)	**98,045**	**63,208**	**21,327**	**(20,971)**	**(59,292)**	**(100,060)**

Austin has Steam-Electric supplies and demands through a joint commitment with LCRA. The Region K cutoff water supply model predicted the firm yield of Austin's run-of-river Steam-Electric water right (14-5471) to be zero for Steam-Electric in Fayette County (Chapter 3, Table 3.26). So, the Steam-Electric demands in Fayette County are met exclusively through the LCRA backup contract. **Table 4.23** shows the supply amounts associated with the Steam-Electric categories in Travis and Fayette counties, along with the estimated demands and needs specific to Austin. While Austin shows an internal deficit for their portion of Steam-Electric, Fayette, the 20,052 acre-feet per year of overall demand (Table 2.7) is fully covered by the LCRA commitment (21,000 acre-feet per year) combined with Austin's commitment (7,500 acre-feet per year) so no overall need occurs for this WUG. Austin's strategy for covering their internal Steam-Electric, Fayette need can be found in **Section 5.2.9**.

Table 4.23 Austin Supply and Demand Summary for Steam-Electric Demands with Future First-tier Needs

	Austin Supply and Demand Summary (acre feet per year)					
	2030	2040	2050	2060	2070	2080
Steam-Electric, Travis County Supply	4,906	4,995	5,084	5,084	5,084	5,084
Steam-Electric, Fayette County Supply	7,500	7,500	7,500	7,500	7,500	7,500
Total Steam-Electric Supplies	**12,406**	**12,495**	**12,584**	**12,584**	**12,584**	**12,584**
Steam-Electric, Travis County Demand	4,116	4,116	4,116	4,116	4,116	4,116
Steam-Electric, Fayette County Demand[1]	10,300	10,300	10,300	10,300	10,300	10,300
Total Steam-Electric Demands	**14,416**	**14,416**	**14,416**	**14,416**	**14,416**	**14,416**
Surplus/(Deficit) Travis County	**790**	**879**	**968**	**968**	**968**	**968**
Surplus/(Deficit) Fayette County	**(2,800)**[2]	**(2,800)**	**(2,800)**	**(2,800)**	**(2,800)**	**(2,800)**
Surplus/(Deficit) Overall	**(2,010)**	**(1,921)**	**(1,832)**	**(1,832)**	**(1,832)**	**(1,832)**

[1]Austin's estimate of their portion of the demand from Steam-Electric, Fayette.

[2]While Austin shows a deficit for their portion of Steam-Electric, Fayette, the 20,052 acre-feet per year of overall demand is fully covered by the LCRA commitment (21,000 acre-feet per year) combined with Austin's commitment (7,500 acre-feet per year) so no overall need occurs for this WUG. Austin's strategy for covering their Steam-Electric, Fayette need can be found in Section 5.2.9.

4.4 Second-Tier Water Needs Analysis

The Second-Tier water needs analysis compares the current and projected supplies and demands after reductions from conservation and direct reuse. Conservation and direct reuse are both characterized as water management strategies (WMS), which will be further discussed in Chapter 5. The DB27 Reports at the end of the Executive Summary include a hyperlink to Report 6, which contains listings of the second-tier water needs by water user group and major water provider.

Table 4.24 shows a summary of projected second-tier regional needs. The number of WUGs with second-tier needs has decreased from 33 to 30 in 2030 and from 58 to 51 in 2080. So, most of the same WUGs still show needs after conservation and reuse are considered, albeit decreased in many cases.

Table 4.24 Summary of Projected Second-Tier Regional Needs by Water Use Type

	2030	2040	2050	2060	2070	2080
Number of WUGs with Second-Tier Needs	30	40	45	46	48	51
Total Second-Tier Needs for Region K (acre-feet per year)	(297,977)	(274,105)	(268,846)	(267,755)	(269,941)	(300,343)

Table 4.25 shows the second-tier water needs by category. Note that mining and manufacturing do not have associated conservation or reuse strategies, and livestock did not have first-tier needs associated with the category. The greatest decrease in needs is in the municipal category, where 2030 needs have decreased from about 14,000 acre-feet per year to about 6,000 acre-feet per year, and 2080 needs have decreased from about 258,000 acre-feet per year to about 90,500 acre-feet per year. About 130,000 acre-feet per year of decrease is

due to conservation strategies, while about 50,000 acre-feet per year is due to reuse strategies. More information on those strategies can be found in Chapter 5.

Table 4.25 Summary of Projected Second-Tier Regional Needs by Water Use Type

Total by Water Use Type (acre feet per year)	2030	2040	2050	2060	2070	2080
Irrigation	(286,774)	(256,356)	(242,452)	(228,923)	(216,027)	(203,857)
Livestock	-	-	-	-	-	-
Manufacturing	(1,485)	(1,778)	(2,082)	(2,397)	(2,723)	(3,063)
Mining	(2,990)	(1,357)	(1,739)	(2,318)	(2,895)	(3,428)
Municipal	(6,728)	(14,614)	(22,573)	(34,117)	(48,296)	(89,995)
Steam-Electric Power	-	-	-	-	-	-
Total	**(297,977)**	**(274,105)**	**(268,846)**	**(267,755)**	**(269,941)**	**(300,343)**

A large portion of the change from first-tier to second-tier municipal needs is due to Austin's significant conservation and reuse strategies, shown in **Table 4.26**. Their first-tier municipal and manufacturing needs of about 100,000 acre-feet per year in 2080 are reduced to about 34,000 acre-feet per year of second-tier needs (Table 4.25). Austin's internal first-tier need of 2,800 acre-feet per year for Steam-Electric, Fayette is the same for second tier.

Table 4.26 Summary of Austin First and Second-Tier Needs for Municipal and Manufacturing Demand

	Austin First and Second Tier Needs Summary (acre feet per year)					
	2030	2040	2050	2060	2070	2080
First-tier (Needs)/Surplus	98,045	63,208	21,327	(20,971)	(59,292)	(100,060)
Conservation	674	14,900	19,600	24,200	28,900	33,400
Reuse	0	2,200	12,400	19,100	25,700	32,400
Second Tier (Needs)/Surplus	**98,719**	**80,308**	**53,327**	**22,329**	**(4,692)**	**(34,260)**

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References

No references were cited in this chapter.

Chapter 5.

Identification, Evaluation, and Selection of Water Management Strategies

Chapter 5.

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Table 5.1 Strategies by Water User Group (Conservation [Section 5.2.2.3] and Drought Management [Section 5.2.4.7] not listed here)

WUG	Strategy Name	Section
Aqua WSC	Aquifer Storage and Recovery	5.2.4.5.1
	Brackish Groundwater Blending	5.2.4.6.1
	Brackish Groundwater Desalination	5.2.4.6.2
	Direct Potable Reuse	5.2.5.2.1
	New Surface Water	5.2.4.1.1
Austin	Aquifer Storage and Recovery	5.2.3.2.5
	Brackish Groundwater Desalination	5.2.3.2.9
	Capture Local Inflows to Lady Bird Lake	5.2.3.2.7
	Conservation - Customer-Side Water Use Management	5.2.3.2.1
	Conservation - Native and Efficient Landscaping	5.2.3.2.1
	Direct Reuse - Centralized Reclaimed	5.2.3.2.2
	Direct Reuse - Decentralized Reclaimed	5.2.3.2.3
	Direct Reuse - Onsite Reuse	5.2.3.2.4
	Indirect Potable Reuse through Lady Bird Lake	5.2.3.2.8
	Reduced System Loss - Utility Side Water Loss Control	5.2.3.2.1
	Surface Water - Lake Walter E. Long OCR	5.2.3.2.6
Bastrop County WCID 2	Expanded Local Use of Groundwater - Carrizo-Wilcox Aquifer	5.2.4.3.1
Bertram	Expanded Local Use of Groundwater - Ellenburger Wellfield	5.2.4.3.2
Briarcliff	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Buda	Aquifer Storage and Recovery	5.2.4.5.2
	Direct Potable Reuse	5.2.5.2.2
	Direct Reuse	5.2.5.3.1
Cedar Park	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Corix Utilities	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Cottonwood Shores	Expanded Surface Water - Expanded Contract	5.2.4.2.2
County Other, Gillespie County	Expanded Local Use of Groundwater - Ellenburger Aquifer	5.2.4.3.2

WUG	Strategy Name	Section
	Expanded Local Use of Groundwater – Edwards Trinity (Plateau) Aquifer	5.2.4.3.4
County Other, Hays County	Rainwater Harvesting	5.3.2.1
County Other, Bastrop County	Expanded Local Use of Groundwater - Carrizo-Wilcox Aquifer	5.2.4.3.1
Creedmoor Maha WSC	Brackish Groundwater Desalination	5.2.4.6.3
	Expanded Surface Water - New Contract	5.2.4.2.1
Dripping Springs WSC	Direct Potable Reuse	5.2.5.2.3
	Direct Reuse	5.2.5.3.2
	Expanded Local Use of Groundwater - Trinity Aquifer	5.2.4.3.6
	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Hays County WCID 1	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Hays County WCID 2	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Irrigation, Colorado County	Expanded Local Use of Groundwater - Gulf Coast Aquifer	5.2.4.3.5
Irrigation, Gillespie County	Expanded Local Use of Groundwater - Ellenburger Aquifer	5.2.4.3.2
Irrigation, San Saba County	Expanded Local Use of Groundwater - Ellenburger Aquifer	5.2.4.3.2
	Expanded Local Use of Groundwater - Hickory Aquifer	5.2.4.3.3
Jonestown WSC	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Kingsland WSC	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Lago Vista	Direct Reuse	5.2.5.3.3
	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Leander	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Llano	Direct Potable Reuse	5.3.2.2
	Expanded Surface Water - New Contract	5.2.4.2.1
Lower Colorado River Authority	Aquifer Storage and Recovery	5.2.3.1.7
	Purchase Wholesale Groundwater	5.2.3.1.5

WUG	Strategy Name	Section
	Downstream Return Flows from Pflugerville	5.2.3.1.9
	Expanded Local Use of Groundwater - Carrizo Wilcox Aquifer	5.2.3.1.4
	Lake Bastrop Water Supply Project	5.2.3.1.2
	New Storage Development in the Lower Colorado Basin	0
	Import Return Flows from Williamson County	5.2.3.1.6
	Seawater Desalination	5.2.3.1.10
Manufacturing, Burnet County	Expanded Surface Water - Expanded Contract	5.2.4.2.2
	Expanded Local Use of Groundwater - Ellenburger Aquifer	5.2.4.3.2
Manufacturing, Gillespie County	Expanded Local Use of Groundwater - Ellenburger Aquifer	5.2.4.3.2
Manufacturing, Matagorda County	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Marble Falls	Direct Potable Reuse - North WTP project and Transmission Improvements	5.2.5.2.4
	Expanded Use of Surface Water - South WTP Project	5.2.4.1.2
Mid-Tex Utility	Expanded Surface Water - New Contract	5.2.4.2.1
Mining, Mills County	Expanded Local Use of Groundwater - Trinity Aquifer	5.2.4.3.6
Mining, Burnet County	Expanded Local Use of Groundwater – Ellenburger Aquifer	5.2.4.3.2
	Local Surface Water	5.2.4.4
Mining, Hays County	Expanded Local Use of Groundwater - Trinity Aquifer	5.2.4.3.6
North Austin MUD 1	Expanded Surface Water - New Contract	5.2.4.2.1
Northtown MUD	Expanded Surface Water - New Contract	5.2.4.2.1
Pflugerville	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Reunion Ranch WCID	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Rollingwood	Expanded Surface Water - New Contract	5.2.4.2.1
Shady Hollow	Expanded Surface Water - New Contract	5.2.4.2.1
Sunset Valley	Expanded Surface Water - New Contract	5.2.4.2.1

WUG	Strategy Name	Section
Travis County MUD 10	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Travis County WCID 10	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Travis County WCID 17	Direct Reuse	5.2.5.3.4
	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Travis County WCID 20	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Travis County WCID Point Venture	Expanded Surface Water - Expanded Contract	5.2.4.2.2
Wells Branch MUD	Expanded Surface Water - New Contract	5.2.4.2.1
West Travis County Public Utility Agency	Direct Reuse	5.2.5.3.5
	Expanded Use of Surface Water - WTP Expansion	5.2.4.1.3
	Expanded Surface Water - Expanded Contract	5.2.4.2.2

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Chapter 5. Identification, Evaluation, and Selection of Water Management Strategies Based on Need

Water User Groups (WUGs) with water needs in Region K were identified in Chapter 4. This chapter (Chapter 5) describes the analysis regarding the identification, evaluation, and selection of appropriate water management strategies for Region K. Water management strategies have been defined for identified future water shortages within Region K as required by the regional water planning process. Included within this chapter are:

- Description of the potentially feasible water management strategies
- Definition of the recommended and alternative water management strategies
- Allocation of selected strategies to specific WUGs

In addition to the above, this chapter has a sub-section specifically to address water conservation, including any recommended water conservation management strategies.

5.1 Potential Water Management Strategies

Region K presented their process for identifying potential water management strategies for public comment at the December 1, 2023, Region K meeting. TWDB regional water planning guidelines provide a list of potentially feasible water management strategies that should include, but is not limited to:

1. Conservation
2. Drought management
3. Reuse
4. Management of existing water supplies
5. Conjunctive use
6. Acquisition of available existing water supplies
7. Development of new water supplies
8. Developing regional water supply facilities or providing regional management of water supply facilities
9. Developing large-scale desalination facilities for seawater or brackish groundwater that serve local or regional brackish groundwater production zones identified and designated under TWC §16.060(b)(5)34
10. Developing large-scale desalination facilities for marine seawater that serve local or regional entities
11. Voluntary transfer of water within the region using, but not limited to, contracts, water marketing, regional water banks, sales, leases, options, subordination agreements, and financing agreements
12. Emergency transfer of water under TWC §11.139
13. Interbasin transfers of surface water
14. System optimization
15. Reallocation of reservoir storage to new uses
16. Enhancements of yields
17. Improvements to water quality
18. New surface water supply
19. New groundwater supply
20. Brush control
21. Precipitation enhancement
22. Aquifer storage and recovery
23. Cancellation of water rights
24. Rainwater harvesting

The Region K process that was used to identify potentially feasible water management strategies for the region includes the following:

1. Define groupings or common areas with supply deficiencies.
2. Develop a comprehensive list of potentially feasible strategies for each area.
    - Recommended and alternative strategies from previous Region K Water Plan
    - Strategies documented in local plans
    - Suggestions from the public
3. Meet with potential suppliers/WUGs for each area to determine current strategies under consideration.
4. Prepare qualitative rating based on cost, reliability, environmental impact, and political acceptability for the various strategies.
5. Select one or more additional strategies for each area, if appropriate.
6. Present proposed shortlist at Public Meeting during Region K Planning Group meeting for modification and/or approval.

The Region K Planning Group formed a Water Management Strategy Committee (Table 1.1b) to review and provide feedback on the water management strategies being developed by the Technical Consultant team. This Region K Water Management Strategy Committee met a total of ten times this planning cycle and Committee meeting minutes are provided in **Appendix 5.A**

The complete list of potentially feasible water management strategies considered in the 2026 RWP are included in **Appendix 5.B**. Appendix 5.B includes a table that identifies whether each category of water management strategy required for consideration by TWDB is potentially feasible or is not potentially feasible for each Water User Group (WUG) with water needs. **Appendix 5.C** includes a screening matrix that provides a mixed qualitative and quantitative scoring of the potential strategies. All potentially feasible water management strategies were evaluated under drought of record conditions.

5.2 Recommended Water Management Strategies

The primary emphasis of the regional water planning effort is the development of regional water management strategies sufficient to meet the projected needs of WUGs throughout the state. Water needs are determined by comparing user group water demands to the water supplies available to that user group. The following sections present information concerning the identification, evaluation, and selection of specific water management strategies to meet specific projected water supply shortages for the LCRWPA (Region K). If a project sponsor wishes to be considered for certain types of State funding, the project that the funding is requested for must be included in the Regional and State Water Plan. It should be noted that local plans that are not inconsistent with the regional water supply plan are also eligible to apply for certain types of TWDB financial assistance to implement those local plans even though they have not been specifically recommended in this plan.

The identified water needs presented in Chapter 4 are based on Modeled Available Groundwater (MAG) volumes and conservative surface water availability estimates, which assume only water available during a repeat of the worst Drought of Record (DOR), that all water rights are being fully and simultaneously utilized, and exclude water available from LCRA on an interruptible basis and water available as a result of municipal return flows to the Colorado River. The recommended water management strategies (**Table 5.1**, with section hyperlinks) are intended to alleviate these projected water supply shortages (water needs). **Appendix 5.D** contains the TWDB Costing Tool Cost Summary for each applicable strategy. In accordance with 31 TAC §357.34(e)(3)(A), regional and state water plans are not to include the cost of distribution of water within a water user group service area.

Regional water planning groups are required to take into account and report water loss estimates in the evaluation of water management strategies. A summary of municipal water loss for 2022 in Region K is provided at the end of Chapter 1 in Table 1.10. It shows an average real loss of 16 gallons per capita per day (GPCD) for the region for a total average use of 132 GPCD, or about 12%. Reported real losses for individual municipal WUG from the 2022 audits submitted to TWDB range from 2 to 55%. These losses are embedded in the water use survey data that the TWDB uses to project municipal water demands and determine water needs in the regional water planning process.

In the 2026 Regional Water Planning cycle, the TWDB has introduced a requirement for Regional Water Planning Groups to evaluate water loss mitigation strategies separately from demand management strategies as a part of water conservation for a WUG. The objective is to achieve the real loss threshold in gallons per connection per day established by TAC Section 358.6 (e). This requirement emphasizes the importance of identifying and mitigating water loss as a specific component of water conservation efforts. This separate estimation of water loss, and strategies to mitigate that loss as a component of water conservation are documented in **Section 5.2.2.3**.

Drought management strategies recommended in this plan are considered in parallel with other water management strategies and are not treated as an overall demand reduction strategy. These strategies do not include an increment of water loss. Strategies involving new or amended contracts or the purchase of water from a supplier are assumed to have no additional water losses with the use of existing infrastructure.

Recommended and alternative surface water strategies such as new reservoirs have water losses associated with evaporation that are included in the modeling analyses. Surface water strategies containing new infrastructure such as pump stations and transmission pipelines are assumed to have negligible water losses. Reuse projects are assumed to have negligible water losses as well.

Recommended and alternative groundwater strategies include aquifer storage and recovery (ASR), expanded local use of groundwater, and development of new groundwater supplies, including importation from outside of the region. ASR reduces the water losses associated with evaporation from a reservoir, but there can be water losses due to recovery efficiency from the aquifer. Migration rates vary depending on the aquifer used for storage, and impacts will depend on how long the stored water remains in the aquifer. Recovery efficiency will have some impacts on water volume but should have minimal impacts on the firm yield volumes, as discussed in more detail at the end of this section (Section 5.2). Groundwater expansion strategies that assume additional yield from existing infrastructure have no additional water losses associated with them. Groundwater expansion, development, and importation strategies that require new infrastructure are assumed to have negligible water losses. Desalination strategies in this plan have yields that are assumed to account for approximately 10 percent water loss, due to concentrate disposal.

Per House Bill 807 (HB 807), if a Regional Water Planning Area (RWPA) has significant identified water needs, the Regional Water Planning Group (RWPG) shall provide a specific assessment of the potential for ASR projects to meet those needs. In the 2021 planning cycle, the LCRWPG determined the threshold of significant water needs by evaluating existing needs in the LCRWPA. The LCRWPG did not determine ASR to be feasible cost-wise for the Irrigation WUGs in Colorado, Matagorda, and Wharton counties, and therefore they removed Irrigation needs from consideration for this strategy. Thus, significant identified water need was defined as a municipal WUG with a need of 10,000 acre-feet per year (ac-ft/yr) or greater; this includes Austin, West Travis County Public Utility Agency (PUA), Aqua WSC, County-Other (Hays), and Travis County Water Control and Improvement District (WCID) 17. In addition, LCRA customer needs combine to exceed the 10,000 ac-ft/yr limit.

- The needs in West Travis County PUA are met through conservation, drought management, and strategies requiring infrastructure and increasing their contract with LCRA. Their largest wholesale provider, LCRA, has proposed a large ASR strategy that could potentially benefit West Travis County PUA.
- The ASR evaluation for Austin may be found in **Section 5.2.3.2.3**.
- The ASR strategy for Aqua WSC can be found in **Section 5.2.4.5.1**.
- An ASR strategy for County-Other, Hays requires excess water for recharge that is not readily available to the small utilities that comprise that category, thus ASR was deemed not viable.
- The needs for Travis County WCID 17 are being met by expanded water supply from LCRA, which in turn is employing an ASR strategy.
- The ASR strategy for LCRA can be found in Section **5.2.3.1.8**.

Planning guidance requires that aquifer storage and recovery WMS evaluations must report the expected percent of recovery for the ASR projects and must present that expected, lesser volume as the net water supply yield for the project. None of the above proposed ASR systems are beyond the planning stage, so recoverability estimates (generally performed as part of TCEQ permitting) have not been made. However, because modern ASR system operation design typically uses the target storage volume (TSV) approach, recoverability is expected to be high enough that it should not affect yields significantly.

In ASR systems, the TSV is a critical parameter that significantly influences the system's recoverability. The TSV refers to the specific volume of water that must be recharged into the aquifer to achieve a desired recovery efficiency, ideally approaching 100%. This concept is essential because, during the recharge phase, some of the introduced water blends with the native groundwater or may migrate beyond the immediate capture zone of the recovery well. By determining and injecting the appropriate TSV, operators can establish a sufficient buffer zone within the aquifer. This buffer ensures that the recovered water remains as close as possible to the originally injected volume, thereby maximizing recoverability. Accurate calculation of the TSV requires a comprehensive understanding of the site's hydrogeological characteristics, including aquifer properties, native groundwater quality, and hydraulic gradients. Much of this information is not available at the planning level. However, because the buffer zone is generally established at the start of the project, before the ASR is considered “online,” recoverability approaching 100% will be assumed unless more detailed analyses have been completed.

5.2.1 Utilization of Return Flows

Approximately 60 percent of all municipal diversions by Austin and others are currently returned to the Colorado River as effluent discharges. Unless otherwise authorized by permit, once discharged to the river, this water is subject to diversion under existing water rights permits. State law currently allows a water right holder to consumptively use all the water authorized by permit unless discharge is required by permit. Direct reuse is one possible manner in which a water right holder may increase consumptive use of the water authorized for diversion and use under the water right. The Region K Cutoff Water Availability Model (WAM) for the Colorado River that was used for determining water supply in this round of planning excludes all sources of return flows from the model. The inclusion of return flows in the model is proposed as a water management strategy for the benefit of water rights and environmental flows and indirect reuse by Austin in future regional water plans, consistent with a settlement agreement between Austin and the Lower Colorado River Authority.

The exclusion of all return flows in the determination of water supply leads to conservatively low estimates of available surface water supply for planning purposes. Water shortages for entities that currently use and rely upon the return flows may not be realistic as long as upstream return flow discharges continue into the future. For purposes of this plan, the water management strategies include use of projected state surface water that result from discharge of return flows by Austin and Pflugerville. Strategies related to Austin's reuse of treated effluent are described in **Section 5.2.3.2**. Effluent not being directly reused by Austin as a strategy and these other projected levels of effluent were made available to help meet environmental flow needs of the river and Matagorda Bay and water rights, according to the prior appropriation doctrine. Therefore, return flow assumptions for purposes of developing LCRA's water management strategies incorporate and reflect Austin's proposed strategies of reuse of effluent to meet portions of municipal and manufacturing demand, and the return flow sharing strategy described in Section **5.2.1.1**.

5.2.1.1 Austin Return Flows

In 2007, Austin and LCRA signed a settlement agreement that resolved several permitting disputes and outlined a proposed arrangement for shared rights to the beneficial use of return flows discharged by Austin. According to the settlement agreement, the two parties will seek regulatory approval to effectuate the strategy of joint return flow benefit. The settlement contemplates that the return flows will be managed between the two parties to first help satisfy environmental flow needs before Austin conducts indirect reuse. If Austin has an indirect reuse project in operation that is consistent with the terms and conditions of the Settlement Agreement, LCRA will not call on return flow passage for diversion under LCRA's water rights unless, first, environmental needs and, second, Austin's indirect reuse needs are met.

At this time, Austin has not developed plans for implementing an indirect reuse project as outlined by Austin and LCRA 2007 Settlement Agreement. Future Region K plans may include assumptions related to indirect reuse under this Agreement.

The partitioning of Austin's municipal return flows between environmental flow requirements and water rights will be modeled by Austin and LCRA as part of future TCEQ permit review processes. Environmental flow requirements will likely change in the future based on the latest scientific studies and actual water right utilization levels throughout the basin. The settlement agreement contemplates a framework for joint management between the two parties so that environmental flow requirements, as based on the best available science at the time, will be satisfied with Austin's return flows prior to beneficial use by either party's water rights.

Until Austin and LCRA have been granted regulatory approval for the strategy of joint return flow benefit and until Austin implements an indirect reuse project consistent with the terms and conditions of the Settlement Agreement, the beneficial use of Austin's return flows as a water management strategy, as shown in **Table 5.2**, helps meet the projected needs identified in Chapter 4 which were the result of the conservative modeling assumptions used in Chapter 3.

The quantity of return flows is projected to remain somewhat consistent over the 50-year planning period. Even though water demands in in the Austin area are projected to increase, the quantity of water reused during this period is projected to increase as well. However, beyond 2080 in the long-term, Austin projects that it will significantly increase its reuse of treated effluent to nearly 100 percent through direct and indirect reuse. As return flows discharged by Austin may diminish in the future due to enhanced reclamation of water, other sources may need to be dedicated or developed to meet needs that may currently be met by return flows discharged by Austin.

Table 5.2 Estimated Continued Benefits of Projected Austin Return Flows Strategy in the 2026 Region K Plan

Austin Return Flows	2030	2040	2050	2060	2070	2080
Projected Austin Effluent minus reuse	100,667	103,005	88,496	96,496	104,387	112,750
Estimated Benefits to Major Water Rights						
Highland Lakes	3,520	3,603	2,798	3,519	4,397	4,560
Austin Municipal[1]	19,728	20,034	17,658	18,923	19,979	20,934
Austin Industrial[2]	855	905	802	802	934	1,113
Garwood	2,748	2,748	2,748	2,748	2,748	2,748
Lakeside	14,032	14,328	12,005	13,507	14,498	15,504
Pierce Ranch	5,697	5,852	5,175	5,459	5,943	6,455
Gulf Coast[3]	12,075	12,174	11,304	11,945	12,241	12,813
STP[4]	1,334	1,362	1,264	1,308	1,379	1,479
Estimated Benefit to Matagorda Bay	29,069	29,916	25,484	27,904	30,084	32,837

Note: Estimates derived using a version of the Region K Cutoff Model (Supply Version) with return flows included. Benefits averaged over the drought of record, October 2007 – April 2015.

[1] The benefit shown here is derived by calculating the increase in water availability to Austin's upstream run-of-river water rights when the downstream return flow strategy is added to the Region K Cutoff Model. Therefore, the benefit shown does not reflect indirect reuse in the form of return flows diversion downstream of a discharge location.

[2] Austin Industrial benefit for the minimum run-of-river year is 3,512 acre-feet/year for all decades

[3] Benefits based on the Colorado River diversion plus diversion from Arbuckle for industrial use.

[4] Benefits shown are based on Colorado River diversion, not reservoir firm yield.

Cost Implications of Proposed Strategy

There are no capital costs associated with the diversion of this water because the diversions are done under existing water rights permits with existing infrastructure. Additional energy costs would be required for any increased diversions, similar on a per acre-foot basis as existing diversion energy costs, which would vary depending on the entity that eventually uses the return flows.

Environmental Considerations

Return flows provide a positive impact to the instream flows as they travel downstream to either reach the bay as freshwater inflows or be diverted by downstream water users. There are zero anticipated impacts to cultural resources.

Agricultural & Natural Resources Considerations

Return flows, when available for diversion by the downstream irrigators, provide a positive impact to agriculture. The benefits associated with the Garwood water right are shown in Table 5.2, which includes some irrigation benefit.

5.2.1.2 Downstream Return Flows

In addition to Austin's return flows, return flows from Pflugerville are considered in the plan as a water management strategy. This strategy assumed a projected level of effluent for Pflugerville of 48 percent of the total projected demand after water savings for drought management and conservation have been accounted for in each planning decade. Pflugerville has developed a 2024 Reclaimed Water Master Plan, which identifies a phased approach to growing its direct nonpotable reuse system. Those projected volumes were subtracted from the estimated effluent to calculate what is estimated to be discharged in each decade. It is also assumed that diversions available from the return flows will be reduced by 10 percent due to channel losses and evaporation, which have been incorporated into the supply. It should be noted that, if this is a permit, it likely that there would be environmental flow requirements imposed on that permit that could further reduce this strategy's supply. It should also be noted that the acquisition of a bed and banks permit pushes the online date to 2040. **Table 5.3** shows the estimated benefits of these return flows by planning decade. These downstream return flows are assigned as a benefit to the LCRA system.

Table 5.3 Downstream Return Flows Supply

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	3,405	3,282	3,673	2,975	4,357

Cost Implications of Proposed Strategy

There are no capital costs associated with the diversion of this water because the diversions are done with existing infrastructure or proposed infrastructure with costs identified in other strategies. Energy costs have been calculated for diverting the return flows from the Colorado River using the TWDB Costing Tool. The annual energy costs are $89,000, with a unit cost of $11/ac-ft.

Environmental Considerations

Return flows provide a positive impact to the instream flows as they travel downstream to a diversion point. A potential diversion point for LCRA for these downstream return flows is the proposed New Storage Development in the Lower Colorado Basin water management strategy project diversion point, as well as other existing LCRA diversion points. It is possible that a portion of these discharges would be reserved for instream flow requirements by permit. It is also possible that LCRA could use some of this flow to help achieve their environmental commitments. There are no anticipated impacts to cultural resources.

Agricultural & Natural Resources Considerations

Negligible impacts to agricultural users are expected (zero acres impacted). There is a potential agricultural benefit from flows that are not stored and/or used for firm water demands. If these flows travel further and become available for run-of-river irrigation diversions, the benefit to agricultural users could reach up to 4,357 ac-ft/yr.

5.2.2 Conservation

The LCRWPG supports conservation as an important component of water planning. It is more effective and less costly to use less water than to develop new sources. Conservation can be implemented for municipal, industrial, steam electric, and agricultural uses. In the 2026 plan, water conservation is divided between demand management and water loss mitigation.

All entities applying for a new water right or an amendment to an existing water right are required to prepare and implement a water conservation plan. Entities with 3,300 or more connections, as well as those having a financial obligation greater than $500,000 with TWDB, are also required to submit water conservation plans. The plan is to be submitted to TCEQ along with the application.

Additional entities that are required to prepare and submit conservation plans include municipal, industrial, and other non-agricultural water right holders of 1,000 ac-ft/yr or greater; and agricultural water right holders of 10,000 ac-ft/yr or greater.

Online model water conservation plans are available at the following link:

https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/conserve.html

5.2.2.1 LCRA Conservation

5.2.2.1.1 Enhanced Municipal and Industrial Conservation

LCRA recently completed its 2024 Water Conservation Plan that addresses water conservation practices for its firm water customers (municipal, industrial, power generation, and recreational). These efforts include five-year and 10-year water conservation goals for municipal (including firm irrigation/recreation customers), industrial, and agricultural use that will promote effective water conservation throughout communities in LCRA’s rapidly growing service area. More details on the 2024 Water Conservation Plan can be found online at:

https://www.lcra.org/download/lcra-water-conservation-plan/?wpdmdl=33607

Conservation measures include regulations, financial incentives, and education for water efficiency. All customers with new or renewing contracts must develop and implement water conservation plans. Along with the basic requirements, LCRA requires utility customers to adopt additional measures that include a permanent outdoor watering schedule limiting use to twice per week and irrigation and landscape standards for new development. Financial incentives include providing cost-share grants to firm water customers and offering financial incentives for landscape irrigation technologies such as high efficiency irrigation systems or turf replacement. Education efforts include providing irrigation evaluation training and assistance for wholesale customers' staff, community outreach presentations and funding to support the Central Texas Water Efficiency Network's annual water conservation symposium. LCRA resources for water conservation can be found at:

https://www.lcra.org/water/watersmart/

Since 2024, new conservation programs offered by LCRA include:

- Rebates for converting grass turf to native garden beds or drought tolerant landscapes.
- Increased rebate amounts for commercial, institutional, and industrial (CII) water audits, rainwater harvesting, cooling tower recycling, or commercial ice machines.
- Increased the cost per acre-foot for firm water customers to participate in the conservation cost-share program.

These 2024 program updates increased conservation incentives above the rebate and cost share programs that were previously in place. LCRA continues to reevaluate the effectiveness of these programs and update the incentives as the need and effectiveness can be demonstrated. The programs are available to water users receiving water from LCRA. Municipal customer requirements, such as irrigation standards and permanent landscape watering schedules, account for nearly 70% of savings. In 2022, LCRA revised its Water Conservation Plan rules to include a twice-weekly watering schedule for their municipal customers with firm water contracts. Annual water conservation and drought contingency plan surveys are required. As of 2023, about 7,634 ac-ft/yr is saved from these strategies.

According to LCRA's 2024 WCP, the following goals are developed to continue advancement of water conservation in the LCRA service area.

Five-Year Goals

- 1,000 acre-feet savings per year from LCRA power generation industrial water use.
- 12,000 acre-feet savings per year from firm water contract use (non-power generation).
- 18,000 acre-feet savings per year from use in the agricultural divisions during a year with no curtailment of interruptible stored water.

Ten-Year Goals

- 1,100 acre-feet savings per year from LCRA power generation industrial water use.
- 15,000 acre-feet savings per year from firm water contract use (non-power generation).
- 20,000 acre-feet savings per year from use in the agricultural divisions during a year with no curtailment of interruptible water supply.

The goals above show the expected water savings from the enhanced municipal and industrial conservation strategy. It should be noted that the municipal water savings are from LCRA customers and are already included in the Municipal Conservation strategy in Section 5.2.2.3. As a wholesale water provider, LCRA cannot directly implement this strategy and must rely on their customers to adopt and enforce the measures in the enhanced municipal conservation strategy. The savings for the municipal strategies will be achieved through LCRA customer WUGs and are not above and beyond the conservation strategy savings associated with those individual WUGs. LCRA can and does encourage implementation of these measures by providing education and funding to its customers, but these savings are in support of and in addition to the savings documented in **Table 5.9** in the Municipal Conservation section. LCRA requires its customers to develop water conservation plans that are consistent with the contract requirements for firm water customers, and has developed model conservation plans that can be used by those customers.

Cost Implications of Proposed Strategy

To promote water conservation, LCRA allocates funds for rebates and actively administers programs that address conservation for:

- Individual residences that have a water account with LCRA or are served by one of LCRA's firm water customers.
- Businesses, industries, schools, hospitals, churches and other institutions located in LCRA's water service area.
- Firm water customers.
- Agricultural water customers.

For individual residences, LCRA offers rebates of 50% of the total cost of conservation measures, or up to $600 per residential property, for irrigation evaluations, retrofitting or replacing irrigation system equipment, new pool filters and covers, aeration, compost and mulch, soil testing, and turf grass conversion.

For CII customers, LCRA offers WaterSmart rebates for 50% of the cost of conservation measures, up to $5,000 per system, for irrigation system equipment upgrades, compost and mulch, aeration, pool filters, and turf grass conversion to conserve water and increase efficiency.

Through the Firm Water Conservation Cost-Share Program, LCRA offers funding at the lesser of 50% or $400 per acre-foot saved, with a cap of $100,000 per project. Annual funding is $300,000, which has seen a slight increase recently but has remained consistent overall. While there is an aim to increase this budget, challenges have been faced in fully utilizing the available funds. In August 2024, the cost per acre-foot cap was raised from $155 (previously tied to the raw water rate) to $400. It is hoped that this adjustment will help maximize the budget and justify a future increase. The goal is to raise the budget to $500,000 by fiscal year 2028. For municipal WUGs discussed in Section 5.2.2.3, this cost is already incorporated into the WUG cost. LCRA would be off-setting a portion of their costs.

For Agricultural customers, LCRA is actively engaged in water conservation programs that address conservation on individual farms and within the irrigation divisions. The financial implications of these programs are addressed in Section 5.2.2.4.2, Lower Basin Conservation.

Environmental Impact

Conservation programs do not require additional infrastructure, meaning no environmental mitigation is necessary.

Zero environmental impacts (all environmental factors) are anticipated, as the impacts are already accounted for in the individual conservation strategies identified in Sections 5.2.2.3.

Agricultural & Natural Resources Considerations

Zero impacts to agriculture are anticipated (zero acres impacted), as enhanced municipal and industrial conservation will reduce a small portion of the expected increases to firm demands over time.

5.2.2.1.2 Agricultural Conservation

Irrigators in Colorado, Wharton, and Matagorda counties have the largest irrigation needs in Region K. LCRA has specifically addressed conservation for agricultural water supplies, which are interruptible, in the 2024 LCRA Water Conservation Plan. To increase conservation in LCRA's irrigation operations and by its interruptible water customers, LCRA helps fund conservation projects through grants and House Bill 1437 (HB 1437) funding. The HB 1437 funds are specifically allocated to offset water supplied from the Colorado basin to Williamson County with input from the Agriculture Water Conservation Fund Advisory Committee. These funds are designated not to increase supply but to fund practices that would offset potential reductions in the availability of irrigation water through decreased demand, resulting in "no net loss" of agricultural production. LCRA actively pursues state and federal grants programs to supplement HB 1437 and other funds to implement irrigation system conveyance improvements. Many strategies, which are outlined in detail under Irrigation Conservation in Section 5.2.2.4 are identified in the 2024 LCRA Water Conservation Plan. Costs and savings for some of these strategies, such as automating the operation of major check structures through a centralized Supervisory Control and Data Acquisition (SCADA) control system have been implemented and are proposed for further development. Other conservation strategies like canal rehabilitation and potential canal lining are also proposed.

5.2.2.2 Austin Conservation

Austin began an aggressive water conservation program in the mid-1980s in response to rapid growth and a series of particularly dry years. Austin has achieved significant reductions in both per capita consumption and peak day to average day demand ratio. For the per capita use calculations, Austin used a modified GPCD from year 2011 approved by the LCRWPG and TWDB as their base year since Austin had mandatory water conservation measures in place from September through December that year in the 2021 Regional Water Plan (RWP), which is carried over into the 2026 RWP after adjusting for plumbing code savings.

In 1990, Austin's conservation program evolved from primarily reacting to high summertime demands to a comprehensive program with the goals of reducing both per capita consumption and peak day demand. To achieve these broader goals, Austin has implemented and anticipates continuing water conservation efforts and programs in a number of areas, as documented in their 2024 Water Conservation Plan (WCP). Their efforts include:

- Comprehensive public outreach and education programs
  - Community Events & Education Programs
  - Advertising and Marketing Campaigns
  - Workshops and Presentation
- Residential Customer Programs
  - Digital Garden Hose Meters and Sunlight Calculators
  - Household Material Distribution
  - Residential Irrigation Audits
  - Plumbing Assistance Program
  - Austin Energy All-Star Conservation Kits
  - Residential Incentive Programs
  - Irrigation Upgrade Rebate
  - Landscape Survival Tools
  - Laundry to Landscape
  - Pressure Regulating Valves
  - Pool Cartridge Filter Rebate
  - Pool Cover Rebate
  - Rainwater Harvesting Rebate
  - Water Timer Rebate and Instant Savings
  - WaterWise Landscape Rebate
  - WaterWise Rainscape
- Commercial Customer Programs
  - Bucks for Business
  - Cartridge Pool Filter Rebate Program
  - Commercial, Institutional, and Industrial Water Efficiency Audit Rebate
  - Commercial Kitchen Equipment Rebate
  - Irrigation System Improvement Rebate

- Pressure Regulating Valve Rebate
- Rainwater Harvesting Rebate
- Voluntary Reclaimed Water Connection Pilot Rebate
- WaterWise Landscape Rebate

▪ Regulatory Programs

- Water Use Restrictions and Enforcement
- Water-Use Efficiency Assessment Programs for commercial facility irrigation, cooling tower efficiency program, and commercial facility wash.

Through its various water conservation programs, Austin has made significant advances in reducing per capita water use in its service area. As noted in their 2024 WCP, Austin used approximately the same water in 2023 as it did in 2011, despite having 140,000 more residents.

In the 2024 WCP, Austin set new five and ten-year total average per capita consumption goals of 121 GPCD by 2029 and 114 GPCD by 2034, to be achieved primarily through the implementation of combination of conservation strategies identified in the 2024 Water Forward Plan. Implementation and additional savings from many of these new programs are ongoing. The Water Forward Plan projects conservation strategies and demands for 50 years, corresponding to the planning period for this regional water plan.

Austin also conducted a Water Loss Study to guide their water loss mitigation program, which is projected to result in savings of 1.92 gallons per capita per day by 2030 and 4.39 gallons per capita per day by 2040.

Projected savings from water conservation through water use reduction and water loss mitigation are shown in **Table 5.4**. Note that these projected savings from conservation represent estimated savings from implementing Austin's Water Forward Plan strategies. These strategies include implementation of water loss control efforts, customer-side water use management, and native and efficient landscape. These savings do not include additional potential savings from potable demand offset from utilizing non-potable water from onsite reuse and reclaimed systems.

Table 5.4 Yield and Cost of Austin Water Conservation Strategies

Water Forward Strategies	Estimated Supply (Acre Feet per Year)						Total Annual Community Cost ($per acre foot per year)*
	2030	2040	2050	2060	2070	2080	
Utility-Side Water Loss Control	2,800	7,500	9,400	11,300	13,200	15,000	$267
Customer-Side Water Use Management	2,400	4,700	6,400	8,100	9,800	11,400	$52
Native & Efficient Landscaping	1,300	2,700	3,800	4,800	5,900	7,000	$5,112
Water Conservation Strategies Sub-Total	**6,500**	**14,900**	**19,600**	**24,200**	**28,900**	**33,400**	

** Community cost = Utility cost + Customer cost*

Costs Implications of Proposed Strategy

As presented in **Table 5.5**, capital and operation and maintenance (O&M) costs were provided by the 2024 Austin Water Forward Plan, which utilized the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars. Both costs reflect the costs to the City and their customers, except for the water loss control strategy. Capital costing efforts include a data platform for the customer-side water use management, purchase of vehicles for staff, installation of native and efficient landscape, and calibration or replacement of meters at water treatment plants.

Many of the non-capital cost measures include ongoing leak detection and repair, data management, and staff hours. Region K encourages the TWDB to provide funding for these and other types of conservation measures for WUGs and wholesale water providers within Region K and around the state.

Table 5.5 Austin Conservation Strategy Cost

Type	Capital Cost	2030	2040	2050	2060	2070	2080
Customer-Side Water Use*	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000
Native and Efficient Landscape*	$832,815,000	$55,726,000	$55,726,000	$55,726,000	$55,726,000	$55,726,000	$55,726,000
Water Loss Control	$69,655,000	$7,031,000	$7,031,000	$7,031,000	$7,031,000	$7,031,000	$7,031,000
Total	$69,655,000	$63,082,000	$63,082,000	$63,082,000	$63,082,000	$63,082,000	$63,082,000

** Cost includes both utility and customer cost. It is assumed that customers will be responsible for the native and efficient landscape cost.*

Environmental Considerations

Water conservation is a beneficial strategy. For example, water conservation strategies generally do not require the movement of water between locations. In addition, water conservation generally does not result in adverse impacts to environmental flows or other environmental considerations. The conservation strategies by Austin are estimated to reduce demand by an additional 33,400 ac-ft/yr by 2080. Note that water conservation can cause changes to wastewater concentrations over time, in which case treatment processes may need to be adjusted to maintain permitted discharge parameters. There are zero anticipated impacts to cultural resources.

Agricultural & Natural Resources Considerations

Zero impacts to agriculture are anticipated (zero acres impacted). Negligible direct impacts to other water resources are expected as a result of implementing this strategy.

5.2.2.3 Municipal Conservation

Reduction of municipal water demand through conservation has been a primary focal point for Regional Water Planning in Texas since the 2011 planning cycle. The water demands approved by TWDB and the individual Regional Water Planning Groups (RWPGs) have already been adjusted to incorporate the effects of the 1991 State Water Saving Performance Standards for Plumbing Fixtures Act. In addition, RWPGs are required to consider further water conservation measures in their plan or explain reasons for not recommending conservation for Water User Groups (WUGs) with water needs.

The State of Texas Water Conservation Implementation Task Force had set a statewide goal of an average per capita consumption of 140 GPCD in 2001. The Water Conservation Implementation Task Force also set a recommended goal for municipal water suppliers to have a minimum annual reduction of one percent in total GPCD until the entity achieves a total GPCD of 140 or less. In 2007, the 80th Texas Legislature, via the passage of Senate Bill 3 and House Bill 4, directed the TWDB to appoint the members of the newly created Water Conservation Advisory Council (WCAC), which was established to continue the work initiated by the Water Conservation Implementation Task Force. The Council has submitted a Report and Recommendations to the 88th Texas Legislature[1] with the following updates:

- Recent trends indicate that regional water planning groups should eliminate the 140 GPCD target. However, the Council recognized that the statewide average total per capita being reported through Municipal Conservation Reports is under 140.
- A recommended methodology is to reduce the planning year GPCD by one percent each year from the dry year GPCD (2011 in many cases).

In the Report to the 89th Texas Legislature[2] the WCAC (page 30) noted that for some water users a one percent demand reduction may not be sustainable long-term and that there is a point where a one percent reduction trend can become unrealistic.

In light of the water conservation requirements and the new WCAC recommendations, the Region K Water Management Strategy Subcommittee worked with its consultant team and developed the following water conservation recommendation for WUGs with baselines falling under the category below:

- For baseline greater than 200 GPCD: 2% annual reduction plus plumbing code (PC) water savings.
- For baseline between 140 and 200 GPCD: 1% annual reduction plus PC water savings.
- For baseline between 120 and 140 GPCD: 0.5% annual reduction plus PC water savings.
- For baseline between 100 and 120 GPCD: 0.25% annual reduction plus PC water savings.
- For baseline between 80 and 100 GPCD: 0.1% annual reduction plus PC water savings.
- For baseline less than 80 GPCD: PC water savings only.

This methodology takes into consideration that a long-term 1% annual reduction might not be feasible for WUGs whose baseline demands are already low, as noted by the WCAC, and provide a reasonable target reduction for individual WUGs based on their current demand patterns. **Table 5.6** shows the baseline GPCDs and GPCD goals of the Region K WUGs.

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[1] Water Conservation Advisory Council, Progress Made in Water Conservation in Texas: Report and Recommendations to the 88th Texas Legislature, December 1, 2022. https://savetexaswater.org/resources/doc/2022%20WCAC%20Report_Final.pdf

[2] Water Conservation Advisory Council, Progress Made in Water Conservation in Texas: Report and Recommendations to the 89th Texas Legislature, December 1, 2024. https://savetexaswater.org/resources/doc/Water-Conservation-Advisory-Council-Report-to-the-89th-Texas-Legislature-2024.pdf

Table 5.6 Baseline GPCD and GPCD Goals by WUGs

WUG	Baseline GPCD	GPCD Goal					
		2030	2040	2050	2060	2070	2080
Aqua WSC	148	133	127	120	117	114	111
Austin	157	137	130	123	117	115	112
Barton Creek West WSC	292	234	191	172	156	141	128
Barton Creek WSC	667	540	441	360	294	240	196
Bastrop	166	145	131	124	118	115	113
Bastrop County WCID 2	86	81	80	80	80	80	80
Bay City	136	105	102	99	98	97	96
Bertram	218	174	157	142	129	122	116
Blanco	132	120	114	111	108	106	103
Boling MWD	110	103	99	98	97	97	96
Briarcliff	134	123	117	114	111	108	105
Buda	145	111	108	105	103	100	99
Burnet	201	159	143	130	123	117	114
Caney Creek MUD of Matagorda County	109	99	97	96	95	94	94
Cimarron Park Water	104	97	95	94	93	93	92
Columbus	265	211	172	156	141	127	121
Cottonwood Creek MUD 1	60	60	60	60	60	60	60
Cottonwood Shores	158	139	131	125	119	116	113
County-Other, Bastrop	163	144	130	123	117	115	112
County-Other, Blanco	111	103	100	98	97	96	95
County-Other, Burnet	138	127	120	117	114	111	108
County-Other, Colorado	111	103	100	98	97	96	95
County-Other, Fayette	117	109	105	103	100	98	97
County-Other, Gillespie	106	99	97	96	95	94	93
County-Other, Llano	95	89	87	87	86	85	84
County-Other, Matagorda	94	88	87	86	85	84	83
County-Other, Mills	116	108	105	102	100	99	98
County-Other, San Saba	140	128	121	115	112	110	107
County-Other, Travis	126	115	112	109	106	104	101
County-Other, Wharton	119	111	108	105	103	100	98
Creedmoor-Maha WSC	100	81	80	80	80	80	80
Cypress Ranch WCID 1	91	87	85	84	84	83	82
Dripping Springs WSC	157	138	131	124	118	115	112
Eagle Lake	123	112	109	106	104	101	99
Elgin	125	116	113	110	107	104	102
Fayette County WCID Monument Hill	218	173	156	141	128	122	116
Fayette WSC East	126	116	112	110	107	104	102
Fayette WSC West	126	116	112	110	107	104	102
Flatonia	188	103	100	99	98	97	96
Fredericksburg	249	188	169	153	138	132	125

Table 5.6 Baseline GPCD and GPCD Goals by WUGs

WUG	Baseline GPCD	GPCD Goal					
		2030	2040	2050	2060	2070	2080
Garfield WSC	101	94	92	91	90	89	88
Goldthwaite	321	257	210	171	155	140	127
Granite Shoals	96	91	89	88	87	87	86
Hays	134	123	117	114	111	108	106
Hays County WCID 1	201	160	144	130	124	118	115
Hays County WCID 2	208	167	150	136	129	123	117
Headwaters at Barton Creek	80	76	75	75	75	75	75
Hornsby Bend Utility	75	71	70	70	70	70	70
Horseshoe Bay	411	180	162	147	133	126	120
Hurst Creek MUD	375	302	246	201	164	149	134
Johnson City	155	135	128	121	115	113	110
Jonestown WSC	153	134	127	121	115	112	109
Kelly Lane WCID 1	170	147	133	126	120	114	111
Kelly Lane WCID 2	89	85	84	83	82	81	80
Kingsland WSC	98	93	91	90	89	88	88
La Grange	157	137	130	123	117	114	112
La Ventana WSC	153	131	125	118	116	113	110
Lago Vista	221	176	159	144	130	123	117
Lakeside MUD 3	128	117	114	111	108	106	103
Lakeside WCID 1	85	80	79	79	79	79	79
Lakeside WCID 2-B	186	161	145	131	124	118	115
Lakeside WCID 2-C	78	74	74	74	74	74	74
Lakeside WCID 2-D	133	122	115	112	110	107	104
Lakeway MUD	226	133	126	120	117	114	111
Llano	217	178	160	145	131	125	119
Loop 360 WSC	525	424	346	283	231	189	171
Manor	115	74	74	74	74	74	74
Manville WSC	140	128	122	116	113	110	107
Marble Falls	240	183	165	149	135	128	122
Markham MUD	86	81	79	79	79	79	79
Matagorda County WCID 6	92	87	85	85	84	83	82
Matagorda Waste Disposal & WSC	164	143	128	122	116	113	110
Meadowlakes	300	240	196	177	160	145	131
Mid-Tex Utilities	106	100	98	97	96	96	95
North Austin MUD 1	97	91	90	89	88	87	87
North San Saba WSC	256	205	167	151	136	130	123
Northtown MUD	60	60	60	60	60	60	60
Palacios	110	103	100	99	98	97	96
Pflugerville	149	133	126	120	117	114	111
Rancho Del Lago	229	177	159	144	130	124	118

Table 5.6 Baseline GPCD and GPCD Goals by WUGs

WUG	Baseline GPCD	GPCD Goal					
		2030	2040	2050	2060	2070	2080
Reunion Ranch WCID	244	189	170	154	139	132	126
Richland SUD	210	167	150	136	129	123	117
Rollingwood	242	193	174	157	142	129	122
Rough Hollow in Travis County	190	169	152	138	131	125	118
Ruby Ranch WSC	118	111	108	105	102	100	99
San Saba	311	249	203	166	150	136	129
Schulenburg	200	176	158	143	129	123	117
Senna Hills MUD	308	247	201	165	149	135	128
Shady Hollow MUD	163	143	129	123	117	114	111
Smithville	154	134	127	121	115	112	110
Sunrise Beach Village	92	87	85	85	84	83	82
Sunset Valley	354	282	228	186	169	152	138
Sweetwater Community	132	122	116	113	111	108	105
The Colony MUD 1A	304	234	191	173	156	141	128
Travis County MUD 10	191	168	152	137	130	124	118
Travis County MUD 14	76	72	71	71	71	71	71
Travis County MUD 18	145	125	119	116	113	110	107
Travis County MUD 2	114	107	104	101	99	98	97
Travis County MUD 4	549	445	363	297	242	198	179
Travis County WCID 10	410	330	269	220	180	163	147
Travis County WCID 17	229	165	149	134	128	122	116
Travis County WCID 18	151	132	125	119	116	113	110
Travis County WCID 19	588	474	387	316	258	211	172
Travis County WCID 20	462	374	305	249	204	166	150
Travis County WCID Point Venture	224	178	161	145	132	125	119
Undine Development	224	178	160	145	131	125	119
Weimar	206	155	140	133	126	120	114
Wells Branch MUD	67	64	63	63	63	63	63
West Travis County Public Utility Agency	315	161	145	131	125	119	116
Wharton	160	140	132	126	120	117	114
Wharton County WCID 2	183	161	145	131	124	118	115
Wilbarger Creek MUD 1	75	72	72	72	72	72	72
Windermere Utility	146	125	118	115	112	110	107

Water Loss Mitigation Strategy

System water audits are required every five years for all retail utilities and every year for utilities over 3,300 connections. To maximize the benefits of this measure, a utility would use the information from the water audit to revise meter testing and repair practices, reduce unauthorized water use, improve accounting for unbilled water, and implement effective water loss management strategies. Water loss strategies for new development, to minimize the need for line flushing, can include the addition of extra meters along various line routes to collect more accurate data on water flowing through those routes, creating loops in the water distribution lines, and placing chlorine injection stations strategically throughout the development to avoid the need for excessive flushing to keep chlorine residuals in compliance.

Utilizing the system water audit data, the water loss mitigation strategy is the first strategy that the RWPG identified to meet the GPCD goals, as it is not only a best practice to minimize water loss but also a reliable strategy to reduce demand, especially for those entities with larger leaks.

Municipal water entities seeking infrastructure replacement programs to reduce water loss may qualify for state-supported initiatives, including the State Water Implementation Fund for Texas (SWIFT). According to the TWDB website as of January 2025, SWIFT has been allocated $11.5 billion to make water project financing more affordable and to provide consistent state financial assistance for developing water supply projects identified in the State Water Plan. The Lower Colorado RWPG encourages all Region K WUGs to consider utilizing the SWIFT program if they are interested in mitigating water loss through leaky water main replacements.

For a given WUG, the projected water savings from the water loss mitigation strategy is calculated as the difference between the WUG's actual water loss and the TWDB water loss thresholds. These thresholds are defined as 30 gallons per connection per day (gal/conn/day) for entities with a connection density greater than 32 connections per mile and 57 gal/conn/day for entities with a lower connection density, as approved by the TWDB in February 2023. The implementation schedule assumes that the measure will be 25% complete by 2030, 75% complete by 2040, and 100% complete by 2050.

To maintain the target water loss levels, it is assumed that entities will invest appropriate resources in leak detection and management programs during the planning horizon. This ongoing effort is critical to sustaining the projected savings.

Table 5.7 Estimated Savings from Water Loss Mitigation Strategy by WUGs

WUG	Water Loss Mitigation Savings (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Aqua WSC	71	87	107	129	153	182
Austin (Section 5.2.2.2)	2,800	7,500	9,400	11,300	13,200	15,000
Barton Creek West WSC	2.1	2.1	2.1	2.1	2.1	2.1
Barton Creek WSC	5	15	21	22	23	25
Bastrop	10	13	15	19	22	27
Bastrop County WCID 2	2.4	3.0	3.6	4.3	5.2	6.1
Bay City	181	542	725	727	728	728
Bertram	10	38	60	72	85	99
Blanco	1.1	1.1	1.1	1.0	1.0	1.0
Boling MWD	0.4	0.4	0.3	0.3	0.2	0.2
Briarcliff	2.4	2.9	3.4	3.8	4.3	4.9
Buda	16	23	27	31	36	42
Burnet	7.6	8.1	8.5	8.9	9.4	9.9
Caney Creek MUD of Matagorda County	1.4	1.5	1.6	1.8	1.9	2.1
Cimarron Park Water	1.2	1.2	1.2	1.2	1.2	1.2

Table 5.7 Estimated Savings from Water Loss Mitigation Strategy by WUGs

WUG	Water Loss Mitigation Savings (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Columbus	4.9	5.0	5.0	5.0	5.0	5.0
Cottonwood Creek MUD 1	1.7	1.7	1.7	1.7	1.7	1.7
Cottonwood Shores	1.5	1.7	1.8	2.0	2.3	2.5
County-Other, Bastrop	5	6	7	8	13	20
County-Other, Blanco	4.3	4.2	4.1	3.9	3.7	3.5
County-Other, Burnet	10	8	9	11	12	14
County-Other, Colorado	6.8	6.6	6.4	6.2	6.0	5.8
County-Other, Fayette	2.9	2.4	1.7	1.3	0.8	0.3
County-Other, Gillespie	10	10	11	12	13	14
County-Other, Llano	2.5	2.1	1.6	1.3	0.9	0.5
County-Other, Matagorda	4.4	3.8	3.2	2.4	1.5	0.5
County-Other, Mills	1.2	1.0	0.8	0.7	0.6	0.5
County-Other, San Saba	0.9	0.8	0.6	0.5	0.4	0.3
County-Other, Travis	53	70	64	50	48	47
County-Other, Wharton	9.1	9.0	9.1	9.0	9.0	9.0
Creedmoor-Maha WSC	3.9	4.5	5.1	5.7	6.4	7.1
Cypress Ranch WCID 1	0.8	0.9	0.9	0.9	0.9	0.9
Dripping Springs WSC	12	52	100	118	118	118
Eagle Lake	2.0	1.8	1.6	1.4	1.3	1.1
Elgin	13	58	102	128	137	137
Fayette County WCID Monument Hill	0.7	0.7	0.7	0.6	0.6	0.6
Fayette WSC East	0.4	2.0	3.9	5.3	6.9	8.6
Fayette WSC West	12	37	53	57	61	66
Flatonia	1.5	1.4	1.4	1.4	1.4	1.4
Fredericksburg	15	16	16	17	17	18
Garfield WSC	0.8	0.9	0.9	0.9	1.0	1.0
Goldthwaite	33	100	134	134	134	134
Granite Shoals	3.2	3.3	3.4	3.5	3.6	3.7
Hays	0.8	1.2	1.6	2.3	3.0	3.8
Hays County WCID 1	14	42	56	56	56	56
Hays County WCID 2	5	15	21	21	21	21
Headwaters at Barton Creek	0.5	0.7	1.0	1.5	1.9	2.5
Hornsby Bend Utility	5	6	7	8	9	11
Horseshoe Bay	10.6	11.2	11.5	12.5	13.6	14.7
Hurst Creek MUD	7	22	29	29	29	29
Johnson City	12	39	55	58	62	65
Jonestown WSC	4	5	6	7	9	11
Kelly Lane WCID 1	2.3	2.3	2.3	2.3	2.3	2.3
Kelly Lane WCID 2	2.1	3.0	3.7	4.4	5.3	6.2
Kingsland WSC	4.4	5.1	6.0	6.9	8.1	9.4

Table 5.7 Estimated Savings from Water Loss Mitigation Strategy by WUGs

WUG	Water Loss Mitigation Savings (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
La Grange	4.0	3.9	3.8	3.8	3.7	3.7
La Ventana WSC	0.7	0.7	0.7	0.7	0.7	0.7
Lago Vista	20	30	42	54	57	59
Lakeside MUD 3	2.3	3.2	4.0	4.7	5.6	6.6
Lakeside WCID 1	1.3	1.5	1.7	1.9	2.1	2.4
Lakeside WCID 2-B	2.2	2.5	2.8	3.1	3.4	3.8
Lakeside WCID 2-C	2.7	3.7	4.6	5.5	6.5	7.6
Lakeside WCID 2-D	3.3	4.5	5.6	6.6	7.8	9.1
Lakeway MUD	59	182	246	246	246	246
Llano	4.0	4.0	4.1	4.1	4.1	4.1
Loop 360 WSC	3	9	13	12	12	12
Manor	8	31	51	60	71	83
Manville WSC	85	318	496	568	649	741
Marble Falls	10	37	50	50	50	50
Markham MUD	0.3	0.3	0.3	0.3	0.3	0.3
Matagorda County WCID 6	0.5	0.5	0.4	0.4	0.4	0.4
Matagorda Waste Disposal & WSC	0.3	0.2	0.2	0.2	0.2	0.2
Meadowlakes	3.2	3.4	3.6	3.8	4.1	4.2
Mid-Tex Utilities	7	28	48	61	76	93
North Austin MUD 1	4.9	4.9	4.9	4.9	4.9	4.9
North San Saba WSC	0.6	0.6	0.6	0.5	0.5	0.5
Northtown MUD	3.3	3.5	3.6	3.8	4.0	4.2
Palacios	13	36	47	44	42	39
Pflugerville	98	367	575	659	755	864
Rancho Del Lago	0.6	0.6	0.6	0.6	0.6	0.6
Reunion Ranch WCID	1.6	2.3	3.2	4.4	5.8	7.4
Richland SUD	17	47	60	57	57	58
Rollingwood	1.1	3.5	4.7	4.7	4.8	4.9
Rough Hollow in Travis County	6.0	6.0	6.0	6.0	6.0	6.0
Ruby Ranch WSC	0.7	0.7	0.7	0.7	0.7	0.7
San Saba	5.1	5.1	5.1	5.1	5.1	5.1
Schulenburg	7	21	28	28	28	28
Senna Hills MUD	1.5	1.5	1.6	1.6	1.6	1.7
Shady Hollow MUD	2.9	3.0	3.0	3.1	3.2	3.3
Smithville	3.1	3.3	3.6	3.9	4.2	4.6
Sunrise Beach Village	0.4	0.4	0.4	0.4	0.4	0.4
Sunset Valley	10	30	40	40	40	40
Sweetwater Community	3.2	4.2	4.2	4.2	4.2	4.2
The Colony MUD 1A	1.0	1.3	1.8	2.2	2.8	3.4
Travis County MUD 10	0.5	0.7	0.8	1.0	1.2	1.4

Table 5.7 Estimated Savings from Water Loss Mitigation Strategy by WUGs

WUG	Water Loss Mitigation Savings (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Travis County MUD 14	12	42	63	71	80	90
Travis County MUD 18	1.1	1.1	1.1	1.1	1.1	1.1
Travis County MUD 2	2.7	3.4	4.1	4.7	5.4	6.2
Travis County MUD 4	10	12	14	15	17	19
Travis County WCID 10	17	19	20	21	22	23
Travis County WCID 17	29	108	168	192	218	248
Travis County WCID 18	4.5	4.5	4.5	4.5	4.5	4.5
Travis County WCID 19	3	11	14	14	15	15
Travis County WCID 20	12	37	49	49	49	49
Travis County WCID Point Venture	2.0	2.5	3.0	3.6	4.4	5.3
Undine Development	0.7	0.7	0.7	0.7	0.7	0.7
Weimar	2.1	2.0	2.0	1.9	1.8	1.8
Wells Branch MUD	7.5	7.8	7.9	7.9	7.9	7.9
West Travis County Public Utility Agency	265	1,064	1,812	2,289	2,831	3,444
Wharton	7.5	7.4	7.1	6.9	6.6	6.3
Wharton County WCID 2	1.5	1.5	1.4	1.4	1.3	1.2
Wilbarger Creek MUD 1	21	89	149	179	214	252
Windermere Utility	25	76	101	101	101	101
Total	**4,191**	**11,419**	**15,220**	**17,945**	**20,749**	**23,567**

Cost for Water Loss Mitigation

The cost of the water loss mitigation strategy includes both main replacement and ongoing leak detection and management. It is assumed that main replacements begin in 2030 with a capital cost and loan service. The length of mains expected to be replaced is based on the water loss per mile and the total length of the distribution system in miles. An 8-inch PVC pipe is assumed to be replaced in a rocky area, whose unit costs are informed by the TWDB Unified Costing Model in September 2023 dollars. The recommended water loss mitigation WMSs are not expected to exceed two standard pipe diameters. For planning purposes, an 8-inch PVC pipe was used as a simplified yet representative cost estimate, given the limited available information on specific utility requirements. If, during implementation, a larger pipe size is required to meet adopted utility standards, the evaluation will document the specific standard and provide:

A map of the proposed line replacement
Detailed water loss calculations before and after the replacement

This assumption ensures a reasonable cost estimate while allowing for future adjustments based on utility-specific design standards.

To achieve and maintain the projected water loss reduction, entities are expected to spend $300 per acre-foot per year (ac-ft/yr) to achieve a 34.7% reduction in water loss from their baseline year and $600/ac-ft/yr to achieve additional savings beyond the 34.7%. These cost estimates are based on a 2022 water loss study[3] that analyzed data from over 800 utilities in California, Texas, and Georgia. The study found that it is economically efficient for a median utility to reduce water losses by 34.7% at a cost of $277/ac-ft/yr. Adjusted for inflation, the rounded cost of $300/ac-ft/yr was adopted. Achieving savings beyond 34.7% is expected to be significantly more challenging, warranting a doubled cost factor to reflect the increased difficulty and expense. **Table 5.8** provides the estimate cost from the water loss mitigation strategy for all Region K WUGs.

Table 5.8 Municipal Conservation – Water Loss Mitigation Cost

WUG	Pipe Length (Miles)	Maximum Water Reduction (ac ft)	Water Loss Mitigation Capital Cost	Largest Annual Cost	2040 Unit Conservation Cost* ($/ac ft)	2050 2080 Unit Conservation Cost** ($/ac ft)
Aqua WSC	0.95	182	$992,000	$96,000	529	496
Austin	See Section 5.2.2.2 for City of Austin's conservation data.					
Barton Creek West WSC	0.05	2	$54,000	$4,400	822	794
Barton Creek WSC	0.10	25	$104,000	$13,500	810	771
Bastrop	0.07	27	$68,000	$8,600	506	496
Bastrop County WCID 2	0.01	6	$16,000	$2,000	331	225
Bay City	0.07	728	$107,000	$320,000	445	439
Bertram	0.24	99	$365,000	$39,100	823	762
Blanco	0.005	1	$5,000	$700	221	202
Boling MWD	0.01	0.4	$7,000	$600	433	234
Briarcliff	0.28	5	$20,000	$2,300	235	201
Buda	0.06	42	$43,000	$12,600	499	496
Burnet	0.06	10	$52,000	$6,100	800	793
Caney Creek MUD of Matagorda County	0.09	2	$30,000	$2,600	317	210
Cimarron Park Water	0.05	1	$83,000	$6,200	860	209
Columbus	0.13	5	$126,000	$10,400	818	795
Cottonwood Creek MUD 1	0.004	2	$6,000	$900	536	298
Cottonwood Shores	0.03	3	$34,000	$2,900	545	497
County-Other, Bastrop	0.12	20	$124,000	$10,400	537	496
County-Other, Blanco	0.08	4	$88,000	$7,500	365	205
County-Other, Burnet	0.22	14	$230,000	$19,100	309	204
County-Other, Colorado	0.15	7	$152,000	$12,700	372	205
County-Other, Fayette	0.06	3	$61,000	$5,200	380	204
County-Other, Gillespie	0.21	14	$216,000	$18,300	424	210
County-Other, Llano	0.04	2	$46,000	$4,000	557	233
County-Other, Matagorda	0.08	4	$88,000	$7,500	591	206
County-Other, Mills	0.02	1	$24,000	$2,000	400	194
County-Other, San Saba	0.02	1	$20,000	$1,700	306	183

[3] ScienceDaily. "Leaks an untapped opportunity for water savings." ScienceDaily, 8 March 2022. https://www.sciencedaily.com/releases/2022/03/220308102834.htm

Table 5.8 Municipal Conservation – Water Loss Mitigation Cost

WUG	Pipe Length (Miles)	Maximum Water Reduction (ac ft)	Water Loss Mitigation Capital Cost	Largest Annual Cost	2040 Unit Conservation Cost* ($/ac ft)	2050 2080 Unit Conservation Cost** ($/ac ft)
County-Other, Travis	1.22	70	$1,280,000	$111,100	293	204
County-Other, Wharton	0.20	9	$205,000	$17,100	368	206
Creedmoor-Maha WSC	0.08	7	$71,000	$6,300	234	202
Cypress Ranch WCID 1	0.003	1	$5,000	$600	452	232
Dripping Springs WSC	0.65	118	$990,000	$85,200	603	485
Eagle Lake	0.04	2	$41,000	$3,500	316	206
Elgin	0.42	137	$642,000	$62,500	411	218
Fayette County WCID Monument Hill	0.45	1	$5,000	$600	812	792
Fayette WSC East	0.001	9	$1,000	$2,600	348	304
Fayette WSC West	0.12	66	$124,000	$19,900	345	235
Flatonia	0.02	1	$18,000	$1,700	806	793
Fredericksburg	0.19	18	$124,000	$13,400	801	794
Garfield WSC	0.01	1	$15,000	$1,300	374	194
Goldthwaite	0.02	134	$26,000	$63,500	498	489
Granite Shoals	0.12	4	$97,000	$7,800	721	205
Hays	0.02	4	$17,000	$1,500	244	200
Hays County WCID 1	0.04	56	$60,000	$23,300	506	486
Hays County WCID 2	0.03	21	$46,000	$7,900	780	765
Headwaters at Barton Creek	0.01	2	$9,000	$900	1204	289
Hornsby Bend Utility	0.05	11	$81,000	$8,200	1342	405
Horseshoe Bay	0.08	15	$78,000	$8,800	800	796
Hurst Creek MUD	0.11	29	$164,000	$19,200	804	780
Johnson City	0.02	65	$36,000	$28,300	445	358
Jonestown WSC	0.10	11	$102,000	$8,700	541	496
Kelly Lane WCID 1	0.05	2	$6,000	$1,100	503	498
Kelly Lane WCID 2	0.02	6	$8,000	$1,900	258	216
Kingsland WSC	0.01	9	$15,000	$2,800	268	208
La Grange	0.03	4	$44,000	$4,300	517	496
La Ventana WSC	0.004	1	$5,000	$600	527	488
Lago Vista	0.20	59	$206,000	$23,500	800	794
Lakeside MUD 3	0.06	7	$7,000	$2,000	215	202
Lakeside WCID 1	0.02	2	$4,000	$700	186	318
Lakeside WCID 2-B	0.05	4	$54,000	$4,600	535	497
Lakeside WCID 2-C	0.04	8	$8,000	$2,300	457	298
Lakeside WCID 2-D	0.15	9	$8,000	$2,700	208	202
Lakeway MUD	0.15	246	$232,000	$105,800	757	732
Llano	0.06	4	$40,000	$4,000	804	793

Table 5.8 Municipal Conservation – Water Loss Mitigation Cost

WUG	Pipe Length (Miles)	Maximum Water Reduction (ac ft)	Water Loss Mitigation Capital Cost	Largest Annual Cost	2040 Unit Conservation Cost* ($/ac ft)	2050 2080 Unit Conservation Cost** ($/ac ft)
Loop 360 WSC	0.14	13	$206,000	$17,800	834	788
Manor	0.28	83	$429,000	$39,500	520	493
Manville WSC	0.41	741	$424,000	$222,300	331	251
Marble Falls	0.12	50	$128,000	$20,200	792	787
Markham MUD	0.002	0.3	$4,000	$400	296	84
Matagorda County WCID 6	0.01	0.5	$9,000	$800	421	223
Matagorda Waste Disposal & WSC	0.01	0.3	$6,000	$500	494	508
Meadowlakes	0.08	4	$77,000	$6,400	814	795
Mid-Tex Utilities	0.02	93	$23,000	$34,300	429	370
North Austin MUD 1	0.10	5	$100,000	$8,500	575	210
North San Saba WSC	0.02	1	$16,000	$1,300	814	799
Northtown MUD	0.05	4	$56,000	$5,000	1431	301
Palacios	0.03	47	$50,000	$17,200	466	369
Pflugerville	1.19	864	$1,810,000	$259,200	289	217
Rancho Del Lago	0.02	1	$16,000	$1,300	821	796
Reunion Ranch WCID	0.04	7	$41,000	$3,600	816	793
Richland SUD	0.02	60	$19,000	$27,500	488	460
Rollingwood	0.10	5	$148,000	$11,400	880	786
Rough Hollow in Travis County	0.02	6	$7,000	$2,300	499	496
Ruby Ranch WSC	0.01	1	$5,000	$600	225	202
San Saba	0.07	5	$31,000	$3,700	800	795
Schulenburg	0.09	28	$141,000	$16,700	553	477
Senna Hills MUD	0.04	2	$38,000	$3,100	819	794
Shady Hollow MUD	0.07	3	$69,000	$5,700	542	497
Smithville	0.07	5	$72,000	$6,100	551	495
Sunrise Beach Village	0.01	0.4	$7,000	$600	384	225
Sunset Valley	0.02	40	$31,000	$15,600	697	693
Sweetwater Community	0.07	4	$72,000	$6,300	262	203
The Colony MUD 1A	0.01	3	$4,000	$1,000	795	796
Travis County MUD 10	0.09	1	$4,000	$500	494	497
Travis County MUD 14	0.02	90	$28,000	$39,100	482	435
Travis County MUD 18	0.01	1	$6,000	$800	513	493
Travis County MUD 2	0.05	6	$56,000	$5,000	321	206
Travis County MUD 4	0.08	19	$88,000	$9,800	801	796
Travis County WCID 10	0.52	23	$261,000	$23,900	807	795
Travis County WCID 17	1.89	248	$2,866,000	$241,600	832	790
Travis County WCID 18	0.10	5	$108,000	$9,000	549	495

Table 5.8 Municipal Conservation – Water Loss Mitigation Cost

WUG	Pipe Length (Miles)	Maximum Water Reduction (ac ft)	Water Loss Mitigation Capital Cost	Largest Annual Cost	2040 Unit Conservation Cost* ($/ac ft)	2050 2080 Unit Conservation Cost** ($/ac ft)
Travis County WCID 19	0.01	15	$16,000	$6,900	772	773
Travis County WCID 20	0.08	49	$80,000	$21,100	767	757
Travis County WCID Point Venture	0.01	5	$8,000	$1,600	795	793
Undine Development	0.02	1	$17,000	$1,400	834	794
Weimar	0.05	2	$52,000	$4,300	826	794
Wells Branch MUD	0.01	8	$3,000	$2,600	333	303
West Travis County Public Utility Agency	1.61	3,444	$2,235,000	$1,541,600	780	760
Wharton	0.17	7	$182,000	$15,100	555	496
Wharton County WCID 2	0.04	2	$37,000	$3,100	538	499
Wilbarger Creek MUD 1	0.01	252	$20,000	$114,800	470	455
Windermere Utility	0.19	101	$289,000	$45,400	516	470

** Representative for capital repayment phase.*

*** Representative for the O&M phase.*

Water Use Reduction Strategies

For those WUGs whose water loss mitigation strategy alone is not sufficient to meet the GPCD goals, the RWPG also identifies the three sets of water use reduction strategies to close the gaps.

- 0 –20% (unit cost: $200/ac-ft)
  - **Public Outreach and School Education:** Programs aimed at raising awareness and educating the public and students about water conservation practices.
  - **Water Conservation Pricing**: Implementing tier-rate pricing strategies to encourage reduced water usage through financial incentives.
  - **Time of Day Irrigation**: Restricting irrigation to specific times of the day to minimize water loss due to evaporation.
  - **Water Waste Prohibition**: Enforcing regulations to prevent wasteful water practices.
- 20-40% (unit cost: $500/ac-ft)
  - **Twice Weekly Irrigation**: Limiting irrigation to twice a week to reduce water consumption.
  - **High Volume Irrigation / User Audits**: Conducting audits for high-volume water users to identify and implement conservation measures.
  - **Residential Usage Review:** Reviewing residential usage to identify conservation opportunities.
  - **Landscape Ordinance for New Developments**: Implementing ordinances for new developments to ensure water-efficient landscaping (required for populations over 20,000 as per TX Local Government Code 401.006).
  - **Water Conservation Coordinator**: Appointing a coordinator to oversee and promote water conservation efforts in larger WUGs with populations over 10,000.
- Greater than 40% (unit cost: $800/ac-ft)
  - **Landscape Conversion**: Converting turf grass to more water-efficient or drought tolerant landscapes that do not require supplemental water to significantly reduce water usage.
  - **Existing Conservation**: Continuing and enhancing conservation efforts for WUGs whose current water use is already significantly lower than their baselines.

Table 5.9 Estimated Savings from Water Use Reduction Strategy by WUGs

WUG	Water Use Reduction Savings (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Aqua WSC	989	1,900	3,365	4,589	6,125	8,010
Austin	3,700	7,400	10,200	12,900	15,700	18,400
Barton Creek West WSC	76	142	169	194	216	236
Barton Creek WSC	73	135	196	258	318	377
Bastrop	191	455	682	966	1,238	1,563
Bastrop County WCID 2	3	9	11	13	16	19
Bay City	330	19	0	0	0	0
Bertram	204	355	534	770	981	1,230
Blanco	10	20	25	29	32	36
Boling MWD	1.6	3.3	3.4	3.4	3.1	2.5
Briarcliff	22	54	77	104	137	176
Buda	674	1,031	1,331	1,659	2,055	2,443
Burnet	279	422	562	648	740	812
Caney Creek MUD of Matagorda County	15	19	24	30	36	43
Cimarron Park Water	5	7	9	12	14	16
Columbus	178	329	396	455	508	529
Cottonwood Creek MUD 1	0.000*	0.000	0.000	0.000	0.000	0.000
Cottonwood Shores	27	46	66	89	108	129
County-Other, Bastrop	94	200	294	435	726	1,200
County-Other, Blanco	18	38	56	60	64	66
County-Other, Burnet	88	153	218	296	388	502
County-Other, Colorado	28	60	88	97	105	111
County-Other, Fayette	12.2	21.3	24.0	23.7	18.1	6.4
County-Other, Gillespie	41	64	89	120	156	198
County-Other, Llano	2.8	6.6	8.2	9.1	8.2	5.2
County-Other, Matagorda	4.9	11.9	15.9	16.6	13.4	5.8
County-Other, Mills	5	9	11	13	12	11
County-Other, San Saba	8	14	17	17	15	12
County-Other, Travis	482	976	1,192	1,150	1,303	1,477
County-Other, Wharton	38	81	124	165	205	243
Creedmoor-Maha WSC	111	138	156	174	194	218
Cypress Ranch WCID 1	0.9	2.7	4.4	6.0	7.7	9.4
Dripping Springs WSC	263	526	981	1,440	1,573	1,703
Eagle Lake	18	25	29	33	35	36
Elgin	85	179	331	556	748	894
Fayette County WCID Monument Hill	25	35	43	51	55	58
Fayette WSC East	0.004	0.000	0.000	0.000	0.000	0.000
Fayette WSC West	44	49	68	103	142	185
Flatonia	127	128	127	128	128	129

Table 5.9 Estimated Savings from Water Use Reduction Strategy by WUGs

WUG	Water Use Reduction Savings (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Fredericksburg	688	937	1,172	1,405	1,546	1,698
Garfield WSC	3	5	7	9	12	14
Goldthwaite	81	106	147	179	207	233
Granite Shoals	4	10	17	24	32	40
Hays	7	21	37	62	94	135
Hays County WCID 1	136	171	213	239	264	276
Hays County WCID 2	139	190	239	264	288	311
Headwaters at Barton Creek	0.000	0.000	0.000	0.000	0.000	0.000
Hornsby Bend Utility	0.000	0.000	0.000	0.000	0.000	0.000
Horseshoe Bay	1,170	1,329	1,462	1,667	1,853	2,061
Hurst Creek MUD	206	364	497	611	660	705
Johnson City	19	9	11	27	36	46
Jonestown WSC	81	142	222	325	424	548
Kelly Lane WCID 1	52	91	109	127	143	151
Kelly Lane WCID 2	3	10	20	33	49	69
Kingsland WSC	5	16	30	48	72	101
La Grange	74	107	136	165	179	191
La Ventana WSC	15	21	27	30	32	35
Lago Vista	738	1,560	2,787	4,242	4,789	5,350
Lakeside MUD 3	25	50	80	117	162	219
Lakeside WCID 1	1.9	2.3	2.6	2.9	3.2	3.6
Lakeside WCID 2-B	49	100	154	191	234	272
Lakeside WCID 2-C	0.000	0.000	0.000	0.000	0.000	0.000
Lakeside WCID 2-D	36	91	137	191	257	339
Lakeway MUD	1,003	997	1,027	1,064	1,100	1,136
Llano	124	190	252	306	330	354
Loop 360 WSC	164	288	388	473	540	566
Manor	868	1,160	1,412	1,668	1,960	2,292
Manville WSC	114	158	312	496	721	996
Marble Falls	763	1,290	1,580	1,854	1,981	2,102
Markham MUD	0.4	1.0	1.0	0.9	0.9	0.8
Matagorda County WCID 6	0.5	1.4	2.2	3.0	3.6	4.0
Matagorda Waste Disposal & WSC	5	9	10	12	12	12
Meadowlakes	115	226	285	347	412	462
Mid-Tex Utilities	3	0	0	0	0	0
North Austin MUD 1	5	15	25	34	43	53
North San Saba WSC	23	39	44	48	49	48
Northtown MUD	0.000	0.000	0.000	0.000	0.000	0.000
Palacios	0.000	0.000	0.000	0.000	0.000	0.000

Table 5.9 Estimated Savings from Water Use Reduction Strategy by WUGs

WUG	Water Use Reduction Savings (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Pflugerville	848	1,472	2,313	3,054	3,946	5,015
Rancho Del Lago	27	37	45	52	54	56
Reunion Ranch WCID	67	131	227	370	520	703
Richland SUD	12	0	0	0	0	0
Rollingwood	74	104	133	162	189	205
Rough Hollow in Travis County	110	213	306	349	390	429
Ruby Ranch WSC	3	6	10	13	16	17
San Saba	186	339	464	518	566	588
Schulenburg	57	99	143	189	210	231
Senna Hills MUD	54	101	142	162	181	193
Shady Hollow MUD	55	107	133	160	176	192
Smithville	58	91	128	170	201	237
Sunrise Beach Village	0.4	1.2	2.0	2.7	3.6	4.4
Sunset Valley	44	66	91	105	119	131
Sweetwater Community	29	77	96	114	132	149
The Colony MUD 1A	42	95	147	212	291	387
Travis County MUD 10	9	25	43	58	76	98
Travis County MUD 14	0.000	0.000	0.000	0.000	0.000	0.000
Travis County MUD 18	26	36	40	45	49	54
Travis County MUD 2	11	31	55	85	108	135
Travis County MUD 4	363	786	1,220	1,663	2,136	2,524
Travis County WCID 10	626	1,221	1,766	2,276	2,598	2,942
Travis County WCID 17	3,106	4,781	6,594	8,076	9,808	11,825
Travis County WCID 18	85	125	163	181	198	216
Travis County WCID 19	52	92	127	161	189	213
Travis County WCID 20	127	215	295	370	431	457
Travis County WCID Point Venture	75	129	198	286	372	480
Undine Development	25	36	45	54	58	62
Weimar	93	121	130	139	145	149
Wells Branch MUD	0.000	0.000	0.000	0.000	0.000	0.000
West Travis County Public Utility Agency	7,111	9,835	13,282	17,461	22,392	27,716
Wharton	140	205	258	303	315	323
Wharton County WCID 2	28	54	74	80	84	81
Wilbarger Creek MUD 1	0.000	0.000	0.000	0.000	0.000	0.000
Windermere Utility	294	371	404	461	517	571
Total	**28,540**	**45,402**	**63,046**	**80,747**	**98,570**	**117,728**

*0.000 indicates that water use reduction strategy is not needed to meet the GPCD goals for these WUGs as presented in Table 5.6.

Table 5.10 Municipal Conservation – Water Use Reduction Cost

WUG	Unit Cost ($/ac ft)	Max Yield (ac ft)	Total Annual Cost		
			2030	2040	2080
Aqua WSC	$500	8,010	$494,000	$950,000	$4,005,000
Austin	See Section 5.2.2.2 for City of Austin's conservation data.				
Barton Creek West WSC	$800	236	$61,000	$114,000	$189,000
Barton Creek WSC	$800	377	$58,000	$108,000	$302,000
Bastrop	$500	1,563	$96,000	$228,000	$781,000
Bastrop County WCID 2	$200	19	$1,000	$2,000	$4,000
Bay City	$200	330	$66,000	$4,000	$0
Bertram	$800	1,230	$163,000	$284,000	$984,000
Blanco	$200	36	$2,000	$4,000	$7,000
Boling MWD	$200	3	$0	$1,000	$0
Briarcliff	$200	176	$4,000	$11,000	$35,000
Buda	$500	2,443	$337,000	$516,000	$1,222,000
Burnet	$800	812	$223,000	$338,000	$650,000
Caney Creek MUD of Matagorda County	$200	43	$3,000	$4,000	$9,000
Cimarron Park Water	$200	16	$1,000	$1,000	$3,000
Columbus	$800	529	$142,000	$263,000	$424,000
Cottonwood Creek MUD 1	$200	0	$0	$0	$0
Cottonwood Shores	$500	129	$14,000	$23,000	$65,000
County-Other, Bastrop	$500	1,200	$47,000	$100,000	$600,000
County-Other, Blanco	$200	66	$4,000	$8,000	$13,000
County-Other, Burnet	$200	502	$18,000	$31,000	$100,000
County-Other, Colorado	$200	111	$6,000	$12,000	$22,000
County-Other, Fayette	$200	24	$2,000	$4,000	$1,000
County-Other, Gillespie	$200	198	$8,000	$13,000	$40,000
County-Other, Llano	$200	9	$1,000	$1,000	$1,000
County-Other, Matagorda	$200	17	$1,000	$2,000	$1,000
County-Other, Mills	$200	13	$1,000	$2,000	$2,000
County-Other, San Saba	$200	17	$2,000	$3,000	$2,000
County-Other, Travis	$200	1,477	$96,000	$195,000	$295,000
County-Other, Wharton	$200	243	$8,000	$16,000	$49,000
Creedmoor-Maha WSC	$200	218	$23,000	$27,000	$44,000
Cypress Ranch WCID 1	$200	9	$0	$1,000	$2,000
Dripping Springs WSC	$500	1,703	$132,000	$263,000	$851,000
Eagle Lake	$200	36	$4,000	$5,000	$7,000
Elgin	$200	894	$17,000	$35,000	$178,000
Fayette County WCID Monument Hill	$800	58	$20,000	$28,000	$46,000
Fayette WSC East	$200	0	$0	$0	$0
Fayette WSC West	$200	185	$9,000	$10,000	$37,000
Flatonia	$800	129	$102,000	$103,000	$103,000
Fredericksburg	$800	1,698	$550,000	$749,000	$1,358,000

Table 5.10 Municipal Conservation – Water Use Reduction Cost

WUG	Unit Cost ($/ac ft)	Max Yield (ac ft)	Total Annual Cost		
			2030	2040	2080
Garfield WSC	$200	14	$1,000	$1,000	$3,000
Goldthwaite	$500	233	$40,000	$53,000	$117,000
Granite Shoals	$200	40	$1,000	$2,000	$8,000
Hays	$200	135	$1,000	$4,000	$27,000
Hays County WCID 1	$500	276	$68,000	$86,000	$138,000
Hays County WCID 2	$800	311	$111,000	$152,000	$249,000
Headwaters at Barton Creek	$200	0	$0	$0	$0
Hornsby Bend Utility	$200	0	$0	$0	$0
Horseshoe Bay	$800	2,061	$935,000	$1,064,000	$1,649,000
Hurst Creek MUD	$800	705	$165,000	$291,000	$564,000
Johnson City	$200	46	$4,000	$2,000	$9,000
Jonestown WSC	$500	548	$40,000	$71,000	$274,000
Kelly Lane WCID 1	$500	151	$26,000	$46,000	$76,000
Kelly Lane WCID 2	$200	69	$1,000	$2,000	$14,000
Kingsland WSC	$200	101	$1,000	$3,000	$20,000
La Grange	$500	191	$37,000	$53,000	$96,000
La Ventana WSC	$500	35	$8,000	$11,000	$17,000
Lago Vista	$800	5,350	$591,000	$1,248,000	$4,280,000
Lakeside MUD 3	$200	219	$5,000	$10,000	$44,000
Lakeside WCID 1	$200	4	$0	$0	$1,000
Lakeside WCID 2-B	$500	272	$25,000	$50,000	$136,000
Lakeside WCID 2-C	$200	0	$0	$0	$0
Lakeside WCID 2-D	$200	339	$7,000	$18,000	$68,000
Lakeway MUD	$800	1,136	$802,000	$798,000	$909,000
Llano	$800	354	$99,000	$152,000	$283,000
Loop 360 WSC	$800	566	$131,000	$230,000	$453,000
Manor	$500	2,292	$434,000	$580,000	$1,146,000
Manville WSC	$200	996	$23,000	$32,000	$199,000
Marble Falls	$800	2,102	$611,000	$1,032,000	$1,681,000
Markham MUD	$200	1	$0	$0	$0
Matagorda County WCID 6	$200	4	$0	$0	$1,000
Matagorda Waste Disposal & WSC	$500	12	$2,000	$4,000	$6,000
Meadowlakes	$800	462	$92,000	$180,000	$369,000
Mid-Tex Utilities	$200	3	$0	$0	$0
North Austin MUD 1	$200	53	$1,000	$3,000	$11,000
North San Saba WSC	$800	49	$18,000	$31,000	$39,000
Northtown MUD	$200	0	$0	$0	$0
Palacios	$200	0	$0	$0	$0
Pflugerville	$200	5,015	$170,000	$294,000	$1,003,000
Rancho Del Lago	$800	56	$22,000	$30,000	$45,000

Table 5.10 Municipal Conservation – Water Use Reduction Cost

WUG	Unit Cost ($/ac ft)	Max Yield (ac ft)	Total Annual Cost		
			2030	2040	2080
Reunion Ranch WCID	$800	703	$54,000	$105,000	$562,000
Richland SUD	$200	12	$2,000	$0	$0
Rollingwood	$800	205	$59,000	$83,000	$164,000
Rough Hollow in Travis County	$500	429	$55,000	$107,000	$214,000
Ruby Ranch WSC	$200	17	$1,000	$1,000	$3,000
San Saba	$800	588	$149,000	$272,000	$471,000
Schulenburg	$500	231	$29,000	$50,000	$115,000
Senna Hills MUD	$800	193	$43,000	$81,000	$154,000
Shady Hollow MUD	$500	192	$27,000	$54,000	$96,000
Smithville	$500	237	$29,000	$46,000	$118,000
Sunrise Beach Village	$200	4	$0	$0	$1,000
Sunset Valley	$800	131	$35,000	$53,000	$105,000
Sweetwater Community	$200	149	$6,000	$15,000	$30,000
The Colony MUD 1A	$800	387	$33,000	$76,000	$309,000
Travis County MUD 10	$500	98	$5,000	$12,000	$49,000
Travis County MUD 14	$200	0	$0	$0	$0
Travis County MUD 18	$500	54	$13,000	$18,000	$27,000
Travis County MUD 2	$200	135	$2,000	$6,000	$27,000
Travis County MUD 4	$800	2,524	$291,000	$629,000	$2,020,000
Travis County WCID 10	$800	2,942	$501,000	$977,000	$2,353,000
Travis County WCID 17	$800	11,825	$2,485,000	$3,825,000	$9,460,000
Travis County WCID 18	$500	216	$42,000	$62,000	$108,000
Travis County WCID 19	$800	213	$42,000	$73,000	$171,000
Travis County WCID 20	$800	457	$102,000	$172,000	$366,000
Travis County WCID Point Venture	$800	480	$60,000	$103,000	$384,000
Undine Development	$800	62	$20,000	$29,000	$50,000
Weimar	$800	149	$75,000	$97,000	$120,000
Wells Branch MUD	$200	0	$0	$0	$0
West Travis County Public Utility Agency	$800	27,716	$5,689,000	$7,868,000	$22,173,000
Wharton	$500	323	$70,000	$103,000	$161,000
Wharton County WCID 2	$500	84	$14,000	$27,000	$41,000
Wilbarger Creek MUD 1	$200	0	$0	$0	$0
Windermere Utility	$500	571	$147,000	$185,000	$285,000

Note: The WUGs with zero max yield and zero cost suggest that either they have a baseline GPCD <80 GPCD such that additional advance water conservation is recommended by LCRWPG or they have met their GPCD goals after the water loss mitigation strategies.

Region K encourages the TWDB to provide funding for all types of conservation measures for WUGs and wholesale water providers within Region K and around the state. The Texas Water Conservation Advisory Council provides ongoing development and updates of many conservation measures – or best management practices (BMPs) – that can meet a WUG's water conservation strategy. More information can be found at the Council's website www.savetexaswater.org.

Table 5.11 shows total conservation water savings from both water loss mitigation and water use reduction strategies.

Table 5.11 Municipal Conservation Yield

WUG	Water Management Strategies (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Aqua WSC	1,060	1,987	3,472	4,718	6,279	8,191
Austin	6,500	14,900	19,600	24,200	28,900	33,400
Barton Creek West WSC	78	144	171	196	218	239
Barton Creek WSC	77	150	217	280	341	402
Bastrop	202	468	697	985	1,260	1,590
Bastrop County WCID 2	5	12	15	18	21	25
Bay City	511	561	725	727	728	728
Bertram	214	393	595	842	1,066	1,330
Blanco	11	21	26	30	33	37
Boling MWD	2	4	4	4	3	3
Briarcliff	24	57	81	108	141	181
Buda	690	1,054	1,358	1,690	2,091	2,485
Burnet	287	430	571	656	749	822
Caney Creek MUD of Matagorda County	17	21	26	31	38	45
Cimarron Park Water	6	8	11	13	15	17
Columbus	183	334	401	460	513	534
Cottonwood Creek MUD 1	2	2	2	2	2	2
Cottonwood Shores	29	48	68	91	110	132
County-Other, Bastrop	100	206	300	443	740	1,220
County-Other, Blanco	22	42	60	64	68	70
County-Other, Burnet	98	161	227	306	401	516
County-Other, Colorado	35	66	95	103	111	117
County-Other, Fayette	15	24	26	25	19	7
County-Other, Gillespie	50	74	100	132	169	212
County-Other, Llano	5	9	10	10	9	6
County-Other, Matagorda	9	16	19	19	15	6
County-Other, Mills	6	10	12	14	13	11
County-Other, San Saba	9	15	18	17	16	12
County-Other, Travis	535	1,046	1,257	1,200	1,351	1,524
County-Other, Wharton	47	90	133	174	214	252
Creedmoor-Maha WSC	115	142	161	179	201	225
Cypress Ranch WCID 1	2	4	5	7	9	10
Dripping Springs WSC	275	577	1,081	1,558	1,692	1,821
Eagle Lake	20	27	31	35	37	37

Table 5.11 Municipal Conservation Yield

WUG	Water Management Strategies (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Elgin	98	237	433	684	885	1,031
Fayette County WCID Monument Hill	25	35	44	52	55	59
Fayette WSC East	0.4	2	4	5	7	9
Fayette WSC West	55	87	122	160	203	251
Flatonia	128	130	128	129	130	130
Fredericksburg	703	952	1,188	1,422	1,564	1,715
Garfield WSC	4	6	8	10	13	15
Goldthwaite	114	206	281	313	341	367
Granite Shoals	7	14	21	28	36	44
Hays	8	23	39	64	97	139
Hays County WCID 1	150	213	269	295	320	332
Hays County WCID 2	144	205	260	285	309	332
Headwaters at Barton Creek	1	1	1	1	2	2
Hornsby Bend Utility	5	6	7	8	9	11
Horseshoe Bay	1,180	1,340	1,474	1,680	1,866	2,076
Hurst Creek MUD	214	386	526	641	689	734
Johnson City	31	48	66	85	97	111
Jonestown WSC	85	147	228	333	433	558
Kelly Lane WCID 1	54	94	112	129	145	153
Kelly Lane WCID 2	5	13	24	37	54	76
Kingsland WSC	9	21	36	55	80	111
La Grange	78	111	140	169	182	195
La Ventana WSC	16	22	28	30	33	36
Lago Vista	759	1,590	2,830	4,296	4,845	5,410
Lakeside MUD 3	27	53	84	121	168	226
Lakeside WCID 1	3	4	4	5	5	6
Lakeside WCID 2-B	52	102	157	194	238	275
Lakeside WCID 2-C	3	4	5	5	6	8
Lakeside WCID 2-D	40	96	143	198	265	348
Lakeway MUD	1,062	1,179	1,272	1,309	1,346	1,381
Llano	128	194	256	310	334	358
Loop 360 WSC	167	297	401	485	553	578
Manor	876	1,191	1,463	1,728	2,031	2,374
Manville WSC	199	475	808	1,064	1,370	1,737
Marble Falls	773	1,328	1,630	1,903	2,030	2,151
Markham MUD	1	1	1	1	1	1
Matagorda County WCID 6	1	2	3	3	4	4
Matagorda Waste Disposal & WSC	5	9	11	12	12	12
Meadowlakes	118	229	289	351	417	466
Mid-Tex Utilities	10	28	48	61	76	93

Table 5.11 Municipal Conservation Yield

WUG	Water Management Strategies (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
North Austin MUD 1	10	20	30	39	48	58
North San Saba WSC	24	40	44	49	49	49
Northtown MUD	3	3	4	4	4	4
Palacios	13	36	47	44	42	39
Pflugerville	945	1,839	2,889	3,714	4,701	5,878
Rancho Del Lago	28	38	46	53	55	57
Reunion Ranch WCID	69	133	230	374	526	711
Richland SUD	28	47	60	57	57	58
Rollingwood	75	107	137	166	194	210
Rough Hollow in Travis County	116	219	312	355	396	435
Ruby Ranch WSC	4	7	10	14	17	18
San Saba	191	345	469	523	571	593
Schulenburg	64	121	171	217	239	259
Senna Hills MUD	56	103	143	163	183	194
Shady Hollow MUD	57	110	136	163	179	195
Smithville	61	94	132	174	205	241
Sunrise Beach Village	1	2	2	3	4	5
Sunset Valley	53	96	130	145	158	171
Sweetwater Community	32	81	100	118	136	154
The Colony MUD 1A	43	96	149	214	294	390
Travis County MUD 10	10	25	44	59	78	100
Travis County MUD 14	12	42	63	71	80	90
Travis County MUD 18	27	37	41	46	51	55
Travis County MUD 2	14	34	60	90	113	141
Travis County MUD 4	373	798	1,233	1,679	2,153	2,543
Travis County WCID 10	643	1,240	1,785	2,296	2,620	2,965
Travis County WCID 17	3,136	4,889	6,762	8,268	10,026	12,074
Travis County WCID 18	89	129	167	185	203	220
Travis County WCID 19	56	102	142	175	204	228
Travis County WCID 20	139	252	343	419	480	506
Travis County WCID Point Venture	77	131	201	289	376	485
Undine Development	26	36	46	55	59	63
Weimar	95	123	132	141	147	151
Wells Branch MUD	7	8	8	8	8	8
West Travis County Public Utility Agency	7,375	10,899	15,094	19,751	25,222	31,161
Wharton	148	212	265	310	322	329
Wharton County WCID 2	30	56	75	81	85	82
Wilbarger Creek MUD 1	21	89	149	179	214	252
Windermere Utility	319	447	505	562	618	672
Total	**29,720**	**47,061**	**65,576**	**83,249**	**101,193**	**120,702**

Environmental Considerations

Conservation has potential impacts for WUGs that are served by groundwater. Communities that are served by surface water will divert less water from streams, meaning more water will remain in channels for downstream uses. However, groundwater communities contribute to streamflow by discharging treated groundwater into streams (typically 60 percent of water supplied is discharged following treatment). Conservation measures implemented by these WUGs may lead to an overall decrease in streamflow which is derived from groundwater sources. However, streamflow would not be expected to be decreased if the conservation is in the outdoor irrigation usage sector. Individual WUG implementation has negligible impacts to the region, but full regional implementation could leave up to approximately 40,000 ac-ft/yr in the lakes and aquifers. This additional water would increase storage levels, delay drought triggers, and increase springflows. There are zero anticipated impacts to cultural resources.

Agricultural & Natural Resources Considerations

Zero impacts to agriculture are anticipated (zero acres impacted). Negligible direct impacts to other water resources are expected as a result of implementing this strategy.

5.2.2.4 Irrigation Conservation

There are opportunities for conservation of water in agricultural irrigation. The lower Colorado region is effectively split between two types of irrigation. In the upper counties with irrigation water needs (Burnet, Gillespie, Mills, and San Saba) there two predominant types of crops – orchard and forage, and the water source is mostly groundwater. In the lower three counties (Colorado, Matagorda, and Wharton), the primary crop is rice with some turf and row crops, with the water source being a mix of surface water and groundwater. The water conservation strategies are presented separately between the upper basin and lower basin

5.2.2.4.1 Upper Basin Conservation

In general, the upper basin irrigation water needs are relatively small by comparison to other water needs. The irrigation water needs in the upper basin are summarized in **Table 5.12**.

Table 5.12 Irrigation Needs in the Upper Basin

County	Basin	Irrigation Need 2030 2080 (ac ft/yr)*
Burnet	Brazos	(109)
Gillespie	Colorado	(75)
Mills	Colorado	(3,084)
San Saba	Colorado	(1,300)

** Parentheses in this column indicate demands are less than supplies – unmet need.*

Analysis

To evaluate the total potential conservation, two primary crops were considered for evaluation. The acreage for crops under irrigation was based on the data obtained from the USDA National Agriculture Statistics Service

(NASS) for the year 2022. These data are only collected about every 5 years but provide significant detail about the agricultural use in each county.

One major crop in all four counties is forage, which is typically irrigated with either center pivot or side roll irrigation systems. The consumptive use for forage was estimated at 44.3 inches/yr based on data from the Texas Board of Water Engineers Bulletin 6019. To satisfy this irrigation requirement, systems with an 80% average application efficiency will need to use about 55.35 inches of water per acre. It is proposed that a combination of practices can be implemented to increase the application efficiency to 85%. This reduces the water demand by 3.26 inches for the season. The conservation practices include:

- Changing spray heads from elevated impact spray to medium level drop spays.
- Reducing system operating pressure.
- Eliminating system leaks.
- Monitoring daily evapotranspiration (ET) by monitoring the Texas ET network and scheduling irrigation to match with irrigation system application depth. (https://texaset.tamu.edu/)

Orchards are the second major crop, with this including pecans, peaches, and grapes, which are typically irrigated with drip irrigation systems that also include micro-spray emitters. The same reference was used to estimate the consumptive use for orchards at 37.8 inches/yr. Orchard use is lower than forage use because of the length of the growing season. An orchard primarily needs irrigation before and during the time the fruit is developed and harvested, which may occur in mid-summer. Forage crops will continue to grow and produce hay until the average temperatures begin to slow the growth in the early fall. To satisfy the irrigation requirement, systems with a 90% average application efficiency will need to use about 42.0 inches of water per acre. It is proposed that a combination of practices can be implemented to increase the application efficiency to 95%. This reduces the water demand by 2.21 inches for the season. The conservation practices include:

- Eliminating system leaks.
- Changing emitter or microspray heads to minimize evaporative loss.
- Using soil moisture monitoring devices to schedule and/or shut off irrigation.

The total irrigation conservation volumes for forage and orchards in each county are provided in **Table 5.13**.

Table 5.13 Irrigation Conservation by Crop Type

County	Forage		Orchard		Total Conservation Volume (ac ft/yr)
	Area (acres)	Conservation Volume (ac ft/yr)	Area (acres)	Conservation Volume (ac ft/yr)	
Burnet	1,071	291	-	0	291
Gillespie	439	119	890	164	283
Mills	410	111	2,000	363	474
San Saba	1,579	428	1,990	403	831

Cost Implications of the Proposed Strategy

The cost estimates for implementing the proposed conservation strategies identified above are estimated at:

- $100/acre for forage irrigation system modifications.
- $700/acre for orchard irrigation system modifications.

When these costs are applied to the areas shown in Table 5.13, the resulting total costs for implementation and remaining needs are calculated as shown in **Table 5.14**. The only county with remaining unmet irrigation need is Mills County.

Table 5.14 Upper Basin Irrigation Conservation Cost and Remaining Need

County	Basin	Capital Cost	Unit Cost ($/ac ft)	Remaining Irrigation Need (ac ft/yr)*
Burnet	Brazos	$252,000	$110	182
Gillespie	Colorado	$839,000	$382	208
Mills	Colorado	$1,748,000	$475	(2,610)
San Saba	Colorado	$$2,016,000	$311	468

** Parentheses in this column indicate demands remain less than supplies – unmet need.*

Environmental Considerations

Overall, environmental impacts of implementing these conservation practices are minimal. There will be an environmental benefit in terms of lowered groundwater use in most counties. There are no cultural or historic resource impacts and no impacts on threatened and endangered species.

Agricultural & Natural Resources Considerations

On-farm conservation methods result in a benefit to agriculture in that reducing the total demand for water increases the likelihood that water will be available on a more consistent basis or for more users. In some cases, cost share funding and low-interest loans may help mitigate the costs shown in Table 5.14.

5.2.2.4.2 Lower Basin Conservation

Lower Basin Conservation will largely be driven by conservation in the production of rice. Rice is a fairly high volume water use crop, however, the total annual depth of water applied to rice (feet per year) is not significantly greater than that required for forage crops in the upper basin. This results from the irrigation cessation that occurs to allow for harvesting both the main crop and the ratoon, or second crop, whereas a forage or hay crop will grow continuously for the entire warm season and will require irrigation for the entire period. However, there are many practices that can be adopted to improve water use efficiency on the farm and to minimize water lost from the conveyance system before the water reaches the farm. The evaluation of lower basin conservation practices will be presented separately for on-farm and conveyance practices.

The total lower basin conservation that can be achieved by on-farm and conveyance improvements is provided in **Table 5.15**.

Table 5.15 Lower Basin Estimate of Conservation Water Savings

County	Basin	Estimate of Conservation Water Savings (ac ft/yr)					
		2030	2040	2050	2060	2070	2080
Colorado	Brazos-Colorado	2,614	6,976	6,976	6,976	6,976	6,976
Colorado	Colorado	403	1,074	1,074	1,074	1,074	1,074
Colorado	Lavaca	3,025	8,074	8,074	8,074	8,074	8,074
Matagorda	Brazos-Colorado	2,605	4,600	4,600	4,600	4,600	4,600
Matagorda	Colorado	385	680	680	680	680	680
Matagorda	Colorado-Lavaca	2,683	4,738	4,738	4,738	4,738	4,738
Wharton	Brazos-Colorado	1,795	3,093	3,093	3,093	3,093	3,093
Wharton	Colorado	553	954	954	954	954	954
	Total	**14,063**	**30,190**	**30,190**	**30,190**	**30,190**	**30,190**

The needs remaining after implementing conservation strategies – both on-farm and conveyance system - are provided in **Table 5.16**.

Table 5.16 Lower Basin Needs Remaining after Conservation

County	Basin	Remaining Irrigation Water Needs (ac ft/yr)					
		2030	2040	2050	2060	2070	2080
Colorado	Brazos-Colorado	(11,203)	(5,527)	(4,250)	(3,007)	(1,798)	(622)
Colorado	Colorado	(1,725)	(343)	348	1,020	1,675	2,312
Colorado	Lavaca	(12,967)	(5,566)	(3,276)	(1,048)	1,119	3,228
Matagorda	Brazos-Colorado	(48,846)	(44,842)	(42,887)	(40,985)	(39,134)	(37,333)
Matagorda	Colorado	(7,220)	(6,677)	(6,435)	(6,199)	(5,970)	(5,748)
Matagorda	Colorado-Lavaca	(50,314)	(46,035)	(43,872)	(41,768)	(39,720)	(37,727)
Wharton	Brazos-Colorado	(77,159)	(72,048)	(68,339)	(64,730)	(61,218)	(57,802)
Wharton	Colorado	(23,785)	(21,763)	(20,186)	(18,651)	(17,157)	(15,704)
	Total	**(233,219)**	**(202,800)**	**(188,896)**	**(175,367)**	**(162,202)**	**(149,395)**

Note that parentheses mark remaining need while positive numbers indicate a surplus.

Analysis – On-farm Practices

Significant water conservation can be achieved by implementing a combination of on-farm irrigation practices in the rice growing area. The most beneficial practices include:

- Precision land leveling (also called laser land leveling)
- Permanent levees (field border and any intermediate levees)
- Multiple inlets

At one time, these practices were implemented separately, but it has become increasingly important over time to recognize that the greatest conservation benefit can be achieved by implementing these practices together. It is difficult to evaluate the potential benefit of one practice without also having the other practices in place. At one time, laser leveling was implemented to place a constant slope across the field with small plowed (temporary) intermediate levees on about 0.2-ft increment in elevation between levees. While this system helped manage water depth, it did not prevent the destruction of the levees during a significant rainfall event and loss of water from the field. This precision leveling approach has transitioned to one that involves precision leveling of a field with a small constant slope, but permanent levees are now part of the design. The borders of each zone are significant enough to remain in place through rain events and from year to year with minimal maintenance. In conjunction with the permanent levees, multiple permanent water control structures or multiple inlets are used to facilitate better (faster and more accurate) management of water level changes at intermediate points between zones and along the field borders. Precision leveling with permanent levees and permanent inlets work together as a system that achieves more water conservation than the earlier designs.

It is estimated that almost 90,000 acres were leveled from 2008 to 2022 in Colorado, Matagorda, and Wharton counties. This was done utilizing cost share assistance from the Environmental Quality Incentives Program (EQIP), the Texas State Soil and Water Conservation Board (TSSWCB), the funding from the HB 1437 program administered by LCRA. At 0.46 ac-ft/acre (two crops), the total conservation that could result from all fields in production is as high as 41,400 ac-ft/yr. Usually, only about one third of these fields are in production in a given year, so this is reduced to about 14,000 ac-ft/yr. The NRCS practice life for precision leveled fields is 15 years, so it is unclear whether fields leveled in 2008 would continue to receive credit toward water conservation after 2023, and similarly for succeeding years. LCRA recognized that this was a significant concern and that the NRCS had no program in place to address cost-share assistance for maintaining these fields in compliance with the practice standards or an approach for recertifying these fields. LCRA took the initiative, under HB 1437 funding, to develop and initiate a program for recertification of fields that may be reaching the 15-year practice life. LCRA began a program to cost-share recertification of precision leveled fields in 2025 that can be used to touch up permanently leveled fields and convert fields with temporary levees to permanent levees.

About half of the precision leveled fields are in Colorado County, due to the fact that the Garwood Irrigation Division is more likely to receive irrigation water during curtailment periods. Participation in the precision leveling programs is the lowest in Matagorda County.

The projection of precision land leveling to be implemented in the future for fields that have not previously been precision leveled with permanent levees is based on the EQIP data for the three-year period 2020-2022. During this period, there were no fields leveled using HB 1437 cost-share funds. Since LCRA has begun implementing the recertification process for previously leveled fields, it is assumed that most of the future fields to be completed under HB 1437 cost-share will be evaluated to achieve recertification and maintain the levels of conservation that were previously established under the program. Therefore, it is assumed that most of the precision leveling funded by EQIP will be in areas irrigated with groundwater, since most of the precision leveling implemented in the LCRA irrigation divisions has been and will continue to be partially funded under HB 1437. It is further assumed that precision leveling will continue at the current average rate for the next 15 years. This results in the following:

- Colorado County – 2,200 acre/yr and 33,000 acres leveled in 15 years.
- Matagorda County – 945 acres/yr and 14,175 acres leveled in 15 years.
- Wharton County – 370 acres/yr and 5,500 acres leveled in 15 years.

Cost Implications – On-farm Practices

Based on information obtained from EQIP records along with information from LCRA records, it is estimated that the current average cost of precision leveling is $500/acre. With savings of 0.36 ac-ft per acre leveled, the amortized (15-year life) unit cost is $119/ac-ft.

For multiple inlets, the costs vary from $600 per structure to a high of $1,500/structure for a 24-inch inlet. The exact number of structures required will vary from field to field depending upon size, shape, and slope. A 100-acre field may include one or two large inlet structures and about 10 internal levee structures. An average cost allowance of $1,500 for inlet structures for each 10-acre field will provide for inlet structures to be installed along with precision leveling and permanent levees. The amortized (15-year life) unit cost is $1,300/ac-ft.

When precision leveling is combined with multiple inlets to achieve 0.46 ac-ft/ac savings, the total cost averages $650/acre, and the amortized unit cost results in $123/ac-ft of water saved. The estimated total costs for on-farm conservation improvements are shown in **Table 5.17**.

Table 5.17 Cost for On-farm Conservation Improvements

County	Basin	Total Facilities Cost	Total Project Costs	Largest Annual Cost	Unit Cost ($/ac ft)
Colorado	Brazos-Colorado	$6,100,143	$6,100,143	$559,000	$123
Colorado	Colorado	$1,895,543	$1,895,543	$124,000	$123
Colorado	Lavaca	$7,656,805	$7,656,805	$646,995	$123
Matagorda	Brazos-Colorado	$17,846,571	$17,846,571	$255,670	$123
Matagorda	Colorado	$146,964	$146,964	$37,791	$123
Matagorda	Colorado-Lavaca	$17,514,606	$17,514,606	$263,352	$123
Wharton	Brazos-Colorado	$14,862,921	$14,862,921	$166,299	$123
Wharton	Colorado	$6,774,447	$6,774,447	$51,263	$123

Analysis – Conveyance Practices

Through the HB 1437 program, the LCRA staff has completed several conveyance system improvement projects. The completed projects include:

- Garwood Agricultural Division – Measurement Project. The project rehabilitated about 400 water measurement and check structures on existing canals and filed laterals. An additional 85 miles of canal laterals were rehabilitated. In 2023, this project was estimated to save 6,604 ac-ft of water.

- Gulf Coast Agricultural Division - Gate Rehabilitation and Control Project. From 2011 to 2019, 57 gates on the canal system were rehabilitated with the addition of remote control and monitoring through a supervisory control and data acquisition system (SCADA). This project was projected to save 4,840 ac-ft/yr. In 2023, with only industrial customers served, overflows from the canal system were reduced by an estimated 3,569 ac-ft.

- Garwood Agricultural Division – Gate Automation Project. From 2019 to 2013, 46 main canal gates were rehabilitated and automated through connection to the SCADA system. This system saved an estimated 2,700 ac-ft of water in 2023.

Additional projects have been studied and proposed for implementation under the HB 1437 program. The newest projects include:

- Lakeside Agricultural Division - Gate Automation Project. A prototype gate design was installed in 2024 to serve as the model for implementing control and automation of the major gates in the lakeside system. This project is estimated to cost $1,500,000. The long term unit cost of this project is $54/ac-ft.

- Gulf Coast Agricultural Division – Canal Lining Project. A study was performed in 2024 to evaluate the potential for lining the canals that convey water year round to industrial customer. An approach was evaluated that included using a bentonite clay layer to minimize seepage losses. Using the TWDB cost model approach this project was estimated to cost $5,568.000, and it would save an estimated 3,500 ac-ft/yr. The long-term unit cost for this project would be $68.12/ac-ft.

Cost Implications – Conveyance Practices

The overall summary of costs for the conveyance system proposed projects is provided in **Table 5.18**.

Table 5.18 Cost for Conveyance System Projects

Project	Total Project Cost	Largest Annual Cost	O&M Cost
Lakeside Gate Automation	$1,500,000	$136,000	$30,000
Gulf Coast Canal Lining	$5,568,000	$238,408	$32,000

Environmental Impact

There are no environmental impacts associated with either on-farm conservation practices or conveyance practices. These is minimal reduction in downstream flows below the ends of the canal systems, but this reduction in flow returns the drainage features to a more natural hydrologic regime than existed because of canal spills. Ther are no impacts on cultural or historic resources that result from irrigation conservation. There are also no impacts on threatened or endangered species that result from conservation.

Agricultural & Natural Resources Considerations

On-farm conservation and irrigation system conveyance improvements have the potential to benefit agriculture in that, by reducing the demand for water overall, these practices increase the likelihood that demands for water could be met on a more consistent basis. The objective of no net loss to or minimizing the impact to farmers for export of water out of the basin is the primary objective of the HB 1437 program. So far, that program has produced greater conservation savings than the volume of water exported out of the basin upstream.

5.2.3 Major Water Provider Management Strategies

There are two Major Water Providers, as defined by the State planning process in Region K: LCRA and Austin. Austin is also a water customer of LCRA, and together they supply a large portion of Region K's water needs for multiple beneficial purposes.

5.2.3.1 LCRA Water Management Strategies

LCRA holds surface water rights to over 2.1 million ac-ft of water in the Colorado River Basin, groundwater permits for industrial use, and rights to develop groundwater in Bastrop County. Combined, LCRA's surface water rights authorize every beneficial purpose of use and help meet certain environmental flow needs. LCRA is authorized by the Texas Legislature to develop water supply to be made available throughout its service area. LCRA supplies water for municipal, agricultural, manufacturing, steam electric, mining, and other water uses. LCRA currently has contracts to supply water to entities in Bastrop, Burnet, Colorado, Fayette, Gillespie, Hays, Lampasas (Region G), Llano, Mason, Matagorda, San Saba, Travis, Wharton, and Williamson (including the portion of Williamson in Region G) counties.

On the whole, LCRA has no existing firm municipal and industrial water needs in the decade 2030 across their entire system (Table 4.19) or in the upper reaches (Table 4.20). However, as seen in Table 4.21, there are individual WUGs in the upper reaches with needs starting in the 2030 decade. With additional new contracts and recommended contract amendments outlined in this plan compared to LCRA's existing supplies, LCRA's firm water needs are projected to be approximately 11,000 ac-ft/yr in the 2050 decade and increase to 60,000 ac-ft/yr in 2080 as shown in Table 4.21. To meet their projected future firm water needs that result with additional new contracts, LCRA is considering several water management strategies which are described in this section. **Table 5.19** provides a summary of all the recommended strategies related to LCRA as a wholesale water provider. The sections following the table discuss the strategies in more detail.

Table 5.19 Summary of Supply of LCRA Water Management Strategies (ac-ft/yr)

Recommended Strategy*	2030	2040	2050	2060	2070	2080
Lake Bastrop Water Supply Project	0	10,200	10,200	10,200	10,200	10,200
Expanded Use of Groundwater	0	8,000	11,000	14,500	16,000	16,000
Purchase Wholesale Groundwater	0	15,500	15,500	15,500	15,500	14,500
Import Return Flows from Williamson County	0	8,000	10,920	16,380	21,840	25,000
Aquifer Storage and Recovery	0	0	22,000	22,000	22,000	22,000
New Storage Development in the Lower Colorado Basin	0	0	73,000	73,000	73,000	73,000
Seawater Desalination	0	0	0	30,000	30,000	30,000
Downstream Return Flows	0	3,405	3,282	3,673	2,975	4,357
Total	**0**	**42,855**	**143,652**	**183,053**	**188,865**	**191,307**

**All contracts are contingent upon both parties reaching mutually agreeable contract terms. Inclusion in this table does not guarantee water supply or contracts from LCRA.*

5.2.3.1.1 General LCRA Strategy - LCRA System Operation Approach

To meet existing water needs in the basin, LCRA has traditionally used its larger water rights together as a system, including its water rights for lakes Buchanan and Travis as well as its downstream run-of-river (ROR) rights. To date, LCRA has largely done this through its Water Management Plan. Thus, its efforts have been focused on the management of lakes Buchanan and Travis to meet projected firm municipal and industrial customer demands while continuing to provide interruptible supplies to downstream agricultural operations and provide both firm and interruptible supplies to help meet certain environmental flow needs. More recently, LCRA has increased use of its ROR rights and groundwater rights to meet downstream needs that would otherwise have been met from stored water released from lakes Buchanan and Travis. Indeed, most of LCRA's firm contracts provide operational flexibility to LCRA by recognizing that LCRA can meet its commitments from any source available to LCRA. As water needs increase and change over time, LCRA will generally employ a system approach that considers all its water supplies and the most efficient way to meet water needs within LCRA's service area. However, in some cases, LCRA may implement a strategy outside of the system approach. LCRA may pursue amendments to its existing water rights, acquire or develop new water supplies, and encourage implementation of water conservation measures and water use efficiencies by their customers, all to provide LCRA with the flexibility it needs to help meet future water demands within its service area.

Issues and Considerations

The use of a system approach allows LCRA greater flexibility to help meet water needs throughout its service area from a variety of water supply sources. The system approach may involve a number of specific strategies, including amendments to its existing water rights, acquisition or development of new water supplies, construction of new water transmission facilities, and encouragement of implementation of water conservation measures and water use efficiencies by their customers, which are examined in greater detail in succeeding sections, with an analysis of the environmental consequences of each.

5.2.3.1.2 Lake Bastrop Water Supply Project

This strategy proposes to modify Lake Bastrop infrastructure and operations to provide additional water supply beyond its existing uses for power plant cooling and recreation. Historically, water has been pumped from the Colorado River to Lake Bastrop to make up for steam electric cooling water use. More recently, groundwater has been pumped into Lake Bastrop from water wells at LCRA's Lost Pines Power Park and diversion facilities from the river have been maintained as a backup supply. Under this strategy, water pumped from the Colorado River would be stored in the top eight feet of conservation storage. When needed for water supply, the stored water would be released from the lake through a new outlet works into Spicer Creek. The existing intake and pump station on the Colorado River would be expanded from 40 to 150 cubic feet per second (cfs) to accommodate the additional supply, and a new 60-inch pipeline would be installed to convey the water approximately three miles from the Colorado River to Lake Bastrop.

Table 5.20 LCRA Lake Bastrop Water Supply Project Supply

Water Management Strategy (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	10,200	10,200	10,200	10,200	10,200

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. Infrastructure used to estimate costs for this strategy include:

- Expansion of the existing Bastrop River Pump Station intake on the Colorado River to accommodate capacity of 150 cfs.
- New 17,100-foot-long 60-inch diameter transmission pipeline and new Lake Bastrop outfall.

- Improvements to Lake Bastrop Dam, including a new low-flow outlet works and additional erosion protection on the upstream slope of the embankment.

The following table shows the estimated costs associated with this strategy.

Table 5.21 LCRA Lake Bastrop Water Supply Project Cost

Total Facilities Cost	Total Project Cost	Annual Cost	Unit Cost ($/ac ft)
$57,968,133	$77,097,616	$6,462,816	$634

Environmental Considerations

The enhanced infrastructure will facilitate an increase in diversions from the Bastrop River pump station, resulting in some decreases in instream flow downstream of the diversion point. Diversions are expected to be made using existing water rights, which as amended, are or will be subject to environmental flow criteria. As a result, this strategy should have a minimal impact on environmental water needs. Infrastructure development may result in some construction disturbance, which could require mitigation. This construction impact would occur on the existing facility site and would cause little disturbance to any surrounding habitat and/or cultural resources in the area.

Agricultural & Natural Resources Considerations

Increase in diversion rate from the Colorado River will impact downstream agriculture as the available supply of surface water gradually diminishes over time. Increased use of Colorado River surface water for this project could impact availability for downstream agricultural uses over time. This could result in more reliance on other sources for irrigation.

5.2.3.1.3 Conservation

LCRA's approach to supporting conservation measures for their customers in the region are discussed in Section 5.2.2.1.

5.2.3.1.4 Expanded Use of Groundwater

LCRA plans to continue expanding its use of groundwater sources to meet future demands. LCRA currently holds groundwater permits from the Lost Pines Groundwater Conservation District for 8,000 ac-ft/yr in production from up to eight wells in the Carrizo-Wilcox Aquifer in Bastrop County and has filed applications for permits to develop up to 25,000 ac-ft/yr of total groundwater in Bastrop County for municipal, industrial, and other beneficial uses.

A preliminary analysis from LCRA indicated that a well field would be located on the Griffith League Ranch in central Bastrop County, and design has begun on that wellfield. The groundwater is anticipated for use in Bastrop County but could also potentially be used in Travis County within the LCRA service area.

TWDB rules require the planning group to treat the Modeled Available Groundwater (MAG) as a cap on groundwater availability in the planning process. The Carrizo-Wilcox Aquifer in Bastrop County has little remaining water under the MAG for strategies after existing regional water planning supplies were allocated, so strategy volumes are limited. Therefore, the supply from this strategy considered as recommended was determined by estimating the total remaining supply under the MAG after accounting for existing supply allocations. **Table 5.22** shows the implementation decade and the amount of water to be pumped for all planning decades.

Table 5.22 LCRA Expanded Use of Groundwater Supply

Water Management Strategy (ac ft/yr)					
2030	**2040**	**2050**	**2060**	**2070**	**2080**
0	8,000	11,000	14,500	16,000	16,000

Since the MAG is not a cap on groundwater permitting, there is additional demand that could be served if the Lost Pines Groundwater Conservation District issues a permit to LCRA for a larger volume. However, because a larger amount would exceed the MAG cap that is imposed by the TWDB planning rules, such a strategy is included as an alternative strategy.

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA. The capital cost for this strategy is primarily driven by the cost of the well field and transmission pipeline needed to supply 25,000 ac-ft/yr; however, the unit costs for this strategy is based on the maximum available MAG. A peaking factor of one (1) was assumed. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. The following table shows the estimated costs associated with this strategy.

Table 5.23 LCRA Expanded Use of Groundwater Cost

Total Facilities Cost	Total Project Cost	Annual Cost	Unit Cost ($/ac ft)
$88,059,585	$117,119,249	$10,024,824	$627*

**Unit cost of $627/ac-ft represents the capital costs associated with building a 25,000 ac-ft/yr project, divided by the MAG-limited supply of 16,000 ac-ft/yr. As seen in the Alternative version of this strategy outlined in Table 5.97, a supply of 25,000 ac-ft/yr results in a unit cost of $401/ac-ft.*

Environmental Considerations

The environmental impacts from this strategy are expected to be low. The impact to the environment due to pipeline construction is expected to be temporary and minimal. Impacts to environmental water needs, habitat, and cultural resources are expected to be low due to the relatively low footprint of this strategy.

It is assumed that this strategy will have negligible impacts to cultural and archaeological resources. A Biological Assessment is being developed due to the project's location within several threatened or endangered species ranges as well as within federally designated Critical Habitat. Consultation with U.S. Fish and Wildlife Service is currently ongoing and Conservation Measures to minimize impacts to several of these species will need to be taken into consideration during design and construction. Appendix 1.A in Chapter 1 provides a list of rare, threatened, and endangered species for each county in Region K, including Bastrop County. These species may need to be considered during construction of any new infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected as a result of implementing this strategy.

5.2.3.1.5 Purchase Wholesale Groundwater

The strategy involves purchasing groundwater from the Carrizo-Wilcox Aquifer from third party entities in Bastrop and Lee counties, with infrastructure developed to deliver water to Travis County. A preliminary analysis from LCRA indicated that a well field could be constructed in Bastrop and Lee counties, where some third party entities have existing permits to produce water from the Simsboro Formation of the Carrizo-Wilcox Aquifer. The strategy assumes a combined total of 25,000 ac-ft/yr could be purchased from one or multiple third party entities.

For costing purposes, this strategy assumes the construction of a new well field consisting of seven Public Water Supply wells completed in the Simsboro Formation. Each well is assumed to have a peak capacity of 2,700 gallons per minute (gpm) and a depth of 2,200 feet below land surface. The well field collection piping is assumed to be approximately 17 miles long, routing to a new pump station and through a new 40-mile-long, 36-inch diameter pipeline that conveys the raw water to a conceptual delivery endpoint in Travis County.

TWDB rules require the planning group to treat the Modeled Available Groundwater (MAG) as a cap on groundwater availability in the planning process. The Carrizo-Wilcox Aquifer in Bastrop and Lee counties had little remaining water under the MAG for strategies after regional water planning supplies were allocated, so strategy volumes are limited. Therefore, the supply from this strategy considered as recommended was determined by estimating the total remaining supply under the MAG after accounting for existing supply allocations. **Table 5.24** shows the implementation decade and the amount of water to be pumped for all planning decades.

Table 5.24 LCRA Purchase Wholesale Groundwater Supply

Water Management Strategy (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	15,500	15,500	15,500	15,500	14,500

Since the MAG is not a cap on groundwater permitting, there is additional demand that could be served if the Lost Pines Groundwater Conservation District issues a permit for a larger volume. However, because a larger amount would exceed the MAG cap that is imposed by the TWDB planning rules, such a strategy is included as an alternative strategy.

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA. The capital cost for this strategy is primarily driven by the cost of the well field and transmission pipeline needed to convey 25,000 ac-ft/yr from the wellfield to Travis County. However, the unit costs for this strategy are based on the maximum available MAG. The cost estimate for this strategy utilizes an assumed rate for groundwater purchase. Ultimately, this cost will be negotiated between the third party entity and LCRA. Additionally, LCRA would be responsible for paying the Lost Pines Groundwater Conservation District (LPGCD) a per acre-foot production fee and export fee. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. **Table 5.25** shows the estimated costs associated with this strategy.

Table 5.25 LCRA Purchase Wholesale Groundwater Costs

Total Facilities Cost	Total Project Cost	Annual Cost	Unit Cost ($/ac ft)
$320,254,000	$634,998,000	$66,063,000	$4,262*

**Unit cost of $4,262/ac-ft represents the capital costs associated with building a 25,000 ac-ft/yr project, divided by the MAG-limited supply of 15,500 ac-ft/yr. As seen in the Alternative version of this strategy outlined in Table 5.99, a supply of 25,000 ac-ft/yr results in a unit cost of $2,643/ac-ft.*

Environmental Considerations

The environmental impacts from this strategy are expected to be low. The impact on the environment due to pipeline construction is expected to be temporary and minimal. Impacts to environmental water needs, habitat, and cultural resources are expected to be low due to the relatively low footprint of this strategy.

Relevant cultural resource assessments and environmental field studies will need to be performed to support project design and permitting. While it is assumed that this strategy would have negligible impacts to cultural resources, coordination with the Texas Historical Commission will need to occur. Further, there are several endangered or threatened species that may need to be taken into consideration during design, permitting, and construction. Appendix 1.A in Chapter 1 provides a list of rare, threatened, and endangered species by county. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected as a result of implementing this strategy.

5.2.3.1.6 Import Return Flows from Williamson County

LCRA has been evaluating water management strategies to develop water supplies by importing return flows (i.e., treated wastewater effluent) from entities in Williamson County. These entities have contracts with LCRA for firm water from the Colorado River and have been granted exempt interbasin transfer permits, allowing the water to be used in the Brazos River Basin within Williamson County.

Ongoing studies have evaluated various options for returning water from the Brazos River Basin back to the Colorado River Basin. The most likely source is return flows from the Brushy Creek Regional Wastewater Treatment Plant (BCRWWTP), which currently discharges into Brushy Creek in the Brazos River Basin. Return flows could also be secured from the Leander wastewater treatment plant (WWTP), which also discharges further upstream into Brushy Creek in the Brazos River Basin.

Two options were considered for this update of the Regional Water Plan: (1) return flows could be pumped directly from the BCRWWTP through a 16-mile transmission pipeline to an existing or new terminal storage location, or (2) return flows could be discharged to Brushy Creek from the BCRWWTP and/or the Leander WWTP, and a bed-and-banks permit would be used to transport the water downstream for diversion at a pump station that would pump the water through an 11-mile transmission pipeline to Wilbarger Creek which feeds into the Colorado River. The return flows can be transported by the bed-and-banks of Wilbarger Creek and the Colorado River to diversions points of LCRA's firm customers, or to one of the off-channel reservoirs. Alignments and cost estimates were provided by LCRA. LCRA may need to obtain an interbasin transfer permit to import return flows from the Brazos River basin to the Colorado River basin. LCRA will likely also secure a bed and banks permit to retain ownership and control of the imported return flows once discharged into the Colorado River basin.

Consistent with the 2021 Regional Water Plan, Option 1 has been evaluated since it has more infrastructure requirements and a longer pipeline route. Based on these criteria, the water management strategy will consist of obtaining necessary water rights permits, construction of tertiary treatment upgrades at BCRWWTP, a pump station and a storage tank at BCRWWTP, and a water transmission pipeline. There are two Brushy Creek WWTP locations. Based on available flow data from each location, East and West, the source for this strategy is assumed to be the BCRWWTP East. **Table 5.26** shows the expected supply by decade for this strategy.

Table 5.26 LCRA Import Return Flows from Williamson County Supply

Water Management Strategy (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	10,920	16,380	21,840	25,000	25,000

Cost Implications of Proposed Strategy

The TWDB Cost Estimating Tool and information from HDR was used to determine project costs. The facilities cost for this strategy is primarily driven by the cost of the transmission pipeline. **Table 5.27** shows the estimated costs associated with this strategy. Costs are given in September 2023 dollars.

The following required for this project includes:

- Pump Station and Storage Tank at BCRWWTP
- Tertiary Treatment upgrade at BCRWWTP
- Approximately sixteen (16) miles of 42-inch transmission piping and appurtenances

Table 5.27 LCRA Import Return Flows from Williamson County Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$112,595,000	$155,551,000	$12,370,000	$495

Environmental Considerations

Either option will need to ensure that water quality is not degraded as a result of discharge to a terminal reservoir or Wilbarger Creek. Potential infrastructure improvements identified at the Brushy Creek WWTP include tertiary treatment for phosphorus removal before effluent can be discharged into a reservoir.

The discharge point would need to be at a point in the reservoir or creek where it has sufficient capacity to handle the additional flow without detrimental effects to the reservoir or stream banks. The environmental impact should be low.

Depending on the volume and location of where the imported return flows are used, some imported water available could help meet instream flows in the Colorado River or to help meet freshwater inflow needs of Matagorda Bay.

Relevant cultural resource assessments and environmental field studies will need to be performed to support project design and permitting. While it is assumed that this strategy would have negligible impacts to cultural resources, coordination with the Texas Historical Commission will need to occur. Further, there are several endangered or threatened species that may need to be taken into consideration during design, permitting, and construction. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

Depending on firm demands, imported return flows could be used by LCRA to meet firm demands that would otherwise be met from stored water releases from the Highland Lakes, potentially increasing availability of interruptible water supply.

Interbasin Transfer Considerations

This strategy is considered an exempt interbasin transfer.

5.2.3.1.7 Aquifer Storage and Recovery (ASR)

This strategy utilizes surface water that is diverted from the Colorado River during periods when water supply is more readily available, treats the water at a surface water treatment facility to a level that would not degrade the underlying aquifer, and then stores the treated water in the aquifer. Water supply recovered from the aquifer would be piped to a delivery location in Travis County. The strategy is anticipated to provide an additional 22,000 acre-feet per year of new firm supply to the LCRA system. The supply is based on the average supply gained from this strategy over the critical drought period of the Highland Lakes (lakes Travis and Buchanan) per LCRA-provided information.

The raw water for this strategy would originate from the Highland Lakes, specifically lakes Travis and Buchanan. During storage periods, water from these lakes would be released downstream to an assumed point along the Colorado River in Bastrop County. From there, it would be diverted and pumped for injection into the Simsboro Aquifer. Prior to injection into the aquifer, the raw water would be treated to a quality that would not degrade the underlying aquifer. In this strategy, it is assumed that LCRA would partner with a customer that already has infrastructure to treat the water (water treatment plant, intake, transmission infrastructure to plant). LCRA would then “rent” the partner’s infrastructure during seasonally lower demand periods to treat the water and then convey it to injection wells[4]. Water supply recovered from the aquifer would be piped to a delivery location in east Travis County where it could be accessed by customers.

While the project infrastructure could be implemented by 2040, the online date of the supply is considered to occur between 2040 and 2050, due to the time it takes to store the ASR water and develop the project such that it can deliver water. The recoverability of the project is assumed to be near 100% using the target storage volume approach, where the buffer will be established with excess water prior to the beginning of operation. Because the water will be stored in a potable aquifer, minor mixing at the edges of the buffer zone is not expected to have a large effect or recovered water quality. The estimated supply from this strategy by decade is shown in **Table 5.28**.

Table 5.28 LCRA Aquifer Storage and Recovery Supply

Water Management Strategy (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	0	22,000	22,000	22,000	22,000

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. The ASR strategy involves several key components for the successful injection and recovery of water in Bastrop County, Texas. ASR can be implemented at a variety of scales. All sizes are conceptual for planning purposes. As the project is further studied and developed, these may change, but ASR at any scale is considered consistent with this plan. For costing purposes, the following components were included:

- A new 30 million gallons per day (MGD) capacity surface water treatment plant to treat raw water before injection.
- Pump station from existing partner water treatment plant to well field.
- Transmission pipeline (33 mile-long, 30-inch diameter) from partner water treatment plant to wellfield.
- Wellfield collection piping.
- A pump station and pipeline (34-mile long, 54-inch diameter) to deliver recovered water to Travis County.
- A groundwater disinfection system for treating recovered water.

Table 5.29 shows the estimated costs associated with this strategy.

Table 5.29 LCRA Aquifer Storage and Recovery Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$486,302,000	$1,009,936,000	$77,321,000	$3,515

4 Although this strategy conceptualizes LCRA partnering with an entity, LCRA could construct a new surface water treatment plant on its own to treat raw surface water prior to injection underground.

Environmental Considerations

Diversions are expected to be made using existing water rights, which as amended are or will be subject to environmental flow criteria. As a result, this strategy should have a minimal impact on environmental water needs.

Separate from hydrological impacts, there would also be a nominal impact to the environment associated with the infrastructure of this strategy (wellfield, pipelines, pump stations).

Relevant cultural resource assessments and environmental field studies will need to be performed to support project design and permitting. While it is assumed that this strategy would have negligible impacts to cultural resources, coordination with the Texas Historical Commission will need to occur. Further, there are several endangered or threatened species that may need to be taken into consideration during design, permitting, and construction. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

Depending on firm demands, this strategy could be used by LCRA to meet firm demands that would otherwise be met from stored water releases from the Highland Lakes, potentially increasing availability of interruptible water supply.

5.2.3.1.8 New Storage Development in the Lower Colorado Basin

This recommended strategy involves the development of one or more new off-channel storage reservoirs in the Lower Colorado Basin downstream of the Austin area. The purpose of the new storage is to capture available river flows and store the captured water for later use. The storage reservoir(s) could supply water to meet needs in the upper reaches through a new transmission pipeline, but depending on the volume of upstream firm demands, water could be released back to the river for use downstream.

The yield from this strategy is dependent on the location and size of the new storage. LCRA has identified several options with between 48,390 and 80,000 ac-ft of storage in Fayette, Bastrop, and Colorado counties. LCRA has not yet finalized the site selection or developed a preferred portfolio of potential storage options. Therefore, for planning purposes, the identified storage option with the largest storage and maximum potential yield is evaluated as representative of this strategy for the 2026 Region K Plan, but development of any off-channel storage reservoir or combination of reservoirs is considered consistent with this plan. The strategy involves diverting water from the Colorado River using LCRA's existing water rights. The water was assumed to be stored in a newly constructed off-channel reservoir (Lower Basin OCR) in Colorado County with a storage capacity of 80,000 acre-feet, and a new transmission pipeline would convey the stored water to a conceptual delivery location in Travis County. It should be noted that other storage options identified by LCRA would be considered consistent with this strategy. These other sites would use the same water rights and also assume transmission to Travis County.

LCRA determined that the Lower Basin OCR is estimated to provide an additional 73,000 acre-feet per year of new firm supply to the Upper Reaches of the LCRA system. The OCR operates as a system with lakes Buchanan and Travis. **Table 5.30** shows the estimated supplies by decade associated with this strategy.

Table 5.30 LCRA New Storage Development in the Lower Colorado Basin Supply

Water Management Strategy (ac ft/yr)					
2030	**2040**	**2050**	**2060**	**2070**	**2080**
0	0	73,000	73,000	73,000	73,000

This strategy could be constructed as one large OCR or as a combination of smaller OCRs at the same or different site locations. LCRA is currently evaluating different options. The individual yield for each of these options is not additive since they are using some of the same water from the Colorado Basin. For the 2026 Region K water plan, construction of one large OCR was assumed for costing purposes. However, alternate storage locations and configurations are consistent with this strategy and additional study will be needed to determine the ultimate site and configuration of the new storage.

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. Infrastructure used to estimate costs for this strategy include:

- Rehabilitation and upgrades to the existing raw water intake pump station(s) on the Colorado River: This involves using LCRA's existing intake pump station(s), which may require some upgrades and rehabilitation to divert the full permitted diversion flow rate.
- New off-channel reservoir (OCR): A new OCR with a storage capacity of 80,000 acre-feet will be constructed using a ring dike. This reservoir will be located in Colorado County and will require approximately 2,000 acres of land.
- New raw water pipeline and intake pump station to Travis County: A new intake pump station in the OCR and an approximately 104-mile-long, 72-inch diameter pipeline will be constructed to deliver raw water from the OCR in Colorado County to a conceptual delivery point in Travis County.

Table 5.31 shows the estimated costs associated with this strategy.

Table 5.31 LCRA New Storage Development in the Lower Colorado Basin Strategy Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$2,066,064,000	$4,072,661,000	$309,339,000	$4,238

Environmental Considerations

The strategy for diverting water from the Colorado River to a new off-channel reservoir (OCR) in Colorado County involves several environmental considerations. The plan includes using the existing infrastructure to divert water and store it in a new OCR with a capacity of 80,000 acre-feet. The construction of pipelines to transport water from the Colorado River to the OCR and from the OCR to Travis County will be carefully planned to minimize environmental impacts, avoiding or minimizing impacts to federal jurisdictional waters of the U.S. (WOTUS) and state watercourses. Approximately 2,000 acres of land will be required for the OCR construction, with the reservoir(s) located to minimize the impact on existing federal jurisdictional waters. Mitigation measures will be implemented to minimize impacts to WOTUS and other sensitive environmental areas, including finding suitable OCR sites and re-routing or tunneling the pipeline to avoid significant environmental impacts.

While it is assumed that this strategy would have negligible impacts to cultural resources, coordination with the Texas Historical Commission will need to occur and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

Depending on firm demands, this strategy could be used by LCRA to meet firm demands that would otherwise be met from stored water releases from the Highland Lakes, potentially increasing availability of interruptible water supply.

5.2.3.1.9 Downstream Return Flows

Downstream return flows from Pflugerville are discussed in Section 5.2.1.2. This benefit is assigned to LCRA, and through a bed and banks permit, the return flows could be transported to a diversion location for an LCRA customer or to be stored in an off-channel reservoir.

5.2.3.1.10 Seawater Desalination

This strategy involves the development of a new advanced water treatment facility to desalinate seawater from the Gulf of Mexico. The treated water will then be transported through a new transmission pipeline to a conceptual delivery location in Travis County to supply firm customers. Based on the information provided by LCRA, the strategy aims to provide 30,000 acre-feet per year of firm water supply consisting of treated water quality. All information is conceptual in nature and may change as the strategy is further studied and developed.

Initially, 73,000 acre-feet per year of seawater is treated using ultrafiltration (UF), with an estimated recovery rate of 93%, resulting in approximately 68,000 acre-feet per year. This supply is then desalinated with an estimated recovery rate of 45%, yielding 30,000 acre-feet per year of potable water. The remaining 43,000 acre-feet per year removed through treatment processes is brine that requires disposal back into the Gulf of Mexico. The strategy assumes that the treated water supply from the seawater desalination facility is conveyed via pipeline to Travis County to supply LCRA's firm customers in the Upper Reaches of their system. The estimated supply by decade that would be provided by this strategy is shown in **Table 5.32**.

Table 5.32 LCRA Seawater Desalination Strategy Supply

Water Management Strategy (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	0	0	30,000	30,000	30,000

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. Infrastructure used to estimate costs for this strategy include:

- Seawater Intake Pump Station (IPS): This station will be constructed to divert raw seawater directly from the Gulf of Mexico along the Matagorda Peninsula. It is designed to convey approximately 78 MGD.
- Raw Seawater Pipeline: This pipeline will convey raw seawater from the seawater IPS to the advanced water treatment facility. It is approximately 9 miles long and 66 inches in diameter.
- Seawater Desalination Treatment Facility: This facility will treat raw seawater using ultrafiltration (UF) membranes and reverse osmosis (RO) membranes. It is designed to produce approximately 30,000 acre-feet per year of fresh, potable water.
- Brine Discharge Pipeline and Pump Station: The brine generated from the treatment facility will be pumped via a nine-mile-long, 54-inch diameter pipeline to a point adjacent to the coast, then will be discharged offshore through a four-mile-long brine diffuser pipeline into the Gulf of Mexico.
- Treated Water Pipeline and Pump Station: This infrastructure will deliver treated water from the advanced water treatment facility to a conceptual delivery point in Travis County. The pipeline is approximately 183 miles long and 48 inches in diameter.

Table 5.33 shows the estimated costs associated with this strategy.

Table 5.33 LCRA Seawater Desalination Strategy Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$1,807,804,000	$3,559,691,000	$308,430,000	$10,281

Environmental Considerations

The strategy for constructing a new advanced water treatment facility to desalinate seawater from the Gulf of Mexico involves several environmental considerations. It is assumed that the brine generated from the desalination process would be discharged offshore through a four-mile brine diffuser pipeline into the Gulf of Mexico to facilitate mixing, minimizing potential environmental impacts. The intake structure for raw seawater is conceptually located at the edge of Matagorda Peninsula in the Gulf of Mexico, but additional study would be needed to site the intake and water treatment plant. All coastal infrastructure could present challenges during major storm events. The project would require several state and federal permits. Additionally, the project would involve environmental and archaeological studies to identify and mitigate potential impacts, including assessing the effects on aquatic resources and designing the project infrastructure to avoid or minimize impacts where feasible. Relevant cultural resource assessments and environmental field studies will need to be performed to support project design and permitting. While it is assumed that this strategy would have negligible impacts to cultural resources, coordination with the Texas Historical Commission will need to occur. Further, there are several endangered or threatened species that may need to be taken into consideration during design, permitting, and construction.

Furthermore, the project will require state-owned submerged land leases for the intake and discharge outfalls, and compliance with the Texas Coastal Management Program as part of the Coastal Zone Management Act

(CZMA). This act defines coastal zones where development must be managed to protect areas of natural resources unique to coastal regions. There may also be additional requirements from local municipalities, such as development regulations and floodplain permitting, which could apply to the project.

5.2.3.2 Austin Water Management Strategies

Austin provides water for municipal, manufacturing, and steam-electric water uses. Austin's existing service area covers portions of Travis, Williamson, and Hays counties. Austin's water management strategies and total water amounts for each strategy are summarized in **Table 5.34**.

Table 5.34 Summary of Austin Water Management Strategies (ac-ft/yr)

Recommended Strategy	2030	2040	2050	2060	2070	2080
Municipal Demand						
Conservation	6,500	14,900	19,600	24,200	28,900	33,400
Centralized Reclaimed	1,100	8,200	12,900	17,600	22,300	26,900
Decentralized Reclaimed	0	200	500	800	1,100	1,300
Onsite Reuse	1,100	4,000	5,700	7,300	9,000	10,600
Aquifer Storage and Recovery	0	44,500	44,500	44,500	44,500	44,500
Lake Walter E. Long (Decker) Off Channel Reservoir	0	18,300	18,300	18,300	18,300	18,300
Indirect Potable Reuse	**	**	22,400	22,400	22,400	22,400
Capture Local Inflows to Lady Bird Lake***	0	0	3,000	3,000	3,000	3,000
Brackish Groundwater Desalination	0	0	0	0	20,000	40,000
Total	**8,700**	**90,100**	**126,900**	**138,100**	**169,500**	**200,400**

*** May be implemented earlier in severe drought conditions*
**** Infrastructure is included in Indirect Potable Reuse strategy*

5.2.3.2.1 Water Conservation

The Austin Conservation strategy is discussed in Section 5.2.2.2.

5.2.3.2.2 Centralized Reclaimed Water

Two of Austin's wastewater treatment plants, South Austin Region (SAR) and Walnut Creek WWTPs, produce Type 1 reclaimed water. Type 1 reclaimed water is the highest level of quality recognized by the Texas Commission on Environmental Quality (TCEQ). Reclaimed water in Austin is primarily used for irrigation purposes, such as on golf courses, commercial properties, ballfields, road medians, and schools. Additionally, it is utilized for cooling in power plants, chilled water supply plants, office buildings, and industrial buildings. Other potential uses include process water at manufacturers, car washes, commercial laundries, and toilet flushing.

Austin aims to expand the current reclaimed water network and is in the process of finalizing updates to the Reclaimed Connection Ordinance. This ordinance mandates that all new commercial, mixed-use, or multifamily developments within 250 feet of reclaimed water systems must connect to them. For larger developments (>250,000 square feet of gross floor area), this requirement extends to within 500 feet of the systems. Reclaimed water from these systems must be used for irrigation, cooling, and toilet flushing. Implementing the centralized reclaimed ordinance will significantly offset the toilet/urinal flushing, laundry, irrigation, and cooling demands of new developments. **Table 5.35** shows the expected supply associated with this strategy by decade.

Table 5.35 Anticipated Centralized Reclaimed Water Supply (Direct Reuse)

Year	2030	2040	2050	2060	2070	2080
Existing Direct Reuse Yield (ac-ft/yr)	5,000	5,000	5,000	5,000	5,000	5,000
Additional Municipal and Manufacturing Direct Reuse Yield (ac-ft/yr)	1,100	8,200	12,900	17,600	22,300	26,900

Through its ongoing water resources planning efforts such as Water Forward, Austin Water evaluates its water reuse program and options for expansion. Future Region K plan updates will reflect changes as additional Austin water reclamation program information becomes available.

Cost Implications of Proposed Strategy

In addition to water conservation, the use of reclaimed water has been identified as a significant source of water to meet Austin's projected demand deficits in 2070. Austin has completed planning studies, including the Water Forward Plan, for a centralized direct non-potable reuse to serve potential customers in Austin's service area. Centralized reuse will provide a portion of the water supply required to meet Austin's identified needs.

Capital costs were provided by Austin in December 2023 dollars. In order to provide a comparable cost consistent with other strategies in this report, annual costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars. The Cost Estimating Tool was also used to determine operating costs.

Table 5.36 shows the estimated costs associated with this strategy for the planning, design, and construction of the additional major infrastructure components of the reclaimed system, including pump stations, storage, reclaimed water mains, and wastewater treatment plant filter and process improvements at multiple facilities.

Table 5.36 Austin Centralized Reclaimed Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$899,162,000	$1,407,041,000	$93,530,000	$2,243

Environmental Considerations

The water quality impacts from direct reuse of reclaimed water are regulated by the TCEQ through 30 TAC Chapter 210. Reclaimed water projects authorized under these regulations are presumed to be protective of human health and the environment. The potential impacts generated through the construction of the proposed pipelines and pump stations will need to be addressed in the preliminary engineering studies to be conducted for these projects.

The use of reclaimed water presents an alternative for providing water for non-potable uses without the development of new water supplies for Austin for the planning period. The costs and environmental impacts of expanding Austin's current reuse system will have to be determined as more specific information, such as the locations of customers to be served, is identified. The extent of pipeline and other transmission facilities will have to be determined before specific environmental impacts can be estimated. However, the majority of the facilities needed will most likely be placed in existing easements and, therefore, minimize the impact upon natural resources.

No outdoor end uses for this strategy are proposed for sensitive recharge areas, including the Edwards Aquifer Recharge Zone.

Negligible impacts are anticipated to wildlife habitat and cultural resources.

Agricultural & Natural Resources Considerations

No impacts to agriculture are expected as a result of implementing this strategy.

5.2.3.2.3 Decentralized Reclaimed Water

Decentralized Reclaimed refers to the collection of wastewater from sewer systems separate from the Austin's centralized wastewater system, and treatment and reuse of that wastewater at the neighborhood scale. Reuse of the treated water via a dual (purple) pipe system will supply irrigation, landscaping, toilet flushing, and cooling demands.

This strategy is expected to provide approximately 1,300 ac-ft/yr by 2080, as shown in **Table 5.37**. Water availability is dependent on wastewater flows from the system area, storage capacities of the proposed system, and proposed end uses for non-potable water. While conservation efforts may decrease wastewater flows over time, wastewater flows are a relatively consistent and predictable source water, in comparison to rain or surface water. Per the Austin Water Forward Plan, the strategy is expected to be online by 2040.

Table 5.37 Austin Decentralized Reclaimed Supply

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	200	500	800	1,100	1,300

Cost Implications of Proposed Strategy

Costs were provided by Austin in December 2023 dollars. In order to provide a comparable cost consistent with other strategies in this report, annual costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars. The Cost Estimating Tool was also used to determine operating costs.

Table 5.38 shows the estimated costs associated with this strategy.

Table 5.38 Austin Decentralized Reclaimed Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$138,375,000	$215,071,000	$15,991,000	$5,158

Note: Cost has not been converted to September 2024 dollars yet.

Environmental Considerations

Assuming the proposed local wastewater plants incur a small footprint, this strategy provides environmental benefit by reducing the energy spent transmitting wastewater from far reaches of the collection system to existing centralized wastewater treatment plants.

It is assumed that there would be no impacts to cultural resources, but applicable coordination with the Texas Historical Commission prior to construction will be performed. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

No outdoor end uses for this strategy are proposed for sensitive recharge areas, including the Edwards Aquifer Recharge Zone.

Agricultural & Natural Resources Considerations

Impact to agriculture is negligible based on the projected return flow amounts over the planning period.

5.2.3.2.4 Onsite Water Reuse

In December 2020, the City of Austin adopted the Onsite Water Reuse Systems Ordinance, adding Chapter 15-13 to the City of Austin Code to regulate the collection, treatment, and use of alternative water sources for non-potable uses in multi-family and commercial buildings. Under the 2020 Ordinance, new commercial and multi-family projects with cooling towers were required to reuse condensate or use non-potable water to make up evaporative losses. An updated version of the Onsite Water Reuse Systems Ordinance requires that, effective April 1, 2024, Onsite Water Reuse Systems must be installed in new commercial and multi-family development projects of 250,000 square feet or greater of gross floor area. These projects will collect and treat rainwater and air conditioner condensate for reuse in buildings for toilet/urinal flushing, laundry, irrigation, and cooling.

The estimated supply for this strategy by decade is shown in **Table 5.39**. This strategy is expected to provide 10,600 ac-ft/yr in by 2080.

Table 5.39 Austin Onsite Water Reuse Supply

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
1,100	4,000	5,700	7,300	9,000	10,600

Cost Implications of Proposed Strategy

Capital costs were provided by Austin in December 2023 dollars. In order to provide a comparable cost consistent with other strategies in this report, annual costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars. The Cost Estimating Tool was also used to determine operating costs.

Capital costs (**Table 5.40**) associated with this strategy include Reuse Harvesting Cistern Storage.

Table 5.40 Austin Onsite Reuse Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$841,418,000	$950,624,000	$145,994,000	$8,957

Environmental Considerations

No environmental impacts are expected as a result of implementing this strategy, including impacts to cultural resources or wildlife habitat. Rainwater harvesting and AC condensate reuse can provide environmental benefit due to the relatively short distance between the rainwater storage and the end use on the property, reduced energy requirements due to gravity fed collection systems, and the small footprints of storage tanks. Additionally, rainwater harvesting can provide environmental benefit by reducing runoff during large storm events.

In some states, water right authorizations or permits are required for rainwater harvesting projects. Texas, however, does not require authorization for rainwater harvesting projects.

Agricultural & Natural Resources Considerations

No impacts to agriculture are expected as a result of implementing this strategy.

Impacts on Other Water Resources of the State

The Austin Water Forward Plan assumes relatively small-scale implementation of this strategy. There are no impacts are expected on other Water Resources of the State at the proposed scale of implementation.

5.2.3.2.5 Aquifer Storage and Recovery

Aquifer Storage and Recovery (ASR) is a strategy in which water is stored in an aquifer during wetter periods and recovered for use during drier periods. ASR offers an opportunity to improve water supply during drought and to reduce evaporative losses through the concept of “water-banking.” By storing water underground, losses to evaporation incurred by above-ground storage reservoirs (lakes) are avoided. This type of strategy is currently being used by cities in the U.S. and Texas including San Antonio, Kerrville, and El Paso.

Per the 2024 Austin Water Forward Plan, treated Colorado River water under Austin’s existing water rights and contract agreements is the proposed source of water for this strategy, particularly during non-drought years. A number of potential storage aquifers will be considered for the strategy. Since the 2016 regional water planning cycle, Austin has performed feasibility analyses to better understand the hydrogeology of the Northern Edwards and Trinity aquifers in order to evaluate potential for recharge and extraction. The analyses found that current regulatory restrictions would prevent injection into or transection of the Edwards Aquifer. The Carrizo-Wilcox Aquifer has been identified as a candidate for storage, given its favorable hydrogeological properties and the San Antonio Water System’s experience with an ASR facility in this aquifer. Since the 2021 regional water planning cycle, Austin has performed a detailed cost and yield analysis.

As part of this strategy, Austin will construct and implement a pilot facility to assess the storage capacity, recovery capacity, migration losses, and other characteristics of the aquifer. The recoverability of the project is assumed to be near 100% using the target storage volume approach, where the buffer will be established with excess water prior to the beginning of operation. Because the water will be stored in a potable aquifer, minor mixing at the edges of the buffer zone is not expected to have a large effect on recovered water quality. Analysis of treatment requirements to provide acceptable water quality for aquifer injection and for distribution will be conducted. Results from this pilot project will inform decisions about the full-scale ASR facility. The ASR strategy is planned to be online by 2040 with a constant projected supply of 44,500 ac-ft/yr (**Table 5.41**).

Table 5.41 Austin Aquifer Storage and Recovery Supply

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	44,500	44,500	44,500	44,500	44,500

Cost Implications of Proposed Strategy

Capital costs were provided by Austin in December 2023 dollars. In order to provide a comparable cost consistent with other strategies in this report, annual costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars. The Cost Estimating Tool was also used to determine operating costs.

Capital costs associated with this strategy include:

- Primary Pump Station (74 MGD)
- Transmission Pipeline (66-inch diameter, approximately 53 miles)
- Well Fields (72 Wells, Pumps, and approximately 13 miles Well Field Piping)
- Water Treatment Plant - Wellfield (37 MGD)
- Integration Point Infrastructure (10 MG GST, 74 MGD Pump Station, Yard Piping, etc.)

Table 5.42 shows the estimated costs associated with this strategy.

Table 5.42 Austin Aquifer Storage and Recovery Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
940,471,000	1,526,577,000	$141,268,000	$1,697

Environmental Considerations

The ASR strategy will require permitting to ensure it complies with all environmental considerations. Project planning will include identification of permit requirements, including environmental permitting, to implement the strategy.

Water to be stored in the ASR facility is planned to come from Austin's existing distribution infrastructure and was therefore modeled as being diverted from the river at any of Austin's existing water treatment plants. In general, if there is vacant storage capacity in any month in the ASR, and if there are unused portions of Austin's available water, then water could be diverted for injection into the ASR. In preliminary conceptual planning for this strategy, instream flow conditions were checked for the water rights with new diversion points before the ASR was modeled as diverting water. This strategy helps satisfy a component of City of Austin demands already anticipated to be met through Colorado River diversions, particularly during drought and low reservoir storage volume conditions in lakes Travis and Buchanan. Although, to store water in the aquifer, more water may be diverted in a particular year than otherwise would have been diverted; this would be done in a wetter year when water is typically available to the environment. In certain drought years, demand for river diversions may be able to be reduced while water is being drawn out of ASR to meet demands. As a result, impacts to environmental flows should be minimal.

It is assumed that there would be no impacts to cultural resources, but, if applicable, coordination with the Texas Historical Commission prior to construction will be performed. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

Impacts to agriculture should be considered negligible. Water storage in the ASR is driven by the availability of excess surface water flows in years of non-drought. The pumping of water into the ASR is anticipated to be conducted in wetter periods when water is typically available to other users in the basin. Therefore, this strategy is anticipated to have negligible effects on other users.

5.2.3.2.6 Lake Walter E. Long (Decker) Off Channel Reservoir

This supply strategy would use Lake Walter E. Long (formed by Decker Dam) as a water supply reservoir to meet customer demands. The lake is currently used for recreation and for the operation of the Decker Power Plant (managed by the City's electric utility). This strategy would continue to provide benefits to those uses and Austin Water would work to maintain little to no impacts to those operations.

The lake is supplied by water diverted from the Colorado River, and this strategy would include a new intake adjacent to the current intake location. The reservoir would be operated so that lake levels would fluctuate within a limited five-foot range during drought periods. This strategy would also include a new conventional WTP located nearby to treat water from the Lake Walter E. Long and convey it to Austin Water's distribution system. The operation and additional storage in Lake Walter E. Long could also be used conjunctively with other supply management strategies, allowing further storage, evaporation management opportunities, and system optimization. One potential implementation issue for utilizing the lake is the reservoir's dependence on the reliability of the source water. The estimated supply for this strategy is shown in **Table 5.43**.

Table 5.43 Lake Walter E. Long (Decker) Off Channel Reservoir Supply

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	18,300	18,300	18,300	18,300	18,300

Cost Implications of Proposed Strategy

Capital costs were provided by Austin in December 2023 dollars. In order to provide a comparable cost consistent with other strategies in this report, annual costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars. The Cost Estimating Tool was also used to determine operating costs.

Capital costs associated with this strategy include:

- Transmission Pipelines (78-inch diameter, approximately 2 miles)
- Intake Pump Station (105 MGD)
- Transmission Pipelines (36-inch diameter, approximately 1 mile)
- Intake Pump Stations (17 MGD)
- Water Treatment Plant with Advanced Water Treatment Components (17 MGD)

Table 5.44 shows the estimated costs associated with this strategy.

Table 5.44 Lake Walter E. Long (Decker) Off Channel Reservoir Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$329,786,000	$477,521,000	$54,503,000	$2,978

Environmental Considerations

According to the Austin Water Forward Plan, in order to fully utilize Austin's water rights as part of this Lake Walter E. Long OCR project, it is possible that water right amendments will be required for this strategy. In preliminary conceptual planning for this strategy, instream flow conditions were checked before storage in the OCR was modeled as diverting water. A conservative estimate of water availability was used to avoid impacts to existing streamflow requirements. This strategy helps satisfy a component of Austin demands already anticipated to be met through Colorado River diversions, particularly during drought and low reservoir storage volume conditions in lakes Travis and Buchanan. To store water in the lake, more water may be diverted from the river in particular conditions than otherwise would have been diverted; however, this would be done in wetter conditions when water is typically available to the environment. In certain drought periods, demand for river diversions may be able to be reduced while water is being drawn out of OCR to meet demands.

Environmental studies and permits may be needed to address potential impacts of this option, including assessment of source water quality, and impacts to water fowl and aquatic life. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

It is assumed that there would be no impacts to cultural resources, but, if applicable, coordination with the Texas Historical Commission prior to construction will be performed.

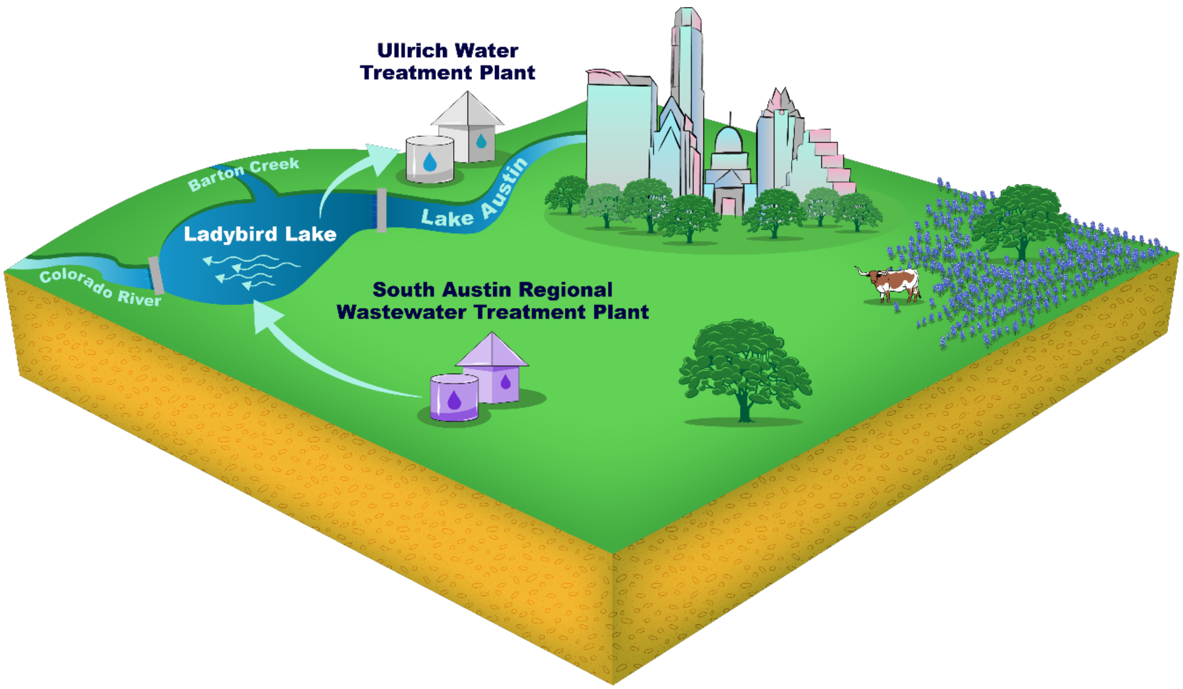
Agricultural & Natural Resources Considerations

Negligible impacts to agriculture are expected as a result of implementing this strategy. The pumping of water into this reservoir is anticipated to be conducted during wetter conditions when water is typically available to other users in the basin and during short-term high flow events within drought periods when interruptible customers would be expected to be cut off, per LCRA's Water Management Plan. Therefore, this strategy is anticipated to have negligible effects on other users.

5.2.3.2.7 Capture Local Inflows to Lady Bird Lake

This strategy for Austin involves capturing spring flows, including Barton Springs, and stormwater flows in Lady Bird Lake when they are not needed for downstream senior water rights including downstream instream flows under LCRA's Water Management Plan. This strategy facilitates the diversion of the city's run-of-river water during wetter periods and would plan to use the infrastructure installed as part of the Austin Indirect Potable Reuse through Lady Bird Lake strategy to convey water from Lady Bird Lake (LBL) to the intake at Ullrich Water Treatment Plant, as shown in **Figure 5.1**.

Figure 5.1 Capture Local Inflows to Lady Bird Lake and Indirect Potable Reuse through Lady Bird Lake Project



This strategy is expected to provide an annual yield of 3,000 ac-ft/yr over the Drought of Record conditions, once implemented, as shown in **Table 5.45**. Water availability for the Capture Local Inflows to Lady Bird Lake option would generally be intermittent and seasonal, with availability more likely in the months of November through February when downstream agricultural irrigation operations are offline. While the strategy may not intend to produce a yield year-round, the annual yield is modeled for Drought of Record conditions and that yield would be available on average in every year of the drought. Per the Austin Water Forward Plan, the strategy is expected to be online by 2050.

Table 5.45 Austin Capture Local Inflows to Lady Bird Lake Supply

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	0	3,000	3,000	3,000	3,000

In cases when local inflows to Lady Bird Lake are not available as a supplemental water supply, Austin Water, as a major water provider, will continue to use water from its Colorado River rights and LCRA back-up contract in addition to other water management strategies. Austin Water has an overall plan to use firm and other water supplies as a system to provide water through a Drought of Record.

Cost Implications of Proposed Strategy

The capital costs for the infrastructure required to convey the water captured in Lady Bird Lake to the Ullrich Water Treatment Plant are included in the Austin Indirect Potable Reuse through Lady Bird Lake strategy and are not included as part of this strategy.

Environmental Considerations

This strategy involves capturing spring flows, including Barton Springs, and stormwater flows in Lady Bird Lake when they are not needed for downstream senior water rights including downstream return flows under LCRA's Water Management Plan. Diversions are anticipated to generally be conducted during wetter periods when water is typically available to other users in the basin. Therefore, this strategy is anticipated to have negligible effects on downstream flows in the Colorado River and estuary flows to Matagorda Bay. There is not an additional water right permit anticipated to be required for this strategy.

Agricultural & Natural Resources Considerations

Impacts to agriculture, cultural resources, or natural resources including wildlife habitat are not expected.

5.2.3.2.8 Indirect Potable Reuse through Lady Bird Lake

Austin is proposing Indirect Potable Reuse (IPR) through Lady Bird Lake as a strategy. The strategy would consist of conveying a highly treated portion of the South Austin Regional Wastewater Treatment Plant discharge to Lady Bird Lake via a reclaimed water transmission main. Water would be withdrawn from Lady Bird Lake with an intake pump station and pumped into the Ullrich Water Treatment Plant intake line. The infrastructure associated with pulling the water from Lady Bird Lake for treatment at Ullrich Water Treatment Plant could also be used with the Capture Local Inflows to Lady Bird Lake strategy for Austin to provide a smaller amount of water more regularly under wetter conditions outside a drought, as shown in Figure 5.1 in Section 5.2.3.2.7.

The Austin Water Forward Plan recommends IPR only be used when the combined storage of Lakes Travis and Buchanan drops below 400,000 acre-feet.

Outside of drought emergencies, the intake and pump station from IPR can be used to capture local inflows to Lady Bird Lake, in particular from Barton Creek and Barton Springs. The reclaimed transmission infrastructure would be used to support the centralized reclaimed water system.

The Austin Water Forward Plan estimates that this strategy will be online by 2050, with yields of 22,400 ac-ft/yr as shown in **Table 5.46**.

Table 5.46 Austin Indirect Potable Reuse through Lady Bird Lake Supply

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	0	22,400	22,400	22,400	22,400

The major infrastructure required for this strategy includes:

- Transmission Pipelines (36-inch diameter, approximately 9 miles)
- Intake Pump Station (21 MGD) From Lady Bird Lake to Ullrich WTP
- Pump Station (19 MGD) From SAR WWTP to Lady Bird Lake
- Additional Treatment (20 MGD) at the WWTP Prior to Pumping to Lady Bird Lake
- Dechlorination at the WWTP Outfall (20 MGD)

As part of developing the indirect potable reuse strategy, a number of permitting and engineering analyses will need to be conducted. Project components to be addressed include water quality modeling, TCEQ permitting, and public education.

Cost Implications of Proposed Strategy

Capital costs were provided by Austin in December 2023 dollars. In order to provide a comparable cost consistent with other strategies in this report, annual costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars.

Table 5.47 shows the estimated costs associated with this strategy.

Table 5.47 Austin Indirect Potable Reuse through Lady Bird Lake Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$117,914,000	$173,044,000	$19,423,000	$867

Environmental Considerations

As stated previously, increased level of treatment of wastewater may be required to ensure sufficient water quality in Lady Bird Lake. Additional investigation will be required to evaluate environmental and water quality considerations and permitting in Lady Bird Lake.

This strategy helps satisfy a component of Austin demands already anticipated to be met through Colorado River diversions, particularly during drought and low reservoir storage conditions in lakes Travis and Buchanan.

There are no expected impacts to cultural resources. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

Impact to agriculture is negligible based on the projected return flow amounts over the planning period.

5.2.3.2.9 Brackish Groundwater Desalination

Austin Water's Water Forward Plan includes brackish groundwater desalination as a strategy for the 2070 planning horizon. Brackish groundwater is defined as groundwater containing between 1,000 and 9,999 milligrams per liter (mg/L) of total dissolved solids. To be utilized for potable use, brackish groundwater may be desalinated or blended with another source water with low total dissolved solids. Texas has already begun implementing brackish groundwater desalination projects, including the commissioning of a 27.5 MGD project by the City of El Paso in 2007 and a 12 MGD project by the San Antonio Water System in 2016.

The specific process used to desalinate water varies depending upon the total dissolved solids, the temperature, and other physical characteristics of the source water, but always requires disposal of concentrate, called brine, that has a higher total dissolved solids content than the source water. Austin Water has identified the following aquifers as potential sources for brackish groundwater: the Edwards, Trinity, Gulf Coast, and Carrizo-Wilcox. While Austin Water has not yet selected the aquifer source for this strategy, costs and yields were estimated based on extraction from the Trinity Aquifer and the saline portion of the Edwards Aquifer.

Per the Austin Water Forward Plan, the City is expecting this future strategy to provide approximately 20,000 ac-ft/yr in 2070 and up to 40,000 ac-ft/yr by 2080 (**Table 5.48**). Due to the MAG limitations and consistency with the regional water planning process, the full allocation of these amounts are not shown in the TWDB's database.

Table 5.48 Austin Brackish Groundwater Desalination Supply

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	0	0	0	20,000	40,000

Cost Implications of Proposed Strategy

Capital costs were provided by Austin in December 2023 dollars. In order to provide a comparable cost consistent with other strategies in this report, annual costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars. The Cost Estimating Tool was also used to determine operating costs.

Infrastructure costs associated with this strategy include:

- Transmission Pipeline (48-inch diameter, approximately 7 miles)
- Primary Pump Station (38 MGD)
- Well Fields (Wells, Pumps, and Collection Piping)
- Storage Tanks (Other Than at Booster Pump Stations)
- Advanced Water Treatment Facility (36 MGD)

Table 5.49 shows the estimated costs associated with this strategy.

Table 5.49 Austin Brackish Groundwater Desalination Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$433,104,000	$745,481,000	$102,667,000	$2,567

Environmental Considerations

Environmental permits will need to be obtained for the disposal of concentrate brine.

It is assumed that there would be no impacts to cultural resources, but applicable coordination with the Texas Historical Commission prior to construction will be performed. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Additionally, desalination facilities generally require greater energy demands in comparison to surface or low total dissolved solids (TDS) groundwater facilities. Austin would plan to pursue green energy sources for operation of a brackish desalination facility.

Agricultural & Natural Resources Considerations

There are negligible impacts to agriculture or natural resources with respect to acres of land anticipated from this strategy; however, the additional drawdown of the aquifer has the potential to impact agriculture by creating the need to lower pumps, redrill wells, and pay for additional electricity for pumping. As these impacts are indefinite, it is difficult to determine quantified costs associated with these potential impacts. However, the groundwater permitting process is a public process, and local groundwater users that may be affected have the ability to provide input regarding concerns on potential drawdown. Given the low permeability of the Trinity Aquifer in some areas, additional studies will be needed to determine the impacts of the proposed extraction location on the surrounding groundwater table.

5.2.3.2.10 Longhorn Dam Operations Improvements

This storage efficiency strategy consists of making improvements to Longhorn Dam. As part of this strategy, new bascule gate controls and operations will be installed to increase the efficiency of gate operations and reduce water loss downstream. Without this strategy in place, water lost out of Lady Bird Lake due to inefficiencies may need to be made up out of the Highland Lakes and would be unavailable to other users in the basin. Austin currently has projects in its Capital Improvement Plan (CIP) and is budgeting for improvements to Longhorn Dam that would help increase the dam's storage efficiency. Cumulatively, these projects are expected to deliver approximately 3,000 ac-ft/yr of water savings, as shown in **Table 5.50**.

Table 5.50 Austin Longhorn Dam Operations Improvement Yield

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
3,000	3,000	3,000	3,000	3,000	3,000

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by Austin Water about the cost for bascule gate improvements. In order to provide a comparable cost consistent with other strategies in this report, annual and unit costs were developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars.

The capital cost for this strategy is primarily driven by the improvements to the gates. **Table 5.51** shows the estimated costs associated with this strategy.

Table 5.51 Austin Longhorn Dam Operations Improvement Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$1,811,000	$2,603,000	$201,000	$67

Environmental Considerations

This strategy provides efficiencies that reduce unintended releases of water downstream in excess of environmental flow (instream flows) requirements, saving an estimated amount of up to 3,000 ac-ft/yr. LCRA manages the river system to meet downstream environmental flow needs and is ultimately responsible for ensuring instream flows requirements are being met. These requirements can be found in the LCRA Water Management Plan.

There are no expected impacts to cultural resources or wildlife habitat from this strategy.

Agricultural & Natural Resources Considerations

Negligible impacts to agriculture or natural resources are expected as a result of implementing this strategy.

5.2.3.2.11 Lake Austin Operations

Lake Austin is normally operated as a pass-through lake with relatively stable lake levels. This strategy would allow Lake Austin to operate with a varying level in the event that combined storage in lakes Travis and Buchanan drops below 600,000 acre-feet. This strategy would allow local flows to be captured during storm events and stored for use, as opposed to excess runoff spilling through the Tom Miller Dam to flow downstream. The level could vary by up to approximately 3 feet during months outside of the peak recreational period for Lake Austin. The period for operating with a variable level would potentially be in the months of October through May. This strategy would provide water supplies during the Drought of Record.

There are no capital costs and no new permits associated with this strategy, and it could be implemented fairly quickly if needed under Drought of Record conditions. Austin would plan to conduct a robust public outreach and education process in advance of possible implementation of this strategy.

The projected annual yields for the Drought of Record from this strategy are shown in **Table 5.52**.

Table 5.52 Austin Lake Austin Operations Yield

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
1,250	1,250	1,250	1,250	1,250	1,250

Cost Implications of Proposed Strategy

Annual costs were provided by the City and are shown in **Table 5.53**. In order to provide a comparable cost consistent with other strategies in this report, a unit cost was developed using the Texas Water Development Board (TWDB) Cost Estimating Tool in September 2023 dollars. No construction or capital costs were assumed. The costs listed include potential costs for professional public outreach resources and water treatment O&M costs to implement this strategy.

Table 5.53 Austin Lake Austin Operations Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$0	$0	$658,000	$530

Environmental Considerations

Environmental impacts are expected to be negligible.

Agricultural & Natural Resources Considerations

No impacts to agriculture, cultural resources, or wildlife habitat are expected as a result of implementing this strategy.

Impacts on Other Water Resources in the State

Minimal impacts to downstream flows are expected as a result of implementing this strategy.

5.2.4 Regional Water Management Strategies

There are several water management strategies that apply to multiple WUG categories, applied throughout the region. These strategies are discussed in this regional water management section of the report. For strategies specific to a category of water use (Municipal, Irrigation, Manufacturing, Mining, and Steam-Electric Power), refer to later sections of the report, including Sections 5.2.5, 5.2.6, 5.2.7, 5.2.8 and 5.2.9.

For municipal WUGs with shortages, water conservation (Section 5.2.2) was considered before these regional strategies.

5.2.4.1 Surface Water – New or Expanded

This section describes those water management strategies that involve new or expanded surface water sources. This can include those strategies that need infrastructure expansion with new or amended contracts for the source water, and those strategies where only a new or amended contract may be contemplated at this stage in the planning.

5.2.4.1.1 Aqua WSC – New Surface Water

Aqua WSC proposes a new surface water strategy that envisions either direct intake or Colorado River alluvium wells for raw water diversion. **Table 5.54** summarizes the estimated yields for Aqua WSC over the planning horizon.

Table 5.54 Aqua WSC – New Surface Water Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Aqua WSC	Bastrop	Colorado	0	0	0	8,000	8,000	8,000

Cost Implications of Proposed Strategy

Costs were provided by Aqua WSC in 2023 (**Table 5.55**). The infrastructure required for the project includes:

- Raw water intake or alluvium wells
- Four miles of 24-inch transmission main
- Water treatment plant

Table 5.55 Aqua WSC – New Surface Water Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Aqua WSC	Bastrop	Colorado	$30,731,000	$45,961,000	$2,639,000	$618

Environmental Considerations

Given the limited diversion amount, implementation of this strategy should have only a small incremental impact to instream flows and flows to the bay. Impacts from construction of wells and pipelines should be limited primarily to the construction period. The water treatment plant facility will take up approximately 20 acres of land.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

Any project that would require releases from lakes Buchanan and Travis, or other LCRA firm water supplies may decrease over time the amount of interruptible water available for agriculture. The extent of these impacts to interruptible water availability cannot reasonably be quantified as part of this regional planning process because it will be affected by the rate at which firm demands materialize and could also be affected by the timing and implementation of other strategies by LCRA to further enhance and optimize operation of its system of water supplies.

5.2.4.1.2 Marble Falls – Expanded Surface Water

The City of Marble Falls is anticipating a level of growth that significantly exceeds the projections included in this regional plan. The indicators of this expected growth are the number and size of proposed developments that are being presented to the city for consideration. A significant amount of the growth will be located on the south side of the Colorado River/Lake Marble Falls (**Table 5.56**). This area is served by a single water supply pipeline that crosses the US 281 bridge. The capacity limits of this pipeline combined with the limited production capacity of the existing water treatment plant drives the need for the city to provide additional water supply south of the river.

Table 5.56 Marble Falls – Expanded Surface Water Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Marble Falls	Burnet	Colorado	0	4,000	4,000	4,000	4,000	4,000

Marble Falls had a total annual authorization of 3,000 ac-ft/yr from LCRA to supply raw water for the existing water treatment plant. The city was successful in increasing its total authorization to 7,000 ac-ft/yr. While an increment of this authorization may be diverted and treated at the existing water plant, most of the additional authorization will be used to supply a new south water plant. A 4.0 MGD capacity water treatment plant is proposed to be located off Max Starcke Dam Road, east of US 281. The specific components of this new water plant and its impacts are addressed as follows.

Cost Implications of Proposed Strategy

Costs were provided by Marble Falls in 2024. The infrastructure required for the project includes

- New 4.0 MGD water treatment plant.
- Raw water intake and pump station.
- 0.65 miles of 24-inch transmission main.
- Access road and site improvements.

The cost for these facilities are derived from the Marble Falls *Draft Water Master Plan* and summarized in **Table 5.57**.

Table 5.57 Marble Falls – Expanded Surface Water Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Marble Falls	Burnet	Colorado	$72,190,000	$117,303,000	$12,234,000	$3,059

Environmental Considerations

The environmental impacts from this project are expected to be minimal. While this project is in the preliminary planning stage, the environmental studies and permitting that are expected to be required have not been performed. Based on the current land use in the area (agricultural land and residential lots along Lake Marble Falls), the construction of a new water treatment plant is not expected to have significant environmental impacts. The raw water intake, pump station, and pipeline to the new plant may have the most significant impacts. These impacts will be managed or minimized through the proposed design and construction. A Clean Water Act Section 404 permit will be obtained unless it is determined that the project can be authorized through one of the existing nationwide permits. Since this intake is located on Lake Marble Falls, the diversion of water is not expected to have downstream flow impacts, since those are regulated from upstream releases that flow through the lake.

Agricultural & Natural Resources Considerations

Any project that would require releases from lakes Buchanan and Travis or other LCRA firm water supplies may decrease over time the amount of interruptible water available for agriculture. The extent of these impacts to interruptible water availability cannot reasonably be quantified as part of this regional planning process because it will be affected by the rate at which firm demands materialize and could also be affected by the timing and implementation of other strategies by LCRA to further enhance and optimize operation of its system of water supplies.

5.2.4.1.3 West Travis County PUA – Expanded Surface Water

West Travis County PUA proposes an improvement project that increases their ability to divert and treat surface water from the Colorado River. The estimated yields are discussed in the expanded contracts Section 5.2.4.2.2.

Cost Implications of Proposed Strategy

The infrastructure required for the project would include:

- Two (2) 844 HP intake pump stations, for a total of 6.7 MGD transmitted flow, located adjacent to current pump station on the Colorado River at Bohls Hollow
- 2-mile, 30-inch raw water transmission main to existing WTCPUA-owned water treatment plant

The infrastructure for West Travis County PUA in this strategy was sized to provide treatment for both a WTCPUA contract amendment amount (5,500 ac-ft/yr) and an amendment amount for WTCPUA's treat and transport customers (2,000 ac-ft/yr). The Texas Water Development Board Cost Estimating Tool was used to size and cost infrastructure, with a peaking factor of 2 assumed. Consistent with the tool, all costs are given in September 2023 dollars. Land acquisition costs (for the raw water pump station and transmission main) and an annual $165/ac-ft water purchase cost is also assumed.

Costs for this strategy are detailed in **Table 5.58**. The largest portion of the costs is the intake pump stations.

Table 5.58 West Travis County PUA – Expanded Surface Water

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
West Travis County PUA	Hays, Travis	Colorado	$33,640,000	$46,782,000	$5,200,000	$693

Issues and Considerations

Amendment of existing contracts to meet increasing municipal, manufacturing, and steam-electric demands will provide for the needs of a growing population but could reduce the amount of interruptible water available for agricultural use and environmental flows as demands actually materialize and depending on what other strategies are implemented by LCRA to further enhance and optimize operation of its system of water supplies. Similarly, as firm water customers use more and more of their contracted water, the available interruptible supply could be reduced.

Environmental Considerations

Depending on the location of the contracted water, some environmental impacts to instream flows and freshwater inflows to Matagorda Bay can be expected from increased use of surface water higher in the basin. Increased firm demands for municipal uses will reduce the amount of interruptible water available for release. Interruptible water provides a benefit to instream flows as it travels downstream to the diversion points. Individual WUG implementation of this strategy has negligible impacts to streamflows and the bay. There are zero anticipated impacts to cultural resources.

Agricultural & Natural Resources Considerations

In general, the increasing municipal needs for water will have some impact on agriculture as the available supply of interruptible water gradually diminishes over time. The extent of these impacts to interruptible water availability cannot reasonably be quantified as part of this regional planning process because it will be affected by the rate at which firm demands materialize and could also be affected by the timing and implementation of other strategies by LCRA to further enhance and optimize operation of its system of water supplies.

5.2.4.2 Surface Water - Contract-Only Strategies

Region K has identified shortages in the region that could be covered through a new or expanded water sale contract for surface water. Because LCRA is by far the largest wholesale provider in the region, they are the likely source for future surface water contracts. Those contracts that are new, versus existing LCRA customers who may seek expanded contracts, are discussed in sections 5.2.4.2.1 and 5.2.4.2.2.

5.2.4.2.1 New Contracts

This section includes certain current wholesale customers of Austin whose contracts are expected to expire during the planning period (**Table 5.59**), as well as WUGs that have never had a raw water contract and are anticipating entering into one by 2030 (**Table 5.60**).

Certain wholesale customers currently receiving water from Austin may need to obtain raw water contracts from another party, likely LCRA, in the future. Austin plans to continue to treat and transport this water. This raw water contracting approach generally does not apply to Austin wholesale customers that are Municipal Utility Districts (MUDs), since Austin generally plans to annex these areas in the future, consistent with the MUD's creation agreements with Austin. As new customers, contracts for water supplied to these customers will come from any source available to LCRA at the time the customer uses water. Table 5.59 summarizes the likely new LCRA contracts over the planning horizon. The amounts in Table 5.59 are set to the projected first-tier needs of the WUGs as approximation of what contract might be needed.

Table 5.59 New Contract Supply for Austin Wholesale Customers

WUG	County	Basin	Water Management Strategy Supply (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Creedmoor Maha	Travis	Colorado	0	273	305	337	373	414
Mid-Tex Utility	Hays, Travis	Colorado	0	457	594	755	937	1,143
North Austin MUD 1	Travis, Williamson	Colorado, Brazos	0	979	979	979	979	979
Northtown MUD	Travis	Colorado	0	699	728	761	797	838
Rollingwood	Travis	Colorado	0	405	410	417	426	434
Shady Hollow	Travis	Colorado	0	595	607	621	637	654
Sunset Valley	Travis	Colorado	0	284	284	284	284	284
Wells Branch MUD	Travis, Williamson	Colorado, Brazos	0	1,562	1,581	1,585	1,585	1,585
		Total	0	5,254	5,488	5,739	6,018	6,331

The next strategy is for the City of Llano to become a firm water customer of LCRA. This would "firm up" Llano's water rights up to a certain amount. LCRA and the City of Llano have begun discussions, but the actual terms of the agreement have not yet been reached. For regional planning purposes, the supply from this strategy is Llano's first-tier need (the difference between the City's demand and the 120 ac-ft/yr of firm yield for existing supply) though the actual contract quantity may ultimately differ. This strategy has no infrastructure associated with it and the costs are simply the annual costs of the firm water contract.

Table 5.60 New Contract Supply for Others

WUG	County	Basin	Water Management Strategy Supply (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Llano	Llano	Colorado	675	684	697	696	696	696
		Total	675	684	697	696	696	696

Cost Implications of Proposed Strategy

Capital expenditures for water supply purposes were not assumed to be required to implement this strategy. The average cost of providing raw water under this strategy is $165/ac-ft in September 2023 dollars.

Issues and Considerations

Much of the water that would be dedicated to new LCRA contracts in Travis County is already being supplied through Austin Water. Based on Austin's raw water contracting plans in this manner, the only change will be that LCRA will contract directly with those certain wholesale customers for raw water instead of Austin Water, and Austin Water will continue to treat and transport the water to these entities.

Environmental Considerations

Individual WUG implementation of this strategy has negligible impacts to streamflows and the bay, but full regional implementation could remove up to 8,712 ac-ft/yr from LCRA sources by 2080. There are zero anticipated impacts to cultural resources.

Agricultural & Natural Resources Considerations

Any large new contracts that would need to use supplies from lakes Buchanan and Travis or other LCRA firm water supplies may decrease over time the amount of interruptible water available for agriculture. The extent of these impacts to interruptible water availability cannot reasonably be quantified as part of this regional planning process because it will be affected by the rate at which firm demands actually materialize and could also be affected by the timing and implementation of other strategies by LCRA to further enhance and optimize operation of its system of water supplies.

5.2.4.2.2 Expanded Contracts

Some existing LCRA customers have increasing demands that will exceed their current contracts, resulting in first-tier needs for those WUGs. The proposed strategy simply assumes that their contracts can be increased to meet the increasing demands. Some of the increased needs several decades in the future may be of such magnitude such that significant infrastructure changes must be made to accommodate them. However, those infrastructure changes have not been characterized in detail, so their eligibility for financing under planning rules are currently unknown. These potential projects can be better characterized in upcoming cycles, as better information becomes available. The current purpose of quantifying these expanded contract strategies is to account for the additional water demand and compare it against the LCRA strategy yields. The yields for the strategies were assumed to be the first-tier needs of the existing customers, shown in **Table 5.61**. Additional detail on the first-tier needs for these WUGs can be found in Section 4.3.1.

Table 5.61 Expanded Contract Yield for Existing LCRA Customers

WUG	County	Basin	Water Management Strategy Yield (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Briarcliff	Travis	Colorado	76	181	274	366	470	588
Cedar Park*	Travis	Colorado	385	583	678	656	635	614
Cottonwood Shores	Burnet	Colorado	-	-	-	-	-	7
Jonestown WSC	Travis	Colorado	111	279	484	729	1,023	1,376
Kingsland WSC	Burnet, Llano	Colorado	-	-	-	126	355	622

Table 5.61 Expanded Contract Yield for Existing LCRA Customers

WUG	County	Basin	Water Management Strategy Yield (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Lago Vista	Travis	Colorado	-	1,084	3,522	5,853	6,397	6,941
Leander*	Travis	Colorado	-	-	236	252	252	252
Manufacturing, Burnet	Burnet	Colorado	144	150	156	162	168	175
Manufacturing, Matagorda	Matagorda	Colorado	1,300	1,573	1,856	2,150	2,454	2,770
Pflugerville	Travis	Colorado	-	-	-	-	-	1,527
Travis County MUD 10	Travis	Colorado	5	41	72	103	137	176
Travis County WCID 10	Travis	Colorado	-	61	267	487	734	1,013
Travis County WCID 17	Travis	Colorado	-	2,024	4,401	6,753	9,423	12,453
Travis County WCID 20	Travis	Colorado	221	220	220	220	220	220
Travis County WCID Point Venture	Travis	Colorado	125	210	314	440	593	778
West Travis County Public Utility Agency	Travis, Hays	Colorado	1,771	6,951	12,635	19,520	27,328	36,185
Reunion Ranch WCID	Hays	Colorado	-	104	287	537	819	1,140
Hays County WCID 1	Hays	Colorado	86	84	84	84	84	84
Hays County WCID 2	Hays	Colorado	93	91	91	91	91	91
Dripping Springs WSC	Hays	Colorado	551	1,793	3,603	4,689	4,689	4,689
		Total	**4,924**	**15,485**	**29,236**	**43,274**	**55,928**	**71,757**

**Region K portion of WUG's first-tier needs*

Cost Implications of Proposed Strategy

Capital expenditures for water supply purposes were not assumed to be required to implement this strategy. The average cost of providing raw water under this strategy is $165/ac-ft in September 2023 dollars.

Environmental Considerations

Individual WUG implementation of this strategy has negligible impacts to streamflows and the bay, but full regional implementation could remove up to 71,757 ac-ft/yr from LCRA sources by 2080. There are zero anticipated impacts to cultural resources.

Agricultural & Natural Resources Considerations

Any large new contracts that would need to use supplies from lakes Buchanan and Travis or other LCRA firm water supplies may decrease over time the amount of interruptible water available for agriculture. The extent of these impacts to interruptible water availability cannot reasonably be quantified as part of this regional planning process because it will be affected by the rate at which firm demands actually materialize and could also be affected by the timing and implementation of other projects.

5.2.4.3 Expanded Local Use of Groundwater

This group of strategies includes WUGs with existing groundwater sources that may be seeking to expand the amount of groundwater they produce from that source or sources to meet their increasing needs. The general strategy is divided into sections by aquifer.

5.2.4.3.1 Carrizo-Wilcox Aquifer

This strategy would involve pumping additional groundwater from the Carrizo-Wilcox Aquifer, either using the WUG's existing wells or drilling additional wells. This additional water, referred to as remaining supply, is limited by the available water under the Modeled Available Groundwater (MAG).

Table 5.62 presents the WUGs that would utilize this strategy along with the implementation decade and the amount of water to be pumped.

Table 5.62 Carrizo-Wilcox Aquifer Expansion Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Bastrop County WCID 2	Bastrop	Colorado	100	200	300	400	600	750
County-Other	Bastrop	Colorado	0	0	0	0	0	850

This strategy was applied to the following WUGs in Bastrop County: Bastrop County WCID 2 and County-Other, Bastrop.

Cost Implications of Proposed Strategy

Table 5.63 presents a summary of the probable costs for each WUG utilizing this strategy. The four cost components analyzed during cost estimation of this strategy were: Total Facilities Cost, Total Project Cost, Annual Cost, and Unit Cost.

Bastrop County WCID 2 currently has groundwater supplied by wells in the Carrizo-Wilcox Aquifer. This strategy envisions an expansion of the wellfield that is about 3 miles east of their primary service area. The 750 acre-feet per year maximum yield would require two additional wells, 1,000 feet deep with yields of 375 gpm. A new 10-inch pipeline was assumed to be required for the increased water volume, and was one of the primary contributors to cost.

County-Other, Bastrop does not show a need until 2080. The Carrizo-Wilcox Aquifer expansion strategy envisions adding two additional wells, 1,000 feet deep with yields of 450 gpm. A small pump station and an 8-inch pipeline was assumed to be needed for each of the additional wells. Because this strategy is not directed at any specific utility, the actual transmission and pump station needs may be determined in the future.

Table 5.63 Carrizo-Wilcox Aquifer Expansion Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Annual Cost	Unit Cost ($/ac ft)
Bastrop County WCID 2	Bastrop	Colorado	$5,698,000	$7,926,000	$653,000	$871
County-Other	Bastrop	Colorado	$3,538,000	$4,943,000	$443,000	$521

Environmental Considerations

The environmental impacts of expanded groundwater use will vary depending upon site characteristics. Some impacts may occur from the expansion of existing groundwater infrastructure, but well sites are generally small in areal extent, and the disturbance from pipeline construction is temporary. The water supply is within the Modeled Available Groundwater (MAG), so this strategy could contribute to drawdown in the aquifer of up to 240 feet by 2070, relative to January 2000 conditions. The Groundwater Conservation Districts will monitor the aquifer levels for any needed changes to the identified available volume.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

There are negligible impacts to agriculture or natural resources with respect to acres of land anticipated from this strategy; however, the additional drawdown of the aquifer has the potential to impact agriculture by creating the need to lower pumps, redrill wells, and pay for additional electricity for pumping. As these impacts are indefinite, it is difficult to determine quantified costs associated with these potential impacts. However, the groundwater permitting process is a public process, and local groundwater users that may be affected have the ability to provide input regarding concerns on potential drawdown.

5.2.4.3.2 Ellenburger-San Saba Aquifer

This strategy would involve pumping additional groundwater from the Ellenburger-San Saba Aquifer by drilling additional wells. The Ellenburger-San Saba Aquifer is a critical source of water in the Texas Hill Country, with these strategies proposed for WUGs in Burnet, Gillespie, and San Saba counties.

Table 5.64 presents a summary of these strategies along with the implementation decade and the amount of water to be produced.

Table 5.64 Ellenburger-San Saba Aquifer Expansion Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Bertram	Burnet	Colorado	500	600	700	800	950	1,100
Mining	Burnet	Colorado	250	250	250	250	250	250
Manufacturing	Burnet	Colorado	80	80	80	80	80	80
Irrigation	San Saba	Colorado	650	650	650	650	650	650
Irrigation	Gillespie	Colorado	100	100	100	100	100	100
Manufacturing	Gillespie	Colorado	150	150	150	150	150	150
County-Other	Gillespie	Colorado	0	25	75	100	150	200

This strategy was applied to the following WUGs: City of Bertram, Mining, and Manufacturing in Burnet County; Irrigation in San Saba County; Irrigation, Manufacturing, and County-Other in Gillespie County.

Cost Implications of Proposed Strategy

Table 5.65 presents a summary of the probable costs for each WUG utilizing this strategy. The four cost components analyzed during cost estimation of this strategy were: Total Facilities Cost, Total Project Cost, Annual Cost, and Unit Cost. The costs of the groundwater supply strategies were estimated using the Texas Water Development Board (TWDB) Cost Estimating Tool.

The City of Bertram strategy envisions three new 500 gpm wells south of Burnet in the same general area as the existing Ellenburger wells that currently supply most of their drinking water. The strategy would include a new pump station and an upgrade to the approximate 12 miles of pipeline required to bring the water east to Bertram. The existing pipeline is 8-inch, the new pipeline was assumed to be 16-inch. The costs include land and water rights lease of $60 per acre-foot per year.

Mining supply from groundwater in Burnet County primarily comes from the Ellenburger-San Saba Aquifer in the form of using pit water. Pit water is comprised of both surface and groundwater. A 2023 analysis for the Texas Materials mine in Burnet County in support of a permit application estimated that about 50% of the pit water that was used was captured rainfall runoff from the site. The use of local surface water as a strategy for mining water supply is discussed in Section 5.2.4.4. In addition to pit water use, some mines may supplement with groundwater use from wells. Discussions with Central Texas Groundwater Conservation District staff resulted in an estimate that about 25% of water use was from wells, with the remaining 75% from pit water. So, for a total Burnet County mining water supply yield of 500 acre-feet per year, 250 acre-feet per year comes from local surface water and 250 acre-feet per year comes from pit water, with an estimated 125 acre-feet per year from wells. A typical well was assumed to be 300 feet deep and yield 40 gpm, and two wells were required. A small amount of wellfield piping was assumed to be required. Note that the expanded use of pit water is assumed to have minimal additional cost to the mine.

Manufacturing supply from groundwater in Burnet County is primarily associated with finishing products from the aggregate mines and rock quarries. As with the general mining demands, the water is assumed to primarily come from pit water, with 25% from wells. A typical well was assumed to be 300 feet deep and yield 40 gpm, and two wells were required. A small amount of wellfield piping was assumed to be required.

Irrigation supply in San Saba county comes from the Ellenburger-San Saba and Hickory aquifers. Strategies to cover their future needs envision additional groundwater development from these aquifers. The aquifer utilized will depend on where the irrigation is needed in the county. The assumption is that about half of the additional groundwater will come from the Ellenburger, and half will come from the Hickory. Because typical wells are of similar depth and productivity in both aquifers, the costs of the strategy for both aquifers combined is covered in this section, but the yields are covered separately for the purposes of accounting against each aquifer MAG (Section 5.2.4.3.3 discusses the Hickory Aquifer strategies). A typical well was assumed to be 350 feet deep and produce about 100 gpm. A 1,500-foot, 8-inch diameter pipeline was assumed to be needed for every three wells to bring water from the corner of a quarter-section field to the center pivot. Nine wells were estimated to be needed to meet the combined 1,300 acre-feet yield from the Ellenburger-San Saba and Hickory aquifers.

Irrigation supply in Gillespie County comes from the Ellenburger-San Saba, Hickory, and Edwards-Trinity Plateau aquifers. According to Hill Country Underground Water Conservation District estimates, the greatest use is from the Ellenburger-San Saba, so the expanded use for this strategy is also assumed to come from that aquifer. The strategy assumes a typical well 300 feet deep, with a yield of 100 gpm. Because only one well is needed to meet the total strategy yield of 100 acre-feet per year, no additional pipelines beyond a 250-foot, 6-inch diameter tie-in line is assumed to be needed.

Manufacturing supply in Gillespie County comes from the Ellenburger-San Saba, Hickory, and Edwards-Trinity Plateau aquifers. The proposed strategy envisions an additional 150 acre-feet per year from the Ellenburger-San Saba aquifer. The strategy assumes a typical well 300 feet deep, with a yield of 100 gpm. Two wells are needed to meet the 150 acre-feet per year total strategy yield. Limited transmission was assumed to be needed.

County-other supply in Gillespie County comes from Ellenburger-San Saba, Hickory, and Edwards-Trinity Plateau aquifers. According to Hill Country Underground Water Conservation District (HCUWCD) estimates, the greatest use is from the Edwards-Trinity Plateau, followed by the Ellenburger-San Saba Aquifer, so the expanded use for this strategy is also assumed to come from those two aquifers, with 600 of the 800 acre-feet per year of overall demand from the Edwards-Trinity Plateau Aquifer and the 200 remaining acre-feet per year from the Ellenburger-San Saba Aquifer. These estimates are based on the current proportion of domestic use from each of the aquifers. Discussions with HCUWCD staff estimated that most of the additional groundwater development will come in the form of private wells, so costs were developed under this assumption. A private well was assumed to cost $20,000 (based on discussion with local drillers) and produce 0.4 acre-feet, based on approximate average household use for the county. The total Supply of 800 acre-feet would thus require 2,000 additional private wells over the next 50 years, with 500 of those producing from the Ellenburger-San Saba Aquifer. The total capital cost per well was estimated to be $27,000 with a total annual cost of $2,000.

Table 5.65 Ellenburger-San Saba Aquifer Expansion Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Annual Cost	Unit Cost ($/ac ft)
Bertram	Burnet	Colorado	$32,589,000	$44,781,000	$3,785,000	$1,893
Mining	Burnet	Colorado	$264,000	$372,000	$32,000	$64
Manufacturing	Burnet	Colorado	$150,000	$211,000	$17,000	$97
Irrigation[1]	San Saba	Colorado	$2,311,000	$3,260,000	$341,000	$262
Irrigation	Gillespie	Colorado	$166,000	$233,000	$18,000	$180
Manufacturing	Gillespie	Colorado	$368,000	$518,000	$45,000	$300
County-Other[2]	Gillespie	Colorado	$10,000,000	$13,500,000	$1,000,000	$4,878

[1]*total costs for wells in both Ellenburger-San Saba and Hickory Aquifers*

[1]*total costs for wells in both the Edwards Trinity (Plateau) and Ellenburger-San Saba Aquifers*

Environmental Considerations

The environmental impacts of expanded groundwater use from the Ellenburger-San Saba Aquifer will vary depending upon site characteristics but are not expected to be significant. Some impacts may occur from the expansion of existing groundwater infrastructure, but well sites are generally small in areal extent and the disturbance from pipeline construction is temporary. The water supply is within the Modeled Available Groundwater (MAG), as described in Chapter 3, Section 3.2.2.4. The Groundwater Conservation Districts will monitor the aquifer levels for any needed changes to the identified available volume.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by County of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

The Ellenburger-San Saba is a source of water supply for agricultural interests in Burnet, Blanco, Gillespie, Llano, and San Saba counties. There are negligible impacts to agriculture or natural resources with respect to acres of land anticipated from this strategy; however, the additional drawdown of the aquifer has the potential to impact agriculture by creating the need to lower pumps, redrill wells, and pay for additional electricity for pumping. As these impacts are indefinite, it is difficult to determine quantified costs associated with these potential impacts. However, the groundwater permitting process is a public process, and local groundwater users that may be affected have the ability to provide input regarding concerns on potential drawdown.

5.2.4.3.3 Hickory Aquifer

This strategy would involve pumping additional groundwater from the Hickory Aquifer, by drilling additional wells. Irrigation in San Saba County is the only strategy relying on expansion of groundwater development from the Hickory Aquifer. The Hickory Aquifer is assumed to provide about half of the additional irrigation supply, while the Ellenburger-San Saba would provide the other half. The estimated yield from Hickory wells is shown in

Table 5.66. The costs, environmental impacts, and agricultural considerations are provided for the combined strategy are provided in the previous section.

Table 5.66 Hickory Aquifer Expansion Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Irrigation	San Saba	Colorado	650	650	650	650	650	650

5.2.4.3.4 Edwards-Trinity (Plateau) Aquifer

This strategy would involve pumping additional groundwater from the Edwards Trinity (Plateau) Aquifer, by drilling additional wells. County-Other, Gillespie is the only WUG relying on additional supply from the Edwards-Trinity (Plateau) Aquifer, combined with additional supply from the Ellenburger-San Saba Aquifer. The estimated yield from Edwards-Trinity (Plateau) Aquifer wells is shown in **Table 5.67**. The costs, environmental impacts, and agricultural considerations are provided for the combined strategy are provided in Section 5.2.4.3.2.

Table 5.67 Edwards-Trinity (Plateau) Aquifer Expansion Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
County-Other	Gillespie	Colorado	50	150	250	400	600	800

5.2.4.3.5 Gulf Coast Aquifer

This strategy would involve pumping additional groundwater from the Gulf Coast Aquifer, either using the WUG's existing wells or drilling additional wells. This additional water, referred to as remaining supply, was determined by subtracting the water that is currently allocated from the available water.

The only WUG associated with this strategy is irrigation in Colorado County, in the Lavaca basin. As discussed in Chapter 4, there are significant irrigation needs in Colorado, Wharton, and Matagorda counties. However, the managed available groundwater (MAG) limits the amount of groundwater that can be associated with future strategies in Wharton and Matagorda counties. The remaining MAG in Colorado County is assumed to be utilized through this expansion of groundwater use.

Table 5.68 presents the WUGs that would utilize this strategy along with the implementation decade and the amount of water to be pumped.

Table 5.68 Gulf Coast Aquifer Expansion Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Irrigation	Colorado	Lavaca	12,000	12,000	12,000	12,000	12,000	12,000

Cost Implications of Proposed Strategy

Table 5.69 presents a summary of the probable costs for each WUG utilizing this strategy. The four cost components analyzed during cost estimation of this strategy were: Total Facilities Cost, Total Project Cost, Annual Cost, and Unit Cost.

The costs of the groundwater supply strategies were estimated using the Texas Water Development Board (TWDB) Cost Estimating Tool. Recent high-capacity irrigation wells drilled in Colorado County have yields of about 3,000 gpm and were between 800 and 1,000 feet deep. To achieve the overall yield would require 6 wells, assuming that the wells are utilized about half the year during the growing season. A half-mile of 16-inch piping was assumed to be required for each well.

Table 5.69 Gulf Coast Aquifer Expansion Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Irrigation	Colorado	Lavaca	$14,036,000	$19,657,000	$2,336,000	$195

Environmental Considerations

The environmental impacts of expanded groundwater use will vary depending upon site characteristics but are not expected to be significant. Some impacts may occur from the expansion of existing groundwater infrastructure, but well sites are generally small in areal extent and the disturbance from pipeline construction is temporary. No Gulf Coast Aquifer strategies are proposed to surpass the current, available yield of the aquifers as determined in Chapter 3.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

This strategy will help meet the needs of agricultural users in the region by providing additional groundwater supply to the irrigation WUGs listed in Table 5.69; however, the additional drawdown of the aquifer has the potential to impact agriculture by creating the need to lower pumps, redrill wells, and pay for additional electricity for pumping. As these impacts are indefinite, it is difficult to determine quantified costs associated with these potential impacts. However, the groundwater permitting process is a public process and local groundwater users that may be affected have the ability to provide input regarding concerns on potential drawdown.

5.2.4.3.6 Trinity Aquifer

This strategy would involve pumping additional groundwater from a currently used source, either using their existing wells or drilling additional wells. **Table 5.70** presents the WUGs that would utilize this strategy along with the implementation decade and the amount of water to be pumped.

Table 5.70 Trinity Aquifer Expansion Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Dripping Springs WSC	Hays	Colorado	0	0	300	300	300	300
Mining	Hays	Colorado	325	325	325	325	325	325
Mining	Mills	Brazos	130	130	130	130	130	130
County-Other	Gillespie	Colorado	0	75	225	300	450	600

This strategy was applied to Dripping Springs WCS, mining in Hays County, mining in Mills County, and county-other in Gillespie County.

Cost Implications of Proposed Strategy

Table 5.71 presents a summary of the probable costs for each WUG utilizing this strategy. The costs of the groundwater supply strategies were estimated using the Texas Water Development Board (TWDB) Cost Estimating Tool.

Dripping Springs WSC provided information on their existing wellfield and the distance needed to transport additional groundwater from the wellfield to their system. While they appear to have some excess capacity in their current wellfield, for the purposes of conservatism, we assumed that one additional well and a pipeline upgrade would be required to accommodate the additional groundwater supply. The pipeline was estimated to be 8-inch and about 3 miles in length. An additional 15 horsepower pump station would be required to move the additional supply through the pipeline.

For mining in Mills County, four additional wells producing a maximum of 25 gpm were assumed to be needed to produce an average of 130 ac-ft/yr. Wells on mine sites are typically drilled close to the transmission system and require limited additional piping or pump stations, so 200-foot lines connecting the wells were assumed with one 500-foot trunkline, all 6-inch piping.

For mining in Hays County, two additional wells, 1,200 feet deep, producing a maximum of 200 gpm were assumed to be needed to produce and average of 325 ac-ft/yr. Wells on mine sites are typically drilled close to the transmission system and require limited additional piping or pump stations, so 200 foot-lines connecting the wells were assumed with one 500-foot trunkline, all 6-inch piping.

The combined County-Other strategy for Gillespie County that includes both the Ellenburger-San Saba and Trinity aquifers is discussed in Section 5.2.4.3.2.

Table 5.71 Trinity Aquifer Expansion Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Dripping Springs WSC	Hays	Colorado	$5,275,000	$7,442,000	$601,000	$2,003
Mining	Mills	Brazos	$493,000	$696,000	$61,000	$469
Mining	Hays	Colorado	$1,038,000	$1,453,000	$131,000	$403
County-Other	Gillespie	Colorado	$30,000,000	$40,500,000	$3,000,000	$4,878

Environmental Considerations

The construction of wells and pipelines, if properly managed, are expected to produce negligible impacts to the environment, and primarily during the construction period itself. The water supply is within the Modeled Available Groundwater (MAG) in each case.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

There are negligible impacts to agriculture or natural resources with respect to acres of land anticipated from this strategy; however, the additional drawdown of the aquifer has the potential to impact agriculture by creating the need to lower pumps, redrill wells, and pay for additional electricity for pumping. As these impacts are indefinite, it is difficult to determine quantified costs associated with these potential impacts. However, the groundwater permitting process is a public process, and local groundwater users that may be affected have the ability to provide input regarding concerns on potential drawdown.

5.2.4.4 Local Surface Water

Local surface water is runoff captured onsite during rain events. In Region K, this strategy is applied only to large aggregate mines in Burnet County. Burnet County is the location of multiple aggregate and stone mines covering hundreds of acres each. Because the mining lowers the ground and creates large pits on the site, runoff during rain events tends to collect on site in these pits. Many of these pits also interact with the groundwater table, i.e., if the pit is emptied, groundwater may seep into the pit at a rate determined by the number of flowing fractures intersected by the pit.

When long droughts occur, pit water that is used by the mine may be comprised of groundwater. Other times, most of the pit water is comprised of local runoff. A recent analysis that was completed as part of a groundwater permit for Texas Materials (Westward Environmental, 2024) concluded that about 50% of pit water use was comprised of groundwater, with the remaining 50% surface water. Note that the manufacturing need in Burnet County is primarily comprised of finishing stone or other products at the mine sites, so they use a similar water source as other mine operations. The yields from the proposed strategy are shown in **Table 5.72**.

Table 5.72 Local Surface Water Supply

WUG	County	Basin	2030	2040	2050	2060	2070	2080
Mining	Burnet	Colorado	250	250	250	250	250	250
Manufacturing	Burnet	Colorado	80	80	80	80	80	80

Cost Implications of Proposed Strategy

Pit water from runoff at a mine site is collected and managed as a part of day-to-day operations, so no additional cost was assumed for this strategy, as noted in **Table 5.73**.

Table 5.73 Local Surface Water Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Mining	Burnet	Colorado	$0	$0	$0	$0
Manufacturing	Burnet	Colorado	$0	$0	$0	$0

Environmental Considerations

Water from this strategy is captured on site, so no additional environmental impacts other than those associated with the mining operation itself are anticipated. Potential environmental impacts to groundwater can occur if untreated or contaminated surface water is introduced to the groundwater system, but the strategy of using surface water runoff rather than letting that water remain in pits does not increase the probability of this occurring.

Agricultural & Natural Resources Considerations

No impacts to agricultural or other natural resources are anticipated as part of this strategy.

5.2.4.5 Aquifer Storage and Recovery

The basic definition of aquifer storage and recovery (ASR) is the storage of water in a suitable aquifer during times of excess water supply, and the recovery of the water from the same aquifer during times of greater water demand. Water is injected and removed from the aquifer through wells. ASR has the benefit of underground storage, so there is no evaporation, and dedicated storage tanks or reservoirs do not have to be built. There are also fewer environmental issues compared to surface storage because it does not change the surface of the land. This type of strategy is currently being used by cities in Texas including San Antonio, Kerrville, and El Paso.

5.2.4.5.1 Aqua WSC - ASR

The ASR strategy proposed by Aqua Water Supply Corporation (Aqua WSC) involves the use of the Simsboro Aquifer, a key formation within the Carrizo-Wilcox Aquifer system, located in Bastrop County, Colorado River Basin. This approach aims to enhance the resilience of Aqua WSC’s potable water supply by storing system water during periods of low demand and recovering it during peak demand or drought conditions.

The ASR system will include six recharge and recovery wells in and around Camp Swift, supported by transmission infrastructure connecting Aqua WSC's treatment and aboveground storage facilities to the wellfield. The ASR wells will be completed in the Simsboro Aquifer. The yield shown in **Table 5.74** is phased in under the assumption that the project would scale from a single well to multiple wells over time. The yield assumes a recoverability of near 100% once the target storage volume is established, since the operation will primarily be for summer peaking (limited time for bubble drift) and the storage zone is potable.

Table 5.74 Aqua WSC - ASR Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Aqua WSC	Bastrop	Colorado	3,000	4,500	5,000	5,000	5,000	5,000

Cost Implications of Proposed Strategy

Aqua WSC provided current planning level costs for this strategy. Primary infrastructure includes:

- Six 1,000 gpm recharge/recovery wells
- 2,100 feet of 24-inch pipeline

Table 5.75 below shows the estimated costs for this strategy.

Table 5.75 Aqua WSC - ASR Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Aqua WSC	Bastrop	Colorado	$13,644,000	$18,829,000	$1,081,000	$365

Environmental Considerations

TCEQ permits will be required to ensure the facility complies with all environmental considerations. This includes an aquifer study to determine the impact of the strategy on the proposed storage aquifer. Because an equal amount of water is recharged to the aquifer as is recovered, there is a net-zero effect on the groundwater system.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

Negligible impacts to natural resources are expected as a result of implementing this strategy. If it is used for municipal or manufacturing purposes, it would have no impact on agriculture, including zero agricultural acres impacted.

5.2.4.5.2 Buda - Edwards/Middle Trinity ASR

Buda operates an existing ASR well, storing water from the Edwards Aquifer in the deeper Trinity Aquifer. The water from the Edwards Aquifer that is used to recharge the ASR is subject to drought curtailment due to the terms of their permit with Barton Springs Edwards Aquifer Groundwater Conservation District (BSEACD). Storing the water in the Trinity Aquifer makes it available under drought conditions. This strategy envisions adding an ASR well that is similar to their existing well that is currently in operation.

The following infrastructure is assumed to be required to implement the strategy for Buda:

- Existing wells should have capacity to extract the needed Edwards-Balcones Fault Zone (BFZ) Aquifer water, so no new extraction wells are assumed in the costing.
- Minimal treatment required
- One (1) new recharge/recovery well, used to both inject and extract water to/from the Middle Trinity Aquifer. Since the Middle Trinity Aquifer overlaps with the Edwards aquifer, it is assumed that the wells extracting from Edwards and the wells injecting into Middle Trinity can be located in close proximity. Thus, no intermediate pump stations or pipelines are assumed.
- New transmission pump station and pipeline to convey the water to the point of use. It is assumed that 1 mile of pipeline is sufficient to convey the water into the existing distribution system, for the various water users. Costs would be higher or lower, depending on actual distance.

Table 5.76 summarizes the yields by decade for this strategy. Buda has accounted for their estimated initial recoverability of 76% (from their TCEQ application) in the yield estimate. Note that this lower recoverability estimate is due to the relatively high natural gradient, and does not account for the fact that the native groundwater is potable.

Table 5.76 Buda - Edwards/Middle Trinity ASR Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Buda	Hays	Colorado	600	600	600	600	600	600

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on depth and yield information from the existing Buda ASR well and were computed using the Texas Water Development Board (TWDB) Cost Estimating Tool. Consistent with the tool, all costs are given in September 2023 dollars.

Table 5.77 shows the estimated costs for this strategy.

Table 5.77 Buda – Edwards/Middle Trinity ASR Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Buda	Hays	Colorado	$4,416,000	$6,115,000	$517,000	$862

Environmental Considerations

BSEACD and TCEQ permits will be required to ensure the facility complies with all environmental considerations. This includes an aquifer study to determine the impact of the strategy on the proposed storage aquifer.

During average rainfall, the strategy may decrease springflow by removing up to an additional 600 ac-ft/yr for storage, within permitted amounts. Negligible impacts are expected during drought periods.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

Negligible impacts to natural resources are expected as a result of implementing this strategy. If water is used for irrigation purposes, it would provide up to an additional 600 ac-ft/yr of water supply for agriculture. If it is used for municipal or manufacturing purposes, it would have no impact on agriculture, including zero agricultural acres impacted.

5.2.4.6 Brackish Groundwater

Brackish groundwater is defined as groundwater containing between 1,000 and 9,999 milligrams per liter (mg/L) of total dissolved solids. To be utilized for potable use, brackish groundwater may be desalinated or blended with another source water with low total dissolved solids.

5.2.4.6.1 Aqua WSC - Brackish Groundwater Blending

With brackish groundwater blending, brackish water is mixed with fresh water in a ratio that produces fresh water. The blend ratio is dependent on the chemical characteristics of the fresh and brackish sources, but the end water quality must meet primary drinking water standards, and generally is targeted to have less than 1,000 mg/L total dissolved solids.

Aqua WSC has identified the Trinity Aquifer in Bastrop and Caldwell counties as the potential source for brackish groundwater. This strategy is expected to provide approximately 2,000 ac-ft/yr by 2030, as shown in **Table 5.78**.

Table 5.78 Aqua WSC Brackish Groundwater Blending Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Aqua WSC	Caldwell	Colorado	2,000	2,000	2,000	2,000	2,000	2,000

Water availability has significant uncertainty for this strategy because brackish groundwater has not been known to be produced in significant quantities from the Trinity Aquifer in this area. Per the TWDB Reports 388 and Technical Note 19-1, favorable areas for extraction from the Trinity Aquifer are located within western Bastrop and Caldwell counties and include the upper, middle, and lower Trinity Aquifers. Per Technical Note 19-1, the Glen Rose and Hosston units could produce in the 500 to 800 ac-ft/yr range. The target zones of water quality based on estimated volumes in place (per both reports) would be slightly to moderately saline, or 1,000 to 10,000 mg/L total dissolved solids.

Cost Implications of Proposed Strategy

Facilities and O&M costs were provided by the Aqua WSC, dated 2023. Infrastructure costs associated with this strategy include four (4) brackish groundwater production wells and infrastructure for chemical treatment and blending.

Table 5.79 shows the estimated costs associated with this strategy.

Table 5.79 Aqua WSC Brackish Groundwater Blending Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$11,487,000	$16,002,060	$919,000	$1,370

Environmental Considerations

The impacts to the environment are expected to be negligible. Impacts from construction of wells and pipelines should be limited primarily to the construction period.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

There are negligible impacts to agriculture or natural resources with respect to acres of land anticipated from this strategy. Given the uncertainty in the hydraulic properties of the brackish Trinity Aquifer in this area, additional studies will be needed to determine the impacts of producing brackish groundwater on both the brackish and fresh water zones in the aquifer.

5.2.4.6.2 Aqua WSC - Brackish Groundwater Desalination

Texas has already begun implementing brackish groundwater desalination projects, including the commissioning of a 27.5 MGD project by the City of El Paso in 2007 and a 12 MGD project by the San Antonio Water System in 2016. The specific process used to desalinate water varies depending upon the total dissolved solids, the temperature, and other physical characteristics of the source water, but always requires disposal of concentrate, called brine, that has a higher total dissolved solids content than the source water. A common way to dispose of the brine is through a deep disposal well.

As with the brackish groundwater blending strategy, Aqua WSC has identified the Trinity Aquifer in Bastrop and Caldwell counties as the potential source for brackish groundwater. This strategy is expected to provide approximately 2,000 ac-ft/yr by 2040, as shown in **Table 5.80**.

Table 5.80 Aqua WSC Brackish Groundwater Desalination Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Aqua WSC	Caldwell	Colorado	2,000	2,000	2,000	2,000	2,000	2,000

As with the brackish groundwater blending strategy (Section 5.2.4.5.1), water availability has significant uncertainty for this strategy because brackish groundwater has not been known to be produced in significant quantities from the Trinity Aquifer in this area. Per the TWDB Reports 288 and Technical Note 19-1, favorable areas for extraction from the Trinity Aquifer are located within western Bastrop and Caldwell counties and include the upper, middle, and lower Trinity Aquifers. Per Technical Note 19-1, the Glen Rose and Hosston units could produce in the 500 to 800 ac-ft/yr range. The target zones of water quality based on estimated volumes in place (per both reports) would be slightly to moderately saline, or 1,000 to 10,000 mg/L total dissolved solids.

Cost Implications of Proposed Strategy

Facilities and O&M costs were provided by the Aqua WSC, dated 2023. Infrastructure costs associated with this strategy include:

- four (4) brackish groundwater production wells
- transmission to treatment plant
- reverse osmosis treatment plant
- brine disposal well

Table 5.81 shows the estimated costs associated with this strategy.

Table 5.81 Aqua WSC Brackish Groundwater Desalination Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$31,230,600	$43,248,000	$2,484,000	$1,608

Environmental Considerations

Permits from the TCEQ underground injection control division will need to be obtained for the disposal of concentrate brine. The impacts to the environment are expected to be negligible. Impacts from construction of wells and pipelines should be limited primarily to the construction period. It should be noted that desalination facilities require large energy demands and thus produce the additional environmental consequences that come from energy production.

While it is assumed that this strategy would have negligible impacts to cultural resources and wildlife habitat, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

There are negligible impacts to agriculture or natural resources with respect to acres of land anticipated from this strategy. Given the uncertainty in the hydraulic properties of the brackish Trinity Aquifer in this area, additional studies will be needed to determine the impacts of producing brackish groundwater on both the brackish and the fresh water zones in the aquifer.

5.2.4.6.3 Creedmoor Maha - Brackish Groundwater Desalination

The Creedmoor Maha WSC service area lies just downdip (southeast) of the “fresh-water” line in the Edwards BFZ Aquifer. Their brackish groundwater desalination project envisions developing a brackish Edwards BFZ Aquifer groundwater source and construction of a treatment plant that could treat the water to potable standards. The treatment plant would have an approximate 2 MGD capacity, accounting for an assumed 10% waste.

The project would go online in the 2040 decade, which is a conservative estimate for planning purposes, given that the supply could potentially be online as early as 2028. The 2 MGD planned capacity would allow production of 2,200 acre-feet per year. However, the modeled available groundwater for the brackish Edwards Aquifer in Caldwell County limits the strategy supply to 1,410 acre-feet per year, as shown in **Table 5.82**.

Table 5.82 Creedmoor Maha Brackish Groundwater Desalination Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Creedmoor Maha	Caldwell	Colorado	0	1,410	1,410	1,410	1,410	1,410

Water availability has significant uncertainty for this strategy because brackish groundwater has not been known to be produced in significant volumes from the Edwards BFZ Aquifer in this area. The region in and downdip of the fault zone has been shown to be productive further south in Hays and Comal counties, but is relatively untested in Travis County.

Cost Implications of Proposed Strategy

Infrastructure costs associated with this strategy include:

- Two brackish groundwater production wells, producing water with total dissolved solids of 10,000 mg/L (at the higher limit of brackish).
- A half-million gallon ground storage tank
- Transmission pipeline to Reverse Osmosis Water Treatment Plant
- Reverse Osmosis Water Treatment Plant
- Brine Disposal Well

Table 5.83 shows the estimated costs associated with this strategy.

Table 5.83 Creedmoor Maha Brackish Groundwater Desalination Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$55,152,000	$77,040,000	$13,012,000	$5,915

5.2.4.7 Drought Management

Water users in central Texas are either preparing for drought or responding to current drought conditions that may be short-term (month or months) or long term (year or years). Where precipitation events can be described according to frequency and duration, such as a 25-year, 24-hour storm, there is not a parallel means to describe drought. That is, a drought cannot be described as a 10-year or 25-year drought. Various means for evaluating drought severity have been developed, and these are presented in **Chapter 7** of this plan.

Preparation for drought includes implementing water conservation plans as a means of reducing water demands and extending the duration of limited supplies. The RWPG has taken a more aggressive approach toward conservation in this plan compared to the 2021 Regional Water Plan. As such, the GPCD planned for lower demands than were previously targeted by the end of the planning cycle. In conjunction with the more aggressive approach toward conservation, the planning group has chosen to implement a drought water management strategy that is less aggressive than was adopted for the 2021 plan. Drought management strategies will be considered in parallel with other water management strategies for each WUG.

5.2.4.7.1 Municipal Utilities

As provided in Chapter 7, the planning group has adopted the following basis for considering Drought Management as a water management strategy in Region K:

- For all municipal WUGs, a 5% demand reduction is adopted as a water management strategy. Drought management strategy volumes for each municipal WUGs are provided in Table 7.3.
- For WUGs that do not have needs, this will increase their buffer of remaining water supply during drought conditions.
- For WUGs with needs, this will provide an additional measure of demand reduction during a drought in addition to other water management strategies.
- For WUGs that have unmet needs, a significantly greater drought management strategy of 20% or more of demand may be needed. These additional drought management strategy volumes are included in Table 7.3.

The drought management strategy volumes are not repeated in this section or in the sections that address strategies for each individual WUG as it is understood drought management is a strategy for every municipal WUG.

Cost Implications of Proposed Strategy

The cost for implementing drought contingency plans was evaluated based on data provided in Water Research Foundation Report #4546 *Drought Management in a Changing Climate: Using Cost-Benefit Analyses to Assist Drinking Water Utilities.* The data for Cobb County Georgia and San Diego were evaluated and determined to be most similar to the drought strategies implemented in the lower Colorado region. The average cost for implementing these programs was related to the populations served in terms of public information/education and enforcement. Basing the cost on person and adjusting to September 2024 dollars resulted in drought strategy cost of $1.15 per person. This cost was multiplied by the population in each municipal WUG each decade to develop the cost presented in Table 7.4. That table of costs is not repeated in this section.

Environmental Considerations

Implementation of drought water management strategies may impact existing water resources in multiple ways. Reducing groundwater use during a drought periods might allow for more springflow if water table aquifers are sufficiently full to produce springflow. Reduced demand may simply reduce the drawdown levels or the severity drawdown within existing aquifers, reducing the potential for compaction of the aquifer formation and subsidence of the land surface. Reducing surface water use allows more water to remain in the streams, rivers, and lakes. If all WUGs implemented their Drought Contingency Plans (DCPs), total demand would reduce by about 35,000 ac-ft/yr during a drought period, in addition to the proposed water conservation strategies.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected.

5.2.4.7.2 Irrigation

Drought management is not a recommended strategy for irrigation apart from the surface water curtailment plan that is part of the *Lakes Buchanan and Travis Water Management Plan*. Under that plan, when drought conditions of the lakes move from Less Severe Drought to Extraordinary Drought on either March 1 or July 1, then interruptible water for agricultural irrigation will be curtailed. Usually, farmers will then need to decide whether to irrigate using groundwater, change crops, or allow the planned irrigation field to lie fallow. Most irrigators that utilize groundwater will not be affected and will not significantly reduce groundwater demand. In many cases, without surface water available, the demand for groundwater will increase. This is reflected by the demands identified in Chapter 2.

The only exception to this is the irrigation demand in Mills County. There is not enough groundwater available to support full consumptive use of crops in Mills County and limited surface water. Most irrigation in this county is considered supplemental only. When drought occurs, the irrigated acreages will be reduced in accordance with the available supply.

Cost Implications of Proposed Strategy

Farming is an important part of the local economy, and the narrow margins in agriculture drive farmers to maximize yield to produce a profit. When irrigation from surface water is curtailed, it results in reduced production and increased production costs. This has many downstream impacts in the local rural economies. Sales of the following items that support farming are reduced: equipment (new, used, parts, service), fuel, seed, fertilizer, chemicals, labor, food, and every additional good or service connected with supporting the agricultural economy.

[Editors' Note: The following paragraph will be updated when the TWDB socioeconomic impact analysis is completed in fall of 2025, following submission of the IPP].

The financial impacts of drought on agriculture were determined using the TWDB Socioeconomic Impact Analysis of Unmet Needs from the 2026 Region K Water Plan, which shows an impact cost to the local economy based on the missed opportunity to grow crops. Unit costs for the economic value of the lack of irrigation water vary from county to county. The unit cost for Irrigation WUGs in Colorado County is $_____/ac-ft; the unit cost for Irrigation WUGs in Matagorda County is $____/ac-ft; the unit cost for Irrigation WUGs in Mills County is $______/ac-ft; and the unit cost for Irrigation WUGs in Wharton County is $_____/ac-ft. No capital costs are associated with this strategy.

5.2.5 Municipal Water Management Strategies

The municipal WUGs include water utilities and County-Other (rural/unincorporated areas of municipal water use aggregated on a county basis).

Several strategies were identified to meet the municipal shortages including conservation; conservation was the first strategy considered for municipal WUGs with needs. For several municipal WUGs with shortages, the following regional management strategies (Section 5.2.4) were selected:

- Surface Water Supplies - New or Expanded (Section 5.2.4.1)
- Surface Water Supplies - Contract Changes (Section 5.2.4.2)
- Expanded Local Use of Groundwater (Section 5.2.4.3)
- Aquifer Storage and Recovery (Section 5.2.4.5)
- Brackish Groundwater (Section 5.2.4.6)
- Drought Management (Section 5.2.4.7.1)

In addition to the strategies identified above, additional municipal strategies have been identified to meet specific WUG needs. The following sections provide a description, analysis, and cost breakdown for these municipal strategies.

5.2.5.1 Municipal Conservation

Municipal conservation is covered in the required consolidated Conservation section of Chapter 5. More specifically, it is discussed in Section 5.2.2.3, Municipal Conservation, and includes separate accounting for demand reduction and water loss mitigation strategies.

5.2.5.2 Direct Potable Reuse

Direct Potable Reuse (DPR) is a water supply strategy that reclaims wastewater effluent to potable water quality and distributes treated potable water to users via a centralized distribution system. DPR is proposed as a strategy for three municipal WUGs within Region K.

Table 5.84 and **Table 5.85** list the project yields and associated costs, respectively, for each of the WUGs. Following the tables, each WUG has an individual section where details are discussed further.

Table 5.84 Direct Potable Reuse Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Aqua WSC	Bastrop	Colorado	0	2,200	2,200	2,200	2,200	2,200
Buda	Hays	Colorado	0	1,680	1,680	1,680	1,680	1,680
Dripping Springs WSC	Hays	Colorado	0	560	560	560	560	560
Marble Falls	Burnet	Colorado	0	1,000	1,000	1,000	1,000	1,000

Table 5.85 Direct Potable Reuse Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Aqua WSC	Bastrop	Colorado	$28,290,000	$39,439,000	$5,556,000	$2,525
Buda	Hays	Colorado	$29,155,000	$40,640,000	$5,326,000	$3,170
Dripping Springs WSC	Hays	Colorado	$10,547,000	$14,700,000	$1,751,000	$3,127
Marble Falls	Burnet	Colorado	$13,920,000	$19,932,000	$3,946,000	$3,946

5.2.5.2.1 Aqua WSC

Aqua WSC is negotiating the purchase of 10 MGD wastewater from the City of Bastrop WWTP. This strategy envisions construction of an advanced treatment facility to make the water potable. Initial estimates indicate a total capacity of 2 MGD. Additional wastewater could be used for direct non-potable reuse, but that strategy is not included in this cycle.

Cost Implications of Proposed Strategy

Aqua WSC had their consulting engineers provide planning level cost estimates for a direct potable reuse (DPR) system with one treatment train with a 1,500 gpm capacity or about 2 MGD when considering some of the water will go to concentrate. Major cost components include:

- Pilot study
- Treatment train
- High-service pump station, motor control center, plant control system
- Deep disposal well

The universal costing model was used to estimate the capital and annual costs, and a capital cost estimate by Aqua WSC's consultants was compared to the Unified Costing Model estimate to ensure consistency. Their estimate was about $30,000,000 for the 2.0 MGD treatment plant only. This is similar to the facilities cost shown in Table 5.85.

Environmental Considerations

The biggest environmental concern for DPR is typically the potential disposal of treatment concentrates. Because the strategy envisions disposal of concentrates through a deep disposal well, the impact on the environment is anticipated to be negligible.

While it is assumed that the project will have negligible impacts on cultural resources, coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture are expected as a result of implementing this strategy.

5.2.5.2.2 Buda

Buda has contracted with the consulting engineer responsible for design of the Buda WWTP Phase III Expansion project to perform a Feasibility Study for evaluation of direct potable water reuse (DPR) alternatives. A draft Feasibility Study Report was submitted in May 2015 that defined feasibility, anticipated treatment process, proposed improvements, regulatory requirements, and planning-level cost estimates for a potential 1.5 to 2 MGD Direct Potable Reuse project. This reuse project would be in addition to the non-potable direct reuse project recommended for Buda, as discussed in Section 5.2.5.3.1.

As part of the feasibility study phase, Buda met with TCEQ staff involved in approval of DPR projects. This meeting confirmed the regulatory feasibility of the proposed DPR project and provided definition of the procedures required by TCEQ for implementation. A 12-month detailed effluent characterization study followed and was completed in 2018. After the completion of pilot testing, and approved permits from TCEQ are obtained, full-scale design and construction are anticipated to be completed before 2040.

This strategy is expected to provide 1,680 ac-ft/yr of potable water supply, beginning in the 2030 decade and extending through the planning period to 2080.

Cost Implications of Proposed Strategy

Based on the Feasibility Study Report assumptions and preliminary findings, the cost estimate includes a DPR WTP with 2.0 MGD capacity; modifications at the Buda WWTP site including effluent transfer pumping facilities and biological denitrification process; facilities for treatment and disposal of wastes from the DPR WTP treatment process under a Texas Pollutant Discharge Elimination System (TPDES) permit; and offsite finished water pipeline, storage, and blending facilities. The costs from the Feasibility Study Report were reported in May 2015 dollars.

The cost of water purchase of the treated water has not been valued in this cost estimate, as no water purchase cost has been identified at this time. This assumption may be reevaluated in future regional water planning cycles.

Costs from the Feasibility Study Report were converted from May 2015 dollars to September 2023 dollars and input into the Texas Water Development Board’s Cost Estimating Tool. The total facilities cost for this strategy is $29,155,000; the total project cost is $40,640,000; the total annual cost is $5,326,000; and the unit cost is $3,170 ac-ft/yr.

Environmental Considerations

If Buda decides to proceed with implementation of Direct Potable Reuse, it is anticipated that residuals from the DPR WTP treatment process would be further treated, then co-disposed under a TPDES permit with any remaining Buda WWTP effluent, accounting for diversions for direct non-potable and potable reuse. As a result, the Total Dissolved Solids (TDS) concentration of the WWTP effluent return flow to the Plum Creek watershed would be increased but remain within water-quality based limits authorized by TCEQ through the TPDES permitting process. Regulated constituents (chloride, sulfate) concentrations in the return flow to Plum Creek would also be increased, subject to TPDES permit limits.

For discharge to Andrews Branch, TCEQ's water quality modeling method is based on existing ambient segment concentrations of 867.8 mg/L TDS, 117.5 mg/L chloride, and 88 mg/L sulfate, and segment criteria of 1,120 mg/L TDS, 350 mg/L chloride, and 150 mg/L sulfate. Preliminary evaluations done for the DPR Feasibility Study indicated that TPDES limits of 1,314 to 1,324 mg/L TDS and 178 mg/L sulfate may be needed for disposal of residuals from a proposed 2 MGD DPR WTP treatment process through co-discharge with 1.5 MGD of WWTP effluent. TPDES limits did not appear to be required for chloride. Having completed its 12-month effluent characterization study in 2018, Buda is in the process of defining anticipated DPR WTP residuals and resulting blended discharge water quality parameters.

Buda discharges treated effluent to tributaries of Plum Creek, and by increasing the effluent reuse, this strategy will reduce the effluent discharge to natural waterways by up to 1,680 ac-ft/yr.

It is assumed that the project will have negligible impacts on cultural resources, but coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected as a result of implementing this strategy.

5.2.5.2.3 Dripping Springs WSC

In addition to reuse water allocated for non-potable direct reuse (Section 5.2.5.3), Dripping Springs is looking at the option of allocating a portion of produced wastewater effluent for potable reuse. In preparation for a DPR project, Dripping Springs completed a feasibility study in April 2015 which examined treatment methods, regulatory requirements, and planning-level capital costs.

The results of this study indicated that DPR is a feasible option for Dripping Springs. The most cost-effective treatment option, ozone-biofiltration, was recommended for further consideration. Pilot testing, determination of residual disposal method, and permitting through TCEQ will need to be completed prior to project implementation.

This strategy would supply 560 ac-ft/yr (0.5 MGD), beginning in the 2030 decade and extending through the planning period to 2080.

Cost Implications of Proposed Strategy

Infrastructure required to implement this strategy includes:

- Retrofitting of the existing wastewater treatment plant, including biological nutrient removal
- 0.5 MGD DPR water treatment plant (includes advanced oxidation via ozone, biofiltration, ultrafiltration, UV disinfection, chlorine disinfection, and pH stabilization)

- Engineered storage buffer
- 0.5 MGD high service pump station and 8-inch PVC water line to convey DPR finished water to existing treated storage tank, allowing for tie-in into existing water system
- Outfall structure for backup WWTP effluent discharge to Walnut Springs Creek (required for permitting)

The cost of water purchase of the treated water has not been valued in this cost estimate, as no water purchase cost has been identified at this time. This assumption may be reevaluated in future regional water planning cycles.

Costs from the City of Dripping Springs Direct Potable Reuse Feasibility Study (April 2015) were converted from April 2015 dollars to September 2023 dollars and input into the Texas Water Development Board's Cost Estimating Tool. For this strategy, the total facilities cost is $10,547,000; the total project cost is $14,700,000; the total annual cost is $1,751,000/yr; and the annual unit cost is $3,127/ac-ft.

Environmental Considerations

Due to the increased wastewater effluent production as its population increases, Dripping Springs anticipates the need to discharge treated effluent into Walnut Springs Creek. Substantial implementation of direct potable reuse of effluent can mitigate or eliminate the need to discharge into Walnut Springs Creek.

As a part of the permitting process through TCEQ, a disposal method for the DPR WTP treatment residuals will need to be identified. Because the concentrations of regulated constituents (Total Dissolve Solids, chloride, sulfate, etc.) will be higher through DPR than conventional wastewater treatment, alternatives to land application or direct discharge may need to be pursued, including but not limited to, deep well injection, evaporation ponds, mechanical evaporation, or brine crystallization.

It is assumed that the project will have negligible impacts on cultural resources, but coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected as a result of implementing this strategy.

5.2.5.2.4 Marble Falls

The City of Marble Falls needs to relocate the existing wastewater plant out of the floodplain and increase capacity from 1.5 to 3.0 MGD to accommodate future demand. In planning for and permitting the new plant, it became clear that the acquisition of additional land for expansion of the Texas Land Application Permit (TLAP) for disposal of reclaimed water would be extremely expensive and a waste of a precious water resource. With the incorporation of new technology, Marble Falls could treat wastewater to a level beyond what is required for TLAP or even use as Type I reclaimed water utilizing an aerobic granular sludge process to reduce total nitrogen to less than 10 mg/L and total phosphorus to less than 1 mg/L.

Marble Falls also recognized the limits of supply from the existing surface water treatment plant and determined that a second supply north of the Colorado River would be useful. With adoption of the One Water approach, Marble Falls permitted the new wastewater plant based on continuation of the TLAP capacity, expansion of the reclaimed water system (Purple Pipe System) that distributes Type I reclaimed water, and addition of a DPR facility to produce potable water. Potable water will be produced by an advanced purity facility and then blended in the water distribution system with water supplied from the surface water treatment plant and from groundwater sources. The specific components of this DPR facility and its impacts are addressed below.

Cost Implications of Proposed Strategy

Infrastructure required to implement this strategy includes:

- 0.6 MGD DPR advanced purity treatment plant [ultrafiltration followed by a combination of RO (reverse osmosis) and O_3-BAC (ozonation and biological activated carbon), finished with UV-AOP (ultraviolet combined with an advanced oxidation process)] located adjacent to the new One Water plant.
- 6,400 feet of pipeline to connect to the existing water distribution system.

Environmental Considerations

Wastewater produced by the new DPR treatment facility will be returned to the adjacent One Water Plant and blended with other wastewater. Total salts (measured as TDS) will be monitored and controlled to minimize impact on the TLAP fields and irrigation areas served by the Purple Pipe system.

Environmental investigations and agency coordination (historical and cultural resources, wetlands, threatened and endangered species habitats, and others) have been completed for the proposed treatment facility sites and pipeline routes. A finding of no significant impact (FNSI) has been received.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected from implementing this strategy. The irrigated hay land (TLAP site) and volume of hay produced will remain the same.

5.2.5.3 Direct Reuse (Non-Potable)

Direct Reuse is recommended as a strategy for several municipal WUGs within Region K. Yield information was obtained directly from these WUGs. **Table 5.86** and **Table 5.87** summarize the project yields and associated costs, respectively, for each of the WUGs, with the exception of Austin, which is discussed in Section 5.2.3.2. Following the tables, each WUG then has an individual section where details are discussed further. There are many other municipal WUGs that have active reuse programs but do not have a recommended reuse strategy.

Table 5.86 Direct Reuse Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Buda	Hays	Colorado	560	1,020	1,020	1,020	1,020	1,020
Dripping Springs WSC	Hays	Colorado	390	460	531	601	672	672

Table 5.86 Direct Reuse Supply

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
West Travis County PUA	Hays, Travis	Colorado	224	224	224	224	224	224
Lago Vista	Travis	Colorado	224	336	448	560	673	673
Travis County WCID 17	Travis	Colorado	0	510	510	510	510	510

Table 5.87 Direct Reuse Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Buda	Hays	Colorado	$0	$0	$0	$0
Dripping Springs WSC	Hays	Colorado	$1,599,000	$2,258,000	$201,000	$299
West Travis County PUA	Hays, Travis	Colorado	$1,100,000	$1,534,000	$119,000	$531
Lago Vista	Travis	Colorado	$924,000	$1,288,000	$142,000	$211
Travis County WCID 17*	Travis	Colorado	$7,858,000	$10,954,000	$873,000	$1,712

** Costs for WUGs marked with an asterisk were calculated by inputting external capital costs provided by the WUG, adjusted to September 2023 dollars, into the TWDB's Unified Costing Model (UCM).*

The cost of water purchase of the treated water has not been valued in this cost estimate, as no water purchase cost has been identified at this time. This assumption may be reevaluated in future regional water planning cycles.

5.2.5.3.1 Buda

Buda currently owns one wastewater treatment plant, which is operated and maintained by the Guadalupe-Blanco River Authority (GBRA). Reclaimed water implementation for Buda consists of multiple related projects funded through Buda's "Purple Pipe Fund." This funding is provided for irrigation of some parks & road medians with Type I reclaimed water, along with the bulk sale of Type I reclaimed water for non-potable uses, improving the condition of grass/landscaping while reducing demand on Buda's drinking water supply. Buda intends to expand reclaimed water implementation through its Capital Projects program and anticipates that the implementation of this strategy will continue to reduce the potable water supply demand by Buda.

This strategy would provide an expansion of reclaimed water service primarily for the Sunfield subdivision, located east of Buda. This strategy is expected to be partially online by 2030, to supply 560 ac-ft/yr, with a full capacity of 1,020 ac-ft/yr by 2040.

Buda's direct reuse system may require additional infrastructure beyond this scope in the future, depending on future demands of the contributing areas of Buda. Additionally, a portion of generated wastewater effluent will be treated and utilized for Buda's Direct Potable Reuse strategy (Section 5.2.5.2.2), thus proposed yields for direct reuse may shift in favor of allocation for potable supply in later decades.

Cost Implications of Proposed Strategy

The capital costs for this strategy are primarily concerned with conversions or upgrades of existing distribution systems, with some new distribution required to move reuse water to areas of new demand. It is assumed that the plant already has conventional treatment processes for biological oxygen demand (BOD) removal and disinfection in place to meet TCEQ reclaimed water Type I requirements.

Because only distribution level costs are required for this strategy, associated costs are $0 for regional planning purposes.

Environmental Considerations

The main advantage the reuse water strategy has over other strategies is that it may be implemented at a low cost, while reducing the need for expanded water supplies. Buda discharges treated effluent to tributaries of Plum Creek, and by increasing the effluent reuse, will reduce the effluent discharge to natural waterways by up to 1,020 ac-ft/yr.

It is assumed that the project will have negligible impacts on cultural resources, but coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected, as a result of implementing this strategy.

5.2.5.3.2 Dripping Springs WSC

Dripping Springs is in Hays County, an area which has experienced large amounts of population growth in the past 10 years and is provided water by Dripping Springs WSC. There is a need for Dripping Springs to increase wastewater treatment capacity for future growth. In response, Dripping Springs has filed to increase its TLAP-permitted capacity and obtained a TPDES discharge permit, including the approval of a reclaimed water system.

Currently, the South Regional Wastewater Collection, Treatment and Disposal Facility permitted capacity is 348,500 GPD (390 ac-ft/yr). Dripping Springs plans to use up to 100% of the effluent generated for direct reuse by 2030. Pending TCEQ approval of the plant’s expanded capacity to 995,000 GPD, approximately 600,000 GPD (672 ac-ft/yr) of the effluent would be diverted to direct reuse. With the planned wastewater expansion pending, additional reclaimed water will be available to service existing and new end-users, including Sports Park, Charro Park, the Caliterra development, hay fields near the wastewater treatment plant, Howard Ranch subdivision, construction processes, irrigation of certain food crops, and other developments planned nearby. To serve these customers, additional infrastructure is needed.

This strategy would provide approximately 390 ac-ft/yr of direct reuse by 2030, with a full capacity of approximately 672 ac-ft/yr supplied by 2070. Dripping Springs also plans to use wastewater effluent for Direct Potable Reuse, as discussed in Section 5.2.5.2.3. Thus, proposed yields for direct reuse may shift in favor of allocation for potable supply in later decades.

Cost Implications of Proposed Strategy

Infrastructure needed for the proposed 672 ac-ft/yr includes:

- High service pump station
- Ground storage tank
- Transmission main to irrigation customers

Regional planning guidelines do not allow distribution-level costs to be included in the regional water plans. As such, transmission piping to deliver water to customers will be required to implement this strategy but will not be included in the cost estimate for regional planning purposes. Cost of a new pump station will be included in the estimate under the assumption additional pumping on-site of WWTP will be required for increased reclaimed water flow due to plant expansion.

Costs were developed using the Texas Water Development Board Cost Estimating Tool and reported in September 2018 dollars. For this strategy, the total project cost is $2,258,000; the total annual cost is $201,000/yr; and the annual unit cost is $299/ac-ft.

Environmental Considerations

Due to the increased wastewater effluent production as its population increases, Dripping Springs anticipates the need to discharge treated effluent into Walnut Springs Creek. Substantial implementation of direct reuse of effluent can mitigate or eliminate the need to discharge into Walnut Springs Creek.

It is assumed that the project will have negligible impacts on cultural resources, but coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

In the preliminary engineering report for the South Regional Wastewater System Expansion Study, a proposed potential use of reclaimed wastewater effluent was irrigation of hay fields as well as some food crops of varieties that would come into minimal contact with the treated effluent and fit requirements set in the Texas Administrative Code (30 TAC, Chapter 210.24(s)). Disposal of effluent through distribution as reclaimed water would be beneficial because Dripping Springs faces limited land available for drip irrigation disposal near the WWTP. Available land will continue to be restricted as development continues in the vicinity.

5.2.5.3.3 West Travis County PUA

West Travis County PUA has several projects planned to expand direct reuse supply by 2030. Supply will be expanded to Bee Cave City Park, Falconhead, and Ladina Subdivision for residential and irrigation uses. A total of approximately 224 ac-ft/yr will be distributed, including effluent going to drip irrigation fields. This strategy is anticipated to be online by 2030.

Cost Implications of Proposed Strategy

Infrastructure to increase beneficial use supply will include:

- Extension of existing reclaimed transmission line
- Reclaimed water storage tank
- High service pump station
- Drip irrigation system, assumed to be $1,200/ac, per the 2004 Texas Water Development Board (TWDB) Report 362

West Travis County PUA is also interested in installing a reverse osmosis filtration and membrane system, which is considered in the cost for the Direct Potable Reuse Strategy for West Travis County PUA (Section 5.2.5.2.5). Per regional planning guidelines, distribution-level infrastructure and associated costs are not to be included in the regional water plans. As such, the cost of reclaimed water drip irrigation and the extension to the existing reclaimed transmission piping are not included. As this strategy is an expansion of an existing reclaimed water system, it is assumed any additional pump stations will be associated with distribution-level costs as well and are not included.

Costs were developed using the Texas Water Development Board Cost Estimating Tool and reported in September 2023 dollars. For this strategy, the total project cost is $1,534,000; the total annual cost is $119,000/yr; and the annual unit cost is $531/ac-ft.

Environmental Considerations

West Travis County PUA cannot discharge into the Highland Lakes, so direct reuse presents a good disposal alternative. Additionally, increasing use of reclaimed water for applications that do not require potable water will mitigate pressure on drinking water supplies and potentially delay need for expansion of water supplies.

It is assumed that the project will have negligible impacts on cultural resources, but coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected, as a result of implementing this strategy.

5.2.5.3.4 Lago Vista

Lago Vista currently produces approximately 504 ac-ft/yr of reclaimed water for golf course irrigation and plans to expand their reclaimed water system to deliver non-potable water to a centralized distribution system for residential use. Beyond the existing reclaimed water produced for golf course irrigation, this strategy would provide 224 ac-ft/yr of additional reclaimed water by 2030, with full expansion to 673 ac-ft/yr by 2070.

Cost Implications of Proposed Strategy

Lago Vista has an existing reclaimed water system. This strategy is comprised of expanding that existing system to residential use. Infrastructure required for this strategy includes:

- Reclaimed water storage tanks
- Re-chlorination system
- Expansion of reclaimed water transmission piping to residential customers

Costs were developed using the Texas Water Development Board Cost Estimating Tool and reported in September 2023 dollars. For this strategy, the total project cost is $1,288,000; the total annual cost is $142,000/yr; and the annual unit cost is $211/ac-ft. Per regional planning guidelines, distribution-level infrastructure and associated costs will not be included in the regional water plans; therefore, the cost of extending existing water transmission and any additional pumping that may be required for the new portion of the line were not considered in this cost estimate.

Environmental Considerations

Increased use of reclaimed water for applications that do not require potable water will mitigate pressure on drinking water supplies and potentially delay need for wastewater treatment plant expansion.

It is assumed that the project will have negligible impacts on cultural resources, but coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected as a result of implementing this strategy.

5.2.5.3.5 Travis County WCID 17

Travis County WCID 17 has seventeen planned improvement projects for the Flintrock Effluent Disposal and Reclaimed Irrigation System. This system will provide Type I effluent to a series of existing and proposed effluent disposal fields and reclaimed water irrigation systems and will include improvements to storage, pumping, and transmission. Eight of the planned improvement projects will increase direct reuse supplies for irrigation, distributing a proposed total of 510 ac-ft/yr of reclaimed water to irrigation fields.

Reclaimed water projects among the planned improvements include:

- Flintrock Effluent Storage Basin, Reclaimed Water Irrigation Pump Station, Effluent Transfer Pumps Station & Effluent Main
- Lakeway Regional Effluent Control Valve Assembly
- Serene Hills Storage Tank #1
- Flintrock Golf Course Rough Irrigation

- Serene Hills Storage Tank #2
- Serene Hills R.O.W. Irrigation Conversion
- Serene Hills Effluent Pump Station and Effluent Main
- Reuse Irrigation Pump Expansion

The yield for this strategy is 510 ac-ft/yr and is anticipated to be online in 2030. Infrastructure associated with these projects include reclaimed water storage basins, storage tanks, force mains, and pump stations.

Cost Implications of Proposed Strategy

Capital costs for this strategy were provided by a consultant for Travis County WCID 17 and were updated from the 2021 plan based on the construction cost index increase. Because regional planning guidelines do not allow the inclusion of distribution-level costs in the regional water plans, some of the projects listed above were not considered for this estimate, including: Lakeway Regional Effluent Control Valve Assembly, Flintrock Golf Course Rough Irrigation, Serene Hills R.O.W. Irrigation Conversion, Serene Hills Effluent Pump Station and Effluent Main, and Reuse Irrigation Pump Expansion. As these projects are related to adding pipe lines, valves, and pump stations to distribute reclaimed water, they are assumed to be entirely distribution-level costs.

The updated capital costs were input into the Texas Water Development Board Cost Estimating Tool in September 2023 dollars. Annual costs were generated by the costing tool. For this strategy, the total project cost is $10,954,000; the total annual cost is $873,000 /yr; and the annual unit cost is $1,712 /ac-ft.

Environmental Considerations

Increased use of reclaimed water for applications that do not require potable water will mitigate pressure on drinking water supplies and potentially delay need for expansion of water supplies.

It is assumed that the project will have negligible impacts on cultural resources, but coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected, as a result of implementing this strategy.

5.2.5.4 Municipal Unmet Needs

As discussed in Chapter 4, the changes in demand patterns and increased growth rates have created areas in Region K where significant municipal needs have been identified. In some cases, strategies could not be identified to meet those needs. **Table 5.88** provides a summary of unmet needs in Region K. Note that these needs remain after accounting for implementation of conservation and aggressive drought management strategies (**Section 7.6.1)**. Additional context on these municipal unmet needs can be found in **Section 6.7**.

Table 5.88 Municipal Unmet Needs

WUG Name	Water Needs (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
County-Other, Hays	0	0	(324)	(4,082)	(8,881)	(14,204)
Elgin	0	(199)	(1,050)	(1,858)	(2,069)	(1,953)
Hays	0	0	(49)	(131)	(220)	(317)
Hornsby Bend Utility	0	0	(167)	(334)	(522)	(736)
Manor	0	0	0	0	0	(256)
Meadowlakes	(164)	(113)	(98)	(84)	(72)	(48)
Travis County MUD 2	0	0	(61)	(134)	(228)	(332)
Williamson County WSID 3	0	(6)	(9)	(10)	(12)	(10)

5.2.6 Irrigation Water Management Strategies

Expanded local use of groundwater and conservation were the recommended strategies to meet irrigation needs in San Saba, Gillespie, and Colorado counties.

The selected strategies (besides conservation) associated with irrigation needs included:

- Expanded Local Use of Groundwater – Ellenburger-San Saba Aquifer (Section 5.2.4.3.2)
- Expanded Local Use of Groundwater – Hickory Aquifer (Section 5.2.4.3.3)
- Expanded Local Use of Groundwater – Gulf Coast Aquifer (Section 5.2.4.3.4)

Irrigation conservation is covered in detail in Sections 5.2.2.1.2 (specific to LCRA) and 5.2.2.4.

The existing water supplies available to the irrigators in Region K are not enough to meet the projected needs, even considering conservation strategies. A shortage would occur in all decades of the planning period should the critical drought be repeated. Using the Region K Cutoff Model with no return flows and assuming full use of the run-of-river irrigation rights to meet irrigation demands in those operations, and applying the conservation strategies described in Section 5.2.2.4, the maximum annual shortage is projected to decrease from 274,305 ac-ft/yr in 2030 to approximately 191,388 ac-ft/yr in 2080. The calculated shortages are expected to decrease due to projected decreases in water demand. **Table 5.89** shows the unmet needs for all Irrigation WUGs in Region K and the number of WUGs with water deficits for each decade.

Table 5.89 Total Unmet Irrigation Needs

Category Name	Water Needs (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Irrigation	(274,305)	(243,887)	(229,983)	(216,454)	(203,558)	(191,388)
No. of WUGs with Need	4	4	4	4	4	4

Irrigation in Mills County has water needs of 3,084 ac-ft/yr for all planning decades. Conservation reduces that demand by 474 acre-feet per year, to result in an unmet need of 2,610 acre-feet per year.

Expanded local use of groundwater supplies were considered as a strategy for Mills County, but this approach was limited by the available MAG, which was only a few hundred acre-feet per year for all available aquifers combined. Mills County does not have a groundwater conservation district, so there is no practical regulation on groundwater production, other than the limited productivity of the aquifers themselves, so increased groundwater use would likely occur to meet some of the needs.

Unmet irrigation needs for the rice growing region, Colorado, Matagorda, and Wharton counties are shown in **Table 5.90**.

Table 5.90 Unmet Irrigation Needs in Rice-Growing Counties

County	Water Needs (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Colorado	(34,367)	(19,908)	(15,650)	(11,507)	(7,745)	(4,460)
Matagorda	(102,037)	(94,904)	(89,618)	(84,474)	(79,468)	(74,599)
Wharton	(135,291)	(126,465)	(122,105)	(117,863)	(113,735)	(109,719)
Total	**(271,695)**	**(241,277)**	**(227,373)**	**(213,844)**	**(200,948)**	**(188,778)**

5.2.7 Manufacturing Water Management Strategies

Expanded local use of groundwater supplies and local surface water were identified to meet manufacturing WUG needs in Burnet and Gillespie counties. The selected strategies associated with manufacturing needs included:

- Expanded Local Use of Groundwater – Ellenburger San Saba Aquifer (Section 5.2.4.3.2)
- Local Surface Water (Section 5.2.4.4)

5.2.8 Mining Water Management Strategies

Expanded local use of groundwater supplies, and local surface water were identified to meet mining needs in Burnet, Hays, and Llano counties. The selected strategies associated with mining needs included:

- Expanded Local Use of Groundwater – Ellenburger San Saba Aquifer (Section 5.2.4.3.2)
- Expanded Local Use of Groundwater – Trinity Aquifer (Section 5.2.4.3.5)
- Local Surface Water – (Section 5.2.4.4)

There are unmet Mining needs identified in the 2026 Region K Plan, shown in **Table 5.91**. These needs were identified in Williamson County in coordination with Region G. The mining occurs in the limestone of the Edwards Aquifer, and the likely source of water is pit water. There is no groundwater conservation district in Williamson County, and no regulation of the volume of that pit water use. The planning process requires that the modeled available groundwater be used as a limit for total groundwater production by county-basin. The available groundwater from the Edwards Aquifer under the MAG was not sufficient to meet those mining demands. In reality, the mining operation water use will not be limited by the MAG.

Table 5.91 Unmet Mining Needs in Region K

WUG	County	Basin	Unmet Needs (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Mining	Williamson	Colorado	(795)	(1,074)	(1,393)	(1,781)	(2,165)	(2,521)

5.2.9 Steam-Electric Power Water Management Strategies

There are no unmet steam-electric needs in Region K. The projected demands are constant throughout the planning cycle and met by identified supplies. There is an identified Austin Steam-Electric need of 2,800 acre-feet per year for Fayette County (**Table 5.92**) and an identified WMS to meet that need.

Austin's Steam-Electric run-of-river availability was calculated as zero, using a minimum year basis (Table 3.3), so that availability will not cover the need. However, the beneficial use of Austin's return flows as a water management strategy results in a gain of 3,512 acre-feet per year to the minimum year Steam-Electric (industrial) run-of-river (Table 5.2, footnote 1). This run-of-river gain is recommended as a strategy to meet Austin's 2,800 acre-feet per year steam-electric need.

Table 5.92 Yield of Austin Steam-Electric Strategy

WUG	County	Basin	Yield (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Steam-Electric	Fayette	Colorado	2,800	2,800	2,800	2,800	2,800	2,800

Environmental and other factors for this strategy would be the same as those for the broader return flow strategy described in Section 5.2.1.1.

5.3 Alternative Water Management Strategies

LCRA is looking at several options to help meet future needs in the decades to come and would like to include some of the potential strategies as alternative strategies while the evaluation process continues. In addition, an expanded local use of groundwater strategy provides water exceeding the MAG.

5.3.1 Alternative Strategies for LCRA Major Water Supply

This section contains alternative new water supply options for LCRA. This water would provide additional firm yield to LCRA as a major water provider and could be used to meet various needs throughout Region K. The yields for these strategies are summarized in **Table 5.93**.

Table 5.93 LCRA Major Water Supply Alternative Water Management Strategy Supplies

LCRA Alternative Strategy	Water Management Strategies (ac ft/yr)					
	2030	2040	2050	2060	2070	2080
Alternative Baylor Creek Reservoir	0	0	27,000	27,000	27,000	27,000

Alternative Expand Use of Groundwater in Bastrop County	16,000	25,000	25,000	25,000	25,000	25,000
Alternative Purchase Groundwater from Bastrop and Lee Counties	0	25,000	25,000	25,000	25,000	25,000

5.3.1.1 Alternative Baylor Creek Reservoir

LCRA holds a water right (Certificate of Adjudication [COA] 14-5474A) to construct and impound water in a new reservoir on Baylor Creek (Baylor Creek Reservoir). The strategy consists of a proposed new, 48,390 ac-ft earthen dam reservoir, located in Fayette County near the existing Cedar Creek Reservoir (Lake Fayette) and the Fayette Power Project.

The purpose of this reservoir is to capture available river water not needed downstream and store the captured water for later use. The demand served by this strategy would be industrial use, in the form of cooling water requirements for the adjacent power plant. With water right amendments, the project could also provide water to downstream industrial demands and environmental uses.

The maximum authorized impoundment amount for this reservoir is 48,390 ac-ft. Currently, the Baylor Creek permit only authorizes diversion and storage of water appropriated under the Highland Lakes water rights and use of that water for industrial purposes (steam-electric cooling). To develop a firm yield from the project, multiple permit amendments would be needed to the existing Baylor Creek permit the existing Baylor Creek permit and potentially other LCRA run-of-river (ROR) permits to authorize diversion and storage of ROR flows.

An amendment to Certificate of Adjudication 14-5474A, granted April 29, 2011, states that the Owner is authorized to divert up to 73,579 ac-ft/yr of water for industrial purposes under Certificates of Adjudication 14-5478 and 14-5482, and to transport the water via pipeline to the proposed Baylor Creek Reservoir and existing Cedar Creek Reservoir. Based on information provided by LCRA, the project yield from this strategy that is available through the drought of record would be 29,000 ac-ft/yr, starting in the year 2040 (**Table 5.94**).

Table 5.94 Alternative LCRA Baylor Creek Reservoir Strategy Yield

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	0	29,000	29,000	29,000	29,000

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. Infrastructure used to estimate costs for this strategy include:

- A new 48,390 ac-ft earthen dam reservoir constructed along Baylor Creek.
- A new river intake, pump station, and two 114-inch diameter, 5-mile-long pipelines, to pump from the Colorado river to the reservoir.
- A new intake pump station and an approximately 70-mile-long, 48-inch diameter pipeline to deliver raw water from the reservoir in Fayette County to a conceptual delivery point in Travis County.

Table 5.95 shows the estimated costs associated with this strategy.

Table 5.95 Alternative LCRA Baylor Creek Reservoir Strategy Cost

Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
$883,383,000	$1,842,704,000	$139,152,000	$4,798

Environmental Considerations

The Baylor Creek Reservoir would rely on capturing available river flows for its yield; thus, environmental impacts as compared to a reservoir on the Colorado River should be negligible. While diversions would be made under amended existing rights, this strategy would contribute to the removal of up to 73,579 ac-ft/yr from the Colorado River for storage in the proposed Baylor Creek Reservoir and existing Cedar Creek Reservoir that otherwise might not have been captured.

While it is assumed that this strategy would have negligible impacts to cultural resources, coordination with the Texas Historical Commission will need to occur and proper environmental field studies will need to be performed before any construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by County of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

The construction of the Baylor Creek Reservoir will lessen the need to send Highland Lakes' water to industrial customers near the coast and could improve agricultural water reliability and efficiency. The new reservoir will increase LCRA's operational flexibility, which, in turn, has the potential to enhance the availability of freshwater to the region, including farmlands, managed waterfowl habitat, and coastal wetlands.

5.3.1.2 Alternative LCRA Expanded Use of Groundwater

LCRA plans to continue expanding its use of groundwater sources to meet future demands (**Table 5.96**). LCRA currently holds groundwater permits from the Lost Pines Groundwater Conservation District for 8,000 ac-ft/yr in production from up to eight wells in the Carrizo-Wilcox Aquifer in Bastrop County and has filed applications for permits to develop up to 25,000 ac-ft/yr of total groundwater in Bastrop County for municipal, industrial, and other beneficial uses.

A preliminary analysis from LCRA indicated that a well field would be located on the Griffith League Ranch in central Bastrop County, and design has begun on that wellfield. The groundwater is anticipated for use in Bastrop County but could also potentially be used in Travis County within the LCRA service area.

Whereas the recommended strategy for the purchase of groundwater allocates water available under the Modeled Available Groundwater (MAG), this alternative version exceeds the amount available under the MAG when considering other permitted pumping. The groundwater source for this strategy will be the Carrizo-Wilcox Bastrop county.

Table 5.96 Alternative LCRA Expanded Use of Groundwater Yield

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
16,000	25,000	25,000	25,000	25,000	25,000

Since the MAG is not a cap on groundwater permitting, there is additional demand that could be served if the Lost Pines Groundwater Conservation District issues a permit to LCRA for a larger yield. However, because a larger amount would exceed the MAG cap that is imposed by the TWDB planning rules, such a strategy is included as an alternative strategy.

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA (**Table 5.97**). The capital cost for this strategy is primarily driven by the cost of the well field and transmission pipeline needed to supply 25,000 ac-ft/yr. A peaking factor of one (1) was assumed. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. The following table shows the estimated costs associated with this strategy.

Table 5.97 Alternative LCRA Expanded Use of Groundwater Cost

Total Facilities Cost	Total Project Cost	Annual Cost	Unit Cost ($/ac ft)
$88,059,585	$117,119,249	$10,024,824	$401

Environmental Considerations

The environmental impacts from this strategy are expected to be low. However, groundwater development from this source should be evaluated for potential impacts on spring flows and base flows if the groundwater production is in close proximity to surface water sources. The impact to the environment due to pipeline construction is expected to be temporary and minimal. Impacts to environmental water needs, habitat, and cultural resources are expected to be low due to the relatively low footprint of this strategy.

The project is subject to federal authorization under the Clean Water Act, Endangered Species Act, and National Historical Preservation Act. Cultural resource investigations have been performed, and it is assumed that this strategy will have negligible impacts to cultural and archeological resources. A Biological Assessment is being developed due to the project’s location within several threatened or endangered species ranges as well as within federally designated Critical Habitat. Consultation with U.S. Fish and Wildlife Service is currently ongoing and Conservation Measures to minimize impacts to several of these species will need to be taken into consideration during design and construction. Appendix 1.A in Chapter 1 provides a list of rare, threatened, and endangered species for all counties in Region K, including Bastrop County. In addition, there are several endangered or threatened species that may need to be taken into consideration during design. These species may need to be considered during construction of infrastructure. There are no anticipated impacts to cultural resources.

Agricultural & Natural Resources Considerations

There are negligible impacts to agriculture or natural resources with respect to acres of land anticipated from this strategy; however, the additional drawdown of the aquifer has the potential to impact agriculture by creating the need to lower pumps, redrill wells, and pay for additional electricity for pumping. As these impacts are indefinite, it is difficult to determine quantified costs associated with these potential impacts. However, the groundwater permitting process is a public process, and local groundwater users that may be affected have the ability to provide input regarding concerns on potential drawdown.

5.3.1.3 Alternative LCRA Purchase Wholesale Groundwater

The strategy involves purchasing groundwater from the Carrizo-Wilcox Aquifer from water marketers in Bastrop and Lee counties, with infrastructure developed to deliver water to Travis County. A preliminary analysis from LCRA indicated that a well field will be constructed in Bastrop and Lee counties, where some water marketers have existing permits to produce water from the Simsboro Formation of the Carrizo-Wilcox Aquifer. The strategy assumes a combined total of 25,000 ac-ft/yr could be purchased from one or multiple groundwater marketers (**Table 5.98**).

For costing purposes, this strategy assumes the construction of a new well field consisting of seven Public Water Supply wells completed in the Simsboro Formation. Each well is assumed to have a peak capacity of 2,700 gallons per minute (gpm) and a depth of 2,200 feet below land surface. The well field collection piping is assumed to be approximately 17 miles long, routing to a centralized area where the transmission infrastructure (e.g., pump station and pipeline) that conveys the supply to Travis County begins. Additionally, a pump station and an approximately 40-mile-long, 36-inch diameter pipeline will be constructed to deliver raw water from the well field to a conceptual delivery endpoint in Travis County.

Whereas the recommended strategy for the purchase of groundwater allocates water available under the Modeled Available Groundwater (MAG), this alternative version exceeds the amount available under the MAG when considering other permitted pumping. The groundwater source for this strategy will be the Carrizo-Wilcox Aquifer in Lee and Bastrop counties.

Table 5.98 Alternative LCRA Purchase Wholesale Groundwater Yield

Water Management Strategies (ac ft/yr)					
2030	2040	2050	2060	2070	2080
0	25,000	25,000	25,000	25,000	25,000

Since the MAG is not a cap on groundwater permitting, there is additional demand that could be served if the Lost Pines Groundwater Conservation District issues a permit to LCRA for a larger yield. However, because a larger amount would exceed the MAG cap that is imposed by the TWDB planning rules, such a strategy is included as an alternative strategy.

Cost Implications of Proposed Strategy

Costs for this strategy were developed based on information provided by LCRA. The capital cost for this strategy is primarily driven by the cost of the well field and transmission pipeline needed to convey 25,000 ac-ft/yr from the wellfield to Travis County. The cost estimate for this strategy utilizes an assumed rate for groundwater purchase. Ultimately, this cost will be negotiated between the water marketer and LCRA. Additionally, LCRA would be responsible for paying the Lost Pines Groundwater Conservation District (LPGCD) production fee per acre-foot and the export fee. Consistent with the Texas Water Development Board (TWDB) Cost Estimating Tool, all costs are given in September 2023 dollars. **Table 5.99** shows the estimated costs associated with this strategy.

Table 5.99 Alternative LCRA Purchase Wholesale Groundwater Costs

Total Facilities Cost	Total Project Cost	Annual Cost	Unit Cost ($/ac ft)
$320,254,000	$634,998,000	$66,063,000	$2,643

Environmental Considerations

The environmental impacts from this strategy are expected to be low. However, groundwater development from this source should be evaluated for potential impacts on spring and base flows if groundwater production is close to surface water sources. The impact on the environment due to pipeline construction is expected to be temporary and minimal. Impacts to environmental water needs, habitat, and cultural resources are expected to be low due to the relatively low footprint of this strategy.

While it is assumed that this strategy would have negligible impacts to cultural resources, coordination with the Texas Historical Commission will need to occur, and proper environmental field studies will need to be performed before any construction begins. The project is subject to requirements of LCRA's Incidental Take Permit and Habitat Conservation Plan and associated requirements of the U.S. Fish and Wildlife Service. In addition, there are several endangered or threatened species that may need to be taken into consideration during design. Appendix 1.A in Chapter 1 provides a list of rare, threatened, and endangered species by county. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected as a result of implementing this strategy.

5.3.2 Other Alternative Water Management Strategies

The following strategy is included in the 2026 Region K Water Plan as an alternative strategy for County-Other, Hays.

5.3.2.1 Rainwater Harvesting

Rainwater harvesting is collecting the run-off from a structure or other impervious surface in order to store for later use. As stated on the TWDB website under Rainwater frequently asked questions (FAQ), "rainwater harvesting is valued as a water conservation tool to reduce demand on more traditional water supply sources." This strategy is not intended to meet all water needs of a particular household but is intended to provide a supplemental supply that reduces demands on the WUG.

The implementation of rainwater harvesting as a water management strategy is dependent upon the catchment area, storage capacity, rainfall frequency, and water demand of the end user. During 2011, at the peak of the drought of record, Travis County received approximately 19 inches of rain and Hays County received approximately 18 inches of rain. This rainfall is not distributed uniformly during the year and, as a result, implementation of rainwater harvesting as a water management strategy should consider water demands and supplies over a multi-month period.

Typically, rooftops serve as the catchment area for rainwater harvesting systems, either from a single residence or a group of buildings. A catchment area of 2,000 square feet yields about 1,000 gallons for 1 inch of rainfall. The required storage capacity is a function of the rainfall frequency and water demand. As stated above, the variability of rainfall results in a need to consider sizing facilities to provide storage over a multi-month period in order to balance rainfall with water demand.

If rainwater harvesting is considered for non-potable, secondary uses as opposed to being a primary water supply, the significance of storage is lessened, and the only remaining concern is the distribution system to deliver the water. This distribution system typically consists of a pump and pressure tank. However, some rainwater catchment systems are gravity driven, where pressurized systems may not be required. If rainwater harvesting is considered as the primary potable water supply, additional considerations concerning filtration and disinfection must be considered. The filtration is readily available with cloth and carbon filtration units. The disinfection is readily available with either chemical or ultraviolet systems. Like the non-potable use, a distribution system is required and includes a pump and pressure tank.

The population associated with County-Other, Hays in the Colorado Basin is predicted to be 21,425 in 2030 and grow to 227,850 by 2080. Assuming 2.7 individuals per household, that would be about 8,000 households in 2030, growing to about 85,000 households in 2080. For the purposes of planning, it was assumed that 10% of households (one catchment area per household) will implement large-scale rainwater harvesting starting in 2030, so 800 households.

The average rainfall in Hays County is 35 inches per year. Assuming a 2,100 square foot roof area, that produces 0.13 acre-feet per year, or about 113 gallons per day per household. For a 2.7 member household, that converts to about 42 gallons per day per capita, which represents living under very aggressive conservation measures.

While the average rainfall in Hays County is 35 inches per year, the variation in rainfall means that significant storage is required to help improve the reliability of the strategy. However, even large storage tanks do not make the supply 100% reliable under significant drought. An analysis was performed with monthly rainfall data in Hays County from 2007 to 2024 to determine the effectiveness of large storage tanks on supply reliability. A very large storage tank, 40,000 gallons, would still require an augmented source (trucked water), three times over that period. This is the reason that Region K decided that rainfall harvesting was an alternate strategy. Region K recognizes the value of rainfall harvesting in increasing the resiliency of supplies in Hays County, but also that the reliability of the strategy is dependent on large storage and occasional augmentation through other sources. **Table 5.100** shows the estimated costs associated with this strategy.

Table 5.100 Rainwater Harvesting Yield

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
County-Other	Hays	Colorado	103	179	300	512	787	1097

Cost Implications of Proposed Strategy

The project costs – that is, full system costs and operations and maintenance costs – of rainwater harvesting systems are borne by individual system owners, although some water user groups provide incentives to these individuals such as rebates and tax credits. The actual cost of a rainwater harvesting system is proportional to the water demand to be served by the system. It is assumed that a single-family household system consists of storage, a pump and pressure tank, cloth filtration, carbon filtration, an ultraviolet disinfection system and miscellaneous piping. All equipment is assumed to be located on the footprint of the homeowner's property. The capital cost for this system is about $40,000 for a system with a 20,000 gallon tank, increasing to $70,000 with a 50,000 gallon tank, with a 30-year life. These costs were provided a contractor who installs turnkey systems in Hays County.

The Texas Water Development Board (TWDB) Cost Estimating Tool methodology was used to determine facility costs, project costs, annual costs, and unit costs for 800 households associated with Hays County-Other. A 5% operations and maintenance (O&M) cost was applied to annual costs. **Table 5.101** identifies the facilities, project, annual, and unit costs associated with the rainwater harvesting strategy.

Table 5.101 Rainwater Harvesting Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
County-Other	Hays	Colorado	$40,000,000	$42,000,000	$7,000	$53,850

Environmental and Agricultural Considerations

The benefit of rainfall harvesting is a decreased use of surface water or groundwater. Because of the close distance between the rainwater storage and the end use on the property, the gravity fed collection system, and the small footprints of storage tanks, there are no significant environmental or energy consumption impacts. Rainwater harvesting can additionally be beneficial from a stormwater management standpoint by reducing runoff during large storm events. Overall, zero environmental impacts (all environmental factors) are anticipated from this strategy. Zero impacts to agriculture are also anticipated.

In some states, water right permits or authorizations are required for rainwater harvesting projects. Texas, however, does not require authorization for rainwater harvesting projects.

5.3.2.2 Llano – Direct Potable Reuse

Llano requested a direct potable reuse (DPR) strategy to be included for potential use in emergency drought conditions. In preparation for a DPR project, Llano will need to complete a feasibility analysis, pilot testing, and obtain relevant permits from the TCEQ.

This strategy would be expected to provide 280 ac-ft/yr of potable water supply. This strategy would be included as a supply beginning in the 2040 decade and extending through the planning period to 2080 (**Table 5.102**).

Table 5.102 Llano Direct Potable Reuse Yield

WUG	County	Basin	Water Management Strategies (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Llano	Llano	Colorado	0	280	280	280	280	280

Cost Implications of Proposed Strategy

Infrastructure required to implement this strategy includes:

- 0.25 MGD DPR treatment plant (includes reverse osmosis, microfiltration or ultrafiltration, ultraviolet disinfection, advanced oxidation processes, and pH stabilization)
- 6-inch, 2-mile, above-ground transmission main and associated pumps to deliver treated water from the DPR plant to existing conventional water treatment plant for blending
- High service pump station expansion at existing wastewater treatment facility, to transmit water from advanced wastewater treatment to water treatment plant

The cost of water purchase of the treated water has not been valued in this cost estimate, as no water purchase cost has been identified at this time. This assumption may be reevaluated in future regional water planning cycles.

Costs were developed using the Texas Water Development Board Cost Estimating Tool and reported in September 2023 dollars. A 0.25 MGD advanced treatment plant was included in the costing to cover necessary additional treatment of the wastewater effluent before transmission to the water treatment plant. It is assumed additional treatment infrastructure would be added as an expansion to the existing wastewater treatment facilities. The cost of a 0.25 MGD DPR treatment plant was entered as an external cost based on estimated costs of advanced treatment facilities for the Buda and Dripping Springs direct potable reuse strategies. It was assumed that the cost of installing an above-ground pipeline per linear foot would be approximately half of the cost of a buried pipe installation. Costs do not include concentrate disposal or upgrades to the existing water treatment plant that may be required by TCEQ. **Table 5.103** shows the estimated costs associated with this strategy.

Table 5.103 Llano Direct Potable Reuse Cost

WUG	County	Basin	Total Facilities Cost	Total Project Cost	Largest Annual Cost	Unit Cost ($/ac ft)
Llano	Llano	Colorado	$11,123,000	$15,674,000	$1,506,000	$5,379

Environmental Considerations

As a part of the permitting process through TCEQ, a disposal method for the DPR WTP treatment residuals will need to be identified. Because the concentrations of regulated constituents (Total Dissolve Solids, chloride, sulfate, etc.) will be higher through DPR than conventional wastewater treatment, alternatives to land application may need to be pursued, including but not limited to deep well injection, evaporation ponds, mechanical evaporation, or brine crystallization.

It is assumed that the project will have negligible impacts on cultural resources, but coordination with the Texas Historical Commission will need to occur before construction begins. Refer to Chapter 1, Appendix 1.A, for the complete list by county of threatened and endangered species in the Lower Colorado Regional Water Planning Area. These species may need to be considered during construction of infrastructure.

Agricultural & Natural Resources Considerations

No impacts to agriculture (zero impacted acres) are expected as a result of implementing this strategy.

5.4 Documentation of the Identification and Evaluation Process

The process that the Water Management Strategies Committee went through to identify and evaluate the potentially feasible water management strategies for this planning cycle is documented in the Water Management Strategies Committee meeting minutes included in **Appendix 5.A**.

5.5 Implementation Status for Certain Types of Recommended WMS

Per Section 2.5.2.7 of the Second Amended General Guidelines for Development of the 2026 Regional Water Plans (amended September 2023), this section documents representative implementation schedules for the following strategy types:

- All reservoir strategies, including major and minor reservoirs (**Figure 5.7**)
- All seawater desalination strategies (**Figure 5.5**)
- Direct potable reuse strategies that provide greater than 5,000 acre-feet per year (ac-feet/yr) of supply in any planning decade (**Figure 5.4**)
- Brackish groundwater strategies that provide greater than 10,000 ac-feet/yr in any planning decade (**Figure 5.2**)
- Aquifer storage and recovery strategies that provide greater than 10,000 ac-feet/yr in any decade (**Figure 5.3**)
- All water transfers from out of state
- Any other innovative technology projects the RWPG considers appropriate

Additionally, this new Texas Water Development Board (TWDB) guidance requires summary information on all Water Management Strategies (WMS) recommended within the region under these strategy types. This summary information can be found in tabular format in Appendix 5B. Finally, implementation information on the strategy type “water transfers from out of state” cannot be found in this section because no WMSs under this strategy type have been recommended in this region.

Figure 5.2 Potential Brackish Groundwater Strategy Implementation Schedule – Traditional Delivery

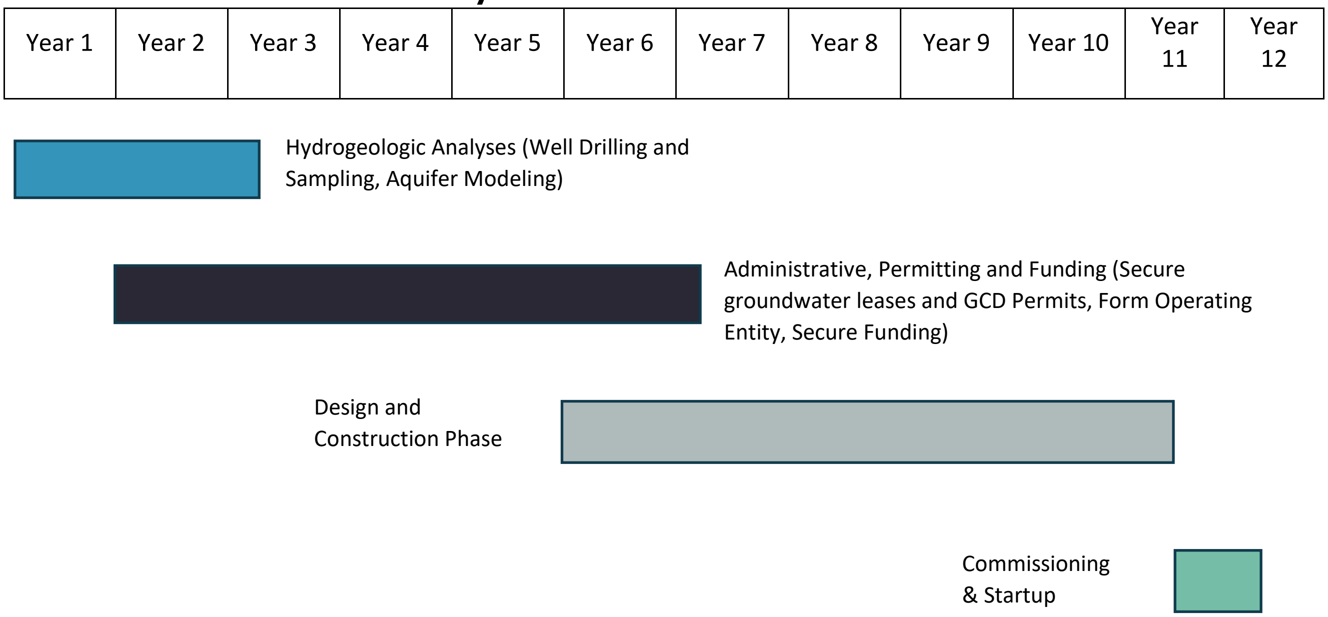


Figure 5.3 Potential Aquifer Storage and Recovery Strategy Implementation Schedule – Traditional Delivery

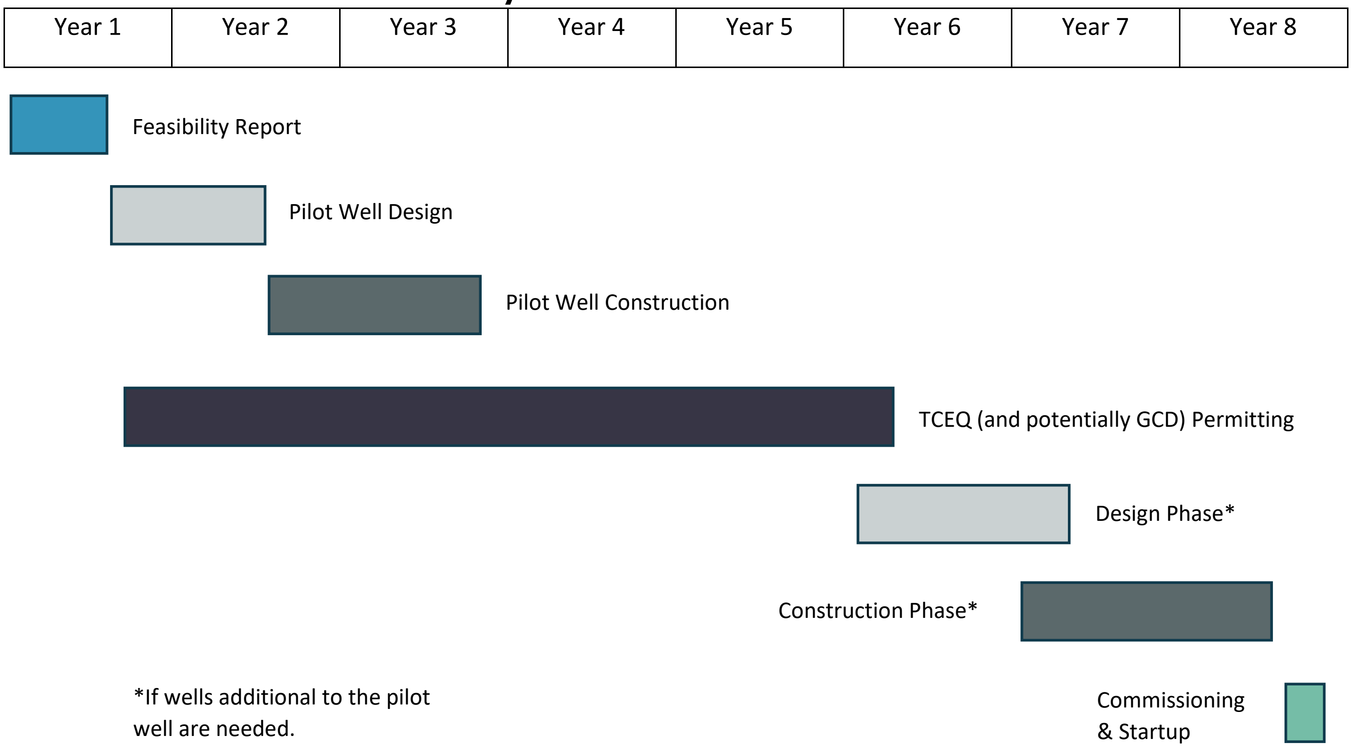


Figure 5.4 Potential Direct Potable Reuse Strategy Implementation Schedule – Traditional Delivery*

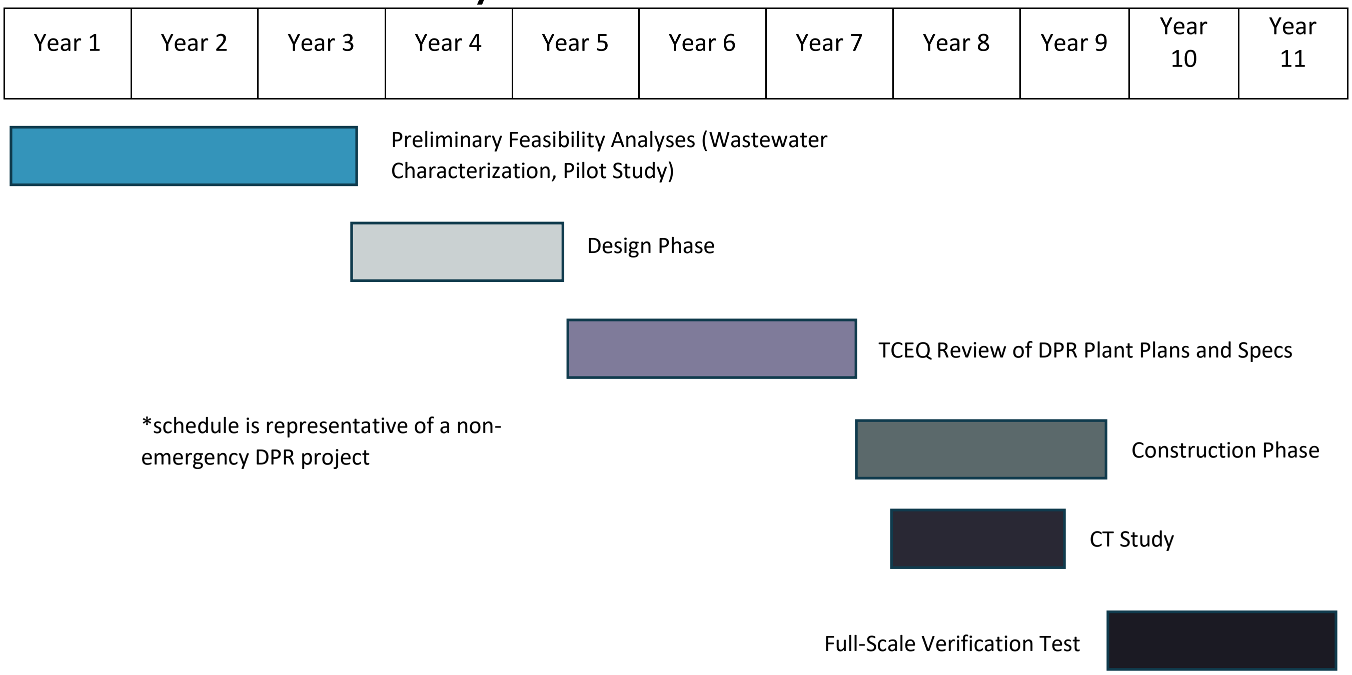
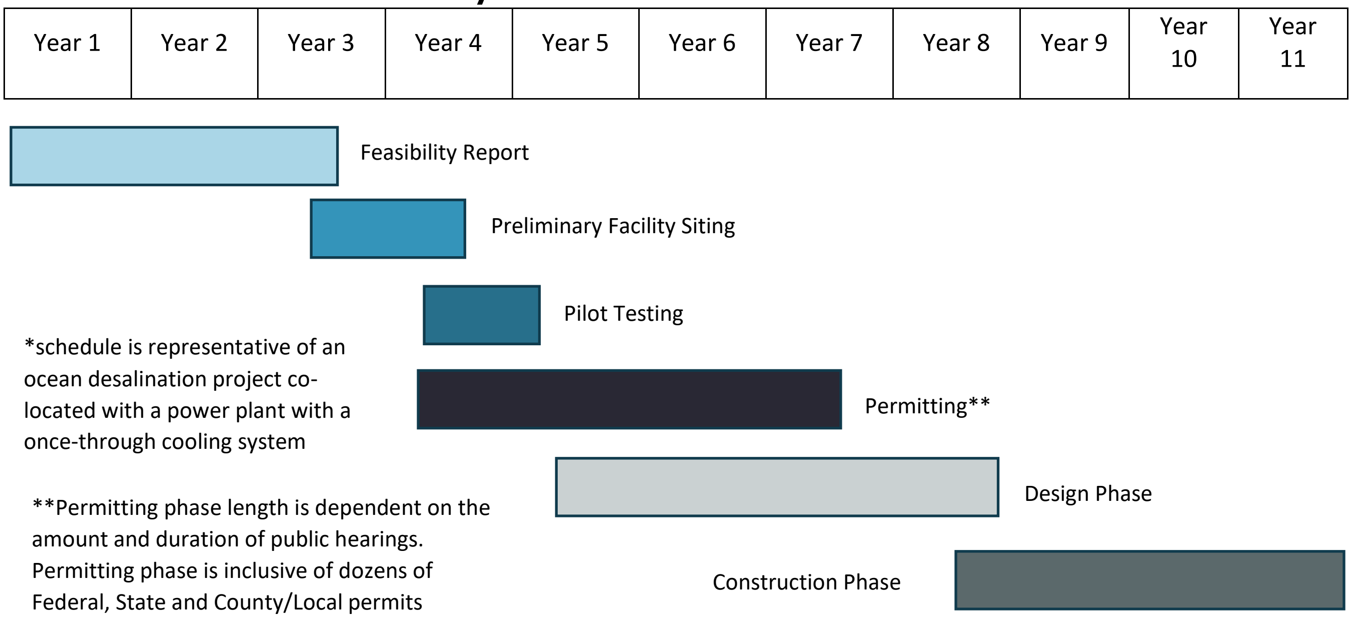


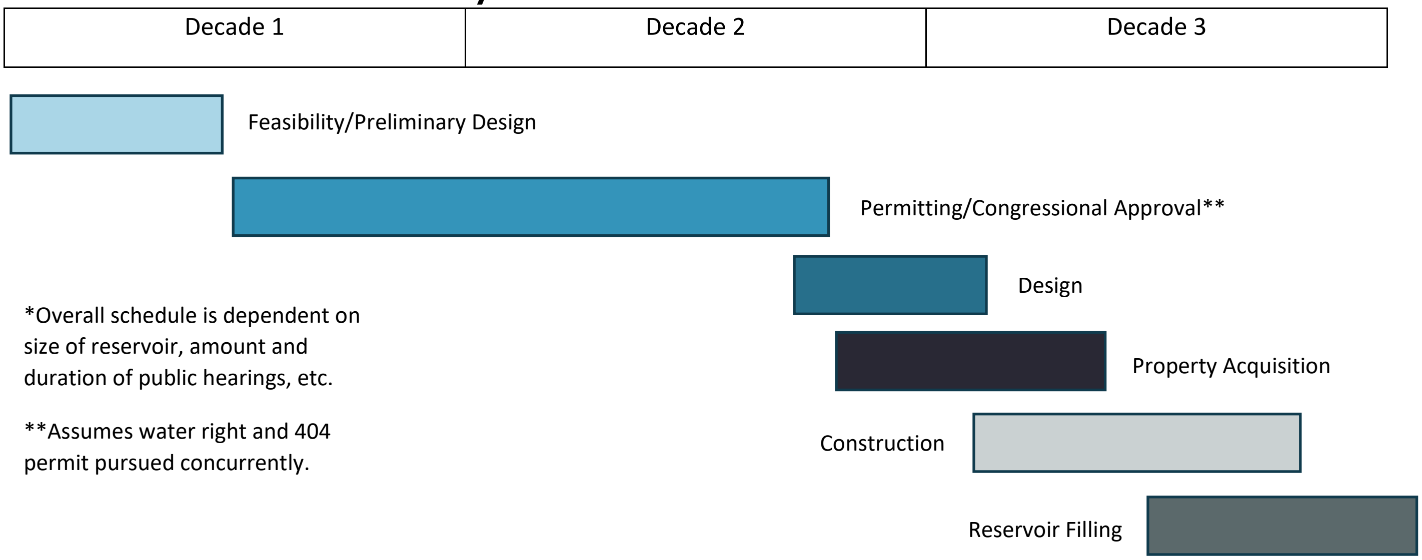
Figure 5.5 Potential Ocean Desalination Strategy Implementation Schedule – Traditional Delivery*



*schedule is representative of an ocean desalination project co-located with a power plant with a once-through cooling system

**Permitting phase length is dependent on the amount and duration of public hearings. Permitting phase is inclusive of dozens of Federal, State and County/Local permits associated with facility construction, feedwater, and residual management.

Figure 5.7 Potential New On Channel Reservoir Strategy Implementation Schedule – Traditional Delivery*



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Chapter 6.

Impacts of Regional Water Plan

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Chapter 6. Impacts of the Regional Water Plan

A major goal of the regional water planning process is the protection of the State's water, agricultural, and natural resources. This Chapter presents the results of Task 6 of the Project Scope, which addresses:

- Evaluation of the estimated cumulative impacts of the Regional Water Plan (RWP), for example on groundwater levels, spring discharges, bay and estuary inflows, and instream flows.
- Assessment of the impact of the RWP on designated unique river or stream segments by the Legislature.
- A socioeconomic impact analysis of not meeting identified water needs.
- Description of the impacts of the RWP regarding:
  - Agricultural Resources;
  - Other Water Resources of the State, including other Water Management Strategies and groundwater and surface water interrelationships;
  - Threats to Agricultural and Natural Resources;
  - Third-party social and economic impacts resulting from voluntary redistributions of water including analysis of third-party impacts of moving water from rural and agricultural areas;
  - Major impacts of recommended Water Management Strategies on key parameters of water quality, and;
  - Effects on Navigation.
- Summarization of the identified water needs that remain unmet by the RWP.

6.1 Cumulative Impacts of the Regional Water Plan

The impacts of individual water management strategies on Colorado River instream flows and bay and estuary freshwater inflows were discussed in Chapter 5. Beyond the impacts of individual water management strategies, the Texas Water Development Board (TWDB) requires an analysis of the cumulative impacts of recommended water management strategies to the Colorado River and Matagorda Bay.

For the 2026 Region K Water Plan, many of the recommended water management strategies utilize water under existing water rights, which includes full use of wastewater effluent at 100 percent, consistent with the required surface water availability modeling guidelines. The baseline water availability analyses are conducted using full use of existing water rights; therefore, the water for the strategies in the Colorado River basin is generally accounted for in the baseline model simulation.

In general, off-channel reservoirs that utilize existing water rights would not create additional impacts to the system, although variations to instream flows could be expected to occur. Additional groundwater that is used and then discharged to a local stream can create additional flow downstream, but the additional pumping can also potentially lower the water table and reduce spring flows in the area. Reuse of wastewater effluent reduces return flows, but it also reduces the need to divert additional surface water to meet demands. Aquifer Storage and Recovery (ASR) has the potential to reduce higher levels of surface water or groundwater by storing it when it is available, but then also has the potential to keep stream and aquifer levels higher during times of drought by providing an additional source of water. Conservation and drought management are strategies that encourage efficient and responsible use of the region's water resources.

When return flows are present, they contribute to instream flows and bay and estuary inflows. They provide a consistent source of flow in the river, even when a portion of the return flows are reused. Return flows are a source of flow that is not included in the surface water availability modeling and show a positive impact to the system as a water management strategy.

Groundwater strategies recommended by Region K had yields within the identified Modeled Available Groundwater (MAG) volumes, which are determined based on the Desired Future Condition (DFC) of each aquifer. Groundwater Conservation Districts will continue to monitor aquifer levels to determine if future changes to the DFC and MAG are needed.

The recommendation by Region K of strategies such as conservation, reuse, and drought management will reduce demands, which will help to maintain the spring discharges in the region, especially during times of drought. In addition, recommended strategies such as off-channel reservoirs and aquifer storage and recovery may aid in balancing peak demands for surface water and groundwater, which could also help maintain spring flows in the region.

6.1.1 Environmental Flow Impacts of Water Management Strategies

Sufficient water to meet environmental needs and to maintain a sound ecological environment in the Colorado River and Matagorda Bay is important to the economic and environmental health of Region K. The qualitative and quantitative environmental impacts for the recommended water management strategies have been evaluated as part of the 2026 Region K Water Plan. In addition, strategies that would require new or amended water rights were evaluated while incorporating the Texas Commission on Environmental Quality (TCEQ) environmental flow requirements that were determined as part of the Senate Bill 3 (SB3) process.

As part of the SB3 process, the Colorado/Lavaca River and Matagorda Bay Basin Expert Science Team (BBEST) studied available data and developed a set of recommendations for the freshwater inflows that would be needed to maintain a sound ecological environment in Matagorda Bay. **Table 6.1** compares the BBEST recommended freshwater inflow components and the attainment frequencies needed to maintain a sound ecological environment with the current TCEQ Water Availability Model (WAM) Run 3 attainment frequencies. TCEQ WAM Run 3 provides information on the amount of unappropriated water available for meeting environmental flow needs and other demands assuming full use of water rights in the basin with no return flows. Table 6.1 below shows that with full use of water rights that the attainment frequencies for the five (5) flow regimes will not be met under a WAM Run 3 regime.

The members of the Region K water planning group are concerned about meeting environmental needs to maintain a sound ecological environment, and we recommend that the planning group take proactive steps during the next round of planning to incorporate strategies to address this shortfall. The planning process is not currently designed to fully address environmental needs.

Table 6.1 Comparison of BBEST recommendations for Matagorda Bay Inflows from Colorado River Basin to WAM Run3 values

Regime Title	BBEST Recommended Value	WAM Run3 Calculated Value
Attainment Frequency for Threshold Regime	100%	68%
Attainment Frequency for MBHE1 Regime	90%	57%
Attainment Frequency for MBHE2 Regime	75%	51%
Attainment Frequency for MBHE3 Regime	60%	30%
Attainment Frequency for MBHE4 Regime	35%	8%
Average Annual Volume	1.4 to 1.5 million ac-ft	973,085 ac-ft
Coefficient of Variation for Volume	Above 0.8	1

6.1.2 Criteria Used

The Region K Cutoff strategy model was used for the evaluation of the recommended water management strategies that involve surface water. The assumptions used for the strategy model are provided in **Appendix 3.B** of **Chapter 3**. The Adopted TCEQ Environmental Flow Standards for the Colorado River and Matagorda Bay were used for the evaluations.

6.1.2.1 Matagorda Bay Freshwater Inflow Criteria

The following tables are from the Matagorda Bay Health Evaluation (2008), which was conducted as part of the LCRA-San Antonio Water System (SAWS) Water Project (LSWP) Studies to help define the criteria used for environmental impact analysis of the freshwater inflows to Matagorda Bay (Control Point M10000 in the Region K Cutoff model). The Matagorda Bay Health Evaluation used the latest data and science to assess the relationship between various factors and bay conditions, and the criteria have been incorporated into the Adopted TCEQ Environmental Flow Standards for Matagorda Bay. Several measures of bay health were investigated, including salinity, habitat condition, species abundance, nutrient supply and benthic condition. The computer models and data analysis in the study were used to develop inflow criteria for the Colorado River. Salinity, habitat and benthic modeling were used to develop criteria for most levels, but additional measures of bay health were used wherever possible.

Table 6.2 Inflow Categories and Range of Inflow Criteria

Inflow Category	Inflow Criteria	Description
LONG-TERM	Long-term Average Volume and Variability	provide adequate bay food supply to maintain the essential food supply and existing primary productivity of the bay system
MBHE INFLOW REGIME	MBHE 4	provide inflow variability and support high levels of primarily productivity, and high quality oyster reef health, benthic condition, low estuarine marsh, and shellfish and forage fish habitat.
	MBHE 3	provide inflow variability and support quality oyster reef health, benthic condition, low estuarine marsh, and shellfish and forage fish habitat.
	MBHE 2	provide inflow variability and sustain oyster reef health, benthic condition, low estuarine marsh, and shellfish and forage fish habitat
	MBHE 1	maintain tolerable oyster reef health, benthic character, and habitat conditions
MINIMUM	Threshold	refuge conditions for all species and habitats

Source: Matagorda Bay Inflow Criteria (Colorado River) and Matagorda Bay Health Evaluation (MBHE)

Table 6.2 above shows the different levels of criteria and gives a description of what each level of flow can provide to the bay. There are three categories of criteria: long-term, minimum, and the Matagorda Bay Health Evaluation (MBHE) inflow regime, which consists of four levels of increasing flow volumes.

Table 6.3 shows specific numerical flow volumes for the four levels of the MBHE inflow regime, which are separated into three "seasons." Achievement guidelines for the percentage of time a particular MBHE level should be met are also provided. It should be noted that the achievement guidelines are provided as information, but that the environmental impact analysis that was done for the water management strategies as part of the 2021 Region K Plan did not try to determine whether or not the recommended strategies were reasonable based on whether the cumulative impacts caused the freshwater inflows to go above or below a particular value. Again, the main comparison for the study was the flow with and without the strategies implemented.

Table 6.3 Recommended MBHE Inflow Regime Criteria and Proposed Distribution

Onset Month	Flow Distribution (% of annual)	INFLOW CRITERIA (Acre-feet)			
		MBHE 1	MBHE 2	MBHE 3	MBHE 4
Spring January February March April May	38%	114,000 ac-ft 3 consecutive month total	168,700 ac-ft 3 consecutive month total	246,200 ac-ft 3 consecutive month total	433,200 ac-ft 3 consecutive month total
Fall August September October	27%	81,000 ac-ft 3 consecutive month total	119,900 ac-ft 3 consecutive month total	175,000 ac-ft 3 consecutive month total	307,800 ac-ft 3 consecutive month total
Intervening Six months	35%	105,000 ac-ft Total for 6 month period	155,400 ac-ft Total for 6 month period	226,800 ac-ft Total for 6 month period	399,000 ac-ft Total for 6 month period
Achievement Guideline		90%	75%	60%	35%* (See Sec. 5.2)

Source: Matagorda Bay Inflow Criteria (Colorado River) and Matagorda Bay Health Evaluation

6.1.2.2 Lower Colorado River Instream Flow Criteria

The following tables show the TCEQ Environmental Flow Standards for the Lower Colorado River Instream Flow Criteria that was used for environmental impact analysis of the water management strategies on the Colorado River instream flows at various control points downstream of the Highland Lakes.

Table 6.4 provides the instream flow guidelines (in cubic feet per second) for three different categories of flow conditions and four separate reaches downstream of the Highland Lakes. The Austin Reach begins at Control Point I20000 in Travis County. The Bastrop Reach begins at Control Point J30000 in Bastrop County. The Columbus Reach begins at Control Point J10000 in Colorado County. The Wharton Reach begins at Control Point K20000 in Wharton County. The three categories of flow are: Subsistence, Base-Dry Conditions, and Base-Average Conditions. The TCEQ Environmental Flow Standards also recommend pulse flows, but the modeling used to analyze the environmental impacts is a monthly flow application, which makes it difficult to analyze pulse flows which occur on a daily level rather than monthly. The Austin Reach only has a Subsistence Flow guideline due to the influence of reservoir discharges from Longhorn Dam and return flows which enter the reach downstream of the United States Geological Survey (USGS) gage for the Colorado River at Austin.

Table 6.4 TCEQ Environmental Flow Standards for Instream Flow for the Lower Colorado River (cfs)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AUSTIN REACH												
Subsistence	50	50	50	50	50	50	50	50	50	50	50	50
BASTROP REACH												
Subsistence	208	274	274	184	275	202	137	123	123	127	180	186
Base-DRY	313	317	274	287	579	418	347	194	236	245	283	311
Base-AVERAGE	433	497	497	635	824	733	610	381	423	433	424	450
COLUMBUS REACH												
Subsistence	340	375	375	299	425	534	342	190	279	190	202	301
Base-DRY	487	590	525	554	966	967	570	310	405	356	480	464
Base-AVERAGE	828	895	1,020	977	1,316	1,440	895	516	610	741	755	737
WHARTON REACH												
Subsistence	315	303	204	270	304	371	212	107	188	147	173	202
Base-DRY	492	597	531	561	985	984	577	314	410	360	486	470
Base-AVERAGE	838	906	1,036	1,011	1,397	1,512	906	522	617	749	764	746

Table 6.5 provides the instream flow guidelines in acre-feet per year (ac-ft/yr), rather than cubic feet per second (cfs).

Table 6.5 Instream Flow Guidelines for the Lower Colorado River (ac-ft/yr))

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
AUSTIN REACH												
Subsistence	3,074	2,777	3,074	2,975	3,074	2,975	3,074	3,074	2,975	3,074	2,975	3,074
BASTROP REACH												
Subsistence	12,789	15,217	16,848	11,127	16,909	12,020	8,424	7,563	7,319	7,809	10,711	11,437
Base-DRY	19,246	17,605	16,848	17,078	35,601	24,873	21,336	11,929	14,043	15,064	16,840	19,123
Base-AVERAGE	26,624	27,602	30,559	37,785	50,666	43,617	37,507	23,427	25,170	26,624	25,230	27,669
COLUMBUS REACH												
Subsistence	20,906	20,826	23,058	17,792	26,132	31,775	21,029	11,683	16,602	11,683	12,020	18,508
Base-DRY	29,944	32,767	32,281	32,965	59,397	57,540	35,048	19,061	24,099	21,890	28,562	28,530
Base-AVERAGE	50,912	49,706	62,717	58,136	80,918	85,686	55,031	31,728	36,298	45,562	44,926	45,316
WHARTON REACH												
Subsistence	19,369	16,828	12,543	16,066	18,692	22,076	13,035	6,579	11,187	9,039	10,294	12,420
Base-DRY	30,252	33,156	32,650	33,382	60,565	58,552	35,478	19,307	24,397	22,136	28,919	28,899
Base-AVERAGE	51,527	50,317	63,701	60,159	85,898	89,970	55,708	32,097	36,714	46,054	45,461	45,870

The instream flow impact analysis was focused on a comparison of the percentage of time the model met these values, both with and without the strategies implemented. The impact is shown as the difference between the two scenarios, rather than how often either the base model or the model with the strategies met the criteria.

6.1.3 Evaluated Water Management Strategies and Results

Several of the strategies recommended in the 2021 Region K Water Plan have been included in the cumulative impacts analysis on environmental flows.

- Austin Return Flows (**Section 5.2.1.1**)
- Lake Walter E. Long Off-Channel Reservoir (**Section 5.2.3.2.6**)
- Downstream Return Flows from Pflugerville (**Section 5.2.1.2**)

- LCRA Lake Bastrop Water Supply Project (**Section 5.2.3.1.2**)
- Import Return Flows from Williamson County (**Section 5.2.3.1.6**)
- LCRA Aquifer Storage and Recovery (ASR) (**Section 5.2.3.1.7**)
- LCRA Lower Basin Off-Channel Reservoir (**Section 5.2.3.1.8**)

The strategy evaluation began with the creation of a base model (Region K Cutoff Model – strategy version.) The assumptions used for the strategy base model are listed in Chapter 3, Appendix 3.B. Results from the base model run were compared to those from the base plus strategies model run. As mentioned earlier, the return flow water management strategies provide positive impacts to the instream flows and freshwater inflow to Matagorda Bay, while the other strategies tend to have either negligible impacts or in some cases may remove some flows from the river and bay. **Table 6.6** shows a comparison of how frequently the attainment goals for the freshwater inflows to Matagorda Bay are met with and without the cumulative strategies for the 2080 decade. Appendix 6.A includes a similar table (6.A.1) that contains an additional column showing the impacts of just the return flow strategies.

Table 6.6 Frequency Attainment of TCEQ Environmental Flow Standards for Freshwater Inflows to Matagorda Bay

Freshwater Inflows to Matagorda Bay

SPRINGTIME ONSET FLOW CRITERIA MET (3 CONSECUTIVE MONTHS DURING JAN-MAY)						
CRITERIA	**TARGET**	**2080 No strategies**		**2080 All Strategies**		**DIFFERENCE**
	(AC-FT)	#YEARS	%	#YEARS	%	%
MBHE 1	114,000	50	64.9%	54	70.1%	5.2%
MBHE 2	168,700	48	62.3%	51	66.2%	3.9%
MBHE 3	246,200	43	55.8%	47	61.0%	5.2%
MBHE 4	433,200	29	37.7%	35	45.5%	7.8%

FALL ONSET FLOW CRITERIA MET(3 CONSECUTIVE MONTHS DURING AUG-OCT)						
CRITERIA	**TARGET**	**2080 No Strategies**		**2080 All Strategies**		**DIFFERENCE**
	(AC-FT)	#YEARS	%	#YEARS	%	%
MBHE 1	81,000	57	74.0%	59	76.6%	2.6%
MBHE 2	119,900	50	64.9%	53	68.8%	3.9%
MBHE 3	175,000	48	62.3%	50	64.9%	2.6%
MBHE 4	307,800	40	51.9%	43	55.8%	3.9%

INTERVENING SIX MONTHS FLOW CRITERIA MET						
CRITERIA	**TARGET**	**2080 No Strategies**		**2080 All Strategies**		**DIFFERENCE**
	(AC-FT)	#YEARS	%	#YEARS	%	%
MBHE 1	105,000	54	70.1%	54	70.1%	0.0%
MBHE 2	155,400	48	62.3%	52	67.5%	5.2%
MBHE 3	226,800	45	58.4%	49	63.6%	5.2%
MBHE 4	399,000	31	40.3%	37	48.1%	7.8%

NUMBER OF MONTHS THAT THRESHOLD LEVEL IS MET						
CRITERIA	**TARGET**	**2080 No Strategies**		**2080 All Strategies**		**DIFFERENCE**
	(AC-FT/mo)	#MONTHS	%	#MONTHS	%	%
THRESHOLD	15,000	641	69.4%	654	70.8%	1.4%

Table 6.7 shows a comparison of how frequently the attainment goals for the Colorado River instream flows are met at Bastrop, Columbus, and Wharton, with and without strategies. Appendix 6.A includes a similar table (6.A.2) that contains an additional column showing the impacts of just the return flow strategies.

Table 6.7 Frequency Attainment of TCEQ Environmental Flow Standards for Colorado River Instream Flows

		TARGET ATTAINMENT FREQUENCY 100%				TARGET ATTAINMENT FREQUENCY 80%				TARGET ATTAINMENT FREQUENCY 60%			
		SUBSISTENCE FLOWS				BASE FLOWS - DRY CONDITIONS				BASE FLOWS - AVERAGE CONDITIONS			
CP J30000	MONTH	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080
		(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%
Bastrop	Jan	12,789	89.6%	100.0%	10.4%	19,246	67.5%	90.9%	23.4%	26,624	45.5%	63.6%	18.2%
	Feb	15,217	84.4%	100.0%	15.6%	17,605	71.4%	93.5%	22.1%	27,602	42.9%	62.3%	19.5%
	Mar	16,848	93.5%	98.7%	5.2%	16,848	93.5%	98.7%	5.2%	30,559	48.1%	64.9%	16.9%
	Apr	10,949	98.7%	100.0%	1.3%	17,078	93.5%	96.1%	2.6%	37,785	44.2%	57.1%	13.0%
	May	16,909	94.8%	98.7%	3.9%	35,601	81.8%	90.9%	9.1%	50,666	64.9%	70.1%	5.2%
	Jun	12,020	98.7%	100.0%	1.3%	24,873	96.1%	98.7%	2.6%	43,617	79.2%	88.3%	9.1%
	Jul	8,424	100.0%	100.0%	0.0%	21,336	90.9%	98.7%	7.8%	37,507	74.0%	75.3%	1.3%
	Aug	7,563	100.0%	100.0%	0.0%	11,929	100.0%	100.0%	0.0%	23,427	83.1%	94.8%	11.7%
	Sep	7,319	100.0%	100.0%	0.0%	14,043	97.4%	98.7%	1.3%	25,170	74.0%	84.4%	10.4%
	Oct	7,809	98.7%	100.0%	1.3%	15,064	84.4%	100.0%	15.6%	26,624	55.8%	62.3%	6.5%
	Nov	10,711	96.1%	100.0%	3.9%	16,840	59.7%	80.5%	20.8%	25,230	48.1%	61.0%	13.0%
	Dec	11,437	93.5%	98.7%	5.2%	19,123	58.4%	72.7%	14.3%	27,669	41.6%	57.1%	15.6%
	Non-Attainment		9	3			4	1			7	2	

		SUBSISTENCE FLOWS				BASE FLOWS - DRY CONDITIONS				BASE FLOWS - AVERAGE CONDITIONS			
CP J10000	MONTH	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080
		(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%
Columbus	Jan	20,906	96.1%	98.7%	2.6%	29,944	64.9%	71.4%	6.5%	50,912	42.9%	55.8%	13.0%
	Feb	20,826	88.3%	100.0%	11.7%	32,767	59.7%	71.4%	11.7%	49,706	37.7%	53.2%	15.6%
	Mar	23,058	92.2%	98.7%	6.5%	32,281	58.4%	70.1%	11.7%	62,717	41.6%	48.1%	6.5%
	Apr	17,792	98.7%	100.0%	1.3%	32,965	77.9%	80.5%	2.6%	58,136	44.2%	51.9%	7.8%
	May	26,132	100.0%	100.0%	0.0%	59,397	74.0%	76.6%	2.6%	80,918	46.8%	53.2%	6.5%
	Jun	31,775	96.1%	98.7%	2.6%	57,540	84.4%	84.4%	0.0%	85,686	53.2%	49.4%	-3.9%
	Jul	21,029	97.4%	100.0%	2.6%	35,048	85.7%	90.9%	5.2%	55,031	68.8%	59.7%	-9.1%
	Aug	11,683	100.0%	100.0%	0.0%	19,061	92.2%	100.0%	7.8%	31,728	74.0%	85.7%	11.7%
	Sep	16,602	98.7%	100.0%	1.3%	24,099	88.3%	96.1%	7.8%	36,298	70.1%	79.2%	9.1%
	Oct	11,683	96.1%	100.0%	3.9%	21,890	83.1%	88.3%	5.2%	45,562	46.8%	57.1%	10.4%
	Nov	12,020	96.1%	100.0%	3.9%	28,562	51.9%	70.1%	18.2%	44,926	45.5%	49.4%	3.9%
	Dec	18,508	92.2%	97.4%	5.2%	28,530	54.5%	72.7%	18.2%	45,316	39.0%	41.6%	2.6%
	Non-Attainment		10	4			7	6			9	10	

		SUBSISTENCE FLOWS				BASE FLOWS - DRY CONDITIONS				BASE FLOWS - AVERAGE CONDITIONS			
CP K20000	MONTH	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080	FLOW	No Strategies 2080	All Strategies 2080	DIFFERENCE 2080
		(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%
Wharton	Jan	19,369	96.1%	96.1%	0.0%	30,252	71.4%	70.1%	-3.9%	51,527	55.8%	53.2%	-2.6%
	Feb	16,828	96.1%	96.1%	0.0%	33,156	63.6%	67.5%	3.9%	50,317	42.9%	48.1%	5.2%
	Mar	12,543	96.1%	98.7%	2.6%	32,650	57.1%	61.0%	3.9%	63,701	39.0%	41.6%	2.6%
	Apr	16,066	93.5%	94.8%	1.3%	33,382	53.2%	57.1%	3.9%	60,159	45.5%	53.2%	7.8%
	May	18,692	97.4%	100.0%	2.6%	60,565	45.5%	54.5%	9.1%	85,898	32.5%	44.2%	11.7%
	Jun	22,076	88.3%	94.8%	6.5%	58,552	44.2%	51.9%	7.8%	89,970	28.6%	33.8%	5.2%
	Jul	13,035	79.2%	92.2%	13.0%	35,478	40.3%	54.5%	14.3%	55,708	24.7%	27.3%	2.6%
	Aug	6,579	89.6%	97.4%	7.8%	19,307	67.5%	77.9%	10.4%	32,097	32.5%	31.2%	-1.3%
	Sep	11,187	87.0%	94.8%	7.8%	24,397	55.8%	66.2%	10.4%	36,714	41.6%	39.0%	-2.6%
	Oct	9,039	93.5%	96.1%	2.6%	22,136	68.8%	72.7%	3.9%	46,054	37.7%	36.4%	-1.3%
	Nov	10,294	97.4%	98.7%	1.3%	28,919	61.0%	58.4%	-2.6%	45,461	45.5%	41.6%	-3.9%
	Dec	12,420	94.8%	97.4%	2.6%	28,899	66.2%	63.6%	-2.6%	45,870	46.8%	49.4%	2.6%
	Non-Attainment		12	11			12	12			12	12	

Decreases in target attainment at the Columbus and Wharton gages may be attributed to modeling assumptions regarding when instream flow targets are turned on and off relative to strategy diversions and the timing of how they are applied to senior and junior water rights. The impacts on the remaining conditions and gages are mainly positive, due in large part to the return flows, and in general decrease the number of non-attainment months.

6.2 Assessment of Impact On Designated Unique River or Stream Segments

Region K does not have any designated unique stream segments or reservoir sites, so there are no impacts from the regional water plan.

6.3 Impacts of Water Management Strategies On Water Resources

A major goal of the regional water planning process is the protection of the State's water, agricultural, and natural resources. The Region K planning group has considered resource protection throughout the process of selecting water management strategies to meet water needs for the future. Conservation and drought management were considered as initial strategies for meeting water needs. Impacts on the State's resources have been considered before recommending other strategies. The effects of the recommended water management strategies on specific resources are discussed in further detail within this Section.

6.3.1 Agricultural Resources

Rice production in the lower three counties of Region K is the agricultural resource most dependent upon a reliable, extensive water supply. The Lower Colorado iver Authority's (L RA's) water rights in these counties used for rice farming are some of the most senior rights within the entire Colorado River Basin. However, the irrigators using these water rights do not have a sufficiently reliable supply of water under drought-of-record (DOR) conditions.

The management strategies introduced in Chapter 5 of this regional water plan were created to meet the needs of all water user groups (WUGs), including agricultural needs. The primary unmet agricultural needs in Region K are related to rice irrigation in the lower counties of Colorado, Wharton, and Matagorda. These needs have been partially met with recommended water management strategies to help reduce the projected shortages. The use of interruptible water supplies, return flows from Austin, on-farm conservation, conveyance improvements, conversion to sprinkler irrigation, and real-time monitoring will help to reduce the water needs, but will not eliminate them completely.

6.3.2 Other Water Resources of the State including Groundwater and Surface Water Interrelationships

In the following subsections, impacts of recommended water management strategies to groundwater and surface water interrelationships are reviewed in further detail.

6.3.2.1 Brazos River Basin

Portions of Bastrop, Burnet, Mills, Travis, and Williamson counties are within the Brazos River Basin. Local supplies are the only surface water sources originating from the Brazos River Basin in Region K. The portion of Williamson County within Region K is within the service area of Austin (Austin Water) and the Lower Colorado River Authority (LCRA) and is served by their respective water supplies from the Colorado River Basin.

Groundwater supplies in the Brazos River Basin are obtained primarily from the Carrizo-Wilcox, Hickory, and Trinity aquifers. Groundwater is also available in lesser quantities from the Edwards-Balcones Fault Zone (BFZ), Ellenburger-San Saba, Gulf Coast, Marble Falls, Queen City, Sparta, Yegua-Jackson, and other unnamed aquifers.

Areas that are supplied from groundwater in the Brazos River Basin would be expected to discharge less water from treatment plants after implementing conservation measures. As wastewater effluent is often an important portion of instream flows, especially during dry periods, conservation measures may result in reduced stream flows. Expanding the use of groundwater will generally increase the amount of return flows to streams.

6.3.2.2 Brazos-Colorado Coastal River Basin

The Brazos-Colorado Coastal River Basin includes portions of Colorado, Matagorda, and Wharton counties. The only surface water source for this basin in Region K that is not a local supply is a run-of-river (ROR) right from the San Bernard River. However, surface water originating in the Colorado River Basin is transferred to the Brazos-Colorado Coastal River Basin for agricultural use and is subsequently released to streams in the process of rice production. The entirety of the Brazos-Colorado River Basin within Region K is served by the Gulf Coast Aquifer.

As in the other basins of Region K, increased groundwater usage may have potential impacts on water quantity in stream channels but possible adverse effects on water quality in some cases. Conservation programs implemented through the Lower Colorado River Authority or local farmers may decrease return flows within the Brazos-Colorado Coastal Basin during dry periods and introduce less water from the Colorado River Basin for irrigation use, due to reduced demands.

6.3.2.3 Colorado River Basin

The majority of Region K lies within the Colorado River Basin; thus, nearly every recommended management strategy has the potential to impact water quantity and quality in the basin.

The Colorado River Basin is the single largest source of water for the region, as discussed at length in Chapter 3. Lake Buchanan and Lake Travis, operated by the Lower Colorado River Authority (LCRA), provide firm surface water supplies throughout the lower part of the basin. A large amount of water is also available from run-of-river (ROR) supplies in the basin. Other reservoirs in the system provide small yields or receive their water from the Highland Lakes System or a ROR right. The largest amounts of groundwater in the Colorado River Basin are available from the Gulf Coast, Carrizo-Wilcox, Trinity, and Ellenburger-San Saba aquifers. These four aquifers represent approximately 80 percent of the available groundwater supply with various other aquifers providing the remaining 20 percent.

Currently, Austin's discharged effluent travels downstream, where it can be diverted under existing water rights and flows in the river from the points of discharge to the downstream points of diversion. There are several recommended Austin strategies that incorporate a portion of the effluent as the strategy’s source of water. It is possible that Austin reuse will become comprehensive enough to reduce these total flows considerably in later decades, though that is not currently projected to occur within the planning horizon for this planning cycle. While the amount of reuse is projected to increase, the amount of Austin’s municipal return flows above the reuse strategy amounts are also projected to increase over the planning period. These projected amounts of return flows as a water management strategy for the planning period are updated as part of the planning process each cycle.

New contracts and contract amendments may also decrease total flow due to decreased availability to agricultural irrigation and may result in higher concentrations of effluent in the river below wastewater discharges in certain areas during low flow periods.

Operation of the Highland Lakes System with one or more new downstream off-channel reservoirs as well as an Austin off-channel reservoir will create additional available firm water and may be beneficial to instream flows during some periods. In addition, it could reduce the amount of stored water in the Highland Lakes that has to be released to meet downstream demands.

Conservation practices for agricultural irrigation will reduce the demand for stored surface water and thereby result in reduced streamflow, although sediment and nutrient loads from irrigation tail water would be reduced, as well.

Portions of Matagorda and Wharton counties are within the Colorado-Lavaca Coastal River Basin. All surface water sources in these areas are associated with local supplies or stored water from the Highland Lakes. However, as in the Brazos-Colorado Coastal River Basin, water from the Colorado River Basin is discharged into streams following its use in rice production, and all groundwater supplies are obtained from the Gulf Coast Aquifer.

As in the other basins of Region K, increased groundwater usage may have potential positive impacts on water quantity in stream channels but possible adverse effects on water quality in some cases. Again, conservation programs for irrigation may decrease stream flows during dry periods and introduce less water from the Colorado River Basin for irrigation use.

6.3.2.4 Lavaca River Basin

The western portions of Colorado and Fayette counties are located in the Lavaca River Basin. There are no firm surface water rights available from the Lavaca River Basin within these two counties. Additionally, the only reservoir in this basin, Lake Texana, is not located in Region K, and no surface water contracts serve WUGs in the region from Lavaca River Basin supplies. All surface water supplies in the basin are obtained from local supplies. The primary source of groundwater for the Lavaca River Basin in Region K is the Gulf Coast Aquifer.

As in the Brazos and Colorado River basins, municipal conservation could possibly impair water quality. However, areas served by groundwater would experience some benefit from increased stream flows from additional pumpage, although groundwater quality issues may introduce additional problems to stream water quality in certain instances.

As in the other basins, conservation programs for irrigation may decrease stream flows during dry periods and introduce less water from the Lavaca River Basin for irrigation use.

6.3.2.5 Guadalupe River Basin

The Guadalupe River Basin includes portions of Bastrop, Blanco, Fayette, Hays, and Travis counties within Region K. No major reservoirs exist within the Region K section of the Guadalupe River Basin, and the only firm surface water source is provided by two (2) minor reservoirs operated by the City of Blanco. Other surface water sources are obtained from local supplies.

The Carrizo-Wilcox and Ellenburger-San Saba aquifers are the major groundwater sources for the Guadalupe River Basin. Other smaller groundwater sources include the Edwards-BFZ, Edwards-Trinity, Gulf Coast, Queen City, Sparta, Trinity, and Yegua-Jackson aquifers.

As in the other basins, expanded groundwater usage is expected to increase stream flows with a possibility of negatively impacting water quality from additional discharges and groundwater quality issues.

6.3.3 Threats to Agricultural and Natural Resources

The water management strategies recommended for Region K are intended to protect natural resources while still meeting the projected water needs of the region. The impacts of recommended strategies on specific resources are discussed below.

6.3.3.1 Threatened and Endangered Species

Region K contains an array of habitats for a variety of wildlife species. A number of these species are listed as threatened or endangered by federal or state authorities, proposed as candidates to be listed, or are otherwise rare but unlisted species. A comprehensive list of these species can be found in Appendix 1.A of Chapter 1 in this Regional Water Plan.

The potential impacts to threatened and endangered species are expected to be limited. The construction of infrastructure related to these strategies may potentially impact one or more of the species identified in Appendix 1.A.

6.3.3.2 Parks and Public Lands

As described in Chapter 1, over 23,000 acres of state parks are within the boundaries of Region K. These 11 state facilities host a variety of outdoor recreational opportunities for visitors from around the state of Texas. None of the recommended water management strategies are expected to have impacts on public lands. In addition, there are no foreseen impacts to stream segments traversing public lands. Additional information concerning impacts from each strategy can be found in Chapter 5.

6.3.4 Third-party Social and Economic Impacts resulting from Voluntary Redistributions of Water

While Region K has not specifically recommended a “voluntary redistribution of water” strategy, the term essentially means one entity providing surplus water to another entity in need of water. Recommended strategies in the 2021 Region K Plan that would fall under this category include the Water Purchase strategy, as well as the New LCRA Contracts and LCRA Contract Amendment strategies.

Because the redistribution of water is voluntary, it is assumed that the existing water supplies would not be redistributed if doing so caused negative social and economic impacts to the entity selling the water. In most cases, it can be anticipated that there would be a positive economic impact to the entity selling the water, and a positive social impact to the entity purchasing the water.

6.3.5 Moving Water from Rural and Agricultural Areas

It is estimated that, in 2030, the water used in rural (livestock) and agricultural areas will represent 51 percent of the total water used in Region K. It is estimated that this will be reduced to 35 percent of the Region’s 1,447,471 acre-feet demand projected in 2080 as a result of growth in municipal and industrial demands and a decrease in agricultural production. Irrigation demand is projected to decrease from 50 to 35 percent of total demand between 2030 and 2080. Livestock demand is projected to remain constant at 1 percent of total demand throughout the planning period.

Water management strategies, along with current sources of water supply, are available to agricultural users throughout the planning period; therefore, the impacts on agricultural users are not directly related to moving water from these areas. The potential impacts of moving water from rural and agricultural areas are mainly associated with socio-economic impacts to third parties. The potential impetus for moving water is expected to occur from two sources: (1) the cost of raw water may become too great for the local irrigator to afford, and they may elect to voluntarily leave the industry for economic reasons; or (2) the value of the water for municipal or industrial purposes may create a market for the wholesale owner to redirect the sale of the water, making it unavailable to the irrigator. Several management strategies are outlined in this Regional Water Plan to provide water to irrigators, especially in the lower basin counties of Colorado, Wharton, and Matagorda; however, the recommended strategies do not meet all of the projected irrigation needs.

It may be feasible for a third party to pay for conservation measures and then utilize the saved water for their own needs (through re-contracting or other agreements) and allow the irrigator to remain in business; however, there are few contractual and institutional measures in effect to allow this trade-off to occur at this time.

There are two strategies in Region K that import water from other regions. The areas that the water is developed from are rural in nature. While the water that is being imported is available under planning and permitting rules and should not impact the water supply of the local residents or agriculture, the ability to access the water may become more expensive, especially in the case of groundwater.

6.4 Impacts of Water Management Strategies On Key Parameters of Water Quality

The potential impacts that water management strategies (WMS) may have on water quality are discussed in this section, including the identified water quality parameters which are deemed important to the use of the water resources within the Region.

Under the Clean Water Act, the State of Texas must define designated uses for all major water bodies and, consequently, the water quality standards that are appropriate for that designated water use. The water quality parameters which are listed for the Lower Colorado Regional Water Planning Area (LCRWPA) below were selected based on the TCEQ Water Quality Inventory for Designated Water Body Uses as well as the water quality parameters identified in the TCEQ 303d List of Impaired Water Bodies.

6.4.1 Surface Water

Key surface water parameters identified within Region K fall into two broad categories: (1) nutrients and non-conservative substances and (2) conservative substances.

The following parameters are included in the first category, nutrients and non-conservative substances:

- Bacteria
- pH

- Dissolved Oxygen
- Total Suspended Solids (TSS)
- Temperature
- Nutrients (nitrogen, phosphorus)
- Minerals and Conservative Substances
- Total Dissolved Solids (TDS)
- Chlorides
- Mercury
- Salinity
- Sediment Contaminants

Non-conservative substances are those parameters that undergo rapid degradation or change as the substance flows downstream, such as nutrients which are consumed by plant life. Nutrients and non-conservative loadings to surface water originate from a variety of natural and man-made sources. One significant source of these loads is wastewater treatment facilities. As population increases, the number and size of these wastewater discharges will likely increase. Stormwater runoff from certain land use types constitutes another significant source of nutrient loading to the Region's watercourses, including such land use types as agricultural areas, golf courses, residential development, or other landscaped areas where fertilizers are applied. Nutrient loads in the LCRWPA are typically within the limits deemed acceptable for conventional water treatment facilities and are, therefore, not considered a major concern as related to source of supply.

Conservative substances are those that do not undergo rapid degradation or do not significantly change in the water as the substance flows downstream, such as metals. Minerals and other conservative substances contributing to surface water generally originate from three sources: (1) non-point source runoff or groundwater seepage from mineralized areas, either natural or man-made, (2) wastewater discharges, and (3) sea water migration above estuaries. Wastewater discharges and industrial discharges have improved over the past 30 years due to the requirements of the Clean Water Act. If local concentrations of conservative contaminants are identified, they are remediated by the appropriate agency. Natural features such as elevation tend to limit salinity migration above estuaries.

6.4.2 Groundwater

Groundwater in Region K is generally of good quality. Water quality parameters of interest include TDS, metals, and hardness.

Groundwater in the Gulf Coast aquifer containing less than 500 milligrams per liter (mg/L) dissolved solids is located at various depths throughout the lower three counties, but at no depths greater than 3,200 feet. The Carrizo-Wilcox aquifer has localized areas of water quality problems which include hydrogen sulfide, methane, increased salinity levels, and dissolved solids. The Edwards aquifer is typically fresh, although hard, with dissolved solids concentrations typically less than 500 mg/L.

Water quality from the Trinity aquifer is acceptable for most municipal and industrial purposes; however, excess concentrations of certain constituents in many places exceed drinking water standards. Heavy pumpage and water level declines in this Region have contributed to deteriorating water quality in the aquifer.

Wells completed in the Middle Trinity Aquifer (especially the Hensell Sand) may exhibit levels of sodium, sulfate, and chloride, which are believed to be the result of leakage from the overlying Glen Rose Formation. This is less likely to be true for wells completed in the Lower Trinity Aquifer. The Hammett Shale acts as an aquitard and effectively prevents leakage from the overlying formations. In some areas, poor quality water occurs in and near wells that have not been properly cased. These wells may have deteriorated casings, insufficient casing or cement, or the casing may have been perforated at multiple depths in an effort to maximize the well yield. These wells serve as a conduit for poor quality water originating in the evaporite beds near the contact of the Upper and Lower Glen Rose formations. Water quality declines in the down-dip direction of all of the Trinity Aquifer water-bearing units.

Natural chemical quality of Edwards-Trinity (Plateau) water ranges from fresh to slightly saline. The water is typically hard and may vary widely in concentrations of dissolved solids, composed mostly of calcium and bicarbonate. The salinity of the groundwater tends to increase toward the west. Water quality of springs issuing from the aquifer in the southern and eastern border areas is typically excellent.

In general, the quality of water from the Hickory aquifer could be described as moderate to low quality. The TDS concentrations vary from 300 to 500 mg/L. In some areas, the groundwater may have dissolved solids concentrations as high as 3,000 mg/L. The water may contain alpha particle and total radium concentrations that may exceed the safe drinking water levels of the U.S. Environmental Protection Agency (EPA) and TCEQ. Radon gas may also be entrained, although no limits have been established for radon. Most of the radioactive groundwater is thought to be produced from the middle Hickory unit, while the upper Hickory unit produces water that exceeds secondary limits for concentration of iron. High nitrate levels may be found in the shallower portions of the aquifer where there may be interaction with surface activities such as fertilizer applications and septic systems.

Throughout most of Region K, the chemical quality of the Queen City Aquifer water is excellent, but water quality may deteriorate fairly rapidly down-dip. The water may be fairly acidic (low pH), have high iron concentrations, or contain hydrogen sulfide gas. All of these conditions are relatively easy to remedy with standard water treatment methods.

Usable quality water is commonly found within the Sparta Aquifer outcrop and for a few miles down-dip. The water quality in most of this aquifer is excellent, but the quality does decrease in the down-dip direction. In some areas, the water can contain iron concentrations exceeding the secondary drinking water standards.

Water produced from the Ellenburger-San Saba Aquifer may have dissolved concentrations that range from 200 mg/L to as high as 3,000 mg/L, but in most cases is usually less than 1,000 mg/L. The quality of water declines rapidly in the down-dip direction. In addition, portions overlying the Hickory Aquifer may be susceptible to radium entering from the Hickory Aquifer through faults.

The water produced from the Marble Falls Aquifer is suitable for most purposes, but some wells in Blanco County have produced water with high nitrate concentrations. The down-dip portion of the aquifer is not extensive, but, in these areas, the water becomes highly mineralized. Since the limestone formation comprising this aquifer is relatively shallow, it is susceptible to pollution by surface uses and activities. In addition, portions overlying the Hickory Aquifer may be susceptible to radium entering from the Hickory Aquifer through faults.

Water quality in the Yegua-Jackson Aquifer varies greatly. Water produced from the Yegua-Jackson Aquifer may have dissolved concentrations as high as 3,000 mg/L. Chlorides and sulfates are also a concern for this aquifer, as well as some areas of high concentrations of dissolved manganese. In general, small amounts of usable water can be found at less than 300 feet deep throughout most of the aquifer.

6.4.3 Brackish Groundwater

TDS is the most commonly used parameter to describe overall groundwater quality because it is a measure of all of the dissolved constituents in water. In this section of the RWP, TDS will be used as the general description of groundwater quality. The term “brackish,” as used in this section of the RWP, describes slightly-saline or moderately-saline groundwater and thus includes water between 1,000 and 10,000 mg/L TDS.

Many water-bearing formations in Texas contain a large volume of brackish groundwater. Discussions on brackish groundwater in Region K are based on information found in “Brackish Groundwater Manual for Texas Regional Planning Groups,” prepared for the Texas Water Development Board WDB) in ebruary .

Historically, the TWDB has defined aquifer water quality in terms of TDS concentrations expressed in milligrams per liter (mg/L) and has classified water into four (4) broad categories; fresh (less than 1,000 mg/L), slightly-saline (1,000 - 3,000 mg/L), moderately-saline (3,000 - 10,000 mg/L), and very-saline (10,000 - 35,000 mg/L).

Official TWDB delineations of the down-dip boundaries of aquifers such as the Edwards (BFZ), Trinity, Queen City, Sparta, and Carrizo-Wilcox have historically been based on water quality, specifically the TDS concentrations that meet the needs of the aquifers’ primary uses. The down-dip extent of most aquifers in the state is defined by the 3,000 mg/L dissolved solids level, as groundwater with less than 3,000 mg/L TDS meets most agricultural and industrial needs. However, a few aquifers have different TDS criteria defining the aquifer extent, including: Edwards (BFZ) (1,000 mg/L TDS).

The availability of brackish groundwater is a general measure of the amount of brackish groundwater in a water-bearing unit. All of the major and minor aquifers in the Region K water planning area contain brackish groundwater, which are listed below:

Major Aquifers

- Carrizo-Wilcox
- Edwards (BFZ)
- Edwards-Trinity (Plateau)
- Trinity
- Gulf Coast

Minor Aquifers

- Ellenburger-San Saba
- Hickory
- Marble Falls
- Queen City
- Sparta
- Yegua-Jackson

6.4.3.1 Carrizo-Wilcox Aquifer

The Carrizo-Wilcox Aquifer is one of the most continuous and permeable water-bearing formations in Texas. In Region K, it extends into Bastrop and Fayette counties. Throughout the extent of the aquifer, it provides groundwater acceptable for most irrigation, public supply and industrial purposes. It also has significant brackish water resources in down-dip portions of the aquifer that may be used as additional water supplies.

In Central Texas, groundwater from the Carrizo is principally sodium chloride and sodium sulfate types. The availability of brackish groundwater from the Carrizo-Wilcox aquifer in Region K is considered high.

6.4.3.2 Edwards (BFZ) Aquifer

The Edwards (Balcones Fault Zone-BFZ) Aquifer extends in Travis and Hays counties in Region K. The boundary between the fresh-water and brackish sections of the Edwards Aquifer is commonly referred to as the "Bad Water Line", which is the ,0 mg L DS line.

Groundwater in the fresh portion of the Edwards is a hard, calcium-bicarbonate water. As the salinity of the water increases in the saline portion of the aquifer, the concentrations of sulfate and chloride increase, as does the concentration of sodium, and the water becomes a sodium-mixed anion type water. The quality of the saline water in the Edwards aquifer does not appear to vary significantly areally. In general, poorer quality water in the aquifer is found in the down-dip portions of the aquifer and may also correlate with low permeability sections of the formations. Similarly, there are no consistent vertical trends in water quality. In places, wells produce fresh water at shallow depths, brackish to saline water at greater depths, and fresh water again at even greater depths. Hydrogen sulfide is often found in the Saline Zone.

Availability of brackish groundwater from Edwards (BFZ) Aquifer in Region K is low to moderate. According to the Barton Springs/Edwards Aquifer Conservation District (BS/EACD), BS/EACD Report of Investigations 2017-1015, water sampled from the saline part of Edwards Aquifer in Southeast Travis County ranged from 8,877 to , mg L. Per the same report, "estimates indicate relatively high-yielding wells are possible in the Saline Edwards, with yields greater than , gpm," indicating that Edwards Aquifer Saline Zone is favorable for extraction.

6.4.3.3 Edwards-Trinity (Plateau) Aquifer

Much of the groundwater found in the Edwards-Trinity (Plateau) Aquifer is fresh to slightly-saline. The chemical quality of the Edwards and associated limestones is generally better than that in the underlying Trinity Aquifer in the Plateau region. Groundwater is fairly uniform in quality, with water from the Edwards and associated limestones being a very hard, calcium bicarbonate type, usually containing less than 500 mg/L TDS, although in some areas the TDS can exceed 1,000 mg/L. The water quality in the Trinity tends to be poorer than in the Edwards. There is no availability of brackish groundwater from Edwards Trinity (Plateau) Aquifer in Region K.

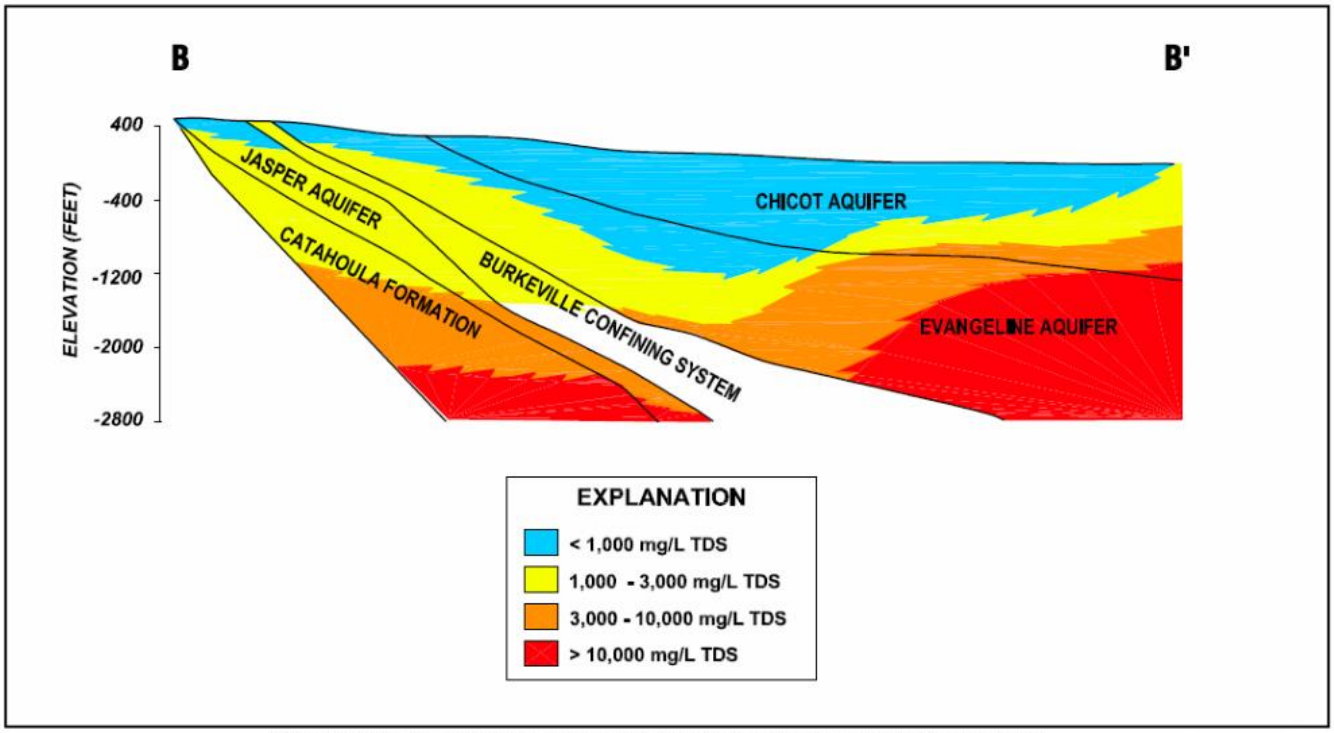
6.4.3.4 Trinity Aquifer

Trinity Group deposits include sands, limestones, shales and clays. The stratigraphy of the Trinity Group is complicated, in part because of the large area that it covers. In Central Texas, the Hensell and Hosston Sands are the most productive units in the Trinity Aquifer. The Hensell is fairly prolific in many areas and is known to yield small to large amounts of water to wells. It is also referred to as the “First” or “Upper” Trinity Sand by drillers and locals in Central Texas. A significant source of brackish water may be found in the down-dip areas of the Trinity Aquifer. The availability of brackish groundwater from the Trinity Aquifer in most of Region K is considered moderate.

6.4.3.5 Gulf Coast Aquifer

The Gulf Coast aquifer extends through a large area of Region K in Fayette, Colorado, Wharton and Matagorda counties. Water quality varies with depth and locality in the Gulf Coast Aquifer. The water quality is generally fresh in the northeastern half of the aquifer, from the Coastal Bend region to Louisiana. Some areas in this half do produce slightly-saline water, in particular near the coast between the City of Houston and Louisiana. The groundwater quality in the southwestern half of the aquifer (generally south of the San Antonio River) is generally more brackish than in the northern section, with most areas containing slightly- to moderately-saline groundwater, and very few areas containing fresh water. The depths that fresh, slightly-saline, moderately-saline, and saline groundwater is found varies from individual aquifer to aquifer throughout the extent of the aquifer system. **Figure 6.1** shows concentrations of total dissolved solids in the Gulf Coast aquifer in a cross-section running through Lavaca, Wharton, and Matagorda counties. The availability of brackish groundwater from the Gulf Coast aquifer in most of Region K is considered moderate to high.

Figure 6.1 Simplified Cross-Section of the Gulf Coast Aquifer System running through Lavaca, Wharton, and Matagorda Counties



SIMPLIFIED CROSS SECTION B-B' OF THE GULF COAST AQUIFER SYSTEM WITH GENERALIZED WATER QUALITY RANGES
(Modified from Baker, 1979)

6.4.4 Other Aquifer Water Quality Information

While the Groundwater Availability Model (GAM) reports may contain information pertaining to water quality of aquifer formations, the models do not provide any outcomes concerning water quality issues. TWDB's water well database tracks concentration of several water quality constituents including sodium, potassium, strontium, bicarbonates, sulfate, chloride, fluorides, nitrates, alkalinity, and hardness.

6.4.5 Potential Water Quality Impacts Resulting from Increased Drawdown of Aquifers

The potential water quality impacts resulting from increased drawdown in Region K are currently not well understood. The following is a discussion of potential water quality issues.

The wells close to the coast have greater risk to be impacted. As they are drawn down, there is a greater potential for salt water intrusion, which begins to increase the total dissolved solids in the water. Overall, water quality has been good throughout the lower counties, and they have experienced higher demands and lower water tables in the past than what is currently projected under this Regional Water Plan.

Concerns for most of the Central Texas aquifers are largely based on limiting or ceasing spring flows rather than quality reasons. With the lack of current knowledge on the locations of the potential salt deposits, it can be stated that increased drawdown could, in some cases, result in deteriorated water quality associated with total dissolved solids and radiation in some areas.

6.4.6 Management Strategies

The LCRA has implemented regulatory programs within their jurisdiction to aid in pollution prevention. LCRA regulations include both land-based activities and surface water usage. Land-based activities include on-site sewage facilities, septic systems, construction, and nonpoint source pollution. In addition, LCRA has supported the "no discharge" designation by CEQ for the Highland Lakes. The water quality parameters and water management strategies selected by Region K were evaluated to determine the impacts on water quality as a result of these recommended strategies. The recommended management strategies (and categories of strategies), as described in Chapter 5 of this RWP and used in this evaluation, are:

- Water Conservation (Municipal, Industrial, and Agricultural) and Drought Management
- LCRA Water Management Plan
- Expanded Use of Local Groundwater Supplies and Purchase of Wholesale Groundwater
- Aquifer Storage and Recovery (ASR)
- Return Flows / Reuse and Reuse-sourced Projects
- New or Amended Water Contracts
- LCRA and Austin Off-Channel Reservoirs
- Lake Bastrop Water Supply Project
- Desalination of Brackish Groundwater
- Seawater Desalination

The following paragraphs discuss the impacts of each management strategy on the chosen water quality parameters.

Water Conservation, including municipal and industrial, can have both positive and negative impacts on water quality. Water that is being processed through a wastewater treatment plant typically has acquired additional dissolved solids prior to discharge to the waters of the state. Conventional wastewater treatment reduces suspended solids but does not reduce dissolved solids in the effluent. Water conservation measures will reduce the volume of water passing through the wastewater plants without reducing the mass loading rates (a 1.6-gallon flush carries the same waste mass to the wastewater plant that a 6-gallon flush once carried). This may result in increased constituent loads to the wastewater treatment plants. In the event that, over time, water conservation causes changes to wastewater concentrations, treatment processes may need to be adjusted to maintain permitted discharge parameters. It should be noted that, during low flow conditions, the wastewater effluent in a stream may represent water that helps to augment and maintain the minimum stream flows.

Conservation of irrigation water (through on-farm water conservation measures, irrigation district conveyance improvements, and conversion to sprinkler irrigation), reduces reliance on pumping groundwater during drought conditions. These practices help extend the benefits of the remaining permitted portion of Colorado River flows. Return flows generated by runoff from rice irrigation are returned via tail water runoff in the

Colorado River Basin or the coastal basin. Tail water is the term used to describe that water returned to the stream after application to irrigated cropland. Tail water may carry nutrients, sediments, salts, and other pollutants from the farmland. This return flow can have a negative impact on water quality, and, by implementing conservation measures which reduce tail water losses, the nutrient and sediment loading can be reduced. However, this return flow tends to be introduced into the receiving stream during normally dry periods, so it may have a net beneficial effect in terms of maintaining minimum streamflow conditions.

LCRA Water Management Plan allows LCRA to supply rice irrigators in the Lower Colorado River Basin with interruptible supplies of water from the Highland Lakes, when available. Releases from storage provide streamflow in the river on the way to the diversion point, with impacts to water quality that are similar to return flows.

The impacts on water quality of the Expanded Local Use of Groundwater and Purchase of Wholesale Groundwater strategies are uncertain. However, they are not expected to have adverse impacts to the water quality in the aquifer. In some particular situations, these strategies may negatively influence water quality. As previously stated, water quality in the Hickory Aquifer could be described as moderate to low quality. The use of this aquifer by municipal users may require additional treatment compared to a standard groundwater treatment plant, especially in areas of high concentrations of TDS, areas that may contain alpha particle and total radium concentrations that may exceed the safe drinking water levels of the EPA and TCEQ, and areas with high nutrient levels. The use of this aquifer by irrigators could potentially release the above constituents into surface water sources, thus causing increased levels of the above described water quality parameters.

The recommended Aquifer Storage and Recovery (ASR) projects in this plan utilize a variety of water sources for storage. Fresh groundwater, brackish or saline groundwater, wastewater effluent, and surface water are all sources that are identified for the various recommended strategies. The groundwater sources should have limited impacts on water quality, although storing fresh water in the Saline Zone for a long period of time can increase the TDS and decrease the quality of the stored water. Utilizing wastewater effluent and surface water that is diverted from the Colorado River could reduce instream flows downstream, which in turn, could negatively impact water quality during certain months of the year when instream flows are already lower.

Reuse and Reuse-sourced Projects are part of Austin's (Austin Water) management strategies and other utilities' water management strategies to respond to droughts and meet future growth and subsequent water supply shortages. Austin plans to use a portion of their wastewater effluent as a source for a number of recommended strategies to extend current supplies and help alleviate future shortages. Austin plans to use indirect reuse, if authorized by TCEQ, or direct reuse with infrastructure for a variety of projects. While the amount of reuse is projected to increase, municipal Return Flows from multiple water providers are also projected to increase over the planning period. In addition, a LCRA strategy to import return flows from Williamson County (Region G, Brazos Basin) to the Colorado Basin will increase instream flows even during times of drought. When available on an interruptible basis, downstream water rights can continue to divert, in seniority order, these return flows. In any event, the quality of water produced by Austin wastewater facilities is such that no adverse impacts on water quality are anticipated. In other parts of the region, direct reuse provides a purposeful use for treated wastewater effluent that cannot otherwise be discharged to the Highland Lakes, due to TCEQ restrictions. A portion of this effluent is currently being used to irrigate areas that do not normally require irrigation. In a sense, this strategy would simply relocate the treated effluent to more useful locations that are currently irrigated with potable water. Due to the treatment standards of the effluent, there should be no water quality issues from this strategy. Since the effluent is not allowed to be discharged to the Highland Lakes, there is also no issue of reduced return flows downstream.

Water Purchase and Additional Contracts as management strategies can decrease instream and bay and estuary freshwater inflows as a result of the full utilization of water supplies, although the Water Management Plan provides for environmental flows in the river below Austin and Matagorda Bay. Fully utilizing existing water supply projects may amplify some existing concerns, particularly contaminant concentrations due to reduced opportunities for instream dilution. The continued return of flows via wastewater treatment facility discharges will provide some mitigation of that effect. Typical municipal return flows are approximately 60 percent of the total quantity diverted for use, although that percentage may be expected to decrease as reuse and reuse-sourced projects develop.

LCRA and Austin Off-Channel Reservoirs potentially will have a positive impact on water quality since one or more will operate partially or wholly as a “scalping reservoir” such that diversions are made to the reservoir only when flows in the river are sufficient to meet higher priority need. The water that is diverted using existing water rights and stored in reservoirs would allow some sediments to settle out, so that water released from the reservoir would be of higher quality. The water would be stored for consumptive use during times of low or no run-of-river availability. Instream flows along with bay and estuary freshwater inflows would slightly decrease during wetter times when the reservoirs are refilled.

Lake Bastrop Water Supply proposes increasing the amount of Colorado River water being pumped into the lake to provide a reserve in the top eight feet of conservation storage. Because of the historical use of groundwater to augment supplies in the lake, increasing the fraction of surface water should reduce the contrast between the source water and the lake water quality. The overall increased water in the lake could help moderate the thermal effects of the use for steam-electric cooling. However, altered temperature gradients can change the distribution of dissolved oxygen and nutrients, so water quality should be monitored closely during initial operation. The proposed additional erosion protection should reduce the amount of potential sediment contribution during runoff events, also having a positive impact on water quality.

Desalination of Brackish Groundwater, such as the Edwards-BFZ Saline Zone and the Trinity Aquifer, will provide a usable water supply with a level of dissolved solids low enough to be used for municipal purposes. A significant side effect of this strategy is the disposal of wastes generated from the desalination process. If deep well injection is used for brine disposal, minimal impacts to water quality should occur.

The Seawater Desalination strategy produces fresh water from saline water, so represents a significant improvement in water quality. However, it does produce a brine concentrate. It is assumed that the brine generated from the desalination process would be discharged offshore through a four-mile brine diffuser pipeline into the Gulf of Mexico to facilitate mixing, minimizing potential environmental impacts.

6.5 Impacts of Water Management Strategies On Navigation

The overall impact on navigation in Region K is negligible in the area of the Colorado River and Matagorda Bay that is tidally influenced. This is the area where the most shipping occurs, and navigation will be least affected in this zone. Once beyond the tidally influenced areas, the overall impact of the management strategies will be to reduce the amount of currently available interruptible water supplies as the current WUGs increase in demand over time through growth in population. However, the current LCRA Water Management Plan calls for a release of up to 33,440 acre-feet (ac-ft). Navigation on the Colorado upstream of the tidally influenced areas is primarily for pleasure craft, and the impact of the mandated releases under the LCRA Management Plan plus other downstream flows may provide sufficient water for navigation purposes.

6.6 Socioeconomic Impacts of Not Meeting Water Needs

Upon delivery of this initially prepared plan, the TWDB will be requested to perform a socioeconomic impact analysis of the projected water shortages for the region. This report will be summarized in this section of the final regional water plan.

6.7 Summary of Unmet Identified Water Needs

While the goal of Region K has been to recommend water management strategies to meet all water needs in the region, this 2026 Region K Plan does have some remaining unmet needs for municipal, irrigation, mining, and steam-electric, as discussed in Chapters 4 and 5.

6.7.1 Unmet Municipal Needs

Since the 2021 planning cycle, changes in demand patterns and increased growth rates have resulted in unmet municipal needs in Region K for this planning cycle (**Table 6.8**), whereas there were no unmet municipal needs in the 2021 planning cycle. Additional discussion about these unmet municipal needs is available in **Section 5.2.5.4**. Note that these needs are after implementation of aggressive conservation and drought management strategies (**Section 7.6.1)**.

Table 6.8 Municipal Unmet Needs

WUG Name	Water (Needs) or Surplus [ac ft/yr]					
	2030	2040	2050	2060	2070	2080
County-Other, Hays	0	0	(324)	(4,082)	(8,881)	(14,204)
Elgin	0	(199)	(1,050)	(1,858)	(2,069)	(1,953)
Hays	0	0	(49)	(131)	(220)	(317)
Hornsby Bend Utility	0	0	(167)	(334)	(522)	(736)
Manor	0	0	0	0	0	(256)
Meadowlakes	(164)	(113)	(98)	(84)	(72)	(48)
Travis County MUD 2	0	0	(61)	(134)	(228)	(332)
Williamson County WSID 3	0	0	(2)	(5)	(8)	(7)

The TWDB guidance requires that, for each municipal WUG with unmet needs, the RWPG must include:

1. Documentation that all potentially feasible WMS were considered to meet the need, including drought management WMS;

2. Explanations as to why additional conservation and/or drought management WMS were not recommended to address the need;
3. Descriptions of how, in the event of a repeat of the drought of record, the WUG associated with the unmet need will ensure the public health, safety, and welfare in each planning decade with an unmet need; and,
4. Explanation as to whether there may be occasion, prior to the development of the next Initially Prepared Plan (IPP), to amend the Regional Water Plan (RWP) to address all or a portion of the unmet municipal need.

County-Other, Hays represents those demands that are associated with small water suppliers (not large enough to be considered a water user group) or private wells. The projected demands increased significantly in this cycle, creating needs that cannot be accommodated by existing supplies or available strategies. Small utilities and private wells generally rely on the Trinity Aquifer, which, according to statements by Hays Trinity Groundwater Conservation District (GCD) at Region K planning group meetings, is already overstressed by groundwater development. There was only a small amount of groundwater available under the Trinity Modeled Available Groundwater (MAG) in Hays County, so this is not a viable solution. Discussions with a Hays County Commissioner indicated that leadership is well aware of the water needs, that they are being felt currently with the rapid development in the previously rural areas of the county. County leadership is incentivizing rainwater harvesting and larger lot requirements for private wells to help reduce stress on the aquifer. Rainwater harvesting is an alternative strategy in this plan (Section 5.3.2.1).

Conservation and drought management (including additional 20% reduction) were applied as strategies, but a significant unmet need remains. Because an assumed expansion of population through development of previously rural areas in Hays County is driving the increased demand, the reality is that this development will be attenuated if limited water is available. During drought, there is already water being trucked into some developments where shallow wells or rainwater harvesting fails as water sources. This trucked water is the protection against harm to public health. Because the need is relatively large, and a regional supply project would likely be needed to meet the need (with no regional project yet in the works), the possibility of an amendment to the plan prior to the next planning cycle seems limited.

City of Elgin responded to the Region K survey regarding water management strategies and indicated that they did not require any strategies to be put in the plan this cycle. They also responded to the implementation survey (**Section 9.1**) indicating that they had completed an expansion of local groundwater supplies and had significant reuse potential from their wastewater treatment plant. Conservation and drought management (including additional 20% reduction) were applied as strategies, and a small unmet need first appears in the 2040 decade. There does not appear to be any imminent danger to public health, and there is a possibility that Elgin's supplies are greater than what is shown in the plan. Region K will continue to reach out to Elgin between the IPP and the final plan to try to resolve this potential underestimate of supplies.

City of Hays did not respond to the Region K strategy survey. Their current supplies rely primarily on groundwater from the Edwards Aquifer. Given the lack of additional groundwater in the area, Region K did not propose a groundwater strategy without the input of Hays. Conservation and drought management (including additional 20% reduction) were applied as strategies, and their first small unmet need appears in the 2050 decade. While there does not appear to be any imminent danger to public health, Region K will continue to reach out to City of Hays prior to the final plan to see if additional water management strategies can be considered.

Hornsby Bend Utility (named "Austin's Colony" in TCEQ records) gets their water from multiple sources, including the EPCOR 130 project and local groundwater. They are operated by Texas Water Utilities. Region K collaborated with Region G to meet with Texas Water Utilities and discuss their needs and whether they had any strategies to propose for the 2026 planning cycle. Because Texas Water Utilities had recently purchased another utility, their leadership indicated that they were still coming up to speed with all of the systems and, while they were committed to participating in regional planning, the timing was such that they did not want to commit to any strategies for this cycle. Conservation and drought management (including additional 20% reduction) were applied as strategies, and their first unmet need appears in the 2050 decade. Hornsby Bend Utility has several potential water sources, including self-supplied groundwater, as well as groundwater purchases from local and regional sources, including the EPCOR 130 Water Supply Corporation. Purchasing additional groundwater could be a water management strategy, but lacking confirmation from the owner, the strategy was not recommended. Given multiple sources of water in emergency circumstances, human health does not appear to be in danger. There is unlikely to be a status change in the near future that would motivate an amendment to the plan.

Manor did not respond to the Region K strategy survey. They did respond to a notification that they would show an unmet need in the plan, but politely declined any follow up. Manor has multiple groundwater sources of supply, as well as wholesale supplies from Manville WSC and the EPCOR 130 project. Conservation and drought management (including additional 20% reduction) were applied as strategies, and only a small unmet need still exists in the 2080 decade. Given the long timeline and minimal need, there does not appear to be danger to human health or a need to contemplate a plan amendment.

Meadowlakes met with Region K and discussed their apparent unmet needs. Their new City Manager explained that Meadowlakes was mostly built out, and that they did not expect the demands that are shown in the plan, (i.e., they have sufficient water supply to meet the known demand, which is not increasing). While conservation and drought management (including an additional 20% reduction) were applied as strategies, the recommendation is that the estimated demands be revisited in the next cycle.

Travis County MUD 2 did not respond to the strategy survey. They are supplied by Wilbarger Creek Municipal Utility District (MUD), which is in turn supplied by Hornsby Bend Utility (see above). They also purchase groundwater from Try Cross County WSC. Conservation and drought management (including additional 20% reduction) were applied as strategies, and a small unmet first appears in the 2050 decade. To protect human health during drought in later decades, the MUD will likely need to purchase additional water from their existing suppliers, or one of the adjacent utilities (Manville WSC, City of Manor). Without confirmation from the owners, these potential strategies were not recommended for this planning cycle.

Williamson County WSID 3 is primarily in Region G. Demands are predicted to be decreasing through time for the Region K portion of the WUG, but needs remain. We discussed the needs with the Region G consulting team, and they indicated that there was a managed available drawdown limitation that was driving part of the unmet need. Conservation and drought management (including additional 20% reduction) were applied as strategies, and small unmet needs appear in the 2050 decade. Given the long timeline and minimal need, there does not appear to be danger to human health or a need to contemplate a plan amendment.

6.7.2 Unmet Irrigation Needs

Irrigation water needs in Colorado, Matagorda, Mills, and Wharton counties were not able to be fully met by recommended strategies (**Section 5.2.6**). Unmet needs for irrigation in the three downstream counties (Colorado, Matagorda, and Wharton) is summarized in **Table 6.9**. Remaining unmet needs range from approximately 233,219 acre-feet in 2030 and decreasing to approximately 149,395 acre-feet in 2080. The limiting factors for new water management strategies that can be recommended for Irrigation are water availability and cost of new infrastructure.

Table 6.9 Summary of Unmet Irrigation Needs in Colorado, Matagorda, and Wharton Counties

	2030 Needs	2040 Needs	2050 Needs	2060 Needs	2070 Needs	2080 Needs
Remaining Shortage	(271,695)	(241,277)	(227,373)	(213,844)	(200,948)	(188,778)

Irrigation in Mills County has projected demand of 3,084 acre-feet per year throughout the current planning horizon. Conservation reduced that demand by 474 acre-feet per year, to result in an unmet need of 2,610 acre-feet per year. Expansion of local groundwater supplies were considered as a strategy for Mills County, but this approach was limited by the available MAG, which was only a few hundred acre-feet per year for all available aquifers combined. Mills County does not have a groundwater conservation district, so there is no practical regulation on groundwater production, other than the limited productivity of the aquifers themselves, so increased groundwater use would likely occur to meet some of the needs.

6.7.3 Unmet Mining Needs

There are identified unmet Mining needs in the 2021 Region K Plan (**Table 6.10**). These needs were identified in Williamson County in coordination with Region G. The mining occurs in the limestone of the Edwards Aquifer, and the likely source of water is pit water. There is no groundwater conservation district in Williamson County, and no regulation of the volume of that pit water use. The planning process requires that the modeled available groundwater be used as a limit for total groundwater production by county-basin. The available groundwater from the Edwards Aquifer under the MAG was not sufficient to meet those mining demands. In reality, the mining operation water use will not be limited by the MAG.

Table 6.10 Unmet Mining Needs in Region K

WUG	County	Basin	Unmet Needs (ac ft/yr)					
			2030	2040	2050	2060	2070	2080
Mining	Williamson	Colorado	(795)	(1,074)	(1,393)	(1,781)	(2,165)	(2,521)

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Chapter 7.

Drought Response Information, Activities, and Recommendations

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Chapter 7. Drought Response Information, Activities and Recommendation

This chapter presents information on drought management and Drought Contingency Plans, as well as a summary of information provided by water systems in the Lower Colorado Regional Water Planning Area regarding drought management, including preparations and response throughout the Region.

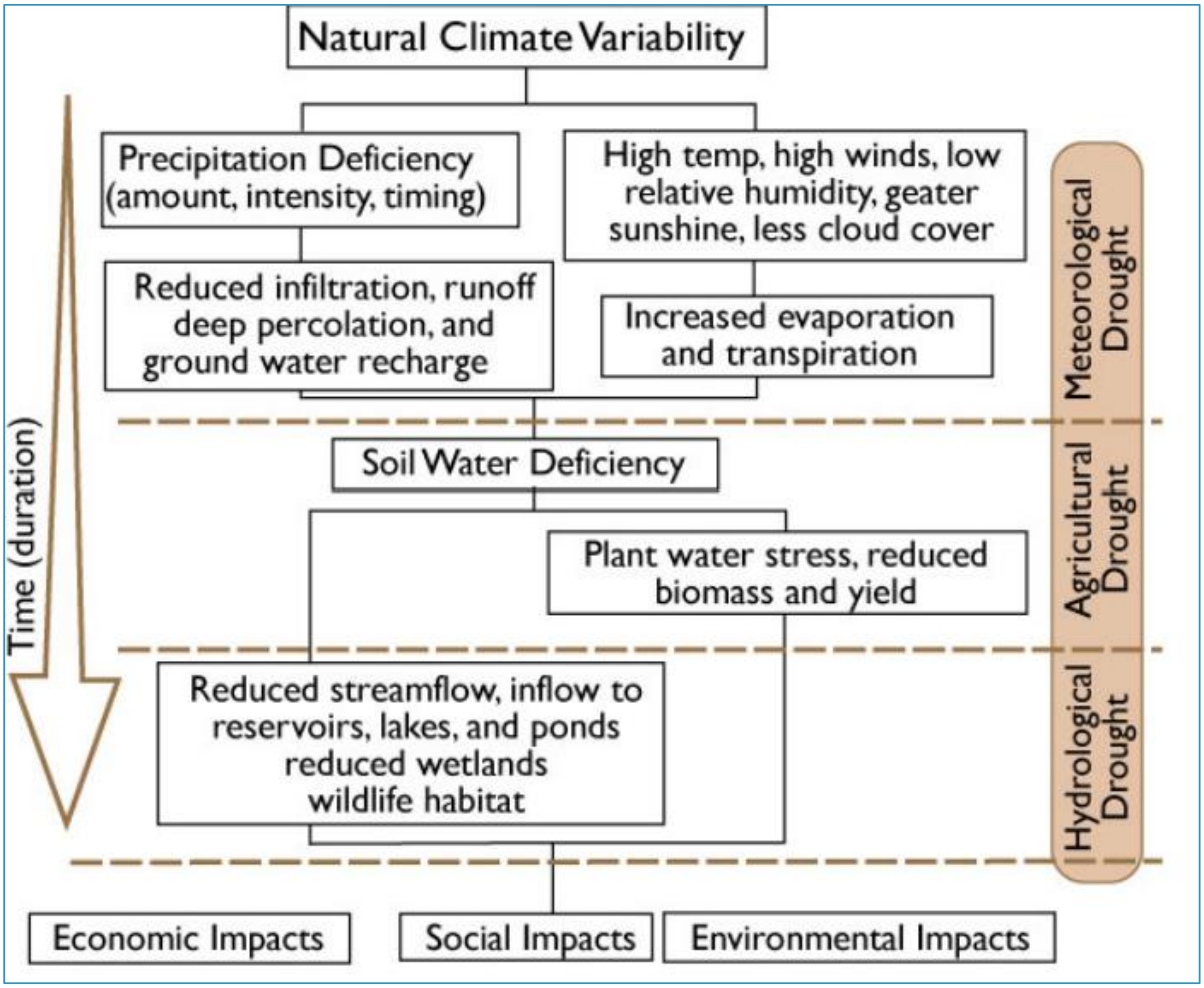
Drought is often referred to as a slow-moving emergency. The impact of droughts can be far-reaching but can be challenging to define due to the gradual and sometimes subtle progression of severity, as well as the tendency for temporal and geographic variations such as isolated rain events to shift perception of the drought severity. The types of droughts are sometimes characterized as meteorological, agricultural, and hydrological, which are events leading to the recognized socioeconomic impacts of drought. These drought terms are integrated and ordered such that, as one type of drought intensifies, it may lead to the development of another category of drought. The following definitions of categories of drought are taken from the State of Texas Drought Preparedness Plan and are further reflected in **Figure 7.1**:

- A meteorological drought is often defined as a period of substantially diminished precipitation duration and/or intensity that persists long enough to produce a significant hydrologic imbalance. The commonly used definition of meteorological drought is an interval of time, generally of the order of months or years, during which the actual moisture supply (typically rainfall in this region) of a given place consistently falls below the average moisture supply or average rainfall amount.
- Agricultural drought occurs when there is inadequate precipitation and/or soil moisture to sustain crop or forage production systems. The water deficit results in serious damage and economic loss to plant or animal agriculture. Agricultural drought usually begins after meteorological drought but before hydrological drought and can also affect livestock and other agricultural operations.
- Hydrological drought refers to reductions in surface and groundwater water supplies. It is measured as streamflow, and as lake, reservoir, and groundwater levels. There is usually a time lag between a lack of rain and lower amounts of measurable water in streams, lakes, and reservoirs.
- Socioeconomic drought occurs when physical water shortages start to affect the health, well- being, and quality of life of the people, or when the drought starts to affect the supply and demand of an economic product.

Determining if a dry weather pattern substantiates a meteorological drought requires an area-specific analysis that is first typically signified by dry meteorological patterns. Short intervals of dry patterns are considered within the norm of meteorological variation (seasonally and annually) so it is important to note that a true meteorological drought is dependent on the area in which it occurs.

In areas where surface and/or groundwater supplies are full at the start of a dry pattern, there is often minimal impact on water use or economic and agricultural activity. However, as dry pattern intensities deepen and duration of the meteorological drought continues and water supplies are stressed, the impacts of meteorological drought transition and begin to indicate other drought categories.

Figure 7.1 Categories of Drought and Natural Climate Variability



Source: National Drought Mitigation Center website "What is Drought?"

7.1 Drought of Record

The definition of Drought of Record is "the period of time when historical records indicate that natural hydrological conditions would have provided the least amount of water supply," per Texas Administrative Code (TAC) Title 31, Part 10, Chapter 357, Subchapter A, Rule 357.10.

Hydrological droughts can be assessed using the Texas Commission on Environmental Quality (TCEQ) Water Availability Model (WAM); this assessment is directly associated with the use of the WAM model to determine firm availability of surface water for the Regional Water Plan.

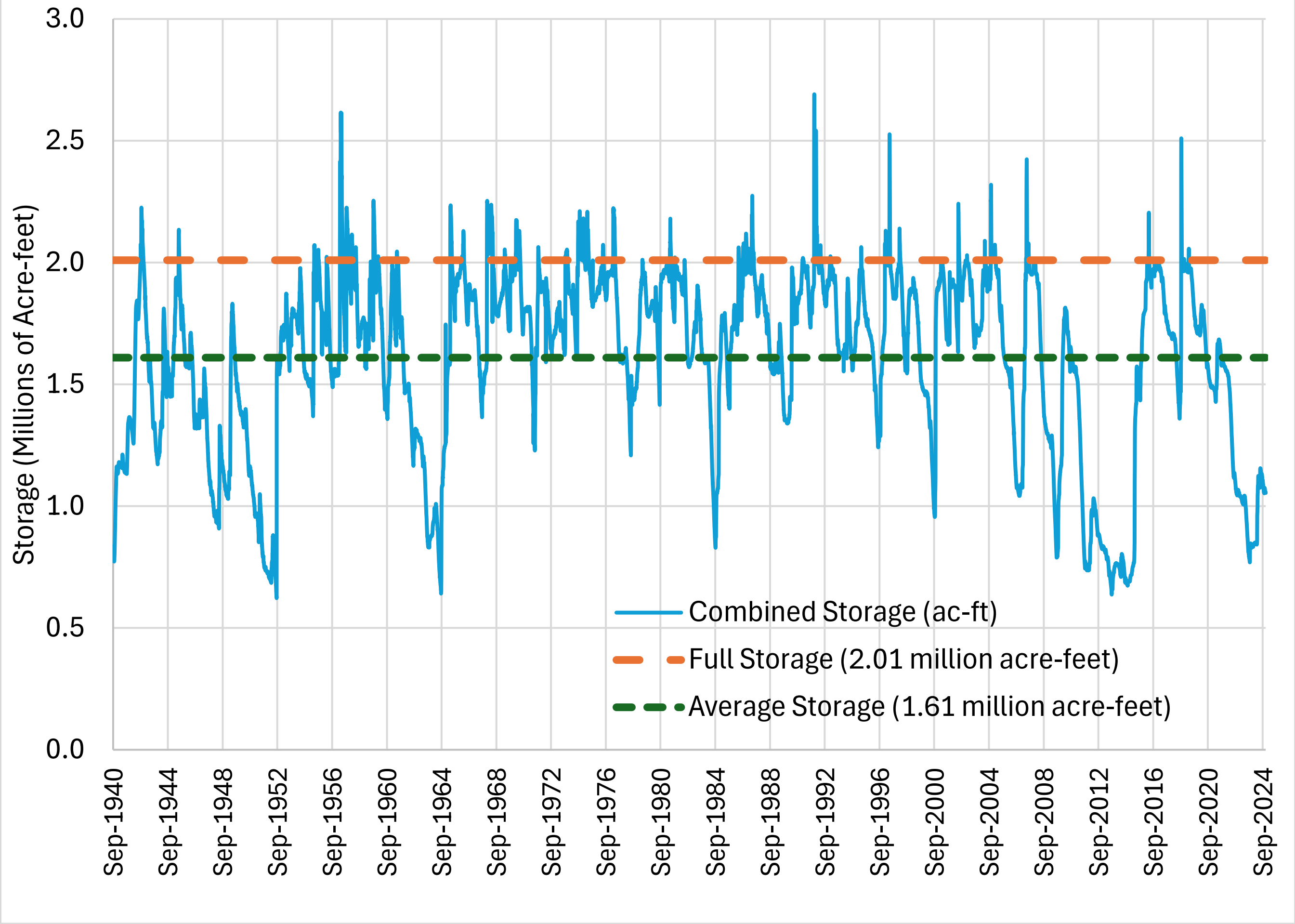
Another indicator commonly used by federal and state agencies to characterize drought severity is the Palmer Drought Severity Index (PDSI). The PDSI is an estimate of soil moisture conditions calculated based on precipitation and temperature. The PDSI classifies soil moisture on a scale ranging from approximately -6.0 to 6.0, with values of approximately -0.49 to 0.49 reflecting normal conditions and 4.0 or lower representing extreme drought.

7.1.1 Drought of Record

Statewide, the period typically considered the Drought of Record occurred in the 1950s and had significant hydrologic and economic consequences throughout the State. Within the Lower Colorado Regional Planning Area, the Drought of Record is most specifically associated with the hydrologic conditions of the Highland Lakes. The current Drought of Record for the Highland Lakes began in October 2007 and lasted through December 2016. Modeling efforts confirm that 2011 represents the worst single-year drought on record, or the dry year of the Colorado River basin. The previous Drought of Record began in May 1947 and lasted through April 1957. During this time, the Highland Lakes reached a lowest combined storage of 621,221 acre-feet on September 9, 1952.

The hydrologic data set used for the plan's surface water availability analysis runs through the end of 2016. Updates to the hydrologic data are in the process, but were not complete at the time that the water availability modeling was being performed for this cycle. Analysis of any additional drought data through 2017 and beyond will need to be conducted in future planning analyses. The 5-year frequency of the regional planning cycles provides the opportunity on a regular basis to update the analyses that go into developing the plan. The 2007 to 2016 Drought of Record resulted in persistently low lake levels from 2011 to mid-2015. A similar low trend returned in 2022 and continued through 2024. **Figure 7.2** shows how the combined storage in the last several years compares to historical storage levels dating back to 1940, when the lakes were built.

Figure 7.2 Total Combined Storage Levels of Lakes Buchanan and Travis



Based on data for storage in Lake Buchanan and Lake Travis from: waterdatafortexas.org.

7.2 Uncertainty and Drought(s) Worse than Drought of Record

This section highlights Region K's approach to addressing uncertainty and preparing for extreme drought conditions and summarizes the measures to enhance resilience against droughts worse than drought of record (DWDOR).

7.2.1 Planning for Uncertainty

Region K acknowledges the inherent uncertainties associated with planning factors such as population, demand, and supply during the planning process. Two basic approaches are generally used to inform planning for uncertainty. One is to attempt to quantify the uncertainty in all of these uncertain inputs and use uncertainty propagation to produce an output distribution that represents the probability of possible outcomes. This is a complex task that is beyond the scope of the current planning process. The second approach is to build conservatism into the process, to provide a margin of error to hedge against uncertainty. This is the approach that is used as the main tool by the Regional Water Planning Group (RWPG) for considering uncertainty in planning.

One way the Regional Water Plan (RWP) applies conservatism is utilizing baseline water demand factors reflective of recent drought conditions to inform demand projections in the Region K area. Given that the RWP is updated every five years, the Region K RWPG will monitor and review demand and supply conditions, ensuring ongoing drought preparedness is addressed in future planning cycles.

7.2.2 Existing Measures for Preparation for Droughts Worse than Drought of Record Conditions

Section 7.2.2 outlines three existing measures that Region K has implemented to prepare for DWDOR conditions. These measures are described below.

7.2.2.1 Total Supply Greater Than Water Demand

One approach to mitigate planning uncertainties and DWDOR impacts is to ensure that total water supply exceeds projected water demand, as reflected by a management supply factor greater than one. Approximately 75 percent of the water supply in Region K is provided by two major water providers (MWPs), Lower Colorado River Authority (LCRA) and Austin. LCRA and Austin have developed strategies that will provide supplies that significantly exceed their predicted demand commitments through 2080. In addition, other large water user groups (WUGs) such as Aqua Water Supply Corporation (WSC), with fast-growing demands, are proposing strategies that diversify their water portfolios to help increase their resiliency under uncertainty. The strategies and their yields can be found in Chapter 5.

7.2.2.2 Drought Resilient Water Strategies

Utilities in the region have implemented or proposed certain strategies that provide resiliency against the DWDOR, by creating supplies that are only minimally affected by drought. One such strategy is aquifer storage and recovery (ASR), where water is stored in an aquifer during times where surplus water is available, and can then be retrieved when more supply is needed. When the water is stored in deep, confined aquifers, the water levels will not be affected by drought conditions at the surface (reduced recharge), and are not subject to evaporation. Both major water providers, and two other WUGs in the region are proposing ASR strategies.

A second drought-resilient strategy is ocean desalination. LCRA, the largest water provider in the region, is proposing a large ocean desalination project that would provide a steady water supply through a DWDOR.

7.2.2.3 Conservative Estimates of Available Water Supply Volumes

The large water providers in the region recognize the intrinsic uncertainty in water planning and are actively planning for DWDORs. The region's MWPs (LCRA and City of Austin) use conservative methods to estimate the supplies available from water sources. For surface water, the water availability modeling is performed under the assumption that there are no return flows and that full permitted water rights are considered, when it is known that there are significant return flows and that most WUGs have not yet developed demand for the full water rights. Therefore, available surface water supply volumes exceed the firm yield, especially over the early decades of the planning period.

Baseline Water Demands Becoming More Conservative

Projected water demands for most WUGs in Region K are based on the per capita water demands experienced in 2011, a very dry year, minus the projected savings from passive water conservation measures. During the 2010s drought (**Figure 7.3**), WUGs in Region K achieved an average 21% reduction in per capita water use from 2011 to 2014, some of which could be attributed to permanent water conservation efforts and the natural replacement of inefficient fixtures. In more recent dry years, such as 2020, the average per capita water demand has been approximately 9 percent less than the 2011 per capita water demand. This suggests that permanent demand reductions may have taken place since 2011, leaving a buffer against increased water demands during a DWDOR or uncertainties in planning variables.

City of Austin

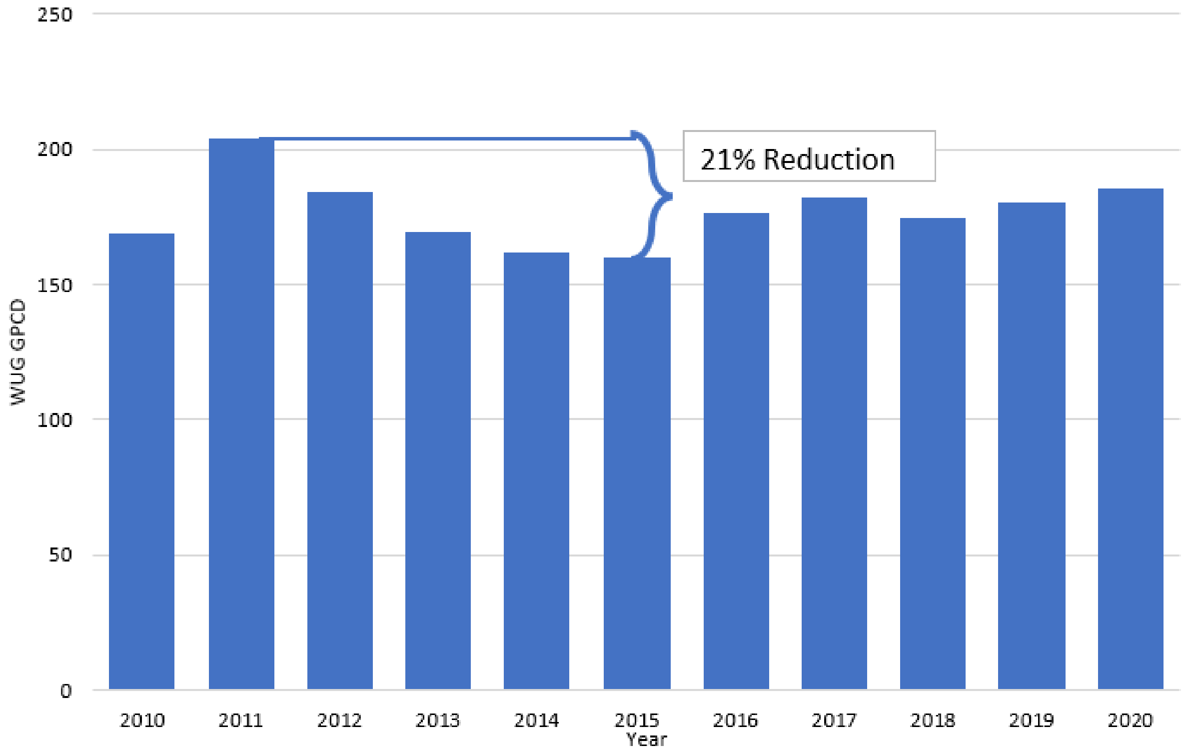
Austin Water (AW) has integrated climate projections from Global Circulation Models (GCMs) into their Water Forward planning process to address future water supply uncertainties and elevated demand from the potential DWDORs. As a major water provider, AW provides a buffer for climate uncertainties in the Lower Colorado Regional Planning Area. Additional details can be found on the City's 2024 Water Forward Plan on the City website (https://www.austintexas.gov/department/water-forward).

LCRA

As the manager of the major water storage reservoirs that provide most of the surface water in Region K, LCRA is actively engaged in study and evaluation of technologies and projects that may be implemented to increase available supplies. Many of these projects are not limited to surface water and further described in the September 20, 2023 presentation to the LCRA Board of Directors (https://www.lcra.org/download/water-ops-agenda-item-no-7-2023-09-20/?wpdmdl=31443). The planning process described in this presentation is ongoing in parallel with Regional Water Planning.

Through the contracts with firm water customers, LCRA requires the adoption and implementation of water conservation and drought contingency plans. LCRA monitors and advocates the status of the surface water systems to keep all firm water customers informed of conditions. Through regular update of the state-approved Water Management Plan, LCRA has adopted policies that are intended to preserve water supply during extreme drought conditions. The 2020 Water Management Plan is scheduled for update during 2025. One of the key elements of this plan that helps preserve water in the reservoirs during droughts is the ability to cut off water to most of the downstream interruptible agricultural customers. This occurs when combined storage in Lakes Buchanan and Travis is less than 1.1 million acre-feet on March 1 or July 1 and the prior three months of inflows are less than the 25th percentile of historic inflows for that three-month period. This is one of the policies that will be reviewed during the subsequent update of the Water Management Plan.

Figure 7.3 Water Use (Gallons Per Capita Per Day) for Water User Groups in Region K



Source: TWDB provided spreadsheet dated March 2022 (CORRECTED - WUG_HistoricalData_2026RWPs.xlsx)

7.2.3 Potential Additional Measures for DWDOR Resilience

Water providers in Region K may have other tools to address DWDORs that are not specifically addressed in this plan. For example, water providers with multiple sources may have the potential to gain extra yield from system operations of their supplies. Emergency interconnects and/or interim emergency purchases with other providers provide another potential option for water during a DWDOR.

7.3 Current Drought Preparations and Response

The TCEQ, in accordance with the Texas Administrative Code, requires all wholesale public water suppliers, retail public suppliers, and irrigation districts to prepare and submit Drought Contingency Plans (DCPs) meeting the requirements of 30 TAC Chapter§288(b) and to update these plans at least every five years.

While drought may be considered an emergency, it is often a slowly developing situation that provides increasing signs that water supplies could become scarce. By contrast, some supply deficiencies, such as equipment or pipeline failures, happen on shorter time intervals and provide little or no advance warning. System limitations that result from unexpected events including equipment failures, water supply contaminations, and other sudden decrease of supply should be planned for just as other emergency events. It is also important for communities to be aware that loss of supply may be a result of intentional damage or attack on a system.

The recent drought provided many water systems in the region with the opportunity to experience implementation of their Drought Contingency Plans. That real-world experience has helped shaped updates to their DCPs. Outdoor watering restrictions are a common method of reducing water use and are now being suggested as voluntary measures for several months a year in various water systems in the region. This effort prepares customers for anticipated water restrictions during periods of drought.

The DCPs show that a variety of triggers have been specified by the different water suppliers as initiators of water shortage conditions. These triggers include a threshold level of total water use, well levels, and conditions caused by mechanical failure of water service systems. Strategies planned for dealing with drought conditions included restrictions on water use for irrigation, vehicle washing, and construction. The amount of water saved for each drought response conditions varied by community.

Appendix 7.A provides a summary of the drought triggers and responses for water users in the region that have submitted DCPs to Region K. An indication of whether the measures at each stage are voluntary or mandatory is identified, and the water reduction goals for each stage are also included.

7.4 Region-Specific Drought Response Recommendations

Drought response recommendations are addressed for both surface water and groundwater systems. Each major water provider has established drought contingency plans, as identified in Appendix 7.A, and these plans have flow-down provisions for many of their customers. Each specific drought contingency plan identifies specific hydrologic or functional parameters that trigger a drought response.

Several resources are available to aid in drought monitoring. The following sources provide information related to drought that surface water suppliers, groundwater suppliers, groundwater conservation districts, and groundwater management areas can all use to monitor drought conditions, help aid in advising the public on the status of drought conditions, and provide guidance for making decisions related to triggers and drought response.

- Texas Drought Preparedness Council:
  http://www.txdps.state.tx.us/dem/CouncilsCommittees/droughtCouncil/stateDroughtPrepCouncil.htm

- Palmer Drought Severity Index:
  https://www.drought.gov/drought/data/category/pdsi-palmer-drought-severity-index
  https://psl.noaa.gov/data/gridded/data.pdsi.html

- TCEQ drought information:
  https://www.tceq.texas.gov/response/drought

- Drought dashboard at Water Data for Texas:
  https://waterdatafortexas.org/drought

7.4.1 Surface Water

The Highland Lakes and Colorado River provide substantial water supply to the Lower Colorado Region and almost exclusively provide the primary source water for a number of Central Texas municipal utilities, including Austin (Austin Water). The Lower Colorado River Authority manages the Highland Lakes and closely monitors total combined storage in the lakes and establishes drought stages based on combined storage levels. **Table 7.1** summarizes recommended drought stage triggers and actions as identified in the LCRA's DCP for Firm Water Customers. LCRA requires all customers to submit DCPs stating the specific combined storage triggers located in its water management plan and requires customers to update their plans every five years. Austin also follows DCP triggers based on the combined storage levels in the Highland Lakes, as well as other triggers based on peak day system demand.

Table 7.1 Summary of LCRA Recommended Drought Triggers and Responses

Drought Stage	Trigger	Action
Stage 1	Combined Storage less than 1.1 million acre-feet and interruptible stored water is being curtailed	Firm customers implement mandatory measures with a target of 10% demand reduction.
Stage 2	A) Combined Storage less than 900,000 acre-feet and interruptible stored water is being curtailed B) On March 1 or July 1 Combined Storage less than 1.1 million acre-feet and the cumulative prior three months of inflows is less than the 25th percentile of historic inflows.	Firm customers implement additional mandatory measures with a target of 20% demand reduction. Must include no more than once-per-week watering schedule
Stage 3	Combined Storage less than 750,000 acre-feet and interruptible stored water is being curtailed	Firm customers implement additional mandatory measures with a target of 25% demand reduction. Must include either a prohibition of operating automatic or manual irrigation systems or limit operation to 6 hours per week.
Stage 4	Combined Storage less than 600,000 acre-feet and LCRA Board declares a Drought Worse than the Drought of Record	Water supplied on Pro Rata basis with initial curtailment at 20% and target demand reduction of 30%. Must include a prohibition against watering ornamental turf grass. Additional mandatory actions to be determined by the LCRA board

Based on LCRA Drought Contingency Plan for Firm Water Customers, April 2024.

The Lower Colorado Regional Water Planning Group (LCRWPG) acknowledges that the Major Water Providers in Region K have extensive knowledge regarding surface water sources in the region, and they may play a leadership role in developing appropriate drought response actions for themselves and their customers. Please see Appendix 7.A for severe and critical/emergency triggers and responses associated with the surface water customers of the Major Water Providers in the region. One area the LCRWPG feels could potentially be improved upon is the coordination and uniformity of Drought Stage levels for all users of a particular source. It has been acknowledged that there can be some confusion when two water users of the same water source are at different Drought Stage levels, even if they are implementing similar drought responses. No unnecessary or counterproductive variations in specific drought response strategies among user groups in Region K were identified that may confuse the public or otherwise impede drought response efforts.

7.4.2 Groundwater

A large portion of the region uses groundwater as their main source of supply. Throughout the region, the DCPs for groundwater users are developed specifically to their use and location. Aquifer characteristics can vary across the region, and it can be difficult to require the same triggers for all users of a particular groundwater source that covers several counties. The LCRWPG acknowledges that the municipalities and water utilities that rely upon groundwater should have the best knowledge to develop their DCP triggers and responses using their specialized knowledge. Please see Appendix 7.A for information of drought triggers and responses associated with groundwater users in the region. Even so, the LCRWPG encourages ongoing coordination between groundwater users, Groundwater Conservation Districts, and the Groundwater Management Areas to monitor local conditions for necessary modifications to the Drought Contingency Plans.

7.5 Existing and Potential Emergency Interconnects

The Texas Administrative Code (31 TAC 357.42(d)) states that the regional water planning groups will collect confidential information on infrastructure and submit the information to the Executive Administrator of the Texas Water Development Board in accordance with the guidance provided.

The guidance provided by the Texas Water Development Board states that "RWPGs shall collect and summarize information on existing major water infrastructure facilities that may be used for emergency interconnects and provide this information to the EA confidentially and separately from the final adopted RWP…This information may be collected in a tabular format that shows the potential user(s) of the interconnect(s), the potential supplier(s), the estimated potential volume of supply that could be provided via the interconnect (including the source name), and a general description of the facility/infrastructure and its location."

Existing emergency interconnect information was obtained from the Texas Commission on Environmental Quality, Texas Drinking Water Watch available at https://dww2.tceq.texas.gov/DWW/ and by soliciting such information from wholesale water providers regarding their own water distribution systems as well as those of their customers. **Table 7.2** shows the 14 WUGs have an existing emergency interconnect with another utility.

Table 7.2 Existing and Potential Emergency Interconnects

Water User Group Recipient	Water User Group Seller	Supply Source
Aqua WSC	Lockhart	GW
Bastrop	Aqua WSC	GW
Fayette County WCID Monument Hill	FAYETTE WSC WEST	GW
Fayette WSC	Fayette County WCID La Grange	GW
Goldthwaite	Mills Pasture East	GW
Hurst Creek MUD	Travis County WCID 17	SW

Table 7.2 Existing and Potential Emergency Interconnects

Water User Group Recipient	Water User Group Seller	Supply Source
La Grange	Fayette WSC West	GW
Lakeway MUD	Hurst MUD Travis County WCID 17	SW
Manor	Austin	SW
Manville WSC	Cross County WSC	GW
Travis County MUD 4	Travis County WCID 20	SW
Travis County WCID 17	Austin	SW
Travis County WCID 20	Travis County MUD 4	SW
West Travis County Public Utility Agency	Travis County WCID 17	SW

Additionally, available DCPs for entities within the Region were reviewed to identify those WUGs that could either establish or activate an interconnect as a drought response. The following entities have DCPs that mention the possibility of establishing or activating emergency interconnects as a drought response: Horseshoe Bay and Leander. Previously, the following entities indicated the possibility of establishing emergency interconnects, but have not been confirmed in the current DCPs: Brookesmith Special Utility District (SUD), Creedmoor-Maha WSC, Deer Creek Ranch, Fayette County Water Control and Improvement District (WCID) Monument Hill, Hays, Hurst Creek Municipal Utility District (MUD), Lago Vista, and Travis County MUD 10.

7.6 Drought Management Water Management Strategies

This section covers the consideration and recommendation of drought management as a water management strategy in Region K.

7.6.1 Potentially Feasible Drought Management WMS Considered

The Lower Colorado Regional Water Planning Group considers drought management an important strategy for meeting the future water needs of the Region. Drought Management measures can be seen as either measures to prepare for drought – such as enhanced water conservation programs that result in long-term behavioral changes that reduce demand, or measures that are a response to drought conditions that may be shorter-term. These can be compared to chronic and acute health conditions, where the chronic condition requires long-term management, and an acute condition requires an immediate response. The Lower Colorado River Authority and Austin (Austin Water), as well as other smaller water providers throughout the Region, have taken a more aggressive approach to the potential chronic drought conditions experienced by the region. This aggressive approach has resulted in greater intensity and focus on water conservation. This is also reflected in the water conservation approach described in Chapter 5 of this plan. The implementation of conservation measures will gradually move demands toward minimum water usage goals, resulting in reduced potential to achieve significant additional demand reduction in response to drought.

Drought management as a water management strategy was adopted by the RWPG as a water management strategy for each municipal WUG, regardless of whether it had water needs. This results in the following:

- For all municipal WUGs a 5% demand reduction is adopted as a water management strategy. Drought management strategy volumes for each municipal WUGs are provided in **Table 7.3**.
- For WUGs that do not have needs, this will increase their buffer of remaining water supply during drought conditions.
- For WUGs with needs, this will provide an additional measure of demand reduction during a drought in addition to other water management strategies.
- For WUGs that have unmet needs, a significantly greater drought management strategy of 20% or more of demand may be needed. These additional drought management strategy volumes are included in Table 7.3.

Table 7.3 Drought Water Management Strategy for All WUGs (ac-ft/yr)

WUG	County	2030	2040	2050	2060	2070	2080
Aqua WSC	Bastrop	592	702	817	967	1,130	1,307
Aqua WSC	Travis	63	71	76	83	91	99
Austin	Hays	1	1	1	1	1	2
Austin	Travis	7,706	8,679	9,836	10,979	12,031	13,145
Austin	Williamson	649	819	1,067	1,320	1,589	1,862
Barton Creek West WSC	Travis	17	14	13	12	11	10
Barton Creek WSC	Travis	17	15	13	11	10	8
Bastrop	Bastrop	92	103	120	138	161	186
Bastrop County WCID 2	Bastrop	24	29	35	43	51	60
Bay City	Matagorda	102	99	97	96	95	94
Bertram	Burnet	47	55	59	64	71	79
Blanco	Blanco	10	10	9	9	9	8
Boling MWD	Wharton	4	3	3	2	2	1
Briarcliff	Travis	23	26	30	33	36	40
Brushy Creek MUD	Williamson	3	2	2	2	2	2
Buda	Hays	127	173	201	228	257	296
Burnet	Burnet	62	59	56	56	56	58
Caney Creek MUD of Matagorda County	Matagorda	13	14	15	16	17	19
Canyon Lake Water Service	Blanco	3	3	3	3	3	3
Canyon Lake Water Service	Hays	8	8	7	7	7	7
Canyon Lake Water Service	Travis	8	8	7	7	7	7

Table 7.3 Drought Water Management Strategy for All WUGs (ac-ft/yr)

WUG	County	2030	2040	2050	2060	2070	2080
Cedar Park	Travis	99	102	96	92	87	83
Cimarron Park Water	Hays	11	11	11	11	11	11
Columbus	Colorado	40	33	30	27	25	23
Corix Utilities Texas Inc	Blanco	7	7	6	6	6	5
Corix Utilities Texas Inc	Burnet	149	150	156	162	169	181
Corix Utilities Texas Inc	Colorado	10	8	7	6	6	5
Corix Utilities Texas Inc	Llano	22	20	20	19	19	19
Corix Utilities Texas Inc	Matagorda	3	3	3	2	2	2
Corix Utilities Texas Inc	Mills	5	4	4	3	3	2
Corix Utilities Texas Inc	San Saba	1	1	1	1	0	0
Cottonwood Creek MUD 1	Travis	17	17	17	17	17	17
Cottonwood Shores	Burnet	13	14	15	16	17	19
County-Other, Bastrop	Bastrop	46	45	52	62	95	143
County-Other, Blanco	Blanco	42	40	38	36	33	31
County-Other, Burnet	Burnet	92	74	83	93	103	115
County-Other, Colorado	Colorado	66	63	60	57	55	52
County-Other, Fayette	Fayette	29	22	16	12	7	2
County-Other, Gillespie	Gillespie	94	100	105	113	123	134
County-Other, Hays	Hays	499	841	1,373	2,322	3,534	4,880
County-Other, Llano	Llano	25	21	16	13	9	5
County-Other, Matagorda	Matagorda	44	38	31	23	14	5
County-Other, Mills	Mills	11	9	8	6	5	4
County-Other, San Saba	San Saba	9	7	5	4	3	2
County-Other, Travis	Travis	499	650	582	441	409	392
County-Other, Wharton	Wharton	88	85	84	82	79	77
County-Other, Williamson	Williamson	0	17	4	9	30	84
Creedmoor-Maha WSC	Bastrop	1	2	2	3	4	5
Creedmoor-Maha WSC	Travis	32	36	41	45	50	55
Cypress Ranch WCID 1	Travis	8	9	8	8	8	8
Dripping Springs WSC	Hays	126	173	239	269	262	256
Eagle Lake	Colorado	19	16	14	13	11	9
El Campo	Wharton	1	1	1	1	0	0
Elgin	Bastrop	334	430	526	618	647	631
Elgin	Travis	164	290	407	517	541	527
Fayette County WCID Monument Hill	Fayette	5	5	4	4	4	3
Fayette WSC East	Bastrop	0	1	1	1	1	2

Table 7.3 Drought Water Management Strategy for All WUGs (ac-ft/yr)

WUG	County	2030	2040	2050	2060	2070	2080
Fayette WSC West	Fayette	52	54	56	59	62	65
Fern Bluff MUD	Williamson	1	1	1	1	1	1
Flatonia	Fayette	8	8	8	7	7	7
Fredericksburg	Gillespie	119	109	101	94	92	91
Garfield WSC	Travis	8	8	9	9	9	10
Georgetown	Burnet	5	6	7	7	7	7
Goforth SUD	Hays	15	21	29	40	53	66
Goforth SUD	Travis	2	2	3	3	3	4
Goldthwaite	Mills	25	20	17	15	14	12
Granite Shoals	Burnet	32	33	33	34	34	35
Hays	Hays	31	42	57	78	100	124
Hays County WCID 1	Hays	33	29	27	25	24	23
Hays County WCID 2	Hays	32	29	26	25	23	22
Headwaters at Barton Creek	Hays	5	7	10	15	19	24
Hornsby Bend Utility	Travis	197	244	287	328	376	430
Horseshoe Bay	Burnet	9	9	9	9	9	9
Horseshoe Bay	Llano	38	36	33	32	33	35
Hurst Creek MUD	Travis	47	38	31	26	23	21
Johnson City	Blanco	14	14	14	15	15	16
Jonestown WSC	Travis	39	44	50	57	67	78
Kelly Lane WCID 1	Travis	21	19	18	17	16	16
Kelly Lane WCID 2	Travis	21	29	36	43	50	59
Kempner WSC	Burnet	5	4	4	4	3	3
Kingsland WSC	Burnet	4	5	6	8	10	12
Kingsland WSC	Llano	40	45	51	59	67	76
La Grange	Fayette	36	33	31	29	28	27
La Ventana WSC	Hays	6	6	5	5	5	5
Lago Vista	Travis	165	221	280	324	323	322
Lakeside MUD 3	Travis	21	29	36	41	48	55
Lakeside WCID 1	Travis	13	15	17	19	21	23
Lakeside WCID 2-B	Travis	20	20	20	21	22	24
Lakeside WCID 2-C	Travis	27	37	46	55	65	76
Lakeside WCID 2-D	Travis	31	40	48	56	64	73
Lakeway MUD	Travis	80	78	75	74	72	70
Leander	Travis	210	259	250	231	216	204
Lee County WSC	Bastrop	10	13	17	22	26	31

Table 7.3 Drought Water Management Strategy for All WUGs (ac-ft/yr)

WUG	County	2030	2040	2050	2060	2070	2080
Lee County WSC	Fayette	8	8	7	7	7	7
Llano	Llano	33	30	28	25	24	23
Loop 360 WSC	Travis	37	30	24	19	16	14
Manor	Travis	348	469	577	681	801	936
Manville WSC	Travis	187	220	245	274	305	339
Marble Falls	Burnet	136	158	143	129	123	117
Markham MUD	Matagorda	3	3	3	3	3	3
Matagorda County WCID 6	Matagorda	5	5	4	4	4	3
Matagorda Waste Disposal and WSC	Matagorda	2	2	2	2	2	1
Meadowlakes	Burnet	103	91	87	84	81	75
Mid-Tex Utilities	Hays	6	8	11	16	21	26
Mid-Tex Utilities	Travis	10	14	17	20	23	27
North Austin MUD 1	Travis	5	5	5	5	5	4
North Austin MUD 1	Williamson	44	43	43	42	42	42
North San Saba WSC	San Saba	5	4	3	3	3	2
Northtown MUD	Travis	33	35	36	38	40	42
Palacios	Matagorda	24	22	21	20	18	17
Pflugerville	Travis	535	635	709	792	886	986
Polonia WSC	Bastrop	1	1	1	1	1	1
Quadvest	Matagorda	1	1	1	1	1	0
Rancho Del Lago	Blanco	5	5	4	4	3	3
Reunion Ranch WCID	Hays	12	16	20	26	32	39
Richland SUD	San Saba	6	5	5	4	4	4
Rollingwood	Travis	16	15	14	13	12	11
Rough Hollow in Travis County	Travis	54	49	44	42	40	38
Round Rock	Travis	15	17	19	21	23	26
Ruby Ranch WSC	Hays	7	7	7	6	6	6
San Saba	San Saba	42	34	28	25	23	22
Schulenburg	Fayette	30	27	24	22	21	20
Senna Hills MUD	Travis	12	10	9	8	7	7
Shady Hollow MUD	Travis	26	24	23	23	23	23
Smithville	Bastrop	28	28	29	30	32	34
Sunrise Beach Village	Llano	4	4	4	4	4	4
Sunset Valley	Travis	12	9	8	7	6	6
Sweetwater Community	Travis	30	38	37	36	35	34
The Colony MUD 1A	Bastrop	8	9	10	12	13	15

Table 7.3 Drought Water Management Strategy for All WUGs (ac-ft/yr)

WUG	County	2030	2040	2050	2060	2070	2080
Travis County MUD 10	Travis	5	6	6	7	8	9
Travis County MUD 14	Travis	12	15	17	19	21	24
Travis County MUD 18	Travis	10	10	9	9	9	9
Travis County MUD 2	Travis	106	130	150	169	192	218
Travis County MUD 4	Travis	83	80	74	67	61	62
Travis County WCID 10	Travis	142	123	106	92	88	85
Travis County WCID 17	Travis	434	482	507	549	595	644
Travis County WCID 18	Travis	41	39	37	36	35	34
Travis County WCID 19	Travis	12	10	8	7	6	5
Travis County WCID 20	Travis	31	25	21	17	14	12
Travis County WCID Point Venture	Travis	17	18	20	22	25	29
Undine Development	Travis	6	5	5	4	4	4
Weimar	Colorado	16	14	13	12	11	10
Wells Branch MUD	Travis	75	77	77	77	77	77
Wells Branch MUD	Williamson	2	3	4	4	4	4
West End WSC	Fayette	4	4	4	4	4	3
West Travis County Public Utility Agency	Hays	154	201	254	337	422	524
West Travis County Public Utility Agency	Travis	242	278	299	328	360	403
Wharton	Wharton	67	64	58	53	50	46
Wharton County WCID 2	Wharton	14	12	11	10	8	8
Wilbarger Creek MUD 1	Travis	13	18	23	28	33	39
Williamson County WSID 3	Travis	4	3	2	2	1	1
Williamson Travis Counties MUD 1	Travis	8	8	8	7	7	7
Windermere Utility	Travis	123	118	115	112	110	107

Note that shaded rows indicate WUGs with unmet needs and a 20% Drought WMS is shown instead of 5% as used for all other WUGs.

The cost of implementing drought contingency plans as a water management strategy was evaluated using information from the Water Research Foundation Report #4546 *Drought Management in a Changing Climate: Using Cost-Benefit Analyses to Assist Drinking Water Utilities.* There are many costs or expenses that a water utility incurs during a drought that result from things like pipeline breaks because of shrinking soils, additional treatment costs due to increased solids in the water under low flows, increased solids handling costs, increased pumping depth for groundwater utilities, and others. There is also a potential reduction in revenue that may be partially offset by drought-period penalty fees charged for high usage. However, overall, the main drought contingency plan implementation costs result from public outreach and enforcement of the mandatory drought measures. Based on the estimates for drought contingency plan implementation costs that include outreach programs, enforcement, leak detection, rebates, and improvement of interconnects, the costs average about

$1.15 per person served by the utility in September 2024 dollars. Applying to the population projections results in the estimated drought contingency strategy costs presented in **Table 7.4** for WUGs in the region. An adjustment has not been made for those utilities that have unmet needs and will need to implement a DCP to achieve a 20% demand reduction instead of 5%.

Table 7.4 Drought Water Management Strategy Implementation Cost for All WUGs

WUG	County	2030	2040	2050	2060	2070	2080
Aqua WSC	Bastrop	$91,516	$113,725	$140,044	$169,938	$203,816	$242,211
Aqua WSC	Travis	$9,673	$11,485	$13,057	$14,625	$16,404	$18,420
Austin	Hays	$ 149	$175	$203	$230	$258	$287
Austin	Travis	$1,296,908	$1,515,307	$1,734,961	$1,953,281	$2,155,335	$2,367,323
Austin	Williamson	$109,257	$143,019	$188,255	$234,820	$284,655	$335,322
Barton Creek West WSC	Travis	$1,504	$1,540	$1,540	$1,540	$1,540	$1,540
Barton Creek WSC	Travis	$ 651	$698	$740	$783	$833	$888
Bastrop	Bastrop	$13,070	$16,161	$19,823	$23,983	$28,698	$34,040
Bastrop County WCID 2	Bastrop	$6,078	$7,477	$9,134	$11,016	$13,148	$15,566
Bay City	Matagorda	$20,020	$19,992	$20,048	$20,086	$20,114	$20,128
Bertram	Burnet	$5,514	$7,139	$8,544	$10,158	$11,977	$14,029
Blanco	Blanco	$1,753	$1,768	$1,736	$1,705	$1,670	$1,629
Boling MWD	Wharton	$ 731	$723	$609	$515	$410	$295
Briarcliff	Travis	$3,780	$4,632	$5,370	$6,101	$6,930	$7,871
Brushy Creek MUD	Williamson	$ 336	$336	$336	$339	$339	$339
Buda	Hays	$23,586	$33,021	$39,346	$45,641	$52,943	$61,413
Burnet	Burnet	$8,021	$8,510	$8,930	$9,369	$9,869	$10,440
Caney Creek MUD of Matagorda County	Matagorda	$2,694	$2,927	$3,193	$3,482	$3,795	$4,131
Canyon Lake Water Service	Blanco	$ 617	$617	$617	$617	$617	$617
Canyon Lake Water Service	Hays	$1,458	$1,499	$1,527	$1,549	$1,564	$1,564
Canyon Lake Water Service	Travis	$1,458	$1,499	$1,529	$1,549	$1,566	$1,566
Cedar Park	Travis	$12,144	$13,772	$14,424	$14,424	$14,424	$14,424
Cimarron Park Water	Hays	$2,436	$2,436	$2,436	$2,436	$2,436	$2,436
Columbus	Colorado	$3,881	$3,944	$3,986	$3,997	$3,996	$3,979
Corix Utilities Texas Inc	Blanco	$ 250	$250	$250	$250	$250	$250
Corix Utilities Texas Inc	Burnet	$5,126	$5,738	$6,267	$6,854	$7,518	$8,266
Corix Utilities Texas Inc	Colorado	$ 357	$325	$296	$270	$245	$222
Corix Utilities Texas Inc	Llano	$3,015	$3,087	$3,145	$3,229	$3,326	$3,436
Corix Utilities Texas Inc	Matagorda	$ 455	$455	$434	$414	$393	$351
Corix Utilities Texas Inc	Mills	$ 624	$599	$574	$540	$498	$439
Corix Utilities Texas Inc	San Saba	$ 120	$111	$ 98	$ 89	$ 78	$ 66

Table 7.4 Drought Water Management Strategy Implementation Cost for All WUGs

WUG	County	2030	2040	2050	2060	2070	2080
Cottonwood Creek MUD 1	Travis	$5,760	$5,760	$5,760	$5,760	$5,760	$5,760
Cottonwood Shores	Burnet	$1,961	$2,234	$2,469	$2,732	$3,031	$3,369
County-Other, Bastrop	Bastrop	$6,570	$7,202	$8,655	$10,916	$17,039	$26,435
County-Other, Blanco	Blanco	$8,283	$8,243	$7,892	$7,538	$7,149	$6,721
County-Other, Burnet	Burnet	$14,954	$12,786	$14,690	$16,768	$19,070	$21,797
County-Other, Colorado	Colorado	$13,196	$12,894	$12,531	$12,155	$11,730	$11,252
County-Other, Fayette	Fayette	$5,392	$4,361	$3,240	$2,394	$1,472	$482
County-Other, Gillespie	Gillespie	$19,704	$21,083	$22,478	$24,515	$26,811	$29,399
County-Other, Hays	Hays	$24,681	$42,799	$71,686	$122,473	$188,181	$262,474
County-Other, Llano	Llano	$5,703	$4,942	$3,734	$3,003	$2,133	$1,110
County-Other, Matagorda	Matagorda	$10,213	$8,920	$7,336	$5,525	$3,501	$1,259
County-Other, Mills	Mills	$2,185	$1,857	$1,514	$1,317	$1,117	$922
County-Other, San Saba	San Saba	$1,416	$1,180	$961	$819	$652	$462
County-Other, Travis	Travis	$89,309	$119,502	$109,849	$85,350	$81,277	$79,738
County-Other, Wharton	Wharton	$16,329	$16,260	$16,368	$16,323	$16,267	$16,193
County-Other, Williamson	Williamson	$ 0	$2,797	$682	$1,562	$5,580	$15,945
Creedmoor-Maha WSC	Bastrop	$ 267	$420	$602	$809	$1,043	$1,307
Creedmoor-Maha WSC	Travis	$8,149	$9,406	$10,499	$11,598	$12,842	$14,252
Cypress Ranch WCID 1	Travis	$1,917	$2,057	$2,057	$2,057	$2,057	$2,057
Dripping Springs WSC	Hays	$18,855	$27,299	$39,524	$46,854	$46,854	$46,854
Eagle Lake	Colorado	$3,458	$3,106	$2,766	$2,530	$2,268	$1,980
El Campo	Wharton	$ 160	$158	$129	$107	$ 81	$ 53
Elgin	Bastrop	$14,819	$19,620	$24,609	$29,666	$31,838	$31,838
Elgin	Travis	$7,252	$13,250	$19,060	$24,803	$26,617	$26,617
Fayette County WCID Monument Hill	Fayette	$ 652	$642	$629	$626	$623	$621
Fayette WSC East	Bastrop	$ 70	$113	$165	$223	$289	$364
Fayette WSC West	Fayette	$9,215	$9,880	$10,595	$11,359	$12,180	$13,060
Fern Bluff MUD	Williamson	$ 137	$139	$142	$144	$146	$149
Flatonia	Fayette	$1,644	$1,612	$1,572	$1,564	$1,556	$1,546
Fredericksburg	Gillespie	$12,972	$13,281	$13,586	$13,982	$14,444	$14,981
Garfield WSC	Travis	$1,746	$1,845	$1,934	$2,029	$2,136	$2,257
Georgetown	Burnet	$ 652	$924	$1,046	$1,107	$1,191	$1,244
Goforth SUD	Hays	$3,543	$5,115	$7,182	$9,990	$13,172	$16,776
Goforth SUD	Travis	$ 364	$500	$617	$733	$863	$1,011
Goldthwaite	Mills	$2,002	$2,002	$2,002	$2,002	$2,002	$2,002

Table 7.4 Drought Water Management Strategy Implementation Cost for All WUGs

WUG	County	2030	2040	2050	2060	2070	2080
Granite Shoals	Burnet	$7,280	$7,520	$7,726	$7,917	$8,139	$8,395
Hays	Hays	$1,278	$1,844	$2,590	$3,602	$4,750	$6,048
Hays County WCID 1	Hays	$4,201	$4,201	$4,201	$4,201	$4,201	$4,201
Hays County WCID 2	Hays	$3,905	$3,905	$3,905	$3,905	$3,905	$3,905
Headwaters at Barton Creek	Hays	$1,418	$2,048	$2,876	$4,001	$5,275	$6,718
Hornsby Bend Utility	Travis	$14,256	$17,829	$20,922	$23,975	$27,442	$31,377
Horseshoe Bay	Burnet	$1,047	$1,144	$1,227	$1,318	$1,422	$1,539
Horseshoe Bay	Llano	$4,324	$4,524	$4,632	$5,017	$5,452	$5,942
Hurst Creek MUD	Travis	$3,204	$3,204	$3,204	$3,204	$3,204	$3,204
Johnson City	Blanco	$2,162	$2,296	$2,438	$2,587	$2,746	$2,916
Jonestown WSC	Travis	$5,964	$7,149	$8,571	$10,274	$12,317	$14,766
Kelly Lane WCID 1	Travis	$2,879	$2,879	$2,879	$2,879	$2,879	$2,879
Kelly Lane WCID 2	Travis	$5,013	$7,118	$8,933	$10,706	$12,721	$15,011
Kempner WSC	Burnet	$ 653	$631	$612	$585	$556	$523
Kingsland WSC	Burnet	$ 931	$1,167	$1,463	$1,835	$2,302	$2,887
Kingsland WSC	Llano	$8,812	$10,157	$11,706	$13,492	$15,550	$17,922
La Grange	Fayette	$5,351	$5,245	$5,125	$5,099	$5,070	$5,038
La Ventana WSC	Hays	$ 950	$950	$950	$950	$950	$950
Lago Vista	Travis	$19,294	$28,561	$40,169	$51,266	$53,856	$56,446
Lakeside MUD 3	Travis	$3,757	$5,267	$6,570	$7,841	$9,287	$10,931
Lakeside WCID 1	Travis	$3,229	$3,816	$4,327	$4,835	$5,412	$6,066
Lakeside WCID 2-B	Travis	$2,508	$2,878	$3,200	$3,525	$3,892	$4,308
Lakeside WCID 2-C	Travis	$7,482	$10,333	$12,794	$15,199	$17,933	$21,041
Lakeside WCID 2-D	Travis	$5,245	$7,189	$8,867	$10,508	$12,373	$14,495
Lakeway MUD	Travis	$12,356	$12,781	$12,950	$12,950	$12,950	$12,950
Leander	Travis	$36,661	$46,317	$45,854	$43,341	$41,575	$40,307
Lee County WSC	Bastrop	$1,748	$2,398	$3,175	$4,053	$5,049	$6,177
Lee County WSC	Fayette	$1,380	$1,351	$1,320	$1,312	$1,305	$1,297
Llano	Llano	$3,858	$3,910	$3,972	$3,967	$3,966	$3,966
Loop 360 WSC	Travis	$1,787	$1,759	$1,738	$1,729	$1,718	$1,704
Manor	Travis	$24,146	$32,821	$40,312	$47,639	$55,971	$65,439
Manville WSC	Travis	$29,880	$37,233	$43,598	$49,883	$57,021	$65,124
Marble Falls	Burnet	$15,306	$19,666	$19,674	$19,682	$19,690	$19,700
Markham MUD	Matagorda	$ 867	$837	$805	$765	$720	$669
Matagorda County WCID 6	Matagorda	$1,135	$1,098	$1,053	$1,002	$943	$877

Table 7.4 Drought Water Management Strategy Implementation Cost for All WUGs

WUG	County	2030	2040	2050	2060	2070	2080
Matagorda Waste Disposal and WSC	Matagorda	$ 329	$319	$306	$291	$274	$256
Meadowlakes	Burnet	$2,214	$2,382	$2,526	$2,683	$2,859	$2,927
Mid-Tex Utilities	Hays	$1,188	$1,714	$2,406	$3,346	$4,413	$5,620
Mid-Tex Utilities	Travis	$2,076	$2,868	$3,554	$4,223	$4,983	$5,849
North Austin MUD 1	Travis	$1,068	$1,068	$1,068	$1,068	$1,068	$1,068
North Austin MUD 1	Williamson	$9,888	$9,888	$9,888	$9,888	$9,888	$9,888
North San Saba WSC	San Saba	$ 516	$484	$456	$437	$417	$393
Northtown MUD	Travis	$11,403	$11,975	$12,484	$13,042	$13,669	$14,372
Palacios	Matagorda	$4,741	$4,585	$4,400	$4,184	$3,939	$3,661
Pflugerville	Travis	$82,736	$103,619	$121,695	$139,530	$159,785	$182,780
Polonia WSC	Bastrop	$ 218	$220	$221	$223	$226	$228
Quadvest	Matagorda	$ 107	$104	$ 99	$ 94	$ 89	$ 83
Rancho Del Lago	Blanco	$ 586	$592	$581	$570	$558	$544
Reunion Ranch WCID	Hays	$1,344	$1,940	$2,723	$3,789	$4,995	$6,363
Richland SUD	San Saba	$ 758	$713	$681	$655	$646	$657
Rollingwood	Travis	$1,736	$1,759	$1,781	$1,813	$1,849	$1,887
Rough Hollow in Travis County	Travis	$6,564	$6,564	$6,564	$6,564	$6,564	$6,564
Round Rock	Travis	$2,298	$2,810	$3,253	$3,692	$4,192	$4,758
Ruby Ranch WSC	Hays	$1,292	$1,292	$1,292	$1,292	$1,292	$1,292
San Saba	San Saba	$3,456	$3,456	$3,456	$3,456	$3,456	$3,456
Schulenburg	Fayette	$3,456	$3,456	$3,456	$3,456	$3,456	$3,456
Senna Hills MUD	Travis	$1,016	$1,040	$1,064	$1,090	$1,115	$1,142
Shady Hollow MUD	Travis	$3,791	$3,869	$3,942	$4,035	$4,138	$4,252
Smithville	Bastrop	$4,246	$4,562	$4,923	$5,339	$5,812	$6,350
Sunrise Beach Village	Llano	$ 885	$903	$918	$931	$947	$965
Sunset Valley	Travis	$ 849	$849	$849	$849	$849	$849
Sweetwater Community	Travis	$5,095	$6,718	$6,718	$6,718	$6,718	$6,718
The Colony MUD 1A	Bastrop	$ 672	$916	$1,208	$1,539	$1,913	$2,337
Travis County MUD 10	Travis	$ 559	$758	$930	$1,098	$1,288	$1,506
Travis County MUD 14	Travis	$3,501	$4,184	$4,776	$5,365	$6,034	$6,793
Travis County MUD 18	Travis	$1,669	$1,669	$1,669	$1,669	$1,669	$1,669
Travis County MUD 2	Travis	$5,089	$6,443	$7,613	$8,768	$10,079	$11,567
Travis County MUD 4	Travis	$3,822	$4,511	$5,110	$5,707	$6,384	$7,151
Travis County WCID 10	Travis	$8,822	$9,417	$9,943	$10,501	$11,130	$11,838

Table 7.4 Drought Water Management Strategy Implementation Cost for All WUGs

WUG	County	2030	2040	2050	2060	2070	2080
Travis County WCID 17	Travis	$54,087	$66,687	$77,601	$88,395	$100,649	$114,559
Travis County WCID 18	Travis	$6,362	$6,362	$6,362	$6,362	$6,362	$6,362
Travis County WCID 19	Travis	$ 533	$541	$549	$558	$566	$574
Travis County WCID 20	Travis	$1,692	$1,692	$1,692	$1,692	$1,692	$1,692
Travis County WCID Point Venture	Travis	$1,921	$2,326	$2,815	$3,409	$4,126	$4,996
Undine Development	Travis	$ 646	$646	$646	$646	$646	$646
Weimar	Colorado	$2,130	$2,075	$2,011	$1,950	$1,882	$1,805
Wells Branch MUD	Travis	$24,275	$25,236	$25,236	$25,236	$25,236	$25,236
Wells Branch MUD	Williamson	$ 576	$846	$1,166	$1,236	$1,236	$1,236
West End WSC	Fayette	$ 869	$849	$831	$825	$821	$814
West Travis County Public Utility Agency	Hays	$19,688	$28,405	$39,884	$55,465	$73,122	$93,134
West Travis County Public Utility Agency	Travis	$30,944	$39,445	$46,801	$54,041	$62,265	$71,605
Wharton	Wharton	$9,928	$9,871	$9,516	$9,165	$8,771	$8,328
Wharton County WCID 2	Wharton	$1,764	$1,752	$1,658	$1,571	$1,475	$1,365
Wilbarger Creek MUD 1	Travis	$3,653	$5,240	$6,610	$7,945	$9,465	$11,191
Williamson County WSID 3	Travis	$ 514	$423	$348	$287	$236	$195
Williamson Travis Counties MUD 1	Travis	$1,377	$1,377	$1,377	$1,377	$1,377	$1,377
Windermere Utility	Travis	$20,220	$20,581	$20,581	$20,581	$20,581	$20,581

Drought management was also considered as a potentially feasible strategy for irrigation water user groups with water needs. Irrigation in Colorado, Matagorda, and Wharton counties has severe shortages throughout the planning period, partially because irrigation water from the Colorado River is an interruptible supply. Rice farming is prominent in these three counties and generally involves growing both a first and second (ratoon) crop. The *Lakes Buchanan and Travis Water Management Plan* identifies when releases for irrigation may be interrupted. The plan identifies Normal, Less Severe, and Extraordinary Drought conditions. When the criteria for Extraordinary Drought conditions are met, the interruptible stored water is cut off either on March 1 or July 1. This generally occurs when the combined storage is less than 1.3 million acre-feet and the inflows have been significantly lower than normal due to drought. Therefore, rice irrigation farmers will know on March 1 whether than can grow a main crop or on July 1 if they can grow a ratoon crop. Under drought conditions, irrigators will need to decide whether to implement drought management measures that may involve: growing only a main crop and forgoing a ratoon crop (assumes Less Severe Drought prior to March 1), irrigation with groundwater, changing to a dryland crop for the season, or allowing the rice fields to lie fallow for a season.

There is also a significant need for irrigation water in Mills County (Brazos Basin.) that will persist even with conservation. There are limited supplies of water in that area of the county, and it is assumed that water use by agriculture will be reduced based on drought conditions.

7.6.2 Recommended Drought Management WMS

A drought management strategy was adopted for all municipal WUGs that have Region K as their primary region, and for the irrigation WUGs mentioned in Section 7.6.1. Triggers conditions associated with implementing these recommended strategies include those referenced in the LCRA Water Management Plan and the individual utility drought contingency plans. Please refer to Chapter 5 for additional details.

Total water demand reductions for municipal and irrigation-related to drought management strategies within the Region reaches approximately 35,000 acre-feet per year (ac-ft/yr) by 2080. When coupled with the more aggressive water conservation strategy included in this plan, the result is a reduction in gallons per capita per day (GPCD) compared to the previous plan and total reduction of about 85,000 ac-ft/yr when multiplied by the 2080 population.

Other recommended drought-related strategies that may be implemented specifically to help manage extreme drought conditions and extend water supplies include two strategies for Austin (Austin Water). The two Austin strategies include the Indirect Potable Reuse through Lady Bird Lake strategy and the Lake Austin Operations strategy, both discussed more fully, including drought triggers, in Chapter 5.

7.7 Emergency Responses to Local Drought Conditions or Loss of Municipal Supply

Emergency preparedness is of particular importance for entities that rely on a sole-source of water for supply purposes. In instances where water systems rely exclusively on a single source, the State of Texas has identified a need to develop emergency preparedness protocols should a source's availability be significantly and suddenly reduced for any reason, including drought, equipment failure, or accidental or deliberate source contamination.

7.7.1 WUGs With 2030 Population Less Than 7,500 and With a Sole-Source of Water

The Texas Administrative Code (31 TAC §357.42) requires that regional planning groups evaluate potential emergency responses to drought conditions or loss of existing water supplies for municipal water user groups with a population of less than 7,500 and with a sole-source of water, as well as all county-other water user groups. For these emergency responses to local drought conditions or loss of municipal supply, the WUGs were assumed to have 180 days or less of remaining supply.

A list of identified single-source municipal Water User Groups with population less than 7,500 and with a sole-source of water is provided in **Table 7.5** on the next page. The table also lists potential emergency water supply options for each Water User Group.

7.7.2 County-Other WUGs

Table 7.6 provides the list of County-Other Water User Groups in Region K, and their potential emergency water supply options. For these emergency responses to local drought conditions or loss of municipal supply, the WUGs were assumed to have 180 days or less of remaining supply.

Table 7.5 Municipal Region K WUGs Under 7,500 in Population and With a Sole-Source of Water

Entity					Potential Emergency Water Supply Source(s)								Implementation Requirements				
Water User Group Name	County	2030 Population	2030 Demand (ac ft/yr)	Supply Source	Release from upstream reservoir	Curtailment of upstream/downstream water rights	Local groundwater well	Brackish groundwater limited treatment	Brackish groundwater desalination	Emergency interconnect	Other named local supply	Trucked in water	Type of infrastructure required (numerical values explained on pg 7 9)	Entity providing supply (letter codes explained on pg 7 9)	Other local entities required to participate/ coordinate	Emergency agreements/ arrangements already in place?	Other
BARTON CREEK WEST WSC	Travis	1,337	430	Highland Lakes Lake/Reservoir System						X		X	1	A		unk	
BARTON CREEK WSC	Travis	771	571	Highland Lakes Lake/Reservoir System			X					X	2				
BLANCO	Blanco	1,414	200	Blanco River (City Lake)								X					
BOLING MWD	Wharton	256	30	Gulf Coast Aquifer System			X					X	2				
BRIARCLIFF	Travis	6,833	988	Highland Lakes Lake/Reservoir System								X					
CANEY CREEK MUD OF MATAGORDA COUNTY	Matagorda	3,586	421	Gulf Coast Aquifer System			X					X	2				
CIMARRON PARK WATER	Hays	2,115	234	Edwards-BFZ Aquifer								X					
COLUMBUS	Colorado	3,454	1,003	Gulf Coast Aquifer System	X		X					X	2,3				
COTTONWOOD CREEK MUD 1	Travis	5,000	336	Carrizo-Wilcox Aquifer			X					X	2				
COTTONWOOD SHORES	Burnet	2,925	502	Highland Lakes Lake/Reservoir System			X			X		X	1,2	B		unk	
EAGLE LAKE	Colorado	1,719	227	Gulf Coast Aquifer System			X					X	2				
FAYETTE COUNTY WCID MONUMENT HILL	Fayette	539	128	Gulf Coast Aquifer System			X			X		X	2	P			
FLATONIA	Fayette	1,342	275	Yegua-Jackson Aquifer			X					X	2				
GARFIELD WSC	Travis	1,959	209	Trinity Aquifer			X					X	2				
GRANITE SHOALS	Burnet	7,288	743	Highland Lakes Lake/Reservoir System			X			X		X	1,2	C		unk	
HAYS	Hays	5,250	760	Edwards-BFZ Aquifer			X			X		X	1	O		unk	
HAYS COUNTY WCID 1	Hays	3,647	801	Highland Lakes Lake/Reservoir System			X					X	2				

Table 7.5 Municipal Region K WUGs Under 7,500 in Population and With a Sole-Source of Water

Entity					Potential Emergency Water Supply Source(s)								Implementation Requirements				
Water User Group Name	County	2030 Population	2030 Demand (ac ft/yr)	Supply Source	Release from upstream reservoir	Curtailment of upstream/downstream water rights	Local groundwater well	Brackish groundwater limited treatment	Brackish groundwater desalination	Emergency interconnect	Other named local supply	Trucked in water	Type of infrastructure required (numerical values explained on pg 7 9)	Entity providing supply (letter codes explained on pg 7 9)	Other local entities required to participate/ coordinate	Emergency agreements/ arrangements already in place?	Other
HAYS COUNTY WCID 2	Hays	3,390	775	Highland Lakes Lake/Reservoir System			X					X	2				
JONESTOWN WSC	Travis	12,818	2,126	Highland Lakes Lake/Reservoir System								X					
KELLY LANE WCID 1	Travis	2,499	465	Highland Lakes Lake/Reservoir System			X					X	2				
LA GRANGE	Fayette	4,373	742	Yegua-Jackson Aquifer	X		X			X		X	2,3	P		unk	
LLANO	Llano	3,443	816	Llano Run-of-River		X						X					
LOOP 360 WSC	Travis	1,479	861	Highland Lakes Lake/Reservoir System								X					
MARKHAM MUD	Matagorda	581	53	Gulf Coast Aquifer System			X					X	2				
MATAGORDA COUNTY WCID 6	Matagorda	761	74	Gulf Coast Aquifer System			X					X	2				
MATAGORDA WASTE DISPOSAL & WSC	Matagorda	222	39	Gulf Coast Aquifer System			X					X	2				
MEADOWLAKES	Burnet	2,541	839	Colorado Run-of-River			X			X		X	1,2	J		unk	
MID-TEX UTILITIES	Hays, Travis	9,956	1,143	Austin Lake/Reservoir								X					
NORTH SAN SABA WSC	San Saba	341	96	Ellenburger-San Saba Aquifer			X					X	2				
PALACIOS	Matagorda	3,178	373	Gulf Coast Aquifer System			X					X	2				
REUNION RANCH WCID	Hays	5,524	1,490	Highland Lakes Lake/Reservoir System								X					
ROLLINGWOOD	Travis	1,638	434	Colorado Run-of-River			X					X	2				
ROUGH HOLLOW IN TRAVIS COUNTY	Travis	5,698	1,191	Highland Lakes Lake/Reservoir System			X					X	2				

Table 7.5 Municipal Region K WUGs Under 7,500 in Population and With a Sole-Source of Water

Entity					Potential Emergency Water Supply Source(s)								Implementation Requirements				
Water User Group Name	County	2030 Population	2030 Demand (ac ft/yr)	Supply Source	Release from upstream reservoir	Curtailment of upstream/downstream water rights	Local groundwater well	Brackish groundwater limited treatment	Brackish groundwater desalination	Emergency interconnect	Other named local supply	Trucked in water	Type of infrastructure required (numerical values explained on pg 7 9)	Entity providing supply (letter codes explained on pg 7 9)	Other local entities required to participate/ coordinate	Emergency agreements/ arrangements already in place?	Other
RUBY RANCH WSC	Hays	1,122	142	Edwards-BFZ Aquifer								X					
SAN SABA	San Saba	3,000	1,027	Ellenburger-San Saba Aquifer								X					
SENNA HILLS MUD	Travis	991	336	Highland Lakes Lake/Reservoir System			X			X		X	2	M		unk	
SHADY HOLLOW MUD	Travis	3,691	654	Colorado Run-of-River			X					X	2				
SMITHVILLE	Bastrop	5,512	918	Carrizo-Wilcox Aquifer	X		X					X	2,3				
SWEETWATER COMMUNITY	Travis	5,832	840	Highland Lakes Lake/Reservoir System			X					X	2				
TRAVIS COUNTY MUD 10	Travis	1,307	272	Highland Lakes Lake/Reservoir System			X			X		X	2	unk		unk	
TRAVIS COUNTY MUD 14	Travis	5,897	472	Carrizo-Wilcox Aquifer			X					X	2				
TRAVIS COUNTY MUD 18	Travis	1,449	229	Highland Lakes Lake/Reservoir System								X					
TRAVIS COUNTY WCID 19	Travis	498	324	Highland Lakes Lake/Reservoir System						X		X		K		unk	
TRAVIS COUNTY WCID 20	Travis	1,469	754	Highland Lakes Lake/Reservoir System						X		X	1	A		unk	
TRAVIS COUNTY WCID POINT VENTURE	Travis	4,337	1,063	Highland Lakes Lake/Reservoir System			X			X		X	2	N		unk	
UNDINE DEVELOPMENT	Travis	561	137	Highland Lakes Lake/Reservoir System								X					
WEIMAR	Colorado	1,567	352	Gulf Coast Aquifer System	X		X					X	2,3				
WHARTON COUNTY WCID 2	Wharton	1,185	236	Gulf Coast Aquifer System			X					X	2				

Table 7.5 Notes:

Type of Infrastructure Required:

1. *Transmission pipeline and pump station*
2. *Water Well*
3. *River intake, transmission pipeline, and surface water treatment plant*

Entities potentially providing emergency interconnect water

A. *Travis County MUD 4*
C. *Sunrise Beach*
D. *Cottonwood Shores*
E. *Lago Vista*
F. *Lakeway MUD or Travis County WCID 17*
H. *Austin*
I. *Meadowlakes*
J. *Marble Falls*
K. *Travis County WCID 20*
L. *West Travis County PUA*
N. *Travis County MUD 1*
O. *Buda*
P. *Fayette WSC West*

Table 7.6 County-Other WUGs in Region K

Entity					Potential Emergency Water Supply Source(s)								Implementation Requirements				
Water User Group Name	County	2030 Population	2030 Demand (AF/year)	Supply Source(s)	Release from upstream reservoir	Curtailment of upstream/downstream water rights	Local groundwater well	Brackish groundwater limited treatment	Brackish groundwater desalination	Emergency interconnect	Other named local supply	Trucked in water	Type of infrastructure required	Entity providing supply	Other local entities required to participate/ coordinate	Emergency agreements/ arrangements already in place?	Other
County-Other	Bastrop	22,948	4,091	Carrizo Wilcox / Highland Lakes			X			X		X	well	Aqua WSC			
County-Other	Blanco	5,834	690	Ellenburger-San Saba Aquifer / Hickory / Trinity / Canyon Lake			X					X	well				
County-Other	Burnet	18,922	2,815	Ellenburger-San Saba / Hickory / Marble Falls Aquifer / Other Alluvium / Trinity / Highland Lakes			X					X	well				
County-Other	Colorado	9,768	1,155	Gulf Coast Aquifer			X					X	well				
County-Other	Fayette	418	52	Gulf Coast Aquifer / Fayette WSC / Sparta / Yegua-Jackson / Highland Lakes			X					X	well				

Table 7.6 County-Other WUGs in Region K

Entity					Potential Emergency Water Supply Source(s)								Implementation Requirements				
Water User Group Name	County	2030 Population	2030 Demand (AF/year)	Supply Source(s)	Release from upstream reservoir	Curtailment of upstream/downstream water rights	Local groundwater well	Brackish groundwater limited treatment	Brackish groundwater desalination	Emergency interconnect	Other named local supply	Trucked in water	Type of infrastructure required	Entity providing supply	Other local entities required to participate/ coordinate	Emergency agreements/ arrangements already in place?	Other
County-Other	Gillespie	25,521	2,880	Edwards-Trinity Plateau / Ellenburger-San Saba / Hickory / Highland Lakes			X					X	well				
County-Other	Hays (p)	227,850	27,130	Edwards-BFZ / Trinity / Canyon Lake			X					X	well				
County-Other	Llano	964	96	Ellenburger-San Saba / Hickory / Other-alluvium / Highland Lakes			X			X		X	well	Horse-shoe Bay			
County-Other	Matagorda	1,093	108	Gulf Coast Aquifer			X					X	well				
County-Other	Mills	800	99	Ellenburger-San Saba / Trinity			X					X	well				
County-Other	San Saba	401	60	Ellenburger-San Saba / Hickory / Marble Falls / Highland Lakes			X					X	well				
County-Other	Travis	69,219	9,362	Carrizo-Wilcox / Other Aquifer / Trinity / Highland Lakes			X			X		X	well	Lakeway MUD			
County-Other	Wharton (p)	14,057	1,791	Gulf Coast			X					X	well				
County-Other	Williamson (p)	13,842	2,101	Colorado Run-of-River, Highland Lakes			X					X	well				

(p) These county-other WUGs are split between more than one planning region.

7.8 Other Drought Recommendations

Housed within the Office of Emergency Management within the Texas Department of Public Safety, the Drought Preparedness Council was authorized and established by the 76th legislature (HB-2660) in 1999, subsequent to the establishment of the Drought Monitoring and Response Committee (75th legislature, SB1.) The Council is composed of representatives of state agencies and appointees by the governor. As defined by the Texas Water Code, the Council is responsible for the monitoring and assessing drought conditions and advising elected and planning officials about drought-related topics.

On February 8, 2024, the Drought Preparedness Council provided the Region K RWPG with a letter with the following three recommendations:

- "The regional water plans and state water plan shall serve as water supply plans under drought of record conditions. The DPC encourages regional water planning groups to consider planning for drought conditions worse than the drought of record, including scenarios that reflect greater rainfall deficits and/or higher surface temperatures."
    - Region K Response: Region K has utilized the Chapter 7 template provided by TWDB staff and has addressed the requirements related to a DWDOR, as shown in Section 7.2.
- "The Drought Preparedness Council encourages regional water planning groups to incorporate projected future reservoir evaporation rates in their assessments of future surface water availability."
    - Region K Response: The Region K technical consultant has incorporated an extended period of hydrology, addressing modified evaporation rates, in the water availability modeling analysis.
- "The Drought Preparedness Council encourages regional water planning groups to identify in their plans utilities within their boundaries that reported having less than 180 days of available water supply to the Texas Commission on Environmental Quality during the current or preceding planning cycle. For systems that appeared on the 180-day list, RWPGs should perform the evaluation required by Texas Administrative Code Section 357.42(g), if it has not already been completed for that system."
    - Region K Response: Region K has utilized the Chapter C template provided by TWDB staff and has addressed the requirements consistent TAC §357.42(g), as shown in Section 7.7.

7.9 Region-Specific Model-Drought Contingency Plans

Model drought contingency plans addressing the requirements of 30 TAC Chapter §288(b) were developed for Region K and are available in **Appendix 7.B**. In addition, LCRA has adopted model drought contingency plans for its customers. These plans are also included in Appendix 7.B. Model plans were developed for wholesale water providers, retail public water suppliers, irrigation water users, and steam-electric water users, based on the recommendations of the Drought Preparedness Council this planning cycle. The recommendation was to include region-specific model drought contingency plans for any water use category that uses 10 percent or more of the region's water demand in any given decade. Other than for steam-electric, these model plans were largely based on templates provided by the TCEQ with modifications made to acknowledge coordination with the Lower Colorado Regional Water Planning Group and to make the template more specific to the region. The TCEQ does not have templates for steam-electric water users, so a model plan was developed using a Drought Contingency Plan from a steam-electric facility in the region as an example.

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Chapter 8.

Additional Recommendations (Including Legislative Issues, Regional Policy Issues, and Unique Ecological Stream Segments and Reservoir Sites)

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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List of Appendices

Chapter 8. Additional Recommendations (Including Legislative Issues, Regional Policy Issues, And Unique Ecological Stream Segments And Reservoir Sites)

Summary of Policy Recommendations

In accordance with Texas Water Development Board (TWDB) rules, this chapter contains regulatory, administrative, and legislative recommendations developed by the Lower Colorado Regional Water Planning Group (LCRWPG), or Region K. In this regard, the LCRWPG established a Legislation and Policy Committee, which developed recommendations for consideration by the LCRWPG. The following recommendations are offered by the LCRWPG for consideration by the Texas Legislature, TWDB, Texas Commission on Environmental Quality (TCEQ), other water planning regions and all stakeholders and participants in Texas' regional and state water planning efforts.

Background information on all Legislative and Policy Recommendations can be found in **Appendix 8.A**.

8.1 Management of Surface Water Resources: Inter-Basin Transfers and Model Linking

8.1.1 Policy Statements

8.1.1.1 Inter-Basin Transfers

It is essential that current water supplies be protected and preserved to meet water commitments within the basin. Inter-basin transfers (IBTs) should follow principles established by the LCRWPG in the first planning cycle, and revised in each subsequent planning cycle for transporting water outside of and into the region.

In addition to the required elements for obtaining an IBT permit from TCEQ, the following ten-point policy identifies the conceptual elements and guidelines for transporting water outside of and into the Lower Colorado Regional Water Planning Area (LCRWPA) from the 2021 Region K Water Plan:

1. A cooperative regional water solution shall benefit each region.

2. The LCRWPA's water shortages shall be substantially reduced.

3. Proposed actions for inter-regional water transfers shall have minimal detrimental water quality, environmental, social, economic, and cultural impacts.

4. Regional water plans with exports of significant water resources shall provide for the improvement of lake recreation and tourism in the LCRWPA over what would occur without water exports.

5. Each region shall determine its own water management strategies to meet internal water shortages when those strategies involve internal water supplies and/or water demand management.

6. Cooperative regional solutions shall include consideration of alternatives to resolve conflicts over groundwater availability and should be consistent with LCRWPG's groundwater policies and the applicable rules of involved groundwater conservation districts.

7. Any water export from the Colorado River shall not be guaranteed on a permanent basis.

8. Any water export from the Colorado River shall make maximum use of flood or excess inflows below Austin and shall occur only after in-basin demands are met in the LCRWPA. Provisions and supporting technical reviews included in a draft permit to support this principle shall be reviewed by the Regional Water Planning Group to assure consistency with the planning process.

9. Any water export from the Colorado River shall comply with the LCRA's inter-basin water transfer policy.

10. Any water export from the Colorado River shall be subject to the same LCRA Drought Contingency Plan restrictions applied within the basin.

8.1.1.2 Linking Groundwater and Surface Water Models

Future groundwater and surface water modeling development by the state's water permitting and planning agencies should include the ability to link such models to better integrate the effects of changes in the uses or availability of either groundwater or surface water on each other in varying conditions such as flood or drought. The ongoing study by Texas Water Development Board is an investigation of surface water-groundwater interaction along the Lower Colorado River and is part of efforts to provide additional information to the adaptive management phase of the Senate Bill 3 e-flows process. This pilot study is an excellent example of an important step in developing some of the additional science needed to develop such linkages. Such linking of models may be more appropriate for specific areas where groundwater and surface water closely relate and interact, such as concentrations of base-flow springs or stream-based recharge. The LCRWPG supports the development of methodologies to utilize available empirical data from public and private sectors to calibrate both groundwater and surface water models.

8.1.2 Recommendations

Texas Legislature – The LCRWPG encourages the Legislature to:

1. Support State funding for linking groundwater and surface water models by the TWDB during the development of the next generation of Groundwater Availability Models/Water Availability Models (GAMs/WAMs) with a priority for specific areas where groundwater and surface water closely relate and interact, such as concentrations of base-flow springs or stream-based recharge. Encourage the validation and calibration of models with data and technical reviews available from the public and private sectors.

Texas Commission on Environmental Quality (TCEQ) – The LCRWPG encourages TCEQ to:

1. Include provisions in water right permits related to inter-basin transfers that protect the basin of origin. Obtain concurrence that draft permits are consistent with the regional water planning process.

2. Provide the Regional Water Planning Groups with technical review summaries including WAM runs for pending permits affecting the region to ensure consistency with the regional planning process.

8.2 Environmental – Instream Flows and Freshwater Inflows to Bays and Estuaries

8.2.1 Policy Statement

The LCRWPG supports the protection of instream flows and bay and estuary inflows at levels sufficient to protect native species throughout extended periods of drought at population levels that would enable the species to fully recover upon the return of normal weather conditions. During normal weather conditions, flows sufficient to ensure a healthy habitat for fish and wildlife should be assured. This requires addressing the specific water quality, flow rates and timing that are required to sustain a healthy and productive riparian and estuarine ecosystem as well as the physical form of the river such as deep pools, riffles, bluffs, terraces, and its vegetation, springs, and tributaries.

The LCRWPG recommends the following actions to accomplish environmental flow protection through the surface water permitting process:

1. In areas where appropriating additional quantities of water could threaten the adequacy of environmental flows, permits for additional quantities of water should include environmental flow conditions consistent with the environmental flow standards adopted by TCEQ, including reasonable approaches for environmental flow protection to help achieve compliance with the flow standards, as well as strategy targets.

2. The environmental flow standards adopted by TCEQ are due for revision per statute. The state should ensure a prompt and robust revision process for environmental flow standards designed to produce science-based flow criteria with a goal of protecting a sound ecological environment.

3. In areas where predicted flows are not adequate to meet environmental flows standards, including strategy targets, adopted by TCEQ, the SB3 Basin and Bay Area Stakeholder Committees (BBASC) should identify strategies to ensure that the water needed to support a sound ecological environment for fish and wildlife is present in each river basin and bay system. In addition, the state should create a funding mechanism to assist with implementation of appropriate strategies to ensure environmental flows, particularly in areas where predicted flows are not adequate to meet environmental flows standards adopted by TCEQ.

4. The State should aggressively seek the conversion of water rights to environmental uses through programs such as the voluntary sale or lease of water rights back to the State as a means of ensuring adequate flow conditions. Once under state ownership, these water rights should then be managed to provide for environmental flow protection.

5. Environmental flows should be considered as a use category in regional water planning to provide a more complete illustration of water use needs. A methodology for incorporating environmental flow needs and recommending strategies to meet those needs should be developed for the Regional Water Plan (RWP) process and, if necessary, recommended to the State legislature.

Background information on this Legislative and Policy Recommendations can be found in Appendix 8.A.

8.2.2 Recommendations

Texas Legislature – The LCRWPG encourages the Legislature to:

1. Provide funding for Basin and Bay Area Committees (BBASC) and Bay and Basin Area Expert Science Teams (BBEST) to complete a revision process for adopted environmental flow standards that produces science-based standards adequate to protect a sound ecological environment.

2. Appropriate funding for further research and field studies supporting updated environmental flows standards and the potential strategies required to meet them.

3. Appropriate funding to support the purchase and conversion of water rights to environmental uses through voluntary transactions.

4. Clarify the status of environmental flows as a use category as part of the regional water planning process.

Colorado and Lavaca BBASC – The LCRWPG encourages the Colorado and Lavaca BBASC to:

1. Develop workplans to study and determine the most effective strategies to secure water to meet environmental flow needs.

2. Continue studying the river/bay systems and update environment flow standards when necessary and as new research and information become available.

3. Identify strategies to meet environmental flow needs.

8.2.3 Timing and/or Conflicts

The initial SB3 standards-adoption process has been completed for the Colorado and Lavaca Rivers and Matagorda/Lavaca Bays. As part of the SB3 adaptive-management process, the BBASC has developed a workplan, although the Environmental Flows Advisory Group has not acted to approve it, and, consistent with the workplan, is continuing its work to identify and review scientific studies to increase their understanding of the Colorado and Lavaca Rivers and Matagorda Bay systems. It is now time for the BBASC to develop recommendations for revisions of the adopted standards, but funding is not available to provide the BBASC with science-based input from the BBEST.

8.3 Groundwater

8.3.1 Policy Concerns

8.3.1.1 Groundwater Ownership

In 2011, passage of SB 332 meant that a landowner has a property interest in groundwater in place subject to reasonable regulation by a groundwater conservation district (GCD) but also concluded that “unreasonable” regulation by a GCD may constitute a compensable taking of that property for public use. The Edwards Aquifer Authority v. Day case affirmed the authority of the Edwards Aquifer Authority to limit pumping but also found that land ownership includes an interest in groundwater in place. The two events validate the role of GCDs in managing groundwater but confirm that the landowner is entitled to compensation when regulation constitutes a taking of the property. The LCRWPG recognizes the importance of managing the groundwater resources of the State and it is the LCRWPG’s policy to support GCDs as the preferred method of groundwater management and their long-term financial and institutional stability to serve their statutory purpose.

8.3.1.2 Groundwater Management by GCDs

The LCRWPG supports local management of groundwater by GCDs as well as aquifer-wide planning and coordination between GCDs within groundwater management areas (GMAs). GCDs have been managing and regulating groundwater since the early 1950s and should be maintained as the State's preferred method of groundwater management and regulation.

The LCRWPG recognizes the importance of managing the groundwater resources of the State, and it is the LCRWPG’s policy to support GCDs as the preferred method of groundwater management and their long-term financial and institutional stability to serve their statutory purpose. The LCRWPG supports consideration of the possibility of creation of new GCDs, annexation of new areas into existing GCDs or consolidation of existing GCDs to optimize and enable more effective and efficient groundwater management. However, it is also the LCRWPG’s policy that attempts to create, annex, consolidate existing GCDs, or other reorganization of GCDs must be referred to the local election process for validation or rejection.

8.3.1.3 DFCs and MAGs

The LCRWPG supports GMA-wide cooperation in management of groundwater resources, including joint efforts among GCDs with shared relevant aquifers to establish and implement compatible rules and management plans to achieve the GMA-adopted desired future conditions (DFCs). While the DFC is the appropriate metric and management goal, the modeled available groundwater (MAG) should be given appropriate consideration as a management tool when establishing rules and making permitting decisions. Permitting decisions informed by the MAG and other relevant considerations should be followed by continuous and long-term aquifer monitoring of the aquifer conditions to ensure preservation of the DFC. Where DFCs are compromised as measured by actual aquifer conditions, the LCRWPG supports the use of mitigation plans or authority by GCDs to adjust permits, as necessary.

To help unify the legal and institutional disconnect between surface and groundwater management, the LCRWPG's policy encourages GMAs to establish such surface water-related DFCs (e.g., minimum springflows, baseflows, reservoir inflows, etc.) where appropriate.

8.3.1.4 Groundwater Marketing (e.g., Water Rights Leases, Sales, Transfers)

The LCRWPG's policy is to establish coordination between water marketing proposals with local GCDs and Regional Water Planning Groups (RWPGs) and support the requirement that state agencies and private interests comply with all local GCD rules, state-certified groundwater management plans, and state and regional water plans.

8.3.1.5 Improving Groundwater Availability Data

The LCRWPG's policy is to encourage new funding sources for GCDs specific to data collection and storage methods that emphasize ease of public accessibility. The LCRWPG's policy is to support the funding needs of the TWDB for the maintenance and expansion of state-wide groundwater modeling and databases.

8.3.1.6 Funding and Technical Assistance for GMA Planning

SB 660, passed in 2011, added additional complexity to the GCD's joint-regional groundwater planning responsibilities. It is the LCRWPG's policy to encourage the TWDB to provide funding to facilitate GMA's role in determining groundwater availability estimates for regional planning. Additionally, the LCRWPG supports funding for the TWDB to provide the technical assistance to the GMAs as required by SB 660.

8.3.1.7 Sustainability and MAG Peak Factors

Sustainability is defined as balancing groundwater withdrawals with natural recharge and replenishment to maintain long-term balanced stability in regional or local groundwater supplies. It is the LCRWPG's policy to look to GCDs within a given GMA to cooperate in determining the degree to which sustainability can be achieved.

MAG values were developed using groundwater availability models calibrated for long-term average, not drought of record, conditions. TWDB revised its planning rules to include a MAG Peak Factor that ensures regional water plans have the ability to fully reflect how GCDs anticipate managing groundwater production under drought conditions. The LCRWPG supports the limited use of the MAG Peak Factor when: (1) it is allowable under the policies of the local groundwater conservation district; (2) the relevant groundwater conservation district provides written consent to use the MAG Peak Factor; (3) TWDB Executive Administrator approves each MAG Peak Factor; (4) a technical basis for the use of MAG Peak Factor is provided; and (5) the MAG Peak Factor will not prevent the groundwater district from managing groundwater resources to achieve the desired future conditions. The supported goal in this case would be to meet a temporary need through intermittent pumping of the aquifer with volumes greater than the MAG during drought that is offset by pumping in wetter (more typical) years that is expected to fall below the MAG. The LCRWPG does not support utilizing the MAG Peak Factor when such use could be expected to contribute to subsidence.

8.3.1.8 Use and Permitting of Brackish Water

The LCRWPG recognizes the value brackish water might have as a resource to meet the growing water needs in Texas and supports legislative actions that advance accessing this resource. The LCRWPG further believes that local groundwater conservation districts are the most logical and appropriate governmental body to regulate and permit wells targeting brackish water zones. Potential brackish water zones may be beyond the normal "window" where computer modeling runs are performed to determine water availability. Additionally, recent legislation has mandated a 30-year duration for brackish water permits. Long-term and ongoing monitoring will be necessary to track potential impacts on water levels and water quality in the same or adjacent aquifers and for the potential effects of subsidence. To accommodate the necessary studies and long-term monitoring more efficiently, the bulk of the costs should be borne primarily by the applicant or by the TWDB.

8.3.2 Policy Statements

It is the LCRWPG's policy to encourage the TWDB to provide funding to facilitate the GMA's role in determining groundwater availability estimates for regional planning. Additionally, the LCRWPG supports funding to assist the GMAs in developing and approving mandatory DFC explanatory reports.

The Texas Legislature and courts have validated the role of GCDs to manage groundwater but also acknowledge that the landowner is entitled to compensation when regulation constitutes a taking of the property. There is little guidance on when such regulation becomes a taking or how to determine compensation when a taking has occurred. The LCRWPG recognizes the importance of managing groundwater resources, and it is the LCRWPG's policy to support GCDs as the preferred method of groundwater management and their long-term financial and institutional stability to serve their statutory purposes.

It is the LCRWPG's policy to look to GCDs within a given GMA to cooperate in determining the degree to which aquifer sustainability can be achieved.

The LCRWPG supports the limited use of MAG Peak Factors to meet a temporary need through intermittent pumping of the aquifer with volumes greater than the MAG during drought that is offset by pumping in wetter (more typical) years that is expected to fall below the MAG.

The LCRWPG's policy is to encourage new funding sources for GCDs specific to data collection and storage methods that emphasize ease of public accessibility. The LCRWPG also supports the funding needs of the TWDB for the maintenance and expansion of state-wide groundwater modeling and databases.

8.3.3 Recommendations

Texas Legislature – The LCRWPG encourages the Legislature to:

1. Provide sufficient funding to the TWDB to be allocated for GMAs for planning in a manner similar to the funding available to Regional Water Planning Groups. This includes, but is not limited to, funding related to groundwater availability modeling (including development/ review/ updating/ recalibration, and sufficient monitoring wells to provide validation of modeling), technical assistance to GCDs and GMAs, and database management and accessibility, and for verifying the accuracy of GAMs and reliability of DFCs.

2. Confirm that the State has joint liability with GCDs when GCD decisions that are made to satisfy statutory groundwater management obligations are judged to be compensable takings. Such joint liability would require that the State contribute financially to the just compensation for the taking.

Texas Water Development Board – The LCRWPG encourages TWDB to:

1. Seek adequate funding for GMA planning, groundwater related programs, GAM needs, and technical assistance to GCDs and GMAs;

2. Evaluate the risks associated with Peak Factors, which allow over-pumping during drought periods and communicate the impacts on sustainability of aggressive DFCs and managed depletion. Continue assisting GCDs in their management planning, groundwater quantity and quality research, water conservation programs, and inter-agency cooperative database management efforts.

Groundwater Conservation Districts – The LCRWPG encourages GCDs to:

1. Work cooperatively with GMA and regional planning efforts; and

2. Continue to expand or develop groundwater research and database efforts in order to be the primary resource for groundwater data in their jurisdiction.

8.3.4 Timing and/or Conflicts

The 90th Session of the Texas Legislature will occur in 2027 and will be setting the budget for the following biennium, which will have direct impacts on funding programs needed by the TWDB, GCDs, and RWPGs.

Groundwater planning through the GMA process has further developed into a process that assigns the responsibility for determining groundwater availability for planning purposes to GCDs. The importance of this role should be recognized through the implementation of the recommended actions in the 90th legislative session.

8.4 Potential Impacts to Agricultural and Rural Water Supplies

8.4.1 Policy Statement

The State should be careful that transfers of surface water or groundwater occur only after sufficient study and consideration of local supplies and economies that could be adversely affected, including mitigation opportunities and funding mechanisms.

8.4.2 Recommendations

Texas Legislature – The LCRWPG encourages the Legislature to:

1. Strengthen GCDs' abilities to reasonably protect and preserve groundwater supplies for both present and future local uses.

2. Maintain water policies that protect basins of origin in interbasin transfers of surface water.

3. Require that TCEQ provide notice to regional water planning groups of pending water supply actions.

4. Support funding for rural community infrastructure and water supply planning for regional planning, emergency water connections and redundant drinking supplies, particularly to mitigate the adverse impacts from out-of-basin transfers.

Texas Commission on Environmental Quality – The LCRWPG encourages TCEQ to provide pertinent technical reviews and draft surface water permits to affected regional water planning groups to confirm consistency with regional water plans.

8.4.3 Timing and/or Conflicts

These recommendations should be implemented during the 90th legislative session.

8.5 Agricultural Water Conservation

8.5.1 Policy Statement

The LCRWPG encourages agricultural water conservation as a method of stretching existing supplies by reducing agricultural demands in order to increase water availability to meet new and existing water demands. Additional funding is needed to increase implementation of agricultural water conservation practices. The LCRWPG further recognizes the need for partnerships with irrigation districts and individual irrigators to fund water conservation practices.

8.5.2 Recommendations

Texas State Soil and Water Conservation Board -- The LCRWPG encourages the Texas State Soil and Water Conservation Board (TSSWCB) to work with the Natural Resources Conservation Service (NRCS) State Conservationist to prioritize water conservation funding for programs that offer the most water conservation benefit for the state and within Region K.

Texas Water Development Board – The LCRWPG encourages TWDB to work cooperatively with the TSSWCB and NRCS to identify funding programs that achieve the greatest water conservation benefit for the state and Region K.

Water Conservation Advisory Council – The LCRWPG encourages the Water Conservation Advisory Council (WCAC) to continue work in developing water use metrics, efficiency standards, and best management practices for agricultural irrigation to maximize efficient use of available water supplies.

Water Conservation Partnerships – The LCRWPG encourages the identification and development of partnerships between water user groups to accomplish water conservation that shares costs and benefits between water user groups.

8.5.3 Timing and/or Conflicts

Creative funding and implementation of water conservation is an ongoing responsibility for all water user groups and their constituents. Federal funding for conservation programs is related to the cycle of funding for the Farm Bill, which was last authorized in 2018 and funded through 2025 with a continuing resolution. Future funding will depend upon federal budget authorizations and the emphasis areas associated with those authorizations.

8.6 Municipal/Industrial Conservation

8.6.1 Consistent GPCD and Water Savings Methodology

8.6.1.1 Policy Statement

The LCRWPG supports the use of methodologies outlined in the December 2012 “Guidance and Methodology for Reporting on Water Conservation and Water Use” report, efforts to further standardize and facilitate groundwater per capita per day (GPCD) calculations, and the study of other metrics to assess water use efficiency.

8.6.1.2 Recommendations

Texas Legislature and TWDB – The LCRWPG encourages the Legislature and TWDB to:

1. Continue support for efforts by the Texas Water Conservation Advisory Council (TWCAC) to develop consistent methodology for calculating commercial, industrial, and institutional measurements that can successfully track water use and water savings over time for these water use sectors.

2. Establish funding of research efforts to determine water savings and incorporate the information into current and future Best Management Practices (BMPs) found on the Council website. This information should be aimed at providing water suppliers with useful information for developing and implementing conservation goals and successful management strategies.

8.6.2 Homeowners Association Policies

8.6.2.1 Policy Statement

Texas Property Code 202.007, titled "Certain Restrictive Covenants Prohibited," prevents homeowners associations (HOAs) from restricting a property owner's ability to use water-saving practices. However, a Subsection E was passed that effectively negated the provisions of 202.007 for large counties, such as Travis County (see below):

> *“(e) This section does not apply to a property owners' association that: (1) is located in a municipality with a population of more than 175,000 that is located in a county in which another municipality with a population of more than one million is predominantly located; and*

> *(2) manages or regulates a development in which at least 4,000 acres of the property is subject to a covenant, condition, or restriction designating the property for commercial use, multifamily dwellings, or open space."*

The LCRWPG supports the use by residential and commercial landscaping that encourages conservation and the removal of barriers to xeriscaping and other water-minimum landscaping practices.

8.6.2.2 Recommendations

Texas Legislature and TWDB – The LCRWPG encourages the Legislature and TWDB to:

1. Repeal all of Subsection E of property code 202.007. Everyone should have the right to alter their landscaping to conserve water.

2. Request TWDB to fund statewide efforts and incentives to encourage xeriscaping and pool covers.

3. Request TWDB to develop programs for rebates to encourage removal of heavy grasses, and replacement with water efficient landscaping.

8.6.3 Water Supply Monitoring

8.6.3.1 Policy Statement

The LCRWPG supports the addition of a new metric, such as reservoir capacity, that is more indicative of surface water supply conditions during periods of drought and low inflows.

8.6.3.2 Recommendations

TWDB – The LCRWPG encourages TWDB to continue support of the Drought Monitor stakeholder process. In addition to that process, TWDB should establish a process by which hydrological drought conditions are developed and delivered to media outlets. Communications to the public should not only report on meteorological drought conditions, but also hydrological drought conditions, including the state of the water supplies in each region. We recommend developing and delivering a monthly communication to the media and the end users so they know and understand their groundwater and surface water supply levels and the need for conservation. This should also include developing a State of the Water Report Card by each region.

8.6.4 Additional Financial Assistance to Reduce Municipal Water Loss

8.6.4.1 Policy Statement

The LCRWPG recognizes that funding is available through the SWIFT program for loans to support retail utility water loss projects, and a significant amount of the funding appropriated by SB 28 will be used for projects that mitigate water loss. However, additional funding should be considered for this purpose as the state continues to gain a better understanding of the scale of water loss as a statewide problem and growing public awareness generates increased support for further investments.

8.6.4.2 Recommendations

Texas Legislature and TWDB – The LCRWPG encourages the Legislature and TWDB to:

1. More broadly market and communicate to water utilities the SWIFT funding for utility water loss projects. The funds would be used to replace aging or deteriorated pipe, to replace inaccurate or incorrectly sized water meters, to enhance leak detection efforts, or to implement a pressure reduction strategy if warranted.

2. Additional funds should be appropriated to the Texas Water Fund to support water loss mitigation activities, including projects solicited solely for this purpose rather than being identified and pulled from other program funding lists.

8.7 Brush Management

8.7.1 Policy Statement

The LCRWPG supports brush control as an effective means of enhancing water supplies and encourages that all feasible means be utilized to maximize and target brush control efforts in watersheds that are experiencing below normal inflows to water supplies and which offer the greatest opportunity for helping to meet identified water supply shortages.

8.7.2 Recommendations

Texas State Soil and Water Conservation Board – The LCRWPG encourages the TSSWCB to:

1. Request Water Supply Enhancement Plan (WSEP) brush control cost-share funding in an amount sufficient to accomplish the greatest water supply enhancement for areas that are experiencing the greatest percentage reduction from average of their water supply reservoir storage levels.

2. Conduct brush control feasibility studies for the Lower Colorado River watersheds, in order to estimate the potential water yield from brush control. Based on current WSEP governing statute and agency rules, completed feasibility studies for these watersheds would “open up” eligibility for WSEP cost-share funds to landowners in these watersheds.

Texas Legislature – The LCRWPG encourages the Texas Legislature to reinstate and fund the WSEP sufficiently to accomplish significant water supply enhancement throughout the areas which are most negatively impacted by the invasion of brushy plants and more specifically those areas experiencing significant reduction from average of their water supply reservoir storage levels.

8.7.3 Timing and/or Conflicts

We encourage that the Legislature bi-annually assess the effectiveness of the Water Supply Enhancement Plan (WSEP) and fund the program commensurate with its successes. We encourage the Texas State Soil and Water Conservation Board (TSSWCB) to annually prioritize its WSEP funding placement to target water supply concerns as noted above.

8.8 Inflows to Highland Lakes

8.8.1 Policy Statement

Data demonstrating reduced inflows to Lakes Buchanan and Travis in recent years have shown that further investigation and analysis may be valuable in the Region K watersheds. Research focusing on the inflows to the lakes is needed to understand and quantify these observations, so that the results can provide meaningful input to regional water modeling and planning activities. Future water planning activities should consider the impacts of land use/land cover and small impoundment on streamflow, potentially by adjusting both surface water Water Availability Models (WAMs) and groundwater GAMs to account for current river basin characteristics.

8.8.2 Recommendations

Texas Legislature – The LCRWPG recommends the State continue to provide funding for studies to evaluate rainfall-runoff trends in the upper watershed of the Lower Colorado River Basin. Further study should include elements recommended in the Phase II study, including:

1. Develop a semi- or fully- distributed rainfall/runoff model of the study area watersheds that would be able to simulate both surface runoff and subsurface infiltration processes. The model should account for the extent and water usage properties of the noxious brush common to each watershed.

2. Further comprehensive study of the potential impacts of noxious brush, likely through modeling and empirical study of results generated from recently completed and published paired watershed studies.

3. Additional small pond analysis, including expanding the analysis to the entire Colorado River watershed and defining drainage areas for the ponds to allow better quantification of the impact of each pond to its local portion of the watershed. This analysis should facilitate modeling the rainfall-runoff response for the flow network over time.

4. Consider the impact from the proliferation of small ponds in the watershed, and the resultant reduction in inflows to the Highland Lakes, and whether repeal of the HB 247 (2001) should be carefully evaluated. As a minimum, a requirement should be added to require the reporting of small impoundments in order to more accurately evaluate the full impacts on inflows.

5. Provide funding to TCEQ and TWDB to establish/bolster resources devoted to monitoring the development of small ponds and managing the records keeping related to registration of small ponds.

6. Modeling future temperature and precipitation scenarios as derived from Global Climate model data.

In addition, since the Phase II study was not able to obtain sufficient groundwater pumping data to evaluate its impact on streamflows, the LCRWPG recommends future studies include an analysis focusing on identifying and quantifying the potential streamflow impacts of groundwater pumping from alluvial wells.

The purpose of these recommended studies is to further quantify the impacts of land use/land cover, surface water-groundwater interaction, and small impoundments on inflows to the Highland Lakes.

8.8.3 Timing and/or Conflicts

Given the importance of accurate inflow data on water supply planning, analyses and evaluations should continue in order to provide data for more accurate hydrologic modeling and planning.

8.9 Education on Water

8.9.1 Policy Statement

The LCRWPG strongly supports programs that educate the public about water topics, including but not limited to dissemination of information via media outlets. Topics include the importance of water conservation and transitioning to more native landscaping, as well as programs that enhance public awareness regarding the sources of water supplies for the residences and businesses in their areas of the Region.

8.9.2 Recommendations

The LCRWPG requests the TWDB provide information on the economic and community impacts of water shortages and costs of developing new supplies, including potable reuse and other innovative new supplies. The goal is to help communities better understand the value of water and need for conservation.

8.10 Coordination of Planning Cycles for Determination of Desired Future Conditions by GCDs and Generation of the Regional Water Plan by RWPGs

8.10.1 Policy Statement

The LCRWPG recommends staggering the five-year cycles for determination of DFCs by GCDs and the RWPG such that MAG estimates are available for consideration by RWPGs in advance of the deadline for the technical memorandum when determining projected water supplies, demands, and needs. Both cycles require the involved entities to undergo considerable technical evaluation and public review before final approval.

8.10.2 Recommendations

State GMAs – The LCRWPG encourages that each of the 16 groundwater management areas should review this proposal and submit recommendations in favor of or in opposition to the proposal.

Texas Legislature – The LCRWPG encourages the Legislature to introduce legislation to alter the planning cycle for GCDs to derive DFCs within their assigned GMA so that finalized data can go into the regional water planning process in a timely and useful fashion. GCDs should not be burdened with a compressed cycle in order to accomplish this action.

8.10.3 Timing and/or Conflicts

This should be addressed in the next legislative session so it can go into effect prior to the next planning cycle.

8.11 Recommended Improvements to the Regional Planning Process (SB 1 - 75th Legislature)

8.11.1 Recommendations

The following recommendations have been developed by the LCRWPG in order to improve the ongoing regional water planning process:

1. The LCRWPG continues to support action by the State to provide for the integration of water quantity (supply) and water quality planning. Improvements have been made, but more coordination is needed between TWDB and TCEQ, especially in the area of permitting for new water supply projects, in order to facilitate the implementation of key water management strategies. TWDB; TCEQ; and other state, local, and federal entities are doing a good job of providing a clearinghouse for infrastructure funding options for small and rural communities through the Texas Water Infrastructure Coordination Committee (TWICC). TWDB and TCEQ should also work to coordinate the regional planning process with the Texas Clean Rivers Program, which is a partnership that uses a watershed management approach to identify and evaluate water quality issues. The RWPGs are considering water quality issues during this revision to the plan, and continued coordination with the Texas Clean Rivers Program is desirable.

2. The LCRWPG supports action by the State to continue to fund programs for the collection of water data and groundwater availability information, which remains a critical need in the planning process. The State should provide adequate, continuous funding in order to improve the collection, development, monitoring, and dissemination of such water data.

3. The LCRWPG continues to support action by the State to provide assistance to the RWPGs with public information materials and administrative support.

4. The LCRWPG continues to support action by the State to provide for the opportunity to have improved representation of women and minorities on the RWPGs to ensure a true diversity of interests.

5. The LCRWPG supports action by the State to structure the planning process to include environmental needs in order to get a clear picture of the amount of available water resources for all users. Environmental needs and water supply strategies should be planned for just like Agricultural, Municipal, Industrial and other uses in the state.

6. The LCRWPG supports adequate and timely state funding for the regional water planning process. This funding is critical for the development of long-term, sustainable, environmentally protective and conservation-effective water management strategies as well as the collection of water data and groundwater availability information, including the refinement of modeling data and methods, public information materials, and administrative assistance. This includes funding for new tools and modeling for evaluating Droughts Worse Than the Drought of Record. See Section 8.13 Planning for Droughts Worse Than the Drought of Record.

7. The LCRWPG recognizes the importance of the role of the GMA planning process in determining groundwater availability for planning purposes and supports providing the necessary resources and technical support to facilitate effective water planning.

8. The LCRPWG supports the Texas Open Meetings Act, which encourages participation by all interested parties in governmental decision making. All regional water planning group meeting and committee meeting agendas are posted 72 hours in advance of the meetings and are open to the public. Public inputs and concerns during all meetings are encouraged by including at least one item on each agenda for public participation/comment.

9. The LCRPWG recognizes that water is a major economic resource that is critical to the growth of the Region. As the region grows, the scarcity of this resource will become acute without measures to accommodate the growth. However, the planning process needs to include robust economic analysis of the various demands, options, choices, and decisions that each Region faces to understand the impact of those options on the economic growth of the Region and State. This document is robust in hydrology, engineering, and environmental analysis, and would benefit from further economic analysis.

10. The LCRWPG recommends that TWDB consider revising the regional water planning guidance in future regional water planning cycles to make eligible for funding Water Management Strategy costs such as distribution system costs that under current guidance are not allowed to be included. The revised methodology would allow the plans to capture the full cost of strategies and allow the water user group (WUG) to secure funding for a larger portion of the strategy.

11. The LCRWPG recommends that TWDB consider evaluating the value of separating the potable and non-potable supply, demand, need and strategy for future water planning cycles. Doing so might facilitate fit-for-purpose planning by identification of opportunities to transfer demand from existing potable water supplies to non-potable supplies. This reflects current trends in water planning.

8.12 Radionuclides in the Hickory and Marble Falls Aquifers

8.12.1 Recommendations

The LCRWPG recommends the State should provide adequate funding for alternative water supplies or for water treatment and radioactive waste disposal for those rural communities that may lose their water supply if such financial support is inadequate. In addition, State agencies should develop disposal procedures to provide for the safe handling of the radioactive wastes derived from the treatment processes.

8.13 Planning for Droughts Worse than the Drought of Record

8.13.1 Policy Statements

The LCRWPG supports, as a minimum, the continued use of drought of record (DOR) conditions as a baseline hydrologic benchmark in the planning process. It is essential that adequate water supplies are available through at least a repeat of the known historical worst conditions. However, the LCRWPG also recognizes that drought worse than drought of record (DWDOR) events are prudent to anticipate, as one was recently experienced in the Lower Colorado River watershed. Therefore, planning for future DWDOR events should be an integral part of risk management and developing water supply resiliency in water planning, especially when considering the relatively short hydraulic record, projections for fast population growth, and increasing demands over the planning horizon.

The LCRWPG recommends the following:

- The State should provide funding for a study to:
  - Identify the potential incremental impacts to the State's water resources for a range of DWDOR events given the current planning process based on drought of record events,
  - Recommend changes to the planning process to facilitate the development of water management strategies by RWPGs to specifically address DWDOR events (see Item 6 in Section 8.11.1), and
  - Recommend methodologies and provide new tools for development and evaluation of DWDOR conditions for RWPGs to including in the planning process.
- Prior to the Seventh Cycle of Regional Water Planning, the TWDB should consider including in the Guidelines to RWPGs additional options and examples of variance requests to address DWDOR planning.
- If appropriate, upon completion of the aforementioned study and prior to the Eighth Cycle of Regional Water Planning, the State should consider initiating a rulemaking process to amend TAC Title 31 Chapters 357 and 358 to require planning for DWDOR events and the associated water management strategies into the Regional and State Water Plans to improve risk management and the resiliency of future water supplies for the state.

8.13.2 Recommendations

The Texas Legislature should provide funding to support a study regarding the potential impacts of DWDOR events and, if appropriate, recommendations for incorporating DWDOR event planning into the State and Regional Water Plans.

If appropriate, prior to the Seventh Cycle of Regional Water Planning, the TWDB should consider amending the Guidelines to the RWPGs to include additional options and examples of variance requests to address DWDOR planning.

If appropriate, the State should consider amending title 31 Chapters 357 and 358 of the Texas Administrative Code to incorporate DWDOR event planning in the Regional and State Water Plans.

8.13.3 Timing and/or Conflicts

Given the long time-frames associated with developing new water supplies or drought contingency measures sufficient to address DWDOR events, the actions listed in this section (Section 8.13) should be taken immediately.

8.14 Summary of Unique Stream Segment Recommendations

In accordance with the Texas Administrative Code 31 §357.8, RWPGs:

> *"…may include in adopted regional water plans recommendations for all or parts of river and stream segments of unique ecological value located within the regional water planning area by preparing a recommendation package consisting of a physical description giving the location of the stream segment, maps, and photographs of the stream segment, and a site characterization of the stream segment documented by supporting literature and data."*

During the 2001 planning cycle, the LCRWPG reviewed information included in a list of Ecologically Significant Stream Segments within the Lower Colorado Regional Water Planning Area by Texas Parks and Wildlife (TPWD). From the information provided, the LCRWPG listed and provided background information on nine of the streams that were recommended by a subcommittee of the LCRWPG as warranting further study for potential designation as ecologically unique in the 2001 Region K Water Plan. A tenth stream segment (Hamilton Creek) was added to this list as part of the 2006 Region K Water Plan.

Within Chapter 8 of the subsequent Region K Water Plans, the LCRWPG has continued to include the information on these ten streams and their recommendation for further study. No further study on any of the ten streams has taken place to date, and no streams have been recommended by the LCRWPG for designation as "ecologically unique."

During the 2026 planning cycle, the Unique Stream Segments (USS) Committee met to discuss the history of the unique stream segment recommendation process the LCRWPG has gone through, and to determine what, if any, new actions needed to be taken.

The USS Committee developed recommendations for consideration by the full LCRWPG at their December 6, 2024 meeting. The recommendations approved by the full LCRWPG include the following:

a. Before including in the Region K Water Plan any on-channel reservoir/dam water management strategies located on stream segments identified for further study for potential designation as ecologically unique in Chapter 8, Region K will conduct a higher level of additional screening, as defined by the LCRWPG, to determine potential ecological impacts. (Recommendation is not intended to include existing structures or diversion structures, recharge enhancement weirs, or flood control.)

b. The 2026 RWP will include a list of studies completed since 2000 relevant to segments listed in Table 8.A.1 of the 2016 RWP (see Appendix 8.B).

c. Recommend requesting sufficient funding from TWDB for the 2026 RWP to reevaluate stream segments based on criteria for potential identification as ecologically unique, using studies listed in Action Item B. Note that, even if a reevaluated stream segment remains on the list of stream segments identified for further study for potential designation as ecologically unique in Chapter 8, or if stream segments are added to this list, the planning group, after weighing all considerations, may or may not choose to recommend the segments for designation as ecologically unique.

d. Request a status update from the TWDB on how unique stream segments and unique reservoir sites have been addressed in the 2026 Regional Water plans and the 2027 State Water Plan. This update should include information on how these segments have been treated by different planning groups, any special considerations around these recommended segments, and the current status of their designation and implementation. This information will help inform the planning group's approach to unique stream segments and reservoir sites in the next round of regional planning.

No new unique ecological stream segments are recommended for further study by the LCRWPG for this planning cycle. The ten unique stream segment recommendations for further study from the 2006 Region K Plan, which the LCRWPG continues to recommend for further study, can be found in Appendix 8.B.

8.15 Summary of Potential Sites Uniquely Suited for Reservoirs

In accordance with the Texas Administrative Code 31 §357.9, RWPGs:

> *"…may recommend sites of unique value for construction of reservoirs by including descriptions of the sites, reasons for the unique designation, and expected beneficiaries of the water supply to be developed at the site."*

No potential reservoir sites were recommended for designation as unique by the LCRWPG in past planning cycles. No potential reservoir sites are recommended by the LCRWPG for this planning cycle.

References

No references cited in this chapter.

Chapter 9.

Implementation and Comparison to the Previous Regional Water Plan







2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Appendix

Chapter 9. Implementation and Comparison to the Previous Regional Water Plan

9.1 Implementation

The Texas Water Development Board (TWDB) uses a survey to track the implementation status of all recommended strategies from the previous planning cycle. The TWDB survey template was used to help collect the information from the Water User Groups (WUGs) and wholesale water providers in the region. As of January 2025, 15 strategy sponsors had responded to the survey, detailing implementation progress on 41 strategies. In asking for responses, only Water User Groups with strategies beyond conservation or drought management were surveyed, since these demand reduction strategies can be tracked through the required conservation and drought management plans (Chapters 5 and 7). **Appendix 9.A** contains the Implementation template used to record the survey results, with results recorded for those Water User Groups that responded.

Of the 49 strategies with updates, three were marked as completed, including:

- Barton Springs/Edwards Aquifer Conservation District (BS/EACD) Edwards/Middle Trinity ASR - Buda
- Expansion of Current Groundwater Supplies - Carrizo-Wilcox Aquifer – Elgin
- Acquire Additional Water Rights – Lower Colorado River Authority

There were 21 marked as started:

- Austin
  - Aquifer Storage and Recovery
  - Indirect Potable Reuse Through Lady Bird Lake
  - Onsite Rainwater and Stormwater Harvesting
  - Decentralized Direct Non-Potable Reuse
- Lower Colorado River Authority
  - Expansion of Carrizo-Wilcox Aquifer Supplies
  - Interruptible Water for Agriculture (Colorado, Wharton, and Matagorda Counties)
  - Import Return Flows from Williamson County
- Direct Potable Reuse - Buda
- Direct Reuse – Buda (2 projects), Marble Falls, and West Travis County Public Utility Authority (WTPUA)
- Surface Water Infrastructure Expansion - WTCPUA
- Expansion of Local Groundwater Supplies – Aqua Water Supply Corporation (WSC), Bertram, and Dripping Springs WSC
- Water Purchase Amendments – Creedmoor Maha WSC and Travis County Municipal Utility District (MUD) 14

- Rainwater Harvesting – Dripping Springs WSC

Sixteen were marked as not started, with the most common reason being economic feasibility/financing, and the second most common reason being simply as shift in timeline. These included:

- Austin
    - Brackish Groundwater Desalination
    - Capture Local Inflows to Lady Bird Lake
    - Direct Reuse (Centralized)
    - Off-Channel Reservoir and Evaporation Suppression
- Lower Colorado River Authority
    - Aquifer Storage and Recovery
    - Baylor Creek Reservoir
    - Excess Flows Permit Off-Channel Reservoir
    - Mid-Basin Off-Channel Reservoir
- BS/EACD Saline Edwards Desalination and ASR for County Other, Hays
- Hays County Pipeline – West Travis County PUA
- Buena Vista Regional Project
- Development of New Trinity Aquifer Supplies - Elgin
- Direct Potable Reuse - Dripping Springs WSC
- Direct Non-Potable Reuse - Dripping Springs WSC, Fredericksburg, and Travis County WCID 17

Finally, nine were marked as no longer being pursued. Reasons recorded ranged from hydrogeologic (e.g., “test well was low-producing”) to economic (e.g., “not a cost-effective option”). These included:

- Austin - Blackwater and Greywater Reuse
- Austin - Community-Scale Stormwater Harvesting
- Development of New Trinity Aquifer Supplies - Travis County MUD 10
- Direct Potable Reuse – Llano, West Travis County PUA
- Expansion of Current Groundwater Supplies - Edwards-Balcones Fault Zone (BFZ) Aquifer - Pflugerville
- Enhanced Recharge and Conjunctive Use - Lower Colorado River Authority
- Prairie Site Off-Channel Reservoir - Lower Colorado River Authority
- New Water Purchase from Junction – Llano

Note that many of the strategies that are marked as not started have been carried forward to the current plan, as discussed later in this chapter, starting with Section 9.2.6.

9.2 Comparison to the Previous Regional Water Plan

This section discusses how the 2026 Regional Water Plan (RWP) compares to the 2021 RWP, with respect to population, water demands, water supplies, and water management strategies.

9.2.1 Population Projections

The base populations used for projections in this cycle were based on a more recent United States Census, which was completed in 2020. TWDB's initial projections relied on county-level population projections from the Texas Demographic Center. In the past, the TWDB had altered the resulting regional plan population projections in certain counties – by holding them flat in future periods – to avoid projecting declining populations. For the 2026 Regional Water Plans, the draft county population projections followed the trends projected by the Texas Demographic Center, including declines. More information on the population projection methodologies can be found in Chapter 2. Note that, in both cycles, Region K submitted revision requests to the TWDB, which were mostly granted.

Table 9.1 shows a comparison between population projections from the 2021 RWP and the current (2026) RWP for the 2070 decade, which is the last overlapping decade between the two. The overall population projection in Region K for that decade has increased by over half a million people in the current plan versus 2021. Most of the increase is projected for Travis, Hays, and Williamson counties, with a small increase in Llano County. The remaining 10 counties show a decrease compared to the projections in the previous plan, with the largest decrease in Bastrop County of 116,000 or 30 percent.

Table 9.1 Comparison between 2070 Population Projections for the 2021 and 2026 Regional Water Plans

County	2026 Regional Water Plan Projected Population in Year 2070	2021 Regional Water Plan Projected Population in Year 2070	Increase (+) or Decrease ( )	Percent Change
Bastrop	268,126	384,244	-116,118	-30
Blanco	11,277	18,472	-7,195	-39
Burnet	76,064	97,426	-21,362	-22
Colorado	17,468	26,293	-8,825	-34
Fayette	22,990	40,476	-17,486	-43
Gillespie	35,813	36,142	-329	-1
Hays (partial)	354,449	186,579	**+167,870**	**+90**
Llano	27,236	23,549	**+3,687**	**+16**
Matagorda	29,313	44,815	-15,502	-35
Mills	3,140	5,859	-2,719	-46
San Saba	4,557	7,039	-2,482	-35
Travis	2,720,449	2,233,259	**+487,190**	**+22**
Wharton (partial)	23,441	33,629	-10,188	-30
Williamson (partial)	262,027	152,695	**+109,332**	**+72**
Total (Region K)	3,856,350	3,290,477	**+565,873**	**+17**

9.2.2 Water Demand Projections

The projected total water demand in Region K has increased in the current plan compared to 2021. **Table 9.2** shows a county-level comparison of the projected demands from the 2021 RWP and the current (2026) RWP for the 2070 decade, which is the last overlapping decade between the two. Total projected demand has increased about 71,000 acre-feet per year (ac-ft/yr), or 5 percent. More information on the water demand projection methodologies can be found in Chapter 2.

The comparison of water demands between the 2021 and 2026 Regional Water Plans at the county level reveals significant changes in several counties. For instance, in Bastrop County, the demand in the 2026 RWP is projected to be 57,540 ac-ft/yr, which represents a decrease of 17,614 ac-ft/yr or 31 percent from the 2021 RWP projection of 75,154 ac-ft/yr. Similarly, Burnet County is expected to see a reduction in demand, with projections indicating a decrease of 11,599 ac-ft/yr, from 32,285 ac-ft/yr in the 2021 RWP to 20,686 ac-ft/yr in the 2026 RWP, marking a 56 percent reduction. Fayette County also shows a substantial decrease in demand, with projections for the 2026 RWP at 27,496 ac-ft/yr, down by 31,050 ac-ft/yr or 113 percent from the 2021 RWP projection of 58,546 ac-ft/yr. In contrast, Hays County is projected to experience an increase in demand, with the 2026 RWP projections at 63,493 ac-ft/yr, up by 23,741 ac-ft/yr or 37 percent from the 2021 RWP projection of 39,752 ac-ft/yr. Additionally, Travis County is projected to see an increase in water demand, with the 2026 RWP projections at 509,391 ac-ft/yr, up by 78,631 ac-ft/yr or 15 percent from the 2021 RWP projection of 430,760 ac-ft/yr.

Table 9.2 County-level Comparison between 2070 Demands for the 2021 and 2026 Regional Water Plans

County	Demand Year 2070 (2026 Regional Water Plan)	Demand Year 2070 (2021 Regional Water Plan)	Increase (+) or Decrease ( )	Percent Change
Bastrop	57,540	75,154	**-17,614**	**-31**
Blanco	3,864	4,032	-168	-4
Burnet	20,686	32,285	**-11,599**	**-56**
Colorado	153,517	168,138	-14,621	-10
Fayette	27,496	58,546	**-31,050**	**-113**
Gillespie	9,971	10,198	-227	-2
Hays (partial)	63,493	39,752	**+23,741**	**+37**
Llano	8,638	8,024	+614	+7
Matagorda	258,902	259,160	-258	-0
Mills	6,277	6,463	-186	-3
San Saba	10,522	10,736	-214	-2
Travis	509,391	430,760	**+78,631**	**+15**
Wharton (partial)	201,860	178,718	+23,142	+11
Williamson (partial)	46,664	25,677	**+20,987**	**+45**
Total (Region K)	1,378,821	1,307,643	+71,178	+5

The projected water demands for the year 2070 in the Region K planning area exhibit notable changes across different categories when comparing the 2026 Regional Water Plan with the 2021 Regional Water Plan (**Table 9.3**). Municipal water demand also sees a substantial increase in the projected demand, increasing by 79,762 ac-ft/yr (+13 percent).

Irrigation shows a marginal increase of 1,392 ac-ft/yr, which translates to a negligible percentage change (+0 percent). Irrigation is the second-highest demand category by 2070, surpassed by municipal demand. Livestock, on the other hand, experiences a decrease of 1,016 ac-ft/yr (-8 percent). The percentage decrease is relatively modest, indicating a stable but slightly diminishing reliance on water for livestock purposes.

The manufacturing sector exhibits a dramatic increase in projected water demand, rising by 47,684 ac-ft/yr (+212 percent). The increase in the projected demand is almost entirely made up of increases in Travis and Matagorda counties.

Conversely, the steam-electric power category shows a steep decline in projected demand, decreasing by 56,644 ac-ft/yr (-34 percent). This decrease is mostly due to decreases in Fayette and Matagorda counties.

Table 9.3 Category-level Comparison between 2070 Demands for the 2021 and 2026 Regional Water Plans

Category	Demand Year 2070 (2026 Regional Water Plan)	Demand Year 2070 (2021 Regional Water Plan)	Increase (+) or Decrease ( )	Percent Change
Irrigation	513,214	511,822	+1,392	+0
Livestock	10,988	12,004	-1,016	-8
Manufacturing	70,177	22,493	+47,684	+212
Municipal	674,991	595,229	+79,762	+13
Steam-electric	109,451	166,095	-56,644	-34
Total (Region K)	1,378,821	1,307,643	+71,178	+5

9.2.3 Drought of Record and Hydrologic Assumptions

The Drought-of-Record for the 2021 Region K Water Plan occurred from 2007-2016, which is the same as for the current plan. The Region K Supply Evaluation Model (called the Region K Cutoff Model in the 2021 RWP) was used in both plans for determining the surface water availability numbers. In both plans, the period of record was from 1940-2016, with a critical dry year of 2011. Hydrologic assumptions for the surface water modeling involving the Region K Supply Evaluation Model are included in Chapter 3.

9.2.4 Surface Water and Groundwater Availability and Water Supplies

Overall, for Region K, the total water source availability in the 2026 Region K Plan has decreased from the availability in the 2021 Region K Plan. **Figure 9.1** shows the availability in the 2030 and 2070 decades for the 2021 and 2026 plans. In the 2026 Region K Plan, the total water availability for 2030 is approximately 1.25 million ac-ft/yr, with 66 percent surface water, 33 percent groundwater, and about 1 percent reuse. In the 2021 Region K Plan, the total water availability for 2030 was approximately 1.30 million ac-ft/yr, with 70 percent surface water, 29 percent groundwater, and about 1 percent reuse. The 2026 Region K Plan surface water availability decreased due to the results of the updated water availability modeling that occurred in the current cycle. Groundwater availability increased in the 2026 plan compared to the 2021 plan.

Figure 9.1 Source Availability Comparison between the 2021 and 2026 Regional Water Plans

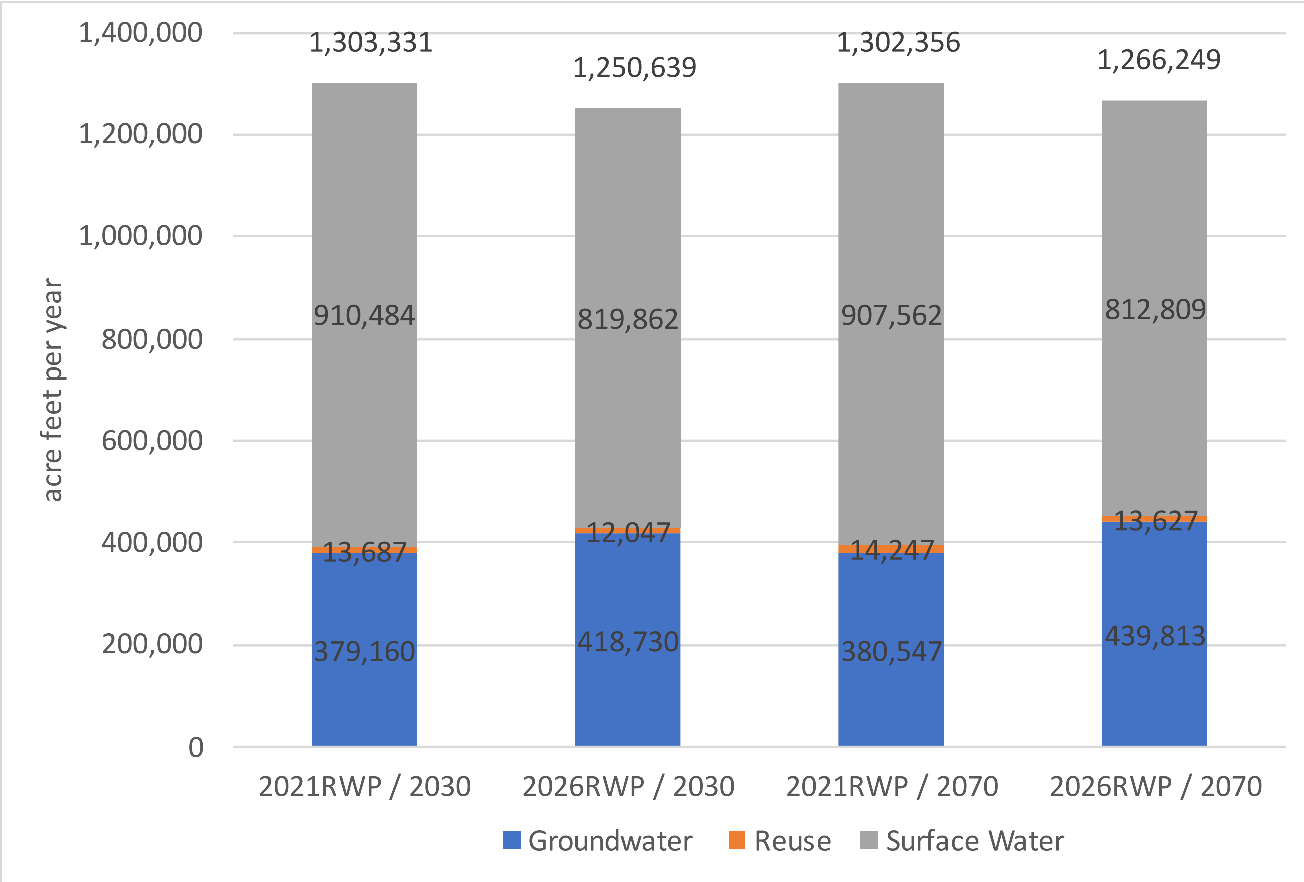
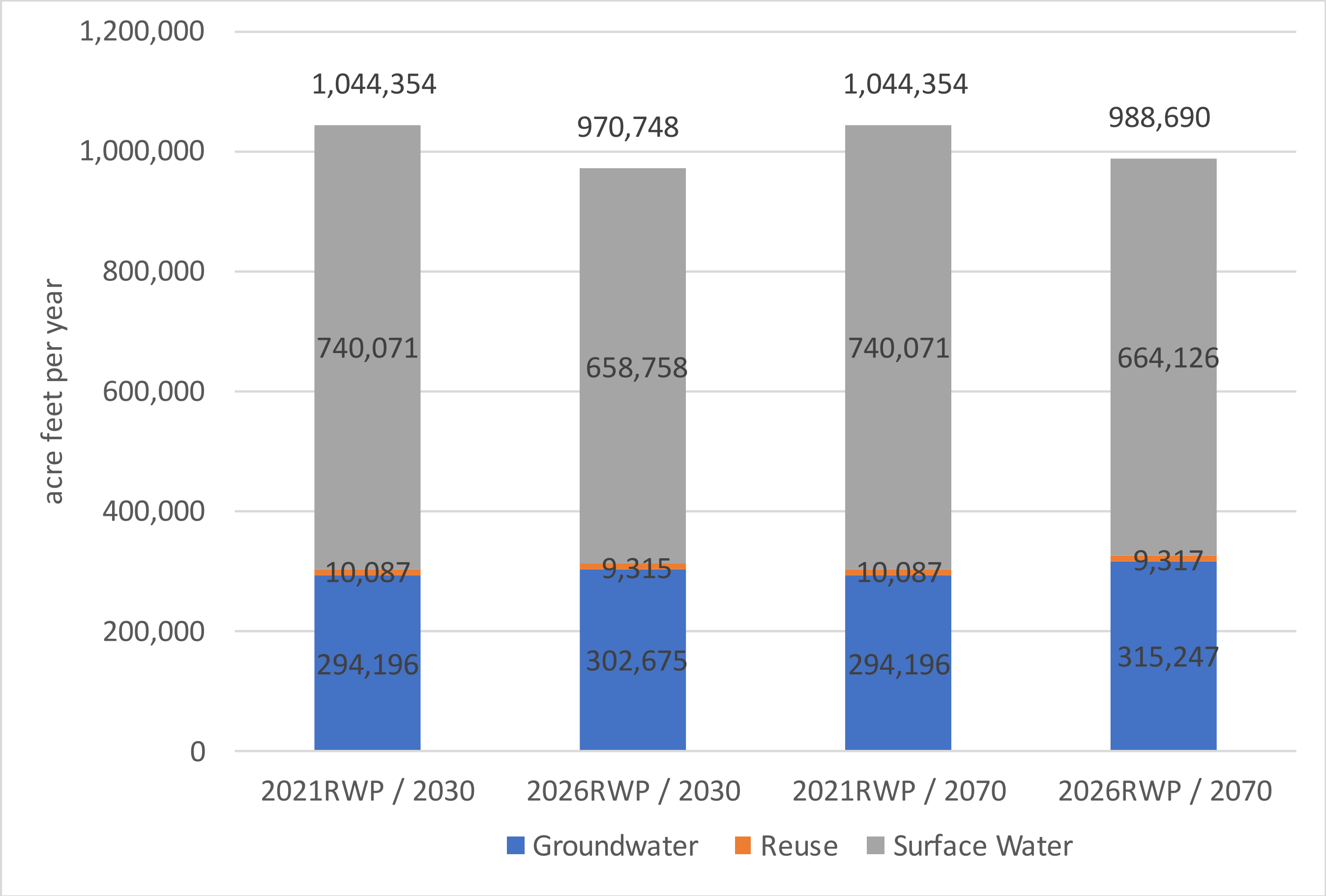


Figure 9.2 provides a comparison of the existing surface water and groundwater supplies in Region K for the 2021 Region K Plan and 2026 Region K Plan, shown for the 2030 and 2070 planning decades. Existing water supplies are those that can be currently accessed by Water User Groups, both physically and legally. Existing water supplies are generally less than the available source volumes. Total existing water supplies decrease by about 6 percent in the 2026 Region K Plan as compared to the 2021 Region K Plan. The decrease in supplies is of similar magnitude to the estimated decrease in overall source availability, which is again primarily due to the decrease in modeled surface water availability.

Figure 9.2 Supply Comparison between the 2021 and 2026 Regional Water Plans



9.2.5 First-Tier Water Needs

First-tier water needs in the region are determined by comparing the demand projections to the existing supplies, prior to the reductions in demand/need derived from enhanced conservation or water reuse. The 2070 water needs for Region K have increased by approximately 87,000 ac-ft/yr in the 2026 Region K Plan compared to the 2021 Region K Plan (**Table 9.4**). The increase is due primarily to an increase in projected total demands, combined with a slight decrease in estimated total supplies. The increase in needs for urban or urbanizing counties such as Travis and Hays are driven by an increase in municipal demands, while the increase in needs for Wharton County is driven by increasing agricultural demands.

Table 9.4 Comparison of Water Needs by County for 2070

County	2070 Water Needs from 2021 Regional Water Plan (ac ft/yr)	2070 Water Needs from 2026 Regional Water Plan (ac ft/yr)	Comparison (Positive Increased Need) (ac ft/yr)
Bastrop	37,368	23,719	-13,649
Blanco	82	82	+0
Burnet	9,033	3,836	-5,197
Colorado	37,433	35,603	-1,830
Fayette	5,246	183	-5,063
Gillespie	-	927	+927
Hays	18,990	39,116	+20,126
Llano	642	1,289	+647
Matagorda	110,277	126,207	+15,930
Mills	1,756	3,359	+1,603
San Saba	-	1,308	+1,308
Travis	43,787	110,018	+66,231
Wharton	53,386	83,515	+30,129
Williamson	785	3,141	+2,356
Total (Region K)	**318,785**	**432,303**	**+113,518**

The 2070 firm water needs for Major Water Providers (Lower Colorado River Authority and Austin) in the region have changed between the 2021 Region K Plan and the 2026 Region K Plan, as shown in **Table 9.5** below. The Lower Colorado River Authority shows a similar slight surplus as in the last c cle. Austin's needs have increased significantly due primarily to a projected increase in retail municipal demands. Note that Table 9.5 reflects the first-tier needs, before considering conservation or reuse strategies.

Table 9.5 Comparison of 2070 Firm First-Tier Water Surplus/Needs by Major Water Provider

Major Water Provider	2070 Firm Water Surplus/Need from 2021 Regional Water Plan (ac ft/yr)	2070 Firm Water Surplus/Need from 2026 Regional Water Plan (ac ft/yr)
Lower Colorado River Authority	8,127	11,649
Austin	(11,658)	(59,292)

9.2.6 Recommended Water Management Strategies

As strategies have been implemented or determined infeasible since the previous planning cycle, the water management strategies identified in the 2026 Region K Plan have differences from the identified water management strategies in the 2021 Region K Plan. The next two sections identify only the differences between the two plans.

There are several recommended water management strategies in the 2026 Region K Plan that are new and were not included as Recommended in the 2021 Region K Plan. They include the following:

- Seawater Desalination – Lower Colorado River Authority
- Lake Bastrop - Lower Colorado River Authority
- Expanded Local Use of Groundwater in Bastrop County – Lower Colorado River Authority (moved from alternative to recommended)
- Aquifer Storage and Recovery – Aqua WSC
- Brackish Groundwater Desalination
  - Aqua WSC
  - Creedmoor-Maha WSC
- Direct Potable Reuse
  - Aqua WSC
  - Marble Falls
- Expanded Use of Surface Water (Firm Water Contract with LCRA) - Llano
- Expanded Local Use of Groundwater – Hickory Aquifer

In the current plan, Aqua WSC has emerged with several new strategies that will help to diversify their water supply portfolio, which is currently mostly dependent on groundwater. In addition, Creedmoor-Maha WSC has an aggressive timeline for implementing brackish groundwater desalination to help increase their water supplies over the next decade.

There are several recommended water management strategies that were included in the 2021 Region K Plan but are no longer recommended in the 2026 Region K Plan. Some have been completed since the publication of the 2021 Region K Plan and are therefore now shown as existing supplies, others are not started or not being pursued and were not kept in the plan. Those strategies include the following:

- Austin
  - Blackwater and Greywater Reuse (not being pursued)
  - Community-Scale Stormwater Harvesting (not being pursued)
- Lower Colorado River Authority
  - Enhanced Recharge (not being pursued)
  - Prairie Site Off Channel Reservoir (not being pursued)
  - Acquire New Water Rights (implemented)
- Expanded Local Use of Groundwater (removed the following)
  - Edwards BFZ Aquifer
  - Sparta Aquifer

  - Yegua-Jackson Aquifer
- Development of New Groundwater Supplies (removed the following)
  - Ellenburger-San Saba Aquifer
  - Gulf Coast Aquifer
  - Hickory Aquifer
  - Marble Falls Aquifer
  - Sparta Aquifer
  - Trinity Aquifer
  - Yegua-Jackson Aquifer
- Water Importation – Hays County Pipeline (removed)
- Burnet County Regional Projects (removed the following)
  - Buena Vista
  - East Lake Buchanan
  - Marble Falls
- Brush Management (removed)

Most of the previously recommended strategies that are no longer recommended have been removed because the demands that motivated the strategies have changed. As discussed in Sections 9.2.1 and 9.2.2, the population and demand projections for the current plan generally show increased demand projections for urbanized areas that mainly use surface water supplies and decreased demand projections for rural areas that mainly use groundwater supplies. So multiple strategies in the groundwater categories have been removed, along with the Burnet County Regional Projects. Significant needs still exist in Burnet County, for Marble Falls, Bertram, and Burnet, but these municipalities are no longer relying on regional strategies.

Hays County is the exception to this trend, since Hays County is projecting higher demands in the current plan than in the 2021 plan, yet the Hays County Pipeline project was removed from the current plan. Discussions with Guadalupe Blanco River Authority (GBRA) and other stakeholders indicated that there were no active plans for this project to move forward.

9.2.7 Alternative Water Management Strategies

There are several alternative water management strategies that were included in the 2021 Region K Plan but are no longer included as alternative strategies in the 2026 Region K Plan. Those strategies include the following:

- Expanded Local Use of Groundwater - Carrizo-Wilcox Aquifer, Lower Colorado River Authority (moved from alternative to recommended)
- Expanded Local Use of Groundwater – Carrizo-Wilcox Aquifer, Aqua WSC (removed)
- Brackish Groundwater Desalination from the Gulf Coast Aquifer - Lower Colorado River Authority (removed)

- Supplement Bay & Estuary Inflows with Brackish Groundwater - Lower Colorado River Authority (removed)

Two water management strategies that were recommended in the 2021 plan were moved to alternative in the 2026 plan:

- Direct Potable Reuse – Llano (moved to alternative)
- Rainwater Harvesting (with the exception of City of Austin, which kept the strategy as recommended)

9.2.8 Recommended Water Management Strategy Projects

As strategies have been implemented or determined infeasible since the previous planning cycle, the associated water management strategy projects identified in the 2026 Region K Plan have also changed from the identified water management strategy projects in the 2021 Region K Plan. The water management strategy projects are all associated with a water management strategy, but there may be more than one project or associated sponsor per strategy. The next two sections identify only the differences in projects between the two plans.

There are a number of recommended water management strategies and associated projects in the 2026 Region K Plan that are new and were not included as Recommended in the 2021 Region K Plan. They include the following:

- Seawater Desalination – Lower Colorado River Authority
- Lake Bastrop - Lower Colorado River Authority
- Expanded Local Use of Groundwater – Carrizo-Wilcox Aquifer, Lower Colorado River Authority (moved from alternative to recommended)
- Aquifer Storage and Recovery – Aqua WSC
- Brackish Groundwater Desalination
  - Aqua WSC
  - Creedmoor-Maha WSC
- Direct Potable Reuse
  - Aqua WSC
  - Marble Falls
- Expanded Local Use of Groundwater – Hickory Aquifer
  - Irrigation, San Saba County
  - County-Other, Gillespie County

There are several recommended water management strategy projects that were included in the 2021 Region K Plan but are no longer recommended in the 2026 Region K Plan. Many projects, such as those associated with conservation or direct reuse, are already being implemented. Those strategies include the following:

- Austin

   - Blackwater and Greywater Reuse (not being pursued)
   - Community-Scale Stormwater Harvesting (not being pursued)
- Lower Colorado River Authority
   - Enhanced Recharge (not being pursued)
   - Acquire New Water Rights (implemented)
   - Excess Flows Permit (5731) Off-Channel Reservoir (not yet started)
- Expanded Local Use of Groundwater (removed the following)
   - Edwards BFZ Aquifer
      - Pflugerville
      - Sunset Valley
   - Gulf Coast Aquifer
      - Wharton
      - County-Other, Colorado County
      - Irrigation, Matagorda County
      - Irrigation, Wharton County
   - Sparta Aquifer – County Other, Fayette County
   - Trinity Aquifer
      - Mining, Hays County
      - County-Other, Hays County
      - Manville WSC
      - Irrigation, Mills County
   - Yegua-Jackson Aquifer – Mining, Fayette County
- Development of New Groundwater Supplies (removed the following)
   - Ellenburger-San Saba Aquifer – Mining, Burnet County
   - Gulf Coast Aquifer - Irrigation, Matagorda County
   - Hickory Aquifer - Mining, Burnet County
   - Marble Falls Aquifer – Mining, Burnet County
   - Sparta Aquifer – County-Other, Fayette County
   - Trinity Aquifer
      - Elgin

    - Sunset Valley
    - Travis County MUD 10
  - Yegua-Jackson Aquifer
    - Manufacturing, Fayette County
    - Smithville
- BSEACD Saline Aquifer Desalination and ASR (removed)
- BSEACD Edwards/Middle Trinity ASR – County-Other, Hays (removed)
- Water Importation – Hays County Pipeline (removed)
- Direct Potable Reuse – Llano (moved to alternative)
- Direct Reuse (removed the following)
  - Blanco
  - Fredericksburg
  - Horseshoe Bay
  - Lakeway MUD
  - Marble Falls
  - Meadowlakes
- Burnet County Regional Projects (removed the following)
  - Buena Vista
  - East Lake Buchanan
  - Marble Falls
- Brush Management (removed for the following)
  - County-Other, Blanco County
  - County-Other, Gillespie County
  - County-Other, Hays County
  - County-Other, Travis County
- Rainwater Harvesting (removed for the following)
  - Dripping Springs WSC
  - Hays
  - Sunset Valley
- Water Purchase (removed for the following)
  - Windermere Utility

- Barton Creek WSC
- Creedmoor-Maha WSC
- Travis County MUD 14

9.2.9 Alternative Water Management Strategy Projects

There are four alternative water management strategies with associated projects that were included in the 2021 Region K Plan but are no longer included as alternative strategies in the 2026 Region K Plan.

- Expanded Local Use of Groundwater - Carrizo-Wilcox Aquifer, Lower Colorado River Authority (moved from alternative to recommended)
- Expanded Local Use of Groundwater – Carrizo-Wilcox Aquifer, Aqua WSC (removed)
- Brackish Groundwater Desalination from the Gulf Coast Aquifer - Lower Colorado River Authority (removed)
- Supplement Bay & Estuary Inflows with Brackish Groundwater - Lower Colorado River Authority (removed)

Two water management strategies that were recommended in the 2021 plan were moved to alternative in the 2026 plan:

- Direct Potable Reuse – Llano
- Rainwater Harvesting (with the exception of City of Austin, which kept the strategy as recommended)

9.2.10 Region's Progress Towards Regionalization

HB 8 requires that the regional water plan shall "assess the progress of the RWPA [Regional Water Planning Area] in encouraging cooperation between water user groups for the purpose of achieving economies of scale and otherwise incentivizing strategies that benefit the entire region." **Table 9.6** shows the number of recommended water management strategies in the 2021 Region K Plan and the number of recommended strategies in the 2026 Region K Plan that serve more than one Water User Group. This table was produced using *Report 125 – Recommended WMS Economies of Scale Analysis Reference* from the TWDB DB27 Database Reports.

WUGs in Region K are already participants in several cross-basin regional water supply projects in various phases of implementation. For example, the Brushy Creek Regional Utility Authority has an agreement with LCRA to supply Colorado River water to the cities of Cedar Park, Leander, and Round Rock, with some of that water crossing into the Brazos Basin (Region G). One of the water management strategies in the current plan (LCRA – Import Return Flows from Williamson County) involves returning some of this water from the Brazos River Basin for use in the Colorado River Basin. A second example is the Alliance Regional Water Authority that brings water from the Guadalupe River Basin (Region L) to the City of Buda in Region K. Finally, multiple WUGs in Region K benefit from groundwater that is piped west from counties such as Lee, Milam, and Burleson in Region G.

Of the recommended strategies in the 2021 Region K Plan that may benefit multiple Water User Groups shown in Table 9.6, six have taken steps towards implementation (shown in bold in Table 9.6). Note that the strategies that depend on expansion of current groundwater supplies are generally independent projects that use the same aquifer, so they do not necessarily represent progress towards regionalization.

The members of Region K recognize the importance of regionalization. Both of the major water providers, Lower Colorado River Authority and Austin Water, have several large strategies planned that will benefit multiple Water User Groups and achieve the desired economies of scale. While some small Water User Groups do not have the resources for larger projects, other growing Water User Groups, such as Aqua WSC, are working to diversify their portfolio to increase their ability to wholesale additional water in some of the fastest-growing areas of the region.

Table 9.6 Number of Benefitting Water User Groups from Recommended Strategies in the 2021 and 2026 Regional Water Plans

Strategy*	Number of Benefitting Water User Groups 2021 RWP	Number of Benefitting Water User Groups 2026 RWP
G / G; K / Brushy Creek RUA-Existing Contracts	4	7
G / G; K / Storage Reallocation of Lake Whitney		2
K / G; K / LCRA - Highland Lakes Existing Supplies Allocation		18
K / G; K / LCRA - Purchase Wholesale Groundwater		23
K / G; K; L / LCRA - Mid Basin Reservoir	13	
K / G; K; L / LCRA - New Storage Development in the Lower Colorado Basin		29
K / K / Austin - Centralized Direct Non-Potable Reuse	2	
K / K / Direct Reuse - Buda	2	
K / K / Edwards/Middle Trinity ASR	4	
K / K / Expanded Local Use of Groundwater - Carrizo-Wilcox Aquifer		2
K / K / Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer		7
K / K / Expanded Local Use of Groundwater - Trinity Aquifer		3
K / K / Expanded Use of Local Surface Water		2
K / K / Expansion of Current Groundwater Supplies - Carrizo-Wilcox Aquifer	2	
K / K / Expansion of Current Groundwater Supplies - Ellenburger-San Saba Aquifer	3	
K / K / Expansion of Current Groundwater Supplies - Gulf Coast Aquifer	8	
K / K / Expansion of Current Groundwater Supplies - Trinity Aquifer	6	
L / K; L / ARWA - DPR (Phase 3)		6
L / K; L / ARWA - Expanded Carrizo-Wilcox (Phase 2)		6
L / K; L / ARWA - Phase 2	6	
L / K; L / ARWA - Phase 3	6	
L / K; L / GBRA - MBWSP - Surface Water w/ASR	7	
L / K; L / Entity Purchase to Meet Shortages - GBRA		4
L / K; L / GBRA - WaterSECURE - Availability Increase		19
L / K; L / GBRA - WaterSECURE - MAG Limited Groundwater Portion		18

**The letter before the backslash indicates the source region, while the letter or letters after the backslash indicate the regions that are supplied by the strategy.*

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References

There are no references cited in this chapter.

Chapter 10.

Public Participation Activities for Plan Development and Adoption







2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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Chapter 10. Public Participation Activities for Plan Development and Adoption

Regional water planning in Texas is a public process, requiring a comprehensive strategy to ensure that each regional water plan (RWP) includes opportunities for the public to participate in the development and adoption of the plan. During both plan development and adoption, the Lower Colorado Regional Water Planning Group's (LCRWPG) strategies for public participation, including meeting the requirements of the Texas Administrative Code and Texas Government Code, are described in this chapter.

Texas Administrative Code

Chapter 357 of Title 31 of the Texas Administrative Code, Rule §357.21, outlines the requirements for notice and public participation in regional water planning. This rule requires the following:

- Regional Water Planning Groups (RWPGs) and their committees or subcommittees must comply with Chapters 551 and 552 of the Government Code.
- All materials presented or discussed at open meetings must be available for public inspection before and after the meetings.
- Each RWPG must create and maintain a website to post public notices of all meetings, agendas, and related materials.
- RWPGs must provide a means to accept written public comments before and after meetings.
- Oral public comments must be allowed during RWPG meetings and hearings.
- RWPGs must solicit interested parties from the public and maintain a list of emails of persons or entities who request to be notified electronically of RWPG activities.
- Notices of all meetings, materials, and agendas must be sent electronically to all voting and non-voting RWPG members and to any person or entity who has requested notice of RWPG activities.
- Additional notice requirements apply if a recommended or alternative Water Management Strategy (WMS) located outside the RWPG is being considered or if there are hearings on declarations of intent to pursue simplified planning.
- RWPGs must ensure ease of access to the public, including posting the Initially Prepared Plan (IPP) on websites and providing notice of such posting.
- A public meeting or public hearing with an opportunity for public comment is required for the following: planning for the next RWP, pursuing simplified planning (if applicable), proposing major amendments to the previous RWP (if applicable), adopting the IPP, and adopting the final RWP.

Texas Government Code

Chapter 551 of the Texas Government Code (Texas Open Meetings Act) was adopted to make governmental decision-making accessible to the public. Specifically, it requires meetings of governmental bodies to be preceded by public notice of the time, place, and subject matter of the meeting (OAG, 2022). Chapter 552 of the Government Code (Texas Public Information Act) gives the public the right to request access to government information (OAG, 2022). Specifically, the rules from these chapters require the following:

- Every regular meeting is open to the public and complied with all the requirements of the Texas Open Meetings Act.
- Meeting information is to be made available at least 72 hours prior to the meeting.

- Any emergency meetings to address imminent threats to public health and safety or urgent public necessity are called at least one hour in advance with a notice that identifies the nature of the emergency.
- Meetings are convened with the presence of a quorum in the meeting room.
- Only present members of a governmental body in the meeting are able to submit their written vote.
- Meeting location is accessible to the public.
- Members of the public are able to address comments on any subject to the governmental body during “public comment” or “public forum” sessions.
- The public is not able to choose the items to be placed on the agenda for discussion at the meeting.
- Members of the public have permission to record open meetings with a recorder or a video camera.
- The minutes and recordings of the meeting are published for public inspection and copied on request to the governmental body’s chief administrative officer or the officer’s designee. The minutes stated the subject and indicated each vote, decision, or other action taken.

The Region K planning group met all requirements under the Texas Open Meetings Act and Public Information Act in accordance with 31 TAC § 357.12 and 357.21.

While adhering to these requirements of the Texas Administrative and Government Codes, the LCRWPG’s strategy for public participation during the development of the plan included the following activities listed below:

- **Holding a public hearing to receive input from the public** on the scope of work for the 2026 Region K Water Plan. This public hearing was held on September 15, 2021, as a part of a regular meeting of the LCRWPG at the LCRA Dalchau Service Center.

- **Holding 16 regular meetings of the LCRWPG** for presentation of materials, discussions, deliberations, and receiving public comment between September 15, 2021, and February 20, 2025.

- **Holding 46 meetings of eight different committees** between November 30, 2021, and February 5, 2025, that were open and accessible to the public.

- **Holding a Water Planning 101 meeting** for new Region K members on April 27, 2022.

- **Serving as speakers at various civic and interest group meetings** representing a wide spectrum of interests and public opinion.

- **Conducting surveys** of the Water User Groups to obtain feedback on population and water demand projections and to obtain information regarding water supplies, water management strategies, and implementation of projects.

- **Maintaining a web page** with documentation and notices of meetings and discussions, with links from the LCRA home page and the Texas Water Development Board (TWDB) website.

- **Engaging rural** public water systems that met the definition of a rural political subdivision by contacting them via email, certified mail, and phone calls to obtain their responses to the WUG surveys.

- **Developing policy statements** through the Region K Legislative and Policy Committee regarding support of public participation policies that had been adopted in the previous planning cycle.

After the Region K Planning Group produced the Region K Initially Prepared Plan (IPP), public participation continued during the adoption of the plan with the following list of activities:

[*Editor's note, this will be updated for the final plan*].

- **Holding a public hearing** to solicit comments on the IPP on April 17, 2025.
- **Making the IPP available** to the public by providing copies to at least one public library or clerk's office in each county in the region and counties outside the region. The IPP was also posted on the Region K and TWDB websites.
- **Holding YY regular meetings of the LCRWPG** to finalize the Region K Water Plan and to receive public comment between YY and YY.
- **Receiving and responding to a Public Information Requests**. Requests for Region K information were received on YY.

10.1 Plan Development

From September 2021 to February 2025, Region K conducted a comprehensive and collaborative approach to water planning for the 6th cycle. Key activities and efforts involved in the development of the Region K water plan include a public hearing on the planning process, regular and committee meetings, public outreach activities, and extensive surveys conducted with the water user groups.

10.1.1 Public Hearing

On September 15, 2021, as a part of its first regular meeting for the 6th cycle of water planning, Region K held a public hearing where comments were received regarding the upcoming planning cycle. Key concerns included water availability, conservation, and reuse strategies. **Appendix 10.A** lists all comments made at this public hearing.

10.1.2 Planning Group and Committee Meetings

Region K held 16 regular meetings between September 15, 2021, and February 20, 2025, for presentations, discussion, deliberation, voting on specific measures, and public comments. Most meetings were held at the LCRA Dalchau Service Center, located at 3505 Montopolis Drive in Austin. Members of the public attended all these meetings, which were posted on the Texas Secretary of State website and the Region K website in accordance with the Open Meetings Act. In accordance with the Texas Public Information Act, meeting minutes and other LCRWPG-related documents were posted on the Region K website for viewing. Interested stakeholders that requested to be included in email notices received email communications regarding upcoming meetings. Every meeting included a scheduled time for public comment and questions. **Appendix 10.B** lists all comments made at all regular meetings of the LCRWPG, including number of public attendees present.

In addition to the regular planning group meetings, Region K held 46 meetings of eight different committees, including the Bylaw Committee, Executive Committee, Population and Water Demand Committee, Nominating Committee, Water Modeling Committee, Water Management Strategy Committee, Legislative & Policy Committee, and the Unique Stream Segments Committee.

These committees met throughout each planning cycle as needed to discuss certain parts of the plan in more detail. Committee meetings were open to the public. **Appendix 10.C** lists each committee, the date of the meeting and the number of public attendees.

10.1.3 Public Outreach Activities

Summarized below are the efforts and activities of the LCRWPG in engaging the public, civic and special-interest groups, and public water supply systems.

Presentations to Civic and Special-Interest Groups

No activities have been reported by planning group members to date.

Websites and Electronic Mail

All regular and committee meetings were advertised through the Secretary of State website and the Region K website. Electronic mailouts, including meeting agendas and associated meeting materials, were provided to interested parties.

Surveys

Region K conducted three surveys in 2023 and 2024 to gather comprehensive data from the water user groups (WUGs) within the region. These surveys focused on understanding a WUG's water supply sources, projected population growth, municipal water demand, conservation measures, and drought contingency plans. Surveys were sent to 132 WUGs that are primarily located in Region K.

Survey #1

In the first survey, conducted between April and June 2023, Region K collected responses from 59 WUGs. The survey focused on gathering basic details about the participating entities, assessing consensus on projected population growth and identifying any significant disagreements, evaluating projected water demand and identifying any discrepancies, and collecting preferred contact details for follow-up communications.

Several WUGs agreed with the projections, while some noted that the projections did not reflect recent growth trends or planned developments, and others indicated that their districts are nearly built out and do not foresee significant population increases. Regarding water demand, some expected higher water demand due to population growth and development pressures. Others have implemented conservation measures and do not anticipate significant increases in water usage and a few entities noted that their current water usage trends and future projections differ from the survey estimates. See **Appendix 10.D** for the questions included in Survey #1.

Survey #2

The second survey, conducted between August through December 2023, delved deeper into specific aspects of water supply and demand. Forty-one WUGs responded. The survey specifically identified entities that provide water on a wholesale basis and the details of their contracts. Additionally, the survey asked for information on groundwater wells, aquifers, and surface water rights, the extent of reclaimed water usage and its applications, and the capacity of water treatment plants operated by the entities.

Several entities provide wholesale water to multiple customers. The contract amounts varied, with some entities having no contractual limits and others specifying exact volumes. Regarding water supply, many entities operate groundwater wells within the Carrizo-Wilcox, Trinity, and Gulf Coast aquifers. The total capacity of wellfields varied significantly. Several entities hold water right permits for surface water. Some entities utilize reclaimed water for golf course irrigation and other non-potable uses. Many entities have contracts with regional water authorities, such as the Lower Colorado River Authority and Guadalupe-Blanco River Authority. Finally, the number of water treatment plants owned and operated by entities varied, with some entities having as many as 15 plants. See **Appendix 10.D** for the questions included in Survey #2.

Survey #3

The third survey was conducted between April through August 2024, with 51 entities responding. This survey focused on the implementation and future planning of water projects. Specifically, the third survey evaluated entities' agreement with projects listed in the 2021 Regional Water Plan, identified projects that have been implemented or are in progress, gathered information on new projects proposed by the entities, assessed current and potential water conservation strategies, and asked the entities the measures they have in place for drought response.

Key responses indicated that some entities disagreed with certain projects and provided reasons for their disagreement. Common reasons for disagreement included the need for additional reclaimed water projects and adjustments to groundwater supply projects. Many entities have implemented water conservation plans, drought management plans, and municipal conservation measures. Specific projects implemented include smart water meters, fire hydrant maintenance, and leak detection programs. Several entities are in the process of expanding reclaimed water systems, updating LCRA contracts, and implementing new drought ordinances. Projects in progress include the Hays County Pipeline and expanded local use of groundwater. Proposed projects include alternative water sources, rainwater harvesting, aquifer storage and recovery, and brackish groundwater desalination. Some entities are considering the construction of new water treatment plants and increased use of reclaimed water.

Common measures for water conservation measures include system audits, leak detection, conservation pricing structures, and public education. Additional measures considered include incentives for low-impact development and mandatory seasonal watering policies. Many entities conduct routine leak detection surveys, use smart meters for rapid leak detection, and perform annual water loss audits. Specific elements of these programs include fire hydrant maintenance, acoustic leak testing, and public engagement to report leaks. Many entities have implemented drought contingency measures such as time-of-day watering restrictions, prohibition on wasting water, and public education. Finally, some entities responded that they are currently in a drought stage, with most reporting Stage 1 or Stage 2 drought conditions. See **Appendix 10.D** for the questions included in Survey #3.

Outreach to Rural Entities

For those public water systems that met the definition of a rural political subdivision as defined in Chapter 15 of the Texas Water Code, Section 15.001(14), Region K surveyed these public water supply systems through the WUG survey process – if they were identified as a Region K WUG. If these systems were identified as "county-other," the LCRWPG contacted these smaller rural public water supply systems via email (when possible), certified mail (when an email was address was not available), and phone calls in some cases asking them to participate in Survey #3.

In Region K, a total of 101 public water systems met the definition of a rural political subdivision, of which 38 were included in the WUG survey process. **Appendix 7.E** lists these 101 rural public water supply systems, and which ones responded to Survey #1, #2, or #3. **Appendix 7.E** also includes the letter sent to the "county -other" systems.

Additionally, for public water supply systems identified by the TCEQ as having a 180-day water supply remaining, three were identified as rural - Marble Falls, Blanco, and the City of Horseshoe Bay. All three systems are Region K WUGs and were contacted through the WUG survey process.

Outreach and Coordination with Neighboring Regions

Beginning in 2023, the Region K consultants worked closely with the consultants for Regions G, L, and P by holding coordination calls every three weeks to discuss mutual interests, planning strategies, and any emerging interregional issues. A total of 25 coordination calls were held. Specifically, these meetings included discussions on the identification and coordination of (1) shared wholesale water providers, (2) existing supplies across regions, (3) new supplies and strategies for future water needs, and (4) shared municipal and non-municipal WUGs to determine what was the primary region for each based on population and demand. Since Region K had no mutual interests with Regions F and H, no coordination calls with these Regions' consultants were held.

Additionally, at various Region K meetings, the Regions G, L, and P liaisons provided reports on relevant interregional issues.

10.2 Plan Adoption

The LCRWPG adopted the Region K Water Plan with continued collaborative efforts and transparent processes, including holding a public hearing on the Initially Prepared Plan (IPP), making available the IPP for public review, and notifying stakeholders and the public of additional planning group meetings.

10.2.1 Public Hearing (Placeholder)

[Editor's note: this section will be updated based on activities that occur after the IPP is submitted]

On April 17, 2025, the LCRWPG held a public hearing where comments were received regarding the Region K Initially Prepared Plan (IPP). **Appendix 10.A** lists all comments made at this public hearing with the comment responses. **Appendix 1.0F** contains the public hearing notice, the presentation posted online prior to the public hearing, and the meeting minutes. Written comments were received from the public from March 18, 2025, to June 16, 2025. These comments also are provided in **Appendix 10.A**.

10.2.2 Planning Group Meetings (Placeholder)

[*Editor's note: this section will be updated based on activities that occur after the IPP is submitted*]

After the public hearing on the IPP, the LCRWPLG held YY regular planning meetings, including the meeting to adopt the final Region K Water Plan, which was held on YY. Written comments received from the public on the final Region K Water Plan until YY. These comments are provided in **Appendix 10.A**.

10.2.3 Availability of the IPP (Placeholder)

[*Editor's note: this section will be updated based on activities that occur after the IPP is submitted*]

The LCRWPG provided a copy of the IPP to at least one public library in each county in the region and either the county courthouse's law library or the county clerk's office in each county in the region and for those counties outside the region involved in the Region K recommended water management strategies. The IPP was also posted onto the Region K and TWDB websites. **Appendix 10.F** includes the Region K IPP Public Hearing Notice, Public Presentation, and Meeting Minutes.

10.2.4 Public Information Requests

No public information requests have been received as of the submission of the IPP on March 3, 2025.

10.3 Related Public Outreach Activities within the Region K Area

In the 2021 joint groundwater planning cycle, the Groundwater Management Areas (GMAs) in the Region K Area (GMAs 7, 8, 9, 10, 12, and 15) followed a process for transforming adopted Desired Future Conditions (DFCs) to the Modeled Available Groundwater (MAGs) for relevant aquifers within each GMA. These MAGs were considered by the LCRWPG in the 2026 Region K Water Plan.

In the joint groundwater planning process, public participation ensures that the voices of stakeholders, including local communities, landowners, and other interested parties, are heard and considered in DFC decision. Opportunities for public participation and input include the following:

90-Day Public Comment Period: After the GMAs proposed DFCs and mailed them to the Groundwater Conservation Districts (GCDs) within the GMA, a 90-day public comment period was initiated. During this time, the public was encouraged to review the proposed DFCs and submit their comments, feedback, and concerns.

GCD Public Hearing: As part of the 90-day public comment period, GCDs were required to hold a public hearing. This hearing served as a formal platform for stakeholders to present their views, ask questions, and engage in discussions about the proposed DFCs.

GCD Compilation of Comments: Following the public comment period, GCDs compiled all the comments received and distributed them to other GCDs within the GMA.

After the GCDs within each GMA compiled relevant comments, each GMA adopted the DFCs. The following table lists the date that the GMAs in the Region K area adopted their most recent DFCs (TWDB, 2021 Joint Groundwater Planning website).

Table 10.1 Adoption Dates for Desired Future Conditions by Groundwater Management Areas in Region K

GMA	DFC Adoption Date
7	August 19, 2021
8	November 4, 2021
9	November 15, 2021
10	October 16, 2021
12	November 30, 2021
15	October 14, 2022

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References

Office of the Attorney General of Texas, Open Meetings Act Handbook 2022, page 1.

Office of the Attorney General of Texas, Public Information Act Handbook 2022, page 1.

Appendices

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Appendix 1.A

Threatened and Endangered Species in the Lower Colorado Regional Water Planning Area







2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

APPENDIX 1A

THREATENED AND ENDANGERED SPECIES IN THE LOWER COLORADO REGIONAL WATER PLANNING AREA
(Texas Parks & Wildlife Department Special Species Lists and Annotated County Lists of Rare Species)

KEY: COUNTY THREATENED OR ENDANGERED SPECIES

LE, LT	Federally Listed Endangered/Threatened
PE, PT	Federally Proposed Endangered/Threatened
SAE, SAT	Federally Endangered/Threatened by Similarity of Appearance
C1	Federal Candidate for Listing, formerly Category 1 Candidate
DL, PDL	Federally Delisted/Proposed for Delisting
NL	Not Federally Listed
E, T	State Listed Endangered/Threatened
NT	Not tracked or no longer tracked by the State
"blank"	Rare, but with no regulatory listing status

Species appearing on these lists do not all share the same probability of occurrence. Some species are migrants or wintering residents only, or may be historic or considered extirpated.

Source: Texas Parks and Wildlife Department Special Species Lists and Annotated County Lists of Rare Species (current as of September 2018)

TABLE 1A-1: THREATENED OR ENDANGERED SPECIES OF BASTROP COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******AMPHIBIANS******				
Houston Toad	*Anaxyrus houstonensis*	endemic; sandy substrate, water in pools, ephemeral pools, stock tanks; breeds in spring especially after rains; burrows in soil of adjacent uplands when inactive; breeds February-June; associated with soils of the Sparta, Carrizo, Goliad, Queen City, Recklaw, Weches, and Willis geologic formations	LE	E
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Henslow's Sparrow	*Ammodramus henslowii*	wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking		
Interior Least Tern	*Sterna antillarum athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Red Knot	*Calidris canutus rufa*	Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San	LT	

Common Name	Scientific Name	Description	Federal Status	State Status
		Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.		
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
Wood Stork	*Mycteria americana*	forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960		T
******CRUSTACEANS******				
A crayfish	*Procambarus texanus*	ponds		
******FISHES******				
Blue sucker	*Cycleptus elongatus*	larger portions of major rivers in Texas; usually in channels and flowing pools with a moderate current; bottom type usually of exposed bedrock, perhaps in combination with hard clay, sand, and gravel; adults winter in deep pools and move upstream in spring to spawn on riffles		T
Guadalupe bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
******MAMMALS******				
Cave myotis bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Elliot's short-tailed shrew	*Blarina hylophaga hylophaga*	sandy areas in live oak mottes, grassy areas with a Loblolly pine (Pinus taeda) overstory, and grassy areas near Post oak (Quercus stellata) stands; burrows extensively under leaf litter, logs, and into soil, but ground cover is not required; needs soft damp soils for ease of burrowing		
Plains spotted skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				

Common Name	Scientific Name	Description	Federal Status	State Status
Texas garter snake	*Thamnophis sirtalis annectens*	wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August		
Texas horned lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
Timber rattlesnake	*Crotalus horridus*	swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto		T
******PLANTS******				
Green beebalm	*Monarda viridissima*	Endemic perennial herb of the Carrizo Sands; deep, well-drained sandy soils in openings of post oak woodlands; flowers white.		
Navasota ladies'-tresses	*Spiranthes parksii*	Texas endemic; openings in post oak woodlands in sandy loams along upland drainages or intermittent streams, often in areas with suitable hydrologic factors, such as a perched water table associated with the underlying claypan; flowering populations fluctuate widely from year to year, an individual plant does not flower every year; flowering late October-early November (-early December)	LE	E
Sandhill woollywhite	*Hymenopappus carrizoanus*	Texas endemic; disturbed or open areas in grasslands and post oak woodlands on deep sands derived from the Carrizo Sand and similar Eocene formations; flowering April-June		
Shinner's sunflower	*Helianthus occidentalis ssp plantagineus*	mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country		

TABLE 1A-2: THREATENED OR ENDANGERED SPECIES OF BLANCO COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******AMPHIBIANS******				
Blanco River Springs Salamander	*Eurycea pterophila*	subaquatic; springs and caves in the Blanco River drainage		
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapilla*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous & broad-leaved shrubs & trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
Zone-tailed Hawk	*Buteo albonotatus*	arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions		T
******FISHES******				
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		

Common Name	Scientific Name	Description	Federal Status	State Status
Headwater catfish	*Ictalurus lupus*	originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers		
******INSECTS******				
A mayfly	*Allenhyphes michaeli*	TX Hill Country; mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation		
Disjunct crawling water beetle	*Haliplus nitens*	unknown, maybe shallow water		
******MAMMALS******				
Black Bear	*Ursus americanus*	bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state listed Threatened		T
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Gray wolf	*Canis lupus*	extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands	LE	E
Llano pocket gopher	*Geomys texensis texensis*	found in deep, brown loamy sands or gravelly sandy loams and is isolated from other species of pocket gophers by intervening shallow stony to gravelly clayey soils		
Plains spotted skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Golden orb	*Quadrula aurea*	sand and gravel in some locations and mud at others; found in lentic and lotic; Guadalupe, San Antonio, Lower San Marcos, and Nueces River basins	C	T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fatmucket	*Lampsilis bracteata*	streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Spot-tailed earless lizard	*Holbrookia lacerata*	central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates; eggs laid underground		
Texas garter snake	*Thamnophis sirtalis annectens*	wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August		
Texas horned lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
******PLANTS******				
Granite spiderwort	*Tradescantia pedicellata*	Texas endemic; mostly in fractures on outcrops of granite, gneiss, and similar igneous and metamorphic rocks, or in early successional grasslands or forb-dominated assemblages on well-drained, sandy to gravelly soils derived from same; flowering at least April-May		

Common Name	Scientific Name	Description	Federal Status	State Status
Hill Country wild-mercury	*Argythamnia aphoroides*	Texas endemic; mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; flowering April-May with fruit persisting until midsummer		
Llano butterweed	*Packera texensis*	Endemic to Llano Uplift of Edwards Plateau; granite sands; arises quickly from evergreen winter rosettes during January rains; flowers Feb-Mar.		

TABLE 1A-3: THREATENED OR ENDANGERED SPECIES OF BURNET COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******ARACHNIDS******				
Bee Creek Cave harvestman	*Texella reddelli*	small, blind, cave-adapted harvestman endemic to a few caves in Travis and Williamson counties	LE	
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers, and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter, hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapilla*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	LE	E
Interior Least Tern	*Sterna antillarum athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio	LE	E

Common Name	Scientific Name	Description	Federal Status	State Status
		counties		
******CRUSTACEANS******				
An amphipod	*Stygobromus russelli*	subterranean waters, usually in caves and limestone aquifers; resident of numerous caves in ca. 10 counties of the Edwards Plateau		
Bifurcated cave amphipod	*Stygobromus bifurcatus*	found in cave pools		
******FISHES******				
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
Headwater catfish	*Ictalurus lupus*	originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers		
******INSECTS******				
Disjunct crawling water beetle	*Haliplus nitens*	unknown, maybe shallow water		
******MAMMALS******				
Cave myotis bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Gray wolf	*Canis lupus*	extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands	LE	E
Llano pocket gopher	*Geomys texensis texensis*	found in deep, brown loamy sands or gravelly sandy loams and is isolated from other species of pocket gophers by intervening shallow stony to gravelly clayey soils		
Plains spotted skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fatmucket	*Lampsilis bracteata*	streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Concho water snake	*Nerodia paucimaculata*	Texas endemic; Concho and Colorado river systems; shallow fast-flowing water with a rocky or gravelly substrate preferred; adults can be found in deep water with mud bottoms; breeding March-October	DL	
Spot-tailed earless lizard	*Holbrookia lacerata*	central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates;		

Common Name	Scientific Name	Description	Federal Status	State Status
		eggs laid underground		
Texas garter snake	*Thamnophis sirtalis annectens*	wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August		
Texas horned lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
******PLANTS******				
Basin bellflower	*Campanula reverchonii*	Texas endemic; among scattered vegetation on loose gravel, gravelly sand, and rock outcrops on open slopes with exposures of igneous and metamorphic rocks; may also occur on sandbars and other alluvial deposits along major rivers; flowering May-July		
Edwards Plateau cornsalad	*Valerianella texana*	very shallow, well-drained, but seasonally moist gravelly-sandy soils derived from igneous or metamorphic rocks, often along the downslope margin of rock outcrops, in full sun or in partial shade of oak-juniper woodlands; more likely encountered in early successional areas; population numbers fluctuate considerably from year to year, with higher numbers following winters with higher rains and/or moderate temperatures; peak flowering/fruiting mid-March–late April, stems wither and disappear by the beginning of May		
Enquist's sandmint	*Brazoria enquistii*	Texas endemic; primarily on sand banks in and along beds of streams that drain granitic or gneissic landscapes; flowering/fruiting April-June		
Granite spiderwort	*Tradescantia pedicellata*	Texas endemic; mostly in fractures on outcrops of granite, gneiss, and similar igneous and metamorphic rocks, or in early successional grasslands or forb-dominated assemblages on well-drained, sandy to gravelly soils derived from same; flowering at least April-May		
Rock quillwort	*Isoetes lithophila*	Texas endemic; rooted in sand and gravel under shallow water of seasonal pools (vernal pools) that develop during rainy seasons in small, shallow, unshaded basins on barren outcrops of granite and gneiss; sporulating in late winter and spring, and opportunistically in other seasons following heavy rainfall		

TABLE 1A-4: THREATENED OR ENDANGERED SPECIES OF COLORADO COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******AMPHIBIANS******				
Houston Toad	*Anaxyrus houstonensis*	endemic; sandy substrate, water in pools, ephemeral pools, stock tanks; breeds in spring especially after rains; burrows in soil of adjacent uplands when inactive; breeds February-June; associated with soils of the Sparta, Carrizo, Goliad, Queen City, Recklaw, Weches, and Willis geologic formations	LE	E
Southern Crawfish Frog	*Lithobates areolatus areolatus*	The Southern Crawfish Frog can be found in abandoned crawfish holes and small mammal burrows. This species inhabits moist meadows, pasturelands, pine scrub, and river flood plains. This species spends nearly all of its time in burrows and only leaves the burrow area to breed. Although this species can be difficult to detect due to its reclusive nature, the call of breeding males can be heard over great distances. Eggs are laid and larvae develop in temporary water such as flooded fields, ditches, farm ponds and small lakes. Habitat: Shallow water, Herbaceous Wetland, Riparian, Temporary Pool, Cropland/hedgerow, Grassland/herbaceous, Suburban/orchard, Woodland – Conifer.		
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Attwater's Greater Prairie-chicken	*Tympanuchus cupido attwateri*	this county within historic range; endemic; open prairies of mostly thick grass one to three feet tall; from near sea level to 200 feet along coastal plain on upper two-thirds of Texas coast; males form communal display flocks during late winter-early spring; booming grounds important; breeding February-July	LE	E
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Henslow's Sparrow	*Ammodramus henslowii*	wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking		
Interior Least Tern	*Sterna antillarum athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Red Knot	*Calidris canutus rufa*	Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and	LT	

Common Name	Scientific Name	Description	Federal Status	State Status
		also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.		
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
White-faced Ibis	*Plegadis chihi*	prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats		T
White-tailed Hawk	*Buteo albicaudatus*	near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May		T
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
Wood Stork	*Mycteria americana*	forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960		T
******FISHES******				
Blue sucker	*Cycleptus elongatus*	larger portions of major rivers in Texas; usually in channels and flowing pools with a moderate current; bottom type usually of exposed bedrock, perhaps in combination with hard clay, sand, and gravel; adults winter in deep pools and move upstream in spring to spawn on riffles		T
Guadalupe bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
******INSECTS******				
Texas asaphomyian tabanid fly	*Asaphomyia texensis*	globally historic; adults of tabanid spp. found near slow-moving water; eggs laid in masses on leaves or other objects near or over water; larvae are aquatic and predaceous; females of tabanid spp. bite, while males chiefly feed on pollen and nectar; using sight, carbon dioxide, and odor for selection, tabanid spp. lie in wait in shady areas under bushes and trees for a host to happen by		
******MAMMALS******				
Louisiana Black Bear	*Ursus americanus luteolus*	possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas	DL	T
Plains spotted skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T

Common Name	Scientific Name	Description	Federal Status	State Status
******REPTILES******				
Texas horned lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
Timber rattlesnake	*Crotalus horridus*	swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto		T
******PLANTS******				
Coastal gay-feather	*Liatris bracteata*	Texas endemic; coastal prairie grasslands of various types, from salty prairie on low- lying somewhat saline clay loams to upland prairie on nonsaline clayey to sandy loams; flowering in fall		
Shinner's sunflower	*Helianthus occidentalis ssp plantagineus*	mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country		

TABLE 1A-5: THREATENED OR ENDANGERED SPECIES OF FAYETTE COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Henslow's Sparrow	*Ammodramus henslowii*	wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking		
Interior Least Tern	*Sterna antillarum athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Red Knot	*Calidris canutus rufa*	Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.	LT	
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E

Wood Stork	*Mycteria americana*	forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960		T
******FISHES******				
Blue sucker	*Cycleptus elongatus*	larger portions of major rivers in Texas; usually in channels and flowing pools with a moderate current; bottom type usually of exposed bedrock, perhaps in combination with hard clay, sand, and gravel; adults winter in deep pools and move upstream in spring to spawn on riffles		T
Guadalupe bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
******MAMMALS******				
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Plains Spotted Skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red Wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Texas horned lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
Timber rattlesnake	*Crotalus horridus*	swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto		T
******PLANTS******				
Bristle nailwort	*Paronychia setacea*	Flowering vascular plant endemic to eastern southcentral Texas, occurring in sandy soils		
Navasota ladies'-tresses	*Spiranthes parksii*	Texas endemic; openings in post oak woodlands in sandy loams along upland drainages or intermittent streams, often in areas with suitable hydrologic factors, such as a perched water table associated with the underlying claypan; flowering populations fluctuate widely from year to year, an individual plant does not flower every year; flowering late October-early November (-early December)	LE	E
Shinner's sunflower	*Helianthus occidentalis ssp plantagineus*	mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country		

Texas meadow-rue	*Thalictrum texanum*	Texas endemic; mostly found in woodlands and woodland margins on soils with a surface layer of sandy loam, but it also occurs on prairie pimple mounds; both on uplands and creek terraces, but perhaps most common on claypan savannas; soils are very moist during its active growing season; flowering/fruiting (January-) February-May, withering by midsummer, foliage reappears in late fall(November) and may persist through the winter

TABLE 1A-6: THREATENED OR ENDANGERED SPECIES OF GILLESPIE COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Baird's Sparrow	*Ammodramus bairdii*	shortgrass prairie with scattered low bushes and matted vegetation; mostly migratory in western half of State, though winters in Mexico and just across Rio Grande into Texas from Brewster through Hudspeth counties		
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapilla*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	C	
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
Zone-tailed Hawk	*Buteo albonotatus*	arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions		T
******FISHES******				
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		

Common Name	Scientific Name	Description	Federal Status	State Status
Headwater catfish	*Ictalurus lupus*	originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers		
******MAMMALS******				
Black Bear	*Ursus americanus*	bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state listed Threatened		T
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Gray Wolf	*Canis lupus*	extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands	LE	E
Llano Pocket Gopher	*Geomys texensis texensis*	found in deep, brown loamy sands or gravelly sandy loams and is isolated from other species of pocket gophers by intervening shallow stony to gravelly clayey soils		
Plains spotted skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fatmucket	*Lampsilis bracteata*	streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Spot-tailed earless lizard	*Holbrookia lacerata*	central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates; eggs laid underground		
Texas horned lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
******PLANTS******				
Basin bellflower	*Campanula reverchonii*	Texas endemic; among scattered vegetation on loose gravel, gravelly sand, and rock outcrops on open slopes with exposures of igneous and metamorphic rocks; may also occur on sandbars and other alluvial deposits along major rivers; flowering May-July		
Big red sage	*Salvia pentstemonoides*	Texas endemic; moist to seasonally wet, steep limestone outcrops on seeps within canyons or along creek banks; occasionally on clayey to silty soils of creek banks and terraces, in partial shade to full sun; basal leaves conspicuous for much of the year; flowering June-October		
Canyon rattlesnake-root	*Prenanthes carrii*	Texas endemic; rich humus soils over limestone in upper woodland canyon drainages, upper small spring fed drainages, typically near springs in deep soils around the springs and on limestone shelves, honeycomb rock (porous rock); flowering and fruiting late August-November		

Common Name	Scientific Name	Description	Federal Status	State Status
Correll's false dragon-head	*Physostegia correllii*	wet, silty clay loams on streamsides, in creek beds, irrigation channels and roadside drainage ditches; or seepy, mucky, sometimes gravelly soils along riverbanks or small islands in the Rio Grande; or underlain by Austin Chalk limestone along gently flowing spring-fed creek in central Texas; flowering May-September		
Edwards Plateau cornsalad	*Valerianella texana*	very shallow, well-drained, but seasonally moist gravelly-sandy soils derived from igneous or metamorphic rocks, often along the downslope margin of rock outcrops, in full sun or in partial shade of oak-juniper woodlands; more likely encountered in early successional areas; population numbers fluctuate considerably from year to year, with higher numbers following winters with higher rains and/or moderate temperatures; peak flowering/fruiting mid-March–late April, stems wither and disappear by the beginning of May		
Hill Country wild-mercury	*Argythamnia aphoroides*	Texas endemic; mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; flowering April-May with fruit persisting until midsummer		
Llano butterweed	*Packera texensis*	Endemic to Llano Uplift of Edwards Plateau; granite sands; arises quickly from evergreen winter rosettes during January rains; flowers Feb-Mar.		
Rock quillwort	*Isoetes lithophila*	Texas endemic; rooted in sand and gravel under shallow water of seasonal pools (vernal pools) that develop during rainy seasons in small, shallow, unshaded basins on barren outcrops of granite and gneiss; sporulating in late winter and spring, and opportunistically in other seasons following heavy rainfall		
Small-headed pipewort	*Eriocaulon koernickianum*	in East Texas, post-oak woodlands and xeric sandhill openings on permanently wet acid sands of upland seeps and hillside seepage bogs, usually in patches of bare sand rather than among dense vegetation or on muck; in Gillespie County, on permanently wet or moist hillside seep on decomposing granite gravel and sand among granite outcrops; flowering/fruiting late May-late June		
Warnock's coral-root	*Hexalectris warnockii*	in leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years		

TABLE 1A-7: THREATENED OR ENDANGERED SPECIES OF HAYS COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******AMPHIBIANS******				
Barton Springs salamander	*Eurycea sosorum*	dependent upon water flow/quality from the Barton Springs pool of the Edwards Aquifer; known from the outlets of Barton Springs and subterranean water-filled caverns; found under rocks, in gravel, or among aquatic vascular plants and algae, as available; feeds primarily on amphipods	LE	E
Blanco Blind Salamander	*Eurycea robusta*	troglobitic; water-filled subterranean caverns; may inhabit deep levels of the Balcones aquifer to the north and east of the Blanco River		T
Blanco River Springs Salamander	*Eurycea pterophila*	subaquatic; springs and caves in the Blanco River drainage		
San Marcos Salamander	*Eurycea nana*	headwaters of the San Marcos River downstream to ca. ½ mile past IH-35; water over gravelly substrate characterized by dense mats of algae (*Lyng bya*) and aquatic moss (*Leptodictym riparium*), and water temperatures of 21-22 ^{O} C; diet includes amphipods, midge larve, and aquatic snails	LT	T
Texas Blind Salamander	*Eurycea rathbuni*	troglobitic; water-filled subterranean caverns along a six mile stretch of the San Marcos Spring Fault, in the vicinity of San Marcos; eats small invertebrates, including snails, copepods, amphipods, and shrimp	LE	E
******ARACHNIDS******				
Bandit Cave spider	*Cicurina bandida*	very small, subterrestrial, subterranean obligate		
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapilla*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T

Common Name	Scientific Name	Description	Federal Status	State Status
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
Zone-tailed Hawk	*Buteo albonotatus*	arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions		T
******CRUSTACEANS******				
A cave obligate crustacean	*Monodella texana*	subaquatic, subterranean obligate; underground freshwater aquifers		
Balcones Cave amphipod	*Stygobromus balconis*	subaquatic, subterranean obligate amphipod		
Ezell's Cave Amphipod	*Stygobromus flagellatus*	known only from artesian wells		
Texas Cave Shrimp	*Palaemonetes antrorum*	subterranean sluggish streams and pools		
Texas troglobitic water slater	*Lirceolus smithii*	subaquatic, subterranean obligate, aquifer		
******FISHES******				
Fountain Darter	*Etheostoma fonticola*	known only from the San Marcos and Comal rivers; springs and spring-fed streams in dense beds of aquatic plants growing close to bottom, which is normally mucky; feeding mostly diurnal; spawns year-round with August and late winter to early spring peaks	LE	E
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
Ironcolor shiner	*Notropis chalybaeus*	Big Cypress Bayou and Sabine River basins; spawns April-September, eggs sink to bottom of pool; pools and slow runs of low gradient small acidic streams with sandy substrate and clear well vegetated water; feeds mainly on small insects, ingested plant material not digested		
San Marcos Gambusia	*Gambusia georgei*	extinct; endemic; formerly known from upper San Marcos River; restricted to shallow, quiet, mud-bottomed shoreline areas without dense vegetation in thermally constant main channel	LE	E
******INSECTS******				
Comal Springs dryopid beetle	*Stygoparnus comalensis*	dryopids usually cling to objects in a stream; dryopids are sometimes found crawling on stream bottoms or along shores; adults may leave the stream and fly about, especially at night; most dryopid larvae are vermiform and live in soil or decaying wood	LE	E
Comal Springs Riffle Beetle	*Heterelmis comalensis*	Comal and San Marcos Springs	LE	E
Edwards Aquifer Diving Beetle	*Haideoporus texanus*	habitat poorly known; known from an artesian well in Hays County		
Flint's net-spinning caddisfly	*Cheumatopsyche flinti*	very poorly known species with habitat description limited to 'a spring'		
San Marcos Saddle-case Caddisfly	*Protoptila arca*	known from an artesian well in Hays County; locally very abundant; swift, well-oxygenated warm water about 1-2 m deep; larvae and pupal cases abundant on rocks		
Texas austrotinodes caddisfly	*Austrotinodes texensis*	appears endemic to the karst springs and spring runs of the Edwards Plateau region; flow in type locality swift but may drop significantly during periods of little drought; substrate coarse and ranges from cobble and gravel to limestone bedrock; many limestone outcroppings also found along the streams		
******MAMMALS******				

Common Name	Scientific Name	Description	Federal Status	State Status
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Plains Spotted Skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Golden orb	*Quadrula aurea*	sand and gravel in some locations and mud at others; found in lentic and lotic; Guadalupe, San Antonio, Lower San Marcos, and Nueces River basins	C	T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fatmucket	*Lampsilis bracteata*	streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Cagle's Map Turtle	*Graptemys caglei*	endemic; Guadalupe River System; shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of water's edge		T
Spot-tailed Earless Lizard	*Holbrookia lacerata*	central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates; eggs laid underground		
Texas Garter Snake	*Thamnophis sirtalis annectens*	wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August		
Texas Horned Lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
******PLANTS******				
Bracted twistflower	*Streptanthus bracteatus*	Texas endemic; shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer	C	
Hill country wild-mercury	*Argythamnia aphoroides*	Texas endemic; mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; flowering April-May with fruit persisting until midsummer		
Texas wild-rice	*Zizania texana*	Texas endemic; spring-fed river, in clear, cool, swift water mostly less than 1 m deep, with coarse sandy soils rather than finer clays; flowering	LE	E

Common Name	Scientific Name	Description	Federal Status	State Status
		year-round, peaking March-June		
Warnock's coral root	*Hexalectris warnockii*	in leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years		

TABLE 1A-8: THREATENED OR ENDANGERED SPECIES OF LLANO COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapillus*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous & broad-leaved shrubs & trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	LE	E
Interior Least Tern	*Sterna antillarum athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E

Common Name	Scientific Name	Description	Federal Status	State Status
Zone-tailed Hawk	*Buteo albonotatus*	arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions		T
******FISHES******				
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
Headwater catfish	*Ictalurus lupus*	originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers		
******MAMMALS******				
Black Bear	*Ursus americanus*	bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state listed Threatened		T
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Gray Wolf	*Canis lupus*	extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands	LE	E
Llano Pocket Gopher	*Geomys texensis texensis*	found in deep, brown loamy sands or gravelly sandy loams and is isolated from other species of pocket gophers by intervening shallow stony to gravelly clayey soils		
Plains Spotted Skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red Wolf	*Canis Rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fatmucket	*Lampsilis bracteata*	streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Spot-tailed Earless Lizard	*Holbrookia lacerata*	central & southern Texas & adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other		

Common Name	Scientific Name	Description	Federal Status	State Status
		obstructions, including disturbed areas; eats small invertebrates; eggs laid underground		
Texas Garter Snake	*Thamnophis sirtalis annectens*	wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August		
Texas Horned Lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
******PLANTS******				
Basin bellflower	*Campanula reverchonii*	Texas endemic; among scattered vegetation on loose gravel, gravelly sand, and rock outcrops on open slopes with exposures of igneous and metamorphic rocks; may also occur on sandbars and other alluvial deposits along major rivers; flowering May-July		
Edwards Plateau Cornsalad	*Valerianellla texana*	very shallow, well-drained, but seasonally moist gravelly-sandy soils derived from igneous or metamorphic rocks, often along the downslope margin of rock outcrops, in full sun or in partial shade of oak-juniper woodlands; more likely encountered in early successional areas; population numbers fluctuate considerably from year to year, with higher numbers following winters with higher rains and/or moderate temperatures; peak flowering/fruiting mid-March–late April, stems wither and disappear by the beginning of May		
Elmendorf’s Onion	*Allium elmendorfii*	Texas endemic; grassland openings in oak woodlands on deep, loose, well-drained sands; in Coastal Bend, on Pleistocene barrier island ridges and Holocene Sand Sheet that support live oak woodlands; to the north it occurs in post oak-black hickory-live oak woodlands over Queen City and similar Eocene formations; one anomalous specimen found on Llano Uplift in wet pockets of granitic loam; flowering March-April, May		
Enquist's sandmint	*Brazoria enquistii*	Texas endemic ; primarily on sand banks in and along beds of streams that drain granitic or gneissic landscapes; flowering/fruiting April-June		
Granite spiderwort	*Tradescantia pedicellata*	Texas endemic; mostly in fractures on outcrops of granite, gneiss, and similar igneous and metamorphic rocks, or in early successional grasslands or forb-dominated assemblages on well-drained, sandy to gravelly soils derived from same; flowering at least April-May		
Llano butterweed	*Packera texensis*	Endemic to Llano Uplift of Edwards Plateau; granite sands; arises quickly from evergreen winter rosettes during January rains; flowers Feb-March.		
Rock quillwort	*Isoetes lithophila*	Texas endemic; rooted in sand and gravel under shallow water of seasonal pools (vernal pools) that develop during rainy seasons in small, shallow, unshaded basins on barren outcrops of granite and gneiss; sporulating in late winter and spring, and opportunistically in other seasons following heavy rainfall.		

TABLE 1A-9: THREATENED OR ENDANGERED SPECIES OF MATAGORDA COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near seacoasts, rivers, and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black Rail	*Laterallus jamaicensis*	salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous year's dead grasses; nest usually hidden in marsh grass or at base of Salicornia	NL	
Brown Pelican	*Pelecanus occidentalis*	largely coastal and near shore areas, where it roosts and nests on islands and spoil banks	DL	
Eskimo Curlew	*Numenius borealis*	historic; nonbreeding: grasslands, pastures, plowed fields, and less frequently, marshes and mudflats	LE	E
Henslow's Sparrow	*Ammodramus henslowii*	wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking		
Northern Aplomado Falcon	*Falco femoralis septentrionalis*	open country, especially savanna and open woodland, and sometimes in very barren areas; grassy plains and valleys with scattered mesquite, yucca, and cactus; nests in old stick nests of other bird species	LE	E
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Piping Plover	*Charadrius melodus*	wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats	LT	T
Red Knot	*Calidris canutus rufa*	Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.	LT	
Reddish Egret	*Egretta rufescens*	resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear		T
Snowy Plover	*Charadrius alexandrinus*	formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast		

Common Name	Scientific Name	Description	Federal Status	State Status
Sooty Tern	*Sterna fuscata*	predominately 'on the wing'; does not dive, but snatches small fish and squid with bill as it flies or hovers over water; breeding April-July		T
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Western Snowy Plover	*Charadrius alexandrinus nivosus*	uncommon breeder in the Panhandle; potential migrant; winter along coast		
White-faced Ibis	*Plegadis chihi*	prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats		T
White-tailed Hawk	*Buteo albicaudatus*	near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May		T
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
Wood Stork	*Mycteria americana*	forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960		T
******CRUSTACEANS******				
A crayfish	*Cambarellus texanus*	shallow water; benthic, burrowing in or using soil; apparently tolerant of warmer waters; prefers standing water of ditches in which there is emergent vegetation; will burrow in dry periods; detritivore		
******FISHES******				
American Eel	*Anguilla rostrata*	coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally		
Blue sucker	*Cycleptus elongatus*	larger portions of major rivers in Texas; usually in channels and flowing pools with a moderate current; bottom type usually of exposed bedrock, perhaps in combination with hard clay, sand, and gravel; adults winter in deep pools and move upstream in spring to spawn on riffles		T
Smalltooth sawfish	*Pristis pectinata*	different life history stages have different patterns of habitat use; young found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 32 ft (10 m); in sheltered bays, on shallow banks, and in estuaries or river mouths; adult sawfish are encountered in various habitat types (mangrove, reef, seagrass, and coral), in varying salinity regimes and temperatures, and at various water depths, feed on a variety of fish species and crustaceans	LE	E
******INSECTS******				
Gulf Coast clubtail	*Gomphus modestus*	medium river, moderate gradient,and streams with silty sand or rocky bottoms; adults forage in trees, males perch near riffles to wait for females, larvae overwinter; flight season late Apr - late Jun		
******MAMMALS******				
Louisiana Black Bear	*Ursus americanus luteolus*	possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas	DL	T
Ocelot	*Leopardus pardalis*	dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas; breeds and raises young June-November	LE	E
Plains Spotted Skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red Wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E

Common Name	Scientific Name	Description	Federal Status	State Status
West Indian Manatee	*Trichechus manatus*	Gulf and bay system; opportunistic, aquatic herbivore	LT	E
******MOLLUSKS******				
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Atlantic Hawksbill Sea Turtle	*Eretmochelys imbricata*	Gulf and bay system, warm shallow waters especially in rocky marine environments, such as coral reefs and jetties, juveniles found in floating mats of sea plants; feed on sponges, jellyfish, sea urchins, molluscs, and crustaceans, nests April through November	LE	E
Green sea turtle	*Chelonia mydas*	Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches; adults are herbivorous feeding on sea grass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on sea grasses and seaweeds; nesting behavior extends from March to October, with peak activity in May and June	LT	T
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Gulf and bay system, adults stay within the shallow waters of the Gulf of Mexico; feed primarily on crabs, but also snails, clams, other crustaceans and plants, juveniles feed on sargassum and its associated fauna; nests April through August	LE	E
Leatherback Sea Turtle	*Dermochelys coriacea*	Gulf and bay systems, and widest ranging open water reptile; omnivorous, shows a preference for jellyfish; in the US portion of their western Atlantic nesting territories, nesting season ranges from March to August	LE	E
Loggerhead Sea Turtle	*Caretta caretta*	Gulf and bay system primarily for juveniles, adults are most pelagic of the sea turtles; omnivorous, shows a preference for mollusks, crustaceans, and coral; nests from April through November	LT	T
Texas Diamondback Terrapin	*Malaclemys terrapin littoralis*	coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive; may venture into lowlands at high tide		
Texas Horned Lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
Texas scarlet snake	*Cemophora coccinea lineri*	mixed hardwood scrub on sandy soils; feeds on reptile eggs; semi-fossorial; active April-September		T
Texas Tortoise	*Gopherus berlandieri*	open brush with a grass understory is preferred; open grass and bare ground are avoided; when inactive occupies shallow depressions at base of bush or cactus, sometimes in underground burrows or under objects; longevity greater than 50 years; active March-November; breeds April-November		T
Timber Rattlesnake	*Crotalus horridus*	swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto		T
****** PLANTS******				
Coastal Gay-Feather	*Liatris bracteata*	Texas endemic; coastal prairie grasslands of various types, from salty prairie on low- lying somewhat saline clay loams to upland prairie on nonsaline clayey to sandy loams; flowering in fall		
Panicled indigobush	*Amorpha paniculata*	A stout shrub, 3 m (9 ft) tall that grows in acid seep forests, peat bogs, wet floodplain forests, and seasonal wetlands on the edge of Saline Prairies in East Texas. It is distinguished from other Amorpha species by its fuzzy		

Common Name	Scientific Name	Description	Federal Status	State Status
		leaflets with prominent raised veins underneath, and the flower panicles, which are 8 to 16 inches long and slender, held above the foliage. Perennial; Flowering summer		
Shinner's sunflower	*Helianthus occidentalis ssp plantagineus*	mostly in prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country		
Threeflower broomweed	*Thurovia triflora*	Texas endemic; near coast in sparse, low vegetation on a veneer of light colored silt or fine sand over saline clay along drier upper margins of ecotone between between salty prairies and tidal flats; further inland associated with vegetated slick spots on prairie mima mounds; flowering September-November		

TABLE 1A-10: THREATENED OR ENDANGERED SPECIES OF MILLS COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapilla*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	LE	E
Interior Least Tern	*Sterna antillarum athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
******FISHES******				
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
******MAMMALS******				
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of		

		Panhandle during winter; opportunistic insectivore		
Gray Wolf	*Canis lupus*	extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands	LE	E
Llano pocket gopher	*Geomys texensis texensis*	found in deep, brown loamy sands or gravelly sandy loams and is isolated from other species of pocket gophers by intervening shallow stony to gravelly clayey soils		
Red Wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Concho Water Snake	*Nerodia Paucimaculata*	Texas endemic; Concho and Colorado river systems; shallow fast-flowing water with a rocky or gravelly substrate preferred; adults can be found in deep water with mud bottoms; breeding March-October	DL	
Texas Horned Lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
******PLANTS******				
Hill Country Wild-Mercury	*Argythamnia Aphoroides*	Texas endemic; mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; flowering April-May with fruit persisting until midsummer		

TABLE 1A-11: THREATENED OR ENDANGERED SPECIES OF SAN SABA COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Baird's Sparrow	*Ammodramus bairdii*	shortgrass prairie with scattered low bushes and matted vegetation; mostly migratory in western half of State, though winters in Mexico and just across Rio Grande into Texas from Brewster through Hudspeth counties		
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapilla*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	LE	E
Interior Least Tern	*Sterna Antillarum Athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
Zone-tailed Hawk	*Buteo albonotatus*	arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions		T

Common Name	Scientific Name	Description	Federal Status	State Status
******CRUSTACEANS******				
Reddell's cave amphipod	*Stygobromus reddelli*	subterranean obligate; small cave streams		
******FISHES******				
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
Headwater catfish	*Ictalurus lupus*	originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers		
Sharpnose shiner	*Notropis oxyrhynchus*	endemic to Brazos River drainage; also, apparently introduced into adjacent Colorado River drainage; large turbid river, with bottom a combination of sand, gravel, and clay-mud	LE	
******MAMMALS******				
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Gray Wolf	*Canis lupus*	extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands	LE	E
Llano Pocket Gopher	*Geomys texensis texensis*	found in deep, brown loamy sands or gravelly sandy loams and is isolated from other species of pocket gophers by intervening shallow stony to gravelly clayey soils		
Red Wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quincuncina mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fatmucket	*Lampsilis bracteata*	streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Concho water snake	*Nerodia paucimaculata*	Texas endemic; Concho and Colorado river systems; shallow fast-flowing water with a rocky or gravelly substrate preferred; adults can be found in deep water with mud bottoms; breeding March-October	DL	
Spot-tailed earless lizard	*Holbrookia lacerata*	central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates; eggs laid underground		
Texas horned lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
******PLANTS******				

Common Name	Scientific Name	Description	Federal Status	State Status
Basin bellflower	*Campanula reverchonii*	Texas endemic; among scattered vegetation on loose gravel, gravelly sand, and rock outcrops on open slopes with exposures of igneous and metamorphic rocks; may also occur on sandbars and other alluvial deposits along major rivers; flowering May-July		

TABLE 1A-12: THREATENED OR ENDANGERED SPECIES OF TRAVIS COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******AMPHIBIANS******				
Austin Blind Salamander	*Eurycea waterlooensis*	mostly restricted to subterranean cavities of the Edwards Aquifer; dependent upon water flow/quality from the Barton Springs segment of the Edwards Aquifer; only known from the outlets of Barton Springs (Sunken Gardens (Old Mill) Spring, Eliza Spring, and Parthenia (Main) Spring which forms Barton Springs Pool); feeds on amphipods, ostracods, copepods, plant material, and (in captivity) a wide variety of small aquatic invertebrates	LE	E
Barton Springs Salamander	*Eurycea sosorum*	dependent upon water flow/quality from the Barton Springs pool of the Edwards Aquifer; known from the outlets of Barton Springs and subterranean water-filled caverns; found under rocks, in gravel, or among aquatic vascular plants and algae, as available; feeds primarily on amphipods	LE	E
Jollyville Plateau Salamander	*Eurycea tonkawae*	known from springs and waters of some caves north of the Colorado River	LT	
Pedernales River Springs Salamander	*Eurycea sp. 6*	endemic; known only from springs		
******ARACHNIDS******				
Bandit Cave Spider	*Cicurina bandida*	very small, subterrestrial, subterranean obligate		
Bee Creek Cave harvestman	*Texella reddelli*	small, blind, cave-adapted harvestman endemic to a few caves in Travis and Williamson counties	LE	
Bone Cave Harvestman	*Texella reyesi*	small, blind, cave-adapted harvestman endemic to a few caves in Travis and Williamson counties; weakly differentiated from Texella reddelli	LE	
Tooth Cave Pseudoscorpion	*Tartarocreagris texana*	small, cave-adapted pseudoscorpion known from small limestone caves of the Edwards Plateau	LE	
Tooth Cave Spider	*Neoleptoneta myopica*	very small, cave-adapted, sedentary spider	LE	
Warton's cave meshweaver	*Cicurina wartoni*	very small, cave-adapted spider		
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapillus*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-	LE	E

Common Name	Scientific Name	Description	Federal Status	State Status
		leaved trees and shrubs; nesting late March-early summer		
Interior Least Tern	*Sterna antillarum athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Red Knot	*Calidris canutus rufa*	Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.	LT	
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
******CRUSTACEANS******				
An Amphipod	*Stygobromus russelli*	subterranean waters, usually in caves & limestone aquifers; resident of numerous caves in ca. 10 counties of the Edwards Plateau		
Balcones Cave amphipod	*Stygobromus balconis*	subaquatic, subterranean obligate amphipod		
Bifurcated Cave Amphipod	*Stygobromus bifurcatus*	found in cave pools		
******FISHES******				
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
Smalleye shiner	*Notropis buccula*	endemic to upper Brazos River system and its tributaries (Clear Fork and Bosque); apparently introduced into adjacent Colorado River drainage; medium to large prairie streams with sandy substrate and turbid to clear warm water; presumably eats small	LE	

Common Name	Scientific Name	Description	Federal Status	State Status
		aquatic invertebrates		
INSECTS				
Kretschmarr Cave Mold Beetle	*Texamaurops reddelli*	small, cave-adapted beetle found under rocks buried in silt; small, Edwards Limestone caves in of the Jollyville Plateau, a division of the Edwards Plateau	LE	
Tooth Cave Blind Rove Beetle	*Cylindropsis sp. 1*	one specimen collected from Tooth Cave; only known North American collection of this genus		
Tooth Cave Ground Beetle	*Rhadine persephone*	resident, small, cave-adapted beetle found in small Edwards Limestone caves in Travis and Williamson counties	LE	
MAMMALS				
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Plains Spotted Skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red Wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
MOLLUSKS				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fatmucket	*Lampsilis bracteata*	streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins	C	T
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
REPTILES				
Spot-tailed Earless Lizard	*Holbrookia lacerata*	central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates; eggs laid underground		
Texas Garter Snake	*Thamnophis sirtalis annectens*	wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August		
Texas Horned Lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
****** PLANTS******				
Basin bellflower	*Campanula reverchonii*	Texas endemic; among scattered vegetation on loose gravel, gravelly sand, and rock outcrops on open slopes with exposures of igneous and metamorphic rocks; may also occur on sandbars and other alluvial deposits along major rivers; flowering May-July		
Boerne bean	*Phaseolus texensis*	Narrowly endemic to rocky canyons in eastern and southern Edwards Plateau occurring on limestone soils in mixed woodlands, on limestone cliffs and outcrops, frequently along creeks.		
Bracted twistflower	*Streptanthus bracteatus*	Texas endemic; shallow, well-drained gravelly clays and clay loams	C	

Common Name	Scientific Name	Description	Federal Status	State Status
		over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer		
Correll's false dragon-head	*Physostegia correllii*	wet, silty clay loams on streamsides, in creek beds, irrigation channels and roadside drainage ditches; or seepy, mucky, sometimes gravelly soils along riverbanks or small islands in the Rio Grande; or underlain by Austin Chalk limestone along gently flowing spring-fed creek in central Texas; flowering May-September		
Texabama croton	*Croton alabamensis var. texensis*	Texas endemic; in duff-covered loamy clay soils on rocky slopes in forested, mesic limestone canyons; locally abundant on deeper soils on small terraces in canyon bottoms, often forming large colonies and dominating the shrub layer; scattered individuals are occasionally on sunny margins of such forests; also found in contrasting habitat of deep, friable soils of limestone uplands, mostly in the shade of evergreen woodland mottes; flowering late February-March; fruit maturing and dehiscing by early June		
Warnock's coral-root	*Hexalectris warnockii*	in leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years		

TABLE 1A-13: THREATENED OR ENDANGERED SPECIES OF WHARTON COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******AMPHIBIANS******				
Southern Crawfish Frog	*Lithobates areolatus areolatus*	The Southern Crawfish Frog can be found in abandoned crawfish holes and small mammal burrows. This species inhabits moist meadows, pasturelands, pine scrub, and river flood plains. This species spends nearly all of its time in burrows and only leaves the burrow area to breed. Although this species can be difficult to detect due to its reclusive nature, the call of breeding males can be heard over great distances. Eggs are laid and larvae develop in temporary water such as flooded fields, ditches, farm ponds and small lakes. Habitat: Shallow water, Herbaceous Wetland, Riparian, Temporary Pool, Cropland/hedgerow, Grassland/herbaceous, Suburban/orchard, Woodland – Conifer.		
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Attwater's Greater Prairie-chicken	*Tympanuchus cupido attwateri*	this county within historic range; endemic; open prairies of mostly thick grass one to three feet tall; from near sea level to 200 feet along coastal plain on upper two-thirds of Texas coast; males form communal display flocks during late winter-early spring; booming grounds important; breeding February-July	LE	E
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Henslow's Sparrow	*Ammodramus henslowii*	wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking		
Interior Least Tern	*Sterna antillarum athalassos*	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	DL	T
Red Knot	*Calidris canutus rufa*	Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches,	LT	

Common Name	Scientific Name	Description	Federal Status	State Status
		herbaceous wetland, and Tidal flat/shore.		
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
White-faced Ibis	*Plegadis chihi*	prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats		T
White-tailed Hawk	*Buteo albicaudatus*	near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May		T
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
Wood Stork	*Mycteria americana*	forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960		T
******CRUSTACEANS******				
A crayfish	*Cambarellus texanus*	shallow water; benthic, burrowing in or using soil; apparently tolerant of warmer waters; prefers standing water of ditches in which there is emergent vegetation; wll burrow in dry periods; detritivore		
******FISHES******				
American Eel	*Anguilla rostrata*	coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally		
Blue sucker	*Cycleptus elongatus*	larger portions of major rivers in Texas; usually in channels and flowing pools with a moderate current; bottom type usually of exposed bedrock, perhaps in combination with hard clay, sand, and gravel; adults winter in deep pools and move upstream in spring to spawn on riffles		T
Sharpnose shiner	*Notropis oxyrhynchus*	endemic to Brazos River drainage; also, apparently introduced into adjacent Colorado River drainage; large turbid river, with bottom a combination of sand, gravel, and clay-mud	LE	
******MAMMALS******				
Louisiana Black Bear	*Ursus americanus luteolus*	possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas	DL	T
Plains Spotted Skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River	C	T

Common Name	Scientific Name	Description	Federal Status	State Status
		basins		
Texas pimpleback	*Quadrula petrina*	mud, gravel and sand substrates, generally in areas with slow flow rates; Colorado and Guadalupe river basins	C	T
******REPTILES******				
Texas Horned Lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
Timber Rattlesnake	*Crotalus horridus*	swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto		T

TABLE 1A-14: THREATENED OR ENDANGERED SPECIES OF WILLIAMSON COUNTY

Common Name	Scientific Name	Description	Federal Status	State Status
******AMPHIBIANS******				
Georgetown Salamander	*Eurycea naufragia*	endemic; known from springs and waters in and around town of Georgetown in Williamson County	LT	
Jollyville Plateau Salamander	*Eurycea tonkawae*	known from springs and waters of some caves north of the Colorado River	LT	
Salado Springs salamander	*Eurycea chisholmensis*	endemic; surface springs and subterranean waters of the Salado Springs system along Salado Creek	LT	
Southern Crawfish Frog	*Lithobates areolatus areolatus*	The Southern Crawfish Frog can be found in abandoned crawfish holes and small mammal burrows. This species inhabits moist meadows, pasturelands, pine scrub, and river flood plains. This species spends nearly all of its time in burrows and only leaves the burrow area to breed. Although this species can be difficult to detect due to its reclusive nature, the call of breeding males can be heard over great distances. Eggs are laid and larvae develop in temporary water such as flooded fields, ditches, farm ponds and small lakes. Habitat: Shallow water, Herbaceous Wetland, Riparian, Temporary Pool, Cropland/hedgerow, Grassland/herbaceous, Suburban/orchard, Woodland – Conifer.		
******ARACHNIDS******				
Bandit Cave spider	*Cicurina bandida*	very small, subterrestrial, subterranean obligate		
Bone Cave Harvestman	*Texella reyesi*	small, blind, cave-adapted harvestman endemic to a few caves in Travis and Williamson counties; weakly differentiated from Texella reddelli	LE	
******BIRDS******				
American Peregrine Falcon	*Falco peregrinus anatum*	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	DL	
Bald Eagle	*Haliaeetus leucocephalus*	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	DL	T
Black-capped Vireo	*Vireo atricapilla*	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	DL	E
Golden-cheeked Warbler	*Setophaga chrysoparia*	juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	LE	E
Mountain Plover	*Charadrius montanus*	breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous		
Peregrine Falcon	*Falco peregrinus*	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed	DL	T

Common Name	Scientific Name	Description	Federal Status	State Status
		in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.		
Red Knot	*Calidris canutus rufa*	Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.	LT	
Sprague's Pipit	*Anthus spragueii*	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.		
Western Burrowing Owl	*Athene cunicularia hypugaea*	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows		
Whooping Crane	*Grus americana*	potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties	LE	E
******CRUSTACEANS******				
An amphipod	*Stygobromus russelli*	subterranean waters, usually in caves and limestone aquifers; resident of numerous caves in ca. 10 counties of the Edwards Plateau		
Bifurcated cave amphipod	*Stygobromus bifurcatus*	found in cave pools		
Ezell's cave amphipod	*Stygobromus flagellatus*	known only from artesian wells		
******FISHES******				
Guadalupe Bass	*Micropterus treculii*	endemic to perennial streams of the Edward's Plateau region; introduced in Nueces River system		
Sharpnose Shiner	*Notropis oxyrhynchus*	endemic to Brazos River drainage; also, apparently introduced into adjacent Colorado River drainage; large turbid river, with bottom a combination of sand, gravel, and clay-mud	LE	
Smalleye Shiner	*Notropis buccula*	endemic to upper Brazos River system and its tributaries (Clear Fork and Bosque); apparently introduced into adjacent Colorado River drainage; medium to large prairie streams with sandy substrate and turbid to clear warm water; presumably eats small aquatic invertebrates	LE	
******INSECTS******				
A mayfly	*Pseudocentroptiloides morihari*	mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation		
Coffin Cave Mold Beetle	*Batrisodes texanus*	resident, small, cave-adapted beetle found in small Edwards Limestone caves in Travis and Williamson counties	LE	
Tooth Cave Ground Beetle	*Rhadine persephone*	resident, small, cave-adapted beetle found in small Edwards Limestone caves in Travis and Williamson counties	LE	
******MAMMALS******				

Common Name	Scientific Name	Description	Federal Status	State Status
Cave Myotis Bat	*Myotis velifer*	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore		
Plains Spotted Skunk	*Spilogale putorius interrupta*	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie		
Red wolf	*Canis rufus*	extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
******MOLLUSKS******				
False spike mussel	*Quadrula mitchelli*	possibly extirpated in Texas; probably medium to large rivers; substrates varying from mud through mixtures of sand, gravel and cobble; one study indicated water lilies were present at the site; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins		T
Smooth pimpleback	*Quadrula houstonensis*	small to moderate streams and rivers as well as moderate size reservoirs; mixed mud, sand, and fine gravel, tolerates very slow to moderate flow rates, appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottoms, lower Trinity (questionable), Brazos, and Colorado River basins	C	T
Texas fawnsfoot	*Truncilla macrodon*	little known; possibly rivers and larger streams, and intolerant of impoundment; flowing rice irrigation canals, possibly sand, gravel, and perhaps sandy-mud bottoms in moderate flows; Brazos and Colorado River basins	C	T
******REPTILES******				
Spot-tailed Earless Lizard	*Holbrookia lacerata*	central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates; eggs laid underground		
Texas Garter Snake	*Thamnophis sirtalis annectens*	wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August		
Texas Horned Lizard	*Phrynosoma cornutum*	open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September		T
Timber Rattlesnake	*Crotalus horridus*	swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto		T
******PLANTS******				
Elmendorf's onion	*Allium elmendorfii*	Texas endemic; grassland openings in oak woodlands on deep, loose, well-drained sands; in Coastal Bend, on Pleistocene barrier island ridges and Holocene Sand Sheet that support live oak woodlands; to the north it occurs in post oak-black hickory-live oak woodlands over Queen City and similar Eocene formations; one anomalous specimen found on Llano Uplift in wet pockets of granitic loam; flowering March-April, May		

Appendix 1.B

The Highland Lakes: History and Social and Economic Importance

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

APPENDIX 1B

THE HIGHLAND LAKES: HISTORY AND SOCIAL AND ECONOMIC IMPORTANCE

This Appendix was developed by the Central Texas Water Coalition, Inc. and was most recently updated in the 2021 Region K Plan. A list of reference documents, source materials, and entities who provided assistance and data for this Appendix is provided at its conclusion.

Brief History of the Highland Lakes System

The Highland Lakes system is comprised of two water storage reservoirs, Lakes Buchanan and Travis, and four pass-through reservoirs, Lakes Inks, LBJ, Marble Falls and Austin. During the construction of the dams and development of the Highland Lakes system, the Lower Colorado River Authority (LCRA) acquired large tracts of land that surround the reservoir system. LCRA is authorized to develop, manage, and promote the use of these lands for parks, recreational facilities and natural science laboratories and to promote the preservation of fish and wildlife. LCRA must also provide public access to, and use of, its lakes and lands for recreation.

In the early years of LCRA's existence, the predominant priorities in water resources management were to moderate and control the floods and droughts in the Lower Colorado River Basin. This was accomplished through the construction of dams in the Texas Hill Country west of Austin, which created the Highland Lakes. Due to the Highland Lakes, the ravages of floodwaters on the lower Colorado River have largely been controlled. The Highland Lakes have historically also provided a dependable source of water supply for municipal, industrial, agricultural, and mining uses. Additionally, the Highland Lakes provided the source of inexpensive, renewable electrical energy, and recreational opportunities for the citizens and communities of Central Texas. In sum, the work of LCRA in its early years provided the foundation on which much of the present day population and economy of Central Texas now depend. The rapidly increasing population of Austin and surrounding Central Texas communities requires additional water resources for drinking water and to sustain business and industry. Tourism and recreation became significant industries, both on the Highland Lakes and lower Colorado River.

The Highland Lakes Region has benefitted from the growth in the Austin Metropolitan area. The Region has maintained much of its Hill Country character and cultural identity but has also exhibited a more independent nature with the development of the extensive Bee Cave and Marble Falls Retail Trade businesses. It has also benefited from the recovery of the lake levels on Lake Travis and Lake Buchanan in 2015, and the draw of highly regarded school districts such as Lake Travis ISD. The combination of strong school systems, attractive retail shopping options and higher lake levels has stimulated strong growth. The Community Impact 2019 Real Estate Edition (Volume 10, Issue 7 on July 10, 2019) reported that "from the southern hills of Travis County up through the inlets and peninsulas of Lake Travis, residential neighborhoods are quickly being developed." A June 2019 report from www.LakeHomes.com, documented the Lake Travis area as the biggest lake market in Texas. They reported that their analysis was based on the combined list prices of its 877 properties for sale. They also reported that the combined list prices total $623,574,159, which not only ranks it the largest lake market in Texas, but the 4th in the country. The Texas school finance system has benefitted significantly from the very large property tax base of the Region. The four largest school districts in the upper Highland Lakes Region—Llano, Marble Falls, Lago Vista, and Lake Travis—have contributed $938.8 million to help balance the State's school finance system. This represents 3.48% of all recapture payments ever received by the State since 1994 to 2019.

Tourism and Recreational Demands

The use of water for recreation and tourism is closely linked to the population of an area, location of the recreational opportunity and ease of access, and the value of the resource to recreational users. Recreational users are interested in qualities such as accessible lakes, flowing rivers, clean water, and aesthetics. In many areas, recreational uses of the waterways are increasing steadily. The entire Highland Lakes area, from Lake Austin to Lake Buchanan, receives a great deal of recreational use from boaters, park visitors, swimmers and anglers from all over Texas and the Southwestern United States.

Recreation and tourism in the Highland Lakes area are important contributors to local economies. The recreation industry associated with the Highland Lakes experienced phenomenal growth from 2000-2010 and became the major economic stability factor in many of the counties surrounding the Highland Lakes. However, the viability of this recreational industry is strongly tied to the level of water in the reservoirs, and LCRA's 1989 Water Management Plan recommended maintaining the water elevation of Lake Travis at 660 feet or more above mean sea level (msl) and of Lake Buchanan at 1,012 feet or more above msl. In the pass through lakes—Inks, LBJ, Marble Falls, and Austin—little direct impact is felt from variations in the levels of Lakes Buchanan and Travis. However, very low lake levels in Lakes Buchanan and Travis appear to divert those recreational users toward the pass-through lakes, which may then experience the over-crowding that was observed in the 2011-2015 period.

Typically, the annual hydrologic cycle includes filling the water supply reservoirs in the winter and spring and drawing down the water levels as water is used during the hot summer months. The recreational users of these reservoirs are accustomed to a certain amount of variation in the lake levels. However, extremely low, sustained lake levels, such as those that occurred from 2011-2015, have had a significant adverse impact on recreational and tourism interests.

To update Appendix 1B, economic data from 2010 to 2018 was collected to assess the most recent growth and development of the Region. In addition, work was done to capture specific impacts of the new drought of record (2008 – 2015) and associated sustained low lake levels on Lake Travis from 2011-2015, as well as the higher lake levels observed from 2015-2018. The data has been collected from many sources, as shown in the list of references and sources. Tourism data on visitation to the Hill Country was provided by Travel Texas from the Economic Development and Tourism Department in the Office of the Governor. Leisure travel to the Hill Country Region, excluding Austin, was growing at a rate of 10% from 2010-2011 (slightly above Austin's rate of 9%). In contrast, leisure travel to the Hill Country grew at an annual average rate of only 2% from 2011-2017 (when Austin travel was increasing at a 7% rate). In 2018, with lakes at high levels, leisure travel visitation to the Hill Country increased to an 8% growth rate.

Lake Travis in Travis County

Lake Travis is a 19,000-acre lake with over 270 miles of shoreline located within Travis and Burnet Counties. Formed in 1937 with the creation of the Marshall Ford Dam, Lake Travis has been and continues to be an important force in the economic growth and sustainability of the region. Lake Travis is the source of water and electricity for its surrounding communities, including, but not limited to, the municipalities of Briarcliff, Lakeway, Lago Vista, Jonestown, Point Venture, The Hills of Lakeway, Volente, and Austin (currently 23 municipalities rely on Lake Travis for water). The lake is a recreational destination for boaters and other water enthusiasts throughout the state, and it is an important component of the region's tourism economy. Businesses of all sizes depend upon Lake Travis for their operations, including restaurants; hotels; boat sales, rentals and services; marinas; golf courses; scuba operators; and real estate brokers and developers. As customers of retail water suppliers, companies, including Samsung, NXP Semiconductors, AMD, and 3M, rely upon Lake Travis for their manufacturing operations. Finally, the lake is an amenity to the surrounding households. From 1990 to 2010, the size of the population living within 30 miles of Lake Travis more than doubled to over 1.5 million people according to the U.S. Census. According to a new estimate from the Texas Demographic Center, this 30-mile range number grew to 1.9 million in 2017.

Incorporated communities, such as Lakeway, Lago Vista, Jonestown, Point Venture, Briarcliff, and Village of the Hills, were founded around Lake Travis in the 1960s, and Bee Cave has also dramatically developed, with both major retail and residential areas, since 2000. According to the Texas Demographic Center, these incorporated communities have grown by 32% since 2010 to a total population of almost 37,000 as of July 2018, with the largest gains coming in Lakeway and Bee Cave. And, it also should be noted that these population estimates do not include the unincorporated areas, such as Spicewood, which is also rapidly developing, some of which is enabled by technology and business policies that allow employees to work from home and avoid long commute times into the Austin area.

Lake Travis is a controlled-flow lake, with water coming in through rainfall and inflows from area creeks, rivers, and streams, and water going out to serve the demand of surrounding cities, water utilities, irrigation needs for the downstream industrial and agricultural users, and flows sufficient to maintain downstream instream flow needs and bay and estuary health. The lake is considered full at an elevation of 681.1 feet ("full pool") above mean sea level (msl), and lake levels have fluctuated from a low of 614 feet in 1951 to a high of 710 feet in 1991. In addition to its use for flood control, hydroelectric power, water supply, and water quality, Lake Travis supports broad recreational tourism and diverse fish and wildlife habitats. Drought, increased water use, releases to meet downstream demands, and reduced inflows all cause water levels in Lake Travis to fall. Conversely, during flood events, businesses surrounding the lake may be forced to close for extended periods of time, and/or incur significant maintenance costs.

An economic impact study by consulting firm Robert Charles Lesser & Co (RCLCO) in 2011 used historical data and econometric models to assess the financial impact that low lake levels or poor water quality have on the region. This study established a baseline to measure the fiscal and economic impacts associated with Lake Travis in 2010 and found that a sufficiently operational Lake Travis generates revenues from property, sales, hotel and mixed beverage taxes that buys ambulances, maintains schools and provides state government with needed funding. The sources cited in the 2011 study and some new sources, such as the State Comptroller's Office, Texas Parks and Wildlife Department, Travis County Parks, LCRA, Travis County Tax Appraisal District

(TCAD), Travis County, the Texas Demographic Center, and specific lake-related businesses, have been used to expand and update the economic data through 2018.

Key findings describing the status of the Lake Travis economic engine in 2010, with comparisons to the drought period between 2011–2014 and to its status in 2018, are presented below:

- In 2010, $158.4 million in revenue was generated for state and local governments from property taxes. In 2018, the contribution from property taxes grew to over $350 million, based on information received from TCAD on 2018 assessed values in the study area.
- In 2010, 3900 commercial businesses in the Lake Travis area generated $45.2 million in state revenue from sales taxes. In 2018, sales taxes revenue grew to $77.9 million., as shown below:

Sales Tax Information from Incorporated Communities in Travis County Around Lake Travis from the Texas Comptroller's Office:

		Annual Average		
	2010	2011-2014	2015-2017	2018
State & Local Sales Taxes, $ million	$45.2	$54.8	$69.1	$77.9

- In 2010, $3.4 million in state revenue was generated from hotel and mixed beverage taxes. In 2018, the contributions from Hotel and mixed beverage taxes grew to $7.2 million, as shown below:

Hotel and Mixed Beverage Taxable Receipts from Incorporated Communities in Travis County Around Lake Travis provided by Texas Comptroller's Office

		Annual Average		
Hotel & Mixed Beverages, $ million	2010	2011-2014	2015-2017	2018
Taxable Receipts	$24.3	28.4	$43.0	$51.3
Taxes Collected	$3.4	$4.0	$6.0	$7.2

- In 2010, $8.4 billion in residential market property value ($2.428 billion in waterfront and total of $4.353 billion in lake-related homes and land property value in 2010 from Travis County Appraisal District (TCAD)); In 2018, $12.771 billion in residential and $1.635 billion in commercial market value was provided by TCAD. In 2019, $3.275 billion in waterfront and total of $5.992 billion in lake-related homes and land property value from TCAD

- Lake related activity in 2010 base case:
    - Total visitor-related spending creates 1,607 jobs, $34.6 million in direct wages, and $90.5 million in value added to the local economy. The data gathered in 2019 for this updated Appendix 1B is consistent with the predictions made in the 2010 study – visitor-related spending creates jobs and provides significant economic benefits to the local economy.

The 2011 Lake Travis Economic Impact Report by RCLCO identified four categories of visitor spending: park visitors, vacation renters, second home owners and boaters. In 2019, comparable data was obtained for park visitors and boating. Regarding park visitors, the 2011 RCLCO Study estimated that park visitors accounted for $38 million in total spending in 2010, based on about 475,000 visitor-days. To update that data, Travis County and LCRA provided park visitation and associated revenue data for 2010-2018 for the lake-related parks that they manage. Combined visitation results in 2014 were about 51% lower than park visits in 2010. With the recovery of Lake Travis water levels in 2015, park visitations have increased every year from the 2014 lows at both the Travis County-managed and LCRA-managed parks, and both Travis County and LCRA reported that visitations slightly exceeded 2010 levels by 2017. Using the daily spending estimates for 2018 found in the 2018 Hill Country Region report provides an estimate of $44.3 million in park visitor spending for 2018 and supports 294 jobs and provides $15.9 million in non-inflation adjusted total value add, the majority of which is labor income**.**

Regarding boating, the 2011 RCLCO Study estimated that boater spending supports an additional 574 jobs, and boat sales support 309 jobs, many of which are related to the commercial and community marinas and private docks on Lake Travis. According to LCRA data, there are now about 120 commercial and community marinas on the Highland Lakes that provide roughly 7,000 boat slips. According to the RCLCO Study, there are also over 2000 dry slips and 30 boat ramps at marinas. According to the LCRA website, there are also 12 public boat ramps on Lake Travis, but only 6 are operational below 660 feet msl, 3 below 650 feet and 1 below 640 feet at Mansfield Dam (closes at 633 feet). As such, there was very limited access from public boat ramps in the 2011-2015 period of very low lake levels. Regarding private boat dock slips, RCLCO determined using aerial images that there were 2,165 private docks on Lake Travis in 2010, many of which were grounded during the low lake level period from 2011-2015, and the boats were moved to storage.

Boat sales supported an additional 309 jobs and an additional $22.1 million in total value add to the economy in 2010$. In 2010, $40.6 million in sales revenue was generated from new and used boat sales in Travis County, according to data from the Texas Parks and Wildlife Department. In 2018, the sales revenue from new and used boat sales has grown to $71.8 million, and has now returned to its previous peak in 2007, as shown below:

Boat Sales in Travis County from Texas Parks and Wildlife Department (TPWD):

			Annual Average		
	2007	2010	2011-2014	2015-2017	2018
Aggregate Sales Value, $M New and Used Boats	$71.0	$40.6	$41.0	$63.5	$71.8

Given the recovery and gains of the boating business, the 2010 RCLCO jobs estimate should at least support their 309 jobs estimate when lake levels are at reasonable operating levels above 660 feet.

Lake levels finally recovered in 2015 and have remained at higher levels, with the exception of a six-month period in 2017, where a "flash drought" and associated very low inflows, which fell to only 2% of average in July 2018, and caused the Lake Travis lake level to fall below 660 feet to about 654 feet. However, heavy rains in October brought Lake Travis levels back up to above- full, and levels have remained at good operating levels above 660 through 2019.

The 2011 RCLCO Study also found that vacation renters support 309 jobs; and second homeowners support 431 jobs. The proportion of second homes on Lake Travis remains very high at approximately 50% in 2018, based on the percentage of homes that are not designated as homesteads. As such, the 2011 RCLCO Study estimate that total visitor spending supports 1609 jobs that provides $90.5 million in value add to the economy (2010$) is viewed to be a valid estimate, and it is likely much higher.

The 2010 RCLCO Study found that adverse economic impacts begin when lake levels remain below 660 feet, and significant economic impacts occur when lake levels fall below 650 feet. Some specific effects that the 2011 Study predicted, with actual results on park visits from the 2019 update, include:

- Fewer park visits - Park visits fell from 475,800 in 2010 to 232,400 in 2014, or about 51% lower.
- 29 lost jobs for each 10% drop in park visits. The 51% reduction in park visits between 2010 and 2014 translates into 145 lost jobs, with a loss of $7.9 million (2010$) in total employment value, per the 2011 RCLCO Study
- $23.6 million to $38.8 million reductions in visitor spending; and
- Up to 241 lost jobs and $6.1 million in lost wages.

The study also found significant annual fiscal impacts could occur, including:

- $21.9 million in total fiscal revenues lost versus the 2010 base case; and
- $1.7 million lost sales tax revenues.

As a result of the extended severe drought that began in 2008 and large interruptible water releases under the governing LCRA Water Management Plan during the severe drought in 2011, Lake Travis lake levels fell to the 620-630 foot elevation and remained there from 2011 until May of 2015. Public access to Lake Travis was severely impaired below 630 feet, and the lake also became much more dangerous to navigate as the lake levels fell. As a result, many of the predicted impacts became reality.

In order to get a better picture of the scope of the adverse economic impacts, information from several directly affected business groups was obtained and compiled in 2019. Boat sales provide a strong indicator for desired utilization of the lakes. Boat sales data for 2006-2018 was obtained from TPWD. It was found that actual numbers of new boat sales in Travis County declined about 15%, and used boats sales numbers fell about 22%, from 2010 to 2014 during the low-lake level period.

Another large key boating-related business group is the commercial marina business. A questionnaire/survey was conducted in 2019 of the Marina Association of Lake Travis (MALT). Responses were received from many of the major commercial marinas on Lake Travis, and those responses represented about 51% of the total boat slips in the large commercial marinas. The response rate was utilized to scale up the business and employment data provided by the Questionnaire to yield the following current total Lake Travis Commercial Marina business estimates for 2018:

- Annual 2018 revenues of large major marinas alone are estimated to be about $36.4 million/year, with much more revenues provided by rest of the active marinas;
- Annual employee payroll estimated to be about $7 million/year for about 375 full-time, part-time and seasonal employees. It should be noted that there are also many other employees associated with related boat services, restaurant and rental activities at the marinas or other supporting businesses and locations that are not included in these estimates.

Feedback was also requested in the Commercial Marina Questionnaire on the adverse economic impacts that actually resulted from the very low lake levels during 2011-2015, and the recovery once levels returned to higher operating levels in 2015. Specific results from that Survey include:

- Almost all commercial marinas experienced significant reductions in occupancy rates, and associated revenues, during the low lake level years, with several falling to 78% and a few reporting rates as in the 40-60% range. On average, the reduced occupancy rates translated to an annual revenue reduction of about 30% (down about $11 million) versus current performance, with some reporting a revenue reduction approaching 40%.
- Almost all report significant negative financial impacts, such as high dock relocation costs, when the Lake Travis lake level falls below the 640-650 foot msl range, and the impacts worsen if the lake continues to drop
- Numerous marinas reported that the large boats are important for their financial health, and they have been harder to get since the low lake-level period. 2019 appears to be the 1st year that has experienced a significant return of the “big boats” from other cities, such as Houston.

With the return of higher water levels on Lake Travis from June 2015 to the present, results from the Survey show that the average occupancy rates improved back up to 94% in 2018, which is 4% above the 90% occupancy rates reported by the RCLCO Study. In addition, almost all of the responding large commercial marinas report that they are finally realizing higher slip rates than in 2011.

Regarding adverse impacts on other significant lake-related businesses during the 2011-2015 period, with loss of access, tourism greatly declined, and many lake-related businesses and restaurants closed. This included iconic, high-profile ones, such as Carlos’ N Charlie’s that had been in business for many years. In the specific case of Carlos’ N Charlie’s alone, at least 120 employees lost their jobs between 2011- 2014, which represented over $1 million in lost payroll, and. total associated State taxes of over $400k per year were also lost. Another 100 employees lost their jobs in 2015 when it closed in 2015. Just for Fun, a boat rental business, lost an average number of 29 employees from 2010 to 2014, representing over $500,000 in annual payroll. Other support-related businesses, such as boat service businesses also closed, such as Full-Throttle Marine in Spicewood. Other restaurants such as Café Blue in Volente also closed, and many others changed hands. As such, job losses were likely much higher than estimated by the RCLCO Study. However, the largest reduction in boating spending was likely in the daily boat usage category, where a 50% reduction in visitors would likely have a proportional impact. As such, annual spending for daily boat usage could have dropped in the $20 million range by 2014, versus the $40.1 spending level, as estimated by the RCLCO Study in 2010.

Real Estate Impacts from Austin Board of Realty (ABOR) and TCAD

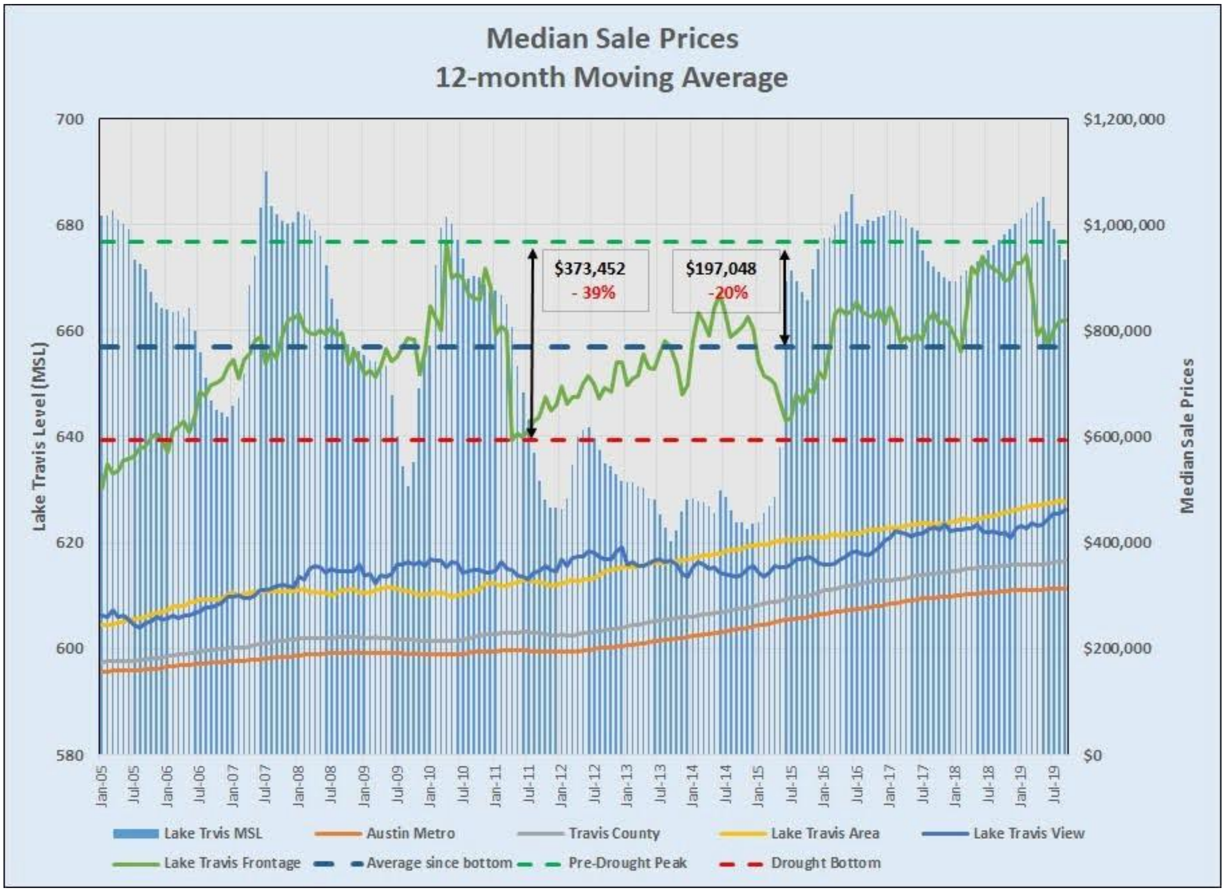
Low lake levels also impacted the real estate sector of the economy during 2011-2015. While the Austin metropolitan area continued to enjoy significant growth and increased property values, lake-related property values greatly suffered, both with homes and unimproved land values. The following results were compiled by the real estate industry for the 2009-2014 timeframe:

- Median sales price decline of waterfront/view homes down 29.5% since 2011
- $/sq. ft. average price decline 33.9% since 2009
- Median undeveloped waterfront/view land price down 36.8% since 2009
- Real estate inventory levels are a very strong indicator of the health of a real estate market. While the residential market across the 5-county Austin metropolitan area had less than three months' supply as of December 2014, active listing inventory for homes with Lake Travis frontage will last more than two years at the Dec. 2014 pace of sales. There was more than three years of listing inventory for unimproved lots on Lake Travis.

These declines in water-related home and land values have a significant aggregate effect, both on the homeowners and on the taxing districts that rely on property taxes. This rapid decline in waterfront market values represented a major reversal from a very strong appreciation history in median sales prices. According to the Austin Board of Realtors (ABOR) real estate data, the median moving average waterfront home rose about 65% from $585k in January 2005 to $966k in April 2010. In an ideal case where Lake Travis levels were stable above 660 feet, waterfront properties should have appreciated at least as well as the 5-county metro area, in general. Median sales prices in the 5-county Metro have appreciated by 65 % from 2010 to 2019. **As such, median prices of waterfront properties should have increased to about $1.598 million per property, if they had enjoyed the same 5-county Metro rate of increase, in a "stable lake" environment.**

It should be noted that the recession that followed severe disruptions in the mortgage and residential real estate industries began (in Central Texas) in mid-2007, reached it's low-point in early 2009, and hovered near that level until early 2011. Residential listing inventories began to decline in mid-2011 and continued to fall as sales increased from then until early 2013, when the now seven-year old boom was fully in place. Residential sale prices in most of Central Texas were much more modestly affected than other parts of the U.S., and aggregate prices in the 5-county Austin metropolitan area were largely unaffected. Median prices of lakefront homes on Lake Travis, however, plummeted 39% between April 2010 and May 2011, almost exactly in parallel with falling water levels (from

681 feet to 653 feet) during the same thirteen months. (See exhibit below.) Prices recovered somewhat between then and mid-2014, but sagged twice more as water levels dipped again in 2013 and 2015, while the rest of the metro area proceeded with unprecedented price increases. In June 2018 and February 2019, lakefront prices almost rose again to April 2010 levels, but fell again and were again 20% lower than that peak by September 2019. This market behavior was clearly not unrelated to the broader recession, but and was highly correlated with changes in Lake Travis water levels and subsequent lack of confidence in sustained water levels and property values.



More specifically, the waterfront property market median prices began a rapid decline in September 2010, and closely tracked the rate of decline in Lake Travis levels, $370k in median pricing down to about $600k, while the 5-county metro area continued its steady growth. During the 2011-2015 period, waterfront median sales prices recovered somewhat until mid-2014, but then fell back to about $630k in mid-2015. With the recovery to higher lake levels in 2015, median home prices climbed to above $900k in early 2018 but have since dropped back to the $820k range in September 2019 due to uncertainty in lake levels.

As such, o**ver the entire 2010-2019 period, average median waterfront home pricing of $780k is down about 19% from the 2010 peak of $966k. However, if we compare the current average**

median price of $820k to the predicted stable lake value estimate of $1.598 million, the predicted waterfront price of $1.598 million is 95% higher per property.

According to data provided by the Travis County Appraisal District, total waterfront market values on Lake Travis were about $2.428 billion in 2010. Their appraised market values were reduced by about $50 million by 2012 and were at $2.574 billion in 2015. With the recovery to higher lake levels, TCAD has increased its total appraised waterfront market values (homes and lots) by 27% from 2015 to $3.275 billion in 2019, which is now up 35% from 2010. An analysis of waterfront data provided by TCAD shows that the average market value for a waterfront home is up to $808k in 2018, which is ow roughly in line with the current real estate market average median pricing.

Applying the current TCAD market value of $808k per home across only the roughly 3000 waterfront homes yields a total of $2.4 billion in market value. **If the values of these waterfront home were actually in line with the predicted "stable lake" median sales value of $1.6 million in 2018, the total waterfront market value would be $4.8 billion, or about double the current market value. Assuming an average 2% property tax rate, this would translate into $48 million of additional tax revenue in 2018, which supports schools and county services. It should be noted that this analysis does not consider the additional value that would also come from waterfront lots ($513 million in 2018) or the waterfront-related home and property values ($2.642 billion in 2018 from TCAD data)**

Looking backwards and assuming that TCAD assessed market values were aligned with the average real estate market, it is possible to estimate the loss of potential property tax revenue that has already occurred from 2010 to 2018. An analysis of real estate average median prices over the 2010 to 2018 period shows a reduction in median market value of waterfront homes of $186k since 2010. **On roughly 3,000 waterfront homes (not including almost 1,500 waterfront lots and 8,800 water-related homes and properties), this represents $558 million in lost market value or about $11.1 million per year in lost property taxes on residential waterfront homes alone. Over the 8-year period between 2010 and 2019, this represent a total impact of about $89 million in lost property tax revenues.** Given the very strong and on-going population growth in the area, and the magnitude of the lost tax revenues from lake-related properties, the shortfalls will likely have to be borne by the rest of the taxpayers to meet required service needs.

Lake Buchanan in Burnet and Llano Counties

Located along the Colorado River, both Burnet and Llano counties have strong agricultural and ranching sectors combined with tourists seeking water-related recreational opportunities on Lakes Buchanan, Inks, LBJ and Marble Falls. Historically, the tourism sector has been the largest employer in the region with visitors spending millions of dollars each year at hotels and resorts, restaurants, and shops. The area has also become popular for retirement and 2nd homes, and the properties around the lakes are among the most valuable in the area. More recently, substantial retail and medical facilities have been built in the area, particularly in the Marble Falls area.

When the drought began in 2008, the reservoir Lake Buchanan fell and remained primarily at levels below the conservation level of 1,012 feet msl. The situation worsened significantly in the summer of 2011, when lake levels fell below 995 feet and continued to fall. At these low levels, lake access was very restricted and public boat ramps were closed, and tourism around the lake was adversely impacted.

In 2011, in a joint effort to measure the contribution of the upper Highland Lakes to the regional and state economies, Burnet and Llano Counties retained a project team to perform an economic impact analysis. The project team of TXP, Inc., Concept Development and Planning, LLC, and Diverse Planning and Development conducted the baseline assessment for Burnet and Llano Counties that was completed in the fall of 2012. The study area for the project included Burnet and Llano Counties as well as the properties at nearby Lake Buchanan, Inks Lake, Lake LBJ, Lake Marble Falls, and Lake Travis (only the portion in Burnet County). The sources cited in the 2011 study, and other new sources, such as the State Comptroller's Office, Texas Parks and Recreation Department, and the Burnet and Llano County Tax Appraisal Offices have been utilized to expand and update the economic data through the 2018/2019 period.

Economic Activity & Tax Revenue Attributable to the Upper Highland Lakes from the 2012 Study

Some of the key findings from the 2012 baseline study that show the scope and importance of tourism and recreation is provided below. Data has been compiled in 2019 to show the growth and development of the Region and identify impacts of the most recent drought of record and associated sustained low lake levels on Lake Buchanan and the Upper Highland Lakes Region. This updated information is also presented below, including information sources.

In 2011, direct spending by all visitors to Burnet and Llano Counties resulted in the following:

- $161.3 million in direct economic activity;
- $58.9 million in earnings for employees and business owners;
- 3,125 jobs (or 25.9 percent of total regional employment);
- $3.46 million in local tax revenue excluding property taxes; and
- $9.2 million in state tax revenue.

Direct spending data from visitors during the 2012-2018 period was not available for the 2019 update. Total Sales Tax information is shown below:

Total Sales Tax Information from Incorporated Communities in Upper Highland Lakes from the Texas Comptroller's Office (from the 2019 update**):**

		Annual Average		
	2010	2011-2014	2015-2017	2018
State & Local Sales Taxes, $M	$25.7	$29.4	$36.3	$41.7

A review of the detailed city/municipality data reveals that the sales taxes generated in the major cities, such as Marble Falls and Horseshoe Bay, remained relatively flat in 2011 and 2012. A large share of the State and Local Sales Taxes were found to be from Marble Falls, which has developed a large retail trade presence and added several new hotels near Lake Marble Falls. Significant contributions from 2015 to 2018 were also made by Horseshoe Bay via its major resort, golf, and recreational boating facilities.

Hotel Occupancy and Mixed Beverage Taxes:

Hotel occupancy tax revenue generated by properties in the Upper Highland Lakes Region more than doubled from 2000 to 2010. In 2012, over 81.1 percent of Burnet and Llano Counties' accommodation and lodging businesses were found to be within two miles of the lakes. As such, the proportion of taxable hotel room revenue attributable to lake-related hotel properties was approximately 75 percent of total Upper Highland Lakes Region hotel sector activity. Lake-related hotel activity generated about $1 million in tax revenues for the State of Texas each year.

In 2011, direct purchases (based on room capacity and hotel occupancy tax receipts) by lake-related visitors to Burnet and Llano Counties from the 2012 Study reported the following baseline information:

- $122.5 million in direct economic activity;
- $45.3 million in earnings for employees and businesses owners;
- 2,454 jobs;
- $2.6 million in local tax revenue excluding property taxes; and
- $7.0 million in state tax revenue.

Hotel and Mixed Beverage Taxable Receipts from Just Communities Around the Upper Highland Lakes provided by Texas Comptroller's Office

- In 2010, $2.3 million in state revenue was generated from hotel and mixed beverage taxes. In 2018, the contributions from Hotel and mixed beverage taxes grew to $4.0 million,

		Annual Average		
Hotel & Mixed Beverages, $ million	2010	2011-2014	2015-2017	2018
Taxable Receipts	$27.8	33.1	$43.0	$49.9
Taxes Collected	$2.3	$2.7	$3.5	$4.0

Hotel and Beverage Taxable Receipts provide a good indicator of tourism and recreation. As the Lake Buchanan water levels returned to and remained above the conservation level of 1,012 feet msl in 2015, an average of $43 million in total hotel and mixed beverage taxable receipts were generated annually in the 2015-2017 period, an increase of 30% compared to the 2011-2014 average annual receipts of $33.1 million. After nearly 3 1/2 years of higher lake levels on Lake Buchanan, taxable receipts from hotels and mixed beverages increased at an annual rate of 8% from $46.3 million in 2017 to $49.9 million in 2018.

Indirect Spending from 2012 Study

The total economic impact in 2011 of lake-related visitor spending in the Upper Highland Lakes, including indirect positive effects on support services and businesses, were described as follows:

- $185.5 million in total economic activity;
- $81.7 million in earnings for employees and businesses owners;
- 3,648 jobs.

Population Trends from the Texas Demographic Center at UTSA:

Communities in the Upper Highland Lakes Region include Burnet, Horseshoe Bay, Llano, Marble Falls, Sunrise Beach Village, and Kingsland. These population trends indicate an impact on growth by low lake reservoir lake levels.

	2010	2015	2018
Population Trend	25,457	26.498	28.839
Rate of Growth vs 2010		4%	13% (9% growth increase from 2015 to 2018)

The rural areas also saw significant population growth from 2010 to 2018, based on analysis of new electric service hook-ups provided by PEC and CTEC.

Specific Low Lake Level Impacts Around Lake Buchanan

Numerous tourism-related businesses suffered or closed as a result of the sustained low-lake level period between 2011-2015, such as restaurants, grocery stores and resorts, and associated job losses and business viability issues have been significant. For example, Thunderbird Lodge on Lake Buchanan reports that they historically brought in 6,000 guests annually. It saw its business drop off by 60-65% during the sustained low lake period, with its boat ramp, dock and marina becoming unusable. To avoid bankruptcy, they cut every cost they could and made payroll cuts, but they still were forced to transition to a new partnership structure for funding, and have now almost recovered, with higher lake levels returning in 2015. Hi-Line Lake Resort was not as fortunate and went bankrupt in 2013.

The charter-fishing business on Lake Buchanan has also been significantly affected by the sustained low lake levels. One of the major long-time bass fishing businesses, Ken Milam Guide Service, has seen its scheduled trip count fall by about 60% on average from around 500 in the pre-drought peak years to lows ranging from 177-254 during the 2011-2015 period. They reported that it also took flexibility and creativity to find ways to access the lake to maintain the business and experience for the customers. Unfortunately, many customers have not returned, and the recovery since then has been slow, with annual trip counts ranging from 170-220 since 2015 to the present. The reduction in business has also taken a toll on the number of other full-time professional guides. Over 30 guides were working during the peak years, with full time professional guides of about 15. That number has dropped by about 67% to a current group of only 5, which makes it more challenging to host large charter outings. Typical trips average 4 people per trip, so a drop from 500 trips to about 200 per year results in a drop of around 1,200 fisherman per year plus any friends or family that may have come for the trips. This loss of high-revenue visitors has translated in losses of cabin rentals, and for other support businesses such as the convenience stores and restaurants. It has also reduced the number of customers who liked the area and chose to have 2nd homes or relocate into the area. Many businesses have changed ownership, and others are looking at alternative types of business models to help recover and remain viable, as tourism slowly improves.

Boat Sales in Burnet and Llano Counties from Texas Parks and Wildlife Department

	Annual Boat Sales				
	2006	2010	2012	2015	2018
Aggregate Sales,					
New and Used Boats, $M	$9.7	$5.6	$5.5	$7.9	$14.5
Number of New & Used	1,091	767	734	858	1,044

Actual numbers of new boat sales in Burnet and Llano counties declined about 3% and used boats sales numbers fell about 5% from 2010 to 2012 during the early low-lake level period on Lake Buchanan. During this period, total sales revenues from new and used boats remained around $5.5 million, lifted by increasing sales prices of new boats, and the benefit of the option to utilize the pass-through lakes (LBJ, Marble Falls and Inks. With the recovery to higher lake levels in Lake Buchanan in 2015, total boat sales value in Burnet and Llano counties have significantly increased every year since 2015 and are up to $14.5 million in 2018. The number of new and used boat sales in 2018 of 1,044 is also nearing the peak of 1,091 from 2006. As such, overall contributions of boat sales to jobs, wages and overall value add to the economy, and at least support the 2011 baseline spending levels from the 2012 Study.

Property & Real Estate Impacts from BCAD and LCAD and Highland Lakes MLS System & Agents

According to the Burnet County Appraisal District (BCAD), Burnet County experienced a 114% increase in appraised market value from 2002 to 2010 to $6.5 billion. During this period, waterfront properties increased about 175% in appraised market values, and represented about 35% of the taxable market value. According to the Llano County Appraisal District (LCAD), their appraised market values was a $5.4 billion in 2010, and assessed values of waterfront-related communities represented 54% of net taxable values.

The 2012 Study reported that "over the past two decades, communities adjacent to the lakes have been the fastest growing in the two-county area. Since 2000, the majority of new homes built in the Upper Highland Lakes Region have been lake-adjacent. Nearly three-quarters of all homes built in the two counties in the past decade were within two miles of the lakes." That Study also found that “the average taxable value of a home on the lakes is substantially greater than the countywide averages – ranging from approximately 70 percent higher around Lake Buchanan to more than 3.5 times the average home price in Burnet and Llano Counties around Lake LBJ and Lake Marble Falls.” As such, waterfront properties generate significant local property tax revenue to support schools and local government services.

During the 2011-2015 period of sustained very low reservoir-lake levels, total assessed market values continued to increase in Burnet and Llano counties, but at much lower rates. According to BCAD, appraised market values increased by 16% to $7.6 billion. During this period, county-wide waterfront properties, including the pass-through lakes (Inks, LBJ and Marble Falls), increased only 13% to $1.7 billion, and still represented 34% of taxable market value. During this same period, LCAD records show that their assessed total market values increased 13% to $6.1 billion, but county-wide waterfront community-related properties increased by only 7% to $1.9 billion and represented about 49% of net taxable values.

Appraised Property Data from BCAD & LCAD	2002	2010	2015	2018
Burnet County				
Total Market Value, $B	$3.508	$6.529	$7.594	$9.960
Net Taxable Value, $B	$2.1	$4.296	$4.96	$6.411
Waterfront, $B	$0.545	$1.510	$1.700	$2.046
% Taxable Market Value	26%	35%	34%	32%
Llano County		2010	2015	2019
Total Market Value, $B		$5.358	$6.063	$7.430
Net Taxable Value, $B		$3.318	$3.880	$4.965
Waterfront-related, $B		$1.783	$1.917	$2.378
% Taxable Market Value		54%	49%	48%

Looking at the county numbers after the lakes recovered in 2015, according to BCAD, total assessed market values increased by 31% to $9.96 billion from 2015 to 2018 versus 16% from 2010-2015. County-wide waterfront property market assessments went up 20% from 2015 to 2018 versus the 13% increase from 2010-2015. The percentage of waterfront versus taxable value was 32% in 2018. In Llano County, total assessed market values increased by 23% to $7.43 billion from 2015 to 2019 versus 13 % from 2010-2015. County-wide water-related property market assessments went up 24% from 2015 to 2019 versus only the 7% increase from 2010-2015. The percentage of waterfront-related vs Net Taxable value remained very high at 48% in 2018.

However, when focusing on the assessed values of waterfront-related properties on the reservoir lakes during the period of very low lake levels from 2011-2015, a much different picture emerges, particularly on Lake Buchanan. **Analysis of BCAD waterfront property data on Lake Buchanan shows that total existing assessed property values were reduced from 2010 to 2015 by $41.6 million (19%) from $220 million to $178 million,** after new construction was considered. And **analysis by LCAD on waterfront community property data on Lake Buchanan shows that**

<u>total existing assessed property values were reduced by $28.1 million (16%) from $171 million to $143 million, without new construction adjustment</u>. As such, **the combined loss in assessed market value for waterfront related properties in both Burnet and Llano counties due to sustained low lake levels on Lake Buchanan was $69.7 million in 2015.**

The Peninsula on Lake Buchanan provides an excellent example of a premier development that has significantly suffered from the sustained low lake levels. It was developed in 2007 as a gated community with underground utilities, surface water treatment plant and a private community marina. It has 83 lots, 67 of which are waterfront, and the initial sales prices of the lots were $275-475k, with 37 lots sold in the 2007-2008 period. However, lot sales fell off dramatically with the sustained low lake level periods of 2009 and 2011-2015. In 2012, the original developer went bankrupt, and the new investor had a “fire sale” with 9 original lots offered and sold at 1/3 the original price. This situation continued in 2013 and 2014 with 2 lots selling at $114k vs $300k and $165 vs $385k. Actual home construction in the development has also been severely affected, as only 3 homes were built from 2007-2009 and zero homes were built from 2009-2016 versus an expected 30-40 homes at a normal 5% per year rate. **This represents a significant loss of potential taxable value, in the $30-50 million range in this community alone, as these are $750k-1 million plus homes.**

Looking at Lake Travis in Burnet County, assessed market values of existing waterfront properties remained essentially flat from 2010 at $108 million to $112 million in 2015. New waterfront-related construction between 2010-2015 accounted $11 million.

Beginning in 2015, with the sustained recovery of the reservoir lakes, appraised market values of waterfront-related properties have significantly increased. BCAD data shows that waterfront properties on Lake Buchanan have increased by over $70 million (38%) in assessed market values to $254 million from their 2015 lows and are now $34 million above their 2010 values. However, according to local real estate agents, this partial recovery in actual sales of the high value waterfront lots at the Peninsula in 2017 has not continued in 2018 and 2019 YTD sales. According to the MLS system, average annual residential sales prices on Lake Buchanan have increased by 36% to about $359k from their 2015 levels. BCAD data on Lake Travis reflects about a $27 million (30%) increase vs the 2015 lows and is now $46 million above 2010. Looking at LCAD data on Lake Buchanan, the assessed market values of waterfront properties in 2019 have recovered by $24.6 million (17%) to $168 million, but they have yet to fully recover to their 2010 market values.

Considering long-term implications of the sustained low lake level around Lake Buchanan, two of the key findings from the 2012 Study were evaluated with local real estate agents, and found to appear to still be valid, as follows:

- **“The Highland Lakes community’s overwhelming concern is that overall economic activity in the region will not return to its pre-drought growth rate because of the prolonged low lake levels.”** The information and data collected for this update continues to validate this concern.
- **Low lake levels could adversely impact development of 5,799 undeveloped, lake-related acres, with an additional 1,180 underdeveloped acres that have a potential taxable**

property value of $1.4 billion around the lakes. Consultation with local real estate brokers reveals that this continues to be a valid concern, particularly around Lake Buchanan.

Community Summaries:
Community summaries, authored by each community, highlight the nature, strengths and growth of the Highland Lakes Region:

Marble Falls - With a city population of just under 7,000, most people would call Marble Falls a small town—but very few would call it "sleepy." The town feels much bigger due to a primary retail trade area population of more than 70,000 and daily traffic counts in the center of town exceeding 35,000 vehicles per day. In 2018, Marble Falls surpassed $1 billion in gross sales for the first time. In the last 5 years, Marble Falls' primary retail trade area population has grown 6.5%, average household income has increased by 21.3%, and median home value has increased by 21.5%. During the same period, taxable sales activity has increased by 31.5% to more than $466 million. Recent developments include Baylor Scott & White's $100 million regional medical center, a new 110,000-square-foot H-E-B grocery store, and a $20 million operations center for Pedernales Electric Cooperative. The development pipeline includes some exciting retail development, multi-family properties, and a Downtown hotel and conference center, in addition to two new subdivisions with more than 1,200 homes planned. People are beginning to see Marble Falls as more than just a touristy, scenic lake town on the outskirts of the Austin metro area.

Lakeway - Since its inception, the city of Lakeway has been closely tied to the quality water resources found in central Texas. Its name alone demonstrates its tie to Lake Travis as what first attracted visitors to the area and the growth of the city. Within the city limits are several miles of shoreline with a number of businesses directly related to activities on or near Lake Travis. With a population of over 15k people, Lakeway is now the third largest city in Travis County with a growth rate of 5% annually over the last 18 years. The city generates $12 million revenue annually with $1 million coming from the Hotel Occupancy Tax. Property values have tripled between 2006 and 2018; however, there is a clear recognition how the water level and quality of Lake Travis can impact that trend. Much of the city falls in the Lake Travis watershed and there is close coordination with the LCRA to review projects for compliance with the Highlands Lakes Watershed Ordinance. In a recent citizen survey, availability of quality water, proper disposal of wastewater, and protection of the Lake Travis water resource were three of the top ten highest priorities out of over 60 categories covered. Lakeway's bond with quality water resources is a key to its future.

Bee Cave - Just like most other Cities in the region, Bee Cave has experienced a significant amount of growth. The current projected population (8300) is more than double the 2010 (4000) population and 8x higher than the year 2000. Although valuations and property tax revenues have tripled in that time, the City of Bee Cave maintains a $.02/$100 property tax rate and is reliant on sales tax revenues for the general operation of the city. Annual sales tax revenue doubled in the last 10 years, topping $10.5M in FY '18-19 and continues to rise with new investments in the community such as an $850M mixed-use planned development, event venue, multiple hotels, and residential development. Bee Cave's sales tax numbers are driven by the number of people who travel to the city as a destination and through the city to enjoy the other things the local area has to offer. Since 2000, Bee

Cave has become home to over 2.1M sq. ft. in retail shopping space, which acts as a magnet to members of neighboring communities and from adjoining counties. The majority of Bee Cave's retail growth has occurred in an area of the city where 3 major state highways, TX-71, RM-620, and RM-2244 intersect. Texas Highway 71 averages 50,000 trips per week day and Ranch to Market 620 between Bee Cave and Lakeway averages over 47,000 daily trips. Finally, RM 2244 generates over 34,000 vehicular trips per day to and from the greater Austin area. The economic health of the City of Bee Cave is reliant on factors within the city's jurisdiction, but the impact of neighboring jurisdictions, such as our immediate neighbor Lakeway, may be equally important to our community. While not a lake town, Bee Cave is very tied to the other communities in the Lake Travis watershed.

Lago Vista – Nestled in the Hill Country between Cedar Park and Marble Falls, Lago Vista is a Lake Travis community with small town charm. Originally founded as a golf resort community, Lago Vista has experienced substantial population growth in the past several years with a 2019 population estimate of 8,046. Within a 15-minute drive is 12,075 households with a population of 31,843 and a growth rate of 28.80%. Young families are choosing to move to Lago Vista for the excellent schools, low crime rates, and variety of recreation opportunities. Lago Vista also has amenities that include POA-owned lakefront parks, tennis courts, baseball fields and frisbee golf courses. Swimming, camping, boating, kayaking, golf, and hiking trails are also favored activities. The Travis County Arkansas Bend Park in Lago Vista is available to the public. The City of Lago Vista is in the process of completing Phase One of a new municipal sports and recreation complex. Expected completion is May 2020. A variety of sports and entertainment events are held in Lago Vista each year. Lago Fest is a large live music, art, and food festival on the shore of Lake Travis in Bar-K Park. Festival goers enjoy coming by boat as well as land. Lago Fest is held at the same time as the Austin Yacht Club's Annual Turnback Regatta. Sailors race to the shore of Bar-K Park camp overnight and race back in the morning. The highly touted La Primavera bike race is held in Lago Vista offering serious cyclists a challenging course throughout the city's winding hilly roadways overlooking the lake. The Lago Vista business community includes medical facilities, corporate manufacturing, financial advisors, retail shopping, restaurants and service providers. Starbucks just opened and is a new addition to the Lago Vista community.

Lake Buchanan Community - The communities on the banks of Lake Buchanan, including surrounding areas in both Llano and Burnet Counties, continue to grow at a noticeable rate. The area has traditionally been a mecca for retirees looking for a slower pace of life at reduced living costs. That is changing, as the cities of Llano, Kingsland and Burnet have become shopping, supply and dining attractions. Numerous wineries and tasting rooms have opened, as a way to attract visitors seeking smaller crowds than found along the Winery Highway between Johnson City and Fredericksburg. To further capture these tourist dollars, numerous RV, resort and owner short term rentals have successfully opened. In addition to the peak summer traffic from parents transporting children to a variety of camps, the area has become an arts destination, with the oldest art guild in Texas located at Buchanan Dam, and other festivals such as LEAF, twice yearly Llano Studio Tours, Western Art on the Llano, and Paint the Town and Burnet Plein Air Festival, growing in participation and attendance. Fishing continues to fuel the economy on the lake, with Buchanan providing some of the best Striper bass fishing in the world.

Emerging Issues in the Highland Lakes Region:

Water Access Issues for Firefighting in Travis County ESD 8 Service Area at Lake Levels below 650 ft msl - In a 2018 Assessment provided by the ESD 8 Fire Chief – He reports that Travis County Emergency Services District 8 needs Lake Travis for firefighting operations. When Lake Travis reaches 650 feet, available water for firefighting is reduced. Low lake levels also increase the danger to the public by exposing them to underwater hazards as they become more prevalent. ESD 8 provides coverage to 15,000 full-time residents in its approximately 54 square mile service area. At levels above 650 feet, water access for firefighting is provided by 8 Hydrant Areas and 17 Drafting Locations. At 650 feet lake elevation, 5 of the Drafting Locations become questionable. If Lake Travis continues to drop and reaches 640, the Fire Department could be in a critical need for water. The district could be faced with transporting water from only 1 reliable water source location at Briarcliff Marina, and turnaround times could be 30-40 minutes. As an example of the risks when the Lake Travis water level is low, the Labor Day 2011 Pedernales Bend Wildfire burned 6,500 acres, destroyed 70 structures, and left 545 homes without power.

Zebra Mussels – In a 2019 Survey of Lake Travis Marina Owners, almost all marinas reported that Zebra mussels are causing negative impacts. They noted factors such as need for cleaning of dock ladders and hoists; more problems with cable work, motors and inlets on boats, particularly on boats that remain in the water; and safety issues related to minor injuries from sharp surfaces caused by the Zebra mussels.

Sedimentation and Flooding in Upper Highland Lakes – There is a question as to who is responsible for helping communities with flooding and sedimentation issues.

REFERENCE DOCUMENTS, SOURCE MATERIALS, AND INFORMATION CONTRIBUTORS:

- "Lake Travis Economic Impact Report" prepared by Robert Charles Lesser & Co. (RCLCO) for Travis County and the Lake Travis Economic Stakeholders Committee (Sept. 2011);
- "The Economic Impact of the Upper Highland Lakes of the Colorado River" prepared by TXP, Inc., Concept Development & Planning, LLC, and Diverse Planning and Development for Burnet and Llano Counties (Fall 2012);
- County Appraisal Districts - data on property appraised valuations.
    - Travis County Appraisal District
    - Burnet County Appraisal District
    - Llano County Appraisal District
- Multiple Listing Service reports on property sales
- Texas Demographic Center at the University of Texas at San Antonio (UTSA)
- Texas Parks and Wildlife Department (TPWD)
- Marina Association of Lake Travis (MALT)
- Economic Development and Tourism Department; Office of the Governor
- Travis County Parks
- Lower Colorado River Authority (LCRA)
- Upper Highland Lakes Retail Trade Area Demographic Profile prepared by the Retail Coach for the Marble Falls Economic Development Corporation, July 2019
- Marble Falls Economic Development Corporation
- City of Bee Cave
- City of Lakeway
- City of Lago Vista
- Travis County Emergency Services District 8
- Pedernales Electric Cooperative, Inc (PEC)
- Central Texas Electric Cooperative, Inc. (CTEC)
- Various owners of lake-oriented businesses and local community leaders

Appendix 2.A

Demand Revision Requests as Submitted to TWDB

Appendix 2.A

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

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TO: Katie Dahlberg (TWDB)

CC: File, Lann Bookout (TWDB)

FROM: Adam Conner (Freese and Nichols), Neil Deeds (INTERA)

SUBJECT: Region K Draft Population and Municipal Demand Revision Requests

DATE: July 19, 2023

PROJECT: ITA21936

In January 2023, the Texas Water Development Board (TWDB) released draft municipal population and water demand projections to each of the Regional Water Planning Groups for review and comment. Plumbing Code Savings assumptions were revised and new projections were provided in May 2023. Since the 2020 Census data was released subsequent to the publication of the 2021 Plans, regional and county population totals were altered in the projections provided by TWDB. Individual water user groups (WUGs) were adjusted to be representative of retail water service area boundaries rather than political city limit boundaries, as was done in the 2021 Plans. TWDB determined to allow populations of some WUGs whose historic population has been decreasing to continue to decrease. Finally, TWDB has begun using Commercial Plumbing Code Savings for the first time this planning cycle.

This memo details the suggested changes to the population and demand projections that the Region K Water Planning group determined were necessary to more accurately reflect the upcoming water needs of the region. The Region K Water Planning Group identified two key factors impacting municipal water user groups that may not have been adequately accounted for in the TWDB draft population projections. These factors include errors and inaccuracies in the service area boundaries and individual communities growing at significantly different rates than was projected in the 2021 Plan. Baseline per capita water usage adjustments reflect corrected historical populations served, increased conservation, and more recent data. Projected per capita water usage incorporates the TWDB reductions for water efficiencies savings (Plumbing code implementation).

Section 1 of this memo provides a summary of all population revision requests (with key supporting documentation found in Attachments), by WUG. Section 2 highlights the revision requests for baseline GPCD (with key supporting documentation in Attachments), by WUG. Section 3 describes the product of any population and/or baseline GPCD revisions for each WUG requesting one or both, in acre-feet per year.

1.00 POPULATION REVISION REQUESTS

1.01 NAMED WUG POPULATION REVISION REQUESTS

Austin

Austin Water is in the process of updating its Austin Water Forward Plan, the community's 100-year integrated water resource plan. Draft population projections developed for the plan update indicate near-term growth rates that are higher than the draft 1.0 migration scenario projections. Attachment A provides supporting documentation for the requested higher growth rates in Travis and Williamson County and justifies the addition of population in Hays County for the Austin WUG. This WUG is entirely in Region K, so this value comprises the total population for Austin.

This population revision request associated with the Austin WUG exceeds the draft 1.0 migration scenario projections and will not be balanced by a corresponding decrease to the Travis County-Other population. Therefore, ***this population revision request associated with the Austin WUG will increase both the Travis and Williamson County total population above the draft 1.0 migration scenario and the Region K total population.*** Since the Hays County revision is due to an error in service area boundaries, a corresponding decrease to Hays County is recommended.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Hays County	-	-	-	-	-	-
Travis County	1,053,682	1,175,496	1,311,393	1,463,000	1,632,134	1,820,821
Williamson County	92,210	124,095	161,645	202,917	249,744	302,802
Proposed Revised Population						
Hays County	**129**	**152**	**176**	**200**	**224**	**249**
Travis County	**1,166,122**	**1,362,937**	**1,561,206**	**1,758,318**	**1,941,307**	**2,132,924**
Williamson County	**94,844**	**124,153**	**163,421**	**203,844**	**258,328**	**304,309**

Buda

Communications with Buda revealed that the City is currently undergoing an update to its Comprehensive Plan. The City keeps accurate records of the number of connections/population within its water service area (see Attachment B), and comparing the City's 2020 estimate to the 2020 Census data demonstrates how closely they correlate. Applying the growth rates projected for the entire city to its water service area yields population projections identified in the table below. Buda's requests effectively increase its population growth in the near decades and reduce it in the outer decades compared to the Draft 1.0 Migration Scenario. This WUG is entirely in Region K, so this value comprises the total population for Buda. A corresponding near-term decrease and long-term increase to the Hays County-Other population is recommended, as described in Section 1.02. Combined with the baseline GPCD revision request in Section 2, this will make Buda's total dry year demand more accurate. Should the baseline GPCD revision request be rejected, this population revision request should be withdrawn.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Hays County	18,055	26,040	36,554	50,826	67,000	85,329
Proposed Revised Population						
Hays County	**20,475**	**28,665**	**34,156**	**39,620**	**45,959**	**53,312**

Canyon Lake Water Service

Canyon Lake Water Service Company (now called Texas Water Company) developed detailed population and demand projections using robust housing analysis. Population and GPCD were developed for 2030-2070, for each of Canyon Lake's systems. A Lower and Higher scenario was analyzed for population, with the Lower assuming no growth in service area and the Higher assuming growth into adjacent areas with no CCN. For the three systems within Region K, no growth in service area was assumed, so the two projections are the same. Finally, the 2080 population is kept the same as the 2070 population.

The report can be found in Attachment C and the projections from that report are rolled up by County here for regional water planning purposes. It should be noted that the majority of Canyon Lake's population and service area fall within Region L, and this memo only outlines the population and demand for the Region K portion of Canyon Lake Water Service. The only systems that lie within Region K are the Rust Ranch system (entirely within Blanco County) and the Deer Creek system (split between Travis and Hays County). For the Deer Creek system, total population is split evenly between Travis and Hays County.

Corresponding changes to the Blanco County-Other, Hays County-Other, and Travis County-Other populations are recommended, as described in Section 1.02. Combined with the baseline GPCD revision request in Section 2, this will make Canyon Lake's total dry year demand more accurate. Should the baseline GPCD revision request be rejected, this population revision request should be withdrawn.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Blanco County	802	809	794	779	763	743
Hays County	666	960	1,349	1,876	2,473	3,151
Travis County	3,293	4,542	5,620	6,674	7,872	9,233
Proposed Revised Population						
Blanco County	**536**	**536**	**536**	**536**	**536**	**536**
Hays County	**1,266**	**1,301**	**1,326**	**1,345**	**1,358**	**1,358**
Travis County	**1,266**	**1,301**	**1,327**	**1,345**	**1,359**	**1,359**

Corix

In discussions with Corix leadership, it was discovered that the utility's projected 2030 population is much higher than the draft 1.0 migration scenario (and draft 0.5 migration scenario for their Mills and San Saba systems). Due to the confidential nature of their development agreements, the utility was not able to provide any supporting documentation. However, it was determined to keep projected population constant at the 2030 population.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Blanco County	1	1	1	1	1	1
Burnet County	1,677	1,877	2,050	2,242	2,459	2,704
Colorado County	285	259	236	215	196	178
Llano County	1,584	1,622	1,652	1,696	1,747	1,805
Matagorda County	22	22	21	20	19	17
Proposed Revised Population						
Blanco County	**322**	**322**	**322**	**322**	**322**	**322**
Burnet County	**5,856**	**5,856**	**5,856**	**5,856**	**5,856**	**5,856**
Colorado County	**375**	**375**	**375**	**375**	**375**	**375**
Llano County	**4,001**	**4,001**	**4,001**	**4,001**	**4,001**	**4,001**
Matagorda County	**525**	**525**	**525**	**525**	**525**	**525**

	2030	2040	2050	2060	2070	2080
Draft 0.5 Migration Scenario						
Mills County	75	75	75	76	78	80
San Saba County	80	76	71	68	65	61
Proposed Revised Population						
Mills County	**735**	**735**	**735**	**735**	**735**	**735**
San Saba County	**140**	**140**	**140**	**140**	**140**	**140**

Cottonwood Creek MUD 1

In discussions with Cottonwood Creek MUD 1 leadership, it was discovered that the utility is roughly built out and land locked (see Attachment D). It is estimated that buildout population is roughly 5,000. Therefore, it is proposed to cap population at 5,000. Aerial view of the WUG service area can be found in Attachment D. This WUG is entirely in Region K, so this value comprises the total population for Cottonwood Creek MUD 1. A corresponding increase to the Travis County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	5,056	6,929	8,545	10,126	11,923	13,965
Proposed Revised Population						
Travis County	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**

Dripping Springs WSC

Leadership at Dripping Springs WSC indicated that the draft 2030 population is lower than what they plan for. They provided a detailed breakdown showing their 2022 residential connections to be 3,644 and 2022 multi family connections to be 250. Applying a 2.9 persons per connection ratio to their 2022 connection count of 3,894 yields a population of 11,293. The utility also indicated that it is planning for 1,750 new connections by 2030. Applying a 2.9 persons per connection ratio to those planned connections brings the 2030 population to 16,368. For projected population in 2040 through 2080, the same decadal growth rates from the draft 1.0 migration scenario projections were used, with an assumption that the 2080 population from the draft 1.0 migration scenario (40,673) is the build-out population. This WUG is entirely in Region K, so this value comprises the total population for Dripping Springs WSC.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Hays County	8,631	12,496	18,092	26,194	31,942	40,673
Proposed Revised Population						
Hays County	**16,368**	**23,698**	**34,310**	**40,673**	**40,673**	**40,673**

Elgin

City of Elgin provided a map showing all proposed and applied for plats within the City's city limits and ETJ (Attachment E). These future lots/units total roughly 15,000 and the City is confident that a good number of them will be developed within the next 10-20 years. It should be noted that Elgin's city limits are different from its water Certificate of Convenience and Necessity (CCN).

Using a persons per connection ratio of 2.5 and assuming that one-quarter of the units are developed between Elgin's 2020 Census estimate of 9,784 and 2030, and one-quarter are developed in each subsequent decade, results in population projections that are much higher than the draft 1.0 migration scenario. It is assumed that the total population distribution between Bastrop and Travis County will be the same as the proportions found in the Draft 1.0 Migration Scenario. It is also assumed that full build-out is reached in 2060.

The draft and proposed revised population projections for Elgin are found below. This WUG is entirely in Region K, so this value comprises the total population for Elgin. Corresponding decreases to the Bastrop County-Other and Travis County-Other populations are recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Bastrop County	8,712	9,455	10,311	11,293	12,409	13,678
Travis County	1,492	1,955	2,356	2,748	3,195	3,703
Proposed Revised Population						
Bastrop County	**16,358**	**21,324**	**24,989**	**27,638**	**27,638**	**27,638**
Travis County	**8,004**	**14,401**	**19,354**	**23,106**	**23,106**	**23,106**

Goldthwaite

The City of Goldthwaite indicated that they do not believe a declining trend in population is appropriate, and in fact some growth has occurred since 2020 that was not captured in the historical data used for projections. A townhome complex was added in 2021, increasing the number of residential connections. The city also stated that some large parcels are expected to be subdivided, but documentation was not available to support this prediction. Therefore, it is recommended to maintain a constant population of 1,738, which is the population submitted in the 2021 Water Use Survey. The 2010 and 2021 water use surveys are included in Attachment F, illustrating the increases in both residential and commercial connections. This WUG is entirely in Region K, so this value comprises the total population for Goldthwaite. A corresponding decrease to the Mills County-Other population is recommended, as described in Section 1.02. Note that we recommend adopting the ***0.5 Migration Scenario for the Mills County total population***. Goldthwaite is also requesting a revision to its baseline GPCD, which can be found in Section 2.

	2030	2040	2050	2060	2070	2080
Draft 0.5 Migration Scenario						
Mills County	1,624	1,551	1,495	1,472	1,498	1,610
Proposed Revised Population						
Mills County	**1,738**	**1,738**	**1,738**	**1,738**	**1,738**	**1,738**

Hays County WCID 2

Hays County WCID 2 has experienced rapid growth over the past decade, but the utility indicated that this service area is built out and landlocked. The buildout population is estimated to be 3,390 based on a total connection count of 1,130 times 3 persons per connection. Therefore, it is proposed to maintain a constant population of 3,390. An aerial view of the WUG service area can be found in Attachment G. This WUG is entirely in Region K, so this value comprises the total population for Hays County WCID 2. A corresponding increase in the Hays County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Hays County	4,998	7,213	10,130	14,091	18,578	23,664
Proposed Revised Population						
Hays County	**3,390**	**3,390**	**3,390**	**3,390**	**3,390**	**3,390**

Hurst Creek MUD

Hurst Creek MUD's CCN aligns almost exactly with the city limit of Village of the Hills, with the exception of the areas identified in Attachment H. Village of the Hills' 2020 Census estimate was 2,613. Page 1 of Attachment H shows 67 lots that fully lie outside of Village of the Hills' city limits and fully within Hurst Creek MUD's CCN. Page 2 of Attachment H shows only non-residential connections within those same parameters. Applying a 2.5 persons per connection ratio yields an additional 168 people, for a total estimated population in 2020 of 2,781.

In reviewing aerials of Hurst Creek MUD's CCN, it was determined that the service area is fully built-out. Therefore, the proposed revised population shown below maintains population at 2,781. This

WUG is entirely in Region K, so this value comprises the total population for Hurst Creek MUD. A corresponding increase to the Travis County-Other population is recommended, as described in Section 1.02. Hurst Creek MUD is also requesting a revision to its baseline GPCD, which can be found in Section 2.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	3,095	3,095	3,095	3,095	3,095	3,095
Proposed Revised Population						
Travis County	**2,781**	**2,781**	**2,781**	**2,781**	**2,781**	**2,781**

Johnson City

The City of Johnson City has stated that a declining trend in population does not accurately reflect historical trends or expected future growth. The utility has seen growth in connections over the last decade, as shown in the 2010 and 2020 water use survey reports included as Attachment I. Connections have increased from 833 to 884, for an average annual growth rate of approximately 0.6%, We propose the following projections based on a starting 2020 population of two times the 2020 connection count (1,768) and a growth rate of 0.6% per year. A corresponding decrease to the Blanco County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Blanco County	1,631	1,645	1,616	1,589	1,559	1,524
Proposed Revised Population						
Blanco County	**1,877**	**1,993**	**2,116**	**2,246**	**2,384**	**2,531**

La Ventana WSC

In discussions with La Ventana WSC leadership, it was discovered that the utility currently has a total of 307 lots available, of which 260 are currently serviced by the utility. Therefore, it is proposed to cap population at 825, assuming it reaches buildout by 2030. Aerial view of the WUG service area can be found in Attachment J. This WUG is entirely in Region K, so this value comprises the total population for La Ventana WSC. A corresponding increase to the Hays County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Hays County	825	1,191	1,673	2,326	3,067	3,906
Proposed Revised Population						
Hays County	**825**	**825**	**825**	**825**	**825**	**825**

Lago Vista

The City of Lago Vista has indicated that recent growth trends warrant a higher growth projection. The draft 2026 projections show a growth rate of 2.3% (at 1.0 Migration Scenario), but the population growth for Lago Vista from 2010 to 2020 was 4.2% according to historical population data provided by TWDB. Much of the growth in connections has occurred in recent years, with an average growth rate in connections of roughly 5% from 2014 to 2021. Additionally, a buildout capacity of 49,000 people has been estimated for the city based on available land, as described in the Comprehensive Plan (which due to its size can be provided upon request). The City also noted that the current population has nearly reached the draft 2030 projection. The 2020 population is estimated to be 11,315, which is equal to the 2020 connection count of 4,526 times 2.5 people per connection. The 2020 water use survey showing this connection count is also included in Attachment K. Therefore, a population growth rate of 4% is proposed, beginning from a 2020 population of 11,315, and capped at a buildout population of 49,000. This WUG is entirely in Region K, so this value comprises the total population for Lago Vista. A corresponding decrease to the Travis County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	11,892	14,972	18,850	23,732	29,879	37,618
Proposed Revised Population						
Travis County	**16,749**	**24,793**	**36,700**	**49,000**	**49,000**	**49,000**

Lakeway MUD

In discussions with Lakeway MUD leadership, it was discovered that the utility's current population exceeds its projected 2030 population. The utility also provided its buildout population of 11,242 by 2044. Lakeway MUD's requests effectively increase its population growth rate in the near decades and reduce it in the later decades compared to the draft projections. A more detailed description of the revision request can be found in Attachment L. This WUG is entirely in Region K, so this value comprises the total population for Lakeway MUD. A corresponding near-term decrease and long-term increase to the Travis County-Other population is recommended, as described in Section 1.02. Combined with the baseline GPCD revision request in Section 2, this will make Lakeway MUD's total dry year demand more accurate. Should the baseline GPCD revision request be rejected, this population revision request should be withdrawn.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	9,779	10,776	11,632	12,436	13,025	13,025
Proposed Revised Population						
Travis County	**10,726**	**11,095**	**11,242**	**11,242**	**11,242**	**11,242**

Marble Falls

The City of Marble Falls has indicated that recent growth trends warrant a higher growth projection. This has been echoed by members of the Region K planning group. The City provided draft 2023-2033 population projections from the Impact Fee Study it is currently developing (Attachment M). They indicated that Scenario C is what is being planned for in the Impact Fee Study. It was determined to use the City Limits populations in Scenario C to determine the 2030 population and near-term trend line, which was projected out logarithmically to 2080. Therefore, the following population projections for Marble Falls are proposed. This WUG is entirely in Region K, so this value comprises the total population for Marble Falls. A corresponding decrease to the Burnet County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Burnet County	7,655	8,823	10,169	11,720	13,508	15,569
Proposed Revised Population						
Burnet County	**13,287**	**17,072**	**17,079**	**17,086**	**17,093**	**17,101**

Ruby Ranch WSC

In discussions with Ruby Ranch WSC leadership, it was discovered that the utility is roughly built out. Therefore, it is proposed to cap population at 1,122, assuming it reaches buildout by 2030. Aerial view of the WUG service area can be found in Attachment N. This WUG is entirely in Region K, so this value comprises the total population for Ruby Ranch WSC. A corresponding increase to the Hays County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Hays County	1,122	1,620	2,275	3,164	4,172	5,314
Proposed Revised Population						
Hays County	**1,122**	**1,122**	**1,122**	**1,122**	**1,122**	**1,122**

San Saba

It was determined that the ***draft 0.5 migration scenario*** should be adopted for the San Saba County total. In discussions with City of San Saba leadership, it was discovered that the utility's current population exceeds its projected 2030 population and that the City does not anticipate any reduction in population. Water Use Surveys submitted over the past few years (Attachment O) indicate a slightly increasing population above 3,000, with a population per residential connection of roughly 3. Therefore, it is proposed to maintain San Saba's population at 3,000 for all planning decades. This WUG is entirely in Region K, so this value comprises the total population for San Saba. A corresponding decrease to the San Saba County-Other population is recommended, as described in Section 1.02. San Saba is also requesting a revision to its Baseline GPCD, which can be found in Section 2.

	2030	2040	2050	2060	2070	2080
Draft 0.5 Migration Scenario						
San Saba County	2,170	2,143	2,143	2,167	2,237	2,381
Proposed Revised Population						
San Saba County	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**

Schulenburg

In discussions with Schulenburg leadership, it was discovered that the utility's current population exceeds its projected 2030 population and that the City does not anticipate any reduction in population. Water Use Surveys submitted over the past few years indicate a population slightly below 3,000, and documentation from the City's Economic Development Corporation indicate a strong growth in jobs and development interest growing west of the Houston metroplex (Attachment P). Therefore, it is proposed to maintain Schulenburg's population at 3,000 for all planning decades. This WUG is entirely in Region K, so this value comprises the total population for Schulenburg. A corresponding decrease to the Fayette County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Fayette County	2,438	2,395	2,347	2,337	2,326	2,314
Proposed Revised Population						
Fayette County	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**

Sunset Valley

City of Sunset Valley is located in south Austin and is fully surrounded by Austin city limits. It is in the heart of a rapidly growing urban center and should not show a decrease in population. Therefore, the proposed revised population shown below maintains population at 737. This WUG is entirely in Region K, so this value comprises the total population for Sunset Valley. A corresponding decrease to the Travis County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	737	611	507	424	354	295
Proposed Revised Population						
Travis County	**737**	**737**	**737**	**737**	**737**	**737**

Travis County MUD 18

Travis County MUD 18 is a new WUG for the 2026 regional planning cycle, and the utility indicated that this service area is built out and landlocked. The buildout population is estimated by the utility to be 1,449 based on a total connection count of 483 times 3 persons per connection. Therefore, it is proposed to maintain a constant population of 1,449. An aerial view of the WUG service area can be found in Attachment Q. This WUG is entirely in Region K, so this value comprises the total population for Travis County MUD 18. A corresponding increase to the Travis County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	2,455	3,387	4,192	4,979	5,873	6,889
Proposed Revised Population						
Travis County	**1,449**	**1,449**	**1,449**	**1,449**	**1,449**	**1,449**

Travis County WCID 18

Travis County WCID 18 is located in west Austin and purchases water from LCRA. It is in the heart of a rapidly growing urban center and should not show a decrease in population. Additionally, the utility provided a report to its Board (Attachment R) showing the total connection count in April 2023 to be 1,920, for a total population of 5,523. Therefore, the proposed revised population shown below maintains population at 5,523. This WUG is entirely in Region K, so this value comprises the total population for Travis County WCID 18. A corresponding decrease to the Travis County-Other population is recommended, as described in Section 1.02.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	3,048	2,318	1,766	1,354	1,037	794
Proposed Revised Population						
Travis County	**5,523**	**5,523**	**5,523**	**5,523**	**5,523**	**5,523**

Undine Development

A representative at Undine LLC communicated that the system currently has 232 active connections and uses a multiplier of 3 people per connection, so requested that its 2030 population be shown as 696. The utility also explained that it is at build-out, and therefore should be shown as having a static population throughout the planning horizon.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	372	381	389	400	411	424
Proposed Revised Population						
Travis County	**696**	**696**	**696**	**696**	**696**	**696**

Wells Branch MUD

Communications with Wells Branch MUD revealed that the utility's current population exceeds its projected 2030 population. Attachment S shows the utility's 2021 Water Use Survey, reporting a population of 19,377, as well as documentation of the utility's total multifamily units. Additionally, Attachment S documents the numbers of future units in various stages of development/planning, which totals 1,239 units (Generational Housing Multifamily should not be included as future development). While it is very likely that the utility will have more growth in the future than what is known today, it was decided to limit future growth to what is known today. It was assumed that all future units will be developed by 2040. Wells Branch MUD directed that all population in addition to the Draft 1.0 Migration Scenario be assumed to occur in Travis County. This WUG is entirely in Region K, so this value comprises the total population for Wells Branch MUD. A corresponding decrease to the Travis County-Other population is recommended, as described in Section 1.02. Wells Branch MUD is not requesting a change to the Williamson County portion of its service area, just the Travis County portion.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario						
Travis County	15,366	17,093	18,576	18,750	18,750	18,750
Williamson County	500	734	1,012	1,073	1,073	1,073
Proposed Revised Population						
Travis County	**21,073**	**21,907**	**21,907**	**21,907**	**21,907**	**21,907**
Williamson County	500	734	1,012	1,073	1,073	1,073

1.02 COUNTY-OTHER POPULATION REVISION REQUESTS

In order to balance the County total populations with the various revisions within the County, changes in County-Other populations are proposed, as identified in the following subsections. In Travis and Williamson County, ***an increase above the 1.0 migration scenario County total is requested***, and those increases are entirely attributed to the increase requested by Austin. Travis County-Other population is balanced by the revision requests of all WUGs within Travis County except for Austin.

Bastrop County-Other

It was determined that the draft 1.0 migration scenario should be used for the Bastrop County total. In order to maintain the county total to this population, the Bastrop County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in Bastrop County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Bastrop County	111,046	136,189	165,955	199,775	238,106	281,553
Draft 1.0 Migration Scenario – Bastrop County-Other	9,855	13,829	18,565	23,936	30,020	36,908
Draft 1.0 Migration Scenario – Bastrop County Total	120,901	150,018	184,520	223,711	268,126	318,461
Proposed All Named WUGs in Bastrop County	118,692	148,058	180,633	216,120	253,335	295,513
Proposed Revised Population – Bastrop County-Other	**2,209**	**1,960**	**3,887**	**7,591**	**14,791**	**22,948**
Proposed Bastrop County Total	120,901	150,018	184,520	223,711	268,126	318,461

Blanco County-Other

It was determined that the draft 1.0 migration scenario should be used for the Blanco County total. In order to maintain the county total to this population, the Blanco County-Other population has been adjusted as described in the proposed revisions in the table below. The "Proposed All Named WUGs in Blanco County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Blanco County	4,465	4,504	4,422	4,344	4,257	4,154
Draft 1.0 Migration Scenario – Blanco County-Other	7,386	7,447	7,309	7,174	7,020	6,850
Draft 1.0 Migration Scenario – Blanco County Total	11,851	11,951	11,731	11,518	11,277	11,004
Proposed All Named WUGs in Blanco County	4,766	4,900	4,985	5,079	5,176	5,275
Proposed Revised Population – Blanco County-Other	**7,085**	**7,051**	**6,746**	**6,439**	**6,101**	**5,729**
Proposed Blanco County Total	11,851	11,951	11,731	11,518	11,277	11,004

Burnet County-Other

It was determined that the draft 1.0 migration scenario should be used for the Burnet County total. In order to maintain the county total to this population, the Burnet County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in Burnet County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Burnet County	33,702	37,806	41,765	46,238	51,374	57,163
Draft 1.0 Migration Scenario – Burnet County-Other	21,560	22,821	23,492	24,085	24,690	25,407
Draft 1.0 Migration Scenario – Burnet County Total	55,262	60,627	65,257	70,323	76,064	82,570
Proposed All Named WUGs in Burnet County	43,513	50,034	52,481	55,218	58,356	61,847
Proposed Revised Population – Burnet County-Other	**11,749**	**10,593**	**12,776**	**15,105**	**17,708**	**20,723**
Proposed Burnet County Total	55,262	60,627	65,257	70,323	76,064	82,570

Colorado County-Other

It was determined that the draft 1.0 migration scenario should be used for the Colorado County total. In order to maintain the county total to this population, the Colorado County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in Colorado County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Colorado County	8,505	8,180	7,843	7,574	7,268	6,918
Draft 1.0 Migration Scenario – Colorado County-Other	11,480	11,216	10,899	10,571	10,200	9,783
Draft 1.0 Migration Scenario – Colorado County Total	19,985	19,396	18,742	18,145	17,468	16,701
Proposed All Named WUGs in Colorado County	8,595	8,296	7,982	7,734	7,447	7,115
Proposed Revised Population – Colorado County-Other	**11,390**	**11,100**	**10,760**	**10,411**	**10,021**	**9,586**
Proposed Colorado County Total	19,985	19,396	18,742	18,145	17,468	16,701

Fayette County-Other

It was determined that the draft 1.0 migration scenario should be used for the Fayette County total. In order to maintain the county total to this population, the Fayette County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in Fayette County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Fayette County	19,027	19,391	19,771	20,380	21,038	21,738
Draft 1.0 Migration Scenario – Fayette County-Other	5,243	4,391	3,466	2,741	1,952	1,104
Draft 1.0 Migration Scenario – Fayette County Total	24,270	23,782	23,237	23,121	22,990	22,842
Proposed All Named WUGs in Fayette County	19,589	19,996	20,424	21,043	21,712	22,424
Proposed Revised Population – Fayette County-Other	**4,681**	**3,786**	**2,813**	**2,078**	**1,278**	**418**
Proposed Fayette County Total	24,270	23,782	23,237	23,121	22,990	22,842

Hays County-Other

It was determined that the draft 1.0 migration scenario should be used for the Hays County total. In order to maintain the county total to this population, the Hays County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in Hays County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Hays County	64,764	90,931	125,891	173,853	224,773	284,695
Draft 1.0 Migration Scenario – Hays County-Other	30,703	46,786	67,462	95,015	129,676	166,742
Draft 1.0 Migration Scenario – Hays County Total	95,467	137,717	193,353	268,868	354,449	451,437
Proposed All Named WUGs in Hays County	74,042	100,564	131,123	162,551	191,092	223,587
Proposed Revised Population – Hays County-Other	**21,425**	**37,153**	**62,230**	**106,317**	**163,357**	**227,850**
Proposed Hays County Total	95,467	137,717	193,353	268,868	354,449	451,437

Llano County-Other

It was determined that the draft 1.0 migration scenario should be used for the Llano County total. In order to maintain the county total to this population, the Llano County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in Llano County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that the Hays County-Other population in 2080 is reduced by 55 to serve to increase the Llano County-Other population in 2080 by 55. Finally, it should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Llano County	17,105	18,544	20,080	22,015	24,244	26,802
Draft 1.0 Migration Scenario – Llano County-Other	5,984	5,348	4,319	3,714	2,992	2,142
Draft 1.0 Migration Scenario – Llano County Total	23,089	23,892	24,399	25,729	27,236	28,944
Proposed All Named WUGs in Llano County	19,522	20,923	22,429	24,320	26,498	28,998
Proposed Revised Population – Llano County-Other	**3,567**	**2,969**	**1,970**	**1,409**	**738**	**1**
Proposed Llano County Total	23,089	23,892	24,399	25,729	27,236	28,999

Matagorda County-Other

It was determined that the draft 1.0 migration scenario should be used for the Matagorda County total. In order to maintain the county total to this population, the Matagorda County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in Matagorda County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Matagorda County	25,973	25,945	25,981	25,980	25,952	25,890
Draft 1.0 Migration Scenario – Matagorda County-Other	9,239	8,116	6,724	5,135	3,361	1,381
Draft 1.0 Migration Scenario – Matagorda County Total	35,212	34,061	32,705	31,115	29,313	27,271
Proposed All Named WUGs in Matagorda County	26,476	26,448	26,485	26,485	26,458	26,398
Proposed Revised Population – Matagorda County-Other	**8,736**	**7,613**	**6,220**	**4,630**	**2,855**	**873**
Proposed Matagorda County Total	35,212	34,061	32,705	31,115	29,313	27,271

Mills County-Other

It was determined that the ***draft 0.5 migration scenario*** should be adopted for the Mills County total. In order to maintain the county total to this population, the Mills County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in Mills County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 0.5 Migration Scenario - All Named WUGs in Mills County	1,699	1,626	1,570	1,548	1,576	1,690
Draft 0.5 Migration Scenario – Mills County-Other	2,478	2,244	1,980	1,802	1,564	1,229
Draft 0.5 Migration Scenario – Mills County Total	4,177	3,870	3,550	3,350	3,140	2,919
Proposed All Named WUGs in Mills County	2,473	2,473	2,473	2,473	2,473	2,473
Proposed Revised Population – Mills County-Other	**1,704**	**1,397**	**1,077**	**877**	**667**	**446**
Proposed Mills County Total	4,177	3,870	3,550	3,350	3,140	2,919

San Saba County-Other

It was determined that the ***draft 0.5 migration scenario*** should be adopted for the San Saba County total. In order to maintain the county total to this population, the San Saba County-Other population has been adjusted as described in the proposed revisions in the table below. It should be noted that the "Proposed All Named WUGs in San Saba County" incorporates all of the proposed revisions in Section 1.01. It should also be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 0.5 Migration Scenario - All Named WUGs in San Saba County	3,356	3,258	3,201	3,183	3,225	3,353
Draft 0.5 Migration Scenario – San Saba County-Other	2,083	1,901	1,705	1,553	1,332	1,016
Draft 0.5 Migration Scenario – San Saba County Total	5,439	5,159	4,906	4,736	4,557	4,369
Proposed All Named WUGs in San Saba County	4,246	4,179	4,127	4,088	4,063	4,051
Proposed Revised Population – San Saba County-Other	**1,193**	**980**	**779**	**648**	**494**	**318**
Proposed San Saba County Total	5,439	5,159	4,906	4,736	4,557	4,369

Travis County-Other

Due to the number of WUGs in Travis County requesting revisions, the magnitude of those revisions, and the quality of supporting documentation, it was determined that ***a value greater than the draft 1.0 migration scenario*** should be used for the Travis County total. It should be noted that the Travis County-Other population is recommended to remain at the draft 1.0 migration scenario and that the Travis County-Other population is balanced by the revision requests of all WUGs within Travis County other than Austin, and that the "Proposed All Named WUGs in Travis County" incorporates all of the proposed revisions in Section 1.01 and Section 1.02. It should also be noted that all populations are for Region K portion only.

Finally, Region G is intending to submit revision requests for the Region K portions of WUGs primarily in Region G, the majority of which also lie within Travis County. As of the publication of this memo, Region G has not formally submitted its revision requests. Those requests will need to amend Region K's Travis County-Other WUG population and are not included in this memo, which this memo assumes will happen in coordination with TWDB and Region G.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Travis County	1,447,692	1,693,109	1,909,277	2,139,978	2,399,230	2,690,639
Draft 1.0 Migration Scenario – Travis County-Other	94,947	127,362	126,546	112,159	97,941	84,228
Draft 1.0 Migration Scenario – Travis County Total	1,572,639	1,820,417	2,035,823	2,252,137	2,497,171	2,774,867
Proposed All Named WUGs in Travis County	1,607,551	1,904,120	2,190,378	2,473,364	2,735,789	3,017,751
Proposed Revised Population – Travis County-Other	**77,528**	**103,738**	**95,358**	**74,091**	**70,555**	**69,219**
Proposed Travis County Total	**1,685,079**	**2,007,858**	**2,285,736**	**2,547,455**	**2,806,344**	**3,086,970**

Williamson County-Other

Austin is the only WUG that has requested revisions for the portion of Williamson County that is within the Lower Colorado Regional Water Planning Area. Due to the magnitude of these changes, a value greater than the draft 1.0 migration scenario is recommended for the Williamson County total in the year 2070. In other decades, the Williamson County-Other population for Region K has been adjusted to maintain the draft 1.0 migration scenario county total population. It should be noted that all populations are for Region K portion only.

	2030	2040	2050	2060	2070	2080
Draft 1.0 Migration Scenario - All Named WUGs in Williamson County	101,644	133,783	171,632	212,988	259,839	312,923
Draft 1.0 Migration Scenario – Williamson County-Other	2,634	2,529	2,392	2,288	2,188	2,087
Draft 1.0 Migration Scenario – Williamson County Total	104,278	136,312	174,024	215,276	262,027	315,010
Proposed All Named WUGs in Williamson County	104,278	133,841	173,408	213,915	268,423	314,430
Proposed Revised Population – Williamson County-Other	**0**	**2,471**	**616**	**1,361**	**0**	**580**
Proposed Revised Williamson County Total	**104,278**	**136,312**	**174,024**	**215,276**	**268,423**	**315,010**

1.03 SUMMARY OF POPULATION REVISION REQUESTS

The following table summarizes the totality of population revision requests, by WUG and Region-County. It should be noted that, with the exception of WUGs in San Saba and Mills Counties, all draft projections are 1.0 migration scenario.

			Draft Population Projections						Proposed Population Projections					
Region	WUG	County	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080
K	**Austin**	Hays	-	-	-	-	-	-	129	152	176	200	224	249
K	**Austin**	Travis	1,053,682	1,175,496	1,311,393	1,463,000	1,632,134	1,820,821	1,166,122	1,362,937	1,561,206	1,758,318	1,941,307	2,132,924
K	**Austin**	Williamson	92,210	124,095	161,645	202,917	249,744	302,802	94,844	124,153	163,421	203,844	258,328	304,309
K	**Buda**	Hays	18,055	26,040	36,554	50,826	67,000	85,329	20,475	28,665	34,156	39,620	45,959	53,312
K	**Canyon Lake Water Service**	Blanco	802	809	794	779	763	743	536	536	536	536	536	536
K	**Canyon Lake Water Service**	Hays	666	960	1,349	1,876	2,473	3,151	1,266	1,301	1,326	1,345	1,358	1,358
K	**Canyon Lake Water Service**	Travis	3,293	4,542	5,620	6,674	7,872	9,233	1,266	1,301	1,327	1,345	1,359	1,359
K	**Corix**	Blanco	1	1	1	1	1	1	322	322	322	322	322	322
K	**Corix**	Burnet	1,677	1,877	2,050	2,242	2,459	2,704	5,856	5,856	5,856	5,856	5,856	5,856
K	**Corix**	Colorado	285	259	236	215	196	178	375	375	375	375	375	375
K	**Corix**	Llano	1,584	1,622	1,652	1,696	1,747	1,805	4,001	4,001	4,001	4,001	4,001	4,001
K	**Corix**	Matagorda	22	22	21	20	19	17	525	525	525	525	525	525
K	**Corix**	Mills	75	75	75	76	78	80	735	735	735	735	735	735
K	**Corix**	San Saba	80	76	71	68	65	61	140	140	140	140	140	140
K	**Cottonwood Creek MUD 1**	Travis	5,056	6,929	8,545	10,126	11,923	13,965	5,000	5,000	5,000	5,000	5,000	5,000

K	**County-Other, Bastrop**	Bastrop	9,855	13,829	18,565	23,936	30,020	36,908	**2,209**	**1,960**	**3,887**	**7,591**	**14,791**	**22,948**
K	**County-Other, Blanco**	Blanco	7,386	7,447	7,309	7,174	7,020	6,850	**7,085**	**7,051**	**6,746**	**6,439**	**6,101**	**5,729**
K	**County-Other, Burnet**	Burnet	21,560	22,821	23,492	24,085	24,690	25,407	**11,749**	**10,593**	**12,776**	**15,105**	**17,708**	**20,723**
K	**County-Other, Colorado**	Colorado	11,480	11,216	10,899	10,571	10,200	9,783	**11,390**	**11,100**	**10,760**	**10,411**	**10,021**	**9,586**
K	**County-Other, Fayette**	Fayette	5,243	4,391	3,466	2,741	1,952	1,104	**4,681**	**3,786**	**2,813**	**2,078**	**1,278**	**418**
K	**County-Other, Hays**	Hays	30,703	46,786	67,462	95,015	129,676	166,742	**21,425**	**37,153**	**62,230**	**106,317**	**163,357**	**227,850**
K	**County-Other, Llano**	Llano	5,984	5,348	4,319	3,714	2,992	2,142	**3,567**	**2,969**	**1,970**	**1,409**	**738**	**1**
K	**County-Other, Matagorda**	Matagorda	9,239	8,116	6,724	5,135	3,361	1,381	**8,736**	**7,613**	**6,220**	**4,630**	**2,855**	**873**
K	**County-Other, Mills**	Mills	2,478	2,244	1,980	1,802	1,564	1,229	**1,704**	**1,397**	**1,077**	**877**	**667**	**446**
K	**County-Other, San Saba**	San Saba	2,083	1,901	1,705	1,553	1,332	1,016	**1,193**	**980**	**779**	**648**	**494**	**318**
K	**County-Other, Travis**	Travis	94,947	127,362	126,546	112,159	97,941	84,228	**77,528**	**103,738**	**95,358**	**74,091**	**70,555**	**69,219**
K	**County-Other, Williamson**	Williamson	2,634	2,529	2,392	2,288	2,188	2,087	**0**	**2,471**	**616**	**1,361**	**0**	**580**

K	**Dripping Springs WSC**	Hays	8,631	12,496	18,092	26,194	31,942	40,673	**16,368**	**23,698**	**34,310**	**40,673**	**40,673**	**40,673**
K	**Elgin**	Bastrop	8,712	9,455	10,311	11,293	12,409	13,678	**16,358**	**21,324**	**24,989**	**27,638**	**27,638**	**27,638**
		Travis	1,492	1,955	2,356	2,748	3,195	3,703	**8,004**	**14,401**	**19,354**	**23,106**	**23,106**	**23,106**
K	**Goldthwaite**	Mills	1,624	1,551	1,495	1,472	1,498	1,610	**1,738**	**1,738**	**1,738**	**1,738**	**1,738**	**1,738**
K	**Hays County WCID 2**	Hays	4,998	7,213	10,130	14,091	18,578	23,664	**3,390**	**3,390**	**3,390**	**3,390**	**3,390**	**3,390**
K	**Hurst Creek MUD**	Travis	3,095	3,095	3,095	3,095	3,095	3,095	**2,781**	**2,781**	**2,781**	**2,781**	**2,781**	**2,781**
K	**Johnson City**	Blanco	1,631	1,645	1,616	1,589	1,559	1,524	**1,877**	**1,993**	**2,116**	**2,246**	**2,384**	**2,531**
K	**Lago Vista**	Travis	11,892	14,972	18,850	23,732	29,879	37,618	**16,749**	**24,793**	**36,700**	**49,000**	**49,000**	**49,000**
K	**Lakeway MUD**	Travis	9,779	10,776	11,632	12,436	13,025	13,025	**10,726**	**11,095**	**11,242**	**11,242**	**11,242**	**11,242**
K	**La Ventana WSC**	Hays	825	1,191	1,673	2,326	3,067	3,906	**825**	**825**	**825**	**825**	**825**	**825**
K	**Marble Falls**	Burnet	7,655	8,823	10,169	11,720	13,508	15,569	**13,287**	**17,072**	**17,079**	**17,086**	**17,093**	**17,101**
K	**Ruby Ranch WSC**	Hays	1,122	1,620	2,275	3,164	4,172	5,314	**1,122**	**1,122**	**1,122**	**1,122**	**1,122**	**1,122**
K	**San Saba**	San Saba	2,170	2,143	2,143	2,167	2,237	2,381	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**
K	**Schulenburg**	Fayette	2,438	2,395	2,347	2,337	2,326	2,314	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**
K	**Sunset Valley**	Travis	737	611	507	424	354	295	**737**	**737**	**737**	**737**	**737**	**737**
K	**Travis County MUD 18**	Travis	2,455	3,387	4,192	4,979	5,873	6,889	**1,449**	**1,449**	**1,449**	**1,449**	**1,449**	**1,449**
K	**Travis County WCID 18**	Travis	3,048	2,318	1,766	1,354	1,037	794	**5,523**	**5,523**	**5,523**	**5,523**	**5,523**	**5,523**

K	**Undine Development**	Travis	372	381	389	400	411	424	**696**	**696**	**696**	**696**	**696**	**696**
K	**Wells Branch MUD**	Travis	15,366	17,093	18,576	18,750	18,750	18,750	**21,073**	**21,907**	**21,907**	**21,907**	**21,907**	**21,907**

2.00 BASELINE GPCD REVISION REQUESTS

After extensive outreach, multiple WUGs expressed their interest in revising their baseline GPCD. Section 2.2.2.1 of Exhibit C – First Amended General Guidelines for Development of 2026 Regional Water Plans allows the following criteria for adjustment of baseline GPCD:

1. Evidence that per capita water use from a more recent year (2015-2019) would be more appropriate as the baseline because that year was more representative of dry-year conditions.
2. Evidence of errors identified in the historical water use or GPCD for a utility or public water system, including evidence that volumes of reuse (potable reuse) water used for municipal purposes should be or should not be included in the draft projections.
3. Evidence that the base dry-year water use was abnormal due to temporary infrastructure constraints or water restriction triggered by utility's drought management plan.
4. Trends indicating that per capita water use for a utility or rural area of a county have increased substantially in recent years, and evidence that these trends will continue to rise in the short-term future due to commercial development.
5. Evidence that the most recent water efficiency and conservation savings that have already been implemented are not reflected in the default baseline GPCD.
6. Evidence that the number of installations of water-efficient fixtures and appliances between 2010 and 2020 is substantially different than the TWDB estimate or evidence that the projected replacement rate of water-efficient fixtures and appliances is substantially different than the TWDB projections.
7. Evidence that future water efficiency savings are projected much higher than the draft projections due to a utility's conservation plans that accelerate the replacement of the existing outdated plumbing fixtures and appliances.

2.01 ERRORS AND CORRECTIONS

Buda

After discussions with City of Buda, it was discovered that while the total production amount in its 2011 Water Use Survey was correct, the population was not. A more accurate population for Buda's service area in 2011 would be 7,242, which results in a 2011 GPCD of 145. More detail on Buda's historical estimates can be found in Attachment B. Therefore, Buda is requesting a revision of its baseline GPCD to be 145 due to Criteria #2 above, or whatever that usage would be after applying plumbing code savings 2011-2020. Combined with the population revision request in Section 1.01, this will make Buda's total dry year demand more accurate. Should the population revision request be rejected, this baseline GPCD revision request should be withdrawn.

Draft Baseline GPCD	161
Proposed Revised Baseline GPCD	**145**

Canyon Lake Water Service

Canyon Lake has developed detailed analysis on its historic water usage. That report used the methodology of taking the average of the three highest GPCDs to set the baseline GPCD. In 2011, Canyon Lake's Rust Ranch system in Blanco County used 76 GPCD and the Deer Creek system in Travis and Hays County used 70 GPCD. For the purpose of using a conservative estimate for the combination of the systems, a baseline GPCD of 76 is proposed. For more details on the baseline GPCD methodology, see Attachment C.

Draft Baseline GPCD	113
Proposed Revised Baseline GPCD	**76**

Goldthwaite

The City of Goldthwaite provided evidence that it has experienced more commercial development in recent years, with increases in institutional and commercial connections from 2010-2020. The City indicated that it has a new 28-unit town home complex being built, as well as three new restaurants, a new large truck stop convenience store, expansion of its Family Dollar and Dollar General, expanded pecan processing facility, new law enforcement center, expanded medical clinic, new clinic under development, new high school and elementary school, and new EMS complex. As a result of this trend toward more commercial development, it is recommended to use a more recent year as the baseline GPCD, per Criteria #4 above. Therefore, Goldthwaite is requesting a revision of its baseline GPCD to be 321, which is what it experienced in 2020 with a total production amount of 201,307,039 gallons and a Census estimated population of 1,719. The water efficiency savings developed by TWDB can then be applied for subsequent decades. Goldthwaite is also requesting a revision to its population, which can be found in Section 1.01.

Draft Baseline GPCD	173
Proposed Revised Baseline GPCD	**321**

Lakeway MUD

After discussions with Lakeway MUD, it was discovered that the utility has more accurate numbers to calculate its 2011 GPCD. More detail on Lakeway MUD's revision request on baseline GPCD can be found in Attachment L. Lakeway MUD is requesting a revision of its baseline GPCD to be 253 due to Criteria #2 above, or whatever that usage would be after applying plumbing code savings 2011-2020. Combined with the population revision request in Section 1.01, this will make Lakeway MUD's total dry year demand more accurate. Should the population revision request be rejected, this baseline GPCD revision request should be withdrawn.

It should be noted that Lakeway MUD has a higher GPCD than is representative of their conservation ethic, due to the following reasons:

1. As the wholesale water provided by Lakeway MUD traverses within and to the far extent of Lakeway MUD's distribution system prior to delivery, the system water losses associated with the wholesale delivery portion remain within Lakeway MUD's baseline GPCD.
2. As the most recent 2-year wholesale deliveries have averaged roughly 10% of Lakeway MUD distributed flows and system water loss has been on the order of 15%, this inaccuracy is notable.
3. Lakeway MUD has a relatively high percentage of transient population, which artificially lowers its population and increases its GPCD.

Draft Baseline GPCD	226
Proposed Revised Baseline GPCD	**253**

Undine Development

A representative from Undine LLC provided historical production data for the system, 2020-2022. Comparing the net use data provided by the utility with their proposed population yields a GPCD of 159, 154, and 198 for 2020, 2021 and 2022, respectively. In order to align Undine's total demand closer to its projected dry year demand, the proposal is to use a baseline GPCD of 198.

Draft Baseline GPCD	350
Proposed Revised Baseline GPCD	**198**

2.02 CHANGES TO DRY YEAR

Hurst Creek MUD

In discussions with Hurst Creek MUD leadership, it was conveyed that they believe the draft baseline GPCD does not represent what their customers currently use in a dry year. They explained that 2022 was a very dry year for them and that they did not implement any drought stages, so it represents relatively unmitigated water usage. Attachment T shows Hurst Creek MUD's 2022

Water Use Survey, which equates to a GPCD of 375 (when not including reuse in production amount). Therefore, it is recommended to use this more recent and accurate number for Hurst Creek MUD's baseline GPCD. Hurst Creek MUD is also requesting a revision to its population, which can be found in Section 1.01.

Draft Baseline GPCD	496
Proposed Revised Baseline GPCD	**375**

2.03 SUMMARY OF BASELINE GPCD REVISION REQUESTS

The following table summarizes the totality of baseline GPCD revision requests, by WUG and Region-County.

Region	WUG	County	Draft Baseline GPCD	Proposed Baseline GPCD
K	**Buda**	Hays	161	145
K	**Canyon Lake Water Service**	Blanco	113	76
K	**Canyon Lake Water Service**	Hays	113	76
K	**Canyon Lake Water Service**	Travis	113	76
K	**Goldthwaite**	Mills	173	321
K	**Hurst Creek MUD**	Travis	496	375
K	**Lakeway MUD**	Travis	226	253
K	**Undine Development**	Travis	350	198

3.00 TOTAL DEMAND REVISION REQUESTS

The following subsections describe the product of any population and/or baseline GPCD revisions for each WUG requesting one or both, shown in acre-feet per year. It should be noted that the total demand in decades subsequent to 2030 is not the product of the population in that decade times the baseline GPCD; instead, it is the product of the population in that decade times the baseline GPCD minus plumbing code savings.

Austin

Population revision requests are being recommended for Austin, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Hays County		**129**	**152**	**176**	**200**	**224**	**249**
Travis County		**1,166,122**	**1,362,937**	**1,561,206**	**1,758,318**	**1,941,307**	**2,132,924**
Williamson County		**94,844**	**124,153**	**163,421**	**203,844**	**258,328**	**304,309**
Draft GPCD	157	152	152	152	152	152	152
Proposed Total Demand (acre-feet per year)							
Hays County		**22**	**26**	**30**	**34**	**38**	**42**
Travis County		**198,677**	**231,308**	**264,957**	**298,409**	**329,465**	**361,985**
Williamson County		**16,159**	**21,070**	**27,735**	**34,595**	**43,842**	**51,645**

Buda

Both population and baseline GPCD revision requests are being recommended for Buda (see Section 1.01 and Section 2, respectively). Should either of those requests be denied, this subsection would need to be revised. Revised population, GPCD and Total Demand are shown in the table below.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Hays County		**20,475**	**28,665**	**34,156**	**39,620**	**45,959**	**53,312**
Proposed GPCD	**145**	**141**	**141**	**141**	**141**	**141**	**141**
Proposed Total Demand (acre-feet per year)							
Hays County		**3,236**	**4,515**	**5,380**	**6,240**	**7,239**	**8,397**

Canyon Lake Water Service

Both population and baseline GPCD revision requests are being recommended for Canyon Lake Water Service (see Section 1.01 and Section 2, respectively). Should either of those requests be denied, this subsection would need to be revised. Revised population, GPCD and Total Demand are shown in the table below.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Blanco County		**536**	**536**	**536**	**536**	**536**	**536**
Hays County		**1,266**	**1,301**	**1,326**	**1,345**	**1,358**	**1,358**
Travis County		**1,266**	**1,301**	**1,327**	**1,345**	**1,359**	**1,359**
Proposed GPCD	**76**	**72**	**72**	**72**	**72**	**72**	**72**
Proposed Total Demand (acre-feet per year)							
Blanco County		**43**	**43**	**43**	**43**	**43**	**43**
Hays County		**102**	**104**	**106**	**108**	**109**	**109**
Travis County		**102**	**104**	**106**	**108**	**109**	**109**

Corix

Population revision requests are being recommended for Corix, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Blanco County		**322**	**322**	**322**	**322**	**322**	**322**
Burnet County		**5,856**	**5,856**	**5,856**	**5,856**	**5,856**	**5,856**
Colorado County		**375**	**375**	**375**	**375**	**375**	**375**
Llano County		**4,001**	**4,001**	**4,001**	**4,001**	**4,001**	**4,001**
Matagorda County		**525**	**525**	**525**	**525**	**525**	**525**
Mills County		**735**	**735**	**735**	**735**	**735**	**735**
San Saba County		**140**	**140**	**140**	**140**	**140**	**140**
Draft GPCD	144	139	139	139	139	139	139
Proposed Total Demand (acre-feet per year)							
Blanco County		**50**	**50**	**50**	**50**	**50**	**50**
Burnet County		**914**	**910**	**910**	**910**	**910**	**910**
Colorado County		**59**	**58**	**58**	**58**	**58**	**58**
Llano County		**624**	**622**	**622**	**622**	**622**	**622**
Matagorda County		**82**	**82**	**82**	**82**	**82**	**82**
Mills County		**115**	**114**	**114**	**114**	**114**	**114**
San Saba County		**22**	**22**	**22**	**22**	**22**	**22**

Cottonwood Creek MUD 1

Population revision requests are being recommended for Cottonwood Creek MUD 1, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**5,000**	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**
Draft GPCD	60	60	60	60	60	60	60
Proposed Total Demand (acre-feet per year)							
Travis County		**336**	**336**	**336**	**336**	**336**	**336**

County-Other, Bastrop

Population revision requests are being recommended for County-Other, Bastrop, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Bastrop County		**2,209**	**1,960**	**3,887**	**7,591**	**14,791**	**22,948**
Draft GPCD	163	160	159	159	159	159	159
Proposed Total Demand (acre-feet per year)							
Bastrop County		**395**	**349**	**693**	**1,353**	**2,637**	**4,091**

County-Other, Blanco

Population revision requests are being recommended for County-Other, Blanco, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Blanco County		**7,085**	**7,051**	**6,746**	**6,439**	**6,101**	**5,729**
Draft GPCD	111	106	106	106	106	106	106
Proposed Total Demand (acre-feet per year)							
Blanco County		**843**	**835**	**798**	**762**	**722**	**678**

County-Other, Burnet

Population revision requests are being recommended for County-Other, Burnet, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Burnet County		**11,749**	**10,593**	**12,776**	**15,105**	**17,708**	**20,723**
Draft GPCD	138	133	133	133	133	133	133
Proposed Total Demand (acre-feet per year)							
Burnet County		**1,754**	**1,576**	**1,900**	**2,247**	**2,634**	**3,082**

County-Other, Colorado

Population revision requests are being recommended for County-Other, Colorado, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Colorado County		**11,390**	**11,100**	**10,760**	**10,411**	**10,021**	**9,586**
Draft GPCD	111	106	106	106	106	106	106
Proposed Total Demand (acre-feet per year)							
Colorado County		**1,355**	**1,313**	**1,273**	**1,231**	**1,185**	**1,134**

County-Other, Fayette

Population revision requests are being recommended for County-Other, Fayette, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Fayette County		**4,681**	**3,786**	**2,813**	**2,078**	**1,278**	**418**
Draft GPCD	117	112	111	111	111	111	111
Proposed Total Demand (acre-feet per year)							
Fayette County		**586**	**470**	**350**	**258**	**159**	**52**

County-Other, Hays

Population revision requests are being recommended for County-Other, Hays, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Hays County		**21,425**	**37,153**	**62,230**	**106,317**	**163,357**	**227,850**
Draft GPCD	111	107	106	106	106	106	106
Proposed Total Demand (acre-feet per year)							
Hays County		**2,561**	**4,424**	**7,410**	**12,659**	**19,451**	**27,130**

County-Other, Llano

Population revision requests are being recommended for County-Other, Llano, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Llano County		**3,567**	**2,969**	**1,970**	**1,409**	**738**	**1**
Draft GPCD	95	90	89	89	89	89	89
Proposed Total Demand (acre-feet per year)							
Llano County		**359**	**297**	**197**	**141**	**74**	**-**

County-Other, Matagorda

Population revision requests are being recommended for County-Other, Matagorda, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Matagorda County		**8,736**	**7,613**	**6,220**	**4,630**	**2,855**	**873**
Draft GPCD	94	89	88	88	88	88	88
Proposed Total Demand (acre-feet per year)							
Matagorda County		**871**	**754**	**616**	**458**	**283**	**86**

County-Other, Mills

Population revision requests are being recommended for County-Other, Mills, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Mills County		**1,704**	**1,397**	**1,077**	**877**	**667**	**446**
Draft GPCD	116	111	111	111	111	111	111
Proposed Total Demand (acre-feet per year)							
Mills County		**212**	**173**	**133**	**109**	**83**	**55**

County-Other, San Saba

Population revision requests are being recommended for County-Other, San Saba, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
San Saba County		**1,193**	**980**	**779**	**648**	**494**	**318**
Draft GPCD	140	135	134	134	134	134	134
Proposed Total Demand (acre-feet per year)							
San Saba County		**180**	**147**	**117**	**97**	**74**	**48**

County-Other, Travis

Population revision requests are being recommended for County-Other, Travis, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**77,528**	**103,738**	**95,358**	**74,091**	**70,555**	**69,219**
Draft GPCD	126	121	121	121	121	121	121
Proposed Total Demand (acre-feet per year)							
Travis County		**10,524**	**14,031**	**12,898**	**10,021**	**9,543**	**9,362**

County-Other, Williamson

Population revision requests are being recommended for County-Other, Williamson, as described in Section 1.02. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Williamson County		**0**	**2,471**	**616**	**1,361**	**0**	**580**
Draft GPCD	140	136	136	136	136	136	136
Proposed Total Demand (acre-feet per year)							
Williamson County		**-**	**375**	**94**	**207**	**-**	**88**

Dripping Springs WSC

Population revision requests are being recommended for Dripping Springs WSC, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Hays County		**16,368**	**23,698**	**34,310**	**40,673**	**40,673**	**40,673**
Draft GPCD	157	153	152	152	152	152	152
Proposed Total Demand (acre-feet per year)							
Hays County		**2,802**	**4,044**	**5,854**	**6,940**	**6,940**	**6,940**

Elgin

Population revision requests are being recommended for Elgin, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Bastrop County		**16,358**	**21,324**	**24,989**	**27,638**	**27,638**	**27,638**
Travis County		**8,004**	**14,401**	**19,354**	**23,106**	**23,106**	**23,106**
Draft GPCD	125	121	120	120	120	120	120
Proposed Total Demand (acre-feet per year)							
Bastrop County		**2,209**	**2,867**	**3,360**	**3,716**	**3,716**	**3,716**
Travis County		**1,081**	**1,936**	**2,602**	**3,106**	**3,106**	**3,106**

Goldthwaite

Both population and baseline GPCD revision requests are being recommended for Goldthwaite (see Section 1.01 and Section 2, respectively). Should either of those requests be denied, this subsection would need to be revised. Revised population, GPCD and Total Demand are shown in the table below.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Mills County		**1,738**	**1,738**	**1,738**	**1,738**	**1,738**	**1,738**
Proposed GPCD	**321**	**316**	**315**	**315**	**315**	**315**	**315**
Proposed Total Demand (acre-feet per year)							
Mills County		**615**	**614**	**614**	**614**	**614**	**614**

Hays County WCID 2

Population revision requests are being recommended for Hays County WCID 2, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Hays County		**3,390**	**3,390**	**3,390**	**3,390**	**3,390**	**3,390**
Draft GPCD	208	205	204	204	204	204	204
Proposed Total Demand (acre-feet per year)							
Hays County		**777**	**775**	**775**	**775**	**775**	**775**

Hurst Creek MUD

Both population and baseline GPCD revision requests are being recommended for Hurst Creek MUD (see Section 1.01 and Section 2, respectively). Should either of those requests be denied, this subsection would need to be revised. Revised population, GPCD and Total Demand are shown in the table below.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**2,781**	**2,781**	**2,781**	**2,781**	**2,781**	**2,781**
Proposed GPCD	**375**	**370**	**370**	**370**	**370**	**370**	**370**
Proposed Total Demand (acre-feet per year)							
Travis County		**1,154**	**1,152**	**1,152**	**1,152**	**1,152**	**1,152**

Johnson City

Population revision requests are being recommended for Johnson City, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Blanco County		**1,877**	**1,993**	**2,116**	**2,246**	**2,384**	**2,531**
Draft GPCD	155	150	149	149	149	149	149
Proposed Total Demand (acre-feet per year)							
Blanco County		**315**	**333**	**353**	**375**	**398**	**423**

Lago Vista

Population revision requests are being recommended for Lago Vista, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**16,749**	**24,793**	**36,700**	**49,000**	**49,000**	**49,000**
Draft GPCD	221	216	216	216	216	216	216
Proposed Total Demand (acre-feet per year)							
Travis County		**4,061**	**5,999**	**8,880**	**11,856**	**11,856**	**11,856**

Lakeway MUD

Both population and baseline GPCD revision requests are being recommended for Lakeway MUD (see Section 1.01 and Section 2, respectively). Should either of those requests be denied, this subsection would need to be revised. Revised population, GPCD and Total Demand are shown in the table below.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**10,726**	**11,095**	**11,242**	**11,242**	**11,242**	**11,242**
Proposed GPCD	**253**	**248**	**248**	**248**	**248**	**248**	**248**
Proposed Total Demand (acre-feet per year)							
Travis County		**2,984**	**3,081**	**3,122**	**3,122**	**3,122**	**3,122**

La Ventana WSC

Population revision requests are being recommended for La Ventana WSC, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Hays County		**825**	**825**	**825**	**825**	**825**	**825**
Draft GPCD	153	149	148	148	148	148	148
Proposed Total Demand (acre-feet per year)							
Hays County		**138**	**137**	**137**	**137**	**137**	**137**

Marble Falls

Population revision requests are being recommended for Marble Falls, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Burnet County		**13,287**	**17,072**	**17,079**	**17,086**	**17,093**	**17,101**
Draft GPCD	240	235	234	234	234	234	234
Proposed Total Demand (acre-feet per year)							
Burnet County		**3,497**	**4,480**	**4,482**	**4,484**	**4,485**	**4,488**

Ruby Ranch WSC

Population revision requests are being recommended for Ruby Ranch WSC, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Hays County		**1,122**	**1,122**	**1,122**	**1,122**	**1,122**	**1,122**
Draft GPCD	118	114	113	113	113	113	113
Proposed Total Demand (acre-feet per year)							
Hays County		**143**	**142**	**142**	**142**	**142**	**142**

San Saba

Population revision requests are being recommended for San Saba, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
San Saba County		**3,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**
Draft GPCD	311	306	306	306	306	306	306
Proposed Total Demand (acre-feet per year)							
San Saba County		**1,029**	**1,027**	**1,027**	**1,027**	**1,027**	**1,027**

Schulenburg

Population revision requests are being recommended for Schulenburg, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Fayette County		**3,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**
Draft GPCD	200	195	194	194	194	194	194
Proposed Total Demand (acre-feet per year)							
Fayette County		**654**	**652**	**652**	**652**	**652**	**652**

Sunset Valley

Population revision requests are being recommended for Sunset Valley, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**737**	**737**	**737**	**737**	**737**	**737**
Draft GPCD	354	346	344	344	344	344	344
Proposed Total Demand (acre-feet per year)							
Travis County		**286**	**284**	**284**	**284**	**284**	**284**

Travis County MUD 18

Population revision requests are being recommended for Travis County MUD 18, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**1,449**	**1,449**	**1,449**	**1,449**	**1,449**	**1,449**
Draft GPCD	145	141	141	141	141	141	141
Proposed Total Demand (acre-feet per year)							
Travis County		**230**	**229**	**229**	**229**	**229**	**229**

Travis County WCID 18

Population revision requests are being recommended for Travis County WCID 18, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**5,523**	**5,523**	**5,523**	**5,523**	**5,523**	**5,523**
Draft GPCD	151	146	146	146	146	146	146
Proposed Total Demand (acre-feet per year)							
Travis County		**906**	**902**	**902**	**902**	**902**	**902**

Undine Development

Both population and baseline GPCD revision requests are being recommended for Undine Development (see Section 1.01 and Section 2, respectively). Should either of those requests be denied, this subsection would need to be revised. Revised population, GPCD and Total Demand are shown in the table below.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**696**	**696**	**696**	**696**	**696**	**696**
Proposed GPCD	**198**	**193**	**192**	**192**	**192**	**192**	**192**
Proposed Total Demand (acre-feet per year)							
Travis County		**151**	**150**	**150**	**150**	**150**	**150**

Wells Branch MUD

Population revision requests are being recommended for Wells Branch MUD, as described in Section 1.01. Combining the revised population with the draft baseline GPCD yields the Total Demand shown in the table below. Should the population revision request be denied, the draft Total Demand projections will be effective and this subsection is struck.

	Baseline GPCD	2030	2040	2050	2060	2070	2080
Proposed Revised Population							
Travis County		**21,073**	**21,907**	**21,907**	**21,907**	**21,907**	**21,907**
Williamson County		500	734	1,012	1,073	1,073	1,073
Draft GPCD	67	62	62	62	62	62	62
Proposed Total Demand (acre-feet per year)							
Travis County		**1,464**	**1,511**	**1,511**	**1,511**	**1,511**	**1,511**
Williamson County		35	51	70	74	74	74

3.01 SUMMARY OF TOTAL DEMAND REVISION REQUESTS

The following table summarizes the totality of total demand revision requests, by WUG and Region-County. It should be noted that, with the exception of WUGs in San Saba and Mills Counties, all draft projections are 1.0 migration scenario.

			Draft Demand Projections (ac-ft/yr)						Proposed Demand Projections (ac ft/yr)					
Region	WUG	County	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080
K	**Austin**	Hays	-	-	-	-	-	-	22	26	30	34	38	42
K	**Austin**	Travis	179,520	199,497	222,560	248,290	276,994	309,017	198,677	231,308	264,957	298,409	329,465	361,985
K	**Austin**	Williamson	15,710	21,061	27,433	34,438	42,385	51,389	16,159	21,070	27,735	34,595	43,842	51,645
K	**Buda**	Hays	3,177	4,568	6,413	8,916	11,754	14,969	3,236	4,515	5,380	6,240	7,239	8,397
K	**Canyon Lake Water Service**	Blanco	98	98	97	95	93	90	43	43	43	43	43	43
K	**Canyon Lake Water Service**	Hays	81	117	164	228	301	383	102	104	106	108	109	109
K	**Canyon Lake Water Service**	Travis	402	552	683	812	957	1,123	102	104	106	108	109	109
K	**Corix**	Blanco	-	-	-	-	-	-	50	50	50	50	50	50
K	**Corix**	Burnet	262	292	319	348	382	420	914	910	910	910	910	910
K	**Corix**	Colorado	44	40	37	33	30	28	59	58	58	58	58	58
K	**Corix**	Llano	247	252	257	264	272	281	624	622	622	622	622	622
K	**Corix**	Matagorda	3	3	3	3	3	3	82	82	82	82	82	82
K	**Corix**	Mills	12	11	11	10	9	8	115	114	114	114	114	114
K	**Corix**	San Saba	12	11	10	9	8	7	22	22	22	22	22	22
K	**Cottonwood Creek MUD 1**	Travis	340	466	574	681	801	939	336	336	336	336	336	336

K	**County-Other, Bastrop**	Bastrop	1,761	2,466	3,310	4,268	5,352	6,580	**395**	**349**	**693**	**1,353**	**2,637**	**4,091**
K	**County-Other, Blanco**	Blanco	879	881	865	849	831	811	**843**	**835**	**798**	**762**	**722**	**678**
K	**County-Other, Burnet**	Burnet	3,219	3,394	3,494	3,582	3,672	3,779	**1,754**	**1,576**	**1,900**	**2,247**	**2,634**	**3,082**
K	**County-Other, Colorado**	Colorado	1,366	1,327	1,289	1,250	1,207	1,157	**1,355**	**1,313**	**1,273**	**1,231**	**1,185**	**1,134**
K	**County-Other, Fayette**	Fayette	656	546	431	341	243	137	**586**	**470**	**350**	**258**	**159**	**52**
K	**County-Other, Hays**	Hays	3,670	5,571	8,033	11,314	15,441	19,854	**2,561**	**4,424**	**7,410**	**12,659**	**19,451**	**27,130**
K	**County-Other, Llano**	Llano	602	535	432	371	299	214	**359**	**297**	**197**	**141**	**74**	**-**
K	**County-Other, Matagorda**	Matagorda	921	803	666	508	333	137	**871**	**754**	**616**	**458**	**283**	**86**
K	**County-Other, Mills**	Mills	308	278	245	223	194	152	**212**	**173**	**133**	**109**	**83**	**55**
K	**County-Other, San Saba**	San Saba	315	286	256	234	200	153	**180**	**147**	**117**	**97**	**74**	**48**
K	**County-Other, Travis**	Travis	12,889	17,227	17,116	15,170	13,247	11,392	**10,524**	**14,031**	**12,898**	**10,021**	**9,543**	**9,362**

K	**County-Other, Willamson**	Williamson	401	384	363	347	332	317	**-**	**375**	**94**	**207**	**-**	**88**
K	**Dripping Springs WSC**	Hays	1,477	2,132	3,087	4,470	5,450	6,940	**2,802**	**4,044**	**5,854**	**6,940**	**6,940**	**6,940**
K	**Elgin**	Bastrop	1,176	1,271	1,386	1,518	1,668	1,839	**2,209**	**2,867**	**3,360**	**3,716**	**3,716**	**3,716**
		Travis	201	263	317	369	430	498	**1,081**	**1,936**	**2,602**	**3,106**	**3,106**	**3,106**
K	**Goldthwaite**	Mills	306	291	280	276	281	302	**615**	**614**	**614**	**614**	**614**	**614**
K	**Hays County WCID 2**	Hays	1,146	1,650	2,317	3,223	4,250	5,413	**777**	**775**	**775**	**775**	**775**	**775**
K	**Hurst Creek MUD**	Travis	1,704	1,702	1,702	1,702	1,702	1,702	**1,154**	**1,152**	**1,152**	**1,152**	**1,152**	**1,152**
K	**Johnson City**	Blanco	274	275	270	265	260	254	**315**	**333**	**353**	**375**	**398**	**423**
K	**Lago Vista**	Travis	2,884	3,623	4,561	5,742	7,230	9,102	**4,061**	**5,999**	**8,880**	**11,856**	**11,856**	**11,856**
K	**Lakeway MUD**	Travis	2,425	2,666	2,878	3,077	3,223	3,223	**2,984**	**3,081**	**3,122**	**3,122**	**3,122**	**3,122**
K	**La Ventana WSC**	Hays	138	198	278	387	510	649	**138**	**137**	**137**	**137**	**137**	**137**
K	**Marble Falls**	Burnet	2,014	2,315	2,669	3,076	3,545	4,086	**3,497**	**4,480**	**4,482**	**4,484**	**4,485**	**4,488**
K	**Ruby Ranch WSC**	Hays	143	206	289	402	529	674	**143**	**142**	**142**	**142**	**142**	**142**
K	**San Saba**	San Saba	745	734	734	742	766	815	**1,029**	**1,027**	**1,027**	**1,027**	**1,027**	**1,027**
K	**Schulenburg**	Fayette	532	520	510	508	505	503	**654**	**652**	**652**	**652**	**652**	**652**
K	**Sunset Valley**	Travis	286	236	196	164	137	114	**286**	**284**	**284**	**284**	**284**	**284**

K	**Travis County MUD 18**	Travis	389	535	663	787	928	1,089	**230**	**229**	**229**	**229**	**229**	**229**
K	**Travis County WCID 18**	Travis	500	379	288	221	169	130	**906**	**902**	**902**	**902**	**902**	**902**
K	**Undine Development**	Travis	144	147	150	154	159	164	**151**	**150**	**150**	**150**	**150**	**150**
K	**Wells Branch MUD**	Travis	1,068	1,179	1,281	1,293	1,293	1,293	**1,464**	**1,511**	**1,511**	**1,511**	**1,511**	**1,511**

ATTACHMENT A

AUSTIN WATER SUPPORTING DOCUMENTATION

CITY OF AUSTIN

POPULATION AND DEMAND PROPOSED REVISION REQUEST

7/6/2023

The City of Austin (COA) has reviewed the Texas Water Development Board's (TWDB's) population projections and has several proposed revisions to request.

Population Revision Request

Austin has reviewed TWDB's draft population projections for this round of planning and, with the guidance of the Region K Population and Water Demand Committee, is requesting the addition of Austin population in Hays County consistent with the 2021 Regional Water Plan and utility service areaas well as increased population in the Austin WUGs to align with internal projections.

Service Area Extent

Austin Water serves customers in Travis, Hays, and Williamson Counties.

Hays County

The Austin Water service area extends into Hays County, and Table 1 shows the Hays County component to the Austin WUG that has been included in previous plans and the proposed additions for this planning cycle.

Table 1 Austin WUG Population in Hays County, 2021 RWP, TWDB Draft population, and proposed 2026 RWP revisions

County	2030	2040	2050	2060	2070	2080
Proposed 2026 RWP Austin Hays Population						249
2026 DRAFT TWDB Austin WUG/ Hays County Population	-				-	-
2021 RWP Austin WUG/ Hays County Population	74	796	1,560	3,957	9,535	17,255

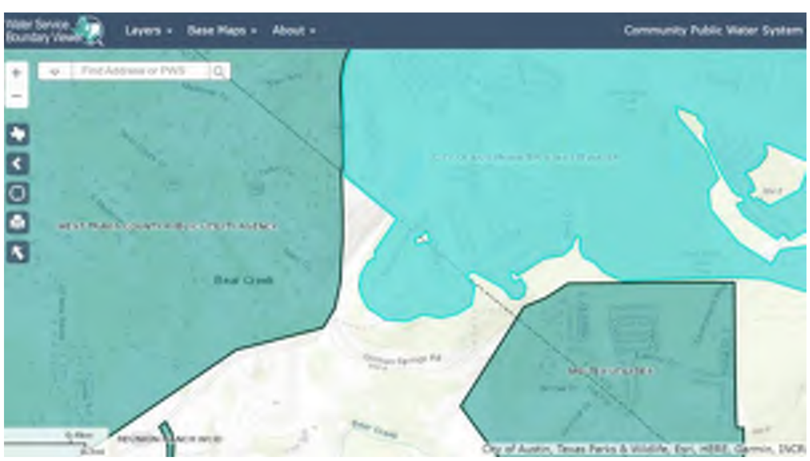

Figure 1 Water Service Boundary Viewer, Austin Service Area in Hays County

Austin Water Retail Population Served

The Austin WUG population estimate was developed as a part of Austin Water's Integrated Water Resource Plan, Water Forward, which is regularly updated with best available population and demand data. Water Forward population estimates are developed in coordination with the City of Austin Demographer and are typically based on the decennial Census population estimates. In reviewing the 2020 Census data, in consultation with Austin Water and other City departments, the City Demographer found that there were numerous discrepancies with the 2020 Census unit counts across the city and filed a County Question Resolution with the Census Bureau (Appendix A). As a result, significant data analysis took place within the City to ensure the quality of the 2020 population served estimate.

2020 Base Year

The estimate was developed with multiple data sources and cross-checked against water and wastewater billing data as a quality assurance measure. The population served by Austin Water's retail system was developed using the number of household units from AW billing data, COA Address Database, Austin Energy billing data, land use data, and development records. The 2020 Census block estimates of people per household for single- and multi-family households was used when there was a sufficient sample size, and the block-group was used when there were too few units to produce a reliable estimate. The water usage from April of 2020 (coincidental with the 2020 Census) was used alongside typical GPCD for that building typology to identify unoccupied homes and outliers.

Growth Rate and Population Projection

The estimated growth rates for Austin Water's population are based on a conservative projection of historical growth rates with a gradual decay over the planning period. These estimates also include the expectation that Austin Water will continue to expand our service area within the Impact Fee Boundary to meet the needs of future development.

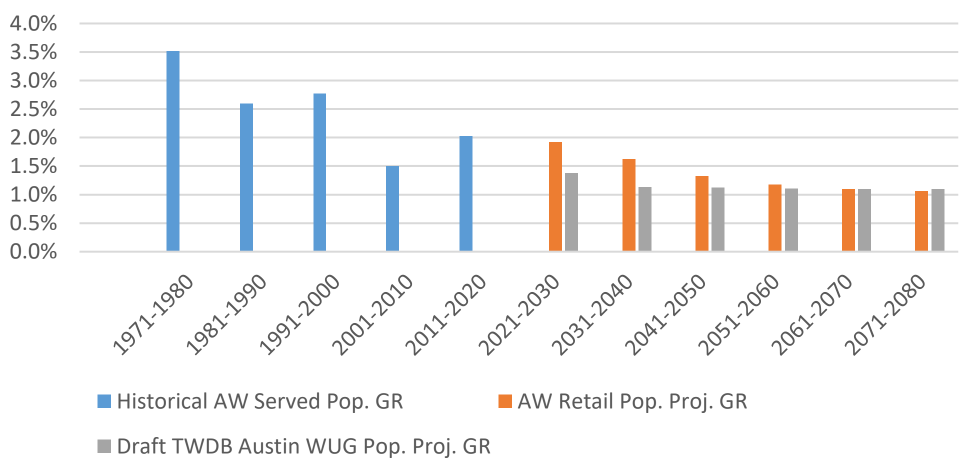

Figure 2 Comparison of historical and projected growth rates for Austin's retail (WUG) customers

The resulting population projection is provided in Table 2, including the 2020 base year for comparison.

Table 3 outlines the revised Austin WUG population distributed across the service area in Travis, Williamson, and Hays Counties. The portion of Williamson County that is included in Region K is entirely within the Austin Impact Fee Service Area Boundary and is currently served or planned to be served by Austin Water, either Austin WUG or wholesale customers of Austin.

Table 2 City of Austin WUG population estimate comparison between TWDB Draft, 1% Migration Scenario, and City of Austin planning estimate

	2020	2030	2040	2050	2060	2070	2080
TWDB Draft Austin WUG Population, 1% Migration Scenario							2,123,623
Austin WUG Population Estimate	1,034,947	1,261,095	1,487,242	1,724,802	1,962,362	2,199,922	2,437,482
Austin Pop Increase Proposed from TWDB Draft, 1% Migration Scenario	52,328	115,203	187,651	251,764	296,445	318,044	313,859

Table 3 City of Austin WUG population estimate distributed among counties

County	2030	2040	2050	2060	2070	2080
Austin WUG Travis County Population						2,132,924
Austin WUG Williamson County Population	94,844	124,153	163,421	203,844	258,328	304,309
Austin WUG Hays County Population	129	152	176	200	224	249

Count Question Resolution Housing Unit Case for Austin, TX: Summary Report

This summary accompanies the Count Question Resolution (CQR) tabulation of blocks where the housing unit count totals from the 2020 Census count differ from internal City of Austin housing unit counts. Below, we describe the internal data sources compared to the 2020 Census housing unit totals, a description of the accuracy and validity of the source materials, and a summary of suspected housing unit count errors.

Count Question Resolution Tabulation

Please see the file titled "cqr20_CityofAustin_PL4805000_UpdatedBCL.xlsx" for a list of blocks where differences in housing unit totals were found.

Method

The housing unit count comparison analysis was conducted using ESRI GIS software and Census Bureau decennial housing unit counts, City of Austin permitting data, 911 addressing data, utility connections data, and affordable housing data. Data on housing units from the various city departments were filtered to meet the following criteria: all addresses reviewed were valid on April 1, 2020; the permitting, addressing, utility connections, and affordable housing data were filtered to include only residential addresses that existed and were available for occupancy on April 1, 2020. Please see below for additional information on each of these data sources.

Data Sources:

1. Block level decennial housing unit counts were extracted from the CQR Block Count List Files provided by the Census Bureau.
2. Internal housing unit counts were derived from issued building permits data provided by the City of Austin Development Services Department (DSD). DSD issues permits for the construction of new buildings and improvements to existing structures. The building permit data are collected as new permit applications are received and are entered and updated in near real-time. The housing units dataset was extracted on February 24, 2022, from the city's building permit database, AMANDA. Permits were filtered by type to only include residential properties available for occupancy on April 1, 2020.
3. Addresses for housing units were provided by the City of Austin Address Management Services (AMS) Office. AMS assigns an address to new structures using 911 addressing standards. The addresses dataset was extracted on February 24, 2022 and filtered to include only residential addresses existing on April 1, 2020.
4. Internal housing unit counts derived from utility connections were provided by Austin Water and Austin Energy. The utility connections data are used to monitor and charge for energy and water consumption. The housing unit dataset from Austin Water connections was extracted on March 4, 2022, and the dataset from Austin Energy was extracted on March 8, 2022. The utility connections datasets were filtered to include only residential customers with active connections on April 1, 2020.

5. The City of Austin Housing and Planning Department maintains an inventory of income restricted housing projects funded by the city or incentivized through development programs. All projects are added to the inventory at the time of project certification and are monitored through the development process. The affordable units dataset was extracted on March 1, 2022 and filtered to include only completed developments available for occupancy on April 1, 2020.

Summary of Findings

Total housing units from the 2020 Census count were compared to internal records of housing units. The 2020 Census count yielded a total of 444,426 total housing units compared to 451,755 identified in internal City of Austin records. This produced a potential net deficit of 7,329 housing units.

The tabulation file includes all blocks where internal records showed a deficit in the Census count of 50 or more units. Of the 10,913 blocks contained in the City of Austin, we identified 307 blocks potentially missing at least 50 units. These blocks included a total of 102,161 housing units per internal records and 78,656 per the 2020 Census count, with potentially 23, 505 missing housing units.

Our review of blocks with discrepant unit counts indicated both potential coverage issues and potential geocoding issues. Potential coverage issues were most often found in blocks with multi-family developments. Additionally, potential coverage issues were also common in blocks with very recent development. Potential geocoding issues were found in a number of blocks. Many potential geocoding issues resulted in large deficits in one block and a high surplus in adjacent blocks.

Block-Level Examples

For those blocks with particularly large discrepancies, areal imagery was used to further explore the nature of the discrepancy. The following depicts a few examples of the types of discrepancies observed.

Figure 1 below depicts Block 484530003081004 located in the Mueller Development in Central Austin, a mixed-use neighborhood still under construction. This particular block includes The Jordan, a community of 132 units of affordable apartment homes. The project was completed in 2019. The Census Bureau enumerated 79 fewer housing units than shown in the City's internal data. The recent development of this project makes it probable the Census Bureau may not have adequately captured all the units at this site.

Figure 1. Block 484530003081004 in the Mueller Development

Figure 2 below depicts Block 484530024071006 in South Austin, represented by the outer area not including the inner portion in blue. This block includes a subdivision of single-family homes along with a multi-family development. The single-family homes were built between 2018 and 2020, and the multifamily project includes 312 units and was built in 2018. The Census Bureau enumerated 306 fewer housing units.

Figure 2. Block 484530024071006 in Estancia Development off IH-35 in South Austin

Figure 3 below depicts Block 484530009024026 in a central East Austin. This area of the city has undergone significant gentrification and redevelopment. Historically, this area had single family homes that would have been captured adequately by this block structure. However, single family homes have been replaced with block-sized multi-family developments that now embark Block 484530009024026 as well as the Block 484530009024032 to the south. The development being split between these blocks appears to result in discrepant housing unit figures for each of these blocks.

Figure 3. Block 484530009024026 in redeveloped East Austin

This detailed review of blocks with high discrepancy in units revealed many of the blocks with discrepancies were often in areas with recent development. At times, the new developments were multi-family projects, and other times, they were single-family subdivisions, but the commonality between these was the recent, and oftentimes ongoing, development in the area. Additionally, this detailed review helped us to identify numerous potential geocoding errors.

Conclusion

This study included an analysis comparing City of Austin internal records of housing units with housing units enumerated by the Census Bureau in the 2020 decennial census. The analysis uncovered housing unit discrepancies in 307 blocks where the Census Bureau enumerated fewer units than found in internal records. Many of the blocks with discrepancies were often blocks with recent development, recently developed multi-family projects, and geocoding errors.

Given the challenges of the 2020 Census, the fast pace of growth in the city of Austin, and research documenting historical undercounts, we believe these housing unit discrepancies would benefit from the Census Bureau's CQR review process. We recognize our 2020 Census count cannot be changed and adjustments will only impact subsequent population estimates. However, even a small adjustment to our housing unit count could significantly impact our population figure and translate into hundreds of thousands of dollars over the next ten years for critical services for the residents of Austin. Therefore, we appreciate the Census Bureau's review of the City of Austin housing unit count and associated population as enumerated in the 2020 Census.

ENTITYID	STATEFP	COUNTYFP	TRACT	BLOCK	CENSUSHU	CENSUSGQ	CQRHU	CQRGQ
PL4805000	48	453	000204	1016	58	0	150	
PL4805000	48	453	000308	1004	53	0	132	
PL4805000	48	453	000308	1012	31	0	49	
PL4805000	48	453	000308	1013	10	0	27	
PL4805000	48	453	000308	1026	16	0	28	
PL4805000	48	453	000309	3005	0	0	322	
PL4805000	48	453	000309	3011	429	0	563	
PL4805000	48	453	000402	2006	57	0	163	
PL4805000	48	453	000601	1010	44	0	63	
PL4805000	48	453	000605	3000	648	0	720	
PL4805000	48	453	000605	1009	212	0	279	
PL4805000	48	453	000605	2000	92	0	128	
PL4805000	48	453	000605	2001	22	0	42	
PL4805000	48	453	000606	3000	188	0	293	
PL4805000	48	453	000606	4011	4	0	67	
PL4805000	48	453	000606	4002	50	0	106	
PL4805000	48	453	000606	3003	191	0	240	
PL4805000	48	453	000606	3001	151	0	191	
PL4805000	48	453	000606	4001	79	0	99	
PL4805000	48	453	000607	2002	44	0	152	
PL4805000	48	453	000607	3002	189	0	220	
PL4805000	48	453	000607	2000	124	0	146	
PL4805000	48	453	000608	2004	163	0	235	
PL4805000	48	453	000608	2003	308	0	361	
PL4805000	48	453	000608	1004	299	0	332	
PL4805000	48	453	000801	1003	8	0	57	
PL4805000	48	453	000802	3011	90	0	221	
PL4805000	48	453	000803	1001	46	0	81	
PL4805000	48	453	000803	3039	12	0	37	
PL4805000	48	453	000803	3035	5	0	24	
PL4805000	48	453	000804	2002	66	0	118	
PL4805000	48	453	000804	2036	65	0	106	
PL4805000	48	453	000902	1000	36	0	373	
PL4805000	48	453	000902	2014	87	0	184	
PL4805000	48	453	000902	4026	121	0	210	
PL4805000	48	453	000902	4023	435	0	519	
PL4805000	48	453	000902	4045	7	0	83	
PL4805000	48	453	000902	4022	338	0	378	
PL4805000	48	453	000902	4016	222	0	296	
PL4805000	48	453	000902	4027	346	0	407	
PL4805000	48	453	000902	3026	71	0	101	
PL4805000	48	453	000902	4032	5	0	4	
PL4805000	48	453	000902	4029	166	0	1	
PL4805000	48	453	001000	5004	291	0	334	
PL4805000	48	453	001101	2025	7	0	196	
PL4805000	48	453	001101	1005	32	0	135	

ENTITYID	STATEFP	COUNTYFP	TRACT	BLOCK	CENSUSHU	CENSUSGQ	CQRHU	CQRGQ
PL4805000	48	453	001101	1024	89	0	135	
PL4805000	48	453	001102	3000	193	0	360	
PL4805000	48	453	001102	2009	175	0	274	
PL4805000	48	453	001102	3004	7	0	99	
PL4805000	48	453	001102	3001	156	0	186	
PL4805000	48	453	001102	1005	302	0	313	
PL4805000	48	453	001103	2012	99	0	188	
PL4805000	48	453	001103	2007	13	0	40	
PL4805000	48	453	001103	2017	46	0	58	
PL4805000	48	453	001200	4002	252	0	290	
PL4805000	48	453	001200	2015	94	0	113	
PL4805000	48	453	001304	1000	51	0	95	
PL4805000	48	453	001304	4011	21	0	34	
PL4805000	48	453	001307	3011	327	0	354	
PL4805000	48	453	001307	1000	289	0	314	
PL4805000	48	453	001308	1001	18	0	125	
PL4805000	48	453	001309	1005	119	0	155	
PL4805000	48	453	001309	1006	104	0	121	
PL4805000	48	453	001310	1002	168	0	207	
PL4805000	48	453	001310	3003	28	0	48	
PL4805000	48	453	001311	1015	2	0	74	
PL4805000	48	453	001311	1010	341	0	409	
PL4805000	48	453	001312	2026	257	0	368	
PL4805000	48	453	001312	3001	99	0	172	
PL4805000	48	453	001312	1007	225	0	269	
PL4805000	48	453	001401	3001	224	0	439	
PL4805000	48	453	001401	3008	285	0	363	
PL4805000	48	453	001401	3000	161	0	226	
PL4805000	48	453	001401	2000	335	0	274	
PL4805000	48	453	001402	3004	149	0	346	
PL4805000	48	453	001402	3000	176	0	224	
PL4805000	48	453	001402	3005	118	0	144	
PL4805000	48	453	001503	2000	285	0	517	
PL4805000	48	453	001504	4009	10	0	24	
PL4805000	48	453	001602	1007	165	0	222	
PL4805000	48	453	001602	3000	186	0	236	
PL4805000	48	453	001606	1001	28	0	107	
PL4805000	48	453	001910	1034	334	0	404	
PL4805000	48	453	001910	3009	275	0	306	
PL4805000	48	453	001911	3015	411	0	481	
PL4805000	48	453	001911	1003	249	0	280	
PL4805000	48	453	001912	1004	151	0	217	
PL4805000	48	453	001913	2033	79	0	134	
PL4805000	48	453	001913	2020	106	0	160	
PL4805000	48	453	001914	3003	660	0	695	
PL4805000	48	453	001915	1013	6	0	26	

ENTITYID	STATEFP	COUNTYFP	TRACT	BLOCK	CENSUSHU	CENSUSGQ	CQRHU	CQRGQ
PL4805000	48	453	001917	3021	134	0	147	
PL4805000	48	453	001920	2018	9	0	307	
PL4805000	48	453	001920	1000	735	0	974	
PL4805000	48	453	001920	2005	1	0	151	
PL4805000	48	453	001920	2006	377	0	465	
PL4805000	48	453	001922	1003	689	0	769	
PL4805000	48	453	001923	2016	328	0	372	
PL4805000	48	453	002003	2005	302	0	466	
PL4805000	48	453	002006	1001	325	0	389	
PL4805000	48	453	002007	2004	203	0	259	
PL4805000	48	453	002104	1002	74	0	95	
PL4805000	48	453	002105	3003	211	0	234	
PL4805000	48	453	002105	4008	484	0	501	
PL4805000	48	453	002106	1008	87	0	188	
PL4805000	48	453	002110	2009	329	0	383	
PL4805000	48	453	002111	1002	177	0	273	
PL4805000	48	453	002112	2001	348	0	418	
PL4805000	48	453	002113	3017	52	0	86	
PL4805000	48	453	002201	1022	43	0	62	
PL4805000	48	453	002214	2000	325	0	362	
PL4805000	48	453	002220	1019	0	0	284	
PL4805000	48	453	002220	1022	266	0	354	
PL4805000	48	453	002222	1001	18	0	52	
PL4805000	48	453	002222	2004	254	0	282	
PL4805000	48	453	002304	1001	423	0	847	
PL4805000	48	453	002304	1005	252	0	383	
PL4805000	48	453	002304	3004	560	0	642	
PL4805000	48	453	002304	3005	72	0	141	
PL4805000	48	453	002307	2001	892	0	957	
PL4805000	48	453	002307	4002	120	0	166	
PL4805000	48	453	002313	1000	224	0	262	
PL4805000	48	453	002313	1001	160	0	135	
PL4805000	48	453	002313	1005	131	0	1	
PL4805000	48	453	002314	5003	53	0	159	
PL4805000	48	453	002314	3001	281	0	367	
PL4805000	48	453	002314	5012	379	0	453	
PL4805000	48	453	002314	5009	145	0	205	
PL4805000	48	453	002314	1002	127	0	145	
PL4805000	48	453	002316	2000	308	0	527	
PL4805000	48	453	002316	1001	577	0	667	
PL4805000	48	453	002316	1000	399	0	475	
PL4805000	48	453	002320	1008	675	0	799	
PL4805000	48	453	002320	1017	348	0	371	
PL4805000	48	453	002321	2001	34	0	231	
PL4805000	48	453	002321	1013	251	0	311	
PL4805000	48	453	002321	3015	0	0	21	

ENTITYID	STATEFP	COUNTYFP	TRACT	BLOCK	CENSUSHU	CENSUSGQ	CQRHU	CQRGQ
PL4805000	48	453	002321	3014	15	0	36	
PL4805000	48	453	002321	1014	8	0	1	
PL4805000	48	453	002322	1002	264	0	640	
PL4805000	48	453	002322	2000	280	0	345	
PL4805000	48	453	002323	3001	25	0	200	
PL4805000	48	453	002323	1002	188	0	244	
PL4805000	48	453	002323	3000	194	0	221	
PL4805000	48	453	002323	3005	174	0	198	
PL4805000	48	453	002403	2000	59	0	108	
PL4805000	48	453	002407	1006	220	0	526	
PL4805000	48	453	002407	2000	298	0	477	
PL4805000	48	453	002407	3000	417	0	484	
PL4805000	48	453	002413	2001	210	0	351	
PL4805000	48	453	002419	1008	561	0	756	
PL4805000	48	453	002419	2000	787	0	839	
PL4805000	48	453	002422	2003	390	0	467	
PL4805000	48	453	002422	2005	290	0	342	
PL4805000	48	453	002423	3013	16	0	31	
PL4805000	48	453	002437	1007	273	0	345	
PL4805000	48	453	002437	2003	240	0	290	
PL4805000	48	453	002437	2000	45	0	47	
PL4805000	48	453	002438	3014	447	0	570	
PL4805000	48	453	002440	2001	797	0	1061	
PL4805000	48	453	002440	2016	131	0	209	
PL4805000	48	453	002441	1014	652	0	735	
PL4805000	48	453	002443	1004	296	0	401	
PL4805000	48	453	002443	3004	551	0	617	
PL4805000	48	453	002446	1003	305	0	355	
PL4805000	48	453	002448	3017	159	0	342	
PL4805000	48	453	002448	3018	74	0	144	
PL4805000	48	453	002451	1005	689	0	1023	
PL4805000	48	453	002451	2000	1094	0	1186	
PL4805000	48	453	002500	4000	675	0	875	
PL4805000	48	453	002500	3000	378	0	433	
PL4805000	48	453	002500	3006	376	0	426	
PL4805000	48	491	020311	3008	501	0	604	
PL4805000	48	491	020311	1017	97	0	146	
PL4805000	48	491	020334	1003	849	0	727	
PL4805000	48	491	020356	2016	362	0	414	
PL4805000	48	491	020404	2012	180	0	231	
PL4805000	48	491	020405	4017	436	0	539	
PL4805000	48	491	020405	4002	48	0	84	
PL4805000	48	491	020406	2000	357	0	533	
PL4805000	48	491	020406	1001	486	0	547	
PL4805000	48	491	020406	2005	271	0	330	
PL4805000	48	491	020406	2004	135	0	166	

ENTITYID	STATEFP	COUNTYFP	TRACT	BLOCK	CENSUSHU	CENSUSGQ	CQRHU	CQRGQ
PL4805000	48	491	020406	2006	223	0	242	
PL4805000	48	491	020408	1007	635	0	908	
PL4805000	48	491	020409	1029	81	0	0	
PL4805000	48	491	020410	4004	562	0	657	
PL4805000	48	491	020410	2007	440	0	490	
PL4805000	48	491	020508	1005	779	0	982	
PL4805000	48	491	020508	1006	854	0	1009	
PL4805000	48	491	020517	1002	0	0	26	
PL4805000	48	453	030000	4004	31	0	367	
PL4805000	48	453	030000	1003	335	0	361	
PL4805000	48	453	030100	2003	233	0	250	
PL4805000	48	453	030200	4000	539	0	590	
PL4805000	48	453	030300	2013	18	0	33	
PL4805000	48	453	030400	3009	127	0	212	
PL4805000	48	453	030500	3006	361	0	597	
PL4805000	48	453	030500	2004	195	0	211	
PL4805000	48	453	030500	3004	48	0	54	
PL4805000	48	453	030600	5009	15	0	80	
PL4805000	48	453	030600	1004	392	0	405	
PL4805000	48	453	030600	1002	146	0	158	
PL4805000	48	453	030700	3000	207	0	260	
PL4805000	48	453	030800	1003	228	0	332	
PL4805000	48	453	030800	3000	345	0	408	
PL4805000	48	453	030800	2014	309	0	361	
PL4805000	48	453	030800	2012	479	0	521	
PL4805000	48	453	031000	3014	476	0	633	
PL4805000	48	453	031300	1003	468	0	549	
PL4805000	48	453	031300	2020	299	0	369	
PL4805000	48	453	031700	3004	265	0	318	
PL4805000	48	453	031700	2007	302	0	333	
PL4805000	48	453	031800	2002	283	0	345	
PL4805000	48	453	031900	2009	514	0	592	
PL4805000	48	453	032000	6010	59	0	579	
PL4805000	48	453	032000	1000	24	0	428	
PL4805000	48	453	032000	3000	319	0	494	
PL4805000	48	453	032000	4009	87	0	145	
PL4805000	48	453	032100	1006	733	0	823	
PL4805000	48	453	032100	3007	576	0	635	
PL4805000	48	453	032100	2031	271	0	329	
PL4805000	48	453	032300	1001	502	0	585	
PL4805000	48	453	032300	1000	366	0	424	
PL4805000	48	453	032300	2006	258	0	294	
PL4805000	48	453	032300	2002	249	0	268	
PL4805000	48	453	032400	1000	406	0	423	
PL4805000	48	453	032500	2000	470	0	528	
PL4805000	48	453	032500	1001	808	0	831	

ENTITYID	STATEFP	COUNTYFP	TRACT	BLOCK	CENSUSHU	CENSUSGQ	CQRHU	CQRGQ
PL4805000	48	453	032800	1007	435	0	509	
PL4805000	48	453	032800	1008	371	0	212	
PL4805000	48	453	032900	3000	614	0	719	
PL4805000	48	453	032900	1011	330	0	365	
PL4805000	48	453	033000	1015	724	0	884	
PL4805000	48	453	033000	2000	56	0	96	
PL4805000	48	453	033500	2002	708	0	871	
PL4805000	48	453	034100	1009	434	0	665	
PL4805000	48	453	034100	3014	534	0	590	
PL4805000	48	453	034200	1001	193	0	291	
PL4805000	48	453	034400	1001	275	0	332	
PL4805000	48	453	034600	2001	714	0	946	
PL4805000	48	453	034600	2004	345	0	407	
PL4805000	48	453	034600	1003	442	0	72	
PL4805000	48	453	034700	2001	94	0	100	
PL4805000	48	453	034800	1007	456	0	616	
PL4805000	48	453	035800	2057	60	0	120	
PL4805000	48	453	035800	1027	0	0	21	
PL4805000	48	453	037200	2008	95	0	195	
PL4805000	48	453	040000	1003	606	0	685	
PL4805000	48	453	040000	3003	266	0	283	
PL4805000	48	453	040000	4004	239	0	253	
PL4805000	48	453	040200	1009	232	0	277	
PL4805000	48	453	040200	2018	19	0	52	
PL4805000	48	453	040200	1012	179	0	200	
PL4805000	48	453	040300	2003	24	0	64	
PL4805000	48	453	040400	1001	79	0	127	
PL4805000	48	453	040500	2011	260	0	318	
PL4805000	48	453	040600	3005	561	0	624	
PL4805000	48	453	040700	5000	292	0	533	
PL4805000	48	453	040700	4002	558	0	622	
PL4805000	48	453	040700	4006	249	0	290	
PL4805000	48	453	040700	2006	420	0	457	
PL4805000	48	453	040900	4001	186	0	200	
PL4805000	48	453	041000	4002	586	0	660	
PL4805000	48	453	041100	2000	277	0	345	
PL4805000	48	453	041200	2005	63	0	95	
PL4805000	48	453	041200	2014	401	0	424	
PL4805000	48	453	041400	2003	30	0	475	
PL4805000	48	453	041400	2002	423	0	486	
PL4805000	48	453	041500	1003	368	0	411	
PL4805000	48	453	041600	3012	240	0	291	
PL4805000	48	453	041600	4005	192	0	211	
PL4805000	48	453	041600	2005	127	0	138	
PL4805000	48	453	041700	1019	22	0	42	
PL4805000	48	453	042100	4011	55	0	119	

ENTITYID	STATEFP	COUNTYFP	TRACT	BLOCK	CENSUSHU	CENSUSGQ	CQRHU	CQRGQ
PL4805000	48	453	042200	3001	364	0	392	
PL4805000	48	453	042200	1008	301	0	318	
PL4805000	48	453	042400	1011	26	0	41	
PL4805000	48	453	043100	2000	822	0	892	
PL4805000	48	453	043300	2003	632	0	684	
PL4805000	48	453	043400	1008	170	0	186	
PL4805000	48	453	043400	1009	188	0	201	
PL4805000	48	453	043500	1001	1019	0	1285	
PL4805000	48	453	043500	3039	11	0	274	
PL4805000	48	453	043500	3020	6	0	27	
PL4805000	48	453	043500	3016	10	0	27	
PL4805000	48	453	043600	2016	569	0	634	
PL4805000	48	453	043700	1008	310	0	373	
PL4805000	48	453	043800	1007	257	0	308	
PL4805000	48	453	043900	1009	401	0	444	
PL4805000	48	453	044000	2011	712	0	1142	
PL4805000	48	453	044300	3001	284	0	305	
PL4805000	48	453	044600	2037	0	0	34	
PL4805000	48	453	044600	2040	0	0	24	
PL4805000	48	453	044600	2044	0	0	16	
PL4805000	48	453	045000	1015	299	0	343	
PL4805000	48	453	045100	1022	18	0	514	
PL4805000	48	453	045100	1005	181	0	300	
PL4805000	48	453	045100	2009	24	0	66	
PL4805000	48	453	045300	2002	163	0	223	
PL4805000	48	453	045300	1000	677	0	732	
PL4805000	48	453	045300	2001	233	0	275	
PL4805000	48	453	045300	2008	244	0	261	
PL4805000	48	453	045400	2011	315	0	344	
PL4805000	48	453	045400	1001	290	0	311	
PL4805000	48	453	045400	3000	29	0	48	
PL4805000	48	453	045600	1005	20	0	0	

ATTACHMENT B

BUDA HISTORICAL DATA

Year	Total Produced	Single Family Use	Multi Family Use	Commercial Use	Institutional	Reuse	Total Use	SFH Connect	MFH Connect	Com Connect	SFH Pop est	MFH Pop est	Total Pop est	GPCD (from produced)	GPCD (from use)
2022	618,094,819							3765	981	309	11907	1715	13622	124	0
2021	542,874,014	302,167,000	13,899,000	115,757,000	37,175,000	4,549,335	473,547,335	3,725	981	308	11793	1715	13508	110	96
2020	526,422,049	326,597,000	15,447,000	103,895,000	35,476,000	9,532,480	490,947,480	3655	981	286	11594	1475	13069	110	103
2019	520,434,048	309,861,000	13,422,000	121,151,000	29,518,000	5,962,086	479,914,086	3557	895	369	11386	1400	12786	112	103
2018	457,688,000	269,327,189	11,522,624	112,835,000	35,473,000	5,637,300	434,795,113	3478	847	334	10916	1375	12291	102	97
2017	456,904,300	263,463,207	28,911,793	137,262,000			429,637,000	3437	799	311	10762	1375	12137	103	97
2016	391,873,500	236,107,740	25,041,730	96,589,530			357,739,000	3375	733	298	10468	1375	11843	91	83
2015	386,821,400	229,782,000	19,557,000	117,939,000			367,278,000	3111	733	289	9588	1191	10779	98	93
2014	469,116,200	236,876,000	16,414,000	118,398,000			371,688,000	2952	433	281	9117	999	10116	127	101
2013	412,954,800	235,260,000	12,246,000	114,683,000			362,189,000	2647	433	274	8237	746	8983	126	110
2012	374,293,800	224,272,000	5,323,000	114,479,000			344,074,000	2402	133	251	7428	324	7752	132	122
2011	383,702,600	235,640,065	4,341,000	112,626,000			352,607,065	2244	133	248	6978	264	7242	145	133
2010	346,959,700	189,475,000	888,000	106,532,000			296,895,000	2098	1	236	6535	54	6589	144	123

ATTACHMENT C

CANYON LAKE WATER SERVICE SUPPORTING DOCUMENTS

Canyon Lake Water Service Company

GROWTH AND DEMAND PROJECTIONS

PREPARED FOR:

Canyon Lake Water Service Company

PREPARED BY:

Freese and Nichols, Inc.
10431 Morado Circle, Suite 300
Austin, Texas 78759
512 617 3100

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

GROWTH AND WATER DEMAND PROJECTIONS

Prepared for:

Canyon Lake Water Service Company

November 2022

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EXECUTIVE SUMMARY

In June 2022, Canyon Lake Water Service Company (CLWSC) engaged Freese and Nichols, Inc. (FNI) to provide detailed water resources analysis services to provide estimates of projected water demand between 2022 and 2070. The objective of this analysis is to generate data-driven estimates of water usage over a multi-decadal planning horizon so that CLWSC can compare projected demand with its determination of current supply availability. This report outlines the methodology used to develop gallons per capita per day (GPCD) estimates, population projections, and total water demand projections for CLWSC. These results are intended for planning purposes and are subject to change as more detailed information becomes available over time. It is recommended that these results be re-evaluated in five years.

Water demand varies with population and with per-capita water use, or the amount of water used by the average person each day. FNI developed projections of population and GPCD by year for 2022 through 2030 and by decade for 2030-2070 in order to estimate future demand.

To develop GPCD projections, FNI calculated historical per-capita water use based on observed population and water use data. The average of the three highest GPCDs was used to establish the baseline GPCD. To project future GPCDs, FNI applied reductions to the baseline GPCD based on the passive savings calculated for CLWSC in the *2021 South Central Texas Regional Water Plan* (*SCT RWP*). These GPCD reductions were applied consistently to all systems within CLWSC. This amounts to a reduction between 2020 and 2030 of approximately 2 GPCD from the initial baseline GPCD, with future decadal reductions tapering off as the savings from replacing pre-1995 appliances wane. Assessing the future savings from CLWSC's water conservation programs was not part of the scope of work for this analysis. The calculated baseline GPCD and projections by decade are included in **Table ES-1.** For more information about how the baseline GPCD was calculated and projections were estimated, see **Section 2.0**.

Table ES-1: Calculated Baseline GPCD and Projected Future GPCD

System	Baseline	2030	2040	2050	2060	2070
Canyon Lake Shores	137	135	135	134	134	134
Triple Peak	129	127	126	126	126	126
North Point	108	106	105	105	105	105
Rust Ranch	73	71	70	70	69	69
Deer Creek	76	74	74	73	73	73
Glenwood	193	191	190	190	190	190
Latigo Ranch	112	110	109	109	109	109
Summit Ridge	202	200	200	199	199	199
Bridlegate	93	91	90	90	90	90

System	Baseline	2030	2040	2050	2060	2070
Kendall West	135	133	133	132	132	132
Texas Country Water	303	302	301	301	300	300
Rockwall Ranch / KT Water	321	319	319	318	318	318

Population projections through the year 2030 were developed by Zonda (formerly Metrostudy) using their proprietary database of housing market activity. Zonda surveyors visually inspect all known residential developments and account for all stages of development activity within each subdivision. The boundaries of the existing water service areas and the Certificate of Convenience and Necessity (CCN) areas, as well as subdivisions discovered in Zonda's proprietary database, are shown on **Figure ES-1**. In addition to the known subdivisions in the database, future single-family homes and apartments were estimated for each census tract based on recent trends. Subdivisions outside of an existing CCN were generally assigned to the nearest CCN. Future lots and apartments in each census tract were assigned to the CCN and PWS where the largest amount of population growth was expected to occur from subdivisions with known locations in that census tract.

To evaluate the potential impacts of expanding CLWSC's CCN boundaries, two population projections were developed for Canyon Lake Shores, Kendall West Utility, Triple Peak, and Glenwood. Other systems are assumed to maintain their current boundaries. Therefore, the lower and higher projections are the same. The lower projection scenario only includes population growth within existing CCN boundaries, while the higher scenario includes new developments outside of existing CCNs that might be served by CLWSC. It is assumed that CLWSC would begin serving those new developments starting in 2022. The lower and higher total population projections are shown in **Table ES-2**. Additional details on the near-term population methodology and the detailed projections by system are included in **Section 3.1** and **Appendix C**.

Figure ES-1: PWS and CCN Boundaries, and Known Subdivisions Assigned to Water Systems

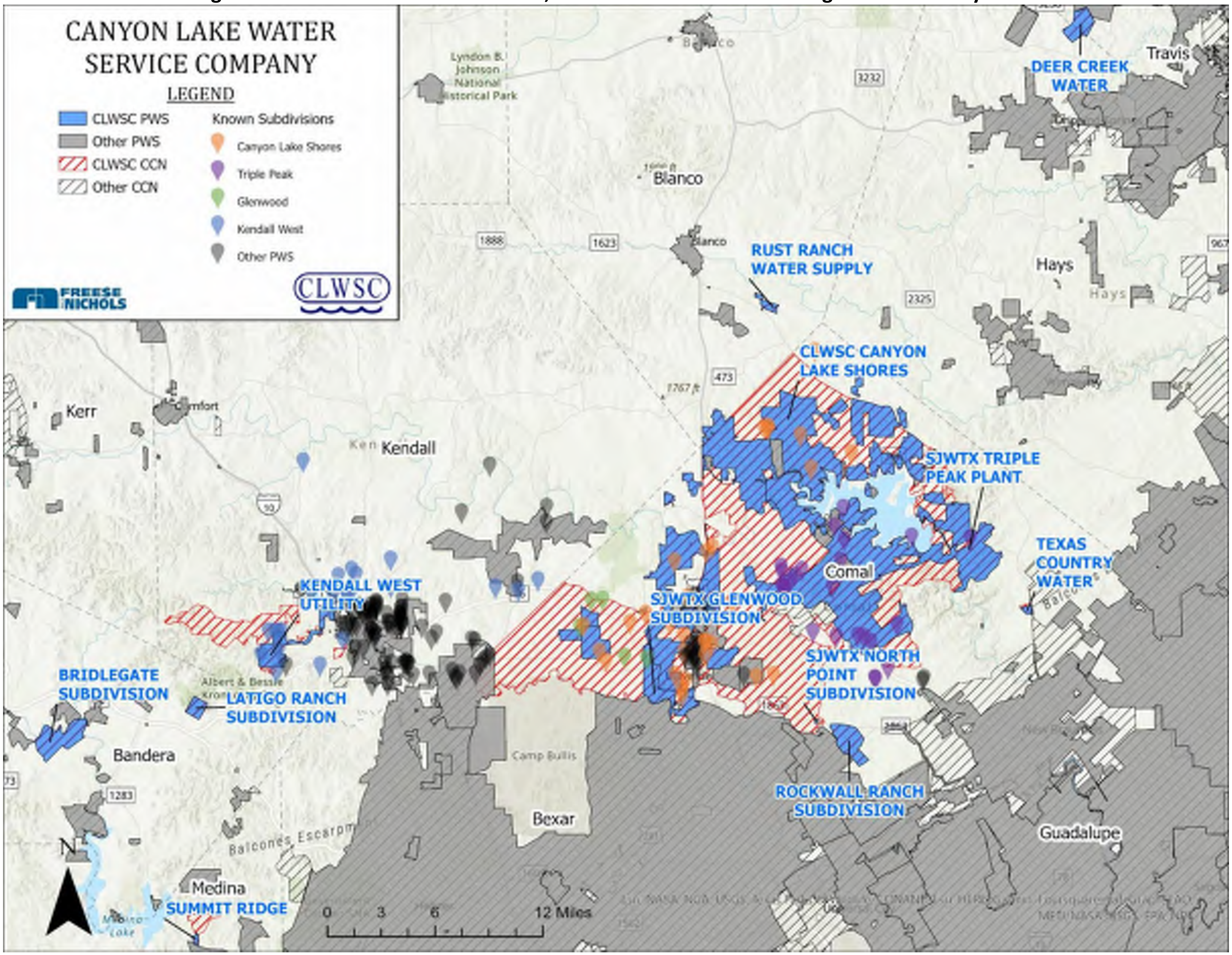


Table ES-2: Near Term Population Projections

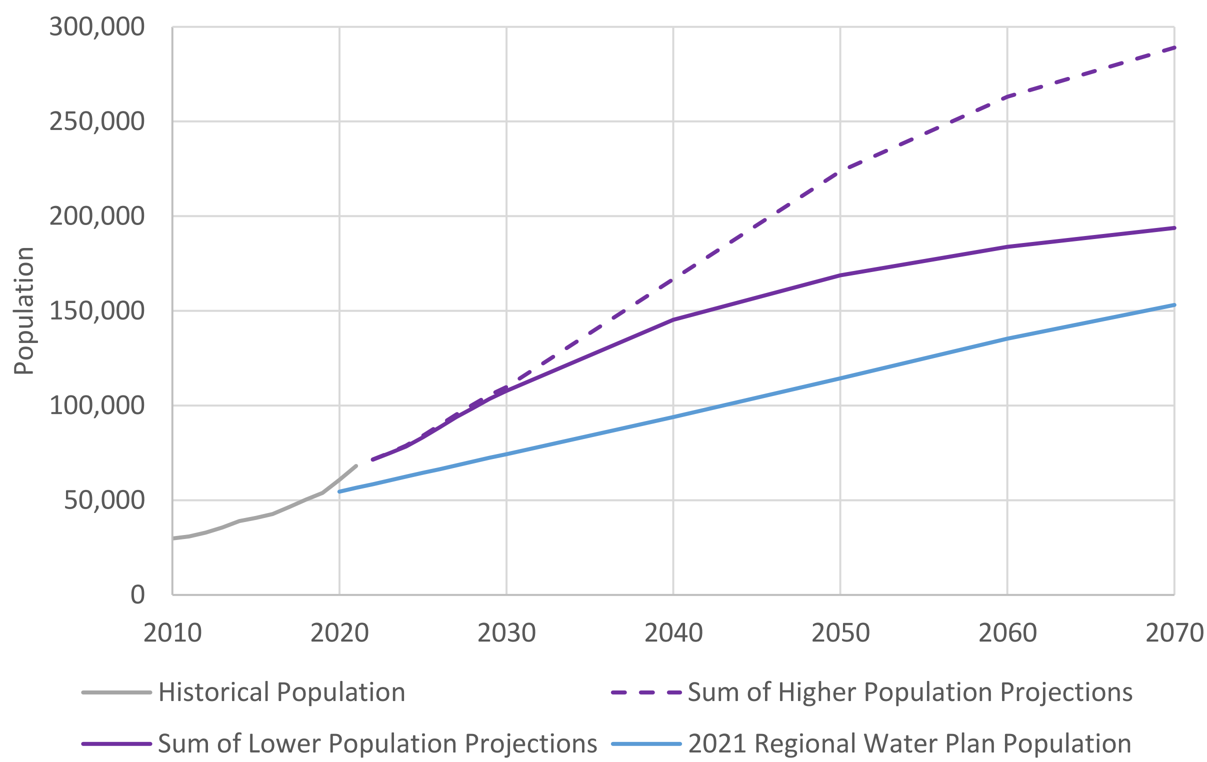
	Total Lower Population Projection (No CCN Expansion)	Total Higher Population Projection (Expansion of CCN)
2022	71,435	71,555
2023	74,802	75,024
2024	78,411	78,922
2025	83,312	84,130
2026	88,565	89,692
2027	93,855	95,295
2028	98,745	100,489
2029	103,623	105,621
2030	107,768	109,903

For the period from 2030-2070, population was projected within each water system by evaluating recent historical population trends and the near-term projections by Zonda, where available. Based on these historical and near-term projection values, a future growth rate was estimated that was similar or slightly lower than the historical values with a declining rate of increase. In addition, a saturation, or buildout, population, was estimated for each water system. In general, the buildout population was calculated by multiplying the relevant CCN area by a population density of 500 to 1,000 persons per square mile. As mentioned earlier, a higher growth scenario was developed for Canyon Lake Shores, Triple Peak, Glenwood, and Kendall West Utility. In the long-term population projection, the assumption was that the CCN for Kendall West Utility will expand by 50 percent from its current size, and that CLWSC will expand in Comal County to serve all areas not currently bounded by an existing CCN. The area of future CCN expansion in Comal County was divided among Canyon Lake Shores, Triple Peak, and Glenwood based on the current relative sizes of the systems' boundaries. Detailed information on the long-term population projection methodology for each system is included in **Section 3.2** and **Appendix D**, and the results for the system as a whole are shown in **Table ES-3**. The combined population projections for all water systems are shown in **Figure ES-2**. The population projections from the *2021 SCT RWP* are included in **Figure ES-2** for comparison. This line is the sum of projections for the following "Water User Groups" (WUG): Canyon Lake Water Service, Clear Water Estates, Kendall West Utility, Deer Creek Ranch Water, and KT Water Development. Bridlegate, Latigo Ridge, Summit Ridge, and Texas Country Water are included in the "County-other" category for regional planning and are not included in the figure, but these systems make up less than two percent of the total population of all CLWSC systems.

Table ES-3: Long Term Population Projections

2030	107,768	109,903
2040	145,257	166,765
2050	168,791	223,799
2060	183,913	263,171
2070	193,813	289,033

Figure ES-2: Historical and Projected Retail Population in CLWSC Water Service Area



The total demand projections are calculated by multiplying projected retail population by the projected GPCD for each system and adding any additional wholesale water demands. The results for the system as a whole are shown in **Table ES-4**, and additional details are included in **Section 4.0.**

Table ES-4: Total Demand Projections

	Total Lower Demand Projection (No CCN Expansion) ac ft/year	Total Higher Demand Projection (Expansion of CCN) ac ft/year
2022	11,086	11,103
2023	11,602	11,634
2024	12,163	12,239
2025	12,918	13,039
2026	13,744	13,911
2027	14,567	14,781
2028	15,321	15,579
2029	16,072	16,368
2030	16,708	17,024
2040	22,424	25,863
2050	25,970	34,426
2060	28,249	40,272
2070	29,759	44,111

CLWSC obtains 6,130 ac-ft/year of raw water from Canyon Lake through a contract with the Guadalupe-Blanco River Authority (GBRA). An additional 1,472 ac-ft/year of treated water is available from GBRA through a separate contract. CLWSC operates thirty-eight active wells and five inactive wells in Comal County. Based on the calculated and estimated production capacity of the active wells, 8,944 a-f/year is available from the Edwards/Trinity aquifer. CLWSC is currently in the process of acquiring a well field from KT Water Resources Ltd., which could yield 10,000 to 21,000 ac-ft/year. Additional details regarding existing supplies can be found in **Section 5.0**.

The combined retail and wholesale water demand, as well as total firm supply as identified by CLWSC staff, is presented in **Figure ES-3**. **Based on the growth and demand projections developed within this report, the total water demand is expected to exceed supply around the year 2040 for the higher demand scenario and 2044 for the lower demand scenario. This would change if the KT Water Resources Ltd. wellfield is not acquired or does not yield a firm supply similar to what is shown in this report.**

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1.0 INTRODUCTION

Canyon Lake Water Service Company (CLWSC) is an investor-owned utility providing water service in seven south central Texas counties. CLWSC currently has the exclusive right and requirement to serve approximately 260 square miles in Comal and Kendall Counties, which is the primary study area of this report. Within those two counties, CLWSC owns and operates seven individual systems: Canyon Lake Shores, Triple Peak, North Point Subdivision, Glenwood, Kendall West Utility, Texas Country Water, and Rockwall Ranch/KT Water. CLWSC also owns five water systems outside of Kendall and Comal counties: Rust Ranch, Deer Creek, Latigo Ranch, Summit Ridge, and Bridlegate. CLWSC operates but does not own Miralomas MUD, and this water system is excluded from FNI's analysis.

CLWSC obtains raw water from Canyon Lake via a contract with the Guadalupe-Blanco River Authority (GBRA). CLWSC also utilizes groundwater produced from the Edwards/Trinity Aquifer. CLWSC owns and operates three water treatment plants that treat water diverted from Canyon Lake: Canyon Lake Shores, Triple Peak, and Sybil Lightfoot. Some additional treated water originating from the Western Canyon project is purchased from GBRA. In addition to customers within CLWSC's retail water service area, CLWSC provides water wholesale to Windmill Ranch and City of Blanco. The City of Blanco has its own contract for up to 600 acre-feet per year (ac-ft/year) from GBRA.

In June 2022, CLWSC engaged Freese and Nichols, Inc. (FNI) to provide detailed water resources analysis services culminating in estimates of projected water demand between 2022 and 2070. The objective of this analysis is to generate data-driven estimates of water usage over a multi-decadal planning horizon so that CLWSC can compare projected demand with its determination of current supply availability. This report outlines the methodology used to develop gallons per capita per day (GPCD) estimates, population projections, and total water demand projections for CLWSC. These results are intended for planning purposes and are subject to change as more detailed information becomes available over time. It is recommended that these results be re-evaluated in five years.

1.1 LIST OF ABBREVIATIONS

Table 1-1 summarizes a list of abbreviations used in this report.

Table 1-1: Abbreviations

Abbreviation	Definition
ac-ft/year	Acre-Feet per Year (1 acre-foot per year = 325,851 gallons per year)
CCN	Certificate of Convenience and Necessity

CLWSC	Canyon Lake Water Service Company
GBRA	Guadalupe-Blanco River Authority
GPCD	Gallons per Capita per Day
MGD	Million Gallons per Day
PUC	Public Utility Commission
PWS	Public Water System
SCT RWP	South Central Texas Regional Water Plan (Region L Plan)
TWDB	Texas Water Development Board
WUG	Water User Group

2.0 GALLONS PER CAPITA PER DAY (GPCD) ESTIMATES

Historical demand data for CLWSC was obtained through CLWSC's records, Texas Water Development Board (TWDB) Water Use Surveys, and other sources.

2.1 KEY ASSUMPTIONS

In order to calculate consistent, defensible GPCD projections across years and between systems, the following assumptions were made:

- GPCD is calculated for each individual system within CLWSC's service area, as the systems are configured as of September 2022.
- This report uses a combined average GPCD rather than individual rates for different customer types, and it is assumed that the ratio of residential volumetric usage to commercial and other non-residential uses (such as construction water use and nonrevenue water) does not change in the future. Should this ratio change in the future, GPCDs could be different from these projections.
- Historic populations were calculated using past connection counts as reported in TWDB Water Use Surveys or in CLWSC records, as available. For all historical data, population was estimated by multiplying connection counts by 2.75. This value is supported by a review of 2010 and 2020 census data, which shows around 2.6 to 2.8 persons per household in the census tracts overlapping the CLWSC service area. CLWSC's people per connection policy has changed in the past, and some systems recently acquired by CLWSC appear to have used different techniques to estimate population. This analysis uses a constant factor of 2.75 people per connection to maintain consistency.
- Connection counts were not available for Latigo Ranch prior to 2020, which was recently acquired by CLWSC. Population was estimated by interpolating between the earliest available water use survey population of 60 in 2017 to the value of 120 reported by CLWSC in 2021. The water use surveys in 2018-2020 show a decline in population, and it was assumed that this was in error.
- The Summit North system merged with Canyon Lake Shores in 2020, and Clear Water Estates merged with Triple Peak. For each of these cases, historical population and water use data was combined to match the current system configuration.

- As requested by CLWSC, Miralomas MUD was excluded from this analysis, since it is an isolated system that is operated but not owned by CLWSC.

- CLWSC supplies water to two wholesale customers from the Canyon Lake Shores treatment plant: Windmill Ranch and the City of Blanco. This wholesale water use was not included in the GPCD calculation for Canyon Lake Shores, and separate projections were developed for wholesale water use. These wholesale water use estimates were added to the retail demand projections, as described in **Section 4.2**.

2.2 BASELINE GPCD METHODOLOGY

Per-capita water use depends on two variables: total water usage and population served. Total water usage was sourced from historic TWDB Water Use Surveys for each CLWSC system and CLWSC intake and billing records, as available. Served population was calculated by multiplying the historic connection counts found within the TWDB Water Use Surveys and CLWSC records by 2.75 people per connection. Applying Equation (1) yielded GPCD estimates for each year that historic data were available.

$$\text{GPCD} = (\text{Total Annual Water Usage in Gallons} / \text{Population}) / 365 \text{ Days} \tag{1}$$

Per-capita water use varies over time, and it tends to be higher in years with drier weather because of higher water demand for landscape irrigation. When estimating future conditions, one could use the highest historical GPCD, but this approach may be overly conservative. Averaging all years would result in a lower projection, but this would minimize the most critical years for water supply planning. After initial coordination with CLWSC, the average of the three highest GPCDs was used to establish each system's baseline GPCD in order to represent demand conditions that might occur during a dry year, which is when supplies are most likely to be constrained.

In the event that a water system's data did not include the year 2011, the average of the three highest GPCDs was increased by 10 percent to establish the baseline GPCD. While 2022 has rivalled 2011 for number of hot and dry days, as well as water usage, the timeline of this analysis requires findings prior to the end of 2022. Therefore, 2011 is still considered the benchmark for a conservative estimate for high water usage, and the average GPCD including 2011 was approximately 10 percent higher than the average of the three next highest GPCDs for systems where 2011 data was available. These corrections were applied to North Point, Latigo Ranch, Summit Ridge, Bridlegate, Kendall West Utility, and Texas Country Water.

2.3 GPCD PROJECTION METHODOLOGY

Assessing the future savings from CLWSC's water conservation programs was not part of the scope of work for this analysis. Therefore, the only reductions applied to the baseline GPCD were based on the passive savings applied to CLWSC in the *2021 SCT RWP* (which was the same methodology used in the *2016 SCT RWP*). These GPCD reductions were applied consistently to all systems within CLWSC by subtracting the savings that occur after 2020 from the calculated baseline GPCD for each system. This amounts to a reduction between 2020 and 2030 of approximately 2 GPCD from the initial baseline GPCD, with future decadal reductions tapering off as the savings from replacing pre-1995 appliances wane. For more detailed information about the methodology used for estimating passive savings, please see **Appendix A** of this report.

2.4 GPCD FINDINGS

As described in **Section 2.2**, a baseline GPCD value was calculated based on historical water use and population. A summary of historical water use is included in **Table 2-1**, and historical population is shown in **Table 2-2**. The historical GPCD values calculated using these values are included in **Table 2-3**. The calculated baseline GPCD and projections by decade are included in **Table 2-4.** Figures showing the historical and projected GPCD are included in **Appendix B**.

Table 2-1: Historical Total Retail Water Use (acre-ft)

System	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Canyon Lake Shores	1,447	1,920	1,709	1,594	1,688	2,222	2,237	2,510	2,627	3,026	3,731	3,753
Triple Peak	2,048	2,471	2,125	1,841	2,256	1,819	1,851	2,303	2,344	2,638	2,996	3,039
North Point	-	-	7	7	7	7	7	8	7	8	9	10
Rust Ranch	26	29	26	29	29	30	31	33	35	34	37	36
Deer Creek	71	93	95	116	134	141	149	181	186	183	207	203
Glenwood	39	50	41	45	47	47	50	67	85	110	152	210
Latigo Ranch	-	-	-	-	-	-	-	6	7	10	13	14
Summit Ridge	-	-	-	-	-	-	-	-	-	14	20	20
Bridlegate	-	-	-	-	-	-	-	38	43	42	55	52
Kendall West	274	274[a]	274[a]	234	237	249	268	294	321	351	367	427
Texas Country Water	-	-	-	-	-	-	79	95	62	72	81	75
Rockwall Ranch / KT Water	186	319	306	323	339	317	357	406	429	431	555	-[b]
Total	**4,090**	**5,156**	**4,582**	**4,189**	**4,736**	**4,832**	**5,029**	**5,941**	**6,145**	**6,919**	**8,225**	**7,840[c]**

[a] Duplicative reporting entry.
[b] Neither Water Use Survey nor CLWSC intake data available.
[c] Does not include any usage data from Rockwall Ranch.

Table 2-2: Historical Total Population Served

System	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Canyon Lake Shores	10,178	10,852	12,117	13,525	15,590	16,360	17,251	18,846	20,859	22,426	26,318	33,817
Triple Peak	15,040	15,271	15,659	16,693	17,493	18,101	18,744	19,993	21,304	22,842	25,493	29,752
North Point	-	-	77	74	74	74	74	77	80	80	80	88
Rust Ranch	347	344	349	347	396	404	415	451	470	476	495	536
Deer Creek	1,067	1,191	1,290	1,403	1,774	1,823	1,977	2,115	2,230	2,335	2,384	2,448
Glenwood	209	209	223	223	253	278	289	325	542	693	850	1,474
Latigo Ranch[a]	-	-	-	-	-	-	-	60	75	90	105	120
Summit Ridge	-	-	-	-	-	-	-	-	-	68	69	168
Bridlegate	-	-	-	-	-	-	-	462	644	470	534	578
Kendall West	2,283	2,490[b]	2,490[b]	2,335	2,360	2,395	2,404	2,439	2,508	2,582	2,750	2,967
Texas Country Water	-	-	-	-	-	-	270	275	283	283	283	294
Rockwall Ranch / KT Water	696	839	910	1,029	1,114	1,221	1,320	1,375	1,414	1,477	1,532	-[c]
Total	**29,818**	**30,987**	**32,907**	**35,626**	**39,053**	**40,656**	**42,743**	**46,417**	**50,408**	**53,822**	**60,891**	**66,469[d]**

[a] Population reported in TWDB Water Use Surveys appear incorrect, so the 2017 figure represents what was reported in that year's Water Use Survey, and subsequent years are an interpolation between that figure and what CLWSC reported as population in 2021.
[b] Duplicative reporting entry.
[c] Data not available.
[d] Does not include data for Rockwall Ranch.

Table 2-3: Calculated Historical GPCD

System	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Canyon Lake Shores	127	158	126	105	97	121	116	119	112	120	127	103
Triple Peak	122	144	121	98	115	90	88	103	98	103	105	91
North Point	-	-	77	86	81	90	89	88	77	92	106	97
Rust Ranch	67	76	67	75	65	66	67	65	66	64	67	59
Deer Creek	59	70	65	74	67	69	67	76	75	70	78	74
Glenwood	168	214	163	181	167	152	155	184	139	142	160	127
Latigo Ranch	-	-	-	-	-	-	-	90	85	97	106	102
Summit Ridge	-	-	-	-	-	-	-	-	-	185	261	106
Bridlegate	-	-	-	-	-	-	-	90	85	97	106	102

System	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Kendall West	107	107 [a]	107 [a]	89	90	93	100	108	114	121	119	129
Texas Country Water	-	-	-	-	-	-	263	309	196	226	256	229
Rockwall Ranch / KT Water	238	340	301	280	271	232	241	264	271	261	324	-[b]

[a] Duplicative reporting entry
[b] Data not available

Table 2-4: Calculated Baseline GPCD and Projected Future GPCD

System	Baseline	2030	2040	2050	2060	2070
Canyon Lake Shores	137	135	135	134	134	134
Triple Peak	129	127	126	126	126	126
North Point[a]	108	106	105	105	105	105
Rust Ranch	73	71	70	70	69	69
Deer Creek	76	74	74	73	73	73
Glenwood	193	191	190	190	190	190
Latigo Ranch[a]	112	110	109	109	109	109
Summit Ridge[a]	202	200	200	199	199	199
Bridlegate[a]	93	91	90	90	90	90
Kendall West[a]	135	133	133	132	132	132
Texas Country Water[a]	303	302	301	301	300	300
Rockwall Ranch / KT Water	321	319	319	318	318	318

[a] Additional 10 percent increase due to missing 2011 data.

3.0 POPULATION PROJECTIONS

Population projections for the study area were estimated for use in the development of municipal water demand projections. The boundaries of the existing water service areas and the Certificate of Convenience and Necessity (CCN) areas are shown on **Figure 3-1.** This map also shows the subdivisions with a known location in the Zonda database, color coded by the water system by which we assume they will be served for the purposes of the near-term projections.

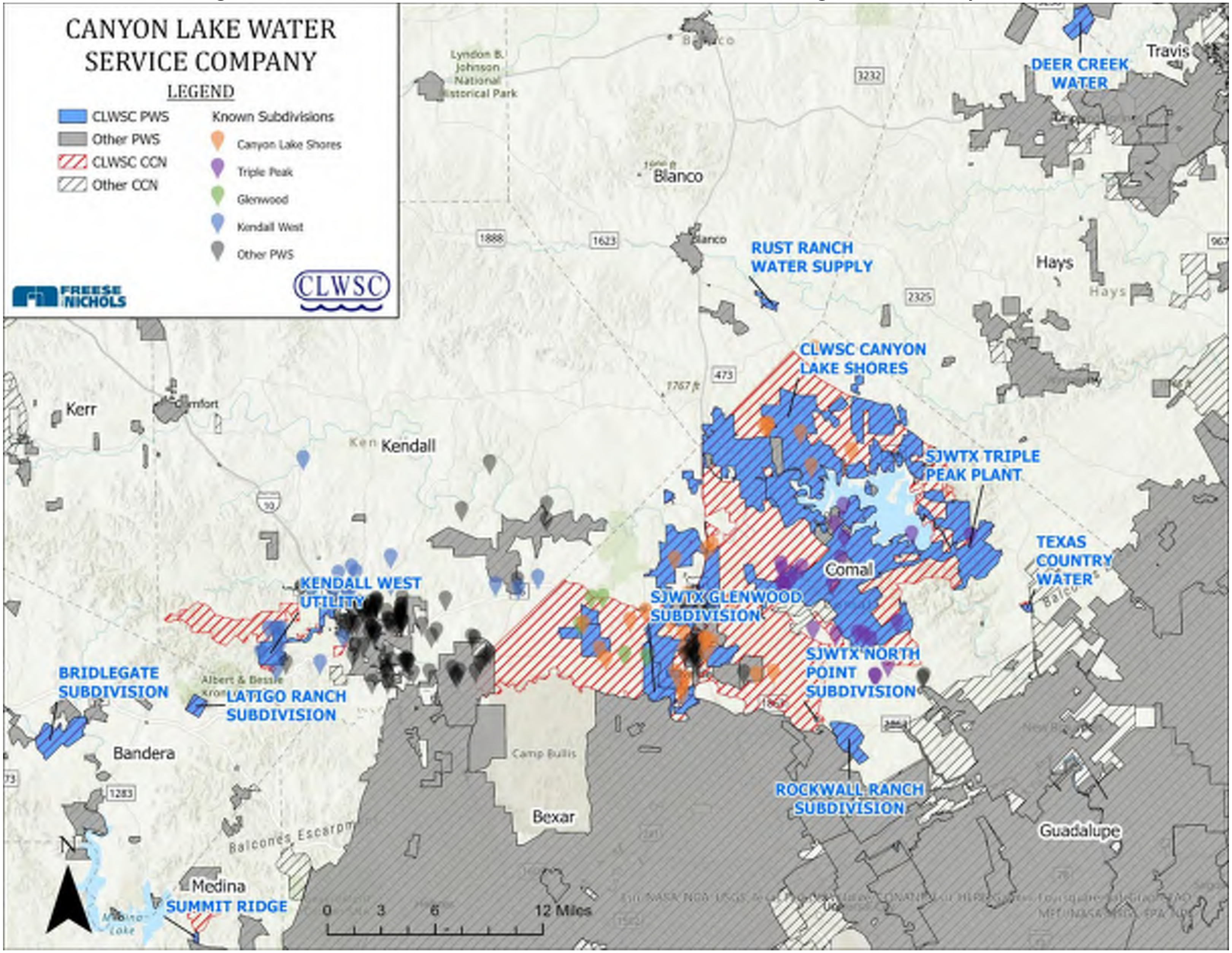
3.1 NEAR TERM POPULATION PROJECTIONS (2022-2030)

Population projections through the year 2030 were developed by Zonda (formerly Metrostudy) using their proprietary database of housing market activity. The database is focused on residential development in the San Antonio MSA, with quarterly surveys conducted by staff to track future platted lots, lots under active development, vacant developed lots, homes under construction, finished vacant homes, and occupied homes. Zonda surveyors visually inspect all known residential developments and account for all stages of development activity within each subdivision. This data allows Zonda to forecast housing unit and population growth for various geographies based on detailed supply and demand trends. In addition to the survey data, external sources of information for projections include the US Census Bureau, ESRI (third party demographic data), ALN Apartment Data, Inc. (third party apartment data), and RealPage (third party apartment data). The following outline describes the methodology for housing unit and population projections in the study area.

1. **Baseline Housing Unit and Population Counts**

   Utilizing data from the 2020 Census (collected in April 2020), occupied housing unit and population counts were determined for each of the 26 Census Tracts that make up the assessment area. Note that the boundaries of some Census Tracts extended beyond the boundaries of the assessment area, likely leading to modestly higher occupied housing unit and population counts.

Figure 3-1: PWS and CCN Boundaries, and Known Subdivisions Assigned to Water Systems



2. Historic Population to Household Ratios

Utilizing Census Bureau data (provided by ESRI), the overall average household size (2020 population / 2020 occupied housing units) and the average new household size (2020 population – 2010 population / 2020 occupied housing units – 2010 occupied housing units) were calculated for individual Census Tracts in Comal and Kendall counties. The average overall/new household formation rates (Census Tract and County) was utilized to convert projected housing unit growth to projected population growth in the assessment area. Based upon Census data for the San Antonio MSA, an average household size of 1.80 residents was assumed for apartment units (regardless of location). The average persons per household ratio for all new subdivisions assumed to be served by CLWSC in the higher scenario was 2.62.

3. Projecting For Sale Housing Unit Growth

In order to project for sale housing unit growth in the assessment area, the following steps were taken using Zonda's proprietary housing survey data:

a. Aggregated total future new home supply in the assessed area.
b. Utilized five-year trends to project additional new lots/homes that could be added to the assessment area between now and 2030.
c. Assessed new home closing trends at the subdivision level to project the pace at which new homes will close over the forecast period.
d. Projected annual housing unit growth through 2030 for active and future subdivisions in the assessment area.

4. Projecting Apartment Unit Growth

In order to project apartment unit growth in the assessment area, the following steps were taken using data from third party sources such as ALN Apartment Data, Inc. and RealPage:

a. Identified recently completed (since 2020), under construction, and planned apartment communities to determine the extent and location of apartment development activity within the assessment area.

b. Utilized five-year trends to project additional apartment units that could be added to the assessment area between now and 2030.

c. Projected annual apartment unit growth through 2030 for active and future apartment communities in the assessment area.

5. Projecting Population Growth

Once the for-sale and apartment housing unit projections were completed, the annual new housing unit projections were converted into annual population growth projections by applying the household formation rates detailed in Step 2.

In addition to the known subdivisions in the database, future single-family homes and apartments were estimated for each census tract based on recent trends.

Subdivisions with a known location in the database were assigned to a water system based on the Public Water System (PWS) and Certificate of Convenience and Necessity (CCN) boundary shapefiles available from the Texas Water Development Board (TWDB) and Public Utility Commission (PUC), respectively. We assumed that subdivisions outside of a PWS but inside a CCN would be served by the nearest PWS associated with that CCN. Subdivisions outside of an existing CCN were generally assigned to the nearest CCN. Future lots and apartments in each census tract were assigned to the CCN and PWS where the largest amount of population growth was expected to occur from subdivisions with known locations in that census tract.

To evaluate the potential impacts of expanding CLWSC's CCN boundaries, two population projections were developed for Canyon Lake Shores, Kendall West Utility, Triple Peak, and Glenwood. Other systems are assumed to maintain their current boundaries, so the lower and higher projections are the same. The lower projection scenario only includes subdivisions that are within existing CCN boundaries, while the higher scenario includes new developments outside of existing CCNs that might be served by CLWSC. It is assumed that CLWSC would begin serving those new developments starting in 2022. The lower and higher population projections are shown in **Table 3-1** and **Table 3-2**. Additional details on the near term population methodology are included in **Appendix C**.

Table 3-1: Near Term Lower Population Projections (No CCN Expansion)

System	2022	2023	2024	2025	2026	2027	2028	2029	2030
Canyon Lake Shores	29,541	31,019	32,688	35,426	38,294	41,300	43,996	46,891	49,490
Triple Peak	31,051	32,358	33,480	34,749	35,922	37,080	38,237	39,221	39,879
North Point[a]	88	88	88	88	88	88	88	88	88
Rust Ranch[a]	536	536	536	536	536	536	536	536	536
Deer Creek[a]	2,457	2,466	2,476	2,485	2,495	2,504	2,513	2,523	2,532

System	2022	2023	2024	2025	2026	2027	2028	2029	2030
Glenwood	1,677	1,896	2,230	2,561	3,199	3,734	4,166	4,597	4,951
Latigo Ranch[a]	138	156	174	192	211	229	247	265	283
Summit Ridge[a]	193	218	244	269	294	320	345	370	396
Bridlegate[a]	631	684	738	791	845	898	952	1,005	1,058
Kendall West	3,139	3,346	3,675	4,080	4,500	4,934	5,383	5,795	6,172
Texas Country Water[a]	294	294	294	294	294	294	294	294	294
Rockwall Ranch / KT Water[a]	1,689	1,739	1,789	1,839	1,889	1,938	1,988	2,038	2,088
Total	**71,435**	**74,802**	**78,411**	**83,312**	**88,565**	**93,855**	**98,745**	**103,623**	**107,768**

[a] These near-term population projections were developed using the methods described in Section 3.2 for 2030 with linear interpolation from 2021-2030

Table 3-2: Near Term Higher Population Projections (Expansion of CCN)

System	2022	2023	2024	2025	2026	2027	2028	2029	2030
Canyon Lake Shores	29,541	31,019	32,863	35,775	38,817	41,997	44,867	47,936	50,642
Triple Peak	31,172	32,565	33,757	35,116	36,380	37,632	38,887	39,936	40,610
North Point[a]	88	88	88	88	88	88	88	88	88
Rust Ranch[a]	536	536	536	536	536	536	536	536	536
Deer Creek[a]	2,457	2,466	2,476	2,485	2,495	2,504	2,513	2,523	2,532
Glenwood	1,677	1,896	2,230	2,561	3,199	3,734	4,166	4,597	4,951
Latigo Ranch[a]	138	156	174	192	211	229	247	265	283
Summit Ridge[a]	193	218	244	269	294	320	345	370	396
Bridlegate[a]	631	684	738	791	845	898	952	1,005	1,058
Kendall West	3,139	3,362	3,733	4,182	4,646	5,124	5,606	6,032	6,424
Texas Country Water[a]	294	294	294	294	294	294	294	294	294
Rockwall Ranch / KT Water[a]	1,689	1,739	1,789	1,839	1,889	1,938	1,988	2,038	2,088
Total	**71,555**	**75,024**	**78,922**	**84,130**	**89,692**	**95,295**	**100,489**	**105,621**	**109,903**

[a] These near-term population projections were developed using the methods described in Section 3.2 for 2030 with linear interpolation from 2021-2030

3.2 LONG TERM POPULATION PROJECTIONS (2030-2070)

Population was projected within each water system for the period from 2030-2070 by evaluating recent historical population trends and the near-term projections by Zonda, where available. The population growth rate, *k*, was calculated using Equation (2).

$$P_t = P_0 e^{kt} \tag{2}$$

Here, the initial population is denoted P_0, the population after t years is P_t, and e is the exponential constant. The annual growth rate, k, was calculated for the period from 2010-2021 (as available) as well as for 2010-2030 and 2020-2030 for the water systems with population projections from Zonda. Based on these values, a future growth rate was estimated that was similar or slightly lower than the historical values. The growth rate was applied using Equation (3) to model growth with a declining rate of increase. This equation requires a saturation, or buildout, population, which was estimated for each water system. In Equation (3), P_0 is the initial population, P_t is the population after t years, and S is the buildout population.

$$P_t = P_0 + (S - P_0)(1 - e^{-k(t-t_0)}) \qquad (3)$$

In general, the buildout population was calculated by multiplying the relevant CCN area by a population density of 800 or 1,000 persons/square mile. Since the Canyon Lake Shores, Triple Peak, and Glenwood systems share a CCN area, the CCN area was divided among the systems based on the current ratio of existing PWS boundary areas. As mentioned in **Section 3.1**, a higher growth scenario was developed for Canyon Lake Shores, Triple Peak, Glenwood, and Kendall West Utility. In the long-term population projection, the assumption was that the CCN for Kendall West Utility will expand by 50 percent from its current size, and that CLWSC will expand in Comal County to serve all areas not currently bounded by an existing CCN, with the area of Canyon Lake excluded. Similar to the existing CCN, the area of future CCN expansion was divided among Canyon Lake Shores, Triple Peak, and Glenwood based on the current relative sizes of the PWS boundaries. Detailed information on the long-term population projection methodology for each system is included in **Appendix D**, and the results are shown in **Table 3-3** and **Table 3-4**. The combined population projections for all water systems are shown in **Figure 3-2**. The population projections from the *2021 SCT RWP* are included in **Figure 3-2** for comparison. This line is the sum of projections for the following WUGs: Canyon Lake Water Service, Clear Water Estates, Kendall West Utility, Deer Creek Ranch Water, and KT Water Development. It does not include the remaining four customers that were grouped in County-other for the *2021 SCT RWP*, but these account for less than 2 percent of the total projected population. Figures showing population projections for individual water systems are included in **Appendix B**.

Table 3-3: Long Term Lower Population Projections (No Expansion)

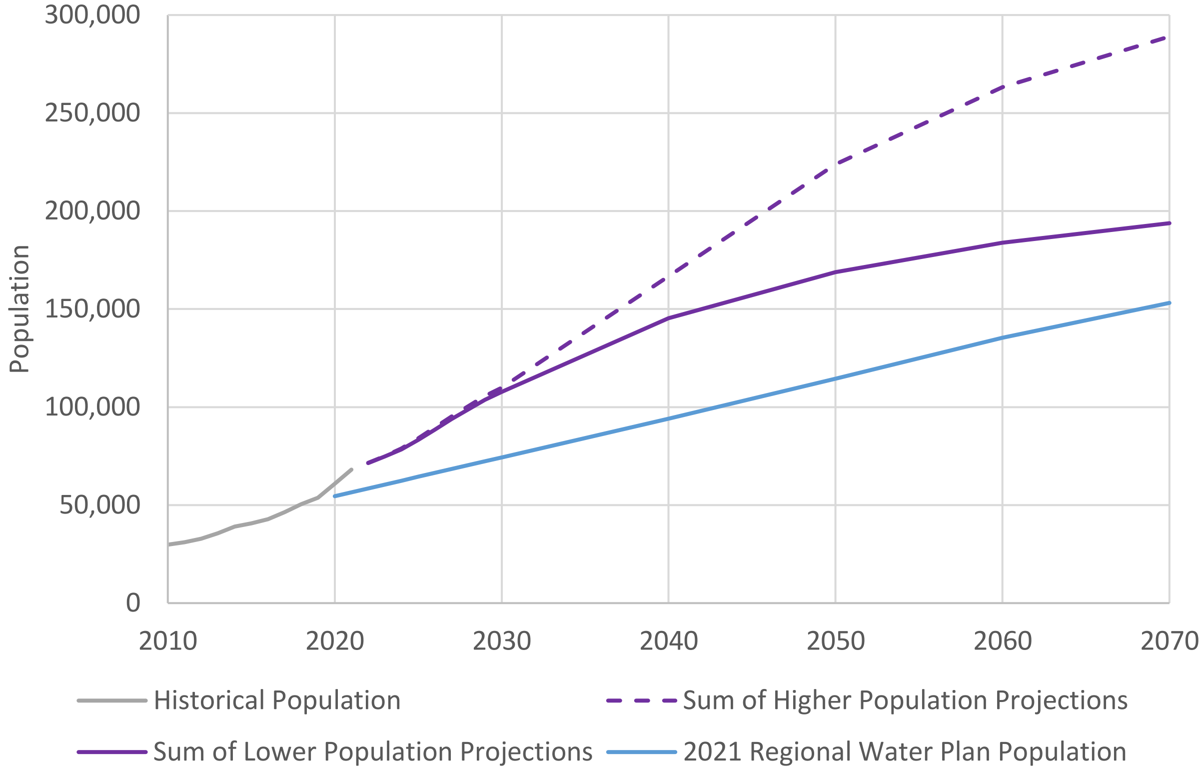
System	2030	2040	2050	2060	2070
Canyon Lake Shores	49,490	70,309	82,936	90,594	95,239
Triple Peak	39,879	51,439	60,002	66,347	71,046
North Point	88	88	88	88	88
Rust Ranch	536	536	536	536	536
Deer Creek	2,532	2,602	2,653	2,690	2,717
Glenwood	4,951	7,232	8,072	8,380	8,494
Latigo Ranch	283	382	419	432	437

System	2030	2040	2050	2060	2070
Summit Ridge	396	563	624	647	655
Bridlegate	1,058	1,361	1,528	1,619	1,669
Kendall West	6,172	8,105	9,166	9,748	10,067
Texas Country Water	294	294	294	294	294
Rockwall Ranch / KT Water	2,088	2,346	2,474	2,537	2,569
Total	**107,768**	**145,257**	**168,791**	**183,913**	**193,813**

Table 3-4: Long Term Higher Population Projections (Expansion of CCN)

System	2030	2040	2050	2060	2070
Canyon Lake Shores	50,642	82,490	115,821	136,037	148,299
Triple Peak	40,610	54,576	73,346	90,207	102,698
North Point	88	88	88	88	88
Rust Ranch	536	536	536	536	536
Deer Creek	2,532	2,602	2,653	2,690	2,717
Glenwood	4,951	10,924	13,121	13,930	14,227
Latigo Ranch	283	382	419	432	437
Summit Ridge	396	563	624	647	655
Bridlegate	1,058	1,361	1,528	1,619	1,669
Kendall West	6,424	10,602	12,895	14,153	14,844
Texas Country Water	294	294	294	294	294
Rockwall Ranch / KT Water	2,088	2,346	2,474	2,537	2,569
Total	**109,903**	**166,765**	**223,799**	**263,171**	**289,033**

Figure 3-2: Historical and Projected Retail Population in CLWSC Water Service Area



4.0 PROJECTED WATER DEMAND

4.1 RETAIL WATER DEMAND

CLWSC's retail demands include municipal demands for residential, commercial, and institutional customers, as well as some bulk haulers. Since the ratio of water customer types is expected to remain similar over time, a combined GPCD was utilized that is based on total water use and total population, as described in **Section 2.1**. Retail water demands were calculated for each water system using Equation (4).

$$\text{Water Use (ac-ft/year)} = (\text{Population} * 365 \text{ Days} * \text{GPCD}) / 325{,}851 \text{ gal/ac-ft} \qquad (4)$$

4.2 WHOLESALE WATER DEMAND

CLWSC provides wholesale water to two customers. Since this water is delivered from the Canyon Lake Shores WTP, the wholesale amounts described below were added to the total demand for the Canyon Lake Shores system.

4.2.1 Windmill Ranch Subdivision/Kestral Airpark

CLWSC is contracted to supply up to 50 kgal/day to Windmill Ranch, and it is assumed this amount remains constant through the planning horizon. After converting this amount to ac-ft/year, it is then adjusted based on the average water loss percentage for Canyon Lake Shores of 22.3 percent for a total annual raw water demand of 72.1 ac-ft/year.

4.2.2 City of Blanco

The City of Blanco has a contract with GBRA for up to 600 ac-ft/year of treated water from CLWSC, but there are transmission capacity limitations. At the request of CLWSC, a demand of 57 ac-ft/year was assumed based on recent usage. After adjusting for losses, this equates to a raw water demand of 73.3 ac-ft/year.

4.3 TOTAL WATER DEMAND

The combined retail and wholesale water demand by system is presented in **Table 4-1** and **Table 4-2**. Figures showing demand projections for individual water systems are included in **Appendix B**.

Table 4-1: Lower Total Demand Projections (ac-ft/year)

System	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050	2060	2070
Canyon Lake Shores	4,678	4,905	5,161	5,578	6,015	6,471	6,879	7,315	7,706	10,878	12,821	14,028	14,790
Triple Peak	4,476	4,657	4,811	4,986	5,146	5,304	5,462	5,594	5,679	7,286	8,476	9,360	10,018
North Point	11	11	11	11	11	10	10	10	10	10	10	10	10
Rust Ranch	43	43	43	43	43	43	43	43	42	42	42	42	42
Deer Creek	208	209	209	209	210	210	210	210	210	214	217	220	222
Glenwood	362	409	480	551	687	801	893	984	1,059	1,542	1,718	1,782	1,805
Latigo Ranch	17	19	22	24	26	28	30	33	35	47	51	53	53
Summit Ridge	44	49	55	61	66	72	78	83	89	126	139	144	146
Bridlegate	65	71	76	81	87	92	97	102	108	137	154	163	167
Kendall West	475	505	554	614	677	741	807	868	923	1,206	1,360	1,445	1,491
Texas Country Water	100	100	100	100	100	100	100	99	99	99	99	99	99
Rockwall Ranch / KT Water	607	625	642	660	677	695	712	730	747	837	882	904	915
Total	**11,086**	**11,602**	**12,163**	**12,918**	**13,744**	**14,567**	**15,321**	**16,072**	**16,708**	**22,424**	**25,970**	**28,249**	**29,759**

Table 4-2: Higher Total Demand Projections (ac-ft/year)

System	2022	2023	2024	2025	2026	2027	2028	2029	2030	2040	2050	2060	2070
Canyon Lake Shores	4,678	4,905	5,187	5,632	6,094	6,577	7,011	7,474	7,881	12,714	17,765	20,851	22,752
Triple Peak	4,493	4,687	4,851	5,039	5,212	5,383	5,554	5,696	5,783	7,730	10,361	12,727	14,481
North Point	11	11	11	11	11	10	10	10	10	10	10	10	10
Rust Ranch	43	43	43	43	43	43	43	43	42	42	42	42	42
Deer Creek	208	209	209	209	210	210	210	210	210	214	217	220	222
Glenwood	362	409	480	551	687	801	893	984	1,059	2,329	2,792	2,962	3,024
Latigo Ranch	17	19	22	24	26	28	30	33	35	47	51	53	53
Summit Ridge	44	49	55	61	66	72	78	83	89	126	139	144	146
Bridlegate	65	71	76	81	87	92	97	102	108	137	154	163	167
Kendall West	475	508	563	630	699	769	841	903	961	1,577	1,913	2,098	2,199
Texas Country Water	100	100	100	100	100	100	100	99	99	99	99	99	99
Rockwall Ranch / KT Water	607	625	642	660	677	695	712	730	747	837	882	904	915
Total	**11,103**	**11,634**	**12,239**	**13,039**	**13,911**	**14,781**	**15,579**	**16,368**	**17,024**	**25,863**	**34,426**	**40,272**	**44,111**

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6.0 NEXT STEPS

The scope of work for this report calls for the development of growth and water demand projections. As a value-added service, this report additionally combines its demand projections with the current supply availability assumptions provided by CLWSC staff. Merging those two sources of data identifies a need for additional water by the year 2040 for the higher demand scenario and 2044 for the lower demand scenario , with significant needs arising in 2050 and beyond. This would change if the KT Water Resources Ltd. wellfield is not acquired or does not yield a firm supply similar to what is shown in this report**.** CLWSC should consider a detailed evaluation of the reliability of its current supplies, to better understand the timing of its future water needs.

Securing additional water supplies can take a decade or more of planning and design before the supply comes online. CLWSC should begin securing its immediate water needs, as well as begin evaluating water supply alternatives for the intermediate and long-term planning horizons. For a utility as geographically fragmented as CLWSC, this analysis of future water supply alternatives should be tailored and not a one-size-fits-all approach. Water conservation should be evaluated as part of that process. An Integrated Long Range Water Supply Plan is an effective way to communicate to both utility leadership and customers the vision of the utility.

In an ever-changing landscape, it is important to revisit water planning assumptions regularly, especially for an expanding utility in a growing region. Future water supply alternatives which seem unaffordable or not easily implementable today could be more appealing in the future. Macroeconomic factors could change the growth trajectory if labor market and/or materials commodities within the housing development industry become increasingly unstable.

ATTACHMENT D

COTTONWOOD CREEK MUD 1 AERIAL


Tower Ln
Vigilance St
Charles Abraham Way
Bois D Arc Rd
Clara Martin Rd
Abraham Lincoln St
Canopy Ln
Topsail St
Mizzen St
George Bush St
US Highway 290 E

ATTACHMENT E

ELGIN FUTURE DEVELOPMENT

LEGEND

DEVELOPMENT	LOTS
BRICKSTON	2021 LOTS & 476 UNITS
ELM CREEK NORTHWEST	608 LOTS
POTH TRACT	106 LOTS
ELM CREEK	1086 LOTS
CREEKS CROSSING	287 LOTS
CANO	8 LOTS
NORTHSIDE MEADOWS	229 LOTS
WESTWIND	321 LOTS
BRIARWOOD	774 LOTS
HOMESTEAD ESTATES	475 LOTS
EAGLES LANDING PHASE I & II	275 LOTS
EAGLES LANDING PHASE III & IV	215 LOTS
EAGLES LANDING PHASE V	215 LOTS
ROLLING MEADOWS	21 LOTS
STONE CREEK RANCH	288 LOTS
ELGIN LANDING	456 LOTS
LUND FARMS	2000 LOTS
HARVEST RIDGE	1171 LOTS
PEPPERGRASS	272 LOTS

LEGEND

DEVELOPMENT	LOTS
CRESCENT VILLAGE	152 UNITS
COUNTY LINE	683 LOTS
LARSON TRACT	840 LOTS
SHENANDOAH	375 LOTS
ELGIN MEADOWS	92 LOTS
SARATOGA FARMS	257 LOTS
TRINITY RANCH	1659 LOTS
CMC APARTMENTS	308 UNITS
SIERRA APARTMENTS	63 UNITS
ELLA ESTATES	7 LOTS
BURLESON CREEK ESTATES	29 LOTS
SPACE FOR ALL	GAS STATION
WESTBROOK TINY HOMES	175 UNITS
GRAHAM TRACT	521 LOTS
RED TOWN SUBDIVISION	3 LOTS
RED TOWN ESTATES	3 LOTS
78-ACRE TRACT	228 LOTS & 250 UNITS
CEDAR GROVE APARTMENTS	231 UNITS
POTH SOUTH	997 UNITS

ATTACHMENT F

GOLDTHWAITE WATER USE SURVEYS

Date/Time Survey Submitted: 9/15/2011 12:08:04 PM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2010

SYSTEM NAME:	CITY OF GOLDTHWAITE		**SURVEY NUMBER:**	0330600
OPERATOR NAME:			**PRIMARY USED COUNTY:**	MILLS
MULTIPLE SURVEY ORG:			**PRIMARY USED RIVER BASIN:**	COLORADO
MAILING ADDRESS 1:	PO BOX 450		**ORGANIZATION MAIN PHONE:**	- -
MAILING ADDRESS 2:			**MAIN EMAIL:**	
CITY/STATE/ZIP:	GOLDTHWAITE TX 76844-		**WEB:**	
PWS NAME:	CITY OF GOLDTHWAITE		**PWS CODE:**	1670001

INTAKE:

Water Type	County	Basin	Reservoir / River	Water Right #	% Consumed	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
SURFACE WATER SELF SUPPLIED	MILLS	COLORADO	COLORADO RUN OF RIVER		100.00	E	N	0.00	96,585,500

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
6,105,000	0	0	13,744,500	15,369,750	17,267,250	16,013,250	1,848,000	13,975,500	9,003,500	0	3,258,750

CONNECTIONS & USAGE:

	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	940	0
Residential - Single Family	850	82,148,175
Residential - Multi Family	85	8,214,825
Institutional	0	0
Commercial	0	0
Industrial	0	0
Agriculture	0	0
Reuse	0	0
TOTAL UNMETERED:	2	900,000

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	1,802

Date/Time Survey Submitted: 2/8/2022 10:05:42 AM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2021

SYSTEM NAME:	CITY OF GOLDTHWAITE	**SURVEY NUMBER:**	0330600
OPERATOR NAME:		**PRIMARY USED COUNTY:**	MILLS
MULTIPLE SURVEY ORG:		**PRIMARY USED RIVER BASIN:**	COLORADO
MAILING ADDRESS 1:	PO BOX 450	**ORGANIZATION MAIN PHONE:**	325-648-3186
MAILING ADDRESS 2:		**MAIN EMAIL:**	
CITY/STATE/ZIP:	GOLDTHWAITE TX 76844-	**WEB:**	
PWS NAME:	CITY OF GOLDTHWAITE	**PWS CODE:**	1670001

INTAKE:

GROUND WATER SELF SUPPLIED	MILLS	COLORADO				M	N	0.00	

1,464,050	1,464,050	1,464,050	1,464,050	1,464,050	1,464,050	1,464,050	1,464,050	0	0	0	0

SURFACE WATER SELF SUPPLIED	MILLS	COLORADO	COLORADO RUN OF RIVER		100.00	E	N	0.00	

22,518,000	22,518,000	22,518,000	25,314,000	19,524,000	21,150,000	20,754,000	22,117,500	22,117,500	12,042,000	0	9,474,000

SURFACE WATER PURCHASED			CITY OF SAN SABA		M	N	0.00	

1,026,956	0	0	0	1,689,778	1,763,283	2,398,947	3,284,317	3,284,317	1,896,517	3,351,743	279,883

SALES:

GOLDTHWAITE PLANT	I			SURFACE WATER			Treated	0

COUNTY CONNECTIONS:

COUNTY NAME	TOTAL CONNECTIONS
MILLS	1,164

CONNECTIONS & USAGE:	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	1,165	95,284,697
Residential - Single Family	859	53,620,195
Residential - Multi Family	143	2,738,100
Institutional	49	11,580,700
Commercial	113	24,556,702
Industrial	0	0
Agriculture	0	0
Reuse	1	2,789,000
TOTAL UNMETERED:	0	0

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	1,738

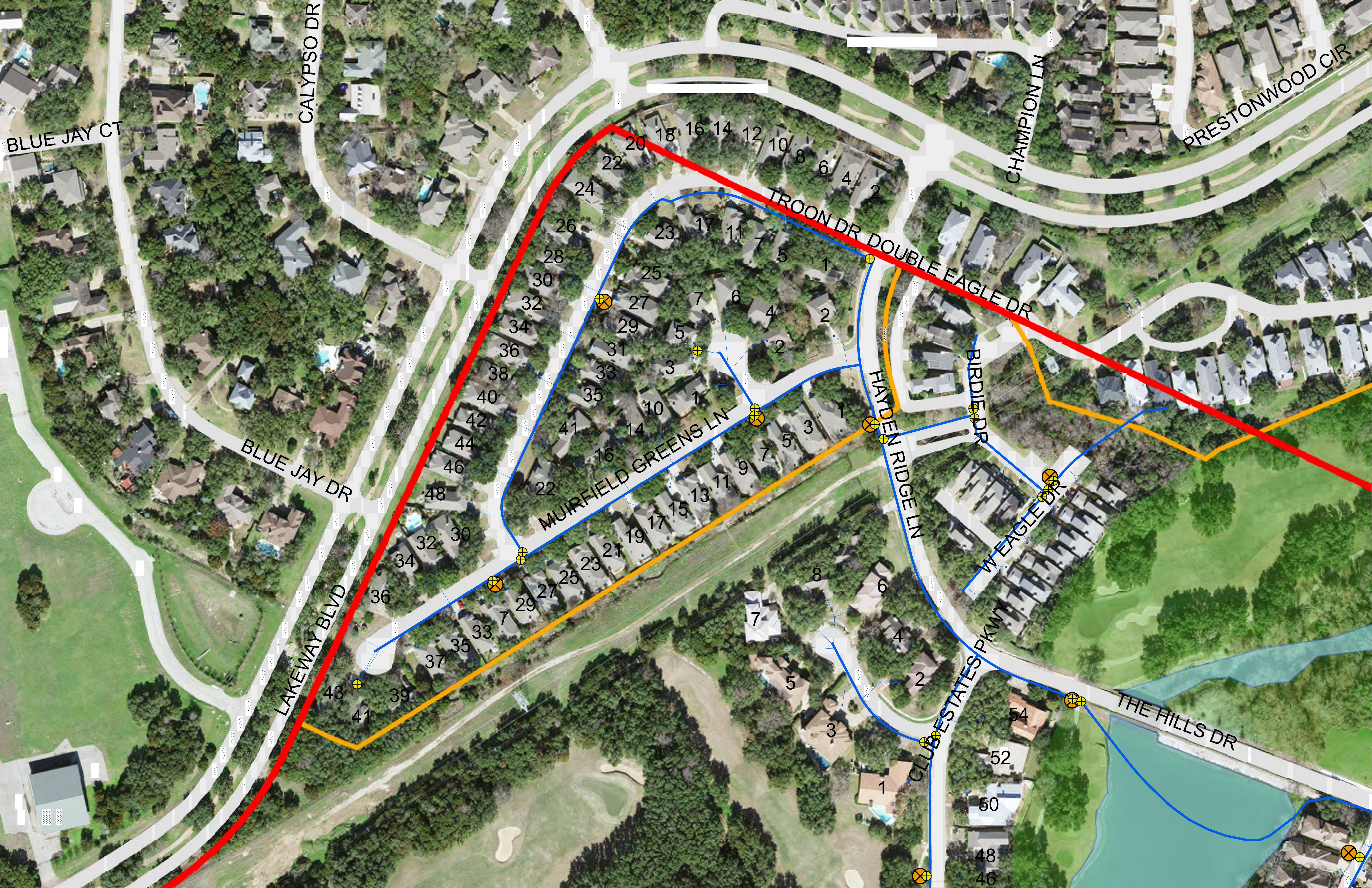
ATTACHMENT G

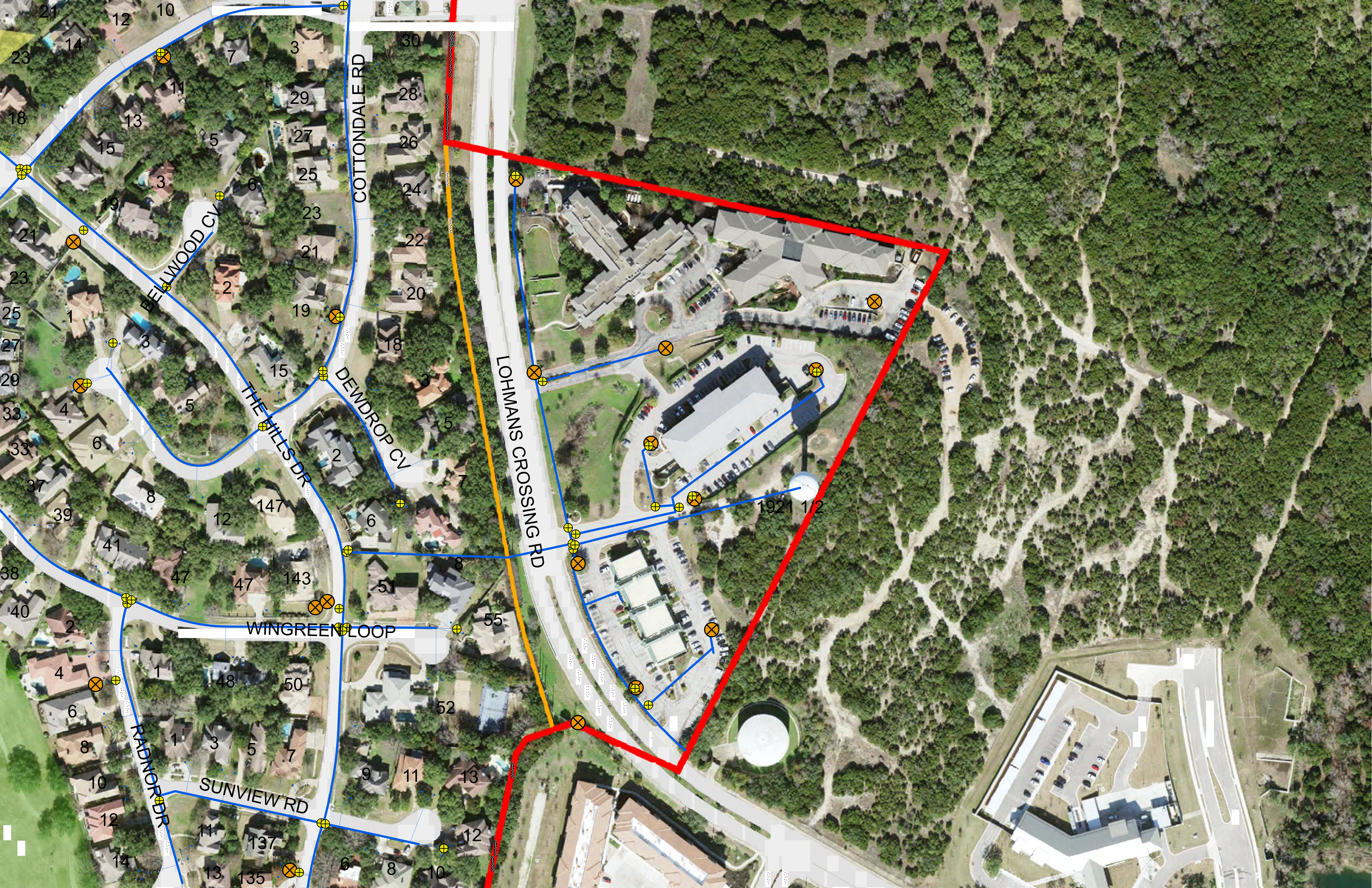
HAYS COUNTY WCID 2 AERIAL


WEST TRAVIS COUNTY PUBLIC UTILITY AGENCY

ATTACHMENT H

HURST CREEK MUD SERVICE AREA BOUNDARY


BLUE JAY CT
CALYPSO DR
CHAMPION LN
PRESTONWOOD CIR
TROON DR
DOUBLE EAGLE DR
BIRDIE DR
HAYDEN RIDGE LN
MUIRFIELD GREENS LN
BLUE JAY DR
LAKEWAY BLVD
W EAGLE DR
CLUB ESTATES PKWY
THE HILLS DR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BELLWOOD CV
DEWDROP CV
THE HILLS DR
LOHMANS CROSSING RD
WINGREEN LOOP
RADNOR DR
SUNVIEW RD
1921 1/2

ATTACHMENT I

JOHNSON CITY WATER USE SURVEYS

Date/Time Survey Submitted: 10/10/2011 2:17:18 PM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2010

SYSTEM NAME:	CITY OF JOHNSON CITY			**SURVEY NUMBER:**	0439200
OPERATOR NAME:				**PRIMARY USED COUNTY:**	BLANCO
MULTIPLE SURVEY ORG:				**PRIMARY USED RIVER BASIN:**	COLORADO
MAILING ADDRESS 1:	PO BOX 369			**ORGANIZATION MAIN PHONE:**	- -
MAILING ADDRESS 2:				**MAIN EMAIL:**	
CITY/STATE/ZIP:	JOHNSON CITY	TX	78636-	**WEB:**	
PWS NAME:	CITY OF JOHNSON CITY			**PWS CODE:**	160001

INTAKE:

Water Type	County	Basin	Aquifer	Well Name (if applicable)	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
GROUND WATER SELF SUPPLIED	BLANCO	COLORADO	TRINITY AQUIFER	5	M	N	0.00	80,146,798

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
5,403,880	6,000,200	4,221,900	5,635,294	5,594,760	9,049,950	7,500,980	10,932,900	8,047,324	6,152,580	6,037,920	5,569,110

CONNECTIONS & USAGE:

	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	831	0
Residential - Single Family	626	60,333,380
Residential - Multi Family	0	0
Institutional	0	0
Commercial	162	20,797,081
Industrial	0	0
Agriculture	0	0
Reuse	0	0
TOTAL UNMETERED:	2	10,000

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	1,600

Date/Time Survey Submitted: 4/15/2021 8:56:44 AM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2020

SYSTEM NAME:	CITY OF JOHNSON CITY		**SURVEY NUMBER:**	0439200
OPERATOR NAME:			**PRIMARY USED COUNTY:**	BLANCO
MULTIPLE SURVEY ORG:			**PRIMARY USED RIVER BASIN:**	COLORADO
MAILING ADDRESS 1:	PO BOX 369		**ORGANIZATION MAIN PHONE:**	- -
MAILING ADDRESS 2:			**MAIN EMAIL:**	
CITY/STATE/ZIP:	JOHNSON CITY	TX 78636-	**WEB:**	
PWS NAME:	CITY OF JOHNSON CITY		**PWS CODE:**	160001

INTAKE:

Water Type	County	Basin	Aquifer	Well Name (if applicable)	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
GROUND WATER SELF SUPPLIED	BLANCO	COLORADO	TRINITY AQUIFER	5	M	N	0.00	54,000,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	5,000,000	6,000,000	6,000,000	4,000,000	5,000,000	4,000,000	4,000,000

COUNTY CONNECTIONS:

COUNTY NAME	TOTAL CONNECTIONS
BLANCO	883

CONNECTIONS & USAGE:

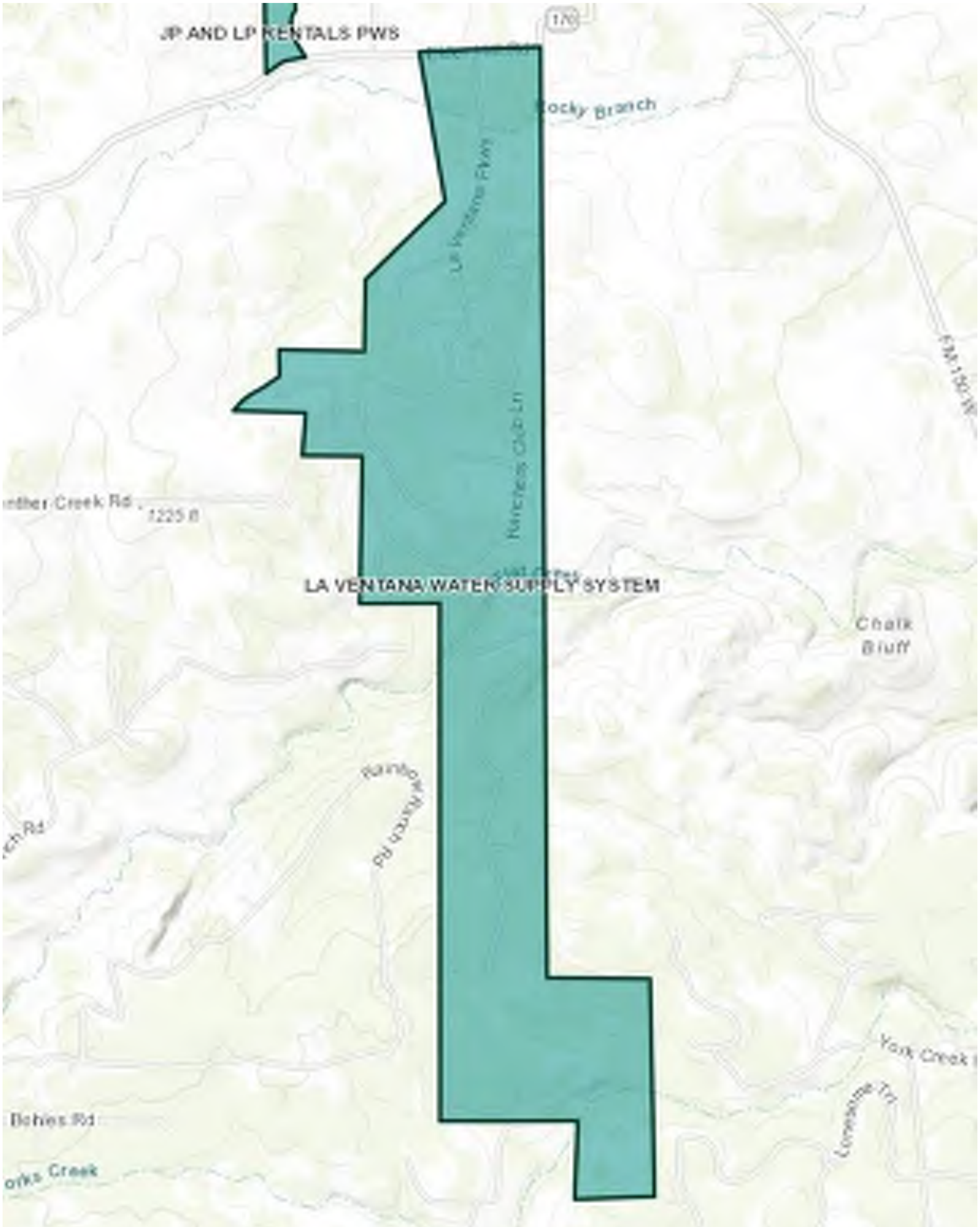
	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	883	51,194,000
Residential - Single Family	615	26,863,000
Residential - Multi Family	81	3,551,000
Institutional	0	0
Commercial	187	20,780,000
Industrial	0	0
Agriculture	0	0
Reuse	0	0
TOTAL UNMETERED:	1	115,000

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	2,091

ATTACHMENT J

LA VENTANA WSC AERIAL


JP AND LP RENTALS PWS
Rocky Branch
La Ventana Pkwy
Ranches Club Ln
LA VENTANA WATER SUPPLY SYSTEM
Chalk
Bluff
Bohles Rd
York Creek
Lonesome Trl
Ranch Rd
Creek

ATTACHMENT K

LAGO VISTA WATER USE SURVEYS

Date/Time Survey Submitted: 2/24/2021 8:39:16 AM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2020

SYSTEM NAME:	CITY OF LAGO VISTA	**SURVEY NUMBER:**	0871728
OPERATOR NAME:		**PRIMARY USED COUNTY:**	TRAVIS
MULTIPLE SURVEY ORG:		**PRIMARY USED RIVER BASIN:**	COLORADO
MAILING ADDRESS 1:	PO BOX 4727	**ORGANIZATION MAIN PHONE:**	512-267-1155
MAILING ADDRESS 2:		**MAIN EMAIL:**	
CITY/STATE/ZIP:	LAGO VISTA TX 78645-0001	**WEB:**	www.lagovistatexas.org
PWS NAME:	CITY OF LAGO VISTA	**PWS CODE:**	2270092

INTAKE:

Water Type	County	Basin	Reservoir / River	Water Right #	% Consumed	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
SURFACE WATER SELF SUPPLIED	TRAVIS	COLORADO	TRAVIS LAKE/RESERVOIR		100.00	M	N	0.00	484,762,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
32,851,000	30,024,000	29,655,000	31,130,000	40,766,000	47,666,000	58,464,000	58,622,000	40,813,000	45,455,000	37,388,000	31,928,000

CONNECTIONS & USAGE:

	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	4,526	483,062,000
Residential - Single Family	4,241	478,900,000
Residential - Multi Family	0	0
Institutional	0	0
Commercial	285	4,162,000
Industrial	0	0
Agriculture	0	0
Reuse	0	0
TOTAL UNMETERED:	0	1,700,000

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	14,153

ATTACHMENT L

LAKEWAY MUD SUPPORTING DOCUMENTATION

LAKEWAY MUNICIPAL UTILITY DISTRICT
1097 LOHMANS CROSSING • LAKEWAY, TX 78734-4459
MAIN OFFICE: (512) 261-6222 x110 • CUSTOMERSERVICE@LAKEWAYMUD.ORG
AFTER HOURS EMERGENCY: (512) 314-7590 • FAX (512) 261-6681

May 15, 2023

Mr. Adam Conner
Freese and Nichols
10431 Morado Cir #300
Austin, TX 78759
Transmitted via email: adam.conner@freese.com

RE: Region K Population & Demand Estimates
Lakeway MUD - Request for Revision

Mr. Conner,

After review of Lakeway MUD's (LMUD's) Region K 2030 through 2080 population and demand projections, it was found that the estimates are in need of slight revision.

The current Region K population and demand estimates were determined to be 16-21% low initially in 2030, compared to recent actual population and use, and a slightly higher ultimately in 2080 due to lack of consideration for area buildout. The projected distribution is consequently different and requested revisions are provided in more detail, below.

Population Estimates

The current 2022 LMUD population already exceeds the estimates that Region K has for 2030. With additional consideration of the anticipated full buildout of the area by the year 2044, the revised population estimates are noted in the table below.

Year	P2030	P2040	P2050	P2060	P2070	P2080
Population	11,678	12,047	12,194	12,194	12,194	12,194

The above estimates assume 2.46 persons per household, per the 2017-2021 US Census.

Demand Estimates

The estimated value of 226 Base GPCD in the draft Region K estimates is low. Upon evaluation of recent 2022 potable water usage, the actual average gallons per capita day (gpcd) was 235 gpcd. The Lakeway area has a notable transient population of lake-area vacation and rental properties that impacts this resulting value.

While demand during 2022 is not as extreme as the 2011 drought of record demand, the value is recent and representative enough of high demand conditions to be adequate for planning purposes. The 235 gpcd baseline value from 2022 was used to develop the revised demand estimates, as noted in the table below.

Year	D2030	D2040	D2050	D2060	D2070	D2080
Demand (acre-ft)	3,069	3,166	3,205	3,205	3,205	3,205

Should you have any questions, please contact me at (512) 261-6222, extension 140.

Respectfully,

Earl Foster, General Manager

Cc: Mr. Neil Deeds, INTERA, via email at *ndeeds@intera.com*

LAKEWAY MUNICIPAL UTILITY DISTRICT
1097 LOHMANS CROSSING • LAKEWAY, TX 78734-4459
MAIN OFFICE: (512) 261-6222 x110 • CUSTOMERSERVICE@LAKEWAYMUD.ORG
AFTER HOURS EMERGENCY: (512) 314-7590 • FAX (512) 261-6681

May 25, 2023

Mr. Adam Conner
Freese and Nichols
10431 Morado Cir #300
Austin, TX 78759
Transmitted via email: adam.conner@freese.com

RE: Region K Population & Demand Estimates
Lakeway MUD – Supplement to 5/15/23 Request for Revision

Mr. Conner,

This letter is to supplement the prior LMUD revision request and is in response to our subsequent discussions with regards to accurate account of raw water use, as well as development of baseline gallons per capita day (GPCD) data. As LMUD is responsible for ensuring that adequate future supplies are available to meet community needs through retail and contractual wholesale requirements, the revisions provided in the May 15, 2023 letter reflected all related water usage. This supplement, however, provides additional information that separates out the LMUD-only retail information, as well as addresses LMUD's proposed baseline GPCD further.

It is important to highlight that removal of the delivered wholesale component results in inaccurately higher values in LMUD's baseline GPCD, for the following reasons:

- As the wholesale provided by LMUD traverses within and to the far extents of LMUD's distribution system prior to delivery, the system water losses associated with the wholesale delivery portion remain within LMUD's baseline GPCD.
- As the most recent 2-year wholesale deliveries have averaged roughly 10% of LMUD distributed flows and system water loss has been on the order of 15%, this inaccuracy is notable.

This inaccuracy should be addressed in the plan chapter for population and demand.

A further adjustment to Lakeway MUD's (LMUD's) Region K 2030 through 2080 population and demand projections has been provided to remove the wholesale component. Even with LMUD-only retail considered, the current Region K population and demand estimates were determined to be 9-16% low initially in 2030, compared to recent actual population and use, and slightly higher ultimately in 2080 due to lack of consideration for area buildout. The projected distribution is consequently different and requested revisions are provided in more detail, as follows.

Population Estimates

The current 2022 LMUD-only retail population already exceeds the estimates that Region K has for 2030. With additional consideration of the anticipated full buildout of the area by the year 2044, the revised population estimates are noted in the table as follows.

Year	P2030	P2040	P2050	P2060	P2070	P2080
Population	10,726	11,095	11,242	11,242	11,242	11,242

The above estimates assume 2.46 persons per household, per the 2017-2021 US Census.

Demand Estimates

It should be noted that the estimated value of 226 Base GPCD in the current draft Region K estimates is low.

You indicated that TWDB requires use of 2011 data for baseline development which would result in a value of 263 GPCD. LMUD had some data reporting issues during the 2011 timeframe, but with applied data corrections, a revised baseline value of 253 GPCD was derived and is recommended for use in the plan.

Should you have any questions, please contact me at (512) 261-6222, extension 140.

Respectfully,

Earl Foster

Earl Foster, General Manager

Cc: Mr. Neil Deeds, INTERA, via email at *ndeeds@intera.com*

ATTACHMENT M

MARBLE FALLS DRAFT IMPACT FEE ANALYSES

Project: City of Marble Falls Impact Fee Study
Location: City Council Chambers
Date: September 8, 2022
Title: Impact Fee Advisory Committee – Meeting 2 Data Packet

Start Time: 6:00 pm
End Time:

A. Development Map & Summary

- Attachment A1 – Development Map
- Attachment A2 – Development Projections Summary

B. Population Projections

- Attachment B – Population Growth Scenarios Chart

C. Future Land Use Map & Summary

- Attachment C1 – Future Land Use Map
- Attachment C2 – Future Land Use Area Summary

D. Water Service Area Map

- Attachment D – Water Service Area Map

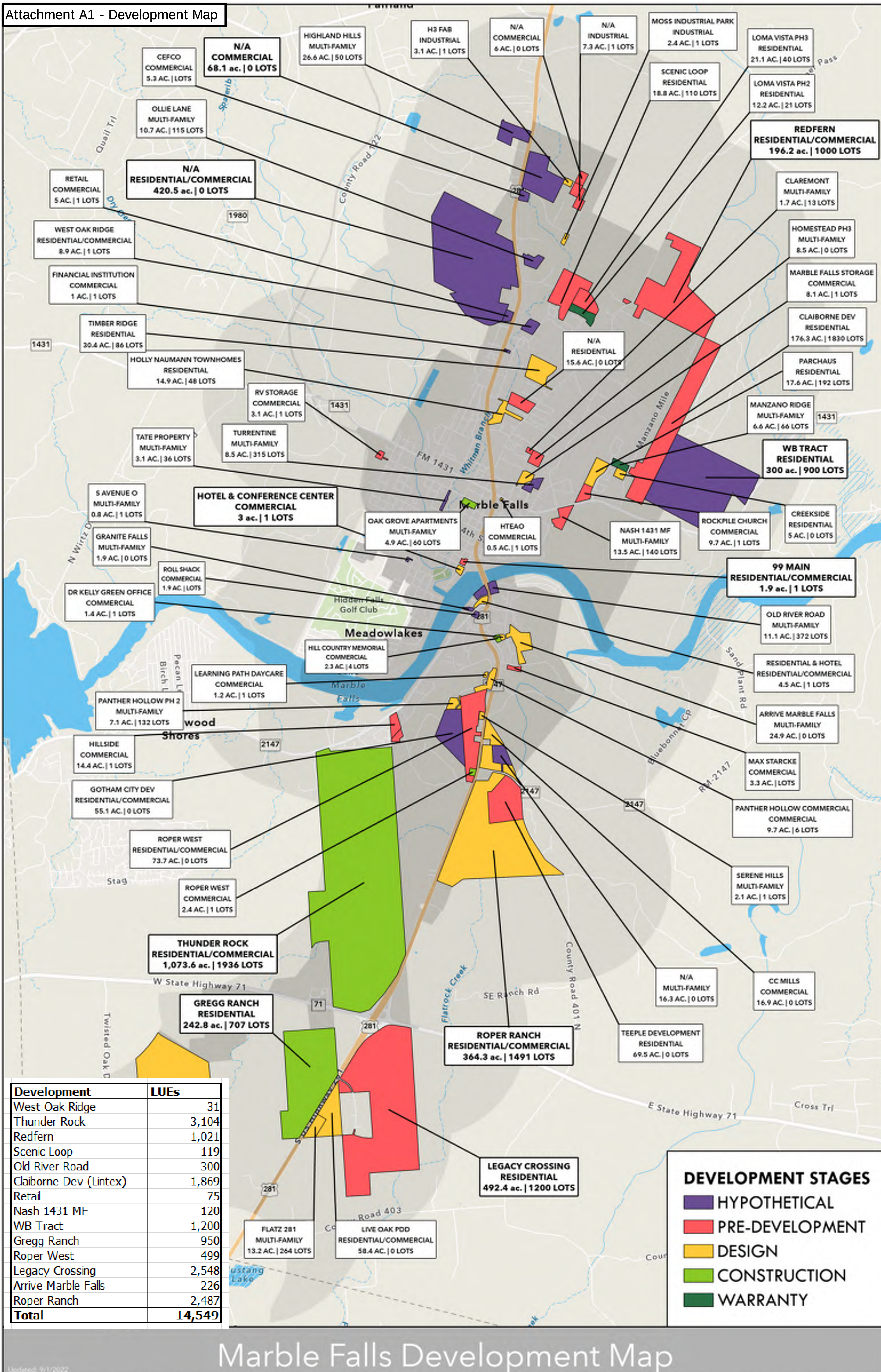
E. Wastewater Service Area Map

- Attachment E – Wastewater Service Area Map

F. Future Water/Sewer Connections

- Attachment F Water Connections Summary

Attachment A1 - Development Map



Development	LUEs
West Oak Ridge	31
Thunder Rock	3,104
Redfern	1,021
Scenic Loop	119
Old River Road	300
Claiborne Dev (Lintex)	1,869
Retail	75
Nash 1431 MF	120
WB Tract	1,200
Gregg Ranch	950
Roper West	499
Legacy Crossing	2,548
Arrive Marble Falls	226
Roper Ranch	2,487
Total	**14,549**

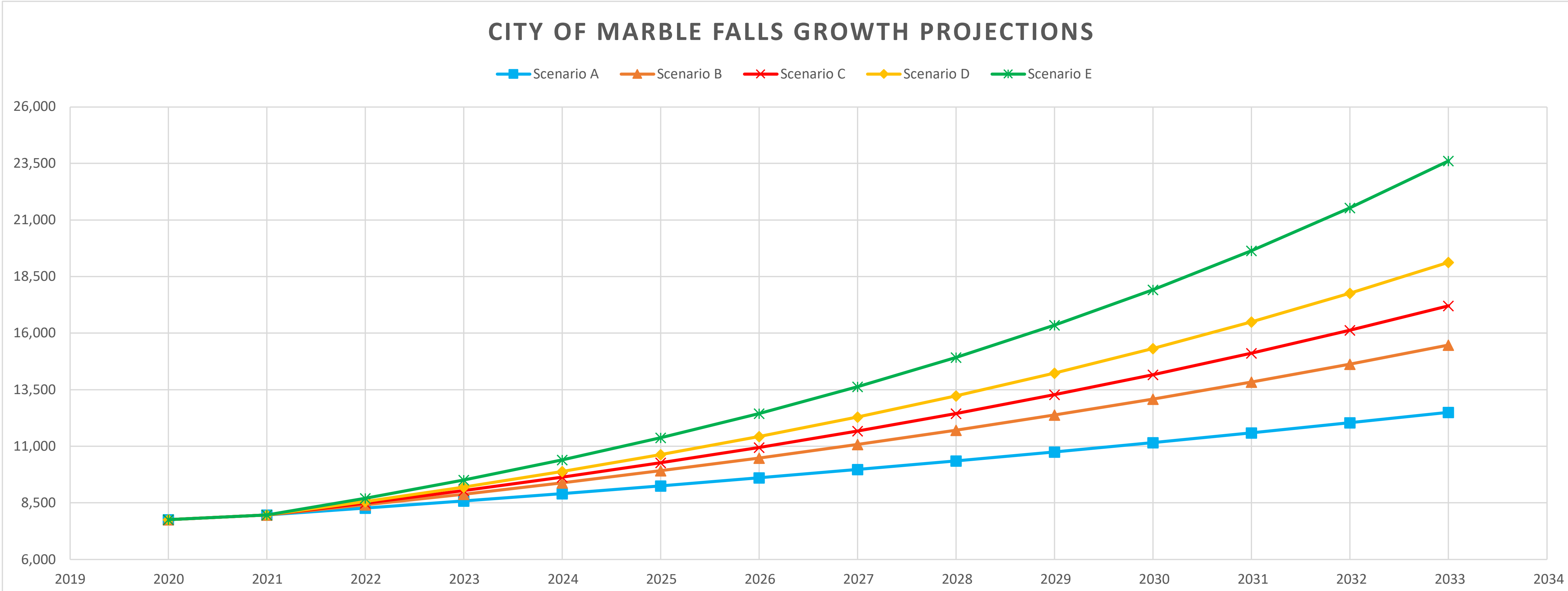
Attachment A2 - Development Projections Summary

Development Summary - Northside

Type of Development	Name	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
SF and/or Master Planned	Claiborne (Lintex) Development	0	50	50	50	50	50	50	50	50	50	50
	Redfern	0	0	100	0	150	0	100	0	150	0	100
	WB Tract	0	0	0	140	240	140	140	140	140	140	140
	Ronhaar/Shiflett Tract	0	0	0	100	0	100	50	50	50	50	50
	NE corner Resource/281	0	0	0	50	25	25	25	25	0	0	0
Multifamily	Parchaus MF	0	200	0	0	0	0	0	0	0	0	0
	Timber Ridge SF	0	0	85	0	0	0	0	0	0	0	0
	Ollie Ln MF	0	0	150	0	0	0	0	0	0	0	0
	Serene Falls	0	0	80	0	0	0	0	0	0	0	0
	99 Main	0	0	0	100	0	0	0	0	0	0	0
	Homestead Phase 3 MF	0	0	0	50	0	0	0	0	0	0	0
	Nash MF	0	0	0	150	0	0	0	0	0	0	0
	12th Street MF	0	0	300	0	0	0	0	0	0	0	0
	Public Housing Development (PFC)	0	0	288	0	0	0	0	0	0	0	0
Major Commercial / Misc.	Conference Center	0	0	150	0	0	0	0	0	0	0	0
	River Road waterfront (with MF)	0	0	150	50	0	0	0	0	0	0	0
	Miscellaneous In-fill Development	20	100	50	50	50	50	50	50	50	50	50
	Annual Total LUEs	20	350	1,403	740	515	365	415	315	440	290	390
	Cumulative Total LUEs	20	370	1,773	2,513	3,028	3,393	3,808	4,123	4,563	4,853	5,243
	Cumulative Total Population	48	892	4,273	6,056	7,297	8,177	9,177	9,936	10,997	11,696	12,636

Development Summary - Southside

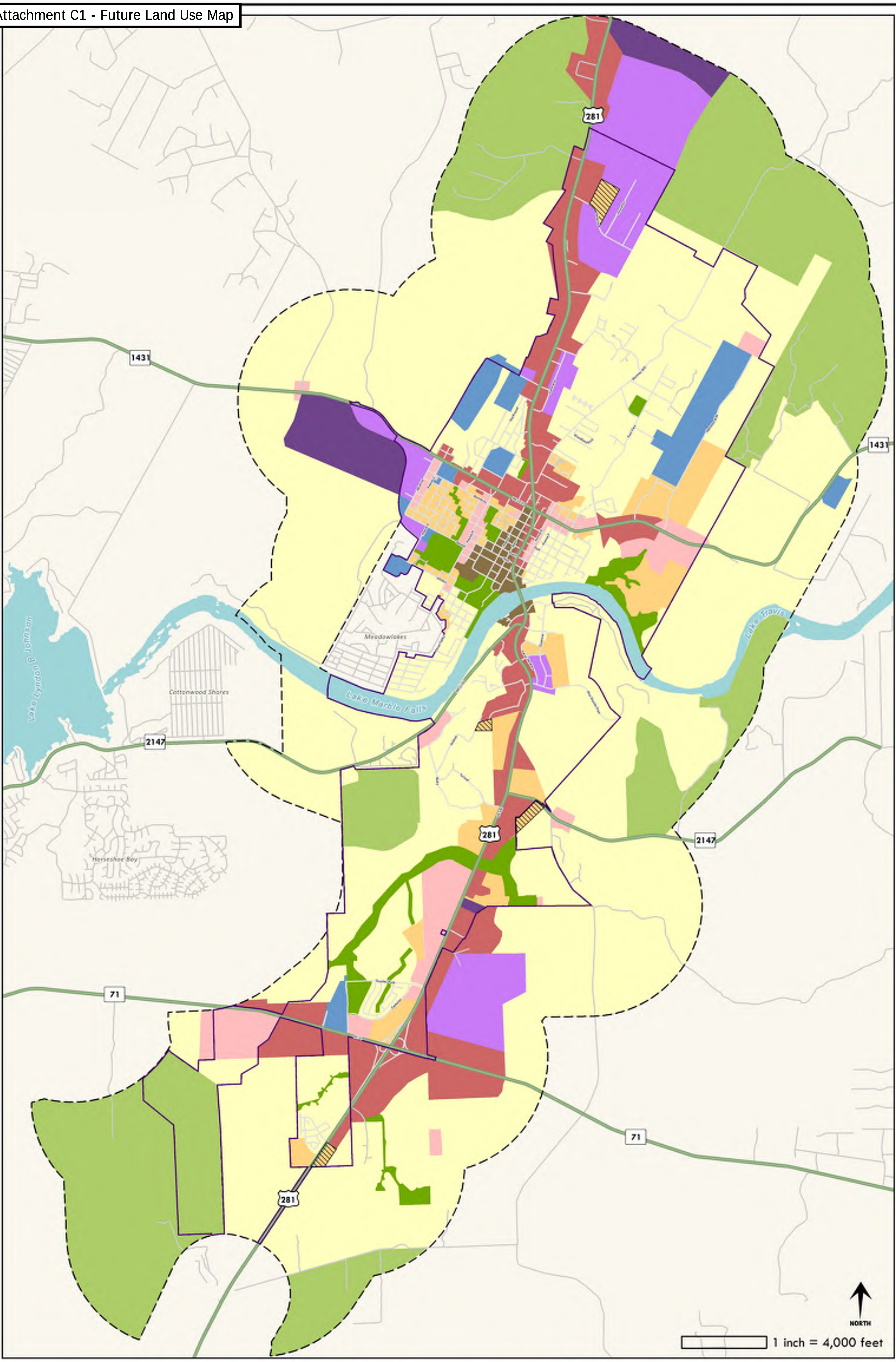
Type of Development	Name	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
SF and/or Master Planned	Gregg Ranch	155	0	121	0	102	0	46		151	0	141
	Thunder Rock	0	872	0	500	0	467	0	293	0	295	0
	Roper Ranch	0	0	200	200	200	200	200	200	200	200	200
	Legacy Crossing	0	200	200	200	200	200	200	200	200	200	150
	West Roper	0	0	250	46	43	78	68	15	0	0	0
Multifamily	Triangle MF	0	50	0	200	0	0	0	0	0	0	0
	Arrive MF	0	0	216	0	0	0	0	0	0	0	0
	Panther Hollow Ph 2. MF	0	0	200	200	0	0	0	0	0	0	0
Major Commercial / Misc.	Panther Hollow Commercial	0	10	30	10	0	0	0	0	0	0	0
	Miscellaneous In-fill Development	20	20	20	20	20	20	20	20	20	20	20
	Annual Total LUEs	175	1,152	1,237	1,376	565	965	534	728	571	715	511
	Cumulative Total LUEs	175	1,327	2,564	3,940	4,505	5,470	6,004	6,732	7,303	8,018	8,529
	Cumulative Total Population	422	3,198	6,179	9,495	10,857	13,183	14,470	16,224	17,600	19,323	20,555



	Annual Growth Rate (%)	Location	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Scenario A	4%	City Limits	7,044	7,227	7,516	7,817	8,129	8,455	8,793	9,144	9,510	9,891	10,286	10,698	11,126	11,571
	2%	ETJ	715	735	750	765	780	796	811	828	844	861	878	896	914	932
		TOTAL	**7,759**	**7,962**	**8,266**	**8,581**	**8,909**	**9,250**	**9,604**	**9,972**	**10,355**	**10,752**	**11,165**	**11,594**	**12,040**	**12,503**
Scenario B	6%	City Limits	7,044	7,227	7,661	8,120	8,607	9,124	9,671	10,252	10,867	11,519	12,210	12,942	13,719	14,542
	2%	ETJ	715	735	750	765	780	796	811	828	844	861	878	896	914	932
		TOTAL	**7,759**	**7,962**	**8,410**	**8,885**	**9,387**	**9,920**	**10,483**	**11,079**	**11,711**	**12,380**	**13,088**	**13,838**	**14,633**	**15,474**
Scenario C	7%	City Limits	7,044	7,227	7,733	8,274	8,853	9,473	10,136	10,846	11,605	12,417	13,287	14,217	15,212	16,277
	2%	ETJ	715	735	750	765	780	796	811	828	844	861	878	896	914	932
		TOTAL	**7,759**	**7,962**	**8,483**	**9,039**	**9,633**	**10,269**	**10,948**	**11,674**	**12,449**	**13,279**	**14,165**	**15,113**	**16,126**	**17,209**
Scenario D	8%	City Limits	7,044	7,227	7,805	8,430	9,104	9,832	10,619	11,468	12,386	13,377	14,447	15,603	16,851	18,199
	2%	ETJ	715	735	750	765	780	796	811	828	844	861	878	896	914	932
		TOTAL	**7,759**	**7,962**	**8,555**	**9,194**	**9,884**	**10,628**	**11,430**	**12,296**	**13,230**	**14,238**	**15,325**	**16,499**	**17,765**	**19,131**
Scenario E	10%	City Limits	7,044	7,227	7,950	8,745	9,619	10,581	11,639	12,803	14,083	15,492	17,041	18,745	20,619	22,681
	2%	ETJ	715	735	750	765	780	796	811	828	844	861	878	896	914	932
		TOTAL	**7,759**	**7,962**	**8,699**	**9,509**	**10,399**	**11,377**	**12,451**	**13,631**	**14,928**	**16,353**	**17,919**	**19,641**	**21,533**	**23,614**

1. 2020 & 2021 City Population is based on U.S. Census Data Estimates
2. TWDB Est. ~4% Annual Growth

Attachment C1 - Future Land Use Map



This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of boundary properties.

Adopted: July 2016
Updated: September 2022

CITY OF Marble Falls TEXAS

Land Use Assumptions

Impact Fee Update

Parks & Open Space
Ranch Rural & Estate
Neighborhood Residential
Transitional Residential
Neighborhood Commercial
Corridor Commercial
Business Park
Industrial
Downtown
Public & Institutional
Multi Family

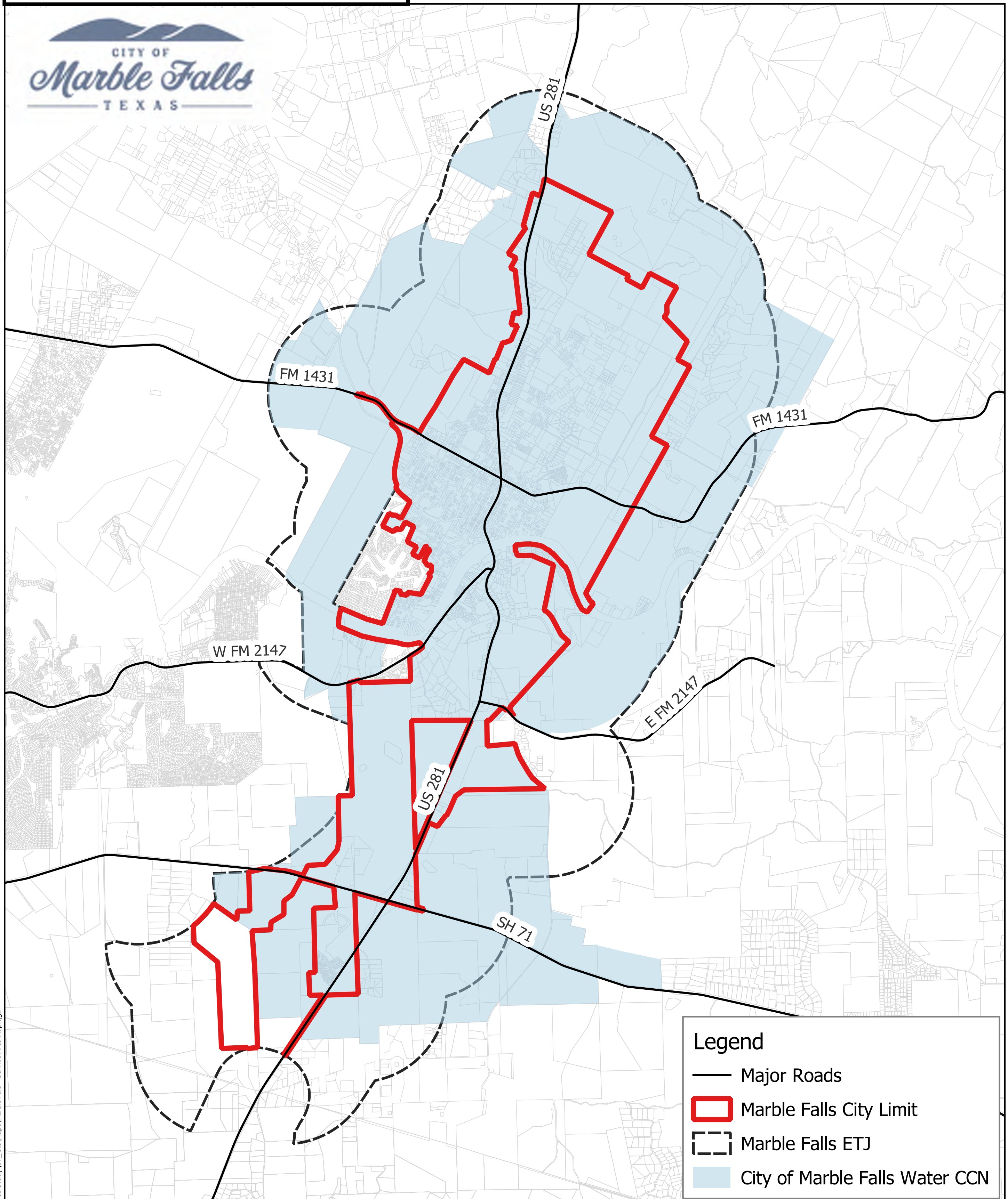
Attachment C2 - Future Land Use Area Summary

Project: Impact Fee Study
Job No.: 01109-010
Date: 9/1/2022
By: SCS/MG
Title: Future Land Use

Future Land Use Summary Table

Future Land Use Classification	Total Area (Acres)	Percent (%)
Business Park	1,352	4.8%
Corridor Commercial	2,129	7.6%
Downtown	163	0.6%
Industrial	514	1.8%
Lake Marble Falls	523	1.9%
Neighborhood Commercial	750	2.7%
Neighborhood Residential	14,778	52.5%
Parks & Open Space	571	2.0%
Public & Institutional	536	1.9%
Ranch Rural & Estate	5,850	20.8%
Transitional Residential	1,001	3.6%

Attachment D - Water Service Area Map



P:\01109 City of Marble Falls\010 Impact Fee Study\07_GIS\Maps\Marble Falls - Service Area Map.qgz

MillerGRAY
Consulting. Engineering. Infrastructure.
7320 N. MoPac Expressway, Suite 203
Austin, Texas 78731
Phone (512) 861-5300
www.miller-gray.com
TBPE FIRM REG. NO. F-16302

2022 WATER & WASTEWATER IMPACT FEE UPDATE

WATER SERVICE AREA MAP

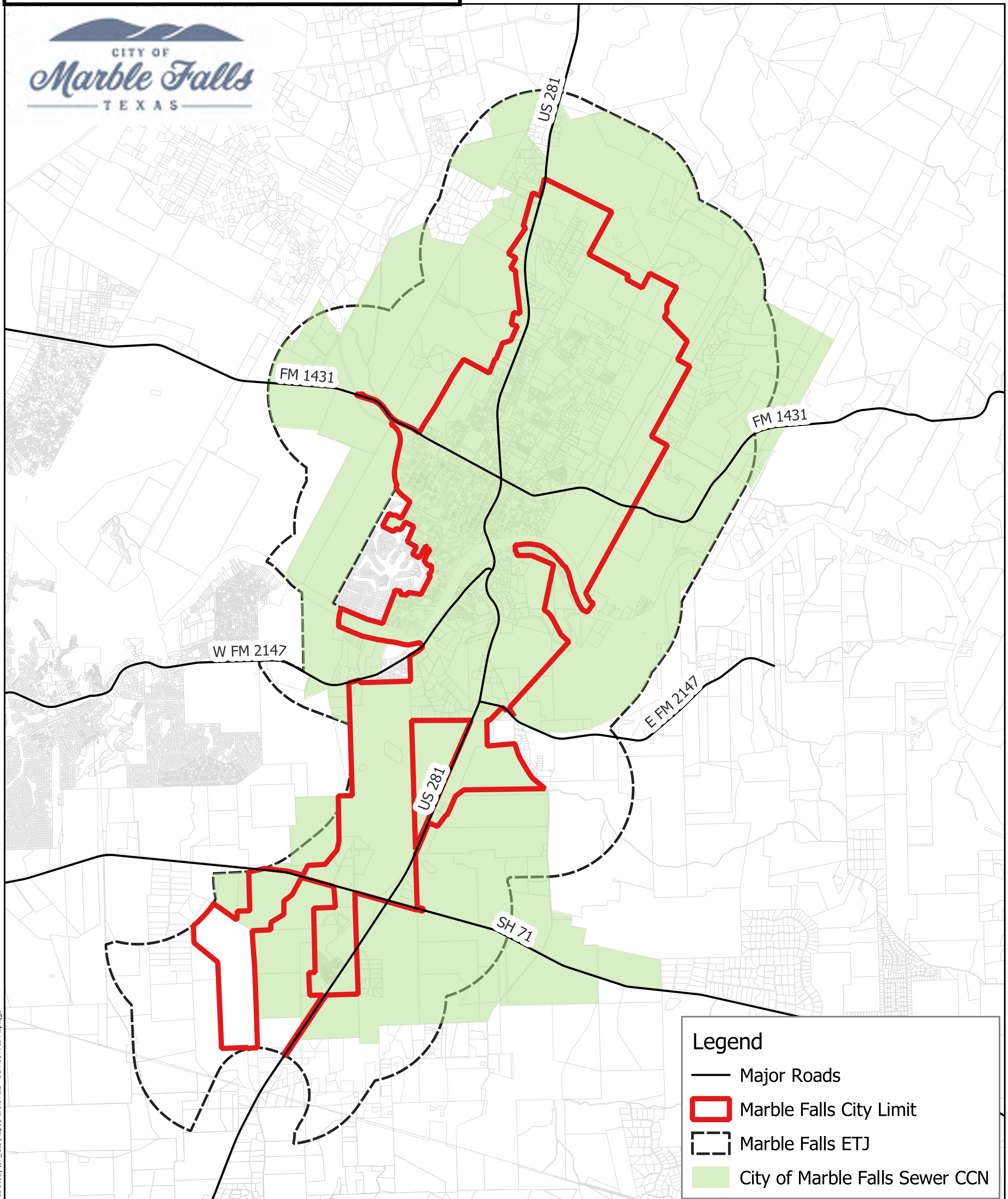
FIGURE 1.0

CITY OF MARBLE FALLS

SEPTEMBER 2022

PROJECT NUMBER: 01109-010

Attachment E - Wastewater Service Area Map



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www.miller-gray.com
TBPE FIRM REG. NO. F-16302

0 4,000 8,000 ft

N

2022 WATER & WASTEWATER IMPACT FEE UPDATE

WASTEWATER SERVICE AREA MAP

FIGURE 1.0

CITY OF MARBLE FALLS

SEPTEMBER 2022

PROJECT NUMBER: 01109-010

Attachment F - Water Connections Summary

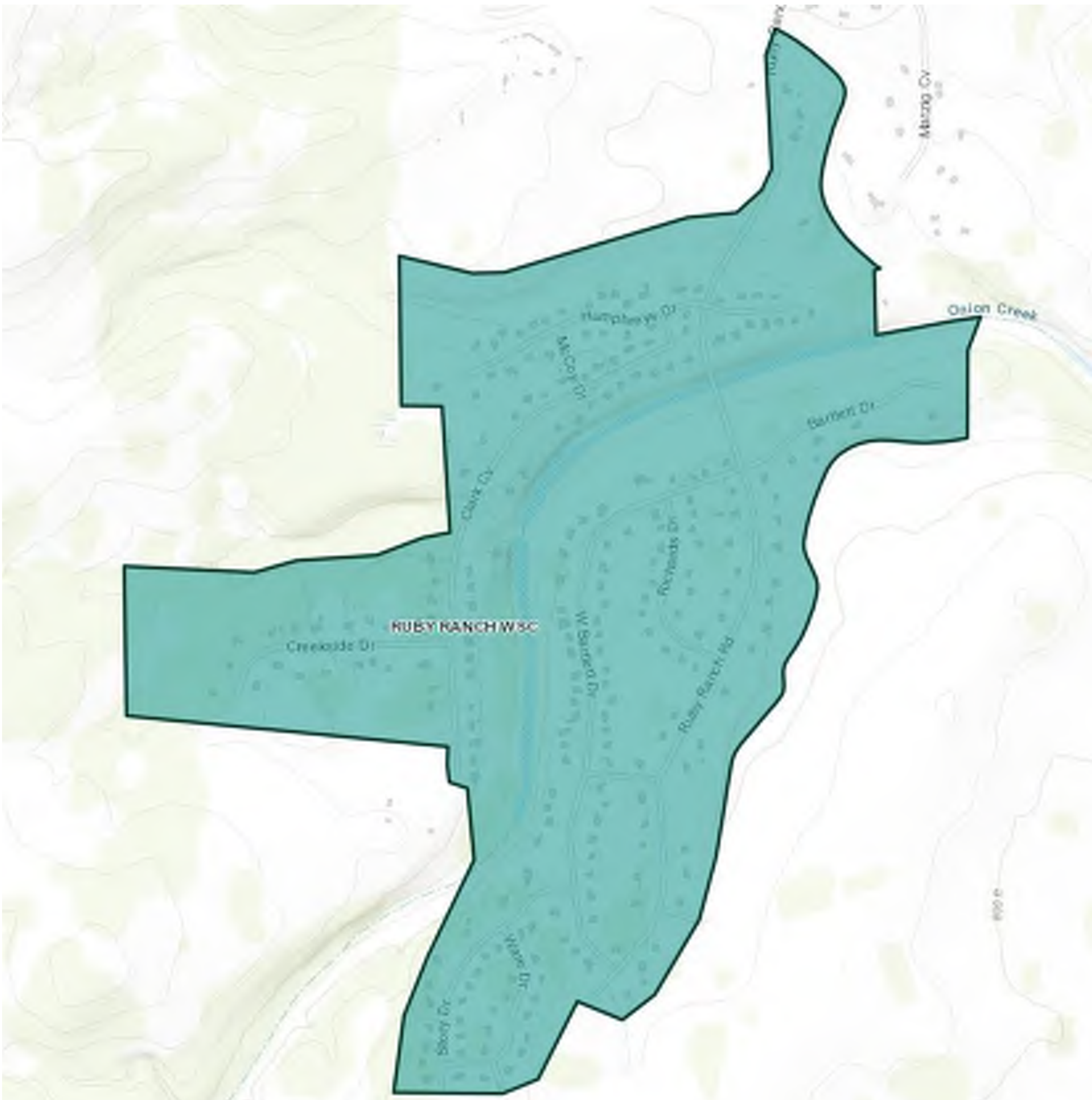
	CURRENT				Annual Growth Rate (4%)			Annual Growth Rate (6%)			Annual Growth Rate (8%)			Annual Growth Rate (10%)			Annual Growth Rate (12%)		
Water Meter Size	Living Unit Equivalents (LUEs per Meter) (a)	Number of Meters in 2022 (b)	Number of LUEs in 2022	Equivalent Population	Number of Meters in 2032	Number of LUEs in 2032	Equivalent Population	Number of Meters in 2032	Number of LUEs in 2032	Equivalent Population	Number of Meters in 2032	Number of LUEs in 2032	Equivalent Population	Number of Meters in 2032	Number of LUEs in 2032	Equivalent Population	Number of Meters in 2032	Number of LUEs in 2032	Equivalent Population
WATER																			
3/4"	1.00	2,920	2,920	7,037	4,322	4,322	10,417	5,229	5,229	12,603	6,304	6,304	15,193	7,574	7,574	18,253	9,069	9,069	21,856
1"	1.67	415	693	1,670	614	1,026	2,472	743	1,241	2,991	896	1,496	3,606	1,076	1,798	4,332	1,289	2,153	5,188
1.5"	3.33	30	100	241	44	148	356	54	179	431	65	216	520	78	259	624	93	310	748
2"	5.33	156	831	2,004	231	1,231	2,966	279	1,489	3,589	337	1,795	4,326	405	2,157	5,198	485	2,582	6,224
3"	10.00	11	110	265	16	163	392	20	197	475	24	237	572	29	285	688	34	342	823
4"	16.67	8	133	321	12	197	476	14	239	576	17	288	694	21	346	834	25	414	998
6"	33.33	7	233	562	10	345	832	13	418	1,007	15	504	1,214	18	605	1,458	22	725	1,746
Total Water		**3,547**	**5,021**	**12,101**	**5,250**	**7,432**	**17,912**	**6,352**	**8,992**	**21,671**	**7,658**	**10,840**	**26,125**	**9,200**	**13,023**	**31,386**	**11,016**	**15,595**	**37,583**

(a) Derived from AWWA C700-C703 standards for continuous rated flow performance scaled to 3/4" meter.

(b) Source: City of Marble Falls, meter count as of July 2022

ATTACHMENT N

RUBY RANCH WSC AERIAL


Onion Creek
Humphreys Dr
McCoy Dr
Bartlett Dr
Clark Cv
Richards Dr
RUBY RANCH WSC
Creekside Dr
W Bartlett Dr
Ruby Ranch Rd
Ware Dr
Story Dr

ATTACHMENT O

SAN SABA WATER USE SURVEYS

Date/Time Survey Submitted: 2/5/2021 9:47:24 AM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2020

SYSTEM NAME:	CITY OF SAN SABA	**SURVEY NUMBER:**	0770600
OPERATOR NAME:		**PRIMARY USED COUNTY:**	SAN SABA
MULTIPLE SURVEY ORG:		**PRIMARY USED RIVER BASIN:**	COLORADO
MAILING ADDRESS 1:	303 S. CLEAR	**ORGANIZATION MAIN PHONE:**	325-372-8905
MAILING ADDRESS 2:		**MAIN EMAIL:**	sswd@centex.net
CITY/STATE/ZIP:	SAN SABA TX 76877-	**WEB:**	Jesse Hunt
PWS NAME:	CITY OF SAN SABA	**PWS CODE:**	2060001

INTAKE:

Water Type	County	Basin	Aquifer	Well Name (if applicable)	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
GROUND WATER SELF SUPPLIED	SAN SABA	COLORADO	OTHER AQUIFER	3 - BY WAREHOUSE	M	N	0.00	82,662,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
7,450,000	3,414,000	3,715,000	5,496,000	7,586,000	9,752,000	16,195,000	16,628,000	3,318,000	4,375,000	3,434,000	1,299,000

Water Type	County	Basin	Aquifer	Well Name (if applicable)	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
GROUND WATER SELF SUPPLIED	SAN SABA	COLORADO	OTHER AQUIFER	4	M	N	0.00	179,424,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
12,272,000	9,969,000	12,420,000	12,561,000	16,396,000	17,120,000	17,180,000	19,135,000	14,547,000	18,015,000	15,125,000	14,684,000

Water Type	County	Basin	Reservoir / River	Water Right #	% Consumed	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
SURFACE WATER SELF SUPPLIED	SAN SABA	COLORADO	COLORADO RUN OF RIVER	01906-0-	100.00	E	N	0.00	35,121,600

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
2,325,000	900,000	2,565,000	3,471,600	4,290,000	4,890,000	5,430,000	4,650,000	4,050,000	1,425,000	675,000	450,000

Water Type	County	Basin	Reservoir / River	Water Right #	% Consumed	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
SURFACE WATER SELF SUPPLIED	SAN SABA	COLORADO	COLORADO RUN OF RIVER	01903-0-	100.00	E	N	0.00	58,714,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
986,000	2,220,000	10,272,000	1,050,000	7,305,000	6,945,000	0	5,565,000	16,092,000	3,929,000	0	4,350,000

SALES:

BUYER	SALE TYPE (MUNICIPAL or INDUSTRIAL)	COUNTY NAME	BASIN NAME	WATER TYPE	AQUIFER NAME (if GW)	SURFACE WATER Name (if SW)	RAW or TREATED	TOTAL VOLUME (GALLONS)
CITY OF GOLDTHWAITE	M			SURFACE WATER			Raw	21,604,000
NORTH SAN SABA WSC	M			GROUND WATER			Treated	46,323,400

COUNTY CONNECTIONS:

COUNTY NAME	TOTAL CONNECTIONS
MILLS	1
SAN SABA	1,372

CONNECTIONS & USAGE:

	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	1,362	216,993,278
Residential - Single Family	1,078	105,729,752
Residential - Multi Family	0	0
Institutional	0	0
Commercial	283	105,930,626
Industrial	1	5,332,900
Agriculture	0	0
Reuse	0	0
TOTAL UNMETERED:	10	3,592,450

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	3,128

Date/Time Survey Submitted: 2/15/2022 2:04:17 PM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2021

SYSTEM NAME: CITY OF SAN SABA
OPERATOR NAME:
MULTIPLE SURVEY ORG:
MAILING ADDRESS 1: 303 S. CLEAR
MAILING ADDRESS 2:
CITY/STATE/ZIP: SAN SABA TX 76877-
PWS NAME: CITY OF SAN SABA

SURVEY NUMBER: 0770600
PRIMARY USED COUNTY: SAN SABA
PRIMARY USED RIVER BASIN: COLORADO
ORGANIZATION MAIN PHONE: 325-372-8905
MAIN EMAIL: sswd@centex.net
WEB: Jesse Hunt
PWS CODE: 2060001

INTAKE:

Water Type	County	Basin	Aquifer	Well Name (if applicable)	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
GROUND WATER SELF SUPPLIED	SAN SABA	COLORADO	OTHER AQUIFER	3 - BY WAREHOUSE	M	N	0.00	60,270,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1,250,000	3,970,000	7,830,000	5,370,000	2,320,000	6,670,000	6,130,000	9,260,000	6,650,000	2,790,000	3,250,000	4,780,000

Water Type	County	Basin	Aquifer	Well Name (if applicable)	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
GROUND WATER SELF SUPPLIED	SAN SABA	COLORADO	OTHER AQUIFER	4	M	N	0.00	204,290,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
16,820,000	15,120,000	15,220,000	13,680,000	16,970,000	18,000,000	20,880,000	20,490,000	19,590,000	17,350,000	16,580,000	13,590,000

Water Type	County	Basin	Reservoir / River	Water Right #	% Consumed	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
SURFACE WATER SELF SUPPLIED	SAN SABA	COLORADO	COLORADO RUN OF RIVER	01906-0-	100.00	E	N	0.00	31,410,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
2,880,000	1,950,000	2,445,000	0	0	2,520,000	3,015,000	3,645,000	3,750,000	4,560,000	2,265,000	4,380,000

Water Type	County	Basin	Reservoir / River	Water Right #	% Consumed	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
SURFACE WATER SELF SUPPLIED	SAN SABA	COLORADO	COLORADO RUN OF RIVER	01903-0-	100.00	E	N	0.00	54,228,061

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
18,642,000	0	6,225,000	5,100,000	2,115,000	3,453,061	0	0	5,263,000	8,453,000	3,177,000	1,800,000

SALES:

BUYER	SALE TYPE (MUNICIPAL or INDUSTRIAL)	COUNTY NAME	BASIN NAME	WATER TYPE	AQUIFER NAME (if GW)	SURFACE WATER Name (if SW)	RAW or TREATED	TOTAL VOLUME (GALLONS)
CITY OF GOLDTHWAITE	M			SURFACE WATER			Raw	23,550,000
NORTH SAN SABA WSC	M			GROUND WATER			Treated	40,790,000

COUNTY CONNECTIONS:

COUNTY NAME	TOTAL CONNECTIONS
MILLS	1
SAN SABA	1,370

CONNECTIONS & USAGE:

	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	1,361	207,123,800
Residential - Single Family	1,072	83,960,017
Residential - Multi Family	0	0
Institutional	0	0
Commercial	282	108,957,677
Industrial	1	11,258,000
Agriculture	6	2,948,106
Reuse	0	0
TOTAL UNMETERED:	0	0

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	3,128

ATTACHMENT P

SCHULENBURG SUPPORTING DOCUMENTATION

SCHULENBURG, TEXAS
Market Guide

City Contact Information

Tami Walker
City Administrator/City Secretary
City of Schulenburg

t.walker@schulenburgtx.org

(979) 743-4126 (office)
(979) 743-4398 (fax)

Demographics
(10-Minute Drive Time)

Average Age	Median Household Income	Growth Rate
42.4	$45,537	2.64%

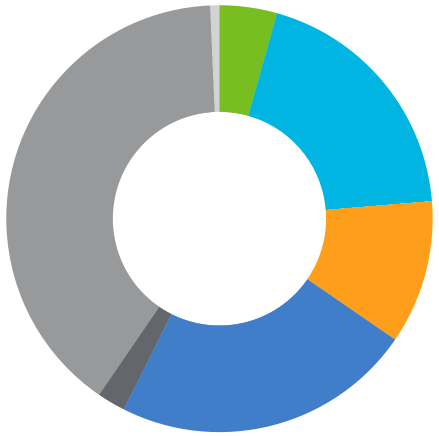
Peer Analysis

The Peer Analysis, built by Retail Strategies along with our analytics partner (Tetrad), identifies analogue retail nodes within a similar demographic and retail makeup. The Peer Analysis is derived from a 5 or 10 minute drive time from major comparable retail corridors throughout the country. The variables used are population, income, daytime population, market supply and gross leasable area. The following are retail areas that most resemble this core city:

Peer Trade Areas

Breckenridge, TX	*3215 W Walker St*
Eastland, TX	*1371 E Main St*
Yoakum, TX	*304 W Grand Ave*
Caldwell, TX	*403 W Highway 21*
Bowie, TX	*1500 Highway 59 N*
Fairfield, TX	*300 W Commerce St*

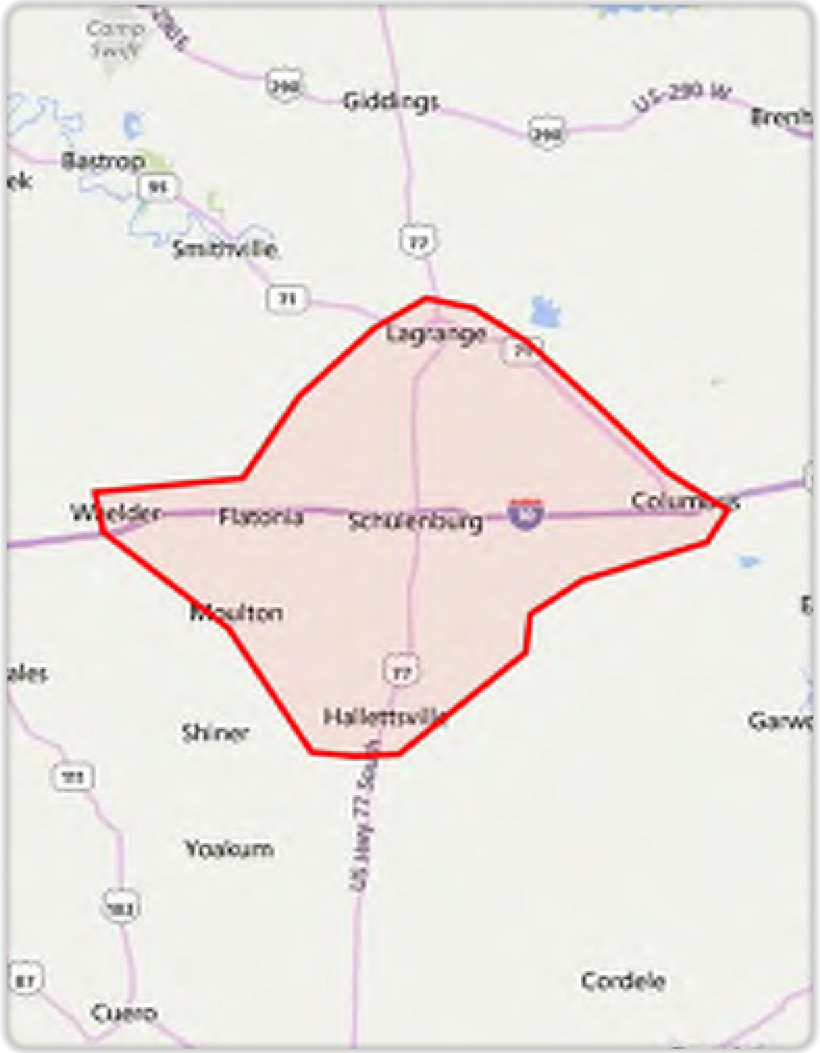
Daytime Population 37,542
(Custom Trade Area)



Children at Home	1,634
Retired/Disable persons	7,255
Homemakers	4,096
Student Populations	8,571
Work at Home	803
Employed	14,922
Unemployed	261

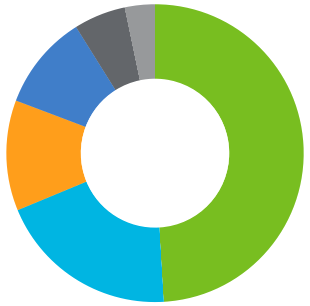
DEMOGRAPHIC PROFILE	3 Mile Radius	5 Mile Radius	10 Mile Radius
2018 Estimated Population	3,646	4,441	10,143
Daytime Population	4,655	5,089	9,865
Median HH Income	$41,488	$43,546	$50,263
Number of Households	1,427	1,763	4,133
	5 Minute DT	**10 Minute DT**	**15 Minute DT**
2018 Estimated Population	3,339	6,172	11,130
Daytime Population	4,494	8,063	11,674
Median HH Income	$41,183	$45,537	$48,297
Number of Households	1,298	2,451	4,460

*Source: STI PopStats



GAP Analysis $64,978,861
(Custom Trade Area)

The Gap Analysis is a summary of the primary spending Gaps segmented by retail category. It measures actual consumer expenditures within the City's trade area and compares it to the potential retail revenue generated by retailers in the same area. The difference between the two numbers reflects leakages, or the degree to which consumers travel outside the community for certain retail goods and services. The Gap analysis is a useful tool to gauge retail supply and demand within the community.



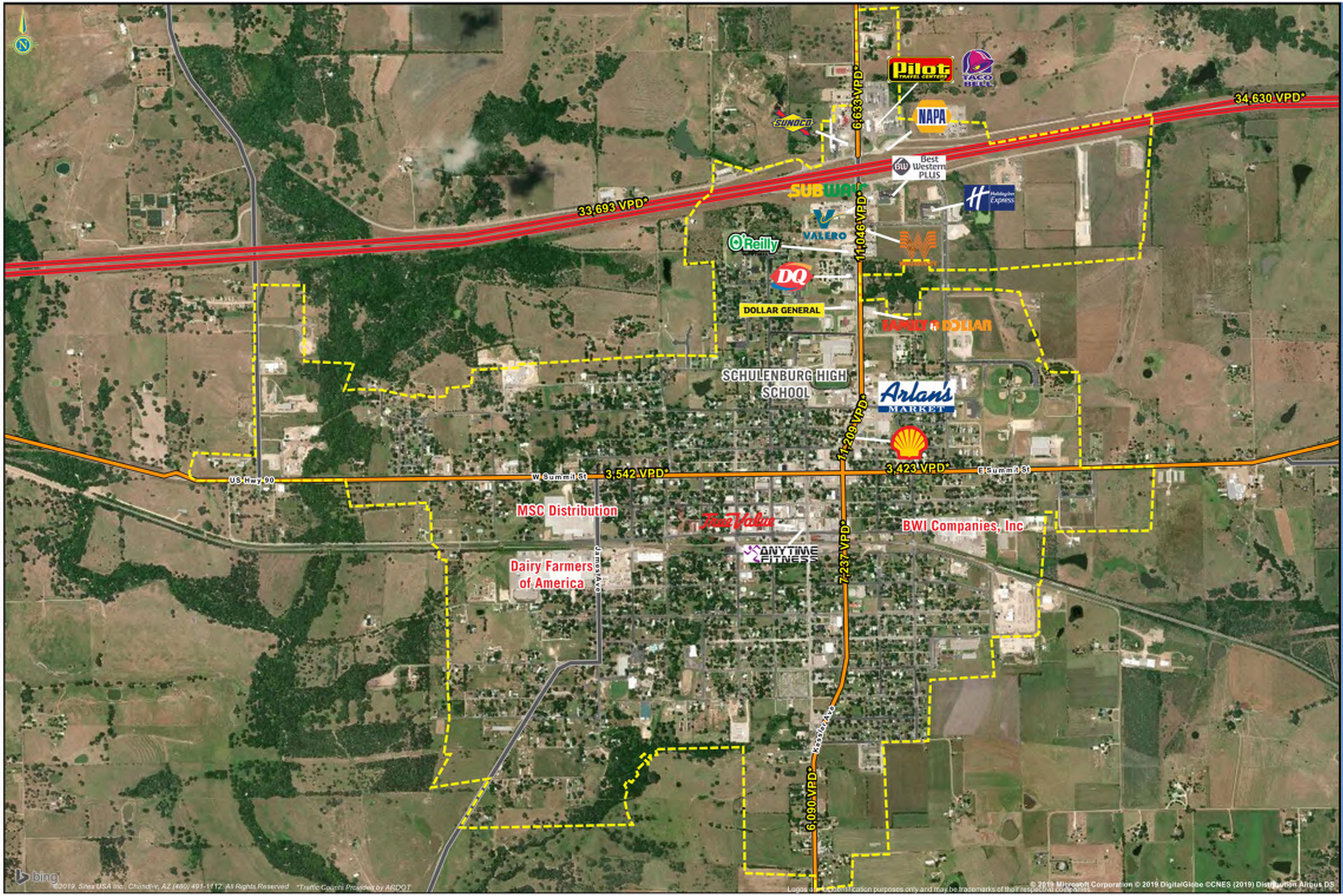
Other General Merchandise Stores	$31,882,427
Clothing Store	$12,790,639
Electronics & Appliance Stores	$7,793,556
Furniture and Home Furnishings Stores	$6,721,082
Shoe Stores	$3,659,808
Beer, Wine & Liquor Stores	$2,131,349

Focus Categories

The top categories for focused growth in the municipality are pulled from a combination of leakage reports, peer analysis, retail trends and real estate intuition. Although these are the top categories, our efforts are inclusive beyond the defined list.

Let us know how we can help you find a site!

Clothing & Accessories	Home Furnishings	Building Equipment	General Merchandise



SCHULENBURG, TEXAS

Major Retail & Restaurants

ATTACHMENT Q

TRAVIS COUNTY MUD 18 AERIAL


W Highway 71
Vail Dr
Cinco Terra Dr
La Catania Way
Via del Corso Dr
Cabrillo Way
Hamilton Pool Rd
71

ATTACHMENT R

TRAVIS COUNTY WCID 18 SUPPORTING DOCUMENTATION

Crossroads
utility services

GENERAL MANAGER'S REPORT

TRAVIS COUNTY WATER CONTROL & IMPROVEMENT DISTRICT # 18
Board of Directors Meeting

June 12, 2023

Travis County W.C.I.D. #18
June 12, 2023

1) The water loss for the time period from March 7 to April 6 is a loss of 9.74%. We have a loss of 12.93% for the year.

2) The pump #6 blockage still exists. The line will be in the lake needs to be cleaned. This may be part of the problem. The lower lake line that we thought was feeding these pumps was found to be incorrect. This means we need to clean the higher line in lake. We are scheduling this shortly. Pump #6 will need to be pulled simultaneously to make sure everything is clean upon completion of the project.

3) The new chemical room install has some action this month. Everything has been moved to the room. We are waiting on new meter specifications from Pall to complete this job. The system is in operation but just needs to have the metering of chemicals added. The current measurements are being done manually.

4) The west clarifier recirculation drive is being pumped down so repairs can me made. The trash pumps that pull the sludge out of the clarifier are not doing a good enough job. We are going to fill the clarifier with water and blast the sludge with air and waste it out.

5) We have removed the media from one of the underdrains at the conventional plant. This project is basically on hold now until the fall.

6) Water restrictions continue to call for mandatory two times a week watering. This has not changed since last month. The current lake levels are at 1,040,882 acre feet.

7) The radio communication between the Woodlake and Village West stations continues to have sporadic problems. We had one drop out this last month. We have altered the settings on the delays for the alarm. This has eliminated some to the alarms that are not needed. We still have allowed us time should we get an alarm to respond.

8) The Village water tank has been taken down and is waiting to be replaced at this time. Tank construction has begun. The old tank has been removed. Valves have been repaired now. We are just waiting on the new tank to come in.

9) The LAS building will begin in its construction soon. I am told that we are still waiting on permits.

10) A tree has fallen in the backyard of the office. I am trying to get either Austin Energy or just find a tree service to remove it. This is difficult due to the existing electrical lines by it. I will update at the meeting.

Travis County Water Control & Improvement District #18
Operations Report

For the Month of April 2023

GENERAL INFORMATION

Occupied Single Family Connections	1841	x 3 =	5523	Estimated Population
Vacant Single Family Connections	42			
Builder	12			
Vacant Builder	1			
Commercial Connections	10			
Vacant Commercial Connections	2			
Church	4			
District Meters	2			
Vacant District Meters	0			
Fire Hydrant	0			
Vacant Fire Hydrant	0			
Irrigation	5			
Vacant Irrigation	1			
TOTAL CONNECTIONS	1920			

BACTERIOLOGICAL ANALYSES

7 Water samples taken on 04/19/23 All bacterial samples were satisfactory

WATER ACCOUNTING

Pumped Through Finished WTP Meter					
from	03/07/23	to	04/06/23	19,072,000	Gallons
System Flushing					
from	03/07/23	to	04/06/23	0	Gallons
Total Gallons Billed					
from	03/07/23	to	04/06/23	17,215,000	Gallons
Total Adjustments To Billing					
from	03/07/23	to	04/06/23	0	Gallons
Gallons gain/loss				(1,857,000)	Gallons
Percentage gain/loss				-9.74%	

ATTACHMENT S

WELLS BRANCH MUD SUPPORTING DOCUMENTATION

Date/Time Survey Submitted: 2/18/2022 7:13:35 PM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2021

SYSTEM NAME:	WELLS BRANCH MUD	**SURVEY NUMBER:**	0607440
OPERATOR NAME:	CROSSROADS UTILITY SERVICES	**PRIMARY USED COUNTY:**	TRAVIS
MULTIPLE SURVEY ORG:		**PRIMARY USED RIVER BASIN:**	COLORADO
MAILING ADDRESS 1:	2601 FOREST CREEK DR	**ORGANIZATION MAIN PHONE:**	512-246-1400
MAILING ADDRESS 2:		**MAIN EMAIL:**	randerson@crossroadsus.com
CITY/STATE/ZIP:	ROUND ROCK TX 78665-	**WEB:**	crossroadsus.com
PWS NAME:	WELLS BRANCH MUD 1	**PWS CODE:**	2270227

INTAKE:

Water Type	County	Basin	Seller Name and/or Seller System		River / Reservoir	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
SURFACE WATER PURCHASED	TRAVIS	COLORADO	CITY OF AUSTIN	GENERAL DISTRIBUTION SYSTEM	AUSTIN LAKE/RESERVOIR	M	N	100.00	453,843,800

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
29,811,400	34,114,000	34,173,000	34,523,500	37,242,000	43,335,000	38,284,000	44,251,000	50,311,000	38,267,000	36,552,900	32,979,000

SALES:

BUYER	SALE TYPE (MUNICIPAL or INDUSTRIAL)	COUNTY NAME	BASIN NAME	WATER TYPE	AQUIFER NAME (if GW)	SURFACE WATER Name (if SW)	RAW or TREATED	TOTAL VOLUME (GALLONS)
GUNZE ELECTRONICS USA CORP	I			SURFACE WATER			Treated	145,000
DXC TECHNOLOGY SERVICES	I			SURFACE WATER			Treated	2,336,000
SWVP TANDEM BLVD LLC	I			SURFACE WATER			Treated	304,000

CONNECTIONS & USAGE:	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	7,471	435,963,000
Residential - Single Family	2,921	169,542,000
Residential - Multi Family	4,435	196,841,000
Institutional	38	20,713,000
Commercial	74	46,082,000
Industrial	3	2,785,000
Agriculture	0	0
Reuse	0	0
TOTAL UNMETERED:	0	0

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	19,377

Units	NAME	SERVICE ADDRESS	April	March	February	January
284	RIDGECREST APARTMENTS	3101 WELLS BRANCH PKWY	1093	941	941	897
152	AUSTIN AFFORDABLE HOUSING CORP	2323 WELLS BRANCH PKWY	496	416	416	555
44	LAKES AT RENAISSANCE PARK APT	LAKE METER 831240 2IN	118	84	84	89
44	LAKES AT RENAISSANCE PARK APT	LAKE METER Bldgs G & H	224	148	148	144
44	LAKES AT RENAISSANCE PARK APT	LAKE METER 831594 2IN	111	96	96	104
44	LAKES AT RENAISSANCE PARK PAT	LAKE 2IN METER 831587	90	68	68	65
44	LAKES AT RENAISSANCE PARK APT	LAKE 2IN METER 831647	156	62	62	61
44	LAKES AT RENAISSANCE PARK APT	LAKE 2IN METER 831586	232	141	141	115
212	ARBORS OF WBCH C/O	1831 WELLS BRANCH PKWY	935	583	583	587
372	CHAPARRAL CREEK ASSOCIATES	14100 THERMAL DR	1467	1134	1134	1202
504	CAF CITYMARK MORGAN OWNER LLC	1801 WELLS BRANCH PKWY	2355	2400	2400	2518
308	PRESERVE AT WELLS BRANCH	1773 WELLS BRANCH PKWY	1245	1012	1012	1086
276	WYNDHAVEN WELLS BRANCH LLC	1720 WELLS BRANCH PKWY	671	959	959	1745
216	WELLS BRANCH SENIORS LTD	14320 TANDEM BLVD DOM	483	464	464	445
167	HFT HOLDING -WELLS BRANCH LLC	14300 TANDEM LN	339	248	248	264
576	BECKS AT WELLS BRANCH LP	2801 WELLS BRANCH PKWY	2210	1681	1681	1835
38	TAP PARK AT WELLS LLC	1915 WELLS BRANCH PKWY	53	43	43	86
38	TAP PARK AT WELLS LLC	1915 WELLS BRANCH PKWY	187	114	114	126
38	TAP PARK AT WELLS LLC	1915 WELLS BRANCH PKWY	258	438	438	16
38	TAP PARK AT WELLS LLC	1915 WELLS BRANCH PKWY	221	177	177	189
38	TAP PARK AT WELLS LLC	1915 WELLS BRANCH PKWY	147	110	110	214
38	TAP PARK AT WELLS LLC	1915 WELLS BRANCH PKWY	210	145	145	158
38	TAP PARK AT WELLS LLC	1915 WELLS BRANCH PKWY	130	142	142	133
336	MID AMERICA APARTMENTS, LP	1630 WELLS BRANCH PKWY	1989	1561	1561	1628
348	AURA 33 HUNDRED APARTMENTS	3300 WELLS BRANCH PKWY	660	626	765	908
154	AFFINITY AT WELLS BRANCH, LLC	14508 OWEN TECH BLVD-APT BLDG	615	611	517	556
87	TX OWEN TECH 2018 LTD	14011 OWEN TECH BLVD-DOM	72	124	337	350
87	TX OWEN TECH 2018 LTD	14011 OWEN TECH-DOM 2	118	111	149	169
4,609						

Murfee Engineering Company

May 17th, 2023

Shirley Ross
District Manager
3000 Shoreline Drive
Austin, TX 78728

Re: Wells Branch MUD – Lower Colorado River Water Planning Group (Region K) Current and Proposed Multifamily Units

Ms. Ross:

Murfee Engineering Company (MEC) was approached by District staff to investigate current and projected multifamily development growth for the purposes of water usage demand planning. The following multifamily development unit counts have been collected from design engineers, design plans, and a City of Austin Service Extension Request as displayed in Table 1 below:

Table 1: Current and Proposed Multifamily Development

Development	Development Stage	Units	LUEs	Source
Lots 1A & 2 Austin Continuum Mixed Use Development	Proposed	350	329	SER
Lot 3 - Austin Continuum Multifamily	Proposed	345	215	Engineer
Alamo Wells (Ph O Sec 2) Multifamily	Proposed	317	222	Plans
2800 WB Pkwy Multifamily	Proposed	227	159	Engineer
Generational Housing Multifamily	Developed	174	122	LUE Table/Plans

If you have any questions, please do not hesitate to contact me.

Sincerely,

Evan Parker

Evan Parker, E.I.T.

cc: Jason Baze, P.E. – MEC
MEC File No. 91070.506

ATTACHMENT T

HURST CREEK MUD 2022 WATER USE SURVEY

Date/Time Survey Submitted: 2/15/2023 1:18:23 PM

TEXAS WATER DEVELOPMENT BOARD
WATER USE SURVEY

WATER USE IN CALENDAR YEAR: 2022

SYSTEM NAME:	HURST CREEK MUD	**SURVEY NUMBER:**	0410850
OPERATOR NAME:		**PRIMARY USED COUNTY:**	TRAVIS
MULTIPLE SURVEY ORG:		**PRIMARY USED RIVER BASIN:**	COLORADO
MAILING ADDRESS 1:	102 TROPHY DR	**ORGANIZATION MAIN PHONE:**	512-261-6281
MAILING ADDRESS 2:		**MAIN EMAIL:**	kurtpendleton@hurstcreekmud.org
CITY/STATE/ZIP:	AUSTIN TX 78738-	**WEB:**	www.hurstcreekmud.org
PWS NAME:	HURST CREEK MUD	**PWS CODE:**	2270172

INTAKE:

Water Type	County	Basin	Reservoir / River	Water Right #	% Consumed	Metered or Estimated	Brackish / Saline (Y or N)	% Treated Prior to Intake	Total Volume (gallons)
SURFACE WATER SELF SUPPLIED	TRAVIS	COLORADO	TRAVIS LAKE/RESERVOIR		100.00	M	N	0.00	349,408,000

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
17,734,000	14,382,000	21,856,000	28,708,000	32,821,000	37,209,000	43,861,000	41,632,000	38,469,000	34,732,000	20,705,000	17,299,000

Water Type	County	Basin	Metered or Estimated	% Reuse for Industrial	% Reuse for Landscape	% Reuse for Agriculture	% Reuse for Other	Total Volume (gallons)
REUSE SELF SUPPLIED DIRECT NON-POTABLE	TRAVIS	COLORADO	M	0.00	100.00	0.00	0.00	72,082,000

COUNTY CONNECTIONS:

COUNTY NAME	TOTAL CONNECTIONS
TRAVIS	1,207

CONNECTIONS & USAGE:

	CONNECTIONS	VOLUME (GALLONS)
TOTAL METERED RETAIL:	1,204	301,581,000
Residential - Single Family	1,177	277,590,000
Residential - Multi Family	0	0
Institutional	13	12,710,000
Commercial	14	11,281,000
Industrial	0	0
Agriculture	0	0
Reuse	0	0
TOTAL UNMETERED:	0	38,776,000

WATER SYSTEM INFORMATION:

Estimated full-time residential population served directly by this system	2,550

Thank you for submitting the Regional Water Planning Group's (RWPG) request to revise the population and municipal demand projections. TWDB has reviewed the revision request and accompanying data provided by the RWPG and the Executive Administrator's (EA) response and recommendation is summarized here. Based on TWDB EA reviews, not all RWPG revision requests are being recommended by the EA for agency coordination. The attached spreadsheet includes three data tabs:

- Data Tab 1: the two TWDB draft county-level projection migration scenarios developed by the state demographer and provided to the RWPG from which they could select their scenario-preference, by county,
- Data Tab 2: the RWPG WUG-level projection revision requests along with accompanying TWDB EA recommendations for each including review comments, and
- Data Tab 3: the TWDB EA county-level recommendations for agency coordination.

It is anticipated that the attached EA recommended WUG projections will be submitted to the three agencies (Texas Commission on Environmental Quality, Texas Department of Agriculture, and Texas Parks and Wildlife Department) for their review within five weeks. Following the reviews by the three agencies, the EA will recommend a final set of population and water demand projections to the TWDB Board for adoption for use in the 2026 Regional Water Plans.

The remaining discussion below summarizes the WUGs for which the EA is not recommending the RWPGs's specific request to revise either:

- the population projections,
- the baseline gallons per capita per day (GPCD), or
- the plumbing code savings projections.

The EA provides key relevant background regarding the RWPG revision requests, including some explanation for what was considered in evaluating the request, and describes what was determined to be acceptable. In many cases, the EA recommends revised population projections or baseline GPCD, which differ from both the TWDB draft projections and the RWPG's specific revision request. The related municipal water demand projections are included in the corresponding spreadsheet (in acre-feet). At the end of each WUG summary below is a comparison of:

1. The TWDB Draft Projections,
2. The RWPG's Revision Request,
3. The EA's Recommended projections after considering the RWPG revision request.

Please see corresponding spreadsheet *RegionK_PopMun_2026RWP_TWDBReview.xlsx.*

Summary of those WUG revision requests that were not accepted and/or were modified:

Austin

Region K requested revisions to the population projections for Austin WUG to align with the new draft Austin Water Forward Plan. The 2018 Water Forward Plan population projections appear to have been developed by Austin's city demographer using 2010-2015 historical growth rates for the retail and wholesale water service population (p. 4-4, Austin Water Forward Integrated Water Resource Plan, 2018), and projects higher population than the new draft projections utilized in Region K's revision request. Page 53 of Region K's supporting memo states that the 2020 base year for the requested revised projections was developed using "Austin Water's retail systems, City of Austin address database, Austin Energy billing data, land use data, and development records" in addition to "2020 Census block estimates…when there was a sufficient sample size" and Table 2 reports a 2020 population of 1,034,947. However, Austin Water Utility reported a different population estimate in the 2020 Water Use Survey (1,053,756). The 2020 U.S. Census population for the City of Austin was 961,855 and the City of Austin filed a formal Census Count Question Resolution utilizing a housing unit undercount approach, as included in the Region K memo. Per page 56 of the Region K memo, housing unit undercount analysis resulted in a 1.6% undercount.

2020 analysis:	Austin Census	Austin	Percentage difference
Population	961,855	1,034,947	-7.1%
Housing Units	444,426	451,755	-1.6%

The 2020 WUG population estimate provided by the TWDB in January 2023 utilized Austin WUG's service boundary and 2020 Census blocks to develop a 2020 population estimate of 982,619, which is in between the City of Austin U.S. Census 2020 population count and the Austin Water Forward Plan (populations listed in table above).

According to the U.S. Census Bureau, Texas was undercounted by approximately 1.92% statewide. The Pew Research Center analyzed nationwide undercounts based on demographic cohorts and determined that the Hispanic (or Latino) population was undercounted by 5%, which was a record high undercount for this cohort, and the Black population as undercounted by 3.3%. Utilizing these undercounts and the U.S. Census Bureau's demographic percentages for Travis County from their population estimates program, it appears the county may have been undercounted by 1.96%.

County	**2020 Census**
Travis	1,290,188
Latino Population – 33%	425,762
Black Population – 9.4%	121,278
Pew Research – 5% undercount of Latino Population	21,288
Pew Research – 3.3% undercount of Black Population	4,002
Total County Population with undercount:	**1,315,478**
Travis County Undercount Percentage	**1.96%**

Applying this 1.96 percent undercount to the Austin WUG population estimate based on the TWDB's Census Block population analysis (982,619), results in a revised undercount baseline 2020 population of 1,001,878. The EA recommends using this 2020 revised undercount baseline for the WUG and applying Region K's requested projected growth rates to the WUG, except for the 2070 growth rate in Williamson County (discussed below).

No changes to Region K's requested revisions to the population projections for the County-Other, Travis WUG are recommended in relation to the EA recommendation for Austin WUG.

Lastly, it appears that in the Region K requested revisions to the Austin WUG population projections portion within Williamson County grows faster in the 2060-2070 decade at 2.4% compared to 2050-2060

(2.2%) and 2070-2080 (1.7%). Therefore, it is recommended to reduce the growth in that decade, to better align with the other years. The EA recommends revising the County-Other, Williamson WUG population projection in 2070 and 2080 to balance to the county total population projections using the 1.0 migration scenario (as requested by Region K for the county).

Region K's revision request for the Austin WUG's population projections:

County	2030	2040	2050	2060	2070	2080
HAYS	129	152	176	200	224	249
TRAVIS	1,166,122	1,362,937	1,561,206	1,758,318	1,941,307	2,132,924
WILLIAMSON	94,844	124,153	163,421	203,844	258,328	304,309
Region K requested revision: Austin Total Population	**1,261,095**	**1,487,242**	**1,724,803**	**1,962,362**	**2,199,859**	**2,437,482**
Hays annual growth rate		1.7%	1.5%	1.3%	1.1%	1.1%
Travis annual growth rate		1.6%	1.4%	1.2%	1.0%	0.9%
Williamson annual growth rate		2.7%	2.8%	2.2%	2.4%	1.7%
Austin Total WUG growth		**1.7%**	**1.5%**	**1.3%**	**1.1%**	**1.0%**

TWDB EA recommendation utilizing the revised undercount baseline and applying Region K's request to revise projected growth rates:

County	2030	2040	2050	2060	2070	2080
HAYS	129	152	176	200	224	249
TRAVIS	1,125,827	1,315,416	1,506,094	1,695,615	1,871,015	2,055,039
WILLIAMSON	94,844	124,153	163,421	203,844	247,105	291,088
EA recommended: Total WUG Population	**1,220,800**	**1,439,721**	**1,669,691**	**1,899,659**	**2,118,344**	**2,346,376**
Hays annual growth rate		1.7%	1.5%	1.3%	1.1%	1.1%
Travis annual growth rate		1.6%	1.4%	1.2%	1.0%	0.9%
Williamson annual growth rate		2.7%	2.8%	2.2%	1.9%	1.7%
Austin Total WUG growth		**1.7%**	**1.5%**	**1.3%**	**1.1%**	**1.0%**

Comparison of draft projections, Region K's revision request, and the EA's recommended revision based on undercount analysis and supporting growth rates from Region K for the whole Austin WUG:

Comparison	2030	2040	2050	2060	2070	2080
TWDB Draft Projections	1,145,892	1,299,591	1,473,038	1,665,917	1,881,878	2,123,623
Region K Requested	1,261,095	1,487,242	1,724,803	1,962,362	2,199,859	2,437,482
EA Recommended	1,220,800	1,439,721	1,669,691	1,899,659	2,118,344	2,346,376

Elgin

On page 6 of the Region K supporting revision request memo, the methodology for revising the population projections states that 15,000 additional lots will be built within the WUG. Using a 2.5 persons per connection assumption, population was estimated and added to each decade, assuming one-quarter of the lots would be developed in each subsequent decade until buildout is reached. 15,000 additional lots times 2.5 persons per household (assuming one house is built on each lot) equals 37,500 people; assuming one-quarter of this population is added each decade results in an additional 9,375 people each decade. All population accounted for in that specific revision request was offset by shifting county-other population into the Elgin WUG.

The methodology described in the Region K memo does not appear to have been implemented in developing the numerical revisions to the population projections themselves. Therefore, the EA recommends adding the same number of people per the WUG's revision request (40,960) throughout the planning horizon, following the methodology to distribute one-quarter of the people each decade until buildout is reached (50,744 people) in accordance with the method described in the Region K memo, distributing to counties based on Region K's recommendation, and reaching buildout by 2070. No changes to Region K's requested revisions to the County-Other, Travis WUG population projections are recommended in relation to the EA recommendation for the Elgin WUG.

Population	**2020 Census Count (U.S. Census Bureau)**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Region K request: Bastrop		16,358	21,324	24,989	27,638	27,638	27,638
Region K request: Travis		8,004	14,401	19,354	23,106	23,106	23,106
Region K request: Elgin Total Population	9,784	**24,362**	**35,725**	**44,343**	**50,744**	**50,744**	**50,744**
Decadal difference		14,578	11,363	8,618	6,401	0	0
Population projections based on methodology (adding 1/4 Lots * 2.5 pphh) plus additional population until buildout	9,784	19,159	28,534	37,909	47,284	50,744	50,744
Additional population each decade:		9,375	9,375	9,375	9,375	3,460	0
EA Recommended: Bastrop		12,864	17,032	21,363	25,753	27,638	27,638
EA Recommended: Travis		6,295	11,502	16,546	21,531	23,106	23,106
TWDB Recommended: Elgin Total Population		**19,159**	**28,534**	**37,909**	**47,284**	**50,744**	**50,744**

Comparison of draft projections, Region K's revision request, and the EA's recommended revision based on the additional population growth recommended in Region K's memo for the Elgin WUG:

Comparison	2030	2040	2050	2060	2070	2080
TWDB Draft Projections	10,204	11,410	12,667	14,041	15,604	17,381
Region K Requested	24,362	35,725	44,343	50,744	50,744	50,744
EA Recommended	19,159	28,534	37,909	47,284	50,744	50,744

Lago Vista

Page 9 of the Region K memo states that the basis for revising this WUG's projected population is that the WUG grew by 4.2% annually from 2010 to 2020 and recommends continuing this 4% annual growth rate through 2050. All population was offset with county-other population. Without further supporting evidence to justify why a 4% annual growth rate would continue for an additional thirty years, the EA recommends the use of the 4% growth rate in the near-term and then a decline in the annual growth rate commensurate with the county's declining growth based on Region K's request to revise the projected growth rate for Travis County until buildout is reached in 2080. No changes to Region K's requested revisions to the County-Other, Travis WUG population projections are recommended in relation to the EA recommendation for the Lago Vista WUG.

	2020 Population (per p. 9 of Region K memo)	2030	2040	2050	2060	2070	2080
Region K Requested	11,315	16,749	24,793	36,700	49,000	49,000	49,000
Annual growth		4.0%	4.0%	4.0%	2.9%	0.0%	0.0%
TWDB recommended	11,315	16,749	24,793	34,870	44,503	46,752	49,000
Annual growth		4.0%	4.0%	3.5%	2.5%	0.5%	0.5%

Comparison of draft projections, Region K's revision request, and the EA's recommended revision based on a revised projected growth rate for the Lago Vista WUG:

Comparison	2030	2040	2050	2060	2070	2080
TWDB Draft Projections	11,892	14,972	18,850	23,732	29,879	37,618
Region K Requested	16,749	24,793	36,700	49,000	49,000	49,000
EA Recommended	16,749	24,793	34,870	44,503	46,752	49,000

Undine Development

Page 13 of the Region K memo states that the system reported 232 active connections and is currently built out. They use three people per household multiplier (PPHH) to estimate a population of 696. All population was offset with County-Other, Travis WUG population. Three PPHH is much higher than the U.S. Census Bureau's 2.42 PPHH estimate for the county. Using the U.S. Census Bureau's 2.42 PPHH times 232 connections results in 561 population. The EA recommends holding the current population of 561 constant through the planning horizon due to buildout noted by the WUG. No changes to Region K's requested revisions to the County-Other, Travis WUG population projections are recommended in relation to the EA recommendation for the Undine Development WUG.

Due to differences in how population is estimated, Region K requested to revise the baseline gallons per capita per day (GPCD) to 198. However, based on the supporting data provided by Region K and the EA's recommended population, the EA recommends the baseline GPCD be revised to 236, which is lower than TWDB's draft baseline GPCD of 350. The table below includes the GPCD estimates listed on page 29 of the memo, the system's self-reported net use via the Water Use Survey (WUS), and the estimated GPCD using the TWDB's population estimate described above.

	2020	2021
P. 29 of the Region K memo GPCD	159	154
WUS Net Use gal	45,814,000	45,814,000
TWDB Population Estimate	561	561
GPCD Estimate	224	224

Comparison of draft projections, Region K's revision request, and the EA's recommended population projections and baseline GPCD for Undine Development WUG:

Comparison	2030	2040	2050	2060	2070	2080	Baseline GPCD
TWDB Draft Projections	372	381	389	400	411	424	350
Region K Requested	696	696	696	696	696	696	198
EA Recommended	561	561	561	561	561	561	224

Please note that while Travis County WCID 18 also uses a three PPHH multiplier, the supporting documentation provided by Region K (Attachment R in the memo) notes that the WUG's population estimate methodology is reported to the WCID's Board. Additionally, all population was offset with County-Other, Travis WUG population. Therefore, the EA will recommend the Region K requested revisions to the projections for Travis County WCID 18 WUG based on the use of a 3 PPHH and population projection of 5,523 in each decade (due to buildout) to the three agencies for review.

Round Rock

Region G submitted revision requests to the Round Rock WUG population projections on behalf of Region K. Per the U.S. Census Bureau's 2010 and 2020 decennial Census counts, Round Rock grew by approximately 2% per year. Region G's request for the Travis County-portion of Round Rock is projected to grow faster than the U.S. Census Bureau's historical growth rate, and without any supporting documentation for the higher growth rate, the EA does not recommend the Travis County-portion of the Round Rock request.

Additionally, Region G requested that the baseline GPCD for the Round Rock WUG be revised to 139 and plumbing code savings projections be zero in all decades to align the Round Rock's projected GPCD with their water master plan. These revisions are recommended by the EA and summarized in the table below. No changes to Region K's requested revisions to the County-Other, Travis WUG population projections are recommended in relation to the EA's recommendation for the Round Rock WUG.

TWDB draft population projections and growth rates:

		TWDB Draft Projections					
Region	**County**	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**
G	WILLIAMSON	140,893	164,337	191,737	221,875	239,565	239,565
K	TRAVIS	1,995	2,439	2,824	3,205	3,639	4,130
	Round Rock Total	**142,888**	**166,776**	**194,561**	**225,080**	**243,204**	**243,695**
	Williamson Growth Rate		1.6%	1.6%	1.5%	0.8%	0.0%
	Travis Growth Rate		2.0%	1.5%	1.3%	1.3%	1.3%
	Total WUG Growth Rate		**1.6%**	**1.6%**	**1.5%**	**0.8%**	**0.0%**

Region G requested population projections and growth rates:

		Region G Request					
Region	**County**	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**
G	WILLIAMSON	145,880	180,164	214,132	221,167	227,537	233,092
K	TRAVIS	2,328	2,986	3,506	3,586	3,922	4,618
	Round Rock Total	**148,208**	**183,150**	**217,638**	**224,753**	**231,459**	**237,710**
	Willaimson Growth Rate		2.1%	1.7%	0.3%	0.3%	0.2%
	Travis Growth Rate		2.5%	1.6%	0.2%	0.9%	1.6%
	Total WUG Growth Rate		**2.1%**	**1.7%**	**0.3%**	**0.3%**	**0.3%**

Comparison of draft projections, Region request to revise the projections, and EA recommendations:

Population Comparison	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
TWDB Draft Projections	1,995	2,439	2,824	3,205	3,639	4,130
Region G Requested – Travis County portion Round Rock	2,328	2,986	3,506	3,586	3,922	4,618
EA Recommended	1,995	2,439	2,824	3,205	3,639	4,130

	Baseline	**Projected Plumbing Code Savings**					
Comparison GPCDs	**GPCD**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
TWDB Draft Projections	144	4.58	5.16	5.16	5.16	5.16	5.16
Region G Requested	139	0	0	0	0	0	0
EA Recommended	139	0	0	0	0	0	0

Leander

Region G provided supporting documentation that included Leander's projected population and number of connections based on historical growth and a household multiplier of approximately 3 PPHH, which aligns with the U.S. Census Bureau's PPHH of 3.02 for the City of Leander. Also provided was Leander's Comprehensive Plan, which states on page 29 that based on future land use, Leander will hit a buildout population of 225,000 likely around 2050. Page 48 of Leander's plan states that Leander serves water to the city limits and Extraterritorial Jurisdiction (ETJ). Therefore, the Region G requested projections are recommended by the EA for 2030-2050 and then the buildout population of 225,000 is recommended for the remaining decades. A projected GPCD of 124 is recommended to align with the utility's plan, therefore Region G’s request for the projected plumbing code savings to be zero is all decades is recommended by the EA. No changes to Region K's requested revisions to the County-Other, Travis WUG population projections are recommended in relation to the EA's recommendation for the Leander WUG.

TWDB draft population projections:

		TWDB Draft Population Projections					
Region	**County**	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**
G	WILLIAMSON	84,741	119,989	161,576	206,991	258,107	315,610
K	TRAVIS	19,679	27,769	34,750	41,563	49,311	58,119
	Leander Total	**104,420**	**147,758**	**196,326**	**248,554**	**307,418**	**373,729**

Region G requested population projections:

		Region G requested					
Region	**County**	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**
G	WILLIAMSON	137,045	173,735	185,078	196,856	208,617	220,564
K	TRAVIS	31,825	40,207	39,805	39,528	39,856	40,616
	Leander Total	**168,870**	**213,942**	**224,883**	**236,384**	**248,473**	**261,180**

EA recommended population projections:

		EA Recommended					
Region	**County**	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**
G	WILLIAMSON	137,045	173,735	185,078	187,376	188,909	190,010
K	TRAVIS	31,825	40,207	39,805	37,624	36,091	34,990
	Leander Total	**168,870**	**213,942**	**224,883**	**225,000**	**225,000**	**225,000**

EA recommended baseline GPCD and projected plumbing code savings:

	Baseline GPCD	**Projected Plumbing Code Savings**					
Comparison GPCDs		**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
TWDB Draft Projections	124	3.87	4.29	4.29	4.29	4.29	4.29
Region G Requested	124	0	0	0	0	0	0
EA Recommended	124	0	0	0	0	0	0

County-Other, Travis

Comparison of draft projections, Region K's revision request, and the EA's recommended population projections for the County-Other, Travis WUG:

Comparison	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
TWDB Draft Projections	94,947	127,362	126,546	112,159	97,941	84,228
Region K Requested	77,528	103,738	95,358	74,091	70,555	69,219
EA Recommended	77,528	103,738	95,358	74,091	70,555	69,219

Canyon Lake Water Service

Region K requested a revision to the baseline GPCD from the draft 113 value to 76 GPCD. This WUG geographically splits with Region L, which did not request revisions to the baseline GPCD. Only one baseline GPCD can be used per WUG, even if the WUG splits geographically across counties, regional water planning areas, or river basins. Furthermore, in Attachment C of the Region K memo, it appears that the requested GPCD values are specific to Region K systems within the utility. Page 3 of the Region K memo also notes that the population request be withdrawn if the revised GPCD is not approved.

Due to a lack of supporting data as to why the population projections for the Region K-portion of the WUG would not hit buildout at 1,359 people due to a different GPCD, the population projections are recommended. However, the baseline GPCD is not recommended because the GPCD represents a utility-wide average gallons per person, which applies to both Region K and Region L splits. Region L did not request a revision to the baseline GPCD.

Comparison of draft projections, Region K's revision request, and the EA's recommended population projections and baseline GPCD for Canyon Lake Water Service WUG:

TWDB draft population projections and baseline GPCD:

	TWDB Draft Projections						
County	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**	**Baseline GPCD**
BLANCO	802	809	794	779	763	743	113
HAYS	666	960	1,349	1,876	2,473	3,151	113
TRAVIS	3,293	4,542	5,620	6,674	7,872	9,233	113
Canyon Lake Water Service Total	**4,761**	**6,311**	**7,763**	**9,329**	**11,108**	**13,127**	

Region K requested population projections:

	Region K requested						
County	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**	**Baseline GPCD**
BLANCO	536	536	536	536	536	536	76
HAYS	1,266	1,301	1,326	1,345	1,358	1,358	76
TRAVIS	1,266	1,301	1,327	1,345	1,359	1,359	76
Canyon Lake Water Service Total	**3,068**	**3,138**	**3,189**	**3,226**	**3,253**	**3,253**	

EA recommended population projections:

	EA Recommended						
County	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**	**Baseline GPCD**
BLANCO	536	536	536	536	536	536	113
HAYS	1,266	1,301	1,326	1,345	1,358	1,358	113
TRAVIS	1,266	1,301	1,327	1,345	1,359	1,359	113
Canyon Lake Water Service Total	**3,068**	**3,138**	**3,189**	**3,226**	**3,253**	**3,253**	

Corix Utilities Texas Inc

Region K requested revisions for the Corix Utilities Texas Inc population projections but provided no supporting documentation citing “confidential nature of the development agreements” (p.4 of the Region K memo). Region G requested different revisions to the WUG population projections, and on August 18, 2023, TWDB staff confirmed with the Region K technical consultant that Region K preferred Region G’s revisions.

Region G provided documentation from the WUG listing the current number of meters plus living unit equivalents to estimate the number of connections by 2030. TWDB confirmed that the current number of meters is similar to what’s being reported on the TWDB Water Use Survey. The WUG indicated a 3.5 PPHH multiplier was applied to estimate the 2030 population, which the EA does not recommend. Instead, a county-specific persons per household (PPHH) multiplier, as listed in the table below, from the U.S. Census Bureau was applied to estimate the 2030 population and the TWDB projected growth rates, as requested by Region G, were applied to project 2040-2080.

Resulting revisions to County-Other WUG population projections are recommended per Region K’s requested revisions to maintain county totals using the appropriate migration scenario as drafted by the TWDB. Please see attached spreadsheet for recommended County-Other population and municipal water demand projections.

A baseline GPCD revision of 170 requested by Region G was confirmed by Region K and is recommended by the EA.

County	2030 Meter Count	County-level PPHH	2030 Population
BLANCO	92	2.36	217
BURNET	1,673	2.66	4,450
COLORADO	107	2.90	310
LLANO	1,143	2.29	2,617
MATAGORDA	150	2.63	395
MILLS	210	2.58	542
SAN SABA	40	2.60	104

Region G requested revisions to the population projections on behalf of Region K:

County	EntityName	P2030	P2040	P2050	P2060	P2070	P2080	GPCD
BLANCO	Corix Utilities Texas Inc	322	322	322	322	322	322	170
BURNET	Corix Utilities Texas Inc	5,856	6,554	7,158	7,828	8,586	9,441	170
COLORADO	Corix Utilities Texas Inc	375	341	311	283	258	234	170
LLANO	Corix Utilities Texas Inc	4,001	4,097	4,173	4,284	4,413	4,560	170
MATAGORDA	Corix Utilities Texas Inc	525	525	501	477	453	405	170
MILLS	Corix Utilities Texas Inc	735	705	675	635	585	516	170
SAN SABA	Corix Utilities Texas Inc	140	129	115	104	91	71	170

EA recommended population projections:

County	EntityName	P2030	P2040	P2050	P2060	P2070	P2080	GPCD
BLANCO	Corix Utilities Texas Inc	217	217	217	217	217	217	170
BURNET	Corix Utilities Texas Inc	4,450	4,981	5,440	5,950	6,526	7,176	170
COLORADO	Corix Utilities Texas Inc	310	282	257	234	213	193	170

LLANO	Corix Utilities Texas Inc	2,617	2,680	2,730	2,803	2,887	2,983	170
MATAGORDA	Corix Utilities Texas Inc	395	395	377	359	341	305	170
MILLS	Corix Utilities Texas Inc	542	520	498	469	432	381	170
SAN SABA	Corix Utilities Texas Inc	104	96	85	77	68	57	170

Georgetown

The EA does not recommend the region-requested revised projections, and instead recommends the WUG's projections in Georgetown's Integrated Water Resources Plan (IWRP) from May 2023 on page 26, which are more recent than the 'RAW water Projections' supporting documentation provided that is dated April 2023. The projections in the IWRP were developed based on historical growth in connections and using a 2.5 PPHH. The baseline 2020 number of connections aligns with the self-reported number of single-family connections on the 2020 Water Use Survey.

TWDB draft population projections:

		TWDB Draft Population Projections					
Region	**County**	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**
G	BELL	3,044	3,228	3,368	3,446	3,535	3,636
G	WILLIAMSON	171,668	233,734	306,892	386,842	476,783	577,936
K	BURNET	392	433	468	506	550	599
	Georgetown Total	**175,104**	**237,395**	**310,728**	**390,794**	**480,868**	**582,171**

Region G requested population projections:

		Region G requested					
Region	**County**	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**
G	BELL	4,831	6,577	7,183	6,882	6,658	6,565
G	WILLIAMSON	272,462	476,246	654,502	772,543	898,034	1,043,487
K	BURNET	622	882	998	1,011	1,036	1,082
	Georgetown Total	**277,915**	**483,705**	**662,683**	**780,436**	**905,728**	**1,051,134**

EA recommended population projections using the projections developed in Georgetown's IWRP and the county proportions requested by Region G:

		EA Recommended					
Region	**County**	**P2030**	**P2040**	**P2050**	**P2060**	**P2070**	**P2080**
G	BELL	4,394	5,982	6,533	6,542	6,648	6,555
G	WILLIAMSON	247,802	433,143	595,264	734,394	896,686	1,041,920
K	BURNET	566	802	908	961	1,034	1,080
	Georgetown Total	**252,762**	**439,927**	**602,705**	**741,897**	**904,368**	**1,049,555**

Region G requested revisions to the baseline GPCD and plumbing code savings. The requested GPCD aligns with historical Water Use Survey data. The IWRP mentions a future GPCD of 150 but does not explain if this will be due to passive savings from plumbing code laws or active conservation (the latter should be included in supply-side strategies for the 2026 Regional Water Plans). Therefore, the EA recommends the revision to the baseline GPCD but not the plumbing code savings projections.

Comparison GPCDs	Baseline GPCD	Projected Plumbing Code Savings					
		2030	2040	2050	2060	2070	2080
TWDB Draft Projections	197	4.31	4.74	4.74	4.74	4.74	4.74
Region G Requested	173	0.00	3.00	7.00	11.00	15.00	18.00
EA Recommended	173	4.31	4.74	4.74	4.74	4.74	4.74

Kempner WSC

Region G requested revisions to the population projections for Kempner WSC on behalf of Region K. The request to revise the population projections is based on Kempner WSC reporting to the Water Use Survey 20,055 population and 5,688 residential connections, which results in 3.5 persons per household (PPHH), which is much higher than the U.S. Census Bureau 2.66 PPHH for Burnet County. Therefore, the EA recommends the draft projections rather than the requested revisions, however the revision request to the baseline GPCD is recommended by the EA based on 2012 water use for the WUG.

Comparison – Kempner WSC in Burnet County	2030	2040	2050	2060	2070	2080	Baseline GPCD
TWDB Draft Projections	567	548	531	508	483	454	157
Region G Requested	648	627	608	580	553	519	176
EA recommended	567	548	531	508	483	454	176

MEMORANDUM

Project Name:	**6th Cycle Regional Water Planning – Region K**
Subject:	Region K Non-Municipal Water Demand Projections (Except Irrigation Demands)
Project No:	3644-001-01
Date:	July 14, 2023
Prepared For:	Lower Colorado Regional Water Planning Group
Prepared By:	Plummer Associates, Inc. and INTERA, Inc.
Cc:	Texas Water Development Board

1 INTRODUCTION

Plummer Associates, Inc. (Plummer) and INTERA, Inc. (INTERA) evaluated the draft demand projections for non-municipal use types (livestock, manufacturing, mining, and steam-electric power) developed by the Texas Water Development Board (TWDB) for the 6th cycle of regional water planning (2026 Regional Water Plan) with the development of irrigation demands presented in a separate Memorandum. As part of this evaluation, historical use data for each non-municipal use type, the methodologies used by TWDB to develop the non-municipal demand projections for each use type, and the draft 2026 projections for each county in Region K were reviewed and compared to the projections from the 2021 Region K Water Plan (RWP). This memorandum contains key observations organized by non-municipal use type. In addition, this memorandum includes recommendations reviewed and adopted by the Regional Planning Group.

2 IRRIGATION

(See separate Memorandum.)

3 LIVESTOCK

The TWDB's livestock water use estimates were based on average annual water use estimates, by county, developed by the TWDB for various livestock species (e.g., dairy cattle, fed and other cattle, broiler and non-broiler chickens, turkeys, equine, sheep, and goats).

3.1 HISTORICAL USE

The TWDB historical livestock water use estimates from 2015 to 2019 consist of species-specific water use per head values, multiplied by annual inventory estimates, plus surveyed water use for non-standard livestock production such as fish hatcheries. The region-wide livestock water use estimates for the historical demand period have ranged from 10,134 to 11,812 ac-ft/yr.

3.2 PROJECTION METHODOLOGY

The draft livestock water demand projections for the 2026 Regional Water Plans (RWPs) were based upon the five-year average annual water use estimates (2015 through 2019), by county, developed by the TWDB for the various livestock species. Additionally, TWDB incorporated the average historical use from livestock-related facilities (e.g., finfish farming and fish hatcheries, aquaculture) during the 2015-2019 period into the livestock demand projections. In Region K, this included demand from the Inks Dam National Fish Hatchery in Burnet County. Livestock water demand increase rates, if any, approved during the previous water planning cycle (2021 RWP) were applied to the five-year average annual water use estimates for counties in Region K to project their demands from 2030 to 2080. In all Region K counties, the projected demand was estimated to be the five-year average annual water use from 2015-2019 and was held constant from 2030 to 2080.

TWDB made some changes to the baseline data that were incorporated into the 2026 RWP draft livestock projections, including:

- Updates to the water use geographic splits (region/county/basin) based on an updated analysis of likely grazing lands for various species, including locations of permitted Concentrated Animal Feeding Operations (CAFOs). These updates were applied retroactively to annual water use estimates from 2015 forward. For Region K, this change did not make an appreciable difference in the water demand projections for the period 2010-2014 compared to 2015-2019, apart from the changes in animal counts which produced a greater reduction in historical demand.
- Review of published literature and expert opinion regarding livestock water use (gallons/head/day). This resulted in changes to assumed water use parameters used in the 2026 RWP projections for five types of livestock:
    - Dairy Cattle: Decreased from 75 to 55 gal/head/day (due to increased water efficiencies for managing dairy cattle).
    - Fed and Other Cattle remained at 15 gal/head/day (includes pasture, range, and feedlot cattle).
    - Chickens (Non-broiler): Increased from 0.086 to 0.09 gal/head/day.
    - Chickens (Broiler): Increased from 0.077 to 0.09 gal/head/day.
    - Hogs: Decreased from 11 to 5 gal/head/day (due to increased water efficiency for CAFO operations).
    - Goats: Increased from 0.5 to 2 gal/head/day.
- Starting in 2015, the methodology to estimate the inventory for chickens was updated to be based on the U.S. Department of Agriculture (USDA) inventory numbers instead of production numbers. According to the TWDB, production numbers measure activity; for example, there may be several cycles per year of broiler chickens hatching to slaughter, allowing for production numbers per year to be a multiple of the annual inventory numbers. Thus, inventory numbers are a better proxy to estimate the annual water use for chickens based on the TWDB methodology, which estimates water use based on water use coefficients per head. In Region K, this change in methodology resulted in very little change in the total animal count.

3.3 COMPARISON TO 2021 REGIONAL WATER PLAN

The Region K TWDB draft 2026 RWP projections for livestock demand were approximately 8.5 percent lower compared to the 2021 RWP (**Figure 3-1**). This reduction was primarily due to the draft 2026 RWP using the most recent five-year historical use average from 2015-2019 to develop projections, whereas the 2021 RWP used the five-year average from 2010-2014. As discussed in the preceding section, the difference in historical use between these two periods appeared to be primarily attributable to a total reduction in animal counts. The reduction in animal counts appears to be a consequence of the drought of 2011-2015.

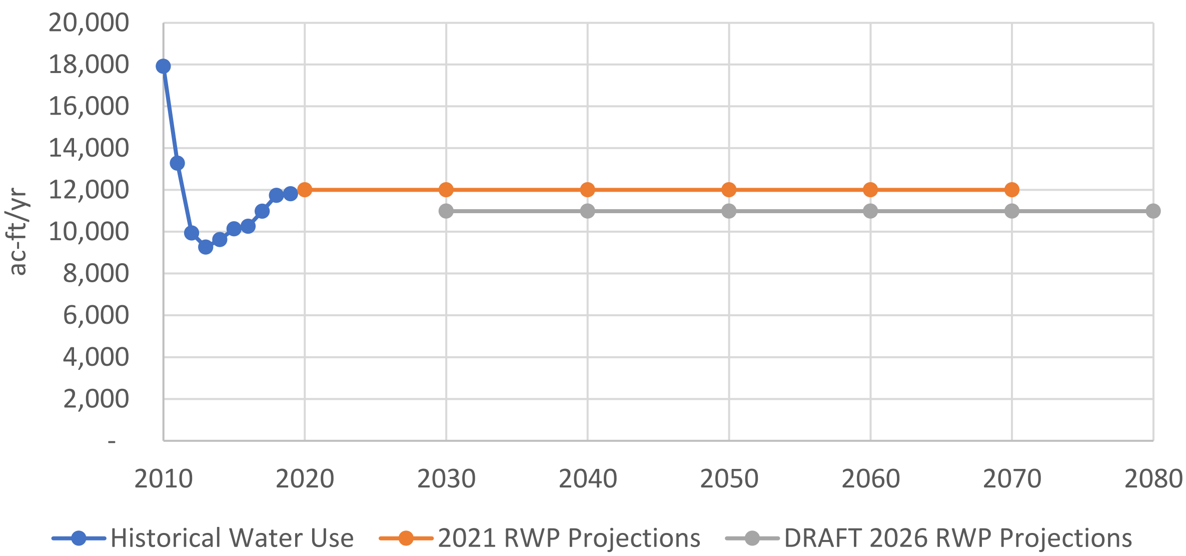


Figure 3-1: Region K Livestock Water Demand Projection Comparison

When comparing draft 2026 RWP projections by county to the 2021 RWP, changes larger than 10% increase or decrease include:

a. Bastrop County: Increased from 1,135 ac-ft/yr to 1,250 ac-ft/yr.
b. Burnet County: Decreased from 1,691 ac-ft/yr to 795 ac-ft/yr.
c. Gillespie County: Decreased from 1,212 ac-ft/yr to 1,002 ac-ft/yr.
d. Hays County: Increased from 17 ac-ft/yr to 116 ac-ft/yr.
e. Matagorda County: Decreased from 1,075 ac-ft/yr to 959 ac-ft/yr.
f. San Saba County: Increased from 779 ac-ft/yr to 893 ac-ft/yr.
g. Travis County: Decreased from 527 ac-ft/yr to 400 ac-ft/yr.

3.4 RECOMMENDED AND ADOPTED PROJECTIONS

It was recommended that Region K adopt the DRAFT 2026 RWP projections for Livestock demand provided by the TWDB. This recommendation was adopted by the planning group at the April 26,2023 meeting.

4 MANUFACTURING

The TWDB's manufacturing water use estimates are obtained from manufacturing facilities that complete TWDB Water Use Surveys (WUS) and from manufacturing use volumes reported by surveyed municipal water sellers.

4.1 HISTORICAL USE

The TWDB historical manufacturing water use estimates focus on facilities that use large amounts of water and/or are self-supplied by groundwater or surface water. Facilities with smaller uses that are supplied by public utilities and cannot easily be tracked separately are included in municipal water demands.

As of May 2022, historical manufacturing water use estimates are available through the year 2019. Since 2010, the region-wide manufacturing water use estimates have increased from 14,562 to 22,298 ac-ft/yr. Matagorda and Travis Counties have accounted for over 90% of the total manufacturing demand in Region K from 2015-2019.

4.2 PROJECTION METHODOLOGY

The TWDB's draft 2026 manufacturing demand projections were based on the maximum annual manufacturing water use that occurred in each county during 2015-2019 (the baseline for projections) plus an estimate of the non-surveyed water use. Non-surveyed water use was determined using the U.S. Census Bureau's Business Patterns (CBP) and an inventory of the industries from the Water Use Survey.

To obtain the initial year demand projection values (year 2030), the baseline demand in each county was multiplied by the statewide annual total historic water use rate of change from 2010-2019, which was determined to be 0.96 percent. This was to account for potential changes in production and water use that may occur between the baseline water use values and the first projected decade. For each planning decade after 2030, a statewide manufacturing growth proxy of 0.37 percent was applied to each county to project increases in manufacturing water demands per decade from 2040 to 2080. This growth proxy was based on the annual increase in the CBP historical number of establishments in the manufacturing sector from 2010-2019. Both growth factors (0.96 percent and 0.37 percent) were applied equally by county across the state and by decade.

4.3 COMPARISON TO 2021 REGIONAL WATER PLAN

In comparison to the 2021 RWP, the total draft 2026 RWP manufacturing demand increased by 16% in 2030 and 34% in 2070 (**Figure 4-1**). This increase was driven primarily by the increased manufacturing demand projections for Matagorda and Travis Counties, but secondarily, by increases in other counties as well. It is important to note that the 2021 RWP manufacturing projections did not include a statewide manufacturing growth proxy and instead were held constant from 2030 onward.

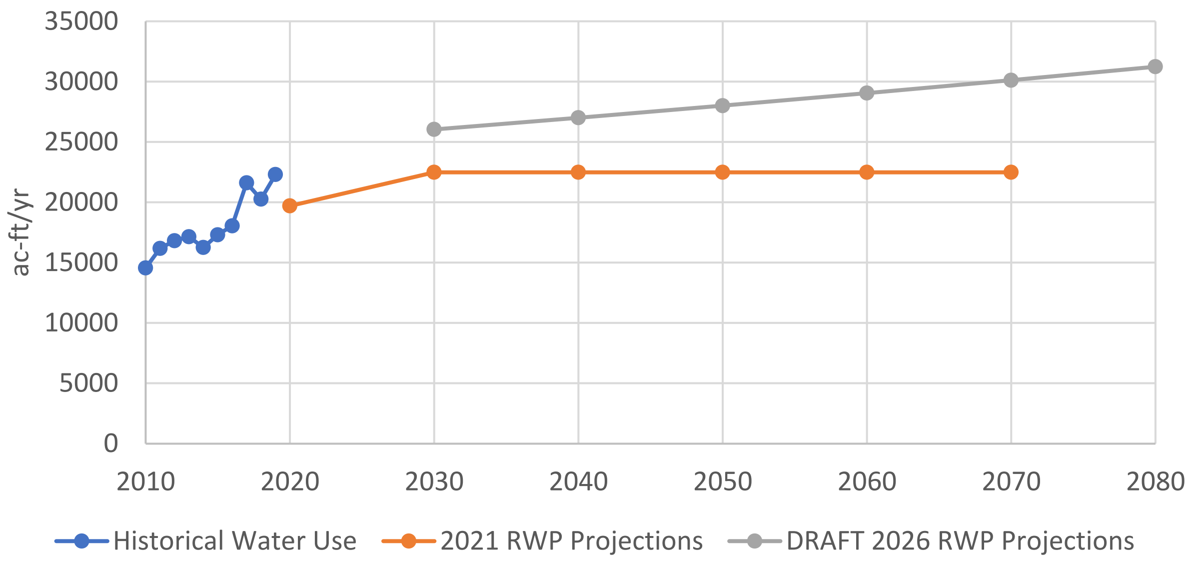


Figure 4-1: Region K Manufacturing Water Demand Projection Comparison

When comparing draft 2026 RWP projections by county to the 2021 RWP, notable differences include:

a. Bastrop County: Increased from 215 ac-ft/yr to 414-496 ac-ft/yr.
b. Burnet County: Decreased from 299 ac-ft/yr to 156-187 ac-ft/yr.
c. Colorado County: Decreased from 1,132 ac-ft/yr to 593-711 ac-ft/yr.
d. Gillespie County: Increased from 93 ac-ft/yr to 388-465 ac-ft/yr.
e. Hays County: Decreased from 324 ac-ft/yr to 181-217 ac-ft/yr.
f. Matagorda County: Increased from 4,916 ac-ft/yr to 7,378-8,848 ac-ft/yr.
g. Travis County: Increased from 14,853 ac-ft/yr to 16,401-19,669 ac-ft/yr.

4.4 OTHER CONSIDERATIONS

Manufacturing water use is a significant fraction of the total water use in Region K, with technology industries in Travis County and oil and gas or chemical manufacturers in the lower basin (Matagorda County). There are several new manufacturing facilities not accounted for in the existing draft projections, or facilities expected to create increased demand for municipal supplies. Proposed adjustments to account for specific demands included the following:

a. Burnet County: Southwestern Graphite Co. is expected to require 400 ac-ft/yr in all future decades.

b. Matagorda County: Underground Services of Markham is a significant manufacturing water user that has been in business for many years but is not included in the manufacturing data. This company is expected to use 9,300 ac-ft/yr through the remainder of the planning period.

c. Travis County:
   i. Alamo Concrete products in not included in the manufacturing data and is expected to use 400 ac-ft/yr in all decades.

   ii. TXI Operations, LP was only included in the 2011-2012 data but not included in the 2015-2019 data. This facility is expected to use 62 ac-ft/yr in all decades.

In addition, two of the major water providers in the region, Austin Water and the Lower Colorado River Authority (LCRA) have identified additional manufacturing demands that should be included in the projections. These projections for increased demand are described below.

- Matagorda County: LCRA has received confidential requests for manufacturing water in the lower basin. These requests are anticipated to increase demand by 20,000 ac-ft/yr by 2030, continuing through the remainder of the planning period.
- Travis County: Austin Water has received requests for manufacturing water and expects to continue to receive additional requests for water as the area grows through the remainder of the planning period. Based on the requests received, Austin Water anticipates providing manufacturing water supply of 2,500 ac-ft/yr by 2030 with the demand increasing by 2,500 ac-ft/yr each decade until 2060, reaching a total increase in demand of 10,000 ac-ft/yr. This demand is expected to remain constant through the end of the planning period. Slides providing an overview of the Austin Water projected demands are provided in **Appendix B**.

4.5 RECOMMENDED AND ADOPTED PROJECTIONS

It was recommended that Region K adopt the TWDB Draft projections for the 2026 Plan with the adjustments described in the Other Considerations section above.

Figure 4-2 shows a comparison of the draft projections for the 2026 RWP (provided by TWDB), the final 2021 RWP projections, and the modified projections adopted by the Lower Colorado Regional Water Planning Group (LCRWPG). The revisions result in an increase of approximately 40,000 ac-ft/yr compared to the 2026 RWP draft projections by 2080. **Appendix A** includes the recommended and adopted projections broken down by decade and by county.

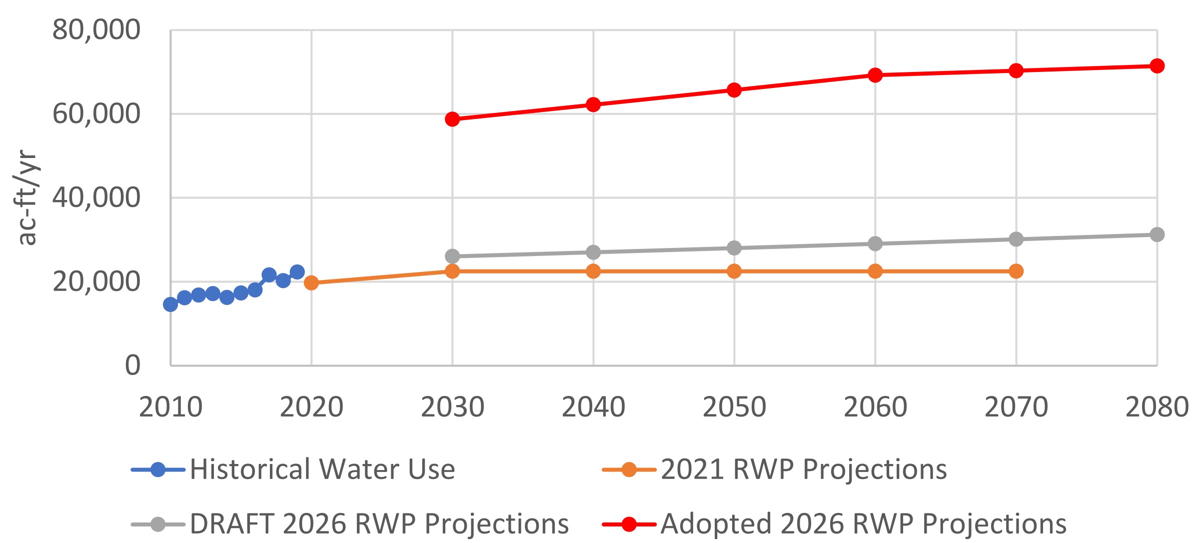


Figure 4-2: Region K Adopted Manufacturing Water Demand Projection

5 MINING

Mining water use in Texas is divided into three categories: Oil and Gas Industry Water Use, Coal Mining Water Use, and Aggregate Mining Water Use. Mining water use in Region K is limited to Oil and Gas or

Aggregate mining.

5.1 HISTORICAL USE

The TWDB published historical annual mining water use estimates for each county based on the 2022 TWDB Mining Water Use Study conducted by the United States Geological Survey (USGS) and Bureau of Economic Geology (BEG). The region-wide mining water use estimates range from 4,680 ac-ft/yr in 2015 to 2,511 ac-ft/yr in 2019.

5.2 PROJECTION METHODOLOGY

The TWDB draft mining demand projections for the 2026 Regional Water Plans were developed from the 2022 TWDB Mining Water Use Study. The study used different methods to develop projections for each mining water use category: oil and gas, aggregate mining, and coal mining. These methods are outlined in greater detail in the 2022 TWDB Mining Water Use Study. The Mining Water Use Study projects mining use in Region K to increase from 7,103 ac-ft/yr in 2030 to 9,748 ac-ft/yr in 2080 (**Figure 5-1**) due to increased demand for water by aggregate mining while the demand for water to support oil and gas mining will decrease.

5.3 COMPARISON TO 2021 REGIONAL WATER PLAN

In comparison to the 2021 RWP, the total mining demand projected for Region K in the draft 2026 RWP decreased by approximately 73% in 2030 and approximately 61% in 2070, respectively (**Figure 5-1**).

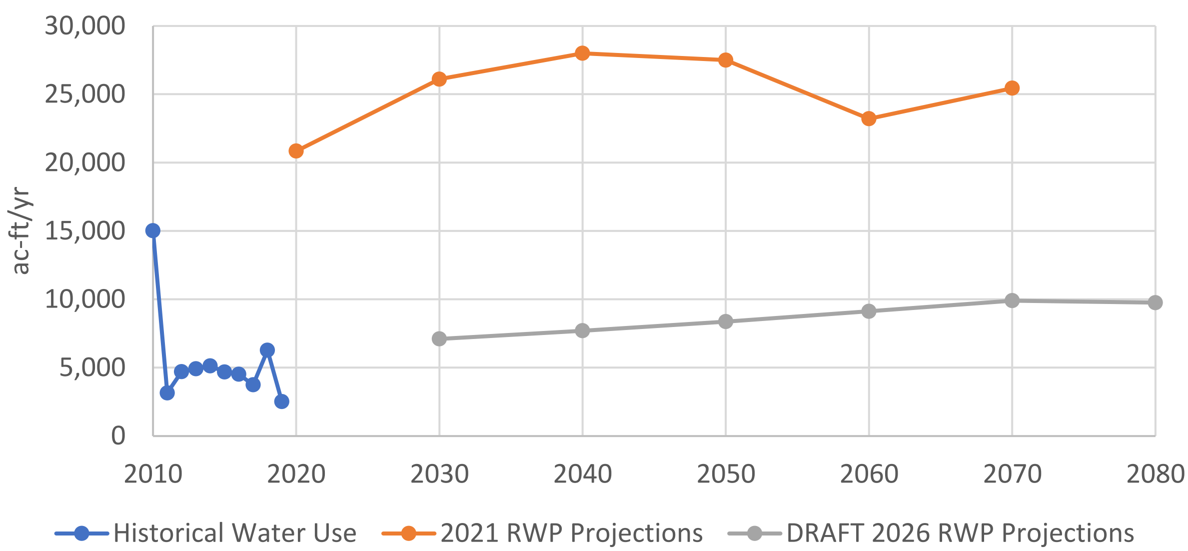


Figure 5-1: Region K Mining Water Demand Projection Comparison

When comparing draft 2026 RWP projections by county to the 2021 RWP, notable changes include:

a. Bastrop County: Decreased from approximately 6,800-7,500 ac-ft/yr early in the planning period to approximately 400-500 ac-ft/yr, but increased from about 500 ac-ft/yr to 1,000 ac-ft/yr at the end of the planning period.
b. Burnet County: Decreased from approximately 7,500-10,000 ac-ft/yr to 500-600 ac-ft/yr.
c. Colorado County: Decreased from approximately 5,500 ac-ft/yr to about 3,000 ac-ft/yr.

d. Fayette County: Increased from approximately 350 ac-ft/yr late in the planning period to approximately 950 ac-ft/yr.
e. Hays County: Decreased from approximately 1,500-1,900 ac-ft/yr to approximately 200-270 ac-ft/yr.
f. Llano County: Increased from approximately 3 ac-ft/yr to 250-280 ac-ft/yr.
g. San Saba County: Decreased from roughly 1,000 ac-ft/yr to 0 ac-ft/yr.
h. Travis County: Decreased from approximately 3,500-7,000 ac-ft/yr to 550-830 ac-ft/yr.
i. Wharton County: Decreased from approximately 50 ac-ft/yr to 2 ac-ft/yr.
j. Williamson County: Increased from approximately 3 ac-ft/yr to 1,500-3,000 ac-ft/yr.

5.4 OTHER CONSIDERATIONS

Several specific modifications to the draft 2026 RWP mining projections were identified by the members of Region K. The modifications include the following adjustment from the draft projections:

a. Burnet County: The Central Texas Groundwater Conservation District (Mitchell Sodek) proposed adding 886-ac-ft/yr to the existing 143 ac-ft/yr identified as surface water use for mining, giving a total demand of 1,029 ac-ft/yr for 2030 (**Appendix C**). The demand for each decade following would be increased proportional to the proposed population increase in Burnet County. This results in the following demands (ac-ft/yr):

Decade	2030	2040	2050	2060	2070	2080
Demand	1,029	1,245	1,427	1,602	1,755	1,887

b. Fayette County: The demand should remain at 934 ac-ft/yr for the final decade (2080) of the planning period instead of decreasing to 2 ac-ft/yr.

c. Hays County: Three limestone quarries in Hays County (Centex Materials, Industrial Asphalt, and Texas-Lehigh Cement) are known to use about 844 ac-ft/yr of water in addition to the volumes provided in the TWDB projections from the Mining Study.

d. Llano County: LCRA has identified a surface water application for 1,926 ac-ft/yr by Collier Materials for aggregate mining that is only expected to continue through the first decade. This demand should be added to TWDB-proposed demand of 251 ac-ft/yr to give a total of 2,214 ac-ft/yr in 2020.

5.5 RECOMMENDED AND ADOPTED PROJECTIONS

It was recommended that Region K adopt the TWDB Draft projections for the 2026 Plan with the adjustments described in the Other Considerations section above. This recommendation was adopted by the planning group at the April 26,2023 meeting.

Figure 5-2 shows a comparison of the draft projections for the 2026 RWP (provided by TWDB), the final 2021 RWP projections, and the modified projections adopted by the LCRWPG. The revisions result in an increase of about 1,600 – 3,000 ac-ft/yr for most of the planning period compared to the 2026 RWP draft projections. **Appendix A** includes the proposed projections broken down by decade and by county.

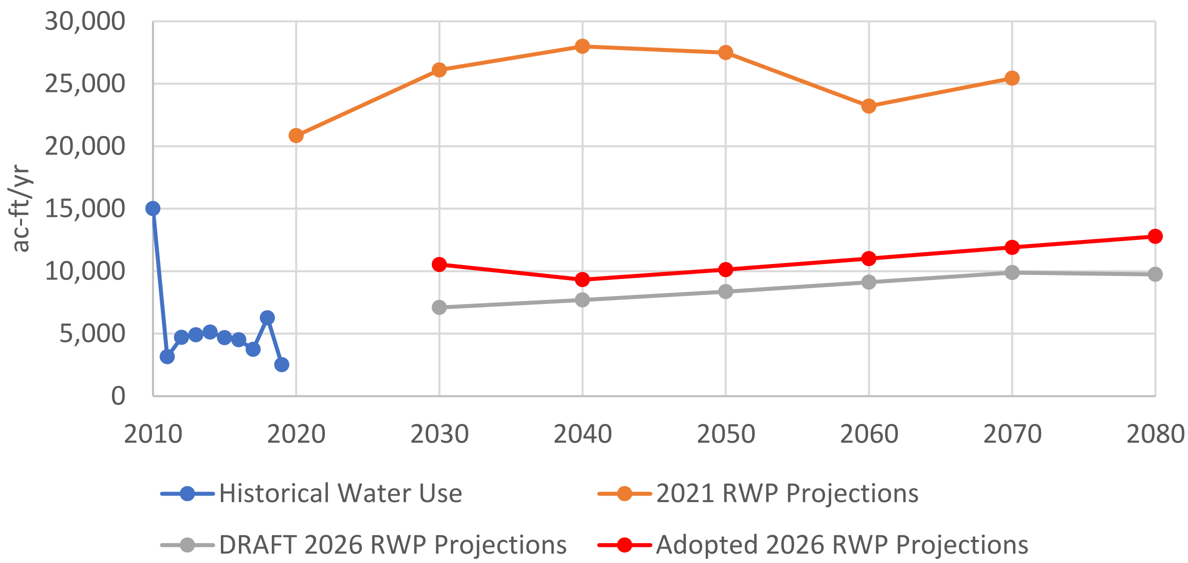


Figure 5-2. Region K Adopted Mining Water Demand Projection

6 STEAM ELECTRIC POWER

6.1 HISTORICAL USE

The TWDB historical steam-electric power (SEP) water use estimates from 2015 to 2019 are gathered by the TWDB annual WUS of power generation facilities throughout the state. The water use volumes in the water planning process include volumes consumed by operable power generation facilities that sell power on the open market and exclude facilities which are included with manufacturing estimates. The water use estimates are composed of the reported intake volume of self-supplied groundwater, water purchased from a provider, and/or water withdrawn from a surface water source and not returned to the source. The volume of water withdrawn from a surface water source and not returned is referred to as consumptive use. Additionally, reuse volumes, such as treated effluent, were included in the historical water use intake estimates and water demand projections. Any water sales from the surveyed facility to other entities are subtracted from the intake volume.

If any known power generation facility was not surveyed in the TWDB's annual WUS, then that facility's water use was obtained from the operator or estimated using average water use per kilowatt-hour output for the associated fuel-type and added to the historical highest water use for that county.

6.2 PROJECTION METHODOLOGY

The TWDB draft steam-electric water demand projections for the 2026 Regional Water Plans were based upon:

- The highest single-year county water use from within the most recent five years of data for steam-electric power water users from the annual WUS,
- Near-term additions and retirements of generating facilities, and
- Holding the projected water demand volume constant through 2080.

The U.S. Energy Information Administration (EIA) releases an annual database called EIA-860, which includes data about power generating facilities and infrastructure across the country. In preparation for the 2027 State Water Plan (SWP), TWDB reviewed data from EIA-860 and developed a list of active facilities to be included in the projections and identified any facilities scheduled to come online within the planning horizon. TWDB also reviewed steam electric power facilities and comments from Regional Water Planning Groups included in the 2022 SWP. TWDB removed some facilities from the baseline estimates based on these criteria:

- Facilities with confirmed retirement: Any facility which was listed as retired in the 2019 EIA-860 database and reporting 0 use to the WUS by 2019.
- Manufacturing power facilities: Facilities which were confirmed to have water use in a manufacturing survey or which the LCRWPG requested to be removed from 2022 SWP projections.

6.3 COMPARISON TO 2021 REGIONAL WATER PLAN

In comparison to the 2021 RWP, the total steam-electric power demand projected in Region K decreased by approximately 34% across the planning horizon (**Figure 6-1**).

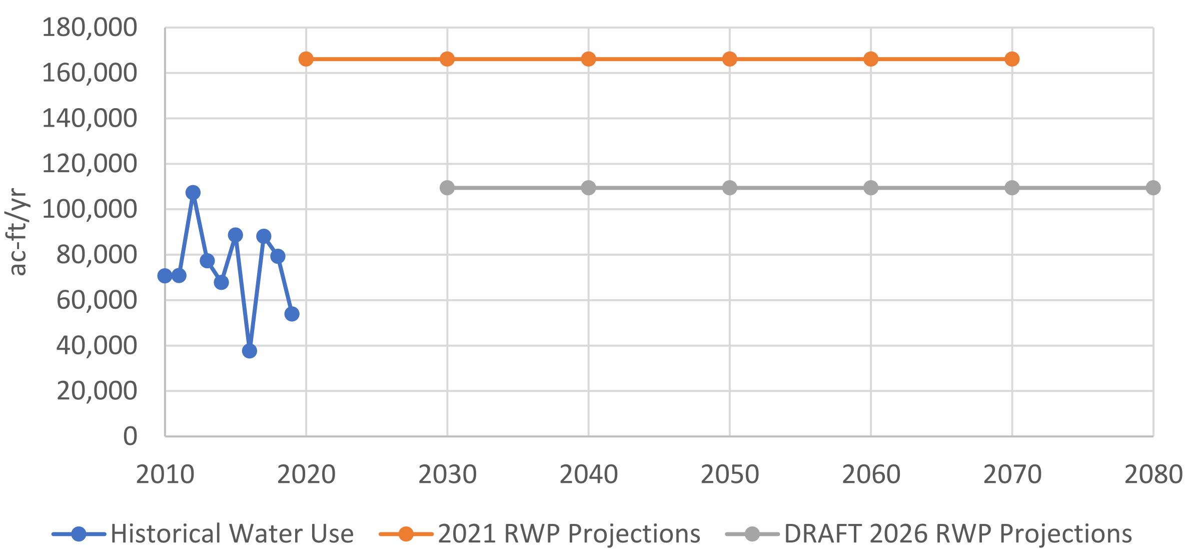


Figure 6-1: Region K Steam Electric Power Water Demand Projection Comparison

When comparing draft 2026 RWP projections by county to the 2021 RWP, notable changes include:

a. Bastrop County: Decrease from 10,288 ac-ft/yr to 7,764 ac-ft/yr.
b. Colorado County: Decrease from 4,971 ac-ft/yr to 226 ac-ft/yr.
c. Fayette County: Decrease from 49,211 ac-ft/yr to 20,052 ac-ft/yr.
d. Hays County: Decrease from 1,187 ac-ft/yr to 0 ac-ft/yr.
e. Llano County: Increase from 1,748 ac-ft/yr to 1,927 ac-ft/yr.
f. Matagorda County: Decrease from 80,536 ac-ft/yr to 67,453 ac-ft/yr.
g. Travis County: Decrease from 10,253 ac-ft/yr to 4,116 ac-ft/yr.

6.4 OTHER CONSIDERATIONS

Although some consideration was given to reducing water demand for steam electric power generation in Fayette County and Travis County due to potential generator shut downs, the planning group elected to retain these demands for potential replacement power generation demand that will be needed to support a growing population and increases in manufacturing demand for power. The input from Austin Water on retaining the current level of Steam Electric demands is also provided in **Appendix B**.

6.5 RECOMMENDED AND ADOPTED PROJECTIONS

It was recommended that Region K adopt the TWDB Draft projections for the 2026 Plan. This recommendation was adopted by the planning group at the April 26,2023 meeting. Appendix A includes the proposed projections broken down by decade and by county.

7 CONCLUSION

This technical memorandum contains an overview of the TWDB draft non-municipal demand projections for the 2026 Regional Water Plan and conveys recommended and adopted changes to these projections by the LCRWPG (Region K). These changes were adopted by the planning group at the April 26, 2023 meeting with approval for the consultants to coordinate minor adjustments with the TWDB staff.

Appendix A

Region K Proposed Demands - Irrigation

		Historical Water Use Estimates					2021 Regional Water Plan Projections						2026 DRAFT Regional Water Plan Projections						RWPG Revision Requests						
Region	County	2015	2016	2017	2018	2019	2020	2030	2040	2050	2060	2070	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	Comment
K	BASTROP	3,204	2,872	5,093	5,571	7,066	4,280	4,280	4,280	4,280	4,280	4,280	4,761	4,761	4,761	4,761	4,761	4,761	4,761	4,761	4,761	4,761	4,761	4,761	
K	BLANCO	1,339	1,398	2,152	2,342	2,338	1,327	1,327	1,327	1,327	1,327	1,327	1,914	1,914	1,914	1,914	1,914	1,914	1,914	1,914	1,914	1,914	1,914	1,914	
K	BURNET	2,020	1,733	2,065	2,022	2,114	1,498	1,498	1,498	1,498	1,498	1,498	1,991	1,991	1,991	1,991	1,991	1,991	1,991	1,991	1,991	1,991	1,991	1,991	
K	COLORADO	68,956	104,470	94,822	111,140	99,079	173,112	168,455	163,924	159,514	155,223	151,048	95,693	95,693	95,693	95,693	95,693	95,693	162,081	157,704	153,446	149,303	145,272	141,350	See attached document
K	FAYETTE	472	711	859	732	842	828	828	828	828	828	828	723	723	723	723	723	723	723	723	723	723	723	723	
K	GILLESPIE	2,564	2,386	2,463	2,450	2,427	2,383	2,383	2,383	2,383	2,383	2,383	2,458	2,458	2,458	2,458	2,458	2,458	2,458	2,458	2,458	2,458	2,458	2,458	
K	HAYS	433	346	428	320	386	525	525	525	525	525	525	383	383	383	383	383	383	383	383	383	383	383	383	
K	LLANO	599	683	568	677	715	998	998	998	998	998	998	648	648	648	648	648	648	648	648	648	648	648	648	
K	MATAGORDA	43,251	107,370	88,879	104,949	90,304	191,588	186,434	181,419	176,539	171,790	167,169	86,951	86,951	86,951	86,951	86,951	86,951	165,964	161,483	157,123	152,881	148,753	144,737	See attached document
K	MILLS	5,934	4,622	4,036	3,021	4,964	4,743	4,743	4,743	4,743	4,743	4,743	4,515	4,515	4,515	4,515	4,515	4,515	4,515	4,515	4,515	4,515	4,515	4,515	
K	SAN SABA	7,012	7,729	7,501	9,846	8,348	7,199	7,199	7,199	7,199	7,199	7,199	8,087	8,087	8,087	8,087	8,087	8,087	8,087	8,087	8,087	8,087	8,087	8,087	
K	TRAVIS	11,327	2,177	2,111	2,289	2,399	4,816	4,816	4,816	4,816	4,816	4,816	4,061	4,061	4,061	4,061	4,061	4,061	4,061	4,061	4,061	4,061	4,061	4,061	
K	WHARTON	80,361	136,934	132,029	148,738	124,841	189,110	184,023	179,073	174,256	169,569	165,008	124,581	124,581	124,581	124,581	124,581	124,581	211,591	205,878	200,320	194,911	189,648	184,528	See attached document
K	WILLIAMSON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Region Total	227,472	373,431	343,006	394,097	345,823	582,407	567,509	553,013	538,906	525,179	511,822	336,766	336,766	336,766	336,766	336,766	336,766	569,177	554,607	540,430	526,636	513,214	500,155	

Region K Proposed Demands - Livestock

Region	County	Historical Water Use Estimates					2021 Regional Water Plan Projections						2026 DRAFT Regional Water Plan Projections						RWPG Revision Requests						
		2015	2016	2017	2018	2019	2020	2030	2040	2050	2060	2070	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	Comment
K	BASTROP	1,052	1,074	1,346	1,390	1,390	1,135	1,135	1,135	1,135	1,135	1,135	1,250	1,250	1,250	1,250	1,250	1,250							
K	BLANCO	308	311	376	388	390	331	331	331	331	331	331	355	355	355	355	355	355							
K	BURNET	634	576	611	1,048	1,106	1,691	1,691	1,691	1,691	1,691	1,691	795	795	795	795	795	795							**No changes proposed from TWDB DRAFT Projections**
K	COLORADO	1,187	1,218	1,298	1,344	1,347	1,276	1,276	1,276	1,276	1,276	1,276	1,279	1,279	1,279	1,279	1,279	1,279							
K	FAYETTE	1,649	1,695	1,673	1,723	1,723	1,726	1,726	1,726	1,726	1,726	1,726	1,693	1,693	1,693	1,693	1,693	1,693							
K	GILLESPIE	834	858	1,088	1,114	1,114	1,212	1,212	1,212	1,212	1,212	1,212	1,002	1,002	1,002	1,002	1,002	1,002							
K	HAYS	124	124	107	112	112	17	17	17	17	17	17	116	116	116	116	116	116							
K	LLANO	610	615	626	644	644	580	580	580	580	580	580	628	628	628	628	628	628							
K	MATAGORDA	971	982	922	959	959	1,075	1,075	1,075	1,075	1,075	1,075	959	959	959	959	959	959							
K	MILLS	785	802	824	845	853	863	863	863	863	863	863	822	822	822	822	822	822							
K	SAN SABA	751	764	967	992	992	779	779	779	779	779	779	893	893	893	893	893	893							
K	TRAVIS	414	417	380	395	395	527	527	527	527	527	527	400	400	400	400	400	400							
K	WHARTON	799	811	749	770	770	792	792	792	792	792	792	780	780	780	780	780	780							
K	WILLIAMSON	16	16	16	17	17	0	0	0	0	0	0	16	16	16	16	16	16							
	Region Total	10,134	10,263	10,983	11,741	11,812	12,004	12,004	12,004	12,004	12,004	12,004	10,988	10,988	10,988	10,988	10,988	10,988							

Region K Proposed Demands - Manufacturing

		Historical Water Use Estimates					2021 Regional Water Plan Projections						2026 DRAFT Regional Water Plan Projections						RWPG Revision Requests						
Region	County	2015	2016	2017	2018	2019	2020	2030	2040	2050	2060	2070	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	Comment
K	BASTROP	99	71	167	245	350	188	215	215	215	215	215	414	429	445	461	478	496	414	429	445	461	478	496	
K	BLANCO	0	0	0	0	0	0	0	0	0	0	0	16	17	18	19	20	21	16	17	18	19	20	21	
K	BURNET	137	101	105	71	92	251	299	299	299	299	299	156	162	168	174	180	187	556	562	568	574	580	587	**See notes below.**
K	COLORADO	532	539	500	513	509	960	1,132	1,132	1,132	1,132	1,132	593	615	638	662	686	711	593	615	638	662	686	711	
K	FAYETTE	363	318	277	259	311	396	442	442	442	442	442	399	414	429	445	461	478	399	414	429	445	461	478	
K	GILLESPIE	19	25	321	314	314	77	93	93	93	93	93	388	402	417	432	448	465	388	402	417	432	448	465	
K	HAYS	134	106	119	119	131	277	324	324	324	324	324	181	188	195	202	209	217	181	188	195	202	209	217	
K	LLANO	3	1	2	2	2	3	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	
K	MATAGORDA	3,954	4,392	5,464	4,740	6,688	4,199	4,916	4,916	4,916	4,916	4,916	7,378	7,651	7,934	8,228	8,532	8,848	36,678	36,951	37,234	37,528	37,832	38,148	**See notes below.**
K	MILLS	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
K	SAN SABA	5	5	5	4	17	10	12	12	12	12	12	19	20	21	22	23	24	19	20	21	22	23	24	
K	TRAVIS	12,002	12,424	14,576	13,918	13,816	13,164	14,853	14,853	14,853	14,853	14,853	16,401	17,008	17,637	18,290	18,967	19,669	19,363	22,470	25,599	28,752	29,429	30,131	**See notes below.**
K	WHARTON	49	51	57	60	59	156	171	171	171	171	171	79	82	85	88	91	94	79	82	85	88	91	94	
K	WILLIAMSON	10	12	13	13	8	25	30	30	30	30	30	14	15	16	17	18	19	14	15	16	17	18	19	
	Region Total	17,309	18,046	21,607	20,259	22,298	19,708	22,493	22,493	22,493	22,493	22,493	26,043	27,008	28,008	29,045	30,118	31,234	58,705	62,170	65,670	69,207	70,280	71,396	

Burnet County - Southwestern Graphite Co. – add 400 ac-ft/yr all decades. Not included in historical use or future demand projections.

Matagorda County - 1.) Underground Service of Markham – add 9,300 ac-ft/yr to the proposed projections. Not included in historical use or future demand projections.
2.)LCRA - 20,000 ac-ft year of future demand. (Starts in 2030)

Travis County - 1.) Alamo Concrete Products Co. – add 400 ac-ft/yr all decades. Not included in historical use or future demand projections..
2.) TXI Operations, LP – add 62 ac-ft/yr all decades. Only included in 2011-2012 data, not 2015-2019 data.

Austin Water Proposed Additional Demands

	Baseline	2030	2040	2050	2060	2070	2080
Proposed Increase	**0**	**2,500**	**5,000**	**7,500**	**10,000**	**10,000**	**10,000**

Region K Proposed Demands - Mining

		Historical Water Use Estimates					2021 Regional Water Plan Projections						2026 DRAFT Regional Water Plan Projections						RWPG Revision Requests						
Region	County	2015	2016	2017	2018	2019	2020	2030	2040	2050	2060	2070	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	Comment
K	BASTROP	44	22	74	47	269	2,884	6,813	7,498	5,998	399	476	388	467	567	694	852	1,050	388	467	567	694	852	1,050	
K	BLANCO	0	0	0	0	4	5	5	5	5	5	5	9	9	10	10	10	10	9	9	10	10	10	10	
K	BURNET	50	88	88	86	195	4,490	5,412	6,379	7,255	8,263	9,412	408	460	510	554	593	625	1,029	1,245	1,427	1,602	1,755	1,887	See data below
K	COLORADO	4,009	4,009	3,056	5,339	471	5,325	5,378	5,433	5,487	5,542	5,597	2,773	2,857	2,977	3,078	3,176	3,263	2,773	2,857	2,977	3,078	3,176	3,263	
K	FAYETTE	269	121	170	484	943	2,526	2,032	1,465	918	359	350	934	934	934	934	934	2	934	934	934	934	934	934	See data below
K	GILLESPIE	5	4	6	8	16	4	4	4	4	4	4	19	20	21	23	24	25	19	20	21	23	24	25	
K	HAYS	300	264	345	303	301	845	1,075	1,361	1,445	1,654	1,893	115	139	161	194	230	269	959	983	1,005	1,038	1,074	1,113	See data below
K	LLANO	0	0	0	0	239	3	3	3	3	3	3	251	250	246	254	262	271	2,214	250	246	254	262	271	See data below
K	MATAGORDA	1	0	1	0	0	96	100	75	55	35	22	1	1	1	1	1	1	1	1	1	1	1	1	
K	MILLS	0	0	0	0	0	4	4	4	4	4	4	108	111	115	120	124	130	108	111	115	120	124	130	
K	SAN SABA	0	0	0	0	0	1,088	1,093	944	900	864	838	0	0	0	0	0	0	-	-	-	-	-	-	
K	TRAVIS	0	0	0	0	71	3,502	4,108	4,762	5,374	6,046	6,817	551	622	676	722	772	830	551	622	676	722	772	830	
K	WHARTON	2	1	0	0	0	71	74	55	41	26	17	2	2	2	2	2	2	2	2	2	2	2	2	
K	WILLIAMSON	0	0	0	0	2	5	3	3	3	3	3	1,544	1,823	2,142	2,530	2,914	3,270	1,544	1,823	2,142	2,530	2,914	3,270	
	Region Total	4,680	4,509	3,740	6,267	2,511	20,848	26,104	27,991	27,492	23,207	25,441	7,103	7,695	8,362	9,116	9,894	9,748	10,531	9,324	10,123	11,008	11,900	12,786	

Burnet County - Central Texas GCD proposed an additional 886 ac-ft/yr based on actual groundwater use, added to the 143 ac-ft/yr from TWDB surface water use as 2030 starting point.
Fayette County - the demand should remain at 934 ac-ft/yr for the final decade dinstead of recuing to 2 ac-ft/yr.
Hays County - Three quarries (Centex Materials, Industrial Asphalt, and Texas-Lehigh Cement) are estimated to use about 844 ac-ft/yr in addition to the demand projected by the TWDB for the full planning period.
Llano County - LCRA identified 1,926 ac-ft/yr for Collier Materials application added to the TWDB estimate of 251 ac-ft/yr.

Burnet County
Data below provided by Central Texas GCD (Mitchell Sodek)

These are the reported meter usage and estimated usage for 2020:

Capitol Aggregates INC/Knife River	OP-16011401	92.6
Lhoist/Texas Materials		150
Lhoist		13
Texas Materials Group INC	OP-12052101	53
Texas Materials Group INC	OP-13022503	0
Texas Materials Group INC	OP-13022502	0
Lehigh Hanson Materials South	OP-10110301	349.11
Spicewood Crushed Stone LLC	OP-21070701	0
Bilbrough Marble	OP-10102009	0
Vulcan Construction Materials LP	OP-10101934	80.97
		738.68

I believe that you could make a reasonable estimate that an additional 20% of GW usage is unmetered, unpermitted, unaccounted for. 2020 baseline 738.68 +20% = 886 AF

Combining 886 AF/yr with 143 AF/yr from TWDB data for surface water use = 1,029 ac-ft/yr for aggregate.
This establishes starting point for 2030 and is then increased proportionally to population increase for future decades.

Region K Proposed Demands - Steam Electric

		Historical Water Use Estimates					2021 Regional Water Plan Projections						2026 DRAFT Regional Water Plan Projections						RWPG Revision Requests						
Region	County	2015	2016	2017	2018	2019	2020	2030	2040	2050	2060	2070	2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	Comment
K	BASTROP	7,764	5,844	6,905	7,118	7,319	10,288	10,288	10,288	10,288	10,288	10,288	7,764	7,764	7,764	7,764	7,764	7,764							
K	BLANCO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
K	BURNET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**No changes proposed from TWDB DRAFT Projections**						
K	COLORADO	0	0	0	0	0	4,971	4,971	4,971	4,971	4,971	4,971	226	226	226	226	226	226							
K	FAYETTE	9,338	8,494	18,575	20,052	14,023	49,211	49,211	49,211	49,211	49,211	49,211	20,052	20,052	20,052	20,052	20,052	20,052							
K	GILLESPIE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
K	HAYS	0	0	0	0	0	1,187	1,187	1,187	1,187	1,187	1,187	0	0	0	0	0	0							
K	LLANO	1,733	1,927	1,762	1,446	1,054	1,748	1,748	1,748	1,748	1,748	1,748	1,927	1,927	1,927	1,927	1,927	1,927							
K	MATAGORDA	67,453	16,715	57,068	46,278	25,134	80,536	80,536	80,536	80,536	80,536	80,536	67,453	67,453	67,453	67,453	67,453	67,453							
K	MILLS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
K	SAN SABA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
K	TRAVIS	2,321	2,208	2,103	2,680	4,116	10,253	10,253	10,253	10,253	10,253	10,253	4,116	4,116	4,116	4,116	4,116	4,116							
K	WHARTON	3	2,449	1,687	1,696	2,217	7,901	7,901	7,901	7,901	7,901	7,901	7,913	7,913	7,913	7,913	7,913	7,913							
K	WILLIAMSON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
	Region Total	88,612	37,637	88,100	79,270	53,863	166,095	166,095	166,095	166,095	166,095	166,095	109,451	109,451	109,451	109,451	109,451	109,451							

Appendix B

Draft 2026 Region K Non-Municipal Demand Projections

COA FEEDBACK: NON-MUNI DEMANDS

	Steam Electric: No Revision Requested	AW reviewed facility-based historical data and projections for Travis and Fayette Counties with Austin Energy and have no revisions to request at this time.
	Manufacturing: Requesting an increase	AW reviewed historical data and projections and has aligned with internal planning to accommodate increases in use from existing customers and future new large volume customers.

STEAM ELECTRIC DEMAND

DRAFT PROJECTIONS	2020	2030	2040	2050	2060	2070	2080	Notes
CITY OF AUSTIN-FAYETTEVILLE POWER STATION CEDAR	6,975	6,975	6,975	6,975	6,975	6,975	6,975	COA's portion of Fayette, based on 2018
LOWER COLORADO RIVER AUTHORITY-FAYETTE POWER PLANT	13,077	13,077	13,077	13,077	13,077	13,077	13,077	LCRA's portion of Fayette, based on 2018
CITY OF AUSTIN-DECKER CREEK POWER STATION	1,696	1,696	1,696	1,696	1,696	1,696	1,696	Based on 2019
CITY OF AUSTIN-SAND HILL POWER PLANT	2,338	2,338	2,338	2,338	2,338	2,338	2,338	Based on 2019, includes reclaimed water use

DRAFT **Steam-Electric Water Demand Projections for the 2026 Regional Water Plans (Demands in Acre-Feet)**

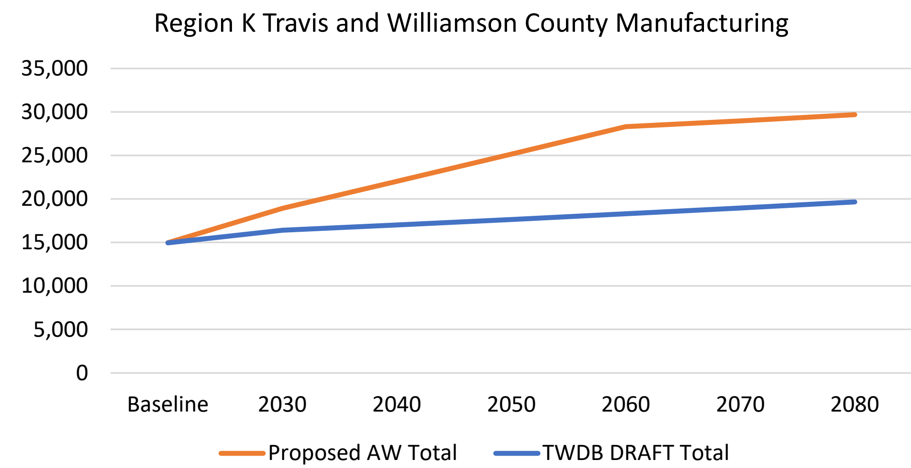
County	Baseline	2030	2040	2050	2060	2070	2080
FAYETTE	20,052	20,052	20,052	20,052	20,052	20,052	20,052
TRAVIS	4,116	4,116	4,116	4,116	4,116	4,116	4,116

Steam-Electric Water Demand Projections for the 2021 Regional Water Plans (Demands in Acre-Feet)

County	2020	2030	2040	2050	2060	2070	
FAYETTE	49,211	49,211	49,211	49,211	49,211	49,211	
TRAVIS	10,253	10,253	10,253	10,253	10,253	10,253	

MANUFACTURING

- COA submits an annual water use report to TWDB which includes AW's 5 large-volume customers.
- TWDB surveys other users designated as manufacturing to identify additional water use.
- TWDB baseline estimates align with internal estimates.
- Because TWDB's projections for Travis and Williamson Counties are based on manufacturing facilities served by AW, AW will plan to continue providing water service for the manufacturing demand in these counties.
- AW requests a revision to include additional expected growth of existing large volume customers and potential future large volume customers.



	Baseline	2030	2040	2050	2060	2070	2080
Region K Projection - Travis County	14,964	16,401	17,008	17,637	18,290	18,967	19,669
Proposed Manufacturing Demand Increase	**0**	**2,500**	**5,000**	**7,500**	**10,000**	**10,000**	**10,000**
Proposed Travis County Manufacturing Demand Total	**14,964**	**18,901**	**22,008**	**25,137**	**28,290**	**28,967**	**29,669**
Region K Projection - Williamson County (partial)	13	14	15	16	17	18	19
Total	14,977	18,915	22,023	25,153	28,307	28,985	29,688

Appendix C

Data provided by Mitchell Sodek of the Central Texas GCD.

See the following table of metered groundwater use.

These are the reported meter usage and estimated usage for 2020:

Capitol Aggregates INC/Knife River	OP-16011401	92.6
Lhoist/Texas Materials		150
Lhoist		13
Texas Materials Group INC	OP-12052101	53
Texas Materials Group INC	OP-13022503	0
Texas Materials Group INC	OP-13022502	0
Lehigh Hanson Materials South	OP-10110301	349.11
Spicewood Crushed Stone LLC	OP-21070701	0
Bilbrough Marble	OP-10102009	0
Vulcan Construction Materials LP	OP-10101934	80.97
		738.68

I believe that you could make a reasonable estimate that an additional 20% of GW usage is unmetered, unpermitted, unaccounted for. 2020 baseline 738.68 +20% = 886 AF

The total of metered use is 738.68 ac-ft/yr.

Assuming that there is an additional 20% of unmetered, unpermitted, unaccounted water results in 886 ac-ft/yr demand. Adding this demand to the 143 ac-ft/yr of surface water demand for mining in Burnet County reported by the TWDB results in a total demand of 1,029 ac-ft/yr for the 2030 base year.

Assuming that the 2030 demand for aggregate mining will increase proportional to the population increase for Burnet County (more homes, businesses, streets, and general building) results in the following projections for aggregate mining water demand (ac-ft/yr):

Decade	2030	2040	2050	2060	2070	2080
Demand	1,029	1,245	1,427	1,602	1,755	1,887

MEMORANDUM

Project Name:	**6th Cycle Regional Water Planning – Region K**
Subject:	Region K Non-Municipal Demands - Irrigation
Date:	July 13, 2023
Prepared For:	Lower Colorado Regional Water Planning Group
Prepared By:	Plummer Associates, Inc. with support from LCRA
Cc:	Texas Water Development Board

1 TWDB METHODOLOGY FOR 2026 REGIONAL PLANS

The TWDB methodology for the 2026 regional plans for projection decades 2030 through 2080 (6th planning cycle) is like the projection methodology utilized for the 2021 regional plans (5th planning cycle). The primary differences in the TWDB projections for the 2026 planning cycle are as follows:

- Baseline irrigation demand is calculated as the average as average of five years of TWDB annual region-county level estimates (2015 - 2019) instead of the average of five years of TWDB annual region-county level estimates (2010 - 2014).
- Draft Irrigation demand projections are held constant unless constrained by modeled available groundwater (MAG), then, after a single decade delay, the demands are reduced at the same rate as groundwater availability.

For Region K, like other regions, the annual region-county level baseline estimates are built-up by applying a calculated evapotranspiration-based "crop water need" estimate to the reported irrigated acreage by crop from the Farm Service Agency. The TWDB also acknowledges that a more credible methodology is to focus on recent historical irrigation water use data as an indicator of future use, and this is the reasoning for evaluating the 2015-2019 irrigated crop acreage to determine the baseline water use.

The resulting irrigation water use projection for Region K (2030-2080) is shown in Table 1, below, without constraints imposed by the MAG.

Table 1. Draft Region K Irrigation Demands

County	Demand (ac-ft.yr)
Bastrop	4,761
Blanco	1,914
Burnet	1,991
Colorado	95,693
Fayette	723
Gillespie	2,458

County	Demand (ac-ft.yr)
Hays	383
Llano	648
Matagorda	86,951
Mills	4,515
San Saba	8,087
Travis	4,061
Wharton	124,581
Williamson	0

2 CONCERNS FOR APPLYING THE TWDB METHODOLOGY IN REGION K

The Lower Colorado Regional Water Planning Group (LCRWPG) Population and Water Demand Committee met several times to review and discuss the draft irrigation water demand projections. The specific concern was the draft irrigation water demand for the lower three counties in the region: Colorado County, Matagorda County, and Wharton County (Region K portion). For these three counties the TWDB Draft irrigation demand would be about 57 percent of the irrigation demand projected for the region in the 2021 planning cycle.

The LCRWPG Population and Water Demand Committee was concerned that the TWDB demand methodology did not adequately address the following elements:

- Canal system losses and on-farm distribution system losses.
- Actual water use for irrigation of both first and second crop rice.
- Water use for other crops and uses not specifically captured by the Farm Service Agency data.
- Concern that the Farm Service Agency data is incomplete or not adequately reported.

3 PROPOSED METHODOLOGY FOR THE 2026 REGIONAL PLAN FOR SURFACE WATER DEMAND

The methodology proposed for evaluating the surface water irrigation demand was based on the following key points:

1. First crop irrigation demand.
    a. Irrigation demand will be based on 2022 water demand to capture water use during a dry year utilizing the most current practices for water management.
    b. Acreage for each irrigation division will be based on the highest planted acreage since 2011.
    c. The 2022 acre-foot per acre use with be combined with a minimum use floor of 1.5 ac-ft/acre to address areas where conjunctive groundwater use reduces surface water demand.
2. Second crop irrigation demand.
    a. Based on highest acre-foot per acre use since 2016 with a minimum use floor to address conjunctive groundwater use.
3. Supplemental crops irrigation demand.
    a. Includes turf, row crops, aquaculture
    b. Based on average 2016-2021 acre-foot per acre use

These key points result in the demands shown in Table 2, below.

Table 2. Irrigation Demands Applied by Crop Season

(Acre-foot per acre demand)	Garwood Agricultural Division	Lakeside Agricultural Division	Pierce Ranch*	Gulf Coast Agricultural Division
First season**	3.20	2.66	2.66	3.21
Second season***	1.30	1.27	1.27	1.83
Supplemental	1.3	1.6	1.6	1
Canal loss	20%	20%	20%	30%

*Estimated based on Lakeside Agricultural Division data.
**Based on 2022 water use w/ minimum 1.5 a-f/acre use.
***Based on highest water use since 2016

See Attachment 1 for the historical acreage data.

The historical acreage for each district is combined with the irrigation demands shown in Table 2 to arrive at the demands for each irrigation division as shown in Table 3.

Table 3. Baseline Surface Water Irrigation Demand for the Rice Irrigation Areas

Crop	Division	Highest Acres Planted since 2011 (ac)	2022 Adjusted Duty (ac-ft/ac)	Calculated Dry Year Use (ac-ft)	Assumed Canal Loss (%)	Calculated Base Year Use with Canal Loss (ac-ft)
1st Crop	Garwood	20,785	3.2	66,512	20%	79,814
	Lakeside	27,554	2.66	73,294	20%	87,952
	Pierce Ranch	6,792	2.66	18,067	20%	21,680
	Gulf Coast	18,316	3.21	58,794	30%	76,433
2nd Crop	Garwood	17,308	1.3	22,500	20%	27,000
	Lakeside	18,099	1.27	22,986	20%	27,583
	Pierce Ranch	3,693	1.27	4,690	20%	5,628
	Gulf Coast	15,120	1.83	27,670	30%	35,970
Supplemental	Garwood	-	NA	-	20%	-
	Lakeside	1,392	1.6	2,227	20%	2,673
	Pierce Ranch	-	NA	-	20%	-
	Gulf Coast	12,404	1	12,404	30%	16,125
Total		**141,463**		**309,144**		**380,859**

Geographic data shows the following on allocation of the agricultural divisions by County:

- 20% of the Garwood division is in Wharton County.
- 80% of the Garwood division is in Colorado County.
- 60% of the Lakeside division is in Wharton County.
- 40% of the Lakeside division is in Colorado County.
- The Gulf Coast division is within Matagorda County.
- Pierce Ranch is fully within Wharton County.

Applying the percentage for distribution of the irrigation divisions by county results in the surface water irrigation demands by County shown in Table 4.

Table 4. Baseline Surface Water Demand for Irrigation

County	Surface Water Demand for Irrigation (ac-ft/ac)
Colorado	131,618
Matagorda	128,528
Wharton	120,713
TOTAL	**380,859**

The LCRWPG Population and Water Demand Committee has elected, based on recommendation from the irrigation users, to apply a 2.7% reduction in demand each decade to account for increasing water use efficiency over time. This reduction in demand will be applied to surface water and groundwater-based irrigation demand.

4 PROPOSED METHODOLOGY FOR THE 2026 REGIONAL PLAN FOR GROUNDWATER DEMAND

Through working with the irrigators, it was determined that there has been a significant increase in groundwater use over time. The total irrigation demand was considered, but the worst case is when there is no surface water available. This effectively sets the upper limit on irrigation demand from groundwater during drought years.

Therefore, the groundwater demand for irrigation during the drought period 2011-2014 when surface water use was terminated establishes the baseline for groundwater-based irrigation. The total groundwater demand by County is shown in Table 5. All data is based on information obtained from groundwater conservation districts, except for the data shown for Colorado County for 2011 through 2013, in which TWDB data was used.

Table 5. Groundwater-based Irrigation Demand for 2011-2014 (ac-ft/yr)

County	2011	2012	2013	2014	Average
Colorado	50,965	26,535	18,658	25,692	30,463
Matagorda	51,410	31,681	33,286	33,365	37,436
Wharton	176,895	140,017	151,440	141,570	152,481

Since Wharton County is split between planning regions K and P, an evaluation was done to assess well counts within each region. The results showed that 59.6% of the wells in Wharton County are in Region K. Therefore, the 152,481 ac-ft/yr shown for Wharton County is reduced to 90,878 ac-ft/yr to establish the groundwater baseline.

Combining data from Tables 4 and 5, and modifying the Wharton County groundwater demand, results in the Baseline Irrigation Demand shown in Table 6.

Table 6. Baseline Irrigation Demand

County	Irrigation Demand (ac-ft/yr) (2030 Demand)
Colorado	162,081
Matagorda	165,964
Wharton	211,591

Applying the 2.3% reduction by decade results in the projections for irrigation demand shown in Table 7.

Table 7. Irrigation Demand Projections (ac-ft/yr)

County	2030	2040	2050	2060	2070	2080
Colorado	162,081	157,704	153,446	149,303	145,272	141,350
Matagorda	165,964	161,483	157,123	152,881	148,753	144,737
Wharton	211,591	205,878	200,320	194,911	189,648	184,528
TOTAL	539,636	525,066	510,889	497,095	483,673	470,614

Attachment 1
Historical Acreage

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Gulf Coast 1st crop acreage	18,316	0	0		0	13,714	8,545	11,728	6,253	9,590	8,952	8,327
Gulf Coast 2nd crop acreage	15,120	0	0		0	10,851	5,537	7,547	3,280	5,035	2,972	0
Gulf Coast supplemental acreage	12,404	4,543	3,077	0	1,820	3,704	2,686	3,564	1,776	3,333	1,826	4,662
Lakeside 1st crop acreage	27,554	0	0			24,190	19,371	22,415	17,998	21,460	21,594	25,625
Lakeside 2nd crop acreage	12,736	0	0			18,099	10,754	14,699	8,273	13,042	15,666	0
Lakeside supplemental acreage	0	0	0			1,047	511	270	1,392	856	1,299	875
Garwood 1st crop acreage	18,687	16,866	18,638	19,000	18,353	19,290	16,146	19,572	17,574	19,756	19,777	20,785
Garwood 2nd crop acreage	14,651	14,949	16,982	16,263	14,141	14,238	12,819	14,842	13,319	16,146	17,308	15,878
Garwood supplemental acreage	0	0	1,799	2,376	2,255	2,300	3,708	4,218	4,618	3,136	3,148	3,590
Pierce Ranch 1st crop acreage	6,792	0	506	733	584	2,482	2,895	2,468	2,499	2,494	2,225	2,676
Pierce Ranch 2nd crop acreage	3,693	324	0	0	0	2,068	2,706	2,468	1,597	1,746	1,521	
Pierce Ranch supplemental acreage	0	1,920	2,027	1,693	1,094	1,162	1,068	1,079	844	844	622	724

Appendix 2.B

Population and Water Demand Projections Adopted by the TWDB

Appendix 2.B







2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

DRAFT Region K Water User Group (WUG) Population

	WUG Population					
	2030	2040	2050	2060	2070	2080
Bastrop County Total	**120,901**	**150,018**	**184,520**	**223,711**	**268,126**	**318,461**
Bastrop County / Brazos Basin Total	**1,515**	**1,962**	**2,501**	**3,117**	**3,853**	**4,708**
Aqua WSC*	763	948	1,167	1,416	1,699	2,018
Lee County WSC*	687	943	1,248	1,593	1,985	2,428
County-Other	65	71	86	108	169	262
Bastrop County / Colorado Basin Total	**118,864**	**147,410**	**181,224**	**219,628**	**263,100**	**312,339**
Aqua WSC*	78,181	97,153	119,637	145,176	174,116	206,917
Bastrop	11,346	14,029	17,208	20,819	24,912	29,550
Bastrop County WCID 2	5,276	6,491	7,929	9,563	11,414	13,513
Creedmoor-Maha WSC*	232	365	523	702	905	1,135
Elgin	12,864	17,032	21,363	25,753	27,638	27,638
Fayette WSC*	61	98	143	194	251	316
Lee County WSC*	830	1,139	1,508	1,925	2,398	2,934
Polonia WSC*	189	191	192	194	196	198
Smithville	3,686	3,960	4,274	4,635	5,045	5,512
The Colony MUD 1A	583	795	1,049	1,336	1,661	2,029
County-Other	5,616	6,157	7,398	9,331	14,564	22,597
Bastrop County / Guadalupe Basin Total	**522**	**646**	**795**	**966**	**1,173**	**1,414**
Aqua WSC*	500	622	766	929	1,115	1,325
County-Other	22	24	29	37	58	89
Blanco County Total	**11,851**	**11,951**	**11,731**	**11,518**	**11,277**	**11,004**
Blanco County / Colorado Basin Total	**6,211**	**6,308**	**6,256**	**6,210**	**6,155**	**6,089**
Corix Utilities Texas Inc*	217	217	217	217	217	217
Johnson City	1,877	1,993	2,116	2,246	2,384	2,531
County-Other	4,117	4,098	3,923	3,747	3,554	3,341
Blanco County / Guadalupe Basin Total	**5,640**	**5,643**	**5,475**	**5,308**	**5,122**	**4,915**
Blanco	1,522	1,535	1,507	1,480	1,450	1,414
Canyon Lake Water Service*	536	536	536	536	536	536
Rancho Del Lago	509	514	504	495	484	472
County-Other	3,073	3,058	2,928	2,797	2,652	2,493
Burnet County Total	**55,262**	**60,627**	**65,257**	**70,323**	**76,064**	**82,570**
Burnet County / Brazos Basin Total	**9,907**	**10,880**	**12,669**	**14,620**	**16,822**	**19,305**
Bertram	4,578	5,926	7,093	8,433	9,943	11,646
Corix Utilities Texas Inc*	65	72	79	86	95	104

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DRAFT Region K Water User Group (WUG) Population

	WUG Population					
	2030	2040	2050	2060	2070	2080
Georgetown*	566	802	908	961	1,034	1,080
Kempner WSC*	567	548	531	508	483	454
County-Other	4,131	3,532	4,058	4,632	5,267	6,021
Burnet County / Colorado Basin Total	**45,355**	**49,747**	**52,588**	**55,703**	**59,242**	**63,265**
Bertram	209	271	324	385	454	532
Burnet	6,963	7,387	7,752	8,133	8,567	9,063
Corix Utilities Texas Inc*	4,385	4,909	5,361	5,864	6,431	7,072
Cottonwood Shores	1,702	1,939	2,143	2,372	2,631	2,925
Granite Shoals	6,320	6,528	6,707	6,873	7,065	7,288
Horseshoe Bay	909	993	1,065	1,144	1,234	1,336
Kingsland WSC	808	1,013	1,270	1,593	1,998	2,506
Marble Falls	13,287	17,072	17,079	17,086	17,093	17,101
Meadowlakes	1,922	2,068	2,193	2,329	2,482	2,541
County-Other	8,850	7,567	8,694	9,924	11,287	12,901
Colorado County Total	**19,985**	**19,396**	**18,742**	**18,145**	**17,468**	**16,701**
Colorado County / Brazos-Colorado Basin Total	**2,263**	**2,140**	**2,015**	**1,915**	**1,803**	**1,678**
Eagle Lake	896	805	717	656	588	513
County-Other	1,367	1,335	1,298	1,259	1,215	1,165
Colorado County / Colorado Basin Total	**13,971**	**13,595**	**13,172**	**12,782**	**12,337**	**11,831**
Columbus	3,369	3,424	3,460	3,470	3,469	3,454
Corix Utilities Texas Inc*	310	282	257	234	213	193
Eagle Lake	2,106	1,891	1,684	1,540	1,381	1,206
Weimar	572	558	541	524	506	485
County-Other	7,614	7,440	7,230	7,014	6,768	6,493
Colorado County / Lavaca Basin Total	**3,751**	**3,661**	**3,555**	**3,448**	**3,328**	**3,192**
Weimar	1,277	1,243	1,205	1,169	1,128	1,082
County-Other	2,474	2,418	2,350	2,279	2,200	2,110
Fayette County Total	**24,270**	**23,782**	**23,237**	**23,121**	**22,990**	**22,842**
Fayette County / Colorado Basin Total	**16,514**	**16,371**	**16,205**	**16,329**	**16,459**	**16,591**
Fayette County WCID Monument Hill	566	557	546	543	541	539
Fayette WSC*	6,787	7,277	7,803	8,366	8,971	9,618
La Grange	4,645	4,553	4,449	4,426	4,401	4,373
Lee County WSC*	1,198	1,173	1,146	1,139	1,133	1,126
West End WSC*	754	737	721	716	713	707

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DRAFT Region K Water User Group (WUG) Population

	WUG Population					
	2030	2040	2050	2060	2070	2080
County-Other	2,564	2,074	1,540	1,139	700	228
Fayette County / Guadalupe Basin Total	**809**	**822**	**835**	**859**	**884**	**913**
Fayette WSC*	466	500	536	575	616	661
Flatonia	259	254	248	247	245	244
County-Other	84	68	51	37	23	8
Fayette County / Lavaca Basin Total	**6,947**	**6,589**	**6,197**	**5,933**	**5,647**	**5,338**
Fayette WSC*	746	800	858	920	986	1,058
Flatonia	1,168	1,145	1,117	1,111	1,106	1,098
Schulenburg	3,000	3,000	3,000	3,000	3,000	3,000
County-Other	2,033	1,644	1,222	902	555	182
Gillespie County Total	**28,366**	**29,831**	**31,307**	**33,419**	**35,813**	**38,526**
Gillespie County / Colorado Basin Total	**27,738**	**29,159**	**30,591**	**32,638**	**34,959**	**37,589**
Fredericksburg	11,261	11,529	11,794	12,138	12,539	13,005
County-Other	16,477	17,630	18,797	20,500	22,420	24,584
Gillespie County / Guadalupe Basin Total	**628**	**672**	**716**	**781**	**854**	**937**
County-Other	628	672	716	781	854	937
Hays County Total	**95,467**	**137,717**	**193,353**	**268,868**	**354,449**	**451,437**
Hays County / Colorado Basin Total	**95,467**	**137,717**	**193,353**	**268,868**	**354,449**	**451,437**
Austin	129	152	176	200	224	249
Buda	20,475	28,665	34,156	39,620	45,959	53,312
Canyon Lake Water Service*	1,266	1,301	1,326	1,345	1,358	1,358
Cimarron Park Water	2,115	2,115	2,115	2,115	2,115	2,115
Dripping Springs WSC	16,368	23,698	34,310	40,673	40,673	40,673
Goforth SUD*	3,076	4,440	6,235	8,672	11,434	14,563
Hays	1,109	1,601	2,248	3,127	4,123	5,250
Hays County WCID 1	3,647	3,647	3,647	3,647	3,647	3,647
Hays County WCID 2	3,390	3,390	3,390	3,390	3,390	3,390
Headwaters at Barton Creek	1,231	1,778	2,497	3,473	4,579	5,832
La Ventana WSC	825	825	825	825	825	825
Mid-Tex Utilities	1,031	1,488	2,089	2,905	3,831	4,879
Reunion Ranch WCID	1,167	1,684	2,364	3,289	4,336	5,524
Ruby Ranch WSC	1,122	1,122	1,122	1,122	1,122	1,122
West Travis County Public Utility Agency	17,091	24,658	34,623	48,148	63,476	80,848

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DRAFT Region K Water User Group (WUG) Population

	WUG Population					
	2030	2040	2050	2060	2070	2080
County-Other*	21,425	37,153	62,230	106,317	163,357	227,850
Llano County Total	**23,089**	**23,892**	**24,399**	**25,729**	**27,236**	**28,944**
Llano County / Colorado Basin Total	**23,089**	**23,892**	**24,399**	**25,729**	**27,236**	**28,944**
Corix Utilities Texas Inc*	2,617	2,680	2,730	2,803	2,887	2,983
Horseshoe Bay	3,754	3,927	4,021	4,355	4,733	5,158
Kingsland WSC	7,650	8,817	10,162	11,712	13,499	15,558
Llano	3,349	3,394	3,448	3,444	3,443	3,443
Sunrise Beach Village	768	784	797	808	822	838
County-Other	4,951	4,290	3,241	2,607	1,852	964
Matagorda County Total	**35,212**	**34,061**	**32,705**	**31,115**	**29,313**	**27,271**
Matagorda County / Brazos-Colorado Basin Total	**25,212**	**24,830**	**24,407**	**23,889**	**23,289**	**22,584**
Bay City	17,323	17,299	17,347	17,380	17,405	17,417
Caney Creek MUD of Matagorda County	2,339	2,541	2,772	3,023	3,294	3,586
Corix Utilities Texas Inc*	391	391	374	356	338	302
Matagorda County WCID 6	985	953	914	870	819	761
Matagorda Waste Disposal & WSC	5	5	5	5	4	4
County-Other	4,169	3,641	2,995	2,255	1,429	514
Matagorda County / Colorado Basin Total	**1,163**	**1,050**	**910**	**752**	**575**	**378**
Bay City	56	56	56	56	56	56
Corix Utilities Texas Inc*	4	4	3	3	3	3
Matagorda Waste Disposal & WSC	281	272	261	248	234	218
County-Other	822	718	590	445	282	101
Matagorda County / Colorado-Lavaca Basin Total	**8,837**	**8,181**	**7,388**	**6,474**	**5,449**	**4,309**
Markham MUD	753	727	699	664	625	581
Palacios	4,116	3,980	3,820	3,632	3,419	3,178
Quadvest*	93	90	86	82	77	72
County-Other	3,875	3,384	2,783	2,096	1,328	478
Mills County Total	**4,177**	**3,870**	**3,550**	**3,350**	**3,140**	**2,919**
Mills County / Brazos Basin Total	**749**	**641**	**528**	**463**	**397**	**333**
Goldthwaite	29	29	29	29	29	29
County-Other	720	612	499	434	368	304

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DRAFT Region K Water User Group (WUG) Population

	WUG Population					
	2030	**2040**	**2050**	**2060**	**2070**	**2080**
Mills County / Colorado Basin Total	**3,428**	**3,229**	**3,022**	**2,887**	**2,743**	**2,586**
Corix Utilities Texas Inc*	542	520	498	469	432	381
Goldthwaite	1,709	1,709	1,709	1,709	1,709	1,709
County-Other	1,177	1,000	815	709	602	496
San Saba County Total	**5,439**	**5,159**	**4,906**	**4,736**	**4,557**	**4,369**
San Saba County / Colorado Basin Total	**5,439**	**5,159**	**4,906**	**4,736**	**4,557**	**4,369**
Corix Utilities Texas Inc*	104	96	85	77	68	57
North San Saba WSC	448	420	396	379	362	341
Richland SUD*	658	619	591	569	561	570
San Saba	3,000	3,000	3,000	3,000	3,000	3,000
County-Other	1,229	1,024	834	711	566	401
Travis County Total	**1,655,086**	**1,969,741**	**2,230,906**	**2,474,606**	**2,720,449**	**2,985,821**
Travis County / Colorado Basin Total	**1,654,203**	**1,968,636**	**2,229,645**	**2,473,206**	**2,718,868**	**2,984,031**
Aqua WSC*	8,397	9,970	11,335	12,696	14,240	15,990
Austin	1,125,827	1,315,416	1,506,094	1,695,615	1,871,015	2,055,039
Barton Creek West WSC	1,306	1,337	1,337	1,337	1,337	1,337
Barton Creek WSC	565	606	642	680	723	771
Briarcliff	3,281	4,021	4,662	5,296	6,016	6,833
Canyon Lake Water Service*	1,266	1,301	1,327	1,345	1,359	1,359
Cedar Park*	10,542	11,955	12,521	12,521	12,521	12,521
Cottonwood Creek MUD 1	5,000	5,000	5,000	5,000	5,000	5,000
Creedmoor-Maha WSC*	6,600	7,618	8,503	9,393	10,401	11,543
Cypress Ranch WCID 1	1,664	1,786	1,786	1,786	1,786	1,786
Elgin	6,295	11,502	16,546	21,531	23,106	23,106
Garfield WSC	1,516	1,602	1,679	1,761	1,854	1,959
Hornsby Bend Utility	12,375	15,477	18,162	20,812	23,822	27,238
Hurst Creek MUD	2,781	2,781	2,781	2,781	2,781	2,781
Jonestown WSC	5,177	6,206	7,440	8,919	10,692	12,818
Kelly Lane WCID 1	2,499	2,499	2,499	2,499	2,499	2,499
Kelly Lane WCID 2	4,352	6,179	7,755	9,294	11,043	13,031
Lago Vista	16,749	24,793	34,870	44,503	46,752	49,000
Lakeside MUD 3*	3,261	4,572	5,703	6,807	8,062	9,489
Lakeside WCID 1	2,803	3,313	3,756	4,197	4,698	5,266
Lakeside WCID 2-B	2,177	2,498	2,778	3,060	3,379	3,740
Lakeside WCID 2-C	6,495	8,970	11,106	13,194	15,567	18,265
Lakeside WCID 2-D	4,553	6,241	7,697	9,122	10,741	12,583

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DRAFT Region K Water User Group (WUG) Population

	WUG Population					
	2030	2040	2050	2060	2070	2080
Lakeway MUD	10,726	11,095	11,242	11,242	11,242	11,242
Leander*	31,825	40,207	39,805	37,624	36,091	34,990
Loop 360 WSC	1,551	1,527	1,509	1,501	1,491	1,479
Manor	20,961	28,491	34,994	41,355	48,588	56,807
Manville WSC*	25,938	32,321	37,847	43,303	49,499	56,533
Mid-Tex Utilities	1,802	2,490	3,085	3,666	4,326	5,077
North Austin MUD 1	927	927	927	927	927	927
Northtown MUD	9,899	10,395	10,837	11,322	11,866	12,476
Pflugerville	71,822	89,950	105,642	121,124	138,707	158,669
Rollingwood	1,507	1,527	1,546	1,574	1,605	1,638
Rough Hollow in Travis County	5,698	5,698	5,698	5,698	5,698	5,698
Round Rock*	1,995	2,439	2,824	3,205	3,639	4,130
Senna Hills MUD	882	903	924	946	968	991
Shady Hollow MUD	3,291	3,359	3,422	3,503	3,592	3,691
Sunset Valley	737	737	737	737	737	737
Sweetwater Community	4,423	5,832	5,832	5,832	5,832	5,832
Travis County MUD 10	485	658	807	953	1,118	1,307
Travis County MUD 14	3,039	3,632	4,146	4,657	5,238	5,897
Travis County MUD 18	1,449	1,449	1,449	1,449	1,449	1,449
Travis County MUD 2	4,418	5,593	6,609	7,611	8,749	10,041
Travis County MUD 4	3,318	3,916	4,436	4,954	5,542	6,208
Travis County WCID 10	7,658	8,175	8,631	9,116	9,662	10,276
Travis County WCID 17	46,952	57,890	67,364	76,734	87,372	99,447
Travis County WCID 18	5,523	5,523	5,523	5,523	5,523	5,523
Travis County WCID 19	463	470	477	484	491	498
Travis County WCID 20	1,469	1,469	1,469	1,469	1,469	1,469
Travis County WCID Point Venture	1,668	2,019	2,444	2,959	3,582	4,337
Undine Development	561	561	561	561	561	561
Wells Branch MUD	21,073	21,907	21,907	21,907	21,907	21,907
West Travis County Public Utility Agency	26,862	34,242	40,627	46,912	54,051	62,159
Wilbarger Creek MUD 1	3,171	4,549	5,738	6,897	8,216	9,715
Williamson County WSID 3*	446	367	302	249	205	169
Williamson Travis Counties MUD 1*	1,195	1,195	1,195	1,195	1,195	1,195
Windermere Utility	17,553	17,866	17,866	17,866	17,866	17,866
County-Other	77,435	103,614	95,244	74,002	70,470	69,136
Travis County / Guadalupe Basin Total	**883**	**1,105**	**1,261**	**1,400**	**1,581**	**1,790**
Creedmoor-Maha WSC*	474	547	611	675	747	829

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DRAFT Region K Water User Group (WUG) Population

	WUG Population					
	2030	2040	2050	2060	2070	2080
Goforth SUD*	316	434	536	636	749	878
County-Other	93	124	114	89	85	83
Wharton County Total	**25,098**	**24,970**	**24,550**	**24,030**	**23,441**	**22,773**
Wharton County / Brazos-Colorado Basin Total	**16,996**	**16,906**	**16,576**	**16,187**	**15,750**	**15,252**
Boling MWD	635	628	529	447	356	256
Wharton	5,851	5,817	5,608	5,401	5,169	4,908
Wharton County WCID 2	1,531	1,521	1,439	1,364	1,280	1,185
County-Other*	8,979	8,940	9,000	8,975	8,945	8,903
Wharton County / Colorado Basin Total	**6,756**	**6,723**	**6,624**	**6,497**	**6,350**	**6,185**
El Campo*	139	137	112	93	70	46
Wharton	2,767	2,752	2,653	2,555	2,445	2,321
County-Other*	3,850	3,834	3,859	3,849	3,835	3,818
Wharton County / Colorado-Lavaca Basin Total	**1,243**	**1,238**	**1,246**	**1,243**	**1,238**	**1,233**
County-Other*	1,243	1,238	1,246	1,243	1,238	1,233
Wharton County / Lavaca Basin Total	**103**	**103**	**104**	**103**	**103**	**103**
County-Other*	103	103	104	103	103	103
Williamson County Total	**104,339**	**136,312**	**174,024**	**215,276**	**262,027**	**315,010**
Williamson County / Brazos Basin Total	**104,339**	**136,312**	**174,024**	**215,276**	**262,027**	**315,010**
Austin	94,844	124,153	163,421	203,844	247,105	291,088
Brushy Creek MUD*	292	292	292	294	294	294
Fern Bluff MUD*	119	121	123	125	127	129
North Austin MUD 1	8,584	8,584	8,584	8,584	8,584	8,584
Wells Branch MUD	500	734	1,012	1,073	1,073	1,073
County-Other*	0	2,428	592	1,356	4,844	13,842
Region K Population Total	**2,208,542**	**2,631,327**	**3,023,187**	**3,427,947**	**3,856,350**	**4,328,648**

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DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Bastrop County Total	**33,737**	**38,329**	**43,876**	**50,211**	**57,540**	**65,957**
Bastrop County / Brazos Basin Total	**612**	**677**	**756**	**848**	**960**	**1,089**
Aqua WSC*	123	152	187	227	273	324
Lee County WSC*	96	131	173	221	276	337
County-Other	12	13	15	19	30	47
Livestock	97	97	97	97	97	97
Irrigation	284	284	284	284	284	284
Bastrop County / Colorado Basin Total	**32,752**	**37,260**	**42,704**	**48,919**	**56,103**	**64,351**
Aqua WSC*	12,590	15,597	19,207	23,307	27,952	33,218
Bastrop	2,048	2,523	3,095	3,744	4,480	5,315
Bastrop County WCID 2	482	590	721	870	1,038	1,229
Creedmoor-Maha WSC*	25	39	55	74	96	120
Elgin	1,737	2,290	2,872	3,462	3,716	3,716
Fayette WSC*	8	13	19	26	34	43
Lee County WSC*	116	158	210	268	333	408
Polonia WSC*	23	23	23	23	24	24
Smithville	616	660	712	772	840	918
The Colony MUD 1A	196	267	352	448	557	680
County-Other	1,003	1,098	1,320	1,664	2,597	4,028
Manufacturing	414	429	445	461	478	496
Mining	388	467	567	694	852	1,050
Steam Electric Power	7,764	7,764	7,764	7,764	7,764	7,764
Livestock	1,102	1,102	1,102	1,102	1,102	1,102
Irrigation	4,240	4,240	4,240	4,240	4,240	4,240
Bastrop County / Guadalupe Basin Total	**373**	**392**	**416**	**444**	**477**	**517**
Aqua WSC*	81	100	123	149	179	213
County-Other	4	4	5	7	10	16
Livestock	51	51	51	51	51	51
Irrigation	237	237	237	237	237	237
Blanco County Total	**3,914**	**3,927**	**3,906**	**3,887**	**3,864**	**3,837**
Blanco County / Colorado Basin Total	**2,504**	**2,518**	**2,519**	**2,522**	**2,522**	**2,522**
Corix Utilities Texas Inc*	40	40	40	40	40	40
Johnson City	315	333	353	375	398	423
County-Other	490	485	464	444	421	395
Manufacturing	12	13	14	15	15	16

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DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Mining	9	9	10	10	10	10
Livestock	297	297	297	297	297	297
Irrigation	1,341	1,341	1,341	1,341	1,341	1,341
Blanco County / Guadalupe Basin Total	**1,410**	**1,409**	**1,387**	**1,365**	**1,342**	**1,315**
Blanco	216	217	213	209	205	200
Canyon Lake Water Service*	65	65	65	65	65	65
Rancho Del Lago	129	130	127	125	122	119
County-Other	365	362	347	331	314	295
Manufacturing	4	4	4	4	5	5
Livestock	58	58	58	58	58	58
Irrigation	573	573	573	573	573	573
Burnet County Total	**15,598**	**17,240**	**18,303**	**19,443**	**20,686**	**22,032**
Burnet County / Brazos Basin Total	**3,560**	**3,906**	**4,348**	**4,823**	**5,343**	**5,916**
Bertram	1,099	1,420	1,699	2,021	2,382	2,790
Corix Utilities Texas Inc*	12	13	15	16	17	19
Georgetown*	107	151	171	181	195	204
Kempner WSC*	109	105	102	97	93	87
County-Other	617	525	604	689	783	896
Mining	364	440	505	567	621	668
Livestock	484	484	484	484	484	484
Irrigation	768	768	768	768	768	768
Burnet County / Colorado Basin Total	**12,038**	**13,334**	**13,955**	**14,620**	**15,343**	**16,116**
Bertram	50	65	78	92	109	128
Burnet	1,529	1,617	1,697	1,780	1,875	1,984
Corix Utilities Texas Inc*	812	906	989	1,082	1,187	1,305
Cottonwood Shores	293	333	368	407	452	502
Granite Shoals	648	666	684	701	721	743
Horseshoe Bay	413	451	484	520	560	607
Kingsland WSC	85	106	132	166	208	261
Marble Falls	3,497	4,480	4,482	4,484	4,485	4,488
Meadowlakes	635	683	724	769	819	839
County-Other	1,321	1,126	1,293	1,476	1,679	1,919
Manufacturing	556	562	568	574	580	587
Mining	665	805	922	1,035	1,134	1,219
Livestock	311	311	311	311	311	311

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DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Irrigation	1,223	1,223	1,223	1,223	1,223	1,223
Colorado County Total	**170,166**	**165,810**	**161,612**	**157,515**	**153,517**	**149,602**
Colorado County / Brazos-Colorado Basin Total	**49,202**	**47,870**	**46,578**	**45,322**	**44,100**	**42,908**
Eagle Lake	119	106	94	86	78	68
County-Other	163	158	154	149	144	138
Manufacturing	2	2	3	3	3	3
Livestock	296	296	296	296	296	296
Irrigation	48,622	47,308	46,031	44,788	43,579	42,403
Colorado County / Colorado Basin Total	**32,499**	**31,825**	**31,207**	**30,591**	**29,981**	**29,368**
Columbus	980	994	1,004	1,007	1,007	1,003
Corix Utilities Texas Inc*	57	52	47	43	39	36
Eagle Lake	279	249	222	203	182	159
Weimar	129	125	121	118	114	109
County-Other	906	880	855	829	801	768
Manufacturing	105	109	113	117	121	126
Mining	2,773	2,857	2,977	3,078	3,176	3,263
Steam Electric Power	226	226	226	226	226	226
Livestock	731	731	731	731	731	731
Irrigation	26,313	25,602	24,911	24,239	23,584	22,947
Colorado County / Lavaca Basin Total	**88,465**	**86,115**	**83,827**	**81,602**	**79,436**	**77,326**
Weimar	287	279	271	262	253	243
County-Other	294	286	278	270	260	249
Manufacturing	486	504	522	542	562	582
Livestock	252	252	252	252	252	252
Irrigation	87,146	84,794	82,504	80,276	78,109	76,000
Fayette County Total	**27,600**	**27,536**	**27,482**	**27,489**	**27,496**	**26,569**
Fayette County / Colorado Basin Total	**24,705**	**24,677**	**24,656**	**24,676**	**24,699**	**24,134**
Fayette County WCID Monument Hill	135	133	130	129	129	128
Fayette WSC*	928	990	1,061	1,139	1,221	1,309
La Grange	791	772	755	751	747	742
Lee County WSC*	167	163	159	158	157	156
West End WSC*	79	77	75	74	74	73
County-Other	321	258	192	141	87	28

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DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Manufacturing	3	3	3	3	3	3
Mining	587	587	587	587	587	1
Steam Electric Power	20,052	20,052	20,052	20,052	20,052	20,052
Livestock	1,208	1,208	1,208	1,208	1,208	1,208
Irrigation	434	434	434	434	434	434
Fayette County / Guadalupe Basin Total	**302**	**302**	**304**	**307**	**311**	**315**
Fayette WSC*	64	68	73	78	84	90
Flatonia	53	52	51	50	50	50
County-Other	11	8	6	5	3	1
Livestock	102	102	102	102	102	102
Irrigation	72	72	72	72	72	72
Fayette County / Lavaca Basin Total	**2,593**	**2,557**	**2,522**	**2,506**	**2,486**	**2,120**
Fayette WSC*	102	109	117	125	134	144
Flatonia	240	234	228	228	226	225
Schulenburg	654	652	652	652	652	652
County-Other	254	204	152	112	69	23
Manufacturing	396	411	426	442	458	475
Mining	347	347	347	347	347	1
Livestock	383	383	383	383	383	383
Irrigation	217	217	217	217	217	217
Gillespie County Total	**8,883**	**9,084**	**9,309**	**9,620**	**9,971**	**10,369**
Gillespie County / Colorado Basin Total	**8,806**	**9,002**	**9,222**	**9,526**	**9,869**	**10,257**
Fredericksburg	3,075	3,137	3,209	3,303	3,412	3,539
County-Other	1,870	1,989	2,121	2,314	2,531	2,774
Manufacturing	388	402	417	432	448	465
Mining	19	20	21	23	24	25
Livestock	996	996	996	996	996	996
Irrigation	2,458	2,458	2,458	2,458	2,458	2,458
Gillespie County / Guadalupe Basin Total	**77**	**82**	**87**	**94**	**102**	**112**
County-Other	71	76	81	88	96	106
Livestock	6	6	6	6	6	6

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DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Hays County Total	**19,392**	**26,881**	**36,642**	**49,403**	**63,493**	**79,467**
Hays County / Colorado Basin Total	**19,392**	**26,881**	**36,642**	**49,403**	**63,493**	**79,467**
Austin	22	26	30	34	38	42
Buda	3,236	4,515	5,380	6,240	7,239	8,397
Canyon Lake Water Service*	155	158	161	164	165	165
Cimarron Park Water	235	234	234	234	234	234
Dripping Springs WSC	2,802	4,044	5,854	6,940	6,940	6,940
Goforth SUD*	335	481	676	940	1,239	1,578
Hays	161	232	325	453	597	760
Hays County WCID 1	803	801	801	801	801	801
Hays County WCID 2	777	775	775	775	775	775
Headwaters at Barton Creek	104	150	210	292	385	490
La Ventana WSC	138	137	137	137	137	137
Mid-Tex Utilities	119	171	240	334	440	560
Reunion Ranch WCID	315	454	637	887	1,169	1,490
Ruby Ranch WSC	143	142	142	142	142	142
West Travis County Public Utility Agency	5,950	8,570	12,034	16,735	22,062	28,100
County-Other*	2,561	4,424	7,410	12,659	19,451	27,130
Manufacturing*	78	85	92	99	106	114
Mining*	959	983	1,005	1,038	1,074	1,113
Livestock*	116	116	116	116	116	116
Irrigation*	383	383	383	383	383	383
Llano County Total	**9,781**	**7,963**	**8,060**	**8,331**	**8,638**	**8,984**
Llano County / Colorado Basin Total	**9,781**	**7,963**	**8,060**	**8,331**	**8,638**	**8,984**
Corix Utilities Texas Inc*	485	495	504	517	533	550
Horseshoe Bay	1,707	1,783	1,826	1,978	2,149	2,342
Kingsland WSC	801	919	1,059	1,220	1,407	1,621
Llano	795	804	817	816	816	816
Sunrise Beach Village	75	77	78	79	80	82
County-Other	498	429	324	261	185	96
Manufacturing	3	3	3	3	3	3
Mining	2,214	250	246	254	262	271
Steam Electric Power	1,927	1,927	1,927	1,927	1,927	1,927
Livestock	628	628	628	628	628	628
Irrigation	648	648	648	648	648	648

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DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Matagorda County Total	**275,566**	**271,221**	**267,010**	**262,905**	**258,902**	**254,996**
Matagorda County / Brazos-Colorado Basin Total	**78,276**	**76,215**	**74,224**	**72,274**	**70,368**	**68,501**
Bay City	2,547	2,533	2,540	2,544	2,548	2,550
Caney Creek MUD of Matagorda County	276	298	325	355	386	421
Corix Utilities Texas Inc*	72	72	69	65	62	55
Matagorda County WCID 6	97	93	89	85	80	74
Matagorda Waste Disposal & WSC	1	1	1	1	1	1
County-Other	416	360	297	223	141	51
Livestock	453	453	453	453	453	453
Irrigation	74,414	72,405	70,450	68,548	66,697	64,896
Matagorda County / Colorado Basin Total	**46,160**	**46,172**	**46,198**	**46,240**	**46,296**	**46,369**
Bay City	8	8	8	8	8	8
Corix Utilities Texas Inc*	1	1	1	1	1	1
Matagorda Waste Disposal & WSC	50	48	46	44	41	38
County-Other	82	71	58	44	28	10
Manufacturing	36,678	36,951	37,234	37,528	37,832	38,148
Livestock	132	132	132	132	132	132
Irrigation	9,209	8,961	8,719	8,483	8,254	8,032
Matagorda County / Colorado-Lavaca Basin Total	**151,130**	**148,834**	**146,588**	**144,391**	**142,238**	**140,126**
Markham MUD	69	66	63	60	57	53
Palacios	486	468	449	427	402	373
Quadvest*	20	20	19	18	17	16
County-Other	386	335	275	208	132	47
Mining	1	1	1	1	1	1
Steam Electric Power	67,453	67,453	67,453	67,453	67,453	67,453
Livestock	374	374	374	374	374	374
Irrigation	82,341	80,117	77,954	75,850	73,802	71,809
Mills County Total	**6,398**	**6,360**	**6,323**	**6,302**	**6,277**	**6,252**
Mills County / Brazos Basin Total	**1,693**	**1,680**	**1,668**	**1,661**	**1,655**	**1,649**
Goldthwaite	10	10	10	10	10	10
County-Other	90	76	62	54	46	38
Mining	42	43	45	46	48	50
Livestock	311	311	311	311	311	311
Irrigation	1,240	1,240	1,240	1,240	1,240	1,240

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DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Mills County / Colorado Basin Total	**4,705**	**4,680**	**4,655**	**4,641**	**4,622**	**4,603**
Corix Utilities Texas Inc*	100	96	92	87	80	70
Goldthwaite	605	604	604	604	604	604
County-Other	146	124	101	88	74	61
Manufacturing	2	2	2	2	2	2
Mining	66	68	70	74	76	80
Livestock	511	511	511	511	511	511
Irrigation	3,275	3,275	3,275	3,275	3,275	3,275
San Saba County Total	**10,702**	**10,639**	**10,588**	**10,553**	**10,522**	**10,495**
San Saba County / Colorado Basin Total	**10,702**	**10,639**	**10,588**	**10,553**	**10,522**	**10,495**
Corix Utilities Texas Inc*	19	18	16	14	13	11
North San Saba WSC	126	118	111	107	102	96
Richland SUD*	343	322	308	296	292	297
San Saba	1,029	1,027	1,027	1,027	1,027	1,027
County-Other	186	154	125	107	85	60
Manufacturing	19	20	21	22	23	24
Livestock	893	893	893	893	893	893
Irrigation	8,087	8,087	8,087	8,087	8,087	8,087
Travis County Total	**314,373**	**369,982**	**419,133**	**465,785**	**509,391**	**556,427**
Travis County / Colorado Basin Total	**314,268**	**369,852**	**418,987**	**465,625**	**509,212**	**556,225**
Aqua WSC*	1,352	1,601	1,820	2,038	2,286	2,567
Austin	191,812	223,243	255,604	287,768	317,536	348,767
Barton Creek West WSC	420	430	430	430	430	430
Barton Creek WSC	419	449	476	504	536	571
Briarcliff	476	581	674	766	870	988
Canyon Lake Water Service*	155	158	161	164	165	165
Cedar Park*	2,205	2,493	2,611	2,611	2,611	2,611
Cottonwood Creek MUD 1	336	336	336	336	336	336
Creedmoor-Maha WSC*	703	805	899	993	1,100	1,220
Cypress Ranch WCID 1	163	174	174	174	174	174
Elgin	850	1,546	2,224	2,895	3,106	3,106
Garfield WSC	163	171	179	188	198	209
Hornsby Bend Utility	984	1,222	1,434	1,643	1,880	2,150
Hurst Creek MUD	1,154	1,152	1,152	1,152	1,152	1,152
Jonestown WSC	861	1,029	1,234	1,479	1,773	2,126
Kelly Lane WCID 1	467	465	465	465	465	465

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DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Kelly Lane WCID 2	418	591	742	889	1,057	1,247
Lago Vista	4,061	5,999	8,437	10,768	11,312	11,856
Lakeside MUD 3*	455	637	794	948	1,123	1,321
Lakeside WCID 1	254	298	338	377	422	473
Lakeside WCID 2-B	443	507	564	621	686	759
Lakeside WCID 2-C	542	745	922	1,095	1,292	1,516
Lakeside WCID 2-D	659	901	1,112	1,318	1,551	1,818
Lakeway MUD	2,659	2,745	2,782	2,782	2,782	2,782
Leander*	4,420	5,585	5,529	5,226	5,013	4,860
Loop 360 WSC	904	889	878	874	868	861
Manor	2,613	3,538	4,346	5,136	6,034	7,055
Manville WSC*	3,932	4,875	5,708	6,531	7,466	8,527
Mid-Tex Utilities	208	286	354	421	497	583
North Austin MUD 1	96	95	95	95	95	95
Northtown MUD	665	699	728	761	797	838
Pflugerville	11,645	14,526	17,060	19,560	22,400	25,624
Rollingwood	401	405	410	417	426	434
Rough Hollow in Travis County	1,193	1,191	1,191	1,191	1,191	1,191
Round Rock*	311	380	440	499	567	643
Senna Hills MUD	300	306	314	321	328	336
Shady Hollow MUD	585	595	607	621	637	654
Sunset Valley	286	284	284	284	284	284
Sweetwater Community	639	840	840	840	840	840
Travis County MUD 10	101	137	168	199	233	272
Travis County MUD 14	245	291	332	373	419	472
Travis County MUD 18	230	229	229	229	229	229
Travis County MUD 2	545	686	810	933	1,073	1,231
Travis County MUD 4	2,027	2,390	2,707	3,023	3,382	3,788
Travis County WCID 10	3,475	3,705	3,911	4,131	4,378	4,657
Travis County WCID 17	11,813	14,529	16,906	19,258	21,928	24,958
Travis County WCID 18	906	902	902	902	902	902
Travis County WCID 19	302	306	311	315	320	324
Travis County WCID 20	755	754	754	754	754	754
Travis County WCID Point Venture	410	495	599	725	878	1,063
Undine Development	138	137	137	137	137	137
Wells Branch MUD	1,464	1,511	1,511	1,511	1,511	1,511
West Travis County Public Utility Agency	9,351	11,901	14,121	16,305	18,786	21,605

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Wilbarger Creek MUD 1	255	365	460	553	659	779
Williamson County WSID 3*	90	73	60	50	41	34
Williamson Travis Counties MUD 1*	182	182	182	182	182	182
Windermere Utility	2,776	2,812	2,812	2,812	2,812	2,812
County-Other	10,511	14,014	12,883	10,009	9,532	9,351
Manufacturing	19,363	22,470	25,599	28,752	29,429	30,131
Mining	551	622	676	722	772	830
Steam Electric Power	4,116	4,116	4,116	4,116	4,116	4,116
Livestock	392	392	392	392	392	392
Irrigation	4,061	4,061	4,061	4,061	4,061	4,061
Travis County / Guadalupe Basin Total	**105**	**130**	**146**	**160**	**179**	**202**
Creedmoor-Maha WSC*	50	58	65	71	79	88
Goforth SUD*	34	47	58	69	81	95
County-Other	13	17	15	12	11	11
Livestock	8	8	8	8	8	8
Wharton County Total	**224,085**	**218,338**	**212,708**	**207,216**	**201,860**	**196,633**
Wharton County / Brazos-Colorado Basin Total	**144,263**	**140,428**	**136,663**	**132,995**	**129,414**	**125,921**
Boling MWD	75	74	62	52	42	30
Wharton	1,016	1,007	970	935	894	849
Wharton County WCID 2	306	303	286	271	255	236
County-Other*	1,151	1,139	1,146	1,144	1,139	1,135
Manufacturing*	79	82	85	88	91	94
Steam Electric Power*	5	5	5	5	5	5
Livestock*	438	438	438	438	438	438
Irrigation*	141,193	137,380	133,671	130,062	126,550	123,134
Wharton County / Colorado Basin Total	**69,218**	**67,586**	**65,992**	**64,434**	**62,916**	**61,434**
El Campo*	26	25	21	17	13	8
Wharton	481	476	459	442	423	402
County-Other*	493	488	492	490	489	486
Mining	2	2	2	2	2	2
Steam Electric Power*	7,908	7,908	7,908	7,908	7,908	7,908
Livestock*	262	262	262	262	262	262
Irrigation*	60,046	58,425	56,848	55,313	53,819	52,366

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

DRAFT Region K Water User Group (WUG) Demand

	WUG Demand (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Wharton County / Colorado-Lavaca Basin Total	**10,591**	**10,311**	**10,040**	**9,774**	**9,517**	**9,265**
County-Other*	159	158	159	158	158	157
Livestock*	80	80	80	80	80	80
Irrigation*	10,352	10,073	9,801	9,536	9,279	9,028
Wharton County / Lavaca Basin Total	**13**	**13**	**13**	**13**	**13**	**13**
County-Other*	13	13	13	13	13	13
Williamson County Total	**18,741**	**24,313**	**31,038**	**38,407**	**46,664**	**55,851**
Williamson County / Brazos Basin Total	**18,741**	**24,313**	**31,038**	**38,407**	**46,664**	**55,851**
Austin	16,159	21,070	27,735	34,595	41,937	49,401
Brushy Creek MUD*	59	59	59	59	59	59
Fern Bluff MUD*	25	26	26	26	27	27
North Austin MUD 1	889	884	884	884	884	884
Wells Branch MUD	35	51	70	74	74	74
County-Other*	0	369	90	206	735	2,101
Manufacturing*	14	15	16	17	18	19
Mining*	1,544	1,823	2,142	2,530	2,914	3,270
Livestock*	16	16	16	16	16	16
Region K Demand Total	**1,138,936**	**1,197,623**	**1,255,990**	**1,317,067**	**1,378,821**	**1,447,471**

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

Appendix 2.C

Gallons per Capita per Day (GPCD) Municipal Water Demand Savings due to Plumbing Codes and Water-Efficient Appliances

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

			Gallons per Capita per Day (GPCD) with Plumbing Code Savings					
Region	County	WUG Name	2030	2040	2050	2060	2070	2080
K	BASTROP	Aqua WSC	144	143	143	143	143	143
K	BASTROP	Bastrop	161	161	161	161	161	161
K	BASTROP	Bastrop County WCID 2	82	81	81	81	81	81
K	BASTROP	County-Other, Bastrop	160	159	159	159	159	159
K	BASTROP	Creedmoor-Maha WSC	95	94	94	94	94	94
K	BASTROP	Elgin	121	120	120	120	120	120
K	BASTROP	Fayette WSC East	122	121	121	121	121	121
K	BASTROP	Lee County WSC	125	124	124	124	124	124
K	BASTROP	Polonia WSC	108	108	108	108	108	108
K	BASTROP	Smithville	149	149	149	149	149	149
K	BASTROP	The Colony MUD 1A	300	299	299	299	299	299
K	BLANCO	Blanco	127	126	126	126	126	126
K	BLANCO	Canyon Lake Water Service	109	109	109	109	109	109
K	BLANCO	Corix Utilities Texas Inc	165	165	165	165	165	165
K	BLANCO	County-Other, Blanco	106	106	106	106	106	106
K	BLANCO	Johnson City	150	149	149	149	149	149
K	BLANCO	Rancho Del Lago	226	225	225	225	225	225
K	BURNET	Bertram	214	214	214	214	214	214
K	BURNET	Burnet	196	195	195	195	195	195
K	BURNET	Corix Utilities Texas Inc	165	165	165	165	165	165
K	BURNET	Cottonwood Shores	154	153	153	153	153	153
K	BURNET	County-Other, Burnet	133	133	133	133	133	133
K	BURNET	Georgetown	169	168	168	168	168	168
K	BURNET	Granite Shoals	92	91	91	91	91	91
K	BURNET	Horseshoe Bay	406	405	405	405	405	405
K	BURNET	Kempner WSC	172	171	171	171	171	171
K	BURNET	Kingsland WSC	94	93	93	93	93	93
K	BURNET	Marble Falls	235	234	234	234	234	234
K	BURNET	Meadowlakes	295	295	295	295	295	295
K	COLORADO	Columbus	260	259	259	259	259	259
K	COLORADO	Corix Utilities Texas Inc	165	165	165	165	165	165
K	COLORADO	County-Other, Colorado	106	106	106	106	106	106
K	COLORADO	Eagle Lake	118	118	118	118	118	118
K	COLORADO	Weimar	201	200	200	200	200	200
K	FAYETTE	County-Other, Fayette	112	111	111	111	111	111
K	FAYETTE	Fayette County WCID Monument Hill	213	213	213	213	213	213
K	FAYETTE	Fayette WSC West	122	121	121	121	121	121
K	FAYETTE	Flatonia	183	183	183	183	183	183

			Gallons per Capita per Day (GPCD) with Plumbing Code Savings					
Region	**County**	**WUG Name**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
K	FAYETTE	La Grange	152	151	151	151	151	151
K	FAYETTE	Lee County WSC	125	124	124	124	124	124
K	FAYETTE	Schulenburg	195	194	194	194	194	194
K	FAYETTE	West End WSC	93	93	93	93	93	93
K	GILLESPIE	County-Other, Gillespie	101	101	101	101	101	101
K	GILLESPIE	Fredericksburg	244	243	243	243	243	243
K	HAYS	Austin	152	152	152	152	152	152
K	HAYS	Buda	141	141	141	141	141	141
K	HAYS	Canyon Lake Water Service	109	109	109	109	109	109
K	HAYS	Cimarron Park Water	99	99	99	99	99	99
K	HAYS	County-Other, Hays	107	106	106	106	106	106
K	HAYS	Dripping Springs WSC	153	152	152	152	152	152
K	HAYS	Goforth SUD	97	97	97	97	97	97
K	HAYS	Hays	130	129	129	129	129	129
K	HAYS	Hays County WCID 1	197	196	196	196	196	196
K	HAYS	Hays County WCID 2	205	204	204	204	204	204
K	HAYS	Headwaters at Barton Creek	76	75	75	75	75	75
K	HAYS	La Ventana WSC	149	148	148	148	148	148
K	HAYS	Mid-Tex Utilities	103	103	103	103	103	103
K	HAYS	Reunion Ranch WCID	241	241	241	241	241	241
K	HAYS	Ruby Ranch WSC	114	113	113	113	113	113
K	HAYS	West Travis County Public Utility Agency	311	310	310	310	310	310
K	LLANO	Corix Utilities Texas Inc	165	165	165	165	165	165
K	LLANO	County-Other, Llano	90	89	89	89	89	89
K	LLANO	Horseshoe Bay	406	405	405	405	405	405
K	LLANO	Kingsland WSC	94	93	93	93	93	93
K	LLANO	Llano	212	212	212	212	212	212
K	LLANO	Sunrise Beach Village	88	87	87	87	87	87
K	MATAGORDA	*Bay City*	131	131	131	131	131	131
K	MATAGORDA	Caney Creek MUD of Matagorda County	105	105	105	105	105	105
K	MATAGORDA	Corix Utilities Texas Inc	165	165	165	165	165	165
K	MATAGORDA	County-Other, Matagorda	89	88	88	88	88	88
K	MATAGORDA	Markham MUD	82	81	81	81	81	81
K	MATAGORDA	Matagorda County WCID 6	88	87	87	87	87	87
K	MATAGORDA	Matagorda Waste Disposal & WSC	159	158	158	158	158	158

			Gallons per Capita per Day (GPCD) with Plumbing Code Savings					
Region	County	WUG Name	2030	2040	2050	2060	2070	2080
K	MATAGORDA	Palacios	105	105	105	105	105	105
K	MATAGORDA	Quadvest	195	195	195	195	195	195
K	MILLS	Corix Utilities Texas Inc	165	165	165	165	165	165
K	MILLS	County-Other, Mills	111	111	111	111	111	111
K	MILLS	Goldthwaite	316	315	315	315	315	315
K	SAN SABA	Corix Utilities Texas Inc	165	165	165	165	165	165
K	SAN SABA	County-Other, San Saba	135	134	134	134	134	134
K	SAN SABA	North San Saba WSC	252	251	251	251	251	251
K	SAN SABA	Richland SUD	205	205	205	205	205	205
K	SAN SABA	San Saba	306	306	306	306	306	306
K	TRAVIS	Aqua WSC	144	143	143	143	143	143
K	TRAVIS	Austin	152	152	152	152	152	152
K	TRAVIS	Barton Creek West WSC	287	287	287	287	287	287
K	TRAVIS	Barton Creek WSC	662	662	662	662	662	662
K	TRAVIS	Briarcliff	130	129	129	129	129	129
K	TRAVIS	Canyon Lake Water Service	109	109	109	109	109	109
K	TRAVIS	Cedar Park	187	186	186	186	186	186
K	TRAVIS	Cottonwood Creek MUD 1	60	60	60	60	60	60
K	TRAVIS	County-Other, Travis	121	121	121	121	121	121
K	TRAVIS	Creedmoor-Maha WSC	95	94	94	94	94	94
K	TRAVIS	Cypress Ranch WCID 1	87	87	87	87	87	87
K	TRAVIS	Elgin	121	120	120	120	120	120
K	TRAVIS	Garfield WSC	96	95	95	95	95	95
K	TRAVIS	Goforth SUD	97	97	97	97	97	97
K	TRAVIS	Hornsby Bend Utility	71	70	70	70	70	70
K	TRAVIS	Hurst Creek MUD	370	370	370	370	370	370
K	TRAVIS	Jonestown WSC	149	148	148	148	148	148
K	TRAVIS	Kelly Lane WCID 1	167	166	166	166	166	166
K	TRAVIS	Kelly Lane WCID 2	86	85	85	85	85	85
K	TRAVIS	Lago Vista	216	216	216	216	216	216
K	TRAVIS	Lakeside MUD 3	125	124	124	124	124	124
K	TRAVIS	Lakeside WCID 1	81	80	80	80	80	80
K	TRAVIS	Lakeside WCID 2-B	182	181	181	181	181	181
K	TRAVIS	Lakeside WCID 2-C	74	74	74	74	74	74
K	TRAVIS	Lakeside WCID 2-D	129	129	129	129	129	129
K	TRAVIS	Lakeway MUD	221	221	221	221	221	221
K	TRAVIS	Leander	124	124	124	124	124	124

			Gallons per Capita per Day (GPCD) with Plumbing Code Savings					
Region	County	WUG Name	2030	2040	2050	2060	2070	2080
K	TRAVIS	Loop 360 WSC	520	520	520	520	520	520
K	TRAVIS	Manor	111	111	111	111	111	111
K	TRAVIS	Manville WSC	135	135	135	135	135	135
K	TRAVIS	Mid-Tex Utilities	103	103	103	103	103	103
K	TRAVIS	North Austin MUD 1	92	92	92	92	92	92
K	TRAVIS	Northtown MUD	60	60	60	60	60	60
K	TRAVIS	Pflugerville	145	144	144	144	144	144
K	TRAVIS	Rollingwood	237	237	237	237	237	237
K	TRAVIS	Rough Hollow in Travis County	187	187	187	187	187	187
K	TRAVIS	Round Rock	139	139	139	139	139	139
K	TRAVIS	Senna Hills MUD	304	303	303	303	303	303
K	TRAVIS	Shady Hollow MUD	159	158	158	158	158	158
K	TRAVIS	Sunset Valley	346	344	344	344	344	344
K	TRAVIS	Sweetwater Community	129	129	129	129	129	129
K	TRAVIS	Travis County MUD 10	186	186	186	186	186	186
K	TRAVIS	Travis County MUD 14	72	71	71	71	71	71
K	TRAVIS	Travis County MUD 18	142	141	141	141	141	141
K	TRAVIS	Travis County MUD 2	110	109	109	109	109	109
K	TRAVIS	Travis County MUD 4	545	545	545	545	545	545
K	TRAVIS	Travis County WCID 10	405	405	405	405	405	405
K	TRAVIS	Travis County WCID 17	225	224	224	224	224	224
K	TRAVIS	Travis County WCID 18	146	146	146	146	146	146
K	TRAVIS	Travis County WCID 19	582	581	581	581	581	581
K	TRAVIS	Travis County WCID 20	459	458	458	458	458	458
K	TRAVIS	Travis County WCID Point Venture	219	219	219	219	219	219
K	TRAVIS	Undine Development	219	219	219	219	219	219
K	TRAVIS	Wells Branch MUD	62	62	62	62	62	62
K	TRAVIS	West Travis County Public Utility Agency	311	310	310	310	310	310
K	TRAVIS	Wilbarger Creek MUD 1	72	72	72	72	72	72
K	TRAVIS	Williamson County WSID 3	179	178	178	178	178	178
K	TRAVIS	Williamson Travis Counties MUD 1	136	136	136	136	136	136
K	TRAVIS	Windermere Utility	141	141	141	141	141	141
K	WHARTON	Boling MWD	105	105	105	105	105	105
K	WHARTON	County-Other, Wharton	114	114	114	114	114	114
K	WHARTON	El Campo	165	165	165	165	165	165
K	WHARTON	Wharton	155	154	154	154	154	154

			Gallons per Capita per Day (GPCD) with Plumbing Code Savings					
Region	County	WUG Name	2030	2040	2050	2060	2070	2080
K	WHARTON	Wharton County WCID 2	178	178	178	178	178	178
K	WILLIAMSON	Austin	152	152	152	152	152	152
K	WILLIAMSON	Brushy Creek MUD	181	180	180	180	180	180
K	WILLIAMSON	County-Other, Williamson	136	136	136	136	136	136
K	WILLIAMSON	Fern Bluff MUD	190	189	189	189	189	189
K	WILLIAMSON	North Austin MUD 1	92	92	92	92	92	92
K	WILLIAMSON	Wells Branch MUD	62	62	62	62	62	62

			Municipal Water Savings from Plumbing Code (ac-ft/yr)					
Region	County	WUG Name	2030	2040	2050	2060	2070	2080
K	BASTROP	Aqua WSC	376	518	637	773	928	1,102
K	BASTROP	Bastrop	62	85	105	127	152	180
K	BASTROP	Bastrop County WCID 2	26	35	43	52	62	73
K	BASTROP	County-Other, Bastrop	22	27	32	41	63	98
K	BASTROP	Creedmoor-Maha WSC	1	2	3	4	6	7
K	BASTROP	Elgin	64	95	119	144	154	154
K	BASTROP	Fayette WSC East	0	0	1	1	1	2
K	BASTROP	Lee County WSC	8	12	15	20	24	30
K	BASTROP	Polonia WSC	1	1	1	1	1	1
K	BASTROP	Smithville	20	23	25	27	30	33
K	BASTROP	The Colony MUD 1A	3	4	5	7	9	11
K	BLANCO	Blanco	9	10	10	9	9	9
K	BLANCO	Canyon Lake Water Service	2	3	3	3	3	3
K	BLANCO	Corix Utilities Texas Inc	1	1	1	1	1	1
K	BLANCO	County-Other, Blanco	39	43	41	39	37	35
K	BLANCO	Johnson City	11	13	14	15	16	17
K	BLANCO	Rancho Del Lago	2	2	2	2	2	2
K	BURNET	Bertram	20	29	34	41	48	56
K	BURNET	Burnet	38	46	48	51	53	57
K	BURNET	Corix Utilities Texas Inc	23	29	32	35	38	42
K	BURNET	Cottonwood Shores	8	10	11	13	14	16
K	BURNET	County-Other, Burnet	68	65	74	85	97	110
K	BURNET	Georgetown	3	4	5	5	5	6
K	BURNET	Granite Shoals	31	36	37	38	39	40
K	BURNET	Horseshoe Bay	5	6	7	7	8	8
K	BURNET	Kempner WSC	3	3	3	3	3	3
K	BURNET	Kingsland WSC	4	6	7	9	11	14
K	BURNET	Marble Falls	75	110	110	110	110	110
K	BURNET	Meadowlakes	10	12	13	14	15	15
K	COLORADO	Columbus	20	23	23	23	23	23
K	COLORADO	Corix Utilities Texas Inc	2	2	2	1	1	1
K	COLORADO	County-Other, Colorado	61	68	66	64	62	59
K	COLORADO	Eagle Lake	16	16	14	13	12	10
K	COLORADO	Weimar	10	11	11	11	10	10
K	FAYETTE	County-Other, Fayette	28	26	19	14	9	3
K	FAYETTE	Fayette County WCID Monument Hill	3	3	3	3	3	3
K	FAYETTE	Fayette WSC West	35	43	47	50	54	57
K	FAYETTE	Flatonia	8	8	8	8	8	8

			Municipal Water Savings from Plumbing Code (ac-ft/yr)					
Region	County	WUG Name	2030	2040	2050	2060	2070	2080
K	FAYETTE	La Grange	26	28	28	28	27	27
K	FAYETTE	Lee County WSC	6	7	6	6	6	6
K	FAYETTE	Schulenburg	18	20	20	20	20	20
K	FAYETTE	West End WSC	4	4	4	4	4	4
K	GILLESPIE	County-Other, Gillespie	90	108	115	125	137	150
K	GILLESPIE	Fredericksburg	66	78	80	82	85	88
K	HAYS	Austin	1	1	1	1	1	2
K	HAYS	Buda	90	141	168	195	226	262
K	HAYS	Canyon Lake Water Service	6	6	7	7	7	7
K	HAYS	Cimarron Park Water	11	12	12	12	12	12
K	HAYS	County-Other, Hays	103	196	328	560	860	1,200
K	HAYS	Dripping Springs WSC	77	124	179	213	213	213
K	HAYS	Goforth SUD	13	21	30	41	54	69
K	HAYS	Hays	5	9	12	17	22	28
K	HAYS	Hays County WCID 1	18	20	20	20	20	20
K	HAYS	Hays County WCID 2	13	14	14	14	14	14
K	HAYS	Headwaters at Barton Creek	6	10	14	19	25	32
K	HAYS	La Ventana WSC	4	4	4	4	4	4
K	HAYS	Mid-Tex Utilities	4	6	8	11	15	19
K	HAYS	Reunion Ranch WCID	4	6	9	12	16	20
K	HAYS	Ruby Ranch WSC	5	6	6	6	6	6
K	HAYS	West Travis County Public Utility Agency	81	130	183	254	335	427
K	LLANO	Corix Utilities Texas Inc	14	16	16	16	17	18
K	LLANO	County-Other, Llano	29	27	21	17	12	6
K	LLANO	Horseshoe Bay	21	25	25	27	30	32
K	LLANO	Kingsland WSC	38	49	57	65	75	87
K	LLANO	Llano	19	21	21	21	21	21
K	LLANO	Sunrise Beach Village	4	4	4	4	4	5
K	MATAGORDA	*Bay City*	92	103	104	104	104	104
K	MATAGORDA	Caney Creek MUD of Matagorda County	10	12	13	15	16	17
K	MATAGORDA	Corix Utilities Texas Inc	2	2	2	2	2	2
K	MATAGORDA	County-Other, Matagorda	49	49	40	30	19	7
K	MATAGORDA	Markham MUD	4	4	4	4	3	3
K	MATAGORDA	Matagorda County WCID 6	5	5	5	5	4	4
K	MATAGORDA	Matagorda Waste Disposal & WSC	2	2	2	2	2	2

			Municipal Water Savings from Plumbing Code (ac-ft/yr)					
Region	**County**	**WUG Name**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
K	MATAGORDA	Palacios	21	23	22	21	20	18
K	MATAGORDA	Quadvest	0	0	0	0	0	0
K	MILLS	Corix Utilities Texas Inc	3	3	3	3	3	2
K	MILLS	County-Other, Mills	10	10	8	7	6	5
K	MILLS	Goldthwaite	10	11	11	11	11	11
K	SAN SABA	Corix Utilities Texas Inc	1	1	0	0	0	0
K	SAN SABA	County-Other, San Saba	7	7	5	5	4	3
K	SAN SABA	North San Saba WSC	2	2	2	2	2	2
K	SAN SABA	Richland SUD	4	4	4	3	3	3
K	SAN SABA	San Saba	16	18	18	18	18	18
K	TRAVIS	Aqua WSC	40	52	59	67	75	84
K	TRAVIS	Austin	6,179	8,089	9,262	10,427	11,506	12,638
K	TRAVIS	Barton Creek West WSC	7	8	8	8	8	8
K	TRAVIS	Barton Creek WSC	3	4	4	4	4	5
K	TRAVIS	Briarcliff	16	22	26	29	33	38
K	TRAVIS	Canyon Lake Water Service	6	6	7	7	7	7
K	TRAVIS	Cedar Park	51	65	68	68	68	68
K	TRAVIS	Cottonwood Creek MUD 1	-	-	-	-	-	-
K	TRAVIS	County-Other, Travis	418	610	561	436	415	407
K	TRAVIS	Creedmoor-Maha WSC	39	51	57	63	70	78
K	TRAVIS	Cypress Ranch WCID 1	7	8	8	8	8	8
K	TRAVIS	Elgin	31	64	92	120	129	129
K	TRAVIS	Garfield WSC	8	10	11	11	12	12
K	TRAVIS	Goforth SUD	1	2	3	3	4	4
K	TRAVIS	Hornsby Bend Utility	56	79	92	106	121	138
K	TRAVIS	Hurst Creek MUD	14	16	16	16	16	16
K	TRAVIS	Jonestown WSC	26	34	41	49	59	71
K	TRAVIS	Kelly Lane WCID 1	9	11	11	11	11	11
K	TRAVIS	Kelly Lane WCID 2	16	25	31	37	44	52
K	TRAVIS	Lago Vista	85	139	195	249	261	274
K	TRAVIS	Lakeside MUD 3	12	19	24	28	33	39
K	TRAVIS	Lakeside WCID 1	13	18	20	22	25	28
K	TRAVIS	Lakeside WCID 2-B	10	14	15	17	18	20
K	TRAVIS	Lakeside WCID 2-C	26	39	48	57	68	80
K	TRAVIS	Lakeside WCID 2-D	19	28	35	41	49	57
K	TRAVIS	Lakeway MUD	56	64	64	64	64	64
K	TRAVIS	Leander	-	-	-	-	-	-

			Municipal Water Savings from Plumbing Code (ac-ft/yr)					
Region	County	WUG Name	2030	2040	2050	2060	2070	2080
K	TRAVIS	Loop 360 WSC	8	9	9	9	9	9
K	TRAVIS	Manor	87	132	162	191	225	263
K	TRAVIS	Manville WSC	136	194	227	260	297	339
K	TRAVIS	Mid-Tex Utilities	6	10	12	14	17	20
K	TRAVIS	North Austin MUD 1	5	5	5	5	5	5
K	TRAVIS	Northtown MUD	-	-	-	-	-	-
K	TRAVIS	Pflugerville	342	487	572	655	750	858
K	TRAVIS	Rollingwood	8	9	9	9	9	10
K	TRAVIS	Rough Hollow in Travis County	19	22	22	22	22	22
K	TRAVIS	Round Rock	-	-	-	-	-	-
K	TRAVIS	Senna Hills MUD	4	5	5	5	5	6
K	TRAVIS	Shady Hollow MUD	16	18	18	19	19	20
K	TRAVIS	Sunset Valley	6	8	8	8	8	8
K	TRAVIS	Sweetwater Community	15	22	22	22	22	22
K	TRAVIS	Travis County MUD 10	3	4	5	5	6	7
K	TRAVIS	Travis County MUD 14	14	19	21	24	27	30
K	TRAVIS	Travis County MUD 18	6	6	6	6	6	6
K	TRAVIS	Travis County MUD 2	20	28	33	39	44	51
K	TRAVIS	Travis County MUD 4	14	18	21	23	26	29
K	TRAVIS	Travis County WCID 10	42	50	53	56	59	63
K	TRAVIS	Travis County WCID 17	230	321	374	425	484	551
K	TRAVIS	Travis County WCID 18	28	32	32	32	32	32
K	TRAVIS	Travis County WCID 19	3	4	4	4	4	4
K	TRAVIS	Travis County WCID 20	6	7	7	7	7	7
K	TRAVIS	Travis County WCID Point Venture	9	12	14	17	21	25
K	TRAVIS	Undine Development	3	3	3	3	3	3
K	TRAVIS	Wells Branch MUD	117	133	133	133	133	133
K	TRAVIS	West Travis County Public Utility Agency	127	181	214	248	285	328
K	TRAVIS	Wilbarger Creek MUD 1	11	17	22	26	32	37
K	TRAVIS	Williamson County WSID 3	2	2	2	2	1	1
K	TRAVIS	Williamson Travis Counties MUD 1	6	7	7	7	7	7
K	TRAVIS	Windermere Utility	94	110	110	110	110	110
K	WHARTON	Boling MWD	3	4	3	3	2	2
K	WHARTON	County-Other, Wharton	74	83	84	83	83	83
K	WHARTON	El Campo	1	1	1	1	0	0
K	WHARTON	Wharton	47	53	51	49	47	45

			Municipal Water Savings from Plumbing Code (ac-ft/yr)					
Region	County	WUG Name	2030	2040	2050	2060	2070	2080
K	WHARTON	Wharton County WCID 2	8	9	9	8	8	7
K	WILLIAMSON	Austin	521	763	1,005	1,254	1,520	1,790
K	WILLIAMSON	Brushy Creek MUD	1	2	2	2	2	2
K	WILLIAMSON	County-Other, Williamson	-	12	3	7	24	69
K	WILLIAMSON	Fern Bluff MUD	1	1	1	1	1	1
K	WILLIAMSON	North Austin MUD 1	44	49	49	49	49	49
K	WILLIAMSON	Wells Branch MUD	3	4	6	7	7	7

Appendix 2.D

Meeting Minutes of the Region K Population and Water Demand Committee

Appendix 2.D

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

MINUTES

Lower Colorado Regional Water Planning Group

Population and Demand Committee Meeting

November 2, 2022

INTERA Incorporated Offices

9600 Great Hills Plaza, Suite 300W

Austin, TX 78759

1:00 P.M.

Meeting Minutes:

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting was called to order at approximately 1:00 P.M.

Attendance:

Committee Members and Alternates:

Lauri Gillam, Small Municipalities, Committee Chair

Christina Castleberry, Water Utilities

Barbara Johnson, Industry

Jennifer Walker, Environmental

David Lindsay, Recreation

Monica Masters, River Authorities

Jason Homan, Alternate for Environmental

Sue Thorton, Alternate for Recreation

Other Planning Group Members

Daniel Berglund, Small Business

Other attendees:

Marisa Florez Gonzalez, Austin Water

Sara Eatman, Austin Water

Stacy Pandey, LCRA

Annette Keaveny, LCRA

Robert Adams, Plummer, Consulting Team

Neil Deeds, INTERA, Consulting Team

2. Public Comments

No public comments were offered for this item.

3. Review Draft Irrigation Projections

Consulting team presented TWDB draft irrigation demand projections.

Committee discussion focused on differences between the current TWDB projections and the last round of projections promulgated by the committee. Lauri Gillam noted that during the last round, Daniel Berglund and Stacy Pandey led an effort to develop irrigation demand numbers that were more representative than those estimated by TWDB. During the last round, the TWDB ultimately accepted these irrigation demand numbers developed by the committee.

Action Item: Lauri Gillam proposed that Daniel and Stacy perform a similar analysis with the newer data. A timeline was proposed where the draft demands could be available in late January.

4. Review Draft Mining Projections

Consulting team presented TWDB draft mining demand projections.

Committee discussion focused on differences between the current TWDB mining projections and the projections from the previous round. The demand projections from the TWDB are generally lower in the current round than in the previous round.

General discussion occurred on the drivers of mining demand in Region K, including the growth in aggregate mining, and the change (decline?) in water use for oil and gas.

Action Item: Consulting team was asked to explore the reason for the decrease and provide an explanation to the committee.

5. Review planning cycle schedule. Consider and plan for future meetings of Population and Demand Committee, as needed. Consider report(s) to and request(s) of the full Region K Regional Water Planning Group.

Consulting team presented key upcoming dates for planning cycle. The next committee meeting was projected for February, 2023, and a “doodle poll” was suggested to help schedule the meeting. Another committee meeting in early to mid-March was suggested to review draft municipal demands (expected from TWDB in February) and continue work on non-municipal demands.

Action Item: Consulting team work to schedule next committee meeting, with help from COA and LCRA in announcements and postings.

6. New/other business

None, other than action items from previous discussions.

7. Receive public comments

No public comments were offered for this item.

8. Adjourn.

Meeting adjourned at approximately 2:45 P.M.

MINUTES

Lower Colorado Regional Water Planning Group

Population and Demand Committee Meeting

February 6, 2023

INTERA Incorporated Offices

9600 Great Hills Plaza, Suite 300W

Austin, TX 78759

9:00 A.M.

Meeting Minutes:

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting was called to order at approximately 9:00 A.M.

Attendance:

Committee Members:

Lauri Gillam, Small Municipalities, Committee Chair

Christina Castleberry, Water Utilities

Barbara Johnson, Industry

Monica Masters, River Authorities

Teresa Lutes, Municipalities

Jason Homan, Alternate for Environmental

Sue Thorton, Alternate for Recreation

Earl Foster, Alternate for Small Municipalities

Other Planning Group Members

Daniel Berglund, Small Business

Other attendees:

Cindy Smiley, Smiley Law Firm

Sara Eatman, Austin Water

Stacy Pandey, LCRA

Robert Adams, Plummer, Consulting Team

Justin Durant, FNI, Consulting Team

Neil Deeds, INTERA, Consulting Team

2. Public Comments

Cindy Smiley of Smiley Law Firm:

Ms. Smiley discussed the need for the committee to be conservative in their estimates of demands, suggesting a significant downside of not making the demand estimates high enough. She asked the committee to lean towards the worst case when considering future conditions. She thanked the committee for their work and noted the importance of the process.

3. Review Revised Irrigation Projections

Lauri Gillam discussed the history of the irrigation demand projections, noting that two planning cycles ago the region used the TWDB estimates, but in the most recent planning cycle, the irrigation demand estimates were revised based on work by this committee. The estimates were made based on input from LCRA and irrigators, and the revisions were accepted by the TWDB.

She noted that the same approach, as much as possible, was being employed in the current planning cycle, but that the estimates were not yet ready for discussion at the committee level, with more time being needed to ensure that the approach was consistent with previous efforts.

This agenda item was tabled.

4. Review Draft Mining Projections

    a. Consider Burnet County revision request

Neil Deeds of the consulting team presented a proposed revision to the mining demands in Burnet County. He had met with Mitchell Sodek, planning group member and general manager of the Central Texas Groundwater Conservation District (CTGCD), which covers Burnet County. Through his role at the CTGCD, Mr. Sodek had mining water use estimates, based on reporting by the mines, that were higher than those estimated by the TWDB.

Neil presented the assumptions and estimates provided by Mr. Sodek. The committee discussed the revised estimates and generally agreed that the revisions would be proposed to the planning group.

Additional discussion of the mining demands included a request by Sue Thorton that the consulting team see whether revised estimates could be made for Llano County, even in the absence of data from a GCD. She is concerned Llano County TWDB estimates are similarly low (as in Burnet County). Some members were skeptical that revisions would be accepted by the TWDB without additional data support.

The committee reiterated their desire for the consulting team to provide an explanation for the large decrease in mining demand estimates from the most recent planning cycle to the current TWDB estimates.

Action Items: Consulting team to look into additional data sources for Llano County, and provide explanation for decrease in TWDB mining use estimates in the region.

5. Review Livestock, Manufacturing, Steam electric projections; consider proposed revisions

Robert Adams of the consulting team presented the demand projections for livestock, manufacturing, and steam-electric.

Livestock was presented first. Livestock demands were developed using the same methodology as last cycle although livestock use coefficients have changed significantly. They applied the new water/head to average animal counts which are an average of 2015-2019. Robert noted that the counts drop during a drought, so that range of numbers will include the lower years. Jason Homan asked if they had used historical data, Robert explained that the TWDB uses historical data from the last 5 years as their methodology and the numbers are updated with each planning cycle.

Barbara Johnson asked if they're any value to calculating the water/head of cattle based on their water use in a drought year, because we would expect it to be higher. Robert said that he has looked into this for another region, looked into water use for animals and how it relates to temperatures. His research indicated that TWDB approach is appropriate for drought years.

Sue Thornton asked whether exotics were considered, since there are large tracts of land for exotics in the northern part of the region. The general consensus was that exotics were not explicitly considered as livestock. Lauri suggested that Region K include a recommendation in Chapter 8 about tracking data for exotics.

After reviewing the livestock demands on a county-by-county basis, Monica Masters moved, and Barbara seconded a motion to accept the draft livestock demand numbers. Motion passed by voice vote.

Action: Livestock demand numbers accepted by committee for proposal to planning group.

Manufacturing was presented next, again by Robert. He noted that the methodology was based on highest water use from 2015-2019, plus unaccounted for demands. Growth was estimated from the County Business Patterns historical data.

Robert noted some manufacturers that were not included in the draft numbers, and suggested corrections. This included confirming that US Fish & Wildlife is the same or separate user from the Inks Dam National Fish Hatchery. Robert was to check with LCRA with respect to this question.

Monica discussed “future industrial users” in the Highland Lakes area and the lower basin. General discussion about confirming whether these will be allowed or if TWDB will require a specific named/contracted entity to include in the demand projections. About 30K AFY was currently set for "future industrial users" in Travis, but that is too high. City of Austin would need to supply, and Monica said there were no "tire kickers" she knew of in Travis. Teresa Lutes indicated she would bring some kind of projection forward for this item.

Action Items: Robert to check with LCRA on Inks Dam Fish Hatchery. City of Austin (Teresa) would bring forward more specifics about potential future demands.

Steam electric manufacturing was the final portion of this item, presented by Robert. Steam Electric baseline is based on the highest year demand (per county) from 2015-2019, refers to facilities that are closed/closing. Water use is limited to consumptive use. Draft projections were held constant from 2030-2080. Robert presented some proposed changes for the Decker and Fayette power plants.

Committee asked that a suggestion be brought forward to TWDB that natural gas power plants be assessed for water use in future planning cycles. This was associated with the discussion of Mueller Energy Center.

Action Items: Robert to confirm that Decker Power Station demands should decrease to zero. Robert to discuss with City of Austin whether to remove demand for LCRA Fayette and Austin Fayette from the projections.

6. Review schedule
    a. Schedule future meetings of Population and Demand Committee, as needed.
    b. Consider report(s) to and request(s) of the full Region K Regional Water Planning Group

Livestock demand numbers accepted by committee for reporting to the planning group.

Neil suggested the next meeting should occur within a month or so, and would be sending out a “doodle poll” to try get input on scheduling the meeting.

7. New/other business

None, other than action items from previous discussions.

8. Receive public comments

No public comments were offered for this item.

9. Adjourn.

Meeting adjourned at approximately 10:58 A.M.

MINUTES

Lower Colorado Regional Water Planning Group

Population and Demand Committee Meeting

February 28, 2023

INTERA Incorporated Offices

9600 Great Hills Plaza, Suite 300W

Austin, TX 78759

1:00 P.M.

Meeting Minutes:

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting was called to order at approximately 1:00 P.M.

Attendance:

Committee Members:

Lauri Gillam, Small Municipalities, Committee Chair

Christina Castleberry, Water Utilities

Barbara Johnson, Industry

Monica Masters, River Authorities

Jennifer Walker, Environmental

David Lindsay, Recreation

Teresa Lutes, Municipalities

Jason Homan, Alternate for Environmental

Sue Thorton, Alternate for Recreation

Earl Foster, Alternate for Small Municipalities

Other Planning Group Members

Daniel Berglund, Small Business

Earl Wood, Water Utilities

Paul Sliva, Agriculture

Other attendees:

Lann Bookout, TWDB

Sara Eatman, Austin Water*

Marisa Flores Gonzalez, Austin Water

Stacy Pandey, LCRA

Robert Adams, Plummer, Consulting Team

Adam Connor, FNI, Consulting Team*

Neil Deeds, INTERA, Consulting Team

*did not sign in, but verified participants

2. Public Comments

No public comments provided.

3. Review Revised Irrigation Projections

Lauri Gillam suggested that this item was moved to near the end of the meeting, after #6. [In these notes referred to as item 6a]

4. Review Draft Mining Projections

   a. Discuss why projections changed the last round of planning

Neil Deeds presented his analysis of why projections had changed since the last round of planning. The 2021 projections were identical to the 2016 projections. The 2016 projections were based on a 2011 BEG study. The 2011 BEG study differed from the most recent BEG study in several of the counties where the largest changes occurred. The differences in the analysis included the change in the size of the market for coal, and a change in estimated aggregate mine water use from being based on size/type of facility, to relying on direct TCEQ/TWDB surveys of mining operators. Lauri noted that the decreased demand estimates more closely match estimates of historical use.

   b. Discuss any potential demand revisions

Neil Deeds and Robert Adams presented their work on looking into Llano County mining water use. Neil had discussed additional data sources with Mitchell Sodek (general manager at Central Texas GCD, which covers Burnet County), while Robert had asked former Llano mayor Mike Reagor for his take on the TWDB estimates. Both Mitchell and Mike indicated that they did not have better data sources than the TWDB estimates.

Lauri motioned that the draft mining numbers, with the revisions to Burnet County, be brought forward to the planning committee. Barbara Johnson seconded. Motion carried by voice vote.

Action: Bring forward draft mining demand numbers, with revisions to Burnet County, to planning committee.

5. Review Manufacturing, Steam electric projections; consider proposed revisions

Robert Adams presented some minor revisions based on missing manufacturing demands with associated users. He brought up the question of whether “unassigned” demands could be proposed by LCRA (in Matagorda County) or Austin Water (in Travis County).

Teresa Lutes presented an analysis by Austin Water for their projected demands. She discussed the basis for the estimates, including existing customers showing potential for increase. She noted that the TWDB projections do not account for all of the increases projected by Austin Water. David Lindsay made the case for assuming growth. Marisa noted that Austin Water is planning to provide the supporting materials in the request with TWDB.

Additional discussion occurred about “unassigned demands” (Monica noted she knew of several “tire-kickers” or potential users), and whether they would be accepted by TWDB. Lann Bookout noted that if the TWDB rejected revision requests, there is an appeal process that was fairly cumbersome. He also noted that LCRA (with their management plan) and Austin Water (with their water forward plan) would have a strong basis for a dialog with TWDB.

Daniel stated that “aiming high” was preferred, and it is preferrable to err on the side of overplanning.

Teresa stated that Austin Water could potentially be prepared to outline a revision request in the late April planning meeting.

Teresa moved that the manufacturing demands, with requested revisions by Austin Water and LCRA, be brought forward to the planning committee. Christina seconded. Motion passed by voice vote.

Action: Bring forward draft manufacturing demand numbers, with revision requests by Austin Water and LCRA, to the planning committee.

Robert Adams presented steam electric demands. The committee had some discussion about reductions in demand for steam electric in the future, including Fayette and Decker. The more conservative approach, keeping demands in place in case there is some other power generation use in the future is recommended by the consulting team.

Daniel Berglund moved to accept the draft steam electric demands, [unknown] second. Motion passed by voice vote.

Action: Bring forward draft steam electric demand numbers.

6. Initial discussion of Population and Municipal Water Demand Projections

Adam Connor of the consulting team presented a summary of draft population and water demand projections. General discussion of the 0.5 and 1.0 population growth datasets, both which have been provided by TWDB.

6a. Review Revised Irrigation Projections

Stacy Pandy, Monica Masters of LCRA, and Daniel Berglund led a presentation on irrigation surface water demand estimates. A similar strategy was used to develop demands as the last round of planning. Some modifications included using 2022 as representative year, since it was comparable to 2011 but more recent. 2022 planted acreage was used for Garwood, 2011 acreage for Gulf Coast, Lakeside, Pierce Ranch (and supplemental – i.e. turf grass). The 2nd crop max ft/acre since 2016 was used. They had capped demand at the “duty” last time, but did not use the cap in the current methodology. They include a 2.7% reduction in demands over the planning horizon – comparable to the passive conservation factored into municipal demands.

The groundwater irrigation demand has nott been evaluated yet, the consulting team is working to gather this data, led by Robert Adams. Robert said he is planning to use the maximum year instead of the average. The MAG will not be used as a cap, since that is a supply limit.

David Lindsay noted that rice production may increase in the future and the potential for double cropping corn and its effects on demands. Jennifer Walker noted that crop demands are unlikely to decrease under increasing population growth.

David Lindsay asked that a similar writeup on the methodology be provided as in the last round of planning.

At the end of the discussion, Lauri asked whether the committee had a comfort level with the surface water demand revisions as presented, and received general agreement.

7. Review schedule

    a. Schedule future meetings of Population and Demand Committee, as needed.

    b. Consider report(s) to and request(s) of the full Region K Regional Water Planning Group

Next committee meeting should occur in early April, prior to the planning group meeting.

David started a discussion of how golf course water demands were treated in planning. Lann indicated that they should appear under “county-other” WUG demands if not supplied by a municipal WUG. David asked that the golf courses receive attention due to their potential for large water use.

David noted the large potential demand from Region K from the BCRUA project that is bringing water from Lake Travis to Round Rock, Leander, and Cedar Park. So the supply will be from Region K but the demand is in Region G. David expressed concerns about the timing of the diversions, and what limits were placed on how much and when diversions occurred. Monica said that in 2027 the deep water intake and plant expansion were set to be complete, and that water was already being used as part of the project. Monica indicated that the diversion was limited by the treatment plant capacity.

8. New/other business, agenda items for next meeting

Agenda items suggested for next meeting:

    a. Groundwater component of irrigation demand projections, also “apples to pears” comparison of projections from this cycle vs. last cycle.

    b. Pop methodology & projections

    c. Demand methodology & projections

9. Receive public comments

No public comments were offered for this item.

10. Adjourn.

Meeting adjourned at approximately 3:15 P.M.

MINUTES

Lower Colorado Regional Water Planning Group

Population and Demand Committee Meeting

April 10, 2023

INTERA Incorporated Offices

9600 Great Hills Plaza, Suite 300W

Austin, TX 78759

9:00 A.M.

Meeting Minutes:

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting was called to order at 9:02 A.M.

Attendance:

Committee Members:

Lauri Gillam, Small Municipalities, Committee Chair

Christianne Castleberry, Water Utilities

Barbara Johnson, Industry

Monica Masters, River Authorities

Jennifer Walker, Environmental

David Lindsay, Recreation

Teresa Lutes, Municipalities

Jason Homan, Alternate for Environmental

Daniel Berglund, Small Business

Other Planning Group Members

Earl Wood, Water Utilities

Other attendees:

Earl Foster, Alternate for Small Municipalities

Sue Thorton, Alternate for Recreation

Lann Bookout, TWDB

Sara Eatman, Austin Water

Marisa Flores-Gonzalez, Austin Water

Stacy Pandey, LCRA

Robert Adams, Plummer, Consulting Team

Adam Conner, FNI, Consulting Team

Neil Deeds, INTERA, Consulting Team

Cindy Smiley, Smiley Law Firm

Jordan Furnans, Concerned Citizen

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting called to order at 9:02a.

2. Receive public comments (Limit 3 minutes per person)

Jordan Furnans spoke about his experience with the Colorado Basin, and suggested there could be alternative approaches to the typical WAM modeling that is done as part of the planning process. He had heard there has been discussion whether releases to environmental flows should be considered as demands. He urged the committee to consider environmental flows in the planning process. He said that the environmental flows represent large releases that are not currently represented as demands in the WAM, and that the cumulative amount of water for environmental flows, divided by the number of years, exceeded the roughly 33,000 AFY allocated for these purposes. He strongly urged that these flows be included as demands, even though they are not traditional demands, because LCRA is required to manage the flows in a way that is consistent with them being demands.

Lauri noted there would be additional discussion of environmental flows in Item 8.

Cindy Smiley thanked the committee, noting that their important work provides a foundation for the planning process. She encouraged the committee to look closely at the numbers, so that everything is accounted for in a way that is most protective. She suggested that we should plan for a drought worse than the drought of record. She said the committee should ask for variances when needed, in order to plan for the worst case, and to use those numbers to be protective. She asked that everything that relates to demands should reflected somehow, and noted that the LCRA WMP is unique to this Region, and that the WMP includes environmental flows, so they need to be reflected in the RWP process. Finally, she asked that the committee consider a safe yield not a firm yield in its planning.

3. Review and approve meeting minutes

Lauri Gillam noted that she would work with the consultant to clean up misspellings and other grammatical items in the minutes and asked if any members had substantial changes to the minutes.

David Lindsay was unclear about “double cropping corn” comment on page three of February 28 minutes. Daniel Berglund clarified that a second commodity or other grain or cover crop could constitute a second crop. Neil noted that he had likely misrepresented the speaker of that phrase during their exchange. Daniel noted that new agricultural practices are coming online, given fewer acres and more demand.

David Lindsay asked that there be a parallel writeup [to the previous plan] for irrigation. He asked that the writeup be available prior to approval. Monica Masters said that while we don’t have the detailed report ready today, it will be ready prior to the April 26 meeting. Lauri said that the report did not have to be part of the decision making, in terms of approving the draft numbers, but served as a backup both for the planning group and for the revision request. Monica agreed that LCRA (along with the consultant contributions) could have it ready for the next meeting.

Three sets of minutes were approved.

November 2, 2022: Jennifer Walker moved to approve, Lauri seconded, passed with no opposition.

February 6, 2023: Daniel moved to approve, Christianne Castleberry seconded, passed with no opposition.

February 28, 2023: Jennifer moved to approve, Lauri seconded, noting the required revisions regarding the double cropping statement.

4. Summarize existing revision requests in non-municipal demands

Lauri gave shoutout to Sara on her summary of revisions that had been emailed out after the last meeting.

Robert Adams of the consulting team presented a summary of revision requests. Livestock and steam electric were presented without comment.

On manufacturing, Lauri Gillam asked if the Matagorda County estimates of future demand were 20,000 AFY or 30,000 AFY? Monica Masters answered that in LCRA's draft Water Supply Resources Report, LCRA plans for an expected case of 20,000 AFY and a high case of 30,000 AFY, but that the previous Population and Demand Committee decided to use 20,000 AFY. Sue Thornton asked whether these represent the "tire kickers", and Monica replied in the affirmative.

Jason Homan noted that a previous discussion in the committee had suggested we could not propose unassigned future demands and asked if we needed additional justification if we did propose them. Neil Deeds said that LCRA and Austin Water would prepare justification for each of their unassigned demands. Jason asked if these justification documents will be ready before we approve the proposed demands? Sara Eatman responded that Austin Water's justification will be ready for the April 26 meeting, and will be made available as a part of the meeting package prior to that meeting. Teresa said that while the consultant will prepare the overall revision request package, Austin Water and LCRA will contribute their justification portions to the package.

Lauri Gillam asked that we go straight to item 6 in the agenda so we could discuss an amendment to mining demands.

6. Consider revision and re-approval of mining demands based on Collier permit application to LCRA

[This was handled after #4, out of order.]

Robert Adams discussed the sand dredging contract from Collier Materials. He noted that the contract had a 5 year timeline, and asked the committee whether we want to include the demands in 2030 and beyond?

Monica said that this is the first dredging permit, and is now two water contracts, both 1,963 AFY. The permit for dredging is 5 years, and then Collier will have to do a full reapplication for the entire project to get it renewed. Collier only requested a 5 year water contract, because they need to reapprove the dredging permit.

Daniel Berglund asked how they use the water? Monica Masters said that they pick up the water with the sand, and then most of the water drains in a retention pond, making its way back to the lake. Lann Bookout noted that only a small percentage gets carried out as product retention, much of it returns to the lake. Monica said that they are very early in the application, it was just deemed administratively complete. Jennifer Walker asked where the sand is being mined? Monica replied that it is being mined from the island, location at the upper end where the Llano River comes in.

Sue Thorton noted that several people have expressed concerns today about making sure we are working with high numbers, not low numbers, and would it behoove us to keep it high, just to cover future contingencies? The dredging is an evolving process, and why she raised concerns in earlier meetings. If Burnet County mining demands need to triple, common sense that Llano County mining demands would increase significantly. Monica Masters asked if this demand should be captured in full if most of the water returns to the lake? Sue Thornton stated that these full demands could cover future need, even if some of the water is returning? Jennifer Walker stated that because this is a contract, it should be included in full and considered a commitment. Monica agreed that they are indeed short-term commitments and that they have other short-term commitments that do not get included. Jennifer said that it is most appropriate for Region K to reflect the full commitment, since return flows are not captured in other LCRA contracts that are used in the planning process. Lauri asked how far out we should include it? Jason suggested that since the contract is 5 years, we put it in 2030 only, then reevaluate in next planning cycle.

Sara Eatman suggested that we could potentially add the two 1,963 AFY contracts over 5 years by splitting them in half over the decade, to represent an average over those 10 years. She said that if we assign a number to 2030 it implies a decade-long commitment, rather than the 5 years that are in the contract. There was some follow-up discussion about what the 2030 planning horizon means, and Jennifer Walker indicated that the 2030 was indicative of the years leading up to 2030. Lann gave the example of a 2020 strategy having to be in place by March of 2023, indicating that the strategy was applied to 2020.

Marisa asked to clarify whether these demands represent a snapshot in time (similar to how the WAM simulated demands) or an average demand over a 10-year period?

Lauri suggested that the group use a total of 1,963 AFY over 10 years, which is similar to what Sara suggested. Teresa asked if both diversion points are in Llano County, and Monica confirmed they are. Sue noted that LCRA has received two water requests for 2 of the 4 designated dredging zones, and if the current operations proceed, others will apply for the other two, and those water requests may be of similar volume. She asked how are we accounting for it? Lauri replied that they would be accounted for in the next plan, should those additional operations progress.

Barbara Johnson made a motion for 1,963 AFY to cover the 10 years, 2020 through 2029, assigned to 2030. Jason seconded. Passed with no opposing votes.

Monica made a motion to approve this amendment to the mining demands. Christianne seconded. Passed with no opposing votes.

Action: Add 1,963 AFY to the existing 251 AFY to the Llano County mining demand in 2030. Remaining years remain as proposed by TWDB.

5. Review groundwater irrigation demand projections

Robert Adams presented the proposed irrigation groundwater demands, which included two possible strategies. Methodology #1 refers to the highest year of groundwater use, and Methodology #2 refers to an average goundwater use over 2011-2014.

David Lindsay noted that we are proposing to use highest year for our irrigation estimates, which is in conflict with the average demand we discussed for mining. He noted that surcharges were a large driver after 2011, but Stacy Pandey clarified that surcharges are in place now, and were in place in 2011.

Robert Adams presented a proposed strategy for splitting Matagorda County demand between Regions K and P that was not based on land area but the distribution of wells. Lauri clarified that while TWDB split approximately 60/40 between P/K, we are proposing 40/60 P/K so we are reversing the ratio. Robert noted that Neil Hudgeons [Wharton and Matagorda GCD General Manager] said that using the number of wells was appropriate for the allocation between P and K. The GCD does not have the well demands mapped at that resolution.

Teresa noted the future decline in irrigation demands that is projected. Robert replied that as in last planning cycle, we assume 2.7% decline in each decade, while TWDB assumes one number, applies as constant through the future. The decline is based on assumed efficiencies in distribution systems, conservation, etc. similar to passive conservation assumptions applied to municipal demand projections.

Lauri asked if the difference in the two potential strategies is that we are using the drought years in Methodology #2? Robert replied yes, but also thatwe are using an average in Methodology #2 for the drought years instead of a high year in Methodology #1 for the more recent non-drought years.

Daniel Berglund said that the groundwater information is better today than 6 years ago. Lauri Gillam noted that Methodology #2 is the more conservative of the two. Robert Adams observed that the second strategy gives us a starting point about 2.7% less than the starting point of the last planning cycle.

David Lindsay asked what kind of duty is currently being assessed? Daniel Berglund replied that this was difficult to determine, given multiple crops. Surface water is mostly rice, while all the other demands are variable, with well water and more wells being drilled. He also said that the water costs so much, nobody uses more than they have to.

David Lindsay noted that a previous driver for planning was the waste standards. Daniel Berglund explained that the GCD manages to a standard where there is a maximum percentage of waste per crop, and the GCD helps farmers if there are issues with wasting water. Excessive use is the main source of water loss. Sue Thornton asked how excessive use is defined? Daniel replied that it is when water is not being confined to the field. Lann Bookout and Daniel Berglund had a short discussion about cost driving efficiency; land leveling and other efficiency strategies have been funded by the federal government.

David Lindsay asked whether coastal agricultural users have gone to real-time monitoring, etc. Daniel replied that they are getting to that level, but it’s hard to make a change – change is coming and being driven by economics.

Jennifer Walker asked if 5.25 ft/acre is the limit for rice? Robert Adams responded that this is the limit for two crops. Jennifer recalled a limit of 6 ft/acre? Daniel replied that with canal loss, surface water demands can get that high, but that groundwater districts have a stricter standard because it is on-farm use. Sue Thornton noted that Daniel’s comments and answers are helpful for the rest of the committee to understand the irrigation demands.

Daniel Berglund moved to accept Methodology #2, Lauri Gillam seconded.

David Lindsay noted for the record that it “is a lot of water”, but that he is not arguing the demand number, he just wanted to recognize the magnitude of the use. Daniel Berglund said that 2022 is going to be even higher use for groundwater because of curtailment under LCRA’s water management plan. Robert Adams finished the discussion by noting that the regional total that will be brought to the planning group has slightly higher totals than the three county totals that the committee has been focusing on due to the small contributions from other counties.

The motion to accept the results from Methodology #2 passed by voice vote, with no opposing votes.

Action: Bring Methodology #2 result for irrigation demands forward to the full planning group for approval of revision request.

Committee took a break at 10:31a.

Committee resumed at 10:41a.

7. Municipal population and demands

Adam Conner of the consulting team presented information regarding municipal population and demand projections , starting with methodology and then discussing the survey that the consultants are sending to water user groups (WUGs).

b. Methodology, draft estimates, potential revision constraints

Adam explained the development process for population includes estimates from the TDC of county totals, and the TWDB allocates that population between WUGs in each county based on data from the Water Use Surveys.

Jennifer Walker asked what is TDC? Adam replied that it is Texas Data Center [actually Texas Demographic Center], and Lann noted they are the state demographers.

David Lindsay asked about the definition of WUGs in Region K, and brought up a concern about how the Brushy Creek Regional Utility Authority (BCRUA) project would be handled in the planning process. He wanted to be sure that the growth in demands for that project was accounted for. Adam noted that the municipal demand for the project is in Region G. Neil added that Adam had set up a coordination meeting with the consultants from Region G and other adjacent regions to address these types of interregional items. David asked whether this represented an inter-basin transfer. Monica said that the BCRUA project is required to adhere to House Bill 1437.

Teresa stated that this item will be handled during the discussion of supplies, because the demands do not originate in Region K, but the supply will be provided by entities in Region K. David noted that a portion of Leander is in Region K. Adam replied that in the process the “primary” region for a given WUG (Region G in this case) typically brings the demand numbers forward, so Carollo [Region G consultant] would be drafting the demands for all of Leander, and we will coordinate with them. David asked whether this is similar for Corpus Christi? Adam replied that yes we will be coordinating with Regions L and P as well. Adam also said that we can provide a more detailed description of BCRUA in this update of Region K’s plan, even though the demands are being handled by Region G. Monica closed the discussion noting that BCRUA is not the ultimate customer for the water, but rather it is the three member cities.

a. Progress on WUG survey

Jennifer Walker asked Adam Conner if he could provide a copy of the WUG survey, Adam replied in the affirmative. Jennifer noted that other sources of information will come from the TWDB and others that can help inform this process. Barbara asked that the committee be informed on which WUGs are responsive to the survey. Lauri asked the committee members and others in attendance to talk to people from Region K WUGs about the survey and encourage them to fill it out. Jason Homan noted that we (Region K) don’t have leverage to compel WUGs to reply to surveys, unlike some of the TWDB required surveys. Adam noted that our survey was strategically short and should only take 5 minutes. Cindy Smiley offered to help find utilities contact information.

David Lindsay asked how we would contact County-Other? Adam replied that they are a dispersed group, and we don’t typically reach out to them, since there is no “leader” to contact. David noted that category is where the golf courses would fall. Monica asked what the WUG size cutoff is and Adam and Lann replied that it is based on water use greater than 100 AFY.

Action: send draft survey to P&WD committee. Have a list of those WUGs who have responded for each committee meeting. Will also bring up list of folks without contact information. Will also provide summaries of revision requests to P&WD Committee prior to full RWPG.

8. Review of legislative recommendation regarding an environmental demand included in the 2021 Region K plan

Lauri Gillam opened the discussion by noting that there are concerns about amount of water sent from the lakes for environmental flows. Environmental flows are not specifically accounted for in the work that this committee does, but are addressed in the water modeling committee. This was brought up in last cycle and resulted in a recommendation that the legislature consider changing the approach. At this point , there is no funding for the committee or the consultants to explore this issue. We have not been charged by TWDB to put environmental flows into demands, but we could put the item in the legislative recommendations again.

[This was a long discussion and a summary is captured here. No action came from the discussion.]

Teresa Lutes stated that environmental flows are being accounted for in the process, just not in Chapter 2 (the demands chapter), but rather when water management strategies are evaluated. She felt that discussing them as demands was putting the cart before the horse, since “static” demands need to be considered for the modeling, and that the modeling then informs other portions of the water balance, like return flows and environmental flows.

Jennifer Walker said that she reviewed the legislative recommendations. She (and NWF) have proposed that the environment be treated as a separate user group, but that has not been acted on by the legislature. She said that while the SB3 process is not perfect, it does provide a process by which environmental flows are characterized and accounted for. She proposed that the legislative recommendation (and some others) be revisited and carried forward in this round of planning, but that any additional analysis is not scoped nor funded. Lauri followed up by noting that the discussion of environmental flows, as Teresa said, will be handled in the water management strategy committee, and that folks are welcome to attend those meetings.

Barbara Johnson asked whether the region could apply for grant funding to perform a study that would address some of the un-scoped and unfunded aspects Jennifer mentioned? Jennifer said this was a good idea, and added that there is a discussion (without direct action required) in the current Chapter 2 on environmental flows that she recommended be repeated, which includes SB3 results and other information.

David Lindsay provided a handout that showed environmental releases from Highland Lakes from 2011 to 2021, operational and threshold criteria for releasing water to Matagorda Bay, and freshwater triggers and inflow criteria. Sara Eatman said that when the WAM runs are done, that the requirements from the WMP are included in those runs, and that the basis is the 85 year historical flow regime.

David Lindsay went over the handout. He said that with new requirements after 2015 that releases increased and noted the large volume in 2020. He spoke of the LCRA daily report, where a two-month summary had gotten his attention because of the large volume. He stated his concern that the gap that is created by the need to meet environmental flows does not get handled in Chapter 4 (where other needs are addressed). He said that a permit is a permit, not an option [with respect to the releases for environmental flows]. Jennifer Walker pointed out that "storable water" which is included on David's handout does not necessarily get stored.

Lauri Gillam summarized that environmental flows would be discussed further on in the process – they are significant and important, and will be discussed but not in the context of demands. Teresa Lutes added that during the future discussions, we can talk about how environmental flows are sometimes mixed with other demands, such as irrigation, i.e. irrigation water can sometimes help meet environmental flows.

Jason Homan asked how we can ensure that the other committees responsible for the environmental flow issue (Modeling, Legislative, WMS) are coordinating with one other? How can we ensure that legislative recommendations be carried forward? Teresa Lutes noted that she chairs the Water Availability Modeling committee, and Jennifer Walker said that this will be handled in the legislative committee a little later in the process.

9. Review schedule

a. Schedule future meetings of Population and Demand Committee, as needed.

Lauri Gillam and Neil Deeds agreed that a P&WD committee meeting should be held in May and will coordinate with the consultant team and committee to identify a date.

b. Consider report(s) to and request(s) of the full Region K Regional Water Planning Group

Lauri stated that non-municipal demand revisions will be proposed at the April 26 meeting. She spoke about how these proposed demands reflect all the hard work of the committee, and hoped that the full committee would recognize all of the work that has been done to bring the demands forward.

Lann Bookout noted the small window of time between the July planning group meeting and the deadline for municipal demands to be submitted in August. He suggested that the planning group needs to hear about the municipal process at this coming meeting to prime them for the following meeting.

Adam Conner stated that the consulting team will have pre-meetings with TWDB staff to work through any items prior to proposing any revisions to the full committee, which could help to assure the full committee that the draft numbers are sound.

10. Future Agenda Items

Lauri Gillam noted that municipal demands would dominate future agenda items. No other items were proposed at this time.

11. Receive public comments (Limit 3 minutes per person)

No additional public comments.

12. Adjourn

Adjourn at 11:43 pm.

MINUTES

Lower Colorado Regional Water Planning Group

Population and Demand Committee Meeting

May 22, 2023

INTERA Incorporated Offices

9600 Great Hills Plaza, Suite 300W

Austin, TX 78759

9:00 A.M.

Meeting Minutes:

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting was called to order at 9:08 AM.

Attendance:

Committee Members:

Lauri Gillam, Small Municipalities, Committee Chair

Christianne Castleberry, Water Utilities

Barbara Johnson, Industry

Monica Masters, River Authorities

Jennifer Walker, Environmental

David Lindsay, Recreation

Teresa Lutes, Municipalities

Jason Homan, Alternate for Environmental

Other Planning Group Members

None

Other attendees:

Earl Foster, Alternate for Small Municipalities

Sue Thornton, Alternate for Recreation

Lann Bookout, TWDB

Sara Eatman, Austin Water

Marisa Flores-Gonzalez, Austin Water

Stacy Pandey, LCRA

Robert Adams, Plummer, Consulting Team

Adam Conner, FNI, Consulting Team

Justin DuRant, FNI, Consulting Team

Neil Deeds, INTERA, Consulting Team

2. Receive public comments (Limit 3 minutes per person)

None.

3. Review and approve meeting minutes

David Lindsay has a question on the meeting minutes with respect to recorded comments from Teresa Lutes regarding where in the planning document environmental flows will be considered/accounted for. Discussion between Teresa and David followed, with some contributions by Sara Eatman. Teresa finally proposed some clarifying language for the previous minutes, and noted that additional discussion on this topic would be occurring soon in the Water Modeling Committee and at the next planning group meeting. The clarifying language [proposed edits to April 10 minutes completed by Sara Eatman] generally removed reference to specific chapters in the document.

Barbara Johnson moved to approve the minutes from April 10, seconded by Jennifer Walker. Passed by voice vote.

Neil Deeds noted that in the context of the previous minutes, Robert Adams has written a draft memo detailing the estimation of irrigation demands. Robert noted that during the creation of the memo, a minor 400 acre-foot per year discrepancy was found in the estimates and corrected. While not significant to the overall demands, this correction will be presented to the full planning group.

4. Introduction to "infeasible strategy" task

Neil Deeds introduced the topic of identification of infeasible strategies from the 2021 plan. There was general discussion on what strategies are the focus of the work, and the implications of an infeasible strategy being identified. Monica Masters noted that TWDB had previously reached out with respect to one or more of their projects, and Lann Bookout said that TWDB was seeking the current status of proposed reservoirs. Monica asked whether TWDB could provide a summary of the TWDB efforts. Lann indicated he would check.

Justin DuRant asked about the consequences of an infeasible strategy. Robert replied that the previous plan would have to be amended requiring significant effort. Lann noted the potential burden on the TWDB should all of the planning groups have to go back and amend their previous plans.

Lauri Gillam asked whether an infeasible strategy could go back into the next plan? Lann replied that the decade could be updated if the project was still viable. Lauri then asked whether there is a subcommittee dedicated to this task? Neil replied that there is not. Lann noted that a public hearing is required for amending the previous plan, so infeasible determinations need to be happening now. Lauri asked that this topic be on the agenda for the next full planning group meeting. Teresa added that the water management strategy committee should meet soon to discuss this topic.

Sue Thornton asked whether infeasible projects could still be implemented outside the plan. Lann noted that the project would not be eligible for certain types of state funding.

Sue Thornton asked how the balance between demand and supply would be affected by an infeasible strategy? Lann answered that the consultants will have to adjust the supply numbers. There was some discussion among David Lindsay, Sara Eatman, and Lann about how unmet needs for WUGs would be created or affected by strategies being deemed infeasible. Lann noted that some WUGs already had unmet needs, and so documentation/explanation was key.

Monica Masters asked whether we should convene the water management strategy committee regarding this topic, or should the whole planning group meet? Lauri offered to talk with Chair David Van Dressar to see if he had a preference on the path forward.

No action was taken on this item.

5. Municipal population and demands

a. Update on WUG survey responses

Adam Conner presented and led a discussion of the WUG survey responses. He noted that TWDB had revisited the plumbing code savings, and that this decreased the assumed savings by about 10%, thereby increasing demands beyond what TWDB originally provided in February 2023. Jennifer Walker clarified that this change is only in the "passive" conservation, while "active" conservation strategies are yet to be proposed.

Barbara Johnson asked who requests revisions to the population or demand numbers? Adam replied that the utility initiates the request nearly every time, and that the consulting team receives and processes any supporting documentation. Jennifer asked how non-responding WUGs will be treated? Adam replied that the TWDB numbers will be accepted without change in the absence of WUG feedback. Monica noted that Adam had reached out to the 5 largest WUGs, and that LCRA would help to make sure that these WUGs responded. David asked whether we are getting data from Region G, and Adam responded that we are coordinating with both Region G and Region L.

b. Update on revision requests

Adam discussed revision requests, as noted in the supporting materials. [these notes capture those revision requests that led to committee discussion/comments]

Adam noted that the details for revision requests up to this point are in the draft memo, and covered some examples of requests from particular WUGs. Monica asked whether when someone requests lower GPCD, do they provide supporting information? Adam replied yes, for example Buda has given us supporting numbers. He noted that TWDB draft GPCDs are based on reported utility production divided by Census estimate of population, but that population is not necessarily consistent with utility estimates. Some discussion of this followed by Jennifer and Lann. Christianne Castleberry asked whether the GPCD from prior plan was considered, and Adam answered that the prior plan used a similar strategy, but the new numbers are not based specifically on the prior plan.

Discussion occurred particular to Elgin, with comments on Elgin's aggressive growth plans and their general reliance on groundwater from Aqua.

Adam introduced the concept of having to balance overall county populations using the "county-other" category as a pool from which to draw. Jennifer said that in previous planning cycles TWDB has been reluctant to change overall numbers by county, and especially by region. Lann noted that TWDB has faith in demand projections overall by region, and any changes have to be based on a good dataset, with the Census being a good dataset. That said, if the WUG can provide hard good evidence that can be used to justify, it will be acceptable.

David Lindsay asked who the “champion” is for the county-other and who provides data? Adam replied that there isn’t a single county-other representative, and we do not have the time or resources to reach out to the smaller entities that comprise the county-other category.

There was some discussion particular to Horseshoe Bay and the effect their request for increases over baseline could have on the county-other numbers. The discussion included comments on the difference between transient populations and permanent populations, and how transient populations will generally be reflected in a higher GPCD. Jennifer and David discussed the ratio driving this result, and Jennifer noted that while the denominator in the ratio [number of people] may be wrong, the important result is that the overall demand is correct. Christianne noted that we have to be mindful that the higher GPCD from transient populations is not a sign of wasting water. She also discussed how losses from wholesale water distribution can result in falsely high perception of loss in the retail water supplies, specifically using Lakeway MUD as an example.

Teresa Lutes went over several slides that were specific to the revision request being proposed by Austin Water (AW). She noted that AW will be requesting the addition of population for AW in Hays County and an increase for the AW WUG total. Their requests will be consistent with the analyses supporting AW’s Water Forward plan, with projections through 2120.

Specifically in Hays County, Teresa noted that TWDB draft data does not include retail service area in Hays County and that AW would be requesting that as a revision. The last planning cycle showed significant growth in that part of the WUG. Sara Eatman noted that the requested population in Hays County this cycle is based on the current service area, and the high growth in the previous cycle may have included some assumptions about extension of the existing service area.

Teresa discussed their likely request for a population increase of >300,000 people in 2080 for the combined area. Adam said that Travis “county-other” could not make up that difference, so we would need to request an overall county increase. Teresa noted that we have had a similar experience in previous rounds, asking for higher projection, and that Region K had previously asked for the TWDB to increase the region total. Adam said that this would likely be necessary, because we probably cannot balance the Travis County increase without an overall increase for the region.

Sara suggested that we are asked to plan conservatively and that our attempt to increase population projections may be successful, given the questions around the 2020 census. She went on to note that in the event we are not successful in asking for an increase, the 1.0 migration numbers are better than 0.5.

Additional discussion occurred with respect to Llano County and Horseshoe Bay, with Sue Thornton asking about the decreases in county-other shown for Llano County. Adam explained that those decreases are compensating for requested increases by Horseshoe Bay, and that the revisions requested by Horseshoe Bay may or may not be accepted by TWDB. David Lindsay asked how county-other is analyzed, and Adam explained that county-other is generally used as a pool that balances out WUG requests, in order to keep county totals the same. Discussion occurred about the growth along 281 between Marble Falls and Johnson City, and other sources of growth in the area.

Christianne noted that while there is little previous precedent for increasing county-other estimates, that the fast growth some of these areas are experiencing might warrant our requesting an increase if we could find the data to back it up, similar to how AW can justify an increase in Travis County.

Sara provided some context for the overall planning approach, where even if demands for county-other seem low, due to shifting population to accommodate WUG revisions requests, the planning group still has the ability to account for growth on the supply side by accounting for the supplies that are going to meet the county-other demands, regardless of the demands shown in the county-other category. Additionally, that the smaller entities that aren't included as WUGs may be important water users, but often don't have the capacity to participate in planning, so the planning group and consultant need to balance where the planning effort goes.

David Lindsay expressed concern that golf course water use that isn't supplied by a utility is not fully accounted for. Jennifer Walker noted that SB2440 has changed some requirements with respect to water availability studies for new subdivision plats.

Discussion ended with Adam offering to keep the committee informed about updates to the memo in the coming weeks.

Lauri asked that if members of the committee had questions, they be sent to Sara for distribution, and that the earlier we handle questions, the better.

6. Review schedule

Action: Next P&WD committee meeting was tentatively scheduled for June 12 at INTERA offices at 9:00a.

7. Future Agenda Items

No new items, but we will consider revisions in next meeting and take possible action on recommendations for revisions.

8. Receive public comments (Limit 3 minutes per person)

None.

9. Adjourn

Adjourn at 10:38a.

MINUTES

Lower Colorado Regional Water Planning Group

Population and Demand Committee Meeting

June 12, 2023

INTERA Incorporated Offices

9600 Great Hills Plaza, Suite 300W

Austin, TX 78759

9:00 A.M.

Meeting Minutes:

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting was called to order at 9:07 A.M.

Attendance:

Committee Members:

Lauri Gillam, Small Municipalities, Committee Chair

Christianne Castleberry, Water Utilities

Barbara Johnson, Industry

Monica Masters, River Authorities

Jennifer Walker, Environmental

David Lindsay, Recreation

Teresa Lutes, Municipalities

Daniel Berglund, Small Business

Other attendees:

Earl Foster, Alternate for Small Municipalities

Lann Bookout, TWDB

Sara Eatman, Austin Water

Marisa Flores-Gonzalez, Austin Water

Stacy Pandey, LCRA

Roland Adams, Crosswater Yacht Club

Robert Adams, Plummer, Consulting Team

Adam Conner, FNI, Consulting Team

Justin DuRant, FNI, Consulting Team

Cindy Smiley, Smiley Law Firm

Sue Thornton, CTWC

2. Receive public comments (Limit 3 minutes per person)

None.

3. Review and approve meeting minutes

Christianne Castleberry moved for approval. Barbara Jordan seconded. Motion passed by voice vote.

4. Municipal population and demands

   a. Presentation led by Adam Conner reviewed the status of the WUG survey process and developing the draft memo that would support Region K's request for revisions to TWDB.

      Discussion:

      David Lindsay voiced concern about under-estimation of County Other demands. He has submitted separate information on utilities and golf courses in the Spicewood area to Neil, and is concerned about utilities, especially private utilities, that aren't considered as individual WUGs in the planning process like Aqua-Texas and other developments. Additionally, David noted that there are at least 3 new golf courses in Travis County and reminded the group to be sure those demands are accounted for. Mr. Lindsay cautioned against pulling population from County Other in an effort to correct the WUG population projections.

      Adam Conner noted that he's open to receiving additional information, but data availability and budget constraints drive limitations on planning for County-Other.

      Lann Bookout suggested that water use associated with golf courses and known development in County Other can be documented in the plan. The group discussed the value of including supplemental discussion about these demands in County Other in the Demands chapter, and recommended that the group continue to track these demands when the Availability and Supply are considered in later chapters.

      Adam provided additional details on the memo development and conversations with neighboring regions. He mentioned that Region G will be requesting an increase for the Williamson County demands. Adam noted that 20 utilities are making revision requests at this point. He presented the draft memo with sections highlighted that may require additional information.

   b. Present and consider recommendations for approval of revision requests. The Committee decided to review and vote on the revision requests that were considered straightforward and complete. Those population and GPCD revision requests would then be included in the recommended revisions for the full planning group to consider and submit to the Texas Water Development Board.

   - Travis County. City of Austin requested an increase in population that exceeded the Travis County total, requires additional discussion. **No action.**

- Buda requested a near-term increase and long-term decrease in population. Lauri Gillam moved to recommend the revision, seconded by Daniel Berglund. **Motion passed**.
- Cottonwood Creek requested a decrease in population because they're fully developed. Daniel Berglund moved to recommend the revisions, Laurie Gillam seconded. **Motion passed**.
- Elgin requested a population increase and provided ample documentation. Monica Masters noted that she has also seen the rapid growth in the area. David Lindsay moved to recommend the revision, Barbara Johnson seconded. **Motion passed.**
- Goldthwaite requested both a population and GPCD increase. The Committee requested more information on institutional demand, and to check water use.
    - Christianne Castleberry moved to recommend, Daniel Berglund seconded the population revision request. **Motion passed.**
    - Christianne Castleberry moved to recommend, Daniel Berglund seconded the GPCD revision request. **Motion passed.**
- Hays County WCID2 requested a significant reduction in population. Daniel Berglund moved to recommend the revision and Christianne Castleberry seconded. **Motion passed.**
- Horseshoe Bay requested an increase in population and a reduction in GPCD. The planning group discussed the impact of transient population, like second homes or vacation homes, on utility metrics. Lauri Gillam and Christianne Castleberry suggested that any WUGs where this seems to be a contributor to high GPCD should be noted in the plan, since it's not necessarily reflective of high water use per residential unit, Earl Foster and others agreed. The Committee requested that the consultant provide some additional information. **No action.**
- Hurst Creek MUD requested to reduce population and GPCD and provided documentation. Christianne Castleberry moved to recommend the revision, Daniel Berglund seconded. **Motion passed.**
- La Ventana requested a decrease in population. Lauri Gillam moved to recommend the revisions, Barbara Johnson seconded. **Motion passed.**
- Lago Vista requested a near-term population increase based on their recent connection count growth rate, and a cap at 49,000 people. Barbara Johnson moved to recommend the revisions, David Lindsay seconded. **Motion passed.**
- Lakeway MUD requested a near-term increase and a reduction from the draft projections in later decades. Lauri Gillam moved to recommend the revisions, Daniel Berglund seconded. **Motion passed.**
- Marble Falls requested a near-term increase and a leveling of growth at about 17,000 people. Lauri Gillam moved to recommend the revisions, Daniel Berglund seconded. **Motion passed.**
- Ruby Ranch WSC requested a reduction to 1100. Christianne Castleberry moved to recommend, Barbara Johnson seconded. **Motion passed.**
- San Saba requested an increase in population held constant through the planning horizon. Lauri Gillam moved to recommend the revisions, Teresa Lutes seconded. **Motion passed.**
- Schulenberg requested an increase in population. Christianne Castleberry moved to recommend the revisions, seconded by Lauri Gillam. **Motion passed.**

- Sunset Valley requested their population be held constant. Monica Masters moved to recommend the revisions, seconded by Teresa Lutes. **Motion passed.**
- Travis County MUD #18 requested that their population be held steady. Daniel Berglund moved to recommend the revisions, second by Christianne Castleberry. **Motion passed.**
- TC WCID #18 initially requested a decrease in population. Barbara moved to recommend, however after further discussion it was noted additional documentation had been provided and the committee decided to **postpone action**.
- Well Branch MUD submitted a request but requires more information. **No action.**

The remaining WUG revision requests were tabled until the next committee meeting.

David Lindsay requested that a baseline total demand be shown for each WUG to provide comparison for the demand projections. Sara Eatman noted that there isn't a baseline demand in the same way that there is a baseline WUG, but historical water use could provide some context for looking at the projections.

Action items included preparation of non-response list for next meeting, as well as a balance sheet showing additions and subtractions for the county-other category. The consultants requested that any committee members with contacts at the non-responsive WUGs reach out to them with a reminder.

6. Review schedule

Next meeting scheduled for June 22 at 1pm. Meeting location TBD.

7. Future Agenda Items

The same agenda will be used in the next meeting, with the goal to wrap up the revision recommendations.

Receive public comments (Limit 3 minutes per person)

None.

9. Adjourn

Adjourn at 10:45.

DRAFT MINUTES

Lower Colorado Regional Water Planning Group

Population and Demand Committee Meeting

June 22, 2023

Freese and Nichols, Inc

10431 Morado Circle, Suite 300

Austin, TX 78759

1:00 P.M.

Meeting Minutes:

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting was called to order at 1:07 P.M.

Attendance:

Committee Members:

Lauri Gillam, Small Municipalities, Committee Chair
Christianne Castleberry, Water Utilities
Barbara Johnson, Industry
Monica Masters, River Authorities
Teresa Lutes, Municipalities
Sue Thornton, Recreation (alternate for David Lindsay)
Jason Homan, Environmental (alternate for Ann McElroy)

Other attendees:
Earl Foster, Alternate for Small Municipalities
Sara Eatman, Austin Water
Marisa Flores-Gonzalez, Austin Water
Stacy Pandey, LCRA
Neil Deeds, INTERA, Consulting Team
Adam Conner, FNI, Consulting Team
Justin DuRant, FNI, Consulting Team

2. Receive public comments (Limit 3 minutes per person)

None.

3. Review and approve meeting minutes

For the June 12 meeting minutes, Barbara Johnson noted an error in spelling her name ("Jordan" rather than "Johnson"). Neil Deeds indicated they would make that correction. Barbara Johnson moved for approval of the 6/12 minutes. Lauri Gillam seconded. Motion passed.

4. Municipal population and demands

   Presentation led by Adam Conner reviewed the status of the WUG survey process and developing the draft memo that would support Region K's request for revisions to TWDB.

   a. Update on WUG survey responses

   The consulting team met with TWDB on Monday, from TWDB's response it seemed unlikely that the Horseshoe Bay request would be approved. Therefore, their request was removed. The cities listed in grey (Manor) had noted that they had objections to the draft but did not provide any supporting documentation.

   Adam presented two alternatives for how the Travis County-Other population should be projected either by using the draft 1.0 migration scenario numbers for the WUG (Option B), or using Travis County-Other as a checking account to balance the remainder for all named WUGs in Travis County other than Austin (Option A). Sue Thornton wanted to say thank you for looking into the new development, but that we may be under-estimating the growth that is overwhelming the lakes area. They'd like to preserve Travis County-Other so that there's enough to plan for.

   Marisa noted that Austin may think that there's some Austin population misallocated. Sue Thornton asked if we get a total population that will be justifiable. Jason Homan requested that we be consistent across all counties rather than making a special exception for Travis County. Sara Eatman reminded the Committee that TWDB allows planning groups to plan for supply above what a WUG's needs calls for. Adam presented a comparison against the 2021 and 2016 Region K plans, which showed that early decades are close but that the new projections are quite a bit higher than past plans in outer years.

   The decision on option A versus option B was held until later in the meeting when the remainder of the revision requests had been discussed.

   b. Present and consider recommendations for approval of revision requests. The Committee decided to review and vote on the revision requests that were considered straightforward and complete. Those population and GPCD revision requests would then be included in the recommended revisions for the full planning group to consider and submit to the Texas Water Development Board.

- Canyon Lake Water Service. This is a WUG that is shared between Region L and K. Draft GPCD was 113, through detailed data it should be 76 – much lower. Detailed analysis also showed somewhat lower population in the Region K portion of Canyon Lake Water Service, as compared to the draft 1.0 migration scenario projections. Results in a 30-40% reduction in demand. Adam indicated that he ran the revision requests by the utility and they support the request. Teresa Lutes made a motion to approve the revision request, Jason seconded. The motion passed.

- Corix. This WUG is largely in Region G. Distributed among various counties. Private utilities have development agreements but they aren't able to provide that information, so can't provide any backup. All based in reductions from County-Other, but Llano needed some from other counties. They didn't provide growth rates and including even nominal growth rates resulted in reducing some County-Others to below zero, so Adam decided to not grow any of the Corix systems beyond what they asked for in the 2030 decade. Jason moved to accept, Monica Masters seconded. The motion passed.

- Creedmoor-Maha WSC. Just submitted this week. Camino Real Utility is developing inside of Creedmoor-Maha. Monica noted that they've met with these folks; LCRA water is not conveniently located for them to provide water, so they're looking for other water including from GBRA and these estimates are consistent with what was provided. What is shown is just the portion within Region K. Lauri made a motion to reject their request due to the uncertainty around the request and the magnitude of the request. Christianne noted that they have a contract with GBRA, and Adam pointed out that Camino Real's supporting documentation claims they have a franchise agreement with the City of Mustang Ridge. Jason Homan seconded the motion to reject the request for revision. Motion passed.

- Dripping Springs WSC asked for a substantial increase to population, no increase to GPCD. Dripping Springs noted the increase in connections they're planning for between now and 2030, and that their current population is 88,000 and the draft 2030 is 86,000. FNI used the TWDB draft growth rate. Adam asked for their buildout and didn't get anything, Teresa suggested taking a middle ground where the near term projections align with Dripping Springs' projection but the growth rate is lower and lands near the 2080 TWDB projections. Cap at 40,673 (TWDB draft for 2080) and interpolate unless they hear from Dripping Springs. Lauri made a motion to revise as noted by Teresa, Barbara Johnson seconded. The motion passed.

- Johnson City. Draft projections showed a decline. Consultant used the 2010 to 2020 increase in connections as the growth rate to project the population forward. Their 2010 census pop was a little lower than the 2020 census doc, so unclear where the decrease came from. Christianne made a motion to accept the revision, Barbara seconded. The motion passed.

- Leander. Primarily in G, the consultant for G provided information for Leander, Round Rock, and Cedar Park. Since the Region K portion of population for Round Rock and Cedar Park is very small compared to the Region G portion, Adam decided to only submit a revision request for Leander. They didn't separate between Regions K and G, Adam referred to the distribution in the draft estimates (roughly 18% in K, 82% in G). Leander provided sufficient backup. Jason Homan moved to accept the revision, Teresa Lutes seconded the motion. The motion passed.

- TCWCID 18. Adam noted that substantial backup had been provided. Barbara moved to accept the revision request, Christianne seconded. The motion was approved.

- Undine Development. Provided connection count, est 3 ppl/connection, static because they're at buildout. Their GPCD is also going from 350-198. Lauri moved to approve. Teresa asked if the GPCD reduction had been approved by the utility. Adam said that he wasn't sure. Lauri clarified that her motion covers GPCD and population revision, and Teresa seconded the motion. Motion passed.

- Wells Branch WSC. Their supporting documentation was the 2021 Water Use Survey, TWDB wasn't completely clear on whether that would be satisfactory as supporting documentation. They also provided documentation of multifamily developments coming in to show the increase to 2030. Teresa moved to approve, Lauri seconded, approved.

- Austin. Katie Dahlberg said she was aware that City of Austin has contested the Census numbers, requested backup on the Census dispute. Marisa will provide. Teresa noted that if we don't get the increase that we're requesting, we can 'overplan' for Austin so that the total supply from Austin's WMSs cover the demands the utility plans for. Teresa noted that the State is looking at control totals, balancing growth across regions and counties, and there's value to asking for more growth to be reflected in our area overall. Adam said the Region G consultant is likely asking for an overall increase. Teresa moved to accept revision request as proposed by Austin Water, Barbara seconded. The motion was approved.

The group then circled back to the choice between options A and B for Travis County-Other.

Jason moved to move forward with option A for Travis County-Other, Christianne seconded, and the motion was approved.

6. Review schedule

We're ready for the planning group meeting on July 12, no additional meetings before that. Consultants will work on the municipal and non-municipal revision request reports.

7. Future Agenda Items

n/a

8. Receive public comments (Limit 3 minutes per person)

None.

9. Adjourn

Adjourn at 2:45p.

Appendix 3.A

List of Active Water Rights within Region K

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1405	CUATRO ESTRELLAS, LTD.	365	Colorado Run-of-River	5.64		
ADJ	1405	MARY C. VEHLE	365	Colorado Run-of-River	5.65		
ADJ	1405	RICHARD L. SECHRIST	365	Colorado Run-of-River	4.55	RICHARD L. SECHRIST	15.00
ADJ	1405	REDDING RANCH, LTD.	365	Colorado Run-of-River	3.33		
ADJ	1405	MARY C. VEHLE	365	Colorado Run-of-River	15.41		
ADJ	1405	RICHARD L. SECHRIST	365	Colorado Run-of-River	12.38	RICHARD L. SECHRIST	15.00
ADJ	1405	REDDING RANCH, LTD.	365	Colorado Run-of-River	9.07		
ADJ	1405	CUATRO ESTRELLAS, LTD.	365	Colorado Run-of-River	1.86		
ADJ	1405	MARY C. VEHLE	365	Colorado Run-of-River	5.07		
ADJ	1405	RICHARD L. SECHRIST	365	Colorado Run-of-River	4.08	RICHARD L. SECHRIST	15.00
ADJ	1405	REDDING RANCH, LTD.	365	Colorado Run-of-River	2.99		
ADJ	1405	CUATRO ESTRELLAS, LTD.	365	Colorado Run-of-River	2.07		
ADJ	1406	REDDING RANCH, LTD.	365	Colorado Run-of-River	8.00		
ADJ	1407	GENE CRENWELGE PENNY LEIGH GRONA CRENWELGE	365	Colorado Run-of-River	17.38		
ADJ	1407	FALCON SEABOARD DIVERSIFIED, INC.	365	Colorado Run-of-River	10.66		
ADJ	1407	SANDRA GRONA FIELDLER CLETIS GRONA KYNA GRONA REID	365	Colorado Run-of-River	11.75		
ADJ	1407	JOHN ROBINSON LYNNE E. C. ROBINSON	365	Colorado Run-of-River	6.32		
ADJ	1407	JENEEN JELLISON IRWIN PETER IRWIN	365	Colorado Run-of-River	1.07		
ADJ	1407	D BAR P RANCH, LP	365	Colorado Run-of-River	12.83		
ADJ	1407	D BAR P RANCH, LP FALCON SEABOARD DIVERSIFIED, INC. JOHN ROBINSON LYNNE E. C. ROBINSON	365	Colorado Run-of-River		D BAR P RANCH, LP FALCON SEABOARD DIVERSIFIED, INC. JOHN ROBINSON LYNNE E. C. ROBINSON	75.00
ADJ	1408	MARY C. VEHLE	365	Colorado Run-of-River	8.25	MARY C. VEHLE	27.00
ADJ	1409	BIERSCHWALE, KEYSER	365	Colorado Run-of-River	12.50	BIERSCHWALE, KEYSER	8.00
ADJ	1410	SCOTT HARRIS TAMMY HARRIS	365	Colorado Run-of-River	25.34		
ADJ	1411	BOWDEN SPRINGS LLC	365	Colorado Run-of-River	50.00		
ADJ	1412	JOAN MICHELE BONN	365	Colorado Run-of-River	118.00		
ADJ	1413	HENKE, EDWIN HENKE, WERNER	365	Colorado Run-of-River	20.60	HENKE, EDWIN HENKE, WERNER	2.00
ADJ	1414	KOTT, ERNEST W	365	Colorado Run-of-River	12.00		
ADJ	1415	JUENKE, HILMER JUENKE, STEVE	365	Colorado Run-of-River	12.50	JUENKE, HILMER JUENKE, STEVE	9.00

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1416	BONN, CORRINE BONN, MELVIN	365	Colorado Run-of-River	21.75		
ADJ	1417	ROY RICHARDS HENKE	365	Colorado Run-of-River	10.90		
ADJ	1417	SUSAN GAIL BRYLA ALLEN ROY HENKE	365	Colorado Run-of-River	93.60		
ADJ	1417	E. J. COP	365	Colorado Run-of-River	2.90		
ADJ	1417	CHEYENNE INTERESTS, INC. SNAFFLE BIT OUTFITTERS, LLC	365	Colorado Run-of-River	116.30		
ADJ	1417	ALLEN ROY HENKE	365	Colorado Run-of-River	16.30		
ADJ	1417	SUSAN GAIL BRYLA CHEYENNE INTERESTS, INC. ALLEN ROY HENKE	365	Colorado Run-of-River		SUSAN GAIL BRYLA CHEYENNE INTERESTS, INC. ALLEN ROY HENKE	145.00
ADJ	1418	KOTT, NATHAN	365	Colorado Run-of-River	44.00		
ADJ	1419	HEIMANN, WALTON JAMES	365	Colorado Run-of-River	3.00		
ADJ	1420	WISSEMANN, LILLIAN M WISSEMANN, STANLEY	365	Colorado Run-of-River	9.86		
ADJ	1420	YUCCA LILY, LTD.	365	Colorado Run-of-River	6.87		
ADJ	1420	KRISTI K HARRISON HARRISON, STERLING T	365	Colorado Run-of-River	3.27		
ADJ	1421	PARRISH, BARBARA H PARRISH, DONALD M	365	Colorado Run-of-River	66.71	PARRISH, BARBARA H PARRISH, DONALD M	5.00
ADJ	1421	MCLAUGHLIN, BRIAN THOMAS	365	Colorado Run-of-River	31.29		
ADJ	1422	WEIRICH BROS., INC.	365	Colorado Run-of-River	50.20		
ADJ	1423	BARBARA BECKMANN HAGEL BRAIDEN BEN HAGEL HOLLI KATE HAGEL KARSON KETIH HAGEL	365	Colorado Run-of-River	80.00	BARBARA BECKMANN HAGEL BRAIDEN BEN HAGEL HOLLI KATE HAGEL KARSON KETIH HAGEL	8.00
ADJ	1424	A. JABLER RODRIGUEZ DEBRA J. RODRIGUEZ	365	Colorado Run-of-River	33.00		
ADJ	1425	GILBERT, ANNETTE GILBERT, RAY E	365	Colorado Run-of-River	2.00		
ADJ	1426	BURGESS, F W	365	Colorado Run-of-River	17.00		
ADJ	1428	GUSTAVO RIOS JACQUELYN RIOS	365	Colorado Run-of-River	1.50		
ADJ	1428	JEANETTE BROWN WILLIAM GOULD BROWN	365	Colorado Run-of-River	9.68		
ADJ	1428	DABS BROWN HOLLIMON JOHN E HOLLIMON	365	Colorado Run-of-River	9.82		
ADJ	1429	KERMIT ERNST	365	Colorado Run-of-River	5.75		
ADJ	1429	GILLESPIE COUNTY	365	Colorado Run-of-River	0.25		
ADJ	1430	RICKY DEAN BOOS	365	Colorado Run-of-River	25.00		
ADJ	1431	GAIL WISSEMANN WEICH	365	Colorado Run-of-River	11.00		
ADJ	1432	BETTY SOLBRIG DAYTON SOLBRIG	365	Colorado Run-of-River	17.20	BETTY SOLBRIG DAYTON SOLBRIG	16.00

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1432	DRU C. PIPKIN MARVIN G. PIPKIN	365	Colorado Run-of-River	11.50		
ADJ	1432	PAUL R HARTMANN	365	Colorado Run-of-River	6.30		
ADJ	1432	BEATE C. BEAUMONT SAMUEL W BEAUMONT, JR	365	Colorado Run-of-River	1.50		
ADJ	1433	STEHLING, THEODORE J	365	Colorado Run-of-River	30.00	STEHLING, THEODORE J	7.81
ADJ	1434	PERRY, J HARDIN	365	Colorado Run-of-River	6.00		
ADJ	1435	ESTATE OF CLEMENS IMMEL	365	Colorado Run-of-River	4.00		
ADJ	1435	ESTATE OF CLEMENS IMMEL	365	Colorado Run-of-River	8.00		
ADJ	1436	GAY NELL MILLARD DAN ROBERT VESTAL HAL EDWARD VESTAL	365	Colorado Run-of-River	12.00		
ADJ	1437	TRUDY ANN DAY	365	Colorado Run-of-River	30.00		
ADJ	1438	HENRY J. FRANTZEN	365	Colorado Run-of-River	3.98		
ADJ	1438	LESTER C. FRANTZEN	365	Colorado Run-of-River	33.02		
ADJ	1438	ALBERT G. DWARSHUS, JR.	365	Colorado Run-of-River	3.00		
ADJ	1439	HILMAR WEINHEIMER	365	Colorado Run-of-River	169.18		
ADJ	1439	DAVID G. WEINHEIMER KAREN WEINHEIMER	365	Colorado Run-of-River	2.43		
ADJ	1439	DAVID G. WEINHEIMER	365	Colorado Run-of-River	49.34		
ADJ	1440	BOOT RANCH HOLDINGS, LLC	365	Colorado Run-of-River	121.00	BOOT RANCH HOLDINGS, LLC	195.00
ADJ	1441	BOOT RANCH HOLDINGS, LLC	365	Colorado Run-of-River		BOOT RANCH HOLDINGS, LLC	87.00
ADJ	1441	BOOT RANCH HOLDINGS, LLC	365	Colorado Run-of-River		BOOT RANCH HOLDINGS, LLC	6.00
ADJ	1441	BOOT RANCH HOLDINGS, LLC	365	Colorado Run-of-River		BOOT RANCH HOLDINGS, LLC	56.00
ADJ	1441	BOOT RANCH HOLDINGS, LLC	365	Colorado Run-of-River	34.00		
ADJ	1442	MANER, LISTON	365	Colorado Run-of-River	12.00	MANER, LISTON	13.00
ADJ	1443	PATTESON, EUGENE	365	Colorado Run-of-River	13.18		
ADJ	1443	JANICE C. PATTESON	365	Colorado Run-of-River	0.25		
ADJ	1443	PATTESON, EUGENE TROY L. PATTESON	365	Colorado Run-of-River	1.57		
ADJ	1444	K & S SUPPLY CORPORATION	365	Colorado Run-of-River	100.00	K & S SUPPLY CORPORATION	60.00
ADJ	1445	MOHR, WAYNE E	365	Colorado Run-of-River	30.00	MOHR, WAYNE E	5.00
ADJ	1446	MEDICINE BOW RIVER RANCH LP	365	Colorado Run-of-River	45.00		
ADJ	1447	MICHAEL G. PAINTER	365	Colorado Run-of-River	21.00		
ADJ	1447	CONNIE SMITH ROBERT SMITH	365	Colorado Run-of-River	10.00		
ADJ	1449	HOHENBERGER, DANIEL	365	Colorado Run-of-River	26.00		
ADJ	1450	JASON UNDERWOOD MARTHA UNDERWOOD	365	Colorado Run-of-River	35.00	JASON UNDERWOOD MARTHA UNDERWOOD	35.00

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1452	PETSCH, SHEILA E	365	Colorado Run-of-River	18.50	PETSCH, SHEILA E	37.00
ADJ	1452	BELL, JEANINE M	365	Colorado Run-of-River	18.50		
ADJ	1453	WEHMEYER, WILLIE A JR	365	Colorado Run-of-River	41.00		
ADJ	1454	WEHMEYER, WILLIE A JR	365	Colorado Run-of-River	67.50		
ADJ	1456	ROSS MIKOSH	365	Colorado Run-of-River	1.67		
ADJ	1456	MELVIN RAY BEHRENDS	365	Colorado Run-of-River	6.50		
ADJ	1456	BERT ALLAN MIKOSH	365	Colorado Run-of-River	2.33		
ADJ	1457	BERNARD STAUDT ESTATE	365	Colorado Run-of-River	14.00		
ADJ	1458	NEBGEN, HILMAR O	365	Colorado Run-of-River	1.70		
ADJ	1459	RUEBSAHM, RUBEN	365	Colorado Run-of-River	25.50		
ADJ	1460	KIMBERLEY S ZUBERBUELER TRUST	365	Colorado Run-of-River	9.84		
ADJ	1460	KIMBERLEY S ZUBERBUELER	365	Colorado Run-of-River	0.04		
ADJ	1460	KIMBERLEY S ZUBERBUELER ROBERT L ZUBERBUELER	365	Colorado Run-of-River	0.12		
ADJ	1461	THE LBJ COMPANY	365	Colorado Run-of-River	3.26		
ADJ	1461	JOE KIRK FULTON	365	Colorado Run-of-River	499.83		
ADJ	1461	J. MIKE HOWARD HOWARD, MARTHA	365	Colorado Run-of-River	13.81		
ADJ	1461	BYRON C. HULETT ELIZABETH C. HULETT	365	Colorado Run-of-River	13.10		
ADJ	1463	ERNEST HODGES ESTATE WILLIAM BATTS HODGES	365	Colorado Run-of-River	39.00	ERNEST HODGES ESTATE WILLIAM BATTS HODGES	2.50
ADJ	1464	THE LBJ COMPANY	365	Colorado Run-of-River	86.00	THE LBJ COMPANY	48.00
ADJ	1465	US DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE	365	Colorado Run-of-River	114.00		
ADJ	1466	THE LBJ COMPANY US DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE	365	Colorado Run-of-River	1,243.96		
ADJ	1466	JOE KIRK FULTON	365	Colorado Run-of-River	16.04		
ADJ	1467	AUSTIN INVESTMENT CO. US DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE	365	Colorado Run-of-River	220.00	AUSTIN INVESTMENT CO. US DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE	36.00
ADJ	1469	TEXAS PARKS AND WILDLIFE DEPARTMENT	365	Colorado Run-of-River	160.00		
ADJ	1470	WERNER SCHUMANN TEXAS PARKS AND WILDLIFE DEPARTMENT	335	Colorado Run-of-River	50.00		
ADJ	1471	BETH B. JONES ROBERT S. JONES	365	Colorado Run-of-River	21.74	BETH B. JONES ROBERT S. JONES	9.00
ADJ	1471	LINDIG, KENNETH	365	Colorado Run-of-River	34.26		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1472	AL LOUIS LINDIG BRENDA LINDIG	335	Colorado Run-of-River	7.00		
ADJ	1473	OBOYLE, JOHN W JR	335	Colorado Run-of-River	276.00	OBOYLE, JOHN W JR	10.50
ADJ	1474	EP3 RANCH, LLC	365	Colorado Run-of-River	25.93	EP3 RANCH, LLC	45.00
ADJ	1474	LIFE ESTATE OF KERMIT R. ECKHARDT	365	Colorado Run-of-River	0.07	LIFE ESTATE OF KERMIT R. ECKHARDT	45.00
ADJ	1475	OTTMERS, CHARLES	365	Colorado Run-of-River	3.00	OTTMERS, CHARLES	1.50
ADJ	1476	OTTMERS, JOHNNIE W	365	Colorado Run-of-River	3.00	OTTMERS, JOHNNIE W	4.00
ADJ	1477	KELLER EQUIPMENT COMPANY	335	Colorado Run-of-River	4.25	KELLER EQUIPMENT COMPANY	15.00
ADJ	1478	MOONEY, JAMES J	335	Colorado Run-of-River	9.00		
ADJ	1479	CITY OF JOHNSON CITY	335	Colorado Run-of-River	220.00		
ADJ	1479	CITY OF JOHNSON CITY	335	Colorado Run-of-River		CITY OF JOHNSON CITY	345.00
ADJ	1481	TEXAS PARKS AND WILDLIFE DEPARTMENT	335	Colorado Run-of-River	30.00		
ADJ	1482	MRPR HOLDINGS, L.P.	335	Colorado Run-of-River	34.00		
ADJ	1571	KINGSLAND WATER SUPPLY CORPORATION	397	Colorado Run-of-River	40.00		
ADJ	1632	BAETHAGE, BRADLEY OWEN EDNA M. BAETHAGE	365	Colorado Run-of-River	5.73		
ADJ	1632	EDNA M. BAETHAGE MICHAEL VANCE BAETHAGE	365	Colorado Run-of-River	7.75		
ADJ	1632	BYRON KEITH HOOPER HOOPER, LENNAH JO	365	Colorado Run-of-River	9.52		
ADJ	1639	CHANAS RANCH, LLC	397	Colorado Run-of-River	25.00		
ADJ	1639	CHANAS RANCH, LLC	397	Colorado Run-of-River	84.00		
ADJ	1642	LEIFESTE, RANDOLPH C	397	Colorado Run-of-River	5.00		
ADJ	1643	COMANCHE ASH THREE LLC-SERIES 105	397	Colorado Run-of-River	1.00		
ADJ	1644	JONIE GEARHART ROXE ANN JORDAN	397	Colorado Run-of-River	2.79		
ADJ	1644	JONIE GEARHART	397	Colorado Run-of-River	6.97		
ADJ	1644	NORMAN H. GRENWELGE	397	Colorado Run-of-River	20.24		
ADJ	1647	TALKINGTON, RACHEL E JONES	397	Colorado Run-of-River	0.28		
ADJ	1647	WAYNE NEWKUMET	397	Colorado Run-of-River	14.72		
ADJ	1648	KOTHMANN, FLOYD	397	Colorado Run-of-River	2.00		
ADJ	1649	JONES, ODIS K	397	Colorado Run-of-River	6.00		
ADJ	1650	CITY OF LLANO	397	Colorado Run-of-River	400.00	CITY OF LLANO	317.00
ADJ	1650	CITY OF LLANO	397	Colorado Run-of-River	100.00		
ADJ	1651	CELIA J. GRIFFIN GRIFFIN, STEVE	397	Colorado Run-of-River	24.00		
ADJ	1652	COLLIER MATERIALS, INC.	397	Colorado Run-of-River	11.00		
ADJ	1655	CITY OF LLANO	397	Colorado Run-of-River		CITY OF LLANO	183.00
ADJ	1655	CITY OF LLANO	397	Colorado Run-of-River	1,200.00	CITY OF LLANO	200.00
ADJ	1655	CITY OF LLANO	397	Colorado Run-of-River	180.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1657	TURBIVILLE, LEONARD	397	Colorado Run-of-River	1.00		
ADJ	1658	D. MALCOLM LONG	397	Colorado Run-of-River	60.00		
ADJ	1659	FRANK M. SILER TESTAMENTARY TRUST	397	Colorado Run-of-River	24.00		
ADJ	1744	JOHN R. GILGER	403	Colorado Run-of-River	95.00		
ADJ	1745	GRAVES, JOHN JUDSONNORWOOD, MA	403	Colorado Run-of-River	20.00	GRAVES, JOHN JUDSON NORWOOD, MARJORIE JEAN GRAVES WHITE, CAROL JOAN GRAVES	20.00
ADJ	1745	GRAVES, JOHN JUDSONNORWOOD, MA	403	Colorado Run-of-River	80.00	GRAVES, JOHN JUDSON NORWOOD, MARJORIE JEAN GRAVES WHITE, CAROL JOAN GRAVES	80.00
ADJ	1746	GRAVES, JOHN JUDSONNORWOOD, MA	403	Colorado Run-of-River	118.00	GRAVES, JOHN JUDSON NORWOOD, MARJORIE JEAN GRAVES WHITE, CAROL JOAN GRAVES	118.00
ADJ	1746	GRAVES, JOHN JUDSONNORWOOD, MA	403	Colorado Run-of-River	160.00	GRAVES, JOHN JUDSON NORWOOD, MARJORIE JEAN GRAVES WHITE, CAROL JOAN GRAVES	72.00
ADJ	1748	ELIZABETH OTTERNESS 2015 REVOCABL	403	Colorado Run-of-River	77.67		
ADJ	1748	SLEDGE CATTLE COMPANY INC	403	Colorado Run-of-River	47.33		
ADJ	1748	ELIZABETH OTTERNESS 2015 REVOCABL	403	Colorado Run-of-River		ELIZABETH OTTERNESS 2015 REVOCABLE MANAGEMENT TRUST KATRINA KUZMICH 2012 REVOCABLE MANAGEMENT TRUST SARAH LOUISE KUZMICH 2017 REVOCABLE MANAGEMENT TRUST	90.00
ADJ	1749	SLEDGE CATTLE COMPANY INC	403	Colorado Run-of-River	20.00	SLEDGE CATTLE COMPANY INC	18.00
ADJ	1750	WYLIE, J DON	403	Colorado Run-of-River	32.00	WYLIE, J DON	32.00
ADJ	1751	MARY ALICE STALCUP	403	Colorado Run-of-River	200.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1751	PEGGY JEAN ROSS	403	Colorado Run-of-River		PEGGY JEAN ROSS	336.00
ADJ	1752	RAINBOLT FAMILY LP	403	Colorado Run-of-River	127.00	RAINBOLT FAMILY LP	127.00
ADJ	1753	HENRY T MANGHAM	403	Colorado Run-of-River	52.00	HENRY T MANGHAM	82.50
ADJ	1754	ROBERT STARKS	403	Colorado Run-of-River	60.00	ROBERT STARKS	85.00
ADJ	1755	GUILBEAUX RANCH LLC	403	Colorado Run-of-River	60.00	GUILBEAUX RANCH LLC	108.00
ADJ	1756	NANCY RUHMANN ANDERSONVIRGIL K	403	Colorado Run-of-River	16.00		
ADJ	1758	KENT CLAYTON FARMERSTEPHEN JAME	403	Colorado Run-of-River	6.00		
ADJ	1759	STANSBERRY, W M	403	Colorado Run-of-River	69.00		
ADJ	1760	DUREN TRUST	403	Colorado Run-of-River	60.00	DUREN TRUST	70.00
ADJ	1761	JAMES G DOLLINS IIITHERESA K. DOLLIN	403	Colorado Run-of-River	4.00		
ADJ	1762	GINGER STERLING SPIES	403	Colorado Run-of-River	26.59		
ADJ	1762	GWEN STERLING KAUFFMAN	403	Colorado Run-of-River	11.66		
ADJ	1762	DORIS CATHERINE STERLING, TRUSTEE	403	Colorado Run-of-River	2.74		
ADJ	1847	ABELL RANCHES, LP	419	Colorado Run-of-River	200.00		
ADJ	1856	HAWKINS, KATHLEEN	419	Colorado Run-of-River	18.28		
ADJ	1856	JUDY DUNNEGAN	419	Colorado Run-of-River	15.72		
ADJ	1857	HAWKINS, KATHLEEN	419	Colorado Run-of-River	6.00		
ADJ	1858	JOHN WORTH BYRD	419	Colorado Run-of-River	19.00		
ADJ	1859	CHRISTINE DIANE POOL BESSENTPATSY	419	Colorado Run-of-River	171.00	CHRISTINE DIANE POOL BESSENT PATSY MARSCHALL STEWART	3.00
ADJ	1860	BAKER, DONNA BBAKER, LARRY	419	Colorado Run-of-River	96.00		
ADJ	1861	BESSENT, CHRISTINE DIANE POOLBESSE	419	Colorado Run-of-River	20.00		
ADJ	1862	BESSENT, CHRISTINE DIANE POOLBESSE	419	Colorado Run-of-River	28.00		
ADJ	1863	CHURCHILL, BOBBIECHURCHILL, FRANK	419	Colorado Run-of-River	15.00		
ADJ	1863	SHOOK, JIMMYSHOOK, LAURASHOOK, I	419	Colorado Run-of-River	35.00		
ADJ	1864	SHARON KAY ELLIS	419	Colorado Run-of-River	7.26		
ADJ	1864	BARBARA FOWLERDON D. FOWLER	419	Colorado Run-of-River	25.74		
ADJ	1865	DIPPEL SSRR, LLC	419	Colorado Run-of-River	15.00		
ADJ	1866	SEIDERS SAN SABA RANCH, LTD.	419	Colorado Run-of-River	93.00		
ADJ	1867	JOHNSON REVOCABLE TRUST	419	Colorado Run-of-River	54.00		
ADJ	1868	JOHNSON REVOCABLE TRUST	419	Colorado Run-of-River	190.00		
ADJ	1869	ELIZABETH E. OWENSHOMER R. OWEN	419	Colorado Run-of-River	25.73		
ADJ	1869	AMY STENCILCRAIG STENCIL	419	Colorado Run-of-River	20.64		
ADJ	1869	CASEY JOE FISHERKRISTY LEIGH FISHER	419	Colorado Run-of-River	20.64		
ADJ	1870	ELIZABETH E. OWENSHOMER R. OWEN	419	Colorado Run-of-River	88.00		
ADJ	1871	BETTY TYLENNE TERRY	419	Colorado Run-of-River	120.00		
ADJ	1872	TRIPLE "M" CATTLE CO.	419	Colorado Run-of-River	225.00		
ADJ	1873	AMBER LYNN RODRIGUEZSAMUEL MAR	419	Colorado Run-of-River	104.00		
ADJ	1874	DENNIS HARDMANTERESA HARDMAN	419	Colorado Run-of-River	34.10		
ADJ	1874	AMONETT, BEN F.LURA L. AMONETTTRA	419	Colorado Run-of-River	0.90		
ADJ	1875	CAROL SUGAR MARTINJOHN MARCUS I	419	Colorado Run-of-River	114.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1876	ESTATE OF RILEY C. HARKEYBONNIE HAI	419	Colorado Run-of-River	112.00		
ADJ	1876	CAROL ANN MARTINJOHN MARCUS MA	419	Colorado Run-of-River	30.00		
ADJ	1877	WILLIAM LINN OWEN III	419	Colorado Run-of-River	146.00		
ADJ	1878	HIHT ORCHARD, LLC	419	Colorado Run-of-River	120.00		
ADJ	1879	1970 CHILDRESS LP	419	Colorado Run-of-River	25.00		
ADJ	1880	EDMONDSON, CHRISTINE BAGLEY	419	Colorado Run-of-River	29.00		
ADJ	1881	BAGLEY, DEAN JR	419	Colorado Run-of-River	103.00		
ADJ	1881	ADAMS, CONNIE BAGLEY	419	Colorado Run-of-River	37.30		
ADJ	1881	EDMONDSON, CHRISTINE BAGLEY	419	Colorado Run-of-River	20.70		
ADJ	1882	PEGGY NELL DICKENSONRICHARD KEITH	419	Colorado Run-of-River	150.00		
ADJ	1883	DORINDA LEWIS CRUMPMARLA L LAMI	419	Colorado Run-of-River	31.00		
ADJ	1884	LONELY LLAMA LLC	419	Colorado Run-of-River	42.00		
ADJ	1884	LONELY LLAMA LLC	419	Colorado Run-of-River	30.00		
ADJ	1885	WOOD, T N	419	Colorado Run-of-River	64.00	WOOD, T N	81.00
ADJ	1886	LAMBERT, RICKYLAMBERT, SUSANA	419	Colorado Run-of-River	30.60		
ADJ	1886	MIFFLETON, MAXINE	419	Colorado Run-of-River	4.20		
ADJ	1886	MCBRIDE, JOSEPHINEMCBRIDE, RONNI	419	Colorado Run-of-River	4.20		
ADJ	1887	LAMBERT, ROGER RICKYLAMBERT, SUSA	419	Colorado Run-of-River	329.00		
ADJ	1888	SLOAN LIVESTOCK, LTD	419	Colorado Run-of-River	88.00		
ADJ	1889	LINDA CAMERON SLOANWILSON ALLAN	419	Colorado Run-of-River	41.00		
ADJ	1890	THE GREAT SAN SABA RIVER PECAN CO	419	Colorado Run-of-River	434.00		
ADJ	1892	THE ESTATE OF JOHN P MCCONNELL JR	419	Colorado Run-of-River	52.55		
ADJ	1892	EARLY, JOHNETTE MCCONNELLMCCONN	419	Colorado Run-of-River	180.45		
ADJ	1893	BAGLEY, DEAN JR	419	Colorado Run-of-River	52.00		
ADJ	1894	BAGLEY, GAILIAN DEAN JR	419	Colorado Run-of-River	272.00		
ADJ	1895	THE GREAT SAN SABA RIVER PECAN CO	419	Colorado Run-of-River	48.00		
ADJ	1896	BAGLEY, GAILIAN DEAN JR	419	Colorado Run-of-River	64.00		
ADJ	1897	MARTIN, BETTYMARTIN, WILTON	419	Colorado Run-of-River	80.00		
ADJ	1898	GILGER, DAVID	419	Colorado Run-of-River	40.00		
ADJ	1898	GILGER, DAVID	419	Colorado Run-of-River	20.00		
ADJ	1899	OWEN-GILGER, INC.	419	Colorado Run-of-River	340.00		
ADJ	1900	STIFFLEMIRE, STEVE D	419	Colorado Run-of-River	54.00		
ADJ	1901	BAGLEY, ROY	419	Colorado Run-of-River	49.00		
ADJ	1902	SANDERSON, GLENNETTASANDERSON,	419	Colorado Run-of-River	2.00		
ADJ	1903	CITY OF SAN SABA	419	Colorado Run-of-River	550.00	CITY OF SAN SABA	30.00
ADJ	1904	MILLICAN, WINSTON MIKE	419	Colorado Run-of-River	5.00		
ADJ	1905	TOWNSEND, L FTOWNSEND, MARY B	419	Colorado Run-of-River	38.00		
ADJ	1906	CITY OF SAN SABA	419	Colorado Run-of-River	54.00		
ADJ	1907	MCCONNELL, PATSY RAYE	419	Colorado Run-of-River	198.00		
ADJ	1908	OWEN, W L JR	419	Colorado Run-of-River	40.00		
ADJ	1908	OWEN, W L JR	419	Colorado Run-of-River	10.00		
ADJ	1909	SMITH, JOE C	419	Colorado Run-of-River	84.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	1910	HUBBERT, EDGAR JRHUBBERT, LORENA	419	Colorado Run-of-River	14.00	HUBBERT, EDGAR JR HUBBERT, LORENA	1.00
ADJ	1911	SHOOK, JIMMY NSHOOK, NANCY	419	Colorado Run-of-River	95.00	SHOOK, JIMMY N SHOOK, NANCY	0.50
ADJ	1912	ERROL DEAN GAGETONY MIKE GAGE	419	Colorado Run-of-River	112.00		
ADJ	1914	BURNHAM, MARTHA OWENREAGAN O	419	Colorado Run-of-River	207.00		
ADJ	1915	KIM MAHAN	419	Colorado Run-of-River	117.00		
ADJ	1915	DANE MAHAN	419	Colorado Run-of-River	103.00		
ADJ	1916	THE PATIENCE SHANKLIN ESTATE TRUST	419	Colorado Run-of-River	103.00		
ADJ	1917	BURNHAM, MARTHA OWENREAGAN O	419	Colorado Run-of-River	188.00		
ADJ	1918	MIKE REAVISVALERIE REAVIS	419	Colorado Run-of-River	40.00		
ADJ	1919	2016 SHAHAN FAMILY PARTNERSHIP, L	419	Colorado Run-of-River	15.00		
ADJ	1920	TOMMY MADDOXWALLACE MADDOX	403	Colorado Run-of-River	15.00		
ADJ	1920	TOMMY MADDOXWALLACE MADDOX	403	Colorado Run-of-River	14.00		
ADJ	1921	SAN SABA IRREVOCABLE TRUST AGREE	419	Colorado Run-of-River	20.00		
ADJ	1922	WAYNE R. SHAHAN	419	Colorado Run-of-River	40.00		
ADJ	1924	OLIVER, RAYMOND A	419	Colorado Run-of-River	49.00		
ADJ	1925	SALLY ANN HOLLADAY	419	Colorado Run-of-River	37.00		
ADJ	1926	OLIVER, NORMA ROLIVER, R L JROLIVER	419	Colorado Run-of-River	4.85		
ADJ	1926	LANCE T. HILLKAREN A. WELLS	419	Colorado Run-of-River	0.33		
ADJ	1926	BARBARA JOLLEYJOSEPH JOLLEY	419	Colorado Run-of-River	0.82		
ADJ	1927	MARJORIE ANN O'BANON ALTIZER	419	Colorado Run-of-River	54.00		
ADJ	1928	MILLICAN, ELSIE	419	Colorado Run-of-River	118.00		
ADJ	1929	LIPTAK, WINNIFRED	419	Colorado Run-of-River	53.00		
ADJ	2075	TOWNSEND, O C	362	Lavaca Run-of-River	2.00	TOWNSEND, O C	1.75
ADJ	2075	WRIGHT, H DWRIGHT, LETA	362	Lavaca Run-of-River	2.00		
ADJ	2080	ENGSTROM BROTHERS PARTNERSHIP	348	Lavaca Run-of-River	248.00		
ADJ	2081	ENGSTROM, BRADENGSTROM, BRADLE	348	Lavaca Run-of-River	683.27		
ADJ	2085	WIED, WILLIAM MARK	348	Lavaca Run-of-River	13.00		
ADJ	2086	JOE RAY MATZKE	348	Lavaca Run-of-River	282.00		
ADJ	2087	KORENEK, LEO M	348	Lavaca Run-of-River	84.00	KORENEK, LEO M	20.00
ADJ	2088	KORENEK, LEO M	348	Lavaca Run-of-River	45.00		
ADJ	2089	HOFFMAN, LOUIS P	348	Lavaca Run-of-River	48.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	2452	ASHLEY D CHRISTIANADELAIDE H CHUR	419	Colorado Run-of-River	225.00	ASHLEY D CHRISTIAN ADELAIDE H CHURCH OBIE D HALLUM RALEIGH L HALLUM NANCY E HERREN JENNIFER A JEAN JOHN W KEFFLER MATTHEW L KEFFLER LAH ENTERPRISES LIMITED PARTNERSHIP ELLEN V LEONARD EMILY A LEONARD JOHN M LEONARD LAUREN A LEONARD MARGERY ELIZABETH LEONARD LEONARD, ROBERT W JR MARTHA L MOTHERAL NANCY ALICE LEONARD INVESTMENT COMPANY, LTD. O.P. LEONARD, JR. INVESTMENT COMPANY, LTD. SAN SABA FAMILY, LLC SAN SABA SPRINGS, LLC THE ANTHONY 2007 IRREVOCABLE ASSET TRUST	15.00
ADJ	2452	ASHLEY D CHRISTIANADELAIDE H CHUR	419	Colorado Run-of-River	28.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	2452	ASHLEY D CHRISTIANADELAIDE H CHUR	419	Colorado Run-of-River	750.00	ASHLEY D CHRISTIAN ADELAIDE H CHURCH OBIE D HALLUM RALEIGH L HALLUM NANCY E HERREN JENNIFER A JEAN JOHN W KEFFLER MATTHEW L KEFFLER LAH ENTERPRISES LIMITED PARTNERSHIP ELLEN V LEONARD EMILY A LEONARD JOHN M LEONARD LAUREN A LEONARD MARGERY ELIZABETH LEONARD LEONARD, ROBERT W JR MARTHA L MOTHERAL NANCY ALICE LEONARD INVESTMENT COMPANY, LTD. O.P. LEONARD, JR. INVESTMENT COMPANY, LTD. SAN SABA FAMILY, LLC SAN SABA SPRINGS, LLC THE ANTHONY 2007 IRREVOCABLE ASSET TRUST	470.00
ADJ	2452	ASHLEY D CHRISTIANADELAIDE H CHUR	419	Colorado Run-of-River	145.00		
ADJ	2452	ASHLEY D CHRISTIANADELAIDE H CHUR	419	Colorado Run-of-River	69.00		
ADJ	2452	ASHLEY D CHRISTIANADELAIDE H CHUR	419	Colorado Run-of-River	85.00		
ADJ	2516	J. PHILLIP KEETER	419	Colorado Run-of-River	11.90		
ADJ	2518	OSCAR L. GRANT	419	Colorado Run-of-River	6.10		
ADJ	2519	KATHERINE CORLEYKURT CORLEY	419	Colorado Run-of-River	8.00		
ADJ	2523	LAFFERTY, TOM	419	Colorado Run-of-River	90.00	LAFFERTY, TOM	90.00
ADJ	2524	RUSSELL T. GULLYSHELLEY E. GULLY	403	Colorado Run-of-River	120.00		
ADJ	2525	EUGENE EDWARD NORWOODJEANINE (	419	Colorado Run-of-River	620.00		
ADJ	2526	LAQUITA HICKS	403	Colorado Run-of-River	4.39		
ADJ	2526	CHRISTOPHER N. BEZNERPAGE BEZNER	403	Colorado Run-of-River	2.10		
ADJ	2526	JOYCE GAYLE HICKS ESTATE	403	Colorado Run-of-River	7.51		
ADJ	2527	LAQUITA HICKS	403	Colorado Run-of-River	14.00		
ADJ	2528	COLORADO BEND RANCH LLC	403	Colorado Run-of-River	203.00		
ADJ	2529	LOCKLEAR, T WARD	419	Colorado Run-of-River	239.00		
ADJ	2530	RIVER CREEK LIMITED, A TEXAS LIMITED	419	Colorado Run-of-River	41.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	2531	JENNIFER ANDREA LOPEZJOHN R. LOPE	419	Colorado Run-of-River	28.07	JENNIFER ANDREA LOPEZ JOHN R. LOPEZ IV	30.00
ADJ	2531	JENNIFER ANDREA LOPEZJOHN R. LOPE	419	Colorado Run-of-River	43.33		
ADJ	2531	DON TAPPJOYCE TAPP	419	Colorado Run-of-River	73.48		
ADJ	2531	SENORITA G. WALDEN FAMILY LIMITED	419	Colorado Run-of-River	55.11		
ADJ	2532	ESTATE OF A J BECK	403	Colorado Run-of-River	90.00	ESTATE OF A J BECK	196.00
ADJ	2533	NANCY C. BUSHROGER D. BUSH	419	Colorado Run-of-River	44.00		
ADJ	2533	NANCY C. BUSH	419	Colorado Run-of-River	44.00		
ADJ	2533	KITTY JO SIMPSON CUMMINGS	419	Colorado Run-of-River	44.00		
ADJ	2534	NETTLESHIP FAMILY TRUST	419	Colorado Run-of-River	156.00		
ADJ	2535	KATHLEEN CLAWSONLANCE CLAWSON	403	Colorado Run-of-River	163.00		
ADJ	2535	ESTHER DITOJAAP J. DITO	403	Colorado Run-of-River	150.00		
ADJ	2535	KATHLEEN CLAWSONLANCE CLAWSON	403	Colorado Run-of-River	30.00		
ADJ	2535	ESTHER DITOJAAP J. DITO	403	Colorado Run-of-River		ESTHER DITO JAAP J. DITO	30.00
ADJ	2537	JANEL RANCH, LTD.RONDO PROPERTIES	403	Colorado Run-of-River	125.00		
ADJ	2538	CARMON R EASON JR	403	Colorado Run-of-River	16.70		
ADJ	2538	BORHO, BILLY WBORHO, GLORIA L	403	Colorado Run-of-River	66.30		
ADJ	2539	CARMON R EASON JR	403	Colorado Run-of-River	102.00		
ADJ	2540	RMZ RANCH HOLDING CO., LLC	419	Colorado Run-of-River	61.89		
ADJ	2540	EDMONDSON, J C	419	Colorado Run-of-River	5.11		
ADJ	2541	KIMBERLY PRICE LEWISRENEE RAINBOL	403	Colorado Run-of-River	57.00	KIMBERLY PRICE LEWIS RENEE RAINBOLT NICKEL SHERAL M. RAINBOLT PAULA RICE	100.00
ADJ	2542	GERALD G HALE	403	Colorado Run-of-River	13.00		
ADJ	2543	GERALD G HALE	403	Colorado Run-of-River	100.00		
ADJ	2544	MARY BESS WILCOX	403	Colorado Run-of-River	16.00		
ADJ	2545	AMY J. GEESLINDAVID G. GEESLIN	403	Colorado Run-of-River	16.00		
ADJ	2546	CHERIE L. O'REARKENNETH O. O'REAR	419	Colorado Run-of-River	600.00		
ADJ	2546	CHERIE L. O'REARKENNETH O. O'REAR	419	Colorado Run-of-River		CHERIE L. O'REAR KENNETH O. O'REAR	180.00
ADJ	2547	ANDREA DUNLAPRYON DUNLAP	403	Colorado Run-of-River	171.00	ANDREA DUNLAP RYON DUNLAP	30.00
ADJ	2549	NANCY A. LEONARD INVESTMENT COM	403	Colorado Run-of-River	249.00		
ADJ	2551	IVA KATHERINE COCKRELL ESTATE	403	Colorado Run-of-River	81.00	IVA KATHERINE COCKRELL ESTATE	12.00
ADJ	2552	BARBARA HUGHESHUGHES, MARTIN	403	Colorado Run-of-River	36.90		
ADJ	2552	AMANDA LOUISE LONGLONG, ROBERT	403	Colorado Run-of-River	72.91		
ADJ	2554	SIBYL W. MILLSAPPSSTUART C. MILLSAP	403	Colorado Run-of-River	24.00		
ADJ	2555	HARTLEY, FRED EHARTLEY, LILLIE MARG	403	Colorado Run-of-River	34.00		
ADJ	2556	A&A LANDSCAPE & IRRIGATION, L.P.	403	Colorado Run-of-River	75.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	2557	BARFIELD, JOHN	419	Colorado Run-of-River	15.84		
ADJ	2558	CECIL CAMPBELL	419	Colorado Run-of-River	71.10		
ADJ	2559	OSWALD, J COSWALD, LOUISE	419	Colorado Run-of-River	27.00		
ADJ	2560	MILLICAN, DEBORAHMILLICAN, ROBERT	419	Colorado Run-of-River	27.00		
ADJ	2561	CECIL CAMPBELL	419	Colorado Run-of-River	39.06	CECIL CAMPBELL	3.50
ADJ	2562	BONNIE LANGEJACKIE CHRISTIAN WARI	419	Colorado Run-of-River	49.42		
ADJ	2562	DAN T. BRADYGLENDA L. BRADY	419	Colorado Run-of-River	46.58		
ADJ	2564	MARILYNE COX	419	Colorado Run-of-River	151.50		
ADJ	2564	CINDEE J. SCHIEFFER	419	Colorado Run-of-River	151.50		
ADJ	2564	ESCANABA BEND, LLC	419	Colorado Run-of-River	151.50		
ADJ	2564	OLIVER INVESTMENTS, L.L.C.	419	Colorado Run-of-River	151.50		
ADJ	2564	FLORENCIA K. SMITHSMITH, ROBERT W	419	Colorado Run-of-River	474.00		
ADJ	2564	JULIE E. MONTGOMERYKENDALL C. MO	419	Colorado Run-of-River	20.00		
ADJ	2565	ESTATE OF OTHEL OTTO SMITH	403	Colorado Run-of-River	100.00		
ADJ	2566	MARIE WATSONSAM WATSON	403	Colorado Run-of-River	100.00		
ADJ	2566	RAYMOND ARTHUR THOMPSON IIISANI	403	Colorado Run-of-River	59.00		
ADJ	2568	KELLIS LANDRUM	403	Colorado Run-of-River	168.00		
ADJ	2569	JOHNSON, R C	403	Colorado Run-of-River	105.61		
ADJ	2569	GBI TRUST	403	Colorado Run-of-River	2.39		
ADJ	2571	CROMER FAMILY RANCHES, LTD.	419	Colorado Run-of-River	113.00		
ADJ	2572	ANITA GOTCHER	419	Colorado Run-of-River	232.00		
ADJ	2573	N. MONETTE BURKESTEPHEN BURKE	419	Colorado Run-of-River	11.00		
ADJ	2574	OLIVER, JOHN J	419	Colorado Run-of-River	45.00		
ADJ	2575	WELLS, JOYCE WOODWOOD, TOMMIE V	419	Colorado Run-of-River	93.00		
ADJ	2576	REAGAN O. BURNHAM	403	Colorado Run-of-River	84.00		
ADJ	2577	CHEREE HAMBLEN	419	Colorado Run-of-River	44.00		
ADJ	2577	LESLIE D. WEINRICH SURVIVOR'S TRUST	419	Colorado Run-of-River	44.00		
ADJ	2578	MICHAEL P. GRIMESSUE BETH O'BANON	419	Colorado Run-of-River	30.00		
ADJ	2582	MICHAEL H. ROCKAFELLOWTAMELA L. F	419	Colorado Run-of-River	71.00		
ADJ	2582	DICK GLOVER CO., INC.GEMSTAR, INC.	419	Colorado Run-of-River		DICK GLOVER CO., INC. GEMSTAR, INC.	14.00
ADJ	2583	MICHAEL H. ROCKAFELLOWTAMELA L. F	419	Colorado Run-of-River	259.00		
ADJ	2584	MARJORIE C MCDOWELL FAMILY TRUST	419	Colorado Run-of-River	96.00		
ADJ	2591	MCCOY, JUDITH ANNEMCCOY, KENNETH	419	Colorado Run-of-River	73.00		
ADJ	2593	MCCOY, JUDITH ANNEMCCOY, KENNETH	419	Colorado Run-of-River	57.00		
ADJ	2595	BURGESS, REBECCA FBURGESS, WILLIAN	419	Colorado Run-of-River	205.00		
ADJ	2601	KELCY WARREN	419	Colorado Run-of-River	105.00		
ADJ	2602	PORCH, W D	419	Colorado Run-of-River	30.00	PORCH, W D	4.00
ADJ	2603	BRISTER, JACKIE	419	Colorado Run-of-River	187.00		
ADJ	2604	CLARK, W N	419	Colorado Run-of-River	60.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	2606	MILLICAN, ELSIEMILLICAN, ROBERT EU(	419	Colorado Run-of-River	18.00	MILLICAN, ELSIE MILLICAN, ROBERT EUGENE MILLICAN, WINSTON MIKE THOMPSON, MARGARET KATHLEEN	0.50
ADJ	2607	GOODRICH RANCH COMPANY	454	Colorado Run-of-River	25.38		
ADJ	2607	JGE HOLDINGS, LTD.	454	Colorado Run-of-River	121.58		
ADJ	2607	TRIBUTARY SPORTING CLUB LP	454	Colorado Run-of-River	18.04		
ADJ	2608	TRIBUTARY SPORTING CLUB LP	454	Colorado Run-of-River		TRIBUTARY SPORTING CLUB LP	780.00
ADJ	2609	JOHANSON, JAMES BARBER	454	Colorado Run-of-River	33.00		
ADJ	2610	T-BAR-O RANCH PARTNERSHIP, LTD.	397	Colorado Run-of-River	99.00		
ADJ	2611	BORDERS, PANSYESTATE OF ELLEN WILL	397	Colorado Run-of-River	48.46		
ADJ	2611	MCGINTY PROPERTIES, LTD.	397	Colorado Run-of-River	3.54		
ADJ	2612	JIMMY GLYNN LACKEYSHEILAH JAN LAC	397	Colorado Run-of-River	12.00		
ADJ	2614	WENDAL LEE PHILLIPS FAMILY PARTNEI	454	Colorado Run-of-River	27.30		
ADJ	2614	STUSIE, LLC	454	Colorado Run-of-River	18.70		
ADJ	2615	TROY FOX	454	Colorado Run-of-River	149.07		
ADJ	2615	ESTATE OF C A BARNETT	454	Colorado Run-of-River	0.93		
ADJ	2619	JOLYNN TEAGUE JOHNSON	365	Colorado Run-of-River	57.00		
ADJ	2619	HOLLY TEAGUE ONEILL	365	Colorado Run-of-River	57.00		
ADJ	2620	ILEE L ERSCH	365	Colorado Run-of-River	1.00		
ADJ	2621	PETERSEN, DANIEL J	365	Colorado Run-of-River	15.00	PETERSEN, DANIEL J	55.00
ADJ	2622	RABKE, LEROY	365	Colorado Run-of-River	0.50	RABKE, LEROY	0.75
ADJ	2623	OEHLER, SAMUEL	397	Colorado Run-of-River	3.05	OEHLER, SAMUEL	5.00
ADJ	2623	JONATHAN C. SCHOOLARMARIKA SCHO	397	Colorado Run-of-River	3.96		
ADJ	2624	HOHMANN, HAROLD DONOVANHOHM	397	Colorado Run-of-River	6.56	HOHMANN, HAROLD DONOVAN HOHMANN, WINONA	11.00
ADJ	2625	HOHMANN, HAROLD DONOVANHOHM	397	Colorado Run-of-River	6.05		
ADJ	2626	HOHMANN, OTTO DOYLE	397	Colorado Run-of-River	10.39		
ADJ	2627	MOSS, E J	397	Colorado Run-of-River	1.00		
ADJ	2628	ESTATE OF ETHEL MAE MOSS	397	Colorado Run-of-River	4.00		
ADJ	2629	ARLENE B. RHOADES	454	Colorado Run-of-River	8.00		
ADJ	2630	PRISCILLA STAPLETONSTEWART BLANE	454	Colorado Run-of-River	438.00		
ADJ	2631	COLD SPRING GRANITE COMPANY	454	Colorado Run-of-River	33.00	COLD SPRING GRANITE COMPANY	13.00
ADJ	2631	COLD SPRING GRANITE COMPANY	454	Colorado Run-of-River	55.00		
ADJ	2632	CITY OF MEADOWLAKES	454	Colorado Run-of-River	89.00		
ADJ	2632	CITY OF MEADOWLAKES	454	Colorado Run-of-River	400.00		
ADJ	2632	CITY OF MEADOWLAKES	454	Colorado Run-of-River	78.00		
ADJ	2633	JOAN BREWER	454	Colorado Run-of-River	18.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	2634	GRIDIRON CREEK RANCH - RIVER BLUFF	454	Colorado Run-of-River	144.00		
ADJ	2635	FELPS, LLC	454	Colorado Run-of-River	11.00		
ADJ	2636	PRATT, BILLIE J	454	Colorado Run-of-River	2.20		
ADJ	2637	PRATT, BILLIE J	454	Colorado Run-of-River	5.50		
ADJ	2638	PRATT, BILLIE J	454	Colorado Run-of-River	5.50		
ADJ	2639	SMITH, JANICE LSMITH, P H	454	Colorado Run-of-River	9.70		
ADJ	2640	FUSSELL, BLANCHEFUSSELL, R G	454	Colorado Run-of-River	10.10	FUSSELL, BLANCHE FUSSELL, R G	3.00
ADJ	2641	ALLEN, G S	454	Colorado Run-of-River	253.00		
ADJ	2642	CIMARRON RANCH PROPERTIES, LP	454	Colorado Run-of-River	89.00		
ADJ	2643	LANCE R. MATHIS	454	Colorado Run-of-River	8.05		
ADJ	2643	GRIDIRON CREEK RANCH - LEWIS LAKE	454	Colorado Run-of-River	71.95		
ADJ	2644	U.S. DEPARTMENT OF THE INTERIOR FI	458	Colorado Run-of-River	27.67		
ADJ	2645	CITY OF LAGO VISTA	458	Colorado Run-of-River	9.00	CITY OF LAGO VISTA	5.00
ADJ	2646	ANDERSON, JAMES L	458	Colorado Run-of-River	0.07		
ADJ	2647	TEXAS CONFERENCE ASSOCIATION OF S	458	Colorado Run-of-River	5.70		
ADJ	2648	SAAAM, LTD.	458	Colorado Run-of-River	0.23		
ADJ	2649	ANDERSON, JAMES L	458	Colorado Run-of-River	1.13		
ADJ	2649	CAROLYN DOUGLASS	458	Colorado Run-of-River	4.10		
ADJ	2649	ALICE K LEENELSON N. LEE	458	Colorado Run-of-River	4.78		
ADJ	2650	TALBOTT, MARVIN TTALBOTT, PEGGY JE	458	Colorado Run-of-River	1.00		
ADJ	2651	U.S. DEPARTMENT OF THE INTERIOR FI	458	Colorado Run-of-River	14.33	U.S. DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE	9.00
WRPERM	3344	ONION CREEK CLUB	458	Colorado Run-of-River	12.00	ONION CREEK CLUB	12.00
WRPERM	3405	PETERSEN, DANIEL J	365	Colorado Run-of-River	55.00	PETERSEN, DANIEL J	55.00
WRPERM	3409	HEXT, J D	365	Colorado Run-of-River	19.00	HEXT, J D	19.00
WRPERM	3411	CITY OF MEADOWLAKES	454	Colorado Run-of-River	403.00	CITY OF MEADOWLAKES	140.00
WRPERM	3414	COE, ROBERTSANSOM, CARROLLSANSO	458	Colorado Run-of-River	0.95		
WRPERM	3414	TURNER LAND & HAY, LLC	458	Colorado Run-of-River	123.13		
WRPERM	3414	SANSOM - COE, LLC	458	Colorado Run-of-River	75.24		
WRPERM	3414	SANSOM, JAMESWANDA SUE SANSOM	458	Colorado Run-of-River	0.68		
ADJ	3418	ANDERSON, HARRY HANDERSON, NAN	456	Brazos-Colorado Run-of-Rive	110.00	ANDERSON, HARRY H ANDERSON, NANCY B	10.00
ADJ	3418	ANDERSON, HARRY HANDERSON, NAN	456	Brazos-Colorado Run-of-Rive	1,010.00		
ADJ	3418	BETTY J. LAAS	456	Brazos-Colorado Run-of-Rive	480.00		
ADJ	3419	ANDERSON, HARRY HANDERSON, NAN	456	Brazos-Colorado Run-of-Rive	800.00	ANDERSON, HARRY H ANDERSON, NANCY B	10.00
ADJ	3420	PEMM PARTNERS LTD	456	Brazos-Colorado Run-of-Rive	300.00	PEMM PARTNERS LTD	300.00
ADJ	3421	Leonard Wittig Grass Farms, Inc.	456	Brazos-Colorado Run-of-Rive	1,000.00		
ADJ	3421	ConocoPhillips Company Phillips 66 Company	456	Brazos-Colorado Run-of-Rive	1,000.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	3421	ConocoPhillips Company Phillips 66 Company	456	Brazos-Colorado Run-of-River		ConocoPhillips Company Phillips 66 Company	1,914.50
ADJ	3421	ConocoPhillips Company Phillips 66 Company	456	Brazos-Colorado Run-of-River		ConocoPhillips Company Phillips 66 Company	1.74
ADJ	3421	ConocoPhillips Company Phillips 66 Company	456	Brazos-Colorado Run-of-River		ConocoPhillips Company Phillips 66 Company	14,202.00
ADJ	3421	Leonard Wittig Grass Farms, Inc.	456	Brazos-Colorado Run-of-River		Leonard Wittig Grass Farms, Inc.	107.50
ADJ	3421	Leonard Wittig Grass Farms, Inc.	456	Brazos-Colorado Run-of-River		Leonard Wittig Grass Farms, Inc.	294.00
ADJ	3421	Leonard Wittig Grass Farms, Inc.	456	Brazos-Colorado Run-of-River		Leonard Wittig Grass Farms, Inc.	0.10
ADJ	3421	Wharton County Generation, LLC	456	Brazos-Colorado Run-of-Rive	1,600.00		
ADJ	3421	Wharton County Generation, LLC	456	Brazos-Colorado Run-of-River		Wharton County Generation, LLC	128.00
ADJ	3421	Wharton County Generation, LLC	456	Brazos-Colorado Run-of-River		Wharton County Generation, LLC	0.16
ADJ	3421	ConocoPhillips Company Phillips 66 Company	456	Brazos-Colorado Run-of-Rive	16,400.00		
ADJ	3426	JOHN S. RUNNELLS III	399	Brazos-Colorado Run-of-Rive	15.02		
ADJ	3426	PATRICIA BLAYLOCKTIMOTHY R. BLAYLO	399	Brazos-Colorado Run-of-Rive	26.16		
ADJ	3426	ESTATE OF C L SMITH	399	Brazos-Colorado Run-of-Rive	1.82		
ADJ	3427	TOWLER, BEN H JR	399	Brazos-Colorado Run-of-Rive	6.10		
ADJ	3427	BRIAN KERN	399	Brazos-Colorado Run-of-Rive	23.90		
ADJ	3428	DONNA SUE REEVES FARISCHRISTOPHE	399	Brazos-Colorado Run-of-Rive	20.00		
ADJ	3429	JANICE K ALFORD	399	Brazos-Colorado Run-of-Rive	40.00		
ADJ	3430	HUDGINS DIVISION OF J.D. HUDGINS, LI	399	Brazos-Colorado Run-of-Rive	800.00	HUDGINS DIVISION OF J.D. HUDGINS, LLC	190.00
ADJ	3431	PRUETT, MICHAEL J	399	Brazos-Colorado Run-of-Rive	44.47		
ADJ	3431	SAMANTHA ANNETTE HUDGINS	399	Brazos-Colorado Run-of-Rive	40.53		
ADJ	3432	JONES, JOHNNY WAYNEJONES, VICKI LY	399	Brazos-Colorado Run-of-Rive	2.00		
ADJ	3432	JONES, JOHNNY WAYNEJONES, VICKI LY	399	Brazos-Colorado Run-of-Rive	78.00		
ADJ	3434	KOPNICKY, DONALD RKOPNICKY, JANICE	399	Brazos-Colorado Run-of-Rive	30.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	3435	BLAIR, PAULINE HCOPPOCK, MICHAEL A	399	Brazos-Colorado Run-of-Rive	550.00	BLAIR, PAULINE H COPPOCK, MICHAEL ANDREW HUEBNER, JOHN A JR HUEBNER, MARY ELIZABETH JAN HUEBNER TRUST NO 2 KRISTI HUEBNER TRUST NO. 2 MOLLIE LOUISE HUEBNER TRUST NO. 2 ROBERT JEFFREY COPPOCK TRUST NO. 2	2.00
ADJ	3435	BLAIR, PAULINE HCOPPOCK, MICHAEL A	399	Brazos-Colorado Run-of-Rive	250.00		
ADJ	3436	STEPHEN T. SLIVA, INC.	399	Brazos-Colorado Run-of-Rive	676.65	STEPHEN T. SLIVA, INC.	5.70
ADJ	3436	MATTHES, JUANITA LETULLEMATTHES, I	399	Brazos-Colorado Run-of-Rive	203.35		
ADJ	3437	SAVAGE, FRANCIS I	399	Brazos-Colorado Run-of-Rive	410.96		
ADJ	3437	O. B. STANLEY	399	Brazos-Colorado Run-of-Rive	2,339.04		
ADJ	3438	E CROSS CATTLE CO., INC.	399	Brazos-Colorado Run-of-Rive	600.00		
ADJ	3438	E CROSS CATTLE CO., INC.	399	Brazos-Colorado Run-of-Rive	668.00		
ADJ	3439	E CROSS CATTLE CO., INC.	399	Brazos-Colorado Run-of-Rive	592.00		
WRPERM	3448	JOHN W. WHITE	332	Colorado Run-of-River		JOHN W. WHITE	36.00
WRPERM	3491	FRIENDS OF CLEAR SPRINGS LAKE	332	Colorado Run-of-River		FRIENDS OF CLEAR SPRINGS LAKE	83.00
WRPERM	3522	MINDY MICHELE WETH FRYERMICHAEL	361	Colorado Run-of-River	35.00	MINDY MICHELE WETH FRYER MICHAEL JOSEPH WETH	33.00
WRPERM	3795	JENNIFER ELLIOTTRICHARD T. ELLIOTTJ(	399	Brazos-Colorado Run-of-Rive	80.00		
WRPERM	3814	FORGASON, JAMES L	456	Brazos-Colorado Run-of-Rive	912.00		
WRPERM	3816	T AND K HLAVINKA FARMS	456	Brazos-Colorado Run-of-Rive	400.00		
WRPERM	3841	BALCONES COUNTRY CLUB MEMBERSH	458	Colorado Run-of-River	76.00	BALCONES COUNTRY CLUB MEMBERSHIP ASSOCIATION, INC.	76.00
WRPERM	3841	BALCONES COUNTRY CLUB MEMBERSH	458	Colorado Run-of-River		BALCONES COUNTRY CLUB MEMBERSHIP ASSOCIATION, INC.	36.00
WRPERM	3846	LINDA C. MOORE	399	Brazos-Colorado Run-of-Rive	90.00	LINDA C. MOORE	4.20
ADJ	3871	HAAS, W J	336	Guadalupe Run-of-River	6.00	HAAS, W J	4.00
ADJ	3871	HAAS, W J	336	Guadalupe Run-of-River	6.00	HAAS, W J	2.00
ADJ	3872	THE KYLE BENNETT LIVING TRUST	336	Guadalupe Run-of-River	4.60		
ADJ	3872	HAMMOND FAMILY FARM, LTD.	336	Guadalupe Run-of-River	20.31		
ADJ	3872	HAMMOND FAMILY FARM, LTD.	336	Guadalupe Run-of-River		HAMMOND FAMILY FARM, LTD.	23.00

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	3872	STETLER FAMILY LIVING TRUST	336	Guadalupe Run-of-River	7.09		
ADJ	3872	STETLER FAMILY LIVING TRUST	336	Guadalupe Run-of-River		STETLER FAMILY LIVING TRUST	9.00
ADJ	3873	MCCLAIN, ELSIE LEEMCCLAIN, HENRY	336	Guadalupe Run-of-River	48.00	MCCLAIN, ELSIE LEE MCCLAIN, HENRY	9.02
ADJ	3873	MCCLAIN, ELSIE LEEMCCLAIN, HENRY	336	Guadalupe Run-of-River	1.00		
ADJ	3874	JUDITH D DRENTHROBERT C DRENTH	336	Guadalupe Run-of-River	14.68		
ADJ	3874	JUDITH D DRENTHROBERT C DRENTH	336	Guadalupe Run-of-River		JUDITH D DRENTH ROBERT C DRENTH	5.00
ADJ	3874	RP 5 RANCH, LLC	336	Guadalupe Run-of-River	9.32		
ADJ	3875	MCCOMBS LEGACY, LTD.	336	Guadalupe Run-of-River	45.00	MCCOMBS LEGACY, LTD.	10.00
ADJ	3877	CITY OF BLANCO	336	Guadalupe Run-of-River	600.00	CITY OF BLANCO	68.47
ADJ	3877	CITY OF BLANCO	336	Guadalupe Run-of-River		CITY OF BLANCO	100.00
ADJ	3883	WOODCREEK RESORT, INC.	397	Colorado Run-of-River		WOODCREEK RESORT, INC.	118.00
WRPERM	3883	LAKE LYNDON B. JOHNSON IMPROVEM	397	Colorado Run-of-River	750.00	LAKE LYNDON B. JOHNSON IMPROVEMENT CORPORATION	26.40
WRPERM	3895	THE MINZE LAND INVESTMENTS LIMITE	399	Brazos-Colorado Run-of-Rive	1,000.00	THE MINZE LAND INVESTMENTS LIMITED PARTNERSHIP	3.00
WRPERM	3904	WEID, NOBERTWISHERT, PAT	348	Lavaca Run-of-River	60.00		
WRPERM	3906	POPP, HERBERT JPOPP, JOSEPHINE	348	Lavaca Run-of-River	140.00	POPP, HERBERT J POPP, JOSEPHINE	20.00
WRPERM	3908	JOE RAY MATZKE	348	Lavaca Run-of-River	279.00		
WRPERM	3926	CORMAN, BRENDA JEAN BURROUGHSC	456	Brazos-Colorado Run-of-Rive	300.00		
WRPERM	3957	HUGH RUST HAWES IV TRUST	399	Brazos-Colorado Run-of-Rive	217.38	HUGH RUST HAWES IV TRUST	10.00
WRPERM	3957	G. P. HARDY III	399	Brazos-Colorado Run-of-Rive	8.81		
WRPERM	3957	SIMON C. CORNELIUS PARTNERSHIP LTI	399	Brazos-Colorado Run-of-Rive	6.47		
WRPERM	3957	CHRISTOPHER THEODORE HAWES TRUS	399	Brazos-Colorado Run-of-Rive	217.34		
WRPERM	3967	MARY ANNIE EASTMANBETTY GENE MC	399	Brazos-Colorado Run-of-Rive	35.00		
WRPERM	3992	RUNNELLS PASTURE COMPANY, LTD.	399	Brazos-Colorado Run-of-Rive	219.00		
WRPERM	4122	COOK, ELAINE HOLUBDAVIDSON, BARB/	399	Brazos-Colorado Run-of-Rive	25.00		
WRPERM	4169	HURST CREEK MUNICIPAL UTILITY DISTI	458	Colorado Run-of-River	700.00	HURST CREEK MUNICIPAL UTILITY DISTRICT OF TRAVIS COUNTY TEXAS	76.00
WRPERM	4169	HURST CREEK MUNICIPAL UTILITY DISTI	458	Colorado Run-of-River	1,000.00		
WRPERM	4177	GUESS, WAYNE ALLEN	456	Brazos-Colorado Run-of-Rive	75.05		
WRPERM	4177	GUESS, THERESA ANNGUESS, WAYNE AI	456	Brazos-Colorado Run-of-Rive	88.95		
WRPERM	4207	APPELT, LESLIE LCULWELL, DON A	400	Colorado-Lavaca Run-of-Rive	750.00	APPELT, LESLIE L CULWELL, DON A	31.28

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
WRPERM	4207	APPELT, LESLIE LCULWELL, DON A	400	Colorado-Lavaca Run-of-Rive	1,500.00	APPELT, LESLIE L CULWELL, DON A	79.45
WRPERM	4207	APPELT, LESLIE LCULWELL, DON A	400	Colorado-Lavaca Run-of-River		APPELT, LESLIE L CULWELL, DON A	82.00
WRPERM	4229	MARCIAL SORREL II TRUST	456	Brazos-Colorado Run-of-Rive	297.00	MARCIAL SORREL II TRUST	34.41
WRPERM	4284	ROBERTS, DONALD GROBERTS, GARY W	456	Brazos-Colorado Run-of-Rive	450.00		
ADJ	4780	JOHNSON, MAX CORNELIUSMARONEY,	400	Colorado-Lavaca Run-of-Rive	400.00	JOHNSON, MAX CORNELIUS MARONEY, JOYCE JOHNSON	400.00
ADJ	4781	PETERSEN, GLORIAPETERSEN, LAWREN	400	Colorado-Lavaca Run-of-Rive	400.00		
ADJ	4782	TRES CREEK, LLC	400	Colorado-Lavaca Run-of-Rive	120.00		
ADJ	4783	HARPER, LOUIS F	400	Colorado-Lavaca Run-of-Rive	301.00		
ADJ	4786	ARTHUR A. PRIESMEYER	400	Colorado-Lavaca Run-of-Rive	93.00		
ADJ	4787	TRES CREEK, LLC	400	Colorado-Lavaca Run-of-Rive	20,615.00	TRES CREEK, LLC	457.30
WRPERM	5084	BASTROP GOLF, LLC	332	Colorado Run-of-River	4.00	BASTROP GOLF, LLC	14.50
WRPERM	5086	STEPHEN P. CARRIGAN	377	Colorado Run-of-River	88.00		
WRPERM	5273	COYOTE CREW RANCH, LTD.	377	Colorado Run-of-River	60.00		
WRPERM	5288	JONES, TOMMY LEE	419	Colorado Run-of-River	20.00		
WRPERM	5324	RABIUS CHIDLREN'S TRUST C/O TIMOTI	456	Brazos-Colorado Run-of-Rive	87.00		
WRPERM	5338	BERNARD O. STONE, JR.	456	Brazos-Colorado Run-of-Rive	420.00		
ADJ	5368	TRAVIS COUNTY WATER CONTROL AND	458	Colorado Run-of-River	122.84		
ADJ	5368	DORIS WILKERSON	458	Colorado Run-of-River	0.05		
ADJ	5368	CLIFTON CHOWNINGJAY C. CHOWNING	458	Colorado Run-of-River	0.03		
ADJ	5368	KLP PARTNERS, LTD.	458	Colorado Run-of-River	1.00		
ADJ	5368	TRAVIS COUNTY WATER CONTROL AND	458	Colorado Run-of-River	12.50		
ADJ	5368	TRAVIS COUNTY WATER CONTROL AND	458	Colorado Run-of-River	7.89		
ADJ	5368	T.H.L. INVESTMENTS, LTD.	458	Colorado Run-of-River	0.10		
ADJ	5368	LAKE AUSTIN LAND AND CATTLE, LTD.	458	Colorado Run-of-River	1.13		
ADJ	5368	MINI ME MANAGEMENT, LTD.	458	Colorado Run-of-River	11.81		
ADJ	5368	SELMA HUGHES INVESTMENT LTD.	458	Colorado Run-of-River	1.65		
ADJ	5368	MICHAEL G. MCCARTHY	458	Colorado Run-of-River	0.64		
ADJ	5368	ROBERT L. STEINER	458	Colorado Run-of-River	0.18		
ADJ	5368	RONALD LEE FINN	458	Colorado Run-of-River	0.18		
ADJ	5369	BOHLS CATTLE RANCH AND INVESTMEN	458	Colorado Run-of-River	22.00		
ADJ	5371	FOWLER, MARION	458	Colorado Run-of-River	8.00		
WRPERM	5371	SIMPSON, ROBERT BOURKE	458	Colorado Run-of-River	5.00		
ADJ	5372	NALLE BUNNY RUN FARM LIMITED LIAB	458	Colorado Run-of-River	23.84		
ADJ	5372	HILL COUNTRY CONSERVANCY	458	Colorado Run-of-River	1.16		
ADJ	5373	GAMEL, WILLIAM GGRANT, EARL LJOHN	458	Colorado Run-of-River	11.00		
ADJ	5374	GREAT HILLS, LTD.	458	Colorado Run-of-River	13.00		
ADJ	5374	GREAT HILLS, LTD.	458	Colorado Run-of-River		GREAT HILLS, LTD.	31.00

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	5375	BROOK ANNE JOHNSON BROESCHE TRU	458	Colorado Run-of-River	40.00	BROOK ANNE JOHNSON BROESCHE TRUST 1 CURT D. JOHNSON TRUST 1 ROBERT J. JOHNSON TRUST 1	6.50
WRPERM	5378	BALCONES COUNTRY CLUB MEMBERSH	458	Colorado Run-of-River	60.00		
WRPERM	5378	BALCONES COUNTRY CLUB MEMBERSH	458	Colorado Run-of-River		BALCONES COUNTRY CLUB MEMBERSHIP ASSOCIATION, INC.	14.50
ADJ	5379	KATHRYN FITZPATRICK ARYDEBRA BAILE	458	Colorado Run-of-River	1,323.00		
ADJ	5380	CAPITOL AGGREGATES, INC.	458	Colorado Run-of-River	242.00		
ADJ	5380	CAPITOL AGGREGATES, INC.	458	Colorado Run-of-River	27.00		
ADJ	5380	CAPITOL AGGREGATES, INC.	458	Colorado Run-of-River	2,540.00	CAPITOL AGGREGATES, INC.	115.00
ADJ	5382	HORSE RANCH, LLC	458	Colorado Run-of-River	50.00		
ADJ	5384	MCMORRIS, WILLIAM D JR	458	Colorado Run-of-River	74.00		
ADJ	5385	GILL, ROBERT MMCMORRIS, JOANNAM	458	Colorado Run-of-River	67.00		
ADJ	5386	TEXAS INDUSTRIES INC	458	Colorado Run-of-River	110.00		
ADJ	5387	PATRICE ARNOLD	377	Colorado Run-of-River	121.34		
ADJ	5387	ISABELLA C. M. CUNNINGHAMWILLIAM	377	Colorado Run-of-River	60.66		
ADJ	5388	TRAVIS ALLISON MATHIS	377	Colorado Run-of-River	16.00		
ADJ	5389	ALMA WIDEN ALEXANDERCHRISTOPHE	377	Colorado Run-of-River	4.86		
ADJ	5389	HANCOCK/HANKS INVESTMENTS, LTD.	377	Colorado Run-of-River	0.14		
ADJ	5390	DICKSON, BETTY SLAUGHTERSLAUGHTE	377	Colorado Run-of-River	6.00	DICKSON, BETTY SLAUGHTER SLAUGHTER FAMILY RANCH LIMITED PARTNERSHIP	6.00
ADJ	5391	ELLIOTT, KATHRYN LAURA NAGEL	377	Colorado Run-of-River	12.00	ELLIOTT, KATHRYN LAURA NAGEL	5.00
ADJ	5392	JEANIE CLARKRANN L. CLARK	458	Colorado Run-of-River	2.00	JEANIE CLARK RANN L. CLARK	2.00
ADJ	5393	TEXAS REGIONAL LANDFILL COMPANY,	458	Colorado Run-of-River	17.00		
ADJ	5393	TEXAS REGIONAL LANDFILL COMPANY,	458	Colorado Run-of-River	3.00		
ADJ	5393	TEXAS REGIONAL LANDFILL COMPANY,	458	Colorado Run-of-River	70.00		
ADJ	5393	TEXAS REGIONAL LANDFILL COMPANY,	458	Colorado Run-of-River	25.00	TEXAS REGIONAL LANDFILL COMPANY, LP	20.00
ADJ	5394	JOHNSON, PEARCE	458	Colorado Run-of-River	150.00		
ADJ	5396	BASTROP ENERGY PARTNERS, L.P.	458	Colorado Run-of-River	180.00		
ADJ	5397	WASHINGTON, CLARENCE	458	Colorado Run-of-River	17.00	WASHINGTON, CLARENCE	64.00
ADJ	5398	THE JOHN COLEMAN HORTON IV 2012 T	332	Colorado Run-of-River	120.00		
ADJ	5399	HR LOST PINES RESORT LLC	332	Colorado Run-of-River	26.00		
ADJ	5400	HR LOST PINES RESORT LLC	332	Colorado Run-of-River	8.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	5401	SIMECEK, J W	458	Colorado Run-of-River	30.00	SIMECEK, J W	77.00
ADJ	5402	LLOYD, KETHA	332	Colorado Run-of-River	348.00		
ADJ	5403	LISA K. GOSSETTWILLIAM P. GOSSETT	332	Colorado Run-of-River	5.00		
ADJ	5404	TEXAS PARKS AND WILDLIFE DEPARTMI	332	Colorado Run-of-River		TEXAS PARKS AND WILDLIFE DEPARTMENT	68.00
ADJ	5405	HUGHES, EDWARD L	332	Colorado Run-of-River	8.40	HUGHES, EDWARD L	18.00
ADJ	5406	LOVEJOY, J B	332	Colorado Run-of-River	2.10	LOVEJOY, J B	16.00
ADJ	5407	ROD, AJ	332	Colorado Run-of-River	80.00		
ADJ	5408	TEXAS PARKS AND WILDLIFE DEPARTMI	332	Colorado Run-of-River		TEXAS PARKS AND WILDLIFE DEPARTMENT	177.00
ADJ	5411	PETZOLD, MILTON C	332	Colorado Run-of-River	9.11		
ADJ	5411	BRENDA SALGUEROVICTOR SALGUERO	332	Colorado Run-of-River	5.89	BRENDA SALGUERO VICTOR SALGUERO	50.00
ADJ	5412	HORSESHOE LAKE PROPERTY OWNERS	332	Colorado Run-of-River		HORSESHOE LAKE PROPERTY OWNERS ASSOCIATION, INC.	8.20
ADJ	5413	DROEMER, CARL	332	Colorado Run-of-River	61.00	DROEMER, CARL	465.00
ADJ	5414	LAKE THUNDERBIRD OWNERS ASSOCIA	332	Colorado Run-of-River		LAKE THUNDERBIRD OWNERS ASSOCIATION	56.00
ADJ	5414	LAKE THUNDERBIRD OWNERS ASSOCIA	332	Colorado Run-of-River		LAKE THUNDERBIRD OWNERS ASSOCIATION	103.00
ADJ	5415	INDIAN LAKE OWNERS ASSOCIATION	332	Colorado Run-of-River		INDIAN LAKE OWNERS ASSOCIATION	540.00
ADJ	5418	KAPPLER, EDMUNDKAPPLER, RUBEN HI	361	Colorado Run-of-River	128.00	KAPPLER, EDMUND KAPPLER, RUBEN H KAPPLER, WANDA	189.00
ADJ	5420	MARLENE GOLDAPP AUNGIER TRUST	361	Colorado Run-of-River	32.00	MARLENE GOLDAPP AUNGIER TRUST	32.00
ADJ	5421	LEHMANN, WILLIE G	361	Colorado Run-of-River	30.00		
ADJ	5422	DAVID LEHMANNDOUGLAS LEHMANN	361	Colorado Run-of-River	3.00		
ADJ	5424	DOLORES M. BARTEKERNEST G. BARTEK	361	Colorado Run-of-River	47.00	DOLORES M. BARTEK ERNEST G. BARTEK	59.00
ADJ	5425	CHARLES T. TREFNY	455	Colorado Run-of-River	76.00	CHARLES T. TREFNY	10.00
ADJ	5426	HAGEMANN, HOWARD RAYJACKSON, B	361	Colorado Run-of-River	10.00		
ADJ	5427	HENSEL, C A	361	Colorado Run-of-River	14.00	HENSEL, C A	7.50
WRPERM	5427	CITY OF FREDERICKSBURG	365	Colorado Run-of-River		CITY OF FREDERICKSBURG	0.04
ADJ	5428	JOHNSON, BETTY RJOHNSON, RALPH T	361	Colorado Run-of-River	15.00		
ADJ	5429	C. G. JOHNSON	455	Colorado Run-of-River	73.00		
ADJ	5432	CHARLES T. TREFNY	455	Colorado Run-of-River	21.00		
ADJ	5433	KELLY K. REYNOLDS	361	Colorado Run-of-River	35.00	KELLY K. REYNOLDS	200.00
ADJ	5434	LOWER COLORADO RIVER AUTHORITY	332	Colorado Run-of-River	133,000.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	5434	LOWER COLORADO RIVER AUTHORITY	455	Colorado Run-of-River	133,000.00		
ADJ	5434	LOWER COLORADO RIVER AUTHORITY	361	Colorado Run-of-River	133,000.00		
ADJ	5434	LOWER COLORADO RIVER AUTHORITY	457	Colorado Run-of-River	133,000.00		
ADJ	5434	LOWER COLORADO RIVER AUTHORITY	458	Colorado Run-of-River	133,000.00		
ADJ	5434	LOWER COLORADO RIVER AUTHORITY	460	Colorado Run-of-River	133,000.00	LOWER COLORADO RIVER AUTHORITY	86.00
ADJ	5434	CITY OF CORPUS CHRISTI	332	Colorado Run-of-River	35,000.00		
ADJ	5434	CITY OF CORPUS CHRISTI	455	Colorado Run-of-River	35,000.00		
ADJ	5434	CITY OF CORPUS CHRISTI	361	Colorado Run-of-River	35,000.00		
ADJ	5434	CITY OF CORPUS CHRISTI	457	Colorado Run-of-River	35,000.00		
ADJ	5434	CITY OF CORPUS CHRISTI	458	Colorado Run-of-River	35,000.00		
ADJ	5434	CITY OF CORPUS CHRISTI	460	Colorado Run-of-River	35,000.00		
ADJ	5435	TRI-GEN LAND CORP.	460	Colorado Run-of-River	192.00		
ADJ	5436	WYLIE VENTURES, LLC	457	Colorado Run-of-River	715.00		
ADJ	5436	WYLIE VENTURES, LLC	457	Colorado Run-of-River	728.00		
ADJ	5437	NRG SOUTH TEXAS LPSTP NUCLEAR OPI	2759	STPNOC Lake/Reservoir		NRG SOUTH TEXAS LP STP NUCLEAR OPERATING COMPANY	202,988.00
ADJ	5437	LOWER COLORADO RIVER AUTHORITYS	2759	STPNOC Lake/Reservoir	102,000.00		
WRPERM	5459	S & S FARMS, A JOINT VENTURE COMPI	456	Brazos-Colorado Run-of-Rive	749.00		
WRPERM	5459	KENNEDY FARM INVESTMENTS, LLCVEN	456	Brazos-Colorado Run-of-Rive	251.00		
ADJ	5471	CITY OF AUSTIN	361	Colorado Run-of-River		CITY OF AUSTIN	10.70
ADJ	5471	CITY OF AUSTIN	458	Colorado Run-of-River		CITY OF AUSTIN	10.70
ADJ	5471	CITY OF AUSTIN	361	Colorado Run-of-River	24,000.00		
ADJ	5471	CITY OF AUSTIN	458	Colorado Run-of-River	24,000.00		
ADJ	5471	CITY OF AUSTIN	361	Colorado Run-of-River			
ADJ	5471	CITY OF AUSTIN	458	Colorado Run-of-River			
ADJ	5471	CITY OF AUSTIN	361	Colorado Run-of-River	271,403.00	CITY OF AUSTIN	24,520.00
ADJ	5471	CITY OF AUSTIN	458	Colorado Run-of-River	271,403.00	CITY OF AUSTIN	24,520.00
ADJ	5471	CITY OF AUSTIN	361	Colorado Run-of-River	1,150.00		
ADJ	5471	CITY OF AUSTIN	458	Colorado Run-of-River	1,150.00		
ADJ	5471	CITY OF AUSTIN	361	Colorado Run-of-River			
ADJ	5471	CITY OF AUSTIN	458	Colorado Run-of-River			
ADJ	5473	LOWER COLORADO RIVER AUTHORITY	2969	Bastrop Lake/Reservoir	10,750.00	LOWER COLORADO RIVER AUTHORITY	16,590.00
ADJ	5474	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System		LOWER COLORADO RIVER AUTHORITY	122,530.00
ADJ	5474	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System			
ADJ	5475	LOWER COLORADO RIVER AUTHORITY	455	Colorado Run-of-River	186,250.00	LOWER COLORADO RIVER AUTHORITY	9,600.00
ADJ	5476	LOWER COLORADO RIVER AUTHORITY	457	Colorado Run-of-River	262,500.00	LOWER COLORADO RIVER AUTHORITY	1,865.00

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
ADJ	5476	LOWER COLORADO RIVER AUTHORITY	460	Colorado Run-of-River	262,500.00	LOWER COLORADO RIVER AUTHORITY	1,865.00
ADJ	5476	LOWER COLORADO RIVER AUTHORITY	457	Colorado Run-of-River		LOWER COLORADO RIVER AUTHORITY	52,000.00
ADJ	5476	LOWER COLORADO RIVER AUTHORITY	460	Colorado Run-of-River		LOWER COLORADO RIVER AUTHORITY	52,000.00
ADJ	5477	LOWER COLORADO RIVER AUTHORITY	460	Colorado Run-of-River	55,000.00		
ADJ	5478	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System	1,500,000.00	LOWER COLORADO RIVER AUTHORITY	992,475.00
ADJ	5478	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System			
ADJ	5479	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System		LOWER COLORADO RIVER AUTHORITY	17,545.00
ADJ	5480	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System	15,700.00	LOWER COLORADO RIVER AUTHORITY	138,500.00
ADJ	5480	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System			
ADJ	5481	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System		LOWER COLORADO RIVER AUTHORITY	8,760.00
ADJ	5482	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System		LOWER COLORADO RIVER AUTHORITY	1,170,752.00
ADJ	5482	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System	1,470.00		
ADJ	5482	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System			
ADJ	5483	BODDEN, CARLEENBODDEN, NIX O	458	Colorado Run-of-River	0.50		
ADJ	5483	JEROME MURRAY	458	Colorado Run-of-River	0.50		
ADJ	5489	CITY OF AUSTIN	458	Colorado Run-of-River		CITY OF AUSTIN	33,940.00
ADJ	5489	CITY OF AUSTIN	458	Colorado Run-of-River	20,300.00		
ADJ	5489	CITY OF AUSTIN	458	Colorado Run-of-River	16,156.00		
ADJ	5491	HEJL, ROBERT D	458	Colorado Run-of-River	22.00	HEJL, ROBERT D	3.50
WRPERM	5556	MARCIA R. LUCAS	336	Guadalupe Run-of-River	20.00		
WRPERM	5623	BILLY J. NITSCHE	456	Brazos-Colorado Run-of-Rive	185.00		
WRPERM	5682	CORNELIUS, HERFF	399	Brazos-Colorado Run-of-Rive	2,400.00	CORNELIUS, HERFF	344.00
WRPERM	5682	CORNELIUS, HERFF	399	Brazos-Colorado Run-of-Rive	2,400.00	CORNELIUS, HERFF	344.00
WRPERM	5684	HUDGINS DUNNAM ANSLEYMORROW I	456	Brazos-Colorado Run-of-Rive	184.00		
WRPERM	5685	MARIE E. SIKORA	456	Brazos-Colorado Run-of-Rive	33.00		
WRPERM	5702	REX HUDGINSSTEVEN HUDGINS	456	Brazos-Colorado Run-of-Rive	217.00		
WRPERM	5715	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System	882.00		
WRPERM	5715	LOWER COLORADO RIVER AUTHORITY	27	Highland Lakes Lake/Reservoir System			554.60
WRPERM	5721	LINDA MULLANINIZAR MULLANI	456	Brazos-Colorado Run-of-Rive	72.00		

Water Right Type	Water Right Permit Number	Water Right Owner Name	DB27 SourceId	DB27 Source Name	Permitted Annual Diversion Volume (acre-feet/year)	Reservoir Operator	Permitted Storage Capacity (acre-feet/year)
WRPERM	5731	LOWER COLORADO RIVER AUTHORITY	#N/A	#N/A	853,514.00	LOWER COLORADO RIVER AUTHORITY	500,000.00

Appendix 3.B

Water Modeling Committee Meeting Minutes

Appendix 3.B

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

MINUTES

Lower Colorado Regional Water Planning Group

Water Modeling Committee Meeting

July 12, 2023

LCRA Dalchau Service Center, Room A226
3505 Montopolis Drive, Austin, TX

9:00 A.M.

Meeting Minutes:

1. **Call to Order, Introductions and Roll Call – Teresa Lutes, Committee Chair**

   Meeting was called to order at 9:01 A.M.

Attendance:

Committee Members:

Teresa Lutes, Municipalities
Monica Masters, River Authorities
Mitchell Sodek, GMA-8
Jim Brasher, GMA-15
David Lindsay, Recreation
Mike Reagor, Small Municipalities

Other attendees:

Barbara Johnson, Industry
Christianne Castleberry, Water Utilities
Jason Homan, alternate for Environmental
Earl Foster, alternate for Small Municipalities
Sue Thornton, alternate for Recreation
Lann Bookout, TWDB
Richard Hoffpauir, Hoffpauir Consulting
Leonard Oliver, LCRA
Sara Eatman, Austin Water
Helen Gerlach, Austin Water
Marisa Flores-Gonzalez, Austin Water
Nick Zackoff, Lake Buchanan Conservation
Jordan Furnans, LRE
Shannon Hamilton, CTWC
Robert Adams, Plummer
Adam Conner, FNI

Augusto Villalon, FNI
Jon Albright, FNI
Justin Durant, FNI
Neil Deeds, INTERA

2. Welcome and Introductions – Chair Lutes

Attendees identified themselves and their affiliation (captured above).

3. Receive public comments on specific issues related to agenda items 4 through 10 - limited to 3 minutes per person

None.

4. Overview and discussion of Water Availability Modeling in Regional Water Planning

Jon Albright and Teresa Lutes went over the meeting materials and led a discussion of the following topics. [Minutes are provided below when discussion ranged outside of the description of the materials].

(a) Purpose and role of committee
(b) TWDB guidelines for surface water availability modeling
(c) Region K Cutoff Model and assumptions used for the previous planning cycle

Barbara Johnson asked about why permittees in Region F are dependent on permittees in Region K not making a priority call. Jon Albright explained that there were agreements where senior rights holders, such as LCRA, would not make priority calls on Region F.

Sue Thornton asked what happens if all of the priority rights were considered first. Jon replied that upper basin folks [with more junior rights] would not have reliable supply due to the senior rights of reservoirs and agriculture in the lower basin. Jon noted that due to the aforementioned agreements, in the modeling we consider upper basin rights first, even though they are junior rights. This is coined the “cutoff model”.

Barbara asked what the difference is between priority and seniority? Jon Albright replied that a senior right has a higher priority for water use.

Mike Reagor noted that under low flow conditions, a senior rights call may not matter because sufficient water may not make it downstream to the diversion point (due to losses) to meet the call. Jon replied that this is possible and called a “futile call”. Mike asked if there has there been a universal water call? Jon replied not to his knowledge. Teresa noted that updates to the historical data occur on a regular basis, so changes to naturalized flow conditions should be captured over time.

Rick Zackoff asked how the 33,400 AFY of environmental flow is monitored downstream? Teresa suggested that this may be an operations question. David Lindsay proposed that the “base case” should be based on the definition of firm yield, i.e. where TWDB requires all permitted flows to be included. Jon Albright replied that LCRA defines their supplies this way, i.e. as if the reservoirs were independent and make up all the water that is available. There was discussion among Lann Bookout, Jon Albright, David Lindsay about whether the water management plan (WMP) is equivalent to a permit. The general consensus was that the WMP is not a permit, since it changes with time. David suggested that it is not under LCRA's control to change the WMP, but rather that is the purview of TCEQ. Augusto said that while the TCEQ approves the plan, they do not initiate changes.

Leonard Oliver said that LCRA may exercise water rights up to 1.5MM AF, but that the constraint is that LCRA cannot exercise full rights while protecting firm customers. The goal of the WMP is to first protect those firm customers, then allocate the rest of the interruptible water. Leonard indicated that this management approach was decided through adjudication.

(d) Potentially needed updates to assumptions for Region K Cutoff Model

[minutes combined in next section]

(e) Hydrologic variance request to TWDB

Teresa led discussion of hydrologic variance request and the current modeling assumptions shown in Table A. She noted that some changes would be made, for example on item 6, change from 2015 to 2020. She also said that in the next meeting we will go through this table in detail, and note what changes are going to made. She suggested we sync our table headers to match the earlier slide that described the three models.

Rick asked whether item #10 included latest permit amendments. Jon replied that any water right permits that have been approved by TCEQ as of "today" will be included, but pending ones will not be included.

Lann said that the TWDB developed a new checklist that will be required to submit as part of this modeling exercise. Includes a couple of additional items, clarify some of the particulars. Teresa said that we'll bring that TWDB table to the next meeting. David asked if the Garwood agreement is considered in the modeling assumptions? Leonard said that it's modeled as an existing water right, and simulated at that point of diversion.

Teresa noted that a new hydrologic variance request (HVR) will be submitted to TWDB, and that it would be good to get the approval for the HVR prior to significant modeling occurring.

Barbara asked if there is a deadline for the HVR? Adam Conner replied that there is no deadline, but it needs to happen in the next 2-3 months. Jon Albright noted that we are using similar assumptions as previous, and the TWDB had approved it before.

David Lindsay said that we are in a situation with declining inflows, which are not captured in the current naturalized inflows and asked how that can be captured? Teresa replied that we can discuss that in the future agenda items in the context of risk management, including drought worse than drought of record.

(f) Surface water availability modeling in the RWP

5. Next Meeting Date

Teresa suggested that one or two meetings occur in the next two months. Neil Deeds said he would send out a doodle poll (or equivalent) to help schedule those meetings.

David asked about the potential for a hybrid meeting option. Barbara noted that it is difficult to run a hybrid meeting. Christianne did not want the meeting to depend on the technology working, and suggested it be a “listen only” option for virtual attendees. There was general agreement that this would be the approach, and Adam Conner said this could be done at FNI’s meeting room.

6. New/Other Business (Time Permitting)

None.

7. Public Comments

Jordan Furnans suggested that public comment/questions not be allowed during the main part of the meeting to improve meeting effectiveness.

8. Adjourn

Adjourned at 10:01

MINUTES

Lower Colorado Regional Water Planning Group
Water Modeling Committee Meeting
August 21, 2023

LCRA Dalchau Service Center, Room A226
3505 Montopolis Drive, Austin, TX

10:00 A.M.

Meeting Minutes:

1. **Call to Order, Introductions and Roll Call – Teresa Lutes, Committee Chair**

   Meeting was called to order at 10:01 A.M.

Attendance:

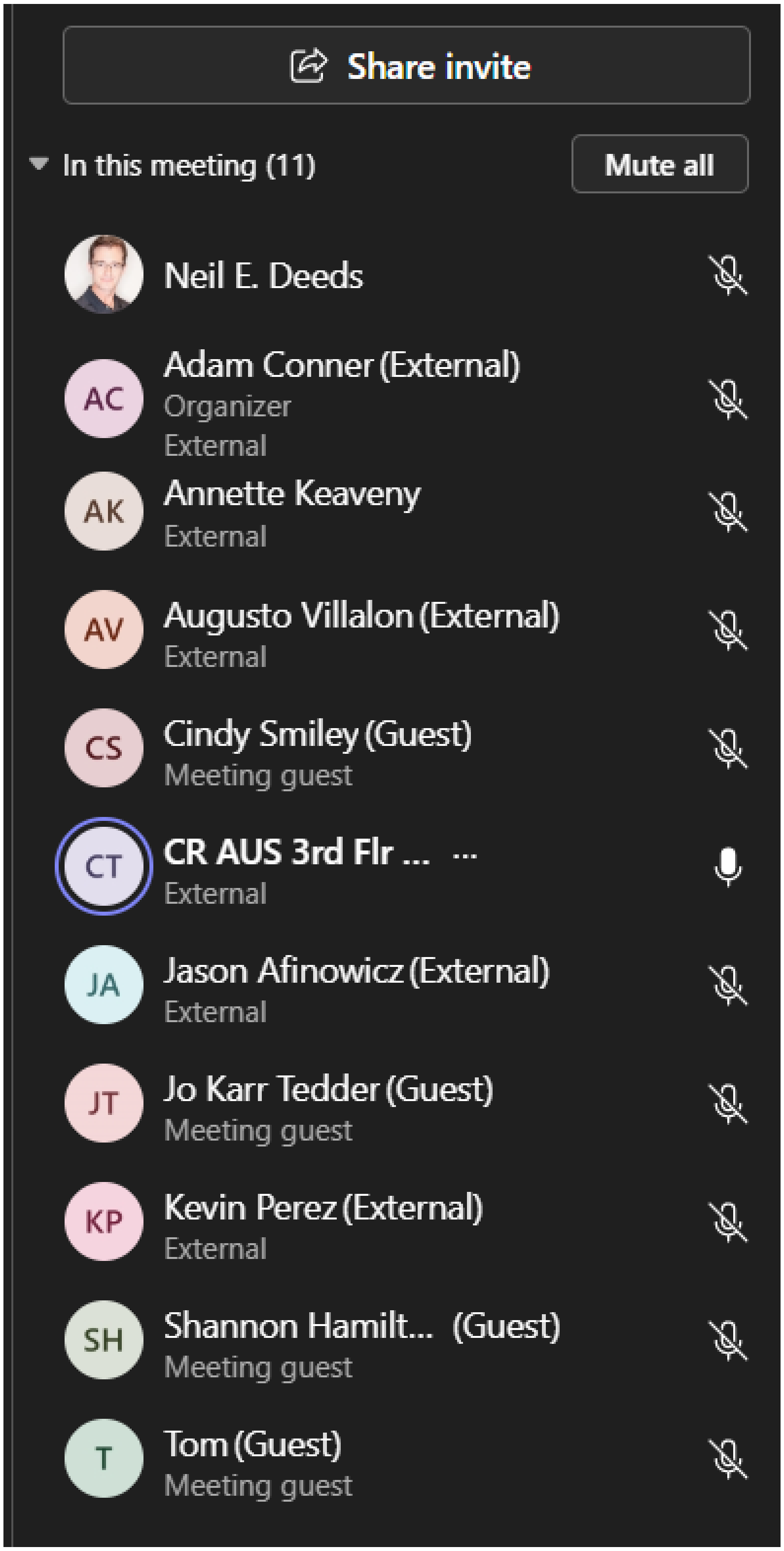
Committee Members:

Teresa Lutes, Municipalities
Monica Masters, River Authorities
Mitchell Sodek, GMA-8
Jim Brasher, GMA-15
David Lindsay, Recreation
Mike Reagor, Small Municipalities
Jason Homan

Other attendees:

Barbara Johnson, Industry
Christianne Castleberry, Water Utilities
Jason Homan, alternate for Environmental
Earl Foster, alternate for Small Municipalities
Sue Thornton, alternate for Recreation
Lann Bookout, TWDB
Richard Hoffpauir, Hoffpauir Consulting
Leonard Oliver, LCRA
Sara Eatman, Austin Water
Helen Gerlach, Austin Water
Marisa Flores-Gonzalez, Austin Water
Nick Zackoff, Lake Buchanan Conservation
Jordan Furnans, LRE
Shannon Hamilton, CTWC

Robert Adams, Plummer
Adam Conner, FNI
Augusto Villalon, FNI
Jon Albright, FNI
Justin Durant, FNI
Neil Deeds, INTERA



2. Welcome and Introductions – Chair Lutes

Attendees identified themselves and their affiliation (captured above).

3. Receive public comments on specific issues related to agenda items 4 through 10 - limited to 3 minutes per person

Sue Thorton: Showed a picture of low flow Colorado, stressing that inflows are low at this time. Also made remakrs for Cindy Smiley. Sue read Cindy's written comments, as captured in the appendix of these minutes.

No virtual comments

4. Phillip's Talk

Phillup went over the basics of region K Cutoff Model and the Hydrologic Variance Request (HVR).

Mike asked what period of record? 1940 – 2016. MR: how account for increased evaporation? Background hydrology considers actual historical record, so that is captured. DL: evaporation in current model might not be representative. DL: Is the DOR representative of the worst drought, i.e. current drought. MR: Expressed similar concern about not accounting for recent climate. DL: asked about use of yield other than firm yield. TL: we are working on a progression from previous work, this is what we have done in the past.

MR: Cutoff was required by adjudication in court? TL: Region K cutoff assumption still must be asked for through TWDB. DL: Cutoff model represents the Lake Buchanan dam? TL: Appropriately reflects operations and agreements in the basin.

MR: other items: heat my keep Llano from coming down. Discussed how water calls may be reflected in the model, are they "real-world". Phil: TCEQ tries to reflect reality in their modeling.

Review Assumptions

TL: Led discussion on assumptions.

1. ML: are they still allocating water rights? Waterstone project on the South Llano. MM: LCRA sold them a water contract, they are buying a right that keeps it from coming into our storage. Leon: Not a new allocation, they are trying to get a new water right, TCEQ is evaluating.

2. TL: this is basically the "cutoff" assumption. JH: why the "simulated" versus "senior". TL: simulated because we are not making the "legal" change.

3. DL: naturalized flows, are they reflective? MM: cannot be extended under the current schedule. DL: note that we are not doing this because of schedule, but may not be the best available data. MM: as dry as 2023 is, when updated it needs to include 2023, so we can't make schedule. MR: Does include 1950s, 1950-1956 Llano River was affected in a way that has never happened to this point. TL: planning is somewhat backward looking, we anticipate we can have that for the next planning cycle.

DL: recommend that this is a limitation that should be noted.

TL: Need to corrected Column 2, should be “yes”.

4. DL: Why no firm yield for Strategies? TL: in Chapter 3, we want legal/paper availability. In strategies, we want evaluate based on projected demands, more operational modeling. Chapter 3 is more water right based evaluation. Phil: Only in supply analysis, it’s an existing permit/model, looking into the future with existing projects. Other models looking at projects that have not been constructed.

5. JB: Assuming LCRA will evaluate sedimentation? I notice that capacity of Lake Buchanan dropped. MM: every 10 years these are evaluated. LO: Need to check on capacity change. TL: we assume available storage decreases through time.

6. DL: Is 33,440 the 10-year average, no longer reflects last 10-years. TL: we are reflecting the 2020 LCRA WMP. TL: capturing the commitment, not the historical record. MR: how did they come up with 33,440? LO: It’s a number that was previously determined, and now hold on the books. It’s originally based on how much firm yield needed to allocate to meet environmental criteria at the time, in the 2010 timeframe. Now reserved out of firm yield supply. DL: discussed concerns about actual environmental flows compared to this commitment. TL: For the strategy WAMs, the 2020 environmental flow criteria will be included. So this is chapter 5, it’s coming in the process. DL: Noted concerns about how the planning process is scheduled, difficult to property study. Environment is changing faster than we can keep up.

7. No comments.

8. No comments. BJ: STP?

9. No comments. BJ: Maybe modify that column (Change from 2016 planning cycle).

10. Consultant team needs to get that date. TL: Consultant team needs to find out from TCEQ, what the latest permits and amendments? DL: Confirm that LCRA WMP is included as part of the permits and amendments?

11. TL: Insert “LCRA” between 2020 and WMP. DL: had a handout regarding modeling assumptions, as attached as an agenda to the minutes. DL: discussed handouts, which pertained to firm yield. Phil: have to run base unmodified model as part of the process, shows up in an appendix. TL: identifies firm yield, so interruptible water is not firm water. More appropriate to include interruptible in WMS world. LO: Firm yield is established by the adjudication of the highland lakes. LCRA has to protect firm yield for firm customers, so interruptible water means no injury to firm yield. TCEQ says that to protect firm customers, you have to meet these other criteria. DL: considers that the LCRA WMP is not reflective of the definition of firm yield. DL: there are limits that change the “interruptible” nature of interruptible flows. TL: as we are operating today, the interruptible water that was delivered prior to the cutoff. For supply analysis, it include.

DL: noted that current drought is worse that previous drought of 2019.

JH: Thinks that we should proceed as stated, that the WMP commits to the firm yield as defined. DL: make a run as the base case, that meets the requirements that are written in WMP. Other inflow requirements should be included in that firm yield calculation.

12. TL: add "LCRA" in that one as well. DL: same argument for including environmental requirements.

13. No comment.

14. No comment.

15. DL: what demands? MR: All Region K demands.

16. No comment.

17. No comment.

18. No comment.

19. No comment.

TL: discussed the HV checklist requirements. Asked members to review prior to the next meeting.

AC: asked that comments be sent prior to the next meeting. Consultant team will get comment responses prior to the next meeting, anticipating a vote on the HVR. DL: asked for word version of document. TL: Make sure comments only, not redline.

5. Review and discuss TWDB guidelines related to uncertainty and Drought(s) Worse Than the Drought of Record (DWDOR)

TL: Led discussion, noted that TWDB did not provide budget for quantative analysis of DWDOR. Noted that the scope is limited to qualitative discussions.

DL: as part of materials, included analysis that shows a decrease in inflows over the last several decades. Recommended that a sensitivity WAM run reflect this decrease. TL: notes that we do not necessarily have the budget/time for quantitative analysis.

TL: asked that the committee review the TWDB guidelines, and note that this is not part of the HVR. This is a down the road discussion for Chapter 7. MM: if we considered that type of approach (decrease over time), that would need to be a full planning group discussion. AC: modeling must be done by the December timeframe.

BJ: Consider adding a recommendation that TWDB/leg provide funding for modeling the DWDOR. TL: Agreed, we proposed policy last round, maybe we can do quantitative next round. MR: What is "worse" in DWDOR? Different risks based on different horizons, i.e. 50 or 100 years.

6. **TL: Roll to next one.**
   ST: would like a discussion of aquifer storage versus folks “draining” the aquifers.

Future agenda items

1. Input on draft HVR
2. Make recommendation regarding uncertainty and DWDOR that would go back to the full planning group.

7. **Public comment**

Jordan Furnans: In July package, email discussion between Jaimie and Lann, requested that Jaime explain reasons for the variance. JF reviewed the response, and has questions. Current consulting team be prepared to discuss Jaimie’s response, and whether those comments are still relevant.

Online: No comments.

BJ: Motion to adjourn, CC seconded.

Meeting closed at 12:06p.

8. **Next Meeting Date**

Teresa suggested that one or two meetings occur in the next two months. Neil Deeds said he would send out a doodle poll (or equivalent) to help schedule those meetings.

David asked about the potential for a hybrid meeting option. Barbara noted that it is difficult to run a hybrid meeting. Christianne did not want the meeting to depend on the technology working, and suggested it be a “listen only” option for virtual attendees. There was general agreement that this would be the approach, and Adam Conner said this could be done at FNI’s meeting room.

9. **New/Other Business (Time Permitting)**

None.

10. **Public Comments**

Jordan Furnans suggested that public comment/questions not be allowed during the main part of the meeting to improve meeting effectiveness.

11. **Adjourn**

Adjourned at 10:01

MINUTES

Lower Colorado Regional Water Planning Group
Water Modeling Committee Meeting
September 18, 2023

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300,
Conference Room "Capital of Texas", Austin, Texas 78759
1:00 P.M.

Meeting Minutes:

1. **Call to Order, Introductions and Roll Call – Teresa Lutes, Committee Chair**

   Meeting was called to order at 1:00 P.M. by Chair Lutes.

   Attendance:

   Committee Members – in person:

   Teresa Lutes, Municipalities
   Monica Masters, River Authorities
   Jim Brasher, GMA-15
   David Lindsay, Recreation
   Mike Reagor, Small Municipalities
   Barbara Johnson, Industry
   Christianne Castleberry, Water Utilities
   Earl Foster, alternate for Small Municipalities (Committee Member Lauri Gillam)
   Carol Olewin, Public Interest
   Mitchell Sodek, GMA-8

   Other attendees – in person:

   Jason Homan, alternate for Environmental
   Lann Bookout, TWDB
   Sue Thornton, alternate for Recreation
   Richard Hoffpauir, Hoffpauir Consulting
   Leonard Oliver, LCRA
   Sara Eatman, Austin Water
   Helen Gerlach, Austin Water
   Marisa Flores Gonzalez, Austin Water
   Jordan Furnans, LRE
   Robert Adams, Plummer
   Adam Conner, FNI
   Neil Deeds, INTERA

Jon Albright, FNI
Cindy Smiley, CTWC
Andrew Weir, SAWDF

Virtual attendees:

Annette Keaveny, LCRA
Kay Wischkaemp, HCUWCD
Kevin Perez, FNI
Shannon Hamilton, CTWC

2. Welcome and Introductions – Chair Lutes

Attendees identified themselves and their affiliations.

3. Receive public comments on specific issues related to agenda items 4 through 10 - limited to 3 minutes per person

Andy Weir, Simsboro Aquifer Defense Fund, spoke regarding managed available groundwater (MAGs) and surface/groundwater interactions.

Jordan Furnans, representing CTWC, spoke about MAG and some concerns regarding their development. Mr. Furnans also expressed his thoughts about "Slide 5" of the presentation, regarding Lake Buchanan and Travis firm supplies.

Sue Thorton, Alternate for Recreation, spoke about concerns of feeling constrained by lack of time to adequately review meeting materials.

6. Review and discuss TWDB guidelines related to uncertainty and Drought(s) Worse Than the Drought of Record (DWDOR)

Chair Lutes asked that item 6 be moved up to this position in the agenda, there was no opposition. Chair Lutes led the discussion of planning for uncertainty and Drought Worse than Drought of Record.

General discussion focused on new TWDB guidance on incorporation of planning for uncertainty and droughts worse than the drought of record into the regional water planning process (Task 7 – Drought). Some members expressed general support for use of the new guidance in Task 7 (some largely qualitative in nature) along with conducting a mid-cycle study to explore tools and methods to further advance planning for uncertainty and DWDR in preparation for quantitative analysis in the next planning round.

4. Discuss Region K Cutoff Model and assumptions for hydrologic variance request (HVR) to Texas Water Development Board (TWDB)

4a. Presentation to address comment from previous committee meeting.
Leonard Oliver, LCRA, presented follow-up information to help clarify the assumptions made in

calculating firm yield and how that process has different elements than the in the LCRA Water Management Plan (WMP). It was noted that the WMP is a short-term operational plan that includes stored water uses for both firm and interruptible customers, as well as environmental flows.

Some additional discussion on how environmental flows are incorporated followed.

4b. Answer questions on comments we received on draft HVR checklist and responses.

Chair Lutes led a discussion on comments received on the draft hydrologic variance request (HVR) and initial checklist responses.

The committee discussed the responses. Some time was spent discussing whether firm or safe yield should form the basis for the modeling, with the understanding that firm yield is the basis that has been used in prior planning rounds. There was more discussion of needing to explore planning for uncertainty and DWDOR in preparation for next planning round including defining and quantifying safe yield, for example. One member expressed frustration that more could not be done to incorporate current drought hydrologic conditions into the modeling this planning cycle.

4c. Review draft HVR checklist

Request by Cindy Smiley for public comment prior to this discussion. Ms. Smiley asked that the planning group use safe yield rather than firm yield in determining water availability.

Chair Lutes led a discussion of HVR checklist. One member suggested creating more consistency between the checklist and the assumption table. The consultants proposed a potential change that could improve this consistency.

4d. Review updated assumption table

Chair Lutes led a discussion of the assumption table. This discussion included additional comments regarding the use of safe yield versus firm yield.

5. Take Action, as Needed

Monica Masters moved that the committee recommend to the full planning group submittal of the HVR and associated materials, as presented, to TWDB. Christianne Castleberry seconded the motion. The motion passed with one opposing vote by David Lindsay.

Chair Lutes led a discussion of the accompanying cover letter and recommended that the letter contain information about the current drought, and the plan for additional mid-cycle study regarding planning for uncertainty and DWDOR. Ms. Lutes suggested that the cover letter be drafted prior to the October planning group meeting for inclusion in the full planning group meeting materials packet for consideration at the meeting.

Some additional discussion occurred regarding the timeline for updating the naturalized flows (hydrology) included the water availability model (WAM) (which currently extend through 2016).

6. Review and discuss TWDB guidelines related to uncertainty and Drought(s) Worse Than the Drought of Record (DWDOR)

This agenda item was handled previously in the meeting (between items 3 and 4).

7. Groundwater Discussion

Chair Lutes suggested that the groundwater discussion be tabled for next meeting, and none opposed.

8. Next meeting date

No next meeting date was set, but the consultants indicated they would follow up with a poll.

9. Future Agenda Items

1. Groundwater and managed available groundwater (MAGs) will likely be discussed in the next meeting.

10. Public comment

Jordan Furnans commented regarding whether environmental flows should be considered interruptible, and that Central Texas Water Coalition (CTWC) had an alternative model that was more up to date on hydrology than the current WAM.

11. Adjournment

Motion to adjourn by Barbara Johnson, seconded by Jason Homan. None opposed.

Chair Lutes adjourned the meeting at 2:49p.

MINUTES

Lower Colorado Regional Water Planning Group
Water Modeling Committee Meeting
October 23, 2023

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300,
Conference Room "Capital of Texas", Austin, Texas 78759
9:30 A.M.

Meeting Minutes:

1. **Call to Order, Introductions and Roll Call – Teresa Lutes, Committee Chair**

   Meeting was called to order at 9:35 A.M. by Chair Lutes.

   Attendance:

   Committee Members – in person:

   Teresa Lutes, Municipalities
   Jim Brasher, GMA-15
   David Lindsay, Recreation
   Mike Reagor, Small Municipalities
   Barbara Johnson, Industry
   Christianne Castleberry, Water Utilities
   Earl Foster, alternate for Small Municipalities (Committee Member Lauri Gillam)
   Carol Olewin, Public Interest
   Mitchell Sodek, GMA-8
   Tom Hegemier, alternate for River Authority (Committee Member Monica Masters)
   Jason Homan, alternate for Environmental

   Other attendees – in person:

   Jennifer Walker, Environmental
   Lann Bookout, TWDB
   Sue Thornton, alternate for Recreation
   Leonard Oliver, LCRA
   Leslie Solo Sanchez, LCRA
   Sara Eatman, Austin Water
   Helen Gerlach, Austin Water
   Emily Rafferty, Austin Water
   Marisa Flores Gonzalez, Austin Water
   Robert Adams, Plummer
   Adam Conner, FNI

Neil Deeds, INTERA
Jon Albright, FNI
Cindy Smiley, CTWC

Virtual attendees:

Annette Keaveny, LCRA
Andy Weir, SAWDF
Kevin Perez, FNI

2. Welcome and Introductions – Chair Lutes

Attendees identified themselves and their affiliations.

3. Receive public comments on specific issues related to agenda items 4 through 10 - limited to 3 minutes per person

Andy Weir, Simsboro Aquifer Defense Fund, spoke regarding modeled available groundwater (MAGs) and specifically how GMA-12 approaches the desired future conditions (DFC) process.

4. Review and approve minutes from previous meetings

Consultant team noted need to add Mitchell Sodek to September 18 modeling meeting attendee list.

David Lindsay asked that content be added to minutes. David may suggest content to add for consideration in the next meeting.

Consultant team noted need to correct spelling of Barbara Johnson's name in the minutes.

Chair Lutes asked that any correction be brought to the consultant team via email.

5. Discuss how groundwater modeling and Modeled Available Groundwater (MAG) data feed into groundwater availability/supplies.

Neil Deeds of the consulting team led the discussion of this topic, generally outlining the groundwater planning process and how it fits with regional planning.

The group discussed several topics with respect to groundwater availability. The question of how water quality was handled in groundwater availability models was asked, with the answer being that groundwater quality is generally handled on the strategy side, e.g. if treatment is needed. The group discussed the change in groundwater availability from the previous plan to the new MAGs. Modest increases in the Carrizo-Wilcox MAG were due to an update in the underlying groundwater model.

There was discussion of how non-relevant aquifers are handled, where there is no DFC but there should be a MAG. There was a consensus that the region should reach out to groundwater conservation districts (GCDs) for those aquifers considered non-relevant.

Two other topics concerned dry wells and whether drawdown is considered in the planning process. Chair Lutes indicated that dry wells could be discussed in Chapter 7 when drought and drought management are discussed. Groundwater district representatives spoke on how drawdowns are considered in most DFCs, which then are used to calculate MAGs.

The TWDB representative asked whether a groundwater hydrologic variance request (HVR) was likely to be made for Region K. The consultant team indicated that a groundwater HVR was not likely.

6. Discuss TWDB response to Surface Water Hydrologic Variance Request, if available

No response was available at this time.

7. Next meeting date

The next meeting date was set for after the planning group meeting on December 1, starting at approximately noon. The consultant team will work with LCRA staff to determine whether a virtual option can be provided.

8. Future Agenda Items

Preliminary surface water modeling results will likely be discussed in the next meeting.

9. Public comment

Andy Weir discussed importance of surface water and groundwater interaction between the Carrizo-Wilcox and the Colorado River. He stated that modeling showed the river will eventually lose water to the outcrop as pumping increases.

10. Adjournment

Motion to adjourn by Barbara Johnson, seconded by David Lindsay. None opposed.

Chair Lutes adjourned the meeting at 10:35 am.

MINUTES

Lower Colorado Regional Water Planning Group
Water Modeling Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300,
Conference Room "Capital of Texas", Austin, Texas 78759

January 22, 2024, 2:30 pm

Meeting Minutes:

1. **Call to order – Chair Teresa Lutes**

   Committee members in attendance:

   Teresa Lutes – Chair, Municipalities
   David Lindsay, Recreation
   Carol Olewin, Public Interest
   Mitchell Sodek, GMA-8
   Christianne Castleberry, Water Utilities
   Monica Masters, River Authorities
   Mike Reagor, Small Municipalities

   Other in-person attendees:

   Robert Adams, APIA
   Lann Bookout, TWDB
   Earl Foster, alternate for Small Municipalities
   Tom Harrison, CTWC
   Sue Thornton, Environment
   Jon Albright, FNI
   Adam Conner, FNI
   Jordan Furnans, LRE
   Leonard Oliver, LCRA
   Augusto Villalon, FNI

   Online attendees:

   Jason Afinowicz, FNI
   Marisa Flores Gonzalez, Austin Water
   Richard Hoffpauir, Hoffpauir Consulting
   Cindy Smiley, Smiley Law Firm
   Sara Eatman, Austin Water
   Helen Gerlach, Austin Water
   Emily Rafferty, Austin Water
   Leslie Soto Sanchez, LCRA

2. **Welcome and introductions – Chair Lutes**

   Attendees introduced themselves and their affiliation (captured above).

3. **Receive public comments on specific issues related to agenda items 4 through 9**

   Jordan Furnans stated that the committee meeting minutes form 9/18/2023, (p.2 item 3) doesn't provide sufficient context to accurately capture his comments.

4. **Review and approve minutes from previous meetings.**

Chair Lutes requested the committee review the minutes from meetings on the following dates:

- July 12, 2023
- Aug 21, 2023
- Sept 18, 2023
- Oct 23, 2023

Christianne Castleberry asked if specific language was available to add to the September comments in response to Mr. Furnans' public comment. Mr. Furnans did not have language available. Ms. Castleberry made a motion to approve all of the minutes, Earl Foster seconded, and the motion passed.

5. Update on surface water availability modeling

Jon Albright, FNI, presented the scope of the surface water modeling for Chapter 3 is to establish the water supplies, as distinct from future water modeling work which includes the yields from Water Management Strategies in Chapter 5. Mr. Albright summarized draft results:

- Major reservoirs:
  - Firm yield evaluation Water Availability Model (WAM) assumptions for the Highland Lakes are based on the Hydrologic Variance request was approved by TWDB in January.
  - The firm yield analysis is based on the annualized average yield over the Drought of Record because of the water supplies associated with the City of Austin and the South Texas Project are senior run-of-river water rights with storage backup from LCRA, and therefore reservoir yields vary year-to-year.
  - In this planning cycle, the consultants propose defining Firm Yield as the average yield over the period form reservoir at full to the reservoir minimum. This aligns with LCRA's Water Management Plan approach and results in a slight increase in the firm yield.
- Other reservoir yields:
  - Arbuckle is considered to be a part of the Gulf Coast water supply
  - Fayette, Decker, and Bastrop are off-channel reservoirs that rely on supplies that are pumped out of the Colorado River; yield is already captured in the Firm Yield.
  - South Texas Project Nuclear Operating Company reservoir can capture 35k from the watershed, the remainder that was counted last cycle includes releases form the Highland Lakes (avoiding double-counting).
- Supplies from Major Water Rights
  - Using annualized average for City of Austin
  - Others are based on minimum annual diversion.
  - Corpus Christi-minimum annual diversion based on an unmodified TCEQ WAM.
  - Overall reduction in yield associated with major water rights as compared with 2021.
- Consulting team proposed to use WAM yield for small run of river irrigation water rights; the previous plan used reported water use for the supply.

Discussion.

- Mike Reagor noted that Llano may need to come up with another supply to show that they don't have a shortage.

6. **Take action on surface water availability modeling results to recommend to the full planning group at the next Region K meeting (scheduled for February 13, 2024)**

   Ms. Castleberry moved to recommend the modeling results provided, Monica Masters seconded the motion. The motion passed with Mike Reagor abstaining.

7. **Discuss Texas Water Development Board (TWDB) response to Surface Water Hydrologic Variance Request**

   TWDB provided a letter, dated Jan 10th, with approval of the hydrologic variance as submitted.

8. **Next meeting date – to be determined**

9. **Future agenda items – to be determined**

10. **General public comments**

- Jordan Furnans provided observations from the meeting. Mr. Furnans, as a water modeler, did not understand the modeling that was provided in the meeting for consideration. He made a note that Intera, the prime consultant, was not present at the meeting. He suggested that a small group including the City of Austin and LCRA appears to have made decisions on the assumptions prior to the meeting, like the definition of the drought of record as reservoir full to empty and that the decision was not made by the committee in full. He noted that not everyone understands the implication of the proposed WAM changes, including him.
    i. Chair Lutes commented that it wasn't a decision made outside of the group but just a review by COA on materials coming into the meeting, and the committee had the opportunity to decide on modeling assumptions.
- David Lindsay suggested that, for someone who doesn't understand the process, it looks like the planning group found additional water since the 2021 plan. He requested that the committee needs to have a better understanding of why or if that water is real. Mr. Lindsay commented that modeling can be complicated and biased, and he does not want to be accused of manipulating the results and he can't explain the changes in assumptions.
    i. Jon Abright responded that he did not have the documentation to match the previous modeling. He strenuously opposes using the reservoir full to reservoir full definition of the drought of record. His professional opinion is that the hydrology after the minimum reservoir storage is not as relevant to the firm yield.

ii. Mike Reagor noted that some users got more water, Llano got less, and it appears to be a result of the shift from agricultural to industrial use patterns associated with some lower basin demands.
iii. Chair Lutes noted that when we update and change assumptions it's typical to see differences and we should expect to see differences in the next cycle. If the committee wants more detail in the next meeting or has specific questions, that can be provided.

11. Adjourned at 4:10

DRAFT MINUTES

Lower Colorado Regional Water Planning Group

Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300, Conference Room "Capital of Texas", Austin, Texas 78759

THIS IS A HYBRID MEETING:
LINK

January 31, 2025, 10:00 a.m.

In-Person

Lauri Gilliam	Small Muni
Teresa Lutes	Municipalities
Monica Masters	River Authority
Christianne Castleberry	Water Utilities
Mike Reagor	Small Municipalities
Barbara Johnson	Industry
Carol Olewin	Public Interest
Earl Foster	alt to Lauri Gilliam
Josh Becker	alt to Mike Reagor
Robert Adams	Plummer
Adam Conner	FNI

Virtual

Daniel Berglund	Small Business
Jennifer Walker	Environment
Jim Brasher	GMA-15
Tom Hegemier	alt to Monica Masters
Mary Ann Baker	alt to Carol Olewin
Stacy Pandey	LCRA
Leonard Oliver	LCRA
Collins Balcolme	LCRA
Dacy Cameron	Aqua WSC
Chandler Crouch	Texas Water Trade

Committee Meeting:

1. **Call to order – Chair Lauri Gillam**

Meeting was called to order at 10:03.

2. **Welcome and introductions – Lauri Gillam**

3. **Receive public comments on specific issues related to agenda items 5 through 7 – limited to 3 minutes per person**

None.

4. **Approval of minutes from previous meeting(s)**

Teresa moved to approve the minutes from the previous meeting, seconded by Barbara. The motion passed by voice vote.

5. **Status update on Water Management Strategy evaluations**

Neil led the discussion, noted that two strategies (in addition to drought management) would be considered today. He also discussed the municipal unmet needs in Region K, and noted that most were fairly minor with the exception of County-Other, Hays. Chair Gillam noted that the committee and region in general were aware that some municipal unmet needs would be reported in the IPP this cycle.

6. **Proposed Drought Management Strategies: Discuss and take action as needed.**

Robert Adams led the discussion. He started by noting that drought management (DM) was considered to be similar to conservation in the previous planning cycle, applied as a demand reduction in the second-tier needs calculation. He noted that DM was required to be considered based on planning guidance. However, due to our approved conservation approach, which is aggressive, he did not think it was appropriate to do an across-the-board 20% demand reduction associated with DM in the current cycle. He noted that the conservation approach in this cycle resulted in greater demand reduction in many cases, than the combined conservation/DM approach from the previous cycle. He suggested that DM be applied only to water user groups (WUGs) with unmet municipal needs.

Barbara asked about the difference between conservation and drought management. Mike explained that conservation is an ongoing practice, whereas drought management involves emergency measures such as water rationing. Jennifer elaborated on the distinction between conservation and drought management, emphasizing that conservation is a year-round practice, while drought management is triggered by specific conditions such as water supply levels, treatment capacity, or outages rather than climatological drought. Josh pointed out that conservation is *proactive*, whereas drought management is *reactive*.

Robert mentioned that many Water User Groups (WUGs) submitted DCPs, mistakenly thinking they were conservation plans, highlighting some confusion between the two concepts. The committee reviewed the calculations of demand reduction in the current plan under conservation, versus the previous cycle approach using conservation plus DM.

Jennifer noted that visible water waste and excessive use in communities should be addressed through conservation, but emphasized that DM should not be abandoned as a water management strategy (WMS). Removing DCPs from the plan could create a potential gap in water supply, necessitating additional infrastructure to compensate. Robert reflected on the progress made over the past 25 years, noting that while drought remains a key factor, historical drought data from that period serves as the foundation for current demand projections.

The committee discussed the development of the DM approach in the last cycle, Teresa noted that reductions were intentionally applied across the board to ensure fairness, similar to the approach for conservation in the current cycle. Lauri supported consulting individual WUGs for DM decisions, while Monica noted that Stage II restrictions no longer achieve a 20% reduction. Robert pointed out that while requirements vary, the Lower Colorado River Authority (LCRA) enforces some level of uniformity. Josh suggested pushing the state to standardize DCPs, and Robert mentioned that Chapter 8 includes recommendations to that effect. Mike observed that what was once considered Phase I conservation is now a standard voluntary practice. Teresa recalled that the previous cycle included a 20% reduction, suggesting that a lower reduction—perhaps 5%—would still be meaningful without being overly impactful. She noted that Jennifer's logic supported this approach, as reductions are based on drought conditions, lower supply, and higher demands. While reductions may not be as significant as in the past, they remain important.

Christianne supported including drought management in the accounting process, cautioning against overestimating conservation and drought management capabilities, which could lead to underestimating actual water needs. She stressed the importance of logical planning to identify true unmet demands. Carol inquired about how deficiency data is communicated to WUGs, and Robert explained that WUGs audit their GPCD to assess their standing and future targets through self-analysis.

Lauri summarized the discussion up to this point as three possible approaches: maintaining the 2021 approach with 20% reduction, maintaining the 2021 approach but lowering the reduction to 5% as Teresa suggested, or adopting Robert's individualized approach to WUGs with unmet needs. Christianne suggested highlighting (in the tables that Robert presented) those WUGs who could achieve additional benefits from DM in the IPP.

Jennifer supported Teresa's proposal of 5% as a WMS, stating that strategy implementation is key. She noted that lowering the percentage addresses some concerns, proposing either a 5% or 10% reduction. She emphasized that applying reductions only to areas with unmet needs may not be ideal, as implementing DCPs should be a universal practice. She reiterated that the State Water Plan (SWP) is a drought-based plan that balances supply and demand, making it logical to incorporate DCPs.

Teresa questioned whether DM should be applied prior to second-tier needs. Lauri observed that the committee was not uncomfortable with showing unmet needs and therefore supported not using DCPs solely to address those needs. Barb suggested including a recommendation that WUGs with unmet needs implement aggressive DCPs.

Teresa proposed setting a 5% DCP strategy across Region K, prompting Monica to affirm that it should apply universally. Christianne recommended including a policy to identify areas where additional DCP potential exists. She also raised the issue of whether second-tier needs should be addressed with DM or simply categorized as unmet needs. The committee discussed whether to account for second-tier needs separately or leave them as unmet.

Monica made a motion that on the strategy side, we develop a drought management strategy for all WUGs each decade of 5% demand reduction. On the needs side, when calculating second-tier needs we just subtract conservation and reuse, not drought management, and we are okay if some of the WUGs are showing an unmet need in the future. Finally, in the writeup, we suggest that WUGs with unmet needs implement more aggressive drought management.

Lauri seconded the motion. The motion passed by voice vote.

7. Other Water Management Strategies: Discuss and take action as needed.

Adam discussed strategy for Llano – a contract with LCRA would increase reliability of Llano's surface water rights**,** without increasing infrastructure. Mike noted that negotiations were ongoing. Adam said that was fine, the strategy could still be considered by the committee.

Monica move we recommend the strategy, and Christianne seconded the motion. The motion passed by voice vote.

Teresa led the discussion on Austin's return flows, explaining how reuse and reclaimed water usage impact return flows. Over the planning horizon, reuse is expected to increase, leading to a corresponding decrease in return flows. Richard H. conducted the surface water modeling to estimate the benefits of these return flows. The table detailing these estimates will be reviewed at the Water Management Committee (WMC) meeting next week.

Barbara asked why return flows increase over time. Teresa clarified that effluent production increases at a faster rate than reuse. Barb noted that in past plans, Austin has indicated that 100% reuse could happen in the future and questioned whether the current return flows are only temporary. Teresa explained that, while there is no requirement to return effluent to the river, significant amounts are currently being returned. The planning projections do not assume full reuse within the 50-year horizon, allowing for a balance between the benefits of reuse and the benefits of return flows.

Jim Brasher then inquired about the Pierce Ranch and Garwood industrial water rights. Leonard explained that the modeling uses an industrial water use pattern to estimate the benefits to the Garwood water right. The Garwood industrial allocation consists of 33,000 acre-feet per year that LCRA does not set aside for Garwood irrigation. Under the purchase agreement, 100,000 acre-feet per year is reserved for agricultural irrigation, while the remaining 33,000 acre-feet per year is not obligated for irrigation use and is marked for industrial or other purposes. Jim found this distinction confusing and asked whether the Garwood right includes the Corpus Christi water right. Leonard clarified that the Corpus Christi right, which accounts for 35,000 acre-feet per year, is separate and not included in this analysis.

Teresa moved to recommend the Austin return flows WMS, Lauri seconded. The motion passed by voice vote.

8. Next meeting date – to be determined

As needed based on comments on the IPP.

9. Future agenda items – to be determined

As needed based on comments on the IPP.

10. General public comments – limited to 3 minutes per person

Daniel made a comment on what he felt like was an inaccurate statement on Slide 9, which had suggested that increased demand increases the likelihood of drought. Neil agreed, and suggested that it would be better stated that increased demand during drought increases the overall impacts of the drought.

11. Adjourn

Adjourned at 11:20p

Appendix 3.C

Region K Supply Evaluation Model Hydrologic Variance Request (including Table A and checklist), and Approval Letter from Texas Water Development Board

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Lower Colorado River Authority, Administrative Agent
P.O. Box 220, Austin, Texas 78767
512-473-3200, Fax 512-473-3551

October 11, 2023

TO: Mr. Jeff Walker, Executive Administrator
Texas Water Development Board (TWDB)
P.O. Box 13231
1700 North Congress Avenue
Austin, Texas 78711-3231

FROM: **David Van Dresar, Lower Colorado Regional Water Planning Group (Region K) Chair**

SUBJECT: **Surface Water Hydrologic Variance Request**

On October 4, 2023, the Lower Colorado Regional Water Planning Group (Region K) authorized submitting this surface water hydrologic variance request to Texas Water Development Board (TWDB) for approval. Region K is requesting approval to use the Region K Cutoff Model (Cutoff Model) in determining availability of surface water resources and analyzing water management strategies for development of the 2026 Region K Regional Water Plan (RWP). Attached are the completed Surface Water Hydrologic Variance Request Checklist and a table for additional detail.

In the development of the 2011 Region K RWP, Region K determined that the standard Texas Commission on Environmental Quality (TCEQ) Full Authorization Water Availability Model (WAM) did not adequately reflect the historical operation of water rights and existing contractual commitments in the Colorado River Basin. Region K subsequently requested and received TWDB's approval to use a modified version of the TCEQ Full Authorization WAM, known as the Cutoff Model, in determining surface water availability and water management strategy analysis for the 2011 RWP.

Region K again requested to use the Cutoff Model for the 2016 Region K RWP, after making some updates that reflected new data and changed conditions within the basin. That request was also approved by TWDB, with limitations identified for water management strategy analysis. The Cutoff Model used for the 2021 RWP used the same assumptions as approved previously by TWDB plus some limited revisions.

Region K is requesting to use the same basic Cutoff Model assumptions with limited revisions to the assumptions used in the 2021 RWP. The attached **Surface Water Hydrologic Variance Request Checklist** provides detail on TWDB's standardized set of questions for each river basin. The attached **Table A – Summary of Region K Modeling Assumptions** outlines all of the major assumptions and identifies where a change to an assumption has been made since the 2021 RWP. It also indicates which section of TWDB's HVR Checklist correlates to each assumptions (if applicable).

There are two basic purposes for applying a Water Availability Model (WAM) in the context of regional water planning. One is to establish the available firm supply of surface water under drought of record conditions for each individual existing surface water right and for each decade of the planning period. The second is to analyze potential water management strategies for meeting projected future water demand by decade, including strategies that potentially involve new appropriations of state water. When the Cutoff Model is applied for these specific purposes, Region K has adopted the nomenclature of "**Region K Supply Evaluation Model**" and "**Region K Strategy Evaluation Model**" to differentiate between the selections of Cutoff Model assumptions as shown in Table A. The unmodified TCEQ Full Authorization WAM is used in addition to the Strategy Evaluation Model if a water management strategy involves a new appropriation of state water.

REGION K SUPPLY EVALUATION MODEL

Region K requests to perform water supply availability analyses using the Supply Evaluation Model. This model reflects historical and current water management operations in the basin with regard to existing water rights, and as such, it provides the best informed representation of available water supplies during drought of record conditions for water rights within the Region K planning area. The basic assumptions that differ from those included in the standard TCEQ Colorado WAM Full Authorization WAM are outlined in **Table A – Summary of Region K Modeling Assumptions**.

REGION K NEW APPROPRIATION MODEL

The analysis of potential surface water-based water management strategies can involve different WAM modeling approaches depending on the nature of a particular strategy and the purpose for which the analysis is being made. For a strategy that requires a new appropriation of surface water from TCEQ, the amount of water that the strategy is capable of producing under drought of record conditions is first determined under the same permitting assumptions used by TCEQ. This means that the strategy should be analyzed using TCEQ's standard Full Authorization WAM as it currently exists with all existing water rights in the entire Colorado River Basin fully exercised in accordance with their authorized impoundment and diversion amounts and with no return flows. The basic assumptions of this Region K "New Appropriation Model" are outlined in the attached **Table A Column 2**.

REGION K STRATEGY EVALUATION MODEL

The Region K "Strategy Evaluation Model" is used for surface water-based water management strategy evaluation. This includes both surface water-based strategies that require a new appropriation and those that rely on an existing water right. Once included in the Strategy Evaluation Model, these new sources of supply then would be available to meet the projected demands for specific water users at different decades in the future. The basic assumptions for the Strategy Evaluation Model for these types of strategy planning simulations are listed in the attached **Table A Column 3**.

RECOGNITION OF IMPACTS OF CURRENT DROUGHT

At the time of this Hydrologic Variance Request (HVR), Region K is experiencing an extraordinary multi-year drought. Inflows to the Highland Lakes, on a monthly and calendar year basis, have recently been the lowest in the period of record back to 1942. However, the current drought has still not been determined to be worse than the 2010s drought which is recognized by Region K as the drought of record for planning purposes. Region K has discussed including information about current drought conditions in Chapters 3 and 7 of the plan report. As the region's naturalized flows are updated and additional hydrological information becomes available, Region K will plan to update its models to reflect this information for future planning rounds.

For this round of planning, Region K intends to use the regional water planning Drought Task (Task/Chapter 7), including Section 7.2 regarding Uncertainty and Drought(s) Worse than the Drought of Record, to advance the plan's scope in this critical arena. Region K intends to request additional TWDB funding for a study to be completed prior to the next round of planning to assess methods of quantification of uncertainty and drought(s) worse than the Drought of Record, including safe yield and other approaches. Through the Region K Policy Committee process, the planning group will consider expanding upon its 2021 RWP policy statement on Planning for Droughts Worse than the Drought of Record. This may include requesting that the Legislature increase funding for planning for uncertainty and droughts worse than the drought of record in a quantified manner.

CONCLUSION

We believe that the WAM modeling approach outlined above is consistent with directives from TWDB regarding regional water planning and meets the requirements of TCEQ with regard to how strategies involving potential new appropriations of surface water are analyzed and represented in the regional planning process. Furthermore, we believe that this approach will provide the best-informed estimates of future available surface water supplies that reflect historical water management operations in the basin with regard to existing water rights.

We appreciate your consideration of this submittal. If you have any questions about this request, please contact me as shown below.

Respectfully submitted,

David Van Dresar
Region K Chairman
david@fayettecountygroundwater.com

Enclosures: Table A - Summary of Region K Cutoff Model Modeling Assumptions
Surface Water Hydrologic Variance Checklist

Cc: Lann Bookout, TWDB
Teresa Lutes, Region K Water Modeling Committee Chair
Neil Deeds, INTERA

TABLE A
SUMMARY OF REGION K MODELING ASSUMPTIONS
REGARDING SUPPLY AND STRATEGY ANALYSES
FOR 2026 REGIONAL PLAN DEVELOPMENT

ITEM	ASSUMPTION	(1) SUPPLY ANALYSIS	(2) STRATEGY ANALYSIS	(3)	Change from 2021 Planning Cycle	Pertinent HVR Checklist Question No.
		Region K Supply Evaluation	Region K New Appropriations	Region K Strategy Evaluation		
A	Use TCEQ Full-Basin WAM Run 3 Without Modification for New Appropriation Water Supply Strategies Analysis	No	Yes	No	No Change	2, 8
B	All Rights at and Above Ivie/Brownwood simulated prior to Downstream Rights (maintaining relative date priority in rights upstream)	Yes	No	Yes	No Change	2, 8
C	Use 1940-2016 Naturalized Flows	Yes	Yes	Yes	Changed Column 2 to “Yes”. Removed “Expanded”.	2, 4, 8
D	Determine Firm Yield for Buchanan-Travis Reservoir System	Yes	No	No	No Change	2, 6, 8
E	Use Sediment-Adjusted Future Reservoir Storage by Decade	Yes	No	Yes	No Change	2, 8
F	Use Lower Colorado River Authority (LCRA) 2020 Water Management Plan Environmental Flow Criteria	No*	Yes	Yes	Changed "2015" to "2020". Added “LCRA”.	2, 8
G	Set All Water Right Demands at Authorized Diversion Amounts	Yes	Yes	No	No Change	2, 8
H	Include Provisions of LCRA-STP 2006 Settlement Agreement	Yes	No	Yes	No Change	2, 8
I	Include Operating Rules for Lakes Buchanan and Travis to Reflect Combined Firm Yield Operation	Yes	Yes	Yes	No change	2, 8
J	Include Latest Approved Permits and Amendments (as of 2023)	Yes	Yes	Yes	Updated to include latest approved permits and amendments in general, not LCRA’s and updated date to 2023.	2, 8
K	Include LCRA 2020 Water Management Plan Highland Lakes Interruptible Water	No	Yes	Yes	Changed "2015" to "2020". Added “LCRA”.	2, 8
L	Adjust LCRA 2020 Water Management Plan Environmental Flow Triggers (Decadal)	No	No	Yes	Changed "2015" to "2020" Added “LCRA”.	2, 8

M	Set All Region K Municipal and Industrial Water Right Demands at Projected Future Demand Amounts by Decade	No	No	Yes	No change	2, 8
N	Modify Curtailment of Highland Lakes Interruptible Water as Necessary to Satisfy LCRA Future Firm Municipal and Industrial Demands	No	No	Yes	No change	2, 8
O	Set LCRA Lower Basin Irrigation Demands Equal to Projected Future Region K Demands by Decade	No	No	Yes	Add "Region K" before "Demands by Decade"	2, 8
P	Include LCRA Irrigation Return Flows to the Colorado River	No	No	Only As A Strategy	No Change	2, 8
Q	Include Return Flows from Austin Wastewater Treatment Plants	No	Only As A Strategy	Only As A Strategy	No Change	2, 8, 9
R	Include Other Municipal and Industrial Return Flows	No	Only As A Strategy	Only As A Strategy	No change	2, 8, 9
S	Include Reuse Provisions and Environmental Flow Requirements of LCRA Austin 2007 Settlement Agreement	No	Only As A Strategy	Only As A Strategy	No Change	2, 8

* The LCRA 2020 Water Management Plan states that the amount of firm water allocated for environmental purposes is 33,440 acre-feet per year (drought average). This amount is a commitment from the firm yield of the Highland Lakes.

Note: TCEQ SB-3 requirements will be taken into consideration in strategies involving a new appropriation of water.

Surface Water Hydrologic Variance Request Checklist

Texas Water Development Board (TWDB) rules[1] require that regional water planning groups (RWPG) use most current Water Availability Models (WAM) from the Texas Commission on Environmental Quality (TCEQ) and assume full utilization of existing water rights and no return flows for surface water supply analysis. Additionally, evaluation of existing stored surface water available during Drought of Record conditions must be based on Firm Yield using anticipated sedimentation rates. However, the TWDB rules also allow, and **we encourage**, RWPGs to use more representative, water availability modeling assumptions; better site-specific information; or justified operational procedures other than Firm Yield with written approval (via a Hydrologic Variance) from the Executive Administrator in order to better represent and therefore prepare for expected drought conditions.

RWPGs must use this checklist, which is intended to save time and reduce effort, to request a Hydrologic Variance for estimating the availability of surface water sources. For Questions 4 – 10, please indicate whether the requested variance is for determining Existing Supply, Strategy Supply, or both. <u>Please complete a separate checklist for each river basin in which variances are being requested.</u>

Water Planning Region: K

1. Which major river basin does the request apply to? Please specify if the request only applies part of the basin or only to certain reservoirs.

Lower Colorado Basin (downstream of O.H. Ivie Reservoir and Lake Brownwood).

2. Please give a brief, bulleted, description of the requested hydrologic variances including how the alternative availability assumptions vary from rule requirements, how the modifications will affect the associated annual availability volume(s) in the regional water plan, and why the variance is necessary or provides a better basis for planning. You must provide more-detailed descriptions in the subsequent checklist questions. Attach any available documentation supporting the request.

Region K uses three variations of the Colorado River WAM:

- *Region K Supply Evaluation Model*. This is used for the decadal supply evaluations that will be reported in Chapter 3. This includes the yield of the Lower Colorado River Authority (LCRA) system. Modifications to TCEQ WAM include:
    - Region K Cutoff assumptions
        - This modification to the TCEQ WAM essentially creates two separate systems within the same WAM: one for upstream of O.H. Ivie Reservoir and Lake Brownwood, and another for downstream. The system above Ivie and Brownwood executes first before the downstream system, which prevents

[1] 31 Texas Administrative Code (TAC) §§ 357.10(14) and 357.32(c)the

senior rights in the lower basin from making priority calls on the upstream system. This assumption is consistent with existing agreements among water right holders and reflects the actual operation of the basin.

  - No LCRA interruptible supplies or environmental flow support
    - Both of these items are part of the 2020 LCRA Water Management Plan (WMP) which is included in the Strategy Evaluation Model only.
  - Sedimentation projections by decade
    - This modification to the TCEQ WAM utilizes the most recent sedimentation surveys for projecting changes to reservoir storage as storage is reduced over time due to sediment accumulation.
- *Region K New Appropriation Model.* This model is TCEQ's Run 3 with an error correction (see below). This will be used for any strategies that require a new water right appropriation. Key features of the Region K New Appropriation Model include:

  - Priority order analysis (no cutoff)
  - 2020 LCRA WMP
  - Authorized storage capacities (no adjustments for sedimentation)
  - No external agreements

- *Region K Strategy Evaluation Model.* This model will be used to evaluate strategies that a) do not require a new water right appropriation (i.e. strategies based on existing water rights), and/or b) for strategies that use a new water right appropriation evaluated with the New Appropriation Model to meet a specific need. Modifications to TCEQ WAM include:

  - Region K Cutoff assumptions
  - LCRA interruptible supplies and environmental flow support. For future decades, we may need to adjust curtailment triggers and other related factors from the 2020 LCRA WMP modeling to protect firm supplies.
  - Sedimentation for current and future decades
  - Wastewater effluent (herein referred to as "return flows") are only considered as a strategy

The Region K Cutoff assumptions modify the priority assumptions in Run 3 and are included in the Supply Evaluation and Strategy Evaluation models. These models assume that all water rights at and above Lakes O.H. Ivie and Brownwood are simulated prior to downstream water rights while maintaining relative date priority in rights upstream. This assumption reflects historical, current, and expected future water management operational practices between the upper and lower Colorado Basin, and is therefore a better basis for planning. The cutoff models show increased water availability upstream of Lakes O.H. Ivie and Brownwood in Region F and decreased availability downstream in Region K.

The Region K Supply Evaluation Model does not include interruptible supplies because:

a). TWDB Regional Planning Rules require (and Region K agrees) that supply estimates be made for firm yield conditions with all water rights fully utilized.

b). Including LCRA's 2020 WMP operation into the supply analysis does not align with the requirement to use firm yield. The LCRA WMP is a near-term operational plan that is not based on the full utilization of senior water rights.

The Region K Supply Evaluation Model represents the environmental flow support as an LCRA commitment of 33,440 ac-ft/year from the firm yield of the Highland Lakes. This is consistent with how LCRA represents its commitment to environmental flows from the firm yield of the system.

The projected conditions within the Region K Strategy Evaluation does include both interruptible supplies and environmental flow support from the 2020 LCRA WMP. The curtailment triggers from the 2020 WMP may need to be modified to protect firm supplies as demand increases.

More details on these modifications may be found in the summary table in Attachment A.

A modification will be made to the models to correctly assign locations for the Twin Buttes/Nasworthy system. These location errors have been identified in previous modeling efforts but have not been incorporated into TCEQ's WAM Run 3 at this time.

3. Was this request submitted in a previous planning cycle? If yes, please indicate which cycle and note how it is different, if at all, from the previous request?

Yes

Only substantive change from request submitted for the 2021 Region K Plan is changing the LCRA WMP cited to be the 2020 WMP.

4. Are you requesting to extend the period of record beyond the current applicable WAM hydrologic period? If yes, please describe the proposed methodology. Indicate whether you believe there is a new drought of record in the basin.

No

Choose an item.

No request is being made to extend the period of record beyond the Colorado WAM hydrologic period which covers 1940-2016. The basin is currently experiencing drought conditions. However, no determination of a new drought of record has been made at the time of this variance request.

5. Are you requesting to use a reservoir safe yield? If yes, please describe in detail how the safe yield would be calculated and defined, which reservoir(s) it would apply to, and why the modification is needed or preferrable for drought planning purposes.

No

Choose an item.

Region K will use the new Chapter 7 subsection on uncertainty and droughts worse than the drought of record (DWDOR) to advance the region's planning process towards identification of strategies that can be used to address DWDORs.

6. Are you requesting to use a reservoir yield other than firm yield or safe yield? If yes, please describe, in a bulleted list, each modification requested including how the alternative yield was calculated, which reservoir(s) it applies to, and why the modification is needed or preferrable for drought planning purposes. Examples of alternative reservoir yield analyses may include using an alternative reservoir level, conditional reliability, or other special reservoir operations.

No

Choose an item.

Click or tap here to enter text.

7. Are you requesting to use a different model (such as a RiverWare or Excel-based models) than RUN 3 of the applicable TCEQ WAM? If yes, please describe the model being considered including how it incorporates water rights and prior appropriation and how it is more conservative than RUN 3 of the applicable TCEQ WAM.

No

Choose an item.

Click or tap here to enter text.

8. Are you requesting to use a modified TCEQ WAM? If yes, please describe in a bulleted list all modifications in detail including all specific changes to the WAM and whether the modified WAM is more conservative than the TCEQ WAM RUN 3. Examples of WAM modifications may include adding subordination agreements, contracts, updated water rights, modified spring flows, updated lake evaporation, updated sedimentation[2], system or reservoir operations, or special operational procedures into the WAM.

Yes

Existing and Strategy Supply

The following assumptions are also summarized in the table in Attachment A.

[2] Updating anticipated sedimentation rates does not require a hydrologic variance under 31 TAC § 357.10(14). The Technical Memorandum will require providing details regarding the sedimentation methodology utilized. Please consider providing that information with this request.

- All rights at and above Ivie/Brownwood are simulated prior to downstream rights, also referred to as "Region K Cutoff" (Yes for Region K Supply Evaluation Model and Region K Strategy Evaluation Model, No for Region K New Appropriation Model)
- Determine Firm Yield for Buchanan-Travis Reservoir System (Yes for Supply Analysis, No for Strategy Analysis)
- Use reservoir storage with adjustment for sedimentation projections by decade
- Include provisions of LCRA-STP 2006 Settlement Agreement
- Include operating rules for Lakes Buchanan and Travis to reflect combined Firm Yield operation
- Include any permits and amendments (as of 2023)
- Modify curtailment of Highland Lakes interruptible water as necessary to satisfy future LCRA Firm Municipal and Industrial Demands (Yes for Strategy Analysis, NA for Supply Analysis)
- Set LCRA lower basin irrigation demands equal to projected future demands by decade (Yes for Strategy Analysis, NA for Supply Analysis)
- Include LCRA Irrigation Return Flows to the Colorado River (Only when evaluating indirect use of these flows as a Strategy, No for Supply Analysis)
- Include Return Flows from Austin Wastewater Treatment Plants (Only when evaluating these flows as a Strategy, No for Supply Analysis)
- Include Other Municipal and Industrial Return Flows (Only when evaluating these flows as a Strategy, No for Supply Analysis)
- Include Reuse Provisions and Environmental Flow Requirements of LCRA-Austin 2007 Settlement Agreement (Only when evaluating the applicable flows as a Strategy, No for Supply Analysis)
- Correct the WAM input file for errors regarding the spatial location and assignment of net evaporation data for Twin Buttes Reservoir and Lake Nasworthy.
  -

The common assumption used for Supply and Strategy Evaluations is the Region K cutoff assumption. This assumption differs from Run 3 in that the order of simulation is changed to allow upper basin water rights to be simulated prior to the lower basin rights. This assumption is more conservation than Run 3.

9. Are you requesting to include return flows in the modeling? If yes, are you doing so to model an indirect reuse water management strategy (WMS)? Please provide complete details regarding the proposed methodology for determining reuse WMS availability.

Yes

Strategy Supply

Return flows are not used in evaluating supplies. Return flows are only included in the strategy evaluation modeling as a water management strategy.

10. Are any of the requested Hydrologic Variances also planned to be used by another region for the same basin? If yes, please indicate the other Region. Please indicate if unknown.

Yes

Many of these changes will be included in Region F.

11. Please describe any other variance requests not captured on this checklist or add any other information regarding the variance requests on this checklist.

Click or tap here to enter text.

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

January 10, 2024

David Van Dresar
Region K Chair
Lower Colorado (Region K) Regional Water Planning Group
5251 Mueller Road
La Grange, Texas 78945

Dear Chairman Van Dresar:

I have reviewed your request dated October 11, 2023, for approval of alternative water supply assumptions to be used in determining existing and future surface water availability. This letter confirms that the TWDB approves use of the Region K Cutoff Model . The following assumptions for the Cutoff Model that require a variance are approved:

1. Use the Region K Cutoff Model, which is TCEQ's Colorado Basin WAM modified to simulate all rights at and above Lake Ivie and Lake Brownwood prior to downstream rights for existing and strategy supply analysis.
2. Correct the WAM input file for errors regarding the spatial location and assignment of net evaporation data for Twin Buttes Reservoir and Lake Nasworthy for existing and strategy supplies.
3. Remove LCRA 2020 Water Management Plan interruptible water supply and environmental flow criteria for existing supply firm yield analysis. For existing supply firm yield evaluation, the environmental flow commitment will be replaced with a 34,440 acre-feet per year firm commitment from the calculated combined firm yield of Lakes Buchanan and Travis.
4. Include provisions of LCRA-South Texas Nuclear Project 2006 Settlement Agreement for existing and strategy supply analysis.
5. Add any permits and amendments not yet included in the Colorado WAM as of 2023 for existing and strategy supply analysis.
6. Modify curtailment of Highland Lakes interruptible water as necessary to satisfy future LCRA firm municipal and industrial demands for strategy supply analysis.
7. Set all Region K municipal and industrial water right demands at projected future demand amounts by decade for strategy supply analysis.
8. Set LCRA lower basin irrigation demands equal to projected future demands by decade for strategy supply analysis.
9. Include LCRA irrigation return flows to the Colorado River, return flows from Austin wastewater treatment plants, and other municipal and industrial return flows when evaluating indirect reuse of those flows as a strategy.

10. Include reuse provisions and environmental flow requirements of LCRA-Austin 2007 Settlement Agreement when evaluating reuse strategy supplies.

While the use of these modified conditions may be reasonable for planning purposes, WAM RUN3 would be utilized by the Texas Commission on Environmental Quality for analyzing permit applications. It is acceptable to use the modified conditions for WMS supply evaluations only if the yield produced is more conservative (less) for surface water appropriations than WAM RUN3.

While the TWDB authorizes these modification to evaluate existing and future water supplies for development of the 2026 Region K RWP, it is the responsibility of the RWPG to ensure that the resulting estimates of water availability are reasonable for drought planning purposes and will reflect conditions expected in the event of actual drought conditions; and in all other regards will be evaluated in accordance with the most recent version of regional water planning contract Exhibit C, *General Guidelines for Development of the 2026 Regional Water Plans.*

Please do not hesitate to contact Lann Bookout of our Regional Water Planning staff at 512-936-9439 or lann.bookout@twdb.texas.gov if you have any questions.

Sincerely,

Matt Nelson
Deputy Executive Administrator

c: Monica Masters, Lower Colorado River Authority
Teresa Lutes, City of Austin (Region K Water Modeling Committee Chair)
Neil Deeds, INTERA
Lann Bookout, Water Supply Planning
Sarah Lee, Water Supply Planning
Nelun Fernando, Ph.D., Surface Water
Lissa Gregg, Freese and Nichols, Inc (Region F Consultant)

Appendix 3.D

Hydrologic Model Table

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Model Name	Base Version Date	Directory	File Name(s)	Date	Comments
2030 Buchanan/Travis Yield	10/1/2023	Supplies\BuchananTravisYields	30BTFY	12/14/2023	Also used for LCRA and City of Austin run-of-river rights
2050 Buchanan/Travis Yield	10/1/2023	Supplies\BuchananTravisYields	50BTFY	12/14/2023	Also used for LCRA and City of Austin run-of-river rights
2080 Buchanan/Travis Yield	10/1/2023	Supplies\BuchananTravisYields	80BTFY	12/14/2023	Also used for LCRA and City of Austin run-of-river rights
2030 STNP yield	10/1/2023	Supplies\STNPYield	30STNPBUfy	12/18/2023	Includes backup from Buchanan/Travis
2050 STNP yield	10/1/2023	Supplies\STNPYield	50STNPBUfy	12/18/2023	Includes backup from Buchanan/Travis
2080 STNP yield	10/1/2023	Supplies\STNPYield	50STNPBUfy	12/18/2023	Includes backup from Buchanan/Travis
Brazos Basin run-of-river supplies	10/1/2023	Supplies\RunOfRiver\BrazosBasin	bwam3	1/3/2024	
Colorado Basin Bastrop County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Bastrop	11/17/2023	
Colorado Basin Blanco County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Blanco	11/16/2023	
Colorado Basin Burnet County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Burnet	11/16/2023	
Colorado Basin City of Llano yield	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	CityOfLlano	1/7/2024	Yield of City of Llano supplies
Colorado Basin Colorado County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Colorado	1/3/2024	
Colorado Basin Fayette County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Fayette	11/16/2023	
Colorado Basin Gillespie County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Gillespie	12/3/2023	
Colorado Basin Hays County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Hays	12/2/2023	
Colorado Basin Llano County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Llano	12/3/2023	
Colorado Basin Matagorda County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Matagorda	12/2/2023	
Colorado Basin Mills County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	Mills	12/3/2023	
Colorado Basin SanSaba County run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoBasin	San Saba	12/3/2023	
Colorado-Lavaca run-of-river supplies	10/1/2023	Supplies\RunOfRiver\ColoradoLavaca	Col-lav3	1/4/2024	
City of Blanco supplies	10/1/2023	Supplies\RunOfRiver\GSA	gsa_blanco	1/4/2024	City of Blanco supplies
Guadalupe Basin run-of-river supplies	10/1/2023	Supplies\RunOfRiver\GSA	gsa_run3	1/4/2024	
City of Corpus Christi Garwood supplies	10/1/2023	Supplies\CorpusChristi	C3CC	12/19/2023	No cutoff assumptions
City of Austin Decker Strategy	10/1/2023	WMS\AustinDecker	COADeckerWMSfni	1/27/2025	
Bastrop County OCR	6/9/2022	WMS\LCRANewStorage	BC_60K	12/26/2024	Firm yield of LCRA system including run-of-river
Fayette County OCR	6/9/2022	WMS\LCRANewStorage	Fay_48K	12/10/2024	Firm yield of LCRA system including run-of-river
Lower Basin OCR 48,000 ac-ft storage	6/9/2022	WMS\LCRANewStorage	LB_48K	12/11/2024	Firm yield of LCRA system including run-of-river
Lower Basin OCR 80,000 ac-ft storage	6/9/2022	WMS\LCRANewStorage	LB_80K	12/11/2024	Firm yield of LCRA system including run-of-river
Lake Bastrop as OCR	6/9/2022	WMS\LCRANewStorage	LkBasOnly	12/12/2024	Firm yield of LCRA system including run-of-river
No strategies for cumulative impacts, 2080 demands	10/1/2023	CumImpacts	NoStrat80	2/4/2025	Existing supplies with 2080 demands
All strategies cumulative impacts, 2080 demand	10/1/2023	CumImpacts	CI80	2/4/2025	Major new surface water strategies, including return flows

Appendix 4.A

DB27 Region K Water User Group (WUG) Needs or Surplus

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

DRAFT Region J Water User Group (WUG) Needs or Surplus

WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Needs/Surplus report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Surplus volumes are shown as positive values, and needs are shown as negative values in parentheses.

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
County-Other	Bandera	Guadalupe	19	19	18	18	18	18
Livestock	Bandera	Guadalupe	8	8	8	8	8	8
County-Other	Bandera	Nueces	176	174	172	169	167	165
Mining	Bandera	Nueces	0	0	0	0	0	0
Livestock	Bandera	Nueces	(20)	(20)	(20)	(20)	(20)	(20)
Irrigation	Bandera	Nueces	14	14	14	14	14	14
Bandera	Bandera	San Antonio	149	143	136	129	122	114
Bandera County FWSD 1	Bandera	San Antonio	97	91	84	76	69	62
County-Other	Bandera	San Antonio	2,967	2,939	2,901	2,862	2,822	2,781
Mining	Bandera	San Antonio	1	1	0	0	0	0
Livestock	Bandera	San Antonio	11	11	11	11	11	11
Irrigation	Bandera	San Antonio	(957)	(957)	(957)	(957)	(957)	(957)
Rocksprings	Edwards	Colorado	697	719	736	747	757	767
County-Other	Edwards	Colorado	21	24	27	28	29	31
Livestock	Edwards	Colorado	53	53	53	53	53	53
Irrigation	Edwards	Colorado	0	0	0	0	0	0
Rocksprings	Edwards	Nueces	(66)	(53)	(42)	(36)	(30)	(23)
County-Other	Edwards	Nueces	51	59	63	68	71	74
Mining	Edwards	Nueces	(8)	(8)	(8)	(8)	(8)	(8)
Livestock	Edwards	Nueces	(53)	(53)	(53)	(53)	(53)	(53)
Irrigation	Edwards	Nueces	75	75	75	75	75	75
County-Other	Edwards	Rio Grande	10	11	13	13	14	15
Livestock	Edwards	Rio Grande	34	34	34	34	34	34
Irrigation	Edwards	Rio Grande	(15)	(15)	(15)	(15)	(15)	(15)
County-Other	Kerr	Colorado	(79)	(83)	(86)	(91)	(96)	(101)
Livestock	Kerr	Colorado	(28)	(28)	(28)	(28)	(28)	(28)
Irrigation	Kerr	Colorado	(97)	(97)	(97)	(97)	(97)	(97)
Kerrville	Kerr	Guadalupe	(1,445)	(1,780)	(2,032)	(2,435)	(2,842)	(3,231)
Kerrville South Water	Kerr	Guadalupe	(70)	(88)	(103)	(126)	(150)	(173)
County-Other	Kerr	Guadalupe	2,324	2,192	2,088	1,925	1,759	1,601
Manufacturing	Kerr	Guadalupe	70	69	68	67	66	65
Mining	Kerr	Guadalupe	(75)	(75)	(75)	(75)	(75)	(75)

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

DRAFT Region J Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Livestock	Kerr	Guadalupe	15	15	15	15	15	15
Irrigation	Kerr	Guadalupe	682	682	671	655	655	655
County-Other	Kerr	Nueces	1	1	1	0	0	0
Livestock	Kerr	Nueces	0	0	0	0	0	0
County-Other	Kerr	San Antonio	28	26	25	23	21	19
Livestock	Kerr	San Antonio	(41)	(41)	(41)	(41)	(41)	(41)
Irrigation	Kerr	San Antonio	(3)	(3)	(3)	(3)	(3)	(3)
County-Other	Kinney	Nueces	3	3	3	3	3	4
Livestock	Kinney	Nueces	28	28	28	28	28	28
Irrigation	Kinney	Nueces	0	0	0	0	0	0
Brackettville	Kinney	Rio Grande	117	146	164	175	186	198
Fort Clark MUD	Kinney	Rio Grande	644	683	708	724	739	755
County-Other	Kinney	Rio Grande	69	73	75	77	78	78
Livestock	Kinney	Rio Grande	10	10	10	10	10	10
Irrigation	Kinney	Rio Grande	1,035	1,035	1,035	1,035	1,035	1,035
County-Other	Real	Colorado	6	6	7	7	7	8
Irrigation	Real	Colorado	3	3	3	3	3	3
Camp Wood	Real	Nueces	(147)	(124)	(106)	(92)	(78)	(64)
Leakey	Real	Nueces	434	456	473	487	500	515
County-Other	Real	Nueces	319	352	378	398	418	437
Manufacturing	Real	Nueces	(2)	(2)	(2)	(2)	(2)	(2)
Livestock	Real	Nueces	0	0	0	0	0	0
Irrigation	Real	Nueces	1,636	1,636	1,636	1,636	1,636	1,636
Del Rio Utilities Commission	Val Verde	Rio Grande	(5,516)	(5,524)	(5,556)	(5,587)	(5,618)	(5,649)
Laughlin Air Force Base	Val Verde	Rio Grande	111	113	113	113	113	113
County-Other	Val Verde	Rio Grande	592	568	537	526	514	502
Manufacturing	Val Verde	Rio Grande	0	0	0	0	0	0
Mining	Val Verde	Rio Grande	2	(6)	(15)	(23)	(30)	(38)
Livestock	Val Verde	Rio Grande	0	0	0	0	0	0
Irrigation	Val Verde	Rio Grande	143	143	143	143	143	143

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DRAFT Region K Water User Group (WUG) Needs or Surplus

WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Needs/Surplus report are calculated by first deducting the WUG split's projected demand from its total existing water supply volume. If the WUG split has a greater existing supply volume than projected demand in any given decade, this amount is considered a surplus volume. Surplus volumes are shown as positive values, and needs are shown as negative values in parentheses.

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Aqua WSC*	Bastrop	Brazos	0	0	0	0	0	0
Lee County WSC*	Bastrop	Brazos	110	133	159	179	196	199
County-Other	Bastrop	Brazos	35	34	32	28	17	0
Livestock	Bastrop	Brazos	0	0	0	0	0	0
Irrigation	Bastrop	Brazos	5	5	5	5	5	5
Aqua WSC*	Bastrop	Colorado	(3,446)	(6,815)	(10,744)	(15,214)	(20,273)	(26,002)
Bastrop	Bastrop	Colorado	29	54	82	33	47	62
Bastrop County WCID 2	Bastrop	Colorado	(9)	(117)	(248)	(397)	(565)	(756)
Creedmoor-Maha WSC*	Bastrop	Colorado	0	0	0	0	0	0
Elgin	Bastrop	Colorado	62	(690)	(1,362)	(2,002)	(2,256)	(2,256)
Fayette WSC*	Bastrop	Colorado	0	0	0	0	0	0
Lee County WSC*	Bastrop	Colorado	136	163	194	222	241	247
Polonia WSC*	Bastrop	Colorado	0	25	18	10	6	1
Smithville	Bastrop	Colorado	0	0	0	0	0	0
The Colony MUD 1A	Bastrop	Colorado	0	0	0	0	0	0
County-Other	Bastrop	Colorado	969	874	652	308	(625)	(2,056)
Manufacturing	Bastrop	Colorado	86	71	55	39	22	4
Mining	Bastrop	Colorado	112	33	0	0	0	0
Steam Electric Power	Bastrop	Colorado	0	0	0	0	0	0
Livestock	Bastrop	Colorado	39	39	39	39	39	39
Irrigation	Bastrop	Colorado	353	353	353	353	353	353
Aqua WSC*	Bastrop	Guadalupe	0	0	0	0	0	0
County-Other	Bastrop	Guadalupe	12	12	11	9	6	0
Livestock	Bastrop	Guadalupe	0	0	0	0	0	0
Irrigation	Bastrop	Guadalupe	170	170	170	170	170	170
Corix Utilities Texas Inc*	Blanco	Colorado	(32)	(33)	(33)	(34)	(34)	(35)
Johnson City	Blanco	Colorado	54	36	16	(6)	(29)	(54)
County-Other	Blanco	Colorado	0	5	26	46	69	95
Manufacturing	Blanco	Colorado	4	3	2	1	1	0
Mining	Blanco	Colorado	1	1	0	0	0	0

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DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Livestock	Blanco	Colorado	0	0	0	0	0	0
Irrigation	Blanco	Colorado	0	0	0	0	0	0
Blanco	Blanco	Guadalupe	329	328	332	336	340	345
Canyon Lake Water Service*	Blanco	Guadalupe	(40)	(40)	(41)	(41)	(41)	(41)
Rancho Del Lago	Blanco	Guadalupe	0	0	2	4	7	10
County-Other	Blanco	Guadalupe	2	5	20	36	53	72
Manufacturing	Blanco	Guadalupe	1	1	1	1	0	0
Livestock	Blanco	Guadalupe	67	67	67	67	67	67
Irrigation	Blanco	Guadalupe	0	0	0	0	0	0
Bertram	Burnet	Brazos	(578)	(899)	(1,178)	(1,500)	(1,861)	(2,269)
Corix Utilities Texas Inc*	Burnet	Brazos	(6)	(7)	(9)	(9)	(10)	(12)
Georgetown*	Burnet	Brazos	0	0	0	0	0	0
Kempner WSC*	Burnet	Brazos	37	53	69	87	103	109
County-Other	Burnet	Brazos	119	211	132	47	(47)	(160)
Mining	Burnet	Brazos	163	87	22	(40)	(94)	(141)
Livestock	Burnet	Brazos	85	85	85	85	85	85
Irrigation	Burnet	Brazos	1	1	1	1	1	1
Bertram	Burnet	Colorado	(50)	(65)	(78)	(92)	(109)	(128)
Burnet	Burnet	Colorado	509	421	341	258	163	54
Corix Utilities Texas Inc*	Burnet	Colorado	(141)	(212)	(274)	(341)	(420)	(508)
Cottonwood Shores	Burnet	Colorado	202	162	127	88	43	(7)
Granite Shoals	Burnet	Colorado	182	164	146	129	109	87
Horseshoe Bay	Burnet	Colorado	79	44	15	(22)	(63)	(110)
Kingsland WSC	Burnet	Colorado	40	19	(7)	(41)	(83)	(136)
Marble Falls	Burnet	Colorado	810	(173)	(175)	(177)	(178)	(181)
Meadowlakes	Burnet	Colorado	(385)	(433)	(474)	(519)	(569)	(589)
County-Other	Burnet	Colorado	1,194	1,389	1,222	1,039	836	596
Manufacturing	Burnet	Colorado	(129)	(135)	(141)	(147)	(153)	(160)
Mining	Burnet	Colorado	220	80	(37)	(150)	(249)	(334)
Livestock	Burnet	Colorado	1	1	1	1	1	1
Irrigation	Burnet	Colorado	640	640	640	640	640	640
Eagle Lake	Colorado	Brazos-Colorado	57	70	82	90	98	108
County-Other	Colorado	Brazos-Colorado	47	52	56	61	66	72

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DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Manufacturing	Colorado	Brazos-Colorado	13	13	12	12	12	12
Livestock	Colorado	Brazos-Colorado	0	0	0	0	0	0
Irrigation	Colorado	Brazos-Colorado	(16,243)	(14,929)	(13,652)	(12,409)	(11,200)	(10,024)
Columbus	Colorado	Colorado	501	487	477	474	474	478
Corix Utilities Texas Inc*	Colorado	Colorado	(21)	(16)	(11)	(7)	(3)	0
Eagle Lake	Colorado	Colorado	121	151	178	197	218	241
Weimar	Colorado	Colorado	58	62	66	69	73	78
County-Other	Colorado	Colorado	94	120	145	171	199	232
Manufacturing	Colorado	Colorado	21	17	13	9	5	0
Mining	Colorado	Colorado	625	541	421	320	222	135
Steam Electric Power	Colorado	Colorado	0	0	0	0	0	0
Livestock	Colorado	Colorado	301	301	301	301	301	301
Irrigation	Colorado	Colorado	(3,534)	(2,823)	(2,132)	(1,460)	(805)	(168)
Weimar	Colorado	Lavaca	95	103	111	120	129	139
County-Other	Colorado	Lavaca	208	216	224	232	242	253
Manufacturing	Colorado	Lavaca	96	78	60	40	20	0
Livestock	Colorado	Lavaca	121	121	121	121	121	121
Irrigation	Colorado	Lavaca	(32,632)	(30,280)	(27,990)	(25,762)	(23,595)	(21,486)
Fayette County WCID Monument Hill	Fayette	Colorado	100	102	105	106	106	107
Fayette WSC*	Fayette	Colorado	(52)	(82)	(74)	(125)	(183)	(201)
La Grange	Fayette	Colorado	0	19	36	40	44	49
Lee County WSC*	Fayette	Colorado	207	185	166	149	131	115
West End WSC*	Fayette	Colorado	0	0	0	0	0	0
County-Other	Fayette	Colorado	154	217	283	334	388	447
Manufacturing	Fayette	Colorado	70	70	70	70	70	70
Mining	Fayette	Colorado	0	0	0	0	0	586
Steam Electric Power	Fayette	Colorado	8,448	8,448	8,448	8,448	8,448	8,448
Livestock	Fayette	Colorado	347	347	347	347	347	347
Irrigation	Fayette	Colorado	19	19	19	19	19	19
Fayette WSC*	Fayette	Guadalupe	0	0	0	0	0	0
Flatonia	Fayette	Guadalupe	36	37	38	39	39	39
County-Other	Fayette	Guadalupe	4	7	9	10	12	14

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DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Livestock	Fayette	Guadalupe	40	40	40	40	40	40
Irrigation	Fayette	Guadalupe	4	4	4	4	4	4
Fayette WSC*	Fayette	Lavaca	0	0	0	0	0	0
Flatonia	Fayette	Lavaca	146	152	158	158	160	161
Schulenburg	Fayette	Lavaca	186	188	188	188	188	188
County-Other	Fayette	Lavaca	9	59	111	151	194	240
Manufacturing	Fayette	Lavaca	79	64	49	33	17	0
Mining	Fayette	Lavaca	0	0	0	0	0	346
Livestock	Fayette	Lavaca	10	10	10	10	10	10
Irrigation	Fayette	Lavaca	48	48	48	48	48	48
Fredericksburg	Gillespie	Colorado	464	402	330	236	127	0
County-Other	Gillespie	Colorado	(69)	(188)	(320)	(513)	(730)	(973)
Manufacturing	Gillespie	Colorado	(56)	(70)	(85)	(100)	(116)	(133)
Mining	Gillespie	Colorado	6	5	4	2	1	0
Livestock	Gillespie	Colorado	210	210	210	210	210	210
Irrigation	Gillespie	Colorado	(75)	(75)	(75)	(75)	(75)	(75)
County-Other	Gillespie	Guadalupe	19	14	9	2	(6)	(16)
Livestock	Gillespie	Guadalupe	0	0	0	0	0	0
Austin	Hays	Colorado	0	0	0	0	0	0
Buda	Hays	Colorado	1,238	(41)	(906)	(1,766)	(2,765)	(3,923)
Canyon Lake Water Service*	Hays	Colorado	(95)	(97)	(99)	(102)	(103)	(104)
Cimarron Park Water	Hays	Colorado	56	57	57	57	57	57
Dripping Springs WSC	Hays	Colorado	(551)	(1,793)	(3,603)	(4,689)	(4,689)	(4,689)
Goforth SUD*	Hays	Colorado	549	328	94	(133)	(186)	(250)
Hays	Hays	Colorado	22	(52)	(145)	(273)	(417)	(580)
Hays County WCID 1	Hays	Colorado	(86)	(84)	(84)	(84)	(84)	(84)
Hays County WCID 2	Hays	Colorado	(93)	(91)	(91)	(91)	(91)	(91)
Headwaters at Barton Creek	Hays	Colorado	0	0	0	0	0	0
La Ventana WSC	Hays	Colorado	0	1	1	1	1	1
Mid-Tex Utilities	Hays	Colorado	0	(171)	(240)	(334)	(440)	(560)
Reunion Ranch WCID	Hays	Colorado	35	(104)	(287)	(537)	(819)	(1,140)
Ruby Ranch WSC	Hays	Colorado	39	40	40	40	40	40

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DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
West Travis County Public Utility Agency	Hays	Colorado	(757)	(2,997)	(5,937)	(10,064)	(14,999)	(20,766)
County-Other*	Hays	Colorado	2,578	715	(2,271)	(7,520)	(14,312)	(21,991)
Manufacturing*	Hays	Colorado	36	29	22	15	8	0
Mining*	Hays	Colorado	(152)	(176)	(198)	(231)	(267)	(306)
Livestock*	Hays	Colorado	0	0	0	0	0	0
Irrigation*	Hays	Colorado	0	0	0	0	0	0
Corix Utilities Texas Inc*	Llano	Colorado	(260)	(277)	(290)	(304)	(321)	(340)
Horseshoe Bay	Llano	Colorado	506	427	380	229	59	(134)
Kingsland WSC	Llano	Colorado	334	216	76	(85)	(272)	(486)
Llano	Llano	Colorado	(675)	(684)	(697)	(696)	(696)	(696)
Sunrise Beach Village	Llano	Colorado	205	203	202	201	200	198
County-Other	Llano	Colorado	620	586	586	586	586	586
Manufacturing	Llano	Colorado	1	1	1	1	1	1
Mining	Llano	Colorado	(1,939)	25	29	21	13	4
Steam Electric Power	Llano	Colorado	0	0	0	0	0	0
Livestock	Llano	Colorado	123	123	123	123	123	123
Irrigation	Llano	Colorado	1,387	1,387	1,387	1,387	1,387	1,387
Bay City	Matagorda	Brazos-Colorado	357	371	364	360	356	354
Caney Creek MUD of Matagorda County	Matagorda	Brazos-Colorado	950	928	901	871	840	805
Corix Utilities Texas Inc*	Matagorda	Brazos-Colorado	(2)	(2)	1	5	8	15
Matagorda County WCID 6	Matagorda	Brazos-Colorado	19	23	27	31	36	42
Matagorda Waste Disposal & WSC	Matagorda	Brazos-Colorado	54	54	54	54	54	54
County-Other	Matagorda	Brazos-Colorado	128	184	247	321	403	493
Livestock	Matagorda	Brazos-Colorado	156	156	156	156	156	156
Irrigation	Matagorda	Brazos-Colorado	(64,414)	(62,405)	(60,450)	(58,548)	(56,697)	(54,896)
Bay City	Matagorda	Colorado	0	0	0	0	0	0

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	County	Basin	2030	2040	2050	2060	2070	2080
Corix Utilities Texas Inc*	Matagorda	Colorado	183	183	183	183	183	183
Matagorda Waste Disposal & WSC	Matagorda	Colorado	280	282	284	286	289	292
County-Other	Matagorda	Colorado	92	103	116	130	146	164
Manufacturing	Matagorda	Colorado	(1,300)	(1,573)	(1,856)	(2,150)	(2,454)	(2,770)
Livestock	Matagorda	Colorado	0	0	0	0	0	0
Irrigation	Matagorda	Colorado	(9,209)	(8,961)	(8,719)	(8,483)	(8,254)	(8,032)
Markham MUD	Matagorda	Colorado-Lavaca	47	50	53	56	59	63
Palacios	Matagorda	Colorado-Lavaca	0	18	37	59	84	113
Quadvest*	Matagorda	Colorado-Lavaca	0	0	0	0	0	0
County-Other	Matagorda	Colorado-Lavaca	188	239	299	366	442	527
Mining	Matagorda	Colorado-Lavaca	0	0	0	0	0	0
Steam Electric Power	Matagorda	Colorado-Lavaca	0	0	0	0	0	0
Livestock	Matagorda	Colorado-Lavaca	140	140	140	140	140	140
Irrigation	Matagorda	Colorado-Lavaca	(67,341)	(65,117)	(62,954)	(60,850)	(58,802)	(56,809)
Goldthwaite	Mills	Brazos	0	0	0	0	0	0
County-Other	Mills	Brazos	78	92	106	114	122	130
Mining	Mills	Brazos	(40)	(41)	(43)	(44)	(46)	(48)
Livestock	Mills	Brazos	10	10	10	10	10	10
Irrigation	Mills	Brazos	96	96	96	96	96	96
Corix Utilities Texas Inc*	Mills	Colorado	(55)	(54)	(53)	(52)	(48)	(43)
Goldthwaite	Mills	Colorado	(108)	(107)	(107)	(107)	(107)	(107)
County-Other	Mills	Colorado	9	31	54	67	81	94
Manufacturing	Mills	Colorado	0	0	0	0	0	0
Mining	Mills	Colorado	(64)	(66)	(68)	(72)	(74)	(78)
Livestock	Mills	Colorado	136	136	136	136	136	136
Irrigation	Mills	Colorado	(3,084)	(3,084)	(3,084)	(3,084)	(3,084)	(3,084)
Corix Utilities Texas Inc*	San Saba	Colorado	(10)	(10)	(9)	(8)	(8)	(7)
North San Saba WSC	San Saba	Colorado	69	77	84	88	93	99

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DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Richland SUD*	San Saba	Colorado	0	0	0	0	0	0
San Saba	San Saba	Colorado	217	219	219	219	219	219
County-Other	San Saba	Colorado	99	131	160	178	200	225
Manufacturing	San Saba	Colorado	5	4	3	2	1	0
Livestock	San Saba	Colorado	0	0	0	0	0	0
Irrigation	San Saba	Colorado	(1,300)	(1,300)	(1,300)	(1,300)	(1,300)	(1,300)
Aqua WSC*	Travis	Colorado	(101)	(182)	(296)	(374)	(468)	(579)
Austin	Travis	Colorado	98,045	63,208	21,327	(20,971)	(59,292)	(100,060)
Barton Creek West WSC	Travis	Colorado	10	0	0	0	0	0
Barton Creek WSC	Travis	Colorado	(76)	(106)	(133)	(161)	(193)	(228)
Briarcliff	Travis	Colorado	(76)	(181)	(274)	(366)	(470)	(588)
Canyon Lake Water Service*	Travis	Colorado	(94)	(96)	(99)	(102)	(103)	(104)
Cedar Park*	Travis	Colorado	(216)	(269)	(295)	(295)	(295)	(295)
Cottonwood Creek MUD 1	Travis	Colorado	0	0	0	0	0	0
Creedmoor-Maha WSC*	Travis	Colorado	53	0	0	0	0	0
Cypress Ranch WCID 1	Travis	Colorado	494	483	483	483	483	483
Elgin	Travis	Colorado	31	(466)	(1,054)	(1,675)	(1,886)	(1,886)
Garfield WSC	Travis	Colorado	97	89	81	72	62	51
Hornsby Bend Utility	Travis	Colorado	(15)	(249)	(461)	(670)	(907)	(1,177)
Hurst Creek MUD	Travis	Colorado	152	154	154	154	154	154
Jonestown WSC	Travis	Colorado	(111)	(279)	(484)	(729)	(1,023)	(1,376)
Kelly Lane WCID 1	Travis	Colorado	0	0	0	0	0	0
Kelly Lane WCID 2	Travis	Colorado	0	0	0	0	0	0
Lago Vista	Travis	Colorado	854	(1,084)	(3,522)	(5,853)	(6,397)	(6,941)
Lakeside MUD 3*	Travis	Colorado	0	0	0	0	0	0
Lakeside WCID 1	Travis	Colorado	0	0	0	0	0	0
Lakeside WCID 2-B	Travis	Colorado	0	0	0	0	0	0
Lakeside WCID 2-C	Travis	Colorado	0	0	0	0	0	0
Lakeside WCID 2-D	Travis	Colorado	0	0	0	0	0	0
Lakeway MUD	Travis	Colorado	410	324	287	287	287	287
Leander*	Travis	Colorado	(1,805)	(2,977)	(3,073)	(2,905)	(2,787)	(2,702)
Loop 360 WSC	Travis	Colorado	346	361	372	376	382	389
Manor	Travis	Colorado	(500)	(927)	(1,402)	(1,711)	(2,546)	(3,567)

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DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	County	Basin	2030	2040	2050	2060	2070	2080
Manville WSC*	Travis	Colorado	0	0	0	0	0	0
Mid-Tex Utilities	Travis	Colorado	0	(286)	(354)	(421)	(497)	(583)
North Austin MUD 1	Travis	Colorado	0	(95)	(95)	(95)	(95)	(95)
Northtown MUD	Travis	Colorado	0	(699)	(728)	(761)	(797)	(838)
Pflugerville	Travis	Colorado	977	96	1,062	(1,438)	(4,278)	(7,502)
Rollingwood	Travis	Colorado	0	(405)	(410)	(417)	(426)	(434)
Rough Hollow in Travis County	Travis	Colorado	0	2	2	2	2	2
Round Rock*	Travis	Colorado	0	(28)	(45)	(65)	(97)	(173)
Senna Hills MUD	Travis	Colorado	36	30	22	15	8	0
Shady Hollow MUD	Travis	Colorado	0	(595)	(607)	(621)	(637)	(654)
Sunset Valley	Travis	Colorado	40	(244)	(244)	(244)	(244)	(244)
Sweetwater Community	Travis	Colorado	201	0	0	0	0	0
Travis County MUD 10	Travis	Colorado	(5)	(41)	(72)	(103)	(137)	(176)
Travis County MUD 14	Travis	Colorado	0	0	0	0	0	0
Travis County MUD 18	Travis	Colorado	0	1	1	1	1	1
Travis County MUD 2	Travis	Colorado	(9)	(146)	(270)	(393)	(533)	(691)
Travis County MUD 4	Travis	Colorado	1,497	1,134	817	501	142	(264)
Travis County WCID 10	Travis	Colorado	169	(61)	(267)	(487)	(734)	(1,013)
Travis County WCID 17	Travis	Colorado	692	(2,024)	(4,401)	(6,753)	(9,423)	(12,453)
Travis County WCID 18	Travis	Colorado	494	498	498	498	498	498
Travis County WCID 19	Travis	Colorado	147	141	134	129	124	120
Travis County WCID 20	Travis	Colorado	(221)	(220)	(220)	(220)	(220)	(220)
Travis County WCID Point Venture	Travis	Colorado	(125)	(210)	(314)	(440)	(593)	(778)
Undine Development	Travis	Colorado	5	6	6	6	6	6
Wells Branch MUD	Travis	Colorado	0	(1,511)	(1,511)	(1,511)	(1,511)	(1,511)

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DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
West Travis County Public Utility Agency	Travis	Colorado	(1,190)	(4,162)	(6,966)	(9,806)	(12,772)	(15,967)
Wilbarger Creek MUD 1	Travis	Colorado	545	435	340	247	141	21
Williamson County WSID 3*	Travis	Colorado	(11)	(22)	(27)	(27)	(26)	(23)
Williamson Travis Counties MUD 1*	Travis	Colorado	53	53	52	51	50	50
Windermere Utility	Travis	Colorado	(638)	(674)	(674)	(674)	(674)	(674)
County-Other	Travis	Colorado	3,793	281	1,403	4,268	4,735	4,916
Manufacturing	Travis	Colorado	555	555	555	555	555	555
Mining	Travis	Colorado	686	615	561	515	465	407
Steam Electric Power	Travis	Colorado	0	0	0	0	0	0
Livestock	Travis	Colorado	117	117	117	117	117	117
Irrigation	Travis	Colorado	919	919	919	919	919	919
Creedmoor-Maha WSC*	Travis	Guadalupe	0	0	0	0	0	0
Goforth SUD*	Travis	Guadalupe	56	32	8	(10)	(12)	(15)
County-Other	Travis	Guadalupe	99	95	97	100	101	101
Livestock	Travis	Guadalupe	10	10	10	10	10	10
Boling MWD	Wharton	Brazos-Colorado	81	82	94	104	114	126
Wharton	Wharton	Brazos-Colorado	96	79	96	106	120	139
Wharton County WCID 2	Wharton	Brazos-Colorado	0	3	20	35	51	70
County-Other*	Wharton	Brazos-Colorado	13	25	18	20	25	29
Manufacturing*	Wharton	Brazos-Colorado	15	12	9	6	3	0
Steam Electric Power*	Wharton	Brazos-Colorado	0	0	0	0	0	0
Livestock*	Wharton	Brazos-Colorado	13	13	13	13	13	13
Irrigation*	Wharton	Brazos-Colorado	(79,721)	(75,908)	(72,199)	(68,590)	(65,078)	(61,662)
El Campo*	Wharton	Colorado	0	1	5	9	13	18
Wharton	Wharton	Colorado	0	5	22	39	58	79
County-Other*	Wharton	Colorado	164	169	165	167	168	171

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DRAFT Region K Water User Group (WUG) Needs or Surplus

			Water Supply Needs or Surplus (acre-feet per year)					
WUG Name	**County**	**Basin**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
Mining	Wharton	Colorado	25	25	25	25	25	25
Steam Electric Power*	Wharton	Colorado	0	0	0	0	0	0
Livestock*	Wharton	Colorado	59	59	59	59	59	59
Irrigation*	Wharton	Colorado	(24,664)	(23,043)	(21,466)	(19,931)	(18,437)	(16,984)
County-Other*	Wharton	Colorado-Lavaca	72	73	72	73	73	74
Livestock*	Wharton	Colorado-Lavaca	101	101	101	101	101	101
Irrigation*	Wharton	Colorado-Lavaca	7,996	8,275	8,547	8,812	9,069	9,320
County-Other*	Wharton	Lavaca	0	0	0	0	0	0
Austin	Williamson	Brazos	0	0	0	0	0	0
Brushy Creek MUD*	Williamson	Brazos	(17)	(17)	(18)	(18)	(18)	(19)
Fern Bluff MUD*	Williamson	Brazos	0	0	0	0	0	0
North Austin MUD 1	Williamson	Brazos	0	(884)	(884)	(884)	(884)	(884)
Wells Branch MUD	Williamson	Brazos	0	(51)	(70)	(74)	(74)	(74)
County-Other*	Williamson	Brazos	6	6	6	6	6	6
Manufacturing*	Williamson	Brazos	1	0	0	0	0	0
Mining*	Williamson	Brazos	(795)	(1,074)	(1,393)	(1,781)	(2,165)	(2,521)
Livestock*	Williamson	Brazos	0	0	0	0	0	0

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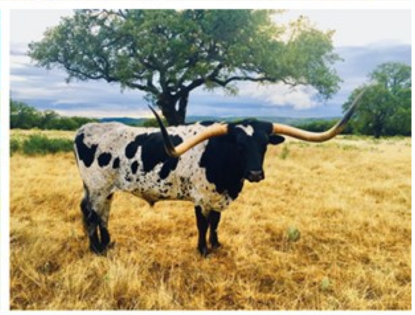
Appendix 4.B

DB27 WUG Second-Tier Identified Water Needs and Summary Report









Appendix 4.B

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

Second-tier needs are WUG split needs adjusted to include the implementation of recommended conservation and direct reuse water management strategies.

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Bastrop County WUG Total	**2,536**	**3,540**	**6,844**	**10,839**	**14,782**	**19,720**
Bastrop County / Brazos Basin WUG	**0**	**0**	**0**	**0**	**0**	**0**
Aqua WSC*	0	0	0	0	0	0
Lee County WSC*	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Bastrop County / Colorado Basin WUG	**2,536**	**3,540**	**6,844**	**10,839**	**14,782**	**19,720**
Aqua WSC*	2,532	2,887	5,493	8,830	12,464	16,440
Bastrop	0	0	0	0	0	0
Bastrop County WCID 2	4	105	233	380	544	731
Creedmoor-Maha WSC*	0	0	0	0	0	0
Elgin	0	548	1,118	1,629	1,774	1,694
Fayette WSC*	0	0	0	0	0	0
Lee County WSC*	0	0	0	0	0	0
Polonia WSC*	0	0	0	0	0	0
Smithville	0	0	0	0	0	0
The Colony MUD 1A	0	0	0	0	0	0
County-Other	0	0	0	0	0	855
Manufacturing	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Steam Electric Power	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0

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DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Bastrop County / Guadalupe Basin WUG	**0**	**0**	**0**	**0**	**0**	**0**
Aqua WSC*	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Blanco County WUG Total	**71**	**70**	**71**	**72**	**73**	**74**
Blanco County / Colorado Basin WUG	**31**	**30**	**30**	**31**	**32**	**33**
Corix Utilities Texas Inc*	31	30	30	31	32	33
Johnson City	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Blanco County / Guadalupe Basin WUG	**40**	**40**	**41**	**41**	**41**	**41**
Blanco	0	0	0	0	0	0
Canyon Lake Water Service*	40	40	41	41	41	41
Rancho Del Lago	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Burnet County WUG Total	**929**	**1,067**	**1,247**	**1,570**	**1,982**	**2,388**
Burnet County / Brazos Basin WUG	**378**	**528**	**615**	**740**	**941**	**1,146**
Bertram	373	522	607	692	838	994
Corix Utilities Texas Inc*	5	6	8	8	9	11

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DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Burnet County / Brazos Basin WUG	**378**	**528**	**615**	**740**	**941**	**1,146**
Georgetown*	0	0	0	0	0	0
Kempner WSC*	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Mining	0	0	0	40	94	141
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Burnet County / Colorado Basin WUG	**551**	**539**	**632**	**830**	**1,041**	**1,242**
Bertram	41	49	55	58	66	74
Burnet	0	0	0	0	0	0
Corix Utilities Texas Inc*	114	151	211	273	347	430
Cottonwood Shores	0	0	0	0	0	0
Granite Shoals	0	0	0	0	0	0
Horseshoe Bay	0	0	0	0	0	0
Kingsland WSC	0	0	3	34	73	121
Marble Falls	0	0	0	0	0	0
Meadowlakes	267	204	185	168	153	123
County-Other	0	0	0	0	0	0
Manufacturing	129	135	141	147	153	160
Mining	0	0	37	150	249	334
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Colorado County WUG Total	**46,386**	**31,921**	**27,658**	**23,511**	**19,746**	**16,460**
Colorado County / Brazos-Colorado Basin WUG	**13,629**	**7,953**	**6,676**	**5,433**	**4,224**	**3,048**
Eagle Lake	0	0	0	0	0	0
County-Other	0	0	0	0	0	0

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DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Colorado County / Brazos-Colorado Basin WUG	**13,629**	**7,953**	**6,676**	**5,433**	**4,224**	**3,048**
Manufacturing	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	13,629	7,953	6,676	5,433	4,224	3,048
Colorado County / Colorado Basin WUG	**3,150**	**1,762**	**1,066**	**390**	**1**	**0**
Columbus	0	0	0	0	0	0
Corix Utilities Texas Inc*	19	13	8	4	1	0
Eagle Lake	0	0	0	0	0	0
Weimar	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Steam Electric Power	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	3,131	1,749	1,058	386	0	0
Colorado County / Lavaca Basin WUG	**29,607**	**22,206**	**19,916**	**17,688**	**15,521**	**13,412**
Weimar	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	29,607	22,206	19,916	17,688	15,521	13,412
Fayette County WUG Total	**0**	**0**	**0**	**0**	**0**	**0**
Fayette County / Colorado Basin WUG	**0**	**0**	**0**	**0**	**0**	**0**
Fayette County WCID Monument Hill	0	0	0	0	0	0
Fayette WSC*	0	0	0	0	0	0

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DRAFT Region K Water User Group (WUG)
Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Fayette County / Colorado Basin WUG	**0**	**0**	**0**	**0**	**0**	**0**
La Grange	0	0	0	0	0	0
Lee County WSC*	0	0	0	0	0	0
West End WSC*	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Steam Electric Power	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Fayette County / Guadalupe Basin WUG	**0**	**0**	**0**	**0**	**0**	**0**
Fayette WSC*	0	0	0	0	0	0
Flatonia	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Fayette County / Lavaca Basin WUG	**0**	**0**	**0**	**0**	**0**	**0**
Fayette WSC*	0	0	0	0	0	0
Flatonia	0	0	0	0	0	0
Schulenburg	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Gillespie County WUG Total	**75**	**186**	**308**	**485**	**683**	**910**
Gillespie County / Colorado Basin WUG	**75**	**186**	**308**	**485**	**683**	**902**
Fredericksburg	0	0	0	0	0	0
County-Other	19	116	223	385	567	769
Manufacturing	56	70	85	100	116	133
Mining	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Gillespie County / Guadalupe Basin WUG	**0**	**0**	**0**	**0**	**0**	**8**
County-Other	0	0	0	0	0	8
Livestock	0	0	0	0	0	0
Hays County WUG Total	**247**	**659**	**3,839**	**9,588**	**17,120**	**25,958**
Hays County / Colorado Basin WUG	**247**	**659**	**3,839**	**9,588**	**17,120**	**25,958**
Austin	0	0	0	0	0	0
Buda	0	0	0	0	0	0
Canyon Lake Water Service*	95	97	99	102	103	104
Cimarron Park Water	0	0	0	0	0	0
Dripping Springs WSC	0	195	1,431	1,970	1,766	1,636
Goforth SUD*	0	0	0	133	186	250
Hays	0	30	106	209	320	441
Hays County WCID 1	0	0	0	0	0	0
Hays County WCID 2	0	0	0	0	0	0
Headwaters at Barton Creek	0	0	0	0	0	0
La Ventana WSC	0	0	0	0	0	0
Mid-Tex Utilities	0	161	221	307	404	514
Reunion Ranch WCID	0	0	57	163	293	430

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DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Hays County / Colorado Basin WUG	**247**	**659**	**3,839**	**9,588**	**17,120**	**25,958**
Ruby Ranch WSC	0	0	0	0	0	0
West Travis County Public Utility Agency	0	0	0	0	1,255	3,023
County-Other*	0	0	1,727	6,473	12,526	19,254
Manufacturing*	0	0	0	0	0	0
Mining*	152	176	198	231	267	306
Livestock*	0	0	0	0	0	0
Irrigation*	0	0	0	0	0	0
Llano County WUG Total	**2,730**	**735**	**699**	**695**	**852**	**1,036**
Llano County / Colorado Basin WUG	**2,730**	**735**	**699**	**695**	**852**	**1,036**
Corix Utilities Texas Inc*	244	245	258	272	288	307
Horseshoe Bay	0	0	0	0	0	0
Kingsland WSC	0	0	0	37	202	391
Llano	547	490	441	386	362	338
Sunrise Beach Village	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Mining	1,939	0	0	0	0	0
Steam Electric Power	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Matagorda County WUG Total	**136,591**	**128,038**	**123,961**	**120,013**	**116,189**	**112,489**
Matagorda County / Brazos-Colorado Basin WUG	**61,809**	**57,805**	**55,850**	**53,948**	**52,097**	**50,296**
Bay City	0	0	0	0	0	0
Caney Creek MUD of Matagorda County	0	0	0	0	0	0
Corix Utilities Texas Inc*	0	0	0	0	0	0

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Matagorda County / Brazos-Colorado Basin WUG	**61,809**	**57,805**	**55,850**	**53,948**	**52,097**	**50,296**
Matagorda County WCID 6	0	0	0	0	0	0
Matagorda Waste Disposal & WSC	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	61,809	57,805	55,850	53,948	52,097	50,296
Matagorda County / Colorado Basin WUG	**10,124**	**9,854**	**9,895**	**9,953**	**10,028**	**10,122**
Bay City	0	0	0	0	0	0
Corix Utilities Texas Inc*	0	0	0	0	0	0
Matagorda Waste Disposal & WSC	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	1,300	1,573	1,856	2,150	2,454	2,770
Livestock	0	0	0	0	0	0
Irrigation	8,824	8,281	8,039	7,803	7,574	7,352
Matagorda County / Colorado-Lavaca Basin WUG	**64,658**	**60,379**	**58,216**	**56,112**	**54,064**	**52,071**
Markham MUD	0	0	0	0	0	0
Palacios	0	0	0	0	0	0
Quadvest*	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Steam Electric Power	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	64,658	60,379	58,216	56,112	54,064	52,071

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Mills County WUG Total	**2,766**	**2,765**	**2,768**	**2,773**	**2,773**	**2,775**
Mills County / Brazos Basin WUG	**40**	**41**	**43**	**44**	**46**	**48**
Goldthwaite	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Mining	40	41	43	44	46	48
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Mills County / Colorado Basin WUG	**2,726**	**2,724**	**2,725**	**2,729**	**2,727**	**2,727**
Corix Utilities Texas Inc*	52	48	47	47	43	39
Goldthwaite	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Mining	64	66	68	72	74	78
Livestock	0	0	0	0	0	0
Irrigation	2,610	2,610	2,610	2,610	2,610	2,610
San Saba County WUG Total	**478**	**478**	**477**	**476**	**476**	**475**
San Saba County / Colorado Basin WUG	**478**	**478**	**477**	**476**	**476**	**475**
Corix Utilities Texas Inc*	9	9	8	7	7	6
North San Saba WSC	0	0	0	0	0	0
Richland SUD*	0	0	0	0	0	0
San Saba	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	469	469	469	469	469	469

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Travis County WUG Total	**2,482**	**7,906**	**9,270**	**10,934**	**13,155**	**40,543**
Travis County / Colorado Basin WUG	**2,482**	**7,906**	**9,270**	**10,924**	**13,143**	**40,528**
Aqua WSC*	0	1	3	3	5	5
Austin	0	0	0	0	0	23,080
Barton Creek West WSC	0	0	0	0	0	0
Barton Creek WSC	0	0	0	0	0	0
Briarcliff	52	124	194	258	329	407
Canyon Lake Water Service*	94	96	99	102	103	104
Cedar Park*	42	0	0	0	0	0
Cottonwood Creek MUD 1	0	0	0	0	0	0
Creedmoor-Maha WSC*	0	0	0	0	0	0
Cypress Ranch WCID 1	0	0	0	0	0	0
Elgin	0	371	865	1,364	1,483	1,417
Garfield WSC	0	0	0	0	0	0
Hornsby Bend Utility	10	243	454	662	898	1,166
Hurst Creek MUD	0	0	0	0	0	0
Jonestown WSC	26	132	256	397	590	817
Kelly Lane WCID 1	0	0	0	0	0	0
Kelly Lane WCID 2	0	0	0	0	0	0
Lago Vista	0	0	245	997	878	859
Lakeside MUD 3*	0	0	0	0	0	0
Lakeside WCID 1	0	0	0	0	0	0
Lakeside WCID 2-B	0	0	0	0	0	0
Lakeside WCID 2-C	0	0	0	0	0	0
Lakeside WCID 2-D	0	0	0	0	0	0
Lakeway MUD	0	0	0	0	0	0

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DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Travis County / Colorado Basin WUG	**2,482**	**7,906**	**9,270**	**10,924**	**13,143**	**40,528**
Leander*	1,805	2,977	3,073	2,905	2,787	2,702
Loop 360 WSC	0	0	0	0	0	0
Manor	0	0	0	0	515	1,192
Manville WSC*	0	0	0	0	0	0
Mid-Tex Utilities	0	268	325	387	457	536
North Austin MUD 1	0	94	93	92	91	90
Northtown MUD	0	696	724	757	793	834
Pflugerville	0	0	0	0	0	1,623
Rollingwood	0	298	272	250	232	224
Rough Hollow in Travis County	0	0	0	0	0	0
Round Rock*	0	28	45	65	97	173
Senna Hills MUD	0	0	0	0	0	0
Shady Hollow MUD	0	485	471	458	458	459
Sunset Valley	0	148	113	99	85	73
Sweetwater Community	0	0	0	0	0	0
Travis County MUD 10	0	15	28	44	60	77
Travis County MUD 14	0	0	0	0	0	0
Travis County MUD 18	0	0	0	0	0	0
Travis County MUD 2	0	112	211	303	420	550
Travis County MUD 4	0	0	0	0	0	0
Travis County WCID 10	0	0	0	0	0	0
Travis County WCID 17	0	0	0	0	0	0
Travis County WCID 18	0	0	0	0	0	0
Travis County WCID 19	0	0	0	0	0	0
Travis County WCID 20	82	0	0	0	0	0

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DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Travis County / Colorado Basin WUG	**2,482**	**7,906**	**9,270**	**10,924**	**13,143**	**40,528**
Travis County WCID Point Venture	48	79	113	150	217	293
Undine Development	0	0	0	0	0	0
Wells Branch MUD	0	1,503	1,503	1,503	1,503	1,503
West Travis County Public Utility Agency	0	0	0	0	1,069	2,326
Wilbarger Creek MUD 1	0	0	0	0	0	0
Williamson County WSID 3*	4	9	14	16	17	16
Williamson Travis Counties MUD 1*	0	0	0	0	0	0
Windermere Utility	319	227	169	112	56	2
County-Other	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Steam Electric Power	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Travis County / Guadalupe Basin WUG	**0**	**0**	**0**	**10**	**12**	**15**
Creedmoor-Maha WSC*	0	0	0	0	0	0
Goforth SUD*	0	0	0	10	12	15
County-Other	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
Wharton County WUG Total	**102,037**	**94,904**	**89,618**	**84,474**	**79,468**	**74,599**
Wharton County / Brazos-Colorado Basin WUG	**77,926**	**72,815**	**69,106**	**65,497**	**61,985**	**58,569**
Boling MWD	0	0	0	0	0	0
Wharton	0	0	0	0	0	0
Wharton County WCID 2	0	0	0	0	0	0
County-Other*	0	0	0	0	0	0

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DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Wharton County / Brazos-Colorado Basin WUG	**77,926**	**72,815**	**69,106**	**65,497**	**61,985**	**58,569**
Manufacturing*	0	0	0	0	0	0
Steam Electric Power*	0	0	0	0	0	0
Livestock*	0	0	0	0	0	0
Irrigation*	77,926	72,815	69,106	65,497	61,985	58,569
Wharton County / Colorado Basin WUG	**24,111**	**22,089**	**20,512**	**18,977**	**17,483**	**16,030**
El Campo*	0	0	0	0	0	0
Wharton	0	0	0	0	0	0
County-Other*	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Steam Electric Power*	0	0	0	0	0	0
Livestock*	0	0	0	0	0	0
Irrigation*	24,111	22,089	20,512	18,977	17,483	16,030
Wharton County / Colorado-Lavaca Basin WUG	**0**	**0**	**0**	**0**	**0**	**0**
County-Other*	0	0	0	0	0	0
Livestock*	0	0	0	0	0	0
Irrigation*	0	0	0	0	0	0
Wharton County / Lavaca Basin WUG	**0**	**0**	**0**	**0**	**0**	**0**
County-Other*	0	0	0	0	0	0
Williamson County WUG Total	**808**	**1,997**	**2,324**	**2,708**	**3,084**	**3,432**
Williamson County / Brazos Basin WUG	**808**	**1,997**	**2,324**	**2,708**	**3,084**	**3,432**
Austin	0	0	0	0	0	0
Brushy Creek MUD*	13	7	5	5	5	6
Fern Bluff MUD*	0	0	0	0	0	0
North Austin MUD 1	0	865	856	848	840	831

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DRAFT Region K Water User Group (WUG) Second-Tier Identified Water Needs

	WUG Second-Tier Needs (acre-feet per year)					
	2030	2040	2050	2060	2070	2080
Williamson County / Brazos Basin WUG	**808**	**1,997**	**2,324**	**2,708**	**3,084**	**3,432**
Wells Branch MUD	0	51	70	74	74	74
County-Other*	0	0	0	0	0	0
Manufacturing*	0	0	0	0	0	0
Mining*	795	1,074	1,393	1,781	2,165	2,521
Livestock*	0	0	0	0	0	0
Region K Second-Tier Needs Total	**298,136**	**274,266**	**269,084**	**268,138**	**270,383**	**300,859**

*A single asterisk next to a WUG's name denotes that the WUG is split by two or more planning regions.

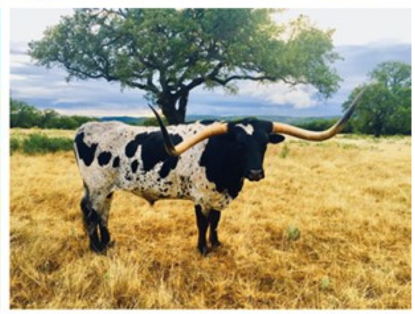
Appendix 5.A

Water Management Strategy Committee Meeting Minutes









2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

AGENDA
Lower Colorado Regional Water Planning Group
Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300,
Conference Room "Capital of Texas", Austin, Texas 78759

March 29, 2024, 1:00 p.m.

Attendance

Committee Members:

Lauri Gillam, Small Municipalities
Teresa Lutes, Municipalities
David Lindsay, Recreation
Mike Reagor, Small Municipalities
Christianne Castleberry, Water Utilities
Carol Olewin, Public Interest

Other attendees:

Emily Rafferty, City of Austin
Lann Bookout, TWDB
Andy Weir, Simsboro Aquifer Water Defense Fund
Sue Thornton, alternate for Recreation
Leonard Oliver, LCRA
Robert Adams, Plummer
Helen Gerlach, Austin Water
Cindy Smiley, CTWC
Adam Conner, FNI
Neil Deeds, INTERA

Committee Meeting:

1. **Call to order – Chair Lauri Gillam**

Call to order at 1:00p

2. **Welcome and introductions – Lauri Gillam**

3. **Receive public comments on specific issues related to agenda items 4 through 6 – limited to 3 minutes per person**

Andy Weir, Simsboro Aquifer Water Defense Fund
Andy spoke to item number 6. Looking at modeled available groundwater. He noted that much of the available groundwater spoken for, particularly in GMA-12, and that Bastrop and Fayette Counties were Region K counties in GMA-12. He noted that the current MAG runs have future projects already accounted for.

Question from committee: These numbers should not be considered available? Andy: The current MAG runs already have the future planned projects in them.

Question from committee: Is it true that there is a project that consists of moving groundwater from CZWX aquifer from Robertson County to Georgetown? Andy: correct.

Question from committee: How much water is actually in these aquifers? Andy: This is a question to take back to GMA-12. Strategies should be checked against the existing MAG run, and determine if they are already accounted for. Noted the offsets between the groundwater planning and regional planning. Proposed that there may be a disconnect between those two processes.

4. Review and approve minutes from previous meetings

Theresa Lutes moved to approve the previous minutes, Carol Olewin seconded. **Motion passed by voice vote.**

5. Overview and discussion of potential conservation strategies

Robert Adams led the discussion of this item using the agenda materials.

1. Water conservation is applied as the first water management strategy. The objective is to increase the reduction in GPCD after the initial reduction.

2. One of the elements that is part of conservation plans is that utilities must look at water loss. This includes audits and evaluation of the system. In this planning cycle, we must evaluate water loss as a requirement for each strategy we consider.

   TWDB representative Lann Bookout noted that as you evaluate a strategy for an entity, you would look at their water conservation plan, that includes water loss auditing, etc. Robert added that, for example, if we have a strategy for a new pipeline, we must consider a water loss component.

   The committee had some general discussion about various types of water losses, including purging and filter backwashing. One committee member asked about the enforceability of drought conservation plans, including LCRAs. Robert noted that new construction falls under adopted building codes. Additional discussion occurred about water saving measures, such as hot water circulation.

   Robert also noted that water loss is distinct from conservation, and may be a requirement as part of the process of obtaining loans for utility expansion.

3. General discussion of non-municipal conservation. Robert noted that this can be more difficult to assess, since irrigation, manuracturing, mining, power do not have to submit conservation plans. Some types of projects, such as upgrades to irrigation canal systems, have reduced infiltration water loss to nearly zero.

4. Robert talked about requirements for submitting conservation plans. He noted that the consultants will make sure we have picked up all the WUGs that meet the criteria. Plan is not considered final until all WUGs submit a copy to the region. Consultants will follow up as necessary.

6. Overview and discussion of potential expansion of local groundwater strategies

Neil Deeds led this discussion and went through the slides. He discussed how groundwater availability is determined for the planning process, and presented materials showing how much of the groundwater is accounted for with existing demands, and what future surpluses are available.

General discussion of potential needs be met by local groundwater strategies. Neil indicated that there were several examples of non-municipal WUG needs that may be met by local groundwater supplies, as well as some planned expansion of wellfields for municipal WUGs.

7. Discussion of any WUG-specific strategies identified to date

Lann Bookout noted that the TWDB refer strategies to committee as needed, e.g. the Rock Creek apartment complex.

General discussion occurred about risk management with respect to drought. Adam Connor noted that from a TWDB perspective, we're a water planning group, but we are required to consider the flood plans, i.e. identify any project for flood control that could generate supply.

Finally, David Lindsay discussed the limitations of a drought monitor as metric for municipal drought triggers. He noted that the drought monitor was designed more to look at agricultural needs, and there can be a perception that we are better off due to the drought monitor, whereas the water supply situation doesn't necessarily match.

8. Next meeting date

The next meeting date was set to Thursday, May 23, at 10a

9. Future agenda items – to be determined

Consultant team noted that scope for additional WMS development would be included in some future meeting.

10. General public comments – limited to 3 minutes per person

None.

11. Adjournment

Meeting adjourned at 2:27p.

Minutes
Lower Colorado Regional Water Planning Group
Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300,
Conference Room ″Capital of Texas″, Austin, Texas 78759

June 18, 2024, 1:00 p.m.

Attendance

Committee Members:

Lauri Gillam, Small Municipalities
Teresa Lutes, Municipalities
Mike Reagor, Small Municipalities
Christianne Castleberry, Water Utilities
Sue Thornton, Recreation
Carol Olewin, Public Interest
Barbara Johnson, Industry
Daniel Berglund, Small Business
Tom Hegemeir, LCRA
Jennifer Walker, Environmental

Other attendees:

Earl Foster, alt to Lauri Gillam
Rob Ruggiero, Small Business
Lann Bookout, TWDB
Leonard Oliver, LCRA
Robert Adams, Plummer
Helen Gerlach, Austin Water
Adam Conner, FNI
Neil Deeds, INTERA
Darrell Peckham
Mia Mason, FNI
Jasyn Twine, FNI
Tom Entsminger, NWF
Emily O'Leary, Aqua WSC
Dacy Cameron, Aqua WSC
Vanessa Chapman, TPWD
Stacy Panday, LCRA

Committee Meeting:

1. **Call to order – Chair Lauri Gillam**

2. **Welcome and introductions – Lauri Gillam**

3. **Receive public comments on specific issues related to agenda items 4 through 5 – limited to 3 minutes per person**

Sue Thornton brought forward comments from Andrew Weir regarding agenda item number 4. He reiterated that the modeled available groundwater (MAG) is already permitted, meaning the water is "spoken for." He expressed concern about the expanded use of the Carrizo-Wilcox.

Despite the comments above, he felt two new water management strategies (WMSs) can be accommodated:

Aqua purchase of 5,000 AF, which may already be included in the MAG.
Manville WSC, expanded local use with a new groundwater permit that LPGCD feels can be accommodated.

4. Explanation of how groundwater availability is determined and why it may increase through time – Neil Deeds, INTERA

Neil Deeds led the discussion of how desired future conditions (DFCs) are used along with groundwater availability models (GAMs) to determine the modeled available groundwater (MAG) which defines available groundwater for planning purposes. Because the members of GMA-12 attempted to anticipate the timing and magnitude of future pumping when constructing the MAG runs, the pumping (and MAG) increases through time for the Carrizo-Wilcox.

One of the major discussion points was whether the MAG represents "all the water available". The MAG is not "all of the water available", but rather the amount of water that can be produced while meeting the DFC, which is set by the GMA as an average amount of drawdown that occurs in an aquifer an political subdivision.

Additional discussion occurred on aquifer storage recover (ASR) as a strategy. One question was whether ASR was accounted for in the DFC. Neil said that it was generally not considered because it would be considered to have a "net zero" long-term effect on water levels, since the same amount or more water is added to the aquifer than is produced.

The potential advantages of ASR and considerations for its implementation where discussed in the context of Austin Water's ASR strategy. Committee members noted the popularity of ASR as a strategy statewide. It was noted that ASR can be an expensive strategy, but also that all new strategies are expensive in the current environment, and these kind of innovative technologies must be considered in the context of drought and droughts worse than the drought of record.

5. Water Conservation and Drought Contingency status – Robert Adams, Plummer

Robert led the discussion on conservation. The initial discussion of the slides focused on the various sources of information and tools that water providers had available to them from the TWDB and other sources. He noted that we needed to be careful to distinguish between the "baked in" decrease in GPCPD that is assumed by the TWDB as part of the process and the advanced conservation strategies that will be considered in the committee.

Robert provided an overview of the TWDB tool that was linked in the presentation, discussion trends in GPCPD with the number of connections. He used Austin Water as an example of what information is available from the tool, including the planned GPCPD in the future and other key metrics.

One committee member noted that for this round of planning, water loss reduction is a separate strategy, so TWDB will track how much supply will come from addressing water loss, and how much from conservation.

There was general discussion about whether the savings from conservation may have a lower limit. Jennifer Walker discussed her role in the Texas Water Conservation Advisory Council and how they provide guidance to the planning groups to help inform water loss, drought, and conservation strategies.

Robert presented a tally of which WUGs had provided a conservation plan and drought plan. Some additional discussion occurred on what the impacts of not submitting plans might be for WUGs.

Chair Gillam recommend that we show the TWDB tool real-time in the next meeting.

6. Update on Water Management Strategy Survey – Adam Conner, FNI

Adam led discussion of survey results.

One committee member commented on several entities not implementing a water loss program. Robert noted that while a supplier might not perform formal audits, if they are complying with state rules they still may be “doing the steps” that generally conform to an audit..

7. Initial discussion of key surface water management strategies proposed for the 2026 plan – John Albright, FNI

Adam Connor (AC) led the discussion, defining surface water strategies as those requiring some Water Availability Model (WAM) modeling. Jon Albright explained that there are two levels of modeling performed when evaluating the strategies: modeling is used to evaluate individual strategies, and then all strategies are pooled together for a comprehensive evaluation. Adam noted the use of two different models in the planning process: one WAM for existing supplies and another for the strategies (WMS model).

Both LCRA and Austin Water are currently working with the consulting team to modify and potentially add additional strategies to the list provided from the previous cycle.

8. Next meeting date – to be determined

The next meeting will be scheduled for soon after the planning meeting (July 10). Neil will send out a scheduling poll, starting the week of July 15th.

9. Future agenda items – to be determined

The next meeting is likely to focus on a review of strategies proposed for recommendation.

10. General public comments – limited to 3 minutes per person

None.

11. Adjourn

Chair Gillam adjourned the meeting at 2:47.

MINUTES
Lower Colorado Regional Water Planning Group
Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300,
Conference Room "Capital of Texas", Austin, Texas 78759

July 16, 2024, 1:00 p.m.

Attendance

Planning Group Members and Alternates:

Lauri Gillam, Chair, Small Municipalities
Teresa Lutes, Municipalities
Monica Masters, River Authorities
Barbara Johnson, Industry
Carol Olewin, Public Interest
Jim Brasher, GMA-15
David Lyndsay, Recreation
Mike Reagor, Small Municipalities
Tom Entsminger, alt to Jennifer Walker
Earl Foster, alt to Lauri Gillam
Christianne Castleberry, Water Utilities
Tom Hegemeir, alt to Monica Masters

Other Attendees:

Dacy Cameron, Aqua WSC
Emily O'Leary, Aqua WSC
Gary Rabalais, Quiddity
Emily Rafferty, Austin Water
Adam Conner, FNI
Lann Bookout, TWDB
Augusto Villalon, FNI
Robert Adams, Plummer

Committee Meeting:

1. **Call to order – Chair Lauri Gillam**

   Call to order at 1:30 PM.

2. **Welcome and introductions – Chair Gillam**

3. **Receive public comments on specific issues related to agenda items 4 through 5 – limited to 3 minutes per person**

   None.

4. **Approval of minutes from previous meeting(s)**

Note that for the June 18 minutes, Sue Thorton should be marked as an alternate. Motion to approve by Monica Masters. Seconded by David Lindsay. Passed by voice vote.

5. Review of the TWDB 2026 Regional Water Supply Needs/Surplus Map

Neil Deeds led an interactive viewing of this map.

6. Drought Management Strategies. Discuss and take action as needed.

Robert Adams led the discussion, noting that most Major Water Providers have updated their Drought Contingency Plans. All entities have been asked to comply with these Drought Contingency Plans and Water Conservation Plans to ensure standardization.

While drought triggers may differ, a committee member asked for an example of a Drought Contingency Plan versus a Water Conservation Plan. Robert Adams explained by using an example of outdoor water use restrictions that vary by drought stage, progressing to stricter measures like hand-held watering during severe drought stages.

In response to a question about Lower Colorado River Authority customers becoming more consistent, Robert Adams confirmed that most are, citing an example of Stage 3 restrictions due to an emergency in Marble Falls. He also pointed out that Drought Contingency Plans typically include emergency trigger conditions.

Robert Adams highlighted that “drought” can be defined by several different measures, including drought indexes and reservoir conditions. Another committee member raised the issue of whether river flow is considered in drought planning. A different attendee mentioned wanting easier print functionality from the Texas Water Development Board.

Jim Brasher led the discussion on drought management for irrigation, noting that districts can designate critical depletion areas and require reductions in production from non-exempt wells within those areas. He recalled that in 2014, Colorado and Wharton counties came close to this situation when the Lower Colorado River Authority curtailed water, leading to the drilling of 32 wells in 18 months, which caused significant water level declines. By 2014, districts began considering requiring cutbacks. During this time, the town of Lissie lost its water supply. In 2015, rain returned, and LCRA water resumed in 2016, leading to a quick rebound in groundwater levels. Jim explained that districts can theoretically make the critical depletion designation and mandate cutbacks, though the amount of reduction varies by district. He mentioned working with the Coastal Bend region on how to handle such situations, and another attendee offered to collaborate with Jim on enforcement conditions.

The group discussed the critical groundwater depletion area, noting that the criteria for when it applies vary significantly between districts. Districts monitor water levels and respond to severe declines, which are captured in their rules. The approach differs across districts, but the Desired Future Conditions are generally adhered to. It was suggested that when water levels reach within 20% of the DFCs, cutbacks might be triggered.

The group also acknowledged that many different approaches are outlined in the table. A committee member suggested that one-day watering restrictions are the way to go, expressing hope that this would become the standard. Another committee member pointed out that water rates can be an effective tool for encouraging conservation. The discussion then shifted to drought management strategies for municipal systems, with one attendee expressing curiosity about how different plans and levels are applied in the regional plan and calling for further discussion on future strategies.

The group discussed whether the plan should include stringent restrictions for future strategies, with Austin cited as an example of a city that imposes an outdoor watering ban when reservoir levels drop to 30%. It was suggested that such restrictions could be incorporated into demand projections, taking 30% off the top based on lawn watering limitations. Another committee member noted that these restrictions could potentially cause issues within the sewer system.

7. Municipal Conservation Strategies. Discuss and take action as needed.

Robert led discussion.

One committee member discussed water losses that are unmetered due to flushing. In some cities, fire trucks are equipped with meters, so that usage is accounted for, as well as for industrial users. Another attendee mentioned that during flushing, estimates are made to account for that water as best as possible, though some losses are due to meter inaccuracies. However, there is uncertainty about where some of the water is going.

The conversation then turned to existing and target Gallons Per Capita Per Day (GPCD) usage, with some committee members noting irregularities in the Water Conservation Advisory Council (WCAC) numbers. There was uncertainty about the baselines, which were likely from 2017 rather than 2020.

The group agreed to bring the actual GPCD data to the next meeting for further review.

Agricultural conservation was discussed under this agenda item.

Robert led this discussion.

In the upper part of the region, drip irrigation is being implemented for various crops, including pecan trees. Robert highlighted how far conservation efforts have come and emphasized the importance of maintaining them while exploring how much additional conservation can still be achieved. He noted that these practices can be revisited every 15 years to ensure continued effectiveness.

The group discussed the potential for pipelines funded by the Natural Resources Conservation Service (NRCS) to support these efforts. Jim Brasher mentioned that he could easily identify which fields were being irrigated due to the water losses that need to be addressed. The discussion centered on how widely such systems could be implemented, with all rice fields already using similar methods.

The question was raised about adding rice varieties as a strategy, with Stacy Panday noting that this could be considered. The group also discussed the potential of sprinkler irrigation and new crop varieties as part of future strategies.

8. Expanded Local Use of Groundwater Strategies. Discuss and take action as needed.

Neil led this discussion of two potential water management strategies involving expansion of local groundwater.

1. Manville WSC
2. Marble Falls

.
No action was taken.

9. Next meeting date

Left TBD, but the next meeting date in about a month. Aiming for mid-August.

10. Future agenda items

Left TBD.

11. General public comments – limited to 3 minutes per person

None

12. Adjourn

Meeting adjourned at 2:36p.

DRAFT MINUTES
Lower Colorado Regional Water Planning Group
Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300,
Conference Room "Capital of Texas", Austin, Texas 78759

August 30, 2024, 10:00 a.m.

Attendees:

Committee Members and Alternates:
Monica Masters, River Authorities
Lauri Gillam, Small Municipalities
Carol Olewin, Public Interest
Barbara Johnson, Industry
David Lindsay, Recreation
Teresa Lutes, Municipalities
Tom Entsminger, Environmental
Mary Ann Baker, alt for Carol Olewin
Marisa Flores Gonzalez, alt for Teresa Lutes

Other Attendees:
Robert Ruggiero, Region K Planning Group
Collins Balcombe, LCRA
Dacy Cameron, Aqua WSC
Shannon Hamilton, CTWC
Ben Mochtyak, Region K resident
Vanessa Chapman, TPWD
Neil Deeds, INTERA
Robert Adams, Plummer
Adam Conner, FNI
Jasyn Twine, FNI

Committee Meeting:

1. Call to Order – Chair Lauri Gillam

The meeting was called to order by Chair Lauri Gillam at 10:03 AM.

2. Welcome and Introductions

Chair Lauri Gillam welcomed attendees and facilitated introductions.

3. Public Comments on Agenda Items 45

No public comments were received.

4. Approval of Minutes from the Previous Meeting

- It was noted that Robert Ruggiero and Mary Ann Baker attended the last meeting and should be added to the list of attendees. David Lindsay's name was spelled incorrectly.
- Lauri Gillam moved to approve the minutes, and Monica Masters seconded the motion. Motion passed by voice vote.

5. Status Update on Water Management Strategy Evaluations

- Neil Deeds led the discussion.
- There was discussion about unsponsored projects (those without survey respondents or sponsors), emphasizing that projects should not be included to cover needs unless they are viable.
- Committee members highlighted the importance of addressing unmet needs in the minutes. It was noted that some planning groups predicted unmet needs in their plans.

6. Status Update on Water Management Strategy Survey

- Adam Connor led the discussion. The committee expressed thanks to Stacy Pandey for her contributions.
- One committee member requested that units be included on the presentation slide.
- Discussions took place about the needs situation in Hays County and how unmet needs could be addressed.
- Some committee members emphasized the importance of conservation over increasing water supply for lawn irrigation, as well as concerns about enforcement of drought provisions.
- Utility committee members mentioned that community members can report water waste through online/hotline systems, and that drought severity influences the number of responses.
- Robert discussed the use of smart meters for enforcement and the challenges associated with analyzing the data due to limited staffing.

7. Conservation Strategies – Progress Update

- Robert led the discussion, referring to the background information in the meeting materials.
- Despite the May deadline, the committee is still receiving updated plans.
- Robert suggested setting the target GPCD (gallons per capita per day) lower than 140.
- The committee discussed the concept of nonfunctional turf and when Texas might be ready for its adoption. There was agreement on the need for clear terminology around functional and nonfunctional turf, with examples from LCRA.
- Irrigation with reclaimed water for golf courses and the challenges of transient populations in lakeside communities were also discussed.
- Ag conservation strategies, particularly those involving LCRA, were reviewed. Issues related to water efficiency reporting when groundwater supplements surface water were raised, and Robert mentioned that the data collection process is being updated to reflect this.

8. Drought Management Strategies – Progress Update

- Robert led the discussion, referring to the background information in the meeting materials.
- A committee member asked for clarification on the difference between the Water Conservation Plan (WCP) and Drought Contingency Plan (DCP). Robert noted that WCP was long-term, DCP was a short-term response to short-term conditions.
- COA noted its commitment to conservation, specifically stating that irrigation of nonfunctional turf would be cut off at Stage 4 drought restrictions.

9. Proposed Management Strategies: Discuss and Take Action

- Aqua WSC: ASR
  - After some initial discussion, a committee member asked that an educational summary of ASR will be provided at the next meeting. Neil Deeds will provide that summary.
  - Lauri moved to recommend the strategy, and Teresa seconded the motion. Motion passed by voice vote.
- Aqua WSC: Brackish Water
  - One committee member noted the need for crossregional collaboration, due to the source being primarily in Region L. Neil Deeds said that a map will be provided in following meetings to help clarify this.
  - Barbara moved to recommend the strategy, and David seconded. Motion passed by voice vote.
- Aqua WSC: Surface Water
  - The committee discussed groundwater/surface water interaction, particularly between the Carrizo-Wilcox aquifer and the Colorado River river. One committee member noted legislative resistance to surface/groundwater interaction modeling. LCRA shared that they are working on two groundwater/surface water interaction studies with TWDB.
  - Lauri moved to recommend the strategy, and Monica seconded. Motion passed by voice vote.
- Aqua WSC: Direct Potable Reuse
  - COA mentioned that costs have increased substantially between planning cycles, and contingencies should be considered when costing
    - David moved to recommend the strategy, Teresa seconded. Motion passed by voice vote.

10. Next Meeting Date

Two more meetings will be held before October. Tentative dates are the third week of September and the first week of October. Polls will be sent out to confirm availability.

11. Future Agenda Items

- General discussion on Aquifer Storage and Recovery (ASR).
- Thumbnail overview of brackish water availability at both regional and state levels.
- Discussion on Indirect Potable Reuse (IPR), which requires an environmental buffer.

12. General Public Comments

Dacy Cameron expressed thanks to the committee for their consideration of strategies for Aqua WSC.

13. Adjournment

The meeting was adjourned at 12:16 PM.

DRAFT MINUTES
Lower Colorado Regional Water Planning Group
Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300,
Conference Room "Capital of Texas", Austin, Texas 78759

September 17, 2024, 10:00 a.m.

Attendees:

Committee Members and Alternates:
Lauri Gillam, Small Municipalities
Monica Masters, River Authorities
Carol Olewin, Public Interest
Barbara Johnson, Industry
David Lindsay, Recreation
Teresa Lutes, Municipalities
Jennifer Walker, Environmental
Christianne Castleberry, Water Utilities
Mike Reagor, Small Municipalities
Jim Brasher, GMA-15
Earl Foster, alt for Small Municipalities
Tom Entsminger, alt for Environmental

Other Attendees:
Collins Balcombe, LCRA
Neil Deeds, INTERA
Robert Adams, Plummer
Adam Conner, FNI
Jasyn Twine, FNI
Lann Bookout, TWDB
Stacy Pandey, LCRA

Committee Meeting:

1. **Call to order – Chair Lauri Gillam**

Called to order at 10:05.

2. **Welcome and introductions – Lauri Gillam**

3. **Receive public comments on specific issues related to agenda items 5 through 9 – limited to 3 minutes per person**

None.

4. Approval of minutes from previous meeting

Barbara moved, Monica seconded.

5. Status Update on Water Management Strategy Evaluations

Neil led the review of the process for WMS evaluations.

6. Status Update on Water Management Strategy Survey

The committee discussed issues pertaining to "Hays County – Other," focusing on subdivisions being built without adequate water supply. The challenges of providing water to rural subdivisions were examined, and questions were raised about whether the county has expectations for how such developments will secure water resources. The discretion allowed for lot sizes was also discussed.

The committee reached a consensus that this situation could potentially represent an unmet need. It was noted that the Lower Colorado River Authority (LCRA) is in talks with the Dripping Springs Water Supply Corporation (WSC), and this area might be one where an unmet need is acknowledged. Neil agreed to reach out to the groundwater districts, specifically the Barton Springs/Edwards Aquifer Conservation District (BSEACD) and the Hays Trinity Groundwater Conservation District, to gather more information.

Concerns were expressed that many people moving into these subdivisions may not be fully aware of the general availability of water. The committee discussed strategies to make potential homeowners aware of these issues. One committee member mentioned that this topic might be relevant in the Legislation and Policy Committee in the education section. Questions were raised about whether other regions have large "county-other" components facing similar challenges and if new Water User Groups (WUGs) might emerge as a result. TWDB staff noted that if such a large unmet need exists, it could prompt legislative action.

7. General background on three potential strategy categories

Neil led the discussion on aquifer storage and recovery and brackish groundwater. Committee members suggested adding sedimentation losses as a potential downside to reservoirs (slide 13), and that potential losses and ownership issues be noted more prominently as potential downsides to ASR.

LCRA representatives noted that permitting requirements for brackish water are the same as for fresh water for the Gulf Coast Aquifer in Region K, providing no incentive to develop brackish sources. They discussed challenges in permitting brackish groundwater and questioned whether the Texas Water Development Board (TWDB) has the tools to model its availability, mentioning that TWDB is just starting to assess this resource. TWDB staff highlighted a large unmet water need in Hays County, suggesting that brackish groundwater might be the only viable strategy and a reasonable assumption, but it requires a sponsor. Neil agreed to speak with Hays County officials and the Barton Springs/Edwards Aquifer Conservation District (BSEACD) to explore this option.

Robert led the discussion of indirect potable reuse. A committee member asked about how pharmaceuticals are discharged into water systems and the methods for their potential treatment. Robert responded that membrane treatment and other advanced technologies can remove these contaminants, but the effectiveness depends on how advanced the treatment system is. Another committee member inquired about online testing for breakthrough events. Robert indicated that there are marker chemicals tested as indicators of treatment failure to monitor the system's performance.

8. Proposed Management Strategies: Discuss and take action as needed.

[Editors note: one committee member suggested that "direct reuse" be labeled "direct non-potable reuse" for clarification purposes – this has been done here in the minutes but was not reflected in the original posted materials.]

Neil led the discussion of three WMSs for Dripping Springs WSC (DSWSC) and two for West Travis County Public Utility Agency (WTCPUA). General committee discussion on the difficulty and expense of direct potable reuse versus direct non-potable reuse.

All five WMSs were recommended by the committee, as follows:

- Expanded Local use of Groundwater: DSWSC

Monica moved to recommend, Lauri seconded. Passed by voice vote.

- Direct Non-Potable Reuse: DSWSC

Lauri moved, Christianne seconded. Passed by voice vote.

- Direct Potable Reuse: DSWSC

Barbara moved to recommend, Jennifer seconded. Passed by voice vote.

- Direct Potable Reuse: WTCPUA

Monica moved to recommend, David seconded. Passed by voice vote.

- Direct Non-Potable Reuse: WTCPUA

Barbara moved, Monica seconded. Passed by voice vote.

On the remaining slides, one committee member noted the need to correct the table record regarding "Lower Basin OCR" strategy, that it needed to specify whether it was in the previous plan.

9. Next meeting date – to be determined

October 3, 10a was proposed as the next meeting date.

10. Future agenda items – to be determined

- Agricultural conservation
- LCRA/City of Austin presentations.
- More WMSs for possible recommendation.

11. General public comments – limited to 3 minutes per person

None.

12. Adjourn

Meeting adjourned at 11:48a.

MINUTES
Lower Colorado Regional Water Planning Group
Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300, Conference Room "Capital of Texas", Austin, Texas 78759

October 3, 2024, 10:00 a.m.

Attendees:

Committee Members and Alternates

Lauri Gillam, Chair, Small Municipalities
Monica Masters, River Authorities
Carol Olewin, Public Interest
Barbara Johnson, Industry
David Lindsay, Recreation
Teresa Lutes, Municipalities
Jennifer Walker, Environmental
Christianne Castleberry, Water Utilities
Mike Reagor, Small Municipalities
Jim Brasher, GMA-15
Earl Foster, alt for Small Municipalities
Daniel Berglund, Small Business

Other Attendees:

Collins Balcombe, LCRA
Lann Bookout, TWDB
Stacy Pandey, LCRA
Robert Adams, Plummer
Adam Conner, FNI
Jasyn Twine, FNI
Cody McCann, Plummer
Emily Rafferty, Austin Water
Neil Deeds, INTERA
Monica Polgar, TPWD

Committee Meeting:

1. **Call to order – Chair Lauri Gillam**

Meeting called to order at 10:03a.

2. **Welcome and introductions – Lauri Gillam**

3. **Receive public comments on specific issues related to agenda items 5 through 9 – limited to 3 minutes per person**

None.

4. **Approval of minutes from previous meeting(s)**

Barbara: Noted that the committee had discussed the issue of people moving into subdivisions but not being aware of water trouble [this was not captured in the previous meeting minutes], and that the issue may be added to the LPC.

5. **Status update on Water Management Strategy evaluations**

Jennifer discussed the unmet water needs in Hays County. Stakeholders noted that there could be unmet needs, specifically pointing out that developers must conduct groundwater availability studies as required by SB 2440. SB 2440 also includes provisions for exemptions related to large lots and certain aquifers, as well as possible exemptions for flag lots.

What does "county-other" mean in Hays County? It seems to primarily include exempt well users, but clarification is needed. The committee needs to explore the specifics, including potential exemptions for flag lots.

There was discussion about the requirements for developers to provide groundwater availability studies. The certification process for these studies was also brought up. The committee expressed a need to find someone knowledgeable to discuss:

- Developer requirements for water studies and the certification process.
- The definition of "county-other" in Hays County (e.g., are they mostly exempt wells, small utilities, or a mix?).

Monica suggested that Jim Luther from Burnet County could provide insight. Neil suggested we try to get Marisa Bruno of the Hill Country Alliance to speak at a meeting.

6. **Proposed Management Strategies: Discuss and take action as needed.**

[Slides 7, 8, 9 “DPR” should be corrected to “DPNR” in the sub-bullet]

Direct Non-Potable Reuse: Travis County WCID 17

The discussion began with a focus on direct non-potable reuse for Travis County WCID 17. Mike asked whether this reuse strategy was classified as Type 1 or Type 2. Type 1 allows human contact, while Type 2 is more restricted and typically used in controlled environments, such as irrigating a turf farm. Lauri asked about the scale of the current system, while Barbara inquired about the costs of potable water. Robert added that storage costs might also be a significant factor to consider.

Monica motioned to recommend, Lauri seconded, and the motion passed.

Direct Non-Potable Reuse: Lago Vista

Monica provided an overview of the direct non-potable reuse strategy in Lago Vista, explaining that the reuse water is primarily used for a golf course and a 65-acre bird habitat, with additional reuse for local ball fields. There was discussion around possibly reallocating some of this water into the existing supply and separating out new yields. Neil mentioned that he would bring this information in any future strategies for consideration.

Teresa moved to recommend, Christianne seconded, and the motion passed by voice vote.

Note: It was noted that the final report should specify whether each strategy is existing or new. Full write-ups will be included for each strategy.

Direct Non-Potable Reuse: City of Buda

The City of Buda is planning to upgrade its direct non-potable reuse system, increasing capacity from 1.5 million gallons per day (MGD) to 3.5 MGD, discharging into the Plum Creek watershed. Plans include overbuilding mains to accommodate future development and adding distribution infrastructure. The committee discussed concerns about excluding distribution network costs due to statutory requirements, and TWDB staff explained that funding is available for replacing old pipes, but not for new systems. David also raised the question of whether potable and non-potable water supplies should be tracked separately.

Monica made a motion to recommend, Christianne seconded, and the motion passed by voice vote.

Direct Potable Reuse: City of Buda

Robert discussed the timeline for direct potable reuse (DPR) projects, noting that it typically takes 12 to 15 years for full approval and implementation. The committee discussed the significant need for DPR in Hays County, especially with the expected increase in individual DPR plants. Jennifer suggested that, when presenting these strategies to the broader planning group, it would be helpful to provide context about how the various pieces fit together and the overall purpose of the recommendations. The committee also highlighted the importance of including these strategies in the plan to make them eligible for SWIFT funding. Lann emphasized that it is essential to explain the committee's role and the vetting process to the planning group.

Teresa moved to recommend, Mike seconded, and the motion passed by voice vote.

Potential Water Transfers and Region-Specific Issues

The committee then discussed potential water transfers between regions, focusing on situations where the region of origin may disagree with the proposed strategy. Lann noted that timber companies in Region D are opposed to the construction of a reservoir. Lauri suggested that these concerns should be brought before the full planning group to ensure comprehensive discussion and resolution.

Region L: ARWA Phase 2

The discussion also covered ARWA (Austin Regional Water Authority) Phase 2, which aims to address rapid growth between highways 130 and I-35. Phase 2 includes drilling new wells, developing a collection system, and connecting to Buda, which will be one of the customers. This coordinated regional effort aims to manage growing water demands effectively.

Rainwater Harvesting

The committee also discussed rainwater harvesting, with particular focus on drought resilience. There was concern about the practicality of rainwater collection during prolonged droughts, and Jennifer emphasized the importance of having a reliable backup plan. The committee agreed that a well-defined, actionable backup plan is essential for ensuring the long-term viability of rainwater harvesting as a water management strategy.

7. **Presentation/discussion of strategies from large water providers**

Collins led the discussion regarding water management strategies from the Lower Colorado

River Authority (LCRA). He noted that the first four strategies are currently in progress, being developed as part of the 50-year Water Supply Resource Recovery (WSRR) plan. All ten strategies discussed are carryovers from the 2021 plan, albeit with certain adjustments.

Expanded Groundwater Use

Monica noted that this project is in progress, and the discussion moved to how the Modeled Available Groundwater (MAG) might be allocated based on priorities. Mike inquired about how this water would be used, and LCRA confirmed that it is intended for municipal use. David questioned whether any Carrizo-Wilcox groundwater was leaving the region, asking about the project's priority areas. Carol asked if this project was part of City of Bastrop or Aqua WSC; it was clarified that it was not.

Lake Bastrop Water Supply Project

The Lake Bastrop Water Supply Project is also in progress. The plan includes modifications to the intake from the Colorado River and the construction of a new pump station. It may require amendments to permits for either adding a new diversion point or increasing the rate of diversion. David asked how this would affect the firm yield, and Monica responded that if water is released from Travis, it can be captured downstream, but ensuring the system yield does not involve double counting is important. The water from Lake Bastrop does not return to the river, but instead is used by customers as raw water.

Williamson County Return Flows

The committee discussed importing return flows from Williamson County into Travis County. Teresa asked if this would mean water going into the river, and LCRA noted that the source is likely the Brushy Creek Regional Utility Authority (BCRUA) Wastewater Treatment Plant (WWP). There are plans to either take effluent and pipe it directly to Travis County or to move it out of Brushy Creek. Once in Travis County, it could be stored in existing or new off-channel storage facilities. LCRA staff indicated that this project might be pushed out to 2040, with the goal being no net loss and bringing back 25,000 acre-feet of water.

Downstream Return Flows

The committee also discussed the use of return flows from Pflugerville, with consultants working on discussions with Pflugerville to determine how much direct reuse they intend to use. Pflugerville recently completed a reuse master plan and has expressed interest in being part of this project. The timeline for the project is still to be determined, with a target date potentially in the 2030s.

Purchase Wholesale Groundwater

Costs for purchasing wholesale groundwater have been estimated through WSRR. This strategy involves buying groundwater from sellers who have permits in hand and does not require new infrastructure. Jennifer asked who would be the customers for this water. The plan includes the infrastructure costs to transport the water to designated locations, assuming a purchaser is present. These groundwater projects are likely intended for the 130 corridor, which already relies heavily on groundwater. There are no plans to mix this water with surface water, but the cost does include the price of wells, excluding the cost of holding the permits. The committee discussed projected growth along the 130 corridor, noting that some of the customers might be from the City of Austin or water supply corporations such as Creedmoor, Aqua WSC, and Manville, all of which rely on groundwater.

Jennifer brought up recommendations regarding the need for an analysis of environmental and other impacts. She highlighted the cumulative effects of surface water strategies combined with increased diversion infrastructure. Jennifer stressed that the environmental impact, especially on downstream environments that rely on river flows, should be considered at the planning level. She asked whether the cumulative environmental impact could be evaluated, rather than assessing projects on a case-by-case basis. In the last planning cycle, the previous consultant conducted an impact assessment, which resulted in a matrix summarizing environmental, socioeconomic, and other impacts. Jennifer emphasized that an important stakeholder is the downstream environment, including bay and estuary systems that depend on these flows. It was agreed that an agenda item should be added to consider cumulative environmental impacts.

Christianne moved to recommend, Daniel seconded, and the motion was approved.

Aquifer Storage and Recovery (ASR)

The discussion turned to an ASR project. David (DL) asked whether this project is in addition to Austin Water's ASR project, and it was confirmed that it is. David inquired if the water would be counted as firm water, and Monica explained that this involves excess water that could be stored during times of excess runoff. The concept involves diverting water from runoff, mitigating evaporation. David asked if this water would otherwise have been stored in lakes, and Monica clarified that in their models, they aim to keep water as high in the system as possible, and that stored water from an upper basin would not be released to store in a lower basin. David expressed the need for smarter modeling to address these types of projects. Monica concluded that modeling indicates a net increase in firm yield due to this strategy. Jim added that excess runoff water should be captured during wet times.

Daniel moved to recommend, Mike seconded, and the motion was approved.

[Jennifer voiced her opposition to new reservoir strategies without more rigorous/comprehensive environmental studies. She was not present for vote on the remaining strategies]

Mid-Basin Off-Channel Reservoir (OCR)

Jennifer noted concerns about this and other OCR strategies in the absence of comprehensive environmental studies, but she was not present for the vote. It was noted that the project aims to supply 35,000 acre-feet per year during the Diversion Order Rate (DOR). Monica explained that the modeling shows that the need is downstream of the Highland Lakes, and the goal is to identify a location in Travis County that could supply future customers such as Pflugerville. Barbara asked if there had been pushback on the OCR concept, and Monica said the feedback had been mixed. Mike noted that climate variability is bringing more extremes, which heightens the need for additional storage. Monica mentioned that exhaustive environmental studies would be required before implementing OCRs. However, Lann noted that environmental studies are not required by statute or guidance before a project is approved or recommended by the Regional Water Planning Group (RWPG).

Mike moved to recommend, Daniel seconded, and the motion was approved.

Baylor Creek Reservoir

The Baylor Creek Reservoir is already permitted but has not yet been constructed. It will be located next to Fayette Lake, essentially acting as a sister reservoir. Monica explained that the idea is to tie these reservoirs together to facilitate moving water upstream to Travis

County without mixing it with groundwater. David suggested that this could form a water grid within the region, an idea that has also been proposed in the legislature. Jim pointed out that these projects are all intended to move water upstream, which Monica confirmed, noting that the goal is to support an anticipated increase of over 30,000 acre-feet in the lower basin while also reducing the need for releases from the Highland Lakes. Teresa added that the reservoir could also provide additional storage for capturing high-flow events. It was clarified that Baylor Creek is a minor creek, and technically this makes the reservoir an on-channel reservoir, but it is not located on a major river. Carol asked if the Fayette Power Plant is expected to be decommissioned within the next ten years. Monica noted that the decommissioning is planned for the 2040 decade, which will reduce FTP water demands accordingly.

Barbara moved to recommend, Christianne seconded, and the motion was approved.

Lower Basin OCR

The discussion then turned to the Lower Basin Off-Channel Reservoir. Lauri requested that a single map be provided showing all of these projects when presenting to the RWPG, asking why the different pipelines were being shown separately. Concerns were raised about the sequence of construction, as only the Baylor Creek Reservoir currently has a fixed location.

Barbara moved to recommend, Mike seconded, and the motion was approved.

Seawater Desalination

The LCRA presented a proposal for seawater desalination, which includes the full cost of transporting water towards the Highland Lakes. LCRA prefers to serve lower basin customers in order to avoid releasing as much water from existing supplies. There was a discussion about where the brine would be discharged, emphasizing that it must be done at a location far enough out to meet EPA regulations. Teresa mentioned that the City of Corpus Christi has an online video detailing their desalination project, where they propose discharging brine into the intercoastal channel with expectations that salinity would decrease to native levels. The proposed transmission pipeline for this project is 183 miles long and 48 inches in diameter.

Christianne moved to recommend, Barbara seconded, and the motion was approved.

David recognized that this is a lot of good work, and that the committee appreciates that work.

8. Presentation/Discussion of Irrigation Conservation Strategies

Daniel and Stacy led the discussion of irrigation conservation strategies.

- **Laser Leveling**: A key component of high-quality land leveling projects, laser leveling helps get water where it's needed without having to keep fields fully flooded.

- **Multiple Field Inputs**: This strategy benefits water distribution by allowing more precise delivery to where it is needed, avoiding cascading down the field. It's an important part of effective land leveling.

- **Irrigation Pipelines**: Implementation of irrigation pipelines has been limited, primarily on the groundwater side. The biggest water losses occur during off-farm transport in open canals. More use of pipelines is encouraged to address these losses. DB mentioned discussions with the USDA to start such a program in DC, although costs remain a challenge. Robert discussed potential partnerships between municipal and agricultural interests to help incentivize these strategies. For a typical project, a pipeline for 1,000 acres at 3 acre-feet per acre (1,200 acre-feet total) might require a 16” pipe operating at 3,000 gallons per minute, with PVC as a possible material. Pipelines are mainly intended to replace lateral ditches rather than canals.

- **Real-Time Meters**: The Texas Water Development Board (TWDB) played a significant role in implementing real-time water meters, which have proven to be very effective.

- **Conveyance Improvements**: Stacy reported that the Garwood gate automation project was completed in 2023, and it should be removed from the plan. It remains difficult to quantify how much water has been saved. Lakeside is the last gate automation project planned, pending available water. The Prairie Reservoir was also considered but has been deferred for decades. Costs for these projects have increased by 30-60%.

- **Canal Lining**: Lining of canals has been completed, which helps reduce losses, although pipelines for industrial users remain prohibitively expensive.

- **Sprinkler Irrigation**: Sprinkler systems are an effective way to save water, though they are not suitable for all irrigation needs. Arkansas was mentioned as an example where sprinkler irrigation has reduced water usage, though overall consumption remains high. Jim shared that TWDB has called for grant proposals for conservation projects, aiming to move beyond metering by incorporating smart sprinkler systems, moisture detectors, and similar technologies.

- **Drip Irrigation**: Drip irrigation has been implemented in the upper basin.

9. Next meeting date – to be determined

Next meeting date will be later October or early November. Neil will send out a scheduling poll.

10. Future agenda items – to be determined

City of Austin plans to present their strategies in the next meeting. The remaining LCRA strategies will also be presented in the next or subsequent meeting.

11. General public comments – limited to 3 minutes per person

None.

12. Adjourn

Adjourn 1:04p.

DRAFT MINUTES

Lower Colorado Regional Water Planning Group

Water Management Strategy Committee Meeting

November 14, 2024, 10:00 a.m.

LCRA Redbud Center

3601 Lake Austin Blvd, Conf Rm 225, Austin, TX 78703

Meeting Minutes:

1. Call to Order, Introductions and Roll Call – Lauri Gillam, Committee Chair

Meeting was called to order at 10:00 A.M. by Chair Gillam.

<u>Attendance</u>

Committee Members:

Lauri Gillam, Committee Chair
Teresa Lutes, Municipalities
David Lindsay, Recreation
Josh Becker, alternate for Small Municipalities (Committee Member Mike Reagor)
Barbara Johnson, Industry
Christianne Castleberry, Water Utilities
Carol Olewin, Public Interest
Monica Masters, River Authorities
Jennifer Walker, Environmental

Other attendees:
Earl Foster, alternate for Small Municipalities
Tom Hegemier, alternate for River Authorities
Mary Ann Baker, Alternative for Public Interest
Tom Entsminger, alternate for Environmental
Earl Wood, alternate for Water Utilities
Shannon Hamilton, alternate for Recreation
Collins Balcombe, LCRA
Dacy Cameron, Aqua Water Supply Corporation
Emily O'Leary, Aqua Water Supply Corporation
Nieves Alfaro, Quiddity Engineering (supporting Aqua Water Supply)
Brent Terry, N/A
Brandon Niese, Austin Water
Young-Hoon Jin, Austin Water
Emily Rafferty, Austin Water
Fatima Wahid, Austin Water

Richard Hoffpauir, Hoffpauir Consulting (supporting Austin Water)
Blake Neffendorf, City of Buda
Vanessa Chapman, TPWD
Lann Bookout, TWDB
Stacy Pandey, LCRA
Robert Adams, Plummer
Cody McCann, Plummer

2. Welcome and Introductions – Chair Gillam

Attendees identified themselves and their affiliations.

3. Receive public comments on specific issues related to agenda items 5 through 7 – limited to 3 minutes per person

No public comments were offered.

4. Approval of minutes from previous meeting(s)

Teresa motioned to recommend, Christianne seconded, and the motion passed.

5. Status update on Water Management Strategy evaluations

Robert Adams of the consulting team provided an update on the unmet water needs in Hays County. The consulting team plans to meet with the Hays County Commissioner Walt Smith before the next meeting on December 2nd.

The committee also briefly discussed rainwater harvesting, Robert noted that the consultants are still working on generating reasonable costing for rainwater harvesting as a strategy; and ensuring that a system could be sized to withstand a drought of record.

6. Proposed Major Water Provider Water Management Strategies: Discuss and take action as needed.

Teresa Lutes presented the City of Austin's Proposed Water Management Strategies. Which include:

- Utility-Side Water Loss Control
- Customer Side Water Use Management
- Native and Efficient Landscapes
- Centralized Reclaimed
- Decentralized Reclaimed
- Onsite Water Reuse
- Aquifer Storage and Recovery
- Lake Walter E. Long Off-Channel Reservoir
- Indirect Potable Reuse and Capture Local Inflows to Lady Bird Lake

    - It was requested that the write-up for this strategy include the equivalent percentage of combined lake storage for 400,000 acre-feet, as this is the threshold when this strategy would be implemented. Richard Hoffpauir noted that for 400,000 acre feet the equivalent percentage is ~20% of the combined lake storage.
- Brackish Groundwater Desalination
    - It was suggested that the consultant confirm what amount of groundwater is available to be included in the regional water plan for this strategy, as this may be limited by the MAG.

Barbara motioned to approve Austin Water's strategies as recommended strategies to be presented to the Regional Water Planning Group, Christianne seconded, and the motion passed.

7. Other Water Management Strategies: Discuss and take action as needed.

Collins Balcombe presented on four of LCRA's Proposed Water Management Strategies. Which include:

- Expanded Groundwater Use
- Lake Bastrop Water Supply Project
- Williamson County Return Flows
    - It was briefly discussed that the Brazos G Region is not counting on these return flows for supply, but this should be confirmed with Region G. Monica noted that LCRA is obligated by law to ensure that this strategy is implemented. She also noted that Round Rock has committed to a portion of their effluent coming back as return flows, but the City is not sure exactly how much effluent this will be. There is also work required to resolve the implementation approach and cost. The information included for the option at this point is the best estimate.
- Downstream Return Flows (Pflugerville)
    - This strategy needs additional information before approval by the committee, most of the information is to be determined, and should be provided by LCRA once known.

Christianne motioned to approve LCRA's strategies 1, 2, and 3, (all strategies presented but the Downstream Return Flows) as recommended strategies to be presented to the Regional Water Planning Group, Lauri seconded, and the motion passed.

8. Next meeting date – to be determined

The next meeting date was set for the 2nd of December at 1:00p at FNI offices.

9. Future agenda items – to be determined

Stacy identified a couple of corrections to the previous meeting minutes that did not get included before approval (Agenda Item 4).

10. General public comments – limited to 3 minutes per person

The committee had a discussion on cloud-seeding or rainfall augmentation. It was noted that at a legislative committee meeting, a consultant presented this topic. The WMS Committee thinks it could be a good idea to have this same consultant present to the entire Region K planning group.

11. Adjournment

By Chair Gillam at 11:15 AM.

Minutes
Lower Colorado Regional Water Planning Group
Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300, Conference Room "Capital of Texas", Austin, Texas 78759

December 2, 2024, 1:00 p.m.

Attendee List:

Name	Represents
Lauri Gilliam	Small Municipalities
Teresa Lutes	Municipalities
Monica Masters	River Authority
Dave Lindsay	Recreation
Christianne Castleberry	Water Utilities
Mike Reagor	Small Municipalities
Barbara Johnson	Industry
Daniel Berglund	Small Business
Jennifer Walker	Environment
Carol Olewin	Public Interest
Jim Brasher	GMA 15
Shannon Hamilton	Alternate to David Lindsay
Tom Entsminger	Alternate to Jennifer Walker
Mary Ann Baker	Alternate to Carol Olewin
Earl Wood	Alternate to Christianne
Josh Becker	Alternate to Mike Reagor
Emily Rafferty	Austin Water
Stacy Pandey	LCRA
Collins Balcolmbe	LCRA
Robert Adams	Plummer
Adam Conner	FNI
Lann Bookout	TWDB
Cody McCann	Plummer
Josh Becker	Llano
Nieves Alfaro	Quiddity
Mary Barton	Quiddity
Blake Neffendorf	Buda
Robert Ruggiero	Lago Vista
Emily Rafferty	Austin Water

<u>Committee Meeting:</u>

1. **Call to order – Chair Lauri Gillam**

Meeting started at 1:02p.

2. **Welcome and introductions – Lauri Gillam**

3. **Receive public comments on specific issues related to agenda items 5 through 7 – limited to 3 minutes per person**

None.

4. **Approval of minutes from previous meeting(s)**

David asked for clarification on Williamson County strategy language. Add …"strategy *in whatever form it takes*".

Barbara made a motion to accept the minutes, Christianne seconded. The motion passed by voice vote.

5. **Status update on Water Management Strategy evaluations**

Neil led the status update.

Teresa emphasizing the need to pursue all strategies, even if conservation or drought management appears to address water needs. She highlighted the importance of planning for drought scenarios worse than the drought of record and recommended using flexible language such as "some" and "may" to describe strategies. Robert noted the importance of ensuring strategies address actual needs, while Lauri stressed the focus on realistic, actionable strategies rather than theoretical ones. Lann clarified that conservation must be considered for addressing water needs and ensuring selected strategies can effectively fulfill those needs. Jennifer added that conservation strategies require a formal process to determine how much of the water need they can cover, ensuring decisions are data-driven rather than arbitrary.

Carol proposed an adjustment to Slide 5, suggesting the addition of "acre-feet" units to the 25,000 figure under the background section. This would improve clarity and accuracy in the presentation. The group also discussed demand characterization, with Jennifer questioning whether the demand could be better defined and contextualized. She noted that the demand corresponds to a population of 167,000 people and suggested considering population growth, including migration to existing cities or Water User Groups (WUGs). Jennifer recommended describing the specific groups or contexts associated with the demand to provide greater clarity in future presentations.

Blake raised concerns about infrastructure, pointing out that without proper planning, water service delivery could be compromised. Jennifer further questioned whether cities would be willing to invest in expanding their limits, especially given potential legislative challenges that could hinder such expansions.

The discussion also touched on Water User Groups and small water providers. Adam highlighted the need to address Certificate of Convenience and Necessity (CCN) holders that do not meet WUG criteria, and Jennifer suggested creating a map to include WUGs and small water providers that are currently excluded from consideration.

6. Proposed Conservation Strategies: Discuss and take action as needed.

Robert Adams led the discussion on conservation for Water Conservation Plans (WCPs). Carol requested a definition of gallons per capita per day (GPCD), and Jennifer provided context on previous recommendations from the Water Conservation Implementation Task Force (WCITF). The group discussed the variability of average GPCD, particularly in rural areas, and noted specific challenges in Llano, where the population triples during the school year.

Robert explained that the planning approach aims to work for most utilities while relying on feedback to address exceptions. David inquired about funding requirements, and it was clarified that WUGs must have a WCP to qualify. Jennifer noted that some smaller utilities considering expensive solutions, like Direct Potable Reuse (DPR), could achieve significant savings through conservation.

Blake raised a question about whether real data aligns with proposed strategies. Robert explained that the base GPCD is grounded in historical water use (2020), and many utilities have since improved their systems. Jennifer clarified that the general approach applies to WUGs without identified needs. It was confirmed that feedback is necessary to adjust numbers if required.

David requested additional data in tables, including a sum at the bottom of the rows, acre-feet savings, and a comparison to actual needs. Jennifer suggested including columns for total demand and needs satisfied, focusing on the 2030 and 2080 decades. The group agreed to send an email blast with a link for feedback, ensuring stakeholders understand the methodology and have a clear deadline to respond. Christianne emphasized that overestimating conservation would lead to incorrect planning.

Mary stressed the importance of connecting strategies to individual plans. Lann noted that the planning group must adopt a standardized approach. Daniel proposed maintaining the first category at 1%. Stacy highlighted that some utilities, like LCRA, have adopted permanent twice-a-week watering schedules, which significantly impact baseline GPCD. Horseshoe Bay was mentioned as a notable exception.

Monica asked whether past studies indicated challenges in achieving a 2% reduction under certain water restrictions. Stacy explained that success depends on the starting point. After discussion, the group considered a change the reduction for utilities using more than 200 GPCD to 1.5%.

In the end, Jennifer moved to accept a 2% target, seconded by Lauri. The motion passed with no opposition or abstentions. Christianne clarified that the recommendation would be shared with the planning group and stakeholders, allowing WUGs to opt out or provide alternative plans.

Lauri requested adding 2021 cost estimates to slide 14. Mike asked about rate structure recommendations, to which Robert responded that tiered structures would be

recommended but individual WUG rate structures were not addressed.
Regarding slide 17, Carol asked Teresa about multifamily units and whether they are metered individually or through a single connection. Teresa confirmed that multifamily units generally have a single connection, which complicates calculations. She noted that achieving the 30-gallon threshold would be challenging, particularly for Austin, which prioritizes fixing water loss. Robert shared that Austin's most recent audit reported a 17% water loss, slightly higher than the previous audit's 16%. Non-revenue water, including unmetered or unaccounted-for usage, contributes to this loss. Marissa explained that apparent and real losses are components of non-revenue water, and multifamily connections tend to skew numbers.

Jennifer added that Austin already has a water loss strategy, making the threshold less relevant for them. It was noted that the Texas Water Development Board (TWDB) established thresholds based on 2015 legislation, requiring utilities to address water loss before expanding supply to qualify for financial assistance.

Jim asked about water systems not included in the list, and Robert explained that those systems likely had not submitted their audit. A public question was raised about whether one-time events like line breaks or fire-fighting affect the numbers, to which Robert responded that such events would only impact a single year. Daniel noted that Wharton had not submitted an audit, prompting a discussion about follow-up procedures. Blake confirmed that TWDB conducts follow-ups. Robert concluded by linking audits to water conservation targets, which are met through GPCD reduction.

Robert led the discussion of agricultural conservation. Daniel noted that this is for surface water conservation only. Robert has asked NRC for their acreages of surface water versus groundwater irrigation, but has not received the data. Robert noted that they do have the numbers from the groundwater district. Daniel suggested reaching out to Neil Hudgeons (General Manager of Coastal Plains GCD) to get information on groundwater conservation practices.

7. Proposed Drought Management Strategies: Discuss and take action as needed.

Robert led a discussion on drought contingency planning, focusing on the stages and their implementation.

Jennifer raised the question of whether the same approach should be used for all utilities and asked for clarification on which stage to use. She suggested that if Stage 1 is a year-round strategy, it could be utilized to achieve certain conservation goals without requiring changes to city codes. However, she proposed that the 10% reduction typically associated with Stage 1 might be removed, necessitating a shift to Stage 2 or higher for further reductions. Jennifer outlined that Stage 2 could then aim for a reduction of 20%, effectively achieving an additional 10% beyond Stage 1.

Mike clarified that Stage 1 is generally a year-round, non-mandatory stage. Josh questioned why the state does not have standardized definitions for each drought stage. Robert acknowledged this as a valid point but noted that there is no uniform approach to defining the stages. Teresa shared that her jurisdiction has remained in Stage 2, which includes once-per-week watering and limited hours.

Josh commented that utilities often move to Stage 2 because Stage 1 is considered a default stage. Stacy added that the assumption for Stage 1 is that the 10% reduction is achieved through increased enforcement, noting that many utilities only enforce restrictions during drought conditions.

8. **Other Water Management Strategies: Discuss and take action as needed.**

City of Bertram

This strategy was considered and discussed. Daniel made the motion to recommend, and Mike seconded. The motion passed by voice vote.

Mining, Mills County

This strategy was considered and discussed. Daniel made the motion to recommend, and Mike seconded. The motion passed by voice vote.

Irrigation, San Saba

This strategy was considered and discussed. Mike made the motion to recommend, and Daniel seconded. The motion passed by voice vote.

Irrigation, Gillespie County

This strategy was considered and discussed. Barb made the motion to recommend, and Jim seconded. The motion passed by voice vote.

Manufacturing, Gillespie County

This strategy was considered and discussed. Daniel made the motion to recommend, and Lauri seconded. The motion passed by voice vote.

County Other, Gillespie County
This strategy was considered and discussed. Monica asked if it would be phased in, and Neil confirmed that it would.

Mike made the motion to recommend, and Daniel seconded. The motion passed by voice vote.

Rainwater Harvesting

There was extensive discussion about alternatives, including trucking water as Plan B. Questions were raised about the costs of trucking and the number of units needed, which would depend on specific requirements. Some cities were noted to be offering cost-sharing for rainwater harvesting as a supplemental strategy.

Monica made the motion to recommend it as an alternate strategy, and Daniel seconded. The motion passed by voice vote.

9. **Next meeting date – to be determined**

Neil agreed to poll the next meeting date for the second week of January.

10. **Future agenda items – to be determined**

Teresa asked that an update to Table 5.2 regarding Austin return flows be discussed in the next meeting.

11. General public comments – limited to 3 minutes per person

A member of the public offered a general thanks for everyone's time and attention.

12. Adjourn

The meeting was adjourned at 3:41 pm.

AGENDA
Lower Colorado Regional Water Planning Group
Water Management Strategy Committee Meeting

LCRA Redbud Center
3601 Lake Austin Blvd, Conf Rm 225
Austin, TX 78703

January 15, 2025, 9:00 a.m.

Attendees

Lauri Gilliam, Chair
Teresa Lutes, Municipalities
Monica Masters, River Authorities
Dave Lindsay, Recreation
Christianne Castleberry, Water Utilities
Barbara Johnson, Industry
Jennifer Walker, Environment
Carol Olewin, Public Interest
Josh Becker, Small Municipalities
Jim Brasher, GMA-15
Earl Foster, alt to Lauri Gilliam
Tom Hegemier, alt to Monica Masters
Shannon Hamilton, alt to David Lindsay
Marisa Flores Gonzalez, alt to Teresa Lutes
Tom Entsminger, alt to Jennifer Walker
Mary Ann Baker, alt to Carol Olewin
Earl Wood, alt to Christianne Castleberry
Collins Balcolme, LCRA
Stacy Pandey, LCRA
Robert Adams, Plummer
Adam Conner, FNI
Lann Bookout, TWDB
Neil Deeds, INTERA
Emily Rafferty, Austin
Blake Neffendorf, Buda

Committee Meeting:

1. Call to order – Chair Lauri Gillam

Lauri called to order at 9:02.

2. **Welcome and introductions – Lauri Gillam**

3. **Receive public comments on specific issues related to agenda items 5 through 10 – limited to 3 minutes per person**

None.

4. **Approval of minutes from previous meeting(s)**

Barbara moved to accept the minutes, David seconded, motion passed.

Christianne later noted that her comment in the previous meeting minutes regarding "overestimating conservation would lead to incorrect planning" should have read "overestimating conservation would lead to **insufficient** planning".

5. **Status update on Water Management Strategy evaluations**

Neil led the discussion. The committee noted that they have a tolerance/comfort for unmet needs, when no strategy was requested by municipalities.

6. **Status update on Municipal Conservation Survey and proposed GPCD goals: Discuss and take action as needed.**

Robert Adam led the discussion. He noted that we received feedback from several stakeholders, and made changes to two of the WUGs based on their feedback.

Christianne noted that the survey had a very low response rate, and questioned the assumption that no response by an entity could be taken as tacit agreement with the proposed GPCD numbers. She said that if conservation is overestimated, then we are not sufficiently planning for future needs.

7. **Proposed Water Conservation Strategies: Discuss and take action as needed.**

- Proposed Water Loss Mitigation Strategies.

Robert led the discussion.

David spoke about two large water breaks that had occurred in his community. He asked how that water is accounted for. Robert said that the lost water should be accounted for in the TWDB audit. David notes that it would pay to be more aware and get ahead of accounting for those types of events. Earl also noted that the loss should be in the TWDB audit. Josh said that if you don't account for it, it makes your numbers look worse, i.e. makes your per-capita use appear to increase.

Robert said that the water loss can show up as an anomaly in trends for water use. Josh asked if the savings was for accounted or unaccounted, Robert said "both".

- Proposed Demand Reduction Strategies

Robert led the discussion of costs for demand reduction strategies.

Christianne asked about the percentage categories for the reduction strategies. Robert said if the GPCD reductions were for the entire planning period, then they assumed that they needed a higher implementation of conservation strategies. Christianne asked about the water conservation coordinator, Robert indicated that this strategy implies a full time coordinator. David asked about where the funding comes from. Robert said that the planning group has no enforcement but are providing guidance which gives the entities an idea of how much they would have to spend to meet the demand reduction objectives. David asks whether the planning group estimates match reality. Robert noted that the plan is updated every 5 years, so there is an opportunity to check against reality.

Lauri noted that it's a plan, not an enforceable action. Robert noted that the objective is to provide tools for the users so they know what has to be done. David noted that this relies on the user implementation. Robert said that there has been a lot of progress in GPCD reduction since the first planning cycle. Teresa said Austin has made progress, especially since the drought of 2011.

Teresa moved to recommend the demand reduction strategies, Barbara seconded. Motion carried.

8. **Proposed Agricultural Conservation Strategies: Discuss and take action as needed.**

Robert led the discussion. He noted that some of the numbers had been updated and that the posted slides will reflect this at some point after the meeting.

Carol asked if canal lining was concrete, Robert indicated that it was a bentonite product.

Jim asked whether the strategies included expanded groundwater use. Robert noted that it would be a strategy (not irrigation conservation) proposed in the plan. Josh asked about conservation percents in San Saba versus Mills Counties, nothing that the proportional conservation is not the same between the two.

Christianne asked if an agricultural representative (Daniel Bergland) had seen these and had a chance to review them. Lauri noted that Daniel had the materials as of a week ago, has not provided an comment to date.

Jim moved to recommend the agricultural conservation strategies, Christianne seconded. Motion passed.

9. Proposed Drought Management Strategies: Discuss and take action as needed.

Robert led the discussion.

Robert noted we needed to correct "safe yield" to "firm yield" on slide 32. Monica noted that LCRA has not done explicit climate modeling [slide indicated that both Austin and LCRA had performed climate modeling], and Robert indicated that the statement will be corrected. David asked that the bullet that said "conservative" should be changed to "lower". After some discussion, the statement was agreed to be clarified as "becoming more efficient". So Slide 33 would be corrected to "greater efficiency, with lower demands".

Jennifer proposed adding additional reduction due to this being a dry year planning, for example assuming that folks will implement stage 2 as drought contingency plan. Something like 5-10%. Jennifer noted that while some cities are using stage 1 for year round, she still thinks there should be some additional savings. Since the consulting team had proposed no additional savings through drought management strategies, Lauri asked that this topic be brought up in the next meeting.

10. Other Water Management Strategies: Discuss and take action as needed.

Josh noted that DPR was a very complicated and expensive strategy, and questioned the plausibility of some of the entities implementing it. Josh asked that Llano DPR strategy be removed from the plan.

Teresa noted that the Austin return flows WMS would be brought forward in the next WMSC meeting, and discussed in more detail in the water modeling committee meeting.

Lauri moved to recommend the other water management strategies, Christianne seconded. The motion passed.

11. Next meeting date – to be determined

12. Future agenda items – to be determined

1. Discuss drought management strategies
2. Austin return flow strategy
3. Other WMSs

13. General public comments – limited to 3 minutes per person

None.

14. Adjourn

Meeting was adjourned at 10:10a.

DRAFT MINUTES

Lower Colorado Regional Water Planning Group

Water Management Strategy Committee Meeting

Freese and Nichols, 10431 Morado Circle, Building 5, Suite 300, Conference Room "Capital of Texas", Austin, Texas 78759

THIS IS A HYBRID MEETING:
LINK

January 31, 2025, 10:00 a.m.

In-Person

Lauri Gilliam	Small Muni
Teresa Lutes	Municipalities
Monica Masters	River Authority
Christianne Castleberry	Water Utilities
Mike Reagor	Small Municipalities
Barbara Johnson	Industry
Carol Olewin	Public Interest
Earl Foster	alt to Lauri Gilliam
Josh Becker	alt to Mike Reagor
Robert Adams	Plummer
Adam Conner	FNI

Virtual

Daniel Berglund	Small Business
Jennifer Walker	Environment
Jim Brasher	GMA-15
Tom Hegemier	alt to Monica Masters
Mary Ann Baker	alt to Carol Olewin
Stacy Pandey	LCRA
Leonard Oliver	LCRA
Collins Balcolme	LCRA
Dacy Cameron	Aqua WSC
Chandler Crouch	Texas Water Trade

Committee Meeting:

1. Call to order – Chair Lauri Gillam

Meeting was called to order at 10:03.

2. Welcome and introductions – Lauri Gillam

3. Receive public comments on specific issues related to agenda items 5 through 7 – limited to 3 minutes per person

None.

4. Approval of minutes from previous meeting(s)

Teresa moved to approve the minutes from the previous meeting, seconded by Barbara. The motion passed by voice vote.

5. Status update on Water Management Strategy evaluations

Neil led the discussion, noted that two strategies (in addition to drought management) would be considered today. He also discussed the municipal unmet needs in Region K, and noted that most were fairly minor with the exception of County-Other, Hays. Chair Gillam noted that the committee and region in general were aware that some municipal unmet needs would be reported in the IPP this cycle.

6. Proposed Drought Management Strategies: Discuss and take action as needed.

Robert Adams led the discussion. He started by noting that drought management (DM) was considered to be similar to conservation in the previous planning cycle, applied as a demand reduction in the second-tier needs calculation. He noted that DM was required to be considered based on planning guidance. However, due to our approved conservation approach, which is aggressive, he did not think it was appropriate to do an across-the-board 20% demand reduction associated with DM in the current cycle. He noted that the conservation approach in this cycle resulted in greater demand reduction in many cases, than the combined conservation/DM approach from the previous cycle. He suggested that DM be applied only to water user groups (WUGs) with unmet municipal needs.

Barbara asked about the difference between conservation and drought management. Mike explained that conservation is an ongoing practice, whereas drought management involves emergency measures such as water rationing. Jennifer elaborated on the distinction between conservation and drought management, emphasizing that conservation is a year-round practice, while drought management is triggered by specific conditions such as water supply levels, treatment capacity, or outages rather than climatological drought. Josh pointed out that conservation is *proactive*, whereas drought management is *reactive*.

Robert mentioned that many Water User Groups (WUGs) submitted DCPs, mistakenly thinking they were conservation plans, highlighting some confusion between the two concepts. The committee reviewed the calculations of demand reduction in the current plan under conservation, versus the previous cycle approach using conservation plus DM.

Jennifer noted that visible water waste and excessive use in communities should be addressed through conservation, but emphasized that DM should not be abandoned as a water management strategy (WMS). Removing DCPs from the plan could create a potential gap in water supply, necessitating additional infrastructure to compensate. Robert reflected on the progress made over the past 25 years, noting that while drought remains a key factor, historical drought data from that period serves as the foundation for current demand projections.

The committee discussed the development of the DM approach in the last cycle, Teresa noted that reductions were intentionally applied across the board to ensure fairness, similar to the approach for conservation in the current cycle. Lauri supported consulting individual WUGs for DM decisions, while Monica noted that Stage II restrictions no longer achieve a 20% reduction. Robert pointed out that while requirements vary, the Lower Colorado River Authority (LCRA) enforces some level of uniformity. Josh suggested pushing the state to standardize DCPs, and Robert mentioned that Chapter 8 includes recommendations to that effect. Mike observed that what was once considered Phase I conservation is now a standard voluntary practice. Teresa recalled that the previous cycle included a 20% reduction, suggesting that a lower reduction—perhaps 5%—would still be meaningful without being overly impactful. She noted that Jennifer's logic supported this approach, as reductions are based on drought conditions, lower supply, and higher demands. While reductions may not be as significant as in the past, they remain important.

Christianne supported including drought management in the accounting process, cautioning against overestimating conservation and drought management capabilities, which could lead to underestimating actual water needs. She stressed the importance of logical planning to identify true unmet demands. Carol inquired about how deficiency data is communicated to WUGs, and Robert explained that WUGs audit their GPCD to assess their standing and future targets through self-analysis.

Lauri summarized the discussion up to this point as three possible approaches: maintaining the 2021 approach with 20% reduction, maintaining the 2021 approach but lowering the reduction to 5% as Teresa suggested, or adopting Robert's individualized approach to WUGs with unmet needs. Christianne suggested highlighting (in the tables that Robert presented) those WUGs who could achieve additional benefits from DM in the IPP.

Jennifer supported Teresa's proposal of 5% as a WMS, stating that strategy implementation is key. She noted that lowering the percentage addresses some concerns, proposing either a 5% or 10% reduction. She emphasized that applying reductions only to areas with unmet needs may not be ideal, as implementing DCPs should be a universal practice. She reiterated that the State Water Plan (SWP) is a drought-based plan that balances supply and demand, making it logical to incorporate DCPs.

Teresa questioned whether DM should be applied prior to second-tier needs. Lauri observed that the committee was not uncomfortable with showing unmet needs and therefore supported not using DCPs solely to address those needs. Barb suggested including a recommendation that WUGs with unmet needs implement aggressive DCPs.

Teresa proposed setting a 5% DCP strategy across Region K, prompting Monica to affirm that it should apply universally. Christianne recommended including a policy to identify areas where additional DCP potential exists. She also raised the issue of whether second-tier needs should be addressed with DM or simply categorized as unmet needs. The committee discussed whether to account for second-tier needs separately or leave them as unmet.

Monica made a motion that on the strategy side, we develop a drought management strategy for all WUGs each decade of 5% demand reduction. On the needs side, when calculating second-tier needs we just subtract conservation and reuse, not drought management, and we are okay if some of the WUGs are showing an unmet need in the future. Finally, in the writeup, we suggest that WUGs with unmet needs implement more aggressive drought management.

Lauri seconded the motion. The motion passed by voice vote.

7. Other Water Management Strategies: Discuss and take action as needed.

Adam discussed strategy for Llano – a contract with LCRA would increase reliability of Llano's surface water rights**,** without increasing infrastructure. Mike noted that negotiations were ongoing. Adam said that was fine, the strategy could still be considered by the committee.

Monica move we recommend the strategy, and Christianne seconded the motion. The motion passed by voice vote.

Teresa led the discussion on Austin's return flows, explaining how reuse and reclaimed water usage impact return flows. Over the planning horizon, reuse is expected to increase, leading to a corresponding decrease in return flows. Richard H. conducted the surface water modeling to estimate the benefits of these return flows. The table detailing these estimates will be reviewed at the Water Management Committee (WMC) meeting next week.

Barbara asked why return flows increase over time. Teresa clarified that effluent production increases at a faster rate than reuse. Barb noted that in past plans, Austin has indicated that 100% reuse could happen in the future and questioned whether the current return flows are only temporary. Teresa explained that, while there is no requirement to return effluent to the river, significant amounts are currently being returned. The planning projections do not assume full reuse within the 50-year horizon, allowing for a balance between the benefits of reuse and the benefits of return flows.

Jim Brasher then inquired about the Pierce Ranch and Garwood industrial water rights. Leonard explained that the modeling uses an industrial water use pattern to estimate the benefits to the Garwood water right. The Garwood industrial allocation consists of 33,000 acre-feet per year that LCRA does not set aside for Garwood irrigation. Under the purchase agreement, 100,000 acre-feet per year is reserved for agricultural irrigation, while the remaining 33,000 acre-feet per year is not obligated for irrigation use and is marked for industrial or other purposes. Jim found this distinction confusing and asked whether the Garwood right includes the Corpus Christi water right. Leonard clarified that the Corpus Christi right, which accounts for 35,000 acre-feet per year, is separate and not included in this analysis.

Teresa moved to recommend the Austin return flows WMS, Lauri seconded. The motion passed by voice vote.

8. Next meeting date – to be determined

As needed based on comments on the IPP.

9. Future agenda items – to be determined

As needed based on comments on the IPP.

10. General public comments – limited to 3 minutes per person

Daniel made a comment on what he felt like was an inaccurate statement on Slide 9, which had suggested that increased demand increases the likelihood of drought. Neil agreed, and suggested that it would be better stated that increased demand during drought increases the overall impacts of the drought.

11. Adjourn

Adjourned at 11:20p

Appendix 5.B

Region K Considered and Evaluated Water Management Strategy Table

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

WUG Name	Maximum need 2030-2080 (af/yr)	conservation - water use reduction	conservation - water loss mitigation	drought management	reuse	management of existing supplies	development of large-scale marine seawater or brackish groundwater	conjunctive use	acquisition of available existing supplies	development of new supplies	development of regional water supply or regional management of water supply facilities	voluntary transfer of water (including regional water banks, sales, leases, options, subordination agreements, and financing agreements)	emergency transfer of water under Section 11.139	system optimization, reallocation of reservoir storage to new uses, contracts, water marketing, enhancement of yield, improvement of water quality	new surface water supply	new groundwater supply	brush management; precipitation enhancement	interbasin transfers of surface water	aquifer storage and recovery	cancellation of water rights	rainwater harvesting	other
Aqua WSC	*(26,581)*	PF	PF	PF	PF	nPF	PF	PF	nPF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	PF	nPF	nPF	
Austin	*(100,041)*	PF	PF	PF	PF	PF	PF	nPF	nPF	PF	nPF	PF	nPF	PF	PF	nPF	nPF	nPF	PF	nPF	PF	
Barton Creek WSC	*(228)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Bastrop County WCID 2	*(756)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Bertram	*(2,397)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Briarcliff	*(588)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Buda	*(3,923)*	PF	PF	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	
Cottonwood Shores	*(7)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Creedmoor-Maha WSC	*(871)*	PF	PF	PF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Dripping Springs WSC	*(4,689)*	PF	PF	PF	PF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Elgin	*(4,142)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Fayette WSC	*(201)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Goldthwaite	*(108)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Hays	*(580)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Hays County WCID 1	*(86)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Hays County WCID 2	*(93)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Hornsby Bend Utility	*(1,177)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Horseshoe Bay	*(244)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Johnson City	*(54)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Jonestown WSC	*(1,376)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Kingsland WSC	*(622)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Lago Vista	*(6,941)*	PF	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Leander	*(902)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	PF	nPF	nPF	nPF	PF	nPF	nPF	nPF	
Llano	*(697)*	PF	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Manor	*(3,567)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Meadowlakes	*(589)*	PF	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Mid-Tex Utilities	*(1,143)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
North Austin MUD 1	*(979)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Northtown MUD	*(838)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Pflugerville	*(7,502)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	PF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Reunion Ranch WCID	*(1,140)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Rollingwood	*(434)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Shady Hollow MUD	*(654)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Sunset Valley	*(244)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Travis County MUD 10	*(176)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	PF	nPF	nPF	nPF	nPF	nPF	
Travis County MUD 2	*(691)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Travis County MUD 4	*(264)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Travis County WCID 10	*(1,013)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Travis County WCID 17	*(14,953)*	PF	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Travis County WCID 20	*(221)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Travis County WCID Point Venture	*(778)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Wells Branch MUD	*(1,585)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
West Travis County Public Utility Agency	*(36,733)*	PF	PF	PF	PF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Windermere Utility	*(674)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
County-Other, Burnet	*(250)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
County-Other, Hays	*(21,991)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	
County-Other, Bastrop	*(2,056)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
County-Other, Gillespie	*(989)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Irrigation, Colorado	*(52,409)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Irrigation, Matagorda	*(140,964)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Irrigation, Mills	*(3,084)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Irrigation, Wharton	*(104,385)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Irrigation, Burnet	*(109)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Irrigation, San Saba	*(1,300)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Manufacturing, Burnet	*(160)*	PF	PF	PF	nPF	nPF	nPF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Manufacturing, Gillespie	*(133)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Manufacturing, Matagorda	*(2,770)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Mining, Burnet	*(475)*	PF	PF	PF	nPF	nPF	nPF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Mining, Williamson	*(2,521)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Mining, Mills	*(126)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Mining, Hays	*(306)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	

nPF = considered but determined 'not potentially feasible' (may include WMSs that were initially identified as potentially feasible)

PF = considered 'potentially feasible' and therefore evaluated

(all WMS evaluations shall be presented in the regional water plan including for WMSs considered potentially feasible but not recommended)

WUGs WITH NEED (REGION K NOT PRIMARY)																						
Brushy Creek MUD (G)	*(19)*	PF	PF	PF	nPF	nPF	nPF	PF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Canyon Lake Water Service (L)	*(249)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Cedar Park (G)	*(724)*	PF	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	
Corix Utilities Texas Inc (G)	*(945)*	PF	PF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Goforth SUD (L)	*(265)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	
Round Rock (G)	*(173)*	PF	PF	PF	nPF	nPF	nPF	PF	PF	PF	PF	nPF	nPF	nPF	PF	nPF	nPF	nPF	nPF	nPF	nPF	
Williamson County WSID 3 (G)	*(27)*	PF	PF	PF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	nPF	

Appendix 5.C

Region K Potentially Feasible Water Management Strategy Screening

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

In accordance with TWDB rules and guidelines, the Lower Colorado Regional Water Planning Group has adopted a standard procedure for ranking potential water management strategies. This procedure classifies the strategies using the TWDB's standard categories developed for regional water planning.

The strategies are ranked based upon the following categories:

- Cost per Acre-Foot
- Supply
- Environmental and Natural Resources
- Institutional Constraints
- Socioeconomic Impacts
- Impacts on Water Resources
- Impacts on Agricultural Resources
- Impacts to Recreation
- Impacts on Other Water Management Strategies

Each category is quantitatively assessed and assigned a ranking from -1 (Negative), 0 (Neutral), and 1 (Positive). Table 1 shows the correlation between the category and the ranking of select categories.

Table 1: Screening Matrix Category Ranking Correlation

Rank	Cost per Ac-Ft	Supply	Impacts on Agricultural Resources	Impacts on Water Resources, Recreation, and Other Water Management Strategies
-1	>$3,500	<10% of total demand in Decade of Maximum Supply	Greater than 50,000 acre-feet of irrigated agriculture in Source County (2022)	High
0	$2,000-$3,500	10-25% of total demand in Decade of Maximum Supply	10,000-50,000 acre-feet of irrigated agriculture in Source County (2022)	Medium
1	<$2,000	>25% of total demand in Decade of Maximum Supply	Less than 10,000 acre-feet of irrigated agriculture in Source County (2022)	Negligible/None/Positive Impact

Region K Potentially Feasible Water Management Strategy Screening (for 2026 Region K Plan)

	Water User Group or Wholesale Provider	Water Management Strategy	Strategy Description	Recommended or Alternative?	Source County	Cost of Water ($/ac-ft)	Year of Max Supply	Max Supply (ac-ft/yr)	Demand in Year of Max Supply (ac-ft/yr)	Screening Matrix Factors (Positive (1), Neutral (0), Negative (-1))										Total of Screening Factors
										Cost	Supply	Water Quality	Environmental and Natural Resources	Institutional Constraints	Socioeconomic Impacts	Impacts on Water Resources	Impacts on Agricultural Resources	Impacts to Recreation	Impacts on Other Water Management Strategies	
1	Aqua WSC	**Downstream Return Flows**		Recommended	Travis				#N/A	1	0	0	1	-1	0	0	1	0	0	2
2	Aqua WSC	**Direct Potable Reuse - Aqua WSC**	Reuse not used in future reservoir or ASR project	Recommended	Bastrop	$2,900	2040	2,200	17,450	0	0	-1	1	-1	0	1	1	0	0	1
3	Aqua WSC	**Aquifer Storage and Recovery - Aqua WSC**	Aquifer storage and recovery (ASR)	Recommended	Bastrop		2040	5,000	17,450	1	1	0	0	-1	0	1	1	0	0	3
4	Aqua WSC	**Brackish Groundwater Blending - Aqua WSC**	Desalination required, not used in new reservoir or ASR or AR project	Recommended	Caldwell	$1,370	2030	2,000	14,146	1	0	-1	0	-1	0	1	1	0	0	1
5	Aqua WSC	**Brackish Groundwater Desalination - Aqua WSC**	Desalination required, not used in new reservoir or ASR or AR project	Recommended	Caldwell	$1,608	2040	2,000	17,450	1	0	-1	0	-1	0	1	1	0	0	1
6	Austin	**Austin - Decentralized Direct Non-Potable Reuse**	Reuse not used in future reservoir or ASR project	Recommended	Travis	$366	2080	1,300	398,210	1	-1	-1	0	-1	0	1	1	0	0	0
7	Austin	**Austin - Longhorn Dam Operation Improvements**		Recommended	Travis	$36	2040	3,000	244,339	1	-1	0	0	0	0	0	1	0	0	1
8	Austin	**Austin - Capture Local Inflows to Lady Bird Lake**		Recommended	Travis	$213	2050	3,000	283,369	1	-1	0	0	0	0	0	1	0	0	1
9	Austin	**Austin - Lake Austin Operations**		Recommended	Travis	$436	2030	1,250	207,993	1	-1	0	0	0	0	0	1	1	0	2
10	Austin	**Austin - Onsite Rainwater and Stormwater Harvesting**		Recommended	Travis	$1,165	2080	4,900	398,210	1	-1	-1	1	-1	0	0	1	0	0	0
11	Austin	**Austin - Indirect Potable Reuse Through Lady Bird Lake**		Recommended	Travis	$457	2080	20,000	398,210	1	-1	0	-1	-1	0	0	1	0	0	-1
12	Austin	**Austin - Aquifer Storage and Recovery**		Recommended	Bastrop	$2,234	2080	15,800	398,210	0	-1	0	0	-1	0	1	1	0	0	0
13	Austin	**Austin - Brackish Groundwater Desalination**		Recommended	Travis	$2,995	2080	2,700	398,210	0	-1	-1	0	-1	0	1	1	0	0	-1
15	Austin	**Austin - Centralized Direct Non-Potable Reuse**		Recommended	Travis	$995	2080	26,900	398,210	1	-1	0	1	-1	0	1	1	0	0	2
16	Austin	**Austin - Blackwater and Greywater Reuse**	Reuse not used in future reservoir or ASR project	Recommended	Travis	$2,534	2080	10,600	398,210	0	-1	-1	1	-1	0	1	1	0	0	0
17	Austin	**Austin - Community-Scale Stormwater Harvesting**		Recommended	Travis	$645	2080	236	398,210	1	-1	0	1	-1	0	0	1	0	0	1
18	Austin	**Austin - Off-Channel Reservoir And Evaporation Suppression**		Recommended	Reservoir	$1,018	2080	25,827	398,210	1	-1	0	0	-1	0	0	0	0	0	-1
19	Barton Creek WSC	**Water Purchase Amendment - Barton Creek WSC**		Recommended	Reservoir	$1,629	2030	90	419	1	0	0	0	0	0	0	0	0	0	1
20	Bastrop County WCID 2	**Expanded Local Use of Groundwater - Carrizo-Wilcox Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$864	2080	750	1,229	1	1	0	0	1	0	0	1	0	0	4
21	Bertram	**Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Burnet	$1,883	2080	1,100	2,918	1	1	0	0	1	0	0	1	0	0	4
22	Briarcliff	**LCRA - Highland Lakes Existing Supplies Allocation**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2040	85	581	1	0	0	0	0	0	0	0	-1	0	0
23	Briarcliff	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	509	988	-1	1	0	0	-1	0	0	0	1	0	0

Region K Potentially Feasible Water Management Strategy Screening (for 2026 Region K Plan)

	Water User Group or Wholesale Provider	Water Management Strategy	Strategy Description	Recommended or Alternative?	Source County	Cost of Water ($/ac-ft)	Year of Max Supply	Max Supply (ac-ft/yr)	Demand in Year of Max Supply (ac-ft/yr)	Screening Matrix Factors (Positive (1), Neutral (0), Negative (-1))										Total of Screening Factors
										Cost	Supply	Water Quality	Environmental and Natural Resources	Institutional Constraints	Socioeconomic Impacts	Impacts on Water Resources	Impacts on Agricultural Resources	Impacts to Recreation	Impacts on Other Water Management Strategies	
24	Briarcliff	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	59	870	-1	-1	0	0	0	0	0	1	0	0	-1
25	Buda	**Edwards/Middle Trinity ASR**	Aquifer storage and recovery (ASR)	Recommended	Hays	$858	2030	600	3,236	1	0	0	0	-1	0	1	1	0	0	2
26	Buda	**Direct Reuse - Buda**	Reuse not used in future reservoir or ASR project	Recommended	Hays	$0	2040	1,020	4,515	1	0	0	1	-1	0	1	1	0	0	3
27	Buda	**Direct Potable Reuse - Buda**	Reuse not used in future reservoir or ASR project	Recommended	Hays	$3,170	2040	1,680	4,515	0	1	-1	1	-1	0	1	1	0	0	2
28	Buda	**ARWA - Phase 2**		Recommended	Caldwell	$638	2050	1,067	5,380	1	0	0	0	0	0	0	1	0	0	2
29	Buda	**ARWA Shared Project (Phase 1)**		Recommended	Caldwell	$1,430	2030	755	3,236	1	0	0	0	0	0	0	1	0	0	2
30	Buda	**ARWA - Phase 3**		Recommended	Hays	$1,995	2070	157	7,239	1	-1	0	0	0	0	0	1	0	0	1
31	Cottonwood Shores	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$609	2080	7	502	1	-1	0	0	-1	0	0	0	1	0	0
32	County-Other, Bastrop	**Expanded Local Use of Groundwater - Carrizo-Wilcox Aquifer**		Recommended	Bastrop	$0	2080	850	#N/A	1	0	0	0	1	0	0	1	0	0	3
33	County-Other, Gillespie	**Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Gillespie	$4,878	2080	200	#N/A	-1	0	0	0	1	0	0	1	0	0	1
34	County-Other, Gillespie	**Expanded Local Use of Groundwater - Edwards Trinity (Plateau) Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Gillespie	$4,878	2080	800	#N/A	-1	0	0	0	1	0	0	1	0	0	1
35	County-Other, Gillespie	**Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer**		Recommended	San Saba	$0			#N/A	1	0	0	0	1	0	0	0	0	0	2
36	Creedmoor-Maha WSC	**Brackish Groundwater Desalination - Creedmoor Maha WSC**	Desalination required, not used in new reservoir or ASR or AR project	Recommended	Travis	$5,915	2040	2,200	902	-1	1	-1	0	-1	0	1	1	0	0	0
37	Creedmoor-Maha WSC	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$609	2080	2,466	1,428	1	1	0	0	-1	0	0	0	1	0	2
39	Dripping Springs WSC	**Expanded Local Use of Groundwater - Trinity Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Hays	$2,003	2050	300	5,854	0	-1	0	0	-1	0	-1	1	0	-1	-3
40	Dripping Springs WSC	**Direct Reuse - Dripping Springs WSC**	Reuse not used in future reservoir or ASR project	Recommended	Hays	$251	2070	672	6,940	1	-1	0	1	-1	0	1	1	0	0	2
41	Dripping Springs WSC	**Direct Potable Reuse - Dripping Springs WSC**	Reuse not used in future reservoir or ASR project	Recommended	Hays	$3,127	2040	560	4,044	0	0	0	1	-1	0	1	1	0	0	2
42	Dripping Springs WSC	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2050	985	5,854	1	0	0	0	0	0	0	0	-1	0	0
43	Dripping Springs WSC	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	3,914	6,940	-1	1	0	0	-1	0	0	0	1	0	0
44	Dripping Springs WSC	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	582	6,940	-1	-1	0	0	0	0	0	1	0	0	-1
45	Hays County WCID 1	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2030	86	803	1	0	0	0	0	0	0	0	-1	0	0
46	Hays County WCID 1	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	48	801	-1	-1	0	0	-1	0	0	0	1	0	-2
47	Hays County WCID 1	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	28	801	-1	-1	0	0	0	0	0	1	0	0	-1
48	Hays County WCID 2	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2030	93	777	1	0	0	0	0	0	0	0	-1	0	0

Region K Potentially Feasible Water Management Strategy Screening (for 2026 Region K Plan)

	Water User Group or Wholesale Provider	Water Management Strategy	Strategy Description	Recommended or Alternative?	Source County	Cost of Water ($/ac-ft)	Year of Max Supply	Max Supply (ac-ft/yr)	Demand in Year of Max Supply (ac-ft/yr)	Screening Matrix Factors (Positive (1), Neutral (0), Negative (-1)) Cost	Supply	Water Quality	Environmental and Natural Resources	Institutional Constraints	Socioeconomic Impacts	Impacts on Water Resources	Impacts on Agricultural Resources	Impacts to Recreation	Impacts on Other Water Management Strategies	Total of Screening Factors
49	Hays County WCID 2	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	52	775	-1	-1	0	0	-1	0	0	0	1	0	-2
50	Hays County WCID 2	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	30	775	-1	-1	0	0	0	0	0	1	0	0	-1
51	Irrigation, Colorado	**Austin Return Flows**		Recommended	Travis	$0			#N/A	1	0	0	1	0	0	0	1	1	0	4
52	Irrigation, Colorado	**Expanded Local Use of Groundwater - Gulf Coast Aquifer**		Recommended	Colorado	$0			#N/A	1	0	0	0	1	0	0	-1	0	0	1
53	Irrigation, Gillespie	**Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Gillespie	$180	2030	100	#N/A	1	0	0	0	1	0	0	1	0	0	3
54	Irrigation, Matagorda	**Austin Return Flows**		Recommended	Travis	$0			#N/A	1	0	0	1	0	0	0	1	1	0	4
55	Irrigation, San Saba	**Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	San Saba	$262	2030	650	#N/A	1	0	0	0	1	0	0	0	0	0	2
56	Irrigation, Wharton	**Expand Use of Groundwater - Irrigation**		Alternative	Wharton	$66	2030	8,067	#N/A	1	0	0	0	1	0	0	-1	0	0	1
57	Irrigation, Wharton	**Austin Return Flows**		Recommended	Travis	$0			#N/A	1	0	0	1	0	0	0	1	1	0	4
58	Jonestown WSC	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2050	132	1,234	1	0	0	0	0	0	0	0	-1	0	0
59	Jonestown WSC	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	1,254	2,126	-1	1	0	0	-1	0	0	0	1	0	0
60	Jonestown WSC	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	91	1,773	-1	-1	0	0	0	0	0	1	0	0	-1
61	Kingsland WSC	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	622	1,882	-1	1	0	0	-1	0	0	0	1	0	0
62	Lago Vista	**Direct Reuse - Lago Vista**	Reuse not used in future reservoir or ASR project	Recommended	Travis	$211	2070	673	11,312	1	-1	0	1	-1	0	1	1	0	0	2
63	Lago Vista	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2040	509	5,999	1	-1	0	0	0	0	0	0	-1	0	-1
64	Lago Vista	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	6,475	11,856	-1	1	0	0	-1	0	0	0	1	0	0
65	Lago Vista	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	352	11,312	-1	-1	0	0	0	0	0	1	0	0	-1
66	Llano	**Direct Potable Reuse - Llano**		Alternative	Llano	$3,764	2040	280	804	-1	1	-1	1	-1	0	0	1	0	0	0
67	Lower Colorado River Authority - Unassigned Water Volumes	**Austin Return Flows**		Recommended	Travis	$0			N/A	1	0	0	1	-1	0	0	1	1	0	3
68	Lower Colorado River Authority - Unassigned Water Volumes	**Downstream Return Flows**		Recommended	Travis	$0			N/A	1	0	0	1	-1	0	0	1	1	0	3
69	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - Aquifer Storage and Recovery**	Aquifer storage and recovery (ASR)	Recommended	Bastrop	$3,348	2050	22,000	N/A	0	0	0	0	-1	0	1	1	0	0	1
70	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - Import Return Flows from Williamson County**	Surface water yield enhancement	Recommended	Williamson	$495	2070	25,000	N/A	1	0	0	1	-1	0	0	1	0	0	2
71	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2050	57,391	N/A	-1	0	0	0	-1	0	0	0	1	0	-1

Region K Potentially Feasible Water Management Strategy Screening (for 2026 Region K Plan)

	Water User Group or Wholesale Provider	Water Management Strategy	Strategy Description	Recommended or Alternative?	Source County	Cost of Water ($/ac-ft)	Year of Max Supply	Max Supply (ac-ft/yr)	Demand in Year of Max Supply (ac-ft/yr)	Screening Matrix Factors (Positive (1), Neutral (0), Negative (-1)) Cost	Supply	Water Quality	Environmental and Natural Resources	Institutional Constraints	Socioeconomic Impacts	Impacts on Water Resources	Impacts on Agricultural Resources	Impacts to Recreation	Impacts on Other Water Management Strategies	Total of Screening Factors
72	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2030	2,149	N/A	1	0	0	0	0	0	0	0	-1	0	0
73	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2060	8,046	N/A	-1	0	0	0	0	0	0	1	0	0	0
74	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - Expanded Use of Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$627	2070	16,000	N/A	1	0	0	0	0	0	0	1	0	0	2
75	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - Lake Bastrop Water Supply Project**	Surface water yield enhancement	Recommended	Reservoir	$634	2040	10,200	N/A	1	0	0	0	0	0	0	0	0	0	1
76	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - Seawater Desalination**	Desalination required, not used in new reservoir or ASR or AR project	Recommended	Gulf of Mexico	$10,281	2060	30,000	N/A	-1	0	-1	-1	-1	0	0	0	0	0	-4
77	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA Alternative - Baylor Creek Reservoir**	New major reservoir	Alternative	Reservoir	$4,798	2050	29,000	N/A	-1	0	0	-1	-1	0	0	0	1	0	-2
78	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA - Downstream Return Flows**	Surface water yield enhancement	Recommended	Travis	$11			N/A	1	0	0	1	-1	0	0	1	1	0	3
79	Lower Colorado River Authority - Unassigned Water Volumes	**LCRA Alternative - Expanded Use of Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Alternative	Bastrop	$401	2040	25,000	N/A	1	0	0	0	-1	0	0	1	0	0	1
81	Lower Colorado River Authority - Water Loss	**Austin Return Flows**		Recommended	Travis	$0			N/A	1	0	0	1	-1	0	0	1	1	0	3
82	Manufacturing, Burnet	**Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Burnet	$97	2030	80	556	1	0	0	0	0	0	0	1	0	0	2
83	Manufacturing, Burnet	**Expanded Use of Local Surface Water**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Burnet	$0	2030	80	556	1	0	0	0	0	0	0	1	0	0	2
84	Manufacturing, Burnet	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2030	144	556	1	1	0	0	0	0	0	0	-1	0	1
85	Manufacturing, Burnet	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	111	587	-1	0	0	0	-1	0	0	0	1	0	-1
86	Manufacturing, Burnet	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	49	580	-1	-1	0	0	0	0	0	1	0	0	-1
88	Manufacturing, Gillespie	**Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Gillespie	$300	2030	150	388	1	1	0	0	-1	0	0	1	0	0	2
89	Manufacturing, Matagorda	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2030	1,300	36,678	1	-1	0	0	0	0	0	0	-1	0	-1
90	Manufacturing, Matagorda	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	2,091	38,148	-1	-1	0	0	-1	0	0	0	1	0	-2
91	Manufacturing, Matagorda	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	510	37,832	-1	-1	0	0	0	0	0	1	0	0	-1
92	Marble Falls	**Direct Reuse - Marble Falls**		Recommended	Burnet	$296	2080	500	4,488	1	0	0	1	-1	0	1	1	0	0	3
93	Mid-Tex Utilities	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	773	1,143	-1	1	0	0	-1	0	0	0	1	0	0
94	Mid-Tex Utilities	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	279	937	-1	1	0	0	0	0	0	1	0	0	1
95	Mining, Burnet	**Expanded Local Use of Groundwater - Ellenburger-San Saba Aquifer**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Burnet	$64	2030	250	1,029	1	0	0	0	0	0	0	1	0	0	2

Region K Potentially Feasible Water Management Strategy Screening (for 2026 Region K Plan)

	Water User Group or Wholesale Provider	Water Management Strategy	Strategy Description	Recommended or Alternative?	Source County	Cost of Water ($/ac-ft)	Year of Max Supply	Max Supply (ac-ft/yr)	Demand in Year of Max Supply (ac-ft/yr)	Screening Matrix Factors (Positive (1), Neutral (0), Negative (-1)) Cost	Supply	Water Quality	Environmental and Natural Resources	Institutional Constraints	Socioeconomic Impacts	Impacts on Water Resources	Impacts on Agricultural Resources	Impacts to Recreation	Impacts on Other Water Management Strategies	Total of Screening Factors
96	Mining, Burnet	**Expanded Use of Local Surface Water**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Burnet	$0	2030	250	1,029	1	0	0	0	0	0	0	1	0	0	2
97	Mining, Hays	**Expanded Local Use of Groundwater - Trinity Aquifer**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Hays	$403	2030	325	959	1	1	0	0	-1	0	-1	1	0	-1	0
98	Mining, Hays	**Direct Reuse - Buda**		Recommended	Hays	$1,597			#N/A	1	0	0	0	-1	0	1	1	0	0	2
99	Mining, Llano	**Expanded Use of Local Surface Water**		Recommended	Burnet	$403	2030	325	2,214	1	0	0	0	0	0	0	1	0	0	2
101	Mining, Llano	**LCRA - Highland Lakes Existing Supplies Allocation**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2030	1,939	2,214	1	1	0	0	0	0	0	0	-1	0	1
102	Mining, Mills	**Expanded Local Use of Groundwater - Trinity Aquifer**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Mills	$469	2030	130	108	1	1	0	0	1	0	0	1	0	0	4
103	North Austin MUD 1	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	186	979	-1	0	0	0	-1	0	0	0	1	0	-1
104	North Austin MUD 1	**LCRA - Purchase Wholesale Groundwater**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	599	979	-1	1	0	0	0	0	0	1	0	0	1
105	Northtown MUD	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	272	838	-1	1	0	0	-1	0	0	0	1	0	0
106	Northtown MUD	**LCRA - Purchase Wholesale Groundwater**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	428	797	-1	1	0	0	0	0	0	1	0	0	1
107	Pflugerville	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	1,583	25,624	-1	-1	0	0	-1	0	0	0	1	0	-2
108	Reunion Ranch WCID	**LCRA - Highland Lakes Existing Supplies Allocation**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2040	49	454	1	0	0	0	0	0	0	0	-1	0	0
109	Reunion Ranch WCID	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	1,095	1,490	-1	1	0	0	-1	0	0	0	1	0	0
110	Reunion Ranch WCID	**LCRA - Purchase Wholesale Groundwater**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2030	33	315	-1	0	0	0	0	0	0	1	0	0	0
111	Rollingwood	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	106	434	-1	0	0	0	-1	0	0	0	1	0	-1
112	Rollingwood	**LCRA - Purchase Wholesale Groundwater**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	248	426	-1	1	0	0	0	0	0	1	0	0	1
113	Shady Hollow MUD	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	172	654	-1	1	0	0	-1	0	0	0	1	0	0
114	Shady Hollow MUD	**LCRA - Purchase Wholesale Groundwater**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	364	637	-1	1	0	0	0	0	0	1	0	0	1
115	Steam-Electric Power, Fayette	**Austin Return Flows**		Recommended	Travis	$0			#N/A	1	0	0	1	-1	0	0	1	1	0	3
117	Steam-Electric Power, Matagorda	**Austin Return Flows**		Recommended	Travis	$0			#N/A	1	0	0	1	-1	0	0	1	1	0	3
118	Steam-Electric Power, Matagorda	**Downstream Return Flows**		Recommended	Travis	$0			#N/A	1	0	0	1	-1	0	0	1	1	0	3
119	Steam-Electric Power, Travis	**Austin - Centralized Direct Non-Potable Reuse**		Recommended	Travis	$995			#N/A	1	0	0	1	-1	0	0	1	0	0	2
120	Sunset Valley	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	46	284	-1	0	0	0	-1	0	0	0	1	0	-1
121	Sunset Valley	**LCRA - Purchase Wholesale Groundwater**	groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	150	284	-1	1	0	0	0	0	0	1	0	0	1

	Water User Group or Wholesale Provider	Water Management Strategy	Strategy Description	Recommended or Alternative?	Source County	Cost of Water ($/ac-ft)	Year of Max Supply	Max Supply (ac-ft/yr)	Demand in Year of Max Supply (ac-ft/yr)	Screening Matrix Factors (Positive (1), Neutral (0), Negative (-1))										Total of Screening Factors
										Cost	Supply	Water Quality	Environmental and Natural Resources	Institutional Constraints	Socioeconomic Impacts	Impacts on Water Resources	Impacts on Agricultural Resources	Impacts to Recreation	Impacts on Other Water Management Strategies	
122	Travis County MUD 10	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2050	20	168	1	0	0	0	0	0	0	0	-1	0	0
123	Travis County MUD 10	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	158	272	-1	1	0	0	-1	0	0	0	1	0	0
124	Travis County MUD 10	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2040	13	137	-1	-1	0	0	0	0	0	1	0	0	-1
125	Travis County MUD 14	**Water Purchase Amendment - Travis County MUD 14**		Recommended	Bastrop	$1,222	2060	35	373	1	-1	0	0	0	0	0	1	0	0	1
126	Travis County WCID 10	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2040	29	3,705	1	-1	0	0	0	0	0	0	-1	0	-1
127	Travis County WCID 10	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	987	4,657	-1	0	0	0	-1	0	0	0	1	0	-1
128	Travis County WCID 10	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2040	19	3,705	-1	-1	0	0	0	0	0	1	0	0	-1
129	Travis County WCID 17	**Direct Reuse - Travis County WCID 17**	Reuse not used in future reservoir or ASR project	Recommended	Travis	$1,712	2040	510	14,529	1	-1	0	1	-1	0	1	1	0	0	2
130	Travis County WCID 17	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2040	951	14,529	1	-1	0	0	0	0	0	0	-1	0	-1
131	Travis County WCID 17	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	11,584	24,958	-1	1	0	0	-1	0	0	0	1	0	0
132	Travis County WCID 17	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	657	21,928	-1	-1	0	0	0	0	0	1	0	0	-1
133	Travis County WCID 20	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2030	221	755	1	1	0	0	0	0	0	0	-1	0	1
134	Travis County WCID 20	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	125	754	-1	0	0	0	-1	0	0	0	1	0	-1
135	Travis County WCID 20	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2050	71	754	-1	-1	0	0	0	0	0	1	0	0	-1
136	Travis County WCID Point Venture	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2030	125	410	1	1	0	0	0	0	0	0	-1	0	1
137	Travis County WCID Point Vent	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	687	1,063	-1	1	0	0	-1	0	0	0	1	0	0
138	Travis County WCID Point Vent	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	68	878	-1	-1	0	0	0	0	0	1	0	0	-1
139	Wells Branch MUD	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	320	1,585	-1	0	0	0	-1	0	0	0	1	0	-1
140	Wells Branch MUD	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	956	1,585	-1	1	0	0	0	0	0	1	0	0	1
141	West Travis County Public Utility Agency	**Direct Reuse - West Travis County PUA**	Reuse not used in future reservoir or ASR project	Recommended	Travis	$531	2030	224	15,301	1	-1	0	1	-1	0	0	1	0	0	1
143	West Travis County Public Utility Agency	**LCRA - Highland Lakes Existing Supplies Allocation**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Reservoir	$165	2050	3,454	26,155	1	0	0	0	0	0	0	0	-1	0	0
144	West Travis County Public Utility Agency	**LCRA - New Storage Development in the Lower Colorado Basin**	New major reservoir	Recommended	Reservoir	$4,238	2080	33,158	49,705	-1	1	0	0	-1	0	0	0	1	0	0
145	West Travis County Public Utility Agency	**LCRA - Purchase Wholesale Groundwater**	Existing surface water or groundwater supply requiring only conventional treatment and conveyance.	Recommended	Bastrop	$4,262	2070	2,254	40,848	-1	-1	0	0	0	0	0	1	0	0	-1

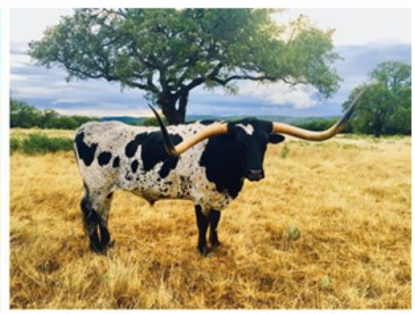
Appendix 5.D

Universal Costing Model Summary Pages









2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Aqua WSC - Aqua WSC Direct Potable Reuse

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (0 MGD)	$999,000
Well Fields (Wells, Pumps, and Piping)	$6,076,000
Advanced Water Treatment Facility (2.2 MGD)	$21,200,000
Integration, Relocations, Backup Generator & Other	$15,000
TOTAL COST OF FACILITIES	**$28,290,000**
- Planning (3%)	$849,000
- Design (7%)	$1,980,000
- Construction Engineering (1%)	$283,000
Legal Assistance (2%)	$566,000
Fiscal Services (2%)	$566,000
All Other Facilities Contingency (20%)	$5,658,000
Environmental & Archaeology Studies and Mitigation	$6,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$1,241,000
TOTAL COST OF PROJECT	**$39,439,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$2,774,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$61,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$25,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$2,674,000
Pumping Energy Costs (239698 kW-hr @ 0.09 $/kW-hr)	$22,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$5,556,000**
Available Project Yield (acft/yr)	2,200
Annual Cost of Water ($ per acft), based on PF=1	$2,525
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$1,265
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$7.75
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$3.88

Note: One or more cost element has been calculated externally

NED *1/10/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Bastrop County WCID 2 - Expand Local Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Transmission Pipeline (10 in. dia., 3.1 miles)	$3,595,000
Well Fields (Wells, Pumps, and Piping)	$2,103,000
TOTAL COST OF FACILITIES	**$5,698,000**
- Planning (3%)	$171,000
- Design (7%)	$399,000
- Construction Engineering (1%)	$57,000
Legal Assistance (2%)	$114,000
Fiscal Services (2%)	$114,000
Pipeline Contingency (15%)	$539,000
All Other Facilities Contingency (20%)	$421,000
Environmental & Archaeology Studies and Mitigation	$100,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$250,000
TOTAL COST OF PROJECT	**$7,926,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$558,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$57,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (425220 kW-hr @ 0.09 $/kW-hr)	$38,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$653,000**
Available Project Yield (acft/yr)	750
Annual Cost of Water ($ per acft), based on PF=1.5	$871
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$127
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$2.67
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.39

ND *12/11/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Bertram - Regional Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (0 MGD)	$2,920,000
Transmission Pipeline (16 in. dia., 12 miles)	$26,051,000
Well Fields (Wells, Pumps, and Piping)	$3,598,000
Integration, Relocations, Backup Generator & Other	$20,000
TOTAL COST OF FACILITIES	**$32,589,000**
- Planning (3%)	$978,000
- Design (7%)	$2,281,000
- Construction Engineering (1%)	$326,000
Legal Assistance (2%)	$652,000
Fiscal Services (2%)	$652,000
Pipeline Contingency (15%)	$3,908,000
All Other Facilities Contingency (20%)	$1,308,000
Environmental & Archaeology Studies and Mitigation	$420,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$1,409,000
TOTAL COST OF PROJECT	**$44,781,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$3,149,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$297,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$73,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (1626656 kW-hr @ 0.09 $/kW-hr)	$146,000
Purchase of Water (2000 acft/yr @ 60 $/acft)	$120,000
TOTAL ANNUAL COST	**$3,785,000**
Available Project Yield (acft/yr)	2,000
Annual Cost of Water ($ per acft), based on PF=2	$1,893
Annual Cost of Water After Debt Service ($ per acft), based on PF=2	$318
Annual Cost of Water ($ per 1,000 gallons), based on PF=2	$5.81
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=2	$0.98

NED *11/27/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Buda - BSEACD ASR

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (0 MGD)	$738,000
Transmission Pipeline (8 in. dia., 1 miles)	$1,879,000
Well Fields (Wells, Pumps, and Piping)	$1,794,000
Integration, Relocations, Backup Generator & Other	$5,000
TOTAL COST OF FACILITIES	**$4,416,000**
- Planning (3%)	$132,000
- Design (7%)	$309,000
- Construction Engineering (1%)	$44,000
Legal Assistance (2%)	$88,000
Fiscal Services (2%)	$88,000
Pipeline Contingency (15%)	$282,000
All Other Facilities Contingency (20%)	$507,000
Environmental & Archaeology Studies and Mitigation	$35,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$193,000
TOTAL COST OF PROJECT	**$6,115,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$430,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$37,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$18,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (355304 kW-hr @ 0.09 $/kW-hr)	$32,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$517,000**
Available Project Yield (acft/yr)	600
Annual Cost of Water ($ per acft), based on PF=1	$862
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$145
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$2.64
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.44

ND *12/11/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
County Other - Bastrop County - Expand Local Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (0 MGD)	$766,000
Transmission Pipeline (8 in. dia., 0.5 miles)	$505,000
Well Fields (Wells, Pumps, and Piping)	$2,264,000
Integration, Relocations, Backup Generator & Other	$3,000
TOTAL COST OF FACILITIES	**$3,538,000**
- Planning (3%)	$106,000
- Design (7%)	$248,000
- Construction Engineering (1%)	$35,000
Legal Assistance (2%)	$71,000
Fiscal Services (2%)	$71,000
Pipeline Contingency (15%)	$76,000
All Other Facilities Contingency (20%)	$607,000
Environmental & Archaeology Studies and Mitigation	$19,000
Land Acquisition and Surveying (8 acres)	$16,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$156,000
TOTAL COST OF PROJECT	**$4,943,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$348,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$28,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$19,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (536527 kW-hr @ 0.09 $/kW-hr)	$48,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$443,000**
Available Project Yield (acft/yr)	850
Annual Cost of Water ($ per acft), based on PF=1.5	$521
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$112
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$1.60
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.34

ND *12/12/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
County-Other, Gillespie County - Local Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$20,000
TOTAL COST OF FACILITIES	**$20,000**
- Planning (3%)	$1,000
- Design (7%)	$1,000
All Other Facilities Contingency (20%)	$4,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$1,000
TOTAL COST OF PROJECT	**$27,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$2,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$0
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (87 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$2,000**
Available Project Yield (acft/yr)	0
Annual Cost of Water ($ per acft), based on PF=0	$4,878
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$0
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$14.97
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.00

Note: One or more cost element has been calculated externally

NED *11/26/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Creedmoor Maha - Brackish Groundwater Desalination

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Intake Pump Stations (0 MGD)	$2,139,000
Transmission Pipeline (12 in. dia., 5 miles)	$6,546,000
Well Fields (Wells, Pumps, and Piping)	$12,460,000
Water Treatment Plant (2 MGD)	$32,539,000
Integration, Relocations, Backup Generator & Other	$64,000
TOTAL COST OF FACILITIES	**$55,152,000**
- Planning (3%)	$1,655,000
- Design (7%)	$3,861,000
- Construction Engineering (1%)	$552,000
Legal Assistance (2%)	$1,103,000
Fiscal Services (2%)	$1,103,000
Pipeline Contingency (15%)	$982,000
All Other Facilities Contingency (20%)	$9,721,000
Environmental & Archaeology Studies and Mitigation	$243,000
Land Acquisition and Surveying (30 acres)	$245,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$2,423,000
TOTAL COST OF PROJECT	**$77,040,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$5,416,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$205,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$53,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$7,128,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (2329457 kW-hr @ 0.09 $/kW-hr)	$210,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$13,012,000**
Available Project Yield (acft/yr)	2,200
Annual Cost of Water ($ per acft), based on PF=1	$5,915
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$3,453
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$18.15
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$10.59

Note: One or more cost element has been calculated externally

NED *1/2/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Dripping Springs WSC - Trinity Aquifer - Expand Local Use of Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (0 MGD)	$716,000
Transmission Pipeline (8 in. dia., 2.8 miles)	$3,692,000
Well Fields (Wells, Pumps, and Piping)	$863,000
Integration, Relocations, Backup Generator & Other	$4,000
TOTAL COST OF FACILITIES	**$5,275,000**
- Planning (3%)	$158,000
- Design (7%)	$369,000
- Construction Engineering (1%)	$53,000
Legal Assistance (2%)	$105,000
Fiscal Services (2%)	$105,000
Pipeline Contingency (15%)	$554,000
All Other Facilities Contingency (20%)	$317,000
Environmental & Archaeology Studies and Mitigation	$106,000
Land Acquisition and Surveying (17 acres)	$165,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$235,000
TOTAL COST OF PROJECT	**$7,442,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$523,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$46,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$18,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (153965 kW-hr @ 0.09 $/kW-hr)	$14,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$601,000**
Available Project Yield (acft/yr)	300
Annual Cost of Water ($ per acft), based on PF=1	$2,003
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$260
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$6.15
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.80

ND *9/11/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Dripping Springs WSC - Direct Reuse

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (0 MGD)	$846,000
Storage Tanks (Other Than at Booster Pump Stations)	$743,000
Integration, Relocations, Backup Generator & Other	$10,000
TOTAL COST OF FACILITIES	**$1,599,000**
- Planning (3%)	$48,000
- Design (7%)	$112,000
- Construction Engineering (1%)	$16,000
Legal Assistance (2%)	$32,000
Fiscal Services (2%)	$32,000
All Other Facilities Contingency (20%)	$320,000
Environmental & Archaeology Studies and Mitigation	$28,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$71,000
TOTAL COST OF PROJECT	**$2,258,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$158,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$8,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$21,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (156730 kW-hr @ 0.09 $/kW-hr)	$14,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$201,000**
Available Project Yield (acft/yr)	672
Annual Cost of Water ($ per acft), based on PF=1	$299
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$64
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.92
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.20

ND *9/12/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Dripping Springs WSC - Direct Potable Reuse

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Advanced Water Treatment Facility (0.5 MGD)	$10,547,000
TOTAL COST OF FACILITIES	**$10,547,000**
- Planning (3%)	$316,000
- Design (7%)	$738,000
- Construction Engineering (1%)	$105,000
Legal Assistance (2%)	$211,000
Fiscal Services (2%)	$211,000
All Other Facilities Contingency (20%)	$2,109,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$463,000
TOTAL COST OF PROJECT	**$14,700,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,034,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$0
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$717,000
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,751,000**
Available Project Yield (acft/yr)	560
Annual Cost of Water ($ per acft), based on PF=0	$3,127
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$1,280
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$9.59
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$3.93

ND *9/12/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Irrigation - Colorado County - Expanded Local Use of Groundwater - Gulf Coast Aquifer

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$14,036,000
TOTAL COST OF FACILITIES	**$14,036,000**
- Planning (3%)	$421,000
- Design (7%)	$982,000
- Construction Engineering (1%)	$140,000
Legal Assistance (2%)	$281,000
Fiscal Services (2%)	$281,000
All Other Facilities Contingency (20%)	$2,807,000
Environmental & Archaeology Studies and Mitigation	$90,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$619,000
TOTAL COST OF PROJECT	**$19,657,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,383,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$140,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (9037855 kW-hr @ 0.09 $/kW-hr)	$813,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$2,336,000**
Available Project Yield (acft/yr)	12,000
Annual Cost of Water ($ per acft), based on PF=0	$195
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$79
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.60
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.24

NED *1/1/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Irrigation, Gillespie County - Local Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$166,000
TOTAL COST OF FACILITIES	**$166,000**
- Planning (3%)	$5,000
- Design (7%)	$12,000
- Construction Engineering (1%)	$2,000
Legal Assistance (2%)	$3,000
Fiscal Services (2%)	$3,000
All Other Facilities Contingency (20%)	$33,000
Environmental & Archaeology Studies and Mitigation	$1,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$8,000
TOTAL COST OF PROJECT	**$233,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$16,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$2,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$18,000**
Available Project Yield (acft/yr)	100
Annual Cost of Water ($ per acft), based on PF=0	$180
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$20
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.55
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.06

NED *11/26/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Irrigation, San Saba - Local Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$2,311,000
TOTAL COST OF FACILITIES	**$2,311,000**
- Planning (3%)	$69,000
- Design (7%)	$162,000
- Construction Engineering (1%)	$23,000
Legal Assistance (2%)	$46,000
Fiscal Services (2%)	$46,000
All Other Facilities Contingency (20%)	$462,000
Environmental & Archaeology Studies and Mitigation	$38,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$103,000
TOTAL COST OF PROJECT	**$3,260,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$229,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$23,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (991902 kW-hr @ 0.09 $/kW-hr)	$89,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$341,000**
Available Project Yield (acft/yr)	1,300
Annual Cost of Water ($ per acft), based on PF=0	$262
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$86
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.80
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.26

NED *11/26/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Lago Vista - Direct Reuse

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Storage Tanks (Other Than at Booster Pump Stations)	$853,000
Water Treatment Plant (0.6 MGD)	$71,000
TOTAL COST OF FACILITIES	**$924,000**
- Planning (3%)	$28,000
- Design (7%)	$65,000
- Construction Engineering (1%)	$9,000
Legal Assistance (2%)	$18,000
Fiscal Services (2%)	$18,000
All Other Facilities Contingency (20%)	$185,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$41,000
TOTAL COST OF PROJECT	**$1,288,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$91,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$9,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$42,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$142,000**
Available Project Yield (acft/yr)	673
Annual Cost of Water ($ per acft), based on PF=1	$211
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$76
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$0.65
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.23

ND *9/24/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Llano - Llano Direct Potable Reuse

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (0 MGD)	$674,000
Transmission Pipeline (6 in. dia., 2 miles)	$1,483,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,119,000
Advanced Water Treatment Facility (MGD)	$7,847,000
TOTAL COST OF FACILITIES	**$11,123,000**
- Planning (3%)	$334,000
- Design (7%)	$779,000
- Construction Engineering (1%)	$111,000
Legal Assistance (2%)	$222,000
Fiscal Services (2%)	$222,000
Pipeline Contingency (15%)	$223,000
All Other Facilities Contingency (20%)	$1,928,000
Environmental & Archaeology Studies and Mitigation	$109,000
Land Acquisition and Surveying (17 acres)	$129,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$494,000
TOTAL COST OF PROJECT	**$15,674,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,103,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$26,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$17,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$359,000
Pumping Energy Costs (7559 kW-hr @ 0.09 $/kW-hr)	$1,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$1,506,000**
Available Project Yield (acft/yr)	280
Annual Cost of Water ($ per acft), based on PF=1.5	$5,379
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$1,439
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$16.50
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$4.42

Adam Conner *12/26/2024*

Cost Estimate Summary Water Supply Project Option September 2023 Prices Manufacturing, Burnet County - Local Groundwater	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$150,000
TOTAL COST OF FACILITIES	**$150,000**
- Planning (3%)	$4,000
- Design (7%)	$10,000
- Construction Engineering (1%)	$1,000
Legal Assistance (2%)	$3,000
Fiscal Services (2%)	$3,000
All Other Facilities Contingency (20%)	$30,000
Environmental & Archaeology Studies and Mitigation	$3,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$7,000
TOTAL COST OF PROJECT	**$211,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$15,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (12353 kW-hr @ 0.09 $/kW-hr)	$1,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$17,000**
Available Project Yield (acft/yr)	175
Annual Cost of Water ($ per acft), based on PF=0	$97
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$11
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.30
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.04
NED	*12/10/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Manufacturing, Gillespie County - Local Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$368,000
TOTAL COST OF FACILITIES	**$368,000**
- Planning (3%)	$11,000
- Design (7%)	$26,000
- Construction Engineering (1%)	$4,000
Legal Assistance (2%)	$7,000
Fiscal Services (2%)	$7,000
All Other Facilities Contingency (20%)	$74,000
Environmental & Archaeology Studies and Mitigation	$4,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$17,000
TOTAL COST OF PROJECT	**$518,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$36,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$4,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (56163 kW-hr @ 0.09 $/kW-hr)	$5,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$45,000**
Available Project Yield (acft/yr)	150
Annual Cost of Water ($ per acft), based on PF=0	$300
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$60
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.92
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.18

NED *11/26/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Marble Falls - Direct Potable Reuse

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Transmission Pipeline (None)	$1,920,000
Water Treatment Plant (0.6 MGD)	$12,000,000
TOTAL COST OF FACILITIES	**$13,920,000**
- Planning (3%)	$418,000
- Design (7%)	$974,000
- Construction Engineering (1%)	$139,000
Legal Assistance (2%)	$278,000
Fiscal Services (2%)	$278,000
Pipeline Contingency (15%)	$288,000
All Other Facilities Contingency (20%)	$2,400,000
Environmental & Archaeology Studies and Mitigation	$20,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$1,217,000
TOTAL COST OF PROJECT	**$19,932,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$1,403,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$19,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$2,524,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (1000 acft/yr @ 0 $/acft)	$0
TOTAL ANNUAL COST	**$3,946,000**
Available Project Yield (acft/yr)	1,000
Annual Cost of Water ($ per acft), based on PF=0	$3,946
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$2,543
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$12.11
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$7.80

Note: One or more cost element has been calculated externally

Robert Adams *1/5/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Marble Falls - Expanded Use of Surface Water

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Transmission Pipeline (None)	$1,190,000
Water Treatment Plant (4 MGD)	$61,000,000
TOTAL COST OF FACILITIES	**$72,190,000**
- Planning (3%)	$2,166,000
- Design (7%)	$5,053,000
- Construction Engineering (4%)	$2,888,000
Legal Assistance (2%)	$1,444,000
Fiscal Services (2%)	$1,444,000
Pipeline Contingency (30%)	$357,000
All Other Facilities Contingency (30%)	$21,300,000
Environmental & Archaeology Studies and Mitigation	$40,000
Interest During Construction (3.5% for 3 years with a 0.5% ROI)	$10,421,000
TOTAL COST OF PROJECT	**$117,303,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$8,254,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$12,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$250,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$3,098,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (4000 acft/yr @ 155 $/acft)	$620,000
TOTAL ANNUAL COST	**$12,234,000**
Available Project Yield (acft/yr)	4,000
Annual Cost of Water ($ per acft), based on PF=0	$3,059
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$995
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$9.38
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$3.05

Note: One or more cost element has been calculated externally

Robert Adams *1/5/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Mining, Burnet County - Local Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$264,000
TOTAL COST OF FACILITIES	**$264,000**
- Planning (3%)	$8,000
- Design (7%)	$18,000
- Construction Engineering (1%)	$3,000
Legal Assistance (2%)	$5,000
Fiscal Services (2%)	$5,000
All Other Facilities Contingency (20%)	$53,000
Environmental & Archaeology Studies and Mitigation	$4,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$12,000
TOTAL COST OF PROJECT	**$372,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$26,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (38625 kW-hr @ 0.09 $/kW-hr)	$3,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$32,000**
Available Project Yield (acft/yr)	500
Annual Cost of Water ($ per acft), based on PF=0	$64
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$12
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.20
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.04

NED *12/10/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Mining, Hays County - Local Groundwater

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$1,038,000
TOTAL COST OF FACILITIES	**$1,038,000**
- Planning (3%)	$31,000
- Design (7%)	$73,000
- Construction Engineering (1%)	$10,000
Legal Assistance (2%)	$21,000
Fiscal Services (2%)	$21,000
All Other Facilities Contingency (20%)	$208,000
Environmental & Archaeology Studies and Mitigation	$5,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$46,000
TOTAL COST OF PROJECT	**$1,453,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$102,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$10,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (207894 kW-hr @ 0.09 $/kW-hr)	$19,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$131,000**
Available Project Yield (acft/yr)	325
Annual Cost of Water ($ per acft), based on PF=0	$403
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$89
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.24
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.27

NED *12/10/2024*

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Mining, Mills County - Local Groundwater*	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$493,000
TOTAL COST OF FACILITIES	**$493,000**
- Planning (3%)	$15,000
- Design (7%)	$35,000
- Construction Engineering (1%)	$5,000
Legal Assistance (2%)	$10,000
Fiscal Services (2%)	$10,000
All Other Facilities Contingency (20%)	$99,000
Environmental & Archaeology Studies and Mitigation	$7,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$22,000
TOTAL COST OF PROJECT	**$696,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$49,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$5,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (81806 kW-hr @ 0.09 $/kW-hr)	$7,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$61,000**
Available Project Yield (acft/yr)	130
Annual Cost of Water ($ per acft), based on PF=0	$469
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$92
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.44
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.28
NED	*11/26/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Travis County WCID 17 - Direct Reuse

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Intake Pump Stations (0 MGD)	$1,504,000
Storage Tanks (Other Than at Booster Pump Stations)	$6,354,000
TOTAL COST OF FACILITIES	**$7,858,000**
- Planning (3%)	$236,000
- Design (7%)	$550,000
- Construction Engineering (1%)	$79,000
Legal Assistance (2%)	$157,000
Fiscal Services (2%)	$157,000
All Other Facilities Contingency (20%)	$1,572,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$345,000
TOTAL COST OF PROJECT	**$10,954,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$771,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$64,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$38,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$873,000**
Available Project Yield (acft/yr)	510
Annual Cost of Water ($ per acft), based on PF=1	$1,712
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$200
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$5.25
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.61

Note: One or more cost element has been calculated externally

ND *9/24/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
West Travis County PUA - Direct Reuse

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Storage Tanks (Other Than at Booster Pump Stations)	$1,100,000
TOTAL COST OF FACILITIES	**$1,100,000**
- Planning (3%)	$33,000
- Design (7%)	$77,000
- Construction Engineering (1%)	$11,000
Legal Assistance (2%)	$22,000
Fiscal Services (2%)	$22,000
All Other Facilities Contingency (20%)	$220,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$49,000
TOTAL COST OF PROJECT	**$1,534,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$108,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$11,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$119,000**
Available Project Yield (acft/yr)	224
Annual Cost of Water ($ per acft), based on PF=0	$531
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$49
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.63
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.15

ND *9/12/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
LCRA - Baylor Creek Reservoir (Alternative)

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Dam and Reservoir (Conservation Pool 48390 acft, 1900 acres)	$84,582,000
Reservoir Intake Pump Station(s) (39.6 MGD)	$67,019,000
Colorado River Intake Pump Station(s) (290.8 MGD)	$158,608,000
Transmission Pipeline from Reservoir to Travis Co. (48 in. dia., 68.4 miles)	$338,372,000
Transmission Pipeline from Colorado River IPS to Reservoir (114 in. dia., 5.5 miles)	$104,523,000
Transmission Pump Station(s) from Reservoir to Travis Co.	$95,103,000
Balancing Storage at Transmission Pump Station(s) and Delivery Endpoint	$31,594,000
Integration, Relocations, Backup Generator & Other	$3,582,000
TOTAL COST OF FACILITIES	**$883,383,000**
Engineering (Planning, Design, and Construction), Legal Assistance, & Fiscal Services (15%)	$132,508,000
Pipeline Contingency (35%)	$155,013,000
All Other Facilities Contingency (35%)	$154,171,000
Environmental & Archaeology Studies and Mitigation	$63,577,000
Land Acquisition and Surveying (950 acres)	$101,088,000
Interest During Construction (5% for 5 years with a 0.5% ROI)	$352,964,000
TOTAL COST OF PROJECT	**$1,842,704,000**
ANNUAL COST	
Debt Service (5 percent, 30 years)	$100,627,000
Reservoir Debt Service (5 percent, 30 years)	$19,010,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$4,465,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$8,018,000
Dam and Reservoir (1.5% of Cost of Facilities)	$1,743,000
Pumping Energy Costs (58,770,000 kW-hr @ 0.09 $/kW-hr)	$5,289,000
TOTAL ANNUAL COST	**$139,152,000**
Available Project Yield (a-f/year)	**29,000**
Annual Cost of Water ($ per a-f)	**$4,798**
Annual Cost of Water After Debt Service ($ per a-f)	**$673**
Annual Cost of Water ($ per 1,000 gallons)	**$14.72**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$2.06**

Note: One or more cost element has been calculated externally

FNI (AS) *6/19/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
LCRA - Purchase Wholesale Groundwater (Alternative)

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Well Fields Pump Station(s) (26.8 MGD)	$54,305,000
Transmission Pipeline from Well Fields (36 in. dia., 39.9 miles)	$140,613,000
Transmission Pump Station(s) & Storage Tank(s) from Well Fields	$50,303,000
Well Fields (Wells, Pumps, and Piping)	$55,652,000
Storage Tanks (Other Than at Booster Pump Stations)	$15,743,000
Water Treatment Plant (26.8 MGD)	$1,832,000
Integration, Relocations, Backup Generator & Other	$1,806,000
TOTAL COST OF FACILITIES	**$320,254,000**
Engineering (Planning, Design, Construction), Legal Assistance, & Fiscal Services (15%):	$48,039,000
Pipeline Contingency (35%)	$49,215,000
All Other Facilities Contingency (35%)	$62,874,000
Environmental & Archaeology Studies and Mitigation	$6,344,000
Land Acquisition and Surveying (680 acres)	$69,071,000
Interest During Construction (5% for 3 years with a 0.5% ROI)	$79,201,000
TOTAL COST OF PROJECT	**$634,998,000**
ANNUAL COST	
Debt Service (5 percent, 30 years)	$41,307,000
Reservoir Debt Service (5 percent, 30 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$2,216,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,420,000
Water Treatment Plant	$1,099,000
Pumping Energy Costs (53,994,000 kW-hr @ 0.09 $/kW-hr)	$4,859,000
Purchase of Water (25000 acft/yr @ 566.4765 $/acft)	$14,162,000
TOTAL ANNUAL COST	**$66,063,000**
Available Project Yield (a-f/year)	25,000
Annual Cost of Water ($ per a-f)	$2,643
Annual Cost of Water After Debt Service ($ per a-f)	$990
Annual Cost of Water ($ per 1,000 gallons)	$8.11
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$3.04

FNI (JS) and AGS (Ty Davidson) *11/6/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
LCRA - Aquifer Storage and Recovery

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Initial Pump Station(s) from Partner WTP to ASR Well Field (14.4 MGD)	$15,523,000
Initial Pump Station(s) from ASR Well Field to Delivery Endpoint (46.1 MGD)	$46,156,000
Transmission Pipeline from Partner WTP to ASR Well Field (30 in. dia., 33 miles)	$88,103,000
Transmission Pipeline from ASR Well Field to Delivery Endpoint (54 in. dia., 34.3 miles)	$191,019,000
Transmission Pump Station(s) & Storage Tank(s) from Partner WTP to ASR Well Field	$20,198,000
Transmission Pump Station(s) & Storage Tank(s) from ASR Well Field to Delivery Endpoi	$49,560,000
ASR Well Field (Wells, Pumps, and Piping)	$41,223,000
Storage Tanks (Other Than at Booster Pump Stations)	$31,223,000
Chlorine Disinfection (Groundwater) Treatment Plant (46.1 MGD)	$3,149,000
Integration, Relocations, Backup Generator & Other	$148,000
TOTAL COST OF FACILITIES	**$486,302,000**
Engineering (Planning, Design, Construction), Legal Assistance, & Fiscal Services (15%):	$72,945,000
Pipeline Contingency (35%)	$97,693,000
All Other Facilities Contingency (35%)	$72,513,000
Environmental & Archaeology Studies and Mitigation	$2,530,000
Land Acquisition and Surveying (940 acres)	$151,987,000
Interest During Construction (5% for 3 years with a 0.5% ROI)	$125,966,000
TOTAL COST OF PROJECT	**$1,009,936,000**
ANNUAL COST	
Debt Service (5 percent, 30 years)	$65,698,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$3,691,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,851,000
Water Treatment Plant	$1,890,000
Pumping Energy Costs (10,021,000 kW-hr @ 0.09 $/kW-hr)	$729,000
Placeholder Cost to Use Partner WTP Capacity (Estimated as ~23% of O&M Cost for 30	$2,462,000
TOTAL ANNUAL COST	**$77,321,000**
Available Project Yield (a-f/year)	22,000
Annual Cost of Water ($ per a-f)	$3,515
Annual Cost of Water After Debt Service ($ per a-f)	$528
Annual Cost of Water ($ per 1,000 gallons)	$10.78
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$1.62

Note: One or more cost element has been calculated externally

FNI (AD, JS) *7/29/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
LCRA - Downstream Return Flows

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$0
TOTAL COST OF PROJECT	**$0**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$0
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$0
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (1120000 kW-hr @ 0.09 $/kW-hr)	$101,000
Purchase of Water (3673.8 acft/yr @ 11 $/acft)	$40,000
TOTAL ANNUAL COST	**$141,000**
Available Project Yield (acft/yr)	3,674
Annual Cost of Water ($ per acft), based on PF=0	$38
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$38
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.12
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.12

Adam Conner *12/19/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
LCRA - Import Return Flows from Williamson County

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool acft, acres)	$0
Off-Channel Storage/Ring Dike (Conservation Pool acft, acres)	$0
Terminal Storage (Conservation Pool acft, acres)	$0
Intake Pump Stations (0 MGD)	$13,254,000
Transmission Pipeline (42 in. dia., 16 miles)	$83,930,000
Transmission Pump Station(s) & Storage Tank(s)	$0
Well Fields (Wells, Pumps, and Piping)	$0
Storage Tanks (Other Than at Booster Pump Stations)	$4,828,000
Water Treatment Plant (0 MGD)	$0
Advanced Water Treatment Facility (MGD)	$10,444,000
Conservation (Leaking Pipe/Meter Replacement)	$0
Integration, Relocations, Backup Generator & Other	$139,000
TOTAL COST OF FACILITIES	**$112,595,000**
Engineering:	
- Planning (3%)	$3,378,000
- Design (7%)	$7,882,000
- Construction Engineering (1%)	$1,126,000
Legal Assistance (2%)	$2,252,000
Fiscal Services (2%)	$2,252,000
Pipeline Contingency (15%)	$12,589,000
All Other Facilities Contingency (20%)	$5,733,000
Environmental & Archaeology Studies and Mitigation	$617,000
Land Acquisition and Surveying (104 acres)	$2,230,000
Interest During Construction (3.5% for 1 years with a 0.5% ROI)	$4,897,000
TOTAL COST OF PROJECT	**$155,551,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$10,945,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$889,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$331,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (2275123 kW-hr @ 0.09 $/kW-hr)	$205,000

Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$12,370,000**
Available Project Yield (acft/yr)	25,000
Annual Cost of Water ($ per acft), based on PF=1.5	$495
Annual Cost of Water After Debt Service ($ per acft), based on PF=1.5	$57
Annual Cost of Water ($ per 1,000 gallons), based on PF=1.5	$1.52
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1.5	$0.17
Adam Conner	*11/6/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
LCRA - New Storage Development in Lower Basin

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Off-Channel Storage/Ring Dike (Conservation Pool 80,000 acft, 2,000 acres)	$527,600,000
OCR Intake Pump Station (94.3 MGD)	$124,126,000
Colorado River Intake Pump Station (452.4 MGD)	$199,589,000
Transmission Pipeline(s) from OCR to Travis Co. (72 in. dia., 104.1 miles)	$811,105,000
Transmission Pipeline(s) from Colorado River IPS to OCR (102 in. dia. each, 5.5 miles ea	$171,119,000
Transmission Pump Station(s) from OCR to Travis Co.	$163,854,000
Balancing Storage at Transmission Pump Station(s) and Delivery Endpoint	$60,296,000
Integration, Relocations, Backup Generator & Other	$8,375,000
TOTAL COST OF FACILITIES	**$2,066,064,000**
Engineering (Planning, Design, and Construction), Legal Assistance, & Fiscal Services (15%)	$309,910,000
Pipeline Contingency (35%)	$343,778,000
All Other Facilities Contingency (35%)	$379,344,000
Environmental & Archaeology Studies and Mitigation	$36,783,000
Land Acquisition and Surveying (3500 acres)	$155,159,000
Interest During Construction (5% for 5 years with a 0.5% ROI)	$781,623,000
TOTAL COST OF PROJECT	**$4,072,661,000**
ANNUAL COST	
Debt Service (5 percent, 30 years)	$188,620,000
Reservoir Debt Service (5 percent, 30 years)	$76,312,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$9,906,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$12,189,000
Dam and Reservoir (1.5% of Cost of Facilities)	$8,818,000
Pumping Energy Costs (150,601,000 kW-hr @ 0.09 $/kW-hr)	$13,554,000
TOTAL ANNUAL COST	**$309,399,000**
Available Project Yield (a-f/year)	**73,000**
Annual Cost of Water ($ per a-f)	**$4,238**
Annual Cost of Water After Debt Service ($ per a-f)	**$609**
Annual Cost of Water ($ per 1,000 gallons)	**$13.01**
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	**$1.87**

Note: One or more cost element has been calculated externally

FNI (AD, JS) *6/19/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
LCRA - Purchase Wholesale Groundwater (Recommended)

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Well Fields Pump Station(s) (26.8 MGD)	$54,305,000
Transmission Pipeline from Well Fields (36 in. dia., 39.9 miles)	$140,613,000
Transmission Pump Station(s) & Storage Tank(s) from Well Fields	$50,303,000
Well Fields (Wells, Pumps, and Piping)	$55,652,000
Storage Tanks (Other Than at Booster Pump Stations)	$15,743,000
Water Treatment Plant (26.8 MGD)	$1,832,000
Integration, Relocations, Backup Generator & Other	$1,806,000
TOTAL COST OF FACILITIES	**$320,254,000**
Engineering (Planning, Design, Construction), Legal Assistance, & Fiscal Services (15%):	$48,039,000
Pipeline Contingency (35%)	$49,215,000
All Other Facilities Contingency (35%)	$62,874,000
Environmental & Archaeology Studies and Mitigation	$6,344,000
Land Acquisition and Surveying (680 acres)	$69,071,000
Interest During Construction (5% for 3 years with a 0.5% ROI)	$79,201,000
TOTAL COST OF PROJECT	**$634,998,000**
ANNUAL COST	
Debt Service (5 percent, 30 years)	$41,307,000
Reservoir Debt Service (5 percent, 30 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$2,216,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,420,000
Water Treatment Plant	$1,099,000
Pumping Energy Costs (53,994,000 kW-hr @ 0.09 $/kW-hr)	$4,859,000
Purchase of Water (25000 acft/yr @ 566.4765 $/acft)	$14,162,000
TOTAL ANNUAL COST	**$66,063,000**
Available Project Yield (a-f/year)	15,500
Annual Cost of Water ($ per a-f)	$4,262
Annual Cost of Water After Debt Service ($ per a-f)	$1,597
Annual Cost of Water ($ per 1,000 gallons)	$13.08
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$4.90

FNI (JS) and AGS (Ty Davidson) *11/6/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
LCRA - Seawater Desalination

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	*Estimated Costs for Facilities*
Initial Pump Station(s) from Desal. WTP to Travis Co. (32.1 MGD)	$62,714,000
Seawater Intake and Pump Station to Desal. WTP (78.2 MGD)	$73,549,000
Pump Station(s) from Desal. WTP to Offshore (46.1 MGD)	$36,641,000
Transmission Pipeline from Desal. WTP to Travis Co. (48 in. dia., 182.9 miles)	$1,001,305,000
Transmission Pipeline from Seawater Intake to Desal. WTP (66 in. dia., 8.7 miles)	$52,637,000
Transmission and Brine Diffuser Pipeline(s) from Desal. WTP to Offshore (54 in. dia., 13.2 miles)	$65,374,000
Transmission Pump Station(s) & Storage Tank(s) from Desal. WTP to Travis Co.	$167,387,000
Storage Tanks (Other Than at Booster Pump Stations)	$9,393,000
Seawater Desalination Water Treatment Plant (27 MGD)	$333,817,000
Integration, Relocations, Backup Generator & Other	$4,987,000
TOTAL COST OF FACILITIES	**$1,807,804,000**
Engineering (Planning, Design, Construction), Legal Assistance, & Fiscal Services (15%):	$271,170,000
Pipeline Contingency (35%)	$391,761,000
All Other Facilities Contingency (35%)	$240,971,000
Environmental & Archaeology Studies and Mitigation	$6,820,000
Land Acquisition and Surveying (2500 acres)	$157,991,000
Interest During Construction (5% for 5 years with a 0.5% ROI)	$683,174,000
TOTAL COST OF PROJECT	**$3,559,691,000**
ANNUAL COST	
Debt Service (5 percent, 30 years)	$231,563,000
Reservoir Debt Service (5 percent, 30 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$11,612,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$7,819,000
Water Treatment Facilities	$50,073,000
Pumping Energy Costs (81,815,000 kW-hr @ 0.09 $/kW-hr)	$7,363,000
TOTAL ANNUAL COST	**$308,430,000**
Available Project Yield (a-f/year)	30,000
Annual Cost of Water ($ per a-f)	$10,281
Annual Cost of Water After Debt Service ($ per a-f)	$2,562
Annual Cost of Water ($ per 1,000 gallons)	$31.55
Annual Cost of Water After Debt Service ($ per 1,000 gallons)	$7.86

Note: One or more cost element has been calculated externally

AD *6/6/2024*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
CoA ASR - Project Alternative 8C (5F)

Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Primary Pump Station (73.4 MGD)	$117,189,000
Transmission Pipeline (66 in dia., 52.7 miles)	$518,112,000
Well Fields (Wells, Pumps, and Piping)	$197,642,000
Storage Tanks (Other Than at Booster Pump Stations)	$7,664,000
Water Treatment Plant (37 MGD)	$86,020,000
Integration, Relocations, & Other	$13,844,000
TOTAL COST OF FACILITIES	**$940,471,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$306,131,000
Environmental & Archaeology Studies and Mitigation	$12,431,000
Land Acquisition and Surveying (1360 acres)	$90,774,000
Interest During Construction (3% for 4.8 years with a 0.5% ROI)	$176,770,000
TOTAL COST OF PROJECT	**$1,526,577,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$106,662,000
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$7,373,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,930,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$4,389,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (248925076 kW-hr @ 0.08 $/kW-hr)	$19,914,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$141,268,000**
Available Project Yield (acft/yr)	83,232
Annual Cost of Water ($ per acft), based on PF=1	$1,697
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$416
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$5.21
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$1.28

Note: One or more cost element has been calculated externally

C. Smith-Salgado; CAS; Zach Saucier (KFA) *3/9/2023*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Austin - Brackish Groundwater Desalination

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (0 MGD)	$13,953,000
Transmission Pipeline (48 in. dia., 14.3 miles)	$38,907,000
Well Fields (Wells, Pumps, and Piping)	$82,158,000
Storage Tanks (Other Than at Booster Pump Stations)	$35,401,000
Advanced Water Treatment Facility (35.7 MGD)	$262,163,000
Integration, Relocations, Backup Generator & Other	$522,000
TOTAL COST OF FACILITIES	**$433,104,000**
- Planning (3%)	$12,993,000
- Design (7%)	$30,317,000
- Construction Engineering (1%)	$4,331,000
Legal Assistance (2%)	$8,662,000
Fiscal Services (2%)	$8,662,000
Pipeline Contingency (15%)	$5,836,000
All Other Facilities Contingency (20%)	$78,839,000
Environmental & Archaeology Studies and Mitigation	$56,834,000
Land Acquisition and Surveying (126 acres)	$60,404,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$45,499,000
TOTAL COST OF PROJECT	**$745,481,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$52,453,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$1,570,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$349,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$39,196,000
Pumping Energy Costs (101098843 kW-hr @ 0.09 $/kW-hr)	$9,099,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$102,667,000**
Available Project Yield (acft/yr)	40,000
Annual Cost of Water ($ per acft), based on PF=1	$2,567
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$1,255
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$7.88
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$3.85

Note: One or more cost element has been calculated externally

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Austin - Longhorn Dam Improvement Cost

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Integration, Relocations, Backup Generator & Other	$1,811,000
TOTAL COST OF FACILITIES	**$1,811,000**
- Planning (3%)	$54,000
- Design (7%)	$127,000
- Construction Engineering (1%)	$18,000
Legal Assistance (2%)	$36,000
Fiscal Services (2%)	$36,000
All Other Facilities Contingency (20%)	$362,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$159,000
TOTAL COST OF PROJECT	**$2,603,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$183,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$18,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$201,000**
Available Project Yield (acft/yr)	3,000
Annual Cost of Water ($ per acft), based on PF=0	$67
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$6
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.21
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.02

Note: One or more cost element has been calculated externally

Plummer *1/1/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Austin - Lake Walter E. Long (Decker) Off Channel Reservoir

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (17.2 MGD)	$95,973,000
Transmission Pipeline (36-78 in. dia., 3.3 miles)	$56,606,000
Water Treatment Plant (16.3 MGD)	$96,948,000
Advanced Water Treatment Facility (16.3 MGD)	$77,757,000
Integration, Relocations, Backup Generator & Other	$2,502,000
TOTAL COST OF FACILITIES	**$329,786,000**
- Planning (3%)	$9,894,000
- Design (7%)	$23,085,000
- Construction Engineering (1%)	$3,298,000
Legal Assistance (2%)	$6,596,000
Fiscal Services (2%)	$6,596,000
Pipeline Contingency (15%)	$8,491,000
All Other Facilities Contingency (20%)	$54,636,000
Environmental & Archaeology Studies and Mitigation	$4,147,000
Land Acquisition and Surveying (51 acres)	$1,847,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$29,145,000
TOTAL COST OF PROJECT	**$477,521,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$33,599,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$591,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$2,399,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$6,786,000
Advanced Water Treatment Facility	$7,434,000
Pumping Energy Costs (41047601 kW-hr @ 0.09 $/kW-hr)	$3,694,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$54,503,000**
Available Project Yield (acft/yr)	18,300
Annual Cost of Water ($ per acft), based on PF=1	$2,978
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$1,142
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$9.14
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$3.51

Note: One or more cost element has been calculated externally

Plummer *1/1/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Austin - Indirect Potable Reuse through Lady Bird Lake

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Intake Pump Stations (21 MGD)	$59,371,000
Transmission Pipeline (36 in. dia., 9 miles)	$53,214,000
Water Treatment Plant (20 MGD)	$4,372,000
Integration, Relocations, Backup Generator & Other	$957,000
TOTAL COST OF FACILITIES	**$117,914,000**
- Planning (3%)	$3,537,000
- Design (7%)	$8,254,000
- Construction Engineering (1%)	$1,179,000
Legal Assistance (2%)	$2,358,000
Fiscal Services (2%)	$2,358,000
Pipeline Contingency (15%)	$7,982,000
All Other Facilities Contingency (20%)	$12,940,000
Environmental & Archaeology Studies and Mitigation	$1,269,000
Land Acquisition and Surveying (85 acres)	$4,691,000
Interest During Construction (3.5% for 2 years with a 0.5% ROI)	$10,562,000
TOTAL COST OF PROJECT	**$173,044,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$12,176,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$542,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$1,484,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$3,808,000
Advanced Water Treatment Facility	$0
Pumping Energy Costs (15703462 kW-hr @ 0.09 $/kW-hr)	$1,413,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$19,423,000**
Available Project Yield (acft/yr)	22,400
Annual Cost of Water ($ per acft), based on PF=1	$867
Annual Cost of Water After Debt Service ($ per acft), based on PF=1	$324
Annual Cost of Water ($ per 1,000 gallons), based on PF=1	$2.66
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=1	$0.99

Note: One or more cost element has been calculated externally

Plummer *1/1/2025*

Cost Estimate Summary Water Supply Project Option September 2023 Prices Lower Basin Irrigation - Precision Leveling	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	**Estimated Costs for Facilities**
Conservation (Leaking Pipe/Meter Replacement)	$1,424,000
TOTAL COST OF FACILITIES	**$1,424,000**
Interest During Construction (0% for 0 years with a 0% ROI)	$0
TOTAL COST OF PROJECT	**$1,424,000**
ANNUAL COST	
Debt Service (3.5 percent, 15 years)	$124,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (0% of Cost of Facilities)	$0
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$124,000**
Available Project Yield (acft/yr)	1,008
Annual Cost of Water ($ per acft), based on PF=0	$123
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$0
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.38
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.00
Robert Adams	*2/4/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Lower Basin Irrigation - Lakeside Gates

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Conservation (Leaking Pipe/Meter Replacement)	$1,500,000
TOTAL COST OF FACILITIES	**$1,500,000**
Interest During Construction (0% for 0 years with a 0% ROI)	$0
TOTAL COST OF PROJECT	**$1,500,000**
ANNUAL COST	
Debt Service (3.5 percent, 20 years)	$106,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (2% of Cost of Facilities)	$30,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$136,000**
Available Project Yield (acft/yr)	2,500
Annual Cost of Water ($ per acft), based on PF=0	$54
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$12
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.17
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.04

Robert Adams *2/4/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Lower Basin Irrigation - Precision Leveling

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Conservation (Leaking Pipe/Meter Replacement)	$1,500,000
TOTAL COST OF FACILITIES	**$1,500,000**
Interest During Construction (0% for 0 years with a 0% ROI)	$0
TOTAL COST OF PROJECT	**$1,500,000**
ANNUAL COST	
Debt Service (3.5 percent, 15 years)	$130,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (0% of Cost of Facilities)	$0
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$130,000**
Available Project Yield (acft/yr)	100
Annual Cost of Water ($ per acft), based on PF=0	$1,300
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$0
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$3.99
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.00

Robert Adams *2/4/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Lower Basin Irrigation - Precision Leveling

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Conservation (Leaking Pipe/Meter Replacement)	$500,000
TOTAL COST OF FACILITIES	**$500,000**
Interest During Construction (0% for 0 years with a 0% ROI)	$0
TOTAL COST OF PROJECT	**$500,000**
ANNUAL COST	
Debt Service (3.5 percent, 15 years)	$43,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (0% of Cost of Facilities)	$0
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$43,000**
Available Project Yield (acft/yr)	360
Annual Cost of Water ($ per acft), based on PF=0	$119
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$0
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.37
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.00

Robert Adams *2/4/2025*

Cost Estimate Summary *Water Supply Project Option* *September 2023 Prices* *Burnet County - Upper Basin Ag Conservation*	
Cost based on ENR CCI 13485.67 for September 2023 and *a PPI of 278.502 for September 2023*	
Item	***Estimated Costs for Facilities***
Transmission Pipeline (None)	$214,000
TOTAL COST OF FACILITIES	**$214,000**
- Planning (3%)	$6,000
Pipeline Contingency (15%)	$32,000
Interest During Construction (0% for 0.5 years with a 0% ROI)	$0
TOTAL COST OF PROJECT	**$252,000**
ANNUAL COST	
Debt Service (3.5 percent, 10 years)	$30,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$2,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$32,000**
Available Project Yield (acft/yr)	291
Annual Cost of Water ($ per acft), based on PF=0	$110
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$7
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.34
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.02
Note: One or more cost element has been calculated externally	
Robert Adams	*1/5/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
Gillespie County - Upper Basin Ag Conservation

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Transmission Pipeline (None)	$711,000
TOTAL COST OF FACILITIES	**$711,000**
- Planning (3%)	$21,000
Pipeline Contingency (15%)	$107,000
Interest During Construction (0% for 0.5 years with a 0% ROI)	$0
TOTAL COST OF PROJECT	**$839,000**
ANNUAL COST	
Debt Service (3.5 percent, 10 years)	$101,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$7,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$108,000**
Available Project Yield (acft/yr)	283
Annual Cost of Water ($ per acft), based on PF=0	$382
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$25
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.17
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.08

Note: One or more cost element has been calculated externally

Robert Adams *1/5/2025*

Cost Estimate Summary Water Supply Project Option September 2023 Prices Mills County - Upper Basin Ag Conservation	
Cost based on ENR CCI 13485.67 for September 2023 and a PPI of 278.502 for September 2023	
Item	***Estimated Costs for Facilities***
Transmission Pipeline (None)	$1,482,000
TOTAL COST OF FACILITIES	**$1,482,000**
- Planning (3%)	$44,000
Pipeline Contingency (15%)	$222,000
Interest During Construction (0% for 0.5 years with a 0% ROI)	$0
TOTAL COST OF PROJECT	**$1,748,000**
ANNUAL COST	
Debt Service (3.5 percent, 10 years)	$210,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$15,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$225,000**
Available Project Yield (acft/yr)	474
Annual Cost of Water ($ per acft), based on PF=0	$475
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$32
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$1.46
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.10
Note: One or more cost element has been calculated externally	
Robert Adams	*1/5/2025*

Cost Estimate Summary
Water Supply Project Option
September 2023 Prices
San Saba County - Upper Basin Ag Conservation

Cost based on ENR CCI 13485.67 for September 2023 and
a PPI of 278.502 for September 2023

Item	***Estimated Costs for Facilities***
Transmission Pipeline (None)	$1,709,000
TOTAL COST OF FACILITIES	**$1,709,000**
- Planning (3%)	$51,000
Pipeline Contingency (15%)	$256,000
Interest During Construction (0% for 0.5 years with a 0% ROI)	$0
TOTAL COST OF PROJECT	**$2,016,000**
ANNUAL COST	
Debt Service (3.5 percent, 10 years)	$242,000
Reservoir Debt Service (3.5 percent, 40 years)	$0
Operation and Maintenance	
Pipeline, Wells, and Storage Tanks (1% of Cost of Facilities)	$17,000
Intakes and Pump Stations (2.5% of Cost of Facilities)	$0
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant	$0
Advanced Water Treatment Facility	$0
Pumping Energy Costs (0 kW-hr @ 0.09 $/kW-hr)	$0
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$259,000**
Available Project Yield (acft/yr)	832
Annual Cost of Water ($ per acft), based on PF=0	$311
Annual Cost of Water After Debt Service ($ per acft), based on PF=0	$20
Annual Cost of Water ($ per 1,000 gallons), based on PF=0	$0.96
Annual Cost of Water After Debt Service ($ per 1,000 gallons), based on PF=0	$0.06

Note: One or more cost element has been calculated externally

Robert Adams *1/5/2025*

Appendix 6.A

Socioeconomic Impacts of Projected Shortages for Region K

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

This page serves as a placeholder for the TWDB socioeconomic impact study that will be available Fall of 2025.

Appendix 7.A

Existing Drought Triggers and Reduction Goals

Appendix 7.A

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

REGION K

WUG Name	DCP Date	Drought Stage*	Voluntary/Mandatory	Percent Reduction	Triggers									Responses									
					Contamination	Demand/Capacity Based	Failure	Groundwater Level	Reservoir Level	Supply Based	Time	Wholesale Provider	Other[1]	Assessment and Identification	Water Rate Change or	Irrigation Schedule	Notification of Public Agencies or Specific Users	Prohibited Use	Public Notification	Discontinue Water Diversions	Suspend Service	Water Allocation	Other[2]
Aqua WSC	2024	1 - V	V	10%		√					√		√			√			√				
		2	M	15%		√	√		√				√			√		√	√				√
		3	M	20%		√	√		√	√			√			√	√	√	√				√
		4 – E	M	25%	√		√						√			√	√	√	√				√
Austin	2024	1	M	10%					√					√		√		√	√				√
		2	M	15% 20%		√			√					same		√		√	√				√
		3	M	25%					√					same		√		√	√				√
		4	M	30%					√				√	same		√		√	√	√	√		√
		5 – E	M		√	√	√			√			√					√	√	√	√		√
Bastrop	2019	1	V			√							√			√			√				
		2	M			√							√			√	√	√	√				√
		3	M			√							√			√	√	√	√				√
		4	M		√	√	√						√			√	√	√	√				√
		5 – E	M										√			√	√	√	√				√
Bastrop County WCID No. 2	2020	1	V			√										√			√				√
		2	M			√										√	√	√	√				√
		3	M			√										√	√		√				√
		4 – E	M		√	√	√									√	√		√				√
		5 – WA	M		√	√	√									√	√		√				√
Bay City	2024	1	V	10%		√										√							

WUG Name	DCP Date	Drought Stage*	Voluntary/Mandatory	Percent Reduction	Triggers									Responses									
					Contamination	Demand/Capacity Based	Failure	Groundwater Level	Reservoir Level	Supply Based	Time	Wholesale Provider	Other[1]	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Notification of Public Agencies or Specific Users	Prohibited Use	Public Notification	Discontinue Water Diversions	Suspend Service	Water Allocation	Other[2]
		2	M	15%		√										√		√					√
		3	M	20%		√										√		√					√
		4 – E	M	40%	√		√									√		√					√
		5 – WA	M																			√	
Buda	2024	YR	V/M	5%												√		√	√				√
		1	M	10%		√				√			√			√		√	√				√
		2	M	20%		√				√			√			√		√	√				√
		3	M	30%		√				√			√			√		√	√				√
		4 – E	M	40%		√				√			√		√	√		√	√				√
Caney Creek MUD	2024	1	V	25%					√								√		√				√
		2	M	50%					√								√		√				√
		3	M	75%					√						√		√		√				√
		4 – E	M		√		√							√	√		√		√				√
Creedmore Maha WSC	2024	1	V	10%		√				√			√	√		√	√	√	√	√			√
		2	M	20%		√				√		√		√		√	√	√	√				√
		3	M	30%		√			√			√		√		√	√	√	√				√
		4 – E	M	40%		√	√					√	√	√			√	√	√				√
Deerhaven WCID	2024	1	M	10%		√			√	√						√							
		2	M	20%		√			√	√				√		√		√	√				√
		3	M	25%		√			√	√				√	√			√	√				√

WUG Name	DCP Date	Drought Stage*	Voluntary/Mandatory	Percent Reduction	Triggers									Responses									
					Contamination	Demand/Capacity Based	Failure	Groundwater Level	Reservoir Level	Supply Based	Time	Wholesale Provider	Other[1]	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Notification of Public Agencies or Specific Users	Prohibited Use	Public Notification	Discontinue Water Diversions	Suspend Service	Water Allocation	Other[2]
		4	M	30%		√			√	√			√		√			√	√				√
		5 – E	M		√		√						√		√			√	√				√
Flatonia	2022	1	V	10%		√			√				√			√			√				
		2	M	10%		√			√							√		√	√				
		3	M	15%		√			√						√	√		√	√				
		4	M	20%		√			√						√	√		√	√				
		5 – E	M	25%	√		√								√			√	√				
Glidden FWSD 1	2023	1 - V	V	5%							√		√			√			√				√
		2	M	10%		√										√		√	√				√
		3	M	25%		√										√		√	√			√	
		4 – E	M	100%	√		√								√			√	√			√	
Hornsby Bend Utility (Austins colony) Texas Water Utilities	2023	A	V	10%		√			√	√						√	√	√	√				√
		1	M	10%		√			√	√						√	√	√	√				√
		2	M	20%		√			√	√						√	√	√	√				√
		3	M	30%		√			√	√						√	√	√	√				√
		4- E	M	40%			√		√	√			√				√	√	√				
Horseshoe Bay	2024	1	M	10%			√		√	√		√	√			√			√				√
		2	M	20%					√	√		√	√			√		√	√	?			√
		3	M	25%					√			√				√		√	√	?	No Landscape Installation		√
		4 – E	M	35%					√			√				√		√	√	?	No		√

					Triggers									Responses									
WUG Name	**DCP Date**	**Drought Stage***	**Voluntary/Mandatory**	**Percent Reduction**	**Contamination**	**Demand/Capacity Based**	**Failure**	**Groundwater Level**	**Reservoir Level**	**Supply Based**	**Time**	**Wholesale Provider**	**Other[1]**	**Assessment and Identification**	**Water Rate Change or**	**Irrigation Schedule**	**Notification of Public Agencies or Specific Users**	**Prohibited Use**	**Public Notification**	**Discontinue Water Diversions**	**Suspend Service**	**Water Allocation**	**Other[2]**
																					Landscape Installation		
Johnson City	2024	1	V	5%		√				√						√			√				
		2	M	10%		√		√		√						√		√	√				√
		3	M	20%		√		√		√						√		√	√				√
		4	M	50%		√		√		√						√		√	√				√
		5 – E	M	60%	√		√	√								√		√	√				√
		6 – WA	M																			√	
Kelly Lane WCID 1	2024	1	V	5%					√	√								√	√				√
		2	M	10%					√	√	√		√			√		√	√				√
		3	M	15%			√		√	√			√			√		√	√				
		4 - E	M	75%	√		√						√					√	√				
Kelly Lane WCID 2	2024	1 – V	V	5%		√			√							√			√				√
		2	M	10%		√			√				√			√		√	√				√
		3	M	15%		√	√		√				√			√		√	√				√
		4 – E	M	75%	√		√						√		√			√	√				√
Lago Vista	2023	1	M	10%					√							√	√		√				√
		2	M	10% - 20%					√						√	√	√	√	√	√			√
		3	M	20% - 30%					√						√	√	√	√	√				√

WUG Name	DCP Date	Drought Stage*	Voluntary/Mandatory	Percent Reduction	Triggers: Contamination	Triggers: Demand/Capacity Based	Triggers: Failure	Triggers: Groundwater Level	Triggers: Reservoir Level	Triggers: Supply Based	Triggers: Time	Triggers: Wholesale Provider	Triggers: Other[1]	Responses: Assessment and Identification	Responses: Water Rate Change or	Responses: Irrigation Schedule	Responses: Notification of Public Agencies or Specific Users	Responses: Prohibited Use	Responses: Public Notification	Responses: Discontinue Water Diversions	Responses: Suspend Service	Responses: Water Allocation	Responses: Other[2]
		4	M							√			√		√		√	√	√				
		5 – E	M							√			√		√		√	√	√				
Lakeside MUD 3	2024	1	V			√				√						√			√				√
		2	M	10%		√			√	√	√					√			√				√
		3	M	15%		√	√		√	√								√	√				
		4 - E	M		√	√	√			√				√					√			√	√
Lakeside WCID (District 1, 2A,2B,2C,2D)	2023	1	V			√										√	√		√				
		2	M	10%		√			√							√	√	√	√				
		3	M	15%		√	√		√								√	√	√				
		4 – E	M		√		√							√	√		√		√				√
Lakeway MUD	2024	1	V	10%		√			√	√				√		√	√	√	√				√
		2	M	20%		√			√	√				√		√	√	√	√	√			√
		3	M	25%		√			√	√				√		√	√	√	√				√
		4 – E	M	30%	√	√			√	√			√	√			√	√	√				√
Lazy Nine MUD 1A	2024	1	M	10%	√		√					√				√		√	√	√			√
		2	M	20%	√		√					√				√		√	√				√
		3	M	30%	√		√					√				√		√	√				√
		4 – E	M		√		√					√	√					√	√				√
Llano	2024	1	M	1.3 MGD						√	√					√			√				
		2	M	0.8 MGD						√	√					√		√	√	1			

WUG Name	DCP Date	Drought Stage*	Voluntary/Mandatory	Percent Reduction	Triggers									Responses									
					Contamination	Demand/Capacity Based	Failure	Groundwater Level	Reservoir Level	Supply Based	Time	Wholesale Provider	Other[1]	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Notification of Public Agencies or Specific Users	Prohibited Use	Public Notification	Discontinue Water Diversions	Suspend Service	Water Allocation	Other[2]
		3 - E	M	0.4 MGD	√		√			√	√				√		√	√	√				
Loop 360 WSC	2023	1	V	5%		√			√		√		√			√			√				√
		2	M	10%		√			√				√			√	√	√	√	√			√
		3	M	20%		√							√			√	√	√	√	√			√
		4 – E	M		√		√						√			√	√	√	√	√			√
Lower Colorado River Authority	2024	1		10%					√				√						√				√
		2		15%					√				√			√			√				√
		3		25%					√				√			√		√	√				√
		4		30%					√				√		√			√	√				√
Manor	2024	Cons.	V								YR					√		√	√				√
		1	V	10%		√										√		√	√				√
		2	V	25%		√										√		√	√	√			√
		3 – E	V	30%	√	√	√		√			√				√	√	√	√	√		√	√
Manville WSC	2023	1	V			√				√						√	√		√				√
		2	M	10%		√			√	√						√	√	√	√		√		√
		3	M	15%		√	√		√	√							√	√	√				√
		4 – E	M		√		√								√		√	√	√				√
Mid-Tex Utility (Texas Water Utilities)	2023	A	V	10%		√			√	√						√	√	√	√				√
		1	M	10%		√			√	√						√	√	√	√				√
		2	M	20%		√			√	√						√	√	√	√				√

WUG Name	DCP Date	Drought Stage*	Voluntary/Mandatory	Percent Reduction	Triggers									Responses										
					Contamination	Demand/Capacity Based	Failure	Groundwater Level	Reservoir Level	Supply Based	Time	Wholesale Provider	Other[1]	Assessment and Identification	Water Rate Change or	Irrigation Schedule	Notification of Public Agencies or Specific Users	Prohibited Use	Public Notification	Discontinue Water Diversions	Suspend Service	Water Allocation	Other[2]
		3	M	30%		√			√	√						√	√	√	√				√
		4- E	M	40%			√		√	√			√				√	√	√				
Pflugerville	2023	Cons.	M								√												
		1	M	10%		√			√				√			√		√	√	√			√
		2	M	25%		√			√				√			√		√	√	√			√
		3 – E	M	30%	√	√	√		√				√				√	√	√				√
		WR	M		√	√	√		√				√		√		√		√				√
Reunion Ranch WCID	2024	1	M	10%								√				√		√	√				√
		2	M	20%								√				√		√	√				√
		3	M	30%								√				√		√	√				√
		4 – E	M									√						√	√				√
Senna Hills MUD	2024	1		10%								√		√		√		√	√				√
		2	M	20%								√				√		√	√	√			√
		3	M	30%								√				√		√	√	√			√
		4 - E	M									√						√	√				√
The Colony MUD (1A,1B,1C,1D,1E,1F ,1G)	2024	1	V/ M	10%		√							√			√		√	√				√
		2	M	15%		√				√		√	√			√		√	√	√			√
		3	M	20%	√	√	√						√					√	√	√			√
		4 - E	M	25%	√		√						√					√	√	√		√	√

WUG Name	DCP Date	Drought Stage*	Voluntary/Mandatory	Percent Reduction	Triggers									Responses									
					Contamination	Demand/Capacity Based	Failure	Groundwater Level	Reservoir Level	Supply Based	Time	Wholesale Provider	Other[1]	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Notification of Public Agencies or Specific Users	Prohibited Use	Public Notification	Discontinue Water Diversions	Suspend Service	Water Allocation	Other[2]
Travis County WCID 17	2023	1 - V		5% - 10%							√					√	√	√	√				√
		2	M	10% - 20%		√			√							√	√	√	√				√
		3	M	20%		√			√								√	√	√				√
		4 – E	M	25%			√		√								√	√	√				√
Wells Branch MUD	2024	1	M	10%					√								√		√				
		2	M	20%		√			√								√		√				
		3	M	25%					√								√		√				
		4	M	30%					√								√		√				
		5 – E	M		√		√						√				√		√				
West Bastrop Village MUD (Bastrop West Water Supply)	2023	1			No Listed Trigger Conditions								√			√			√				√
		2											√			√		√	√				√
		3											√			√		√	√				√
		4 – E											√		√			√	√				√
		5 – WA											√		√				√			√	
West Travis County Public Utility Agency	2024	1	M	10%	√	√	√		√	√			√			√	√	√	√	√			√
		2	M	20%	√	√	√		√	√			√			√	√	√	√	√			√
		3	M	30%	√	√	√		√	√			√		√	√	√	√	√				√
		4 – E	M		√		√						√		√		√	√	√				√
	2023	A	V	10%		√			√	√						√	√	√	√				√

WUG Name	DCP Date	Drought Stage*	Voluntary/Mandatory	Percent Reduction	Triggers									Responses									
					Contamination	Demand/Capacity Based	Failure	Groundwater Level	Reservoir Level	Supply Based	Time	Wholesale Provider	Other[1]	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Notification of Public Agencies or Specific Users	Prohibited Use	Public Notification	Discontinue Water Diversions	Suspend Service	Water Allocation	Other[2]
Windmere Utility (Windmere Community) Texas Water Utilities		1	M	10%		√			√	√						√	√	√	√				√
		2	M	20%		√			√	√						√	√	√	√				√
		3	M	30%		√			√	√						√	√	√	√				√
		4- E	M	40%			√		√	√			√				√	√	√				

* Abbreviations used in this column: V = Voluntary, E = Emergency, WA = Water Allocation, WR = Water Rationing, A = Awareness, C = Conservation

Appendix 7.B

Region-Specific Model Drought Contingency Plans







2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

APPENDIX 7B

REGION-SPECIFIC MODEL DROUGHT CONTINGENCY PLANS

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Model Region K Drought Contingency Plan Template

Utility/Water Supplier

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Model Drought Contingency Plan Template
(Utility / Water Supplier)

Brief Introduction and Background

Include information such as
- Name of Utility
- Address, City, Zip Code
- CCN#
- PWS #s

Section I: Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the ______________________________ (name of your water supplier) hereby adopts the following regulations and restrictions on the delivery and consumption of water through an ordinance/or resolution.

Water uses regulated or prohibited under this Drought Contingency Plan (the Plan) are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in Section XI of this Plan.

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the
______________ (name of your water supplier) by means of ______ (describe methods used to inform the public about the preparation of the plan and provide opportunities for input; for example, scheduling and providing public notice of a public meeting to accept input on the Plan).

Section III: Public Education

The ______________ (name of your water supplier) will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of (describe methods to be used to provide information to the public about the Plan; for example, public events, press releases or utility bill inserts).

Section IV: Coordination with the Lower Colorado Regional Water Planning Group

The service area of the ___________ (name of your water supplier) is located within the Lower Colorado Regional Water Planning Area and _ (name of your water supplier) has provided a copy of this Plan to the Lower Colorado Regional Water Planning Group.

Section V: Authorization

The ___________________ (designated official; for example, the mayor, city manager, utility director, general manager, etc.), or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The _, (designated official) or his/her designee shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the ___ (name of your water supplier). The terms person and customer as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan**,** the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by ____ (name of your water supplier).

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
(c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
(d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
(e) flushing gutters or permitting water to run or accumulate in any gutter or street;
(f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or Jacuzzi- type pools;
(g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
(h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
(i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The ________________ (designated official) or his/her designee shall monitor water supply and/or demand conditions on a (example: daily, weekly, monthly) basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified triggers are reached.

The triggering criteria described below are based on:

(*provide a brief description of the rationale for the triggering criteria; for example, triggering criteria / trigger levels based on a statistical analysis of the vulnerability of the water source under drought of record conditions, or based on known system capacity limits*).

Stage 1 Triggers -- MILD Water Shortage Conditions

Requirements for initiation
Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII Definitions, when

____

(*Describe triggering criteria / trigger levels; see examples below*).

Following are examples of the types of triggering criteria that might be used in one or more successive stages of a drought contingency plan. One or a combination of such criteria must be defined for each drought response stage, but usually not all will apply. Select those appropriate to your system:

Example 1: Annually, beginning on May 1 through September 30.

Example 2: When the water supply available to the _________ (name of your water supplier) is equal to or less than __________________ (acre-feet, percentage of storage, etc.).

Example 3: When, pursuant to requirements specified in the ____(name of ***you*** *water supplier) wholesale water purchase contract with ___________ (name of your wholesale water supplier), notification is received requesting initiation of Stage 1 of the Drought Contingency Plan.*

Example 4: When flows in the ____________ (name of stream or river) are equal to or less than ___cubic feet per second.

Example 5: When the static water level in the ______________ (name of your water supplier) well(s) is equal to or less than ____ feet above/below mean sea level.

Example 6: When the specific capacity of the ____________________ (name of your water supplier) well(s) is equal to or less than ___ percent of the well's original specific capacity.

Example 7: When total daily water demand equals or exceeds _______ million gallons for ____consecutive days of _____ million gallons on a single day (example: based on the safe operating capacity of water supply facilities).

Example 8: Continually falling treated water reservoir levels which do not refill above _ percent overnight (example: based on an evaluation of minimum treated water storage required to avoid system outage).

The public water supplier may devise other triggering criteria which are tailored to its system.

Requirements for termination

Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of __ (e.g. 3) consecutive days.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non- essential water uses provided in Section IX of this Plan when ___ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination

Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (example: 3) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

Stage 3 Triggers -- SEVERE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non- essential water uses for Stage 3 of this Plan when _ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination

Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (example: 3) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non- essential water uses for Stage 4 of this Plan when _ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination

Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (example: 3) consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers -- EMERGENCY Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when _____ (designated official), or his/her designee, determines that a water supply emergency exists based on:

1. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; **or**

2. Natural or man-made contamination of the water supply source(s).

Requirements for termination
Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ____ (example: 3) consecutive days.

Stage 6 Triggers -- WATER ALLOCATION

Requirements for initiation
Customers shall be required to comply with the water allocation plan prescribed in Section IX of this
Plan and comply with the requirements and restrictions for Stage 5 of this Plan when
______________ (describe triggering criteria, see examples in Stage 1).

Requirements for termination - Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of (example: 3) consecutive days.

Note: The inclusion of WATER ALLOCATION as part of a drought contingency plan may not be required in all cases. For example, for a given water supplier, an analysis of water supply availability under drought of record conditions may indicate that there is essentially no risk of water supply shortage. Hence, a drought contingency plan for such a water supplier might only address facility capacity limitations and emergency conditions (example: supply source contamination and system capacity limitations).

Section IX: Drought Response Stages

The ________________ (designated official), or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification
Notification of the Public:
The __________ (designated official) or his/ her designee shall notify the public by means of:

Examples:

- *publication in a newspaper of general circulation, direct mail to each customer,*
- *public service announcements, signs posted in public places take-home fliers at schools.*

Additional Notification:

The ___________ (designated official) or his/ her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

Examples:

- *Mayor / Chairman and members of the City Council / Utility Board Fire Chief(s)*
- *City and/or County Emergency Management Coordinator(s) County Judge & Commissioner(s)*
- *State Disaster District / Department of Public Safety* TCEQ *(required when* mandatory *restrictions are imposed) Major water users*
- *Critical water users, i.e. hospitals*
- *Parks / street superintendents & public facilities managers*

Note: The plan should specify direct notice only as appropriate to respective drought stages.

Stage 1 Response -- MILD Water Shortage Conditions

Target: Achieve a voluntary ______ percent reduction in _____________________________(example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

D*escribe additional measures, if any, to be implemented directly by (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, activation and use of an alternative supply source(s); use of reclaimed water for non-potable purposes.*

Voluntary Water Use Restrictions for Reducing Demand :

(a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.m. to midnight on designated watering days.

(b) All operations of the ___________________ (name of your water supplier) shall adhere to water use restrictions prescribed for Stage 2 of the Plan.

(c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response -- MODERATE Water Shortage Conditions

<u>Target</u>: Achieve a ________ percent reduction in _____ (example: total water use, daily water demand, etc.).

<u>Best Management Practices for Supply Management</u>:

Describe additional measures, if any, to be implemented directly by ______________________________ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

<u>Water Use Restrictions for Demand Reduction</u>:
Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

(a) Irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems shall be limited to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and irrigation of landscaped areas is further limited to the hours of 12:00 midnight until 10:00 a.m. and between 8:00 p.m. and 12:00 midnight on designated watering days. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet filled bucket or watering can of five (5) gallons or less, or drip irrigation system.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight. Such washing, when allowed, shall be done with a hand-held bucket or a hand-held hose equipped with a positive shutoff nozzle for quick rises. Vehicle washing may be done at any time on the immediate premises of a commercial car wash or commercial service station. Further, such washing may be exempted from these regulations if the health, safety, and welfare of the public is contingent upon frequent vehicle cleansing, such as garbage trucks and vehicles used to transport food and perishables.

(c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or Jacuzzi-type pools is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight.

(d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.

(e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the _____ (name of your water supplier).

(f) Use of water for the irrigation of golf course greens, tees, and fairways is prohibited except on designated watering days between the hours 12:00 midnightand 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the ______________________________ (name of your water supplier), the facility shall not be subject to these regulations.

(g) All restaurants are prohibited from serving water to patrons except upon request of the patron.

(h) The following uses of water are defined as non-essential and are prohibited:

1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
3. use of water for dust control;
4. flushing gutters or permitting water to run or accumulate in any gutter or street; and
5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 Response -- SEVERE Water Shortage Conditions

<u>Target</u>: Achieve a ________ percent reduction in _____ (example: total water use, daily water demand, etc.).

<u>Best Management Practices for Supply Management</u>:

Describe additional measures, if any, to be implemented directly by ______________________________ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, *reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.*

Water Use Restrictions for Demand Reduction:
All requirements of Stage 2 shall remain in effect during Stage 3 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

(b) The watering of golf course tees is prohibited unless the golf course utilizes a water source other than that provided by the __________________ (name of your water supplier).

(c) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

Stage 4 Response -- CRITICAL Water Shortage Conditions

Target: Achieve a ________ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by ____ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand:. All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.

(c) The filling, refilling, or adding of water to swimming pools, wading pools, and Jacuzzi-type pools is prohibited.

(d) Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.

(e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response -- EMERGENCY Water Shortage Conditions

Target: Achieve a ________ percent reduction in _____ (example: total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by ______________________________ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

(a) Irrigation of landscaped areas is absolutely prohibited.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Section X: Enforcement

(a) No person shall knowingly or intentionally allow the use of water from the _____ (name of your water supplier) for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by ___________(designated official), or his/her designee, in accordance with provisions of this Plan.

(b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall

(c) Any person, including a person classified as a water customer of the ____ (name of your water supplier), in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.

(d) Any employee of the _____ (name of your water supplier), police officer, or other _________________ employee designated by the _____________ (designated official), may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the _______ (example: municipal court) on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in ___ (example: municipal court) to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in (example: municipal court), a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in ______ (example: municipal court) before all other cases.

Section XI: Variances

The _________________ (designated official), or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

(a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.

(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the ______ (name of your water supplier) within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the _____ (designated official), or his/her designee, and shall include the following:

(a) Name and address of the petitioner(s).

(b) Purpose of water use.

(c) Specific provision(s) of the Plan from which the petitioner is requesting relief.

(d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.

(e) Description of the relief requested.

(f) Period of time for which the variance is sought.

(g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.

(h) Other pertinent information.

EXAMPLE RESOLUTION FOR

ADOPTION OF A DROUGHT

CONTINGENCY PLAN RESOLUTION

NO. ___________________

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE ________________________ (name of water supplier) ADOPTING A DROUGHT CONTINGENCY PLAN.

WHEREAS, the Board recognizes that the amount of water available to the ____ (name of water supplier) and its water utility customers are limited and subject to depletion during periods of extended drought;

WHEREAS, the Board recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes;

WHEREAS, Section 11.1272 of the *Texas Water Code* and applicable rules of the Texas Commission on Environmental Quality require all public water supply systems in Texas to prepare a drought contingency plan; and

WHEREAS, as authorized under law, and in the best interests of the customers of the ______________ (name of water supply system), the Board deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE ______________ (name of water supplier):

SECTION 1. That the Drought Contingency Plan attached hereto as Exhibit "A" and made part hereof for all purposes be, and the same is hereby, adopted as the official policy of the _____________ (name of water supplier).

SECTION 2. That the ___________ (e.g., general manager) is hereby directed to implement, administer, and enforce the Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.

DULY PASSED BY THE BOARD OF DIRECTORS OF THE ___________, ON THIS _ day of ___________, 20__.

President, Board of Directors
ATTESTED TO:

Secretary, Board of Directors

Model Region K Drought Contingency Plan Template

Irrigation Uses

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Model Drought Contingency Plan Template (Irrigation Uses)

DROUGHT CONTINGENCY PLAN FOR

(Name of irrigation district)
(Address)
(Date)

Section I: Declaration of Policy, Purpose, and Intent

The Board of Directors of the ________________ (name of irrigation district) deems it to be in the interest of the District to adopt Rules and Regulations governing the equitable and efficient allocation of limited water supplies during times of shortage. These Rules and Regulations constitute the District's drought contingency plan required under Section 11.1272, Texas Water Code, *Vernon's Texas Codes Annotated*, and associated administrative rules of the Texas Commission on Environmental Quality (Title 30, Texas Administrative Code, Chapter 288).

Section II: User Involvement

Opportunity for users of water from the ______________ (name of irrigation district) was provided by means of ____ (describe methods used to inform water users about the preparation of the plan and opportunities for input; for example, scheduling and providing notice of a public meeting to accept user input on the plan).

Section III: User Education

The ______________ (name of irrigation district) will periodically provide water users with information about the Plan, including information about the conditions under which water allocation is to be initiated or terminated and the district's policies and procedures for water allocation. This information will be provided by means of _________ (e.g. describe methods to be used to provide water users with information about the Plan; for example, by providing copies of the Plan and by posting water allocation rules and regulations on the district's public bulletin board).

Section IV: Authorization

The _______________ (e.g., general manager) is hereby authorized and directed to implement the applicable provision of the Plan upon determination by the Board that such implementation is necessary to ensure the equitable and efficient allocation of limited water supplies during times of shortage.

Section V: Application

The provisions of the Plan shall apply to all persons utilizing water provided by the __________ (name of irrigation district). The term "person" as used in the Plan includes individuals, corporations, partnerships, associations, and all other legal entities.

Section VI: Initiation of Water Allocation

The ____________ (designated official) shall monitor water supply conditions on a ________________ (e.g. weekly, monthly) basis and shall make recommendations to the Board regarding irrigation of water allocation. Upon approval of the Board, water allocation will become effective when ___________________ (describe the criteria and the basis for the criteria):

Below are examples of the types of triggering criteria that might be used; singly or in combination, in an irrigation district's drought contingency plan:

Example 1: Water in storage in the _______ (name of reservoir) is equal to or less than _________ (acre-feet and/or percentage of storage capacity).

Example 2: Combined storage in the ____________ (name or reservoirs) reservoir system is equal to or less than __________ (acre-feet and/or percentage of storage capacity).

Example 3: Flows as measured by the U.S. Geological Survey gage on the ____________ (name of reservoir) near _______________________ ___________________________, Texas reaches cubic feet per second (cfs).

Example 4: The storage balance in the district's irrigation water rights account reaches _____ acre-feet.

Example 5: The storage balance in the district's irrigation water rights account reaches an amount equivalent to (number) irrigations for each flat rate acre in which all flat rate assessments are paid and current.

Example 6: The ___________ (name of entity supplying water to the irrigation district) notifies the district that water deliveries will be limited to _________________________ acre- feet per year (i.e. a level below that required for unrestricted irrigation).

Section VII: Termination of Water Allocation

The district's water allocation policies will remain in effect until the conditions defined in Section IV of the Plan no longer exist and the Board deems that the need to allocate water no longer exists.

Section VIII: Notice

Notice of the initiation of water allocation will be given by notice posted on the

District's public bulletin board and by mail to each ____ (e.g. landowner, holders of active irrigation accounts, etc.).

Section IX: Water Allocation

(a) In identifying **specific, quantified targets** for water allocation to be achieved during periods of water shortages and drought, each irrigation user shall be allocated _____ irrigations or _____ acre-feet of water each flat rate acre onwhich all taxes, fees, and charges have been paid. The water allotment in each irrigation account will be expressed in acre-feet of water.

Include explanation of water allocation procedure. For example, in the Lower Rio Grande Valley, an "irrigation" is typically considered to be equivalent to eight (8) inches of water per irrigation acre; consisting of six (6) inches of water per acre applied plus two (2) inches of water lost in transporting the water from the river to the land. Thus, three irrigations would be equal to 24 inches of water per acre or an allocation of 2.0 acre-feet of water measured at the diversion from the river.

(b) As additional water supplies become available to the District in an amount reasonably sufficient for allocation to the District's irrigation users, the additional water made available to the District will be equally distributed, on a pro rata basis, to those irrigation users having ________.

Example 1: An account balance of less than _________________________ irrigations for each flat rate acre (i.e. _________________ acre-feet).

Example 2: An account balance of less than ________________________ acre-feet of water for each flat rate acre.

Example 3: An account balance of less than _ _____________________ acre-feet of water.

(c) The amount of water charged against a user's water allocation will be _______ (e.g. eight inches) per irrigation, or one allocation unit, unless water deliveries to the land are metered. Metered water deliveries will be charges based on actual measured use. In order to maintain parity in charging use against a water allocation between non-metered and metered deliveries, a loss factor of ____________________ percent of the water delivered in a metered situation will be added to the measured use and will be charged against the user's water allocation. Any metered use, with the loss factor applied, that is less than eight (8) inches per acre shall be credited back to the allocation unit and will be available to the user. It shall be a violation of the Rules and Regulations for a water user to use water in excess of the amount of water contained in the users irrigation account.

(d) Acreage in an irrigation account that has not been irrigated for any reason within the last two (2) consecutive years will be considered inactive and will not be allocated water. Any landowner whose land has not been irrigated within the last two (2) consecutive years, may, upon application to the District expressing intent to irrigate the land, receive future allocations. However, irrigation water allocated shall be applied only upon the acreage to which it was allocated and such water allotment cannot be transferred until there have been two consecutive years of use.

Section X: Transfers of Allotments

(a) A water allocation in an active irrigation account may be transferred within the boundaries of the District from one irrigation account to another. The transfer of water can only be made by the landowner's agent who is authorized in writing to act on behalf of the landowner in the transfer of all or part of the water allocation from the described land of the landowner covered by the irrigation account.

(b) A water allocation may not be transferred to land owned by a landowner outside the District boundaries.

or

A water allocation may be transferred to land outside the District's boundaries by paying the current water charge as if the water was actually delivered by the District to the land covered by an irrigation account. The amount of water allowed to be transferred shall be stated in terms of acre-feet and deducted from the landowner's current allocation balance in the irrigation account. Transfers of water outside the District shall not affect the allocation of water under Section VII of these Rules and Regulations.

(c) Water from outside the District may not be transferred by a landowner for use within the District.

or

Water from outside the District may be transferred by a landowner for use within the District. The District will divert and deliver the water on the same basis as District water is delivered, except that a ___ percent conveyance loss will be charged against the amount of water transferred for use in the District as the water is delivered.

Section XI: Penalties

Any person who willfully opens, closes, changes or interferes with any headgate or uses water in violation of these Rules and Regulations, shall be considered in violation of Section 11.0083, Texas Water Code, *Vernon's Texas Codes Annotated*, which provides for punishment by fine of not less than $10.00 nor more than $200.00 or by confinement in the county jail for not more than thirty (30) days, or both, for each violation, and these penalties provided by the laws of the State and may by enforced by complaints filed in the appropriate court jurisdiction in ______________________ County, all in accordance with Section 11.083; and in addition, the District may pursue a civil remedy in the way of damages and/or injunction against the violation of any of the foregoing Rules and Regulations.

Section XII: Severability

It is hereby declared to be the intention of the Board of Directors of the ____ (name of irrigation district) that the sections, paragraphs, sentences, clauses, and phrases of this Plan shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of this Plan, since the same would not have been enacted by the Board without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph, or section.

Section XIII: Authority

The foregoing rules and regulations are adopted pursuant to and in accordance with Sections 11.039, 11.083, 11.1272; Section 49.004; and Section 58.127-130 of the Texas Water Code, *Vernon's Texas Codes Annotated.*

Section XIV: Effective Date of Plan

The effective date of this Rule shall be five (5) days following the date of Publication hereof and ignorance of the Rules and Regulations is not a defense for a prosecution for enforcement of the violation of the Rules and Regulations.

EXAMPLE RESOLUTION FOR ADOPTION OF A DROUGHT CONTINGENCY PLAN

RESOLUTION NO.

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE (name of water supplier) ADOPTING A DROUGHT CONTINGENCY PLAN.

WHEREAS, the Board recognizes that the amount of water available to the ____ (name of water supplier) and its water utility customers is limited and subject to depletion during periods of extended drought;

WHEREAS, the Board recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes;

WHEREAS, Section 11.1272 of the Texas Water Code and applicable rules of the Texas Commission on Environmental Quality require all public water supply systems in Texas to prepare a drought contingency plan; and

WHEREAS, as authorized under law, and in the best interests of the customers of the ________________(name of water supply system), the Board deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE __________________ (name of water supplier):

SECTION 1. That the Drought Contingency Plan attached hereto as Exhibit A and made part hereof for all purposes be, and the same is hereby, adopted as the official policy of the _________________ (name of water supplier).

SECTION 2. That the ____________________ (e.g., general manager) is hereby directed to implement, administer, and enforce the Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.

DULY PASSED BY THE BOARD OF DIRECTORS OF THE ___________________,
ON THIS _____ day of ____, 20____.

____
President, Board of Directors

ATTESTED TO:

____
Secretary, Board of Directors

Model Region K Drought Contingency Plan Template
Wholesale Water Providers

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Model Drought Contingency Plan Template
(**Wholesale Public Water Suppliers**)

DROUGHT CONTINGENCY PLAN
FOR THE
(Name of wholesale water supplier)

(address)
(CCN)
(PWS)
(Date)

Section I: Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and/or to protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the ___________________________________ (name of your water supplier) adopts the following Drought Contingency Plan (the Plan).

Section II: Public Involvement

Opportunity for the public and wholesale water customers to provide input into the preparation of the Plan was provided by _____ (name of your water supplier) by means of _____________ (describe methods used to inform the public and wholesale customers about the preparation of the plan and opportunities for input; for example, scheduling and proving public notice of a public meeting to accept input on the Plan).

Section III: Wholesale Water Customer Education

The ___________ (name of your water supplier) will periodically provide wholesale water customers with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of _______________ (e.g., describe methods to be used to provide customers with information about the Plan; for example, providing a copy of the Plan or periodically including information about the Plan with invoices for water sales).

Section IV: Coordination with the Lower Colorado Regional Water Planning Group

The service area of the ________ (name of your water supplier) is located within the Lower Colorado Regional Water Planning Area and ___ (name of your water supplier) has provided a copy of this Plan to the Lower Colorado Regional Water Planning Group.

Section V: Authorization

The _________________ (designated official; for example, the general manager or executive director), or his/her designee, is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The _____________________, or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all customers utilizing water provided by the _________________ (name of your water supplier). The terms person and customer as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Criteria for Initiation and Termination of Drought Response Stages

The ___________ (designated official), or his/her designee, shall monitor water supply and/or demand conditions on a (e.g., weekly, monthly) basis and shall determine when conditions warrant initiation or termination of each stage of the Plan. Customer notification of the initiation or termination of drought response stages will be made by mail or telephone. The news media will also be informed.

The triggering criteria described below are based on:

____

____ (provide a brief description of the rationale for the triggering criteria; for example, triggering criteria are based on a statistical analysis of the vulnerability *of the water source under drought of record conditions).*

Stage 1 Triggers -- MILD Water Shortage Conditions

<u>Requirements</u> <u>for</u> <u>initiation</u>: The ________ (name of your water supplier) will recognize that a mild water shortage condition exists when_______(*describe triggering criteria, see examples below).*

Below are examples of the types of triggering criteria that might be used in a wholesale water supplier=s drought contingency plan. One or a combination of such criteria may be defined for each drought response stage:

Example 1: Water in storage in the ________ (name of reservoir) is equal to or less than ___________________________ (acre-feet and/or percentage of storage capacity).

Example 2: When the combined storage in the ______ (name of reservoirs) is equal to or less than _____ (acre-feet and/or percentage of storage capacity).

Example 3: Flows as measured by the U.S. Geological Survey gage on the ________ (name of river) near ______, Texas reaches __ cubic feet per second (cfs).

Example 4: When total daily water demand equals or exceeds _ million gallons for ____consecutive days or _____ million gallons on a single day.

Example 5: When total daily water demand equals or exceeds __ percent of the safe operating capacity of _______________ million gallons per day for _______consecutive days or ____________ percent on a single day.

<u>Requirements</u> <u>for</u> <u>termination:</u> Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of __ (e.g., 30) consecutive days. The _________ (name of water supplier) will notify its wholesale customers and the media of the termination of Stage 1 in the same manner as the notification of initiation of Stage 1 of the Plan.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

<u>Requirements</u> <u>for</u> <u>initiation:</u> The ________ (name of your water supplier) will recognize that a moderate water shortage condition exists when______(describe triggering criteria).

<u>Requirements</u> <u>for</u> <u>termination</u>**:** Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative. The ____ (name of your water supplier) will notify its wholesale customers and the media of the termination of Stage 2 in the same manner as the notification of initiation of Stage 1 of the Plan.

Stage 3 Triggers -- SEVERE Water Shortage Conditions

Requirements for initiation: The ________ (name of your water supplier) will recognize that a severe water shortage condition exists when_______(*describe triggering criteria; see examples in Stage 1*).

Requirements for termination**:** Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative. The ____ (name of your water supplier) will notify its wholesale customers and the media of the termination of Stage 2 in the same manner as the notification of initiation of Stage 3 of the Plan.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

Requirements for initiation - The ________ (name of your water supplier) will recognize that an emergency water shortage condition exists when__(*describe triggering criteria*; *see examples below*).

Example 1. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; or

Example 2. Natural or man-made contamination of the water supply source(s).

Requirements for termination**:** Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of __ (e.g., 30) consecutive days. The _________ (name of your water supplier) will notify its wholesale customers and the media of the termination of Stage 4.

Section VIII: Drought Response Stages

The _________ (designated official), or his/her designee, shall monitor water supply and/or demand conditions and, in accordance with the triggering criteria set forth in Section VI, shall determine that mild, moderate, or severe water shortage conditions exist or that an emergency condition exists and shall implement the following actions:

Stage 1 Response -- MILD Water Shortage Conditions

Target: Achieve a voluntary __ percent reduction in ________ (e.g., total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by

____ (designated official), or his/her designee(s), to manage limited water supplies and/or reduce water demand. Examples include modifying reservoir operations procedures, interconnection with another water system, and use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand:

(a) The ___ (designated official), or his/her designee(s), will contact wholesale water customers to discuss water supply and/or demand conditions and will request that wholesale water customers initiate voluntary measures to reduce water use (e.g., implement Stage 1 of the customer's drought contingency plan).

(b) The ___ (designated official), or his/her designee(s), will provide a weekly report to news media with information regarding current water supply and/or demand conditions, projected water supply and demand conditions if drought conditions persist, and consumer information on water conservation measures and practices.

Stage 2 Response -- MODERATE Water Shortage Conditions

<u>Target:</u> Achieve a _____ percent reduction in ____ (e.g., total water use, daily water demand, etc.).

<u>Best Management Practices for Supply Management</u>:

Describe additional measures, if any, to be implemented directly by ____ (designated official), or his/her designee(s), to manage limited water supplies and/or reduce water demand. Examples include modifying reservoir operations procedures, interconnection with another water system, and use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand:

(a) The ___ (designated official), or his/her designee(s), will initiate weekly contact with wholesale water customers to discuss water supply and/or demand conditions and the possibility of pro rata curtailment of water diversions and/or deliveries.

(b) The ___ (designated official), or his/her designee(s), will request wholesale water customers to initiate mandatory measures to reduce non-essential water use (e.g., implement Stage 2 of the customer's drought contingency plan).

(c) The __ (designated official), or his/her designee(s), will initiate preparations for the implementation of pro rata curtailment of water diversions and/or deliveries by preparing a monthly water usage allocation baseline for each wholesale customer according to the procedures specified in Section VI of the Plan.

(d) The __ (designated official), or his/her designee(s), will provide a weekly report to news media with information regarding current water supply and/or demand conditions, projected water supply and demand conditions if drought conditions persist, and consumer information on water conservation measures and practices.

Stage 3 Response -- SEVERE Water Shortage Conditions

<u>Target:</u> Achieve a _____ percent reduction in ____ (e.g., total water use, daily water demand, etc.).

<u>Best Management Practices for Supply Management</u>:

Describe additional measures, if any, to be implemented directly by ____ (designated official), or his/her designee(s), to manage limited water supplies and/or reduce water demand. Examples include modifying reservoir operations procedures, interconnection with another water system, and use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand:

(a) The _____________ (designated official), or his/her designee(s), will contact wholesale water customers to discuss water supply and/or demand conditions and will request that wholesale water customers initiate additional mandatory measures to reduce non-essential water use (e.g., implement Stage 2 of the customer's drought contingency plan).

(b) The _____________ (designated official), or his/her designee(s), will initiate pro rata curtailment of water diversions and/or deliveries for each wholesale customer according to the procedures specified in Section VI of the Plan.

(c) The _____________ (designated official), or his/her designee(s), will provide a weekly report to news media with information regarding current water supply and/or demand conditions, projected water supply and demand conditions if drought conditions persist, and consumer information on water conservation measures and practices.

Stage 4 Response -- EMERGENCY Water Shortage Conditions

Whenever emergency water shortage conditions exist as defined in Section VII of the Plan, the __________ (designated official) shall:

1. Assess the severity of the problem and identify the actions needed and time required to solve the problem.

2. Inform the utility director or other responsible official of each wholesale water customer by telephone or in person and suggest actions, as appropriate, to alleviate problems (e.g., notification of the public to reduce water use until service is restored).

3. If appropriate, notify city, county, and/or state emergency response officials for assistance.

4. Undertake necessary actions, including repairs and/or clean-up as needed.

5. Prepare a post-event assessment report on the incident and critique of emergency response procedures and actions.

Section IX: Pro Rata Water Allocation

In the event that the triggering criteria specified in Section VII of the Plan for Stage 3 Severe Water Shortage Conditions have been met, the _____ (designated official) is hereby authorized initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code Section 11.039.

Section X: Enforcement

During any period when pro rata allocation of available water supplies is in effect, wholesale customers shall pay the following surcharges on excess water diversions and/or deliveries:

____ times the normal water charge per acre-foot for water diversions and/or deliveries in excess of the monthly allocation up through 5 percent above the monthly allocation.

____ times the normal water charge per acre-foot for water diversions and/or deliveries in excess of the monthly allocation from 5 percent through 10 percent above the monthly allocation.

____ times the normal water charge per acre-foot for water diversions and/or deliveries in excess of the monthly allocation from 10 percent through 15 percent above the monthly allocation.

____ times the normal water charge per acre-foot for water diversions and/or deliveries more than 15 percent above the monthly allocation.

The above surcharges shall be cumulative.

Section XI: Variances

The ______________ (designated official), or his/her designee, may, in writing, grant a temporary variance to the pro rata water allocation policies provided by this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the public health, welfare, or safety and if one or more of the following conditions are met:

(a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.

(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Plan shall file a petition for variance with the __________________________ (designated official) within 5 days after pro rata allocation has been invoked. All petitions for variances shall be reviewed by the ______________________ (governing body), and shall include the following:

(a) Name and address of the petitioner(s).
(b) Detailed statement with supporting data and information as to how the pro rata allocation of water under the policies and procedures established in the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
(c) Description of the relief requested.
(d) Period of time for which the variance is sought.
(e) Alternative measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(f) Other pertinent information.

Variances granted by the ______________ (governing body) shall be subject to the following conditions, unless waived or modified by the __________ (governing body) or its designee:

(a) Variances granted shall include a timetable for compliance.

(b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

Section XII: Severability

It is hereby declared to be the intention of the ________ (governing body of your water supplier) that the sections, paragraphs, sentences, clauses, and phrases of this Plan are severable and, if any phrase, clause, sentence, paragraph, or section of this Plan shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of this Plan, since the same would not have been enacted by the _________ (governing body of your water supplier) without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph, or section.

EXAMPLE RESOLUTION FOR ADOPTION OF A DROUGHT CONTINGENCY

PLAN RESOLUTION NO.

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE _______________ (name of water supplier) ADOPTING A DROUGHT CONTINGENCY PLAN.

WHEREAS, the Board recognizes that the amount of water available to the _ (name of water supplier) and its water utility customers is limited and subject to depletion during periods of extended drought;

WHEREAS, the Board recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes;

WHEREAS, Section 11.1272 of the *Texas Water Code* and applicable rules of the Texas Commission on Environmental Quality require all public water supply systems in Texas to prepare a drought contingency plan; and

WHEREAS, as authorized under law, and in the best interests of the customers of the
_______________(name of water supply system), the Board deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE _______________ (name of water supplier):

SECTION 1. That the Drought Contingency Plan attached hereto as "Exhibit A" and made part hereof for all purposes be, and the same is hereby, adopted as the official policy of the __________ (name of water supplier).

SECTION 2. That the ____________ (e.g., general manager) is hereby directed to implement, administer, and enforce the Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.

DULY PASSED BY THE BOARD OF DIRECTORS OF THE _______________, ON THIS __

day of ________________________, 20___.

____
President, Board of Directors

ATTESTED TO:

____
Secretary, Board of Directors

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Model Region K Drought Contingency Plan Template

Steam-Electric Water Users

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Model Drought Contingency Plan Template
(Steam-Electric Uses)

DROUGHT CONTINGENCY PLAN
FOR
(Name of Facility)

(Address)
(Date)

Section I: Declaration of Policy, Purpose, and Intent

In cases of extreme drought, periods of abnormally high usage, system contamination, or extended reduction in ability to supply water due to equipment failure, temporary restrictions may be instituted to limit non-essential water usage. The purpose of this Drought Contingency Plan (the Plan), adopted by _____ (*name of your facility)* is to encourage a reduction of water use in order to maintain adequate supply to ensure the safe and reliable operation of ________ (*name of your facility),* and to protect the fresh water resources available.

Section II: Facility Staff Education

Management at _________ (*name of your facility*) will periodically provide the employees of the facility with information about the Plan, including the importance of the Plan, information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of __ (*example: describe methods to be used to provide employees with information about the Plan; for example, providing a copy of the Plan or holding staff meetings*).

Section III: Coordination with Regional Water Planning Groups

The water service area of the ___ (name of your facility) is located within the Lower Colorado Regional Water Planning Area (Region K) and the ______ (*name of your facility*) has provided a copy of the Plan to the Lower Colorado Regional Water Planning Group.

Section IV: Authorization

The ____________ (*designated representative; for example, the plant manager*), or his/her designee, is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The ____________________ or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section V: Criteria for Initiation and Termination of Drought Response Stages

The _______ (*designated representative*), or his/her designee, shall monitor water supply and/or demand conditions and shall determine when conditions warrant initiation or termination of each stage of the Plan.

Stage 1 – Year-Round Water Conservation

Action: Implement the facility's Water Conservation Plan (example)

Reduction Target: None (operation under normal conditions); Include definition of year-round conservation in Water Conservation Plan. (examples)

Initiation: Ongoing

Termination: None

Water Use Reduction Response Measures (examples):

1. Irrigation of landscaped areas with hose-end sprinklers or in-ground irrigation systems is limited to no more than twice weekly. Water hours will be limited to between midnight and 10 a.m. and 7 p.m. and midnight.

2. ___________ (Other measures, as needed.)

Stage 2 -- MODERATE Water Shortage Conditions

Action: Curtail outdoor use of water for irrigation of landscape. (example)

Reduction Target: Achieve a __ percent reduction in __ (e.g. percent of non-cooling water use)

Initiation: The ____ (*name of your facility*) will recognize that a moderate water shortage condition exists when _ (*describe triggering criteria*).

Termination: Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased. Upon termination of Stage 2, Stage 1, becomes operative.

Water Use Reduction Response Measures (examples):

1. Prohibit irrigation of landscape, except by hand-held hose, bucket, or drip irrigation.

2. Discontinue irrigation of lawns.
3. Discontinue washing and rinsing of vehicles and other equipment unless required for operation of the facility or to reduce hazards.
4. ______ (Other measures, as needed.)

Stage 3 -- SEVERE Water Shortage Conditions

Action: Curtail consumptive water uses. (example)

Reduction Target: Achieve a __ percent reduction in __ (e.g. percent of consumed water)

Initiation: The ____ (*name of your facility*) will recognize that a severe water shortage condition exists when _ (*describe triggering criteria*).

Termination: Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased. Upon termination of Stage 3, Stage 2 or another appropriate Stage, becomes operative.

Water Use Reduction Response Measures (examples):

1. All water use for washing and rinsing of vehicles and other equipment will be stopped unless an alternative water source is used.
2. Reduce pumping from water source as directed by water supplier and/or based on ERCOT requirements.
3. ___________ (Other measures, as needed.)

Stage 4 – CRITICAL/EMERGENCY Water Shortage Conditions

Action: Further curtail consumptive water uses. (example)

Reduction Target: Achieve a _______ percent reduction in _______ (e.g. percent of consumed water)

Initiation: The____ (*name of your facility*) will recognize that a critical/emergency water shortage condition exists when (*describe triggering criteria*).

Termination: Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased. Upon termination of Stage 4, Stage 3 or another appropriate Stage, becomes operative.

Water Use Reduction Response Measures (examples):

1. Reduce pumping from water source as directed by water supplier and/or based on ERCOT requirements.
2. (Other measures, as needed.)

Section VI: Notification

Notification of the implementation of any mandatory provision of the Plan shall be made to ________________________________ (e.g. water supplier; entity requiring the Plan)______________________________(method of notification) within_________________________________ (number of days) business days of implementation.

Appendix 8.A

Background Information on Legislative and Policy Recommendations

Appendix 8.A

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Appendix 8A

Background Information on Legislative and Policy Recommendations

8A.1 Management of Surface Water Resources: Inter-Basin Transfers and Model Linking

Background Information

Proposed inter-basin transfers (IBTs) must be managed carefully relative to impairment of existing water rights, consistency with the public welfare including the need for water, consistency with state and regional water supply planning, and environmental and water quality issues.

For permits related to inter-basin transfers, among other considerations, the economic and public welfare interests in the basin of origin must be considered. If it is determined that unacceptable short-term or long-term impacts would occur to these interests as a result of the IBT, special provisions to ensure protection of these interests could be warranted. Business, industry, agriculture and other economically important water users developed originally as a result of water availability. Without some means of protecting these users, water transfers should be carefully considered, including their potential impact on the economy of the entire region. In the case for Region K, legislative actions have thus far required LCRA to issue contracts for Williamson County to Leander, Cedar Park and Brazos River Authority, which now total 79,000 acre-feet per year As such, as water supply tightens from reduced inflows and continued growth, Region K may likely need inter-basin transfers into Region K to meet growing water supply needs.

Some identified strategies for dealing with water supply shortages may impact sustainability of groundwater, when development of surface water supplies could be utilized instead. This approach could result in long-term adverse consequences for the region. Likewise, further development or transfer of surface water supplies could be detrimental to groundwater recharge and similarly result in long-term adverse consequences to the region.

8A.2 Environmental – Instream Flows and Freshwater Inflows to Bays and Estuaries

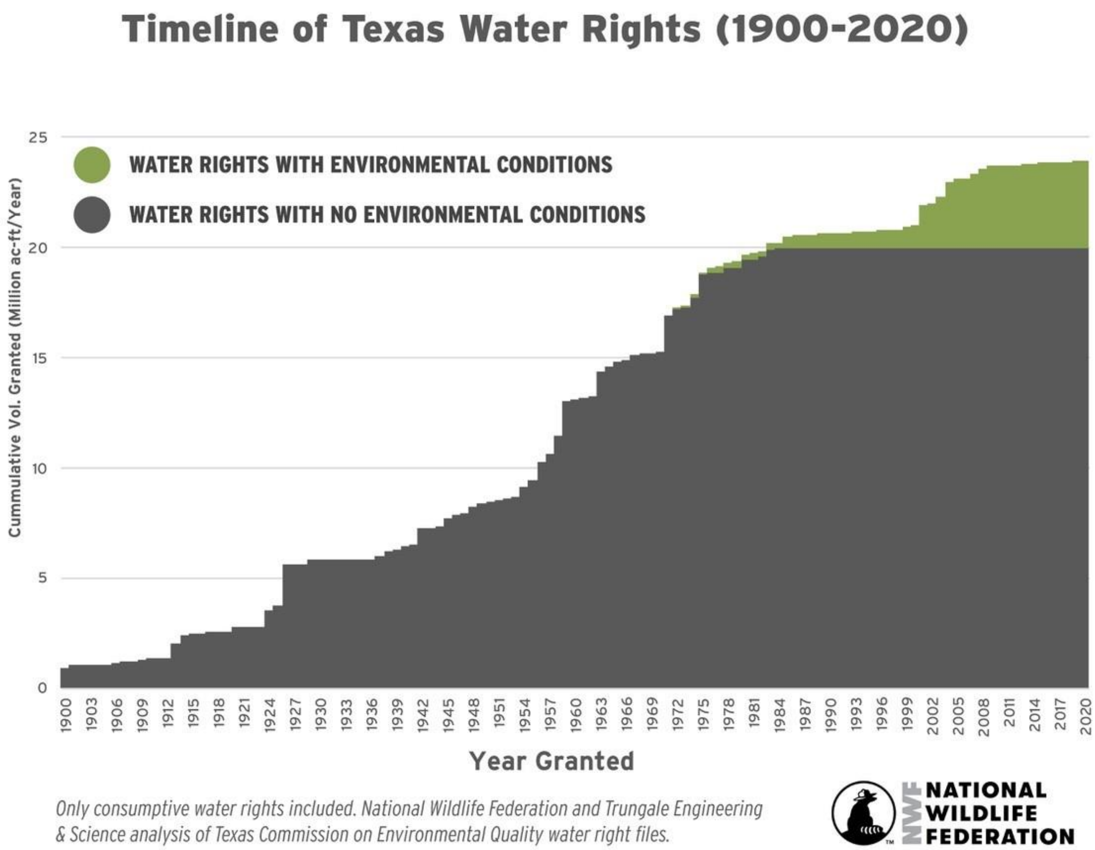
Background Information

Healthy and productive rivers, bays and coastal estuaries are the natural heritage of all Texans and support billions of dollars in economic activity annually. Texas' fish and wildlife resources need and deserve preservation and, in some cases, restoration.

Fortunately, a large percentage of surface water rights in Texas are currently not fully used, and for the time being natural flows, in some cases, are sufficient to provide for essential environmental needs during drought conditions. However, new water rights and projected increases in the use of existing water rights threaten the availability of these critical environmental flows. In fact, modeling undertaken during development of the LCRA Water Management Plan predicts freshwater inflows in the Lower Colorado River Basin will not meet the science-based targets if historical precipitation patterns are repeated.

Total authorizations state-wide for consumptive use are approximately 23.8 million acre-feet of water per year and the vast majority of those authorizations were issued prior to 1985 without conditions to protect environmental flows. This creates a challenge that must be addressed in order to preserve Texas' fish and wildlife habitat.

Figure 8A.1 Timeline of Texas Water Rights (1900-2020)



8A.3 Groundwater

Background Information

Groundwater resources vary greatly across the state and regions, both in quantity and quality. The difficulties and problems inherent in managing these diverse resources have been delegated to locally organized Groundwater Conservation Districts (GCDs) which have been designated by the Legislature as the preferred method of groundwater management in Texas. These local governmental entities are responsible for management, conservation, preservation, protection, and enhancement of groundwater resources in their individual jurisdictions. GCDs vary from small, one or two person offices in single county districts to larger agencies covering multiple counties and employing a staff of twenty or more.

Groundwater is a major source of water in large portions of Texas. Planning efforts must ensure that this water supply will remain a long-term, viable option for consumption by local residents, agriculture, commercial, and other users. As most of the State's surface water resources are fully subscribed and new reservoir projects are limited and controversial, many are looking to groundwater projects to fill the need where demands exceed or are expected to exceed supplies.

In HB 1763 (2005) the Legislature set forth a vehicle for accomplishing aquifer-wide management of the resource through Groundwater Management Area (GMA) adoption of Desired Future Conditions (DFCs) for each aquifer or portion of an aquifer underlying the GMA and are provided to the TWDB every five years. The TWDB uses the DFCs to provide the GCDs within the GMA with the Modeled Available Groundwater (MAG) for each relevant aquifer underlying the GMA. Regional water planning groups are obligated to use the calculated MAG volumes derived from the DFCs for the relevant aquifers as the amount of groundwater available for regional planning purposes.

The groundwater planning process under HB 1763 was substantially modified by SB 660 in 2011 to generally involve more public participation opportunity and a more rigorous consideration of DFCs. The new planning requirements, which are borne by the GCDs, are unfunded and may prove to be a difficult responsibility for GCDs, many of which have limited resources, to fulfill in a manner that is beneficial to the overall State water planning process. This concern coupled with the increased level of importance placed on the water availability estimates for determining eligibility for SWIFT funding may warrant special consideration.

8A.4 Potential Impacts to Agricultural and Rural Water Supplies

Background Information

Some water supply strategies feature transfers of water from rural to urban areas to meet projected urban growth in Texas. These strategies may not adequately assess the potential for harm to rural economies and rural culture. As former Texas Agriculture Commissioner Susan Combs once said, "We can't afford to dewater or leave behind rural Texas."

While compensation to select individuals may occur to facilitate water transfers from one region to another, the economic impacts of the transfer from one region may extend well beyond the individuals who are compensated and may result in negative impacts to others. In other cases, irrigators are often purchasers of water from water rights owners who may sell the water for other uses, thus limiting access to water for irrigated agriculture.

As previously stated, water transfers and water marketing must be carefully considered, and potentially utilized to help fund water conservation and efficiency projects.

In general, much of agriculture and rural Texas cannot afford water at the prices that some cities and industry will pay. Water pricing should be examined for its impact on the availability of water to meet projected needs for agriculture and rural Texas. Moreover, much of rural Texas is experiencing population decline, which if not planned for properly can result in revenue and infrastructure challenges.

8A.5 Agricultural Water Conservation

Background Information

Agriculture is about half of the projected water demand for the region. Water conservation in agriculture may free up substantial water supplies through successful implementation. The economics of agriculture limit producers ability to invest in major water conservation measures without financial assistance. The Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture administers a number of conservation funding programs that can assist producers with implementing water conservation practices. These programs currently include:

- The Environmental Quality Incentives Program (EQIP) is an NRCS platform for encouraging agricultural water conservation through Conservation Incentive Contracts. Conservation of groundwater and surface water is a national and state priority.

- The EQIP WaterSMART Initiative (WSI) is a program to pair producer conservation with projects where the Bureau of Reclamations's WaterSMART funds have been used to implement irrigation district improvements.

- The Regional Conservation Partnership Program (RCPP) is another possible platform for funding to support water conservation in agriculture.

The NRCS-funded programs for water conservation vary over time through changes in federal funding initiated through the farm bill. The Texas funding implementation varies with program emphasis coordinated between the NRCS and the Texas State Soil and Water Conservation Board (TSSWCB). The TSSWCB works in conjunction with local Soil and Water Conservation Districts (SWCDs) to encourage the wise and productive use of natural resources. The TSSWCB is the lead agency for planning, implementing, and managing coordinated natural resource conservation programs that include water conservation and water quality. Through the TSSWCB Water Quality Management Plan Program (WQMP), farmers, ranchers, and silviculturalists receive technical and financial assistance to voluntarily conserve and protect natural resources. Participants receive assistance with conservation practices that address water quality, water quantity, and soil erosion while promoting the productivity of agricultural lands. The opportunity exists for the development of partnerships for funding agricultural water conservation similar to the HB 1437 program (passed in 1999) that is managed by LCRA.

8A.6 Municipal/Industrial Conservation

8A.6.1 Consistent GPCD and Water Savings Methodology

Background Information

In its December 2008 report to the 81st Texas Legislature, the Texas Water Conservation Advisory Council (TWCAC) cautioned:

"The tendency of the media or individuals to use gallons per capita per day (GPCD) as a way to compare conservation efforts of communities is also problematic when the metric is not uniformly defined. Therefore, the Council has determined that it should be a priority to develop standard methodologies for water use metrics and water conservation metrics and definitions."

While various GPCD calculations, such as total daily average GPCD, can be a good measure for internal year-to-year comparisons within one water system, inconsistencies still exist in determining GPCD.

SB 181 was passed by the Legislature in 2011 to develop a consistent methodology for calculating GPCD. The TWDB and the TCEQ, with the assistance of the TWCAC, finalized the document, "Guidance and Methodology for Reporting on Water Conservation and Water Use," in December of 2012. It can be found on the TWDB and TCEQ web sites. While this document outlines a standard methodology for calculating GPCD, there are still inconsistencies in determining GPCD that could be further standardized to facilitate consistent and comparable GPCD.

8A.6.2 Homeowners Association Policies

Background Information

Homeowner Associations (HOAs) are governed by policies that ensure community aesthetics and standards, but when it comes to water use, recent laws have empowered residents to adopt more sustainable practices without HOA interference. In most cases, HOAs are no longer allowed to prohibit homeowners from installing rain barrels or rainwater harvesting systems, making it easier for residents to collect and use rainwater efficiently. Similarly, efficient irrigation systems, such as drip irrigation, which conserve water and reduce waste, cannot be restricted by HOAs.

In addition to irrigation, composting is another environmentally friendly practice protected by these policies. Homeowners are free to compost vegetation, including leaves, grass clippings, and brush, without fear of HOA restrictions. Landscaping choices have also been made more flexible; HOAs cannot prohibit the use of drought-resistant plants or water-conserving natural turf, allowing residents to create low-water landscapes that suit their environmental and aesthetic preferences.

The overarching goal of these regulations is to empower residents in deed-restricted HOA neighborhoods to save both water and money while supporting sustainable living practices that benefit the community and the environment.

8A.6.3 Water Supply Monitoring

Background Information

The Drought Monitor uses the Palmer Drought Severity Indices as a measure of Drought Severity. However, it is only representative of soil moisture, which are not indicative of the condition of surface water reservoirs or groundwater availability.

8A.6.4 Additional Financial Assistance to Reduce Municipal Water Loss

Background Information

In 2003, the 78th Texas Legislature enacted House Bill 3338 which requires all retail water suppliers to submit water loss audits to the TWDB.

The 82nd Texas Legislature (2011) passed House Bill 3090 which requires annual water loss audits from all retail public utilities receiving financial assistance from TWDB. The first of these annual reports were due May 1, 2013.

The 83rd Texas Legislature enacted House Bill 857 (2013) which requires each retail public water utility with more than 3,300 connections to conduct a water audit annually to determine its water loss and to submit that audit to TWDB.

The 83rd Texas Legislature also enacted House Bill 3605 (2013) that requires a retail public water utility that receives financial assistance from the Board to use a portion of that assistance—or any additional assistance provided by the Board—to mitigate the utility's system water loss if based on its water audit the water loss meets or exceeds a threshold to be established by Board rule.

In August 2022, the National Wildlife Federation analyzed the TWDB's water loss audit data and released a report titled "Hidden Reservoirs" which noted that water loss in Texas averages 51 gallons per connection per day and improving utilities' performance compared to their peers would result in more than enough savings to have a significant positive water supply impact at a much lower cost than other traditional supply strategies.

In 2023, the 88th Texas Legislature passed Senate Bill 28 which created the Texas Water Fund to be administered by the Texas Water Development Board and appropriated $1 billion to the new fund. Water loss mitigation was specifically listed in SB 28 as a priority, and in August 2023 the TWDB announced that it intended to award over one third of the appropriation to projects with conservation and water loss mitigation benefits.

8A.7 Brush Management

Background Information

According to the 2017 WSEP Annual Report, under this State Water Supply Enhancement Plan, during fiscal year 2017, 30,202 acres of brush control were incentivized across the state and are estimated to result in the conservation of 9,364 ac-ft of water at a cost of about $132.70 per ac-ft of water. In the Pedernales River watershed, since the Program started through fiscal year 2017, over 74,718 acres of brush have been treated by landowners. There have been no updates or additional studies since this 2017 report. Changes in land use in the upper watershed could benefit from additional studies.

8A.8 Inflows to Highland Lakes

Background Information

The Highland Lakes rely on inflows from contributing watersheds in maintaining regional water supply. Inflows to the Highland Lakes are produced when precipitation occurs in contributing watersheds in sufficient amounts to cause water to run off the land surface and accumulate as stream flows that are tributary to the Highland Lakes.

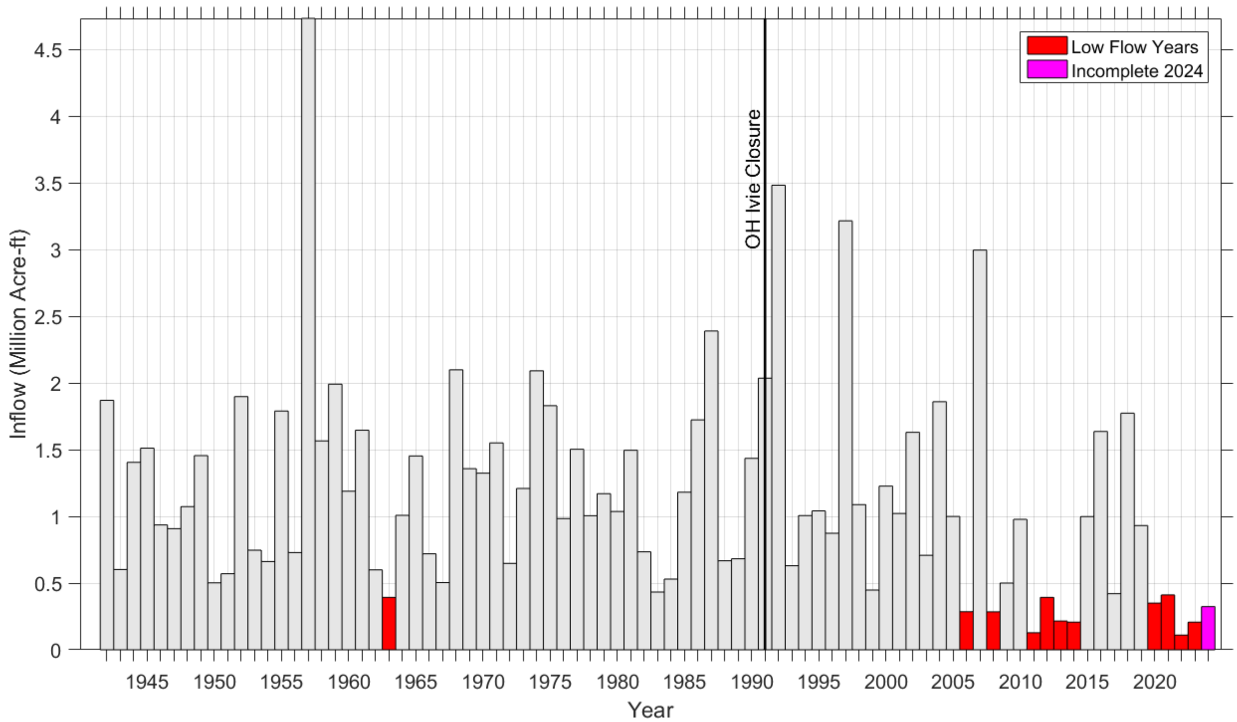
The Texas Water Development Board (TWDB) has undertaken two projects to evaluate rainfall-runoff trends in the Upper Colorado River Basin of Texas, including one site in the Region K area (the San Saba Watershed). In the August 2017 Phase I report (KRC, 2017, TWDB Contract #1600012011), it was noted that observed flows in the Upper Colorado River watershed declined at all study sites over the period 1940-2016. Declines at the majority of sites were attributed to historical water use and the construction of large upstream permitted reservoirs. Yet for some of the study sites (including those in the San Saba), observed flow declines exceeded the declines that would be attributed to permitted upstream withdrawals and reservoir storage.

Phase II of the study, which was finalized in September 2019 (TWDB Contract #1800012283), evaluated many potential causes for the reduced inflows identified in Phase I, and determined that for the San Saba watershed, the change was most likely a result of small pond usage and construction, though several potential factors were not able to be fully evaluated due to lack of data (e.g. groundwater pumping, noxious brush). A study that provides additional supporting information on the reduced inflows to the Highland Lakes has been published in the Texas Water Journal, Volume 11, Number 1, April 3, 2020. It is titled "Runoff Inflow Volumes to the Highland Lakes in Central Texas: Temporal Trends in Volumes and Relations between Volumes and Selected Climatic Indices" by Raymond M. Slade Jr.

To the extent there may be a decreasing trend in inflows to the Highland Lakes it has been asserted that these impacts might be accounted for in water supply planning models through previous updates of the historical naturalized flow data, such as the update through 2016. Understanding the physical basis and magnitude of any trends would provide useful information for planning for future water supply. The analysis of small ponds in the watershed has recently been updated by LCRA, who has reported that over 44,000 small ponds now exist in the watershed. The proliferation of these small ponds was facilitated in June 2001 by the passage of HB 247, which extended the ability to construct small ponds from livestock to wildlife and fishing, without requiring a permit or monitoring. This provision essentially allowed for the widespread construction of amenity ponds for the beautification of the property, and an appropriation of State Water for private purposes, as surface water is the property of the State.

An analysis of the historical annual data indicates that the proliferation of the small ponds has had an impact on the inflows into the Highland Lakes which provide a portion of the water supply for the Region. The magnitude of the proliferation of small ponds now raises difficult questions about the right of property owners versus the right of the holders of the State water rights, who rely on the historically available surface water owned by the State. As the amount of small ponds continues to increase over time, there will continue to be an impact on the inflows into the Highland Lakes, which will continue to strain the water supply of the region.

Figure 8A.2 Nine out of the Ten Worst Gaged Inflows Have Occurred Since 2006



Source: CTWC/LRE Water

8A.9 Education on Water

Background Information

Texas has historically been blessed with plentiful water resources, including surface water through our rivers and streams, and groundwater. However, growth, a changing climate, and other factors have tapped the water supplies. Moreover, much of the region does not know the source of their own water, or how to monitor the levels, and take for granted that the water will always be there. Water heavy landscaping and an abundance of pools in Central Texas have become a large user of domestic and municipal water use. This is becoming a big issue, as the cost of new water has become very high, and availability of new water supplies is a tremendous challenge.

8A.10 Coordination of Planning Cycles for Determination of Desired Future Conditions by GCDs and Generation of the Regional Water Plan by RWPGs

Background Information

In 2005, Texas legislation required groundwater conservation districts (GCDs) to work together within their particular groundwater management areas (GMAs) to determine the desired future conditions (DFCs) of their shared aquifer. These conditions were to be reviewed every five years starting in 2010. The information compiled by the districts through this coordinated effort would be supplied to the appropriate regional water planning group which would in turn eventually be rolled into the state water plan.

Unfortunately, the five-year cycle for assessing desired future conditions by GCDs by GMAs continues to run almost parallel to the regional water planning cycle. The most recent DFCs are finalized by the GMAs after the deadline for submittal to the RWPG. As a result, the RWPG must rely on potentially outdated information from GCDs during the assessment period. In 2013, legislation (SB 1282) pushed the DFC deadline back from September 2015 to May 2016; however, this did not remedy the timing problem.

8A.12 Radionuclides in the Hickory and Marble Falls Aquifers

Background Information

There are several water utilities currently providing water to the public from the Hickory and Marble Falls aquifers where radionuclide contaminates occur above EPA drinking water standards. These include some within Burnet County and San Saba County, within the Lower Colorado Region. Efforts have been made and/or are underway to develop alternative water sources or effective treatment and radioactive waste disposal. These small towns and water utilities have limited financial resources with which to treat the groundwater for municipal uses.

8A.13 Planning for Droughts Worse than the Drought of Record

Background Information

Taking action to address potential droughts worse than the drought of record (DWDOR) events should be an integral part of risk management and developing water supply resiliency in water planning with a 50-year horizon. The 2016 Region K Water Plan and prior Region K plans, like most Regional Plans and the State Water Plan, were developed around hydrology associated with the 1950’s drought. During the planning process for the 2016 Region K Plan, the Lower Colorado River was experiencing a significant drought. In the time after work was completed on the 2016 Region K Plan, the drought of the 2010’s was declared to be a drought worse than the drought of record (DWDOR) and supplanted the 1950’s drought as the new drought of record (DOR) for the Lower Colorado River Basin. The drought of the 2010’s is now the benchmark for Region K planning purposes. The drought of the 1950’s ended in 1957, and the drought of the 2010’s began in 2007. This represents a 50-year span between the previous drought of record and the new drought of record, which coincides with the planning horizon.

From the 2022 State Water Plan:

- Texas' state water plans are based on future conditions in the event of a recurrence of the worst recorded drought in Texas' history—known as the "drought of record"—a time when, generally, water supplies are lowest and water demands are highest.
- The goal of the state's water planning process is to ensure adequate water supplies for all Texans in times of drought.
- Texas has a long history of drought, and there is no indication of that pattern changing; in fact, recent droughts remind us that more severe drought conditions are likely to continue to occur at some point in the future.
- Warmer temperatures, increased evaporation, and increasingly variable precipitation, as experienced in recent years, enhance the risk of extreme drought in Texas (Nielsen-Gammon and others, 2019).
- Although the state's planning process does not prevent regions from planning for conditions worse than the drought of record, there is no established state framework by which to do so. Scenario planning has been suggested in the literature (Banner and others, 2010; NielsenGammon and others, 2020), and the Interregional Planning Council, established by House Bill 807 (86th Texas Legislature, 2019), developed recommendations for the TWDB to consider regarding potential enhancements to the regional and state planning framework. One of those suggestions is to conduct additional, high-level planning for a drought event that is worse than the drought of record. However, implementing a formal change to how the TWDB considers drought risks will likely require additional financial resources and development of a coherent and accepted approach.
- Certain planning groups address drought uncertainty within the existing planning framework by utilizing conservative water source yields or a management supply factor to assess project needs. Some of the larger water providers across the state have conducted scenario planning for their individual long-range plans, but smaller entities do not have the resources or technical expertise to develop similar analyses for managing their systems.

The Texas Water Development Board (TWDB) General Guidelines for the Sixth Cycle of Regional Water Plan Development1, a.k.a. the 2026 Regional Water Plans (RWPs), serve as a summary and augmentation of existing statutes and rules that govern regional and state water planning as described in Title 31 of the Texas Administrative Code (TAC) Chapters 355, 357, and 358. The Guidelines include a new requirement for two subsections within Chapter 7 of the RWP to address uncertainty and DWDORs. The new subsections include a summary of the region's incorporation of uncertainty in planning factors, such as supplies, demands, or population. Additionally, the new subsections include a summary of assumptions, analyses, strategies, and projects included in the 2026 RWP that go beyond meeting identified water needs under a DOR and will provide some additional measures to withstand a DWDOR event. The Guidelines include examples of measures that regional water planning groups (RWPGs) could use to address DWDOR events, such as reservoir safe yield or strategies that provide water volumes in excess of identified needs. Consistent with previous versions of the

1 First Amended General Guidelines for Development of the 2026 Region Water Plans, Exhibit C, TWDB, October 2022

Guidelines, regions can request a variance to extend the hydrologic record to account for recent conditions that may be more severe than the current the drought of record." Regions can also request a variance to calculate reservoir safe yield, as previously mentioned. The Guidelines define reservoir safe yield as a modeling "modification to decrease the firm yield of a reservoir so that an identified annual volume is held in reserve in order to account for droughts worse than the drought of record." However, as noted in the RWP Guidelines[2] "the RWPGs are not expected to identify conditions that constitute a DWDOR or provide details on potential capacities that would be necessary to plan for a DWDOR."

The hydrologic records used to develop the State and Regional plans are relatively short for the purposes of characterizing the worst possible drought conditions. Region K, like many other RWPGs, uses a hydrologic record that begins with 1940 for a total possible period of record of less than 100 years. Within that period of record, many short-term droughts have occurred as well as two longer drought of record events. Given the inherent nature of the regular drought and flood conditions that Texas is known for and the limited hydrologic data available for characterizing water availability extremes, it is important that the risks of future DWDOR events be studied and that thoughtful consideration be given in the State and Regional Plans.

2 TWDB Guidelines, October 2022, Section 2.7.2

Appendix 8.B

Unique Stream Segment Recommendations for Further Study from the 2006 Region K Plan

Appendix 8.B

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Appendix 8B

Unique Stream Segment Recommendations for Further Study from the 2006 Region K Plan

A list of studies completed since 2000 relevant to the ten stream segments recommended for further study has been compiled and provided by TPWD staff and is included below.

These studies will be considered in the next planning cycle in the reevaluation of stream segments for potential identification as ecologically unique, as described in item c above.

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This section provides background information on the ten streams in the Lower Colorado Region identified and recommended by the Subcommittee (originally the first nine during the 2001 planning cycle and the tenth during the 2006 planning cycle) as warranting further study for consideration of designation as ecologically unique (*Table 8B.1*).

Table 8B.1 Stream Segments Identified for Further Study for Potential Designation as Ecologically Unique

Stream Segment	Location
Barton Springs segment of the Edwards Aquifer	Recharge stretches of Barton, Bear, Little Bear, Onion, Slaughter, and Williamson Creeks in Travis and Hays Counties
Bull Creek	From the confluence with Lake Austin upstream to its headwaters in Travis County
Colorado River	Within TCEQ classified Segments 1409 and 1410 including Gorman Creek in Burnet, Lampasas, and Mills Counties
Colorado River	TCEQ classified Segments 1428 and 1434 in Travis, Bastrop, and Fayette Counties
Colorado River	TCEQ classified Segment 1402 including Shaws Bend in Fayette, Colorado, Wharton, and Matagorda Counties
Cummins Creek	From the confluence with the Colorado River upstream to FM 159 in Fayette County
Llano River	TCEQ classified Segment 1415 from the confluence with Johnson Creek to CR 2768 near Castell in Llano County
Pedernales River	TCEQ classified Segment 1414 in Kimball, Gillespie, Blanco, and Travis Counties
Rocky Creek	From the confluence with the Lampasas River upstream to the union of North Rocky Creek and South Rocky Creek in Burnet County.

Hamilton Creek	From the outflow of Hamilton Springs to the confluence with the Colorado River.

8B.1 Barton Creek Within the TCEQ Classified Stream Segment 1430 From the Confluence With Town Lake in Travis County to FM 12 in Hays County

Barton Creek is the TCEQ classified stream Segment 1430 and extends from the confluence with Town Lake in Travis County to FM 12 in Hays County. The creek is in the Central Texas Plateau ecoregion and the watershed lies within the live oak-ashe juniper woods vegetation association. Water quality is generally good to exceptional, although coliform levels are occasionally elevated after storm events. Nitrite levels can also be high due to the influence of groundwater. Substrate is typically limestone bedrock with rubble, boulders, and gravel. The upper portions of the streams are generally intermittent, except in spring-fed reaches, which limits aquatic habitat. A comprehensive list of literature about the Barton Springs portion of the Edwards aquifer was prepared by the City of Austin in collaboration with the Austin History Center, and is available at http://www.ci.austin.tx.us/aquifer/. Barton Creek meets the following criteria for designation as ecologically unique:

- Riparian Conservation Area: the lower end of the stream is in the City of Austin's Zilker Park

- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological assemblages; the stream exhibits high dissolved oxygen (DO) concentrations and a diverse and complex benthic macroinvertebrate community

- Endangered/Threatened Species: the stream contains the only known population of the Barton Springs salamander (*Eurycea sosorum*), a federally listed endangered species

8B.2 Bull Creek From the Confluence With Lake Austin Upstream to its Headwaters

Bull Creek lies wholly within Travis County in the northwest portion of the City of Austin (*Figure 8.2*). The watershed for the stream is approximately 32 square miles in a rapidly developing area. The watershed is located on the eastern edge of the Texas Hill Country and immediately west of the Balcones Fault Zone. Numerous seeps and springs provide baseflow to Bull Creek. Water quality is generally good, although some degradation has occurred due to development. The Bull Creek watershed contains suitable habitat for a variety of rare and endangered species including the Golden-Cheeked Warbler (*Dendroica chrysoparia*), Black-Capped Vireo (*Vireo atricapillus*), Tooth Cave spider (*Neoleptoneta myopica*), Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Bee Creek Cave harvestman (*Texella redelli*), Bone Cave harvestman (*Texella redelli*), Tooth Cave ground beetle (*Rhadine persephone*), Kretshcmarr Cave mold beetle (*Texamaurops reddeli*), and Jollyville Plateau salamander (*Eurycea* sp.). In addition, the watershed contains a very diverse flora. Bull Creek meets the following criteria for designation as ecologically unique:

- Biologic Function: nearly pristine stream with a largely intact riparian area

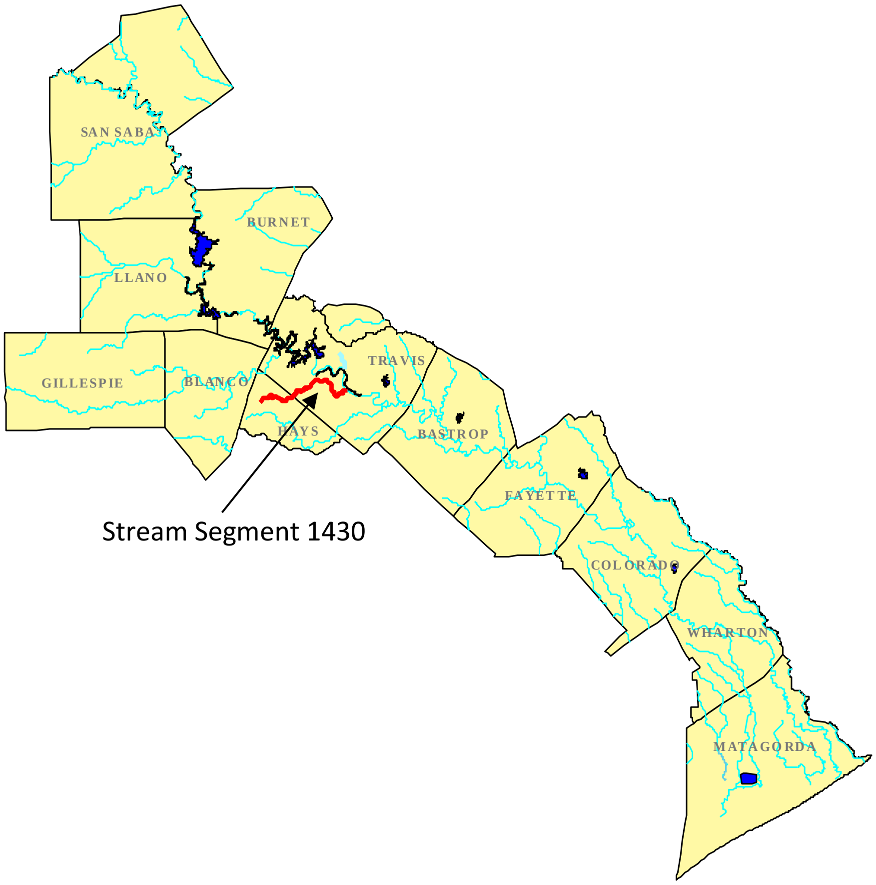
- Hydrologic Function: pervious cover and intact riparian zone reduce downstream flooding

- Riparian Conservation Area: Bull Creek Preserve

- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: overall pristine nature gives the stream a high aesthetic value; stream has a diverse and complex benthic macroinvertebrate community, and an abundance and diversity of amphibians

- Endangered/Threatened Species: the stream contains a population of the Jollyville Plateau salamander (*Eurycea* sp.), a federally listed endangered species

Figure 8B.1: Location and Map of Barton Creek Stream Segment 1430



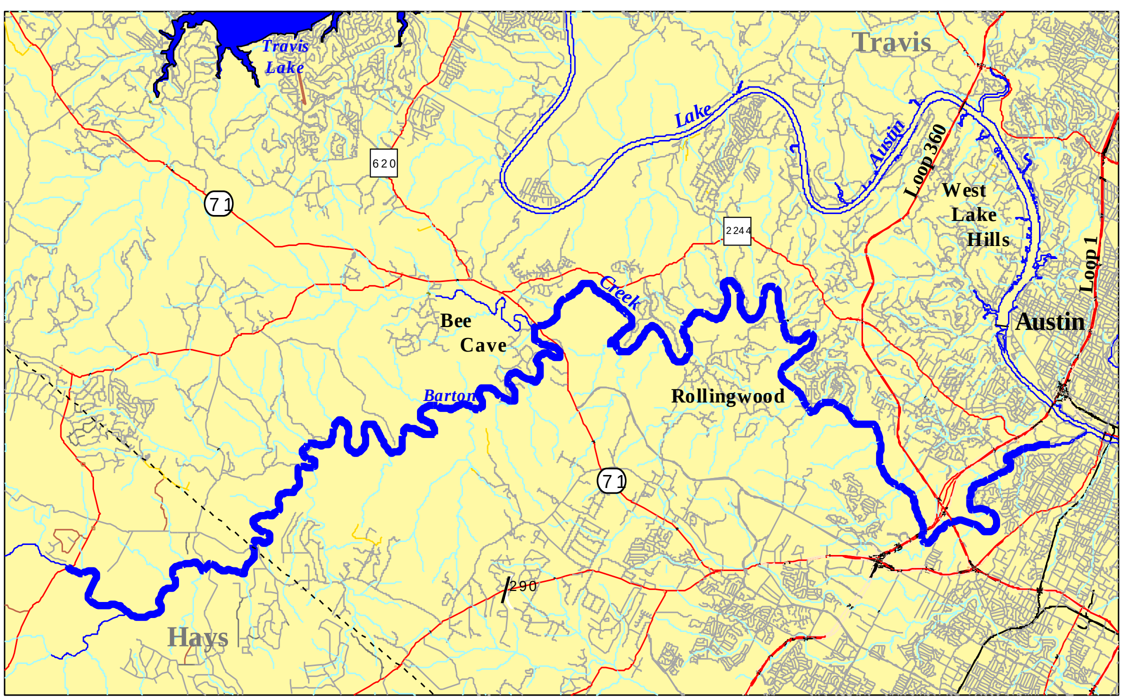
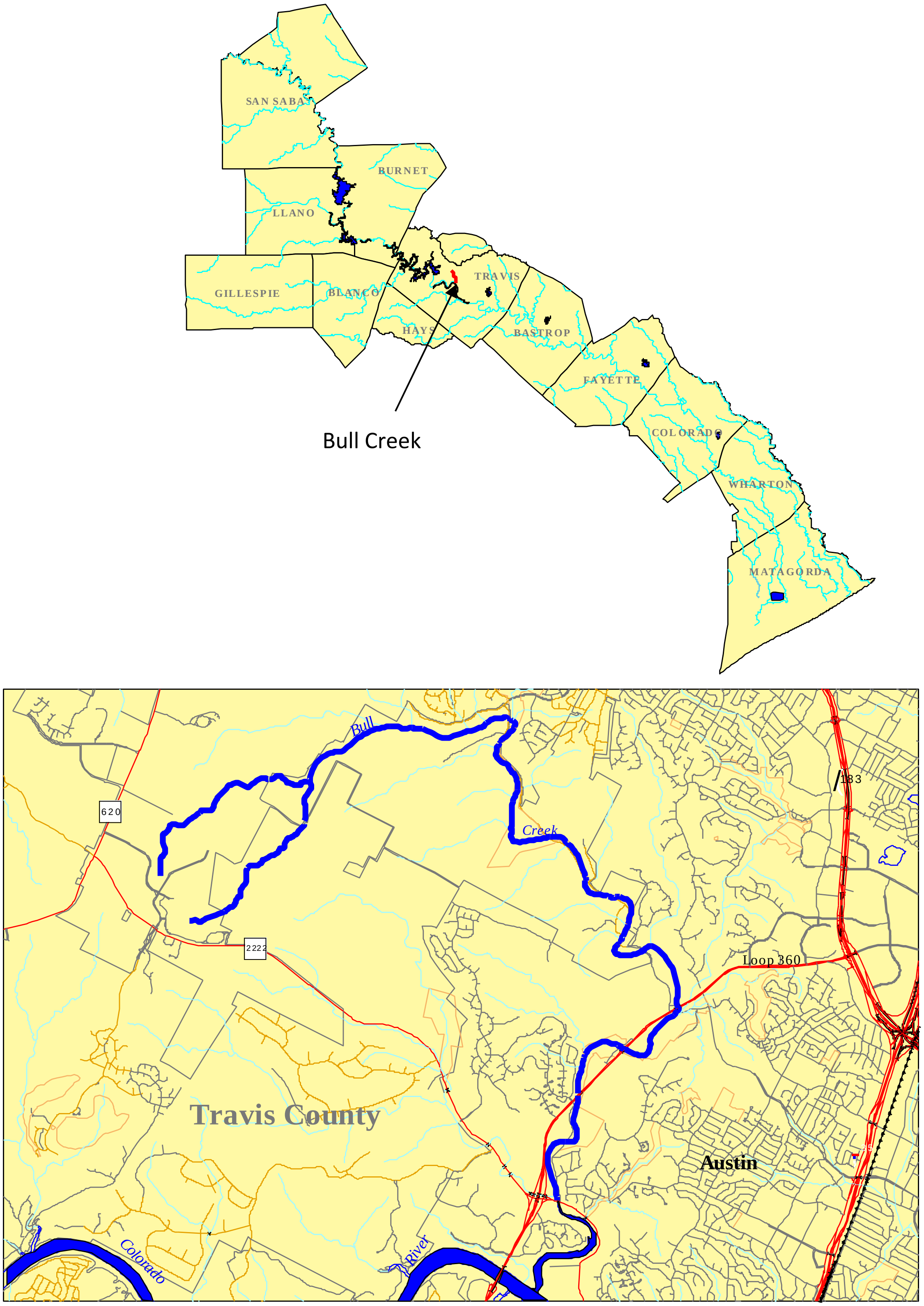


Figure 8B.2: Location of Bull Creek



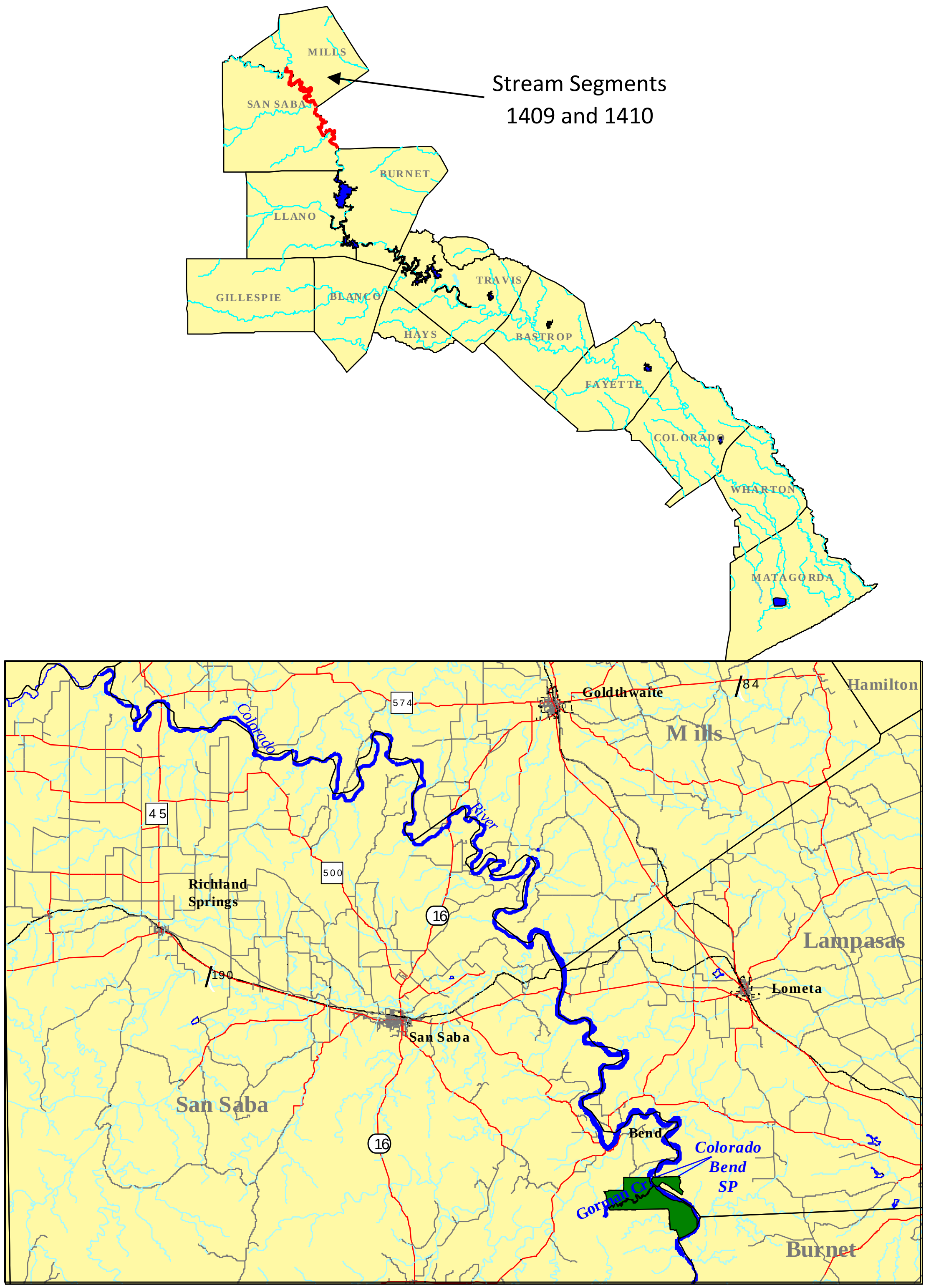
8B.3 Colorado River Within TCEQ Classified Stream Segments 1409 and 1410 Including Gorman Creek in Burnet, Lampasas, and Mills Counties

This segment consists primarily of the Colorado River upstream of Lake Buchanan to the Brown/San Saba/Mills county line, but also includes the Gorman Creek tributary (*Figure 8.3*). The stream segment is within the Central Texas Plateau ecoregion. Vegetation types common along the stream are mostly live oak-juniper parks. The river itself is wide and relatively shallow, flowing over a bed of limestone and gravel. A few stretches of small rapids exist on the upper part of this section down to the point where the backwaters of Lake Buchanan deepen the river and slow its flow.

Among the segment's scenic attributes are high limestone bluffs, vistas of rugged cedar-covered hills, and the existence of one of the most spectacular waterfalls in Texas. Gorman Falls is formed at the point where Gorman Creek tumbles into the Colorado River over a 75-foot-tall limestone bluff. The water coming from the creek is clear and cold, and many ferns and mosses grow on the slippery rocks and travertine deposits below the falls. The TCEQ identifies the segment as having a high aquatic life use. The National Park Service identified the segment for inclusion in the National Rivers Inventory based on the degree to which the river is free-flowing, the degree to which the river and corridor is undeveloped, and the outstanding natural and cultural characteristics of the river and its immediate environment. The segment meets the following criteria for designation as ecologically unique:

- Biologic Function: white bass spawning area
- Riparian Conservation Area: Colorado Bend State Park
- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: exceptional aesthetic value
- Endangered/Threatened Species: Concho water snake (Nerodia paucimaculata), a federal and state listed endangered species, as well as the rare and endemic mollusks, Texas fawnfoot and Texas pimpleback

Figure 8B.3: Location of the Colorado River Within TCEQ Classified Stream Segments 1409 and 1410



8B.4 Colorado River Within TCEQ Classified Stream Segments 1428 and 1434 in Travis, Bastrop, and Fayette Counties

The segment includes the Colorado River from a point 100 meters downstream of SH 71 in La Grange to Longhorn Dam in Austin and portions of Wilbarger, Big Sandy, Alum, and Cedar Creeks in Bastrop County (*Figure 8.4*). Extensive information about the segment in Bastrop County, submitted by the Bastrop County Environmental Network (BCEN), is presented in *Appendix 8B*. In general, water levels in the Colorado River are controlled by releases from Lake Travis and Lake Buchanan. Return flows from various sources, including the City of Austin, can be a significant contributor to instream flow during dry periods. Instream flows in the smaller creeks within Bastrop County originate from diffuse surface water runoff, groundwater contributions, and springs. The segment lies within the Texas Blackland Prairies ecoregion. Substrate in the streams is typically sand and/or gravel. Several reaches of the segment are characterized by rubble and boulder fields. The TCEQ has classified the mainstem river as supportive of exceptional aquatic life uses. Water quality is generally good although nutrient levels are often elevated. Water quality in the creeks is typically good but influenced by flow levels, land use patterns, and wastewater discharges. Cedar Creek contains an exceptional macroinvertebrate community and, based on the ichthyofauna, a high Index of Biotic Integrity rating. This portion of the Colorado River has a diverse fish community, including the state listed threatened blue sucker (*Cycleptus elongatus*). In addition, the state and federally listed endangered Houston toad (*Bufo houstonensis*) occurs in the area. The segment meets the following criteria for designation as ecologically unique:

- <u>Biologic Function</u>: undeveloped riverine habitat, part of the Central Flyway of migratory birds

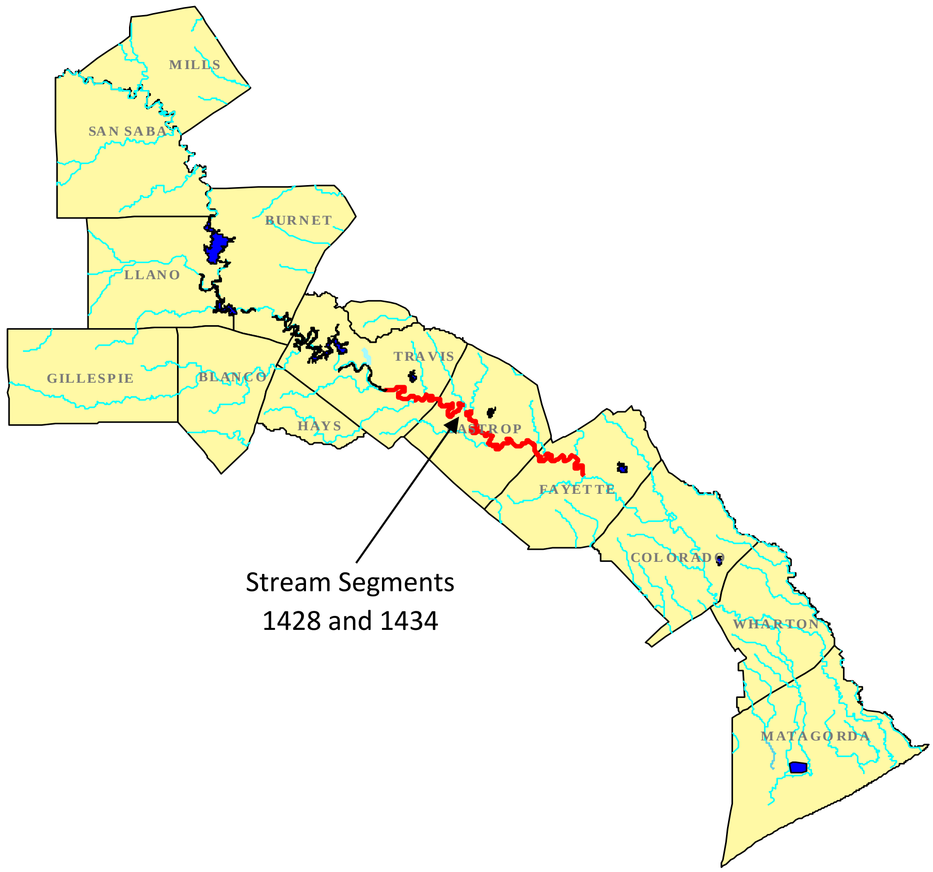
- <u>Hydrologic Function</u>: extensive riparian zone attenuates flooding and improves water quality via filtration and soil stabilization; riparian and stream channels hydrologically connected to an alluvial aquifer and the Carrizo-Wilcox aquifer

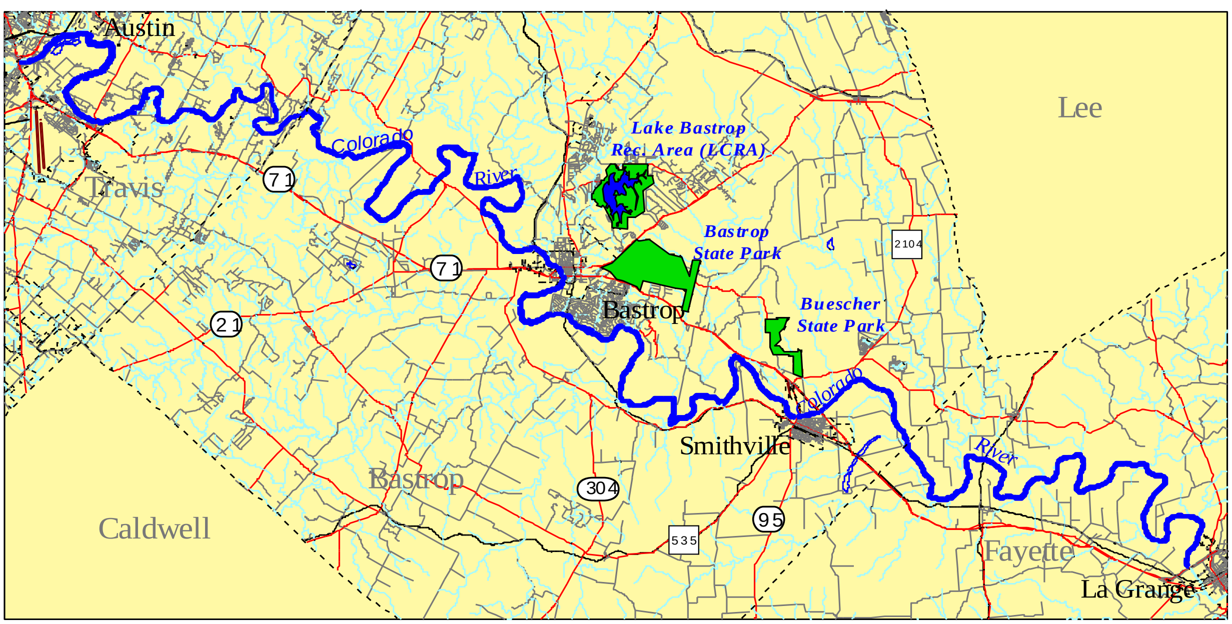
- <u>Riparian Conservation Area</u>: McKinney Roughs Environmental Learning Center

- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: exceptional aquatic life use

- <u>Endangered/Threatened Species</u>: blue sucker (*Cycleptus elongatus*), a state listed endangered species and the federal and state listed endangered Houston toad (*Bufo houstonensis)*

Figure 8B.4: Location of the Colorado River Within TCEQ Classified Stream Segments 1428 and 1434





8B.5 Colorado River Within the TCEQ Classified Stream Segment 1402 in Fayette, Colorado, Wharton, and Matagorda Counties

The segment extends from just downstream of the Missouri-Pacific Railroad trestle in Matagorda County to a point 100 meters downstream of SH 71 in La Grange, a distance of 150 miles (*Figure 8.5*). The segment lies within the Texas Blackland Prairies ecoregion and flows into the East Central Texas Plains ecoregion. Substrate varies from primarily gravel in the upper reaches of the segment to gravel/cobble riffles and extensive sand-dominated reaches downstream. Instream flow is largely dependent on upstream releases for rice irrigation but also receives contributions from the intervening watershed. The water quality of the segment is typically good and supports a high aquatic life use designation. Nutrient levels are elevated, but DO concentrations are typically higher than the minimum required to maintain a high aquatic life use designation. The fish community is generally diverse and includes the blue sucker (*Cycleptus elongatus*), a state listed endangered species. Although not contained in this report, additional information about the segment is available in feasibility studies performed by ECS Technical Services for the U.S. Department of the Interior, which includes the proposed Shaw's Bend Reservoir site in Colorado County. The segment meets the following criteria for designation as ecologically unique:

- <u>Biologic Function</u>: undeveloped riverine habitat, part of the Central Flyway of migratory birds
- <u>Endangered/Threatened Species</u>: blue sucker (*Cycleptus elongatus*), a state listed endangered species

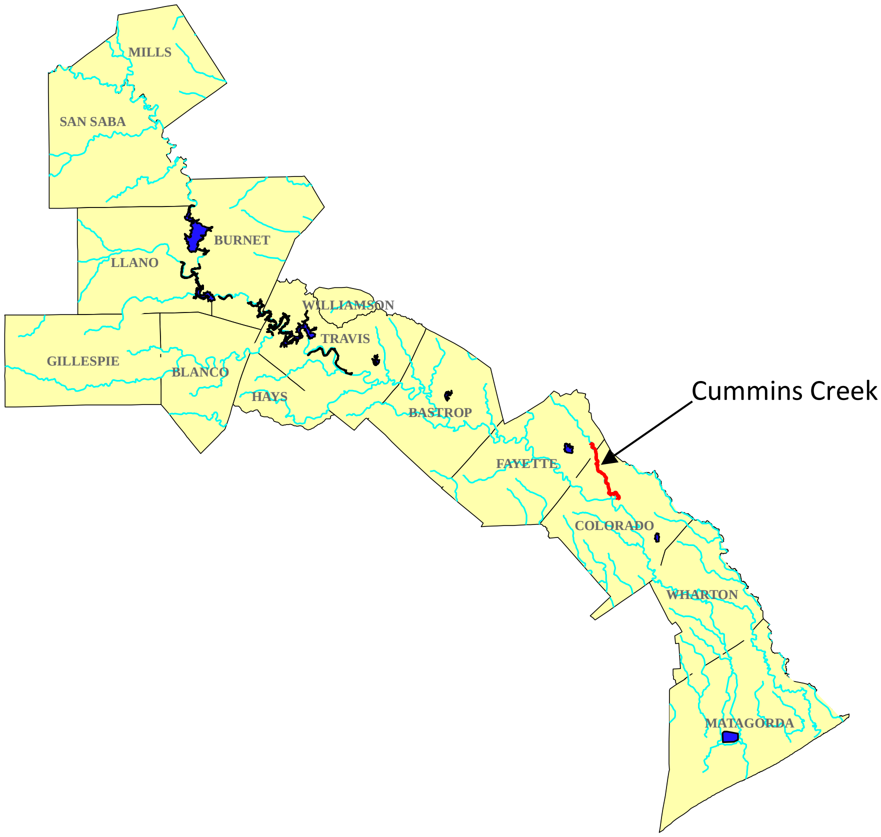
8B.6 Cummins Creek From the Confluence With the Colorado River in Colorado County Upstream to FM 159 in Fayette County

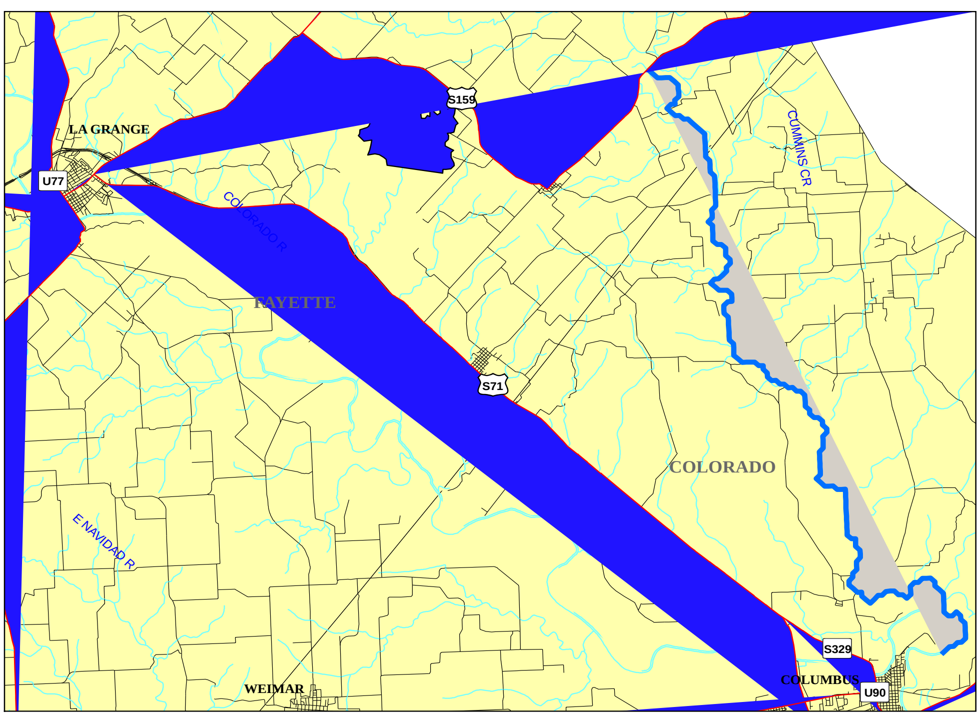
Cummins Creek lies within the Texas Blacklands Prairie ecoregion in Colorado and Fayette Counties (*Figure 8.6*). The stream is characterized by shallow to moderately deep pools, riffles, and occasional shallow runs. Substrate is predominantly fine sands with gravel and rubble in riffles and runs. Cummins Creek is within the post oak savannah vegetation region. The surrounding land use is mostly agricultural. Water quality is generally good, and the stream supports diverse macroinvertebrate and fish communities. The LCRA rated the creek, which has at least 27 species of fish as suitable for a high aquatic life use for fish. Among the fish species that have been collected in the stream is the Guadalupe bass (*Micropterus treculi*). Cummins Creek supports at least 28 species of aquatic macroinvertebrates. Several varieties of mayflies and caddisflies, which are considered intolerant of pollution, are present. Cummins Creek was rated an excellent aquatic life use category for macroinvertebrates based on work by the LCRA. The segment meets the following criteria for designation as ecologically unique:

- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological assemblages the stream
- <u>Exhibits High Dissolved Oxygen Concentrations and a diverse and complex benthic macroinvertebrate community</u>

Figure 8B.5: Location of the Colorado River Within the TCEQ Classified Stream Segment 1402

Figure 8B.6: Location of Cummins Creek





8B.7 Llano River Within the TCEQ Classified Stream Segment 1415 From the Confluence With Johnson Creek to County Road 2768 Near Castell in Llano County

The Llano River between the confluence with Johnson Creek and County Road (CR) 2768 in Llano County is part of TCEQ classified stream Segment 1415 (*Figure 8.7*). The Llano River is a spring-fed stream of the Edwards Plateau and is widely known for its scenic beauty. It is in the Central Texas Plateau ecoregion and is characterized by the live oak-mesquite parks vegetation type. Riparian vegetation includes elm, willow, sycamore, and salt-cedar. The stream has designated water uses for contact recreation, as a public water supply, and for high aquatic life uses. Among the fish found in the stream is the Guadalupe bass (*Micropterus treculi*). The substrate is composed of limestone bedrock and gravel. In addition, large boulders and slabs of granite and gneiss occur in the river. This section of the Llano River is widely known for the one-billion-year-old igneous and metamorphic rocks, which form the riverbed. The area is a part of the Llano Uplift, which is one of the most unique geologic features in Texas. Land use along the stream is generally rural and includes ranching and agriculture. The segment meets the following criteria for designation as ecologically unique:

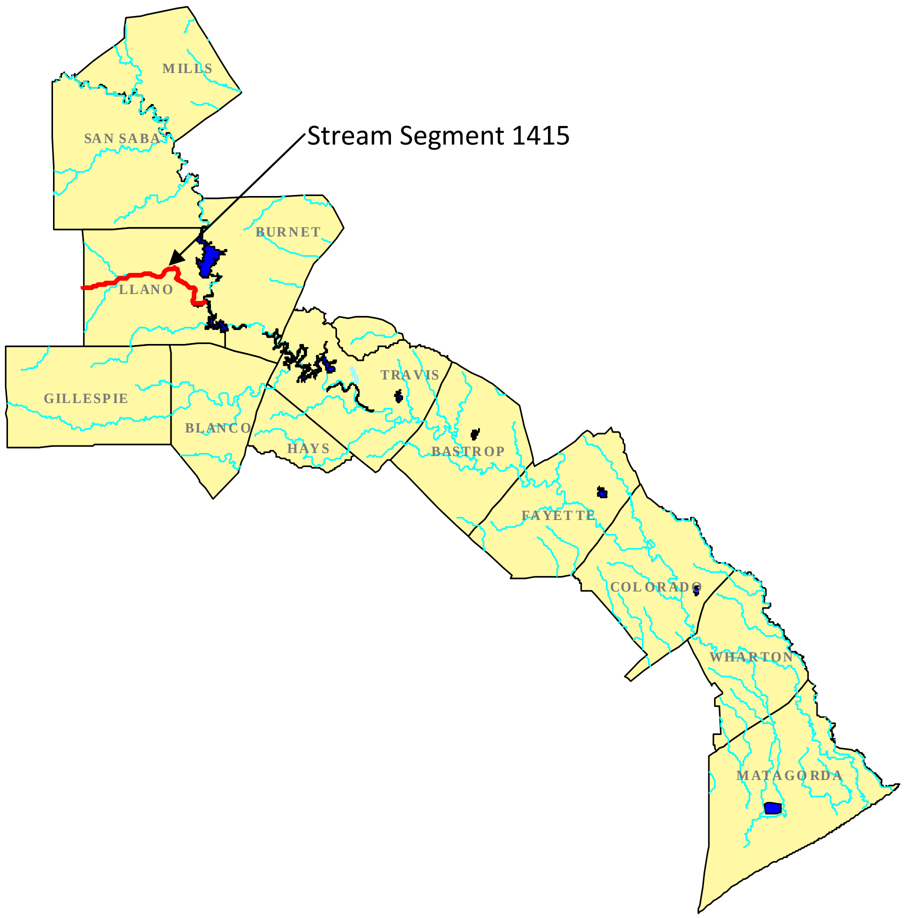
- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: exceptional aesthetic value

8B.8 Pedernales River Within the TCEQ Classified Stream Segment 1414 in Kimball, Gillespie, Blanco, and Travis Counties

The Pedernales River from a point immediately upstream of the confluence of Fall Creek in Travis County upstream to FM 385 in Kimble County makes up the TCEQ classified stream Segment 1415 (*Figure 8.8*). Most of this segment lies within the LCRWPA. The Pedernales River in general has high water quality and supports a high aquatic life use. The stream is within the Central Texas Plateau ecoregion. Surrounding vegetation is characteristic of the live oak-ashe juniper parks and live oak-mesquite-ashe juniper parks vegetation regions. The river is spring-fed and free flowing, with many limestone outcroppings. The National Park Service identified the segment for inclusion in the National Rivers Inventory based on the degree to which the river is free flowing, the degree to which the river and corridor is undeveloped, and the outstanding natural and cultural characteristics of the river and its immediate environment. Bald cypress, red columbine, and native orchids are found adjacent to the river. Among the fish species that occur in the stream is the Guadalupe bass (*Micropterus treculi*). Other aquatic species typical of Hill Country spring-fed streams also inhabit the Pedernales River. Along the river are several state and national parks including Pedernales Falls State Park, LBJ State Park, and LBJ National Park. The segment meets the following criteria for designation as ecologically unique:

- <u>Biologic Function</u>: significant natural area
- <u>Riparian Conservation Area</u>: Pedernales Falls State Park, LBJ State Park, LBJ National Park, and Stonewall Park
- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: exceptional aesthetic value

Figure 8B.7: Location of the Llano River From Johnson Creek Confluence to CR 2768



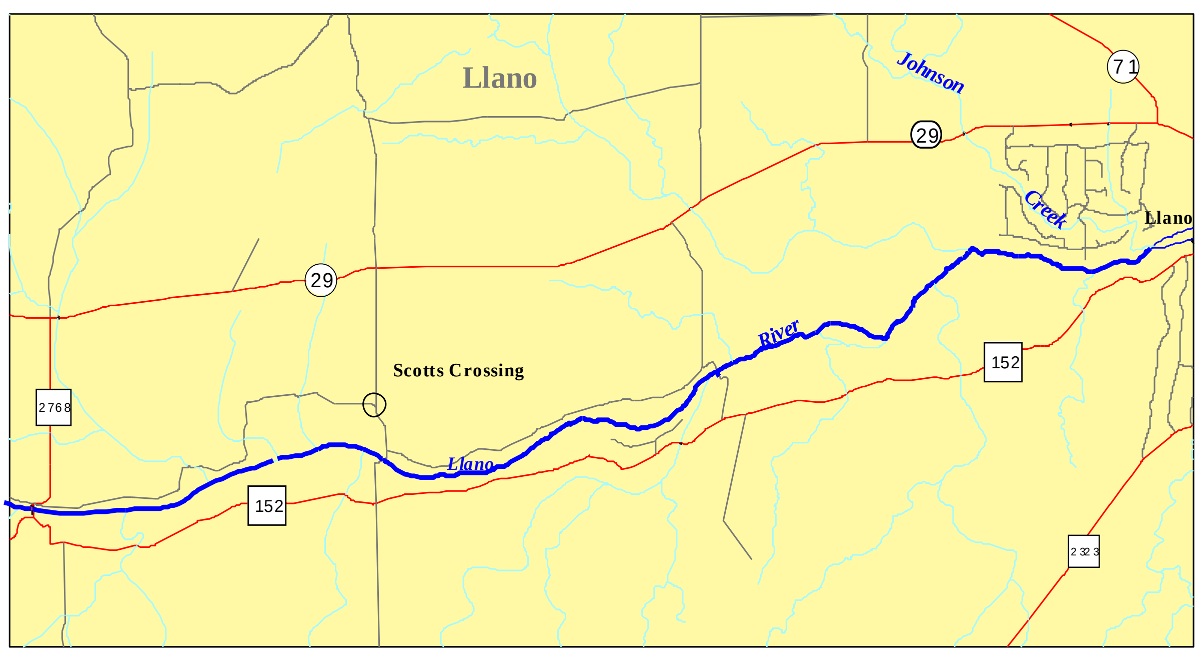


Figure 8B.8: Location of the Pedernales River Within the LCRWPA

8B.9 Rocky Creek From the Confluence With the Lampasas River Upstream to the Union of North Rocky Creek and South Rocky Creek in Burnet County

Rocky Creek lies within the Brazos River Basin in northeast Burnet County (*Figure 8.9*). The stream is approximately 6 miles long with a drainage area of 94 square miles. The stream is in the Central Texas Plateau ecoregion and within the oak-mesquite-juniper parks/woods vegetation association. The upper reach flows through the live oak-ashe juniper parks association. Long deep runs with numerous short riffles and occasional deep glides characterize the creek morphology. Limestone bedrock, gravel, and rubble are the dominant substrate types. In sampling for the Texas Aquatic Ecoregion Project, 54 species of aquatic invertebrates and 15 species of fish were collected. The segment meets the following criteria for designation as ecologically unique:

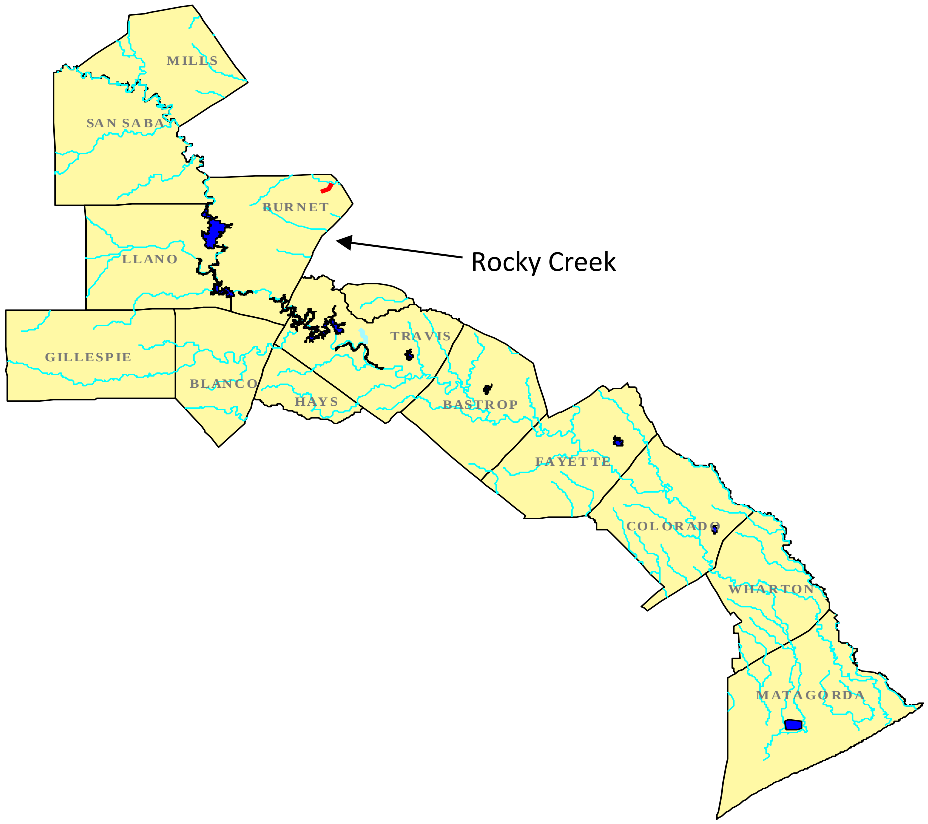
- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological assemblages; the stream exhibits high DO concentrations and a diverse and complex fish and benthic macroinvertebrate community.

8B.10 Hamilton Creek From the Confluence With the Colorado River Upstream to the Outflow of Hamilton Springs in Burnet County

Hamilton Creek originates at Hamilton Springs in south central Burnet County 5 miles northwest of Burnet and flows south for 22 miles to its confluence with the Colorado River in TCEQ classified stream segment 1404 (*Figure 8.10*). The upper reaches of Hamilton Creek are intermittent with flow increasing downstream due to municipal discharges from the City of Burnet and other sources. The stream flows through the Edwards Plateau ecoregion, a region of limestone outcrops and a mixture of granitic and sandy soils. Throughout the Edwards Plateau live oak, shinnery oak, mesquite and juniper dominate the woody vegetation. There is a limited riparian cover adjacent to the stream. TCEQ identifies Hamilton Creek as Segment 1404A with water body uses for contact recreation and fish consumption with an intermediate aquatic life use.

Following the adoption of the Region K Water Supply Plan, the LCRWPG was made aware of a proposed open pit mine being considered in Burnet County adjacent to Hamilton Creek. Local residents in the area around Hamilton Creek came to the RWPG indicating that the pristine nature of the creek was unique and worthy of consideration as a Unique Steam Segment (USS). The hope was that such a designation would protect the creek from potential adverse impacts due to the proposed mining operation. The RWPG, on December 11, 2002, took action on this request by authorizing the issuance of a letter from the RWPG to the TCEQ and the LCRA expressing concerns about excessive water mining and non-point source pollution damage to the creek. At the February 12, 2003, RWPG meeting, the group approved the recommendation that Hamilton Creek, from the outflow of Hamilton Springs to the Colorado River, be designated as a USS and that the recommendation be submitted to a local legislator for consideration during the 78th Legislative Session. The designation of Hamilton Creek as a USS was not passed during the 78th Texas Legislative Sessions.

Figure 8B.9: Location of Rocky Creek in Burnet County



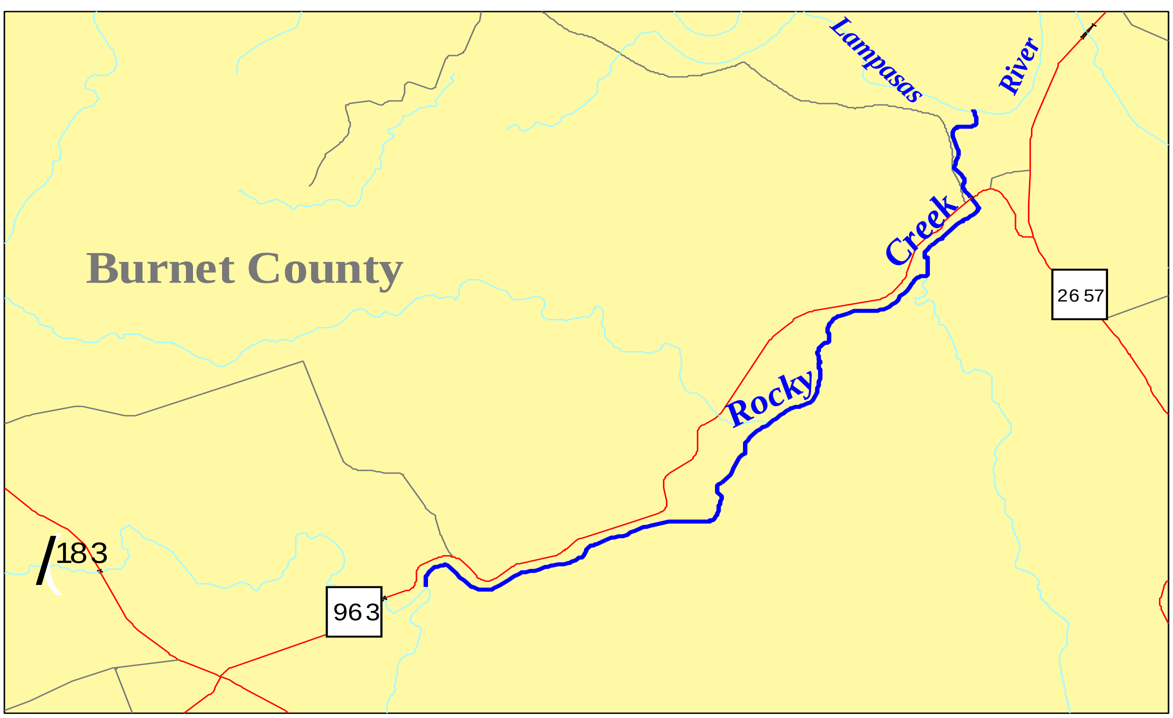
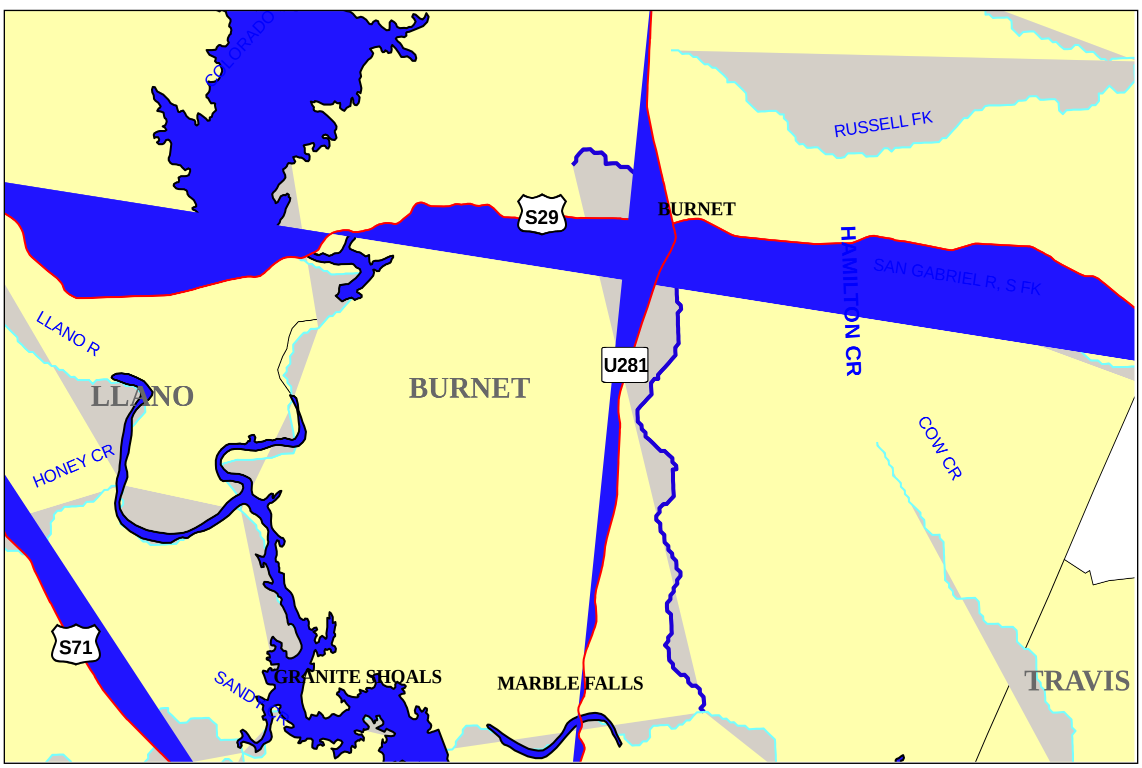


Figure 8B.10: Location of Hamilton Creek in Burnet County



8B.11 Conclusions and Recommendations

The protection intended to be provided by the designation of a river or stream segment as ecologically unique is to preclude a state agency or political subdivision of the state from financing the actual construction of a reservoir in a specific river or stream segment designated by the legislature as ecologically unique. In addition numerous programs presently exist to protect areas of special ecological significance. Since the LCRWPG currently has not recommended strategies for state financed reservoirs on any of the ten identified stream segments, and in the absence of additional environmental data, the LCRWPG takes no action at this time to designate these stream segments as ecologically unique. However, further study may be warranted in future Lower Colorado Regional Water Plans.

Appendix 9.A

Implementation Survey For 2021 Region K Water Plan Projects (TWDB Template)

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Plannin g Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Databas	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
K	Alternate Canal Delivery - STPNOC	2030	Project Sponsor(s): Steam-electric power (Matagorda)	Recommended WMS Project	2324							
K	Austin - Aquifer Storage and Recovery	2040	Project Sponsor(s): Austin	Recommended WMS Project	2135	Yes	Project/WMS started	City has already conducted a feasibility study about this strategy, and this strategy is one of the recommended strategy in the City's 2024 Water Forward Plan	Other	no impediment identified to date	Unknown	
K	Austin - Brackish Groundwater Desalination	2070	Project Sponsor(s): Austin	Recommended WMS Project	2154	No	Project/WMS not started	The planned online decade is 2070, which is 45 years from now. No action take yet.	Other	no impediment identified to date. This strategy is one of the recommended strategy from the 2024 Water Forward Plan.	Unknown	
K	Austin - Capture Local Inflows to Lady Bird Lake	2040	WMS Supply Recipient: Austin	Recommended WMS Supply Without WMS Project	33366	Yes	Project/WMS not started	The planned online decade is 2040, and no action has taken yet. However, this strategy is still listed as one of the recommended strategy in the 2024 Water Forward Plan.	Other	no impediment identified to date. This strategy is one of the recommended strategy from the 2024 Water Forward Plan.	Unknown	
K	Austin - Decentralized Direct Non-Potable Reuse	2030	Project Sponsor(s): Austin	Recommended WMS Project	2147	Yes	Project/WMS started	A few of the City's smaller WWTPs are already providing treated reclaimed water to the City's irrigation customers.	Other	Active project	Private	The City is responsible for the project costs.
K	Austin - Direct Reuse	2020	Project Sponsor(s): Austin	Recommended WMS Project	2132	Yes	Project/WMS not started	City is currently conducting a feasibility study to evaluate the project configuration.	Other	Project evaluation underway.	Unknown	
K	Austin - Indirect Potable Reuse Through Lady Bird Lake	2040	Project Sponsor(s): Austin	Recommended WMS Project	2152	Yes	Project/WMS started	City is currently conducting a feasibility study to evaluate the project configuration.	Other	no impediment identified to date	Unknown	
K	Austin - Lake Austin Operations	2020	WMS Supply Recipient: Austin	Recommended WMS Supply Without WMS Project	33371							
K	Austin - Longhorn Dam Operations Improvements	2030	Project Sponsor(s): Austin	Recommended WMS Project	2144							
K	Austin - Off-Channel Reservoir And Evaporation Suppression	2070	Project Sponsor(s): Austin	Recommended WMS Project	4011	No	Project/WMS not started	The planned online decade is 2070, which is 45 years from now. No action take yet.	Other	no impediment identified to date. This strategy is one of the recommended strategy from the 2024 Water Forward Plan.	Unknown	
K	Austin Blackwater and Greywater Reuse	2030	Project Sponsor(s): Austin	Recommended WMS Project	4403	No	Project/WMS no longer being pursued	The City did not include this strategy in its 2024 Water Forward Plan.	Other	This project was removed from the 2024 Water Forward Plan.	Unknown	
K	Austin Community-Scale Stormwater Harvesting	2030	Project Sponsor(s): Austin	Recommended WMS Project	4405	No	Project/WMS no longer being pursued	The City did not include this strategy in its 2024 Water Forward Plan.	Other	This project was removed from the 2024 Water Forward Plan.	Unknown	
K	Austin Onsite Rainwater and Stormwater Harvesting	2030	Project Sponsor(s): Austin	Recommended WMS Project	4404	Yes	Project/WMS started		Other	No impediment. The City has adopted an ordinance to require new developments >250,000 sq ft to either connect to the City's reclaimed systems or install an onsite reuse system.	Private	Developers are responsible for the project costs, but the City provides financial incentives.
K	Austin Return Flows	2020	WMS Seller: Lower Colorado River Authority; WMS Supply Recipient: Steam-Electric Power, Fayette	Recommended WMS Supply Without WMS Project	91613							
K	Austin Return Flows	2020	WMS Supply Recipient: Irrigation, Colorado	Recommended WMS Supply Without WMS Project	91540							
K	Austin Return Flows	2020	WMS Supply Recipient: Irrigation, Matagorda	Recommended WMS Supply Without WMS Project	91545							
K	Austin Return Flows	2020	WMS Supply Recipient: Irrigation, Wharton	Recommended WMS Supply Without WMS Project	32389							
K	Austin Return Flows	2020	WMS Supply Recipient: Steam-Electric Power, Matagorda	Recommended WMS Supply Without WMS Project	32328							
K	Blend Brackish Surface Water in STPNOC Reservoir	2020	WMS Supply Recipient: Steam-Electric Power, Matagorda	Recommended WMS Supply Without WMS Project	39923							
K	Brush Management - Blanco County	2030	Project Sponsor(s): Municipal county-other (Blanco)	Recommended WMS Project	3985							

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Databas	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
K	Brush Management - Gillespie County	2030	Project Sponsor(s): Municipal county-other (Gillespie)	Recommended WMS Project	4196							
K	Brush Management - Hays County	2030	Project Sponsor(s): Municipal county-other (Hays)	Recommended WMS Project	4197							
K	Brush Management - Travis County	2030	Project Sponsor(s): Municipal county-other (Travis)	Recommended WMS Project	4198							
K	BS/EACD Edwards/Middle Trinity ASR - Buda	2020	Project Sponsor(s): Buda	Recommended WMS Project	2238	Yes	Project/WMS completed	One well complete. Another well in planning.	Other	No major impediments	Unknown	Local and developer funded
K	BS/EACD Edwards/Middle Trinity ASR - Creedmoor-Maha WSC	2030	Project Sponsor(s): Creedmoor-Maha WSC	Recommended WMS Project	4272							
K	BS/EACD Edwards/Middle Trinity ASR - Hays	2030	Project Sponsor(s): Hays	Recommended WMS Project	4270							
K	BS/EACD Edwards/Middle Trinity ASR - Hays County-Other	2030	Project Sponsor(s): Municipal county-other (Hays)	Recommended WMS Project	4269							
K	BS/EACD Saline Edwards Desalination and ASR	2040	Project Sponsor(s): Buda; Municipal county-other (Hays)	Recommended WMS Project	2241	Yes	Project/WMS not started		Economic feasibility/financing		State	State or Federal
K	Buena Vista Regional Project	2030	Project Sponsor(s): Burnet; Municipal county-other (Burnet)	Recommended WMS Project	2258	No	Project/WMS not started	Not sure wha tthis item is.	Other		Unknown	
K	Development of New Ellenburger-San Saba Aquifer Supplies - Burnet County Mining	2050	Project Sponsor(s): Mining (Burnet)	Recommended WMS Project	4052							
K	Development of New Gulf Coast Aquifer Supplies - Matagorda County Irrigation	2020	Project Sponsor(s): Irrigation (Matagorda)	Recommended WMS Project	4053							
K	Development of New Hickory Aquifer Supplies - Burnet County Mining	2030	Project Sponsor(s): Mining (Burnet)	Recommended WMS Project	4054							
K	Development of New Marble Falls Aquifer Supplies - Burnet County Mining	2040	Project Sponsor(s): Mining (Burnet)	Recommended WMS Project	4055							
K	Development of New Sparta Aquifer Supplies - Fayette County-Other	2020	Project Sponsor(s): Municipal county-other (Fayette)	Recommended WMS Project	4056							
K	Development of New Trinity Aquifer Supplies - Elgin	2060	Project Sponsor(s): Elgin	Recommended WMS Project	4058	No	Project/WMS not started	Unknown	Project sponsor not identified			
K	Development of New Trinity Aquifer Supplies - Hays	2030	Project Sponsor(s): Hays	Recommended WMS Project	4057							
K	Development of New Trinity Aquifer Supplies - Sunset Valley	2040	Project Sponsor(s): Sunset Valley	Recommended WMS Project	1769							
K	Development of New Trinity Aquifer Supplies - Travis County MUD 10	2030	Project Sponsor(s): Travis County MUD 10	Recommended WMS Project	4059	Yes	Project/WMS no longer being pursued	Test well was low-producing	Other	Hydrogeology	Private	
K	Development of New Yegua-Jackson Aquifer Supplies - Fayette County Manufacturing	2030	Project Sponsor(s): Manufacturing (Fayette)	Recommended WMS Project	4060							
K	Development of New Yegua-Jackson Aquifer Supplies - Smithville	2030	Project Sponsor(s): Smithville	Recommended WMS Project	4061							
K	Direct Potable Reuse - Buda	2030	Project Sponsor(s): Buda	Recommended WMS Project	2638	Yes	Project/WMS started		Shift in timeline		State	State or Federal
K	Direct Potable Reuse - Dripping Springs WSC	2030	Project Sponsor(s): Dripping Springs WSC	Recommended WMS Project	4084	No	Project/WMS not started	No action has been taken by board to start	Economic feasibility/financing		Private	
K	Direct Potable Reuse - Llano	2030	Project Sponsor(s): Llano	Recommended WMS Project	4085	No	Project/WMS no longer being pursued	Not cost effective option, working on exsitiong storage capacity expantion instead	Economic feasibility/financing			
K	Direct Potable Reuse - West Travis County PUA	2030	Project Sponsor(s): West Travis County Public Utility Agency	Recommended WMS Project	4083	No	Project/WMS no longer being pursued	No board support	Other	No board support		
K	Direct Reuse - Blanco	2030	Project Sponsor(s): Blanco	Recommended WMS Project	4029							
K	Direct Reuse - Buda	2030	WMS Seller: Buda; WMS Supply Recipient: Mining, Hays	Recommended WMS Supply Without WMS Project	33305	Yes	Project/WMS started		Other		Unknown	Local Utility funds
K	Direct Reuse - Buda	2030	WMS Supply Recipient: Buda	Recommended WMS Supply Without WMS Project	33308	Yes	Project/WMS started		Other	No major impediments	Unknown	Local Utility funds
K	Direct Reuse - Dripping Springs WSC	2030	Project Sponsor(s): Dripping Springs WSC	Recommended WMS Project	4034	No	Project/WMS not started	No action has been taken by board to start	Economic feasibility/financing		Private	
K	Direct Reuse - Fredericksburg	2030	Project Sponsor(s): Fredericksburg	Recommended WMS Project	4033	No	Project/WMS not started	Direct Potable Reuse is not possible due to needed $$$ infrastructure.	Economic feasibility/financing		Unknown	
K	Direct Reuse - Horseshoe Bay	2030	Project Sponsor(s): Horseshoe Bay	Recommended WMS Project	4030							
K	Direct Reuse - Lago Vista	2030	Project Sponsor(s): Lago Vista	Recommended WMS Project	4036							
K	Direct Reuse - Lakeway MUD	2030	Project Sponsor(s): Lakeway MUD	Recommended WMS Project	4037							
K	Direct Reuse - Marble Falls	2030	Project Sponsor(s): Marble Falls	Recommended WMS Project	4031	Yes	Project/WMS started				State	Local and Federal funds are also in process.

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Databas	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
K	Direct Reuse - Meadowlakes	2020	WMS Supply Recipient: Meadowlakes	Recommended WMS Supply Without WMS Project	91579							
K	Direct Reuse - Travis County WCID 17	2030	Project Sponsor(s): Travis County WCID 17	Recommended WMS Project	4038	No	Project/WMS not started		Other	We are still a decade away from needing to commence this project	Unknown	
K	Direct Reuse - West Travis County PUA	2030	Project Sponsor(s): West Travis County Public Utility Agency	Recommended WMS Project	4035	Yes	Project/WMS started				Private	
K	East Lake Buchanan Regional Project	2030	Project Sponsor(s): Municipal county-other (Burnet)	Recommended WMS Project	2259							
K	Expansion of Carrizo-Wilcox Aquifer Supplies - Aqua WSC	2030	Project Sponsor(s): Aqua WSC	Recommended WMS Project	1668	Yes	Project/WMS started				Private	
K	Expansion of Carrizo-Wilcox Aquifer Supplies - LCRA	2030	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	1673	Yes	Project/WMS started	N/A				
K	Expansion of Current Groundwater Supplies - Carrizo-Wilcox Aquifer	2060	WMS Supply Recipient: Elgin	Recommended WMS Supply Without WMS Project	19221	Yes	Project/WMS completed					
K	Expansion of Current Groundwater Supplies - Edwards-BFZ Aquifer	2040	WMS Supply Recipient: Pflugerville	Recommended WMS Supply Without WMS Project	31267	Yes	Project/WMS no longer being pursued	The existing groundwater supplies were evaluated and modeled to not have the ability to be expanded without advanced treatment and the facilities are space limited to construct additional treatment that would be required.	Other	Comment included in Column H for impediment		
K	Expansion of Current Groundwater Supplies - Edwards-BFZ Aquifer	2040	WMS Supply Recipient: Sunset Valley	Recommended WMS Supply Without WMS Project	92367							
K	Expansion of Current Groundwater Supplies - Ellenburger-San Saba Aquifer	2030	WMS Supply Recipient: Johnson City	Recommended WMS Supply Without WMS Project	19462							
K	Expansion of Current Groundwater Supplies - Gulf Coast Aquifer	2030	WMS Supply Recipient: Bay City	Recommended WMS Supply Without WMS Project	92031							
K	Expansion of Current Groundwater Supplies - Gulf Coast Aquifer	2020	WMS Supply Recipient: County-Other, Fayette	Recommended WMS Supply Without WMS Project	31356							
K	Expansion of Current Groundwater Supplies - Trinity Aquifer	2050	WMS Supply Recipient: Garfield WSC	Recommended WMS Supply Without WMS Project	92267							
K	Expansion of Ellenburger-San Saba Aquifer Supplies - Bertram	2030	Project Sponsor(s): Bertram	Recommended WMS Project	1705	Yes	Project/WMS started				Private	Currently In Progress
K	Expansion of Ellenburger-San Saba Aquifer Supplies - Burnet County Mining	2030	Project Sponsor(s): Mining (Burnet)	Recommended WMS Project	1706							
K	Expansion of Gulf Coast Aquifer Supplies - Colorado County Irrigation	2020	Project Sponsor(s): Irrigation (Colorado)	Recommended WMS Project	4068							
K	Expansion of Gulf Coast Aquifer Supplies - Colorado County-Other	2030	Project Sponsor(s): Municipal county-other (Colorado)	Recommended WMS Project	1719							
K	Expansion of Gulf Coast Aquifer Supplies - Matagorda County Irrigation	2020	Project Sponsor(s): Irrigation (Matagorda)	Recommended WMS Project	4069							
K	Expansion of Gulf Coast Aquifer Supplies - Wharton	2030	Project Sponsor(s): Wharton	Recommended WMS Project	4072							
K	Expansion of Gulf Coast Aquifer Supplies - Wharton County Irrigation	2020	Project Sponsor(s): Irrigation (Wharton)	Recommended WMS Project	4070							
K	Expansion of Sparta Aquifer Supplies - Fayette County-Other	2030	Project Sponsor(s): Municipal county-other (Fayette)	Recommended WMS Project	1731							
K	Expansion of Trinity Aquifer Supplies - Dripping Springs WSC	2040	Project Sponsor(s): Dripping Springs WSC	Recommended WMS Project	4066	Yes	Project/WMS started		Contract/permit constraints		Private	
K	Expansion of Trinity Aquifer Supplies - Hays County Mining	2020	Project Sponsor(s): Mining (Hays)	Recommended WMS Project	1732							
K	Expansion of Trinity Aquifer Supplies - Hays County-Other	2070	Project Sponsor(s): Municipal county-other (Hays)	Recommended WMS Project	4067							
K	Expansion of Trinity Aquifer Supplies - Manville WSC	2070	Project Sponsor(s): Manville WSC	Recommended WMS Project	1736							
K	Expansion of Trinity Aquifer Supplies - Mills County Irrigation	2020	Project Sponsor(s): Irrigation (Mills)	Recommended WMS Project	1733							
K	Expansion of Yegua-Jackson Aquifer Supplies - Fayette County Mining	2020	Project Sponsor(s): Mining (Fayette)	Recommended WMS Project	4064							
K	Hays County Pipeline - Region K Portion	2030	Project Sponsor(s): West Travis County Public Utility Agency; Municipal county-other (Hays)	Recommended WMS Project	1771	Yes	Project/WMS started		Other	Easement acquisition	Private	CIP project
K	Irrigation Operations Conveyance Improvements - Colorado County	2020	Project Sponsor(s): Irrigation (Colorado)	Recommended WMS Project	1985							

Plannin g Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Databas	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
K	Irrigation Operations Conveyance Improvements - Matagorda County	2020	Project Sponsor(s): Irrigation (Matagorda)	Recommended WMS Project	4211							
K	Irrigation Operations Conveyance Improvements - Wharton County	2020	Project Sponsor(s): Irrigation (Wharton)	Recommended WMS Project	4212							
K	LCRA - Acquire Additional Water Rights	2030	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	2129	Yes	Project/WMS completed	N/A				
K	LCRA - Aquifer Storage and Recovery	2040	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	2158	Yes	Project/WMS not started	Project online date is not until 2040 in the 2021 RWP. The same online date is being used for the 2026 RWP				
K	LCRA - Baylor Creek Reservoir	2040	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	2164	Yes	Project/WMS not started	Project online date is not until 2040 in the 2021 RWP. It is being shifted to 2050 in the 2026 RWP	Shift in timeline			
K	LCRA - Enhanced Recharge and Conjunctive Use	2040	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	2167	No	Project/WMS no longer being pursued	Other options being pursued				
K	LCRA - Excess Flows Permit Off-Channel Reservoir	2030	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	2128	Yes	Project/WMS not started	Project online date is being shifted to 2050 in the 2026 RWP	Shift in timeline			
K	LCRA - Import Return Flows from Williamson County	2030	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	2160	Yes	Project/WMS started	N/A				
K	LCRA - Interruptible Water for Agriculture (LCRA WMP Amendments)	2020	WMS Seller: Lower Colorado River Authority; WMS Supply Recipient: Irrigation, Colorado	Recommended WMS Supply Without WMS Project	16505	Yes	Project/WMS started	N/A				
K	LCRA - Interruptible Water for Agriculture (LCRA WMP Amendments)	2020	WMS Seller: Lower Colorado River Authority; WMS Supply Recipient: Irrigation, Matagorda	Recommended WMS Supply Without WMS Project	16510	Yes	Project/WMS started	N/A				
K	LCRA - Interruptible Water for Agriculture (LCRA WMP Amendments)	2020	WMS Seller: Lower Colorado River Authority; WMS Supply Recipient: Irrigation, Wharton	Recommended WMS Supply Without WMS Project	16515	Yes	Project/WMS started	N/A				
K	LCRA - Mid-Basin Off-Channel Reservoir	2030	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	2127	Yes	Project/WMS not started	Project online date is being shifted to 2050 in the 2026 RWP	Shift in timeline			
K	LCRA - Prairie Site Off-Channel Reservoir	2030	Project Sponsor(s): Lower Colorado River Authority	Recommended WMS Project	2126	No	Project/WMS no longer being pursued	Other options being pursued				
K	Marble Falls Regional Project	2030	Project Sponsor(s): Municipal county-other (Burnet); Marble Falls	Recommended WMS Project	2260							
K	New Surface Water Infrastructure - Bastrop Regional Project	2050	Project Sponsor(s): Bastrop; Aqua WSC; Bastrop County WCID 2	Recommended WMS Project	2313							
K	New Surface Water Infrastructure - Smithville	2030	Project Sponsor(s): Smithville	Recommended WMS Project	2316							
K	New Water Purchase - Llano	2020	WMS Seller: Burnet; WMS Supply Recipient: Llano	Recommended WMS Supply Without WMS Project	93221	No	Project/WMS no longer being pursued	We're not selling water to Llano	Water supply constraints		Unknown	
K	Rainwater Harvesting - County-Other Hays	2030	Project Sponsor(s): Municipal county-other (Hays)	Recommended WMS Project	4406							
K	Rainwater Harvesting - Dripping Springs WSC	2030	Project Sponsor(s): Dripping Springs WSC	Recommended WMS Project	4407	Yes	Project/WMS started		Economic feasibility/financing		State	
K	Rainwater Harvesting - Hays	2030	Project Sponsor(s): Hays	Recommended WMS Project	4408							
K	Rainwater Harvesting - Sunset Valley	2030	Project Sponsor(s): Sunset Valley	Recommended WMS Project	4409							
K	Surface Water Infrastructure Expansion - WTCPUA	2030	Project Sponsor(s): West Travis County Public Utility Agency	Recommended WMS Project	4062	Yes	Project/WMS started		Contract/permit constraints		Private	CIP project--design phase
K	Water Purchase - Windermere Utility	2030	WMS Supply Recipient: Windermere Utility	Recommended WMS Supply Without WMS Project	91550							
K	Water Purchase Amendment - Barton Creek WSC	2020	WMS Seller: Travis County MUD 4; WMS Supply Recipient: Barton Creek WSC	Recommended WMS Supply Without WMS Project	104356							
K	Water Purchase Amendment - Creedmoor-Maha WSC	2040	WMS Seller: Aqua WSC; WMS Supply Recipient: Creedmoor-Maha WSC	Recommended WMS Supply Without WMS Project	92513	Yes	Project/WMS started		Shift in timeline		Private	
K	Water Purchase Amendment - Travis County MUD 14	2050	WMS Seller: Aqua WSC; WMS Supply Recipient: Travis County MUD 14	Recommended WMS Supply Without WMS Project	92521	Yes	Project/WMS started		Other	The MUD is not fully built out yet.	Private	

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Databas	Has the sponsor taken affirmative vote or actions? (TWC 16.053(h)(10))	What is the status of the WMS project or WMS recommended in the 2022 SWP?	If the project has not been started or no longer is being pursued, please explain why by adding information in this column.	Please select one or more project impediments. If an impediment is not listed, select "Other" and provide information in Column K.	If you selected "Other" in Column J, please provide information about project impediments not shown in the impediment list provided.	What funding type(s) are being used for the project? (Select all that apply)	Optional Comments
K	Water Purchase Contracts & Amendments - Hays	2060	Project Sponsor(s): Hays	Recommended WMS Project	4087							

Appendix 10.A

Public Comments on Pre-Planning, IPP, and Draft Region K Water Plan

Appendix 10.A

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Appendix 10A

Region K Regional Water Planning Group - Public Comments on Pre-Planning, IPP, and draft Region K Water Plan

Date comment received	Name/ Affiliation of Commenter	Comment	Priority Ranking/ Responsibility	Response
9/15/21 at public hearing	Sue Thornton with Central Texas Water Coalition	Ms. Thornton expressed that from her point of view the Region K Water Availability Model (WAM) is overly optimistic and provided three specific recommendations: Recommended taking more cautious approach to calculate water availability, including a preference for safe yield rather than firm yield Recommended further study of decreased inflows to the Highland Lakes and Recommended consideration of conservation and reuse strategies, including water rates and pricing, gathering metrics on water use to assess success of conservation efforts. Noted that these rates and pricing metrics should be used across all types of water users.		
9/15/21 at public hearing	Andrew Wier with Simsboro Aquifer Water Defense Fund	Mr. Wier described the SAWDF goal of protecting groundwater rights in Lee, Milam, Burleson, and Bastrop counties. Mr. Wier asked the planning group to emphasize reuse, conservation, and aquifer storage and recovery (ASR) strategies, and recommended that the regional water planning group (RWPG) look at the interaction between surface water and groundwater in more detail. Modeling done with the 2020 GAM for GMA 12 shows that groundwater pumping is curtailed by 59,000 acre-feet in late 2030s or 2040; water is still produced in the model, but it is coming from the Colorado River through the aquifer. The speaker expressed awareness of multiple plans for		

Date comment received	Name/ Affiliation of Commenter	Comment	Priority Ranking/ Responsibility	Response
		additional pumping in the area and expressed concern that this could result in reduced flows in the Colorado River downstream of Austin.		
9/15/21 at public hearing	John Carlton with Travis County WCID No. 10	Mr. Carlton noted that they will have written comments before deadline. WCID No. 10 has been a wholesale customer of Austin Water since the 1950s. They will be submitting proposed corrections for the 2022 Region K plan, including population, water demand, and water management strategies.		

Appendix 10.B

Public Comments at Regular Region K Planning Group Meetings

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Appendix 10B

Region K Regional Water Planning Group Meetings - Public Comments

Received September 15, 2021 to February 20, 2025

Date of Meeting or Hearing	Number of Public in Attendance	Name/Affiliation of Commenter	Comment/Question
9/15/2021	27	N/A	No public comments were made during the 09/15/2021 regular planning group meeting.
01/26/2022	37	Blake Neffendorf with the City of Buda regarding issues on Agenda Item 5.	Mr. Neffendorf noted a correction to the minutes from the September meeting, incorrectly stating Walt Smith's board membership, Hays Caldwell Public Utility. Agency (HCPUA) should be West Travis County Public Utility Agency (WTCPUA). For Agenda item 5, talking about term expiration dates, he noted that he thinks that Groundwater Management Area (GMA) and river authority members do not have an expiration date, suggested striking those categories from the expiration discussion. He reiterated that the City of Buda supports Walt Smith for the Counties position, as shown in the letter they submitted
		Jason Homan with Travis County WCID No. 17 regarding public announcement.	Mr. Homan noted that he prefers to speak during his nomination item
		Joe Don Dockery with Burnet County Commissioners Court regarding bylaws under Item 8.	Mr. Dockery suggested adding another water utility position, regarding bylaws under item 8, in an effort to strive for diversity. He mentioned it would also be a good time to add additional voting member positions for water supply and management for diversity and coverage 3 reasons. From his perspective, the group has one river authority representative, seven groundwater area representatives, and only one water utility representative. The water utility area is what supports the area's dramatic growth and conservation. At least 3 other regions

Date of Meeting or Hearing	Number of Public in Attendance	Name/Affiliation of Commenter	Comment/Question
			have multiple water utility positions. All water strategies need to go through this board. Need to address both surface and groundwater. There are two good nominees, should make an effort as a board to incorporate both people. Burnet County Commissioners took action and expressed unanimous support of Jason Homan. Two commissioners, Ann Howard and Brigid Shea from Travis County, represent about ½ million people and have submitted letters of support for Jason Homan.
		Andy Wier with Simsboro Aquifer Water Defense Fund (SAWDF) regarding issues with comments on September 2021 meeting.	Andy Wier submitted a correction to the minutes from the September 2021 meeting. Mr. Wier expressed that he wanted to correct the way his comments from the September 2021 Public Hearing were reflected in the draft minutes. Mr. Wier expressed interest in noting that when groundwater pumping increases you can take water from surface waters, so there is a concern about risk of double counting.
04/27/2022	31	Andy Wier with Simsboro Aquifer Water Defense Fund (SAWDF) regarding specific issues related to agenda items 4 through 11.	Mr. Wier described the work that SAWDF does for the area and thanked the group for including his comments in the September meeting minutes. The speaker expressed that best available science shows that groundwater pumping will reduce surface water. In Region K, pumping from the central Carrizo Aquifer will affect flows in the Colorado River. SAWDF encourages Region K to promote conservation, reuse, and aquifer

Date of Meeting or Hearing	Number of Public in Attendance	Name/Affiliation of Commenter	Comment/Question
			storage and recovery projects. He recommended that those involved in regional water planning should read the 2021 publication "Five Gallons in a Ten Gallon Hat; Groundwater Sustainability in Texas" from Dr. Mace at the Meadows Center. Dr. Mace's research shows that the modeled available groundwater (MAGs) numbers overestimate sustainable production (2020 MAGs are estimated to be 2.7 times higher than the sustainable pumping level), and Mr. Wier recommends that the LCRWPG consider applying a reduction to the MAGs for the purposes of sustainable planning. Mr. Wier expressed that sustainable production of groundwater can help protect surface water flow as well as property rights. Mr. Wier again urged the planning group to read the research from the Meadows Center and develop an informed and sustainable plan for central Texas' water resources.
07/27/2022	33	Andy Wier with Simsboro Aquifer Water Defense Fund (SAWDF) regarding SAWDF work with public water entities.	Mr. Wier described the work that SAWDF does to protect the Carrizo Wilcox Aquifer and private property rights. The speaker expressed that, in Bastrop, the Carrizo Wilcox Aquifer intersects the Colorado River and contributes inflows that sustain the river in drought. The speaker shared that, in terms of current drought conditions and due to the intersection of the Carrizo Wilcox Aquifer and the Colorado River, SAWDF echoes the request made by the Central Texas Water

Date of Meeting or Hearing	Number of Public in Attendance	Name/Affiliation of Commenter	Comment/Question
			Coalition (CTWC), the Travis County Commissioners Court, and the Burnet County Commissioners Court that the Lower Colorado River Authority (LCRA) accelerate update of its Water Management Plan (WMP). The speaker expressed that conditions have changed since the 2020 passage of the LCRA WMP and that the LCRA WMP should be updated as other demand and supply projections are also updated. Mr. Wier said that SAWDF encourages use of reuse, conservation, and Aquifer Storage and Recovery (ASR) and that sustainable use of groundwater can protect surface water.
		David Bradsby with Blanton and Associates regarding general public announcement.	It was announced that David Bradsby, a non-voting member representing TPWD, is no longer with TPWD, and is now with Blanton and Associates.
10/26/2022	33	Blake Neffendorf with City of Buda regarding issues with the bylaws.	Mr. Neffendorf stated that the bylaws say that the planning group may post requests for nominations publicly and he encouraged the group to post publicly, suggesting that this is the fairest way to fill a vacancy.
01/11/2023	33	N/A	No public comments were made during the 01/11/2023 meeting.
04/26/2023	33	Cindy Smiley with Smiley Law regarding demand estimate development.	Ms. Smiley provided public comment thanked the planning group for their efforts. Ms. Smiley asked that the members not rely on the standardized approach for developing demands that is used at a state level but to look for local information wherever available and to err on the side of caution. Ms. Smiley

Date of Meeting or Hearing	Number of Public in Attendance	Name/Affiliation of Commenter	Comment/Question
			noted the criticality of developing comprehensive demand estimates, including any uses that require releases from LCRA's reservoirs
7/12/2023	27	Cindy Smiley with Smiley Law regarding state-wide standard processes for water modeling.	Ms. Smiley thanked the planning group and the chair of the water modeling committee and asked that the planning group tailor the state-wide standard processes for water modeling to our region and minimize risk.
		Jordan Furnans with LRE Water regarding feedback on environmental flow releases.	Mr. Furnans provided feedback on environmental flow releases: the 33,000 acre-feet that is designated for environmental flow is only half of what LCRA has been releasing. Mr. Furnans strongly urged group to increase storage designated for environmental flow to 66,000 AF.
10/04/2023	27	Andrew Wier with Simsboro Aquifer Water Defense Fund (SAWDF)	Mr. Wier discussed the relationship between the Colorado River and the Carrizo-Wilcox aquifer and stated that the TWDB approved Groundwater Availability Model indicates that pumping groundwater in the Carrizo impacts water flow in the Colorado River and other surface waters. Mr. Weir described the outflows from the aquifer in relation to the Colorado River flow and asked Region K members to take note that water supply strategies that rely on increased production from the aquifer in Region K could reduce surface water available in the Colorado River below Austin. Mr. Wier suggested that the planning group consider the cost of water treatment for public water supplies for PFAS

Date of Meeting or Hearing	Number of Public in Attendance	Name/Affiliation of Commenter	Comment/Question
			and PFOS below Austin on the Colorado River.
		Jordan Furnans with LRE Water representing Central Texas Water Coalition regarding water modeling production.	Dr. Furnans suggested that the planning group should consider the impact of the drought we are currently in potentially becoming a new drought of record. Dr. Furnans developed a water model using LCRA daily published inflows that can be updated frequently. Dr. Furnans stated that his modeling shows that if 2024 is like 2023 in terms of drought conditions, we may enter a new drought of record in 2024.
12/1/2023	33	Jordan Furnans with LRE Water representing Central Texas Water Coalition regarding future agenda items.	Mr. Furnans stated that he wanted the planning group to know he was trying to see what it would look like to incorporate results of a Water Availability Model uncertainty analysis into the next planning cycle.
2/13/2024	33	N/A	No public comments were made in the 02/13/2024 meeting.
04/17/2024	30	Andy Wier representing Simsboro Aquifer Water Defense Fund (SAWDF) regarding issues on meeting comments update and Carrizo-Wilcox Aquifer work.	Mr. Weir suggested adding the following statement to the February 13, 2024 meeting minutes: "Jennifer Walker noted that updated Water Loss Audits and Drought Contingency Plans are due to the TWDB and these documents should be utilized in reviewing or creating new conservation water management strategies". Mr. Weir urged the planning group to scrutinize water loss audits submitted to TWDB. Mr. Weir echoed the comments that were made by GMA-9 and GMA-8 representatives in the February 2024 meeting, asking the group not to look at

Date of Meeting or Hearing	Number of Public in Attendance	Name/Affiliation of Commenter	Comment/Question
			groundwater as the "silver bullet" for filling gaps in water demand. Mr. Weir asked the group to consider the interaction of the Carrizo-Wilcox with the Colorado River in Bastrop County in their planning.
07/10/2024	27	N/A	No public comments were made during the 07/10/2024 meeting.
10/16/2024	27	N/A	No public comments were made during the 10/16/2024 meeting.
12/06/2024	33	Blake Neffendorf with City of Buda regarding issues on item 7.	Mr. Neffendorf signed up to give a public comment and wished to address the comment under item 7. During the presentation and discussion of draft water management strategies, he stated that the location and county of aquifers need to be designated for projects such as the City of Austin's brackish groundwater desalination water management strategy.
01/15/2025	N/A	N/A	It was mentioned in meeting notes that public comments on specific issues related to agenda items 4 through 14 to be limited to three minutes. No public comments were mentioned during the 01/15/2025 meeting.
02/20/2025	N/A	N/A	
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Appendix 10.C

Region K Committees

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Appendix 10C

Region K Regional Water Planning Group - Meetings of the Region K Committees

Committee Name	Date of Meeting	Number of Public Attendees
Bylaw Committee	November 30, 2021	Not Available
	December 13, 2021	7
Executive Committee	September 15, 2021	Not Available
	January 6, 2022	Not Available
	July 27, 2022	Not Available
	January 11, 2023	Not Available
	July 10, 2024	5
Population and Water Demand Committee	May 23, 2022	Not Available
	July 27, 2022	Not Available
	November 2, 2022	6
	February 6, 2023	6
	February 28, 2023	7
	April 10, 2023	11
	May 22, 2023	10
	June 12, 2023	11
	June 22, 2023	14
Nominating Committee	December 13, 2021	Not Available
	December 7, 2022	Not Available
	January 30, 2024	Not Available
Water Modeling Committee	July 12, 2023	26
	August 21, 2023	19
	September 18, 2023	19
	October 23, 2023	22
	January 22, 2024	25
	January 31, 2025	21
Water Management Strategy Committee	October 23, 2023	19
	November 15, 2023	15
	March 29, 2024	10
	June 18, 2024	16
	July 16, 2024	8
	August 30, 2024	10
	September 17, 2024	7
	October 3, 2024	10
	November 14, 2024	24
	December 2, 2024	29
	January 15, 2025	25
	January 31, 2025	21
Legislative & Policy Committee	June 11, 2024	16
	July 26, 2024	14
	August 23, 2024	10
	September 9, 2024	11
	September 24, 2024	5
	October 2, 2024	5
	November 5, 2024	Not Available

Unique Stream Segments Committee	November 6, 2024	5
	November 19, 2024	10

Appendix 10.D

Survey Questions

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Appendix 10.D

Appendix 10D
Region K Regional Water Planning Group – Survey Questions

Survey #1 Questions:

1. **Please enter the name of the entity for which you are completing this survey:**
   Answer Choices: List of various entities (e.g., Aqua WSC, Austin, Barton Creek West WSC, etc.)
2. **Please enter your preferred contact information below:**
   Name (Required); Email (Optional)
3. **Do you have significant disagreement with and wish to make modifications to the projected population for the water users directly supplied by your entity?**
   Answer Choices: Yes, No
4. **If you answered "Yes" on the item above, please describe the primary reason(s) for the adjustments in population:**
   Answer Choices: Study conducted by entity, Study conducted by other party, Other (please specify)
5. **Do you have significant disagreement with and wish to make modifications to the projected municipal water demand for the water users directly supplied by your entity?**
   Answer Choices: Yes, No
6. **If you answered "Yes" on the item above, please describe the primary reason(s) for the adjustments in municipal water demand projections:**
   Answer Choices: Study conducted by entity, Study conducted by other party, Other (please specify)

Survey #2 Questions:

1. **Please enter the name of the entity for which you are completing this survey:**
   Answer Choices: List of various entities (e.g., Aqua WSC, Austin, Barton Creek West WSC, etc.)
2. **Please enter your preferred contact information below:**
   Name (Required);Email (Optional)
3. **Does your entity provide water to other entities on a wholesale basis?**
   Answer Choices: Yes, No
4. **The items below ask for contract amounts. Please select the units (millions of gallons, acre-feet, etc.) that you are using for these volumes:**
   Answer Choices: Thousand gallons (kgal), Million gallons (MG), Acre-feet (ac-ft), Other (please specify)
5. **Please enter the following information for your first wholesale customer:**
   Customer Name; Contract amount (annual)
6. **Please enter the following information for your second wholesale customer:**
   Customer Name; Contract amount (annual)
7. **Please enter the following information for your third wholesale customer:**
   Customer Name; Contract amount (annual)
8. **Please enter the following information for your fourth wholesale customer:**
   Customer Name; Contract amount (annual)
9. **Please enter the following information for your fifth wholesale customer:**
   Customer Name; Contract amount (annual)
10. **If you indicated that you have more than five wholesale customers, please list the names of your wholesale customers.**
11. **Does your entity own or operate groundwater supply wells?**
    Answer Choices: Yes, No
12. **Please indicate the first aquifer that you own and operate wells within:**
    Answer Choices: Carrizo-Wilcox, Gulf Coast, Ellenburger-San Saba, Trinity, Edwards-BFZ, Hickory, Marble Falls, Sparta, Yegua-Jackson, Queen City, Other (please specify)
13. **For the first aquifer, please indicate the total capacity of that wellfield(s), in gpm.**
14. **Please indicate the second aquifer that you own and operate wells within:**
    Answer Choices: Carrizo-Wilcox, Gulf Coast, Ellenburger-San Saba, Trinity, Edwards-BFZ, Hickory, Marble Falls, Sparta, Yegua-Jackson, Queen City, Other (please specify)
15. **For the second aquifer, please indicate the total capacity of that wellfield(s), in gpm.**

16. **Please indicate the third aquifer that you own and operate wells within:**
    Answer Choices: Carrizo-Wilcox, Gulf Coast, Ellenburger-San Saba, Trinity, Edwards-BFZ, Hickory, Marble Falls, Sparta, Yegua-Jackson, Queen City, Other (please specify)
17. **For the third aquifer, please indicate the total capacity of that wellfield(s), in gpm.**
18. **Please indicate the fourth aquifer that you own and operate wells within:**
    Answer Choices: Carrizo-Wilcox, Gulf Coast, Ellenburger-San Saba, Trinity, Edwards-BFZ, Hickory, Marble Falls, Sparta, Yegua-Jackson, Queen City, Other (please specify)
19. **For the fourth aquifer, please indicate the total capacity of that wellfield(s), in gpm.**
20. **Please indicate the fifth aquifer that you own and operate wells within:**
    Answer Choices: Carrizo-Wilcox, Gulf Coast, Ellenburger-San Saba, Trinity, Edwards-BFZ, Hickory, Marble Falls, Sparta, Yegua-Jackson, Queen City, Other (please specify)
21. **For the fifth aquifer, please indicate the total capacity of that wellfield(s), in gpm.**
22. **Does your entity hold any water right permits for surface water?**
    Answer Choices: Yes, No
23. **If known, please provide the production capacity of your surface water system:**
    Production capacity, Units (gpm, mgd, ac-ft/yr, etc.)
24. **Please list the TCEQ water right numbers for any surface water rights that your entity owns.**
25. **Does your entity currently utilize reclaimed water for supply?**
    Answer Choices: Yes, No
26. **Please specify the type of reclaimed water that your entity utilizes:**
    Answer Choices: Direct reuse, Indirect reuse, Both
27. **Does your entity sell (wholesale) reclaimed water to another entity?**
    Answer Choices: Yes, No
28. **Does your entity purchase reclaimed water from another entity?**
    Answer Choices: Yes, No
29. **If you utilize reclaimed supplies, please describe what water demands they are used to meet.**
30. **Does your entity have existing contracts or agreements to purchase water from other entities?**
    Answer Choices: Yes, No
31. **Please input the number of supply contracts and agreements to purchase water supplies that you have.**
32. **The items below ask for contract and deliverable supply volumes. Please select the units (millions of gallons, acre-feet, etc.) that you are using for these volumes:**
    Answer Choices: Thousand gallons (kgal), Million gallons (MG), Millions of gallons per day (mgd), Acre-feet (ac-ft), Other (please specify)
33. **Please enter the following information for your first supplier:**
    Supplier name; Contract amount (annual)

34. **Please enter the following information for your second supplier:**
    Supplier name; Contract amount (annual); Deliverable amount
35. **Please enter the following information for your third supplier:**
    Supplier name; Contract amount (annual); Deliverable amount
36. **Please enter the following information for your fourth supplier:**
    Supplier name, Contract amount (annual), Deliverable amount
37. **Please enter the following information for your fifth supplier:**
    Supplier name, Contract amount (annual), Deliverable amount
38. **If you indicated that you have more than five suppliers, please list the names of your suppliers.**
39. **Does your entity own and/or operate any water treatment plants (WTPs)?**
    Answer Choices: Yes, No
40. **Please enter the number of WTPs you own and/or operate.**
41. **If known, please provide the production capacity of your water treatment system:**
    Production capacity; Units (gpm, mgd, ac-ft/yr, etc.)
42. **Does your entity have existing emergency interconnect facilities either to supply your entity or provide emergency supply to another user?**
    Answer Choices: Yes, No

Survey #3 Questions:

1. **Please enter the name of the entity for which you are completing this survey:**
   Answer Choices: List of various entities (e.g., 3 G WSC, Aqua WSC, Austin, etc.)
2. **Please enter your preferred contact information below:**
   Name (Required); Email (Optional); Phone (Optional)
3. **Do you agree with the recommended projects listed for your entity in the 2021 Regional Water Plan?**
   Answer Choices: N/A - no projects listed, Yes, No
   If "No", list the projects you disagree with.
4. **Have you already implemented any of the recommended projects listed for your entity in the 2021 Regional Water Plan?**
   Answer Choices: Yes, No
   If "Yes", list the projects you have implemented.
5. **Are you currently in the process of implementing (permitting, design, or construction) any of the recommended projects for your entity in the 2021 Regional Water Plan?**
   Answer Choices: Yes, No
   If "Yes", list the projects and estimated implementation date.
6. **Have the implementation (active use) dates of any of the recommended projects for your entity in the 2021 Regional Water Plan changed?**
   Answer Choices: Yes, No
   If "Yes", list the projects and expected implementation date.
7. **Are there any projects which you would like to propose or add for consideration?**
   Answer Choices: Yes, No
   If "Yes", list the projects, anticipated year online, firm yield, and potential partners.
8. **Does your entity have a Water Conservation Plan?**
   Answer Choices: Yes, No, I don't know
9. **Please provide input on potential water conservation measures.**
   Indicate if you have implemented, are currently implementing, or would consider implementing various measures (e.g., system audits, residential watering audits, conservation pricing structure, etc.)
10. **If you have implemented or are considering any additional conservation measures, please describe them below.**
    Note water savings, implementation date, and costs if available.
11. **Has your entity implemented any water loss control or audit program?**
    Answer Choices: Yes, No, I don't know
    If "Yes", describe the specific elements, implementation schedule/status, and performance.
12. **Does your entity have a Drought Contingency Plan?**
    Answer Choices: Yes, No, I don't know

13. **Please provide input on potential drought contingency measures.**
    Indicate if you have implemented or would consider implementing various measures (e.g., system audits, residential watering audits, contingency pricing structure, etc.)
14. **If you have implemented or are considering any additional measures, please describe them below.**
    Note water savings, implementation date, and costs if available.
15. **Is your entity currently in a drought stage?**
    Answer Choices: Yes, No
    If "Yes", indicate the current drought stage.

Appendix 10.E

Responses from Rural Water Suppliers

Appendix 10.E

2026 Region K Water Plan

For the Lower Colorado Regional Water Planning Group

Appendix 10E

Region K Regional Water Planning Group – Responses from Rural Water Suppliers

Response Number	Water User Group Name	Rural Public Water Supply Name	Included in WUG Survey Process?	Included in Rural-Specific Process?	Response		
					Survey 1	Survey 2	Survey 3
1	Aqua WSC	AQUA WSC	YES		YES	YES	
2	Bastrop	CITY OF BASTROP	YES				
3	Bastrop County WCID 2	BASTROP COUNTY WCID 2	YES				
4	Bay City	CITY OF BAY CITY	YES				
5	Bertram	CITY OF BERTRAM	YES		YES		YES
6	Blanco	CITY OF BLANCO	YES				
7	Boling MWD	BOLING MWD	YES				
8	Briarcliff	VILLAGE OF BRIARCLIFF	YES				YES
9	Burnet	CITY OF BURNET	YES		YES		YES
10	Caney Creek MUD of Matagorda County	CANEY CREEK MUD OF MATAGORDA COUNTY	YES				
11	Columbus	CITY OF COLUMBUS	YES		YES	YES	YES
12	Cottonwood Creek MUD 1	COTTONWOOD CREEK MUD 1	YES				
13	Cottonwood Shores	CITY OF COTTONWOOD SHORES	YES				
14	Cypress Ranch WCID 1	CYPRESS RANCH WCID 1	YES				YES
15	Dripping Springs WSC	DRIPPING SPRINGS WSC	YES		YES	YES	YES
16	Eagle Lake	CITY OF EAGLE LAKE	YES				
17	El Campo	CITY OF EL CAMPO	YES				
18	Elgin	CITY OF ELGIN	YES			YES	YES
19	Fayette County WCID Monument Hill	FAYETTE COUNTY WCID MONUMENT HILL	YES				
20	Fayette WSC	FAYETTE WSC EAST	YES		YES		
21	Fayette WSC	FAYETTE WSC WEST	YES		YES		
22	Flatonia	CITY OF FLATONIA	YES			YES	YES
23	Fredericksburg	CITY OF FREDERICKSBURG	YES			YES	
24	Goldthwaite	CITY OF GOLDTHWAITE	YES		YES	YES	
25	Granite Shoals	CITY OF GRANITE SHOALS SHERWOOD III	YES		YES		YES
26	Granite Shoals	CITY OF GRANITE SHOALS	YES		YES		

Response Number	Water User Group Name	Rural Public Water Supply Name	Included in WUG Survey Process?	Included in Rural-Specific Process?	Response		
					Survey 1	Survey 2	Survey 3
27	Hays	CITY OF HAYS	YES		YES		
28	Hays	ELLIOTT RANCH WATER SYSTEM	YES		YES		
29	Hays County WCID 1	HAYS COUNTY WCID 1	YES		YES		
30	Hays County WCID 2	HAYS COUNTY WCID 2	YES		YES		
31	Horseshoe Bay	CITY OF HORSESHOE BAY	YES		YES	YES	
32	Johnson City	CITY OF JOHNSON CITY	YES		YES		
33	Kingsland WSC	KINGSLAND WSC COMANCHE RANCHERIAS	YES		YES	YES	
34	Kingsland WSC	KINGSLAND WSC	YES		YES	YES	
35	La Grange	CITY OF LA GRANGE	YES				
36	Lago Vista	CITY OF LAGO VISTA	YES		YES		YES
37	Lee County WSC	LEE COUNTY WSC	YES				
38	Llano	CITY OF LLANO	YES		YES	YES	YES
39	Marble Falls	CITY OF MARBLE FALLS	YES		YES	YES	YES
40	Markham MUD	MARKHAM MUD	YES				
41	Matagorda County WCID 6	MATAGORDA COUNTY WCID 6	YES				
42	Matagorda Waste Disposal & WSC	MATAGORDA WSC	YES				
43	Meadowlakes	CITY OF MEADOWLAKES	YES				
44	North San Saba WSC	NORTH SAN SABA WSC	YES				
45	Palacios	CITY OF PALACIOS	YES		YES		
46	Polonia WSC	POLONIA WSC NORTH	YES				
47	Richland SUD	RICHLAND SUD	YES				
48	Rollingwood	CITY OF ROLLINGWOOD	YES				
49	San Saba	CITY OF SAN SABA	YES				
50	Schulenburg	CITY OF SCHULENBURG	YES				
51	Smithville	CITY OF SMITHVILLE	YES				
52	Sunrise Beach Village	CITY OF SUNRISE BEACH VILLAGE	YES			YES	
53	Sunset Valley	CITY OF SUNSET VALLEY	YES				

Appendix 10E

Region K Regional Water Planning Group – Responses from Rural Water Suppliers

Response Number	Water User Group Name	Rural Public Water Supply Name	Included in WUG Survey Process?	Included in Rural-Specific Process?	Response		
					Survey 1	Survey 2	Survey 3
54	Travis County MUD 10	TRAVIS COUNTY MUD 10	YES		YES		
55	Travis County MUD 14	TRAVIS COUNTY MUD 14	YES				
56	Travis County MUD 2	TRAVIS COUNTY MUD 2	YES				
57	Travis County WCID Point Venture	TRAVIS COUNTY WCID POINT VENTURE	YES		YES		
58	Weimar	CITY OF WEIMAR	YES				
59	West End WSC	WEST END WSC	YES				
60	Wharton	CITY OF WHARTON	YES			YES	
61	Wharton County WCID 2	WHARTON COUNTY WCID 2	YES				
62	Wilbarger Creek MUD 1	WILBARGER CREEK MUD 1	YES				
63	County-Other, Bastrop	BASTROP COUNTY WCID 1		YES			
64	County-Other, Bastrop	BASTROP COUNTY MUD 1		YES			
65	County-Other, Bastrop	THE COLONY MUD 1E		YES			
66	County-Other, Blanco	OAK RIDGE WSC		YES			YES
67	County-Other, Burnet	SILVER CREEK VILLAGE WSC		YES			YES
68	County-Other, Burnet	WINDERMERE OAKS WSC		YES			
69	County-Other, Burnet	CITY OF HIGHLAND HAVEN WATER SYSTEM		YES			
70	County-Other, Colorado	COLORADO COUNTY WCID 2		YES			
71	County-Other, Colorado	ROCK ISLAND WSC		YES			
72	County-Other, Colorado	SHERIDAN WSC		YES			
73	County-Other, Colorado	GLIDDEN FWSD 1		YES			
74	County-Other, Colorado	LAKE SHERIDAN ESTATES		YES			
75	County-Other, Fayette	CITY OF FAYETTEVILLE		YES			
76	County-Other, Fayette	CITY OF CARMINE		YES			
77	County-Other, Fayette	ELLINGER SEWER AND WSC		YES			
78	County-Other, Fayette	VISTA RANCH WATER SYSTEM		YES			
79	County-Other, Gillespie	STONEWALL WCID		YES			
80	County-Other, Hays	RADIANCE WSC		YES			

Appendix 10E

Region K Regional Water Planning Group – Responses from Rural Water Suppliers

Response Number	Water User Group Name	Rural Public Water Supply Name	Included in WUG Survey Process?	Included in Rural-Specific Process?	Response		
					Survey 1	Survey 2	Survey 3
81	County-Other, Hays	GOLDENWOOD WEST WSC		YES			
82	County-Other, Hays	OAK FOREST WSC		YES			
83	County-Other, Llano	LLANO COUNTY MUD 1		YES			
84	County-Other, Llano	3 G WSC		YES			
85	County-Other, Llano	DEERHAVEN WCID		YES			
86	County-Other, Matagorda	MATAGORDA COUNTY WCID 5		YES			
87	County-Other, Matagorda	WADSWORTH WSC		YES			
88	County-Other, Matagorda	MATAGORDA COUNTY WCID 2		YES			
89	County-Other, Matagorda	RIVER OAKS WSC		YES			
90	County-Other, Matagorda	MIDFIELD WSC		YES			
91	County-Other, Mills	PRIDDY WSC		YES			
92	County-Other, San Saba	CITY OF RICHLAND SPRINGS		YES			
93	County-Other, San Saba	CHEROKEE HOME FOR CHILDREN		YES			
94	County-Other, Travis	VILLAGE OF SAN LEANNA		YES			
95	County-Other, Travis	TONKAWA WSC		YES			
96	County-Other, Travis	LAKEVIEW HILLS WSC		YES			YES
97	County-Other, Travis	KENNEDY RIDGE WSC		YES			
98	County-Other, Travis	THE COVES WSC		YES			
99	County-Other, Wharton	HUNGERFORD MUD 1		YES			
100	County-Other, Wharton	ISAACSON MUD		YES			
101	County-Other, Williamson	DURHAM PARK WSC		YES			

REGION K

THE LOWER COLORADO REGIONAL WATER PLANNING GROUP