2021 SOUTH CENTRAL TEXAS REGIONAL WATER PLAN

Region L
South Central Texas Regional Water Planning Group

VOLUME 1

SOUTH CENTRAL TEXAS REGIONAL WATER PLANNING GROUP
NOVEMBER 5, 2020

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Gary Middleton	Secretary	Municipalities	City of Victoria
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Adam Yablonski	At-Large	Agricultural	Medina County Farm Bureau
Pat Calhoun	Member	Counties	Goliad County Judge
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Alan Cockerell	Member	Water Utilities	Cibolo Valley Local Government Corporation
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Roland Ruiz	Member	Water Districts	Edwards Aquifer Authority
Diane Savage	Member	GMA 13	Evergreen Underground Water Conservation District
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Mitchell Sowards	Member	Small Business	ENTRUST Technology Consulting Services
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Ian Taylor	Member	Municipalities	New Braunfels Utilities
Dianne Wassenich	Member	Public	San Marcos River Foundation

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B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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Chapter Outline

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List of Abbreviations

acft/yr	Acre-Foot per Year
ARWA	Alliance Regional Water Authority
ASR	Aquifer Storage and Recovery
cft/yr	Cubic Feet per Year
CRWA	Canyon Regional Water Authority
CVLGC	Cibolo Valley Local Government Corporation
DB22	State Water Planning Database
DFC	Desired Future Condition
EAA	Edwards Aquifer Authority
GBRA	Guadalupe-Blanco River Authority
GMA	Groundwater Management Area
HB	House Bill
HCP	Habitat Conservation Plan
MAG	Modeled Available Groundwater
MWP	Major Water Provider
NBU	New Braunfels Utilities
RWP	Regional Water Plan
RWPA	Regional Water Planning Area
SARA	San Antonio River Authority
SAWS	San Antonio Water System
SB	Senate Bill
SCTRWP	South Central Texas Regional Water Plan
SCTRWPG	South Central Texas Regional Water Planning Group
SSLGC	Schertz-Sequin Local Government Corporation
SUD	Special Utility District
SWP	State Water Plan
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
USFWS	U.S. Fish & Wildlife Service
WMS	Water Management Strategy
WSC	Water Supply Corporation
WUG	Water User Group
WWP	Wholesale Water Provider

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EXECUTIVE SUMMARY

ES.1 BACKGROUND

Since 1957, the Texas Water Development Board (TWDB) has been charged with preparing a comprehensive and flexible long-term plan for the development, conservation, and management of the state's water resources. The current state water plan (SWP), *2017 State Water Plan – Water for Texas*, was produced by the TWDB and based on approved regional water plans (RWPs) pursuant to requirements of Senate Bill (SB) 1, enacted in 1997 by the 75th Texas Legislature. As stated in SB1 Section 16.053.a, the purpose of the regional water planning effort is to:

> *"…provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of that particular region."*

SB1 also provides that future regulatory and financing decisions of the Texas Commission on Environmental Quality (TCEQ) and the TWDB, respectively, be consistent with approved regional plans.

The TWDB divided the state into 16 regional water planning regions and appointed members to the regional planning groups. As shown on Figure ES-1, the South Central Texas Region (Region L) includes all or portions of 21 counties (Figure ES-1). The South Central Texas Regional Water Planning Group (SCTRWPG) has a total of 31 voting members with one vacancy. These members represent 12 stakeholder groups (public, counties, municipalities, industry, agriculture, environmental, small business, electric generating utilities, river authorities, water districts, water utilities, and groundwater management areas), serve without pay, and are responsible for the development of the South Central Texas Regional Water Plan (SCTRWP).

The SCTRWPG adopted bylaws to govern its operations and, in accordance with its bylaws, selected the San Antonio River Authority (SARA) to serve as its Principal Administrative Offices to perform:

> *"…the functions defined in Texas Water Code, Chapter 16 and in 31 TAC [Texas Administrative Code] Chapters 355, 357 and 358 related to regional water planning groups for the South Central Texas RWPA [Regional Water Planning Area]. Foremost among those responsibilities shall be the development of a regional water plan for the South Central Texas RWPA that identifies both short and long-term water supply needs and recommends water management strategies for addressing them."*

Members of the SCTRWPG and key staff of several stakeholders serve as an ad hoc staff workgroup to review and guide SARA and consultants' work.

Beginning in 2015 and following submittal of the final 2016 SCTRWP, the South Central Texas Regional Water Planning Group (SCTRWPG) undertook the 2021 Plan Enhancement Process whereby the planning group, as a whole, would discuss and take appropriate action to (1) thoroughly consider comments received from agencies and members of the public; and (2) improve the 2021 SCTRWP. The 2021 Plan Enhancement Process sought to improve and clarify the principles that guide SCTRWPG decisions. Over the course of several SCTRWPG meetings from February 2016 to November 2017, the SCTRWPG considered several issues and compiled eleven SCTRWPG Guiding Principles (Refer to Appendix 8-A for a complete compilation of the Guiding Principles).

The Guiding Principles serve as a touchstone for which to reference when the SCTRWPG makes decisions. The Guiding Principles also seek to reconcile competing interests at the onset of the planning process, develop a shared understanding of the approach to regional water planning, and encourage consensus based decision making throughout the planning cycle. The Guiding Principles are further described in Chapter 10 (Refer to Section 10.1). Chapter 8: Policy Recommendations and Unique Sites also includes a recommendation to other regional water planning groups to develop a similar process (Refer to Section 8.8.4).

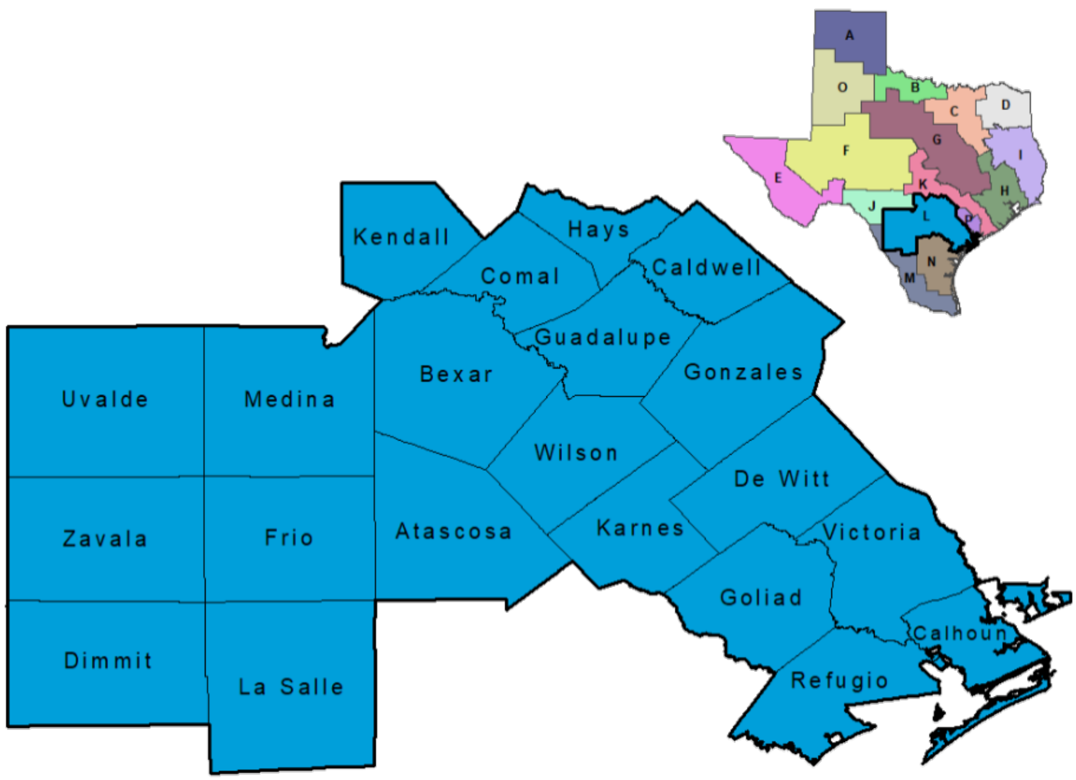

Figure ES-1 South Central Texas Planning Region (Region L)

Pursuant to regional and state water planning guidelines (31 TAC Part 10, Chapters 357 and 358), the SCTRWPG developed the 2001, 2006, 2011, and 2016 SCTRWPs, which the TWDB then integrated into the 2002, 2007, 2012, and 2017 SWPs, respectively. The 2021 SCTRWP, of which this executive summary is part, represents the fifth update of an RWP as presently required to occur on a 5 year cycle. The TWDB will integrate this 2021 SCTRWP into the 2022 SWP.

The chapters of the 2021 SCTRWP are listed below, separated into two volumes:

The planning process for the South Central Texas Region is summarized in Figure ES-2.

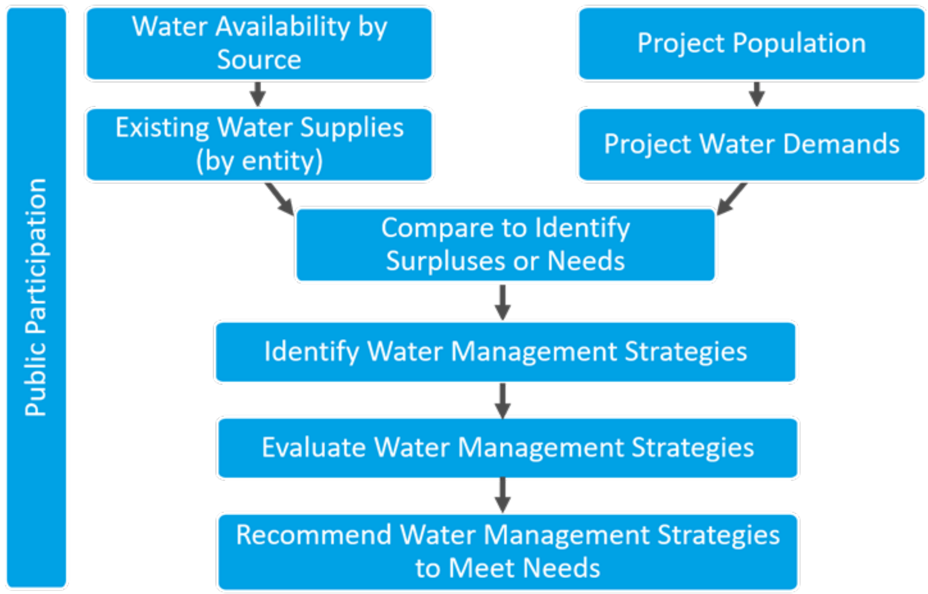

Figure ES-2 Regional Planning Process

ES.2 DESCRIPTION OF SOUTH CENTRAL TEXAS REGION

The South Central Texas Region includes counties that are located in whole or in part in the Rio Grande, Nueces, San Antonio, Guadalupe, Lavaca, and Colorado River Basins and the San Antonio-Nueces, Lavaca-Guadalupe, and Colorado-Lavaca Coastal Basins. Major urban population centers include the cities of San Antonio, Victoria, Seguin, New Braunfels, and San Marcos, which are located within Bexar, Victoria, Guadalupe, Comal, and Hays Counties, respectively. The regional economy is dominated by the trades and services and manufacturing sectors with much smaller, but significant, contributions from the agricultural and mining sectors. Physical terrain of the region ranges from the Hill Country of the Edwards Plateau to the coastal plains. Vegetational areas include the Edwards Plateau, South Texas Plains, Blackland Prairies, Post Oak Savannah, and Gulf Prairies and Marshes. Many species occur within the region that are listed by the U.S. Fish & Wildlife Service (USFWS) or Texas Parks & Wildlife Department (TPWD) as rare, threatened, or endangered. Several of the species listed as endangered occur in or near Comal and San Marcos Springs, the two largest springs in Texas. Average annual precipitation ranges from less than 23 inches in Dimmit County up to 38 inches in DeWitt County.

ES.3 POPULATION, WATER DEMANDS, EXISTING SUPPLIES, AND NEEDS

To develop water plans to meet future water needs, it is necessary to develop projections of future water demands for the region. Integrating information from the 2010 Census and reported water uses from around the state, the TWDB provided draft population and water demand projections for utility-based water user groups (WUGs) within the South Central Texas Region; previous planning cycles used political boundary-based population and water demand projections. In accordance with TWDB rules and contractual requirements, all regional water planning data are entered into the TWDB State Water

Planning Database (DB22), which synthesizes data into reports. The DB22 reports are included as Appendix 2-A in the 2021 SCTRWP.

By 2070, approximately 59 percent of the South Central Texas Region's total population is projected to reside in Bexar County. The counties with the largest anticipated population growth between 2020 and 2070 are Bexar, Comal, Guadalupe, and Hays Counties (Figure ES-3).

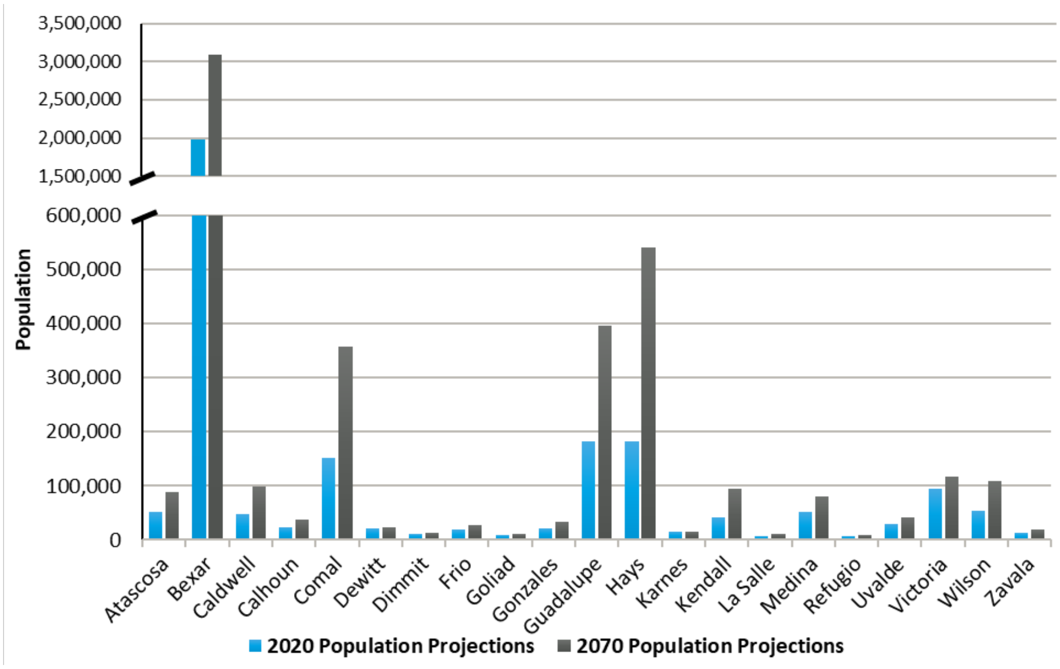

Figure ES-3 Population Projections by County (2020 and 2070)

Municipal water is fresh water used for drinking, sanitation, and other purposes in homes and commercial establishments of both cities and rural areas. A summary of water demand projections by use type is shown in Figure ES-4. Municipal population, water demands, existing supplies, and needs are shown in Table ES-1. Total municipal water demand in the South Central Texas Region in 2020 is expected to be 433,481 acre-feet per year (acft/yr), increasing to 700,477 acft/yr by 2070. Existing supplies range from 499,019 acft/yr in 2020 to 521,441 acft/yr in 2070. Municipal needs are projected to be 24,468 acft/yr in 2020, increasing to 216,255 acft/yr by 2070.

Industrial (manufacturing) water is fresh water used in the manufacture of industrial products. All industries in the region are projected to use 72,516 acft/yr of water in 2020 and 82,765 acft/yr in 2030 and remain at that level through 2070. Existing supplies for industries are 79,400 acft/yr in 2020 to 79,661 acft/yr by 2070. The projected needs for industrial use are 10,427 acft/yr in 2020, increasing to 13,073 acft/yr by 2050, and remain there through 2070. A regional summary of industrial water demands, existing supplies, and needs is shown on Figure ES-4 and in Table ES-1.

In the South Central Texas Region, the principal uses of water for mining are for the extraction of stone, clay, and petroleum (including fracking) and for sand and gravel washing. Mining demands in the region are projected to be 48,738 acft/yr of water in 2020 and 41,209 acft/yr in 2070. Existing supplies for mining range from 32,977 acft/yr in 2020 to 32,355 acft/yr by 2070. The projected needs for mining use are 15,921 acft/yr in 2020, decreasing to 9,180 acft/yr by 2070. A regional summary of mining water demands, existing supplies, and needs is shown on Figure ES-4 and in Table ES-1.

Seven counties (Atascosa, Bexar, Frio, Goliad, Guadalupe, Victoria, and Wilson) of the region use cooling and boiler feedwater in steam-electric power production. Steam-electric power generation in the region is projected to use 106,026 acft/yr of water in 2020 and remain constant through 2070. The existing supply for steam-electric power generation is 112,394 acft/yr for all decades. The projected needs for steam-electric power generation are 21,707 acft/yr for all decades. A regional summary of steam-electric water demands, existing supplies, and needs is shown on Figure ES-4 and in Table ES-1.

Livestock water is fresh water used in the raising of cattle, chickens, and other animals. Total livestock demand in the region is projected to be 31,504 acft/yr in all decades. Existing water supply for livestock is projected to be 32,456 acft/yr in 2020, decreasing to 32,192 acft/yr in 2070. There are no needs associated with the livestock use category in the 2021 SCTRWP. A regional summary of livestock water demands, existing supplies, and needs is shown in Figure ES-4 and in Table ES-1.

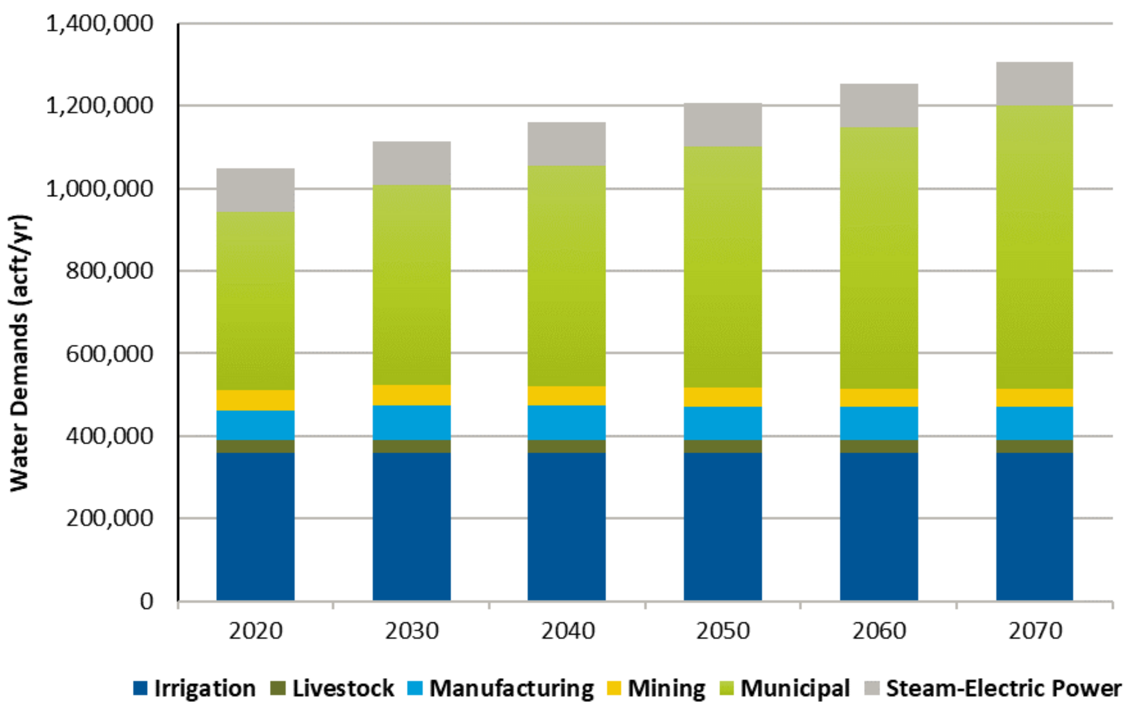

Figure ES-4 Water Demand Projections by Use Sector (2020 to 2070)

Table ES-1 Water User Group Category Summary

REGION L	2020	2030	2040	2050	2060	2070
Municipal						
Population	3,013,139	3,491,337	3,937,489	4,357,274	4,794,505	5,219,393
Demands (acft/yr)	433,481	485,978	536,645	587,919	644,624	700,477
Existing Supplies (acft/yr)	499,019	502,498	508,713	513,832	519,723	521,441
Needs (acft/yr)*	(24,468)	(48,817)	(83,667)	(121,804)	(167,216)	(216,255)
Manufacturing						
Demands (acft/yr)	72,516	82,765	82,765	82,765	82,765	82,765
Existing Supplies (acft/yr)	79,400	79,864	79,749	79,703	79,683	79,661
Needs (acft/yr)*	(10,427)	(12,940)	(13,041)	(13,073)	(13,073)	(13,073)
Mining						
Demands (acft/yr)	48,738	49,976	48,601	44,647	40,831	41,209
Existing Supplies (acft/yr)	32,977	33,326	33,655	32,471	30,561	32,355
Needs (acft/yr)*	(15,921)	(16,809)	(15,105)	(12,334)	(10,454)	(9,180)
Steam-Electric Power						
Demands (acft/yr)	106,026	106,026	106,026	106,026	106,026	106,026
Existing Supplies (acft/yr)	112,394	112,394	112,394	112,394	112,394	112,394
Needs (acft/yr)*	(21,707)	(21,707)	(21,707)	(21,707)	(21,707)	(21,707)
Livestock						
Demands (acft/yr)	31,504	31,504	31,504	31,504	31,504	31,504
Existing Supplies (acft/yr)	32,456	32,456	32,182	32,183	32,192	32,192
Needs (acft/yr)*	0	0	0	0	0	0
Irrigation						
Demands (acft/yr)	358,699	358,699	358,566	358,466	358,147	358,147
Existing Supplies (acft/yr)	245,514	244,754	242,525	240,489	239,028	235,868
Needs (acft/yr)*	(113,185)	(113,945)	(116,041)	(117,977)	(119,119)	(122,279)
Region Totals						
Population	3,013,139	3,491,337	3,937,489	4,357,274	4,794,505	5,219,393
Demands (acft/yr)	1,050,964	1,114,948	1,164,107	1,211,327	1,263,897	1,320,128
Existing Supplies (acft/yr)	1,001,760	1,005,292	1,009,218	1,011,072	1,013,581	1,013,911
Needs (acft/yr)*	(203,707)	(232,188)	(267,624)	(305,017)	(350,046)	(401,027)

*The calculated needs (negative value indicated by parentheses) 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. Before aggregating the difference between supplies and demands to the WUG category level, calculated surpluses are updated to zero so that only WUGs with needs are included with the needs totals.

The TWDB irrigation water use data show annual use for irrigation to field crops, vineyards, orchards, and self-supplied golf courses in South Central Texas. Irrigation water demands for the region is projected to be 358,699 acft/yr of water in 2020, decreasing slightly to 358,147 acft/yr by 2070. Existing supplies for irrigation are 245,514 acft/yr in 2020 and 235,868 acft/yr in 2070. The projected needs for irrigation are 113,185 acft/yr in 2020, increasing to 112,279 acft/yr by 2070. A regional summary of irrigation water demands, existing supplies, and needs is shown in Table ES-1.

Total projected water demand for the South Central Texas Region is the sum of water demand projections for municipal, industrial, steam-electric power, mining, irrigation, and livestock uses. Projected water demands are expected to grow by 269,164 acft/yr (25.6 percent) during the 50 year planning horizon (2020 through 2070), while existing supply is expected to increase by 11,246 acft/yr (1.2 percent) over the same time period. Water needs are expected to double from 203,707 acft/yr in 2020 to 401,027 acft/yr in 2070.

In accordance with TWDB guidelines, the SCTRWPG identified nine major water providers (MWPs) that supply or plan to supply water in the South Central Texas Region. The SCTRWPG defines MWPs as any wholesale water provider (WWP), or municipal WUG including river authorities and irrigation districts that has water demands greater than 20,000 acft/yr by 2070. These MWPs are listed in Table ES-2, along with a general description of their service areas. The SCTRWPG has worked with each of the MWPs in an effort to quantify their projected demands, which typically include the demands of several cities, utilities, and other WUGs.

Table ES-2 Major Water Providers and Service Areas

MAJOR WATER PROVIDER	PRIMARY SERVICE AREAS
San Antonio Water System (SAWS)	Bexar County
Canyon Regional Water Authority (CRWA)	Bexar, Caldwell, Comal, Guadalupe, Hays, and Wilson Counties
Cibolo Valley Local Government Corporation (CVLGC)	Bexar, Comal, and Guadalupe Counties
Guadalupe-Blanco River Authority (GBRA)	Kendall, Comal, Hays, Caldwell, Guadalupe, Gonzales, DeWitt, Victoria, Refugio, and Calhoun Counties
Schertz-Seguin Local Government Corporation (SSLGC)	Schertz, Seguin, Selma, Universal City, Garden Ridge, and Springs Hill Water Supply Corporation (WSC)
Alliance Regional Water Authority (ARWA)	Planned: City of Buda, City of Kyle, County Line Special Utility District (SUD), Crystal Clear SUD, Green Valley SUD, San Marcos
New Braunfels	New Braunfels
San Marcos	San Marcos
Victoria	Victoria

A second-tier needs analysis was performed to identify water needs by WUG after implementation of conservation and direct reuse strategies. The analysis is presented in a TWDB DB22 Report entitled

"Region L Water User Group (WUG) Second-Tier Identified Water Needs" in Appendix 2-A. Second-tier needs analyses for MWPs is provided in Chapter 4.

ES.4 WATER SUPPLY SOURCES

Five major and five minor aquifers supply groundwater to the South Central Texas Region. The five major aquifers are the Edwards-Balcones Fault Zone (including the Barton Springs Segment), Carrizo-Wilcox, Trinity, Gulf Coast, and Edwards-Trinity (Plateau) Aquifers. Minor aquifers include the Sparta, Queen City, Ellenburger-San Saba, Hickory, and Yegua-Jackson Aquifers. Additionally, several other aquifers supply groundwater in the region, including the Austin Chalk, Buda Limestone, San Marcos River Alluvium, and Leona Gravel Aquifers. The region is located in parts of the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca River Basins and parts of the Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins. The existing surface water supplies of the region include storage reservoirs and run-of-river water rights.

Groundwater supplies in the region are based on the modeled available groundwater (MAG) estimates on an average annual basis to achieve a desired future condition (DFC) established by a groundwater management area (GMA) pursuant to House Bill (HB) 1763 of the 79th Texas Legislature as well as the permitting authority of groundwater conservation districts. In the case of the Edwards Aquifer, HB1477 of the 73rd Texas Legislature created the Edwards Aquifer Authority (EAA) and charged it with issuing permits for non-exempt wells, limiting withdrawals to 572,000 acft/yr, and enforcing water management practices, procedures, and methods to ensure that the continuous minimum springflows of the Comal Springs and the San Marcos Springs are maintained to protect endangered and threatened species to the extent required by federal law. In 2013, the Edwards Aquifer Habitat Conservation Plan (HCP) was approved, which included four components that affect water supply from the Edwards Aquifer: (1) the voluntary irrigation suspension program option, (2) additional municipal conservation measures, (3) SAWS aquifer storage and recovery (ASR) tradeoff, and (4) emergency Stage V critical period reductions.[1] For water supply planning purposes in the 2021 SCTRWP, it is assumed that existing supplies from the Edwards Aquifer are based on full implementation of the HCP. The estimated reliable drought year availability from the EAA portion of the Edwards Aquifer is 243,401 acft/yr, including estimated exempt federal and domestic and livestock production.

Surface water resources consist of five major reservoirs: Medina Lake, Braunig Lake, Calaveras Lake, Canyon Reservoir, and Coleto Creek Reservoir. In addition to those associated with major reservoirs, surface water rights have been issued by the TCEQ and predecessor agencies to individuals, cities, industries, and water districts and authorities for diversion from flowing streams of the South Central Texas Region. For the Nueces River Basin part of the South Central Texas Region, run-of-river water rights total more than 120,000 acft/yr and are primarily used for irrigation purposes. Consumptive run-of-river rights in the Guadalupe-San Antonio River Basin total over 446,000 acft/yr and are used primarily for irrigation, municipal, and industrial purposes.

[1] RECON Environmental, Inc., et al. "Edwards Aquifer Recovery Implementation Program – Habitat Conservation Plan." December 2011.

ES.5 SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING PROJECTED WATER NEEDS

The SCTRWPG identified 88 individual water user groups that showed shortages or needs during drought-of-record supply conditions during the 2020 to 2070 planning period. Of the 21 counties in the South Central Texas Region, all have water user groups with projected water needs (shortages) over the planning horizon. A TWDB report presenting the socioeconomic impacts of not meeting needs is included as Appendix 6-A. In summary, Region L could experience $16.57 billion in income losses and almost 100,514 job losses in 2020 if no water management strategies (WMSs) are implemented to meet projected shortages. Similarly, Region L could experience $9.38 billion in income losses and about 94,978 job losses in 2070 if no WMSs are implemented to meet projected shortages. It is worth noting that due to the ongoing nature of plan development, the water supply needs utilized for the socioeconomic analysis may differ slightly from the identified water supply needs in the Initially Prepared Plan and the final adopted RWP.

ES.6 WATER MANAGEMENT STRATEGIES TO MEET PROJECTED WATER NEEDS

The regional water planning process includes developing projections of water needs for each WUG, identifying potentially feasible WMSs, and evaluating such strategies in accordance with TWDB rules. Each potentially feasible WMS was evaluated on the basis of quantity of water, reliability, financial costs, and environmental impacts. Further information regarding how WMSs were evaluated, and detailed evaluations for each potentially feasible WMS can be found in Section 5.2 in Volume 2.

Evaluated WMSs in the SCTRWP are limited to the infrastructure and costs that are required to develop and convey increased water supplies from available water supply sources, and associated treatment as required by end WUGs. Conservation WMSs (i.e. demand reduction via Advanced Water Conservation and Drought Management WMSs) are also included to maximize water savings potential for Region L. These two overarching WMS categories are utilized in conjunction to assist in resolving the needs of Region L WUGs and are summarized in subsequent sections of the Executive Summary.

ES.7 SOUTH CENTRAL TEXAS REGIONAL WATER PLAN

The 2021 SCTRWP includes 33 recommended WMSs that emphasize: water conservation; new groundwater; new surface water supplies; new off-channel reservoirs; groundwater desalination; reuse; and ASR. WMSs recommended to meet projected needs in the South Central Texas Region could produce new supplies in excess of 767,510 acft/yr by 2070. The 2021 SCTRWP does not include any alternative WMSs. The supply sources for the WMSs are proportionally displayed in Figure ES-5. A summary of the recommended WMSs with supplies by decade and annual unit costs is included in Table ES-3.

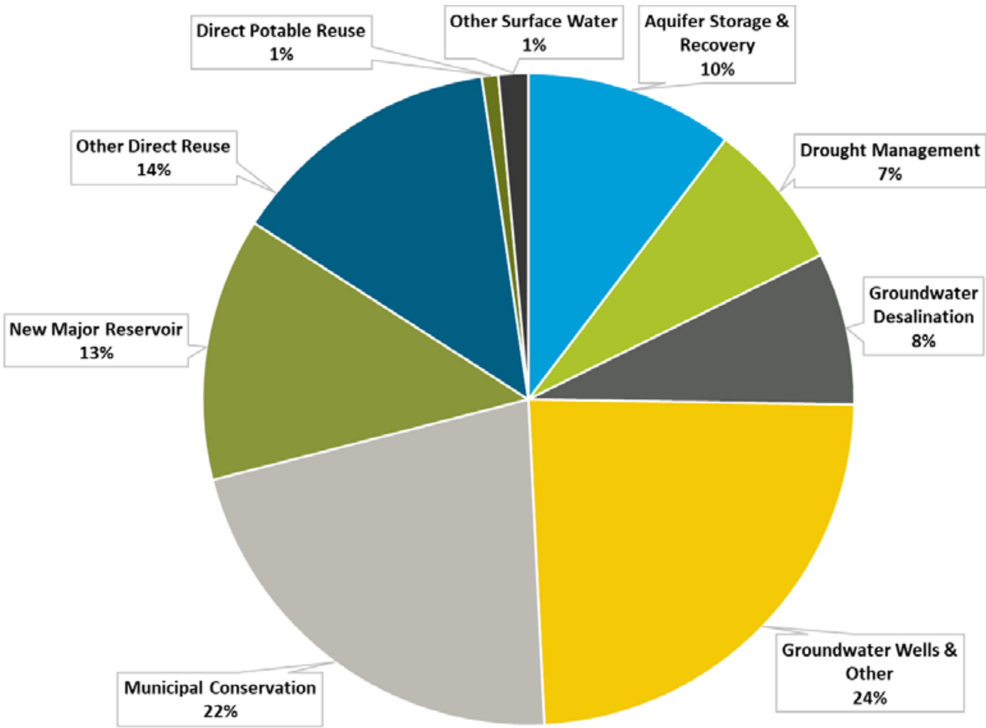

Figure ES-5 Water Management Strategy Supplies by Type in 2070

The following provides a summary of recommended WMSs with volumes and unit costs in 2070, organized by supply source.

- Municipal Conservation
  - Advanced Water Conservation - Projected to save 167,148 acft/yr in 2070 with an average annual cost of $725/acft
  - SAWS Advanced Meter Infrastructure – Projected to save 426 acft/yr in 2020 with an average annual cost of $52,554/acft
- Groundwater Wells
  - Edwards Transfers – Projected to supply 5,906 acft/yr in 2070 with an annual unit cost of $1,134
  - Local Groundwater – Projected to supply 28,240 acft/yr in 2070 with an average annual cost of $306/acft
  - SAWS Expanded Local Carrizo Project – Projected to supply 21,000 acft/yr in 2070 with a unit cost of $42/acft
  - ARWA/GBRA Project (Phase 1) – Projected to supply 30,000 acft/yr in 2070 with an annual unit cost of $358/acft for ARWA and $283/acft for GBRA

- ARWA Project (Phase 2) – Projected to supply 20,999 acft/yr in 2070 with an annual unit cost of $199/acft
- CRWA Wells Ranch Project Phase 3 – Projected to supply 7,000 acft/yr in 2070 with an annual unit cost of $849/acft
- SSLGC Expanded Carrizo Project – Projected to supply 6,000 acft/yr in 2070 with an annual unit cost of $321/acft
- NBU Trinity Well Field Expansion – Projected to supply 3,360 acft/yr in 2070 with an annual unit cost of $284/acft
- City of Victoria Groundwater-Surface Water Exchange – Projected to supply 8,544 acft/yr in 2070 with no costs due to existing infrastructure
- Martindale WSC Alluvial Well – Projected to supply 240 acft/yr in 2070 with an annual unit cost of $96/acft
- Maxwell WSC Trinity Well Field – Projected to supply 230 acft/yr in 2070 with an annual unit cost of $1,822/acft
- County Line SUD Trinity – Projected to supply 740 acft/yr in 2070 with an annual unit cost of $1,078/acft

- Groundwater Desalination
  - SAWS Expanded Brackish Groundwater Project – Projected to supply 70,160 acft/yr in 2070 with an annual unit cost of $952/acft
  - SSLGC Expanded Brackish Wilcox Project – Projected to supply 5,000 acft/yr in 2070 with an annual unit cost of $663/acft
  - SS WSC Brackish Wilcox Groundwater Project – Projected to supply 1,120 acft/yr in 2070 with an annual unit cost of $1,456/acft
  - County Line SUD Brackish Edwards Project – Projected to supply 1,500 acft/yr in 2070 with an annual unit cost of $2,301/acft
- Reuse
  - ARWA Project (Phase 3) – Projected to supply 5,494 acft/yr via direct potable reuse in 2070 with an annual unit cost of $2,000/acft
  - Recycled Water Strategies – Projected to supply 52,388 acft/yr in 2070 with an average annual unit cost of $862/acft
- Surface Water
  - GBRA Lower Basin Storage Project – Projected to supply 59,780 acft/yr in 2070 with an annual unit cost of $49/acft
  - GBRA Lower Basin New Appropriation – Projected to supply 40,500 acft/yr in 2070 with an annual unit cost of $160/acft
  - GBRA Victoria County Steam-Electric Project – Projected to use 23,925 acft/yr in 2070 from the GBRA Lower Basin New Appropriation WMS, with an annual unit cost of $562/acft

- ASR
  - GBRA Mid-Basin Project (Phase 2) – Projected to supply 27,000 acft/yr in 2070 with an annual unit cost of $1,492/acft
  - NBU ASR Project – Projected to supply 10,818 acft/yr in 2070 with an annual unit cost of $207/acft
  - City of Victoria ASR Project – Projected to supply 7,900 acft/yr in 2070 with an annual unit cost of $47/acft

Table ES-3 Water Management Strategy Supplies by Decade (acft/yr)

NO.	WMS	2020	2030	2040	2050	2060	2070	ANNUAL UNIT COST ($/ACFT)
1.	Advanced Water Conservation	29,382	64,038	96,760	120,884	143,799	167,148	Varies[1]
2.	Drought Management[2]	14,176	31,476	45,677	49,377	53,109	56,588	94
3.	Edwards Transfers	5,328	5,814	5,622	5,795	5,770	5,906	1,242
4.	Local Groundwater	11,084	15,226	19,913	22,653	26,388	28,240	Varies
5.	Local Groundwater Conversions[3]	--	--	--	--	--	--	--
6.	Surface Water Rights	--	--	--	--	--	--	--
7.	Balancing Storage	--	--	--	--	--	--	--
8.	Facilities Expansion	7,914	96,288	99,217	98,454	95,834	95,675	Varies
9.	Recycled Water Strategies	3,316	10,443	11,003	26,268	36,828	52,388	Varies
10.	SAWS Expanded Local Carrizo Project	-	-	21,000	21,000	21,000	21,000	120
11.	SAWS Expanded Brackish Groundwater Project	-	-	20,160	20,160	70,160	70,160	1,269
12.	ARWA/GBRA Project (Phase 1)	30,000	30,000	30,000	30,000	30,000	30,000	1,076
13.	ARWA Project (Phase 2)	-	-	20,999	20,999	20,999	20,999	635
14.	ARWA Project (Phase 3)	-	-	-	-	5,494	5,494	2,001
15.	GBRA Mid-Basin Project (Phase 2)	-	27,000	27,000	27,000	27,000	27,000	1,492
16.	GBRA Lower Basin Storage Project	59,780	59,780	59,780	59,780	59,780	59,780	110
17.	GBRA Lower Basin New Appropriation	40,500	40,500	40,500	40,500	40,500	40,500	658

NO.	WMS	2020	2030	2040	2050	2060	2070	ANNUAL UNIT COST ($/ACFT)
18.	GBRA Victoria County Steam-Electric Project	23,925	23,925	23,925	23,925	23,925	23,925	552
19.	CRWA Wells Ranch Phase 3 Project	3,500	7,000	7,000	7,000	7,000	7,000	1,330
20.	CRWA Siesta Project	-	-	-	-	5,042	5,042	2,470
21.	CRWA Brackish Carrizo-Wilcox Project	-	14,700	14,700	14,700	14,700	14,700	1,595
22.	CVLGC Carrizo Project	-	10,000	10,000	10,000	10,000	10,000	1,230
23.	SSLGC Expanded Carrizo Project	6,000	6,000	6,000	6,000	6,000	6,000	1,207
24.	SSLGC Expanded Brackish Wilcox Project	-	-	5,000	5,000	5,000	5,000	663
25.	NBU ASR Project	10,818	10,818	10,818	10,818	10,818	10,818	462
26.	NBU Trinity Well Field Expansion	-	3,360	3,360	3,360	3,360	3,360	685
27.	City of Victoria ASR Project	7,900	7,900	7,900	7,900	7,900	7,900	385
28.	City of Victoria Groundwater-Surface Water Exchange	8,544	8,544	8,544	8,544	8,544	8,544	N/A
29.	SS WSC Brackish Wilcox Groundwater Project	-	-	-	-	1,120	1,120	2,911
30.	Martindale WSC New Alluvial Well	-	240	240	240	240	240	463
31.	Maxwell WSC Trinity Well	-	-	230	230	230	230	4,261
32.	County Line SUD Trinity	-	-	-	500	740	740	2,888
33.	County Line SUD Brackish Edwards	-	-	-	500	1,000	1,500	3,610

[1] Annual unit costs varied by WUG service area description: Urban - $600/acft; Suburban - $681/acft; and $770/acft

[2] Supplies in decades 2030 through 2070 only relate to SAWS

[3] Supply volume is accounted for in Local Groundwater WMS

The SCTRWPG did not identify alternative management strategies for the 2021 SCTRWP planning cycle.

The 2021 SCTRWP did not recommend WMSs to meet some mining, manufacturing, steam-electric and irrigation needs, as strategies to meet those needs may be cost-prohibitive. As shown in the TWDB socio-economic impact analyses in Chapter 6, however, these unmet manufacturing, mining, irrigation, and steam-electric power needs would represent only 1 percent of the potential income losses in 2070, considering projected shortages in all water use sectors. Table ES-4 summarizes the unmet needs of the region by use type. There are no unmet municipal needs included in the 2021 SCTRWP.

Table ES-4 Summary of Unmet Needs (acft/yr)

	2020	2030	2040	2050	2060	2070
Municipal	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Manufacturing	7,641	0	0	0	0	0
Mining	10,332	10,003	8,227	4,613	1,503	229
Steam-Electric Power	18,925	0	0	0	0	0
Livestock	0	0	0	0	0	0
Irrigation	136,868	138,055	140,052	142,220	151,264	154,615
Total	**173,736**	**148,058**	**148,279**	**146,833**	**152,767**	**154,844**

Implementation of the 2021 SCTRWP will result in the development of new water supplies that will be reliable in the event of a repeat of the most severe drought of record. The cumulative supply of the recommended WMSs may include an amount of supply in excess of the amount needed to meet the regional needs considered necessary by the SCTRWPG to allow for uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability.

Costs associated with the implementation and long-term operations and maintenance of WMSs have been estimated in accordance with TWDB rules and general guidelines and reflect regional water treatment capacity and balancing storage facilities sufficient to meet peak daily and seasonal water demands in larger urban areas.

ES.8 WATER PLAN SUMMARY

Recommended WMSs to meet the projected needs of each WUG and WWP in the South Central Texas Region are presented in Sections 5.3 and 5.4, respectively, and are also summarized in tables generated in TWDB DB22 Reports found in Appendix 2-A.

FINAL PLAN

CHAPTER 1: PLANNING AREA DESCRIPTION

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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List of Abbreviations

acft	Acre-Foot
acft/yr	Acre-Foot per Year
ARWA	Alliance Regional Water Authority
ASR	Aquifer Storage and Recovery
BFZ	Balcones Fault Zone
CCMA	Cibolo Creek Municipal Authority
cfs	Cubic Feet per Second
CPM	Critical Period Management
CRWA	Canyon Regional Water Authority
CVLGC	Cibolo Valley Local Government Corporation
DCP	Drought Contingency Plan
DOR	Drought of Record
EAA	Edwards Aquifer Authority
EAHCP	Edwards Aquifer Habitat Conservation Plan
EARIP	Edwards Aquifer Recovery Implementation Program
EPA	Environmental Protection Agency
FRAT	Flow Regime Application Tool
GAM	Groundwater Availability Model
GBRA	Guadalupe-Blanco River Authority
GCD	Groundwater Conservation District
GPCD	Gallons per Capita per Day
HB	House Bill
HCPUA	Hays-Caldwell Public Utility Agency
IH-35	Interstate Highway 35
MAG	Modeled Available Groundwater
mg/L	Milligrams per Liter
mgd	Million Gallons per Day
MWP	Major Water Provider
NBU	New Braunfels Utilities
RWPG	Regional Water Planning Group
SAWS	San Antonio Water System
SCTRWP	South Central Texas Regional Water Plan
SCTRWPG	South Central Texas Regional Water Planning Group
SSLGC	Schertz-Seguin Local Government Corporation
SUD	Special Utility District

TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TWDB	Texas Water Development Board
USFWS	US Fish and Wildlife Service
WAM	Water Availability Model
WCID	Water Control and Improvement District
WMS	Water Management Strategy
WSC	Water Supply Corporation
WUG	Water User Group
WWP	Wholesale Water Provider

CHAPTER 1: PLANNING AREA DESCRIPTION

1.1 BACKGROUND

Water supplies of the South Central Texas Region are obtained from the Edwards-Balcones Fault Zone, Carrizo-Wilcox, Trinity, Edwards-Trinity (Plateau), and Gulf Coast Aquifers; from six minor aquifers (Queen City, Sparta, Austin Chalk, Buda Limestone, Leona Gravel, and Yegua-Jackson); and from the rivers, streams, and reservoirs within the region. The water supply picture of the region is complex, involving intricate relationships between surface water and groundwater. The Edwards-Balcones Fault Zone Aquifer (hereinafter referred to as the Edwards Aquifer) supplied approximately 42 percent of the total water used in the South Central Texas Region in 2010. Water demands for the counties using significant supplies from the Edwards Aquifer are projected to grow at a rate of approximately 0.76 percent per year between 2020 and 2040. However, not even the present level of use can be sustained through drought periods while maintaining levels of flows at Comal and San Marcos Springs adequate to support habitats of threatened and endangered species and also meet downstream water rights. Demands on the Trinity and Carrizo-Wilcox (hereinafter referred to as the Carrizo Aquifer) Aquifers of the South Central Texas Region exceed recharge in some areas. In other areas that now depend upon the Carrizo and Gulf Coast Aquifers, present withdrawal rates are substantially less than recharge. Throughout the region, there is an awareness of the dynamic interrelationships of surface water and groundwater and of the importance of maintaining instream flows and freshwater inflows to bays and estuaries.

Operations of the largest existing surface water supply sources in the region are also directly linked to the Edwards Aquifer. Dependable supplies from Canyon Reservoir for municipal and industrial customers are a function of springflows from the Edwards Aquifer, since inflow passage through Canyon Reservoir is necessary to meet downstream water rights when springflows drop below certain levels. Storage in the Medina Lake system contributes significantly to recharge of the Edwards Aquifer, and reservoirs used for steam-electric power generation (Coleto Creek, Calaveras, and Braunig) and hydropower generation are dependent upon springflows and/or treated municipal effluent that originate from the Edwards Aquifer. Surface water supplies available to the region are also a function of recharge to and withdrawal from the aquifers, as are the quantities of streamflows permitted for use in counties of the Nueces, San Antonio, and Guadalupe River Basins outside of the South Central Texas Region. These factors, together with numerous potential water management strategies (WMSs) available to the South Central Texas Region, are considered in the regional water planning process.

1.2 PHYSICAL DESCRIPTION OF THE SOUTH CENTRAL TEXAS REGION

The South Central Texas Region consists of all or portions of 21 counties located in the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca River Basins, and the Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins (Figure 1-1;Table 1-1). The physical terrain of the region ranges from the Hill Country of the Edwards Plateau to the coastal plains. A general description of the region, including geology, climate, water resources, vegetational areas, and major water demand centers, is presented in the following sections.

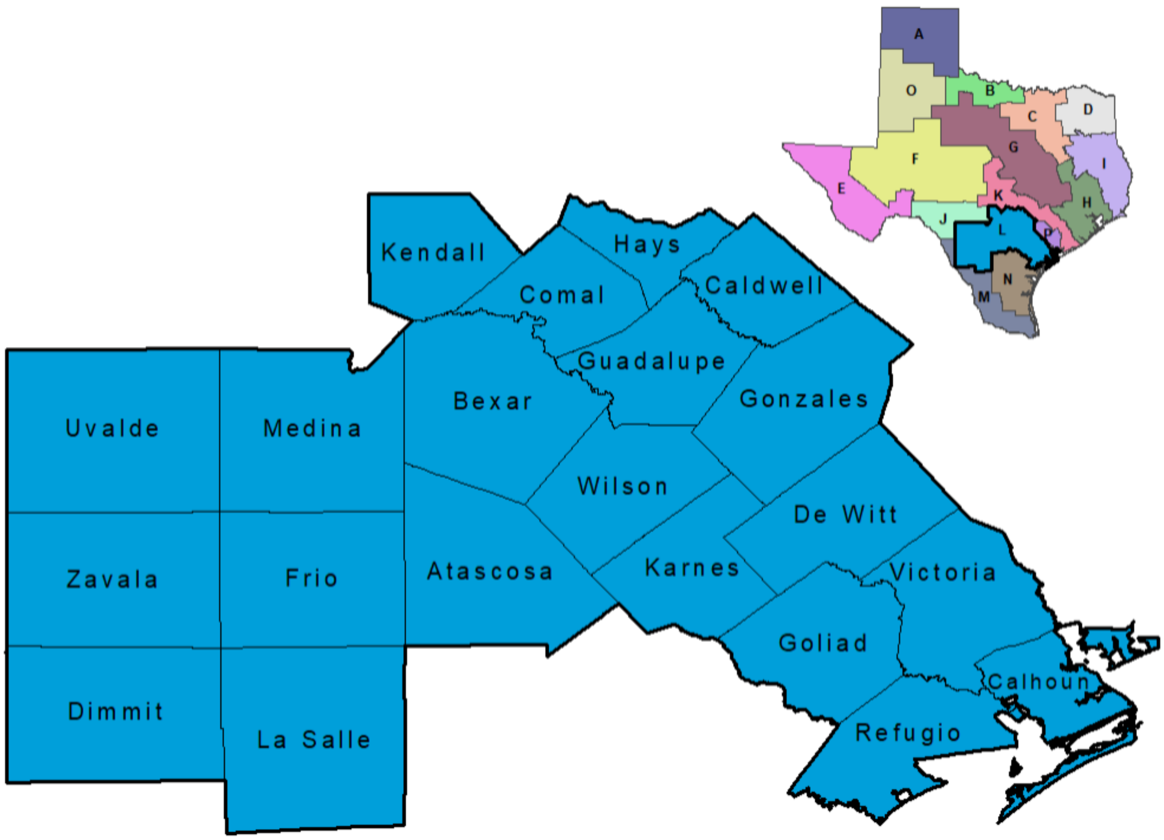

Figure 1-1 **Counties of the South Central Texas Regional Water Planning Area**

Table 1-1 **List of Counties by River Basin and Edwards Aquifer Area**

COUNTY	EDWARDS AQUIFER[1]	NUECES BASIN	SAN ANTONIO BASIN	GUADALUPE BASIN	LOWER COLORADO BASIN	COLORADO-LAVACA COASTAL BASIN	LAVACA BASIN	LAVACA-GUADALUPE COASTAL BASIN	SAN ANTONIO-NUECES COASTAL BASIN	RIO GRANDE
Atascosa	●	●	●							
Bexar	●	●	●							
Caldwell	●			●	●					
Calhoun				●		●		●	●	
Comal	●		●	●						
Dewitt			●	●			●	●		
Dimmit		●								●
Frio		●								
Goliad			●	●					●	
Gonzales				●			●			
Guadalupe	●		●	●						
Hays (Part)	●			●						

COUNTY	EDWARDS AQUIFER[1]	NUECES BASIN	SAN ANTONIO BASIN	GUADALUPE BASIN	LOWER COLORADO BASIN	COLORADO-LAVACA COASTAL BASIN	LAVACA BASIN	LAVACA-GUADALUPE COASTAL BASIN	SAN ANTONIO-NUECES COASTAL BASIN	RIO GRANDE
Karnes		•	•	•					•	
Kendall			•	•	•					
La Salle		•								
Medina	•	•	•							
Refugio			•						•	
Uvalde	•	•								
Victoria			•	•			•	•		
Wilson		•	•	•						
Zavala		•								

Note: A bullet point indicates that all or part of the county is located in the river or coastal basin named in the column heading.

[1] Edwards Aquifer is the area within the Edwards Aquifer Authority (EAA) statutory boundaries.

1.2.1 Climate[1]

The South Central Texas Region lies in three climatic divisions of Texas: the Edwards Plateau, the South Central, and the Upper Coast. The climate of the region is classified as humid subtropical. Summers are usually hot and humid, while winters are often mild and dry. The hot weather persists from late May through September, accompanied by prevailing southeasterly winds. Occasional summer thunderstorms produce much of the annual precipitation within the region. The cool season, beginning about the first of November and extending through March, is also typically the driest season of the year. Winters are ordinarily short and mild, with most of the precipitation falling as drizzle or light rain. Any accumulation of snow is a rare occurrence. Polar air masses, which penetrate the region in winter, bring northerly winds and sharp drops in temperature for short periods of time.

In the coastal region, the climate is dominated by proximity to the Gulf of Mexico and characterized by prevailing southeasterly winds. During the long humid summers, high daytime temperatures, which are common in inland areas, are moderated in coastal areas by the Gulf breeze.

Mean annual precipitation in the region ranges from a high of 41 inches per year in the Colorado-Lavaca River Basin in the southeastern part of the region, to a low of 23 inches per year in the Nueces River Basin in the west (Table 1-2). There is a general trend of decreasing precipitation from the eastern, coastal portions of the region to western inland portions.

Although mean annual temperatures are basically uniform throughout the region, there are some marked seasonal variations, which lead to widely varied values for annual net reservoir surface evaporation. The values for annual net reservoir surface evaporation range from a high of 4.7 feet per year in the southwestern portion of the region to a low of 2.5 feet in the eastern portion of the region.

The South Central Texas Region is subject to the threat of hurricanes each year from mid-June through the end of October, and, in those parts of the region along and near the coastline, the hazard of hurricane tides is prevalent. Although hurricane winds and tornadoes spawned by hurricanes cause extensive damage and occasional loss of life, surveys of hurricanes reaching the Texas Coast indicate that storm tides cause by far the greatest destruction and largest number of deaths. Elsewhere, in the inland areas of the region, the greatest concern with regard to hurricanes is the damage that results from winds and flooding. Records dating back to 1871 show that, on average, a tropical storm or hurricane has affected the region once every three years.

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[1] Texas Water Development Board. “Continuing Water Resources Planning and Development for Texas.” May 1977.

Table 1-2 Climatological Data

RIVER BASIN	PRECIPITATION			TEMPERATURE					ANNUAL NET RESERVOIR SURFACE EVAPORATION (INCHES)
					MEAN DAILY MINIMUM		MEAN DAILY MAXIMUM		
	MEAN ANNUAL (INCHES)	WETTEST MONTH(S)	DRIEST MONTH(S)	MEAN ANNUAL (° F)	JANUARY (° F)	JULY (° F)	JANUARY (° F)	JULY (° F)	
Rio Grande	25	Sept.	Mar.	74	48	74	71	96	65
Nueces	23	May, Sept.	Mar.	71	40	72	65	98	45
San Antonio	30	Sept.	Mar., Dec.	70	41	74	64	96	31
Guadalupe	32	May, Sept.	Mar.	79	37	71	60	95	37
Colorado	34	May, Sept.	Jan.	68	39	74	60	96	35
Lavaca	38	May, Sept.	Mar., July	70	41	72	65	98	24
Lavaca-Guadalupe	37	Sept.	Mar., July	70	44	76	64	94	25
San Antonio-Nueces	33	Sept.	Mar.	71	43	73	65	96	30
Colorado-Lavaca	41	Sept.	Mar., July	70	43	78	64	91	20

Source: Texas Water Development Board. "Continuing Water Resources Planning and Development for Texas." May 1977.

1.2.2 General Geology

The Hill Country area of the South Central Texas Region is underlain by Cretaceous Age limestone, which forms the Edwards Plateau. East and south of the plateau are upper Cretaceous chalk, limestone, dolomite, and clay, with the extensive Balcones Fault Zone System marking the boundary between the Edwards Plateau and the Gulf Coastal Region. The entire sequence dips gently toward the southeast.

A Tertiary Age sequence of southeasterly dipping sand, silts, clay, glauconite, volcanic ash, and lignite overlie the Cretaceous Age strata. The primary water-bearing unit of this sequence is the Carrizo Aquifer. A sequence of clay, sand, caliche, and conglomerate of the Pliocene Age Goliad Formation underlie the coastal areas of the region.

Overlying the Goliad Formation is the Quaternary Age Lissie Formation, which consists of sand, silt, clay and minor amounts of gravel. Clay, silt, and fine-grained sand of the Beaumont Formation overlie the Lissie Formation. Throughout the region, alluvial sediments of Recent Age occur along streams and coastal areas.

1.2.3 Vegetational Areas

Biologically, the South Central Texas Region is a region of transition from the lowland forests of the southeastern United States to the arid grasslands of the western uplands and thornscrub to the south.

The landscape consists of dendritic networks of wooded stream corridors typically populated by eastern species that dissect upland grasslands, and savannas that harbor western species. The vegetational areas or ecoregions containing portions of the South Central Texas Region are the Edwards Plateau, Southern Texas Plains, Texas Blackland Prairies, East Central Texas Plains, and the Western Gulf Coastal Plain (Figure 1-2). Each ecoregion is described below.

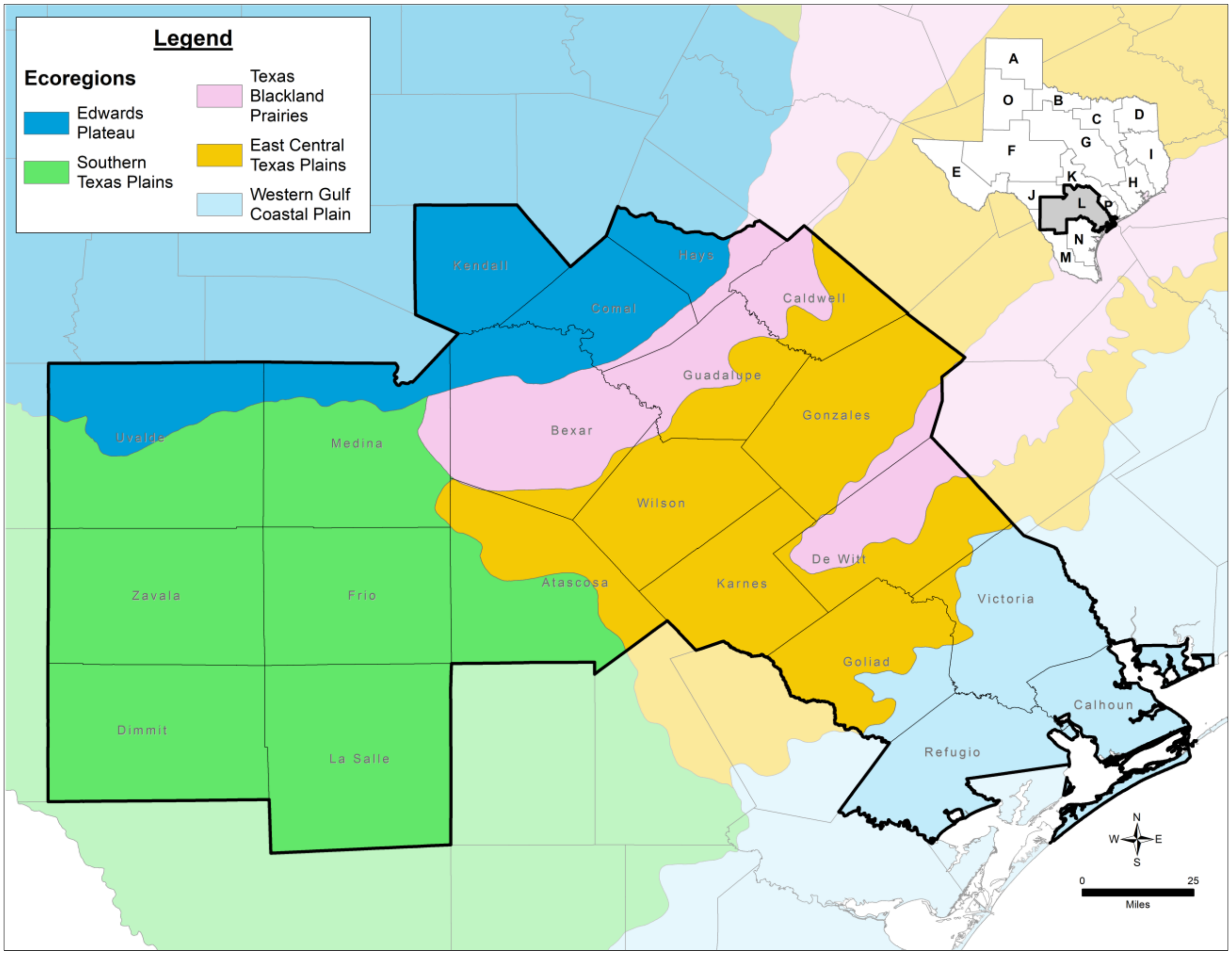

Figure 1-2 **Ecoregions**

1.2.3.1 Edwards Plateau

In the South Central Texas Region, the Edwards Plateau vegetational area includes all of Kendall County, the northern portions of Uvalde, Medina, Bexar, and Comal counties, and the southwestern portion of Hays County located within the planning area. This limestone-based area is characterized by springfed, perennially flowing streams that originate in its interior and flow across the Balcones Escarpment, which bounds it on the south and east. This area is also characterized by the occurrence of numerous ephemeral streams that are important conduits of storm runoff, which contributes to the recharge of the Edwards Aquifer. The soils are shallow, ranging from sands to clays, and are calcareous in reaction. This area is predominantly rangeland, with cultivation confined to limited areas having deeper soils.

The bald cypress (*Taxodium distichum*) grows significantly along the perennially flowing streams. Separated by many miles from cypress growth of the moist Southern Forest Belt, they constitute one of Texas' several "islands" of vegetation.

The principal grasses of the clay soils are several species of bluestem (*Schizachyrium* and *Andropogon* spp.), gramas (*Bouteloua* spp.), Indiangrass (*Sorghastrum nutans*), common curly mesquite (*Hilaria belangeri*), buffalograss (*Buchloe dactyloides)*, and Canadian wild rye (*Elymus canadensis*). The rocky areas support tall or mid-grasses with an overstory of live oak (*Quercus virginiana*) and other oaks (*Q. fusiformis, Q. buckleyi, Q. sinuata* var. *breviloba*), cedar elm (*Ulmus crassifolia*), and mesquite (*Prosopis glandulosa*). The heavy clay soils have a mixture of buffalograss, sideoats grama (*Bouteloua curtipendula*), and mesquite.

1.2.3.2 Southern Texas Plains

The Southern Texas Plains ecoregion, also known as the Tamaulipan Thornscrub or brush country includes all or parts of Uvalde, Medina, Zavala, Frio, Atascosa, Dimmit, and La Salle counties. The ecoregion is characterized by rolling or irregular plains with short trees, shrubs, and thorny vegetation. Principal plants are honey mesquite (*Prosopis glandulosa* var. *torreyana*), live oak (*Quercus virginiana*), post oak (*Q. stellata*), several members of the cactus family (Cactaceae), blackbrush acacia (*Acacia rigidula*), guajillo (*Acacia berlandieri*), huisache (*Acacia farnesiana*), and others that often grow very densely. The original vegetation was mainly perennial warm-season bunchgrass in post oak, live oak, and mesquite savannas. Other brush species form dense thickets on the ridges and along streams. Long-continued grazing, as well as the control of wildfires, has contributed to the dense cover of brush. Most of the desirable grasses have persisted under the protection of brush and cacti. Dominant grasses are little bluestem, cane bluestem (*Bothriochloa barbinodis*), bristlegrasses (*Setaria* spp.), silver bluestem (*Bothriochloa saccharoides*), multiflowered false rhodesgrass (*Trichloris pluriflora*), Arizona cottontop (*Trichachne californica*), bristlegrasses, sideoats grama, lovegrasses (*Eragrostis* spp), and tobosa.

1.2.3.3 Texas Blackland Prairies

This area includes parts of Medina, Bexar, Comal, Guadalupe, Hays, Caldwell, Wilson, Gonzales, and DeWitt counties. While called a "prairie," this ecoregion has timber along streams, including a variety of oaks, pecan (*Carya illinoinensis*), cedar elm, and mesquite. In its native state, it was largely a grassy plain. This region is distinguished from surrounding regions by its fine-textured, clayey soils and predominantly prairie potential natural vegetation.

Most of this fertile area has been cultivated, and only small acreages of meadowland remain in original vegetation. In heavily grazed pastures, buffalograss, Texas grama (*Bouteloua rigidiseta*), and other less-productive grasses have replaced the tall bunchgrass. Mesquite and other woody plants have invaded the grasslands.

The original grass vegetation included big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium var. frequens*), Indiangrass, switchgrass, sideoats grama, hairy grama (*Bouteloua hirsuta*), tall dropseed (*Sporobolus asper*), Texas wintergrass, and buffalograss. Non-grass vegetation is largely legumes and composites.

1.2.3.4 East Central Texas Plains

This secondary forest region, also called the Post Oak Savanna or the Claypan Area, includes all or parts of Bexar, Guadalupe, Caldwell, Atascosa, Wilson, Gonzales, Karnes, DeWitt, Goliad, and Victoria counties. It is immediately west of the pine forests, with less annual rainfall and slightly higher elevation. Principal trees are post oak, blackjack oak (*Quercus marilandica*), and cedar elm. Pecans, walnuts (*Juglans* spp.), and other kinds of water-demanding trees grow along streams. The southwestern extension of this belt is often poorly defined, with large areas of prairie.

The original vegetation consisted mainly of little bluestem, big bluestem, Indiangrass, switchgrass, silver bluestem, Texas wintergrass, post oak, and blackjack oak. The area is still largely native or improved grasslands, with farms located throughout. Intensive grazing has contributed to dense stands of a woody understory of yaupon (*Ilex vomitoria*) and oak brush. In addition, the control of wildfires has led to the encroachment of brush species on Savanna range lands. Plants such as broomsedge, broomweed, bullnettle, and western ragweed have replaced good forage plants.

1.2.3.5 Western Gulf Coastal Plain

The Western Gulf Coastal Plain includes all or parts of Victoria, DeWitt, Goliad, Refugio, and Calhoun counties. The principal distinguishing characteristic of this ecoregion is the relatively flat coastal plain topography and mainly grassland potential natural vegetation. Oaks, elm, and other hardwoods grow to some extent, especially along streams, and the area has some post oak and brushy extensions along its borders. Much of the Western Gulf Coastal Plain is fertile farmland.

Principal grasses of the Gulf Prairies are tall bunchgrasses, including big bluestem, little bluestem, seacoast bluestem, Indiangrass, eastern gamagrass (*Tripsacum dactyloides*), Texas wintergrass, switchgrass, and gulf cordgrass. Seashore saltgrass occurs on most saline sites. Heavy grazing has changed the range vegetation in many cases so that the predominant grasses are less desirable broomsedge (*Andropogon virginicus*), smutgrass (*Sporobolus indicus*), threeawns (*Aristida* spp.), and many other inferior grasses. The other plants that have invaded the productive grasslands include oak underbrush, huisache, mesquite, pricklypear (*Opuntia* spp.), ragweed (*Ambrosia psilostachya*), broomweed (*Xanthocephalum* spp.), and others.

1.2.4 Natural Resources

1.2.4.1 Water Resources

The South Central Texas Region includes parts of six major river basins (Rio Grande, Nueces, San Antonio, Guadalupe, Lavaca, and Lower Colorado) and overlies the Edwards and Gulf Coast Aquifers, and southern parts of the Trinity, Carrizo-Wilcox, and Edwards-Trinity (Plateau) Aquifers. In addition to these water resources, the area also overlies three minor aquifers (Queen City, Sparta, and Yegua-Jackson). Additionally, several other aquifers supply groundwater in the region, including the Austin Chalk, Buda Limestone, Leona Gravel,. Details about these water resources are presented in Section 1.8.1 and Chapter 3.

Springs are also significant water resources in the South Central Texas Region. The two most noteworthy springs are the Comal and San Marcos Springs, which both emanate from the Edwards Aquifer and contribute to flow in the Guadalupe River. The San Marcos Springs have the greatest flow dependability and environmental stability of any spring system in the southwestern United States. Constancy of its springflow is apparently key to the unique ecosystem found in the uppermost San Marcos River. Comal Springs, located in New Braunfels, are the source for the Comal River, which is a tributary of the Guadalupe River. Unlike the San Marcos Springs, Comal Springs is more responsive to drought conditions and ceased flowing in June of 1956 in response to groundwater withdrawals and severe drought conditions. In addition, numerous springs in northern Uvalde and Medina Counties provide surface flows that recharge the Edwards Aquifer, and a few springs, such as Leona Springs and Soldier Springs at Uvalde, flow from below the Edwards Aquifer recharge zone, providing surface flows for many miles downstream.

1.2.4.2 Fish and Wildlife Resources

The streams and reservoirs of the South Central Texas Region encompass habitats that range from the clear, rocky headwaters of the Guadalupe and Nueces Rivers on the Edwards Plateau to the sluggish, turbid river reaches of the coastal plains, all supporting fish communities typical of warm, carbonate dominated hard waters. Typical species of the coastal plains streams include gar, minnows, topminnows, sunfishes, bass, catfish, and a few species of darters and suckers. Although strongly dependent on the physical habitat factors present, typical species in Edwards Plateau streams include the common carp, red shiner, blacktail shiner, topminnow, longear and bluegill sunfish, largemouth and Guadalupe bass, channel catfish, bullheads, dusky darter, bigscale logperch, and grey redhorse. The Guadalupe Estuary, at the mouth of the Guadalupe River, is habitat to brown and white shrimp, blue crabs, eastern oysters, red drum, spotted seatrout, black drum, flounder, mullet, Atlantic croaker, sharks, and kingfish.

Common types of wildlife found in the area include white-tailed deer, raccoons, ringtails, gray foxes, coyotes, bobcats, and several species of skunks. Wintering songbirds such as robins and cedar waxwings may also be found. In addition, a growing population of endangered whooping cranes winters in and near the Aransas National Wildlife Refuge, which is located on Blackjack Peninsula and Matagorda Island adjacent to San Antonio Bay.

A key concern in the South Central Texas Region is that of threatened and endangered species. Various species in the planning region are listed by the US Fish and Wildlife Service (USFWS) or the Texas Parks and Wildlife Department as threatened or endangered. These species are listed by county in Appendix G with notations concerning their habitat preferences and protected status, if any.

1.2.4.3 Agricultural Resources

Of the approximate 12.8 million acres of land area in the planning region, over 10.0 million acres (79 percent) are classified as farmland and ranchland (Table 1-3). In 2017, there were 26,063 farms and ranches in the region, with an average size of 720 acres. Of the 10.0 million acres of farmland, over 1.46 million acres were classified as cropland, of which about 858,000 acres were harvested in 2017. Approximately 16 percent (234,974 acres) of the total cropland in the region was reported to be irrigated in 2017.[2] The leading irrigation counties are located in the western part of the region and include Atascosa, Frio, Medina, Uvalde, and Zavala. The sum of irrigated acres in these five counties decreased by 12.9 percent between 2012 and 2017. In Medina and Uvalde Counties, which rely

[2] 2017 Census of Agriculture, Volume 1. Chapter 2: County Level Data. “Table 1: County Summary Highlights.”

primarily on the Edwards Aquifer, irrigated acres decreased by 23.4 and 34.1 percent, respectively, between 2012 and 2017. Major irrigated crops are corn, cotton, grain sorghum, wheat, rice, soybeans, and vegetables. Cow-calf operations are the predominant type of livestock industry, although beef cattle, hogs and pigs, sheep and lambs, and poultry are also produced. Agricultural production and livestock production are discussed in greater detail in Sections 1.4.2 and 1.4.3, respectively.

Table 1-3 Agricultural Resources

COUNTY	TOTAL LAND AREA (ACRES)	NUMBER OF FARMS AND RANCHES	FARMS AND RANCHES LAND AREA (ACRES)	AVERAGE LAND AREA (ACRES)	TOTAL CROPLAND (ACRES)	HARVESTED CROPLAND (ACRES)	IRRIGATED LAND (ACRES)
Atascosa	780,506	1,681	745,721	444	107,128	42,860	25,079
Bexar	793,518	2,520	331,904	132	91,021	50,609	7,271
Caldwell	348,958	1,517	285,170	188	67,906	53,779	665
Calhoun	324,377	290	189,516	654	48,206	39,236	2,279
Comal	358,067	1,068	206,493	193	23,613	6,046	273
DeWitt	581,745	1,768	483,908	274	50,842	36,907	3,469
Dimmit	850,486	328	484,147	1,476	67,969	(D)	3,548
Frio	725,441	663	677,994	1,023	90,864	62,213	48,600
Goliad	545,286	1,255	379,929	303	36,182	20,804	135
Gonzales	682,680	1,612	614,280	381	58,483	37,638	1,529
Guadalupe	455,212	2,543	359,485	141	102,458	78,496	2,177
Hays (part)[1]	216,956	564	131,620	233	26,478	7,880	317
Karnes	478,443	1,213	431,809	356	75,016	53,294	716
Kendall	423,974	1,349	393,935	292	32,446	9,660	724
La Salle	951,482	383	532,903	1,391	19,824	2,936	2,135
Medina	848,230	2,281	782,391	343	153,499	86,218	39,372
Refugio	493,082	238	488,635	2,053	56,253	53,544	461
Uvalde	993,245	592	987,187	1,668	111,259	50,121	32,638
Victoria	564,571	1,286	426,086	331	83,196	72,273	8,092
Wilson	514,390	2,621	433,728	165	87,877	53,513	11,657
Zavala	830,340	281	729,078	2,595	76,046	40,908	43,837
Total	**12,760,989**	**26,053**	**10,095,919**	**720**	**1,466,566**	**858,935+ (D)**	**234,974**

COUNTY	TOTAL LAND AREA (ACRES)	NUMBER OF FARMS AND RANCHES	FARMS AND RANCHES LAND AREA (ACRES)	AVERAGE LAND AREA (ACRES)	TOTAL CROPLAND (ACRES)	HARVESTED CROPLAND (ACRES)	IRRIGATED LAND (ACRES)

[1] Estimate is for that portion of Hays County located in the planning region (50%).
(D) – Withheld to avoid disclosing data for individual producers.
Source: 2017 Census of Agriculture, Volume 1. Chapter 2: County Level Data. "Table 1: County Summary Highlights."

1.3 POPULATION AND DEMOGRAPHY

1.3.1 Historical and Recent Trends in Population

According to the United States Census Bureau, the South Central Texas Region population has increased from 1,014,752 in 1960 to 2,535,451 in 2010, an increase of 1,520,699 or 2.5 times (Table 1-4). The largest percentage increase occurred between the years 2000 and 2010 (24.2 percent), while the smallest occurred between 1960 and 1970 (16.2 percent). During the period 1960 to 2010, 16 counties had a positive annual growth rate, while five counties (DeWitt, Dimmit, Karnes, Refugio, and Zavala) had a negative annual growth rate. Historically, the fastest growing counties in the region were Hays (4.22 percent), Kendall (3.53 percent), Comal (3.46 percent), and Guadalupe (3.07 percent), while the slowest growing counties were Gonzales (0.21 percent), La Salle (0.29 percent), Calhoun (0.51 percent), and Goliad (0.57 percent). Chapter 2 summarizes population projections through the year 2070 for the South Central Texas Region.

Table 1-4 Population Growth (1960 to 2010)

COUNTY	YEAR						GROWTH RATE[1] (%)
	1960	1970	1980	1990	2000	2010	
Atascosa	18,828	18,696	25,055	30,533	38,628	44,911	1.75
Bexar	687,151	830,460	988,800	1,185,394	1,392,931	1,714,773	1.85
Caldwell	17,222	21,178	23,637	26,392	32,194	38,066	1.60
Calhoun	16,592	17,831	19,574	19,053	20,647	21,381	0.51
Comal	19,844	24,165	36,446	51,832	78,021	108,472	3.46
DeWitt	20,683	18,660	18,903	18,840	20,013	20,097	-0.06
Dimmit	10,095	9,039	11,367	10,433	10,248	9,996	-0.02
Frio	10,112	11,159	13,785	13,472	16,252	17,217	1.07
Goliad	5,429	4,869	5,193	5,980	6,928	7,210	0.57
Gonzales	17,845	16,375	16,883	17,205	18,628	19,807	0.21
Guadalupe	29,017	33,554	46,708	64,873	89,023	131,533	3.07
Hays (part)[2]	15,947	22,114	32,475	52,491	72,499	125,686	4.22
Karnes	14,995	13,462	13,593	12,455	15,446	14,824	-0.02
Kendall	5,889	6,964	10,635	14,589	23,743	33,410	3.53
La Salle	5,972	5,014	5,514	5,254	5,866	6,886	0.29
Medina	18,904	20,249	23,164	27,312	39,304	46,006	1.79
Refugio	10,975	9,494	9,289	7,976	7,828	7,383	-0.79
Uvalde	16,814	17,348	22,441	23,340	25,926	26,405	0.91
Victoria	46,475	53,766	68,807	74,361	84,088	86,793	1.26
Wilson	13,267	13,041	16,756	22,650	32,408	42,918	2.38
Zavala	12,696	11,370	11,666	12,162	11,600	11,677	-0.17
Total	**1,014,752**	**1,178,808**	**1,420,691**	**1,696,597**	**2,042,221**	**2,535,451**	**1.85**

[1] Compound annual growth rate.

[2] It is estimated that 80 percent of the total county population resides within the planning area.

Source: United States Census Bureau. Decadal Censuses of 1960, 1970, 1980, 1990, 2000, and 2010. US Department of Commerce.

1.3.2 Demographic Characteristics

Population within the South Central Texas Region is primarily distributed along the Interstate Highway 35 (IH-35) corridor, with more than 80 percent of the total population located within four counties: Bexar, Comal, Guadalupe, and Hays (partial). With the exception of the City of Victoria in Victoria County, the five most-populous cities in the South Central Texas Region are located within these four counties. Figure 1-3 identifies the population centers located within the South Central Texas Region.

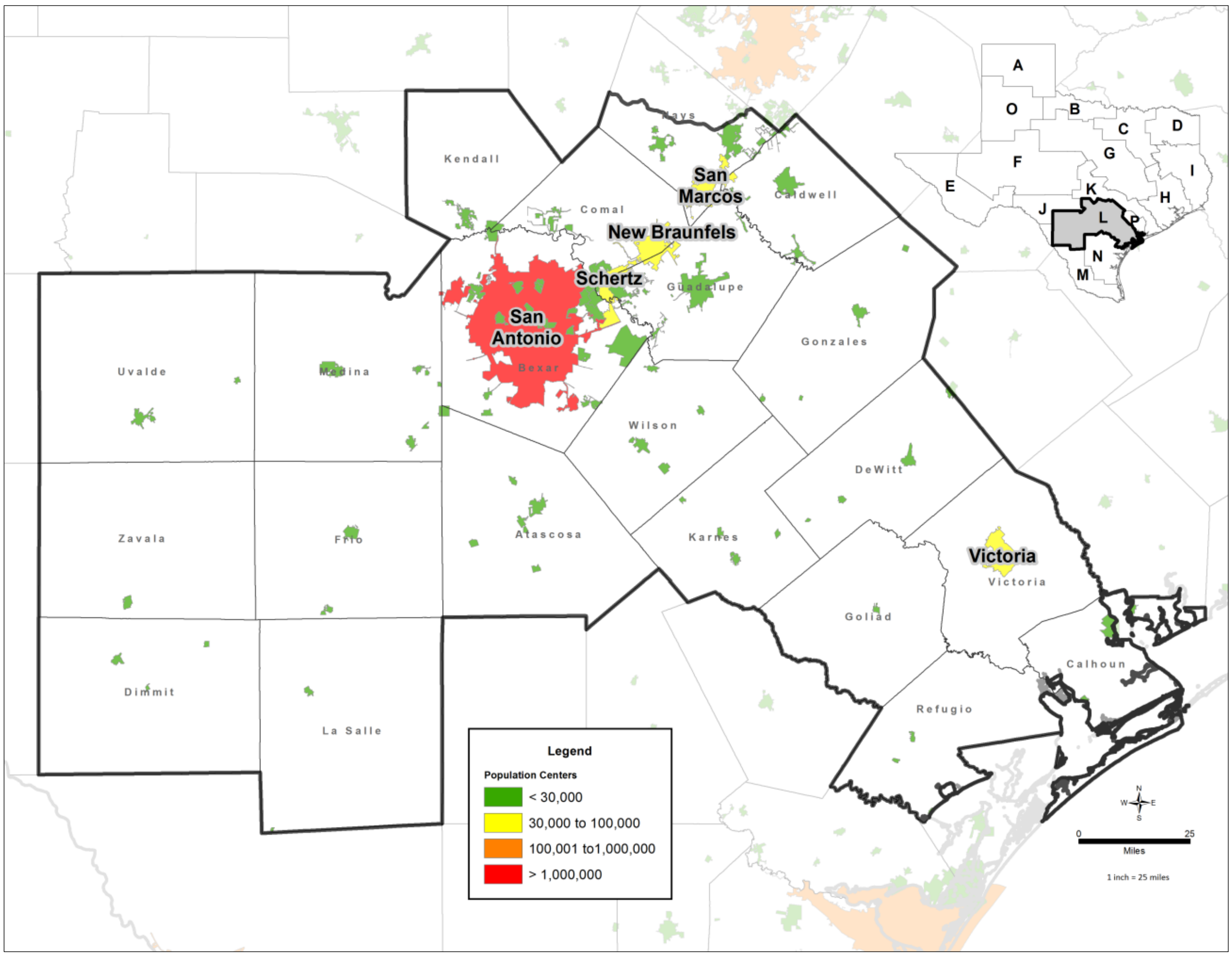

Figure 1-3 Population Centers

In 2010, 83 percent of the South Central Texas Region population resided in urban areas, while only 17 percent resided in rural areas (Figure 1-4). La Salle County had the lowest population in 2010, with 6,886 residents (averaging 4.6 persons per square mile), while Bexar County had the highest population in the region with 1,714,773 residents (averaging 1,375 persons per square mile) (Table 1-5).

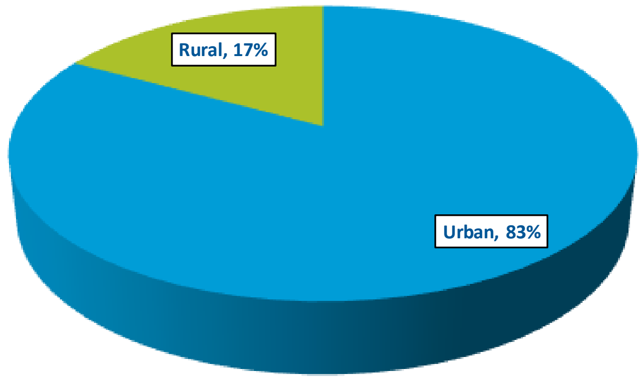

Figure 1-4 Percent of Population Residing in Urban and Rural Areas (2010)

Table 1-5 County Population, Area, and Density (2010)

COUNTY	2010 POPULATION	AREA (SQ. MI.)	POPULATION DENSITY
Atascosa	44,911	1,232	36.5
Bexar	1,714,773	1,247	1,375.1
Caldwell	38,066	546	69.7
Calhoun	21,381	512	41.8
Comal	108,472	562	193.0
DeWitt	20,097	909	22.1
Dimmit	9,996	1,331	7.5
Frio	17,217	1,133	15.2
Goliad	7,210	854	8.4
Gonzales	19,807	1,068	18.5
Guadalupe	131,533	711	185.0
Hays (part)	125,686	374	336.1
Karnes	14,824	750	19.8
Kendall	33,410	663	50.4
La Salle	6,886	1,489	4.6

COUNTY	2010 POPULATION	AREA (SQ. MI.)	POPULATION DENSITY
Medina	46,006	1,328	34.6
Refugio	7,383	770	9.6
Uvalde	26,405	1,557	17.0
Victoria	86,793	883	98.3
Wilson	42,918	807	53.2
Zavala	11,677	1,299	9.0
Total	**2,535,451**	**20,025**	**126.6**
Source: United States Census Bureau, US Department of Commerce.			

Age distribution across the region is characterized by a relatively young population. The two age groups with the highest percentage of the population are under 20 years of age (29.8 percent) and from 25 to 34 years of age (13.8 percent). The age groups with the lowest percentage of the population are ages 20 to 24 (7.7 percent) and ages 55 to 64 (10.7 percent) (Figure 1-5).

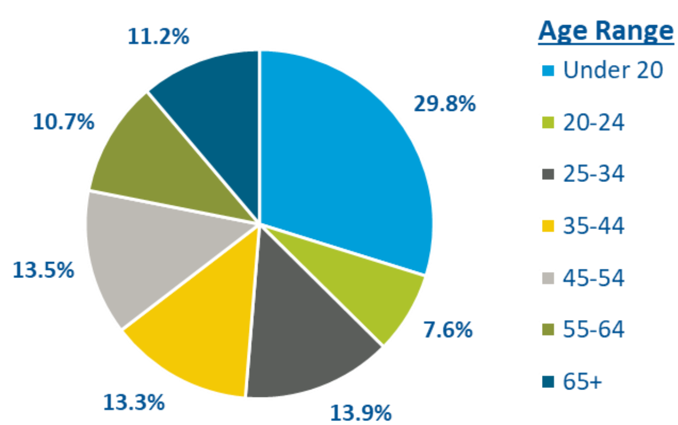

Figure 1-5 Population Distribution by Age Group (2010)

Of those residents in the South Central Texas Region who are 25 years of age or older, 81.3 percent have at least a high school diploma, while 18.7 percent do not. The two largest groups rated according to educational achievement are those who have completed high school but have not gone on to college (26.9 percent) and those who have completed some college education but have no degree (23.2 percent). Only 8.5 percent of the population who are 25 years or older have a graduate degree (Figure 1-6).

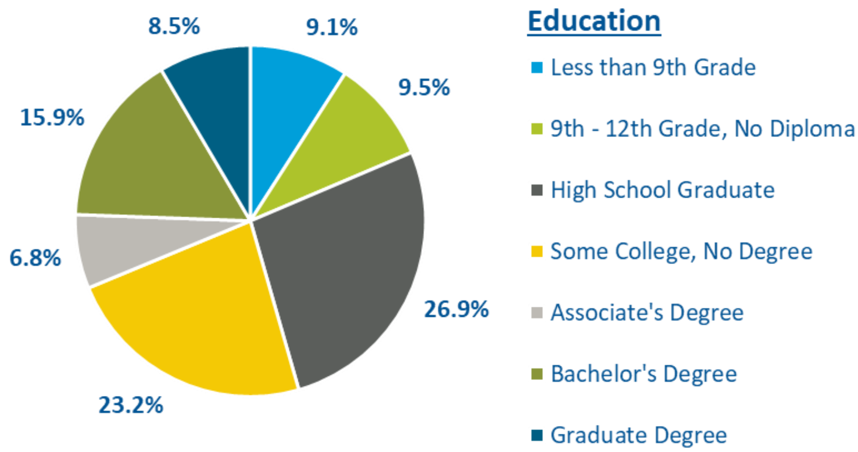

Figure 1-6 Level of Educational Achievement (2010)

1.4 ECONOMY – MAJOR SECTORS AND INDUSTRIES

1.4.1 Regional Economy

The South Central Texas Region has an economic base centered on agricultural production, livestock production, mining, manufacturing, and trades and services. The region has experienced economic ups and downs throughout the past decade, but all sectors of the economy have experienced growth in recent years. Table 1-6 provides a county-by-county summary of economic activity in the key sectors most significantly affecting the economy of the South Central Texas Region. A strong trades and services sector, including a thriving tourism industry in San Antonio, comprises about 36 percent of regional economic activity (summarized in Table 1-6). Fabricated metal products, industrial machinery, petrochemicals, and food processing form the core of the manufacturing sector, which accounts for approximately 35 percent of regional economic activity. Beef cattle, corn, and grain sorghum are the dominant agricultural enterprises, although vegetables produced in the Winter Garden area add diversity to the agricultural sector. The agricultural sector, including both livestock and crops, accounts for about 2 percent of regional economic activity. Finally, oil and gas production dominates the mining sector of the economy and, together, represent about 22 percent of the regional economic activity summarized in Table 1-6. Additional information regarding the agricultural, livestock, mining, manufacturing, and trades and services sectors is presented in the following sections.

Table 1-6 Summary of Economic Activity

COUNTY	TRADES & SERVICES ECONOMIC ACTIVITY (MILLION DOLLARS)[1]	MANUFACTURING ECONOMIC ACTIVITY (MILLION DOLLARS)[1]	MARKET VALUE OF ALL LIVESTOCK (MILLION DOLLARS)[2]	MARKET VALUE OF ALL CROPS (MILLION DOLLARS)[2]	VALUE OF OIL PRODUCTION (MILLION DOLLARS)[3]	VALUE OF GAS PRODUCTION (MILLION DOLLARS)[4]	TOTAL (MILLION DOLLARS)
Atascosa	464	(D)	54	21	1,327	94	1,960
Bexar	18,346	14,766	17	51	5	0	33,185
Caldwell	353	153	39	14	74	0	633
Calhoun	343	11,075	11	21	8	7	11,464
Comal	2,685	960	9	1	0	0	3,655
DeWitt	205	(D)	32	7	2,924	975	4,143
Dimmit	83	11	26	2	2,299	1,040	3,461
Frio	146	(D)	55	70	491	41	803
Goliad	41	(D)	13	5	13	30	102
Gonzales	287	555	522	39	2,111	197	3,710
Guadalupe	1,965	2,543	53	21	43	0	4,625
Hays (Part)[5]	1,849	1,179	7	8	0	0	3,043
Karnes	151	(D)	18	11	6,409	1,265	7,854
Kendall	1,149	(D)	11	1	0	0	1,161
La Salle	85	0	6	1	3,576	932	4,599
Medina	580	(D)	48	46	6	0	680
Refugio	80	0	11	25	139	35	291
Uvalde	483	149	49	38	0	0	719
Victoria	2,216	(D)	24	34	112	15	2,401
Wilson	250	122	56	13	80	2	523
Zavala	38	(D)	43	23	376	24	504
Total	**31,799**	**31,513**	**1,104**	**452**	**19,992**	**4,657**	**89,518**

[1] Source: 2017 Economic Census. US Department of Commerce.
[2] Source: 2017 Census of Agriculture, Volume 1 Geographic Area Series. "Table 1. County Summary Highlights: 2017."
[3] Determined by using the number of barrels produced as reported to the Texas Railroad Commission times $61.40/barrel (the average price for 2018).
[4] Determined by using the cubic feet produced as reported to the Texas Railroad Commission times $3.67/cubic feet (the average price for 2018).
[5] It is estimated that 70% of economic activity within Hays County takes place within the planning region.

1.4.2 Agricultural Production

It is estimated that nearly 1.5 million acres in the South Central Texas Region were used in crop production in 2017. Of this total, only 234,974 acres (16.0 percent) were irrigated; the remaining 84.0 percent of the total cropland was farmed using dryland techniques. The leading irrigation counties are found primarily in the western part of the region and include Frio, Medina, Uvalde, Zavala, and Atascosa.

According to the 2017 Census of Agriculture, all crops grown in the South Central Texas Region had a market value of over $452 million in 2017. The leading agricultural producing counties in the region, by market value of products, are Gonzales, Frio, Medina, Uvalde, and Atascosa. The major crops grown in the region include corn, grain sorghum, wheat, soybeans, and cotton (Table 1-7).

Corn and grain sorghum have historically been the leading crops in the region. In 2017, it was estimated that nearly 21 million bushels of corn were harvested in the South Central Texas Region. The leading corn producing counties in the region are Victoria, Medina, Uvalde, and Guadalupe (Table 1-7). Grain sorghum also contributes significantly to the agricultural sector. In 2017, it was estimated that nearly 8 million bushels of grain sorghum were harvested in the region. The leading grain sorghum producing counties in the region are Refugio, Calhoun, Victoria, and Guadalupe (Table 1-7). Although wheat production is not as widespread as corn and grain sorghum production, it is still an important part of the regional agricultural production with over 1.9 million bushels of wheat harvested in 2017. The leading wheat producing counties in the region are Uvalde, Frio, Medina, and Zavala (Table 1-7).

Because of favorable climatic and soil conditions, the coastal counties of Calhoun and Victoria are able to produce rice. In 2017 Victoria County produced nearly 270,000 hundredweight of rice (Table 1-7). Cotton production is widespread throughout the region. In 2017, the 17 counties in which cotton is produced combined to harvest over 250,000 bales (Table 1-7). Leading counties for cotton production were Medina, Victoria, and Uvalde.

Soybean production in the region reportedly occurs in eight counties, but total production and leading counties are uncertain because of data withheld to avoid disclosure of production by individual producers.

1.4.3 Livestock Production

According to the 2017 Census of Agriculture, livestock marketed in the South Central Texas region had a value of over $1.1 billion, or about 2.4 times the value of all crop production (Table 1-6). Major types of livestock produced in the area include cattle and calves, beef cattle, and sheep and lambs. Layers, pullets, and broilers also contribute significantly to livestock production, with Gonzales County producing over 94 percent of these types of chickens within the region. Table 1-8 provides a county-by-county summary of livestock production. In 2017, the leading livestock producing counties in the region by market value were Gonzales, Frio, and Wilson (Table 1-6).

Table 1-7 Summary of Farm Production Data (2017)

COUNTY	SELECTED CROPS HARVESTED						
	CORN (BUSHELS)	GRAIN SORGHUM (BUSHELS)	WHEAT (BUSHELS)	RICE (100 POUNDS)	COTTON (BALES)	SOYBEANS (BUSHELS)	HAY, ALFALFA, OTHER (TONS)
Atascosa	135,917	78,469	50,759	0	5,517	0	58,244
Bexar	665,904	428,000	127,507	0	2,570	0	45,762
Caldwell	1,702,331	481,899	49124	0	9,096	(D)	29,859
Calhoun	1,527,148	853,856	0	(D)	30,877	50,521	6,851
Comal	25,250	(D)	3,710	0	0	0	7,444
DeWitt	598,963	(D)		0	0	(D)	52,647
Dimmit	(D)	(D)	(D)	0	(D)	(D)	4,909
Frio	1,338,621	153,938	477,952	0	16,549	57,600	37,670
Goliad	797,255	127,144	0	0	(D)	0	15,278
Gonzales	383,037	15,866	3,676	0	(D)	0	57,417
Guadalupe	1,965,212	991,324	73,455	0	1,686	0	57,261
Hays (part)[1]	232,061	67,991	3,348	0	1,668	0	4,358
Karnes	1,102,107	346,780	57,117	0	6,166	0	50,526
Kendall	18,000	(D)	(D)	0	0	11,700	0
La Salle	(D)	(D)	0	0	0	0	3,615
Medina	2,694,597	331,827	323,143	0	41,141	0	52,197
Refugio	313,962	1,994,908	(D)	0	39,714	0	5,869
Uvalde	2,352,983	421,146	365,732	0	34,735	0	9,711
Victoria	3,115,357	1,090,155	(D)	269,370	37,131	243,537	23,484
Wilson	860,689	379,637	51,770	0	8,379	(D)	56,039
Zavala	1,104,854	214,665	333,464	0	19,746	0	21,273
Total	**20,934,248 +(2D)**	**7,977,605 +(5D)**	**1,920,757 +(4D)**	**269,370 +(D)**	**254,975 +(D)**	**363,358 +(3D)**	**600,414**

[1] Estimate for that portion of Hays County located in the planning region (50%).
(D) – Withheld to avoid disclosing data for individual producers.

Table 1-8 Summary of Livestock Production Data (2017)

COUNTY	LIVESTOCK AND POULTRY (NUMBER)						
	CATTLE AND CALVES	BEEF CATTLE	MILK COWS	HOGS AND PIGS	SHEEP AND LAMBS	LAYERS AND PULLETS	BROILERS
Atascosa	76,451	(D)	0	952	1,939	4,039	80
Bexar	40,997	(D)	0	2,417	5,525	7,531	452
Caldwell	39,939	24,730	0	36	1,375	0	75
Calhoun	15,204	8,462	0	33	1,634	507	6
Comal	16,274	7,779	0	587	4,781	25,099	4,299
DeWitt	90,780	51,188	0	240	1,245	5,102	7,240
Dimmit	20,897	(D)	0	30	56	339	0
Frio	54,219	18,389	0	28	377	785	(D)
Goliad	40,372	(D)	(D)	51	289	2,625	552
Gonzales	122,115	57,341	0	232	1,321	7,625,972	74,211,677
Guadalupe	48,840	27,728	0	477	3,325	(D)	4,200,789
Hays (part)[1]	7921	4678	0	153	851.5	3099.5	161
Karnes	47,296	29,289	0	110	164	1,790	0
Kendall	16,601	8,972	0	800	9,380	4,593	816
La Salle	11,831	7,800	0	47	(D)	331	0
Medina	57,232	(D)	(D)	991	3,969	11,697	(D)
Refugio	26,898	14,973	0	54	158	126	0
Uvalde	42,944	(D)	(D)	83	4,877	670	0
Victoria	49,146	31,644	0	156	707	2,295	0
Wilson	86,875	(D)	(D)	342	2,247	6,414	690
Zavala	50,345	12,865	0	0	156	414	0
Total	**963,177**	**305,838 + (7D)**	**4D**	**7,819**	**44,377+ (D)**	**7,703,429+ (D)**	**78,426,837+ (2D)**

[1] It is estimated that 50% of all livestock production in Hays County occurs in the planning region.
(D) – Withheld to avoid disclosing data for individual producers.
Source: 2017 Census of Agriculture, Volume 1, Chapter 2: County Level Data. "Table 1: County Summary Highlights."

1.4.4 Mining

The South Central Texas Region has many sand and gravel quarries and is also rich in petroleum products including oil, natural gas, and lignite. Much of the stone quarried is used in the production of cement. The leading cement producing areas in the region are located in Bexar and Hays Counties. Most of the stone, gravel, and sand mining activities are located in Bexar, Comal, Gonzales, and Victoria Counties.

The region also derives a significant portion of its mining income from oil and gas activities. All but four counties (Comal, Hays, Medina, and Uvalde) in the region had economic activity derived from oil and gas production in 2017. Oil and gas production in the remaining 17 counties generated over $24.6 billion in 2017. The leading oil and gas producing counties in the region were DeWitt, Dimmit, Gonzales, Karnes, and Kendall (Table 1-6).

1.4.5 Manufacturing

In 2017, manufacturing facilities contributed over $31.5 billion in sales in the South Central Texas Region (Table 1-6).[3] The leading manufacturing counties in the region for which data are disclosed, by value of shipments, are Bexar, Calhoun, Comal, Guadalupe, and Hays. Significant economic activity associated with manufacturing also occurs in Atascosa, DeWitt, Frio, Goliad, Karnes, Kendall, Medina, Victoria, and Zavala Counties, although data are withheld to avoid disclosures for individual producers. Types of manufacturing plants and products in the region include plastics, nylon intermediates, automobiles, printing and related support activities, fabricated metal products, miscellaneous products, and food products.

1.4.6 Trades and Services

In 2017, wholesale trade, retail trade, and services contributed over $31.8 billion in sales or receipts in the South Central Texas Region (Table 1-6).[4] The leading trades and services counties, by value of sales or receipts, in the region are Bexar, Comal, Guadalupe, Hays, and Victoria.

1.5 CURRENT WATER USE AND MAJOR WATER DEMAND CENTERS

1.5.1 Current Water Use

Water use in 2017 within the South Central Texas Region as reported to or estimated by the Texas Water Development Board (TWDB)[5] is summarized by source for each of the use types in Table 1-9.

In 2017, total water use in the region was estimated to be 961,992 acre-feet per year (acft/yr). Municipal use accounted for 452,652 acft/yr (47.1 percent), and irrigation use accounted for 268,431 acft/yr (27.9 percent) of the total water use within the region. Surface water use totaled 203,348 acft/yr (21.1 percent), groundwater use totaled 660,882 acft/yr (68.7 percent), and reuse totaled 97,762 acft/yr (10.2 percent). Surface water is the primary source for manufacturing uses, surface water and reuse are the primary sources for steam-electric uses, and groundwater is the primary source for other use types.

[3] Source: 2017 Economic Census. US Department of Commerce.
[4] Source: 2017 Economic Census. US Department of Commerce.
[5] Source: 2017 Historical Water Use Summary Estimates. Texas Water Development Board.

Table 1-9 Summary of Water Use (2017)

USE TYPE	2017 TOTAL USE (ACFT/YR)	PERCENT OF TOTAL	USE BY SOURCE (ACFT/YR [PERCENT])		
			SURFACE WATER	GROUNDWATER	REUSE
Municipal	452,652	47.1%	58,904 (13.0%)	344,870 (76.2%)	48,878 (10.8%)
Manufacturing	70,967	7.4%	58,892 (83.0%)	8,662 (12.2%)	3,413 (4.8%)
Mining	63,641	6.6%	4,324 (6.8%)	49,441 (77.7%)	9,876 (15.5%)
Steam-Electric	83,225	8.7%	38,322 (46.0%)	9,965 (12.0%)	34,938 (42.0%)
Irrigation	268,431	27.9%	33,348 (12.4%)	234,426 (87.3%)	657 (0.2%)
Livestock	23,076	2.4%	9,558 (41.4%)	13,518 (58.6%)	0 (0%)
Total	**961,992**	**100.0%**	**203,348 (21.1%)**	**660,882 (68.7%)**	**97,762 (10.2%)**

1.5.2 Major Water Demand Centers

In the South Central Texas Region, there are four major water demand centers. These centers are the IH-35 corridor from San Antonio to San Marcos, the Edwards Aquifer region west of the City of San Antonio, the Winter Garden area south of the Edwards Aquifer area, and the coastal area. The San Antonio, New Braunfels, and San Marcos corridor along IH-35 is one of the fastest growing areas in Texas. In the next 60 years, its water use will follow the same trend as population growth, with most of the demand being for municipal use.

The Edwards Aquifer region west of San Antonio, including Uvalde and Medina Counties, is a major demand center for water to be used for irrigated agriculture. The Winter Garden area, including Zavala, Dimmit, Frio, La Salle, and Atascosa Counties, is also a major demand center for water for irrigated agriculture. The coastal area, including the cities of Victoria and Port Lavaca, are major demand centers for water for industrial purposes, with some demand for irrigation in Calhoun County.

1.6 WHOLESALE WATER PROVIDERS

The TWDB defines a wholesale water provider (WWP) as any person or entity, including river authorities and irrigation districts, that delivers or sells water wholesale (treated or raw) to water user groups (WUGs) or other WWPs or that the regional water planning group (RWPG) expects or recommends to deliver or sell water wholesale to WUGs or other WWPs during the planning horizon. Under this definition, the following WWPs are identified for the South Central Texas Region:

- San Antonio Water System (SAWS);
- Guadalupe-Blanco River Authority (GBRA);
- Canyon Regional Water Authority (CRWA);
- Cibolo Valley Local Government Corporation (CVLGC);

- Alliance Regional Water Authority (ARWA); and
- Schertz-Seguin Local Government Corporation (SSLGC).

Each WWP is briefly described in the following sections. Detailed water demand projections for each wholesale water provider are presented in Chapter 2.

1.6.1 San Antonio Water System

The SAWS is a public utility owned by the City of San Antonio, and its primary water supply source is the Edwards Aquifer. Additional sources include the Carrizo-Wilcox and Trinity Aquifers, Canyon Reservoir, the Medina Lake System, and direct reuse. SAWS serves more than 1.8 million people in the region. SAWS provides part or all of the water supplies for 14 utility systems, retail water supplies for most, but not all, of the City of San Antonio, and a portion of the industrial supplies in Bexar County. SAWS is the sole water provider for the cities of Balcones Heights, Castle Hills, China Grove, Helotes, Hill County Village, Hollywood Park, Olmos Park, Somerset, Terrell Hills, and Von Ormy, and provides part of the water supply for Leon Valley, Live Oak, and Shavano Park. In addition, SAWS provides water on a wholesale basis to East Central Special Utility District (SUD), Elmendorf, and The Oaks Water Supply Corporation (WSC).

1.6.2 Guadalupe-Blanco River Authority

The GBRA was created by the Texas Legislature in 1933 to develop, store, preserve, and distribute the waters of the Guadalupe River Basin for all useful purposes. GBRA is a regional entity serving Hays, Comal, Guadalupe, Caldwell, Gonzales, DeWitt, Victoria, Kendall, Refugio, and Calhoun counties. GBRA's activities include supplying hydroelectric power through operations of six hydroelectric dams located on the Guadalupe River in Guadalupe and Gonzales counties, supplying potable water, treating wastewater, and supplying raw water through management of substantial run-of-river rights in the lower basin and storage rights in Canyon Reservoir. GBRA is developing groundwater supplies, surface water supplies in the Guadalupe-San Antonio River Basin, and transmission and treatment facilities to deliver these supplies to customers.

1.6.3 Canyon Regional Water Authority

CRWA is a subdivision of the State of Texas created by the Texas Legislature in 1989. CRWA is the water planning and development agency for water purveyors that serve large areas of Guadalupe County and portions of Bexar, Hays, Caldwell, Wilson, and Comal Counties. It works as a partnership of 11 WSCs, cities, and districts responsible for acquiring, treating, and transporting potable water (refer to Chapter 2). CRWA owns and operates two surface water treatment plants: the Lake Dunlap Water Treatment Plant located along the Guadalupe River and the Hays Caldwell Water Treatment Plant located in far western Caldwell County along the San Marcos River. In addition, CRWA operates one groundwater treatment plant, the Wells Ranch, located in Guadalupe County. Water for these water treatment plants are either owned by CRWA or leased from water rights owners.

1.6.4 Cibolo Valley Local Government Corporation

The CVLGC is a partnership between the cities of Cibolo and Schertz created to develop more groundwater supplies within the local area.

1.6.5 Alliance Regional Water Authority

Previously known as the Hays-Caldwell Public Utility Agency (HCPUA), ARWA was formed by the CRWA, Buda, Kyle, and San Marcos for the purposes of sharing water supplies and costs of infrastructure development. The HCPUA was created under Chapter 422 of the Local Government Code General Law in January 2007. A legislative action in 2017 changed the organization to ARWA. Participants in the HCPUA, who are part owners based on an agreed percentage distribution, could take the role(s) of wholesale water distributors and/or retail water purveyors.

1.6.6 Schertz-Seguin Local Government Corporation

The cities of Schertz (located primarily in Guadalupe County and partially in Bexar and Comal Counties) and Seguin (located in Guadalupe County) joined to create the SSLGC. This corporation is responsible for creating and operating a wholesale water supply system to serve the long-term needs of these two communities. In addition, SSLGC sells water to Selma, Universal City, Converse, Springs Hill WSC, and SAWS (discussed in Chapter 2). The Carrizo-Wilcox Aquifer in Gonzales and Guadalupe counties is the current source of supply for SSLGC. SSLGC is pursuing the development of additional water supplies from the Carrizo-Wilcox Aquifer.

1.7 MAJOR WATER PROVIDERS

A new category for this round of planning, a major water provider (MWP) is defined as a WUG or a WWP of particular significance to the region's water supply as determined by the RWPG. This group may include public or private entities that provide water for any water use category. The South Central Texas Regional Water Planning Group (SCTRWPG) has determined that a MWP will be defined as any WWP, or municipal WUG that has demands greater than 20,000 acft/yr by 2070. Using this definition, the following entities are identified as MWPs in the South Central Texas Region:

- ARWA
- CRWA
- CVLGC
- GBRA
- New Braunfels
- SAWS
- San Marcos
- SSLGC
- Victoria

1.8 WATER RESOURCES AND QUALITY CONSIDERATIONS

1.8.1 Groundwater

There are five major and six minor aquifers supplying water to the South Central Texas Region. The five major aquifers are the Edwards, Carrizo, Trinity, Gulf Coast, and Edwards-Trinity (Plateau) (Figure 1-7). The six minor aquifers are the Austin Chalk, Buda Limestone, Leona Gravel, Sparta, Queen City, and Yegua-Jackson (Figure 1-8). Other aquifers include the Austin Chalk, Buda Limestone, and Leona Gravel Aquifers. Each aquifer is described and a general assessment of water quality is provided in the following subsections. A summary of estimated groundwater supplies is presented in Chapter 3.

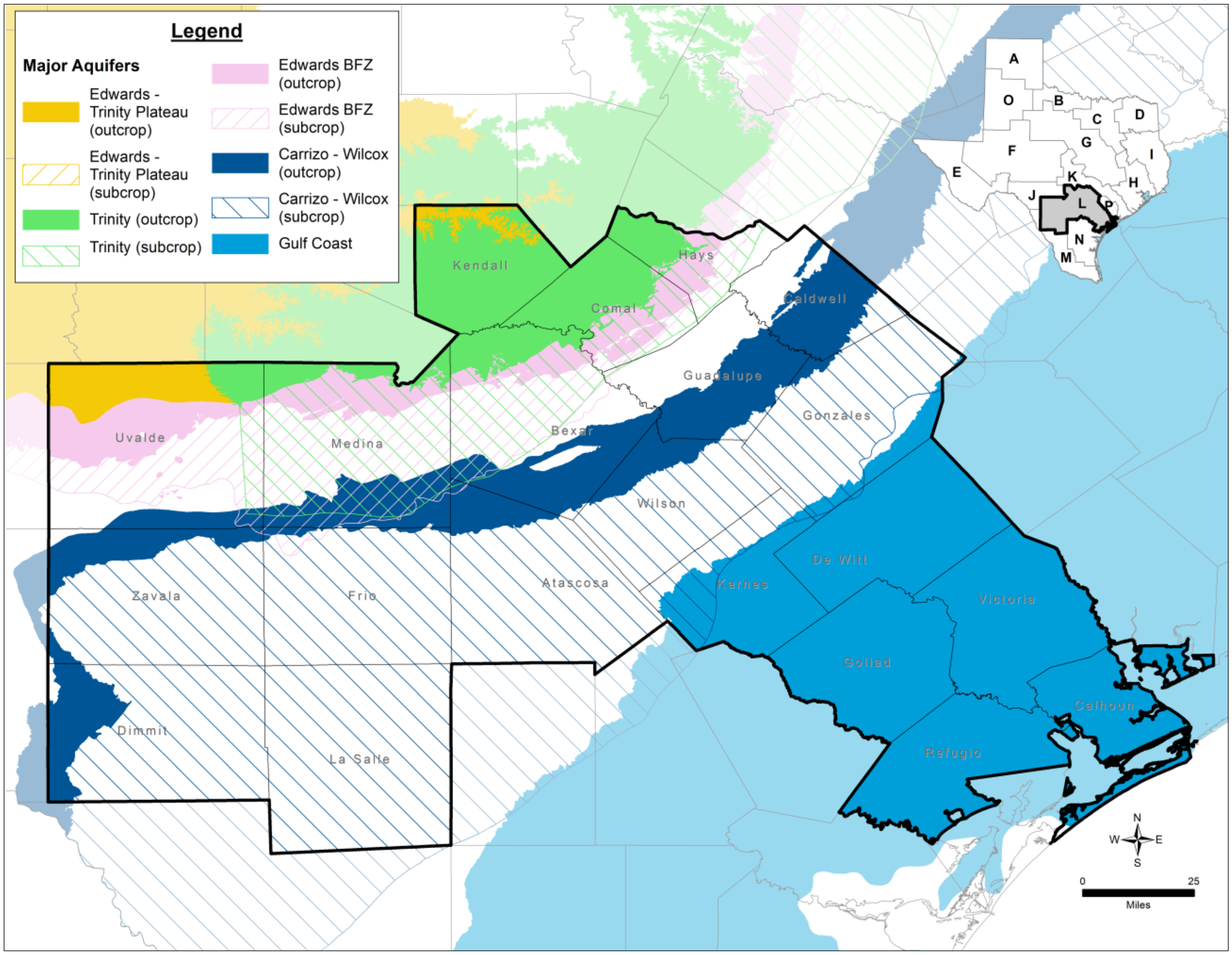

Figure 1-7 Major Aquifers

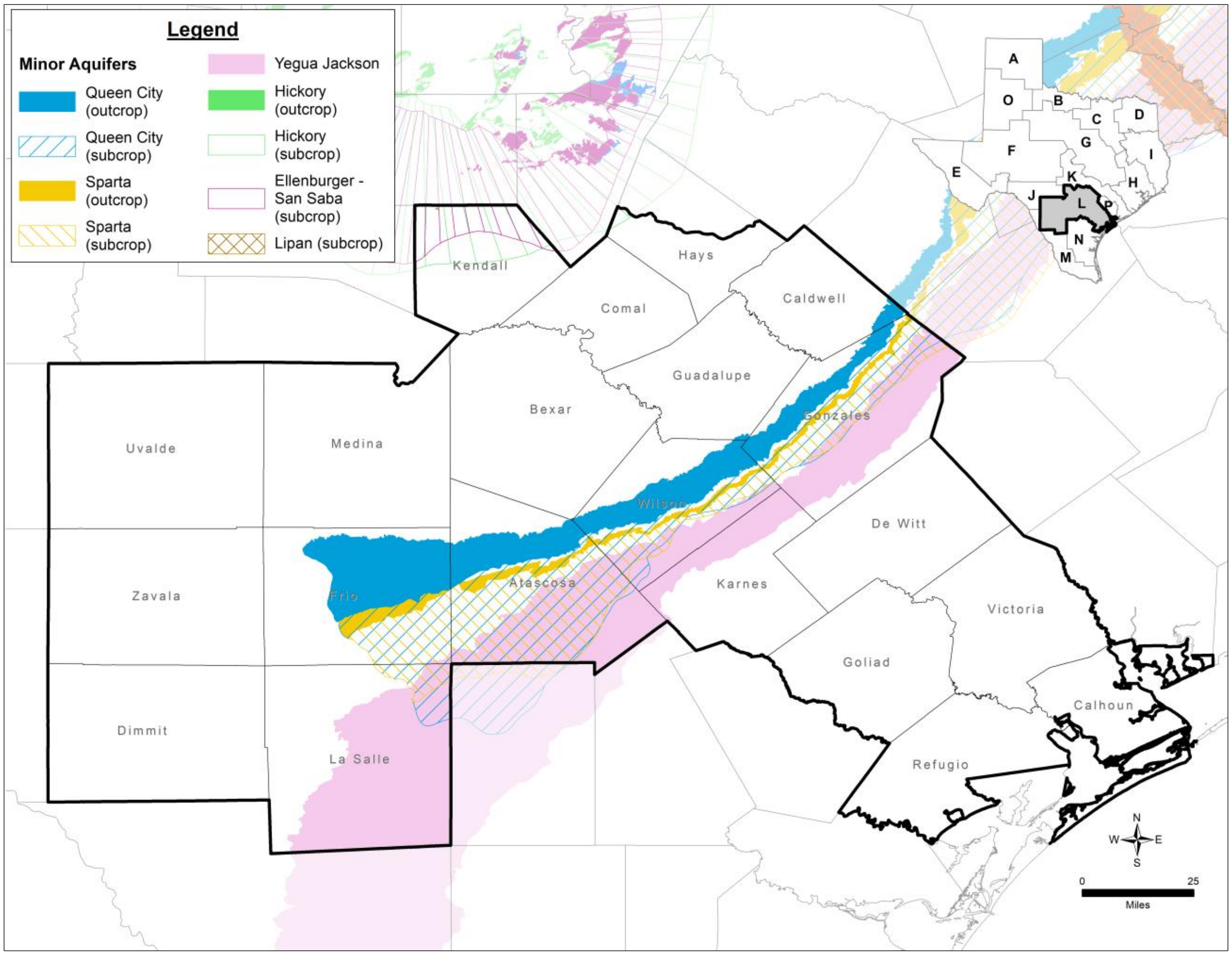

Figure 1-8 **Minor Aquifers**

1.8.1.1 Edwards-Balcones Fault Zone Aquifer (Edwards Aquifer)

The Edwards Aquifer underlies parts of nine counties (Uvalde, Medina, Bexar, Atascosa, Comal, Guadalupe, Hays, Frio, and Zavala) in the South Central Texas Region. The aquifer forms a narrow belt extending from a groundwater divide in 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 the Austin regions except during severe drought. The name Edwards-Balcones Fault Zone (BFZ) distinguishes this aquifer from the Edwards-Trinity (Plateau) and the Edwards-Trinity (High Plains) Aquifers; however, in this document, it will be referred to as the Edwards Aquifer (Figure 1-7).

The aquifer consists primarily of partially dissolved limestone having high permeability. Aquifer thickness ranges from 200 to 600 feet, and freshwater saturated thickness averages 560 feet in the southern part of the aquifer. The groundwater, although hard, is generally fresh and contains less than 500 milligrams per liter (mg/L) of total dissolved solids (TDS). The aquifer feeds several well-known springs, including Comal Springs in Comal County, which is the largest spring in the state, and San Marcos Springs in Hays County, which is the second largest. Hueco, San Pedro, San Antonio, and Leona springs also discharge from the aquifer. Because of its highly permeable nature, Edwards Aquifer water levels and springflows respond quickly to rainfall, drought, and pumping.

Water from the aquifer is primarily used for municipal, irrigation, industrial, and recreational purposes. San Antonio obtains most of its water supply from the Edwards Aquifer.

1.8.1.2 Carrizo-Wilcox Aquifer (Carrizo Aquifer)

The Wilcox Group, including the Calvert Bluff, Simsboro, and Hooper Formations, and the overlying Carrizo Formation of the Claiborne Group, form a hydrologically connected system known as the Carrizo-Wilcox Aquifer, which is sometimes referred to in this plan as the Carrizo Aquifer. The Carrizo-Wilcox Aquifer is a major aquifer extending from the Louisiana border to the border of Mexico. The aquifer is composed of sand locally interbedded with gravel, silt, clay, and lignite. Although the Carrizo-Wilcox Aquifer reaches 3,000 feet in thickness, the freshwater saturated thickness of the sands averages 670 feet. The groundwater, although hard, is generally fresh and typically contains less than 500 mg/L of total dissolved solids in the outcrop; whereas, softer groundwater with total dissolved solids of more than 1,000 mg/L may occur in the confined zone. High iron and manganese content in excess of secondary drinking water standards is characteristic of the deeper, confined portions of the aquifer. Parts of the aquifer in the Winter Garden area are slightly to moderately saline, with total dissolved solids ranging from 1,000 to 7,000 mg/L. Irrigation accounts for slightly more than half of the pumped water, and municipal supply accounts for another 40 percent of pumped water. Water levels have declined in the Winter Garden area because of irrigation pumping and in the northwestern part of the aquifer because of municipal pumping.

1.8.1.3 Trinity Aquifer

The Trinity Aquifer provides water to all or parts of 55 counties in Texas, including six counties (Hays, Comal, Kendall, Bexar, Medina, and Uvalde) in the South Central Texas Region. The Trinity Aquifer is composed of several smaller aquifers contained within the Trinity Group. Although referred to differently in different parts of the state, they include the Antlers, Glen Rose, Paluxy, Twin Mountains, Travis Peak, Hensell, and Hosston Aquifers. These aquifers consist of limestones, sands, clays, gravels, and conglomerates. Their combined freshwater saturated thickness averages about 600 feet in North Texas and about 1,900 feet in Central Texas. In general, groundwater is fresh but very hard in the outcrop of the aquifer. Total dissolved solids increase from less than 1,000 mg/L in the east and southeast to between 1,000 and 5,000 mg/L, or slightly to moderately saline, as depth to the aquifer increases. Sulfate and chloride concentrations also tend to increase with depth. The aquifer is one of the most extensive and highly used groundwater resources in Texas. Although its primary use is for municipalities, it is also used for irrigation, livestock, and domestic purposes.

1.8.1.4 Gulf Coast Aquifer

The Gulf Coast Aquifer is a major aquifer paralleling the Gulf of Mexico coastline from the Louisiana border to the border of Mexico. It consists of several aquifers, including the Jasper, Evangeline, and Chicot, which are composed of discontinuous sand, silt, clay, and gravel beds. The maximum total sand thickness of the Gulf Coast Aquifer ranges from 700 feet in the south to 1,300 feet in the north. Freshwater saturated thickness averages about 1,000 feet. Water quality varies with depth and locality: it is generally good in the central and northeastern parts of the aquifer, where the water contains less than 500 mg/L of TDS but declines to the south, where it typically contains 1,000 to more than 10,000 mg/L of TDS and where the productivity of the aquifer decreases. High levels of radionuclides, thought to be naturally occurring, are found in some wells in Harris County in the outcrop and in South Texas. The aquifer is used for municipal, industrial, livestock and irrigation purposes. In Harris, Galveston, Fort Bend, Jasper and Wharton counties, water level declines of as much as 350 feet have led to land subsidence.

1.8.1.5 Edwards-Trinity (Plateau) Aquifer

The Edwards-Trinity (Plateau) Aquifer is a major aquifer extending across much of the southwestern part of the state. The water-bearing units are predominantly composed of limestone and dolomite of the Edwards Group and sands of the Trinity Group. Although maximum saturated thickness of the aquifer is greater than 800 feet, freshwater saturated thickness averages 433 feet. Water quality ranges from fresh to slightly saline, with dissolved solids ranging from 100 to 3,000 mg/L, and the water is generally characterized as hard within the Edwards Group. Water typically increases in salinity to the west within the Trinity Group. Springs occur along the northern, eastern, and southern margins of the aquifer, primarily near the bases of the Edwards and Trinity groups where exposed at the surface. San Felipe Springs, near Del Rio, is the largest exposed spring along the southern margin. Of the groundwater pumped from this aquifer, more than two-thirds is used for irrigation, with the remainder used for municipal and livestock supplies. Water levels have remained relatively stable because recharge has generally kept pace with the relatively low amounts of pumping over the extent of the aquifer.

1.8.1.6 Sparta Aquifer

The Sparta Aquifer is a minor aquifer extending across East and South Texas, parallel to the Gulf of Mexico coastline and about 100 miles inland. Water is contained within a part of the Claiborne Group known as the Sparta Formation, a sand-rich unit interbedded with silt and clay layers and with massive sand beds in the bottom section. The thickness of the formation changes gradually from more than 700 feet at the Sabine River to about 200 feet in South Texas. Freshwater saturated thickness averages about 120 feet. In outcrop areas and for a few miles in the subsurface, the water is usually fresh, with an average concentration of 300 mg/L of TDS; however, water quality deteriorates with depth (below about 2,000 feet), where the groundwater has an average concentration of 800 mg/L of total dissolved solids. Excess iron concentrations are common throughout the aquifer. Water from the aquifer is predominantly used for domestic and livestock purposes, and its quality has not been significantly affected by pumping. No significant water level declines have been detected throughout the aquifer in wells measured by the TWDB.

1.8.1.7 Queen City Aquifer

The Queen City Aquifer is a minor but widespread aquifer that stretches across the Texas upper coastal plain. Water is stored in the sand, loosely cemented sandstone, and interbedded clay layers of the Queen City Formation that reaches 2,000 feet in thickness in South Texas. Average freshwater saturation in the Queen City Aquifer is about 140 feet. Water is generally fresh, with an average concentration of total dissolved solids of about 300 milligrams per liter in the recharge zone and about 750 milligrams per liter deeper in the aquifer. Although salinity decreases from south to north, areas of excessive iron concentration and high acidity occur in the northeast. The aquifer is used primarily for livestock and domestic purposes, with significant municipal and industrial use in northeast Texas. Water levels have remained fairly stable over time in the northern part of the aquifer. Water level declines are more common in the central (10 to 70 feet) and southern (5 to 130 feet) parts of the aquifer.

1.8.1.8 Yegua-Jackson Aquifer

The Yegua-Jackson Aquifer is a minor aquifer stretching across the southeast part of the state. It includes water bearing parts of the Yegua Formation (part of the upper Claiborne Group) and the Jackson Group (comprising the Whitsett, Manning, Wellborn, and Caddell formations). These geologic units consist of interbedded sand, silt, and clay layers originally deposited as fluvial and deltaic sediments. Freshwater saturated thickness averages about 170 feet. Water quality varies greatly because of sediment composition in the aquifer formations, and in all areas the aquifer becomes highly mineralized with depth. Most groundwater is produced from the sand units of the aquifer where the water is fresh and ranges from less than 50 to 1,000 milligrams per liter of total dissolved solids. Some slightly to moderately saline water, with concentrations of total dissolved solids ranging from 1,000 to 10,000 milligrams per liter, also occurs in the aquifer. No significant water level declines have occurred in wells measured by the TWDB. Groundwater for domestic and livestock purposes is available from shallow wells over most of the aquifer's extent. Water is also used for some municipal, industrial, and irrigation purposes.

1.8.1.9 Austin Chalk, Buda Limestone, and Leona Gravel Aquifers

The Austin Chalk and Buda Limestone are Upper Cretaceous in age. The Del Rio Clay provides a confining layer between the deeper Edwards Aquifer and shallower Buda Limestone, and the Eagle Ford Group separates the lower Buda and upper Austin Chalk formations. There are limited areas where the Buda Formation and the Austin Chalk Formation are at the right elevations and have sufficient hydraulic conductivity to produce significant quantities of water. Water quality in the Austin Chalk and Buda Limestone formations is similar to the Edwards Aquifer water quality, and there is likely some interconnectivity between the aquifers. While most wells completed in this formation are for domestic or livestock use, there are some higher flowing municipal wells.

The Leona Formation includes alluvial aquifers adjacent to the Leona, Nueces, Frio, and other rivers in Central and South Texas. These alluvial aquifers generally depend on associated streamflow, springs, and recharge from adjacent aquifers and are, therefore, subject to depletion during drought conditions. The majority of wells in this formation are small-flow domestic or livestock wells.

1.8.2 Surface Water

The South Central Texas Region includes parts of the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca River Basins and parts of the San Antonio-Nueces, Lavaca-Guadalupe, and Colorado-Lavaca Coastal Basins (Figure 1-9). Existing surface water supplies of the region include those derived from storage reservoirs and run-of-river water rights. The region has three major reservoirs: Canyon Lake, Braunig Reservoir, and Calaveras Reservoir. The geographical characteristics of the various river basins are described in the following subsections, along with major reservoirs and/or water rights. Existing surface water supplies available during drought are summarized in Chapter 3.

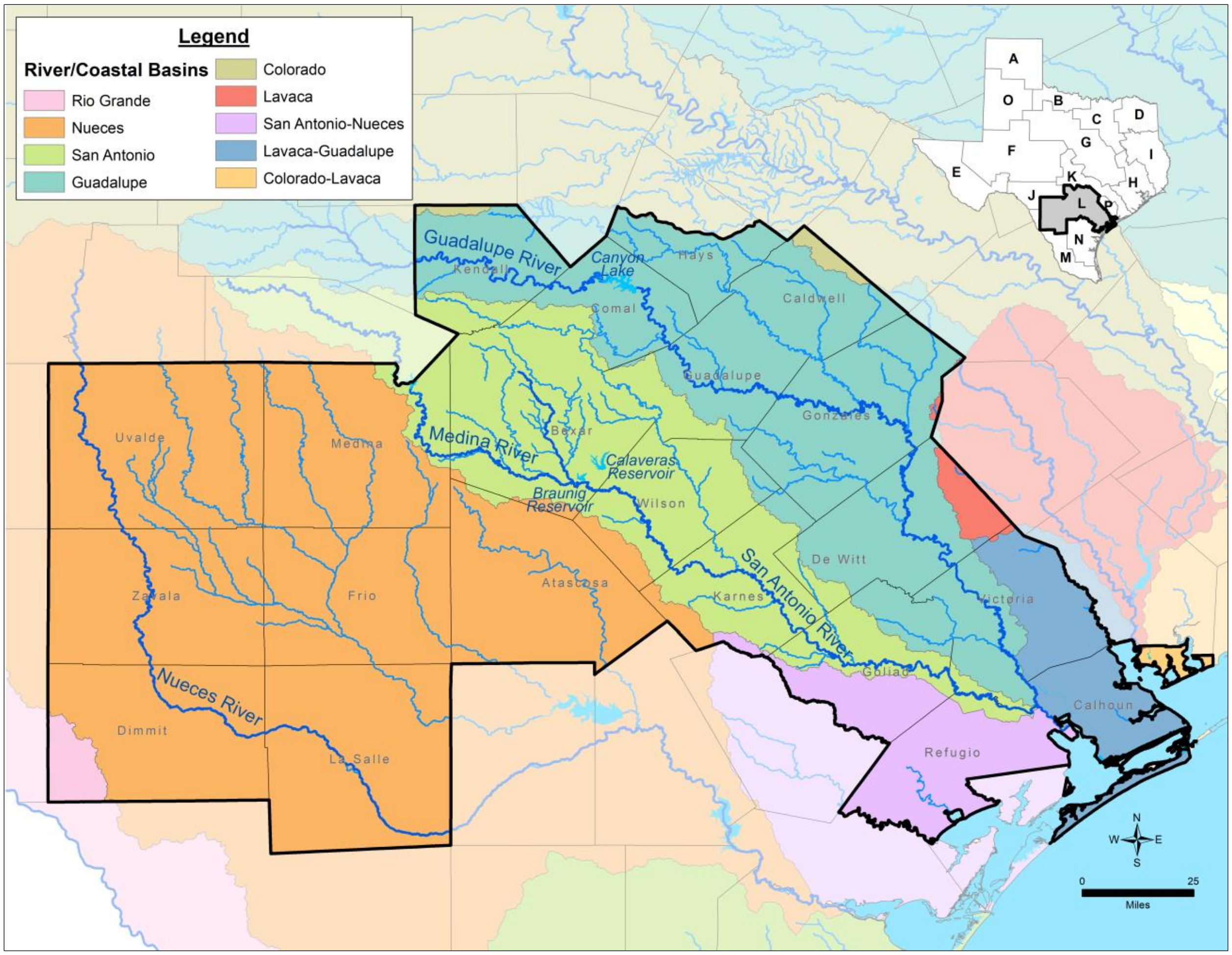

Figure 1-9 **Major River Basins and Reservoirs**

1.8.2.1 Rio Grande Basin

The southwestern corner of Dimmit County, an area of approximately 164 square miles, is located in the Rio Grande Basin and in the South Central Texas Region. The only surface water presently available to this area is that which can be captured in stock tanks.

1.8.2.2 Nueces River Basin

The Nueces River Basin is bounded on the north and east by the Colorado, San Antonio, and Guadalupe River Basins and the San Antonio-Nueces Coastal Basin, and on the west and south by the Rio Grande Basin and the Nueces-Rio Grande Coastal Basin. Total drainage area of the basin is about 16,920 square miles above Calallen Dam, of which 8,973 square miles are located in the South Central Texas planning region. The Nueces River rises in Edwards County and flows 371 river miles from the gage at Laguna in Uvalde County to Nueces Bay on the Gulf of Mexico near Corpus Christi. Principal tributaries of the Nueces River are the Frio and Atascosa Rivers. Major population centers located in the basin include the cities of Uvalde (Uvalde County), Crystal City (Zavala County), Pearsall (Frio County), Pleasanton (Atascosa County), Hondo (Medina County), and Carrizo Springs (Dimmit County). Major water rights in the Nueces River Basin within the South Central Texas Region include those held by the Zavala-Dimmit County Water Control and Improvement District (WCID) No. 1, which total 28,000 acft/yr.

1.8.2.3 San Antonio River Basin

The San Antonio River Basin is bounded on the north and east by the Guadalupe River Basin and on the west and south by the Nueces River Basin and the San Antonio-Nueces Coastal Basin. Total drainage area of the basin is about 4,180 square miles, of which 3,506 square miles are located in the planning region. The San Antonio River has its source in large springs within and near the city limits of San Antonio. The river flows more than 230 river miles across the Coastal Plain to a junction with the Guadalupe River near the Gulf of Mexico. Its principal tributaries are the Medina River and Cibolo Creek, both spring-fed streams. Major population centers located in the basin include the cities of San Antonio (Bexar County), Universal City (Bexar County), Schertz (Guadalupe County), Live Oak (Bexar County), Leon Valley (Bexar County), Converse (Bexar County), Kirby (Bexar County), Alamo Heights (Bexar County), and Floresville (Wilson County). The largest water rights in the San Antonio River Basin are associated with major reservoirs including the Medina Lake system (66,750 acft/yr), Calaveras Lake (37,000 acft/yr), and Braunig Lake (12,000 acft/yr).

1.8.2.4 Guadalupe River Basin

The Guadalupe River Basin is bounded on the north by the Colorado River Basin, on the east by the Lavaca River Basin and the Lavaca-Guadalupe Coastal Basin, and on the west and south by the Nueces and San Antonio River Basins. The Guadalupe River rises in the west-central part of Kerr County. A spring-fed stream, it flows eastward through the Hill Country until it issues from the Balcones Escarpment near New Braunfels. It then crosses the coastal plain to San Antonio Bay. Its total length is more than 430 river miles, and its drainage area is approximately 10,128 square miles above the Lower Guadalupe Saltwater Barrier and Diversion Dam, of which about 4,180 square miles are located within the San Antonio River Basin. Its principal tributaries are the San Marcos River, another spring-fed stream, which joins the Guadalupe River in Gonzales County; the San Antonio River, which joins it just above its mouth on San Antonio Bay; and the Comal River, which joins it at New Braunfels. Comal Springs are the source of the Comal River, which flows about 2.5 miles before joining the Guadalupe River. Major population centers located in the basin include the cities of Victoria (Victoria County), San Marcos (Hays County), New Braunfels (Comal County), Seguin (Guadalupe County), Lockhart (Caldwell County), Cuero (DeWitt County), Gonzales (Gonzales County), and Luling (Caldwell County). Major reservoirs in the Guadalupe River Basin include Canyon Reservoir with authorized diversions averaging 90,000 acft/yr and Coleto Creek Reservoir with authorized diversions from the Guadalupe River of up to 20,000 acft/yr (excluding supplemental supplies from Canyon Reservoir). In addition, there are groups of run-of-river water rights having significant authorized annual consumptive uses. These rights are held by the GBRA and the Dow Chemical Company (172,501 acft/yr), INVISTA/Dow (33,000 acft/yr), and the City of Victoria (27,007 acft/yr).

1.8.2.5 Colorado River Basin

Small portions of the Colorado River Basin are located inside the planning region, in Caldwell and Kendall Counties. The total drainage area of the Colorado River Basin is 41,763 square miles; of which, only 76 square miles are located in the planning region. The only surface water presently available to these two areas of the South Central Texas Region is from local stock tanks.

1.8.2.6 Lavaca River Basin

Small portions of the Lavaca River Basin are located inside the planning region, in DeWitt, Gonzales, and Victoria Counties. The total drainage area of the Lavaca River Basin is 2,309 square miles, of which 156 square miles are located in the planning region. The Lavaca-Navidad River Authority owns and operates Lake Texana and has contracts to provide raw water to Formosa Plastics Corporation in the Colorado-Lavaca Coastal Basin and Corpus Christi in the Nueces-Rio Grande Coastal Basin.

1.8.2.7 Coastal Basins

Parts of the San Antonio-Nueces, Colorado-Lavaca, and Lavaca-Guadalupe Coastal Basins are located within the South Central Texas Region. None of these coastal basins has large surface water projects. Because of limited surface water availability from local runoff and groundwater quality considerations, these basins generally rely on adjoining river basins to provide surface water to meet their needs. The San Antonio-Nueces Coastal Basin obtains imported surface water supplied from the Nueces River Basin. The Colorado-Lavaca Coastal Basin obtains surface water from Lake Texana in the Lavaca River Basin. The Lavaca-Guadalupe Coastal Basin obtains surface water imported from the Guadalupe River.

1.8.3 Reuse

Reuse is defined by 31 Texas Administrative Code (TAC) Section 363.1302 as the beneficial use of groundwater or surface water that has already been beneficially used. Reuse may be categorized as direct or indirect, and water can be used for potable and non-potable purposes. Examples of reuse include irrigation, cooling, and augmenting water supplies.

The most commonly used reuse supply is reclaimed water, which is municipal or industrial wastewater effluent that has been treated to levels that are safe and suitable for the purpose for which they are reused. In Texas, the Texas Commission on Environmental Quality (TCEQ) regulates the use of reclaimed water in 30 TAC Section 210. There are two types of reclaimed water uses, each with varying water quality requirements: Type I and Type II. Type I reclaimed water may be used where public contact is likely, such as irrigation for public parks, school yards, residential lawns, and athletic fields. Type I water may also be used for fire protection, food crop irrigation, and pasture irrigation. Type II reclaimed water may be used in remote, restricted, controlled, or limited-access areas where human contact is unlikely. Type II reclaimed water uses include irrigation water not likely to contact edible portions of a crop, animal feed-crop irrigation, and supply to non-recreational water bodies.

Major providers of reclaimed water within the SCTRWPG include SAWS, GBRA, Cibolo Creek Municipal Authority (CCMA), City of San Marcos, and City of Seguin.

1.8.4 Major Springs

According to selected references [6] [7], six major springs are located within the South Central Texas region: Comal, San Marcos, Hueco, Leona, San Antonio, and San Pedro. The following sub-sections provide descriptions for each of these six springs.

[6] Texas Water Development Board. "Major and Historical Springs of Texas (Report No. 189)." March 1975.
[7] Brune, Gunnar. "Springs of Texas," Volume I. Branch-Smith, Inc. Fort Worth, Texas. 1981.

1.8.4.1 Comal Springs

Comal Springs is located in Landa Park, New Braunfels, in Comal County. Comal Springs discharges water from the Edwards Aquifer and associated limestones of the Edwards Aquifer and issues through the Comal Springs Fault. Senate Bill 3 of the 80th Texas Legislature limited the quantity of water that can be withdrawn from the Edwards Aquifer in each calendar year for the period beginning January 1, 2008, to no more than 572,000 acft, specified critical period withdrawal reductions and triggers, and established the Edwards Aquifer Recovery Implementation Program (EARIP) for protection of species listed as threatened or endangered under federal law and associated with the aquifer. As a result of the EARIP, a Edwards Aquifer Habitat Conservation Plan (EAHCP) was published in November 2012 and approved by the USFWS in February 2013. Flow protection measures in the EAHCP seek to ensure a minimum monthly average discharge from Comal Springs in excess of 30 cubic feet per second (cfs) in a repeat of the drought of record (DOR). Long-term average discharge from Comal Springs is about 290 cfs.

1.8.4.2 San Marcos Springs

San Marcos Springs is located 2 miles northeast of San Marcos, in Hays County. San Marcos Springs discharges water from the Edwards Aquifer and associated limestones of the Edwards Aquifer and issues through the San Marcos Springs Fault. Senate Bill 3 and the EAHCP, as described in the Comal Springs text above, also apply to San Marcos Springs. Flow protection measures in the EAHCP seek to ensure a minimum monthly average discharge from San Marcos Springs in excess of 60 cfs in a repeat of the drought of record. Long-term average discharge from San Marcos Springs is about 170 cfs.

1.8.4.3 Hueco Springs

Hueco Springs is located about 3 miles north of New Braunfels near the confluence of Elm Creek and the Guadalupe River in Comal County. Two main springs issue from a fault in the Edwards limestone at this location. Sources of water for these springs include the Edwards Aquifer and, possibly, underflow from the Guadalupe River. Long-term average discharge from Hueco Springs is about 40 cfs.

1.8.4.4 Leona Springs

Leona Springs consists of three groups of springs located from 1 to 6 miles southeast of Uvalde, in Uvalde County. These springs discharge water from the Edwards Aquifer. Long-term average discharge from Leona Springs is about 25 cfs.

1.8.4.5 San Antonio Springs

San Antonio Springs is located just above East Hildebrand Street in San Antonio, in Bexar County. San Antonio Springs discharges water from the Edwards Aquifer. Long-term average discharge from San Antonio Springs is about 20 cfs.

1.8.4.6 San Pedro Springs

San Pedro Springs is located in San Pedro Park, San Antonio, in Bexar County. San Pedro Springs discharges water from the Edwards Aquifer. Long-term average discharge from San Pedro Springs is about 5 cfs.

1.8.5 Surface Water Quality

Surface water quality within the South Central Texas Region is generally good with typical values for criteria such as TDS, chlorides, sulfates, dissolved oxygen, pH, bacteria, and temperature in compliance with applicable Texas Surface Water Quality Standards. Within the South Central Texas Region, site-specific uses and criteria for classified water bodies are identified for 15 segments in the Guadalupe River Basin, 12 segments in the San Antonio River Basin, 12 segments in the Nueces River Basin, four segments in the San Antonio-Nueces Coastal Basin, nine segments in the Bays and Estuaries Basin, zero segments in the Lavaca River Basin, one segment in the Lavaca-Guadalupe Coastal Basin, and one segment in the Gulf of Mexico Basin. Site-specific uses and criteria for unclassified water bodies within the region include five segments in the Guadalupe River Basin, one segment in the Bays and Estuaries Basin, three segments in the San Antonio River Basin, and two segments in the Nueces River Basin. With the exception of the Victoria Barge Canal, all of the classified and unclassified segments support contact recreation and most support domestic water supply. Aquatic life uses are characterized as exceptional in 33 percent of these segments and high in an additional 63 percent of the segments. Medio Creek and Mid Cibolo Creek, both in the San Antonio River Basin, are characterized as Intermediate Aquatic Life Use and Limited Aquatic Life Use, respectively.[8]

Pursuant to Section 303(d) of the federal Clean Water Act, Texas compiles a list of water bodies for which effluent limitations are not stringent enough to implement water quality standards and for which the associated pollutants are suitable for measurement by maximum daily load. At the time of writing, the *2014 Texas 303(d) List* is the most recent, effective list that was adopted by the TCEQ and approved by the US Environmental Protection Agency (EPA). This list identifies 47 water bodies within the South Central Texas Region as impaired: nine in the Bays and Estuaries Basin, seven in the Guadalupe River Basin, one in the Lavaca River Basin, seven in the Nueces River Basin, 19 in the San Antonio River Basin, three in the San Antonio-Nueces Coastal Basin, and the Gulf of Mexico. Of these water bodies, four have one or more completed and approved Total Maximum Daily Loads (TMDLs). The most common impaired parameters are bacteria and dissolved oxygen. In addition, the following water bodies are listed as impaired for bacteria (oyster waters): Lavaca Bay/Chocolate Bay, Copano Bay/Port Bay/Mission Bay, Keller Bay, Carancahua Bay, and San Antonio Bay/Hynes Bay/Guadalupe Bay.

All WMS analyses were performed subject to the assumption that effluent from such WMSs will be treated at or above the levels in the State Water Quality Management Plan. Additionally, it is assumed that entities comply with the Texas Clean Rivers Program by providing quality-assured data to the TCEQ and identify and evaluate water quality issues.

Surface water quality characteristics typical of streams and bays in the South Central Texas Region are generally suitable for raw water uses in the industrial, steam-electric power generation, mining, irrigation, and livestock sectors as well as municipal and domestic potable uses after application of conventional treatment methods. Identification of impaired water quality parameters in some water bodies does not preclude development of proximate or upstream WMSs but does point to the importance of appropriate wastewater treatment, management of non-point source pollutants, and compliance with environmental flow standards.

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[8] *Texas Surface Water Quality Standards*. Effective March 1, 2018.

1.9 THREATS TO AGRICULTURAL AND NATURAL RESOURCES

Pursuant to 31 TAC Section 357.30, the SCTRWPG has identified the following threats to agricultural and natural resources in the South Central Texas Regional water planning area due to water quantity problems or water quality problems related to water supply:

- A shortage of economically accessible fresh water of suitable quantity and quality for irrigation and for livestock drinking and sanitation purposes. For example, such a shortage could result from groundwater production at insufficiently sustainable rates and/or lack of control over groundwater production; and
- Deterioration of water quality, so that the quantities available are not usable for irrigation or livestock drinking and sanitation. Increased salinity is an example of a water quality threat to agriculture.

The SCTRWPG identified the following threats to natural resources in the planning region:

- Reductions of quantity and/or quality of fresh water available to fish and wildlife;
- Changes to aquatic and riparian habitats associated with use of water from streams and aquifers; and
- Temporary or permanent inundation of aquatic, riparian, and terrestrial habitats associated with surface water impoundment.

Technical evaluations of WMSs (Chapter 5) and/or assessments of the cumulative effects of plan implementation (Chapter 6) include quantitative and/or qualitative discussion of how identified threats to agricultural or natural resources are expected to be addressed or affected by a WMS and/or the plan. The following summarizes specific quantitative and/or qualitative measures used to meet this requirement:

- Reliance upon TWDB application of groundwater availability models (GAMs) to illustrate projected changes in regional aquifer levels (desired future conditions) consistent with modeled available groundwater (MAG) estimates and portray spring discharges and surface water/groundwater interactions at the end of the planning period;
- Comparison of the gross business effects (as provided by the TWDB) associated with failure to meet projected agricultural water needs with the costs of potential WMSs available to the region;
- Applications of surface water availability models (WAMs), along with the flow regime application tool (FRAT) (when necessary), for compliance with TCEQ environmental flow standards in evaluating proposed new appropriations and quantifying projected changes in streamflow and/or freshwater inflows to bays and estuaries. Graphical and tabular summaries of projected changes focus on time series data, monthly medians, and/or frequency of occurrence;
- Qualitative assessment of potential changes in groundwater or surface water quality based on available information; and
- Acreage temporarily or permanently inundated by a planned reservoir and the frequency of such inundation.

1.10 SUMMARY OF EXISTING PLANS

1.10.1 2017 State Water Plan

In Section 16.051 of the Texas Water Code, the Executive Administrator of the TWDB is charged with producing a State Water Plan that addresses the broad public interest of the state.[9] As currently specified in Section 16.051, the plan is to be prepared every 5 year period and incorporates the regional water plans. In accordance with Section 16.051, "The state water plan shall provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions, in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the entire state."

The 2017 Texas Water Plan provides a statewide perspective that places local and regional needs within the state context. Available individual and county-level studies were built into the overall findings, and in formulating water supply solutions, the plan focused on economic viability while taking environmental effects into consideration. Legislation, passed in the 85th Legislature, specifies a 5 year update period for the plan that is based on regional planning studies and provides that related financial assistance applications must be consistent with the regional and State plans for regulatory approval by state agencies.

The ultimate goal of the State Water Plan is to identify those policies and actions that may be needed to meet Texas' near- and long-term water needs, on the basis of reasonable projected uses of water, affordable water supply availability, and the goal of conservation of the state's natural resources.

The 2017 State Water Plan recommends a total of 260 WMSs for the South Central Region, which would provide an additional 180,000 acft of water per year by 2020 and 610,000 acft by 2070. The 2020 cost for all recommended WMSs for the region are the highest of any region in the state at $5.954 billion, reflective of the immediate need for the district.

The annual water need for the South Central Region is estimated to be 200,000 acft for 2020. This need increases to 297,000 acft by 2040, and 483,000 acft by 2070. This represents an increase in need of 141 percent over the time frame. In 2020, 53 percent of the need will come from irrigation and 36 percent from municipals. By 2030, the municipal need will exceed irrigation need. By 2070, 63 percent of need will come from municipals.

For the 2017 State Water Plan, cost estimates were calculated using common cost elements and methodologies and a cost estimation tool developed for the TWDB. Using this tool, the weighted average cost per water management type in dollars per acft was calculated for the South Central Region. The cost for new reservoirs was calculated to be $596/acft, groundwater desalination $698/acft, municipal conservation $652/acft, aquifer storage and recovery $442/acft, and $743/acft for direct potable reuse.

[9] Texas Water Development Board. State Water Plan: Water for Texas – 2017. Austin, Texas. 2017.

1.10.2 2016 Regional Water Plan

The 2016 South Central Texas Regional Water Plan (SCTRWP) was adopted in December 2015. The South Central Texas Regional Water Plan outlines the WMSs recommended by the planning group to meet the identified needs in the region. These WMSs are summarized in Chapter 5 Vol. I of the 2016 SCTRWP. The plan contains a total of 264 strategies and 61 recommended projects, with a combined capital cost of $7.88 billion.

Selected WMSs contained in the 2016 SCTRWP are summarized below:

- Municipal Water Conservation with a goal of reducing per capita use for municipalities currently using 140 gallons per capita per day (GPCD) by 1 percent per year and 0.25 percent per year for municipalities currently using less than 140 GPCD. The plan emphasizes low flow plumbing fixtures, clothes washers, and landscape irrigation conservation which combined has a potential savings of over 25,000 acft/yr, at a cost of between $600 and $770/acft;
- Six entities within the region with planned direct recycled water programs. Combined, these plans have the potential to reuse 97,763 acft/yr of water by 2070, with a unit cost of $458 to $1,500/acft/yr;
- The Local Carrizo groundwater management strategy involves an expansion of well fields in the Carrizo-Wilcox Aquifer. This strategy would open new water supplies totaling 3,388 acft/yr by 2070, at a unit cost ranging from $516/acft/yr to $5,150/acft/yr;
- NBU aquifer storage and recovery (ASR) strategy would use dual purpose wells to store water during time of plenty and recover the water during times of shortage. This project would add an estimated 8,300 acft/yr of new supply by 2070. This strategy couples with a 7.5 million gallons per day (mgd) water treatment plant expansion and combined they would have a unite cost of $462/acft/yr;
- The SAWS Seawater Desalination strategy would supply 84,000 acft of annual storage by 2070 with an estimated unit cost of $2,713/acft/yr; and
- Volume II of the 2016 South Central Texas Regional Water Plan provides a detailed description and evaluation of all the recommended WMSs for the region.

1.10.3 Local Water Plans

During this planning process, the SCTRWPG worked with each local entity to develop a water management supply plan to meet any identified needs. These plans are reflected in Chapter 5.3 of this document.

1.10.4 Current Preparations for Drought

Under requirements of Senate Bill 1 of the 75th Texas Legislature, the TCEQ requires drought contingency plans (DCPs) for WWPs, irrigation districts, and retail water suppliers. All DCPs are required to set triggering criteria for initiation and termination of drought response stages and contain supply and demand management measures to be implemented during each stage. The retail and wholesale water suppliers' plans contain measures to limit or restrict the use of water for purposes such as to irrigate landscaped areas, to wash any motor vehicle, to fill or add water to any indoor or outdoor swimming pool, to operate any ornamental fountain, and to irrigate golf courses. The TCEQ DCPs are to be developed, updated, and submitted every 5 years. Further information on DCPs and drought response can be found in Chapter 7 of the SCTRWP.

The TCEQ requires preparation of water conservation plans for surface water right holders that supply 1,000 acft or more of water for non-irrigation use and 10,000 acft/yr for irrigation use. In addition, conservation plans are commonly included in the management plans of groundwater conservation districts (GCDs).

The TWDB is charged with the approval of groundwater management plans, which are required for all confirmed GCDs in Texas. A groundwater management plan describes a GCD's groundwater management goals, including how to address drought conditions. The districts use methods such as requiring wells in areas that are in danger of over producing groundwater and damaging the aquifers to restrict production by means of production permits, metering the amount of water produced, and working with water utilities, agricultural, and industrial users within the district to promote the efficient use of water.

SAWS' Water Conservation and Reuse Plan aims to reduce the impacts of drought in the San Antonio area of the South Central Texas Region by water conservation programs for its customers. One of the goals of this plan is to increase the public's awareness of water-saving methods to encourage customers to voluntarily conserve water, thus reducing Edwards Aquifer use. Reuse of treated municipal wastewater for landscape irrigation is also a part of the SAWS Water Conservation and Reuse Plan designed to reduce the use of potable water for non-potable applications.

To address Edwards Aquifer management and springflow during times of drought, the Edwards Aquifer Authority (EAA) developed a critical period management (CPM) plan. The CPM plan is divided into four critical period stages, each with a trigger based on aquifer level and spring discharges, and with corresponding responses to reduce groundwater withdrawals. To protect unique species and their habitats from future water quantity concerns in the Edwards Aquifer, EAA and stakeholders developed the EAHCP, which establishes springflow protection measures. These provisions apply to all holders of regular permits, the customers of all permittees who are retail water utilities, and owners of exempt wells. Under these provisions, during times of drought, water use restrictions and other flow protection measures are engaged, as appropriate and necessary.

The SCTRWP relies upon local water management agencies and water utilities to develop drought and other management plans and to determine whether to initiate a drought response. Chapter 7 includes additional information and recommendations of the SCTRWPG regarding drought management.

1.11 WATER LOSS AUDITS

In accordance with 31 TAC Section 357.30, the 2017 SCTRWP includes water loss information compiled by the TWDB from water loss audits performed by retail public utilities of the South Central Texas Regional Water Planning Area pursuant to Section 358.6 of this title (relating to water loss audits). In addition, in accordance with 31 TAC Section 357.30, the regional water planning group has considered strategies to address issues identified in the information compiled by the TWDB from the water loss audits performed by retail public utilities pursuant to Section 358.6 of this title (relating to water loss audits).

All retail public water suppliers are required to submit a water loss audit to the TWDB once every five years. Additionally, any retail water supplier with more than 3,300 connections or with an active financial obligation with the TWDB are required to submit an audit annually. The 2015 to 2017 water loss data presented herein were submitted to the TWDB by water utilities in Texas as required by House Bill (HB) 3338 of the 78th Texas Legislature. HB 3338 required the TWDB to compile the information included in water audits by type of retail public utility and by regional water planning area and to provide that information to regional planning groups for use in identifying appropriate WMSs in regional water plans. The water loss data presented below were acquired as part of the 2015 to 2017 water loss audit reporting efforts. If a water utility is not listed in the table below, then there were no audit data available for 2015-2017. The methodology used relies upon self-reporting data provided by public utilities, and because of this, the self-reported data may need further refinement.

The TWDB provided the list of 161 public utilities of the South Central Texas Region that filed a water loss audit report between 2015 and 2017. Table 1-10 summarizes relevant portions of the most recent report submitted by the 161 entities. This table shows the total retail population served, total water volume input into the system, total water loss, percent loss, and the value of water loss in dollars. Where available, the values presented are the TWDB-corrected values. Further information regarding the methodology can be found in the TWDB's 2008 Water Loss Audit Manual for Texas Utilities[10].

The 161 water utilities that responded to the water loss survey reported having served 2,767,442 people (Table 1-10). Total reported annual quantity of water produced was 399,113 acft, with a reported quantity of water loss of 104,503 acft. The quantity of water loss, as a percent of estimated total water originating at the source is calculated at about 26.2 percent.

Table 1-10 Water Loss Audit Reports Summary (2015 to 2017)

UTILITY NAME	MOST RECENT REPORT YEAR	RETAIL POP SERVED	SYSTEM INPUT VOLUME (ACFT)	WATER LOSS (ACFT)	WATER LOSS (%)	TOTAL COST OF LOSS ($)
Arrowhead Water System	2015	105	18	5	28.9	3,442
Atascosa Rural WSC	2017	14,388	1,509	310	20.5	27,814
Batesville WSC	2016	1,050	174	61	35.0	18,019
Bavarian Hills	2015	198	39	5	12.0	1,584
Benton City WSC	2017	17,550	2,031	234	11.5	156,828
Berry Oaks Water Company	2015	114	14	1	10.9	677
C-Willow Water Co.	2015	732	107	42	39.3	37,488
Canyon Lake Villas	2016	296	17	(18)	0.0	-2,620
Carrizo Hill WSC	2015	1,000	136	14	10.0	19,419,596

[10] Texas Water Development Board. Report No. 367. Water Loss Audit Manual for Texas Utilities. March 2008. http://www.twdb.texas.gov/publications/brochures/conservation/doc/WaterLossManual_2008.pdf?d=1107885.7699999935.

UTILITY NAME	MOST RECENT REPORT YEAR	RETAIL POP SERVED	SYSTEM INPUT VOLUME (ACFT)	WATER LOSS (ACFT)	WATER LOSS (%)	TOTAL COST OF LOSS ($)
Cascade Mobile Home Park	2015	315	20	1	4.6	309
Cedar Oak Mesa WSC	2015	609	24	2	8.8	2,952
City of Alamo Heights	2015	7,031	1,638	200	12.2	21,312,838
City of Asheton	2016	1,310	211	58	27.4	21,175
City of Boerne	2017	14,874	1,692	422	15.9	432,797
City of Castroville	2017	2,954	648	(14)	0.0	25,356
City of Christine	2015	463	496	490	98.7	8,106,187
City of Cibolo	2017	17,000	-	175	10.7	328,058
City of Converse	2017	27,207	1,568	299	13.8	256,873
City of Cotulla	2016	6,750	1,501	70	4.7	105,092
City of Cuero	2015	8,605	2,048	644	31.4	99,583
City of Devine	2015	4,350	577	61	10.5	98,893
City of Falls City	2015	610	112	18	16.1	11,310,901
City of Floresville	2016	7,671	1,186	357	30.1	82,279
City of Garden Ridge	2016	4,375	911	88	9.6	780
City of Gonzales	2017	9,378	1,763	118	6.8	85,408
City of Hondo	2017	9,071	2,041	565	27.7	462,096
City of Jourdanton	2015	5,571	739	37	5.0	11,484
City of Karnes City	2017	3,500	423	75	17.8	31,813
City of Kenedy	2017	8,557	1,612	198	12.3	72,205
City of Kirby	2015	8,600	811	217	26.8	3,733,542,820
City of Kyle	2017	27,468	985	462	14.9	436,007
City of Live Oak	2016	10,500	1,418	192	13.5	157,203
City of Lockhart	2017	13,527	442	239	14.2	235,847
City of Lytle	2015	2,800	514	100	19.5	65,296
City of Marion	2015	2,250	4	(138)	0.0	0
City of Nixon	2015	2,378	935	82	8.7	120,674
City of Nordheim	2016	301	53	(25)	0.0	-4,053
City of Pearsall	2015	9,240	1,912	694	36.3	86,839

UTILITY NAME	MOST RECENT REPORT YEAR	RETAIL POP SERVED	SYSTEM INPUT VOLUME (ACFT)	WATER LOSS (ACFT)	WATER LOSS (%)	TOTAL COST OF LOSS ($)
City of Pleasanton	2017	13,531	1,988	109	5.5	32,973
City of Point Comfort	2015	834	231	28	12.2	50,627
City of Port Lavaca	2017	12,248	-	158	11.8	84,583
City of Poteet	2015	3,600	419	124	29.6	28,234
City of Poth	2015	2,035	313	303	96.7	5,414,182
City of Refugio	2016	2,890	52,678	51,504	97.8	33,565,000
City of Sabinal	2017	1,701	319	72	22.6	6,268
City of San Marcos	2017	68,668	8,522	762	8.9	801,348
City of Schertz	2017	39,453	45	505	9.1	290,740
City of Seguin	2017	28,614	3,740	342	4.9	239,766
City of Shavano Park	2016	1,883	506	27	5.3	13,464
City of Stockdale	2015	1,580	297	81	27.4	64,327
City of Universal City	2017	19,986	2,392	61	2.5	33,059
City of Uvalde	2017	17,450	3,334	712	21.5	162,421
City of Victoria	2017	67,574	10,530	1,330	12.6	271,460
Clear Water Estates	2015	575	282	(3)	0.0	-398
Canyon Lake Water Service Company Canyon Lake Shores	2017	18,766	2,699	501	20.0	315,094
Concan WSC	2015	1,140	66	(22)	0.0	1,766,311
Coolcrest Water System	2015	1,005	74	2	2.2	615
Country Springs Water Co	2015	747	89	3	3.9	1,166
County Line SUD	2015	8,139	740	6	0.9	6,926
Creekwood Estates	2015	786	60	12	20.4	5,710
Creekwood Ranches WSC	2015	477	46	18	39.8	3,641
Crystal Clear SUD	2017	16,988	1,053	574	28.9	358,604
Derby ING.	2017	144	16	8	52.0	10,994
Eagles Peak Ranch WSC	2015	150	28	10	37.8	3,705
East Central SUD	2017	14,991	-	317	18.6	95,138
East Medina County SUD Unit 1	2015	5,037	501	155	30.9	255,153

UTILITY NAME	MOST RECENT REPORT YEAR	RETAIL POP SERVED	SYSTEM INPUT VOLUME (ACFT)	WATER LOSS (ACFT)	WATER LOSS (%)	TOTAL COST OF LOSS ($)
East Medina County SUD Unit 2	2015	2,109	341	190	55.8	311,530
East Medina County SUD Unit 3	2015	1,179	76	3	3.5	4,631
El Oso WSC	2015	6,594	1,069	295	27.6	225,704
Enchanted Harbor	2015	30	0	1	13.7	823
Enchanted Oaks	2015	52	6	1	12.0	687
Fair Oaks Ranch Utilities	2015	7,169	571	84	5.9	29,773
Fannin Community	2015	68	17	2	12.4	1,668
Fashing Peggy Water System	2015	528	87	34	39.6	25,904
Garden Oaks	2015	309	-	1	3.2	318
GBRA Calhoun County Rural Water System	2016	3,632	-	30	12.0	25,093
GBRA Cordillera Ranch	2016	831	22	39	9.5	38,906
GBRA Johnson Ranch Subdivision	2016	606	-	10	4.0	10,490
GBRA Lomas Water Co. Comal Trace	2016	699	38	10	8.0	9,963
Goforth SUD	2017	22,500	481	312	14.2	102,625
Goliad County WSC - Berclair Water System	2015	64	12	1	10.6	1,024
Goliad County WSC - La Bahia	2015	72	14	2	12.3	1,355
Gonzales County WSC	2016	6,350	1,875	407	21.4	121,407
Green Valley SUD	2017	35,283	1,794	909	21.8	604,800
Grey Forest Water System	2016	483	51	2	3.3	209
Hays County WCID 2	2015	1,695	258	25	9.5	19,605
Hickory Hill Water	2015	291	45	21	46.8	13,629
Highway 117 WSC	2015	165	-	13	38.7	19,971
Highway 90 Ranch WSC	2016	400	22	3	12.1	265,386
Kendall County WCID 1	2015	3,000	317	45	14.2	15,256
Kendall West Utility	2015	2,030	71	62	23.7	172,571
Kings Point WSC	2015	52	50	14	27.5	8,166
Knippa WSC	2015	689	117	38	32.1	13,756

UTILITY NAME	MOST RECENT REPORT YEAR	RETAIL POP SERVED	SYSTEM INPUT VOLUME (ACFT)	WATER LOSS (ACFT)	WATER LOSS (%)	TOTAL COST OF LOSS ($)
La Salle WCID 1-A	2016	237	-	3	6.8	4,720
Lake Valley Water	2016	382	38	2	5.5	218,284
Laurel Canyon Ranch Water System	2015	204	27	2	8.3	1,855
Loma Alta Water System	2016	745	176	28	15.7	20,277,563
LSR WSC	2015	102	6	0	2.9	300
Martindale WSC	2017	-	122	116	94.9	155,521
Maxwell WSC	2015	5,958	-	122	25.9	8,817
McCoy WSC	2017	7,917	1,131	174	15.3	42,481
Medina County WCID 2	2015	650	137	37	26.9	41,837
Medina River West WSC	2016	1,500	111	24	21.2	21,958
Medina Valley Water Supply Co	2016	114	17	15	92.3	5,142
Moore WSC	2017	750	92	24	26.1	23,755
New Alsace WSC	2015	150	20	3	15.3	9,585
New Braunfels Utilities	2017	85,806	13,163	1,390	10.6	1,172,107
North Breeze MHP	2016	95	8	-	0.0	0
Oak Hills WSC	2015	5,037	1,024	387	37.8	53,471
Oak Village North	2015	1,938	303	25	8.2	7,710
Oaks North Mobile Home Estates	2015	1,074	72	2	2.1	574
Oakview Water System	2015	192	10	0	0.1	4
Old Hwy 90 - N. Ridge Water Service	2015	174	12	(0)	0.0	-979
Old Hwy 90 Water Service	2015	828	70	(1)	0.0	4,853
Picosa WSC	2015	2,466	171	5	2.8	4,748,944
Pioneer Estates	2015	320	25	1	3.8	634
Platten Creek Water System	2015	114	7	1	8.3	820
Plum Creek	2015	6,837	344	40	5.9	38,086
Polonia WSC	2015	501	42	6	13.9	1,940
Polonia WSC North	2015	5,442	549	59	10.8	21,308

UTILITY NAME	MOST RECENT REPORT YEAR	RETAIL POP SERVED	SYSTEM INPUT VOLUME (ACFT)	WATER LOSS (ACFT)	WATER LOSS (%)	TOTAL COST OF LOSS ($)
Polonia WSC South	2015	1,704	225	29	12.7	7,051
Port O'Connor Improvement District	2017	4,479	-	29	9.9	99,254
Refugio County WCID 1	2015	495	65	32	49.7	1,868
Reunion Ranch WCID	2015	333	-	3	3.6	614
Rim Rock Ranch	2015	1,029	124	9	7.1	2,864
Rio Medina Estates	2015	168	15	1	5.0	487
River Oaks Ranch	2015	345	36	5	13.7	4,831
Rockin J. Ranch Subdivision	2015	249	630	(2)	0.0	462
Rockwall Ranch Subdivision	2015	1,332	320	7	2.2	4,217
Rocky Creek Subdivision Water System	2015	120	5	(0)	0.0	-18
SS WSC	2017	16,542	1,927	46	2.4	15,642
San Antonio Water System	2017	1,819,116	241,429	32,758	13.6	49,074,587
Seven Hills Ranch	2015	468	77	5	6.5	4,844
Seven Oaks Water Supply	2015	144	13	4	30.3	1,056
Shady Oaks Water Company	2015	351	34	1	2.2	474,828
SJWTX Glenwood Subdivision	2016	289	-	4	8.7	5,896
SJWTX North Point Subdivision	2016	74	7	1	13.8	1,077
SJWTX Summit North Subdivision	2016	61	6	2	27.4	1,750
SJWTX Triple Peak Plant	2017	19,401	2,177	478	22.0	229,834
Skyline Ranch Estates WSC	2017	261	18	2	11.9	2,347
Spring Branch Indian Hills Estates WSC	2016	489	32	3	8.4	2,320
Springs Hill WSC	2017	24,279	909	886	29.8	1,082,052
Stage Coach Hills	2015	486	57	3	4.8	887
Sunilandings Utilities	2015	28	15	9	58.2	8,827
Sunko WSC	2015	4,293	524	64	12.2	38,358
Tbm Resident WSC	2015	251	50	6	11.9	1,612
The Oaks WSC	2016	1,173	105	21	13.3	9,877

UTILITY NAME	MOST RECENT REPORT YEAR	RETAIL POP SERVED	SYSTEM INPUT VOLUME (ACFT)	WATER LOSS (ACFT)	WATER LOSS (%)	TOTAL COST OF LOSS ($)
The Woodlands Water System	2015	195	16	3	17.0	2,639
Town of Bayside	2015	325	39	1	2.6	-16
Town of Woodsboro	2017	1,685	215	28	13.2	24,126
Tri Community WSC	2015	1,500	144	24	16.6	31,224
Utopia WSC	2015	209	52	8	15.0	3,763
Victoria County WCID 1	2017	2,459	279	62	22.8	13,980
Ville Dalsace Water Supply	2015	320	85	0	0.3	207
Wimberley Oaks WSC	2015	50	4	0	3.8	52
Wimberley WSC	2015	5,232	456	57	12.5	55,818
Windmill Ranch Subdivision	2015	678	41	2	3.0	888
Windmill WSC	2015	1,644	221	31	14.2	51,090
Yancey WSC	2015	7,390	843	219	25.9	14,416
Zavala County WCID 1	2017	1,500	306	89	29.1	362,243

1.12 DROUGHT OF RECORD

The historical drought of record for the Guadalupe-San Antonio River Basin of the South Central Texas Region is that which occurred primarily in the 1950s. Although the drought of 2011 was quite severe in terms of combined gauged streamflows for the Guadalupe River at Victoria and the San Antonio River at Goliad, there were three consecutive years in the 1950s drought (1954 through 1956) during which streamflows in each year were less than those in 2011.

For the Guadalupe-San Antonio River Basin within the South Central Texas Region, the drought of the 1950s remains the drought of record. In the upper portions of the Guadalupe-San Antonio River Basin, the 1950s drought generally started in summer of 1947 and continued into early 1957. In the lower basin area near the Gulf Coast, the drought generally was a 3 year period between 1954 and 1956.

Until recently, the 1950s drought was the drought of record for the Nueces River Basin as well. However, the 1990s drought was severe and prolonged enough that it is now considered the drought of record for the Nueces River Basin within the South Central Texas Region.

FINAL PLAN

CHAPTER 2: POPULATION AND WATER DEMAND PROJECTIONS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

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acft/yr	Acre-Feet per Year
ARWA	Alliance Regional Water Authority
CRWA	Canyon Regional Water Authority
CVLGC	Cibolo Valley Local Government Corporation
DB22	State Water Planning Database
GBRA	Guadalupe-Blanco River Authority
GPCD	Gallons Per Capita Per Day
MWP	Major Water Provider
RWP	Regional Water Plan
RWPG	Regional Water Planning Group
SAWS	San Antonio Water System
SCTRWPA	South Central Texas Regional Water Planning Area
SSLGC	Schertz-Seguin Local Government Corporation
SUD	Special Utility District
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
WSC	Water Supply Corporation
WUG	Water User Group
WWP	Wholesale Water Provider

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CHAPTER 2: POPULATION AND WATER DEMAND PROJECTIONS

2.1 INTRODUCTION

The Texas Water Development Board (TWDB) has developed population and water demand projections for the South Central Texas (Region L) Regional Water Planning Area (SCTRWPA), which consists of 20 full counties and part of Hays County. These counties are located in six major river basins (Nueces, San Antonio, Guadalupe, Colorado, Lavaca, and Rio Grande) and three coastal basins (Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces) (refer to Table 1-1 in Chapter 1).

This chapter presents the TWDB-approved population and water demand projections for the SCTRWPA on the basis of utility area service boundaries. In previous planning cycles, population and water demand projections were developed on the basis of political boundaries. In subsequent chapters, the water demand projections are used to identify water plans to meet future water needs.

2.2 POPULATION PROJECTIONS

Population estimates for the 2021 Regional Water Plan are based on population projections in the 2016 Regional Water Plan and reassembled by utility service areas instead of political boundaries. The 2016 population estimates were projected over the 50-year planning horizon (2020 to 2070) using the most-recent census (2010 Census) data as the basis. Regional population projections were developed by the State Demographer at the Texas State Data Center; these data were further refined on a county, subcounty, and water user group (WUG) basis by the TWDB in consultation with regional water planning groups (RWPGs), Texas Commission on Environmental Quality (TCEQ), Texas Department of Agriculture, and the Texas Parks and Wildlife Department (TPWD). RWPGs were provided an opportunity to review and suggest adjustments to population projections, as necessary.

The population of the South Central Texas Region is projected to increase from 3,013,139 in 2020 to 5,219,393 in 2070, an increase of 73 percent (Figure 2-1). Most population growth is expected to occur along the Interstate 35 corridor. The following subsections present population projections for each planning decade by WUG, counties, river and coastal basins, and major water providers (MWPs).

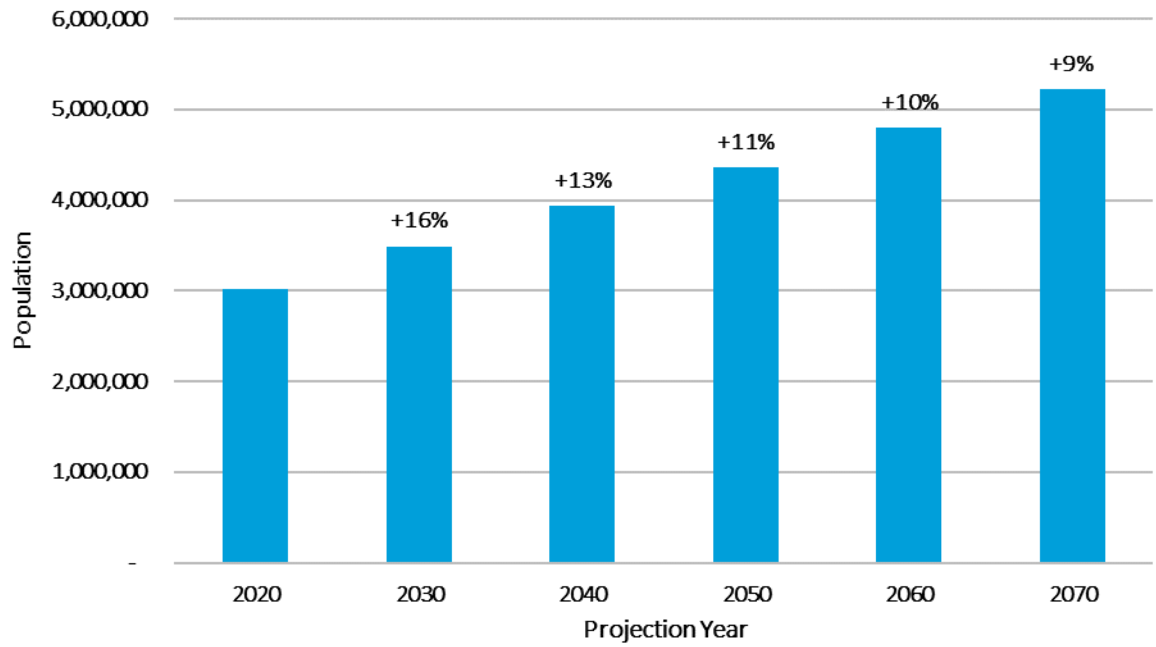

Figure 2-1 **South Central Texas Region Population Projections (2020 to 2070)**

2.2.1 Water User Groups

Population projections for each WUG within the South Central Texas Region are provided in Appendix 2-A.

2.2.2 Counties

Based on 2010 Census data, approximately 66% of the South Central Texas Region's population is projected to reside in Bexar County in 2020. By 2070, the Bexar County population is expected to increase by approximately 1,120,685 people and comprise 59 percent of the total region's total population (Table 2-1 and Figure 2-2). In addition to Bexar County, Comal, Guadalupe, and Hays counties represent the counties with the largest anticipated population growth between 2020 and 2070, with population increases of 204,965 people, 213,568 people, and 358,487 people, respectively. The counties with the smallest projected population growth between 2020 and 2070 include Karnes and Refugio, with population increases of 512 and 526 people, respectively.

Table 2-1 Population Projections for Individual Counties (2020 to 2070)

COUNTIES	POPULATION PROJECTIONS (NO.)					
	2020	2030	2040	2050	2060	2070
Atascosa	52,574	60,755	68,210	75,481	82,324	88,676
Bexar	1,974,041	2,231,550	2,468,254	2,695,668	2,904,319	3,094,726
Caldwell	47,008	57,553	67,955	78,243	88,639	98,754
Calhoun	24,037	26,866	29,622	32,276	34,906	37,454
Comal	152,499	193,188	234,515	276,239	317,682	357,464
DeWitt	20,855	21,555	21,900	22,216	22,425	22,572
Dimmit	10,875	11,725	12,275	12,825	13,246	13,585
Frio	19,186	21,144	22,846	24,488	25,967	27,304
Goliad	8,427	9,519	10,239	10,545	10,759	10,884
Gonzales	21,751	23,921	25,963	28,330	30,738	33,256
Guadalupe	182,693	235,318	276,064	315,934	356,480	396,261
Hays (part)*	183,278	240,549	303,637	353,172	441,377	541,765
Karnes	15,456	15,938	15,968	15,968	15,968	15,968
Kendall	42,185	52,213	62,807	73,308	84,028	94,549
La Salle	7,776	8,517	9,209	9,987	10,657	11,279
Medina	52,653	59,694	65,676	70,896	75,605	79,700
Refugio	7,687	7,929	7,985	8,119	8,175	8,213
Uvalde	28,846	31,548	33,861	36,257	38,543	40,734
Victoria	93,857	100,260	105,298	109,785	113,470	116,522
Wilson	54,266	66,837	79,044	90,016	100,411	109,771
Zavala	13,189	14,758	16,161	17,521	18,786	19,956
Regional Water Planning Area Total	**3,013,139**	**3,491,337**	**3,937,489**	**4,357,274**	**4,794,505**	**5,219,393**

* Hays county is split between Region K and Region L; population projections shown above are for Region L. Hays County population totals are 238,862 in 2020; 313,792 in 2030; 398,384 in 2040; 474,801 in 2050; 593,384 in 2060; and 728,344 in 2070.

Source: Texas Water Development Board projections as of August 2020.

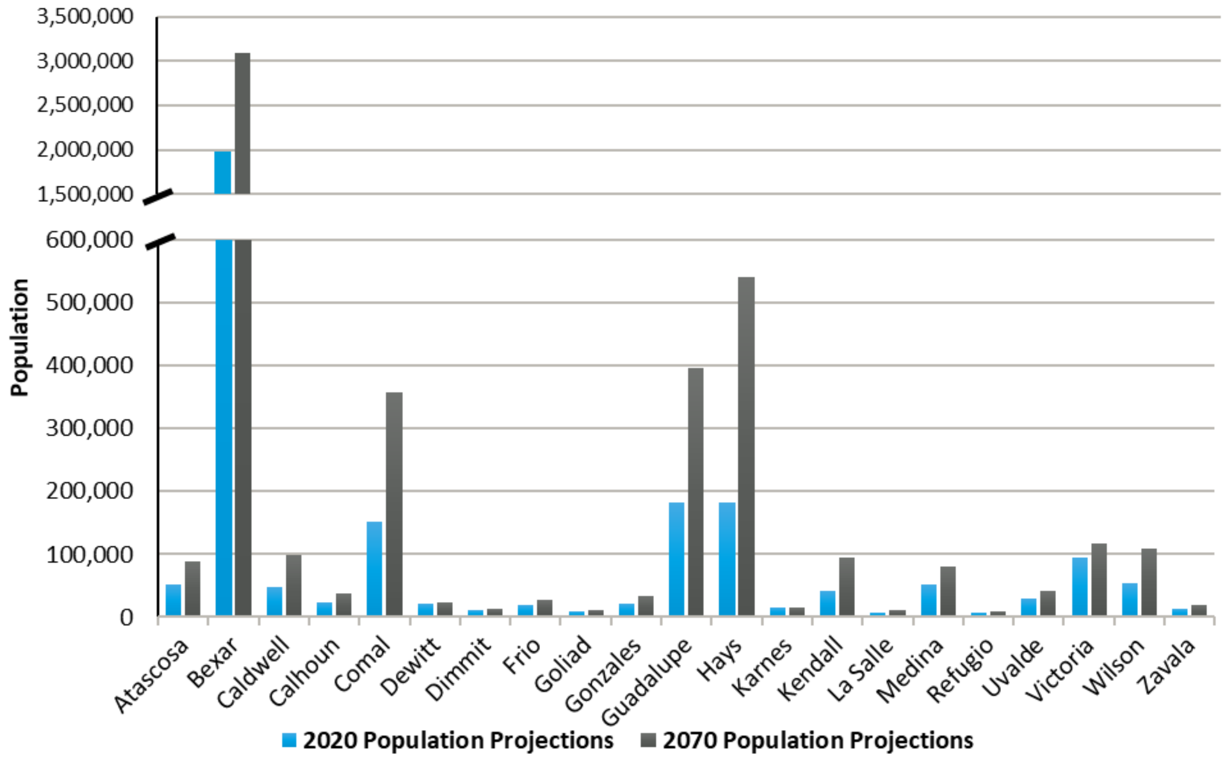

Figure 2-2 Population Projections by County (2020 and 2070)

2.2.3 River and Coastal Basins

The South Central Texas Region includes portions of the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca river basins and portions of the San Antonio-Nueces, Lavaca-Guadalupe, and Colorado-Lavaca coastal basins. The most populous river and coastal basins in the South Central Texas Region are the San Antonio, Guadalupe, and Nueces. In the year 2070, approximately 68 percent of the population of the South Central Texas Region is projected to reside in the San Antonio River Basin and 25 percent in the Guadalupe River Basin (Table 2-2).

Table 2-2 South Central Texas Region Population Projections by River and Coastal Basins (2020 to 2070)

BASIN	POPULATION PROJECTIONS (NO.)					
	2020	2030	2040	2050	2060	2070
Colorado River	4,607	5,330	6,190	7,055	7,920	8,796
Colorado-Lavaca Coastal	1,241	1,388	1,530	1,667	1,803	1,935
Guadalupe River	572,708	702,813	840,668	964,281	1,125,196	1,297,161
Lavaca River	3,683	3,819	3,891	3,963	4,015	4,059
Lavaca-Guadalupe Coastal	55,415	60,315	64,676	68,746	72,515	75,985

BASIN	POPULATION PROJECTIONS (NO.)					
	2020	2030	2040	2050	2060	2070
Nueces River	180,121	202,336	218,734	239,536	258,942	276,724
Rio Grande River	24	26	27	28	29	30
San Antonio River	2,186,940	2,506,575	2,792,922	3,062,984	3,314,994	3,545,560
San Antonio-Nueces Coastal	8,400	8,735	8,851	9,014	9,091	9,143
Total	**3,013,139**	**3,491,337**	**3,937,489**	**4,357,274**	**4,794,505**	**5,219,393**

Note: Populations shown are representative of portions located within the South Central Texas Region.
Source: Texas Water Development Board projections as of August 2020.

2.2.4 Major Water Providers

A new category for this round of planning, a MWP is defined as a WUG or a wholesale water provider (WWP) of particular significance to the region's water supply as determined by the RWPG. This may include public or private entities that provide water for any water use category. The South Central Texas RWPG has chosen to define MWPs as any WWP, or municipal WUG including river authorities and irrigation districts that has water demands greater than 20,000 acre-feet per year (acft/yr) by 2070. Based on this definition, the following entities are identified as MWPs:

- Alliance Regional Water Authority (ARWA);
- Canyon Regional Water Authority (CRWA);
- Cibolo Valley Local Government Corporation (CVLGC);
- City of San Marcos;
- City of Victoria;
- Guadalupe-Blanco River Authority (GBRA);
- New Braunfels;
- San Antonio Water System (SAWS); and
- Schertz-Seguin Local Government Corporation (SSLGC).

Table 2-3 provides population projections for MWPs. There are no population projections identified by the TWDB for ARWA, CRWA, CVLGC, and SSLGC because these MWPs are WWPs that do not directly serve a population. Rather, these four MWPs sell water to entities that serve populations of customers.

Table 2-3 Population Projections for Major Water Providers (2020 to 2070)

MAJOR WATER PROVIDER	2020	2030	2040	2050	2060	2070
ARWA	-	-	-	-	-	-
CRWA	-	-	-	-	-	-
CVLGC	-	-	-	-	-	-

San Marcos	71,135	84,861	101,235	120,769	144,072	171,872
Victoria	67,787	72,496	76,201	79,501	82,211	84,456
GBRA	4,017	4,490	4,951	5,394	5,834	6,260
New Braunfels	91,010	114,969	138,462	162,597	185,964	208,763
SAWS	1,816,408	2,060,058	2,292,113	2,505,291	2,701,257	2,880,045
SSLGC	-	-	-	-	-	-
Source: Texas Water Development Board projections as of August 2020.						

2.3 WATER DEMAND PROJECTIONS

Water demand projections for the South Central Texas Region are summarized on Figure 2-3. Demands are also shown for each use type or sector. Water demands are measured in acft/yr.[1]

In 2020, total water demands in the South Central Texas Region are projected to be 1,050,964 acft/yr. By 2070, total water demands for the region are expected to increase by 25 percent to 1,320,128 acft/yr.

[1] One acre-foot (acft) is approximately 325,851 gallons.

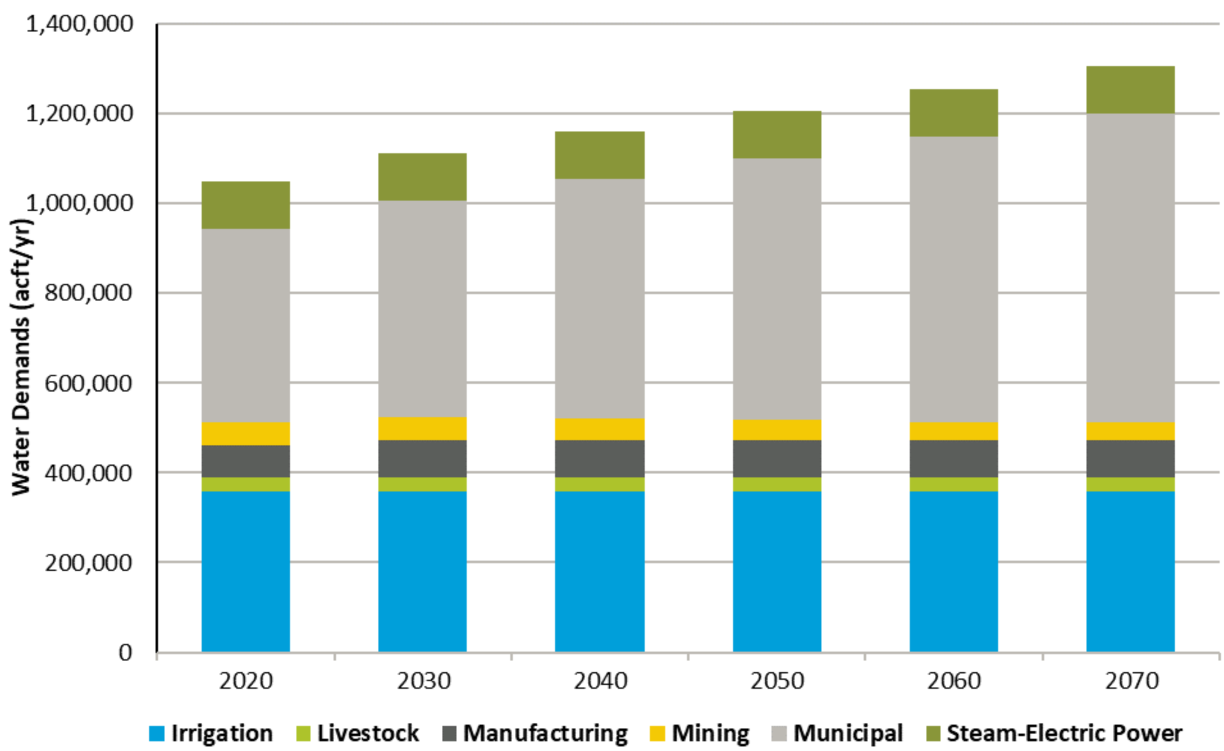

Figure 2-3 Water Demand Projections by Use Sector (2020 to 2070)

2.3.1 Water User Groups

Water demand projections for each WUG within the South Central Texas Region are presented in Appendix 2-A. SAWS, New Braunfels, and San Marcos are expected to have the greatest growth in water demand volumes between 2020 and 2070, with increases of 114,645 acft/yr, 22,674 acft/yr, and 14,297 acft/yr, respectively. The WUGs with the greatest percent increase in demands between 2020 and 2070 are Kendall West Utility, Wimberley Water Supply Corporation (WSC), and Goforth Special Utility District (SUD), with percent increases of 574 percent, 293 percent, and 242 percent, respectively.

2.3.2 Counties

Water demand projections are summarized by county on Figure 2-4 and in Table 2-4. Bexar, Comal, and Hays Counties are expected to have the greatest growth in water demand volumes between 2020 and 2070, with increases of 126,794 acft/yr, 42,711 acft/yr, and 41,578 acft/yr, respectively. Counties with the greatest percent increase in demands between 2020 and 2070 are Hays, Kendall, and Comal, with percent increases of 157 percent, 110 percent, and 102 percent, respectively.

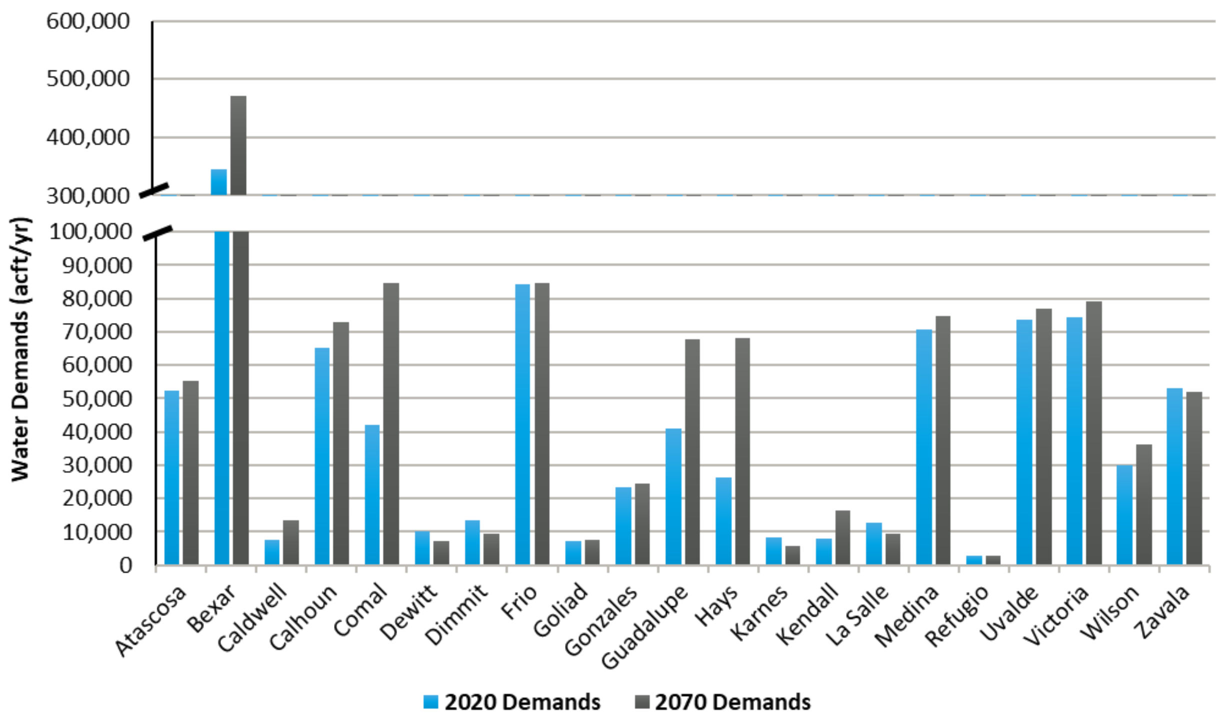

Figure 2-4 Water Demand Projections by County (2020 and 2070)

Table 2-4 South Central Texas Region Water Demand Projections by County (2020 to 2070)

COUNTY	WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Atascosa	52,389	53,409	54,252	54,513	54,769	55,263
Bexar	344,503	370,868	395,122	420,879	446,877	471,297
Caldwell	7,719	8,765	9,862	10,998	12,205	13,415
Calhoun	65,351	71,934	72,169	72,429	72,717	73,004
Comal	42,052	51,191	59,458	67,595	76,204	84,763
DeWitt	10,060	9,973	9,179	8,424	7,682	7,358
Dimmit	13,319	13,532	12,949	11,540	10,116	9,484
Frio	84,108	84,430	84,626	84,710	84,610	84,626
Goliad	7,205	7,318	7,389	7,417	7,443	7,460
Gonzales	23,388	23,625	23,613	23,697	23,815	24,336
Guadalupe	40,989	47,698	52,552	57,475	62,659	67,827

COUNTY	WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Hays*	26,430	32,299	39,339	45,238	55,842	68,008
Karnes	8,363	7,819	7,141	6,494	5,862	5,829
Kendall	7,784	9,371	11,062	12,743	14,540	16,310
La Salle	12,699	12,989	12,610	11,326	10,034	9,469
Medina	70,826	71,745	72,527	73,276	74,069	74,822
Refugio	2,776	2,778	2,737	2,736	2,727	2,724
Uvalde	73,467	74,152	74,647	75,323	76,062	76,818
Victoria	74,261	76,311	77,009	77,740	78,451	79,066
Wilson	30,059	31,374	32,664	33,820	34,947	36,116
Zavala	53,216	53,367	53,200	52,954	52,266	52,133
Total	**1,050,964**	**1,114,948**	**1,164,107**	**1,211,327**	**1,263,897**	**1,320,128**

* Hays county is split between Region K and Region L; water demands shown above are for Region L. Hays County water demand totals are 40,729 acft/yr in 2020; 50,453 acft/yr in 2030; 61,476 acft/yr in 2040; 72,555 acft/yr in 2050; 89,124 acft/yr in 2060; and 107,760 acft/yr in 2070.

Source: Texas Water Development Board projections as of August 2020.

2.3.3 River and Coastal Basins

Water demand projections for the South Central Texas Region from 2020 to 2070 are summarized by river and coastal basin on Figure 2-5 and in Table 2-5. More than 90 percent of the water demands in 2020 are in the San Antonio, Nueces, and Guadalupe river basins. Compared to 2020 projected demands, the San Antonio River Basin water demands in 2070 are expected to increase by 156,360 acft/yr, representing a 38 percent increase.

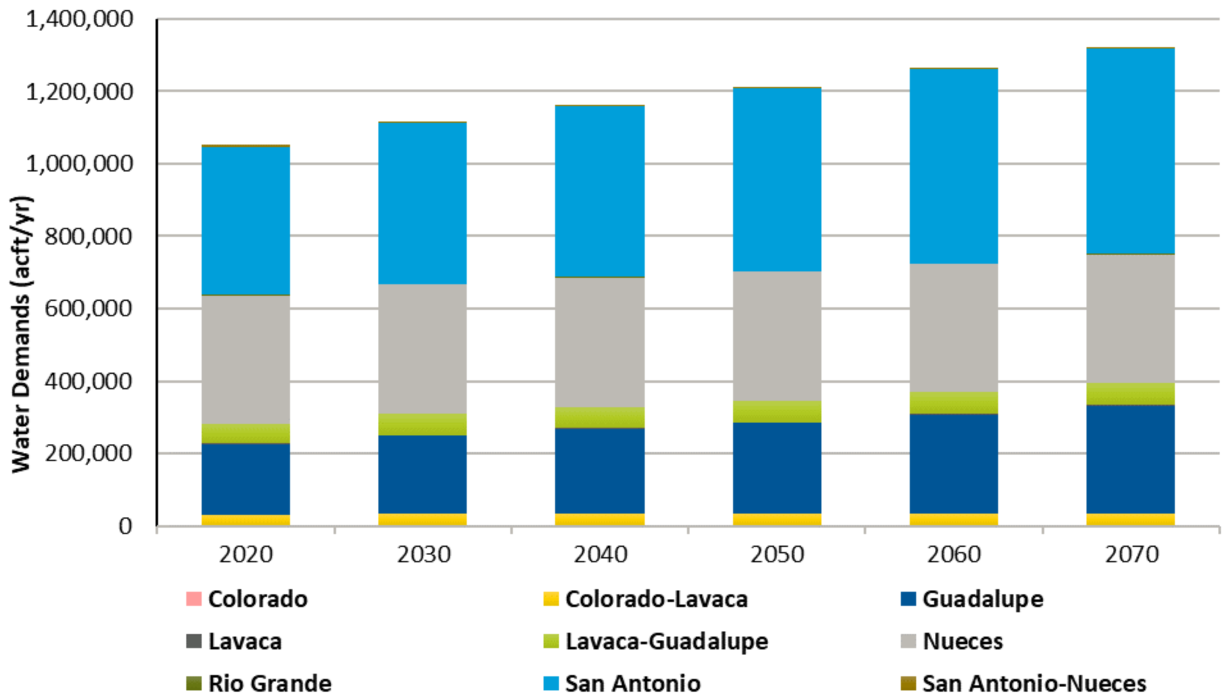

Figure 2-5 **Water Demand Projections by Basin (2020 to 2070)**

Table 2-5 **South Central Texas Region Water Demand Projections by River Basin (2020 to 2070)**

BASIN	WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Colorado	664	728	810	901	995	1,094
Colorado-Lavaca	29,245	33,146	33,151	33,157	33,165	33,175
Guadalupe	195,559	215,355	233,439	250,491	272,789	297,487
Lavaca	2,181	2,190	2,063	1,942	1,825	1,775
Lavaca-Guadalupe	55,254	58,244	58,702	59,199	59,714	60,196
Nueces	353,653	357,023	357,731	356,853	355,414	356,338
Rio Grande	1,387	1,398	1,311	1,109	909	815
San Antonio	409,297	443,155	473,251	504,051	535,493	565,657
San Antonio-Nueces	3,724	3,709	3,649	3,624	3,593	3,591
Total	**1,050,964**	**1,114,948**	**1,164,107**	**1,211,327**	**1,263,897**	**1,320,128**
Source: Texas Water Development Board projections as of August 2019.						

2.3.4 Use Type

Water demand projections for the South Central Texas Region are categorized by use type: irrigation, livestock, manufacturing, mining, municipal, and steam-electric power. Figure 2-6 shows the water demand projections by use type over the planning horizon, and Table 2-6 shows the projected use sector water demands by volume and as a proportion of the total demands (percent) in 2020, 2040, and 2070 . The municipal sector is expected to increase over the planning horizon; whereas, the manufacturing, mining, livestock, and steam-electric power sectors are expected to remain relatively unchanged from 2020 to 2070. Further discussion of water demand projections for each use type is provided in the following subsections.

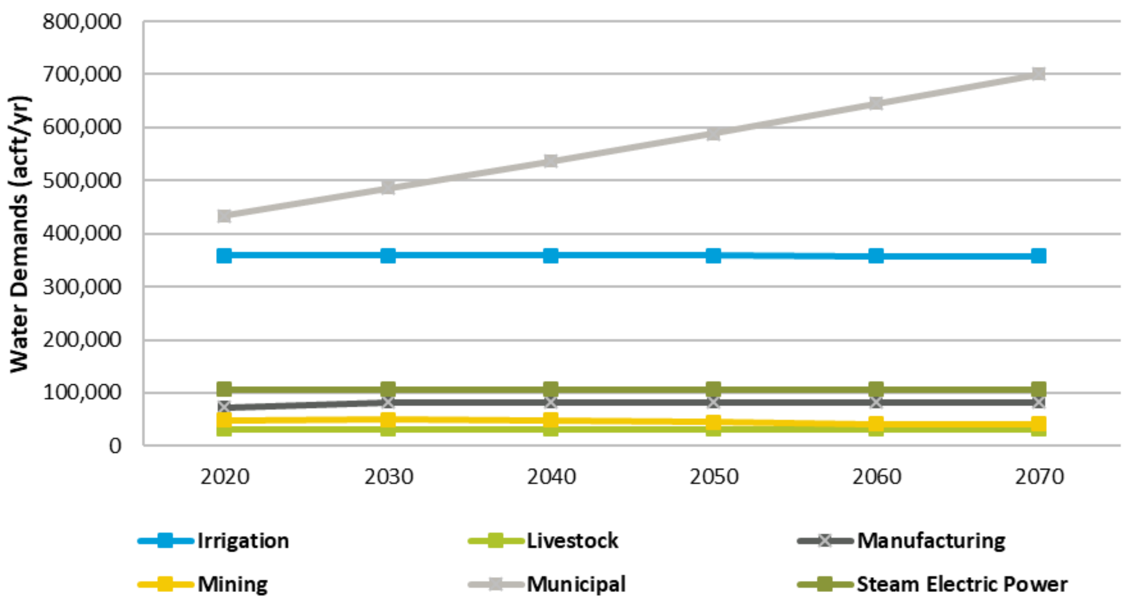

Figure 2-6 **Projected Water Demands by Use Type (2020 to 2070)**

Table 2-6 **Projected Water Demands by Use Type (2020, 2040, and 2070)**

WATER USE	2020		2040		2070	
	ACFT/YR	% TOTAL	ACFT/YR	% TOTAL	ACFT/YR	% TOTAL
Irrigation	358,699	34%	358,566	31%	358,147	27%
Livestock	31,504	3%	31,504	3%	31,504	2%
Manufacturing	72,516	7%	82,765	7%	82,765	6%
Mining	48,738	5%	48,601	4%	41,209	3%
Municipal	433,481	41%	536,645	46%	700,477	53%
Steam-Electric Power	106,026	10%	106,026	9%	106,026	8%
Total	**1,050,964**	**100%**	**1,164,107**	**100%**	**1,320,128**	**100%**

2.3.4.1 Irrigation Water Demand Projections

In 2020, it is projected that irrigated agriculture will account for approximately 34 percent of the total water used in the South Central Texas Region. It is projected that approximately 358,699 acft/yr of water will be used to grow a variety of crops ranging from food and feed grains to fruits, vegetables, and cotton in the South Central Texas Region (Table 2-7 and Figure 2-7). Projected irrigation water demands in the region in 2070 are expected to decrease slightly to 358,147 acft/yr. The projected decline is based on expected increases in irrigation efficiency and reductions in profitability of irrigated agriculture.

Table 2-7 Irrigation Water Demand Projections by County with River Basin Summaries (2020 to 2070)

	IRRIGATION WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Counties						
Atascosa	29,946	29,946	29,946	29,946	29,946	29,946
Bexar	11,926	11,926	11,926	11,926	11,926	11,926
Caldwell	802	802	802	802	802	802
Calhoun	15,839	15,839	15,839	15,839	15,839	15,839
Comal	428	428	428	428	428	428
DeWitt	757	757	757	757	757	757
Dimmit	5,601	5,601	5,601	5,601	5,601	5,601
Frio	78,183	78,183	78,183	78,183	78,183	78,183
Goliad	2,839	2,839	2,839	2,839	2,839	2,839
Gonzales	5,127	5,127	5,127	5,127	5,127	5,127
Guadalupe	1,136	1,136	1,136	1,136	1,136	1,136
Hays*	157	157	157	157	157	157
Karnes	1,023	1,023	1,023	1,023	1,023	1,023
Kendall	606	606	606	606	606	606
La Salle	5,784	5,784	5,784	5,784	5,784	5,784
Medina	59,968	59,968	59,968	59,968	59,968	59,968
Refugio	1,034	1,034	1,034	1,034	1,034	1,034
Uvalde	62,409	62,409	62,409	62,409	62,409	62,409
Victoria	13,398	13,398	13,398	13,398	13,398	13,398
Wilson	15,418	15,418	15,418	15,418	15,418	15,418
Zavala	46,318	46,318	46,185	46,085	45,766	45,766
Total	**358,699**	**358,699**	**358,566**	**358,466**	**358,147**	**358,147**

	IRRIGATION WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
River and Coastal Basin Summaries						
Colorado	24	24	24	24	24	24
Colorado-Lavaca	760	760	760	760	760	760
Guadalupe	10,308	10,308	10,308	10,308	10,308	10,308
Lavaca	431	431	431	431	431	431
Lavaca-Guadalupe	26,878	26,878	26,878	26,878	26,878	26,878
Nueces	283,216	283,216	283,083	282,983	282,664	282,664
Rio Grande	691	691	691	691	691	691
San Antonio	34,970	34,970	34,970	34,970	34,970	34,970
San Antonio-Nueces	1,421	1,421	1,421	1,421	1,421	1,421
Total	**358,699**	**358,699**	**358,566**	**358,466**	**358,147**	**358,147**

* Hays county is split between Region K and Region L; water demands shown above are for Region L.
Source: Texas Water Development Board projections as of August 2020.

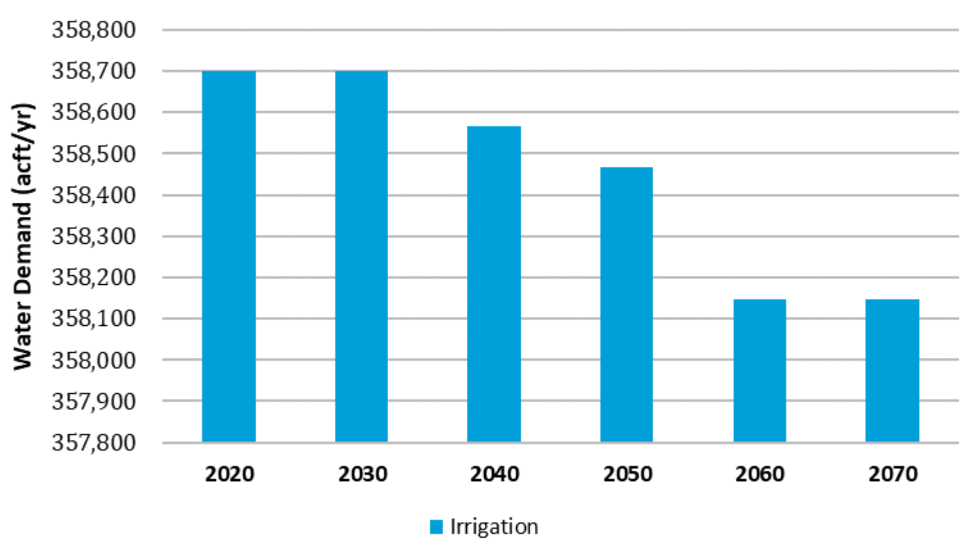

Figure 2-7 Irrigation Water Demand Projections (2020 to 2070)

2.3.4.2 Livestock Water Demand Projections

In Texas in 2017, livestock production was valued at approximately $12.3 billion, which was more than double the value of crops produced in the state during that year.[2] Although livestock production is an

[2] https://www.texasagriculture.gov/About/TexasAgStats.aspx

important component of the regional economy, the industry consumes a relatively small amount of water. In 2020, it is projected that water use in the South Central Texas Region for livestock purposes will be 31,504 acft/yr (Table 2-8 and Figure 2-8). It is projected that water used for livestock purposes will remain constant throughout the planning period.

Table 2-8 Livestock Water Demand Projections for Individual Counties with River Basin Summaries

	LIVESTOCK WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Counties						
Atascosa	1,673	1,673	1,673	1,673	1,673	1,673
Bexar	1,201	1,201	1,201	1,201	1,201	1,201
Caldwell	788	788	788	788	788	788
Calhoun	290	290	290	290	290	290
Comal	237	237	237	237	237	237
DeWitt	1,904	1,904	1,904	1,904	1,904	1,904
Dimmit	388	388	388	388	388	388
Frio	882	882	882	882	882	882
Goliad	841	841	841	841	841	841
Gonzales	9,572	9,572	9,572	9,572	9,572	9,572
Guadalupe	1,300	1,300	1,300	1,300	1,300	1,300
Hays (part)*	2,792	2,792	2,792	2,792	2,792	2,792
Karnes	1,086	1,086	1,086	1,086	1,086	1,086
Kendall	395	395	395	395	395	395
La Salle	491	491	491	491	491	491
Medina	1,145	1,145	1,145	1,145	1,145	1,145
Refugio	475	475	475	475	475	475
Uvalde	2,198	2,198	2,198	2,198	2,198	2,198
Victoria	1,064	1,064	1,064	1,064	1,064	1,064
Wilson	1,889	1,889	1,889	1,889	1,889	1,889
Zavala	893	893	893	893	893	893
Total	**31,504**	**31,504**	**31,504**	**31,504**	**31,504**	**31,504**
River and Coastal Basin Summaries						
Colorado	69	69	69	69	69	69

	LIVESTOCK WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Colorado-Lavaca	56	56	56	56	56	56
Guadalupe	16,876	16,876	16,876	16,876	16,876	16,876
Lavaca	516	516	516	516	516	516
Lavaca-Guadalupe	761	761	761	761	761	761
Nueces	7,872	7,872	7,872	7,872	7,872	7,872
Rio Grande	39	39	39	39	39	39
San Antonio	4,517	4,517	4,517	4,517	4,517	4,517
San Antonio-Nueces	798	798	798	798	798	798
Total	**31,504**	**31,504**	**31,504**	**31,504**	**31,504**	**31,504**

* Hays county is split between Region K and Region L; water demands shown above are for Region L.
Source: Texas Water Development Board projections as of August 2020.

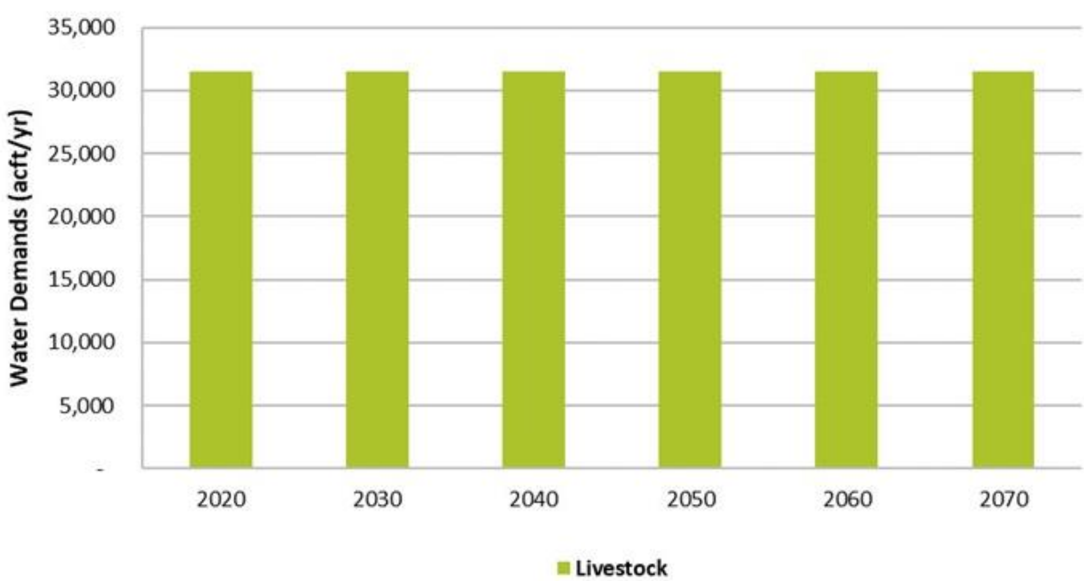

Figure 2-8 Livestock Water Demand Projections (2020 to 2070)

2.3.4.3 Manufacturing Water Demand Projections

The use of water for the production of goods for domestic and foreign markets varies widely among manufacturing industries in Texas. Manufactured products in Texas range from food and clothing to refined chemical and petroleum products to computers and automobiles. Some processes require direct consumption of water as part of the products being manufactured, while others require very little water consumption, but large volumes of water for cooling or cleaning purposes. Five manufacturing industries account for approximately 90 percent of water used by all manufacturing industries in Texas. These five water-intensive industries are chemical products, petroleum refining, pulp and paper, food and kindred products, and primary metals. The chemical and petroleum refining industries account for nearly 60 percent of Texas annual industrial water use.

Major water using manufacturing sectors in Region L are fabricated metal products, industrial machinery, and food processing. All industries in the region are projected to use 72,516 acft/yr of water in 2020 and 82,765 acft/yr in 2070, a 14 percent increase (Table 2-9 and Figure 2-9).

Table 2-9 Manufacturing Water Demand Projections by County with River Basin Summaries (2020 to 2070)

	MANUFACTURING WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Counties						
Atascosa	58	97	97	97	97	97
Bexar	5,925	6,776	6,776	6,776	6,776	6,776
Caldwell	5	5	5	5	5	5
Calhoun	46,130	52,479	52,479	52,479	52,479	52,479
Comal	4,806	5,788	5,788	5,788	5,788	5,788
DeWitt	272	344	344	344	344	344
Dimmit	-	-	-	-	-	-
Frio	-	-	-	-	-	-
Goliad	1	1	1	1	1	1
Gonzales	2,181	2,427	2,427	2,427	2,427	2,427
Guadalupe	4,136	4,523	4,523	4,523	4,523	4,523
Hays*	48	56	56	56	56	56
Karnes	131	155	155	155	155	155
Kendall	1	1	1	1	1	1
La Salle	-	-	-	-	-	-
Medina	63	67	67	67	67	67
Refugio	-	-	-	-	-	-
Uvalde	3	3	3	3	3	3
Victoria	8,113	9,234	9,234	9,234	9,234	9,234
Wilson	40	43	43	43	43	43
Zavala	603	766	766	766	766	766
Total	**72,516**	**82,765**	**82,765**	**82,765**	**82,765**	**82,765**

	MANUFACTURING WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
River and Coastal Basin Summaries						
Colorado	-	-	-	-	-	-
Colorado-Lavaca	28,268	32,159	32,159	32,159	32,159	32,159
Guadalupe	19,422	22,201	22,201	22,201	22,201	22,201
Lavaca	138	175	175	175	175	175
Lavaca-Guadalupe	17,862	20,320	20,320	20,320	20,320	20,320
Nueces	727	933	933	933	933	933
Rio Grande	-	-	-	-	-	-
San Antonio	6,099	6,977	6,977	6,977	6,977	6,977
San Antonio-Nueces	-	-	-	-	-	-
Total	**72,516**	**82,765**	**82,765**	**82,765**	**82,765**	**82,765**

* Hays county is split between Region K and Region L; water demands shown above are for Region L.
Source: Texas Water Development Board projections as of August 2020.

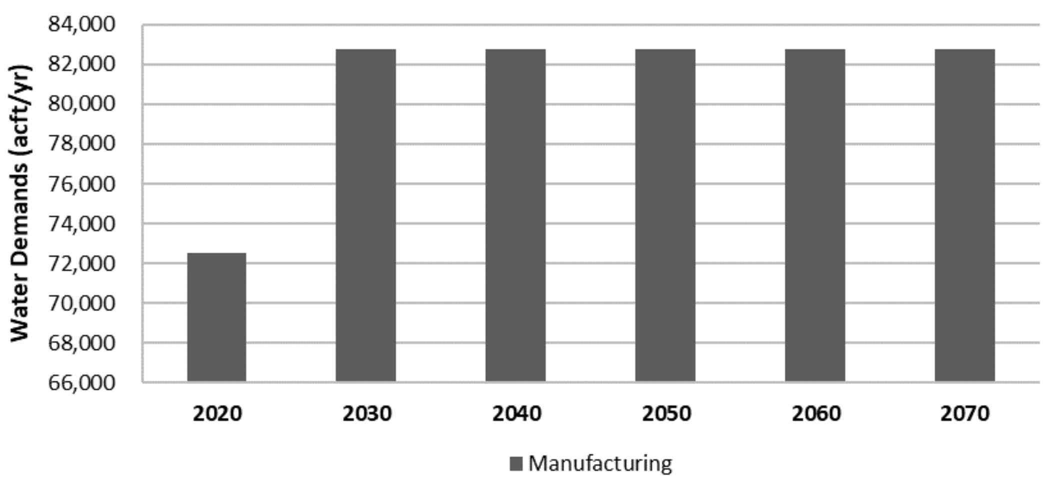

Figure 2-9 Manufacturing Water Demands Projections (2020 to 2070)

2.3.4.4 Mining Water Demand Projections

Although the Texas mining industry is a leader in the production of crude petroleum and natural gas in the United States, it also produces a wide variety of important non-fuel minerals. Texas is the only state to produce native asphalt and is the leading producer nationally of Frasch-mined sulfur. It is also one of the leading states in the production of clay, gypsum, lime, salt, stone, and aggregate. In the South Central Texas Region, the principal uses of water for mining are for the extraction of stone, clay, petroleum, and natural gas and for sand and gravel washing. Many counties in the South Central Texas

Region are part of the Eagle Ford Shale production area. Water use associated with this area is projected to peak in 2030 and then decline as this area sees less exploration and drilling activity and more production activity, which uses less water.

Mining water demands in the South Central Texas Region are projected to be 48,738 acft/yr in 2020 and decrease to 41,209 acft/yr in 2070, a decrease of more than 15 percent (Table 2-10 and Figure 2-10).

Table 2-10 Mining Water Demand Projections for Individual Counties with River Basin Summaries (2020 to 2070)

	MINING WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Counties						
Atascosa	4,081	4,043	3,935	3,212	2,478	2,043
Bexar	7,820	8,740	9,533	10,404	11,399	12,502
Caldwell	123	98	72	46	20	9
Calhoun	52	55	41	30	19	12
Comal	8,600	9,996	11,340	12,513	13,982	15,628
DeWitt	3,165	2,973	2,195	1,422	650	301
Dimmit	4,919	5,001	4,337	2,824	1,315	612
Frio	1,217	1,250	1,178	986	620	390
Goliad	450	450	450	450	450	450
Gonzales	1,600	1,207	813	418	24	1
Guadalupe	456	550	639	755	884	1,043
Hays (part)*	-	-	-	-	-	-
Karnes	2,528	1,919	1,288	662	35	2
Kendall	-	-	-	-	-	-
La Salle	4,617	4,772	4,263	2,819	1,380	676
Medina	1,851	2,057	2,231	2,407	2,629	2,872
Refugio	66	69	51	38	24	15
Uvalde	2,661	2,916	3,037	3,279	3,564	3,874
Victoria	72	75	56	41	27	18
Wilson	1,929	1,548	1,165	782	399	204
Zavala	2,531	2,257	1,977	1,559	932	557
Total	**48,738**	**49,976**	**48,601**	**44,647**	**40,831**	**41,209**

	MINING WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
River and Coastal Basin Summaries						
Colorado	11	9	6	4	2	1
Colorado-Lavaca	26	27	21	15	9	6
Guadalupe	13,203	13,982	14,248	14,376	14,800	16,176
Lavaca	506	475	351	227	104	48
Lavaca-Guadalupe	59	62	46	34	22	14
Nueces	21,187	21,448	20,057	16,246	12,125	10,243
Rio Grande	654	665	577	375	175	81
San Antonio	12,879	13,116	13,146	13,259	13,521	14,577
San Antonio-Nueces	213	192	149	111	73	63
Total	**48,738**	**49,976**	**48,601**	**44,647**	**40,831**	**41,209**

* Hays county is split between Region K and Region L; water demands shown above are for Region L.
Source: Texas Water Development Board projections as of August 2020.

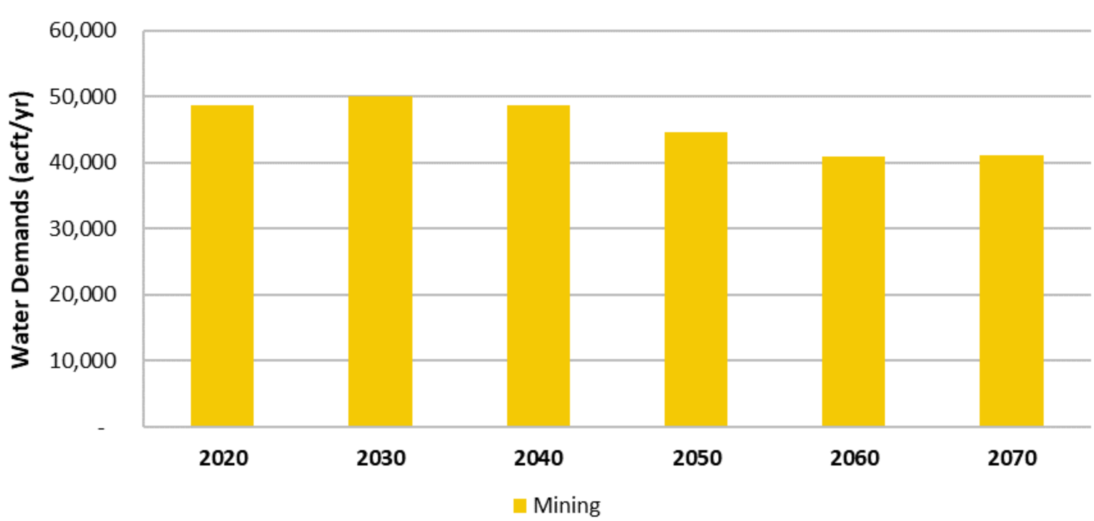

Figure 2-10 Mining Water Demand Projections (2020 to 2070)

2.3.4.5 Municipal Water Demand Projections

Municipal water demand is primarily for drinking, bathing, dish and clothes washing, cleaning, sanitation, air conditioning, and landscape watering for residential and commercial establishments and public offices and institutions. Residential and commercial uses are categorized together under the Municipal Use Type because they are provided treated drinking water from a common system (e.g., a public water system).

The projected quantity of water needed for municipal purposes depends on the size of the population of the service area, climatic conditions, and water conservation measures. In addition to these factors, per capita water use (gallons per person per day of water use) is a key municipal water planning parameter. Population and per capita water use are used to make projections of municipal water demand for each of the 119 municipal WUGs of the South Central Texas Water Planning Region (Appendix 2-A).

The objective of municipal water conservation programs is to reduce the per capita water use parameter without adversely affecting the quality of life of the people involved. For municipal water supplies, this is primarily achieved with use of low flow plumbing fixtures (e.g., toilets, shower heads, and faucets that are designed for low quantities of flow per unit of use). Expected water-efficiency savings (passive conservation) are incorporated into the current TWDB municipal water demand projections and include estimated or anticipated savings due to state and federal specifications for fixture and appliance design. The savings projected by the TWDB includes complete replacement of existing plumbing fixtures to water-efficient fixtures by the year 2045. The projections also assume that all new construction includes water-efficient plumbing fixtures. Table 2-11 summarizes county water savings due to plumbing code savings that were incorporated in the development of the South Central Texas Region's municipal water demand projections.

Table 2-11 Water Savings Due to Plumbing Code Savings by County with River Basin Summary (2020 to 2070)

	WATER SAVINGS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Counties						
Atascosa	571	922	1,219	1,447	1,602	1,733
Bexar	20,945	33,148	43,471	51,130	55,962	59,869
Caldwell	513	864	1,170	1,428	1,642	1,842
Calhoun	275	434	563	658	723	779
Comal	1,331	2,251	3,086	3,824	4,441	4,999
DeWitt	220	327	412	458	470	474
Dimmit	123	191	238	262	275	283
Frio	202	312	390	448	483	510
Goliad	95	150	191	210	218	220
Gonzales	230	359	459	540	596	648
Guadalupe	1,828	3,126	4,156	5,024	5,757	6,439
Hays*	1,910	3,134	4,340	5,346	6,880	8,604
Karnes	161	236	289	310	316	316
Kendall	424	716	988	1,221	1,420	1,604

	WATER SAVINGS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
La Salle	84	129	167	195	212	225
Medina	523	823	1,071	1,246	1,351	1,427
Refugio	85	127	159	170	174	175
Uvalde	316	496	645	752	812	861
Victoria	1,014	1,542	1,971	2,244	2,356	2,425
Wilson	554	930	1,260	1,519	1,719	1,886
Zavala	157	253	329	370	403	430
Total	**31,560**	**50,469**	**66,572**	**78,803**	**87,811**	**95,747**
River and Coastal Basin Summaries						
Colorado	51	82	111	135	153	171
Colorado-Lavaca	15	24	30	33	36	39
Guadalupe	5,787	9,436	12,794	15,539	18,390	21,314
Lavaca	39	58	73	82	84	85
Lavaca-Guadalupe	612	946	1,218	1,405	1,505	1,582
Nueces	1,920	3,052	3,910	4,589	5,038	5,400
Rio Grande	0	0	0	1	1	1
San Antonio	23,043	36,732	48,263	56,834	62,412	66,962
San Antonio-Nueces	92	139	174	187	191	192
Total	**31,560**	**50,469**	**66,572**	**78,803**	**87,811**	**95,747**

* Hays county is split between Region K and Region L; water savings shown above are for Region L.
Source: Texas Water Development Board projections as of July 2020.

According to regional water demand projections provided by the TWDB, per capita water use in the South Central Texas Region is projected to decline over the planning period from 128 gallons per capita per day (GPCD) in year 2020 to 117 GPCD in 2070. However, because of projected population growth between 2020 and 2070, municipal water demand in the South Central Texas Region is projected to increase from 433,481 acft/yr in 2020 to 700,477 acft/yr in 2070 (Table 2-12 and Figure 2-11). Since Bexar County has the highest population, it also has the largest projected water demand, with almost 55 percent of the total projected municipal water demand for the region by the year 2070 (Table 2-12).

Table 2-12 Municipal Water Demand Projections by County with River Basin Summary (2020 to 2070)

	MUNICIPAL WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Counties						
Atascosa	8,204	9,223	10,174	11,158	12,148	13,077
Bexar	265,338	289,932	313,393	338,279	363,282	386,599
Caldwell	6,001	7,072	8,195	9,357	10,590	11,811
Calhoun	3,040	3,271	3,520	3,791	4,090	4,384
Comal	27,981	34,742	41,665	48,629	55,769	62,682
DeWitt	3,962	3,995	3,979	3,997	4,027	4,052
Dimmit	2,411	2,542	2,623	2,727	2,812	2,883
Frio	3,702	3,991	4,259	4,535	4,801	5,047
Goliad	1,211	1,324	1,395	1,423	1,449	1,466
Gonzales	4,908	5,292	5,674	6,153	6,665	7,209
Guadalupe	24,556	30,784	35,549	40,356	45,411	50,420
Hays*	23,433	29,294	36,334	42,233	52,837	65,003
Karnes	3,595	3,636	3,589	3,568	3,563	3,563
Kendall	6,782	8,369	10,060	11,741	13,538	15,308
La Salle	1,807	1,942	2,072	2,232	2,379	2,518
Medina	7,799	8,508	9,116	9,689	10,260	10,770
Refugio	1,201	1,200	1,177	1,189	1,194	1,200
Uvalde	6,196	6,626	7,000	7,434	7,888	8,334
Victoria	20,139	21,065	21,782	22,528	23,253	23,877
Wilson	8,344	10,037	11,710	13,249	14,759	16,123
Zavala	2,871	3,133	3,379	3,651	3,909	4,151
Total	**433,481**	**485,978**	**536,645**	**587,919**	**644,624**	**700,477**
River and Coastal Basin Summaries						
Colorado	560	626	711	804	900	1,000
Colorado-Lavaca	135	144	155	167	181	194
Guadalupe	90,568	106,806	124,624	141,548	163,422	186,744
Lavaca	590	593	590	593	599	605

	MUNICIPAL WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Lavaca-Guadalupe	9,694	10,223	10,697	11,206	11,733	12,223
Nueces	32,100	35,003	37,235	40,268	43,269	46,075
Rio Grande	3	3	4	4	4	4
San Antonio	298,539	331,282	361,348	392,035	423,215	452,323
San Antonio-Nueces	1,292	1,298	1,281	1,294	1,301	1,309
Total	**433,481**	**485,978**	**536,645**	**587,919**	**644,624**	**700,477**

* Hays county is split between Region K and Region L; water demands shown above are for Region L.
Source: Texas Water Development Board projections as of August 2019.

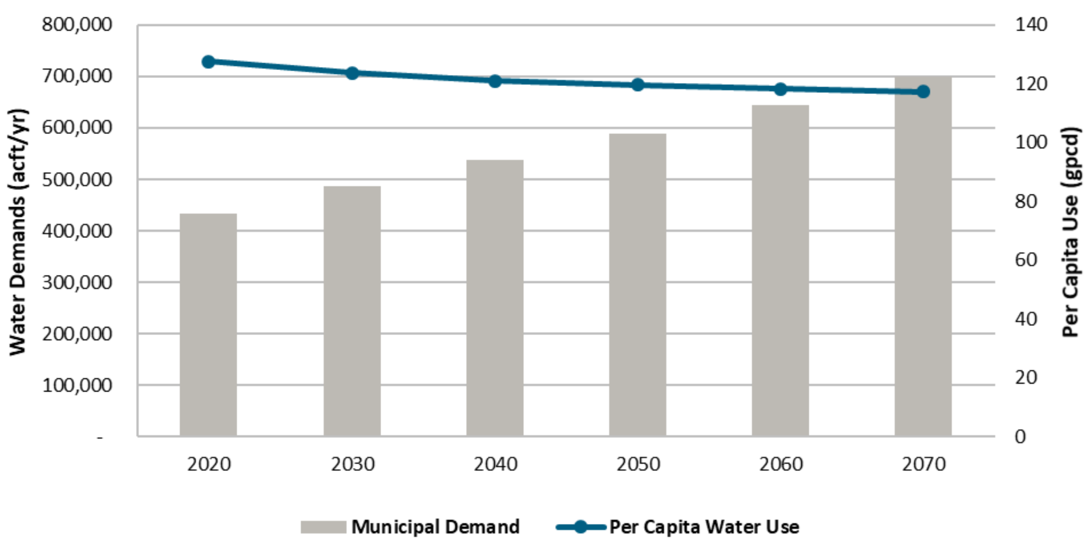

Figure 2-11 Projected Per Capita Water Use and Municipal Water Demand

2.3.4.6 Steam-Electric Power Water Demand Projections

The power generation industry has faced and will continue to face significant changes in the structure of power generation. These changes range from new technologies to government regulations on the marketing of electricity. These changes may have an impact on how and where power will be generated and the quantities of water needed.

In the generation of steam-electric power, cooling water is circulated through the power plants, with approximately 2 percent being evaporated or consumed, and the remainder being either recirculated or returned to streams. Seven counties (Atascosa, Bexar, Frio, Goliad, Guadalupe, Victoria, and Wilson) of the South Central Texas Region have plants that use water in steam-electric power generation. Water demand for steam-electric power generation is projected to be 106,026 acft/yr in 2020. It is projected that water used for steam-electric power purposes will remain constant throughout the planning period (Table 2-13 and Figure 2-12).

Table 2-13 Steam-Electric Power Water Demand Projections by County with River Basin Summaries (2020 to 2070)

	STEAL-ELECTRIC WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Counties						
Atascosa	8,427	8,427	8,427	8,427	8,427	8,427
Bexar	52,293	52,293	52,293	52,293	52,293	52,293
Caldwell	-	-	-	-	-	-
Calhoun	-	-	-	-	-	-
Comal	-	-	-	-	-	-
DeWitt	-	-	-	-	-	-
Dimmit	-	-	-	-	-	-
Frio	124	124	124	124	124	124
Goliad	1,863	1,863	1,863	1,863	1,863	1,863
Gonzales	-	-	-	-	-	-
Guadalupe	9,405	9,405	9,405	9,405	9,405	9,405
Hays (part)*	-	-	-	-	-	-
Karnes	-	-	-	-	-	-
Kendall	-	-	-	-	-	-
La Salle	-	-	-	-	-	-
Medina	-	-	-	-	-	-
Refugio	-	-	-	-	-	-
Uvalde	-	-	-	-	-	-
Victoria	31,475	31,475	31,475	31,475	31,475	31,475
Wilson	2,439	2,439	2,439	2,439	2,439	2,439
Zavala	-	-	-	-	-	-
Total	**106,026**	**106,026**	**106,026**	**106,026**	**106,026**	**106,026**
River and Coastal Basin Summaries						
Colorado	-	-	-	-	-	-
Colorado-Lavaca	-	-	-	-	-	-
Guadalupe	45,182	45,182	45,182	45,182	45,182	45,182

	STEAL-ELECTRIC WATER DEMAND PROJECTIONS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Lavaca	-	-	-	-	-	-
Lavaca-Guadalupe	-	-	-	-	-	-
Nueces	8,551	8,551	8,551	8,551	8,551	8,551
Rio Grande	-	-	-	-	-	-
San Antonio	52,293	52,293	52,293	52,293	52,293	52,293
San Antonio-Nueces	-	-	-	-	-	-
Total	**106,026**	**106,026**	**106,026**	**106,026**	**106,026**	**106,026**

* Hays county is split between Region K and Region L; water demands shown above are for Region L.
Source: Texas Water Development Board projections as of August 2020.

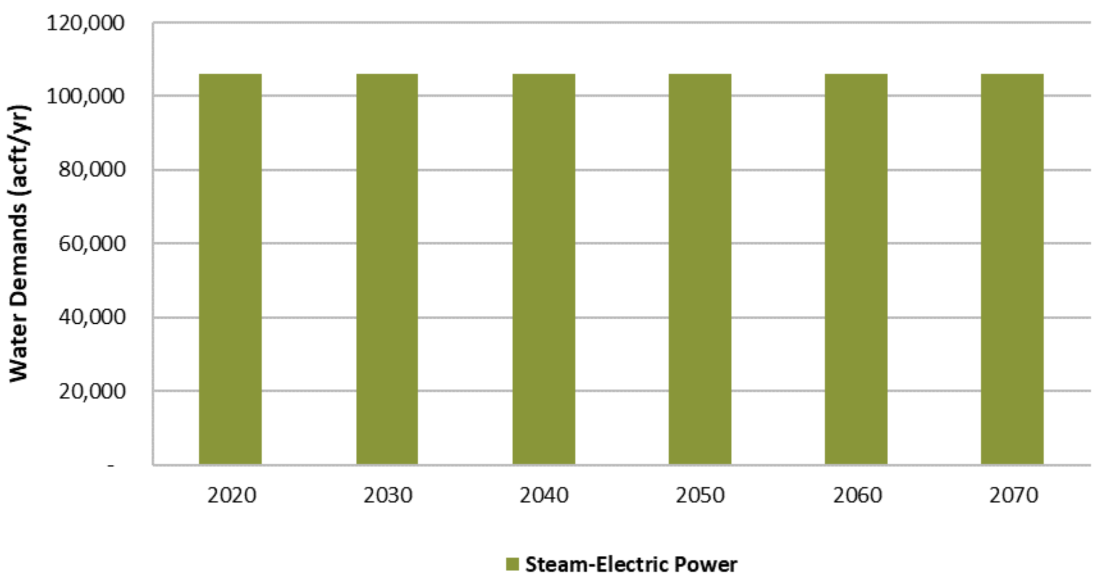

Figure 2-12 Steam-Electric Power Water Demand Projections (2020 to 2070)

2.3.5 Major Water Providers

Water demand projections for MWPs are provided in Table 2-14. As discussed in Subsection 2.2.4, the South Central Texas RWPG defines MWPs as any WWP, or municipal WUG including river authorities and irrigation districts that has water demands greater than 20,000 acft/yr by 2070. Entities may be classified as WUGs, WWPs, or WUGs/WWPs, and are distinguished as follows:

- WUG: has only WUG demands and do not have contract demands.
- WWP: has only contract demands and do not have WUG demands.
- WUG/WWP: Typically has both WUG demands and contract demands.

ARWA and CVLGC are two MWPs that are categorized as WWPs. While these two WWPs have existing contracts to provide water to entities, their supplies would be developed as part of a WMS included in this RWP. Therefore, contract demands for ARWA and CVLGC are shown in the table below as zero. Footnotes are provided in Table 2-14.

Table 2-14 Water Demand Projections for Major Water Providers (2020 to 2070)

MAJOR WATER PROVIDER (PROVIDER TYPE)	USE TYPE	WATER DEMAND PROJECTIONS (ACFT/YR)					
		2020	2030	2040	2050	2060	2070
ARWA (WWP)[1]	**Total**	**--**	**--**	**--**	**--**	**--**	**--**
WUG Demands	--	--	--	--	--	--	--
Contract Demands	--	--	--	--	--	--	--
CRWA (WWP)	**Total**	**26,817**	**26,817**	**26,817**	**26,817**	**26,817**	**26,817**
WUG Demands	--	--	--	--	--	--	--
Contract Demands	Municipal	26,817	26,817	26,817	26,817	26,817	26,817
CVLGC (WWP)[2]	**--**	**--**	**--**	**--**	**--**	**--**	**--**
WUG Demands	--	--	--	--	--	--	--
Contract Demands	--	--	--	--	--	--	--
New Braunfels (WUG)	**Total**	**18,588**	**23,079**	**27,538**	**32,193**	**36,772**	**41,262**
WUG Demands	Municipal	18,588	23,079	27,538	32,193	36,772	41,262
Contract Demands	--	--	--	--	--	--	--
San Marcos (WUG)	**Total**	**10,902**	**12,715**	**14,971**	**17,750**	**21,141**	**25,199**
WUG Demands	Municipal	10,902	12,715	14,971	17,750	21,141	25,199
Contract Demands	--	--	--	--	--	--	--
Victoria (WUG)	**Total**	**17,110**	**17,965**	**18,629**	**19,299**	**19,930**	**20,470**
WUG Demands	Municipal	17,110	17,965	18,629	19,299	19,930	20,470
Contract Demands	--	--	--	--	--	--	--
GBRA (WUG/WWP)	**Total**	**122,657**	**122,675**	**118,695**	**118,719**	**118,749**	**118,779**
WUG Demands	Municipal	325	343	363	387	417	447
Contract Demands	Irrigation	480	480	480	480	480	480
Contract Demands	Manufacturing	35,390	35,390	35,390	35,390	35,390	35,390
Contract Demands	Municipal	63,270	63,270	59,270	59,270	59,270	59,270
Contract Demands	Steam-Electric	9,304	9,304	9,304	9,304	9,304	9,304
Contract Demands	WWP	13,888	13,888	13,888	13,888	13,888	13,888

MAJOR WATER PROVIDER (PROVIDER TYPE)	USE TYPE	WATER DEMAND PROJECTIONS (ACFT/YR)					
		2020	2030	2040	2050	2060	2070
SAWS (WUG/WWP)	**Total**	**246,358**	**269,131**	**292,311**	**315,437**	**338,760**	**360,503**
WUG Demands	Municipal	239,028	262,301	285,481	308,607	331,930	353,673
Contract Demands	Municipal	7,330	6,830	6,830	6,830	6,830	6,830
SSLGC (WWP)	**Total**	**17,039**	**16,644**	**17,039**	**17,039**	**17,039**	**17,039**
WUG Demands	--	--	--	--	--	--	--
Contract Demands	Municipal	17,039	16,644	17,039	17,039	17,039	17,039

[1] ARWA has executed contracts with San Marcos, CRWA, Kyle, and Buda to sell water that will be developed by three water management strategies included in the 2021 South Central Texas Regional Water Plan (See Chapter 5.2): ARWA/GBRA Project (Phase 1), ARWA Project (Phase 2), and ARWA Project (Phase 3).

[2] CVLGC comprises the cities of Schertz and Cibolo, which are contracted with CVLGC to provide water that would be developed by a water management strategy included in the 2021 South Central Texas Regional Water Plan (See the CVLGC Carrizo Project in Chapter 5.2.22).

2.4 CONTRACTUAL OBLIGATIONS FOR WATER USER GROUPS AND WHOLESALE WATER PROVIDERS

An evaluation of current contractual obligations of WUGs and WWPs in the South Central Texas Region was performed to identify obligations of water to be supplied to other entities. The evaluation consisted of collecting information from all WWPs and certain WUGs regarding current contracts, volumes, and duration of those contracts. Results of the evaluation were incorporated into the State Water Planning Database (DB22) and used in subsequent chapters to project surpluses and needs and to identify water supply plans to meet needs in the South Central Texas Region. A summary of contractual obligations is provided in Appendix 2-A.

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FINAL PLAN

APPENDIX 2-A: TWDB DB22 REPORTS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

Some DB22 Reports in Appendix 2-A appear blank because there is no relevant data for these reports. Blank reports for Region L include the following:

- Alternative Water User Group (WUGs) Water Management Strategies (WMS)
- Alternative Projects Associated with Water Management Strategies (WMS)
- Recommended Water Management Strategy (WMS) Supply Associated with a New or Amended Inter-Basin Transfer (IBT) Permit
- Water User Groups (WUGs) Recommended Water Management Strategy (WMS) Supply Associated with a New or Amended Inter-Basin Transfer (IBT) Permit and Total Recommended Conservation WMS Supply

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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Region L Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
BENTON CITY WSC	8,788	10,155	11,402	12,618	13,761	14,824
CHARLOTTE	1,985	2,295	2,575	2,850	3,108	3,348
JOURDANTON	4,829	5,580	6,266	6,932	7,561	8,145
LYTLE	3,252	3,758	4,221	4,670	5,093	5,487
MCCOY WSC*	7,239	8,366	9,393	10,394	11,336	12,211
PLEASANTON	11,142	12,875	14,454	15,996	17,446	18,792
POTEET	3,871	4,473	5,022	5,557	6,060	6,527
SAN ANTONIO WATER SYSTEM	3,134	3,487	3,811	4,109	4,381	4,381
COUNTY-OTHER	6,741	7,925	8,999	10,068	11,084	12,274
NUECES BASIN TOTAL	**50,981**	**58,914**	**66,143**	**73,194**	**79,830**	**85,989**
BENTON CITY WSC	1,086	1,255	1,409	1,559	1,700	1,832
SAN ANTONIO WATER SYSTEM	482	557	625	692	754	812
COUNTY-OTHER	25	29	33	36	40	43
SAN ANTONIO BASIN TOTAL	**1,593**	**1,841**	**2,067**	**2,287**	**2,494**	**2,687**
ATASCOSA COUNTY TOTAL	**52,574**	**60,755**	**68,210**	**75,481**	**82,324**	**88,676**
ATASCOSA RURAL WSC	588	706	814	918	1,014	1,101
LYTLE	77	104	128	151	172	192
COUNTY-OTHER	7,737	8,321	5,853	8,563	11,397	13,923
NUECES BASIN TOTAL	**8,402**	**9,131**	**6,795**	**9,632**	**12,583**	**15,216**
AIR FORCE VILLAGE II INC	742	839	928	928	928	928
ALAMO HEIGHTS	8,073	8,400	8,400	8,400	8,400	8,400
ATASCOSA RURAL WSC	11,090	13,310	15,353	17,315	19,115	20,759
BEXAR COUNTY WCID 10	5,462	5,666	5,853	6,033	6,198	6,349
CONVERSE	23,458	26,125	28,398	28,398	28,398	28,398
EAST CENTRAL SUD	12,957	14,499	16,184	17,801	19,448	20,866
ELMENDORF	2,131	2,781	3,379	3,953	4,480	4,961
FAIR OAKS RANCH	5,024	5,355	5,517	5,458	5,716	5,951
FORT SAM HOUSTON	1,224	1,224	1,224	1,224	1,224	1,224
GREEN VALLEY SUD	3,179	3,594	3,975	4,341	4,677	4,983
KIRBY	9,096	10,282	10,364	10,365	10,365	10,365
LACKLAND AIR FORCE BASE	11,384	11,384	11,384	11,384	11,384	11,384
LEON VALLEY	8,200	8,750	9,256	11,713	12,249	12,738
LIVE OAK	9,322	9,545	9,545	9,545	9,545	9,545
RANDOLPH AIR FORCE BASE	1,793	2,026	2,242	2,448	2,637	2,810
SAN ANTONIO WATER SYSTEM	1,809,454	2,052,237	2,283,495	2,495,918	2,691,193	2,869,595
SCHERTZ	1,510	1,898	2,387	2,908	3,532	4,103
SELMA	5,005	5,658	6,258	6,834	7,363	7,846
SHAVANO PARK	2,194	2,480	2,744	2,997	3,229	3,440
THE OAKS WSC	1,704	2,031	2,332	2,620	2,886	3,128
UNIVERSAL CITY	21,072	21,702	21,702	21,702	21,702	21,702
WATER SERVICES	3,613	4,081	4,523	4,951	5,353	5,726
COUNTY-OTHER	7,952	8,552	6,016	8,800	11,714	14,309
SAN ANTONIO BASIN TOTAL	**1,965,639**	**2,222,419**	**2,461,459**	**2,686,036**	**2,891,736**	**3,079,510**
BEXAR COUNTY TOTAL	**1,974,041**	**2,231,550**	**2,468,254**	**2,695,668**	**2,904,319**	**3,094,726**
AQUA WSC*	260	318	376	433	490	546
CREEDMOOR-MAHA WSC*	1,508	1,762	2,012	2,284	2,545	2,803
POLONIA WSC*	2,303	2,819	3,329	3,833	4,343	4,838
COUNTY-OTHER	216	112	124	132	164	194

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

Region L Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
COLORADO BASIN TOTAL	**4,287**	**5,011**	**5,841**	**6,682**	**7,542**	**8,381**
AQUA WSC*	1,470	1,800	2,125	2,446	2,771	3,087
COUNTY LINE SUD	3,254	4,733	5,711	6,491	6,969	7,148
CREEDMOOR-MAHA WSC*	134	157	179	203	226	249
GOFORTH SUD*	400	400	400	400	400	400
GONZALES COUNTY WSC	197	241	286	329	372	415
LOCKHART	15,726	19,254	22,734	26,176	29,654	33,038
LULING	6,699	8,203	9,685	11,152	12,634	14,076
MARTINDALE WSC	3,380	4,406	5,269	6,305	7,547	9,039
MAXWELL WSC	4,211	5,156	6,086	7,008	7,939	8,846
POLONIA WSC*	4,886	5,982	7,064	8,133	9,213	10,265
SAN MARCOS	9	15	21	27	33	39
TRI COMMUNITY WSC	1,377	1,688	1,992	2,293	2,598	2,894
COUNTY-OTHER	978	507	562	598	741	877
GUADALUPE BASIN TOTAL	**42,721**	**52,542**	**62,114**	**71,561**	**81,097**	**90,373**
CALDWELL COUNTY TOTAL	**47,008**	**57,553**	**67,955**	**78,243**	**88,639**	**98,754**
POINT COMFORT	829	927	1,022	1,113	1,204	1,292
COUNTY-OTHER	412	461	508	554	599	643
COLORADO-LAVACA BASIN TOTAL	**1,241**	**1,388**	**1,530**	**1,667**	**1,803**	**1,935**
GUADALUPE-BLANCO RIVER AUTHORITY	2,948	3,295	3,633	3,958	4,281	4,594
PORT LAVACA	14,196	15,867	17,494	19,062	20,614	22,120
PORT OCONNOR MUD	1,409	1,575	1,736	1,892	2,046	2,195
SEADRIFT	1,534	1,714	1,890	2,060	2,227	2,390
COUNTY-OTHER	2,669	2,982	3,290	3,583	3,877	4,157
LAVACA-GUADALUPE BASIN TOTAL	**22,756**	**25,433**	**28,043**	**30,555**	**33,045**	**35,456**
COUNTY-OTHER	40	45	49	54	58	63
SAN ANTONIO-NUECES BASIN TOTAL	**40**	**45**	**49**	**54**	**58**	**63**
CALHOUN COUNTY TOTAL	**24,037**	**26,866**	**29,622**	**32,276**	**34,906**	**37,454**
CANYON LAKE WATER SERVICE*	40,388	53,097	66,751	80,578	93,877	106,415
CLEAR WATER ESTATES WATER SYSTEM	559	708	859	1,012	1,163	1,309
CRYSTAL CLEAR WSC	1,943	2,238	2,537	2,840	3,140	3,428
GARDEN RIDGE	3,243	3,864	4,612	4,897	5,631	6,337
GREEN VALLEY SUD	443	561	682	803	924	1,039
KT WATER DEVELOPMENT	1,271	1,611	1,957	2,304	2,650	2,981
NEW BRAUNFELS	78,430	100,145	120,734	142,323	163,098	183,353
SAN ANTONIO WATER SYSTEM	977	1,105	1,224	1,338	1,442	1,538
SCHERTZ	1,557	2,531	3,804	5,286	7,126	8,992
WINGERT WATER SYSTEMS	1,416	1,794	2,178	2,178	2,178	2,178
COUNTY-OTHER	4,943	4,943	4,943	4,943	4,943	4,943
GUADALUPE BASIN TOTAL	**135,170**	**172,597**	**210,281**	**248,502**	**286,172**	**322,513**
CANYON LAKE WATER SERVICE*	8,272	10,476	13,032	15,745	18,465	20,912
FAIR OAKS RANCH	404	481	544	584	656	724
GARDEN RIDGE	1,832	2,184	2,607	2,767	3,183	3,581
GUADALUPE-BLANCO RIVER AUTHORITY	551	616	679	740	800	858
SAN ANTONIO WATER SYSTEM	1,139	1,289	1,427	1,560	1,682	1,794
SCHERTZ	39	63	95	132	179	225
SELMA	19	24	28	34	39	44
WATER SERVICES	2,975	3,360	3,724	4,077	4,408	4,715

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

Region L Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
COUNTY-OTHER	2,098	2,098	2,098	2,098	2,098	2,098
SAN ANTONIO BASIN TOTAL	**17,329**	**20,591**	**24,234**	**27,737**	**31,510**	**34,951**
COMAL COUNTY TOTAL	**152,499**	**193,188**	**234,515**	**276,239**	**317,682**	**357,464**
CUERO	6,892	7,122	7,236	7,341	7,410	7,458
GONZALES COUNTY WSC	385	398	405	411	415	418
YORKTOWN	2,247	2,322	2,360	2,394	2,417	2,433
COUNTY-OTHER	7,269	7,514	7,633	7,742	7,815	7,866
GUADALUPE BASIN TOTAL	**16,793**	**17,356**	**17,634**	**17,888**	**18,057**	**18,175**
YOAKUM*	2,195	2,269	2,305	2,339	2,361	2,376
COUNTY-OTHER	1,298	1,342	1,363	1,383	1,395	1,405
LAVACA BASIN TOTAL	**3,493**	**3,611**	**3,668**	**3,722**	**3,756**	**3,781**
COUNTY-OTHER	13	13	14	14	14	14
LAVACA-GUADALUPE BASIN TOTAL	**13**	**13**	**14**	**14**	**14**	**14**
COUNTY-OTHER	556	575	584	592	598	602
SAN ANTONIO BASIN TOTAL	**556**	**575**	**584**	**592**	**598**	**602**
DEWITT COUNTY TOTAL	**20,855**	**21,555**	**21,900**	**22,216**	**22,425**	**22,572**
ASHERTON	1,180	1,272	1,332	1,391	1,437	1,474
BIG WELLS	759	818	856	895	924	948
CARRIZO HILL WSC	686	740	775	809	836	857
CARRIZO SPRINGS	5,994	6,462	6,765	7,069	7,301	7,487
COUNTY-OTHER	2,232	2,407	2,520	2,633	2,719	2,789
NUECES BASIN TOTAL	**10,851**	**11,699**	**12,248**	**12,797**	**13,217**	**13,555**
COUNTY-OTHER	24	26	27	28	29	30
RIO GRANDE BASIN TOTAL	**24**	**26**	**27**	**28**	**29**	**30**
DIMMIT COUNTY TOTAL	**10,875**	**11,725**	**12,275**	**12,825**	**13,246**	**13,585**
BENTON CITY WSC	617	681	736	789	836	879
DILLEY	4,623	5,095	5,506	5,901	6,258	6,579
MOORE WSC	577	635	687	736	781	821
PEARSALL	10,192	11,233	12,137	13,009	13,795	14,505
COUNTY-OTHER	3,177	3,500	3,780	4,053	4,297	4,520
NUECES BASIN TOTAL	**19,186**	**21,144**	**22,846**	**24,488**	**25,967**	**27,304**
FRIO COUNTY TOTAL	**19,186**	**21,144**	**22,846**	**24,488**	**25,967**	**27,304**
COUNTY-OTHER	3,006	3,395	3,652	3,762	3,838	3,883
GUADALUPE BASIN TOTAL	**3,006**	**3,395**	**3,652**	**3,762**	**3,838**	**3,883**
GOLIAD	2,289	2,586	2,781	2,863	2,923	2,956
COUNTY-OTHER	2,456	2,774	2,985	3,074	3,135	3,172
SAN ANTONIO BASIN TOTAL	**4,745**	**5,360**	**5,766**	**5,937**	**6,058**	**6,128**
COUNTY-OTHER	676	764	821	846	863	873
SAN ANTONIO-NUECES BASIN TOTAL	**676**	**764**	**821**	**846**	**863**	**873**
GOLIAD COUNTY TOTAL	**8,427**	**9,519**	**10,239**	**10,545**	**10,759**	**10,884**
GONZALES	8,304	9,132	9,912	10,816	11,734	12,695
GONZALES COUNTY WSC	6,780	7,457	8,093	8,831	9,581	10,367
NIXON	2,542	2,796	3,035	3,311	3,593	3,887
SMILEY	604	665	721	787	854	924
WAELDER	1,244	1,368	1,485	1,620	1,757	1,901
COUNTY-OTHER	2,130	2,341	2,542	2,774	3,011	3,257
GUADALUPE BASIN TOTAL	**21,604**	**23,759**	**25,788**	**28,139**	**30,530**	**33,031**

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

Region L Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
COUNTY-OTHER	147	162	175	191	208	225
LAVACA BASIN TOTAL	**147**	**162**	**175**	**191**	**208**	**225**
GONZALES COUNTY TOTAL	**21,751**	**23,921**	**25,963**	**28,330**	**30,738**	**33,256**
CRYSTAL CLEAR WSC	10,435	12,547	14,706	16,818	18,968	21,079
GONZALES COUNTY WSC	108	131	153	175	197	219
GREEN VALLEY SUD	14,148	17,010	19,938	22,802	25,716	28,578
LULING	24	28	33	38	43	47
MARTINDALE WSC	176	261	375	523	716	871
NEW BRAUNFELS	12,580	14,824	17,728	20,274	22,866	25,410
SCHERTZ	3,012	4,024	4,735	5,431	6,138	6,829
SEGUIN	27,874	33,511	39,279	44,921	50,664	56,302
SPRINGS HILL WSC	23,307	27,018	32,203	37,305	42,674	47,774
TRI COMMUNITY WSC	26	32	38	43	49	55
WATER SERVICES	459	518	574	629	680	727
COUNTY-OTHER	110	134	159	185	209	235
GUADALUPE BASIN TOTAL	**92,259**	**110,038**	**129,921**	**149,144**	**168,920**	**188,126**
CIBOLO	23,066	32,087	36,598	38,853	39,981	40,545
EAST CENTRAL SUD	494	575	555	740	724	906
GREEN VALLEY SUD	20,475	29,521	35,616	43,732	53,161	62,962
MARION	1,862	2,239	2,624	3,001	3,384	3,761
SCHERTZ	37,696	50,365	59,259	67,977	76,816	85,471
SELMA	2,382	5,251	5,251	5,251	5,251	5,251
SPRINGS HILL WSC	3,137	3,637	4,335	5,021	5,744	6,430
COUNTY-OTHER	1,322	1,605	1,905	2,215	2,499	2,809
SAN ANTONIO BASIN TOTAL	**90,434**	**125,280**	**146,143**	**166,790**	**187,560**	**208,135**
GUADALUPE COUNTY TOTAL	**182,693**	**235,318**	**276,064**	**315,934**	**356,480**	**396,261**
BUDA*	1,658	2,184	2,826	3,627	4,533	5,564
COUNTY LINE SUD	7,306	10,627	14,449	18,469	22,791	27,412
CREEDMOOR-MAHA WSC*	64	75	85	97	108	119
CRYSTAL CLEAR WSC	4,393	5,131	6,029	7,152	8,421	9,865
GOFORTH SUD*	23,263	35,628	47,991	60,356	72,721	85,085
KYLE	48,269	77,050	92,000	92,000	92,000	92,000
MAXWELL WSC	1,185	1,291	1,419	1,580	1,761	1,968
SAN MARCOS	71,126	84,846	101,214	120,742	144,039	171,833
SOUTH BUDA WCID 1	1,350	1,774	2,252	2,685	3,354	4,118
TEXAS STATE UNIVERSITY	4,861	4,861	4,861	4,861	4,861	4,861
WIMBERLEY WSC	9,178	12,964	17,573	23,336	29,848	37,259
COUNTY-OTHER*	10,625	4,118	12,938	18,267	56,940	101,681
GUADALUPE BASIN TOTAL	**183,278**	**240,549**	**303,637**	**353,172**	**441,377**	**541,765**
HAYS COUNTY TOTAL	**183,278**	**240,549**	**303,637**	**353,172**	**441,377**	**541,765**
EL OSO WSC*	40	41	41	41	41	41
COUNTY-OTHER	81	84	84	84	84	84
GUADALUPE BASIN TOTAL	**121**	**125**	**125**	**125**	**125**	**125**
EL OSO WSC*	113	116	117	117	117	117
COUNTY-OTHER	53	55	55	55	55	55
NUECES BASIN TOTAL	**166**	**171**	**172**	**172**	**172**	**172**
EL OSO WSC*	3,282	3,384	3,388	3,389	3,389	3,389

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

Region L Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
FALLS CITY	630	648	650	650	650	650
KARNES CITY	3,242	3,343	3,349	3,349	3,349	3,349
KENEDY	3,587	3,699	3,706	3,706	3,706	3,706
RUNGE	1,288	1,328	1,331	1,331	1,331	1,331
SUNKO WSC	183	189	190	190	190	190
COUNTY-OTHER	2,893	2,985	2,991	2,990	2,990	2,990
SAN ANTONIO BASIN TOTAL	**15,105**	**15,576**	**15,605**	**15,605**	**15,605**	**15,605**
EL OSO WSC*	29	30	30	30	30	30
COUNTY-OTHER	35	36	36	36	36	36
SAN ANTONIO-NUECES BASIN TOTAL	**64**	**66**	**66**	**66**	**66**	**66**
KARNES COUNTY TOTAL	**15,456**	**15,938**	**15,968**	**15,968**	**15,968**	**15,968**
COUNTY-OTHER	320	319	349	373	378	415
COLORADO BASIN TOTAL	**320**	**319**	**349**	**373**	**378**	**415**
GUADALUPE-BLANCO RIVER AUTHORITY	508	567	626	682	738	792
KENDALL COUNTY WCID 1	2,977	3,499	4,051	4,598	5,156	5,703
COUNTY-OTHER	12,861	12,809	14,004	14,996	15,186	16,680
GUADALUPE BASIN TOTAL	**16,346**	**16,875**	**18,681**	**20,276**	**21,080**	**23,175**
BOERNE	14,732	19,298	24,121	28,903	33,783	38,574
FAIR OAKS RANCH	2,515	3,476	4,375	5,030	5,975	6,904
GUADALUPE-BLANCO RIVER AUTHORITY	10	12	13	14	15	16
KENDALL WEST UTILITY	2,505	6,500	9,000	12,000	16,000	18,000
COUNTY-OTHER	5,757	5,733	6,268	6,712	6,797	7,465
SAN ANTONIO BASIN TOTAL	**25,519**	**35,019**	**43,777**	**52,659**	**62,570**	**70,959**
KENDALL COUNTY TOTAL	**42,185**	**52,213**	**62,807**	**73,308**	**84,028**	**94,549**
COTULLA	4,138	4,532	4,901	5,314	5,671	6,002
ENCINAL WSC	1,021	1,118	1,208	1,310	1,399	1,480
COUNTY-OTHER	2,617	2,867	3,100	3,363	3,587	3,797
NUECES BASIN TOTAL	**7,776**	**8,517**	**9,209**	**9,987**	**10,657**	**11,279**
LA SALLE COUNTY TOTAL	**7,776**	**8,517**	**9,209**	**9,987**	**10,657**	**11,279**
BENTON CITY WSC	5,556	6,672	7,621	8,449	9,195	9,845
DEVINE	4,425	4,639	4,822	4,981	5,125	5,250
EAST MEDINA COUNTY SUD	7,419	8,528	9,469	10,292	11,035	11,680
HONDO	9,805	10,767	11,585	12,298	12,942	13,502
LYTLE	821	1,017	1,183	1,329	1,462	1,575
MEDINA COUNTY WCID 2	698	792	872	941	1,003	1,058
MEDINA RIVER WEST WSC	755	856	941	1,016	1,084	1,142
NATALIA	1,708	1,936	2,130	2,300	2,452	2,586
WEST MEDINA WSC	1,147	1,300	1,430	1,545	1,647	1,736
YANCEY WSC	1,110	1,258	1,385	1,495	1,594	1,680
COUNTY-OTHER	6,591	7,928	9,053	10,018	10,890	11,641
NUECES BASIN TOTAL	**40,035**	**45,693**	**50,491**	**54,664**	**58,429**	**61,695**
CASTROVILLE	2,846	2,864	2,880	2,893	2,906	2,916
EAST MEDINA COUNTY SUD	669	769	854	928	995	1,053
LA COSTE	1,535	1,740	1,914	2,067	2,203	2,323
MEDINA RIVER WEST WSC	386	438	481	520	554	584
SAN ANTONIO WATER SYSTEM	1,222	1,383	1,531	1,674	1,805	1,925
YANCEY WSC	5,234	5,934	6,528	7,047	7,514	7,922

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Region L Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
COUNTY-OTHER	726	873	997	1,103	1,199	1,282
SAN ANTONIO BASIN TOTAL	**12,618**	**14,001**	**15,185**	**16,232**	**17,176**	**18,005**
MEDINA COUNTY TOTAL	**52,653**	**59,694**	**65,676**	**70,896**	**75,605**	**79,700**
COUNTY-OTHER	67	69	70	71	71	72
SAN ANTONIO BASIN TOTAL	**67**	**69**	**70**	**71**	**71**	**72**
REFUGIO	2,979	3,073	3,095	3,147	3,169	3,183
WOODSBORO	1,647	1,698	1,711	1,739	1,751	1,759
COUNTY-OTHER	2,994	3,089	3,109	3,162	3,184	3,199
SAN ANTONIO-NUECES BASIN TOTAL	**7,620**	**7,860**	**7,915**	**8,048**	**8,104**	**8,141**
REFUGIO COUNTY TOTAL	**7,687**	**7,929**	**7,985**	**8,119**	**8,175**	**8,213**
KNIPPA WSC	740	810	869	931	989	1,045
SABINAL	1,844	2,017	2,164	2,318	2,464	2,603
UVALDE	18,623	20,366	21,860	23,407	24,883	26,297
WINDMILL WSC	1,620	1,772	1,902	2,036	2,165	2,288
COUNTY-OTHER	6,019	6,583	7,066	7,565	8,042	8,501
NUECES BASIN TOTAL	**28,846**	**31,548**	**33,861**	**36,257**	**38,543**	**40,734**
UVALDE COUNTY TOTAL	**28,846**	**31,548**	**33,861**	**36,257**	**38,543**	**40,734**
QUAIL CREEK MUD	1,645	1,758	1,846	1,924	1,989	2,043
VICTORIA	45,688	48,862	51,359	53,583	55,410	56,923
COUNTY-OTHER	13,765	14,650	15,348	15,970	16,480	16,902
GUADALUPE BASIN TOTAL	**61,098**	**65,270**	**68,553**	**71,477**	**73,879**	**75,868**
COUNTY-OTHER	43	46	48	50	51	53
LAVACA BASIN TOTAL	**43**	**46**	**48**	**50**	**51**	**53**
VICTORIA	22,099	23,634	24,842	25,918	26,801	27,533
VICTORIA COUNTY WCID 1	2,331	2,491	2,616	2,727	2,819	2,894
COUNTY-OTHER	8,216	8,744	9,161	9,532	9,836	10,088
LAVACA-GUADALUPE BASIN TOTAL	**32,646**	**34,869**	**36,619**	**38,177**	**39,456**	**40,515**
COUNTY-OTHER	70	75	78	81	84	86
SAN ANTONIO BASIN TOTAL	**70**	**75**	**78**	**81**	**84**	**86**
VICTORIA COUNTY TOTAL	**93,857**	**100,260**	**105,298**	**109,785**	**113,470**	**116,522**
NIXON	8	10	12	14	16	17
SUNKO WSC	26	32	38	43	48	53
COUNTY-OTHER	278	265	232	178	57	57
GUADALUPE BASIN TOTAL	**312**	**307**	**282**	**235**	**121**	**127**
MCCOY WSC*	342	421	498	568	634	694
PICOSA WSC	32	39	47	53	59	65
COUNTY-OTHER	315	301	263	203	65	65
NUECES BASIN TOTAL	**689**	**761**	**808**	**824**	**758**	**824**
EAST CENTRAL SUD	1,449	1,785	1,900	1,900	1,900	1,900
EL OSO WSC*	224	277	327	372	415	454
ELMENDORF	29	35	42	48	54	58
FLORESVILLE	8,123	10,005	11,833	13,476	15,031	16,432
LA VERNIA	1,934	2,382	2,817	3,208	3,579	3,912
MCCOY WSC*	28	35	41	46	52	57
OAK HILLS WSC	5,511	6,788	8,028	9,142	10,198	11,149
PICOSA WSC	2,497	3,076	3,637	4,141	4,620	5,050
POTH	2,375	2,926	3,461	3,940	4,395	4,806

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Region L Water User Group (WUG) Population

	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
S S WSC	18,219	24,485	31,343	38,238	46,651	51,316
STOCKDALE	1,858	2,288	2,706	3,082	3,438	3,759
SUNKO WSC	4,216	5,192	6,140	6,994	7,800	8,527
COUNTY-OTHER	6,802	6,495	5,679	4,370	1,399	1,400
SAN ANTONIO BASIN TOTAL	**53,265**	**65,769**	**77,954**	**88,957**	**99,532**	**108,820**
WILSON COUNTY TOTAL	**54,266**	**66,837**	**79,044**	**90,016**	**100,411**	**109,771**
BATESVILLE WSC	1,242	1,389	1,522	1,650	1,769	1,879
CRYSTAL CITY	8,063	9,022	9,880	10,711	11,484	12,199
LOMA ALTA CHULA VISTA WATER SYSTEM	735	822	900	976	1,047	1,112
ZAVALA COUNTY WCID 1	1,683	1,883	2,062	2,235	2,397	2,546
COUNTY-OTHER	1,466	1,642	1,797	1,949	2,089	2,220
NUECES BASIN TOTAL	**13,189**	**14,758**	**16,161**	**17,521**	**18,786**	**19,956**
ZAVALA COUNTY TOTAL	**13,189**	**14,758**	**16,161**	**17,521**	**18,786**	**19,956**
REGION L POPULATION TOTAL	**3,013,139**	**3,491,337**	**3,937,489**	**4,357,274**	**4,794,505**	**5,219,393**

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
BENTON CITY WSC	950	1,070	1,185	1,300	1,414	1,523
CHARLOTTE	339	381	420	461	502	540
JOURDANTON	1,021	1,153	1,276	1,402	1,527	1,645
LYTLE	628	708	783	859	936	1,008
MCCOY WSC*	896	1,002	1,102	1,207	1,314	1,414
PLEASANTON	2,432	2,750	3,045	3,347	3,645	3,925
POTEET	478	530	579	632	687	740
SAN ANTONIO WATER SYSTEM	412	444	475	506	538	538
COUNTY-OTHER	865	978	1,081	1,194	1,312	1,451
MANUFACTURING	58	97	97	97	97	97
MINING	4,081	4,043	3,935	3,212	2,478	2,043
STEAM ELECTRIC POWER	8,427	8,427	8,427	8,427	8,427	8,427
LIVESTOCK	1,673	1,673	1,673	1,673	1,673	1,673
IRRIGATION	29,647	29,647	29,647	29,647	29,647	29,647
NUECES BASIN TOTAL	**51,907**	**52,903**	**53,725**	**53,964**	**54,197**	**54,671**
BENTON CITY WSC	117	132	146	161	175	188
SAN ANTONIO WATER SYSTEM	63	71	78	85	93	100
COUNTY-OTHER	3	4	4	4	5	5
IRRIGATION	299	299	299	299	299	299
SAN ANTONIO BASIN TOTAL	**482**	**506**	**527**	**549**	**572**	**592**
ATASCOSA COUNTY TOTAL	**52,389**	**53,409**	**54,252**	**54,513**	**54,769**	**55,263**
ATASCOSA RURAL WSC	75	87	99	111	122	132
LYTLE	15	20	24	28	32	35
COUNTY-OTHER	1,023	1,054	724	1,050	1,395	1,703
LIVESTOCK	185	185	185	185	185	185
IRRIGATION	1,175	1,175	1,175	1,175	1,175	1,175
NUECES BASIN TOTAL	**2,473**	**2,521**	**2,207**	**2,549**	**2,909**	**3,230**
AIR FORCE VILLAGE II INC	188	210	229	228	228	228
ALAMO HEIGHTS	2,210	2,261	2,233	2,221	2,218	2,218
ATASCOSA RURAL WSC	1,406	1,642	1,864	2,087	2,299	2,495
BEXAR COUNTY WCID 10	1,174	1,195	1,219	1,249	1,281	1,312
CONVERSE	2,554	2,764	2,951	2,925	2,919	2,917
EAST CENTRAL SUD	1,826	1,973	2,150	2,337	2,547	2,731
ELMENDORF	307	393	473	551	624	691
FAIR OAKS RANCH	1,328	1,401	1,437	1,418	1,483	1,543
FORT SAM HOUSTON	2,596	2,592	2,588	2,587	2,587	2,586
GREEN VALLEY SUD	364	393	423	456	490	522
KIRBY	930	999	973	964	962	961
LACKLAND AIR FORCE BASE	1,209	1,163	1,125	1,104	1,100	1,100
LEON VALLEY	1,401	1,454	1,507	1,886	1,968	2,046
LIVE OAK	1,650	1,657	1,633	1,619	1,616	1,616
RANDOLPH AIR FORCE BASE	121	136	151	165	177	189
SAN ANTONIO WATER SYSTEM	238,114	261,305	284,407	307,453	330,693	352,390
SCHERTZ	243	300	374	454	551	639
SELMA	825	920	1,015	1,106	1,190	1,268
SHAVANO PARK	693	775	851	927	997	1,062
THE OAKS WSC	298	349	397	444	488	528
UNIVERSAL CITY	3,155	3,170	3,112	3,080	3,073	3,072

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
WATER SERVICES	581	636	689	749	808	864
COUNTY-OTHER	1,052	1,083	745	1,080	1,434	1,751
MANUFACTURING	5,925	6,776	6,776	6,776	6,776	6,776
MINING	7,820	8,740	9,533	10,404	11,399	12,502
STEAM ELECTRIC POWER	52,293	52,293	52,293	52,293	52,293	52,293
LIVESTOCK	1,016	1,016	1,016	1,016	1,016	1,016
IRRIGATION	10,751	10,751	10,751	10,751	10,751	10,751
SAN ANTONIO BASIN TOTAL	**342,030**	**368,347**	**392,915**	**418,330**	**443,968**	**468,067**
BEXAR COUNTY TOTAL	**344,503**	**370,868**	**395,122**	**420,879**	**446,877**	**471,297**
AQUA WSC*	43	51	59	68	77	86
CREEDMOOR-MAHA WSC*	167	186	207	231	257	283
POLONIA WSC*	285	338	391	447	505	562
COUNTY-OTHER	26	13	14	15	18	22
MINING	11	9	6	4	2	1
LIVESTOCK	56	56	56	56	56	56
IRRIGATION	24	24	24	24	24	24
COLORADO BASIN TOTAL	**612**	**677**	**757**	**845**	**939**	**1,034**
AQUA WSC*	241	288	336	384	434	483
COUNTY LINE SUD	226	318	384	436	468	480
CREEDMOOR-MAHA WSC*	15	17	18	21	23	25
GOFORTH SUD*	45	43	43	43	42	42
GONZALES COUNTY WSC	54	65	76	87	98	110
LOCKHART	2,258	2,683	3,114	3,557	4,021	4,477
LULING	956	1,131	1,309	1,493	1,688	1,879
MARTINDALE WSC	361	453	529	626	747	894
MAXWELL WSC	428	503	579	659	745	829
POLONIA WSC*	605	717	831	948	1,071	1,193
SAN MARCOS	1	2	3	4	5	6
TRI COMMUNITY WSC	174	206	239	272	308	343
COUNTY-OTHER	116	58	63	66	83	97
MANUFACTURING	5	5	5	5	5	5
MINING	112	89	66	42	18	8
LIVESTOCK	732	732	732	732	732	732
IRRIGATION	778	778	778	778	778	778
GUADALUPE BASIN TOTAL	**7,107**	**8,088**	**9,105**	**10,153**	**11,266**	**12,381**
CALDWELL COUNTY TOTAL	**7,719**	**8,765**	**9,862**	**10,998**	**12,205**	**13,415**
POINT COMFORT	87	92	98	106	115	123
COUNTY-OTHER	48	52	57	61	66	71
MANUFACTURING	28,268	32,159	32,159	32,159	32,159	32,159
MINING	26	27	21	15	9	6
LIVESTOCK	56	56	56	56	56	56
IRRIGATION	760	760	760	760	760	760
COLORADO-LAVACA BASIN TOTAL	**29,245**	**33,146**	**33,151**	**33,157**	**33,165**	**33,175**
LIVESTOCK	2	2	2	2	2	2
GUADALUPE BASIN TOTAL	**2**	**2**	**2**	**2**	**2**	**2**
GUADALUPE-BLANCO RIVER AUTHORITY	238	252	266	284	306	328
PORT LAVACA	1,986	2,144	2,306	2,482	2,678	2,871

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
PORT OCONNOR MUD	110	116	123	131	141	151
SEADRIFT	256	277	299	323	349	374
COUNTY-OTHER	310	333	365	398	429	459
MANUFACTURING	17,862	20,320	20,320	20,320	20,320	20,320
MINING	26	28	20	15	10	6
LIVESTOCK	219	219	219	219	219	219
IRRIGATION	15,079	15,079	15,079	15,079	15,079	15,079
LAVACA-GUADALUPE BASIN TOTAL	**36,086**	**38,768**	**38,997**	**39,251**	**39,531**	**39,807**
COUNTY-OTHER	5	5	6	6	6	7
LIVESTOCK	13	13	13	13	13	13
SAN ANTONIO-NUECES BASIN TOTAL	**18**	**18**	**19**	**19**	**19**	**20**
CALHOUN COUNTY TOTAL	**65,351**	**71,934**	**72,169**	**72,429**	**72,717**	**73,004**
CANYON LAKE WATER SERVICE*	5,059	6,536	8,166	9,827	11,433	12,951
CLEAR WATER ESTATES WATER SYSTEM	677	856	1,037	1,221	1,402	1,578
CRYSTAL CLEAR WSC	279	313	348	386	426	465
GARDEN RIDGE	1,140	1,347	1,601	1,696	1,949	2,193
GREEN VALLEY SUD	51	61	73	84	97	109
KT WATER DEVELOPMENT	432	542	655	770	885	995
NEW BRAUNFELS	16,019	20,103	24,012	28,179	32,251	36,240
SAN ANTONIO WATER SYSTEM	128	141	152	165	177	189
SCHERTZ	251	400	596	825	1,111	1,402
WINGERT WATER SYSTEMS	283	359	436	436	436	436
COUNTY-OTHER	836	814	796	787	785	785
MANUFACTURING	4,806	5,788	5,788	5,788	5,788	5,788
MINING	8,256	9,596	10,886	12,012	13,423	15,003
LIVESTOCK	220	220	220	220	220	220
IRRIGATION	385	385	385	385	385	385
GUADALUPE BASIN TOTAL	**38,822**	**47,461**	**55,151**	**62,781**	**70,768**	**78,739**
CANYON LAKE WATER SERVICE*	1,036	1,290	1,594	1,920	2,249	2,545
FAIR OAKS RANCH	107	126	142	152	170	188
GARDEN RIDGE	645	761	904	959	1,102	1,239
GUADALUPE-BLANCO RIVER AUTHORITY	45	47	50	53	57	61
SAN ANTONIO WATER SYSTEM	150	164	178	192	207	220
SCHERTZ	6	10	15	21	28	35
SELMA	3	4	5	6	6	7
WATER SERVICES	479	523	567	616	665	711
COUNTY-OTHER	355	345	338	334	333	333
MINING	344	400	454	501	559	625
LIVESTOCK	17	17	17	17	17	17
IRRIGATION	43	43	43	43	43	43
SAN ANTONIO BASIN TOTAL	**3,230**	**3,730**	**4,307**	**4,814**	**5,436**	**6,024**
COMAL COUNTY TOTAL	**42,052**	**51,191**	**59,458**	**67,595**	**76,204**	**84,763**
CUERO	1,826	1,854	1,857	1,870	1,885	1,897
GONZALES COUNTY WSC	105	107	108	109	110	110
YORKTOWN	396	397	394	398	401	403
COUNTY-OTHER	990	989	978	977	984	990
MANUFACTURING	134	169	169	169	169	169
MINING	2,405	2,259	1,668	1,081	494	229

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
LIVESTOCK	1,449	1,449	1,449	1,449	1,449	1,449
IRRIGATION	265	265	265	265	265	265
GUADALUPE BASIN TOTAL	**7,570**	**7,489**	**6,888**	**6,318**	**5,757**	**5,512**
YOAKUM*	390	393	390	391	394	397
COUNTY-OTHER	177	177	175	175	176	177
MANUFACTURING	138	175	175	175	175	175
MINING	506	475	351	227	104	48
LIVESTOCK	295	295	295	295	295	295
IRRIGATION	431	431	431	431	431	431
LAVACA BASIN TOTAL	**1,937**	**1,946**	**1,817**	**1,694**	**1,575**	**1,523**
COUNTY-OTHER	2	2	2	2	2	2
LIVESTOCK	17	17	17	17	17	17
IRRIGATION	8	8	8	8	8	8
LAVACA-GUADALUPE BASIN TOTAL	**27**	**27**	**27**	**27**	**27**	**27**
COUNTY-OTHER	76	76	75	75	75	76
MINING	254	239	176	114	52	24
LIVESTOCK	143	143	143	143	143	143
IRRIGATION	53	53	53	53	53	53
SAN ANTONIO BASIN TOTAL	**526**	**511**	**447**	**385**	**323**	**296**
DEWITT COUNTY TOTAL	**10,060**	**9,973**	**9,179**	**8,424**	**7,682**	**7,358**
ASHERTON	238	249	260	271	280	287
BIG WELLS	121	126	129	133	137	141
CARRIZO HILL WSC	119	125	129	134	138	141
CARRIZO SPRINGS	1,623	1,717	1,773	1,846	1,904	1,952
COUNTY-OTHER	307	322	328	339	349	358
MINING	4,265	4,336	3,760	2,449	1,140	531
LIVESTOCK	349	349	349	349	349	349
IRRIGATION	4,910	4,910	4,910	4,910	4,910	4,910
NUECES BASIN TOTAL	**11,932**	**12,134**	**11,638**	**10,431**	**9,207**	**8,669**
COUNTY-OTHER	3	3	4	4	4	4
MINING	654	665	577	375	175	81
LIVESTOCK	39	39	39	39	39	39
IRRIGATION	691	691	691	691	691	691
RIO GRANDE BASIN TOTAL	**1,387**	**1,398**	**1,311**	**1,109**	**909**	**815**
DIMMIT COUNTY TOTAL	**13,319**	**13,532**	**12,949**	**11,540**	**10,116**	**9,484**
BENTON CITY WSC	67	72	76	81	86	90
DILLEY	1,091	1,182	1,262	1,345	1,424	1,497
MOORE WSC	112	121	130	138	146	154
PEARSALL	2,021	2,181	2,323	2,471	2,616	2,750
COUNTY-OTHER	411	435	468	500	529	556
MINING	1,217	1,250	1,178	986	620	390
STEAM ELECTRIC POWER	124	124	124	124	124	124
LIVESTOCK	882	882	882	882	882	882
IRRIGATION	78,183	78,183	78,183	78,183	78,183	78,183
NUECES BASIN TOTAL	**84,108**	**84,430**	**84,626**	**84,710**	**84,610**	**84,626**
FRIO COUNTY TOTAL	**84,108**	**84,430**	**84,626**	**84,710**	**84,610**	**84,626**
COUNTY-OTHER	368	401	421	429	436	441
MINING	126	126	126	126	126	126

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
STEAM ELECTRIC POWER	1,863	1,863	1,863	1,863	1,863	1,863
LIVESTOCK	195	195	195	195	195	195
IRRIGATION	493	493	493	493	493	493
GUADALUPE BASIN TOTAL	**3,045**	**3,078**	**3,098**	**3,106**	**3,113**	**3,118**
GOLIAD	460	506	535	548	558	565
COUNTY-OTHER	300	327	344	350	357	361
MANUFACTURING	1	1	1	1	1	1
MINING	275	275	275	275	275	275
LIVESTOCK	334	334	334	334	334	334
IRRIGATION	1,988	1,988	1,988	1,988	1,988	1,988
SAN ANTONIO BASIN TOTAL	**3,358**	**3,431**	**3,477**	**3,496**	**3,513**	**3,524**
COUNTY-OTHER	83	90	95	96	98	99
MINING	49	49	49	49	49	49
LIVESTOCK	312	312	312	312	312	312
IRRIGATION	358	358	358	358	358	358
SAN ANTONIO-NUECES BASIN TOTAL	**802**	**809**	**814**	**815**	**817**	**818**
GOLIAD COUNTY TOTAL	**7,205**	**7,318**	**7,389**	**7,417**	**7,443**	**7,460**
GONZALES	2,059	2,223	2,381	2,581	2,796	3,024
GONZALES COUNTY WSC	1,847	2,001	2,150	2,334	2,529	2,736
NIXON	395	423	450	487	527	570
SMILEY	122	131	140	151	164	177
WAELDER	213	229	245	265	287	310
COUNTY-OTHER	254	267	288	313	339	367
MANUFACTURING	2,181	2,427	2,427	2,427	2,427	2,427
MINING	1,600	1,207	813	418	24	1
LIVESTOCK	9,356	9,356	9,356	9,356	9,356	9,356
IRRIGATION	5,127	5,127	5,127	5,127	5,127	5,127
GUADALUPE BASIN TOTAL	**23,154**	**23,391**	**23,377**	**23,459**	**23,576**	**24,095**
COUNTY-OTHER	18	18	20	22	23	25
LIVESTOCK	216	216	216	216	216	216
LAVACA BASIN TOTAL	**234**	**234**	**236**	**238**	**239**	**241**
GONZALES COUNTY TOTAL	**23,388**	**23,625**	**23,613**	**23,697**	**23,815**	**24,336**
CRYSTAL CLEAR WSC	1,500	1,752	2,017	2,287	2,574	2,858
GONZALES COUNTY WSC	29	35	41	46	52	58
GREEN VALLEY SUD	1,619	1,862	2,122	2,395	2,694	2,991
LULING	3	4	4	5	6	6
MARTINDALE WSC	19	27	38	52	71	86
NEW BRAUNFELS	2,569	2,976	3,526	4,014	4,521	5,022
SCHERTZ	485	636	742	848	957	1,064
SEGUIN	4,276	4,992	5,748	6,519	7,338	8,150
SPRINGS HILL WSC	2,050	2,265	2,622	2,996	3,415	3,819
TRI COMMUNITY WSC	3	4	5	5	6	7
WATER SERVICES	74	81	87	95	103	110
COUNTY-OTHER	13	15	18	21	23	26
MANUFACTURING	4,134	4,521	4,521	4,521	4,521	4,521
MINING	342	412	479	566	663	782
STEAM ELECTRIC POWER	9,405	9,405	9,405	9,405	9,405	9,405
LIVESTOCK	1,170	1,170	1,170	1,170	1,170	1,170

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
IRRIGATION	949	949	949	949	949	949
GUADALUPE BASIN TOTAL	**28,640**	**31,106**	**33,494**	**35,894**	**38,468**	**41,024**
CIBOLO	2,374	3,251	3,695	3,915	4,024	4,077
EAST CENTRAL SUD	70	78	74	97	95	119
GREEN VALLEY SUD	2,343	3,232	3,790	4,594	5,570	6,591
MARION	234	271	309	350	394	437
SCHERTZ	6,072	7,961	9,292	10,616	11,979	13,322
SELMA	393	854	852	850	849	849
SPRINGS HILL WSC	276	305	353	403	460	514
COUNTY-OTHER	154	183	214	248	280	314
MANUFACTURING	2	2	2	2	2	2
MINING	114	138	160	189	221	261
LIVESTOCK	130	130	130	130	130	130
IRRIGATION	187	187	187	187	187	187
SAN ANTONIO BASIN TOTAL	**12,349**	**16,592**	**19,058**	**21,581**	**24,191**	**26,803**
GUADALUPE COUNTY TOTAL	**40,989**	**47,698**	**52,552**	**57,475**	**62,659**	**67,827**
BUDA*	298	388	499	639	797	978
COUNTY LINE SUD	508	714	971	1,241	1,532	1,842
CREEDMOOR-MAHA WSC*	7	8	9	10	11	12
CRYSTAL CLEAR WSC	632	716	827	973	1,143	1,338
GOFORTH SUD*	2,605	3,871	5,136	6,415	7,712	9,015
KYLE	4,898	7,680	9,133	9,118	9,108	9,104
MAXWELL WSC	120	126	135	149	165	184
SAN MARCOS	10,901	12,713	14,968	17,746	21,136	25,193
SOUTH BUDA WCID 1	214	275	345	409	510	626
TEXAS STATE UNIVERSITY	928	911	902	898	897	896
WIMBERLEY WSC	1,015	1,399	1,889	2,503	3,197	3,988
COUNTY-OTHER*	1,307	493	1,520	2,132	6,629	11,827
MANUFACTURING*	48	56	56	56	56	56
LIVESTOCK*	2,792	2,792	2,792	2,792	2,792	2,792
IRRIGATION*	157	157	157	157	157	157
GUADALUPE BASIN TOTAL	**26,430**	**32,299**	**39,339**	**45,238**	**55,842**	**68,008**
HAYS COUNTY TOTAL	**26,430**	**32,299**	**39,339**	**45,238**	**55,842**	**68,008**
EL OSO WSC*	8	8	8	8	8	8
COUNTY-OTHER	11	12	12	11	11	11
MINING	152	115	77	40	2	0
LIVESTOCK	38	38	38	38	38	38
IRRIGATION	42	42	42	42	42	42
GUADALUPE BASIN TOTAL	**251**	**215**	**177**	**139**	**101**	**99**
EL OSO WSC*	23	23	23	23	23	23
COUNTY-OTHER	8	8	8	7	7	7
MINING	253	192	129	66	4	0
LIVESTOCK	60	60	60	60	60	60
IRRIGATION	71	71	71	71	71	71
NUECES BASIN TOTAL	**415**	**354**	**291**	**227**	**165**	**161**
EL OSO WSC*	671	676	664	657	656	656
FALLS CITY	141	142	140	139	139	139
KARNES CITY	608	611	599	593	592	592

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
KENEDY	1,411	1,436	1,424	1,422	1,421	1,421
RUNGE	263	264	260	259	258	258
SUNKO WSC	30	30	30	29	29	29
COUNTY-OTHER	410	415	410	409	408	408
MANUFACTURING	131	155	155	155	155	155
MINING	2,022	1,535	1,031	530	28	2
LIVESTOCK	966	966	966	966	966	966
IRRIGATION	881	881	881	881	881	881
SAN ANTONIO BASIN TOTAL	**7,534**	**7,111**	**6,560**	**6,040**	**5,533**	**5,507**
EL OSO WSC*	6	6	6	6	6	6
COUNTY-OTHER	5	5	5	5	5	5
MINING	101	77	51	26	1	0
LIVESTOCK	22	22	22	22	22	22
IRRIGATION	29	29	29	29	29	29
SAN ANTONIO-NUECES BASIN TOTAL	**163**	**139**	**113**	**88**	**63**	**62**
KARNES COUNTY TOTAL	**8,363**	**7,819**	**7,141**	**6,494**	**5,862**	**5,829**
COUNTY-OTHER	39	38	40	43	43	47
LIVESTOCK	13	13	13	13	13	13
COLORADO BASIN TOTAL	**52**	**51**	**53**	**56**	**56**	**60**
GUADALUPE-BLANCO RIVER AUTHORITY	41	43	46	49	53	57
KENDALL COUNTY WCID 1	283	318	358	401	448	495
COUNTY-OTHER	1,570	1,513	1,622	1,720	1,737	1,907
MANUFACTURING	1	1	1	1	1	1
LIVESTOCK	316	316	316	316	316	316
IRRIGATION	505	505	505	505	505	505
GUADALUPE BASIN TOTAL	**2,716**	**2,696**	**2,848**	**2,992**	**3,060**	**3,281**
BOERNE	3,169	4,086	5,067	6,049	7,063	8,062
FAIR OAKS RANCH	665	910	1,139	1,306	1,550	1,790
GUADALUPE-BLANCO RIVER AUTHORITY	1	1	1	1	1	1
KENDALL WEST UTILITY	311	782	1,061	1,402	1,865	2,096
COUNTY-OTHER	703	678	726	770	778	853
LIVESTOCK	66	66	66	66	66	66
IRRIGATION	101	101	101	101	101	101
SAN ANTONIO BASIN TOTAL	**5,016**	**6,624**	**8,161**	**9,695**	**11,424**	**12,969**
KENDALL COUNTY TOTAL	**7,784**	**9,371**	**11,062**	**12,743**	**14,540**	**16,310**
COTULLA	1,291	1,392	1,488	1,605	1,711	1,811
ENCINAL WSC	214	229	243	261	279	295
COUNTY-OTHER	302	321	341	366	389	412
MINING	4,617	4,772	4,263	2,819	1,380	676
LIVESTOCK	491	491	491	491	491	491
IRRIGATION	5,784	5,784	5,784	5,784	5,784	5,784
NUECES BASIN TOTAL	**12,699**	**12,989**	**12,610**	**11,326**	**10,034**	**9,469**
LA SALLE COUNTY TOTAL	**12,699**	**12,989**	**12,610**	**11,326**	**10,034**	**9,469**
BENTON CITY WSC	601	703	792	871	945	1,011
DEVINE	648	658	667	680	697	714
EAST MEDINA COUNTY SUD	663	729	786	842	900	952
HONDO	2,074	2,233	2,370	2,499	2,625	2,738
LYTLE	159	192	219	245	269	289

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
MEDINA COUNTY WCID 2	139	154	167	179	191	201
MEDINA RIVER WEST WSC	77	84	89	95	101	107
NATALIA	292	322	347	371	395	416
WEST MEDINA WSC	237	263	286	307	326	344
YANCEY WSC	124	137	148	158	168	177
COUNTY-OTHER	854	999	1,119	1,225	1,328	1,420
MANUFACTURING	63	67	67	67	67	67
MINING	1,388	1,542	1,673	1,805	1,971	2,154
LIVESTOCK	1,024	1,024	1,024	1,024	1,024	1,024
IRRIGATION	48,029	48,029	48,029	48,029	48,029	48,029
NUECES BASIN TOTAL	**56,372**	**57,136**	**57,783**	**58,397**	**59,036**	**59,643**
CASTROVILLE	838	830	823	821	824	827
EAST MEDINA COUNTY SUD	60	66	71	76	81	86
LA COSTE	152	164	174	184	196	206
MEDINA RIVER WEST WSC	39	43	46	49	52	54
SAN ANTONIO WATER SYSTEM	161	176	191	206	222	236
YANCEY WSC	587	645	698	746	794	836
COUNTY-OTHER	94	110	123	135	146	156
MINING	463	515	558	602	658	718
LIVESTOCK	121	121	121	121	121	121
IRRIGATION	11,939	11,939	11,939	11,939	11,939	11,939
SAN ANTONIO BASIN TOTAL	**14,454**	**14,609**	**14,744**	**14,879**	**15,033**	**15,179**
MEDINA COUNTY TOTAL	**70,826**	**71,745**	**72,527**	**73,276**	**74,069**	**74,822**
COUNTY-OTHER	8	8	8	8	8	8
MINING	3	3	2	2	1	1
LIVESTOCK	24	24	24	24	24	24
SAN ANTONIO BASIN TOTAL	**35**	**35**	**34**	**34**	**33**	**33**
REFUGIO	568	571	562	569	572	574
WOODSBORO	269	269	264	268	269	271
COUNTY-OTHER	356	352	343	344	345	347
MINING	63	66	49	36	23	14
LIVESTOCK	451	451	451	451	451	451
IRRIGATION	1,034	1,034	1,034	1,034	1,034	1,034
SAN ANTONIO-NUECES BASIN TOTAL	**2,741**	**2,743**	**2,703**	**2,702**	**2,694**	**2,691**
REFUGIO COUNTY TOTAL	**2,776**	**2,778**	**2,737**	**2,736**	**2,727**	**2,724**
KNIPPA WSC	154	165	174	185	196	207
SABINAL	443	475	502	534	566	598
UVALDE	4,385	4,698	4,970	5,282	5,606	5,923
WINDMILL WSC	356	381	403	428	454	480
COUNTY-OTHER	858	907	951	1,005	1,066	1,126
MANUFACTURING	3	3	3	3	3	3
MINING	2,661	2,916	3,037	3,279	3,564	3,874
LIVESTOCK	2,198	2,198	2,198	2,198	2,198	2,198
IRRIGATION	62,409	62,409	62,409	62,409	62,409	62,409
NUECES BASIN TOTAL	**73,467**	**74,152**	**74,647**	**75,323**	**76,062**	**76,818**
UVALDE COUNTY TOTAL	**73,467**	**74,152**	**74,647**	**75,323**	**76,062**	**76,818**
QUAIL CREEK MUD	192	197	201	206	212	218
VICTORIA	11,532	12,108	12,556	13,007	13,433	13,797

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COUNTY-OTHER	1,610	1,648	1,675	1,715	1,765	1,809
MANUFACTURING	8,113	9,234	9,234	9,234	9,234	9,234
MINING	36	38	28	20	14	9
STEAM ELECTRIC POWER	31,475	31,475	31,475	31,475	31,475	31,475
LIVESTOCK	489	489	489	489	489	489
IRRIGATION	1,607	1,607	1,607	1,607	1,607	1,607
GUADALUPE BASIN TOTAL	**55,054**	**56,796**	**57,265**	**57,753**	**58,229**	**58,638**
COUNTY-OTHER	5	5	5	5	6	6
LIVESTOCK	5	5	5	5	5	5
LAVACA BASIN TOTAL	**10**	**10**	**10**	**10**	**11**	**11**
VICTORIA	5,578	5,857	6,073	6,292	6,497	6,673
VICTORIA COUNTY WCID 1	253	259	263	270	278	285
COUNTY-OTHER	961	983	1,000	1,024	1,053	1,080
MINING	33	34	26	19	12	8
LIVESTOCK	525	525	525	525	525	525
IRRIGATION	11,791	11,791	11,791	11,791	11,791	11,791
LAVACA-GUADALUPE BASIN TOTAL	**19,141**	**19,449**	**19,678**	**19,921**	**20,156**	**20,362**
COUNTY-OTHER	8	8	9	9	9	9
MINING	3	3	2	2	1	1
LIVESTOCK	45	45	45	45	45	45
SAN ANTONIO BASIN TOTAL	**56**	**56**	**56**	**56**	**55**	**55**
VICTORIA COUNTY TOTAL	**74,261**	**76,311**	**77,009**	**77,740**	**78,451**	**79,066**
NIXON	1	2	2	2	2	2
SUNKO WSC	4	5	6	7	7	8
COUNTY-OTHER	33	31	26	20	6	6
MINING	174	140	105	71	36	18
STEAM ELECTRIC POWER	2,439	2,439	2,439	2,439	2,439	2,439
LIVESTOCK	117	117	117	117	117	117
GUADALUPE BASIN TOTAL	**2,768**	**2,734**	**2,695**	**2,656**	**2,607**	**2,590**
MCCOY WSC*	43	51	58	66	73	80
PICOSA WSC	3	4	4	5	5	6
COUNTY-OTHER	37	35	30	23	7	7
MINING	174	140	105	71	36	18
LIVESTOCK	117	117	117	117	117	117
IRRIGATION	6,690	6,690	6,690	6,690	6,690	6,690
NUECES BASIN TOTAL	**7,064**	**7,037**	**7,004**	**6,972**	**6,928**	**6,918**
EAST CENTRAL SUD	204	243	252	249	249	249
EL OSO WSC*	46	55	64	72	80	88
ELMENDORF	4	5	6	7	8	8
FLORESVILLE	1,933	2,335	2,731	3,094	3,447	3,767
LA VERNIA	409	494	578	655	730	797
MCCOY WSC*	3	4	5	5	6	7
OAK HILLS WSC	921	1,111	1,299	1,472	1,639	1,791
PICOSA WSC	237	279	321	359	400	437
POTH	381	455	529	597	665	727
S S WSC	2,203	2,886	3,645	4,418	5,378	5,911
STOCKDALE	391	470	549	621	692	756
SUNKO WSC	685	822	957	1,082	1,206	1,317

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Region L Water User Group (WUG) Demand

	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COUNTY-OTHER	806	750	648	495	159	159
MANUFACTURING	40	43	43	43	43	43
MINING	1,581	1,268	955	640	327	168
LIVESTOCK	1,655	1,655	1,655	1,655	1,655	1,655
IRRIGATION	8,728	8,728	8,728	8,728	8,728	8,728
SAN ANTONIO BASIN TOTAL	**20,227**	**21,603**	**22,965**	**24,192**	**25,412**	**26,608**
WILSON COUNTY TOTAL	**30,059**	**31,374**	**32,664**	**33,820**	**34,947**	**36,116**
BATESVILLE WSC	211	228	245	264	283	300
CRYSTAL CITY	1,702	1,857	1,999	2,159	2,312	2,455
LOMA ALTA CHULA VISTA WATER SYSTEM	235	259	280	303	324	344
ZAVALA COUNTY WCID 1	480	527	570	616	660	701
COUNTY-OTHER	243	262	285	309	330	351
MANUFACTURING	603	766	766	766	766	766
MINING	2,531	2,257	1,977	1,559	932	557
LIVESTOCK	893	893	893	893	893	893
IRRIGATION	46,318	46,318	46,185	46,085	45,766	45,766
NUECES BASIN TOTAL	**53,216**	**53,367**	**53,200**	**52,954**	**52,266**	**52,133**
ZAVALA COUNTY TOTAL	**53,216**	**53,367**	**53,200**	**52,954**	**52,266**	**52,133**
REGION L DEMAND TOTAL	**1,050,964**	**1,114,948**	**1,164,107**	**1,211,327**	**1,263,897**	**1,320,128**

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Region L Water User Group (WUG) Category Summary

MUNICIPAL	2020	2030	2040	2050	2060	2070
POPULATION	2,872,318	3,349,044	3,784,128	4,187,225	4,577,660	4,945,420
DEMAND (acre-feet per year)	415,458	468,353	518,116	567,593	618,848	668,036
EXISTING SUPPLIES (acre-feet per year)	469,982	473,783	478,541	482,547	484,889	485,457
NEEDS (acre-feet per year)*	23,637	47,883	82,679	120,724	163,900	207,601

COUNTY-OTHER	2020	2030	2040	2050	2060	2070
POPULATION	140,821	142,293	153,361	170,049	216,845	273,973
DEMAND (acre-feet per year)	18,023	17,625	18,529	20,326	25,776	32,441
EXISTING SUPPLIES (acre-feet per year)	29,037	28,715	30,172	31,285	34,834	35,984
NEEDS (acre-feet per year)*	831	934	988	1,080	3,316	8,654

MANUFACTURING	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	72,516	82,765	82,765	82,765	82,765	82,765
EXISTING SUPPLIES (acre-feet per year)	79,400	79,864	79,749	79,703	79,683	79,661
NEEDS (acre-feet per year)*	10,427	12,940	13,041	13,073	13,073	13,073

MINING	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	48,738	49,976	48,601	44,647	40,831	41,209
EXISTING SUPPLIES (acre-feet per year)	32,977	33,326	33,655	32,471	30,561	32,355
NEEDS (acre-feet per year)*	15,921	16,809	15,105	12,334	10,454	9,180

STEAM ELECTRIC POWER	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	106,026	106,026	106,026	106,026	106,026	106,026
EXISTING SUPPLIES (acre-feet per year)	112,394	112,394	112,394	112,394	112,394	112,394
NEEDS (acre-feet per year)*	21,707	21,707	21,707	21,707	21,707	21,707

LIVESTOCK	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	31,504	31,504	31,504	31,504	31,504	31,504
EXISTING SUPPLIES (acre-feet per year)	32,456	32,456	32,182	32,183	32,192	32,192
NEEDS (acre-feet per year)*	0	0	0	0	0	0

IRRIGATION	2020	2030	2040	2050	2060	2070
DEMAND (acre-feet per year)	358,699	358,699	358,566	358,466	358,147	358,147
EXISTING SUPPLIES (acre-feet per year)	245,514	244,754	242,525	240,489	239,028	235,868
NEEDS (acre-feet per year)*	131,184	131,915	134,104	136,099	137,596	140,812

*WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The needs shown in the WUG Category Summary 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. Before aggregating the difference between supplies and demands to the WUG category level, calculated surpluses are updated to zero so that only the WUGs with needs in the decade are included with the Needs totals.

Region L Source Availability

GROUNDWATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY *	2020	2030	2040	2050	2060	2070
AUSTIN CHALK AQUIFER	UVALDE	NUECES	FRESH	2,935	2,935	2,935	2,935	2,935	2,935
BUDA LIMESTONE AQUIFER	UVALDE	NUECES	FRESH	758	758	758	758	758	758
CARRIZO-WILCOX AQUIFER	ATASCOSA	NUECES	FRESH	67,548	70,166	70,946	72,598	74,178	75,754
CARRIZO-WILCOX AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	120	120	120	120	120	120
CARRIZO-WILCOX AQUIFER	BEXAR	NUECES	FRESH/ BRACKISH	48,152	48,152	48,152	48,152	48,152	48,176
CARRIZO-WILCOX AQUIFER	BEXAR	SAN ANTONIO	FRESH	33,322	32,665	32,196	31,318	30,825	30,631
CARRIZO-WILCOX AQUIFER	CALDWELL	COLORADO	FRESH	593	593	593	593	593	593
CARRIZO-WILCOX AQUIFER	CALDWELL	GUADALUPE	FRESH	60,652	60,652	57,208	57,208	53,596	53,596
CARRIZO-WILCOX AQUIFER	DIMMIT	NUECES	FRESH	4,022	4,022	4,022	4,022	4,022	4,022
CARRIZO-WILCOX AQUIFER	DIMMIT	RIO GRANDE	FRESH	107	107	107	107	107	107
CARRIZO-WILCOX AQUIFER	FRIO	NUECES	FRESH	111,920	85,036	82,999	81,083	79,197	77,353
CARRIZO-WILCOX AQUIFER	GONZALES	GUADALUPE	FRESH/ BRACKISH	81,438	81,438	85,216	85,579	85,832	85,840
CARRIZO-WILCOX AQUIFER	GONZALES	LAVACA	FRESH	215	215	215	215	215	215
CARRIZO-WILCOX AQUIFER	GUADALUPE	GUADALUPE	FRESH	36,180	32,150	29,767	31,569	31,793	31,744
CARRIZO-WILCOX AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	16,347	15,693	16,008	16,426	16,172	16,089
CARRIZO-WILCOX AQUIFER	KARNES	GUADALUPE	FRESH	177	185	195	207	215	220
CARRIZO-WILCOX AQUIFER	KARNES	NUECES	FRESH	83	87	92	97	101	103
CARRIZO-WILCOX AQUIFER	KARNES	SAN ANTONIO	FRESH	783	813	859	909	948	972
CARRIZO-WILCOX AQUIFER	LA SALLE	NUECES	FRESH	6,863	6,863	6,863	6,863	6,863	6,863
CARRIZO-WILCOX AQUIFER	MEDINA	NUECES	FRESH	2,652	2,643	2,643	2,642	2,641	2,641
CARRIZO-WILCOX AQUIFER	MEDINA	SAN ANTONIO	FRESH	5	5	5	5	5	5
CARRIZO-WILCOX AQUIFER	UVALDE	NUECES	FRESH	2,975	1,231	828	828	828	828
CARRIZO-WILCOX AQUIFER	WILSON	GUADALUPE	FRESH	20,287	20,186	20,340	20,452	20,783	20,923
CARRIZO-WILCOX AQUIFER	WILSON	NUECES	FRESH	7,652	7,154	7,317	7,510	7,709	7,938
CARRIZO-WILCOX AQUIFER	WILSON	SAN ANTONIO	FRESH/ BRACKISH	80,526	77,577	78,538	79,691	80,865	82,232
CARRIZO-WILCOX AQUIFER	ZAVALA	NUECES	FRESH	35,653	35,305	35,171	35,071	34,750	34,695
EDWARDS-BFZ AQUIFER	ATASCOSA	NUECES	FRESH	360	360	360	360	360	360
EDWARDS-BFZ AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	100	100	100	100	100	100
EDWARDS-BFZ AQUIFER	BEXAR	NUECES	FRESH	356	356	356	356	356	356
EDWARDS-BFZ AQUIFER	BEXAR	SAN ANTONIO	FRESH	202,000	202,000	202,000	202,000	202,000	202,000
EDWARDS-BFZ AQUIFER	CALDWELL	COLORADO	SALINE	469	469	469	469	469	469
EDWARDS-BFZ AQUIFER	CALDWELL	GUADALUPE	SALINE	968	968	968	968	968	968
EDWARDS-BFZ AQUIFER	COMAL	GUADALUPE	FRESH	12,000	12,000	12,000	12,000	12,000	12,000
EDWARDS-BFZ AQUIFER	COMAL	SAN ANTONIO	FRESH	362	362	362	362	362	362
EDWARDS-BFZ AQUIFER	FRIO	NUECES	FRESH	23,213	23,213	23,213	23,213	23,213	23,213
EDWARDS-BFZ AQUIFER	GUADALUPE	GUADALUPE	FRESH	221	221	221	221	221	221
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	FRESH	7,118	7,118	7,118	7,118	7,118	7,118
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	SALINE	1,707	1,707	1,707	1,707	1,707	1,707
EDWARDS-BFZ AQUIFER	MEDINA	NUECES	FRESH	20,128	20,128	20,128	20,128	20,128	20,128
EDWARDS-BFZ AQUIFER	MEDINA	SAN ANTONIO	FRESH	5,550	5,550	5,550	5,550	5,550	5,550
EDWARDS-BFZ AQUIFER	UVALDE	NUECES	FRESH	15,367	15,367	15,367	15,367	15,367	15,367
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	COLORADO	FRESH	69	69	69	69	69	69
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	GUADALUPE	FRESH	130	130	130	130	130	130

* Salinity field indicates whether the source availability is considered 'fresh' (less than 1,000 mg/L), 'brackish' (1,000 to 10,000 mg/L), 'saline' (10,001 mg/L to 34,999 mg/L), or 'seawater' (35,000 mg/L or greater). Sources can also be labeled as 'fresh/brackish' or 'brackish/saline', if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

Region L Source Availability

GROUNDWATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY ***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	UVALDE	NUECES	FRESH	1,993	1,993	1,993	1,993	1,993	1,993
ELLENBURGER-SAN SABA AQUIFER	KENDALL	COLORADO	FRESH	10	10	10	10	10	10
ELLENBURGER-SAN SABA AQUIFER	KENDALL	GUADALUPE	FRESH	64	64	64	64	64	64
GULF COAST AQUIFER SYSTEM	CALHOUN	COLORADO-LAVACA	FRESH	5,210	5,210	5,210	5,210	5,210	5,210
GULF COAST AQUIFER SYSTEM	CALHOUN	GUADALUPE	FRESH	18	18	18	18	18	18
GULF COAST AQUIFER SYSTEM	CALHOUN	LAVACA-GUADALUPE	FRESH	2,330	2,330	2,330	2,330	2,330	2,330
GULF COAST AQUIFER SYSTEM	CALHOUN	SAN ANTONIO-NUECES	FRESH	7	7	7	7	7	7
GULF COAST AQUIFER SYSTEM	DEWITT	GUADALUPE	FRESH	11,358	11,358	10,470	10,470	10,470	10,470
GULF COAST AQUIFER SYSTEM	DEWITT	LAVACA	FRESH	2,935	2,935	2,935	2,874	2,874	2,874
GULF COAST AQUIFER SYSTEM	DEWITT	LAVACA-GUADALUPE	FRESH	417	417	417	417	417	417
GULF COAST AQUIFER SYSTEM	DEWITT	SAN ANTONIO	FRESH	766	766	724	724	724	724
GULF COAST AQUIFER SYSTEM	GOLIAD	GUADALUPE	FRESH	4,377	4,377	4,377	4,377	4,380	4,377
GULF COAST AQUIFER SYSTEM	GOLIAD	SAN ANTONIO	FRESH	5,972	5,972	5,972	5,972	5,977	5,972
GULF COAST AQUIFER SYSTEM	GOLIAD	SAN ANTONIO-NUECES	FRESH	1,190	1,190	1,190	1,190	1,195	1,190
GULF COAST AQUIFER SYSTEM	GONZALES	GUADALUPE	FRESH	1	1	1	1	1	1
GULF COAST AQUIFER SYSTEM	GONZALES	LAVACA	FRESH	1	1	1	1	1	1
GULF COAST AQUIFER SYSTEM	KARNES	GUADALUPE	FRESH	11	11	11	11	11	11
GULF COAST AQUIFER SYSTEM	KARNES	NUECES	FRESH	1,057	1,057	78	78	78	78
GULF COAST AQUIFER SYSTEM	KARNES	SAN ANTONIO	FRESH	9,082	9,082	2,880	2,782	2,616	2,616
GULF COAST AQUIFER SYSTEM	KARNES	SAN ANTONIO-NUECES	FRESH	46	46	46	46	46	46
GULF COAST AQUIFER SYSTEM	REFUGIO	SAN ANTONIO	FRESH	321	321	321	321	321	321
GULF COAST AQUIFER SYSTEM	REFUGIO	SAN ANTONIO-NUECES	FRESH	5,526	5,526	5,526	5,526	5,526	5,526
GULF COAST AQUIFER SYSTEM	VICTORIA	GUADALUPE	FRESH	17,600	22,596	27,592	27,592	27,592	27,592
GULF COAST AQUIFER SYSTEM	VICTORIA	LAVACA	FRESH	234	234	234	234	234	234
GULF COAST AQUIFER SYSTEM	VICTORIA	LAVACA-GUADALUPE	FRESH	25,451	25,451	25,451	25,451	30,448	30,448
GULF COAST AQUIFER SYSTEM	VICTORIA	SAN ANTONIO	FRESH	1,689	1,689	1,689	1,689	1,689	1,689
HICKORY AQUIFER	KENDALL	COLORADO	FRESH	12	12	12	12	12	12
HICKORY AQUIFER	KENDALL	GUADALUPE	FRESH	128	128	128	128	128	128
LEONA GRAVEL AQUIFER	MEDINA	NUECES	FRESH	17,955	17,955	17,955	17,955	17,955	17,955
LEONA GRAVEL AQUIFER	MEDINA	SAN ANTONIO	FRESH	4,062	4,062	4,062	4,062	4,062	4,062
LEONA GRAVEL AQUIFER	UVALDE	NUECES	FRESH	9,385	9,385	9,385	9,385	9,385	9,385
QUEEN CITY AQUIFER	ATASCOSA	NUECES	FRESH	4,075	4,543	4,543	4,513	4,407	4,302
QUEEN CITY AQUIFER	CALDWELL	GUADALUPE	FRESH	307	307	307	307	307	307
QUEEN CITY AQUIFER	FRIO	NUECES	FRESH	6,759	4,745	4,573	4,429	4,257	4,113
QUEEN CITY AQUIFER	GONZALES	GUADALUPE	FRESH	5,032	5,032	5,032	5,032	5,032	5,032
QUEEN CITY AQUIFER	GONZALES	LAVACA	FRESH	35	35	35	35	35	35
QUEEN CITY AQUIFER	GUADALUPE	GUADALUPE	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	LA SALLE	NUECES	FRESH	2	2	2	2	2	2
QUEEN CITY AQUIFER	WILSON	GUADALUPE	FRESH	236	128	114	101	90	80

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Source Availability

GROUNDWATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY ***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
QUEEN CITY AQUIFER	WILSON	NUECES	FRESH	273	148	132	117	104	93
QUEEN CITY AQUIFER	WILSON	SAN ANTONIO	FRESH	2,271	1,232	1,094	973	865	772
SAN MARCOS RIVER ALLUVIUM AQUIFER	CALDWELL	GUADALUPE	FRESH	271	271	271	271	271	271
SPARTA AQUIFER	ATASCOSA	NUECES	FRESH	1,215	1,188	1,129	1,083	1,044	1,013
SPARTA AQUIFER	FRIO	NUECES	FRESH	1,045	728	702	674	651	624
SPARTA AQUIFER	GONZALES	GUADALUPE	FRESH	3,531	3,531	3,531	3,531	3,531	3,531
SPARTA AQUIFER	GONZALES	LAVACA	FRESH	23	23	23	23	23	23
SPARTA AQUIFER	LA SALLE	NUECES	FRESH	983	983	983	983	983	983
SPARTA AQUIFER	WILSON	GUADALUPE	FRESH	42	23	20	18	16	14
SPARTA AQUIFER	WILSON	NUECES	FRESH	102	55	49	44	39	34
SPARTA AQUIFER	WILSON	SAN ANTONIO	FRESH	319	173	154	137	121	108
TRINITY AQUIFER	BEXAR	NUECES	FRESH	223	223	223	223	223	223
TRINITY AQUIFER	BEXAR	SAN ANTONIO	FRESH	24,856	24,856	24,856	24,856	24,856	24,856
TRINITY AQUIFER	CALDWELL	GUADALUPE	FRESH	10	10	10	10	10	10
TRINITY AQUIFER	COMAL	GUADALUPE	FRESH	37,941	37,941	37,941	37,941	37,941	37,941
TRINITY AQUIFER	COMAL	SAN ANTONIO	FRESH	5,827	5,827	5,827	5,827	5,827	5,827
TRINITY AQUIFER	GUADALUPE	GUADALUPE	FRESH	188	188	188	188	188	188
TRINITY AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	472	472	472	472	472	472
TRINITY AQUIFER	HAYS	COLORADO	FRESH	32	32	32	32	32	32
TRINITY AQUIFER	HAYS	GUADALUPE	FRESH	7,519	7,519	7,519	7,519	7,519	7,519
TRINITY AQUIFER	KENDALL	COLORADO	FRESH	135	135	135	135	135	135
TRINITY AQUIFER	KENDALL	GUADALUPE	FRESH	6,028	6,028	6,028	6,028	6,028	6,028
TRINITY AQUIFER	KENDALL	SAN ANTONIO	FRESH	4,976	4,976	4,976	4,976	4,976	4,976
TRINITY AQUIFER	MEDINA	NUECES	FRESH	7,057	7,057	7,057	7,057	7,057	7,057
TRINITY AQUIFER	MEDINA	SAN ANTONIO	FRESH	2,104	2,104	2,104	2,104	2,104	2,104
TRINITY AQUIFER	UVALDE	NUECES	FRESH	795	795	795	795	795	795
YEGUA-JACKSON AQUIFER	ATASCOSA	NUECES	FRESH	856	856	856	856	856	856
YEGUA-JACKSON AQUIFER	GONZALES	GUADALUPE	FRESH	4,694	4,694	4,694	4,694	4,694	4,694
YEGUA-JACKSON AQUIFER	GONZALES	LAVACA	FRESH	19	19	19	19	19	19
YEGUA-JACKSON AQUIFER	KARNES	GUADALUPE	FRESH	327	327	327	327	327	327
YEGUA-JACKSON AQUIFER	KARNES	NUECES	FRESH	91	91	91	91	91	91
YEGUA-JACKSON AQUIFER	KARNES	SAN ANTONIO	FRESH	1,641	1,641	1,641	1,641	1,641	1,641
YEGUA-JACKSON AQUIFER	LA SALLE	NUECES	FRESH	92	92	92	92	92	92
YEGUA-JACKSON AQUIFER	WILSON	GUADALUPE	FRESH	40	40	40	40	40	40
YEGUA-JACKSON AQUIFER	WILSON	NUECES	FRESH	184	184	184	184	184	184
YEGUA-JACKSON AQUIFER	WILSON	SAN ANTONIO	FRESH	603	603	603	603	603	603
			GROUNDWATER SOURCE AVAILABILITY TOTAL	**1,174,522**	**1,140,930**	**1,134,704**	**1,136,989**	**1,138,583**	**1,139,279**

REUSE SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY ***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
DIRECT REUSE	BEXAR	SAN ANTONIO	FRESH	29,735	34,735	39,735	39,735	39,735	39,735
DIRECT REUSE	COMAL	GUADALUPE	FRESH	107	107	107	107	107	107
DIRECT REUSE	GUADALUPE	GUADALUPE	FRESH	1,325	1,325	1,325	1,325	1,325	1,325
DIRECT REUSE	HAYS	GUADALUPE	FRESH	8,448	8,448	8,448	8,448	8,848	8,848
DIRECT REUSE	KENDALL	GUADALUPE	FRESH	269	269	269	269	269	269

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Source Availability

REUSE SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY ***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
DIRECT REUSE	KENDALL	SAN ANTONIO	FRESH	65	65	65	65	65	65
			REUSE SOURCE AVAILABILITY TOTAL	**39,949**	**44,949**	**49,949**	**49,949**	**50,349**	**50,349**

SURFACE WATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY ***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
BOERNE LAKE/RESERVOIR	RESERVOIR**	SAN ANTONIO	FRESH	647	647	647	647	647	647
CALAVERAS LAKE/RESERVOIR	RESERVOIR**	SAN ANTONIO	FRESH	36,900	36,900	36,900	36,900	36,900	36,900
CANYON LAKE/RESERVOIR	RESERVOIR**	GUADALUPE	FRESH	86,280	86,136	85,992	85,847	85,703	85,559
COLETO CREEK LAKE/RESERVOIR	RESERVOIR**	GUADALUPE	FRESH	24,160	24,160	24,160	24,160	24,160	24,160
COLORADO LIVESTOCK LOCAL SUPPLY	CALDWELL	COLORADO	FRESH	30	30	30	30	30	30
COLORADO LIVESTOCK LOCAL SUPPLY	KENDALL	COLORADO	FRESH	6	6	6	6	6	6
COLORADO-LAVACA LIVESTOCK LOCAL SUPPLY	CALHOUN	COLORADO-LAVACA	FRESH	64	64	64	64	64	64
GUADALUPE LIVESTOCK LOCAL SUPPLY	CALDWELL	GUADALUPE	FRESH	471	471	471	471	471	471
GUADALUPE LIVESTOCK LOCAL SUPPLY	COMAL	GUADALUPE	FRESH	120	120	120	120	120	120
GUADALUPE LIVESTOCK LOCAL SUPPLY	DEWITT	GUADALUPE	FRESH	631	631	631	631	631	631
GUADALUPE LIVESTOCK LOCAL SUPPLY	GOLIAD	GUADALUPE	FRESH	140	140	140	140	140	140
GUADALUPE LIVESTOCK LOCAL SUPPLY	GONZALES	GUADALUPE	FRESH	4,786	4,786	4,786	4,786	4,786	4,786
GUADALUPE LIVESTOCK LOCAL SUPPLY	GUADALUPE	GUADALUPE	FRESH	650	650	650	650	650	650
GUADALUPE LIVESTOCK LOCAL SUPPLY	HAYS	GUADALUPE	FRESH	754	754	754	754	754	754
GUADALUPE LIVESTOCK LOCAL SUPPLY	KARNES	GUADALUPE	FRESH	20	20	20	20	20	20
GUADALUPE LIVESTOCK LOCAL SUPPLY	KENDALL	GUADALUPE	FRESH	159	159	159	159	159	159
GUADALUPE LIVESTOCK LOCAL SUPPLY	VICTORIA	GUADALUPE	FRESH	312	312	312	312	312	312
GUADALUPE LIVESTOCK LOCAL SUPPLY	WILSON	GUADALUPE	FRESH	93	93	93	93	93	93
GUADALUPE RUN-OF-RIVER	CALDWELL	GUADALUPE	FRESH	524	524	524	524	524	524
GUADALUPE RUN-OF-RIVER	CALHOUN	GUADALUPE	FRESH	33,669	33,669	33,669	33,669	33,669	33,669
GUADALUPE RUN-OF-RIVER	COMAL	GUADALUPE	FRESH	612	612	612	612	612	612
GUADALUPE RUN-OF-RIVER	GONZALES	GUADALUPE	FRESH	2,240	2,240	2,240	2,240	2,240	2,240
GUADALUPE RUN-OF-RIVER	GUADALUPE	GUADALUPE	FRESH	8,089	8,089	8,089	8,089	8,089	8,089
GUADALUPE RUN-OF-RIVER	HAYS	GUADALUPE	FRESH	792	792	792	792	792	792
GUADALUPE RUN-OF-RIVER	KENDALL	GUADALUPE	FRESH	26	26	26	26	26	26
GUADALUPE RUN-OF-RIVER	VICTORIA	GUADALUPE	FRESH	13,110	13,110	13,110	13,110	13,110	13,110
LAVACA LIVESTOCK LOCAL SUPPLY	DEWITT	LAVACA	FRESH	282	282	282	282	282	282
LAVACA LIVESTOCK LOCAL SUPPLY	GONZALES	LAVACA	FRESH	53	53	53	53	53	53
LAVACA LIVESTOCK LOCAL SUPPLY	VICTORIA	LAVACA	FRESH	2	2	2	2	2	2
LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	CALHOUN	LAVACA-GUADALUPE	FRESH	92	92	92	92	92	92
LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	DEWITT	LAVACA-GUADALUPE	FRESH	9	9	9	9	9	9
LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	VICTORIA	LAVACA-GUADALUPE	FRESH	196	196	196	196	196	196
NUECES LIVESTOCK LOCAL SUPPLY	ATASCOSA	NUECES	FRESH	754	754	754	754	754	754
NUECES LIVESTOCK LOCAL SUPPLY	BEXAR	NUECES	FRESH	177	177	177	177	177	177
NUECES LIVESTOCK LOCAL SUPPLY	DIMMIT	NUECES	FRESH	220	220	220	220	220	220

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Source Availability

SURFACE WATER SOURCE TYPE				SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY ***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
NUECES LIVESTOCK LOCAL SUPPLY	FRIO	NUECES	FRESH	497	497	497	497	497	497
NUECES LIVESTOCK LOCAL SUPPLY	LA SALLE	NUECES	FRESH	245	245	245	245	245	245
NUECES LIVESTOCK LOCAL SUPPLY	MEDINA	NUECES	FRESH	519	519	519	519	519	519
NUECES LIVESTOCK LOCAL SUPPLY	UVALDE	NUECES	FRESH	516	516	516	516	516	516
NUECES LIVESTOCK LOCAL SUPPLY	WILSON	NUECES	FRESH	93	93	93	93	93	93
NUECES LIVESTOCK LOCAL SUPPLY	ZAVALA	NUECES	FRESH	594	594	594	594	594	594
NUECES RUN-OF-RIVER	DIMMIT	NUECES	FRESH	210	210	210	210	210	210
NUECES RUN-OF-RIVER	LA SALLE	NUECES	FRESH	474	474	474	474	474	474
NUECES RUN-OF-RIVER	UVALDE	NUECES	FRESH	720	720	720	720	720	720
RIO GRANDE LIVESTOCK LOCAL SUPPLY	DIMMIT	RIO GRANDE	FRESH	24	24	24	24	24	24
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	BEXAR	SAN ANTONIO	FRESH	402	402	402	402	402	402
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	COMAL	SAN ANTONIO	FRESH	9	9	9	9	9	9
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	DEWITT	SAN ANTONIO	FRESH	75	75	75	75	75	75
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	GOLIAD	SAN ANTONIO	FRESH	215	215	215	215	215	215
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	KARNES	SAN ANTONIO	FRESH	558	558	558	558	558	558
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	KENDALL	SAN ANTONIO	FRESH	33	33	33	33	33	33
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	MEDINA	SAN ANTONIO	FRESH	63	63	63	63	63	63
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	REFUGIO	SAN ANTONIO	FRESH	12	12	12	12	12	12
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	VICTORIA	SAN ANTONIO	FRESH	22	22	22	22	22	22
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	WILSON	SAN ANTONIO	FRESH	759	759	759	759	759	759
SAN ANTONIO RUN-OF-RIVER	BEXAR	SAN ANTONIO	FRESH	114	114	114	114	114	114
SAN ANTONIO RUN-OF-RIVER	KARNES	SAN ANTONIO	FRESH	100	100	100	100	100	100
SAN ANTONIO RUN-OF-RIVER	WILSON	SAN ANTONIO	FRESH	1,073	1,073	1,073	1,073	1,073	1,073
SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	CALHOUN	SAN ANTONIO-NUECES	FRESH	16	16	16	16	16	16
SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	GOLIAD	SAN ANTONIO-NUECES	FRESH	209	209	209	209	209	209
SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	KARNES	SAN ANTONIO-NUECES	FRESH	10	10	10	10	10	10
SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	REFUGIO	SAN ANTONIO-NUECES	FRESH	225	225	225	225	225	225
VICTOR BRAUNIG LAKE/RESERVOIR	RESERVOIR**	SAN ANTONIO	FRESH	12,000	12,000	12,000	12,000	12,000	12,000
			SURFACE WATER SOURCE AVAILABILITY TOTAL	**236,857**	**236,713**	**236,569**	**236,424**	**236,280**	**236,136**

REGION L SOURCE AVAILABILITY TOTAL	**1,451,328**	**1,422,592**	**1,421,222**	**1,423,362**	**1,425,212**	**1,425,764**

* Salinity field indicates whether the source availability is considered 'fresh' (less than 1,000 mg/L), 'brackish' (1,000 to 10,000 mg/L), 'saline' (10,001 mg/L to 34,999 mg/L), or 'seawater' (35,000 mg/L or greater). Sources can also be labeled as 'fresh/brackish' or 'brackish/saline', if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
BENTON CITY WSC	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	1,351	1,335	1,329	1,329	1,331	1,336
CHARLOTTE	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	1,098	1,098	1,098	1,098	1,098	1,098
JOURDANTON	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	2,250	2,250	2,250	2,250	2,250	2,250
LYTLE	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	351	345	342	340	339	339
MCCOY WSC*	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	1,900	1,894	1,890	1,887	1,885	1,882
MCCOY WSC*	L	QUEEN CITY AQUIFER | ATASCOSA COUNTY	74	75	75	75	75	75
PLEASANTON	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	5,028	5,028	5,028	5,028	5,028	5,028
POTEET	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	806	806	806	806	806	806
SAN ANTONIO WATER SYSTEM		NO WATER SUPPLY ASSOCIATED WITH WUG	0	0	0	0	0	0
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	246	246	246	246	246	246
COUNTY-OTHER	L	QUEEN CITY AQUIFER | ATASCOSA COUNTY	1,071	1,218	1,356	1,506	1,662	1,809
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	58	97	97	97	97	97
MINING	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	4,081	4,043	3,935	3,212	2,478	2,043
STEAM ELECTRIC POWER	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	8,427	8,427	8,427	8,427	8,427	8,427
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	382	382	382	382	382	382
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	754	754	754	754	754	754
LIVESTOCK	L	QUEEN CITY AQUIFER | ATASCOSA COUNTY	403	403	403	403	403	403
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | ATASCOSA COUNTY	134	134	134	134	134	134
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	29,351	29,351	29,351	29,351	29,351	29,351
IRRIGATION	L	EDWARDS-BFZ AQUIFER | ATASCOSA COUNTY	340	340	340	340	340	340
IRRIGATION	L	QUEEN CITY AQUIFER | ATASCOSA COUNTY	1,924	1,924	1,924	1,924	1,924	1,924
IRRIGATION	L	SPARTA AQUIFER | ATASCOSA COUNTY	1,130	1,082	1,042	1,013	994	994
IRRIGATION	L	YEGUA-JACKSON AQUIFER | ATASCOSA COUNTY	314	314	314	314	314	314
		NUECES BASIN TOTAL	**61,473**	**61,546**	**61,523**	**60,916**	**60,318**	**60,032**
BENTON CITY WSC	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	166	165	164	165	165	165
SAN ANTONIO WATER SYSTEM		NO WATER SUPPLY ASSOCIATED WITH WUG	0	0	0	0	0	0
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	15	15	15	15	15	15
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	410	410	410	410	410	410
IRRIGATION	L	EDWARDS-BFZ AQUIFER | ATASCOSA COUNTY	95	95	95	95	95	95
		SAN ANTONIO BASIN TOTAL	**686**	**685**	**684**	**685**	**685**	**685**
		ATASCOSA COUNTY TOTAL	**62,159**	**62,231**	**62,207**	**61,601**	**61,003**	**60,717**
ATASCOSA RURAL WSC	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	31	31	31	31	31	31
LYTLE	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	8	10	10	11	12	12
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	514	576	570	569	1,268	1,893
COUNTY-OTHER	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,817	1,817	1,816	1,817	1,817	1,817
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	135	135	135	135	135	135
LIVESTOCK	L	TRINITY AQUIFER | BEXAR COUNTY	50	50	50	50	50	50
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	4,293	4,293	4,293	4,293	4,293	4,293
IRRIGATION	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	200	200	200	200	200	200
		NUECES BASIN TOTAL	**7,048**	**7,112**	**7,105**	**7,106**	**7,806**	**8,431**
AIR FORCE VILLAGE II INC	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	84	84	84	84	84	84
ALAMO HEIGHTS	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,268	1,268	1,268	1,268	1,268	1,268
ATASCOSA RURAL WSC	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	579	579	579	579	579	579
BEXAR COUNTY WCID 10	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	757	757	757	757	757	757
CONVERSE	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	1,000	1,000	1,000	1,000	1,000	1,000
CONVERSE	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,204	1,204	1,204	1,204	1,204	1,204
EAST CENTRAL SUD	L	CANYON LAKE/RESERVOIR	1,217	1,204	1,216	1,219	1,233	1,234
EAST CENTRAL SUD	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	9	9	9	9	9	9

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

Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
EAST CENTRAL SUD	G	CARRIZO-WILCOX AQUIFER | BURLESON COUNTY	9	9	9	9	9	9
EAST CENTRAL SUD	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	870	860	868	871	881	882
EAST CENTRAL SUD	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	670	662	669	671	678	679
EAST CENTRAL SUD	L	TRINITY AQUIFER | BEXAR COUNTY	9	9	9	9	9	9
ELMENDORF	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	49	49	49	49	49	49
ELMENDORF	G	CARRIZO-WILCOX AQUIFER | BURLESON COUNTY	10	10	10	10	10	10
ELMENDORF	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	178	178	178	178	178	178
ELMENDORF	L	TRINITY AQUIFER | BEXAR COUNTY	39	39	39	39	39	40
FAIR OAKS RANCH	L	CANYON LAKE/RESERVOIR	1,170	1,064	979	912	857	811
FAIR OAKS RANCH	L	DIRECT REUSE	354	322	296	276	259	245
FAIR OAKS RANCH	L	TRINITY AQUIFER | COMAL COUNTY	26	24	22	20	19	18
FORT SAM HOUSTON	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	677	856	1,037	1,221	1,402	1,578
GREEN VALLEY SUD	L	CANYON LAKE/RESERVOIR	341	323	307	294	283	271
GREEN VALLEY SUD	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	640	606	575	550	528	508
GREEN VALLEY SUD	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	99	94	89	85	82	79
GREEN VALLEY SUD	L	TRINITY AQUIFER | BEXAR COUNTY	68	64	61	58	56	54
KIRBY	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	739	739	739	739	739	739
LACKLAND AIR FORCE BASE	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,200	1,200	1,200	1,200	1,200	1,200
LEON VALLEY	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,138	1,138	1,138	1,138	1,138	1,138
LIVE OAK	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,168	1,168	1,168	1,168	1,168	1,168
RANDOLPH AIR FORCE BASE	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	200	200	200	200	200	200
SAN ANTONIO WATER SYSTEM	L	CANYON LAKE/RESERVOIR	6,082	3,993	0	0	0	0
SAN ANTONIO WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	23,227	23,227	23,228	23,228	23,228	23,228
SAN ANTONIO WATER SYSTEM	G	CARRIZO-WILCOX AQUIFER | BURLESON COUNTY	11,084	15,225	19,086	22,517	24,425	24,425
SAN ANTONIO WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	19,544	16,186	15,189	15,189	15,189	15,189
SAN ANTONIO WATER SYSTEM	L	DIRECT REUSE	25,000	30,000	35,000	35,000	35,000	35,000
SAN ANTONIO WATER SYSTEM	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	156,593	156,594	156,595	156,595	156,595	156,595
SAN ANTONIO WATER SYSTEM	L	GUADALUPE RUN-OF-RIVER	270	270	270	270	270	270
SAN ANTONIO WATER SYSTEM	L	SAN ANTONIO RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L	TRINITY AQUIFER | BEXAR COUNTY	3,933	1,936	937	937	937	937
SAN ANTONIO WATER SYSTEM	L	TRINITY AQUIFER | COMAL COUNTY	0	0	0	0	0	0
SCHERTZ	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	218	275	311	303	294	277
SCHERTZ	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	33	31	32	34	36	37
SELMA	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	709	544	569	592	611	627
SELMA	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	453	347	364	378	390	401
SHAVANO PARK	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	429	429	429	429	429	429
THE OAKS WSC	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	10	10	10	10	10	10
THE OAKS WSC	G	CARRIZO-WILCOX AQUIFER | BURLESON COUNTY	10	10	10	10	10	10
THE OAKS WSC	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	20	20	20	20	20	20
THE OAKS WSC	L	TRINITY AQUIFER | BEXAR COUNTY	120	120	120	120	120	120
UNIVERSAL CITY	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	800	800	800	800	800	800
UNIVERSAL CITY	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	2,056	2,056	2,056	2,056	2,056	2,056
WATER SERVICES	L	TRINITY AQUIFER | BEXAR COUNTY	647	832	787	749	808	864
COUNTY-OTHER	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,868	1,868	1,869	1,868	1,868	1,868
COUNTY-OTHER	L	SAN ANTONIO RUN-OF-RIVER	0	0	0	0	0	0
COUNTY-OTHER	L	TRINITY AQUIFER | BEXAR COUNTY	1,561	1,561	1,561	1,561	1,561	1,561
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	1,139	1,139	1,139	1,139	1,139	1,139
MANUFACTURING	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	4,583	4,583	4,583	4,583	4,583	4,583

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
MANUFACTURING	L	SAN ANTONIO RUN-OF-RIVER	0	0	0	0	0	0
MANUFACTURING	L	TRINITY AQUIFER | BEXAR COUNTY	1,139	1,139	1,139	1,139	1,139	1,139
MINING	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	400	400	400	400	400	400
MINING	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	4,991	4,991	4,991	4,991	4,991	4,991
MINING	L	TRINITY AQUIFER | BEXAR COUNTY	2,429	3,349	4,142	5,013	6,008	7,111
STEAM ELECTRIC POWER	L	CALAVERAS LAKE/RESERVOIR	36,900	36,900	36,900	36,900	36,900	36,900
STEAM ELECTRIC POWER	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	611	611	611	611	611	611
STEAM ELECTRIC POWER	L	VICTOR BRAUNIG LAKE/RESERVOIR	12,000	12,000	12,000	12,000	12,000	12,000
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	424	424	424	424	424	424
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	42	42	42	42	42	42
LIVESTOCK	L	TRINITY AQUIFER | BEXAR COUNTY	550	550	550	550	550	550
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	3,000	3,000	3,000	3,000	3,000	3,000
IRRIGATION	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	4,319	4,319	4,319	4,319	4,319	4,319
IRRIGATION	L	SAN ANTONIO RUN-OF-RIVER	114	114	114	114	114	114
		SAN ANTONIO BASIN TOTAL	**343,080**	**345,614**	**349,356**	**353,708**	**356,795**	**358,047**
		BEXAR COUNTY TOTAL	**350,128**	**352,726**	**356,461**	**360,814**	**364,601**	**366,478**
AQUA WSC*	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	94	94	94	94	94	94
CREEDMOOR-MAHA WSC*	K	CARRIZO-WILCOX AQUIFER | BASTROP COUNTY	40	40	40	40	40	40
CREEDMOOR-MAHA WSC*	K	EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	127	146	167	191	217	243
POLONIA WSC*	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	793	793	789	787	781	775
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	229	229	229	229	229	229
MINING	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	14	11	8	5	3	1
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	26	26	26	26	26	26
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	30	30	30	30	30	30
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	24	24	24	24	24	24
		COLORADO BASIN TOTAL	**1,377**	**1,393**	**1,407**	**1,426**	**1,444**	**1,462**
AQUA WSC*	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	531	531	531	531	531	531
COUNTY LINE SUD	L	CANYON LAKE/RESERVOIR	403	403	371	340	306	270
COUNTY LINE SUD	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	50	50	46	42	38	33
CREEDMOOR-MAHA WSC*	K	EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	15	17	18	21	23	25
GOFORTH SUD*	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	3	3	3	2	2	2
GOFORTH SUD*	L	TRINITY AQUIFER | HAYS COUNTY	26	17	13	16	20	22
GONZALES COUNTY WSC	L	CANYON LAKE/RESERVOIR	9	10	11	12	12	13
GONZALES COUNTY WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	77	86	93	99	102	106
LOCKHART	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	3,075	3,075	3,075	3,075	3,075	3,075
LULING	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	1,083	1,082	1,083	1,082	1,082	1,083
MARTINDALE WSC	L	CANYON LAKE/RESERVOIR	226	224	222	220	218	218
MARTINDALE WSC	L	GUADALUPE RUN-OF-RIVER	11	11	11	11	11	11
MAXWELL WSC	L	CANYON LAKE/RESERVOIR	694	710	720	724	727	727
MAXWELL WSC	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	170	174	177	178	178	178
MAXWELL WSC	L	GUADALUPE RUN-OF-RIVER	9	10	10	10	10	10
POLONIA WSC*	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	1,683	1,680	1,677	1,668	1,658	1,644
SAN MARCOS	L	CANYON LAKE/RESERVOIR	2	2	2	3	3	3
SAN MARCOS	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	0	0	1	1	1	1
TRI COMMUNITY WSC	L	GUADALUPE RUN-OF-RIVER	492	490	490	491	490	490
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	1,086	1,086	1,086	1,086	1,086	1,086
COUNTY-OTHER	L	GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
COUNTY-OTHER	L	QUEEN CITY AQUIFER | CALDWELL COUNTY	142	142	142	142	142	142

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

Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	5	5	5	5	5	5
MINING	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	112	89	66	42	18	8
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	244	244	244	244	244	244
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	471	471	471	471	471	471
LIVESTOCK	L	QUEEN CITY AQUIFER | CALDWELL COUNTY	17	17	17	17	17	17
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	700	700	700	700	700	700
IRRIGATION	L	QUEEN CITY AQUIFER | CALDWELL COUNTY	78	78	78	78	78	78
		GUADALUPE BASIN TOTAL	**11,414**	**11,407**	**11,363**	**11,311**	**11,248**	**11,193**
		CALDWELL COUNTY TOTAL	**12,791**	**12,800**	**12,770**	**12,737**	**12,692**	**12,655**
POINT COMFORT	P	TEXANA LAKE/RESERVOIR	178	178	178	178	178	178
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	153	153	129	96	153	153
MANUFACTURING	L	GUADALUPE RUN-OF-RIVER	17,055	17,046	17,038	17,027	17,013	17,000
MANUFACTURING	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	200	200	200	200	200	200
MANUFACTURING	P	TEXANA LAKE/RESERVOIR	18,874	18,874	18,874	18,874	18,874	18,874
MINING	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	26	27	21	15	11	6
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	122	122	122	122	122	122
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	700	700	700	700	700	700
		COLORADO-LAVACA BASIN TOTAL	**37,308**	**37,300**	**37,262**	**37,212**	**37,251**	**37,233**
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	2	2	2	2	2	2
		GUADALUPE BASIN TOTAL	**2**	**2**	**2**	**2**	**2**	**2**
GUADALUPE-BLANCO RIVER AUTHORITY	L	CANYON LAKE/RESERVOIR	64	68	72	76	82	88
GUADALUPE-BLANCO RIVER AUTHORITY	L	GUADALUPE RUN-OF-RIVER	174	184	194	208	224	240
PORT LAVACA	L	GUADALUPE RUN-OF-RIVER	4,480	4,480	4,480	4,480	4,480	4,480
PORT OCONNOR MUD	L	GUADALUPE RUN-OF-RIVER	1,120	1,120	1,120	1,120	1,120	1,120
PORT OCONNOR MUD	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	110	116	123	131	141	151
SEADRIFT	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	256	277	299	323	349	374
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	342	342	365	398	342	342
MANUFACTURING	L	CANYON LAKE/RESERVOIR	1,534	1,534	1,534	1,534	1,534	1,534
MANUFACTURING	L	GUADALUPE RUN-OF-RIVER	10,776	10,771	10,765	10,758	10,750	10,741
MANUFACTURING	P	TEXANA LAKE/RESERVOIR	11,926	11,926	11,926	11,926	11,926	11,926
MINING	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	26	28	20	15	10	6
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	168	168	168	168	168	168
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	92	92	92	92	92	92
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	1,051	1,051	1,051	1,051	1,051	1,051
		LAVACA-GUADALUPE BASIN TOTAL	**32,119**	**32,157**	**32,209**	**32,280**	**32,269**	**32,313**
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	5	5	6	6	5	5
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	16	16	16	16	16	16
		SAN ANTONIO-NUECES BASIN TOTAL	**21**	**21**	**22**	**22**	**21**	**21**
		CALHOUN COUNTY TOTAL	**69,450**	**69,480**	**69,495**	**69,516**	**69,543**	**69,569**
CANYON LAKE WATER SERVICE*	L	CANYON LAKE/RESERVOIR	5,571	5,571	5,571	5,571	5,571	5,570
CANYON LAKE WATER SERVICE*	K	TRINITY AQUIFER | BLANCO COUNTY	117	118	118	118	117	117
CANYON LAKE WATER SERVICE*	L	TRINITY AQUIFER | COMAL COUNTY	6,390	6,422	6,432	6,429	6,420	6,420
CLEAR WATER ESTATES WATER SYSTEM	L	TRINITY AQUIFER | COMAL COUNTY	50	50	50	50	50	50
CRYSTAL CLEAR WSC	L	CANYON LAKE/RESERVOIR	153	149	144	140	136	133

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
CRYSTAL CLEAR WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	6	89	87	84	81	79
CRYSTAL CLEAR WSC	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	115	112	108	105	102	99
GARDEN RIDGE	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	249	249	249	249	249	249
GARDEN RIDGE	L	TRINITY AQUIFER | COMAL COUNTY	305	305	305	305	305	305
GREEN VALLEY SUD	L	CANYON LAKE/RESERVOIR	44	47	48	51	51	53
GREEN VALLEY SUD	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	90	94	98	103	105	107
GREEN VALLEY SUD	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	14	15	15	16	16	17
GREEN VALLEY SUD	L	TRINITY AQUIFER | BEXAR COUNTY	10	10	10	11	11	11
KT WATER DEVELOPMENT	L	TRINITY AQUIFER | COMAL COUNTY	406	406	406	406	406	406
NEW BRAUNFELS	L	CANYON LAKE/RESERVOIR	8,072	8,124	8,158	8,188	8,207	8,218
NEW BRAUNFELS	L	DIRECT REUSE	89	89	90	90	90	90
NEW BRAUNFELS	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	4,415	4,457	4,461	4,477	4,487	4,494
NEW BRAUNFELS	L	GUADALUPE RUN-OF-RIVER	87	88	88	89	89	89
NEW BRAUNFELS	L	TRINITY AQUIFER | COMAL COUNTY	3,500	3,533	3,537	3,549	3,557	3,562
SAN ANTONIO WATER SYSTEM	L	CANYON LAKE/RESERVOIR	4	2	0	0	0	0
SAN ANTONIO WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	13	13	13	13	13	13
SAN ANTONIO WATER SYSTEM	G	CARRIZO-WILCOX AQUIFER | BURLESON COUNTY	6	8	10	12	13	13
SAN ANTONIO WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	10	9	8	8	8	8
SAN ANTONIO WATER SYSTEM	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	84	84	84	84	84	84
SAN ANTONIO WATER SYSTEM	L	SAN ANTONIO RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L	TRINITY AQUIFER | BEXAR COUNTY	2	2	1	1	1	1
SAN ANTONIO WATER SYSTEM	L	TRINITY AQUIFER | COMAL COUNTY	0	0	0	0	0	0
SCHERTZ	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	225	367	497	551	594	607
SCHERTZ	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	34	41	51	61	72	81
WINGERT WATER SYSTEMS	L	TRINITY AQUIFER | HAYS COUNTY	251	251	251	251	251	251
COUNTY-OTHER	L	CANYON LAKE/RESERVOIR	464	464	464	464	464	464
COUNTY-OTHER	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	90	90	90	90	90	90
COUNTY-OTHER	L	TRINITY AQUIFER | COMAL COUNTY	1,700	1,700	1,700	1,700	1,700	1,700
MANUFACTURING	L	CANYON LAKE/RESERVOIR	5	5	5	5	5	5
MANUFACTURING	L	DIRECT REUSE	784	784	784	784	784	784
MANUFACTURING	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	1,127	1,127	1,127	1,127	1,127	1,127
MANUFACTURING	L	GUADALUPE RUN-OF-RIVER	100	100	100	100	100	100
MANUFACTURING	L	TRINITY AQUIFER | COMAL COUNTY	4	4	4	4	4	4
MINING	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	2,489	2,489	2,489	2,489	2,489	2,489
MINING	L	TRINITY AQUIFER | COMAL COUNTY	1,906	1,906	1,906	1,906	2,085	3,665
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	120	120	120	120	120	120
LIVESTOCK	L	TRINITY AQUIFER | COMAL COUNTY	100	100	100	100	100	100
IRRIGATION	L	CANYON LAKE/RESERVOIR	162	162	162	162	162	162
IRRIGATION	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	462	462	462	462	462	462
IRRIGATION	L	GUADALUPE RUN-OF-RIVER	5	5	5	5	5	5
		GUADALUPE BASIN TOTAL	**39,830**	**40,223**	**40,408**	**40,530**	**40,783**	**42,404**
CANYON LAKE WATER SERVICE*	L	CANYON LAKE/RESERVOIR	1,173	1,172	1,173	1,173	1,173	1,173
CANYON LAKE WATER SERVICE*	K	TRINITY AQUIFER | BLANCO COUNTY	24	23	23	23	23	23
CANYON LAKE WATER SERVICE*	L	TRINITY AQUIFER | COMAL COUNTY	1,308	1,268	1,255	1,256	1,263	1,262
FAIR OAKS RANCH	L	CANYON LAKE/RESERVOIR	95	96	96	98	98	99
FAIR OAKS RANCH	L	DIRECT REUSE	29	29	29	30	30	30

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
FAIR OAKS RANCH	L	TRINITY AQUIFER | COMAL COUNTY	2	2	2	2	2	2
GARDEN RIDGE	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	141	141	141	141	141	141
GARDEN RIDGE	L	TRINITY AQUIFER | COMAL COUNTY	172	172	172	172	172	172
GUADALUPE-BLANCO RIVER AUTHORITY	L	CANYON LAKE/RESERVOIR	12	12	13	14	15	16
GUADALUPE-BLANCO RIVER AUTHORITY	L	GUADALUPE RUN-OF-RIVER	33	35	37	39	42	45
SAN ANTONIO WATER SYSTEM	L	CANYON LAKE/RESERVOIR	4	2	0	0	0	0
SAN ANTONIO WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	15	15	14	14	14	14
SAN ANTONIO WATER SYSTEM	G	CARRIZO-WILCOX AQUIFER | BURLESON COUNTY	7	10	12	14	15	15
SAN ANTONIO WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	13	11	10	10	10	10
SAN ANTONIO WATER SYSTEM	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	99	99	98	98	98	98
SAN ANTONIO WATER SYSTEM	L	SAN ANTONIO RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L	TRINITY AQUIFER | BEXAR COUNTY	2	1	1	1	1	1
SAN ANTONIO WATER SYSTEM	L	TRINITY AQUIFER | COMAL COUNTY	0	0	0	0	0	0
SCHERTZ	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	5	9	13	14	15	15
SCHERTZ	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1	1	1	1	1	2
SELMA	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	3	2	3	3	3	4
SELMA	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	2	2	2	2	2	2
WATER SERVICES	L	TRINITY AQUIFER | BEXAR COUNTY	479	299	341	375	313	254
COUNTY-OTHER	L	TRINITY AQUIFER | COMAL COUNTY	356	302	286	254	214	169
MINING	L	TRINITY AQUIFER | COMAL COUNTY	344	400	454	501	559	625
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	9	9	9	9	9	9
LIVESTOCK	L	TRINITY AQUIFER | COMAL COUNTY	8	8	8	8	8	8
IRRIGATION	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	10	10	10	10	10	10
		SAN ANTONIO BASIN TOTAL	**4,346**	**4,130**	**4,203**	**4,262**	**4,231**	**4,199**
		COMAL COUNTY TOTAL	**44,176**	**44,353**	**44,611**	**44,792**	**45,014**	**46,603**
CUERO	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	1,826	1,854	1,857	1,870	1,885	1,897
GONZALES COUNTY WSC	L	CANYON LAKE/RESERVOIR	18	17	16	15	14	13
GONZALES COUNTY WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	151	141	133	123	115	106
YORKTOWN	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	396	397	394	398	401	403
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	1,008	1,008	1,008	1,008	1,008	1,008
MANUFACTURING	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	157	158	164	171	172	172
MINING	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	731	702	1,322	1,081	494	229
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	818	818	818	818	818	818
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	631	631	631	631	631	631
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	0	0	0	0	520	520
		GUADALUPE BASIN TOTAL	**5,736**	**5,726**	**6,343**	**6,115**	**6,058**	**5,797**
YOAKUM*	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	397	397	397	397	397	397
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	220	220	220	220	220	220
MANUFACTURING	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	162	164	170	177	178	178
MINING	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	462	438	335	226	104	48
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	13	13	13	13	13	13
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	282	282	282	282	282	282
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	476	495	579	665	784	840
		LAVACA BASIN TOTAL	**2,012**	**2,009**	**1,996**	**1,980**	**1,978**	**1,978**
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	2	2	2	2	2	2
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	8	8	8	8	8	8
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	9	9	9	9	9	9

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	15	15	15	15	15	15
		LAVACA-GUADALUPE BASIN TOTAL	**34**	**34**	**34**	**34**	**34**	**34**
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	76	76	75	75	75	76
MINING	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	254	238	176	113	52	24
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	68	68	68	68	68	68
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	75	75	75	75	75	75
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	0	0	102	104	104	104
		SAN ANTONIO BASIN TOTAL	**473**	**457**	**496**	**435**	**374**	**347**
		DEWITT COUNTY TOTAL	**8,255**	**8,226**	**8,869**	**8,564**	**8,444**	**8,156**
ASHERTON	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	238	249	260	271	280	287
BIG WELLS	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	121	126	129	133	137	141
CARRIZO HILL WSC	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	119	125	129	134	138	141
CARRIZO SPRINGS	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	1,623	1,717	1,773	1,846	1,904	1,952
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	358	358	358	358	358	358
MINING	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	695	689	685	680	676	673
MINING	L	NUECES RUN-OF-RIVER	0	0	0	0	0	0
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	179	179	179	179	179	179
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	170	170	170	170	170	170
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	64	64	64	64	64	64
IRRIGATION	L	NUECES RUN-OF-RIVER	210	210	210	210	210	210
		NUECES BASIN TOTAL	**3,777**	**3,887**	**3,957**	**4,045**	**4,116**	**4,175**
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	4	4	4	4	4	4
MINING		NO WATER SUPPLY ASSOCIATED WITH WUG	0	0	0	0	0	0
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	15	15	15	15	15	15
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	24	24	24	24	24	24
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	78	78	78	78	78	78
		RIO GRANDE BASIN TOTAL	**121**	**121**	**121**	**121**	**121**	**121**
		DIMMIT COUNTY TOTAL	**3,898**	**4,008**	**4,078**	**4,166**	**4,237**	**4,296**
BENTON CITY WSC	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	95	90	85	83	81	79
DILLEY	L	CARRIZO-WILCOX AQUIFER | FRIO COUNTY	2,147	2,147	2,147	2,147	2,147	2,147
MOORE WSC	L	CARRIZO-WILCOX AQUIFER | FRIO COUNTY	4,033	4,033	4,033	4,033	4,033	4,033
PEARSALL	L	CARRIZO-WILCOX AQUIFER | FRIO COUNTY	1,410	1,410	1,410	1,410	1,410	1,410
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | FRIO COUNTY	560	560	560	560	560	560
MINING	L	CARRIZO-WILCOX AQUIFER | FRIO COUNTY	517	550	528	386	220	190
MINING	L	QUEEN CITY AQUIFER | FRIO COUNTY	700	700	650	600	400	200
STEAM ELECTRIC POWER	L	CARRIZO-WILCOX AQUIFER | FRIO COUNTY	124	124	124	124	124	124
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	441	441	441	441	441	441
LIVESTOCK	L	QUEEN CITY AQUIFER | FRIO COUNTY	441	441	441	441	441	441
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | FRIO COUNTY	74,283	74,283	72,445	70,671	68,951	67,137
IRRIGATION	L	QUEEN CITY AQUIFER | FRIO COUNTY	3,300	3,300	3,300	3,300	3,300	3,300
IRRIGATION	L	SPARTA AQUIFER | FRIO COUNTY	600	600	600	600	600	600
		NUECES BASIN TOTAL	**88,651**	**88,679**	**86,764**	**84,796**	**82,708**	**80,662**
		FRIO COUNTY TOTAL	**88,651**	**88,679**	**86,764**	**84,796**	**82,708**	**80,662**
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	657	656	655	655	655	655
MINING	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	126	126	126	126	126	126
STEAM ELECTRIC POWER	L	COLETO CREEK LAKE/RESERVOIR	24,160	24,160	24,160	24,160	24,160	24,160
STEAM ELECTRIC POWER	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	1,863	1,863	1,863	1,863	1,863	1,863
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	153	153	153	153	153	153

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	42	42	42	42	42	42
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	539	539	539	539	539	539
		GUADALUPE BASIN TOTAL	**27,540**	**27,539**	**27,538**	**27,538**	**27,538**	**27,538**
GOLIAD	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	920	920	920	920	920	920
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	301	334	355	362	371	376
MANUFACTURING	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	4	4	4	4	4	4
MINING	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	275	275	275	275	275	275
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	246	246	246	246	246	246
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	88	88	88	88	88	88
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	1,600	1,600	1,600	1,600	1,600	1,600
		SAN ANTONIO BASIN TOTAL	**3,434**	**3,467**	**3,488**	**3,495**	**3,504**	**3,509**
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	150	150	150	150	150	150
MINING	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	49	49	49	49	49	49
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	232	232	232	232	232	232
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	80	80	80	80	80	80
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | GOLIAD COUNTY	700	700	700	700	700	700
		SAN ANTONIO-NUECES BASIN TOTAL	**1,211**	**1,211**	**1,211**	**1,211**	**1,211**	**1,211**
		GOLIAD COUNTY TOTAL	**32,185**	**32,217**	**32,237**	**32,244**	**32,253**	**32,258**
GONZALES	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	2,920	2,920	2,920	2,920	2,920	2,920
GONZALES	L	GUADALUPE RUN-OF-RIVER	2,240	2,240	2,240	2,240	2,240	2,240
GONZALES COUNTY WSC	L	CANYON LAKE/RESERVOIR	318	317	317	317	317	317
GONZALES COUNTY WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	2,647	2,644	2,641	2,643	2,645	2,648
NIXON	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	3,620	3,612	3,613	3,614	3,615	3,616
SMILEY	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	444	444	444	444	444	444
WAELDER	L	QUEEN CITY AQUIFER | GONZALES COUNTY	630	630	630	630	630	630
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	778	778	778	778	778	778
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	1,041	1,287	1,287	1,287	1,287	1,287
MANUFACTURING	L	SPARTA AQUIFER | GONZALES COUNTY	1,140	1,140	1,140	1,140	1,140	1,140
MINING	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	1,600	1,207	813	418	24	1
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	3,045	3,045	3,045	3,045	3,045	3,045
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | GONZALES COUNTY	1	1	1	1	1	1
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	4,678	4,678	4,678	4,678	4,678	4,678
LIVESTOCK	L	QUEEN CITY AQUIFER | GONZALES COUNTY	554	554	554	554	554	554
LIVESTOCK	L	SPARTA AQUIFER | GONZALES COUNTY	449	449	449	449	449	449
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | GONZALES COUNTY	629	629	629	629	629	629
IRRIGATION	L	CANYON LAKE/RESERVOIR	7	7	7	7	7	7
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	4,361	4,361	4,361	4,361	4,361	4,361
IRRIGATION	L	GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
IRRIGATION	L	QUEEN CITY AQUIFER | GONZALES COUNTY	1,241	1,241	1,241	1,241	1,241	1,241
		GUADALUPE BASIN TOTAL	**32,343**	**32,184**	**31,788**	**31,396**	**31,005**	**30,986**
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	48	48	48	48	48	48
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	108	108	108	108	108	108
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	108	108	108	108	108	108
		LAVACA BASIN TOTAL	**264**	**264**	**264**	**264**	**264**	**264**
		GONZALES COUNTY TOTAL	**32,607**	**32,448**	**32,052**	**31,660**	**31,269**	**31,250**
CRYSTAL CLEAR WSC	L	CANYON LAKE/RESERVOIR	824	834	837	831	824	813
CRYSTAL CLEAR WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	32	499	500	497	492	486
CRYSTAL CLEAR WSC	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	618	626	628	624	618	610

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
GONZALES COUNTY WSC	L	CANYON LAKE/RESERVOIR	5	6	6	6	7	7
GONZALES COUNTY WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	42	46	50	52	55	57
GREEN VALLEY SUD	L	CANYON LAKE/RESERVOIR	1,396	1,405	1,413	1,419	1,425	1,431
GREEN VALLEY SUD	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	2,847	2,866	2,881	2,892	2,903	2,914
GREEN VALLEY SUD	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	441	444	446	448	450	56
GREEN VALLEY SUD	L	TRINITY AQUIFER | BEXAR COUNTY	302	304	306	307	308	309
LULING	L	CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	3	4	3	4	4	3
MARTINDALE WSC	L	CANYON LAKE/RESERVOIR	12	14	16	18	20	20
MARTINDALE WSC	L	GUADALUPE RUN-OF-RIVER	1	1	1	1	1	1
NEW BRAUNFELS	L	CANYON LAKE/RESERVOIR	1,648	1,596	1,562	1,532	1,513	1,502
NEW BRAUNFELS	L	DIRECT REUSE	18	18	17	17	17	17
NEW BRAUNFELS	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	883	841	837	821	811	804
NEW BRAUNFELS	L	GUADALUPE RUN-OF-RIVER	18	17	17	16	16	16
NEW BRAUNFELS	L	TRINITY AQUIFER | COMAL COUNTY	700	667	663	651	643	638
SCHERTZ	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	434	583	618	566	512	461
SCHERTZ	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	65	64	64	63	62	61
SEGUIN	L	CANYON LAKE/RESERVOIR	1,000	1,000	1,000	1,000	1,000	1,000
SEGUIN	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	3,165	3,921	4,666	5,326	6,028	6,719
SEGUIN	L	DIRECT REUSE	100	100	100	100	100	100
SPRINGS HILL WSC	L	CANYON LAKE/RESERVOIR	3,443	3,002	3,002	3,002	3,002	3,002
SPRINGS HILL WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	828	828	828	828	828	828
SPRINGS HILL WSC	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	975	169	169	169	169	169
TRI COMMUNITY WSC	L	GUADALUPE RUN-OF-RIVER	8	10	10	9	10	10
WATER SERVICES	L	TRINITY AQUIFER | BEXAR COUNTY	74	69	72	76	79	82
COUNTY-OTHER	L	CANYON LAKE/RESERVOIR	464	464	464	464	464	464
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	13	15	18	21	23	26
COUNTY-OTHER	L	GUADALUPE RUN-OF-RIVER	61	61	61	61	61	61
MANUFACTURING	L	CANYON LAKE/RESERVOIR	985	985	985	985	985	985
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	1,488	1,487	1,487	1,487	1,487	1,487
MANUFACTURING	L	EDWARDS-BFZ AQUIFER | GUADALUPE COUNTY	202	202	202	202	202	202
MANUFACTURING	L	GUADALUPE RUN-OF-RIVER	1,459	1,459	1,459	1,459	1,459	1,459
MINING	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	342	412	479	566	663	782
STEAM ELECTRIC POWER	L	CANYON LAKE/RESERVOIR	6,840	6,840	6,840	6,840	6,840	6,840
STEAM ELECTRIC POWER	L	DIRECT REUSE	880	880	880	880	880	880
STEAM ELECTRIC POWER	L	GUADALUPE RUN-OF-RIVER	5,600	5,600	5,600	5,600	5,600	5,600
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	520	520	520	520	520	520
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	650	650	650	650	650	650
IRRIGATION	L	CANYON LAKE/RESERVOIR	311	311	311	311	311	311
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	398	398	398	398	398	398
IRRIGATION	L	GUADALUPE RUN-OF-RIVER	271	271	271	271	271	271
		GUADALUPE BASIN TOTAL	**40,366**	**40,489**	**41,337**	**41,990**	**42,711**	**43,052**
CIBOLO	L	CANYON LAKE/RESERVOIR	1,350	1,350	1,350	1,350	1,350	1,350
CIBOLO	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	2,602	1,861	1,861	1,861	1,861	1,861
EAST CENTRAL SUD	L	CANYON LAKE/RESERVOIR	47	48	42	51	46	54
EAST CENTRAL SUD	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	33	34	30	36	33	38
EAST CENTRAL SUD	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	25	26	23	28	25	30
GREEN VALLEY SUD	L	CANYON LAKE/RESERVOIR	1,019	1,025	1,032	1,036	1,041	1,045
GREEN VALLEY SUD	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	2,079	2,090	2,102	2,111	2,120	2,127

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
GREEN VALLEY SUD	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	322	323	326	327	328	724
GREEN VALLEY SUD	L	TRINITY AQUIFER | BEXAR COUNTY	220	222	223	224	225	226
MARION	L	CANYON LAKE/RESERVOIR	100	100	100	100	100	100
MARION	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	200	200	200	200	200	200
MARION	L	EDWARDS-BFZ AQUIFER | COMAL COUNTY	6	6	6	6	6	6
SCHERTZ	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	5,439	7,299	7,744	7,089	6,406	5,770
SCHERTZ	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	814	810	799	788	776	766
SELMA	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	338	504	478	455	436	419
SELMA	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	216	322	305	291	279	268
SPRINGS HILL WSC	L	CANYON LAKE/RESERVOIR	463	404	404	404	404	404
SPRINGS HILL WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	112	112	112	112	112	112
SPRINGS HILL WSC	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	131	23	23	23	23	23
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	154	183	214	248	280	314
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	2	3	3	3	3	3
MINING	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	114	138	160	189	221	261
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	130	130	130	130	130	130
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	199	199	199	199	199	199
		SAN ANTONIO BASIN TOTAL	**16,115**	**17,412**	**17,866**	**17,261**	**16,604**	**16,430**
		GUADALUPE COUNTY TOTAL	**56,481**	**57,901**	**59,203**	**59,251**	**59,315**	**59,482**
BUDA*	L	CANYON LAKE/RESERVOIR	299	388	499	639	798	979
COUNTY LINE SUD	L	CANYON LAKE/RESERVOIR	905	905	937	968	1,002	1,038
COUNTY LINE SUD	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	112	112	116	120	124	129
CREEDMOOR-MAHA WSC*	K	EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	7	8	9	10	11	12
CRYSTAL CLEAR WSC	L	CANYON LAKE/RESERVOIR	323	317	319	329	340	354
CRYSTAL CLEAR WSC	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	13	204	205	211	219	227
CRYSTAL CLEAR WSC	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	261	256	258	265	274	285
GOFORTH SUD*	L	CANYON LAKE/RESERVOIR	4,186	4,186	4,186	4,186	4,186	4,186
GOFORTH SUD*	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	105	104	103	103	103	103
GOFORTH SUD*	K	EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	7	7	7	7	7	7
GOFORTH SUD*	L	TRINITY AQUIFER | HAYS COUNTY	1,482	1,502	1,509	1,511	1,510	1,507
KYLE	L	CANYON LAKE/RESERVOIR	5,443	5,443	5,443	5,443	5,443	5,443
KYLE	L	DIRECT REUSE	583	583	583	583	583	583
KYLE	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	247	247	247	247	247	247
MAXWELL WSC	L	CANYON LAKE/RESERVOIR	194	178	168	164	161	161
MAXWELL WSC	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	48	44	41	40	40	40
MAXWELL WSC	L	GUADALUPE RUN-OF-RIVER	3	2	2	2	2	2
SAN MARCOS	L	CANYON LAKE/RESERVOIR	9,998	9,998	9,998	9,997	9,997	9,997
SAN MARCOS	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	3,084	3,084	3,083	3,083	3,083	3,083
SOUTH BUDA WCID 1	L	TRINITY AQUIFER | HAYS COUNTY	650	650	650	650	650	650
TEXAS STATE UNIVERSITY	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	1,130	1,130	1,130	1,130	1,130	1,130
WIMBERLEY WSC	L	TRINITY AQUIFER | HAYS COUNTY	1,152	1,152	1,152	1,152	1,152	1,152
COUNTY-OTHER*	L	CANYON LAKE/RESERVOIR	708	0	921	1,533	4,001	4,008
COUNTY-OTHER*	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	258	258	258	258	258	258
COUNTY-OTHER*	L	TRINITY AQUIFER | HAYS COUNTY	341	341	341	341	341	341
MANUFACTURING*	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	550	550	550	550	550	550
LIVESTOCK*	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	200	200	200	200	200	200
LIVESTOCK*	L	LOCAL SURFACE WATER SUPPLY	754	754	754	754	754	754
LIVESTOCK*	L	TRINITY AQUIFER | HAYS COUNTY	1,838	1,838	1,838	1,838	1,838	1,838

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
IRRIGATION*	L	DIRECT REUSE	224	224	224	224	224	224
IRRIGATION*	L	EDWARDS-BFZ AQUIFER | HAYS COUNTY	160	160	160	160	160	160
IRRIGATION*	L	GUADALUPE RUN-OF-RIVER	20	20	20	20	20	20
IRRIGATION*	L	TRINITY AQUIFER | HAYS COUNTY	102	102	102	102	102	102
		GUADALUPE BASIN TOTAL	**35,387**	**34,947**	**36,013**	**36,820**	**39,510**	**39,770**
		HAYS COUNTY TOTAL	**35,387**	**34,947**	**36,013**	**36,820**	**39,510**	**39,770**
EL OSO WSC*	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	3	3	3	3	4	4
EL OSO WSC*	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	5	5	5	4	2	2
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	9	25	25	24	24	24
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	7	7	7	7	7	7
COUNTY-OTHER	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	3	3	3	3	3	3
MINING	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	152	115	77	40	2	0
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	4	4	4	4	4	4
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	20	20	20	20	20	20
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	17	17	17	17	17	17
IRRIGATION	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	310	310	310	310	310	310
		GUADALUPE BASIN TOTAL	**530**	**509**	**471**	**432**	**393**	**391**
EL OSO WSC*	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	8	8	9	10	11	11
EL OSO WSC*	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	13	13	13	12	7	7
COUNTY-OTHER	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	8	8	8	7	7	7
MINING	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	36	36	35	31	28	26
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	42	42	42	42	42	42
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	91	91	91	91	91	91
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	42	42	42	42	42	42
		NUECES BASIN TOTAL	**240**	**240**	**240**	**235**	**228**	**226**
EL OSO WSC*	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	244	241	258	287	306	302
EL OSO WSC*	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	393	390	383	342	199	197
EL OSO WSC*	N	GULF COAST AQUIFER SYSTEM | LIVE OAK COUNTY	1	1	1	1	2	1
FALLS CITY	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	220	233	243	248	252	252
KARNES CITY	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	289	306	319	326	336	360
KENEDY	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	1,838	1,838	1,838	1,838	1,838	1,838
RUNGE	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	263	264	260	259	258	258
SUNKO WSC	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	64	53	46	39	35	33
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	40	45	50	50	50	50
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	288	294	289	286	285	285
COUNTY-OTHER	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	99	98	98	100	100	100
MANUFACTURING	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	131	155	42	0	0	0
MINING	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	411	411	411	411	15	1
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	275	274	0	0	0	0
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	547	548	548	549	558	558
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	888	888	888	888	888	888
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	559	559	0	0	0	0
IRRIGATION	L	SAN ANTONIO RUN-OF-RIVER	100	100	100	100	100	100
		SAN ANTONIO BASIN TOTAL	**6,650**	**6,698**	**5,774**	**5,724**	**5,222**	**5,223**
EL OSO WSC*	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	2	2	2	3	3	3
EL OSO WSC*	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	4	3	3	3	3	3
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	20	20	20	20	20	20
COUNTY-OTHER	L	YEGUA-JACKSON AQUIFER | KARNES COUNTY	1	1	1	1	1	1

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
MINING	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	1	1	1	1	1	1
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	14	14	14	14	14	14
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	10	10	10	10	10	10
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	12	12	12	12	12	12
		SAN ANTONIO-NUECES BASIN TOTAL	**64**	**63**	**63**	**64**	**64**	**64**
		KARNES COUNTY TOTAL	**7,484**	**7,510**	**6,548**	**6,455**	**5,907**	**5,904**
COUNTY-OTHER	L	EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	67	67	67	67	67	67
COUNTY-OTHER	L	TRINITY AQUIFER | KENDALL COUNTY	25	25	25	25	25	25
LIVESTOCK	L	EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	2	2	2	2	2	2
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	6	6	6	6	6	6
LIVESTOCK	L	TRINITY AQUIFER | KENDALL COUNTY	5	5	5	5	5	5
		COLORADO BASIN TOTAL	**105**	**105**	**105**	**105**	**105**	**105**
GUADALUPE-BLANCO RIVER AUTHORITY	L	CANYON LAKE/RESERVOIR	11	11	12	13	14	15
GUADALUPE-BLANCO RIVER AUTHORITY	L	GUADALUPE RUN-OF-RIVER	30	32	34	36	39	42
KENDALL COUNTY WCID 1	L	DIRECT REUSE	227	227	227	227	227	227
KENDALL COUNTY WCID 1	L	TRINITY AQUIFER | KENDALL COUNTY	500	500	500	500	500	500
COUNTY-OTHER	L	CANYON LAKE/RESERVOIR	1,500	1,500	1,500	1,500	1,500	1,500
COUNTY-OTHER	L	EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	94	94	94	94	94	94
COUNTY-OTHER	L	TRINITY AQUIFER | KENDALL COUNTY	1,088	1,005	1,164	1,209	1,234	1,320
MANUFACTURING	L	TRINITY AQUIFER | KENDALL COUNTY	1	1	1	1	1	1
LIVESTOCK	L	EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	9	9	9	9	9	9
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	159	159	159	159	159	159
LIVESTOCK	L	TRINITY AQUIFER | KENDALL COUNTY	148	148	148	148	148	148
IRRIGATION	L	DIRECT REUSE	39	39	39	39	39	39
IRRIGATION	L	GUADALUPE RUN-OF-RIVER	26	26	26	26	26	26
IRRIGATION	L	TRINITY AQUIFER | KENDALL COUNTY	457	457	457	457	457	457
		GUADALUPE BASIN TOTAL	**4,289**	**4,208**	**4,370**	**4,418**	**4,447**	**4,537**
BOERNE	L	BOERNE LAKE/RESERVOIR	647	647	647	647	647	647
BOERNE	L	CANYON LAKE/RESERVOIR	3,611	3,611	3,611	3,611	3,611	3,611
BOERNE	L	DIRECT REUSE	65	65	65	65	65	65
BOERNE	L	TRINITY AQUIFER | KENDALL COUNTY	1,490	1,490	1,490	1,490	1,490	1,490
FAIR OAKS RANCH	L	CANYON LAKE/RESERVOIR	585	690	775	840	895	940
FAIR OAKS RANCH	L	DIRECT REUSE	177	209	235	254	271	285
FAIR OAKS RANCH	L	TRINITY AQUIFER | COMAL COUNTY	13	15	17	19	20	21
GUADALUPE-BLANCO RIVER AUTHORITY	L	GUADALUPE RUN-OF-RIVER	1	1	1	1	1	1
KENDALL WEST UTILITY	L	TRINITY AQUIFER | KENDALL COUNTY	500	500	500	500	500	500
COUNTY-OTHER	L	TRINITY AQUIFER | KENDALL COUNTY	1,000	1,000	1,000	1,100	1,100	1,200
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	33	33	33	33	33	33
LIVESTOCK	L	TRINITY AQUIFER | KENDALL COUNTY	33	33	33	33	33	33
IRRIGATION	L	TRINITY AQUIFER | KENDALL COUNTY	100	100	100	100	100	100
		SAN ANTONIO BASIN TOTAL	**8,255**	**8,394**	**8,507**	**8,693**	**8,766**	**8,926**
		KENDALL COUNTY TOTAL	**12,649**	**12,707**	**12,982**	**13,216**	**13,318**	**13,568**
COTULLA	L	CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	2,381	2,381	2,381	2,381	2,381	2,381

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
ENCINAL WSC	L	CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	295	295	295	295	295	295
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	302	321	341	366	389	412
MINING	L	CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	529	529	529	529	529	529
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	80	80	80	80	80	80
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	245	245	245	245	245	245
LIVESTOCK	L	QUEEN CITY AQUIFER | LA SALLE COUNTY	1	1	1	1	1	1
LIVESTOCK	L	SPARTA AQUIFER | LA SALLE COUNTY	74	74	74	74	74	74
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | LA SALLE COUNTY	91	91	91	91	91	91
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	3,217	3,198	3,178	3,153	3,130	3,107
IRRIGATION	L	NUECES RUN-OF-RIVER	474	474	474	474	474	474
IRRIGATION	L	SPARTA AQUIFER | LA SALLE COUNTY	909	909	909	909	909	909
		NUECES BASIN TOTAL	**8,598**	**8,598**	**8,598**	**8,598**	**8,598**	**8,598**
		LA SALLE COUNTY TOTAL	**8,598**	**8,598**	**8,598**	**8,598**	**8,598**	**8,598**
BENTON CITY WSC	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	855	877	889	890	890	887
DEVINE	L	CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	619	619	619	619	619	619
DEVINE	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	218	218	218	218	218	218
EAST MEDINA COUNTY SUD	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	535	535	535	535	535	535
HONDO	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	1,512	1,512	1,512	1,512	1,512	1,512
LYTLE	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	89	93	96	97	97	97
MEDINA COUNTY WCID 2	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	102	102	102	102	102	102
MEDINA COUNTY WCID 2	L	TRINITY AQUIFER | MEDINA COUNTY	468	468	468	468	468	468
MEDINA RIVER WEST WSC	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	87	87	87	87	87	87
MEDINA RIVER WEST WSC	L	TRINITY AQUIFER | MEDINA COUNTY	215	214	214	214	214	215
NATALIA	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	186	186	186	186	186	186
WEST MEDINA WSC	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	189	189	189	189	189	189
YANCEY WSC	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	18	1	1	1	1	1
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	348	459	542	610	674	726
COUNTY-OTHER	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	1,232	1,232	1,232	1,232	1,232	1,232
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	2	2	2	2	2	2
MANUFACTURING	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	1,526	1,526	1,526	1,526	1,526	1,526
MANUFACTURING	L	LEONA GRAVEL AQUIFER | MEDINA COUNTY	15	15	15	15	15	15
MINING	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	488	456	433	409	373	333
MINING	L	LEONA GRAVEL AQUIFER | MEDINA COUNTY	1,057	1,243	1,397	1,553	1,755	1,978
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	38	38	38	38	38	38
LIVESTOCK	L	LEONA GRAVEL AQUIFER | MEDINA COUNTY	321	321	321	321	321	321
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	519	519	519	519	519	519
LIVESTOCK	L	TRINITY AQUIFER | MEDINA COUNTY	164	164	164	164	164	164
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	1,602	1,525	1,442	1,373	1,308	1,256
IRRIGATION	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	13,156	13,156	13,156	13,156	13,156	13,156
IRRIGATION	L	TRINITY AQUIFER | MEDINA COUNTY	4,250	4,000	4,150	3,900	3,800	2,800
		NUECES BASIN TOTAL	**29,811**	**29,757**	**30,053**	**29,936**	**30,001**	**29,182**
CASTROVILLE	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	557	557	557	557	557	557
EAST MEDINA COUNTY SUD	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	48	48	48	48	48	48
LA COSTE	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	114	114	114	114	114	114
MEDINA RIVER WEST WSC	L	TRINITY AQUIFER | MEDINA COUNTY	109	110	110	110	110	109
SAN ANTONIO WATER SYSTEM	L	CANYON LAKE/RESERVOIR	4	3	0	0	0	0
SAN ANTONIO WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	15	15	15	15	15	15
SAN ANTONIO WATER SYSTEM	G	CARRIZO-WILCOX AQUIFER | BURLESON COUNTY	7	10	13	15	16	16

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
SAN ANTONIO WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	14	12	11	11	11	11
SAN ANTONIO WATER SYSTEM	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	106	105	105	105	105	105
SAN ANTONIO WATER SYSTEM	L	SAN ANTONIO RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L	TRINITY AQUIFER | BEXAR COUNTY	3	1	1	1	1	1
SAN ANTONIO WATER SYSTEM	L	TRINITY AQUIFER | COMAL COUNTY	0	0	0	0	0	0
YANCEY WSC	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	572	589	589	589	589	589
COUNTY-OTHER	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	75	75	75	75	75	75
COUNTY-OTHER	L	TRINITY AQUIFER | MEDINA COUNTY	200	250	300	350	400	450
MINING	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	283	315	338	362	398	438
MINING	L	LEONA GRAVEL AQUIFER | MEDINA COUNTY	180	200	220	240	260	280
LIVESTOCK	L	LEONA GRAVEL AQUIFER | MEDINA COUNTY	33	33	33	33	33	33
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	63	63	63	63	63	63
LIVESTOCK	L	TRINITY AQUIFER | MEDINA COUNTY	27	27	27	27	27	27
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	5	5	5	5	5	5
IRRIGATION	L	EDWARDS-BFZ AQUIFER | MEDINA COUNTY	3,931	3,931	3,931	3,931	3,931	3,931
IRRIGATION	L	TRINITY AQUIFER | MEDINA COUNTY	1,594	1,594	1,594	1,594	1,594	1,594
		SAN ANTONIO BASIN TOTAL	**7,940**	**8,057**	**8,149**	**8,245**	**8,352**	**8,461**
		MEDINA COUNTY TOTAL	**37,751**	**37,814**	**38,202**	**38,181**	**38,353**	**37,643**
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	8	8	8	8	8	8
MINING	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	3	3	2	2	1	1
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	12	12	12	12	12	12
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	12	12	12	12	12	12
		SAN ANTONIO BASIN TOTAL	**35**	**35**	**34**	**34**	**33**	**33**
REFUGIO	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	568	571	562	569	572	574
WOODSBORO	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	269	269	264	268	269	271
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	356	352	343	344	345	347
MINING	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	63	66	49	36	23	14
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	226	226	226	226	226	226
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	225	225	225	225	225	225
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | REFUGIO COUNTY	1,034	1,034	1,034	1,034	1,034	1,034
		SAN ANTONIO-NUECES BASIN TOTAL	**2,741**	**2,743**	**2,703**	**2,702**	**2,694**	**2,691**
		REFUGIO COUNTY TOTAL	**2,776**	**2,778**	**2,737**	**2,736**	**2,727**	**2,724**
KNIPPA WSC	L	AUSTIN CHALK AQUIFER | UVALDE COUNTY	100	100	100	100	100	100
KNIPPA WSC	L	EDWARDS-BFZ AQUIFER | UVALDE COUNTY	119	119	119	119	119	119
KNIPPA WSC	L	TRINITY AQUIFER | UVALDE COUNTY	109	109	109	109	109	109
SABINAL	L	EDWARDS-BFZ AQUIFER | UVALDE COUNTY	297	297	297	297	297	297
UVALDE	L	EDWARDS-BFZ AQUIFER | UVALDE COUNTY	1,951	1,951	1,951	1,951	1,951	1,951
WINDMILL WSC	L	AUSTIN CHALK AQUIFER | UVALDE COUNTY	480	480	480	480	480	480
COUNTY-OTHER	L	BUDA LIMESTONE AQUIFER | UVALDE COUNTY	50	50	114	168	229	289
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | UVALDE COUNTY	799	828	828	828	828	828
COUNTY-OTHER	L	EDWARDS-BFZ AQUIFER | UVALDE COUNTY	9	9	9	9	9	9
COUNTY-OTHER	L	LEONA GRAVEL AQUIFER | UVALDE COUNTY	0	20	20	20	20	20
MANUFACTURING	L	EDWARDS-BFZ AQUIFER | UVALDE COUNTY	111	111	111	111	111	111
MINING	L	EDWARDS-BFZ AQUIFER | UVALDE COUNTY	90	90	90	90	90	90
MINING	L	LEONA GRAVEL AQUIFER | UVALDE COUNTY	2,469	2,724	2,845	3,087	3,372	3,682
LIVESTOCK	L	EDWARDS-BFZ AQUIFER | UVALDE COUNTY	704	704	704	704	704	704
LIVESTOCK	L	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UVALDE COUNTY	501	495	519	519	519	519

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
LIVESTOCK	L	LEONA GRAVEL AQUIFER | UVALDE COUNTY	391	397	373	373	373	373
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	516	516	516	516	516	516
LIVESTOCK	L	TRINITY AQUIFER | UVALDE COUNTY	86	86	86	86	86	86
IRRIGATION	L	AUSTIN CHALK AQUIFER | UVALDE COUNTY	1,780	1,780	1,780	1,780	1,780	1,780
IRRIGATION	L	EDWARDS-BFZ AQUIFER | UVALDE COUNTY	11,956	11,956	11,956	11,956	11,956	11,956
IRRIGATION	L	EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS | UVALDE COUNTY	1,474	1,474	1,474	1,474	1,474	1,474
IRRIGATION	L	LEONA GRAVEL AQUIFER | UVALDE COUNTY	5,388	5,133	5,012	4,770	4,485	4,175
IRRIGATION	L	NUECES RUN-OF-RIVER	720	720	720	720	720	720
IRRIGATION	L	TRINITY AQUIFER | UVALDE COUNTY	600	600	600	600	600	600
		NUECES BASIN TOTAL	**30,700**	**30,749**	**30,813**	**30,867**	**30,928**	**30,988**
		UVALDE COUNTY TOTAL	**30,700**	**30,749**	**30,813**	**30,867**	**30,928**	**30,988**
QUAIL CREEK MUD	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	1,235	1,235	1,235	1,235	1,235	1,235
VICTORIA	L	CANYON LAKE/RESERVOIR	836	836	836	836	836	836
VICTORIA	L	GUADALUPE RUN-OF-RIVER	410	410	410	410	410	410
VICTORIA	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	4,264	4,264	4,264	4,264	4,264	4,264
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	1,457	1,457	1,457	1,457	1,457	1,457
MANUFACTURING	L	GUADALUPE RUN-OF-RIVER	2	2	2	2	2	2
MANUFACTURING	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	470	470	470	470	470	470
MINING	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	36	38	28	20	14	9
STEAM ELECTRIC POWER	L	GUADALUPE RUN-OF-RIVER	12,500	12,500	12,500	12,500	12,500	12,500
STEAM ELECTRIC POWER	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	50	50	50	50	50	50
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	177	177	177	177	177	177
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	312	312	312	312	312	312
IRRIGATION	L	GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	7,398	7,398	7,398	7,398	7,398	7,398
		GUADALUPE BASIN TOTAL	**29,147**	**29,149**	**29,139**	**29,131**	**29,125**	**29,120**
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	4	4	4	4	4	4
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	3	3	3	3	3	3
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	2	2	2	2	2	2
		LAVACA BASIN TOTAL	**9**	**9**	**9**	**9**	**9**	**9**
VICTORIA	L	CANYON LAKE/RESERVOIR	404	404	404	404	404	404
VICTORIA	L	GUADALUPE RUN-OF-RIVER	198	198	198	198	198	198
VICTORIA	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	2,063	2,063	2,063	2,063	2,063	2,063
VICTORIA COUNTY WCID 1	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	370	370	370	370	370	370
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	288	288	288	288	288	288
MINING	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	33	34	26	19	12	8
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	329	329	329	329	329	329
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	196	196	196	196	196	196
IRRIGATION	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	6,000	6,000	6,000	6,000	6,000	6,000
		LAVACA-GUADALUPE BASIN TOTAL	**9,881**	**9,882**	**9,874**	**9,867**	**9,860**	**9,856**
COUNTY-OTHER	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	4	4	4	4	4	4
MINING	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	3	3	2	2	1	1
LIVESTOCK	L	GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	23	23	23	23	23	23
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	22	22	22	22	22	22
		SAN ANTONIO BASIN TOTAL	**52**	**52**	**51**	**51**	**50**	**50**
		VICTORIA COUNTY TOTAL	**39,089**	**39,092**	**39,073**	**39,058**	**39,044**	**39,035**
NIXON	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	9	17	16	15	14	13

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
SUNKO WSC	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	8	9	9	10	9	9
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	125	125	125	125	125	125
MINING	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	174	140	105	71	36	18
STEAM ELECTRIC POWER	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	2,439	2,439	2,439	2,439	2,439	2,439
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	5	5	5	5	5	5
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	93	93	93	93	93	93
LIVESTOCK	L	QUEEN CITY AQUIFER | WILSON COUNTY	7	7	7	7	7	7
LIVESTOCK	L	SPARTA AQUIFER | WILSON COUNTY	7	7	7	7	7	7
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | WILSON COUNTY	5	5	5	5	5	5
		GUADALUPE BASIN TOTAL	**2,872**	**2,847**	**2,811**	**2,777**	**2,740**	**2,721**
MCCOY WSC*	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	91	96	99	103	105	106
MCCOY WSC*	L	QUEEN CITY AQUIFER | ATASCOSA COUNTY	5	5	5	5	5	5
PICOSA WSC	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	4	4	4	4	4	4
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	95	95	95	95	95	95
MINING	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	174	140	105	71	36	18
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	26	26	26	26	26	26
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	2	2	2	2	2	2
LIVESTOCK	L	QUEEN CITY AQUIFER | WILSON COUNTY	5	5	5	5	5	5
LIVESTOCK	L	SPARTA AQUIFER | WILSON COUNTY	34	34	34	34	34	34
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | WILSON COUNTY	50	50	50	50	50	50
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	3,145	3,145	3,145	3,145	3,000	2,700
IRRIGATION	L	QUEEN CITY AQUIFER | WILSON COUNTY	127	112	100	89	80	80
IRRIGATION	L	YEGUA-JACKSON AQUIFER | WILSON COUNTY	28	28	28	28	28	28
		NUECES BASIN TOTAL	**3,786**	**3,742**	**3,698**	**3,657**	**3,470**	**3,153**
EAST CENTRAL SUD	L	CANYON LAKE/RESERVOIR	136	148	142	130	121	112
EAST CENTRAL SUD	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	1	1	1	1	1	1
EAST CENTRAL SUD	G	CARRIZO-WILCOX AQUIFER | BURLESON COUNTY	1	1	1	1	1	1
EAST CENTRAL SUD	L	CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	97	106	102	93	86	80
EAST CENTRAL SUD	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	75	82	78	71	67	61
EAST CENTRAL SUD	L	TRINITY AQUIFER | BEXAR COUNTY	1	1	1	1	1	1
EL OSO WSC*	L	CARRIZO-WILCOX AQUIFER | KARNES COUNTY	17	20	25	32	36	40
EL OSO WSC*	L	GULF COAST AQUIFER SYSTEM | KARNES COUNTY	27	32	37	38	24	26
ELMENDORF	L	CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	1	1	1	1	1	1
ELMENDORF	L	EDWARDS-BFZ AQUIFER | BEXAR COUNTY	2	2	2	2	2	2
ELMENDORF	L	TRINITY AQUIFER | BEXAR COUNTY	1	1	1	1	1	0
FLORESVILLE	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	2,486	2,486	2,486	2,486	2,486	2,486
LA VERNIA	L	CANYON LAKE/RESERVOIR	270	270	270	270	270	270
LA VERNIA	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	699	699	699	699	699	699
LA VERNIA	L	GUADALUPE RUN-OF-RIVER	130	130	130	130	130	130
MCCOY WSC*	L	CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	7	8	9	8	8	10
OAK HILLS WSC	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	453	453	453	453	453	453
PICOSA WSC	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	302	302	302	302	302	302
POTH	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	630	630	630	630	630	630
S S WSC	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,778	1,778	1,778	1,778	1,778	1,778
STOCKDALE	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	920	920	920	920	920	920
SUNKO WSC	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,453	1,463	1,470	1,476	1,481	1,483
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,256	1,256	1,256	1,256	1,256	1,256
COUNTY-OTHER	L	SAN ANTONIO RUN-OF-RIVER	0	0	0	0	0	0

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Region L Water User Group (WUG) Existing Water Supply

WUG NAME	SOURCE REGION	SOURCE DESCRIPTION	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	40	43	43	43	43	43
MINING	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,581	1,268	955	640	327	168
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	455	455	455	455	455	455
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	850	850	850	850	850	850
LIVESTOCK	L	QUEEN CITY AQUIFER | WILSON COUNTY	198	198	198	198	198	198
LIVESTOCK	L	YEGUA-JACKSON AQUIFER | WILSON COUNTY	152	152	152	152	152	152
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | WILSON COUNTY	11,000	11,000	11,000	11,000	11,000	11,000
IRRIGATION	L	SAN ANTONIO RUN-OF-RIVER	1,073	1,073	1,073	1,073	1,073	1,073
IRRIGATION	L	YEGUA-JACKSON AQUIFER | WILSON COUNTY	84	84	84	84	84	84
		SAN ANTONIO BASIN TOTAL	**26,176**	**25,913**	**25,604**	**25,274**	**24,936**	**24,765**
		WILSON COUNTY TOTAL	**32,834**	**32,502**	**32,113**	**31,708**	**31,146**	**30,639**
BATESVILLE WSC	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	211	228	245	264	283	300
CRYSTAL CITY	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	2,455	2,455	2,455	2,455	2,455	2,455
LOMA ALTA CHULA VISTA WATER SYSTEM	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	235	259	280	303	324	344
ZAVALA COUNTY WCID 1	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	1,340	1,340	1,340	1,340	1,340	1,340
COUNTY-OTHER	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	360	360	360	360	360	360
MANUFACTURING	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	603	766	766	766	766	766
MINING	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	2,531	2,257	1,977	1,559	932	557
LIVESTOCK	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	299	299	299	299	299	299
LIVESTOCK	L	LOCAL SURFACE WATER SUPPLY	594	594	594	594	594	594
IRRIGATION	L	CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	25,083	24,968	25,076	25,352	25,618	25,901
		NUECES BASIN TOTAL	**33,711**	**33,526**	**33,392**	**33,292**	**32,971**	**32,916**
		ZAVALA COUNTY TOTAL	**33,711**	**33,526**	**33,392**	**33,292**	**32,971**	**32,916**
		REGION L EXISTING WATER SUPPLY TOTAL	**1,001,760**	**1,005,292**	**1,009,218**	**1,011,072**	**1,013,581**	**1,013,911**

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Region L Water User Group (WUG) Needs/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.

	(NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ATASCOSA COUNTY - NUECES BASIN						
BENTON CITY WSC	401	265	144	29	(83)	(187)
CHARLOTTE	759	717	678	637	596	558
JOURDANTON	1,229	1,097	974	848	723	605
LYTLE	(277)	(363)	(441)	(519)	(597)	(669)
MCCOY WSC*	1,078	967	863	755	646	543
PLEASANTON	2,596	2,278	1,983	1,681	1,383	1,103
POTEET	328	276	227	174	119	66
SAN ANTONIO WATER SYSTEM	(412)	(444)	(475)	(506)	(538)	(538)
COUNTY-OTHER	452	486	521	558	596	604
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	3,412	3,364	3,324	3,295	3,276	3,276
ATASCOSA COUNTY - SAN ANTONIO BASIN						
BENTON CITY WSC	49	33	18	4	(10)	(23)
SAN ANTONIO WATER SYSTEM	(63)	(71)	(78)	(85)	(93)	(100)
COUNTY-OTHER	12	11	11	11	10	10
IRRIGATION	206	206	206	206	206	206
BEXAR COUNTY - NUECES BASIN						
ATASCOSA RURAL WSC	(44)	(56)	(68)	(80)	(91)	(101)
LYTLE	(7)	(10)	(14)	(17)	(20)	(23)
COUNTY-OTHER	1,308	1,339	1,662	1,336	1,690	2,007
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	3,318	3,318	3,318	3,318	3,318	3,318
BEXAR COUNTY - SAN ANTONIO BASIN						
AIR FORCE VILLAGE II INC	(104)	(126)	(145)	(144)	(144)	(144)
ALAMO HEIGHTS	(942)	(993)	(965)	(953)	(950)	(950)
ATASCOSA RURAL WSC	(827)	(1,063)	(1,285)	(1,508)	(1,720)	(1,916)
BEXAR COUNTY WCID 10	(417)	(438)	(462)	(492)	(524)	(555)
CONVERSE	(350)	(560)	(747)	(721)	(715)	(713)
EAST CENTRAL SUD	958	780	630	451	272	91
ELMENDORF	(31)	(117)	(197)	(275)	(348)	(414)
FAIR OAKS RANCH	222	9	(140)	(210)	(348)	(469)
FORT SAM HOUSTON	(1,919)	(1,736)	(1,551)	(1,366)	(1,185)	(1,008)
GREEN VALLEY SUD	784	694	609	531	459	390
KIRBY	(191)	(260)	(234)	(225)	(223)	(222)
LACKLAND AIR FORCE BASE	(9)	37	75	96	100	100
LEON VALLEY	(263)	(316)	(369)	(748)	(830)	(908)
LIVE OAK	(482)	(489)	(465)	(451)	(448)	(448)
RANDOLPH AIR FORCE BASE	79	64	49	35	23	11
SAN ANTONIO WATER SYSTEM	7,619	(13,874)	(34,102)	(53,717)	(75,049)	(96,746)
SCHERTZ	8	6	(31)	(117)	(221)	(325)

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Region L Water User Group (WUG) Needs/Surplus

SELMA	337	(29)	(82)	(136)	(189)	(240)
SHAVANO PARK	(264)	(346)	(422)	(498)	(568)	(633)
THE OAKS WSC	(138)	(189)	(237)	(284)	(328)	(368)
UNIVERSAL CITY	(299)	(314)	(256)	(224)	(217)	(216)
WATER SERVICES	66	196	98	0	0	0
COUNTY-OTHER	2,377	2,346	2,685	2,349	1,995	1,678
MANUFACTURING	936	85	85	85	85	85
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	(2,782)	(2,782)	(2,782)	(2,782)	(2,782)	(2,782)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(3,318)	(3,318)	(3,318)	(3,318)	(3,318)	(3,318)
CALDWELL COUNTY - COLORADO BASIN						
AQUA WSC*	51	43	35	26	17	8
CREEDMOOR-MAHA WSC*	0	0	0	0	0	0
POLONIA WSC*	508	455	398	340	276	213
COUNTY-OTHER	203	216	215	214	211	207
MINING	3	2	2	1	1	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
CALDWELL COUNTY - GUADALUPE BASIN						
AQUA WSC*	290	243	195	147	97	48
COUNTY LINE SUD	227	135	33	(54)	(124)	(177)
CREEDMOOR-MAHA WSC*	0	0	0	0	0	0
GOFORTH SUD*	(16)	(23)	(27)	(25)	(20)	(18)
GONZALES COUNTY WSC	32	31	28	24	16	9
LOCKHART	817	392	(39)	(482)	(946)	(1,402)
LULING	127	(49)	(226)	(411)	(606)	(796)
MARTINDALE WSC	(124)	(218)	(296)	(395)	(518)	(665)
MAXWELL WSC	445	391	328	253	170	86
POLONIA WSC*	1,078	963	846	720	587	451
SAN MARCOS	1	0	0	0	(1)	(2)
TRI COMMUNITY WSC	318	284	251	219	182	147
COUNTY-OTHER	1,112	1,170	1,165	1,162	1,145	1,131
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
CALHOUN COUNTY - COLORADO-LAVACA BASIN						
POINT COMFORT	91	86	80	72	63	55
COUNTY-OTHER	105	101	72	35	87	82
MANUFACTURING	7,861	3,961	3,953	3,942	3,928	3,915
MINING	0	0	0	0	2	0
LIVESTOCK	66	66	66	66	66	66
IRRIGATION	(60)	(60)	(60)	(60)	(60)	(60)
CALHOUN COUNTY - GUADALUPE BASIN						
LIVESTOCK	0	0	0	0	0	0
CALHOUN COUNTY - LAVACA-GUADALUPE BASIN						
GUADALUPE-BLANCO RIVER AUTHORITY	0	0	0	0	0	0
PORT LAVACA	2,494	2,336	2,174	1,998	1,802	1,609
PORT OCONNOR MUD	1,120	1,120	1,120	1,120	1,120	1,120

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Region L Water User Group (WUG) Needs/Surplus

SEADRIFT	0	0	0	0	0	0
COUNTY-OTHER	32	9	0	0	(87)	(117)
MANUFACTURING	6,374	3,911	3,905	3,898	3,890	3,881
MINING	0	0	0	0	0	0
LIVESTOCK	41	41	41	41	41	41
IRRIGATION	(14,028)	(14,028)	(14,028)	(14,028)	(14,028)	(14,028)
CALHOUN COUNTY - SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	0	0	0	0	(1)	(2)
LIVESTOCK	3	3	3	3	3	3
COMAL COUNTY - GUADALUPE BASIN						
CANYON LAKE WATER SERVICE*	7,019	5,575	3,955	2,291	675	(844)
CLEAR WATER ESTATES WATER SYSTEM	(627)	(806)	(987)	(1,171)	(1,352)	(1,528)
CRYSTAL CLEAR WSC	(5)	37	(9)	(57)	(107)	(154)
GARDEN RIDGE	(586)	(793)	(1,047)	(1,142)	(1,395)	(1,639)
GREEN VALLEY SUD	107	105	98	97	86	79
KT WATER DEVELOPMENT	(26)	(136)	(249)	(364)	(479)	(589)
NEW BRAUNFELS	144	(3,812)	(7,678)	(11,786)	(15,821)	(19,787)
SAN ANTONIO WATER SYSTEM	(9)	(23)	(36)	(47)	(58)	(70)
SCHERTZ	8	8	(48)	(213)	(445)	(714)
WINGERT WATER SYSTEMS	(32)	(108)	(185)	(185)	(185)	(185)
COUNTY-OTHER	1,418	1,440	1,458	1,467	1,469	1,469
MANUFACTURING	(2,786)	(3,768)	(3,768)	(3,768)	(3,768)	(3,768)
MINING	(3,861)	(5,201)	(6,491)	(7,617)	(8,849)	(8,849)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	244	244	244	244	244	244
COMAL COUNTY - SAN ANTONIO BASIN						
CANYON LAKE WATER SERVICE*	1,469	1,173	857	532	210	(87)
FAIR OAKS RANCH	19	1	(15)	(22)	(40)	(57)
GARDEN RIDGE	(332)	(448)	(591)	(646)	(789)	(926)
GUADALUPE-BLANCO RIVER AUTHORITY	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	(10)	(26)	(43)	(55)	(69)	(82)
SCHERTZ	0	0	(1)	(6)	(12)	(18)
SELMA	2	0	0	(1)	(1)	(1)
WATER SERVICES	0	(224)	(226)	(241)	(352)	(457)
COUNTY-OTHER	1	(43)	(52)	(80)	(119)	(164)
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(33)	(33)	(33)	(33)	(33)	(33)
DEWITT COUNTY - GUADALUPE BASIN						
CUERO	0	0	0	0	0	0
GONZALES COUNTY WSC	64	51	41	29	19	9
YORKTOWN	0	0	0	0	0	0
COUNTY-OTHER	18	19	30	31	24	18
MANUFACTURING	23	(11)	(5)	2	3	3
MINING	(1,674)	(1,557)	(346)	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(265)	(265)	(265)	(265)	255	255
DEWITT COUNTY - LAVACA BASIN						
YOAKUM*	7	4	7	6	3	0
COUNTY-OTHER	43	43	45	45	44	43

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Region L Water User Group (WUG) Needs/Surplus

MANUFACTURING	24	(11)	(5)	2	3	3
MINING	(44)	(37)	(16)	(1)	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	45	64	148	234	353	409
DEWITT COUNTY - LAVACA-GUADALUPE BASIN						
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	7	7	7	7	7	7
DEWITT COUNTY - SAN ANTONIO BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	(1)	0	(1)	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(53)	(53)	49	51	51	51
DIMMIT COUNTY - NUECES BASIN						
ASHERTON	0	0	0	0	0	0
BIG WELLS	0	0	0	0	0	0
CARRIZO HILL WSC	0	0	0	0	0	0
CARRIZO SPRINGS	0	0	0	0	0	0
COUNTY-OTHER	51	36	30	19	9	0
MINING	(3,570)	(3,647)	(3,075)	(1,769)	(464)	142
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(4,636)	(4,636)	(4,636)	(4,636)	(4,636)	(4,636)
DIMMIT COUNTY - RIO GRANDE BASIN						
COUNTY-OTHER	1	1	0	0	0	0
MINING	(654)	(665)	(577)	(375)	(175)	(81)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(613)	(613)	(613)	(613)	(613)	(613)
FRIO COUNTY - NUECES BASIN						
BENTON CITY WSC	28	18	9	2	(5)	(11)
DILLEY	1,056	965	885	802	723	650
MOORE WSC	3,921	3,912	3,903	3,895	3,887	3,879
PEARSALL	(611)	(771)	(913)	(1,061)	(1,206)	(1,340)
COUNTY-OTHER	149	125	92	60	31	4
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	(1,838)	(3,612)	(5,332)	(7,146)
GOLIAD COUNTY - GUADALUPE BASIN						
COUNTY-OTHER	289	255	234	226	219	214
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	24,160	24,160	24,160	24,160	24,160	24,160
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	46	46	46	46	46	46
GOLIAD COUNTY - SAN ANTONIO BASIN						
GOLIAD	460	414	385	372	362	355
COUNTY-OTHER	1	7	11	12	14	15
MANUFACTURING	3	3	3	3	3	3
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(388)	(388)	(388)	(388)	(388)	(388)

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Region L Water User Group (WUG) Needs/Surplus

GOLIAD COUNTY - SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	67	60	55	54	52	51
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	342	342	342	342	342	342
GONZALES COUNTY - GUADALUPE BASIN						
GONZALES	3,101	2,937	2,779	2,579	2,364	2,136
GONZALES COUNTY WSC	1,118	960	808	626	433	229
NIXON	3,225	3,189	3,163	3,127	3,088	3,046
SMILEY	322	313	304	293	280	267
WAELDER	417	401	385	365	343	320
COUNTY-OTHER	524	511	490	465	439	411
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	482	482	482	482	482	482
GONZALES COUNTY - LAVACA BASIN						
COUNTY-OTHER	30	30	28	26	25	23
LIVESTOCK	0	0	0	0	0	0
GUADALUPE COUNTY - GUADALUPE BASIN						
CRYSTAL CLEAR WSC	(26)	207	(52)	(335)	(640)	(949)
GONZALES COUNTY WSC	18	17	15	12	10	6
GREEN VALLEY SUD	3,367	3,157	2,924	2,671	2,392	1,719
LULING	0	0	(1)	(1)	(2)	(3)
MARTINDALE WSC	(6)	(12)	(21)	(33)	(50)	(65)
NEW BRAUNFELS	698	163	(430)	(977)	(1,521)	(2,045)
SCHERTZ	14	11	(60)	(219)	(383)	(542)
SEGUIN	(11)	29	18	(93)	(210)	(331)
SPRINGS HILL WSC	3,196	1,734	1,377	1,003	584	180
TRI COMMUNITY WSC	5	6	5	4	4	3
WATER SERVICES	0	(12)	(15)	(19)	(24)	(28)
COUNTY-OTHER	525	525	525	525	525	525
MANUFACTURING	0	(388)	(388)	(388)	(388)	(388)
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	3,915	3,915	3,915	3,915	3,915	3,915
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	31	31	31	31	31	31
GUADALUPE COUNTY - SAN ANTONIO BASIN						
CIBOLO	1,578	(40)	(484)	(704)	(813)	(866)
EAST CENTRAL SUD	35	30	21	18	9	3
GREEN VALLEY SUD	1,297	428	(107)	(896)	(1,856)	(2,469)
MARION	72	35	(3)	(44)	(88)	(131)
SCHERTZ	181	148	(749)	(2,739)	(4,797)	(6,786)
SELMA	161	(28)	(69)	(104)	(134)	(162)
SPRINGS HILL WSC	430	234	186	136	79	25
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	1	1	1	1	1
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	12	12	12	12	12	12

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Region L Water User Group (WUG) Needs/Surplus

HAYS COUNTY - GUADALUPE BASIN						
BUDA*	1	0	0	0	1	1
COUNTY LINE SUD	509	303	82	(153)	(406)	(675)
CREEDMOOR-MAHA WSC*	0	0	0	0	0	0
CRYSTAL CLEAR WSC	(35)	61	(45)	(168)	(310)	(472)
GOFORTH SUD*	3,175	1,928	669	(608)	(1,906)	(3,212)
KYLE	1,375	(1,407)	(2,860)	(2,845)	(2,835)	(2,831)
MAXWELL WSC	125	98	76	57	38	19
SAN MARCOS	2,181	369	(1,887)	(4,666)	(8,056)	(12,113)
SOUTH BUDA WCID 1	436	375	305	241	140	24
TEXAS STATE UNIVERSITY	202	219	228	232	233	234
WIMBERLEY WSC	137	(247)	(737)	(1,351)	(2,045)	(2,836)
COUNTY-OTHER*	0	106	0	0	(2,029)	(7,220)
MANUFACTURING*	502	494	494	494	494	494
LIVESTOCK*	0	0	0	0	0	0
IRRIGATION*	349	349	349	349	349	349
KARNES COUNTY - GUADALUPE BASIN						
EL OSO WSC*	0	0	0	(1)	(2)	(2)
COUNTY-OTHER	8	23	23	23	23	23
MINING	0	0	0	0	0	0
LIVESTOCK	3	3	3	3	3	3
IRRIGATION	268	268	268	268	268	268
KARNES COUNTY - NUECES BASIN						
EL OSO WSC*	(2)	(2)	(1)	(1)	(5)	(5)
COUNTY-OTHER	0	0	0	0	0	0
MINING	(217)	(156)	(94)	(35)	24	26
LIVESTOCK	73	73	73	73	73	73
IRRIGATION	(29)	(29)	(29)	(29)	(29)	(29)
KARNES COUNTY - SAN ANTONIO BASIN						
EL OSO WSC*	(33)	(44)	(22)	(27)	(149)	(156)
FALLS CITY	79	91	103	109	113	113
KARNES CITY	(319)	(305)	(280)	(267)	(256)	(232)
KENEDY	427	402	414	416	417	417
RUNGE	0	0	0	0	0	0
SUNKO WSC	34	23	16	10	6	4
COUNTY-OTHER	17	22	27	27	27	27
MANUFACTURING	0	0	(113)	(155)	(155)	(155)
MINING	(1,611)	(1,124)	(620)	(119)	(13)	(1)
LIVESTOCK	744	744	470	471	480	480
IRRIGATION	(222)	(222)	(781)	(781)	(781)	(781)
KARNES COUNTY - SAN ANTONIO-NUECES BASIN						
EL OSO WSC*	0	(1)	(1)	0	0	0
COUNTY-OTHER	16	16	16	16	16	16
MINING	(100)	(76)	(50)	(25)	0	1
LIVESTOCK	2	2	2	2	2	2
IRRIGATION	(17)	(17)	(17)	(17)	(17)	(17)
KENDALL COUNTY - COLORADO BASIN						
COUNTY-OTHER	53	54	52	49	49	45
LIVESTOCK	0	0	0	0	0	0

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Region L Water User Group (WUG) Needs/Surplus

KENDALL COUNTY - GUADALUPE BASIN						
GUADALUPE-BLANCO RIVER AUTHORITY	0	0	0	0	0	0
KENDALL COUNTY WCID 1	444	409	369	326	279	232
COUNTY-OTHER	1,112	1,086	1,136	1,083	1,091	1,007
MANUFACTURING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	17	17	17	17	17	17
KENDALL COUNTY - SAN ANTONIO BASIN						
BOERNE	2,644	1,727	746	(236)	(1,250)	(2,249)
FAIR OAKS RANCH	110	4	(112)	(193)	(364)	(544)
GUADALUPE-BLANCO RIVER AUTHORITY	0	0	0	0	0	0
KENDALL WEST UTILITY	189	(282)	(561)	(902)	(1,365)	(1,596)
COUNTY-OTHER	297	322	274	330	322	347
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1)	(1)	(1)	(1)	(1)	(1)
LA SALLE COUNTY - NUECES BASIN						
COTULLA	1,090	989	893	776	670	570
ENCINAL WSC	81	66	52	34	16	0
COUNTY-OTHER	0	0	0	0	0	0
MINING	(4,088)	(4,243)	(3,734)	(2,290)	(851)	(147)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1,184)	(1,203)	(1,223)	(1,248)	(1,271)	(1,294)
MEDINA COUNTY - NUECES BASIN						
BENTON CITY WSC	254	174	97	19	(55)	(124)
DEVINE	189	179	170	157	140	123
EAST MEDINA COUNTY SUD	(128)	(194)	(251)	(307)	(365)	(417)
HONDO	(562)	(721)	(858)	(987)	(1,113)	(1,226)
LYTLE	(70)	(99)	(123)	(148)	(172)	(192)
MEDINA COUNTY WCID 2	431	416	403	391	379	369
MEDINA RIVER WEST WSC	225	217	212	206	200	195
NATALIA	(106)	(136)	(161)	(185)	(209)	(230)
WEST MEDINA WSC	(48)	(74)	(97)	(118)	(137)	(155)
YANCEY WSC	(106)	(136)	(147)	(157)	(167)	(176)
COUNTY-OTHER	726	692	655	617	578	538
MANUFACTURING	1,480	1,476	1,476	1,476	1,476	1,476
MINING	157	157	157	157	157	157
LIVESTOCK	18	18	18	18	18	18
IRRIGATION	(29,021)	(29,348)	(29,281)	(29,600)	(29,765)	(30,817)
MEDINA COUNTY - SAN ANTONIO BASIN						
CASTROVILLE	(281)	(273)	(266)	(264)	(267)	(270)
EAST MEDINA COUNTY SUD	(12)	(18)	(23)	(28)	(33)	(38)
LA COSTE	(38)	(50)	(60)	(70)	(82)	(92)
MEDINA RIVER WEST WSC	70	67	64	61	58	55
SAN ANTONIO WATER SYSTEM	(12)	(30)	(46)	(59)	(74)	(88)
YANCEY WSC	(15)	(56)	(109)	(157)	(205)	(247)
COUNTY-OTHER	181	215	252	290	329	369
MINING	0	0	0	0	0	0
LIVESTOCK	2	2	2	2	2	2
IRRIGATION	(6,409)	(6,409)	(6,409)	(6,409)	(6,409)	(6,409)

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Region L Water User Group (WUG) Needs/Surplus

REFUGIO COUNTY - SAN ANTONIO BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
REFUGIO COUNTY - SAN ANTONIO-NUECES BASIN						
REFUGIO	0	0	0	0	0	0
WOODSBORO	0	0	0	0	0	0
COUNTY-OTHER	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
UVALDE COUNTY - NUECES BASIN						
KNIPPA WSC	174	163	154	143	132	121
SABINAL	(146)	(178)	(205)	(237)	(269)	(301)
UVALDE	(2,434)	(2,747)	(3,019)	(3,331)	(3,655)	(3,972)
WINDMILL WSC	124	99	77	52	26	0
COUNTY-OTHER	0	0	20	20	20	20
MANUFACTURING	108	108	108	108	108	108
MINING	(102)	(102)	(102)	(102)	(102)	(102)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(40,491)	(40,746)	(40,867)	(41,109)	(41,394)	(41,704)
VICTORIA COUNTY - GUADALUPE BASIN						
QUAIL CREEK MUD	1,043	1,038	1,034	1,029	1,023	1,017
VICTORIA	(6,022)	(6,598)	(7,046)	(7,497)	(7,923)	(8,287)
COUNTY-OTHER	(153)	(191)	(218)	(258)	(308)	(352)
MANUFACTURING	(7,641)	(8,762)	(8,762)	(8,762)	(8,762)	(8,762)
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	(18,925)	(18,925)	(18,925)	(18,925)	(18,925)	(18,925)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	5,791	5,791	5,791	5,791	5,791	5,791
VICTORIA COUNTY - LAVACA BASIN						
COUNTY-OTHER	(1)	(1)	(1)	(1)	(2)	(2)
LIVESTOCK	0	0	0	0	0	0
VICTORIA COUNTY - LAVACA-GUADALUPE BASIN						
VICTORIA	(2,913)	(3,192)	(3,408)	(3,627)	(3,832)	(4,008)
VICTORIA COUNTY WCID 1	117	111	107	100	92	85
COUNTY-OTHER	(673)	(695)	(712)	(736)	(765)	(792)
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(5,791)	(5,791)	(5,791)	(5,791)	(5,791)	(5,791)
VICTORIA COUNTY - SAN ANTONIO BASIN						
COUNTY-OTHER	(4)	(4)	(5)	(5)	(5)	(5)
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
WILSON COUNTY - GUADALUPE BASIN						
NIXON	8	15	14	13	12	11
SUNKO WSC	4	4	3	3	2	1
COUNTY-OTHER	92	94	99	105	119	119
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	0	0	0	0	0	0

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Region L Water User Group (WUG) Needs/Surplus

LIVESTOCK	0	0	0	0	0	0
WILSON COUNTY - NUECES BASIN						
MCCOY WSC*	53	50	46	42	37	31
PICOSA WSC	1	0	0	(1)	(1)	(2)
COUNTY-OTHER	58	60	65	72	88	88
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(3,390)	(3,405)	(3,417)	(3,428)	(3,582)	(3,882)
WILSON COUNTY - SAN ANTONIO BASIN						
EAST CENTRAL SUD	107	96	73	48	28	7
EL OSO WSC*	(2)	(3)	(2)	(2)	(20)	(22)
ELMENDORF	0	(1)	(2)	(3)	(4)	(5)
FLORESVILLE	553	151	(245)	(608)	(961)	(1,281)
LA VERNIA	690	605	521	444	369	302
MCCOY WSC*	4	4	4	3	2	3
OAK HILLS WSC	(468)	(658)	(846)	(1,019)	(1,186)	(1,338)
PICOSA WSC	65	23	(19)	(57)	(98)	(135)
POTH	249	175	101	33	(35)	(97)
S S WSC	(425)	(1,108)	(1,867)	(2,640)	(3,600)	(4,133)
STOCKDALE	529	450	371	299	228	164
SUNKO WSC	768	641	513	394	275	166
COUNTY-OTHER	450	506	608	761	1,097	1,097
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	3,429	3,429	3,429	3,429	3,429	3,429
ZAVALA COUNTY - NUECES BASIN						
BATESVILLE WSC	0	0	0	0	0	0
CRYSTAL CITY	753	598	456	296	143	0
LOMA ALTA CHULA VISTA WATER SYSTEM	0	0	0	0	0	0
ZAVALA COUNTY WCID 1	860	813	770	724	680	639
COUNTY-OTHER	117	98	75	51	30	9
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(21,235)	(21,350)	(21,109)	(20,733)	(20,148)	(19,865)

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

Second-tier needs are WUG split needs adjusted to include the implementation of recommended demand reduction and direct reuse water management strategies.

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ATASCOSA COUNTY - NUECES BASIN						
BENTON CITY WSC	0	0	0	0	83	155
CHARLOTTE	0	0	0	0	0	0
JOURDANTON	0	0	0	0	0	0
LYTLE	243	291	314	368	414	453
MCCOY WSC*	0	0	0	0	0	0
PLEASANTON	0	0	0	0	0	0
POTEET	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	3	55	123	122	202	189
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
ATASCOSA COUNTY - SAN ANTONIO BASIN						
BENTON CITY WSC	0	0	0	0	10	19
SAN ANTONIO WATER SYSTEM	0	9	21	21	35	36
COUNTY-OTHER	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
BEXAR COUNTY - NUECES BASIN						
ATASCOSA RURAL WSC	41	56	68	80	91	98
LYTLE	7	8	10	12	14	15
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
BEXAR COUNTY - SAN ANTONIO BASIN						
AIR FORCE VILLAGE II INC	92	99	99	82	66	59
ALAMO HEIGHTS	789	714	525	353	198	58
ATASCOSA RURAL WSC	771	1,063	1,285	1,508	1,720	1,869
BEXAR COUNTY WCID 10	333	297	228	182	184	183
CONVERSE	249	560	747	721	715	705
EAST CENTRAL SUD	0	0	0	0	0	0
ELMENDORF	23	117	197	274	331	379
FAIR OAKS RANCH	0	0	0	0	0	0
FORT SAM HOUSTON	1,701	1,300	912	542	192	0
GREEN VALLEY SUD	0	0	0	0	0	0
KIRBY	159	260	234	225	223	222
LACKLAND AIR FORCE BASE	0	0	0	0	0	0
LEON VALLEY	156	214	257	583	618	643
LIVE OAK	377	318	282	246	211	177
RANDOLPH AIR FORCE BASE	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	0	0	0	0	0	0
SCHERTZ	0	0	10	82	167	249
SELMA	0	0	0	43	77	101

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
BEXAR COUNTY - SAN ANTONIO BASIN						
SHAVANO PARK	175	237	237	229	212	189
THE OAKS WSC	117	155	193	227	256	279
UNIVERSAL CITY	107	314	256	224	150	76
WATER SERVICES	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	2,782	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	3,318	3,318	3,318	3,318	3,318	3,318
CALDWELL COUNTY - COLORADO BASIN						
AQUA WSC*	0	0	0	0	0	0
CREEDMOOR-MAHA WSC*	0	0	0	0	0	0
POLONIA WSC*	0	0	0	0	0	0
COUNTY-OTHER	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
CALDWELL COUNTY - GUADALUPE BASIN						
AQUA WSC*	0	0	0	0	0	0
COUNTY LINE SUD	0	0	0	0	0	0
CREEDMOOR-MAHA WSC*	0	0	0	0	0	0
GOFORTH SUD*	14	23	27	25	20	18
GONZALES COUNTY WSC	0	0	0	0	0	0
LOCKHART	0	0	39	482	946	1,331
LULING	0	49	226	411	606	794
MARTINDALE WSC	104	218	296	395	518	665
MAXWELL WSC	0	0	0	0	0	0
POLONIA WSC*	0	0	0	0	0	0
SAN MARCOS	0	0	0	0	0	0
TRI COMMUNITY 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
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
CALHOUN COUNTY - COLORADO-LAVACA BASIN						
POINT COMFORT	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	60	60	60	60	60	60
CALHOUN COUNTY - GUADALUPE BASIN						
LIVESTOCK	0	0	0	0	0	0
CALHOUN COUNTY - LAVACA-GUADALUPE BASIN						
GUADALUPE-BLANCO RIVER AUTHORITY	0	0	0	0	0	0

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
CALHOUN COUNTY - LAVACA-GUADALUPE BASIN						
PORT LAVACA	0	0	0	0	0	0
PORT OCONNOR MUD	0	0	0	0	0	0
SEADRIFT	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	87	117
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	14,028	14,028	14,028	14,028	14,028	14,028
CALHOUN COUNTY - SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	0	0	0	0	1	2
LIVESTOCK	0	0	0	0	0	0
COMAL COUNTY - GUADALUPE BASIN						
CANYON LAKE WATER SERVICE*	0	0	0	0	0	145
CLEAR WATER ESTATES WATER SYSTEM	569	664	734	785	818	833
CRYSTAL CLEAR WSC	0	0	9	57	9	51
GARDEN RIDGE	487	601	694	643	691	713
GREEN VALLEY SUD	0	0	0	0	0	0
KT WATER DEVELOPMENT	0	58	103	136	158	168
NEW BRAUNFELS	0	1,861	3,858	6,697	9,534	12,206
SAN ANTONIO WATER SYSTEM	0	0	0	0	0	0
SCHERTZ	0	0	14	150	337	546
WINGERT WATER SYSTEMS	17	68	99	83	74	66
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	2,786	3,768	3,768	3,768	3,768	3,768
MINING	3,861	5,201	6,491	7,617	8,849	8,849
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
COMAL COUNTY - SAN ANTONIO BASIN						
CANYON LAKE WATER SERVICE*	0	0	0	0	0	27
FAIR OAKS RANCH	0	0	0	0	0	0
GARDEN RIDGE	276	340	391	364	391	403
GUADALUPE-BLANCO RIVER AUTHORITY	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	0	0	0	0	0	0
SCHERTZ	0	0	0	4	9	14
SELMA	0	0	0	0	0	0
WATER SERVICES	0	213	213	216	310	396
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	33	33	33	33	33	33
DEWITT COUNTY - GUADALUPE BASIN						
CUERO	0	0	0	0	0	0
GONZALES COUNTY WSC	0	0	0	0	0	0
YORKTOWN	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	11	5	0	0	0
MINING	1,674	1,557	346	0	0	0

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
DEWITT COUNTY - GUADALUPE BASIN						
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	265	265	265	265	0	0
DEWITT COUNTY - LAVACA BASIN						
YOAKUM*	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	11	5	0	0	0
MINING	44	37	16	1	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
DEWITT COUNTY - LAVACA-GUADALUPE BASIN						
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
DEWITT COUNTY - SAN ANTONIO BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	1	0	1	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	53	53	0	0	0	0
DIMMIT COUNTY - NUECES BASIN						
ASHERTON	0	0	0	0	0	0
BIG WELLS	0	0	0	0	0	0
CARRIZO HILL WSC	0	0	0	0	0	0
CARRIZO SPRINGS	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MINING	3,570	3,647	3,075	1,769	464	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	4,636	4,636	4,636	4,636	4,636	4,636
DIMMIT COUNTY - RIO GRANDE BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	654	665	577	375	175	81
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	613	613	613	613	613	613
FRIO COUNTY - NUECES BASIN						
BENTON CITY WSC	0	0	0	0	5	9
DILLEY	0	0	0	0	0	0
MOORE WSC	0	0	0	0	0	0
PEARSALL	504	524	479	565	633	685
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	0	0	1,838	3,612	5,332	7,146
GOLIAD COUNTY - GUADALUPE BASIN						
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

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
GOLIAD COUNTY - GUADALUPE BASIN						
IRRIGATION	0	0	0	0	0	0
GOLIAD COUNTY - SAN ANTONIO BASIN						
GOLIAD	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	388	388	388	388	388	388
GOLIAD COUNTY - SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	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
GONZALES COUNTY - GUADALUPE BASIN						
GONZALES	0	0	0	0	0	0
GONZALES COUNTY WSC	0	0	0	0	0	0
NIXON	0	0	0	0	0	0
SMILEY	0	0	0	0	0	0
WAELDER	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
GONZALES COUNTY - LAVACA BASIN						
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
GUADALUPE COUNTY - GUADALUPE BASIN						
CRYSTAL CLEAR WSC	0	0	52	335	48	318
GONZALES COUNTY WSC	0	0	0	0	0	0
GREEN VALLEY SUD	0	0	0	0	0	0
LULING	0	0	1	1	2	3
MARTINDALE WSC	5	12	21	33	50	65
NEW BRAUNFELS	0	0	0	252	640	995
SCHERTZ	0	0	18	155	290	415
SEGUIN	0	0	0	34	0	0
SPRINGS HILL WSC	0	0	0	0	0	0
TRI COMMUNITY WSC	0	0	0	0	0	0
WATER SERVICES	0	10	13	15	18	19
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	388	388	388	388	388
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
GUADALUPE COUNTY - SAN ANTONIO BASIN						
CIBOLO	0	40	441	437	268	0

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
GUADALUPE COUNTY - SAN ANTONIO BASIN						
EAST CENTRAL SUD	0	0	0	0	0	0
GREEN VALLEY SUD	0	0	107	896	1,483	2,085
MARION	0	0	3	44	88	131
SCHERTZ	0	0	225	1,932	3,627	5,194
SELMA	0	0	0	0	0	0
SPRINGS HILL 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
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
HAYS COUNTY - GUADALUPE BASIN						
BUDA*	0	0	0	0	0	0
COUNTY LINE SUD	0	0	0	0	0	0
CREEDMOOR-MAHA WSC*	0	0	0	0	0	0
CRYSTAL CLEAR WSC	11	0	45	168	47	176
GOFORTH SUD*	0	0	0	608	1,906	3,162
KYLE	0	1,407	2,860	2,793	996	778
MAXWELL WSC	0	0	0	0	0	0
SAN MARCOS	0	0	0	0	0	1,340
SOUTH BUDA WCID 1	0	0	0	0	0	0
TEXAS STATE UNIVERSITY	0	0	0	0	0	0
WIMBERLEY WSC	0	247	737	1,351	2,045	2,836
COUNTY-OTHER*	0	0	0	0	2,029	6,988
MANUFACTURING*	0	0	0	0	0	0
LIVESTOCK*	0	0	0	0	0	0
IRRIGATION*	0	0	0	0	0	0
KARNES COUNTY - GUADALUPE BASIN						
EL OSO WSC*	0	0	0	0	0	0
COUNTY-OTHER	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
KARNES COUNTY - NUECES BASIN						
EL OSO WSC*	1	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MINING	217	156	94	35	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	29	29	29	29	29	29
KARNES COUNTY - SAN ANTONIO BASIN						
EL OSO WSC*	0	0	0	0	0	0
FALLS CITY	0	0	0	0	0	0
KARNES CITY	275	242	196	176	154	118
KENEDY	0	0	0	0	0	0
RUNGE	0	0	0	0	0	0
SUNKO WSC	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
KARNES COUNTY - SAN ANTONIO BASIN						
MANUFACTURING	0	0	113	155	155	155
MINING	1,611	1,124	620	119	13	1
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	222	222	781	781	781	781
KARNES COUNTY - SAN ANTONIO-NUECES BASIN						
EL OSO WSC*	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MINING	100	76	50	25	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	17	17	17	17	17	17
KENDALL COUNTY - COLORADO BASIN						
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
KENDALL COUNTY - GUADALUPE BASIN						
GUADALUPE-BLANCO RIVER AUTHORITY	0	0	0	0	0	0
KENDALL COUNTY WCID 1	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
KENDALL COUNTY - SAN ANTONIO BASIN						
BOERNE	0	0	0	0	0	0
FAIR OAKS RANCH	0	0	0	0	0	0
GUADALUPE-BLANCO RIVER AUTHORITY	0	0	0	0	0	0
KENDALL WEST UTILITY	0	282	561	902	1,365	1,587
COUNTY-OTHER	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	1	1	1	1	1	1
LA SALLE COUNTY - NUECES BASIN						
COTULLA	0	0	0	0	0	0
ENCINAL WSC	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MINING	4,088	4,243	3,734	2,290	851	147
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	1,184	1,203	1,223	1,248	1,271	1,294
MEDINA COUNTY - NUECES BASIN						
BENTON CITY WSC	0	0	0	0	55	102
DEVINE	0	0	0	0	0	0
EAST MEDINA COUNTY SUD	89	194	251	307	365	417
HONDO	424	461	408	388	438	472
LYTLE	61	79	88	105	119	130
MEDINA COUNTY WCID 2	0	0	0	0	0	0
MEDINA RIVER WEST WSC	0	0	0	0	0	0
NATALIA	93	113	135	152	165	175
WEST MEDINA WSC	32	44	43	48	58	65
YANCEY WSC	99	136	147	157	167	174
COUNTY-OTHER	0	0	0	0	0	0

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MEDINA COUNTY - NUECES BASIN						
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	29,021	29,348	29,281	29,600	29,765	30,817
MEDINA COUNTY - SAN ANTONIO BASIN						
CASTROVILLE	218	164	99	39	0	0
EAST MEDINA COUNTY SUD	8	18	23	28	33	38
LA COSTE	30	50	60	70	82	92
MEDINA RIVER WEST WSC	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	0	0	0	0	0	0
YANCEY WSC	0	56	109	157	205	238
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	6,409	6,409	6,409	6,409	6,409	6,409
REFUGIO COUNTY - SAN ANTONIO BASIN						
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
REFUGIO COUNTY - SAN ANTONIO-NUECES BASIN						
REFUGIO	0	0	0	0	0	0
WOODSBORO	0	0	0	0	0	0
COUNTY-OTHER	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
UVALDE COUNTY - NUECES BASIN						
KNIPPA WSC	0	0	0	0	0	0
SABINAL	112	121	109	96	87	98
UVALDE	2,138	2,195	2,074	1,947	1,911	2,030
WINDMILL WSC	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	0	0	0	0	0	0
MINING	102	102	102	102	102	102
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	40,491	40,746	40,867	41,109	41,394	41,704
VICTORIA COUNTY - GUADALUPE BASIN						
QUAIL CREEK MUD	0	0	0	0	0	0
VICTORIA	5,147	5,116	4,591	4,021	3,404	3,221
COUNTY-OTHER	153	191	218	258	308	352
MANUFACTURING	7,641	8,762	8,762	8,762	8,762	8,762
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	18,925	18,925	18,925	18,925	18,925	18,925
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
VICTORIA COUNTY - LAVACA BASIN						
COUNTY-OTHER	1	1	1	1	2	2

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
VICTORIA COUNTY - LAVACA BASIN						
LIVESTOCK	0	0	0	0	0	0
VICTORIA COUNTY - LAVACA-GUADALUPE BASIN						
VICTORIA	2,489	2,475	2,221	1,945	1,646	1,558
VICTORIA COUNTY WCID 1	0	0	0	0	0	0
COUNTY-OTHER	673	695	712	736	765	792
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	5,791	5,791	5,791	5,791	5,791	5,791
VICTORIA COUNTY - SAN ANTONIO BASIN						
COUNTY-OTHER	4	4	5	5	5	5
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
WILSON COUNTY - GUADALUPE BASIN						
NIXON	0	0	0	0	0	0
SUNKO WSC	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
WILSON COUNTY - NUECES BASIN						
MCCOY WSC*	0	0	0	0	0	0
PICOSA WSC	0	0	0	1	1	2
COUNTY-OTHER	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	3,390	3,405	3,417	3,428	3,582	3,882
WILSON COUNTY - SAN ANTONIO BASIN						
EAST CENTRAL SUD	0	0	0	0	0	0
EL OSO WSC*	0	0	0	0	2	0
ELMENDORF	0	1	2	3	4	5
FLORESVILLE	0	0	0	0	0	0
LA VERNIA	0	0	0	0	0	0
MCCOY WSC*	0	0	0	0	0	0
OAK HILLS WSC	410	586	745	877	994	1,090
PICOSA WSC	0	0	19	57	98	135
POTH	0	0	0	0	0	33
S S WSC	330	1,108	1,867	2,640	3,584	3,974
STOCKDALE	0	0	0	0	0	0
SUNKO 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
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
ZAVALA COUNTY - NUECES BASIN						
BATESVILLE WSC	0	0	0	0	0	0
CRYSTAL CITY	0	0	0	0	0	0

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Region L Water User Group (WUG) Second-Tier Identified Water Needs

	WUG SECOND-TIER NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ZAVALA COUNTY - NUECES BASIN						
LOMA ALTA CHULA VISTA WATER SYSTEM	0	0	0	0	0	0
ZAVALA COUNTY WCID 1	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	21,235	21,350	21,109	20,733	20,148	19,865

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Region L Water User Group (WUG) Second-Tier Identified Water Needs Summary

Second-tier needs are WUG split needs adjusted to include the implementation of recommended demand reduction and direct reuse water management strategies.

WUG CATEGORY	NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MUNICIPAL	19,286	25,843	31,451	40,307	47,673	58,495
COUNTY-OTHER	831	891	936	1,000	3,197	8,258
MANUFACTURING	10,427	12,940	13,041	13,073	13,073	13,073
MINING	15,921	16,809	15,105	12,334	10,454	9,180
STEAM ELECTRIC POWER	21,707	18,925	18,925	18,925	18,925	18,925
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	131,184	131,915	134,104	136,099	137,596	140,812

Region L Source Water Balance (Availability - WUG Supply)

GROUNDWATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
AUSTIN CHALK AQUIFER	UVALDE	NUECES	FRESH	575	575	575	575	575	575
BUDA LIMESTONE AQUIFER	UVALDE	NUECES	FRESH	233	233	233	233	233	233
CARRIZO-WILCOX AQUIFER	ATASCOSA	NUECES	FRESH	10,460	13,077	13,965	16,340	18,654	20,665
CARRIZO-WILCOX AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	BEXAR	NUECES	FRESH/ BRACKISH	38,345	38,283	38,289	38,290	37,591	36,990
CARRIZO-WILCOX AQUIFER	BEXAR	SAN ANTONIO	FRESH	8,459	7,802	7,333	6,455	5,962	5,768
CARRIZO-WILCOX AQUIFER	CALDWELL	COLORADO	FRESH	285	288	291	294	296	298
CARRIZO-WILCOX AQUIFER	CALDWELL	GUADALUPE	FRESH	51,177	51,200	47,779	47,803	44,215	44,225
CARRIZO-WILCOX AQUIFER	DIMMIT	NUECES	FRESH	50	50	50	50	50	50
CARRIZO-WILCOX AQUIFER	DIMMIT	RIO GRANDE	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	FRIO	NUECES	FRESH	28,846	1,929	1,752	1,752	1,752	1,752
CARRIZO-WILCOX AQUIFER	GONZALES	GUADALUPE	FRESH/ BRACKISH	16,876	17,023	21,195	21,953	22,600	22,631
CARRIZO-WILCOX AQUIFER	GONZALES	LAVACA	FRESH	10	10	10	10	10	10
CARRIZO-WILCOX AQUIFER	GUADALUPE	GUADALUPE	FRESH	32,323	29,135	26,682	28,394	28,519	28,348
CARRIZO-WILCOX AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	15,738	15,031	15,293	15,648	15,330	15,173
CARRIZO-WILCOX AQUIFER	KARNES	GUADALUPE	FRESH	15	44	92	142	188	195
CARRIZO-WILCOX AQUIFER	KARNES	NUECES	FRESH	1	0	0	5	9	11
CARRIZO-WILCOX AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	LA SALLE	NUECES	FRESH	59	59	59	59	59	59
CARRIZO-WILCOX AQUIFER	MEDINA	NUECES	FRESH	43	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	MEDINA	SAN ANTONIO	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	UVALDE	NUECES	FRESH	1,745	403	0	0	0	0
CARRIZO-WILCOX AQUIFER	WILSON	GUADALUPE	FRESH	19,950	19,884	20,072	20,219	20,584	20,742
CARRIZO-WILCOX AQUIFER	WILSON	NUECES	FRESH	2,557	2,594	3,291	3,919	4,552	4,999
CARRIZO-WILCOX AQUIFER	WILSON	SAN ANTONIO	FRESH/ BRACKISH	54,991	52,350	53,626	55,092	56,581	58,107
CARRIZO-WILCOX AQUIFER	ZAVALA	NUECES	FRESH	2,536	2,373	2,373	2,373	2,373	2,373
EDWARDS-BFZ AQUIFER	ATASCOSA	NUECES	FRESH	20	20	20	20	20	20
EDWARDS-BFZ AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	5	5	5	5	5	5
EDWARDS-BFZ AQUIFER	BEXAR	NUECES	FRESH	54	54	54	54	54	54
EDWARDS-BFZ AQUIFER	BEXAR	SAN ANTONIO	FRESH	12,811	12,632	12,451	12,267	12,086	11,910
EDWARDS-BFZ AQUIFER	CALDWELL	COLORADO	SALINE	469	469	469	469	469	469
EDWARDS-BFZ AQUIFER	CALDWELL	GUADALUPE	SALINE	968	968	968	968	968	968
EDWARDS-BFZ AQUIFER	COMAL	GUADALUPE	FRESH	1,462	1,462	1,462	1,462	1,462	1,462
EDWARDS-BFZ AQUIFER	COMAL	SAN ANTONIO	FRESH	152	152	152	152	152	152
EDWARDS-BFZ AQUIFER	FRIO	NUECES	FRESH	23,213	23,213	23,213	23,213	23,213	23,213
EDWARDS-BFZ AQUIFER	GUADALUPE	GUADALUPE	FRESH	19	19	19	19	19	19
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	SALINE	1,707	1,707	1,707	1,707	1,707	1,707
EDWARDS-BFZ AQUIFER	MEDINA	NUECES	FRESH	497	497	497	497	497	497
EDWARDS-BFZ AQUIFER	MEDINA	SAN ANTONIO	FRESH	6	6	6	6	6	6
EDWARDS-BFZ AQUIFER	UVALDE	NUECES	FRESH	130	130	130	130	130	130
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	COLORADO	FRESH	0	0	0	0	0	0

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.
** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Source Water Balance (Availability - WUG Supply)

GROUNDWATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	**COUNTY**	**BASIN**	**SALINITY***	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	GUADALUPE	FRESH	27	27	27	27	27	27
EDWARDS-TRINITY-PLATEAU, PECOS VALLEY, AND TRINITY AQUIFERS	UVALDE	NUECES	FRESH	18	24	0	0	0	0
ELLENBURGER-SAN SABA AQUIFER	KENDALL	COLORADO	FRESH	10	10	10	10	10	10
ELLENBURGER-SAN SABA AQUIFER	KENDALL	GUADALUPE	FRESH	64	64	64	64	64	64
GULF COAST AQUIFER SYSTEM	CALHOUN	COLORADO-LAVACA	FRESH	4,088	4,088	4,112	4,145	4,088	4,088
GULF COAST AQUIFER SYSTEM	CALHOUN	GUADALUPE	FRESH	16	16	16	16	16	16
GULF COAST AQUIFER SYSTEM	CALHOUN	LAVACA-GUADALUPE	FRESH	300	270	231	177	207	181
GULF COAST AQUIFER SYSTEM	CALHOUN	SAN ANTONIO-NUECES	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER SYSTEM	DEWITT	GUADALUPE	FRESH	6,599	6,599	5,091	5,315	5,364	5,615
GULF COAST AQUIFER SYSTEM	DEWITT	LAVACA	FRESH	1,058	1,058	1,058	997	997	997
GULF COAST AQUIFER SYSTEM	DEWITT	LAVACA-GUADALUPE	FRESH	393	393	393	393	393	393
GULF COAST AQUIFER SYSTEM	DEWITT	SAN ANTONIO	FRESH	326	342	261	322	383	410
GULF COAST AQUIFER SYSTEM	GOLIAD	GUADALUPE	FRESH	1,067	1,068	1,069	1,069	1,072	1,069
GULF COAST AQUIFER SYSTEM	GOLIAD	SAN ANTONIO	FRESH	2,494	2,493	2,492	2,492	2,497	2,492
GULF COAST AQUIFER SYSTEM	GOLIAD	SAN ANTONIO-NUECES	FRESH	41	41	41	41	46	41
GULF COAST AQUIFER SYSTEM	GONZALES	GUADALUPE	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER SYSTEM	GONZALES	LAVACA	FRESH	1	1	1	1	1	1
GULF COAST AQUIFER SYSTEM	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER SYSTEM	KARNES	NUECES	FRESH	979	979	1	5	8	10
GULF COAST AQUIFER SYSTEM	KARNES	SAN ANTONIO	FRESH	5,286	5,255	10	0	0	0
GULF COAST AQUIFER SYSTEM	KARNES	SAN ANTONIO-NUECES	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER SYSTEM	REFUGIO	SAN ANTONIO	FRESH	294	294	294	295	296	296
GULF COAST AQUIFER SYSTEM	REFUGIO	SAN ANTONIO-NUECES	FRESH	2,717	2,714	2,732	2,744	2,757	2,766
GULF COAST AQUIFER SYSTEM	VICTORIA	GUADALUPE	FRESH	3,870	8,864	13,870	13,877	13,884	13,889
GULF COAST AQUIFER SYSTEM	VICTORIA	LAVACA	FRESH	227	227	227	227	227	227
GULF COAST AQUIFER SYSTEM	VICTORIA	LAVACA-GUADALUPE	FRESH	15,013	15,012	15,020	15,027	20,031	20,035
GULF COAST AQUIFER SYSTEM	VICTORIA	SAN ANTONIO	FRESH	1,657	1,657	1,658	1,659	1,659	1,659
HICKORY AQUIFER	KENDALL	COLORADO	FRESH	12	12	12	12	12	12
HICKORY AQUIFER	KENDALL	GUADALUPE	FRESH	128	128	128	128	128	128
LEONA GRAVEL AQUIFER	MEDINA	NUECES	FRESH	15,634	15,634	15,634	15,634	15,634	15,634
LEONA GRAVEL AQUIFER	MEDINA	SAN ANTONIO	FRESH	3,714	3,714	3,714	3,714	3,714	3,714
LEONA GRAVEL AQUIFER	UVALDE	NUECES	FRESH	160	158	128	60	12	12
QUEEN CITY AQUIFER	ATASCOSA	NUECES	FRESH	577	898	760	580	318	66
QUEEN CITY AQUIFER	CALDWELL	GUADALUPE	FRESH	70	70	70	70	70	70
QUEEN CITY AQUIFER	FRIO	NUECES	FRESH	2,318	304	182	88	116	172
QUEEN CITY AQUIFER	GONZALES	GUADALUPE	FRESH	2,607	2,607	2,607	2,607	2,607	2,607
QUEEN CITY AQUIFER	GONZALES	LAVACA	FRESH	35	35	35	35	35	35
QUEEN CITY AQUIFER	GUADALUPE	GUADALUPE	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	LA SALLE	NUECES	FRESH	1	1	1	1	1	1

* Salinity field indicates whether the source availability is considered 'fresh' (less than 1,000 mg/L), 'brackish' (1,000 to 10,000 mg/L), 'saline' (10,001 mg/L to 34,999 mg/L), or 'seawater' (35,000 mg/L or greater). Sources can also be labeled as 'fresh/brackish' or 'brackish/saline', if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, 'reservoir' is applied to all reservoir sources.

Region L Source Water Balance (Availability - WUG Supply)

GROUNDWATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
QUEEN CITY AQUIFER	WILSON	GUADALUPE	FRESH	229	121	97	84	73	63
QUEEN CITY AQUIFER	WILSON	NUECES	FRESH	141	31	27	23	19	8
QUEEN CITY AQUIFER	WILSON	SAN ANTONIO	FRESH	2,073	1,034	896	775	667	574
SAN MARCOS RIVER ALLUVIUM AQUIFER	CALDWELL	GUADALUPE	FRESH	271	271	271	271	271	271
SPARTA AQUIFER	ATASCOSA	NUECES	FRESH	85	106	87	70	50	19
SPARTA AQUIFER	FRIO	NUECES	FRESH	445	128	102	74	51	24
SPARTA AQUIFER	GONZALES	GUADALUPE	FRESH	1,942	1,942	1,942	1,942	1,942	1,942
SPARTA AQUIFER	GONZALES	LAVACA	FRESH	23	23	23	23	23	23
SPARTA AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	WILSON	GUADALUPE	FRESH	35	16	13	11	9	7
SPARTA AQUIFER	WILSON	NUECES	FRESH	68	21	15	10	5	0
SPARTA AQUIFER	WILSON	SAN ANTONIO	FRESH	319	173	154	137	121	108
TRINITY AQUIFER	BEXAR	NUECES	FRESH	173	173	173	173	173	173
TRINITY AQUIFER	BEXAR	SAN ANTONIO	FRESH	8,201	9,281	9,488	8,617	7,622	6,519
TRINITY AQUIFER	CALDWELL	GUADALUPE	FRESH	10	10	10	10	10	10
TRINITY AQUIFER	COMAL	GUADALUPE	FRESH	16,843	15,449	14,143	12,985	15,070	14,002
TRINITY AQUIFER	COMAL	SAN ANTONIO	FRESH	3,703	3,701	3,663	3,648	3,630	3,609
TRINITY AQUIFER	GUADALUPE	GUADALUPE	FRESH	188	188	188	188	188	188
TRINITY AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	472	472	472	472	472	472
TRINITY AQUIFER	HAYS	COLORADO	FRESH	32	32	32	32	32	32
TRINITY AQUIFER	HAYS	GUADALUPE	FRESH	970	970	970	970	970	970
TRINITY AQUIFER	KENDALL	COLORADO	FRESH	86	86	86	86	86	86
TRINITY AQUIFER	KENDALL	GUADALUPE	FRESH	3,603	3,603	3,603	3,603	3,603	3,603
TRINITY AQUIFER	KENDALL	SAN ANTONIO	FRESH	1,427	1,427	1,427	1,427	1,427	1,427
TRINITY AQUIFER	MEDINA	NUECES	FRESH	317	317	317	317	317	317
TRINITY AQUIFER	MEDINA	SAN ANTONIO	FRESH	183	183	183	133	83	33
TRINITY AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	ATASCOSA	NUECES	FRESH	408	408	408	408	408	408
YEGUA-JACKSON AQUIFER	GONZALES	GUADALUPE	FRESH	3,925	3,925	3,925	3,925	3,925	3,925
YEGUA-JACKSON AQUIFER	GONZALES	LAVACA	FRESH	19	19	19	19	19	19
YEGUA-JACKSON AQUIFER	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	KARNES	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	KARNES	SAN ANTONIO	FRESH	231	232	232	231	627	641
YEGUA-JACKSON AQUIFER	LA SALLE	NUECES	FRESH	1	1	1	1	1	1
YEGUA-JACKSON AQUIFER	WILSON	GUADALUPE	FRESH	35	35	35	35	35	35
YEGUA-JACKSON AQUIFER	WILSON	NUECES	FRESH	106	106	106	106	106	106
YEGUA-JACKSON AQUIFER	WILSON	SAN ANTONIO	FRESH	367	367	367	367	367	367
			GROUNDWATER SOURCE WATER BALANCE TOTAL	**445,519**	**413,585**	**409,537**	**413,580**	**419,997**	**420,535**

REUSE SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
DIRECT REUSE	BEXAR	SAN ANTONIO	FRESH	99	99	99	99	99	99
DIRECT REUSE	COMAL	GUADALUPE	FRESH	0	0	0	0	0	0
DIRECT REUSE	GUADALUPE	GUADALUPE	FRESH	345	345	345	345	345	345

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Source Water Balance (Availability - WUG Supply)

REUSE SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
DIRECT REUSE	HAYS	GUADALUPE	FRESH	5,260	5,260	5,260	5,260	5,660	5,660
DIRECT REUSE	KENDALL	GUADALUPE	FRESH	3	3	3	3	3	3
DIRECT REUSE	KENDALL	SAN ANTONIO	FRESH	0	0	0	0	0	0
			REUSE SOURCE WATER BALANCE TOTAL	**5,707**	**5,707**	**5,707**	**5,707**	**6,107**	**6,107**

SURFACE WATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
BOERNE LAKE/RESERVOIR	RESERVOIR**	SAN ANTONIO	FRESH	0	0	0	0	0	0
CALAVERAS LAKE/RESERVOIR	RESERVOIR**	SAN ANTONIO	FRESH	0	0	0	0	0	0
CANYON LAKE/RESERVOIR	RESERVOIR**	GUADALUPE	FRESH	0	0	0	0	0	0
COLETO CREEK LAKE/RESERVOIR	RESERVOIR**	GUADALUPE	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	CALDWELL	COLORADO	FRESH	0	0	0	0	0	0
COLORADO LIVESTOCK LOCAL SUPPLY	KENDALL	COLORADO	FRESH	0	0	0	0	0	0
COLORADO-LAVACA LIVESTOCK LOCAL SUPPLY	CALHOUN	COLORADO-LAVACA	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	CALDWELL	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	COMAL	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	DEWITT	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	GOLIAD	GUADALUPE	FRESH	98	98	98	98	98	98
GUADALUPE LIVESTOCK LOCAL SUPPLY	GONZALES	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	GUADALUPE	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	HAYS	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	KENDALL	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	VICTORIA	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	WILSON	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE RUN-OF-RIVER	CALDWELL	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE RUN-OF-RIVER	CALHOUN	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE RUN-OF-RIVER	COMAL	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE RUN-OF-RIVER	GONZALES	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE RUN-OF-RIVER	GUADALUPE	GUADALUPE	FRESH	450	450	450	450	450	450
GUADALUPE RUN-OF-RIVER	HAYS	GUADALUPE	FRESH	1	1	1	1	1	1
GUADALUPE RUN-OF-RIVER	KENDALL	GUADALUPE	FRESH	0	0	0	0	0	0
GUADALUPE RUN-OF-RIVER	VICTORIA	GUADALUPE	FRESH	0	0	0	0	0	0
LAVACA LIVESTOCK LOCAL SUPPLY	DEWITT	LAVACA	FRESH	0	0	0	0	0	0
LAVACA LIVESTOCK LOCAL SUPPLY	GONZALES	LAVACA	FRESH	53	53	53	53	53	53
LAVACA LIVESTOCK LOCAL SUPPLY	VICTORIA	LAVACA	FRESH	0	0	0	0	0	0
LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	CALHOUN	LAVACA-GUADALUPE	FRESH	0	0	0	0	0	0

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Source Water Balance (Availability - WUG Supply)

SURFACE WATER SOURCE TYPE				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SOURCE NAME	COUNTY	BASIN	SALINITY*	2020	2030	2040	2050	2060	2070
LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	DEWITT	LAVACA-GUADALUPE	FRESH	0	0	0	0	0	0
LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	VICTORIA	LAVACA-GUADALUPE	FRESH	0	0	0	0	0	0
NUECES LIVESTOCK LOCAL SUPPLY	ATASCOSA	NUECES	FRESH	0	0	0	0	0	0
NUECES LIVESTOCK LOCAL SUPPLY	BEXAR	NUECES	FRESH	0	0	0	0	0	0
NUECES LIVESTOCK LOCAL SUPPLY	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
NUECES LIVESTOCK LOCAL SUPPLY	FRIO	NUECES	FRESH	56	56	56	56	56	56
NUECES LIVESTOCK LOCAL SUPPLY	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
NUECES LIVESTOCK LOCAL SUPPLY	MEDINA	NUECES	FRESH	0	0	0	0	0	0
NUECES LIVESTOCK LOCAL SUPPLY	UVALDE	NUECES	FRESH	0	0	0	0	0	0
NUECES LIVESTOCK LOCAL SUPPLY	WILSON	NUECES	FRESH	0	0	0	0	0	0
NUECES LIVESTOCK LOCAL SUPPLY	ZAVALA	NUECES	FRESH	0	0	0	0	0	0
NUECES RUN-OF-RIVER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
NUECES RUN-OF-RIVER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
NUECES RUN-OF-RIVER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
RIO GRANDE LIVESTOCK LOCAL SUPPLY	DIMMIT	RIO GRANDE	FRESH	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	BEXAR	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	COMAL	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	DEWITT	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	GOLIAD	SAN ANTONIO	FRESH	127	127	127	127	127	127
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	KARNES	SAN ANTONIO	FRESH	11	10	10	9	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	KENDALL	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	MEDINA	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	REFUGIO	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	VICTORIA	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	WILSON	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO RUN-OF-RIVER	BEXAR	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO RUN-OF-RIVER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO RUN-OF-RIVER	WILSON	SAN ANTONIO	FRESH	0	0	0	0	0	0
SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	CALHOUN	SAN ANTONIO-NUECES	FRESH	0	0	0	0	0	0
SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	GOLIAD	SAN ANTONIO-NUECES	FRESH	129	129	129	129	129	129
SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	KARNES	SAN ANTONIO-NUECES	FRESH	0	0	0	0	0	0
SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	REFUGIO	SAN ANTONIO-NUECES	FRESH	0	0	0	0	0	0
VICTOR BRAUNIG LAKE/RESERVOIR	RESERVOIR**	SAN ANTONIO	FRESH	0	0	0	0	0	0

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Source Water Balance (Availability - WUG Supply)

SURFACE WATER SOURCE WATER BALANCE TOTAL	**925**	**924**	**924**	**923**	**914**	**914**

REGION L SOURCE WATER BALANCE TOTAL	**452,151**	**420,216**	**416,168**	**420,210**	**427,018**	**427,556**

* Salinity field indicates whether the source availability is considered ‘fresh’ (less than 1,000 mg/L), ‘brackish’ (1,000 to 10,000 mg/L), ‘saline’ (10,001 mg/L to 34,999 mg/L), or ‘seawater’ (35,000 mg/L or greater). Sources can also be labeled as ‘fresh/brackish’ or ‘brackish/saline’, if a combination of the salinity types is appropriate.

** Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
ATASCOSA COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,433	1,332	-7.0%	1,433	2,070	44.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	922	868	-5.9%	1,432	1,456	1.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ATASCOSA COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	26,594	33,564	26.2%	22,498	33,428	48.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	26,594	29,946	12.6%	22,498	29,946	33.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ATASCOSA COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,509	1,673	10.9%	1,509	1,673	10.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,509	1,673	10.9%	1,509	1,673	10.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ATASCOSA COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	12	58	383.3%	12	97	708.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	12	58	383.3%	12	97	708.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ATASCOSA COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,081	4,081	0.0%	2,043	2,043	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,081	4,081	0.0%	2,043	2,043	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ATASCOSA COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	11,996	13,024	8.6%	11,858	12,979	9.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	7,122	7,336	3.0%	11,382	11,621	2.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	247	752	204.5%	1,063	1,517	42.7%
ATASCOSA COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	8,655	8,427	-2.6%	8,655	8,427	-2.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,807	8,427	75.3%	7,819	8,427	7.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
BEXAR COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	9,522	5,760	-39.5%	9,522	7,139	-25.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	5,185	2,075	-60.0%	15,606	3,454	-77.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	6,084	0	-100.0%
BEXAR COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	6,510	11,926	83.2%	6,510	11,926	83.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	11,626	11,926	2.6%	9,401	11,926	26.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	5,116	3,318	-35.1%	2,891	3,318	14.8%
BEXAR COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,158	1,201	3.7%	1,158	1,201	3.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,158	1,201	3.7%	1,158	1,201	3.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
BEXAR COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	31,403	6,861	-78.2%	31,403	6,861	-78.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	22,737	5,925	-73.9%	35,083	6,776	-80.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	3,680	0	-100.0%

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Region L Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
BEXAR COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	7,820	7,820	0.0%	12,502	12,502	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	7,820	7,820	0.0%	12,502	12,502	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
BEXAR COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	243,165	267,049	9.8%	244,941	277,338	13.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	293,923	263,263	-10.4%	427,713	383,145	-10.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	56,382	6,287	-88.8%	186,430	106,399	-42.9%
BEXAR COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	48,900	49,511	1.2%	48,900	49,511	1.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	25,215	52,293	107.4%	42,526	52,293	23.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	2,782	100.0%	0	2,782	100.0%
CALDWELL COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,015	1,457	-27.7%	2,015	1,457	-27.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	725	142	-80.4%	1,420	119	-91.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CALDWELL COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	652	802	23.0%	652	802	23.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	618	802	29.8%	350	802	129.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CALDWELL COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,008	788	-21.8%	1,008	788	-21.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,008	788	-21.8%	1,008	788	-21.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CALDWELL COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	13	5	-61.5%	13	5	-61.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	8	5	-37.5%	13	5	-61.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CALDWELL COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	123	126	2.4%	9	9	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	123	123	0.0%	9	9	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CALDWELL COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	6,752	9,613	42.4%	6,963	9,594	37.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	5,457	5,859	7.4%	10,757	11,692	8.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	201	140	-30.3%	4,080	3,060	-25.0%
CALHOUN COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	425	500	17.6%	425	500	17.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	244	363	48.8%	361	537	48.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	119	100.0%
CALHOUN COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,199	1,751	46.0%	1,199	1,751	46.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	13,472	15,839	17.6%	8,726	15,839	81.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	12,273	14,088	14.8%	7,527	14,088	87.2%

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	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
CALHOUN COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	344	400	16.3%	344	400	16.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	344	290	-15.7%	344	290	-15.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CALHOUN COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	65,245	60,365	-7.5%	65,245	60,275	-7.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	54,857	46,130	-15.9%	76,419	52,479	-31.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	11,174	0	-100.0%
CALHOUN COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	55	52	-5.5%	55	12	-78.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	52	52	0.0%	12	12	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
CALHOUN COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	8,206	6,382	-22.2%	8,206	6,631	-19.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,736	2,677	-2.2%	3,926	3,847	-2.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
COMAL COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,978	2,610	-47.6%	4,978	2,423	-51.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,164	1,191	-71.4%	4,007	1,118	-72.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	164	100.0%
COMAL COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	925	639	-30.9%	925	639	-30.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	429	428	-0.2%	252	428	69.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	33	100.0%	0	33	100.0%
COMAL COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	258	237	-8.1%	258	237	-8.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	258	237	-8.1%	258	237	-8.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
COMAL COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,433	2,020	-54.4%	4,433	2,020	-54.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	8,563	4,806	-43.9%	12,507	5,788	-53.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	4,130	2,786	-32.5%	8,074	3,768	-53.3%
COMAL COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	8,600	4,739	-44.9%	15,628	6,779	-56.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	8,600	8,600	0.0%	15,628	15,628	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	3,861	100.0%	0	8,849	100.0%
COMAL COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	22,613	33,931	50.1%	23,978	34,505	43.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	20,646	26,790	29.8%	50,910	61,564	20.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,218	1,627	33.6%	26,948	27,138	0.7%
DEWITT COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,481	1,306	-11.8%	1,500	1,306	-12.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,432	1,245	-13.1%	1,228	1,245	1.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%

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	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
DEWITT COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,411	491	-65.2%	1,485	1,479	-0.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,485	757	-49.0%	1,485	757	-49.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	74	318	329.7%	0	0	0.0%
DEWITT COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,994	1,904	-4.5%	1,994	1,904	-4.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,994	1,904	-4.5%	1,994	1,904	-4.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
DEWITT COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	769	319	-58.5%	800	350	-56.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	550	272	-50.5%	756	344	-54.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
DEWITT COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,121	1,447	-53.6%	301	301	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,165	3,165	0.0%	301	301	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	44	1,718	3804.5%	0	0	0.0%
DEWITT COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	5,612	2,788	-50.3%	5,572	2,816	-49.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,210	2,717	-15.4%	2,851	2,807	-1.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	2	0	-100.0%
DIMMIT COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	314	362	15.3%	314	362	15.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	611	310	-49.3%	498	362	-27.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	297	0	-100.0%	184	0	-100.0%
DIMMIT COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,403	352	-85.4%	2,403	352	-85.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	5,775	5,601	-3.0%	4,869	5,601	15.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	3,372	5,249	55.7%	2,466	5,249	112.9%
DIMMIT COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	488	388	-20.5%	488	388	-20.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	488	388	-20.5%	488	388	-20.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
DIMMIT COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	93	695	647.3%	93	673	623.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,919	4,919	0.0%	612	612	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	4,826	4,224	-12.5%	519	81	-84.4%
DIMMIT COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,567	2,101	-18.2%	2,567	2,521	-1.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,785	2,101	-24.6%	2,331	2,521	8.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	295	0	-100.0%	0	0	0.0%
FRIO COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,020	560	-45.1%	1,020	560	-45.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	528	411	-22.2%	715	556	-22.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%

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FRIO COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	70,831	78,183	10.4%	59,412	71,037	19.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	70,831	78,183	10.4%	59,412	78,183	31.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	7,146	100.0%
FRIO COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	994	882	-11.3%	994	882	-11.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	994	882	-11.3%	994	882	-11.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
FRIO COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,217	1,217	0.0%	390	390	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,217	1,217	0.0%	390	390	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
FRIO COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,938	7,685	55.6%	4,921	7,669	55.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,108	3,291	5.9%	4,239	4,491	5.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	611	100.0%	20	1,351	6655.0%
FRIO COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	555	124	-77.7%	555	124	-77.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	555	124	-77.7%	163	124	-23.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GOLIAD COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,212	1,108	-8.6%	1,212	1,181	-2.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,035	751	-27.4%	910	901	-1.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GOLIAD COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,175	2,839	-32.0%	4,175	2,839	-32.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,200	2,839	-11.3%	3,200	2,839	-11.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	388	100.0%	0	388	100.0%
GOLIAD COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,128	841	-25.4%	1,128	841	-25.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,128	841	-25.4%	1,128	841	-25.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GOLIAD COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	122	4	-96.7%	122	4	-96.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	34	1	-97.1%	122	1	-99.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GOLIAD COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	450	450	0.0%	450	450	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	450	450	0.0%	450	450	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GOLIAD COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	804	920	14.4%	804	920	14.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	611	460	-24.7%	551	565	2.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%

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GOLIAD COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	26,960	26,023	-3.5%	26,960	26,023	-3.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	17,080	1,863	-89.1%	17,080	1,863	-89.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GONZALES COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	572	826	44.4%	572	826	44.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	422	272	-35.5%	527	392	-25.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GONZALES COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,603	5,609	55.7%	3,603	5,609	55.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,413	5,127	112.5%	1,193	5,127	329.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GONZALES COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,736	9,572	102.1%	4,736	9,572	102.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,736	9,572	102.1%	4,736	9,572	102.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GONZALES COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,387	2,181	-8.6%	2,387	2,427	1.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,671	2,181	30.5%	2,316	2,427	4.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GONZALES COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,600	1,600	0.0%	1	1	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,600	1,600	0.0%	1	1	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GONZALES COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	8,510	12,819	50.6%	8,508	12,815	50.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,982	4,636	-6.9%	6,474	6,817	5.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	367	0	-100.0%
GUADALUPE COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,950	692	-76.5%	3,670	865	-76.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,067	167	-84.3%	2,011	340	-83.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GUADALUPE COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	962	1,179	22.6%	962	1,179	22.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	413	1,136	175.1%	284	1,136	300.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GUADALUPE COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,046	1,300	24.3%	1,046	1,300	24.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,046	1,300	24.3%	1,046	1,300	24.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GUADALUPE COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,667	4,136	12.8%	3,667	4,136	12.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,003	4,136	37.7%	4,521	4,523	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	854	388	-54.6%

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Region L Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
GUADALUPE COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	456	456	0.0%	1,043	1,043	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	456	456	0.0%	1,043	1,043	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
GUADALUPE COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	27,806	35,398	27.3%	30,516	37,639	23.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	24,518	24,389	-0.5%	51,356	50,080	-2.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,486	43	-97.1%	21,502	14,377	-33.1%
GUADALUPE COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	13,792	13,320	-3.4%	13,792	13,320	-3.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	5,984	9,405	57.2%	8,371	9,405	12.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
HAYS COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	5,165	1,307	-74.7%	5,165	4,607	-10.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,064	1,307	-36.7%	17,977	11,827	-34.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	12,812	7,220	-43.6%
HAYS COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	738	506	-31.4%	738	506	-31.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	650	157	-75.8%	620	157	-74.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
HAYS COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	410	2,792	581.0%	410	2,792	581.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	410	2,792	581.0%	410	2,792	581.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
HAYS COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	680	550	-19.1%	680	550	-19.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	107	48	-55.1%	179	56	-68.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
HAYS COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	29,547	30,232	2.3%	29,759	31,315	5.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	21,989	22,126	0.6%	50,338	53,176	5.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	49	35	-28.6%	21,116	22,139	4.8%
HAYS COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	5,376	0	-100.0%	5,376	0	-100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	730	0	-100.0%	5,023	0	-100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KARNES COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	668	475	-28.9%	648	497	-23.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	622	434	-30.2%	587	431	-26.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KARNES COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	845	1,023	21.1%	844	464	-45.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	655	1,023	56.2%	403	1,023	153.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	268	100.0%	0	827	100.0%

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	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
KARNES COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,168	1,908	63.4%	1,168	1,644	40.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,168	1,086	-7.0%	1,168	1,086	-7.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KARNES COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	229	131	-42.8%	220	0	-100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	171	131	-23.4%	203	155	-23.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	155	100.0%
KARNES COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	664	600	-9.6%	58	28	-51.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,528	2,528	0.0%	2	2	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,864	1,928	3.4%	0	1	100.0%
KARNES COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,807	3,347	19.2%	2,783	3,271	17.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,053	3,161	3.5%	2,884	3,132	8.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	497	354	-28.8%	402	395	-1.7%
KENDALL COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	5,427	3,774	-30.5%	5,427	4,206	-22.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,670	2,312	-13.4%	4,959	2,807	-43.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KENDALL COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	460	622	35.2%	460	622	35.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	375	606	61.6%	339	606	78.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	1	100.0%	0	1	100.0%
KENDALL COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	395	395	0.0%	395	395	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	395	395	0.0%	395	395	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KENDALL COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	1	100.0%	0	1	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	1	100.0%	0	1	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
KENDALL COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	7,295	7,857	7.7%	8,049	8,344	3.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,096	4,470	9.1%	10,257	12,501	21.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	2,613	4,389	68.0%
LA SALLE COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	500	302	-39.6%	500	412	-17.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	522	302	-42.1%	484	412	-14.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	22	0	-100.0%	0	0	0.0%
LA SALLE COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,636	4,600	-0.8%	4,636	4,490	-3.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,636	5,784	24.8%	3,971	5,784	45.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	1,184	100.0%	0	1,294	100.0%

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	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
LA SALLE COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	610	491	-19.5%	610	491	-19.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	610	491	-19.5%	610	491	-19.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
LA SALLE COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	529	529	0.0%	529	529	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,617	4,617	0.0%	676	676	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	4,088	4,088	0.0%	147	147	0.0%
LA SALLE COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,268	2,676	18.0%	2,268	2,676	18.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,081	1,505	-27.7%	1,978	2,106	6.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MEDINA COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,521	1,855	-26.4%	2,519	2,483	-1.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,257	948	-24.6%	1,511	1,576	4.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MEDINA COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	25,935	24,538	-5.4%	25,926	22,742	-12.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	57,464	59,968	4.4%	46,615	59,968	28.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	31,529	35,430	12.4%	20,689	37,226	79.9%
MEDINA COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,165	1,165	0.0%	1,165	1,165	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,165	1,145	-1.7%	1,165	1,145	-1.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MEDINA COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,954	1,543	-21.0%	1,954	1,543	-21.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	48	63	31.3%	70	67	-4.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MEDINA COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,851	2,008	8.5%	2,922	3,029	3.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,851	1,851	0.0%	2,872	2,872	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
MEDINA COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	6,088	6,642	9.1%	6,282	6,681	6.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	6,386	6,851	7.3%	9,019	9,194	1.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	981	1,378	40.5%	2,756	3,255	18.1%
REFUGIO COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	523	364	-30.4%	523	355	-32.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	518	364	-29.7%	360	355	-1.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REFUGIO COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	652	1,034	58.6%	652	1,034	58.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	652	1,034	58.6%	652	1,034	58.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%

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	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
REFUGIO COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	636	475	-25.3%	636	475	-25.3%
PROJECTED DEMAND TOTAL (acre-feet per year)	636	475	-25.3%	636	475	-25.3%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REFUGIO COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	66	66	0.0%	15	15	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	66	66	0.0%	15	15	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REFUGIO COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,840	837	-54.5%	1,840	845	-54.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,164	837	-28.1%	839	845	0.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UVALDE COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,333	858	-80.2%	4,021	1,146	-71.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,395	858	-38.5%	1,831	1,126	-38.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UVALDE COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	36,039	21,918	-39.2%	34,902	20,705	-40.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	65,722	62,409	-5.0%	54,004	62,409	15.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	29,683	40,491	36.4%	19,102	41,704	118.3%
UVALDE COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,031	2,198	113.2%	1,031	2,198	113.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,031	2,198	113.2%	1,031	2,198	113.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UVALDE COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	391	111	-71.6%	481	111	-76.9%
PROJECTED DEMAND TOTAL (acre-feet per year)	289	3	-99.0%	364	3	-99.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
UVALDE COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,661	2,559	-3.8%	3,874	3,772	-2.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,661	2,661	0.0%	3,874	3,874	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	102	100.0%	0	102	100.0%
UVALDE COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,433	3,056	-11.0%	3,433	3,056	-11.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	4,497	5,338	18.7%	6,075	7,208	18.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	1,064	2,580	142.5%	2,642	4,273	61.7%
VICTORIA COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	3,474	1,753	-49.5%	3,474	1,753	-49.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	3,050	2,584	-15.3%	3,433	2,904	-15.4%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	831	100.0%	0	1,151	100.0%
VICTORIA COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	15,950	13,398	-16.0%	15,950	13,398	-16.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	21,215	13,398	-36.8%	21,215	13,398	-36.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	5,265	5,791	10.0%	5,265	5,791	10.0%

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Region L Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
VICTORIA COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,165	1,064	-8.7%	1,165	1,064	-8.7%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,165	1,064	-8.7%	1,165	1,064	-8.7%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
VICTORIA COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	28,799	472	-98.4%	28,799	472	-98.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	30,977	8,113	-73.8%	45,051	9,234	-79.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	2,178	7,641	250.8%	16,252	8,762	-46.1%
VICTORIA COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	72	72	0.0%	18	18	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	72	72	0.0%	18	18	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
VICTORIA COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	7,213	9,780	35.6%	7,213	9,780	35.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	17,110	17,555	2.6%	20,471	20,973	2.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	9,897	8,935	-9.7%	13,258	12,295	-7.3%
VICTORIA COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,024	12,550	1125.6%	1,024	12,550	1125.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	5,530	31,475	469.2%	71,720	31,475	-56.1%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	4,506	18,925	320.0%	70,696	18,925	-73.2%
WILSON COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,927	1,476	-49.6%	2,927	1,476	-49.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,493	876	-41.3%	2,878	172	-94.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WILSON COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	15,267	15,457	1.2%	8,220	14,965	82.1%
PROJECTED DEMAND TOTAL (acre-feet per year)	12,182	15,418	26.6%	7,009	15,418	120.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	3,390	100.0%	0	3,882	100.0%
WILSON COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,737	1,889	8.8%	1,737	1,889	8.8%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,737	1,889	8.8%	1,737	1,889	8.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WILSON COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	10	40	300.0%	10	43	330.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	10	40	300.0%	10	43	330.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WILSON COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,929	1,929	0.0%	204	204	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,929	1,929	0.0%	204	204	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
WILSON COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	12,985	9,604	-26.0%	13,088	9,623	-26.5%
PROJECTED DEMAND TOTAL (acre-feet per year)	6,914	7,468	8.0%	13,242	15,951	20.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	895	100.0%	1,885	7,013	272.0%

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Region L Water User Group (WUG) Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
WILSON COUNTY | STEAM ELECTRIC POWER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	0	2,439	100.0%	0	2,439	100.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	0	2,439	100.0%	0	2,439	100.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ZAVALA COUNTY | COUNTY-OTHER WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	900	360	-60.0%	900	360	-60.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	572	243	-57.5%	826	351	-57.5%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ZAVALA COUNTY | IRRIGATION WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	25,735	25,083	-2.5%	26,819	25,901	-3.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	44,222	46,318	4.7%	36,262	45,766	26.2%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	18,487	21,235	14.9%	9,443	19,865	110.4%
ZAVALA COUNTY | LIVESTOCK WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,058	893	-15.6%	1,058	893	-15.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,058	893	-15.6%	1,058	893	-15.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ZAVALA COUNTY | MANUFACTURING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,434	603	-57.9%	1,434	766	-46.6%
PROJECTED DEMAND TOTAL (acre-feet per year)	946	603	-36.3%	1,194	766	-35.8%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ZAVALA COUNTY | MINING WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	2,531	2,531	0.0%	557	557	0.0%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,531	2,531	0.0%	557	557	0.0%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
ZAVALA COUNTY | MUNICIPAL WUG TYPE						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	4,795	4,241	-11.6%	4,795	4,439	-7.4%
PROJECTED DEMAND TOTAL (acre-feet per year)	2,179	2,628	20.6%	3,152	3,800	20.6%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	0	0	0.0%	0	0	0.0%
REGION L						
EXISTING WUG SUPPLY TOTAL (acre-feet per year)	1,027,889	1,001,760	-2.5%	1,015,732	1,013,911	-0.2%
PROJECTED DEMAND TOTAL (acre-feet per year)	1,070,354	1,050,964	-1.8%	1,433,835	1,320,128	-7.9%
WATER SUPPLY NEEDS TOTAL (acre-feet per year)*	200,071	203,707	1.8%	482,943	401,027	-17.0%

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Region L Source Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
ATASCOSA COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	75,533	74,274	-1.7%	82,085	82,505	0.5%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	754	754	0.0%	754	754	0.0%
BEXAR COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	285,214	308,909	8.3%	285,043	306,242	7.4%
REUSE AVAILABILITY TOTAL (acre-feet per year)	25,560	29,735	16.3%	35,560	39,735	11.7%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	6,697	693	-89.7%	6,697	693	-89.7%
CALDWELL COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	45,263	63,270	39.8%	44,279	56,214	27.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	1,797	1,025	-43.0%	1,797	1,025	-43.0%
CALHOUN COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	2,995	7,565	152.6%	2,995	7,565	152.6%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	41,715	33,841	-18.9%	41,715	33,841	-18.9%
COMAL COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	53,056	56,130	5.8%	53,056	56,130	5.8%
REUSE AVAILABILITY TOTAL (acre-feet per year)	107	107	0.0%	107	107	0.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	2,130	741	-65.2%	2,130	741	-65.2%
DEWITT COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	14,636	15,476	5.7%	14,616	14,485	-0.9%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	997	997	0.0%	997	997	0.0%
DIMMIT COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	3,359	4,129	22.9%	3,359	4,129	22.9%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	2,506	454	-81.9%	2,506	454	-81.9%
FRIO COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	107,582	142,937	32.9%	97,827	105,303	7.6%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	497	497	0.0%	497	497	0.0%
GOLIAD COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	11,699	11,539	-1.4%	11,699	11,539	-1.4%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	2,989	564	-81.1%	2,989	564	-81.1%
GONZALES COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	73,999	94,989	28.4%	87,653	99,391	13.4%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	6,408	7,079	10.5%	6,408	7,079	10.5%
GUADALUPE COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	11,041	53,408	383.7%	14,249	48,714	241.9%
REUSE AVAILABILITY TOTAL (acre-feet per year)	1,414	1,325	-6.3%	1,414	1,325	-6.3%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	8,162	8,739	7.1%	8,162	8,739	7.1%
HAYS COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	15,307	16,376	7.0%	15,307	16,376	7.0%
REUSE AVAILABILITY TOTAL (acre-feet per year)	4,119	8,448	105.1%	4,119	8,848	114.8%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	334	1,546	362.9%	334	1,546	362.9%
KARNES COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	5,126	13,298	159.4%	5,170	6,105	18.1%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	1,302	688	-47.2%	1,313	688	-47.6%
KENDALL COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	11,457	11,552	0.8%	11,457	11,552	0.8%
REUSE AVAILABILITY TOTAL (acre-feet per year)	271	334	23.2%	271	334	23.2%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	224	224	0.0%	224	224	0.0%

* Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Source Data Comparison to 2016 Regional Water Plan (RWP)

	2020 PLANNING DECADE			2070 PLANNING DECADE		
	2016 RWP	2021 RWP	DIFFERENCE (%)	2016 RWP	2021 RWP	DIFFERENCE (%)
LA SALLE COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	7,533	7,940	5.4%	7,533	7,940	5.4%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	1,010	719	-28.8%	1,010	719	-28.8%
MEDINA COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	58,424	59,513	1.9%	58,412	59,502	1.9%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	582	582	0.0%	582	582	0.0%
REFUGIO COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	29,328	5,847	-80.1%	29,328	5,847	-80.1%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	318	237	-25.5%	318	237	-25.5%
RESERVOIR* COUNTY						
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	162,805	159,987	-1.7%	162,105	159,266	-1.8%
UVALDE COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	48,296	34,208	-29.2%	47,894	32,061	-33.1%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	1,236	1,236	0.0%	1,236	1,236	0.0%
VICTORIA COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	35,694	44,974	26.0%	35,694	59,963	68.0%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	29,355	13,642	-53.5%	29,355	13,642	-53.5%
WILSON COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	39,387	112,535	185.7%	46,618	113,021	142.4%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	2,637	2,018	-23.5%	2,639	2,018	-23.5%
ZAVALA COUNTY						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	35,859	35,653	-0.6%	34,969	34,695	-0.8%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	594	594	0.0%	594	594	0.0%
REGION L						
GROUNDWATER AVAILABILITY TOTAL (acre-feet per year)	970,788	1,174,522	21.0%	989,243	1,139,279	15.2%
REUSE AVAILABILITY TOTAL (acre-feet per year)	31,471	39,949	26.9%	41,471	50,349	21.4%
SURFACE WATER AVAILABILITY TOTAL (acre-feet per year)	275,049	236,857	-13.9%	274,362	236,136	-13.9%

* Since reservoir sources can exist across multiple counties, the county field value, ‘reservoir’ is applied to all reservoir sources.

Region L Water User Group (WUG) Unmet Needs

WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The unmet needs shown in the WUG Unmet Needs report are calculated by first deducting the WUG split's projected demand from the sum of its total existing water supply volume and all associated recommended water management strategy water volumes. If the WUG split has a greater future supply volume than projected demand in any given decade, this amount is considered a surplus volume. In order to display only unmet needs associated with the WUG split, these surplus volumes are updated to a zero and the unmet needs water volumes are shown as absolute values.

	WUG UNMET NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
BEXAR COUNTY - SAN ANTONIO BASIN						
IRRIGATION	4,152	4,152	4,152	4,152	4,152	4,152
CALHOUN COUNTY - COLORADO-LAVACA BASIN						
IRRIGATION	60	60	60	60	60	60
CALHOUN COUNTY - LAVACA-GUADALUPE BASIN						
IRRIGATION	14,028	14,028	14,028	14,028	14,028	14,028
COMAL COUNTY - SAN ANTONIO BASIN						
IRRIGATION	33	33	33	33	33	33
DEWITT COUNTY - GUADALUPE BASIN						
IRRIGATION	265	265	265	265	0	0
DEWITT COUNTY - SAN ANTONIO BASIN						
IRRIGATION	53	53	0	0	0	0
DIMMIT COUNTY - NUECES BASIN						
MINING	3,570	3,647	3,075	1,769	464	0
IRRIGATION	4,636	4,636	4,636	4,636	4,636	4,636
DIMMIT COUNTY - RIO GRANDE BASIN						
MINING	654	665	577	375	175	81
IRRIGATION	613	613	613	613	613	613
FRIO COUNTY - NUECES BASIN						
IRRIGATION	0	0	1,838	3,612	5,332	7,146
GOLIAD COUNTY - SAN ANTONIO BASIN						
IRRIGATION	388	388	388	388	388	388
KARNES COUNTY - GUADALUPE BASIN						
MINING	92	92	77	0	0	0
IRRIGATION	42	42	42	42	42	42
KARNES COUNTY - NUECES BASIN						
MINING	217	156	94	35	0	0
IRRIGATION	71	71	71	71	71	71
KARNES COUNTY - SAN ANTONIO BASIN						
MINING	1,611	1,124	620	119	13	1
IRRIGATION	222	222	781	781	781	781
KARNES COUNTY - SAN ANTONIO-NUECES BASIN						
MINING	100	76	50	25	0	0
IRRIGATION	17	17	17	17	17	17
KENDALL COUNTY - SAN ANTONIO BASIN						
IRRIGATION	1	1	1	1	1	1
LA SALLE COUNTY - NUECES BASIN						
MINING	4,088	4,243	3,734	2,290	851	147
IRRIGATION	1,184	1,203	1,223	1,248	1,271	1,294
MEDINA COUNTY - NUECES BASIN						
IRRIGATION	30,387	31,117	31,062	31,751	32,058	33,143
MEDINA COUNTY - SAN ANTONIO BASIN						
IRRIGATION	7,249	7,275	7,192	7,147	7,017	7,000

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

Region L Water User Group (WUG) Unmet Needs

	WUG UNMET NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
UVALDE COUNTY - NUECES BASIN						
IRRIGATION	43,021	43,333	43,333	43,423	43,672	44,101
VICTORIA COUNTY - GUADALUPE BASIN						
MANUFACTURING	7,641	0	0	0	0	0
STEAM ELECTRIC POWER	18,925	0	0	0	0	0
VICTORIA COUNTY - LAVACA-GUADALUPE BASIN						
IRRIGATION	5,791	5,791	5,791	5,791	5,791	5,791
WILSON COUNTY - NUECES BASIN						
IRRIGATION	3,390	3,405	3,417	3,428	3,582	3,882
WILSON COUNTY - SAN ANTONIO BASIN						
IRRIGATION	0	0	0	0	7,571	7,571
ZAVALA COUNTY - NUECES BASIN						
IRRIGATION	21,235	21,350	21,109	20,733	20,148	19,865

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

Region L Water User Group (WUG) Unmet Needs Summary

WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The unmet needs shown in the WUG Unmet Needs Summary report are calculated by first deducting the WUG split's projected demand from the sum of its total existing water supply volume and all associated recommended water management strategy water volumes. If the WUG split has a greater future supply volume than projected demand in any given decade, this amount is considered a surplus volume. Before aggregating the difference between supplies and demands to the WUG category level, calculated surpluses are updated to zero so that only the WUGs with unmet needs in the decade are included with the Needs totals. Unmet needs water volumes are shown as absolute values.

WUG CATEGORY	NEEDS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MUNICIPAL	0	0	0	0	0	0
COUNTY-OTHER	0	0	0	0	0	0
MANUFACTURING	7,641	0	0	0	0	0
MINING	10,332	10,003	8,227	4,613	1,503	229
STEAM ELECTRIC POWER	18,925	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	136,838	138,055	140,052	142,220	151,264	154,615

Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
AIR FORCE VILLAGE II INC	L	DROUGHT MANAGEMENT - AIR FORCE VILLAGE II	DEMAND REDUCTION	$127	N/A	3	0	0	0	0	0
AIR FORCE VILLAGE II INC	L	ENTITY PURCHASE TO MEET SHORTAGES - SAWS	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	$701	$4163	107	114	114	97	81	74
AIR FORCE VILLAGE II INC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	9	27	46	62	78	85
ALAMO HEIGHTS	L	DROUGHT MANAGEMENT - ALAMO HEIGHTS	DEMAND REDUCTION	$88	N/A	50	0	0	0	0	0
ALAMO HEIGHTS	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	$1242	$1242	464	388	307	181	105	32
ALAMO HEIGHTS	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	340	341	233	188	108	41
ALAMO HEIGHTS	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	103	279	440	600	752	892
AQUA WSC*	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	1	1	1
ASHERTON	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	7	24	47	57	65	72
ATASCOSA RURAL WSC	L	DROUGHT MANAGEMENT - ATASCOSA RURAL WSC	DEMAND REDUCTION	$89	N/A	59	0	0	0	0	0
ATASCOSA RURAL WSC	L	FE - ATASCOSA RURAL WSC	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$8838	$2161	31	31	31	31	31	31
ATASCOSA RURAL WSC	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	$468	$250	1,049	2,098	2,098	2,098	2,098	2,098
ATASCOSA RURAL WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	50
BATESVILLE WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	5	13	16	22	29	37
BENTON CITY WSC	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	N/A	$0	0	0	0	0	153	345
BENTON CITY WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	60
BEXAR COUNTY WCID 10	L	DROUGHT MANAGEMENT - BEXAR COUNTY WCID 10	DEMAND REDUCTION	$89	N/A	33	0	0	0	0	0
BEXAR COUNTY WCID 10	L	ENTITY PURCHASE TO MEET SHORTAGES - SAWS	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	$701	$1463	348	312	243	197	199	198
BEXAR COUNTY WCID 10	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	51	141	234	310	340	372
BIG WELLS	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	3	2	2	4	7	11
BOERNE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	139	496	1,009	1,551	1,936	2,352
BOERNE	L	REUSE - BOERNE NON-POTABLE REUSE	L | DIRECT NON-POTABLE REUSE	$1783	$442	750	1,500	1,500	1,500	1,500	1,500
BUDA*	L	ARWA - PHASE 3	L | DIRECT NON-POTABLE REUSE	N/A	$1995	0	0	0	0	21	21
BUDA*	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	2	6	9	13	17	23
CANYON LAKE WATER SERVICE*	L	GBRA - MBWSP	L | CARRIZO-WILCOX AQUIFER ASR FRESH/BRACKISH | GONZALES COUNTY	N/A	$442	0	0	0	0	0	174

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
CANYON LAKE WATER SERVICE*	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	89	380	759
CARRIZO HILL WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	2	10	11	14	17	20
CARRIZO SPRINGS	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	77	210	346	498	645	784
CASTROVILLE	L	DROUGHT MANAGEMENT - CASTROVILLE	DEMAND REDUCTION	$108	N/A	17	0	0	0	0	0
CASTROVILLE	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	N/A	300	200	150	100	0	0
CASTROVILLE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	46	109	167	225	283	336
CHARLOTTE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	8	27	33	43	57	73
CIBOLO	L	CIBOLO VALLEY LGC CARRIZO GROUNDWATER PROJECT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	N/A	$314	0	2,000	2,000	2,000	2,000	2,000
CIBOLO	L	CIBOLO VALLEY LGC CARRIZO GROUNDWATER PROJECT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	N/A	$314	0	3,000	3,000	3,000	3,000	3,000
CIBOLO	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	43	267	545	875
CLEAR WATER ESTATES WATER SYSTEM	L	DROUGHT MANAGEMENT - CLEAR WATER ESTATES WATER SYSTEM	DEMAND REDUCTION	$102	N/A	4	0	0	0	0	0
CLEAR WATER ESTATES WATER SYSTEM	L	LOCAL GROUNDWATER DEVELOPMENT	L | TRINITY AQUIFER | COMAL COUNTY	$0	$0	627	806	987	1,171	1,352	1,528
CLEAR WATER ESTATES WATER SYSTEM	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	54	142	253	386	534	695
CONVERSE	L	CRWA - WELLS RANCH (PHASE 3)	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	$1330	$849	264	575	762	736	730	720
CONVERSE	L	DROUGHT MANAGEMENT - CONVERSE	DEMAND REDUCTION	$90	N/A	101	0	0	0	0	0
CONVERSE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	0	8
COTULLA	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	67	180	303	443	589	737
COUNTY LINE SUD	L	ARWA - PHASE 2	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	N/A	$199	0	0	669	669	669	669
COUNTY LINE SUD	L	ARWA - PHASE 3	L | DIRECT NON-POTABLE REUSE	N/A	$2001	0	0	0	0	178	178
COUNTY LINE SUD	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$1430	$358	478	478	478	478	478	478
COUNTY LINE SUD	L	COUNTY LINE SUD - BRACKISH EDWARDS WELLFIELD	L | EDWARDS-BFZ AQUIFER SALINE | HAYS COUNTY	N/A	$2301	0	0	0	500	1,000	1,500
COUNTY LINE SUD	L	COUNTY LINE SUD - TRINITY WELLFIELD	L | TRINITY AQUIFER | HAYS COUNTY	N/A	$1078	0	0	0	500	740	740
COUNTY LINE SUD	L	REUSE - COUNTY LINE SUD	L | DIRECT NON-POTABLE REUSE	$993	$401	560	1,120	1,680	2,240	2,800	3,360
COUNTY-OTHER, BEXAR	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	0	16

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
COUNTY-OTHER, CALHOUN	L	LOCAL GROUNDWATER DEVELOPMENT	L | GULF COAST AQUIFER SYSTEM | CALHOUN COUNTY	N/A	$711	0	0	0	0	412	412
COUNTY-OTHER, COMAL	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	117	264	296	388	520	671
COUNTY-OTHER, DIMMIT	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	2
COUNTY-OTHER, FRIO	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	1
COUNTY-OTHER, GUADALUPE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	5	13
COUNTY-OTHER, HAYS*	L	GBRA - MBWSP	L | CARRIZO-WILCOX AQUIFER ASR FRESH/BRACKISH | GONZALES COUNTY	N/A	$442	0	0	0	0	2,029	7,220
COUNTY-OTHER, HAYS*	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	0	232
COUNTY-OTHER, KARNES	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	1	11	21
COUNTY-OTHER, KENDALL	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	6
COUNTY-OTHER, LA SALLE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	5
COUNTY-OTHER, MEDINA	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	27
COUNTY-OTHER, UVALDE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	1
COUNTY-OTHER, VICTORIA	L	GBRA LOWER BASIN STORAGE PROJECT	L | GBRA LOWER BASIN OFF-CHANNEL LAKE/RESERVOIR	$110	$49	846	906	951	1,015	1,095	1,166
COUNTY-OTHER, WILSON	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	4
COUNTY-OTHER, ZAVALA	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	4	9	15	24	32	42
CRYSTAL CITY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	60	196	353	496	573	654
CRYSTAL CLEAR WSC	L	ARWA - PHASE 2	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	N/A	$199	0	0	3,585	3,585	3,585	3,585
CRYSTAL CLEAR WSC	L	ARWA - PHASE 3	L | DIRECT NON-POTABLE REUSE	N/A	$2001	0	0	0	0	953	953
CRYSTAL CLEAR WSC	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$1430	$358	2,560	2,560	2,560	2,560	2,560	2,560
CRYSTAL CLEAR WSC	L	DROUGHT MANAGEMENT - CRYSTAL CLEAR WSC	DEMAND REDUCTION	$89	N/A	92	0	0	0	0	0
CRYSTAL CLEAR WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	77
CUERO	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	91	233	367	503	637	744
DEVINE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	4
DILLEY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	50	145	248	362	453	501
EAST MEDINA COUNTY SUD	L	DROUGHT MANAGEMENT - EAST MEDINA COUNTY SUD	DEMAND REDUCTION	$90	N/A	43	0	0	0	0	0
EAST MEDINA COUNTY SUD	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	150	250	300	400	450	500

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
EL OSO WSC*	L	DROUGHT MANAGEMENT - EL OSO WSC	DEMAND REDUCTION	$88	N/A	14	0	0	0	0	0
EL OSO WSC*	L	LOCAL GROUNDWATER DEVELOPMENT	N | GULF COAST AQUIFER SYSTEM | BEE COUNTY	$1317	$842	12	13	18	20	45	47
EL OSO WSC*	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	29	84	138	161	176	194
ELMENDORF	L	DROUGHT MANAGEMENT – ELMENDORF	DEMAND REDUCTION	$234	N/A	8	0	0	0	0	0
ELMENDORF	L	ENTITY PURCHASE TO MEET SHORTAGES - SAWS	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	$701	$1463	46	133	214	292	350	399
ELMENDORF	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	1	17	35
ENCINAL WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	8	25	44	58	68	77
FAIR OAKS RANCH	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	117	334	587	831	1,141	1,423
FAIR OAKS RANCH	L	REUSE - FAIR OAKS RANCH NON-POTABLE REUSE	L | DIRECT NON-POTABLE REUSE	N/A	$93	0	672	672	672	672	672
FALLS CITY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	6	17	26	36	39	42
FLORESVILLE	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	N/A	$402	0	0	828	828	1,654	1,656
FLORESVILLE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	79	270	523	819	1,118	1,283
FORT SAM HOUSTON	L	DROUGHT MANAGEMENT - FORT SAM HOUSTON	DEMAND REDUCTION	$106	N/A	5	0	0	0	0	0
FORT SAM HOUSTON	L	ENTITY PURCHASE TO MEET SHORTAGES - SAWS	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	$701	N/A	1,716	1,315	927	557	207	0
FORT SAM HOUSTON	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$600	$600	213	436	639	824	993	1,144
GARDEN RIDGE	L	DROUGHT MANAGEMENT - GARDEN RIDGE	DEMAND REDUCTION	$64	N/A	47	0	0	0	0	0
GARDEN RIDGE	L	LOCAL GROUNDWATER DEVELOPMENT	L | TRINITY AQUIFER | COMAL COUNTY	$0	$0	918	1,241	1,638	1,788	2,184	2,565
GARDEN RIDGE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	108	300	553	781	1,102	1,449
GOFORTH SUD*	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$721	$283	1,869	1,883	1,887	1,854	1,780	1,703
GOFORTH SUD*	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	$721	$283	1,898	1,913	1,917	1,915	1,912	1,906
GOFORTH SUD*	L	DROUGHT MANAGEMENT – GOFORTH SUD	DEMAND REDUCTION	$89	N/A	103	0	0	0	0	0
GOFORTH SUD*	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	0	50
GOLIAD	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	15	51	93	111	123	135
GONZALES	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	96	271	465	690	941	1,081
GONZALES COUNTY WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	109	289	490	717	966	1,233
GREEN VALLEY SUD	L	ARWA - PHASE 2	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	N/A	$199	0	0	2,232	2,232	2,232	2,232

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
GREEN VALLEY SUD	L	ARWA - PHASE 3	L | DIRECT NON-POTABLE REUSE	N/A	$2001	0	0	0	0	594	594
GREEN VALLEY SUD	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$1430	$358	1,595	1,595	1,595	1,595	1,595	1,595
GUADALUPE-BLANCO RIVER AUTHORITY	L	FE - GBRA WESTERN CANYON EXPANSION	L | CANYON LAKE/RESERVOIR	N/A	$510	0	0	0	0	1,725	1,566
GUADALUPE-BLANCO RIVER AUTHORITY	L	FE - HAYS COUNTY PIPELINE PROJECT	L | CANYON LAKE/RESERVOIR	N/A	N/A	0	2,179	5,108	4,345	0	0
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA - MBWSP	L | CARRIZO-WILCOX AQUIFER ASR FRESH/BRACKISH | GONZALES COUNTY	N/A	$442	0	18,553	18,063	17,449	14,726	8,567
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA LOWER BASIN STORAGE PROJECT	L | GBRA LOWER BASIN OFF-CHANNEL LAKE/RESERVOIR	$110	$49	58,934	58,874	58,829	58,765	58,685	58,614
HONDO	L	DROUGHT MANAGEMENT - HONDO	DEMAND REDUCTION	$89	N/A	51	0	0	0	0	0
HONDO	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	500	500	450	425	500	500
HONDO	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	87	260	450	599	675	754
JOURDANTON	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	38	125	232	326	382	442
KARNES CITY	L	DROUGHT MANAGEMENT - KARNES CITY	DEMAND REDUCTION	$112	N/A	23	0	0	0	0	0
KARNES CITY	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	$1131	$611	134	134	134	134	134	134
KARNES CITY	L	LOCAL GROUNDWATER DEVELOPMENT	L | YEGUA-JACKSON AQUIFER | KARNES COUNTY	$1131	$611	310	310	310	310	310	310
KARNES CITY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	21	63	84	91	102	114
KENDALL COUNTY WCID 1	L	REUSE - KENDALL COUNTY WCID NON-POTABLE	L | DIRECT NON-POTABLE REUSE	$0	$0	180	180	180	180	180	180
KENDALL WEST UTILITY	L	LOCAL GROUNDWATER DEVELOPMENT	L | TRINITY AQUIFER | KENDALL COUNTY	N/A	$0	0	282	561	902	1,365	1,596
KENDALL WEST UTILITY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	9
KENEDY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	86	200	304	409	505	593
KIRBY	L	DROUGHT MANAGEMENT - KIRBY	DEMAND REDUCTION	$62	N/A	32	0	0	0	0	0
KIRBY	L	ENTITY PURCHASE TO MEET SHORTAGES - SAWS	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	$701	$1463	174	275	249	240	238	237
KNIPPA WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	6	18	31	42	47	54
KT WATER DEVELOPMENT	L	DROUGHT MANAGEMENT - KT WATER DEVELOPMENT	DEMAND REDUCTION	$123	N/A	7	0	0	0	0	0
KT WATER DEVELOPMENT	L	LOCAL GROUNDWATER DEVELOPMENT	L | TRINITY AQUIFER | COMAL COUNTY	$806	$511	161	161	322	483	483	644
KT WATER DEVELOPMENT	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	28	78	146	228	321	421
KYLE	L	ARWA - PHASE 2	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	N/A	$199	0	0	5,916	5,916	5,916	5,916

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
KYLE	L	ARWA - PHASE 3	L | DIRECT NON-POTABLE REUSE	N/A	$2001	0	0	0	0	1,573	1,573
KYLE	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$1430	$358	4,225	4,225	4,225	4,225	4,225	4,225
KYLE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	52	266	480
LA COSTE	L	DROUGHT MANAGEMENT - LA COSTE	DEMAND REDUCTION	$72	N/A	8	0	0	0	0	0
LA COSTE	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	100	100	100	100	100	100
LA VERNIA	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	15	55	109	157	188	219
LACKLAND AIR FORCE BASE	L	DROUGHT MANAGEMENT - LACKLAND AIR FORCE BASE	DEMAND REDUCTION	$89	N/A	67	0	0	0	0	0
LEON VALLEY	L	DROUGHT MANAGEMENT - LEON VALLEY	DEMAND REDUCTION	$111	N/A	65	0	0	0	0	0
LEON VALLEY	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	$1242	$1242	92	115	150	299	328	356
LEON VALLEY	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	79	113	122	300	304	302
LEON VALLEY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$600	$600	42	102	112	165	212	265
LIVE OAK	L	DROUGHT MANAGEMENT - LIVE OAK	DEMAND REDUCTION	$57	N/A	48	0	0	0	0	0
LIVE OAK	L	ENTITY PURCHASE TO MEET SHORTAGES - SAWS	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	$701	$1463	392	333	297	261	226	192
LIVE OAK	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	57	171	183	205	237	271
LOCKHART	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$721	$283	1,489	1,489	1,489	1,489	1,489	1,489
LOCKHART	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	$721	$283	1,511	1,511	1,511	1,511	1,511	1,511
LOCKHART	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	0	71
LOMA ALTA CHULA VISTA WATER SYSTEM	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	12	34	57	84	112	140
LULING	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	N/A	$453	0	353	353	706	706	1,059
LULING	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	2
LYTLE	L	DROUGHT MANAGEMENT - LYTLE	DEMAND REDUCTION	$45	N/A	18	0	0	0	0	0
LYTLE	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	350	400	450	500	600	650
LYTLE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	25	94	166	199	242	286
MANUFACTURING, COMAL	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$1430	N/A	2,786	0	0	0	0	0

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
MANUFACTURING, COMAL	L	GBRA - MBWSP	L | CARRIZO-WILCOX AQUIFER ASR FRESH/BRACKISH | GONZALES COUNTY	N/A	$442	0	3,783	3,783	3,783	3,783	3,783
MANUFACTURING, DEWITT	L	LOCAL GROUNDWATER DEVELOPMENT	L | GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	N/A	$56	0	242	242	242	242	242
MANUFACTURING, GUADALUPE	L	GBRA - MBWSP	L | CARRIZO-WILCOX AQUIFER ASR FRESH/BRACKISH | GONZALES COUNTY	N/A	$442	0	402	402	402	402	402
MANUFACTURING, KARNES	L	LOCAL GROUNDWATER DEVELOPMENT	L | YEGUA-JACKSON AQUIFER | KARNES COUNTY	N/A	$8	0	0	232	231	242	242
MANUFACTURING, VICTORIA	L	GBRA LOWER BASIN NEW APPROPRIATION	L | GBRA LOWER BASIN NEW APPROPRIATION OFF-CHANNEL RESERVOIR	N/A	$112	0	16,575	16,575	16,575	16,575	16,575
MARION	L	CRWA - WELLS RANCH (PHASE 3)	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	N/A	$849	0	0	18	59	103	146
MARTINDALE WSC	L	CRWA - WELLS RANCH (PHASE 3)	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	N/A	$849	0	65	140	250	530	854
MARTINDALE WSC	L	DROUGHT MANAGEMENT - MARTINDALE	DEMAND REDUCTION	$113	N/A	21	0	0	0	0	0
MARTINDALE WSC	L	FE - CRWA HAYS CALDWELL WTP EXPANSION	L | GUADALUPE RUN-OF-RIVER	$1566	$698	255	255	255	255	255	255
MARTINDALE WSC	L	MARTINDALE WSC - ALLUVIAL WELL	L | SAN MARCOS RIVER ALLUVIUM AQUIFER | CALDWELL COUNTY	N/A	$96	0	240	240	240	240	240
MAXWELL WSC	L	MAXWELL WSC - TRINITY WELL FIELD	L | TRINITY AQUIFER | HAYS COUNTY	N/A	$1822	0	0	230	230	230	230
MEDINA COUNTY WCID 2	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	6	18	31	36	42	48
MINING, COMAL	L	LOCAL GROUNDWATER DEVELOPMENT	L | TRINITY AQUIFER | COMAL COUNTY	$70	$31	4,116	5,566	7,018	8,228	9,206	9,185
MINING, DEWITT	L	LOCAL GROUNDWATER DEVELOPMENT	L | GULF COAST AQUIFER SYSTEM | DEWITT COUNTY	$7	$7	1,937	1,937	1,937	1,937	1,937	1,937
MINING, UVALDE	L	LOCAL GROUNDWATER DEVELOPMENT	L | LEONA GRAVEL AQUIFER | UVALDE COUNTY	$54	$54	242	242	242	242	242	242
MOORE WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	5	14	24	27	31	36
NATALIA	L	DROUGHT MANAGEMENT - NATALIA	DEMAND REDUCTION	$115	N/A	6	0	0	0	0	0
NATALIA	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	125	150	150	200	200	200
NATALIA	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	7	23	26	33	44	55
NEW BRAUNFELS	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$721	$283	3,969	3,969	3,969	3,969	3,969	3,969
NEW BRAUNFELS	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	$721	$283	4,031	4,031	4,031	4,031	4,031	4,031

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
NEW BRAUNFELS	L	FE - NBU SEGUIN INTERCONNECT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	$212	$143	2,500	2,500	2,500	2,500	2,500	2,500
NEW BRAUNFELS	L	FE - NBU SOUTH WTP EXPANSION	L | GUADALUPE RUN-OF-RIVER	N/A	$1438000	0	1	1	1	1	1
NEW BRAUNFELS	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$600	$600	663	2,240	4,381	5,814	7,168	8,631
NEW BRAUNFELS	L	NBU - ASR	L | TRINITY AND/OR BRACKISH EDWARDS AQUIFER ASR FRESH/BRACKISH | COMAL COUNTY	$462	$207	10,818	10,818	10,818	10,818	10,818	10,818
NEW BRAUNFELS	L	NBU - TRINITY DEVELOPMENT	L | TRINITY AQUIFER | COMAL COUNTY	N/A	$284	0	3,360	3,360	3,360	3,360	3,360
NIXON	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	1	1	3	11	23	38
OAK HILLS WSC	L	DROUGHT MANAGEMENT - OAK HILLS WSC	DEMAND REDUCTION	$88	N/A	28	0	0	0	0	0
OAK HILLS WSC	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	$0	$0	475	675	875	1,050	1,200	1,350
OAK HILLS WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	30	72	101	142	192	248
PEARSALL	L	DROUGHT MANAGEMENT - PEARSALL	DEMAND REDUCTION	$68	N/A	26	0	0	0	0	0
PEARSALL	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER | FRIO COUNTY	$564	$296	807	807	1,614	1,614	1,614	1,614
PEARSALL	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	81	247	434	496	573	655
PICOSA WSC	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	N/A	$0	0	0	19	58	99	137
PLEASANTON	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	95	307	565	846	985	1,130
POLONIA WSC*	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	0	4
POTH	L	LOCAL GROUNDWATER DEVELOPMENT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	N/A	$0	0	0	0	0	35	97
POTH	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	7	9	14	25	43	64
REFUGIO	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	19	59	85	96	108	119
RUNGE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	10	28	46	55	59	64
S S WSC	L	CRWA - WELLS RANCH (PHASE 3)	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	$1330	$849	345	1,123	1,882	2,655	2,479	2,869
S S WSC	L	DROUGHT MANAGEMENT - S S WSC	DEMAND REDUCTION	$88	N/A	95	0	0	0	0	0
S S WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	16	159
S S WSC	L	SS WSC BRACKISH CARRIZO WILXOC PROJECT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	N/A	$2578	0	0	0	0	1,120	1,120

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
SABINAL	L	DROUGHT MANAGEMENT - SABINAL	DEMAND REDUCTION	$47	N/A	14	0	0	0	0	0
SABINAL	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | UVALDE COUNTY	$1242	$1242	150	150	150	125	125	125
SABINAL	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	20	57	96	141	182	203
SAN ANTONIO WATER SYSTEM	L	DROUGHT MANAGEMENT - SAWS	DEMAND REDUCTION	$99	$358	11,951	31,476	45,677	49,377	53,109	56,588
SAN ANTONIO WATER SYSTEM	L	FE - SAWS ASR TREATMENT PLANT EXPANSION	L | CARRIZO-AQUIFER ASR FRESH/BRACKISH | BEXAR COUNTY	N/A	$115	0	33,600	33,600	33,600	33,600	33,600
SAN ANTONIO WATER SYSTEM	L	FE - SAWS WESTERN INTEGRATION PIPELINE	L | CANYON LAKE/RESERVOIR	$2281	$293	500	3,094	3,094	3,094	3,094	3,094
SAN ANTONIO WATER SYSTEM	L	FE - SAWS WESTERN INTEGRATION PIPELINE	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	$2281	$293	390	390	390	390	390	390
SAN ANTONIO WATER SYSTEM	L	FE - SAWS WESTERN INTEGRATION PIPELINE	L | GUADALUPE RUN-OF-RIVER	$2281	$293	516	516	516	516	516	516
SAN ANTONIO WATER SYSTEM	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$600	$600	24,367	50,667	74,313	89,629	102,682	115,929
SAN ANTONIO WATER SYSTEM	L	REUSE - SAWS - REUSE WATER PROGRAMS	L | DIRECT NON-POTABLE REUSE	N/A	$1194	0	5,000	5,000	15,000	25,000	40,000
SAN ANTONIO WATER SYSTEM	L	SAWS - EXPANDED LOCAL CARRIZO	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | BEXAR COUNTY	N/A	$42	0	0	21,000	21,000	21,000	21,000
SAN ANTONIO WATER SYSTEM	L	SAWS ADVANCED METER INFRASTRUCTURE	DEMAND REDUCTION	$52554	N/A	426	606	510	0	0	0
SAN ANTONIO WATER SYSTEM	L	SAWS EXPANDED BRACKISH GROUNDWATER PROJECT	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	N/A	$1269	0	0	0	0	23,482	23,482
SAN ANTONIO WATER SYSTEM	L	SAWS EXPANDED BRACKISH GROUNDWATER PROJECT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	N/A	$1269	0	0	20,160	20,160	46,678	46,678
SAN MARCOS	L	ARWA - PHASE 2	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	N/A	$199	0	0	7,530	7,530	7,530	7,530
SAN MARCOS	L	ARWA - PHASE 3	L | DIRECT NON-POTABLE REUSE	N/A	$2001	0	0	0	0	2,002	2,002
SAN MARCOS	L	ARWA/GBRA PROJECT (PHASE 1)	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	$1430	$358	2,594	5,380	5,380	5,380	5,380	5,380
SAN MARCOS	L	FE - CRWA HAYS CALDWELL WTP EXPANSION	L | DIRECT NON-POTABLE REUSE	$1566	$698	1,288	1,288	1,288	1,288	1,288	1,288
SAN MARCOS	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$600	0	0	54	395	949	1,706
SAN MARCOS	L	REUSE - SAN MARCOS	L | DIRECT NON-POTABLE REUSE	$1435	$1435	1,826	1,971	1,971	1,971	1,971	1,971
SAN MARCOS	L	REUSE - SAN MARCOS	L | DIRECT POTABLE REUSE	N/A	$1980	0	0	0	3,808	3,808	3,808
SCHERTZ	L	CIBOLO VALLEY LGC CARRIZO GROUNDWATER PROJECT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	N/A	$314	0	2,000	2,000	2,000	2,000	2,000

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
SCHERTZ	L	CIBOLO VALLEY LGC CARRIZO GROUNDWATER PROJECT	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	N/A	$314	0	3,000	3,000	3,000	3,000	3,000
SCHERTZ	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	242	375	622	971	1,428	1,967
SCHERTZ	L	SSLGC EXPANDED BRACKISH WILCOX GROUNDWATER	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	N/A	$214	0	0	2,500	2,500	2,500	2,500
SCHERTZ	L	SSLGC EXPANDED CARRIZO PROJECT	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	$1207	$321	3,000	3,000	3,000	3,000	3,000	3,000
SEADRIFT	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	6	13	15	21	31	41
SEGUIN	L	DROUGHT MANAGEMENT - SEGUIN	DEMAND REDUCTION	$87	N/A	228	0	0	0	0	0
SEGUIN	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	59	232	448
SEGUIN	L	SSLGC EXPANDED BRACKISH WILCOX GROUNDWATER	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | GONZALES COUNTY	N/A	$214	0	0	2,500	2,500	2,500	2,500
SEGUIN	L	SSLGC EXPANDED CARRIZO PROJECT	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	$1207	$321	3,000	3,000	3,000	3,000	3,000	3,000
SELMA	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	N/A	$1242	0	31	88	123	172	223
SELMA	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	62	109	154	202	253	309
SHAVANO PARK	L	DROUGHT MANAGEMENT - SHAVANO PARK	DEMAND REDUCTION	$77	N/A	47	0	0	0	0	0
SHAVANO PARK	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	$1242	$1242	103	129	139	117	113	104
SHAVANO PARK	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	87	123	113	127	114	99
SHAVANO PARK	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	42	109	185	269	356	444
SMILEY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	5	15	26	31	36	42
SOUTH BUDA WCID 1	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	4	6	12	21	38	60
SPRINGS HILL WSC	L	FE - SHWSC LAKE PLACID WTP EXPANSION	L | CANYON LAKE/RESERVOIR	$1207	$551	1,394	1,394	1,394	1,394	1,394	1,394
STEAM ELECTRIC POWER, BEXAR	L	ENTITY PURCHASE TO MEET SHORTAGES - SAWS	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	$701	$1463	2,797	2,797	2,797	2,797	2,797	2,797
STEAM ELECTRIC POWER, BEXAR	L	FE - CPS DIRECT RECYCLE PIPELINE	L | DIRECT NON-POTABLE REUSE	N/A	$20	0	50,000	50,000	50,000	50,000	50,000
STEAM ELECTRIC POWER, VICTORIA	L	GBRA LOWER BASIN NEW APPROPRIATION	L | GBRA LOWER BASIN NEW APPROPRIATION OFF-CHANNEL RESERVOIR	N/A	$207	0	23,925	23,925	23,925	23,925	23,925
STOCKDALE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	13	49	98	143	171	201
SUNKO WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	17	32	47	71	106	145

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
TEXAS STATE UNIVERSITY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	33	101	153	167	185	201
THE OAKS WSC	L	DROUGHT MANAGEMENT - THE OAKS WSC	DEMAND REDUCTION	$112	N/A	9	0	0	0	0	0
THE OAKS WSC	L	ENTITY PURCHASE TO MEET SHORTAGES - SAWS	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	$701	$1463	132	170	208	242	271	294
THE OAKS WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	12	34	44	57	72	89
TRI COMMUNITY WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	0	2
UNIVERSAL CITY	L	DROUGHT MANAGEMENT - UNIVERSAL CITY	DEMAND REDUCTION	$66	N/A	192	0	0	0	0	0
UNIVERSAL CITY	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	$1242	$1242	175	171	150	114	115	119
UNIVERSAL CITY	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	N/A	N/A	0	158	121	124	50	0
UNIVERSAL CITY	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$681	0	0	0	0	67	140
UVALDE	L	DROUGHT MANAGEMENT - UVALDE	DEMAND REDUCTION	$44	N/A	103	0	0	0	0	0
UVALDE	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | UVALDE COUNTY	$1242	$1242	2,138	2,195	2,074	1,947	1,911	2,030
UVALDE	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	193	552	945	1,384	1,744	1,942
VICTORIA	L	DROUGHT MANAGEMENT - VICTORIA	DEMAND REDUCTION	$61	N/A	490	0	0	0	0	0
VICTORIA	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$600	$600	809	2,199	3,642	5,158	6,705	7,516
VICTORIA	L	VICTORIA - ASR	L | GULF COAST AQUIFER ASR | VICTORIA COUNTY	$385	$47	7,900	7,900	7,900	7,900	7,900	7,900
VICTORIA	L	VICTORIA - GROUNDWATER-SURFACE WATER EXCHANGE	L | GULF COAST AQUIFER SYSTEM | VICTORIA COUNTY	$0	$0	8,544	8,544	8,544	8,544	8,544	8,544
WAELDER	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	7	18	21	27	35	44
WATER SERVICES	L	LOCAL GROUNDWATER DEVELOPMENT	L | TRINITY AQUIFER | BEXAR COUNTY	N/A	$611	0	252	252	315	379	504
WATER SERVICES	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$600	$600	24	26	31	59	99	144
WEST MEDINA WSC	L	DROUGHT MANAGEMENT - WEST MEDINA WSC	DEMAND REDUCTION	$121	N/A	7	0	0	0	0	0
WEST MEDINA WSC	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	75	75	75	75	75	75
WEST MEDINA WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	9	30	54	70	79	90
WIMBERLEY WSC	L	GBRA - MBWSP	L | CARRIZO-WILCOX AQUIFER ASR FRESH/BRACKISH | GONZALES COUNTY	N/A	$442	0	262	752	1,366	2,060	2,851
WINDMILL WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	15	43	75	111	125	141
WINGERT WATER SYSTEMS	L	DROUGHT MANAGEMENT - WINGERT WATER SYSTEMS	DEMAND REDUCTION	$115	N/A	10	0	0	0	0	0

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Region L Recommended Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
WINGERT WATER SYSTEMS	L	LOCAL GROUNDWATER DEVELOPMENT	L | TRINITY AQUIFER | COMAL COUNTY	$872	$524	296	296	296	296	296	296
WINGERT WATER SYSTEMS	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$681	$681	5	40	86	102	111	119
WOODSBORO	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	6	9	8	14	20	27
YANCEY WSC	L	DROUGHT MANAGEMENT - YANCEY WSC	DEMAND REDUCTION	$89	N/A	40	0	0	0	0	0
YANCEY WSC	L	EDWARDS TRANSFERS	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	$1242	$1242	100	225	300	350	400	450
YANCEY WSC	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	N/A	$770	0	0	0	0	0	11
YOAKUM*	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	13	40	40	45	53	63
YORKTOWN	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	12	35	36	43	52	60
ZAVALA COUNTY WCID 1	L	MUNICIPAL WATER CONSERVATION	DEMAND REDUCTION	$770	$770	24	65	113	168	225	283

REGION L RECOMMENDED WMS SUPPLY TOTAL	198,517	428,822	550,572	596,348	691,577	736,777

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

Region L Recommended Projects Associated with Water Management Strategies

SPONSOR NAME	SPONSOR IS WWP?	ONLINE DECADE	PROJECT NAME	PROJECT DESCRIPTION	CAPITAL COST
ALLIANCE REGIONAL WATER AUTHORITY	YES	2040	ARWA PHASE 2	MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; STORAGE TANK	$130,526,000
ALLIANCE REGIONAL WATER AUTHORITY	YES	2060	ARWA PHASE 3	CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$73,558,000
ALLIANCE REGIONAL WATER AUTHORITY	YES	2020	ARWA/GBRA SHARED FACILITIES PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; MULTIPLE WELLS/WELL FIELD; NEW SURFACE WATER INTAKE; NEW WATER RIGHT/PERMIT NO IBT; PUMP STATION; STORAGE TANK	$228,365,000
ATASCOSA RURAL WSC	YES	2020	FE - ATASCOSA RURAL WSC INTERCONNECT	CONVEYANCE/TRANSMISSION PIPELINE	$3,623,000
ATASCOSA RURAL WSC	YES	2020	LOCAL GROUNDWATER - ATASCOSA RURAL WSC	MULTIPLE WELLS/WELL FIELD	$6,490,000
BOERNE	YES	2020	BOERNE NON-POTABLE REUSE PROJECT	NEW WATER TREATMENT PLANT	$9,575,000
CANYON REGIONAL WATER AUTHORITY	YES	2030	CRWA - BRACKISH WILCOX GROUNDWATER	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$177,944,000
CANYON REGIONAL WATER AUTHORITY	YES	2060	CRWA SIESTA PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; NEW SURFACE WATER INTAKE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$107,161
CANYON REGIONAL WATER AUTHORITY	YES	2020	CRWA WELLS RANCH (PHASE 3)	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; WATER TREATMENT PLANT EXPANSION	$47,832,000
CANYON REGIONAL WATER AUTHORITY	YES	2020	FE - CRWA EXPANDED LAKE DUNLAP WTP	WATER TREATMENT PLANT EXPANSION	$19,040,000
CANYON REGIONAL WATER AUTHORITY	YES	2020	FE - CRWA HAYS CALDWELL WTP EXPANSION	WATER TREATMENT PLANT EXPANSION	$19,040,000
CIBOLO VALLEY LOCAL GOVERNMENT CORPORATION	YES	2030	CIBOLO VALLEY LCG CARRIZO PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$130,277,000
COUNTY LINE SUD	YES	2050	COUNTY LINE SUD BRACKISH EDWARDS PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; STORAGE TANK	$13,602,000
COUNTY LINE SUD	YES	2050	COUNTY LINE TRINITY WELLFIELD	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; NEW WATER TREATMENT PLANT; PUMP STATION; MULTIPLE WELLS/WELL FIELD	$11,761,000
COUNTY LINE SUD	YES	2020	REUSE - COUNTY LINE SUD	NEW SURFACE WATER INTAKE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$28,256,000
COUNTY-OTHER, CALHOUN	YES	2060	LOCAL GROUNDWATER - CALHOUN COUNTY-OTHER	MULTIPLE WELLS/WELL FIELD	$1,502,000
EL OSO WSC	YES	2020	EL OSO REGION L GROUNDWATER DEVELOPMENT	MULTIPLE WELLS/WELL FIELD; CONVEYANCE/TRANSMISSION PIPELINE; WATER TREATMENT PLANT EXPANSION	$809,000
FAIR OAKS RANCH	YES	2030	FAIR OAKS RANCH NON-POTABLE REUSE PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER TREATMENT PLANT; PUMP STATION	$3,159,000
FLORESVILLE	YES	2040	LOCAL CARRIZO AQUIFER - FLORESVILLE	MULTIPLE WELLS/WELL FIELD; CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER RIGHT/PERMIT NO IBT	$5,477,000
GUADALUPE-BLANCO RIVER AUTHORITY	YES	2020	ARWA/GBRA SHARED FACILITIES PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; MULTIPLE WELLS/WELL FIELD; NEW SURFACE WATER INTAKE; NEW WATER RIGHT/PERMIT NO IBT; PUMP STATION; STORAGE TANK	$124,512,000
GUADALUPE-BLANCO RIVER AUTHORITY	YES	2030	FE - GBRA WESTERN CANYON WTP EXPANSION	WATER TREATMENT PLANT EXPANSION; PUMP STATION	$23,953,000
GUADALUPE-BLANCO RIVER AUTHORITY	YES	2030	FE - HAYS COUNTY PIPELINE	CONVEYANCE/TRANSMISSION PIPELINE	$25,486,000
GUADALUPE-BLANCO RIVER AUTHORITY	YES	2020	GBRA LOWER BASIN STORAGE	NEW SURFACE WATER INTAKE; NEW WATER RIGHT/PERMIT NO IBT; RESERVOIR CONSTRUCTION	$65,470,000
GUADALUPE-BLANCO RIVER AUTHORITY	YES	2030	GBRA MBWSP	CONVEYANCE/TRANSMISSION PIPELINE; NEW SURFACE WATER INTAKE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK; INJECTION WELL	$403,046,000
GUADALUPE-BLANCO RIVER AUTHORITY	YES	2030	GBRA NEW APPROPRIATION (LOWER BASIN)	CONVEYANCE/TRANSMISSION PIPELINE; NEW SURFACE WATER INTAKE; PUMP STATION; RESERVOIR CONSTRUCTION	$381,960,000

Region L Recommended Projects Associated with Water Management Strategies

SPONSOR NAME	SPONSOR IS WWP?	ONLINE DECADE	PROJECT NAME	PROJECT DESCRIPTION	CAPITAL COST
GUADALUPE-BLANCO RIVER AUTHORITY	YES	2030	GBRA VICTORIA COUNTY STEAM ELECTRIC PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; NEW SURFACE WATER INTAKE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$117,260,000
KARNES CITY	YES	2020	KARNES CITY - LOCAL GROUNDWATER DEVELOPMENT	MULTIPLE WELLS/WELL FIELD; CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER RIGHT/PERMIT NO IBT	$4,080,000
KT WATER DEVELOPMENT	YES	2020	LOCAL GROUNDWATER - KT WATER DEVELOPMENT	MULTIPLE WELLS/WELL FIELD	$3,596,000
LULING	YES	2030	LOCAL GROUNDWATER - LULING	MULTIPLE WELLS/WELL FIELD	$4,038,000
MANUFACTURING, DEWITT	YES	2030	LOCAL GROUNDWATER - MANUFACTURING, DEWITT	MULTIPLE WELLS/WELL FIELD	$167,000
MANUFACTURING, KARNES	YES	2040	LOCAL GROUNDWATER - MANUFACTURING, KARNES	MULTIPLE WELLS/WELL FIELD	$188,000
MARTINDALE WSC	YES	2030	MARTINDALE WSC - ALLUVIAL WELL	CONVEYANCE/TRANSMISSION PIPELINE; SINGLE WELL	$1,253,000
MAXWELL WSC	YES	2040	MAXWELL WSC - TRINITY WELLFIELD	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; STORAGE TANK; INJECTION WELL	$7,971,000
MINING, COMAL	YES	2020	LOCAL GROUNDWATER - MINING, COMAL	MULTIPLE WELLS/WELL FIELD	$10,202,000
MINING, DEWITT	YES	2020	LOCAL GULF COAST AQUIFER - DEWITT MINING	MULTIPLE WELLS/WELL FIELD	$1,333,000
MINING, UVALDE	YES	2020	LOCAL GROUNDWATER - MINING, UVALDE	MULTIPLE WELLS/WELL FIELD	$153,000
NEW BRAUNFELS	YES	2020	FE - NBU SEGUIN INTERCONNECT	CONVEYANCE/TRANSMISSION PIPELINE	$2,428,000
NEW BRAUNFELS	YES	2030	FE - NBU SOUTH WTP EXPANSION	WATER TREATMENT PLANT EXPANSION	$27,701,000
NEW BRAUNFELS	YES	2030	NBU - TRINITY DEVELOPMENT	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; PUMP STATION; STORAGE TANK	$19,155,000
NEW BRAUNFELS	YES	2020	NEW BRAUNFELS UTILITIES ASR	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; MULTIPLE WELLS/WELL FIELD; PUMP STATION; STORAGE TANK	$39,198,000
PEARSALL	YES	2020	LOCAL CARRIZO AQUIFER - PEARSALL	MULTIPLE WELLS/WELL FIELD; CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER RIGHT/PERMIT NO IBT	$6,140,000
S S WSC	YES	2060	BRACKISH WILCOX GROUNDWATER FOR SS WSC	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$20,384,000
SAN ANTONIO WATER SYSTEM	YES	2030	FE - CPS DIRECT RECYCLE PIPELINE	CONVEYANCE/TRANSMISSION PIPELINE	$35,589,000
SAN ANTONIO WATER SYSTEM	YES	2030	FE - SAWS EXPANDED ASR TREATMENT PLANT	WATER TREATMENT PLANT EXPANSION	$39,508,000
SAN ANTONIO WATER SYSTEM	YES	2020	FE - SAWS WESTERN INTEGRATED PIPELINE (PHASE 2)	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION; STORAGE TANK	$113,039,000
SAN ANTONIO WATER SYSTEM	YES	2030	RECYCLED WATER PROGRAM - SAWS	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION; STORAGE TANK	$196,963,028
SAN ANTONIO WATER SYSTEM	YES	2040	SAWS - EXPANDED BRACKISH WILCOX PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$819,805,000
SAN ANTONIO WATER SYSTEM	YES	2040	SAWS - EXPANDED LOCAL CARRIZO	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; WATER TREATMENT PLANT EXPANSION	$23,489,000
SAN ANTONIO WATER SYSTEM	YES	2020	SAWS ADVANCED METER INFRASTRUCTURE	DATA GATHERING/MONITORING TECHNOLOGY	$208,060,000
SAN MARCOS	YES	2020	SAN MARCOS - NON-POTABLE REUSE	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION; STORAGE TANK	$106,770,000
SAN MARCOS	YES	2050	SAN MARCOS - POTABLE REUSE	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION; WATER TREATMENT PLANT EXPANSION	$106,770,000
SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	YES	2040	BRACKISH WILCOX GROUNDWATER FOR SSLGC	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$31,941,000
SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	YES	2020	SSLGC EXPANDED CARRIZO PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK	$75,542,000

Region L Recommended Projects Associated with Water Management Strategies

SPONSOR NAME	SPONSOR IS WWP?	ONLINE DECADE	PROJECT NAME	PROJECT DESCRIPTION	CAPITAL COST
SPRINGS HILL WSC	YES	2030	FE - SPRINGS HILL 16INCH BORED PIPELINE UNDER THE GUADALUPE RIVER	CONVEYANCE/TRANSMISSION PIPELINE	$490,000
SPRINGS HILL WSC	YES	2020	FE - SPRINGS HILL LAKE PLACID WTP EXPANSION	WATER TREATMENT PLANT EXPANSION; PUMP STATION	$12,995,000
VICTORIA	YES	2020	VICTORIA - ASR	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; PUMP STATION; INJECTION WELL	$37,982,000
WATER SERVICES	YES	2030	LOCAL GROUNDWATER - WATER SERVICES	MULTIPLE WELLS/WELL FIELD	$4,378,000
WINGERT WATER SYSTEMS	YES	2020	LOCAL GROUNDWATER - WINGERT WATER SYSTEMS	MULTIPLE WELLS/WELL FIELD	$1,463,000

REGION L RECOMMENDED CAPITAL COST TOTAL	**$4,015,401,189**

Region L Alternative Water User Group (WUG) Water Management Strategies (WMS)

						WATER MANAGEMENT STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
WUG ENTITY NAME	WMS SPONSOR REGION	WMS NAME	SOURCE NAME	UNIT COST 2020	UNIT COST 2070	2020	2030	2040	2050	2060	2070
REGION L ALTERNATIVE WMS SUPPLY TOTAL											

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

Region L Alternative Projects Associated with Water Management Strategies

SPONSOR NAME	SPONSOR IS WWP?	ONLINE DECADE	PROJECT NAME	PROJECT DESCRIPTION	CAPITAL COST
				REGION L ALTERNATIVE CAPITAL COST TOTAL	

Region L Water User Group (WUG) Management Supply Factor

WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. To calculate the Management Supply Factor for each WUG as a whole, not split by region-county-basin, the combined total of existing and future supply is divided by the total projected demand. If a WUG is split by more than one planning region, the whole WUG's management supply factor will show up in each of its planning region's management supply factor reports.

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	2020	2030	2040	2050	2060	2070
AIR FORCE VILLAGE II INC	1.1	1.1	1.1	1.1	1.1	1.1
ALAMO HEIGHTS	1.0	1.0	1.0	1.0	1.0	1.0
AQUA WSC*	1.2	1.0	1.0	1.1	1.1	1.0
ASHERTON	1.0	1.1	1.2	1.2	1.2	1.3
ATASCOSA RURAL WSC	1.2	1.6	1.4	1.2	1.1	1.1
BATESVILLE WSC	1.0	1.1	1.1	1.1	1.1	1.1
BENTON CITY WSC	1.4	1.2	1.1	1.0	1.0	1.0
BEXAR COUNTY WCID 10	1.0	1.0	1.0	1.0	1.0	1.0
BIG WELLS	1.0	1.0	1.0	1.0	1.1	1.1
BOERNE	2.1	1.9	1.6	1.5	1.3	1.2
BUDA*	2.4	3.0	2.7	2.1	1.8	1.4
CANYON LAKE WATER SERVICE*	2.4	1.9	1.5	1.3	1.1	1.0
CARRIZO HILL WSC	1.0	1.1	1.1	1.1	1.1	1.1
CARRIZO SPRINGS	1.0	1.1	1.2	1.3	1.3	1.4
CASTROVILLE	1.1	1.0	1.1	1.1	1.0	1.1
CHARLOTTE	3.3	3.0	2.7	2.5	2.3	2.2
CIBOLO	1.7	2.5	2.2	2.2	2.2	2.2
CLEAR WATER ESTATES WATER SYSTEM	1.1	1.2	1.2	1.3	1.4	1.4
CONVERSE	1.0	1.0	1.0	1.0	1.0	1.0
COTULLA	1.9	1.8	1.8	1.8	1.7	1.7
COUNTY LINE SUD	3.4	3.0	3.2	3.5	3.7	3.6
COUNTY-OTHER, ATASCOSA	1.5	1.5	1.5	1.5	1.5	1.4
COUNTY-OTHER, BEXAR	2.8	2.7	4.0	2.7	2.3	2.1
COUNTY-OTHER, CALDWELL	10.3	20.5	18.9	18.0	14.4	12.2
COUNTY-OTHER, CALHOUN	1.4	1.3	1.2	1.1	1.8	1.7
COUNTY-OTHER, COMAL	2.3	2.4	2.5	2.6	2.7	2.8
COUNTY-OTHER, DEWITT	1.0	1.0	1.1	1.1	1.1	1.0
COUNTY-OTHER, DIMMIT	1.2	1.1	1.1	1.1	1.0	1.0
COUNTY-OTHER, FRIO	1.4	1.3	1.2	1.1	1.1	1.0
COUNTY-OTHER, GOLIAD	1.5	1.4	1.3	1.3	1.3	1.3
COUNTY-OTHER, GONZALES	3.0	2.9	2.7	2.5	2.3	2.1
COUNTY-OTHER, GUADALUPE	4.1	3.7	3.3	3.0	2.7	2.6
COUNTY-OTHER, HAYS*	1.4	2.9	1.9	1.6	1.2	1.1
COUNTY-OTHER, KARNES	1.1	1.1	1.2	1.2	1.2	1.2
COUNTY-OTHER, KENDALL	1.6	1.7	1.6	1.6	1.6	1.5
COUNTY-OTHER, LA SALLE	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, MEDINA	2.0	1.8	1.7	1.7	1.6	1.6
COUNTY-OTHER, REFUGIO	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, UVALDE	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, VICTORIA	1.0	1.0	1.0	1.0	1.0	1.0
COUNTY-OTHER, WILSON	1.7	1.8	2.1	2.7	8.6	8.6
COUNTY-OTHER, ZAVALA	1.5	1.4	1.3	1.2	1.2	1.1
CREEDMOOR-MAHA WSC*	1.9	2.1	1.4	1.3	1.2	1.1
CRYSTAL CITY	1.5	1.4	1.4	1.4	1.3	1.3

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

Region L Water User Group (WUG) Management Supply Factor

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	2020	2030	2040	2050	2060	2070
CRYSTAL CLEAR WSC	2.1	2.0	2.9	2.5	2.5	2.2
CUERO	1.0	1.1	1.2	1.3	1.3	1.4
DEVINE	1.3	1.3	1.3	1.2	1.2	1.2
DILLEY	2.0	1.9	1.9	1.9	1.8	1.8
EAST CENTRAL SUD	1.5	1.4	1.3	1.2	1.1	1.0
EAST MEDINA COUNTY SUD	1.0	1.0	1.0	1.0	1.0	1.0
EL OSO WSC*	1.0	1.1	1.2	1.2	1.1	1.1
ELMENDORF	1.1	1.0	1.0	1.0	1.0	1.0
ENCINAL WSC	1.4	1.4	1.4	1.4	1.3	1.3
FAIR OAKS RANCH	1.2	1.4	1.4	1.4	1.3	1.3
FALLS CITY	1.6	1.8	1.9	2.0	2.1	2.1
FLORESVILLE	1.3	1.2	1.4	1.3	1.5	1.4
FORT SAM HOUSTON	1.0	1.0	1.0	1.0	1.0	1.1
GARDEN RIDGE	1.1	1.1	1.2	1.3	1.4	1.4
GOFORTH SUD*	3.6	2.4	1.8	1.5	1.2	1.0
GOLIAD	2.0	1.9	1.9	1.9	1.9	1.9
GONZALES	2.6	2.4	2.4	2.3	2.2	2.1
GONZALES COUNTY WSC	1.7	1.6	1.6	1.5	1.5	1.5
GREEN VALLEY SUD	2.6	2.1	2.1	1.8	1.6	1.4
GUADALUPE-BLANCO RIVER AUTHORITY	182.3	233.1	226.9	209.2	181.2	154.8
HONDO	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, ATASCOSA	1.1	1.1	1.1	1.1	1.1	1.1
IRRIGATION, BEXAR	0.9	0.9	0.9	0.9	0.9	0.9
IRRIGATION, CALDWELL	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, CALHOUN	0.1	0.1	0.1	0.1	0.1	0.1
IRRIGATION, COMAL	1.5	1.5	1.5	1.5	1.5	1.5
IRRIGATION, DEWITT	0.6	0.7	0.9	1.0	1.9	2.0
IRRIGATION, DIMMIT	0.1	0.1	0.1	0.1	0.1	0.1
IRRIGATION, FRIO	1.0	1.0	1.0	1.0	0.9	0.9
IRRIGATION, GOLIAD	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, GONZALES	1.1	1.1	1.1	1.1	1.1	1.1
IRRIGATION, GUADALUPE	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, HAYS*	1.9	1.9	1.9	1.9	1.9	1.9
IRRIGATION, KARNES	0.7	0.7	0.1	0.1	0.1	0.1
IRRIGATION, KENDALL	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, LA SALLE	0.8	0.8	0.8	0.8	0.8	0.8
IRRIGATION, MEDINA	0.4	0.4	0.4	0.4	0.3	0.3
IRRIGATION, REFUGIO	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, UVALDE	0.3	0.3	0.3	0.3	0.3	0.3
IRRIGATION, VICTORIA	1.0	1.0	1.0	1.0	1.0	1.0
IRRIGATION, WILSON	1.0	1.0	1.0	1.0	0.3	0.3
IRRIGATION, ZAVALA	0.5	0.5	0.5	0.6	0.6	0.6
JOURDANTON	2.2	2.1	1.9	1.8	1.7	1.6
KARNES CITY	1.3	1.3	1.4	1.5	1.5	1.6
KENDALL COUNTY WCID 1	3.2	2.9	2.5	2.3	2.0	1.8
KENDALL WEST UTILITY	1.6	1.0	1.0	1.0	1.0	1.0
KENEDY	1.4	1.4	1.5	1.6	1.6	1.7
KIRBY	1.0	1.0	1.0	1.0	1.0	1.0

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

Region L Water User Group (WUG) Management Supply Factor

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
KNIPPA WSC	2.2	2.1	2.1	2.0	1.9	1.8
KT WATER DEVELOPMENT	1.4	1.2	1.3	1.5	1.4	1.5
KYLE	2.1	1.4	1.8	1.8	2.0	2.0
LA COSTE	1.5	1.3	1.2	1.2	1.1	1.0
LA VERNIA	2.7	2.3	2.1	1.9	1.8	1.7
LACKLAND AIR FORCE BASE	1.0	1.0	1.1	1.1	1.1	1.1
LEON VALLEY	1.0	1.0	1.0	1.0	1.0	1.0
LIVE OAK	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, ATASCOSA	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, BEXAR	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, CALDWELL	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, CALHOUN	1.4	1.4	1.4	1.4	1.4	1.4
LIVESTOCK, COMAL	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, DEWITT	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, DIMMIT	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, FRIO	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, GOLIAD	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, GONZALES	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, GUADALUPE	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, HAYS*	1.3	1.3	1.3	1.3	1.3	1.3
LIVESTOCK, KARNES	1.8	1.8	1.5	1.5	1.5	1.5
LIVESTOCK, KENDALL	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, LA SALLE	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, MEDINA	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, REFUGIO	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, UVALDE	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, VICTORIA	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, WILSON	1.0	1.0	1.0	1.0	1.0	1.0
LIVESTOCK, ZAVALA	1.0	1.0	1.0	1.0	1.0	1.0
LOCKHART	2.7	2.3	2.0	1.7	1.5	1.4
LOMA ALTA CHULA VISTA WATER SYSTEM	1.1	1.1	1.2	1.3	1.3	1.4
LULING	1.1	1.3	1.1	1.2	1.1	1.1
LYTLE	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, ATASCOSA	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, BEXAR	1.2	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, CALDWELL	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, CALHOUN	1.3	1.2	1.1	1.1	1.1	1.1
MANUFACTURING, COMAL	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, DEWITT	1.2	1.6	1.7	1.7	1.7	1.7
MANUFACTURING, GOLIAD	4.0	4.0	4.0	4.0	4.0	4.0
MANUFACTURING, GONZALES	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, GUADALUPE	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, HAYS*	3.1	2.7	2.7	2.7	2.7	2.7
MANUFACTURING, KARNES	1.0	1.0	1.8	1.5	1.6	1.6
MANUFACTURING, KENDALL	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, MEDINA	24.5	23.0	23.0	23.0	23.0	23.0
MANUFACTURING, UVALDE	37.0	37.0	37.0	37.0	37.0	37.0
MANUFACTURING, VICTORIA	0.1	1.8	1.8	1.8	1.8	1.8

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

Region L Water User Group (WUG) Management Supply Factor

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	2020	2030	2040	2050	2060	2070
MANUFACTURING, WILSON	1.0	1.0	1.0	1.0	1.0	1.0
MANUFACTURING, ZAVALA	1.0	1.0	1.0	1.0	1.0	1.0
MARION	1.3	1.1	1.0	1.0	1.0	1.0
MARTINDALE WSC	1.4	1.7	1.6	1.5	1.6	1.6
MAXWELL WSC	2.0	1.8	1.9	1.7	1.5	1.3
MCCOY WSC*	2.2	1.9	1.8	1.6	1.5	1.4
MEDINA COUNTY WCID 2	4.1	3.8	3.6	3.4	3.2	3.1
MEDINA RIVER WEST WSC	3.5	3.2	3.0	2.9	2.7	2.6
MINING, ATASCOSA	1.0	1.0	1.0	1.0	1.0	1.0
MINING, BEXAR	1.0	1.0	1.0	1.0	1.0	1.0
MINING, CALDWELL	1.0	1.0	1.0	1.0	1.1	1.0
MINING, CALHOUN	1.0	1.0	1.0	1.0	1.1	1.0
MINING, COMAL	1.0	1.0	1.0	1.0	1.0	1.0
MINING, DEWITT	1.1	1.1	1.7	2.4	4.0	7.4
MINING, DIMMIT	0.1	0.1	0.2	0.2	0.5	1.1
MINING, FRIO	1.0	1.0	1.0	1.0	1.0	1.0
MINING, GOLIAD	1.0	1.0	1.0	1.0	1.0	1.0
MINING, GONZALES	1.0	1.0	1.0	1.0	1.0	1.0
MINING, GUADALUPE	1.0	1.0	1.0	1.0	1.0	1.0
MINING, KARNES	0.2	0.2	0.3	0.7	1.3	14.0
MINING, LA SALLE	0.1	0.1	0.1	0.2	0.4	0.8
MINING, MEDINA	1.1	1.1	1.1	1.1	1.1	1.1
MINING, REFUGIO	1.0	1.0	1.0	1.0	1.0	1.0
MINING, UVALDE	1.1	1.0	1.0	1.0	1.0	1.0
MINING, VICTORIA	1.0	1.0	1.0	1.0	1.0	1.0
MINING, WILSON	1.0	1.0	1.0	1.0	1.0	1.0
MINING, ZAVALA	1.0	1.0	1.0	1.0	1.0	1.0
MOORE WSC	36.1	33.4	31.2	29.4	27.8	26.4
NATALIA	1.1	1.1	1.0	1.1	1.1	1.1
NEW BRAUNFELS	2.2	2.0	1.8	1.6	1.4	1.3
NIXON	9.2	8.5	8.0	7.4	6.9	6.4
OAK HILLS WSC	1.1	1.1	1.1	1.1	1.1	1.1
PEARSALL	1.1	1.1	1.5	1.4	1.4	1.3
PICOSA WSC	1.3	1.1	1.0	1.0	1.0	1.0
PLEASANTON	2.1	1.9	1.8	1.8	1.6	1.6
POINT COMFORT	2.0	1.9	1.8	1.7	1.5	1.4
POLONIA WSC*	2.8	2.3	2.0	1.8	1.6	1.4
PORT LAVACA	2.3	2.1	1.9	1.8	1.7	1.6
PORT OCONNOR MUD	11.2	10.7	10.1	9.5	8.9	8.4
POTEET	1.7	1.5	1.4	1.3	1.2	1.1
POTH	1.7	1.4	1.2	1.1	1.1	1.1
QUAIL CREEK MUD	6.4	6.3	6.1	6.0	5.8	5.7
RANDOLPH AIR FORCE BASE	1.7	1.5	1.3	1.2	1.1	1.1
REFUGIO	1.0	1.1	1.2	1.2	1.2	1.2
RUNGE	1.0	1.1	1.2	1.2	1.2	1.2
S S WSC	1.0	1.0	1.0	1.0	1.0	1.0
SABINAL	1.1	1.1	1.1	1.1	1.1	1.0
SAN ANTONIO WATER SYSTEM	1.2	1.4	1.6	1.6	1.7	1.7

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

Region L Water User Group (WUG) Management Supply Factor

	WUG MANAGEMENT SUPPLY FACTOR					
WUG NAME	2020	2030	2040	2050	2060	2070
SAN MARCOS	1.7	1.7	2.0	1.9	1.7	1.5
SCHERTZ	1.5	1.9	1.9	1.6	1.4	1.2
SEADRIFT	1.0	1.0	1.1	1.1	1.1	1.1
SEGUIN	1.2	1.1	1.5	1.5	1.4	1.4
SELMA	1.5	1.0	1.0	1.0	1.0	1.1
SHAVANO PARK	1.0	1.0	1.0	1.0	1.0	1.0
SMILEY	3.7	3.5	3.4	3.1	2.9	2.7
SOUTH BUDA WCID 1	3.1	2.4	1.9	1.6	1.3	1.1
SPRINGS HILL WSC	3.2	2.3	2.0	1.7	1.5	1.4
STEAM ELECTRIC POWER, ATASCOSA	1.0	1.0	1.0	1.0	1.0	1.0
STEAM ELECTRIC POWER, BEXAR	1.0	2.0	2.0	2.0	2.0	2.0
STEAM ELECTRIC POWER, FRIO	1.0	1.0	1.0	1.0	1.0	1.0
STEAM ELECTRIC POWER, GOLIAD	14.0	14.0	14.0	14.0	14.0	14.0
STEAM ELECTRIC POWER, GUADALUPE	1.4	1.4	1.4	1.4	1.4	1.4
STEAM ELECTRIC POWER, VICTORIA	0.4	1.2	1.2	1.2	1.2	1.2
STEAM ELECTRIC POWER, WILSON	1.0	1.0	1.0	1.0	1.0	1.0
STOCKDALE	2.4	2.1	1.9	1.7	1.6	1.5
SUNKO WSC	2.1	1.8	1.6	1.4	1.3	1.2
TEXAS STATE UNIVERSITY	1.3	1.4	1.4	1.4	1.5	1.5
THE OAKS WSC	1.1	1.0	1.0	1.0	1.0	1.0
TRI COMMUNITY WSC	2.8	2.4	2.0	1.8	1.6	1.4
UNIVERSAL CITY	1.0	1.0	1.0	1.0	1.0	1.0
UVALDE	1.0	1.0	1.0	1.0	1.0	1.0
VICTORIA	1.5	1.5	1.5	1.5	1.6	1.6
VICTORIA COUNTY WCID 1	1.5	1.4	1.4	1.4	1.3	1.3
WAELDER	3.0	2.8	2.7	2.5	2.3	2.2
WATER SERVICES	1.1	1.2	1.1	1.1	1.1	1.1
WEST MEDINA WSC	1.2	1.1	1.1	1.1	1.1	1.0
WIMBERLEY WSC	1.1	1.0	1.0	1.0	1.0	1.0
WINDMILL WSC	1.4	1.4	1.4	1.4	1.3	1.3
WINGERT WATER SYSTEMS	2.0	1.6	1.5	1.5	1.5	1.5
WOODSBORO	1.0	1.0	1.0	1.1	1.1	1.1
YANCEY WSC	1.0	1.0	1.1	1.0	1.0	1.0
YOAKUM*	1.2	1.3	1.3	1.3	1.3	1.4
YORKTOWN	1.0	1.1	1.1	1.1	1.1	1.1
ZAVALA COUNTY WCID 1	2.8	2.7	2.5	2.4	2.4	2.3

*A single asterisk next to a WUG's name denotes that the WUG is split by more than one planning region.

Region L Recommended Water Management Strategy (WMS) Supply Associated with a New or Amended Inter-Basin Transfer (IBT) Permit

IBT WMS supply is the portion of the total WMS benefitting WUGs that will require a new or amended IBT permit that is not considered exempt under the Texas Water Code § 11.085.

			IBT WMS SUPPLY (ACRE-FEET PER YEAR)					
WMS NAME	SOURCE BASIN	RECIPIENT WUG BASIN	2020	2030	2040	2050	2060	2070

Region L Water User Groups (WUGs)
Recommended Water Management Strategy (WMS) Supply Associated with a
New or Amended Inter-Basin Transfer (IBT) Permit and Total Recommended Conservation WMS Supply

IBT WMS supply is the portion of the total WMS benefitting the WUG basin split listed that will require a new or amended IBT permit that is not considered exempt under the Texas Water Code § 11.085. Total conservation supply represents all conservation WMS volumes recommended within the WUG's region-basin geographic split.

BENEFITTING WUG NAME | BASIN	WMS SOURCE ORIGIN BASIN | WMS NAME	WMS SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070

Region L Sponsored Recommended Water Management Strategy (WMS) Supplies Unallocated* to Water User Groups (WUG)

WMS NAME	WMS SPONSOR	SOURCE NAME	UNALLOCATED STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
			2020	2030	2040	2050	2060	2070
ARWA - PHASE 3	ALLIANCE REGIONAL WATER AUTHORITY	L | DIRECT NON-POTABLE REUSE	0	0	0	0	16	16
CRWA - BRACKISH WILCOX GROUNDWATER	CANYON REGIONAL WATER AUTHORITY	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	0	9,340	9,340	9,340	9,340	9,340
CRWA - BRACKISH WILCOX GROUNDWATER	CANYON REGIONAL WATER AUTHORITY	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	0	5,360	5,360	5,360	3,675	3,675
CRWA - BRACKISH WILCOX GROUNDWATER (GW CONVERSION)	CANYON REGIONAL WATER AUTHORITY	L | CARRIZO-WILCOX AQUIFER FRESH/BRACKISH | WILSON COUNTY	0	0	0	0	1,685	1,685
CRWA - SIESTA PROJECT	CANYON REGIONAL WATER AUTHORITY	L | SAN ANTONIO INDIRECT REUSE	0	0	0	0	1,572	1,572
CRWA - SIESTA PROJECT	CANYON REGIONAL WATER AUTHORITY	L | SAN ANTONIO RUN-OF-RIVER	0	0	0	0	3,470	3,470
CRWA - WELLS RANCH (PHASE 3)	CANYON REGIONAL WATER AUTHORITY	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	2,891	5,237	4,198	3,300	3,158	2,411
FE - CRWA LAKE DUNLAP WTP EXPANSION	CANYON REGIONAL WATER AUTHORITY	L | CANYON LAKE/RESERVOIR	1,040	1,040	1,040	1,040	1,040	1,040
		TOTAL UNALLOCATED STRATEGY SUPPLIES	**3,931**	**20,977**	**19,938**	**19,040**	**23,956**	**23,209**

* Strategy supplies created through the WMS that have not been assigned to a WUG will be allocated to the entity responsible for the water through an ‘unassigned water volumes’ entity. Only strategy supplies associated with an 'unassigned water volume' entity are shown in this report, and may not represent all strategy supplies associated with the listed WMS.

Region L Water User Group (WUG) Strategy Supplies by Water Management Strategy (WMS) Type

WMS TYPE *	STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
AQUIFER STORAGE & RECOVERY	18,718	75,318	75,318	75,318	75,318	75,315
DIRECT POTABLE REUSE	0	0	0	3,808	3,808	3,808
DROUGHT MANAGEMENT	14,165	31,476	45,677	49,377	53,109	56,588
GROUNDWATER DESALINATION	0	0	25,160	25,660	53,798	54,298
GROUNDWATER WELLS & OTHER	69,203	88,540	134,718	138,565	165,748	168,222
MUNICIPAL CONSERVATION	29,382	64,038	96,760	120,884	143,799	167,148
NEW MAJOR RESERVOIR	59,780	100,280	100,280	100,280	100,280	100,280
OTHER DIRECT REUSE	4,604	61,731	62,291	72,851	88,732	104,292
OTHER SURFACE WATER	2,665	7,439	10,368	9,605	6,985	6,826
IRRIGATION CONSERVATION	0	0	0	0	0	0
OTHER CONSERVATION	0	0	0	0	0	0
INDIRECT REUSE	0	0	0	0	0	0
OTHER STRATEGIES	0	0	0	0	0	0
SEAWATER DESALINATION	0	0	0	0	0	0
CONJUNCTIVE USE	0	0	0	0	0	0
TOTAL STRATEGY SUPPLIES	**198,517**	**428,822**	**550,572**	**596,348**	**691,577**	**736,777**

* WMS type descriptions can be found on the interactive state water plan website at http://texasstatewaterplan.org/ using the 'View data for' drop-down menus to navigate to a specific WMS Type page. The data used to create each WMS type value is available in Appendix 3 of the Guidelines for Regional Water Planning Data Deliverable (Exhibit D) document at http://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2021/doc/current_docs/contract_docs/ExhibitD.pdf.

Region L Water User Group (WUG)
Recommended Water Management Strategy (WMS) Supplies by Source Type

SOURCE SUBTYPE*	STRATEGY SUPPLY (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
AQUIFER STORAGE & RECOVERY	18,718	75,318	75,318	75,318	75,318	75,315
GROUNDWATER	69,203	88,540	159,878	164,225	219,546	222,520
GROUNDWATER TOTAL STRATEGY SUPPLIES	**87,921**	**163,858**	**235,196**	**239,543**	**294,864**	**297,835**
DIRECT NON-POTABLE REUSE	4,604	61,731	62,291	72,851	88,732	104,292
DIRECT POTABLE REUSE	0	0	0	3,808	3,808	3,808
INDIRECT NON-POTABLE REUSE	0	0	0	0	0	0
INDIRECT POTABLE REUSE	0	0	0	0	0	0
REUSE TOTAL STRATEGY SUPPLIES	**4,604**	**61,731**	**62,291**	**76,659**	**92,540**	**108,100**
ATMOSPHERE	0	0	0	0	0	0
GULF OF MEXICO	0	0	0	0	0	0
LIVESTOCK LOCAL SUPPLY	0	0	0	0	0	0
OTHER LOCAL SUPPLY	0	0	0	0	0	0
RAINWATER HARVESTING	0	0	0	0	0	0
RESERVOIR	61,674	106,947	109,876	109,113	106,493	106,334
RESERVOIR SYSTEM	0	0	0	0	0	0
RUN-OF-RIVER	771	772	772	772	772	772
SURFACE WATER TOTAL STRATEGY SUPPLIES	**62,445**	**107,719**	**110,648**	**109,885**	**107,265**	**107,106**
REGION L TOTAL STRATEGY SUPPLIES	**154,970**	**333,308**	**408,135**	**426,087**	**494,669**	**513,041**

* A full list of source subtype definitions can be found in section 3 of the Guidelines for Regional Water Planning Data Deliverable (Exhibit D) document at http://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2021/doc/current_docs/contract_docs/ExhibitD.pdf.

Region L Major Water Provider (MWP) Existing Sales and Transfers

Major Water Providers are entities of particular significance to a region's water supply as defined by the Regional Water Planning Group (RWPG), and may be a Water User Group (WUG) entity, Wholesale Water Provider (WWP) entity , or both (WUG/WWP).

Retail denotes WUG projected demands and existing water supplies used by the WUG. Wholesale denotes a WWP or WUG/WWP selling water to another entity.

ALLIANCE REGIONAL WATER AUTHORITY - WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
PROJECTED WHOLESALE CONTRACT DEMANDS						
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS						

CANYON REGIONAL WATER AUTHORITY - WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
PROJECTED WHOLESALE CONTRACT DEMANDS	26,817	26,817	26,817	26,817	26,817	26,817
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**26,817**	**26,817**	**26,817**	**26,817**	**26,817**	**26,817**
GROUNDWATER SALES TO WHOLESALE CUSTOMERS	13,029	13,029	13,029	13,029	13,029	13,029
SURFACE WATER SALES TO WHOLESALE CUSTOMERS	13,788	13,788	13,788	13,788	13,788	13,788
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**26,817**	**26,817**	**26,817**	**26,817**	**26,817**	**26,817**

GUADALUPE-BLANCO RIVER AUTHORITY - WUG/WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
PROJECTED RETAIL WUG DEMANDS	325	343	363	387	417	447
PROJECTED WHOLESALE CONTRACT DEMANDS	122,332	122,332	118,332	118,332	118,332	118,332
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**122,657**	**122,675**	**118,695**	**118,719**	**118,749**	**118,779**
SURFACE WATER SALES TO RETAIL CUSTOMERS	325	343	363	387	417	447
SURFACE WATER SALES TO WHOLESALE CUSTOMERS	118,005	117,283	114,190	114,784	117,230	117,215
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**118,330**	**117,626**	**114,553**	**115,171**	**117,647**	**117,662**

NEW BRAUNFELS - WUG/WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
PROJECTED RETAIL WUG DEMANDS	18,588	23,079	27,538	32,193	36,772	41,262
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**18,588**	**23,079**	**27,538**	**32,193**	**36,772**	**41,262**
GROUNDWATER SALES TO RETAIL CUSTOMERS	9,498	9,498	9,498	9,498	9,498	9,498
REUSE SALES TO RETAIL CUSTOMERS	107	107	107	107	107	107
SURFACE WATER SALES TO RETAIL CUSTOMERS	9,825	9,825	9,825	9,825	9,825	9,825
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**19,430**	**19,430**	**19,430**	**19,430**	**19,430**	**19,430**

SAN ANTONIO WATER SYSTEM - WUG/WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
PROJECTED RETAIL WUG DEMANDS	239,028	262,301	285,481	308,607	331,930	353,673
PROJECTED WHOLESALE CONTRACT DEMANDS	7,330	6,830	6,830	6,830	6,830	6,830
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**246,358**	**269,131**	**292,311**	**315,437**	**338,760**	**360,503**
GROUNDWATER SALES TO RETAIL CUSTOMERS	214,777	213,563	215,431	218,868	220,779	220,779
REUSE SALES TO RETAIL CUSTOMERS	25,000	30,000	35,000	35,000	35,000	35,000
SURFACE WATER SALES TO RETAIL CUSTOMERS	6,364	4,270	270	270	270	270
GROUNDWATER SALES TO WHOLESALE CUSTOMERS	1,130	1,130	1,130	1,130	1,130	1,130
SURFACE WATER SALES TO WHOLESALE CUSTOMERS	500	0	0	0	0	0
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**247,771**	**248,963**	**251,831**	**255,268**	**257,179**	**257,179**

SAN MARCOS - WUG/WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070

Region L Major Water Provider (MWP) Existing Sales and Transfers

PROJECTED RETAIL WUG DEMANDS	10,902	12,715	14,971	17,750	21,141	25,199
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**10,902**	**12,715**	**14,971**	**17,750**	**21,141**	**25,199**
GROUNDWATER SALES TO RETAIL CUSTOMERS	3,084	3,084	3,084	3,084	3,084	3,084
SURFACE WATER SALES TO RETAIL CUSTOMERS	10,000	10,000	10,000	10,000	10,000	10,000
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**13,084**	**13,084**	**13,084**	**13,084**	**13,084**	**13,084**

SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION - WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
PROJECTED WHOLESALE CONTRACT DEMANDS	17,039	16,644	17,039	17,039	17,039	17,039
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**17,039**	**16,644**	**17,039**	**17,039**	**17,039**	**17,039**
GROUNDWATER SALES TO WHOLESALE CUSTOMERS	17,039	16,644	17,039	17,039	17,039	17,039
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**17,039**	**16,644**	**17,039**	**17,039**	**17,039**	**17,039**

VICTORIA - WUG/WWP	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
PROJECTED RETAIL WUG DEMANDS	17,110	17,965	18,629	19,299	19,930	20,470
TOTAL PROJECTED WHOLESALE CONTRACT AND RETAIL DEMANDS	**17,110**	**17,965**	**18,629**	**19,299**	**19,930**	**20,470**
GROUNDWATER SALES TO RETAIL CUSTOMERS	6,327	6,327	6,327	6,327	6,327	6,327
SURFACE WATER SALES TO RETAIL CUSTOMERS	1,848	1,848	1,848	1,848	1,848	1,848
TOTAL WHOLESALE AND RETAIL SALES TO CUSTOMERS	**8,175**	**8,175**	**8,175**	**8,175**	**8,175**	**8,175**

Region L Major Water Provider (MWP) Water Management Strategy (WMS) Summary

MWPs are entities of significance to a region's water supply as defined by the Regional Water Planning Group (RWPG) and may be a Water User Group (WUG) entity, Wholesale Water Provider (WWP) entity, or both (WUG/WWP).'MWP Retail Customers' denotes recommended WMS supply used by the WUG. 'Transfers Related to Wholesale Customers' denotes a WWP or WUG/WWP selling or transferring recommended WMS supply to another entity. Supply associated with the MWP's wholesale transfers will only display if it is listed as the main seller in the State Water Planning database, even if multiple sellers are involved with the sale o water to WUGs. Unallocated water volumes represent MWP recommended WMS supply not currently allocated to a customer of the MWP.'Total MWP Related WMS Supply' will display if the MWP's WMS is related to more than one WMS supply type (retail, wholesale, and/or unallocated). Associated WMS Projects are listed when the MWP is one of the project's sponsors. Report contains draft data and is subject to change.

ALLIANCE REGIONAL WATER AUTHORITY | ARWA - PHASE 2

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	0	0	20,999	20,999	20,999	20,999

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
ARWA PHASE 2	MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; STORAGE TANK

ALLIANCE REGIONAL WATER AUTHORITY | ARWA - PHASE 3

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	0	0	0	0	5,478	5,478
RELATED UNALLOCATED WMS WATER VOLUMES	0	0	0	0	16	16
TOTAL MWP RELATED WMS SUPPLY	0	0	0	0	5,494	5,494

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
ARWA PHASE 3	CONVEYANCE/TRANSMISSION PIPELINE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK

ALLIANCE REGIONAL WATER AUTHORITY | ARWA/GBRA PROJECT (PHASE 1)

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	15,000	15,000	15,000	15,000	15,000	15,000

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
ARWA/GBRA SHARED FACILITIES PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; MULTIPLE WELLS/WELL FIELD; NEW SURFACE WATER INTAKE; NEW WATER RIGHT/PERMIT NO IBT; PUMP STATION; STORAGI TANK

CANYON REGIONAL WATER AUTHORITY | CRWA - SIESTA PROJECT

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
RELATED UNALLOCATED WMS WATER VOLUMES	0	0	0	0	5,042	5,042

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
CRWA SIESTA PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; NEW SURFACE WATER INTAKE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK

CANYON REGIONAL WATER AUTHORITY | CRWA - WELLS RANCH (PHASE 3)

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	609	1,763	2,802	3,700	3,842	4,589
RELATED UNALLOCATED WMS WATER VOLUMES	2,891	5,237	4,198	3,300	3,158	2,411
TOTAL MWP RELATED WMS SUPPLY	3,500	7,000	7,000	7,000	7,000	7,000

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
CRWA WELLS RANCH (PHASE 3)	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; WATER TREATMENT PLANT EXPANSION

CANYON REGIONAL WATER AUTHORITY | FE - CRWA HAYS CALDWELL WTP EXPANSION

	WATER VOLUMES (ACRE-FEET PER YEAR)

Region L Major Water Provider (MWP) Water Management Strategy (WMS) Summary

DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	1,543	1,543	1,543	1,543	1,543	1,543
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
FE - CRWA HAYS CALDWELL WTP EXPANSION	WATER TREATMENT PLANT EXPANSION					

CANYON REGIONAL WATER AUTHORITY | FE - CRWA LAKE DUNLAP WTP EXPANSION						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
RELATED UNALLOCATED WMS WATER VOLUMES	1,040	1,040	1,040	1,040	1,040	1,040
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
FE - CRWA EXPANDED LAKE DUNLAP WTP	WATER TREATMENT PLANT EXPANSION					

CANYON REGIONAL WATER AUTHORITY | GW CONVERSION						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
RELATED UNALLOCATED WMS WATER VOLUMES	0	14,700	14,700	14,700	14,700	14,700
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
CRWA - BRACKISH WILCOX GROUNDWATER	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK					

CIBOLO VALLEY LOCAL GOVERNMENT CORPORATION | CIBOLO VALLEY LGC CARRIZO GROUNDWATER PROJECT						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	0	10,000	10,000	10,000	10,000	10,000
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
CIBOLO VALLEY LCG CARRIZO PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK					

GUADALUPE-BLANCO RIVER AUTHORITY | ARWA/GBRA PROJECT (PHASE 1)						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	14,999	14,999	14,999	14,999	14,999	14,999
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
ARWA/GBRA SHARED FACILITIES PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; MULTIPLE WELLS/WELL FIELD; NEW SURFACE WATER INTAKE; NEW WATER RIGHT/PERMIT NO IBT; PUMP STATION; STORAGI TANK					

GUADALUPE-BLANCO RIVER AUTHORITY | FE - GBRA WESTERN CANYON EXPANSION						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
MWP RETAIL CUSTOMERS	0	0	0	0	1,725	1,566
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
FE - GBRA WESTERN CANYON WTP EXPANSION	WATER TREATMENT PLANT EXPANSION; PUMP STATION					

GUADALUPE-BLANCO RIVER AUTHORITY | FE - HAYS COUNTY PIPELINE PROJECT						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
MWP RETAIL CUSTOMERS	0	2,179	5,108	4,345	0	0
WMS RELATED MWP SPONSORED PROJECTS	**PROJECT DESCRIPTION**					
FE - HAYS COUNTY PIPELINE	CONVEYANCE/TRANSMISSION PIPELINE					

GUADALUPE-BLANCO RIVER AUTHORITY | GBRA - MBWSP

Region L Major Water Provider (MWP) Water Management Strategy (WMS) Summary

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	18,553	18,063	17,449	14,726	8,567
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	0	8,447	8,937	9,551	12,274	18,433
TOTAL MWP RELATED WMS SUPPLY	0	27,000	27,000	27,000	27,000	27,000

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
GBRA MBWSP	CONVEYANCE/TRANSMISSION PIPELINE; NEW SURFACE WATER INTAKE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK; INJECTION WELL

GUADALUPE-BLANCO RIVER AUTHORITY | GBRA LOWER BASIN NEW APPROPRIATION

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	0	40,500	40,500	40,500	40,500	40,500

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
GBRA VICTORIA COUNTY STEAM ELECTRIC PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; NEW SURFACE WATER INTAKE; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK
GBRA NEW APPROPRIATION (LOWER BASIN)	CONVEYANCE/TRANSMISSION PIPELINE; NEW SURFACE WATER INTAKE; PUMP STATION; RESERVOIR CONSTRUCTION

GUADALUPE-BLANCO RIVER AUTHORITY | GBRA LOWER BASIN STORAGE PROJECT

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	58,934	58,874	58,829	58,765	58,685	58,614
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	846	906	951	1,015	1,095	1,166
TOTAL MWP RELATED WMS SUPPLY	59,780	59,780	59,780	59,780	59,780	59,780

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
GBRA LOWER BASIN STORAGE	NEW SURFACE WATER INTAKE; NEW WATER RIGHT/PERMIT NO IBT; RESERVOIR CONSTRUCTION

NEW BRAUNFELS | ARWA/GBRA PROJECT (PHASE 1)

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	8,000	8,000	8,000	8,000	8,000	8,000

NEW BRAUNFELS | FE - NBU SEGUIN INTERCONNECT

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	2,500	2,500	2,500	2,500	2,500	2,500

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
FE - NBU SEGUIN INTERCONNECT	CONVEYANCE/TRANSMISSION PIPELINE

NEW BRAUNFELS | FE - NBU SOUTH WTP EXPANSION

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	1	1	1	1	1

WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION
FE - NBU SOUTH WTP EXPANSION	WATER TREATMENT PLANT EXPANSION

NEW BRAUNFELS | MUNICIPAL WATER CONSERVATION

DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	663	2,240	4,381	5,814	7,168	8,631

Region L Major Water Provider (MWP) Water Management Strategy (WMS) Summary

NEW BRAUNFELS | NBU - ASR						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	10,818	10,818	10,818	10,818	10,818	10,818
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
NEW BRAUNFELS UTILITIES ASR	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; MULTIPLE WELLS/WELL FIELD; PUMP STATION; STORAGE TANK					

NEW BRAUNFELS | NBU - TRINITY DEVELOPMENT						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	3,360	3,360	3,360	3,360	3,360
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
NBU - TRINITY DEVELOPMENT	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; PUMP STATION; STORAGE TANK					

SAN ANTONIO WATER SYSTEM | DROUGHT MANAGEMENT - SAWS						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	11,951	31,476	45,677	49,377	53,109	56,588

SAN ANTONIO WATER SYSTEM | ENTITY PURCHASE TO MEET SHORTAGES - SAWS						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	5,712	5,449	5,049	4,683	4,369	4,191

SAN ANTONIO WATER SYSTEM | FE - CPS DIRECT RECYCLE PIPELINE						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	0	50,000	50,000	50,000	50,000	50,000
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
FE - CPS DIRECT RECYCLE PIPELINE	CONVEYANCE/TRANSMISSION PIPELINE					

SAN ANTONIO WATER SYSTEM | FE - SAWS ASR TREATMENT PLANT EXPANSION						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	33,600	33,600	33,600	33,600	33,600
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
FE - SAWS EXPANDED ASR TREATMENT PLANT	WATER TREATMENT PLANT EXPANSION					

SAN ANTONIO WATER SYSTEM | FE - SAWS WESTERN INTEGRATION PIPELINE						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	1,406	4,000	4,000	4,000	4,000	4,000
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
FE - SAWS WESTERN INTEGRATED PIPELINE (PHASE 2)	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION; STORAGE TANK					

SAN ANTONIO WATER SYSTEM | MUNICIPAL WATER CONSERVATION						
	WATER VOLUMES (ACRE-FEET PER YEAR)					
DATA DESCRIPTION	2020	2030	2040	2050	2060	2070

Region L Major Water Provider (MWP) Water Management Strategy (WMS) Summary

MWP RETAIL CUSTOMERS	24,367	50,667	74,313	89,629	102,682	115,929

SAN ANTONIO WATER SYSTEM | REUSE - SAWS - REUSE WATER PROGRAMS						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	5,000	5,000	15,000	25,000	40,000
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
RECYCLED WATER PROGRAM - SAWS	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION; STORAGE TANK					

SAN ANTONIO WATER SYSTEM | SAWS - EXPANDED LOCAL CARRIZO						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	0	21,000	21,000	21,000	21,000
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
SAWS - EXPANDED LOCAL CARRIZO	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; WATER TREATMENT PLANT EXPANSION					

SAN ANTONIO WATER SYSTEM | SAWS ADVANCED METER INFRASTRUCTURE						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	426	606	510	0	0	0
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
SAWS ADVANCED METER INFRASTRUCTURE	DATA GATHERING/MONITORING TECHNOLOGY					

SAN ANTONIO WATER SYSTEM | SAWS EXPANDED BRACKISH GROUNDWATER PROJECT						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	0	20,160	20,160	70,160	70,160
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
SAWS - EXPANDED BRACKISH WILCOX PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; INJECTION WELL; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK					

SAN MARCOS | ARWA - PHASE 2						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	0	7,530	7,530	7,530	7,530

SAN MARCOS | ARWA - PHASE 3						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	0	0	0	2,002	2,002

SAN MARCOS | ARWA/GBRA PROJECT (PHASE 1)						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	2,594	5,380	5,380	5,380	5,380	5,380

SAN MARCOS | FE - CRWA HAYS CALDWELL WTP EXPANSION						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	1,288	1,288	1,288	1,288	1,288	1,288

Region L Major Water Provider (MWP) Water Management Strategy (WMS) Summary

SAN MARCOS | MUNICIPAL WATER CONSERVATION						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	0	0	54	395	949	1,706

SAN MARCOS | REUSE - SAN MARCOS						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	1,826	1,971	1,971	5,779	5,779	5,779
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
SAN MARCOS - NON-POTABLE REUSE	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION; STORAGE TANK					
SAN MARCOS - POTABLE REUSE	CONVEYANCE/TRANSMISSION PIPELINE; PUMP STATION; WATER TREATMENT PLANT EXPANSION					

SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION | SSLGC EXPANDED BRACKISH WILCOX GROUNDWATER						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	0	0	5,000	5,000	5,000	5,000
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
BRACKISH WILCOX GROUNDWATER FOR SSLGC	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK					

SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION | SSLGC EXPANDED CARRIZO PROJECT						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
TRANSFERS RELATED TO WHOLESALE CUSTOMERS	6,000	6,000	6,000	6,000	6,000	6,000
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
SSLGC EXPANDED CARRIZO PROJECT	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; NEW WATER TREATMENT PLANT; PUMP STATION; STORAGE TANK					

VICTORIA | DROUGHT MANAGEMENT - VICTORIA						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	490	0	0	0	0	0

VICTORIA | MUNICIPAL WATER CONSERVATION						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	809	2,199	3,642	5,158	6,705	7,516

VICTORIA | VICTORIA - ASR						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
MWP RETAIL CUSTOMERS	7,900	7,900	7,900	7,900	7,900	7,900
WMS RELATED MWP SPONSORED PROJECTS	PROJECT DESCRIPTION					
VICTORIA - ASR	CONVEYANCE/TRANSMISSION PIPELINE; MULTIPLE WELLS/WELL FIELD; PUMP STATION; INJECTION WELL					

VICTORIA | VICTORIA - GROUNDWATER-SURFACE WATER EXCHANGE						
DATA DESCRIPTION	WATER VOLUMES (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070

Region L Major Water Provider (MWP) Water Management Strategy (WMS) Summary

MWP RETAIL CUSTOMERS	8,544	8,544	8,544	8,544	8,544	8,544

FINAL PLAN

CHAPTER 3: WATER SUPPLY ANALYSES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

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acft/yr	Acre-Feet per Year
ARWA	Alliance Regional Water Authority
ASR	Aquifer Storage and Recovery
BFZ	Balcones Fault Zone
CRWA	Canyon Regional Water Authority
CVLGC	Cibolo Valley Local Government Corporation
DFC	Desired Future Condition
EAA	Edwards Aquifer Authority
GAM	Groundwater Availability Model
GBRA	Guadalupe-Blanco River Authority
GCD	Groundwater Conservation District
GMA	Groundwater Management Area
GSA WAM	Guadalupe-San Antonio River Basin Water Availability Model
HCP	Habitat Conservation Plan
HDR	HDR Engineering, Inc.
MAG	Modeled Available Groundwater
MOU	Memorandum of Understanding
MWP	Major Water Provider
PGMA	Priority Groundwater Management Area
RIP	Recovery Implementation Program
SAWS	San Antonio Water System
SB	Senate Bill
SCTRWPG	South Central Texas Regional Water Planning Group
SSLGC	Schertz-Seguin Local Government Corporation
TCEQ	Texas Commission on Environmental Quality
TNRCC	Texas Natural Resource Conservation Commission
TWC	Texas Water Code
TWDB	Texas Water Development Board
WAM	Water Availability Model
WCID	Water Control and Improvement District
WUG	Water User Group
WWP	Wholesale Water Provider

CHAPTER 3: WATER SUPPLY ANALYSES

Both groundwater and surface water are critical to the South Central Texas Region. Groundwater availability is established through the joint groundwater management process, and surface water availability is established through water availability modeling. Assumptions guiding hydrologic assessments are included in Appendix 3-A. Additional water availability and supply details, including availability and supplies split geographically by county and river basin are included in the regional water planning database (DB22) reports, Appendix 2-A. an evaluation of water supply results by water user group (WUG) is included in Appendix 2-A, section 5.

3.1 GROUNDWATER SUPPLIES

There are five major and five minor aquifers supplying groundwater to the South Central Texas Region. The five major aquifers are the Edwards-Balcones Fault Zone (BFZ; including the Barton Springs Segment), Carrizo-Wilcox, Trinity, Gulf Coast, and Edwards-Trinity (Plateau) Aquifers (Figure 3-1). Minor aquifers include the Sparta, Queen City, Ellenburger-San Saba, Hickory, and Yegua-Jackson Aquifers (Figure 3-2). Additionally, several other aquifers not shown in the figures supply groundwater in the region, including the Austin Chalk, Buda Limestone, San Marcos River Alluvium, and Leona Gravel Aquifers. Chapter 1.8.1 includes more detailed descriptions of the aquifers, including water quality characteristics.

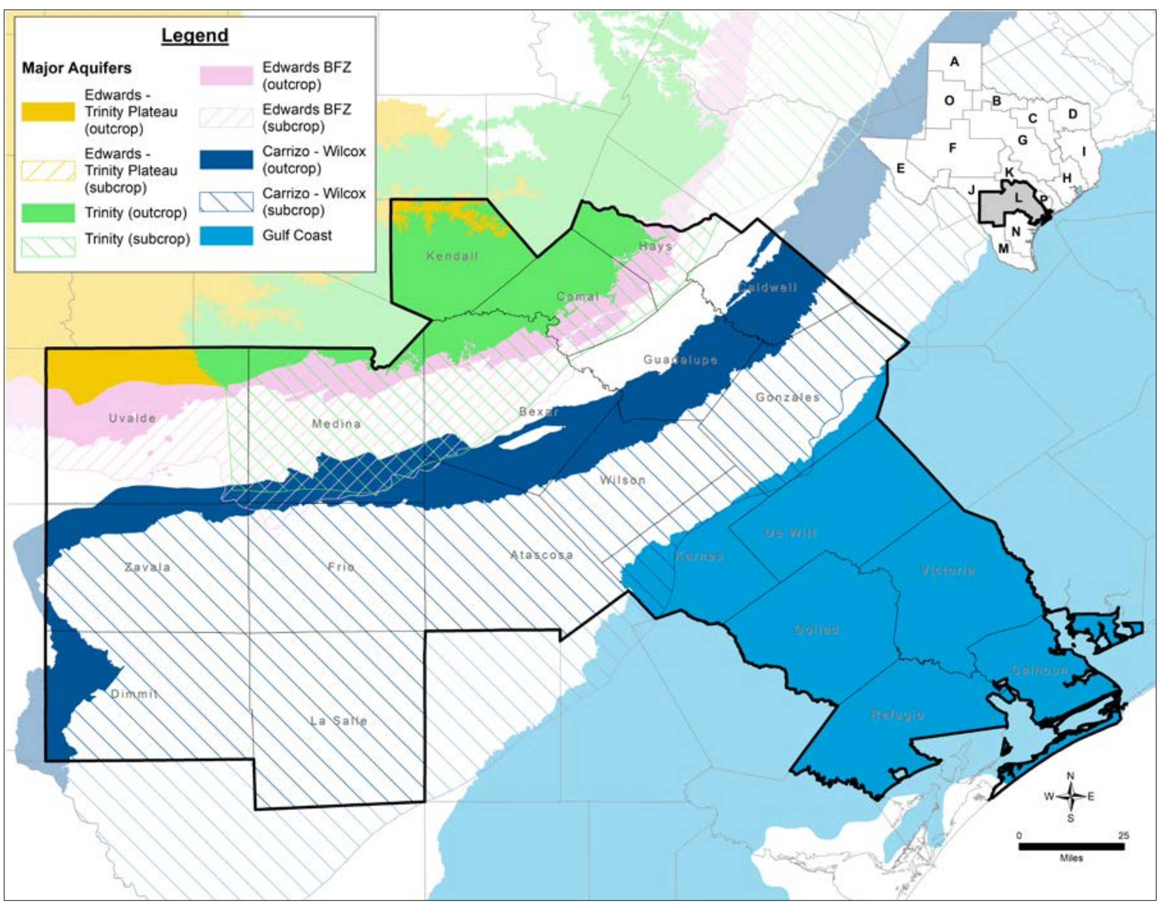

Figure 3-1 Major Aquifers - South Central Texas Region

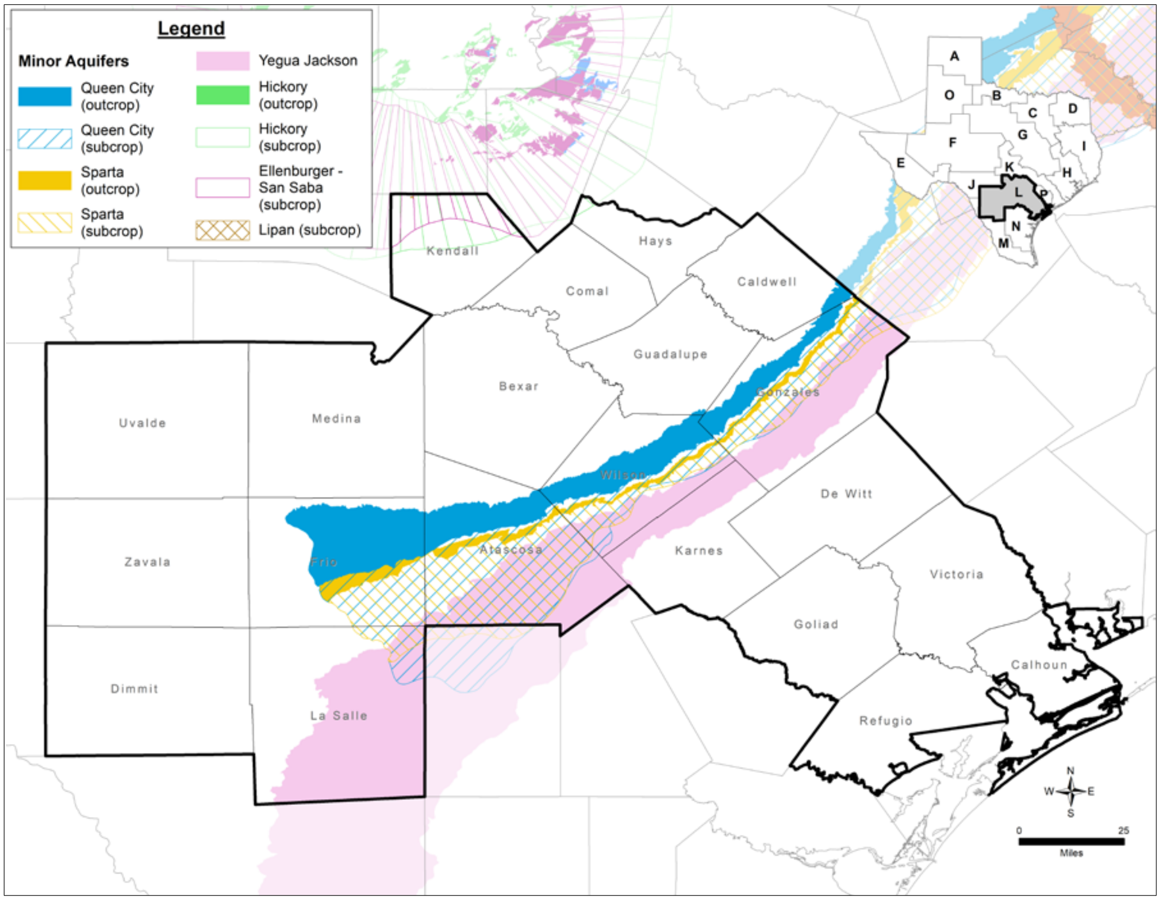

Figure 3-2 Minor Aquifers - South Central Texas Region

There are 18 groundwater conservation districts (GCDs) in the South Central Texas Region (Figure 3-3). A GCD serves all or a portion of each county in the region. The responsibilities and authorities of these GCDs vary depending on legislation and governing law, and some districts are not responsible for all aquifers within the geographic boundaries of the district. For example, the statutory district of the Edwards Aquifer Authority (EAA) includes (among others) Bexar, Medina, and Uvalde Counties, but the EAA exercises permitting authority only with respect to the Edwards Aquifer in those counties. Other aquifers within this three-county area are managed by the Trinity-Glen Rose GCD, Medina County GCD, and the Uvalde County Underground Water Conservation District. The Carrizo-Wilcox Aquifer in Bexar County, however, is not managed by a GCD.

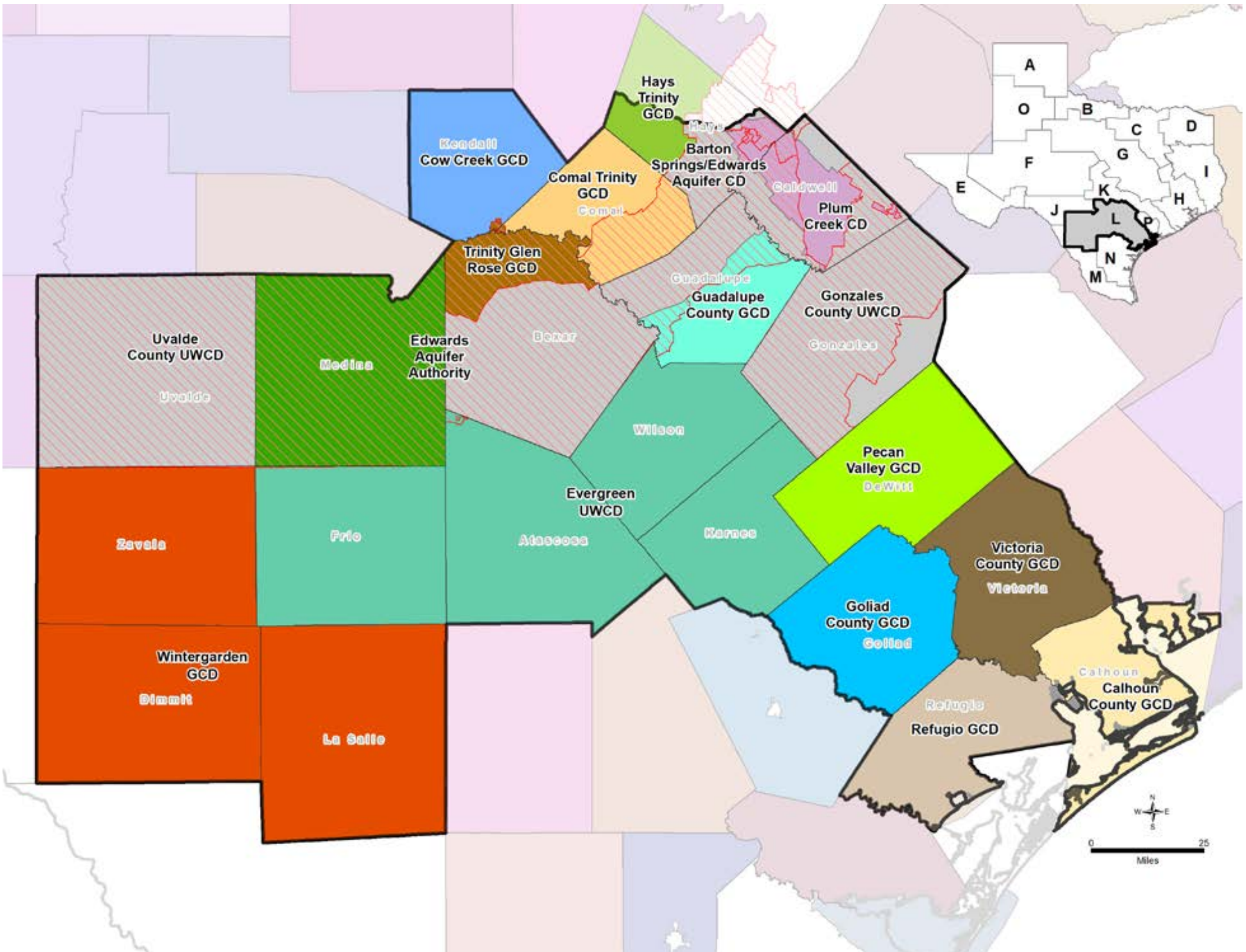

Figure 3-3 Groundwater Conservation Districts

3.1.1 Groundwater Availability

The Texas Water Development Board (TWDB) General Guidelines for Regional Water Plan Development offer the following with regard to evaluation of groundwater availability:

> "Groundwater availability shall be based on the Modeled Available Groundwater (MAG) volumes that may be produced on an average annual basis to achieve Desired Future Conditions (DFCs) as adopted by Groundwater Management Areas (GMAs)."

Groundwater is regulated locally by GCDs except in locations that do not have a district. In areas that do not have a district, water availability may be set by a county commissioners' court pursuant to Texas Water Code (TWC) §35.019. There are several Priority Groundwater Management Areas (PGMAs) around the State, with portions of the Hill Country PGMA located within Region L. PGMAs are established to ensure management of groundwater in areas with critical groundwater problems and to consider to the need for creating Groundwater Conservation Districts (GCDs). PGMAs are designated or delineated by the Texas Commission on Environmental Quality (TCEQ) for areas that are experiencing or are expected to experience critical groundwater problems within 50 years, including shortages of surface water or groundwater, land subsidence resulting from groundwater withdrawal, or contamination of groundwater supplies. Each Region L county located within the Hill Country PGMA has a GCD: The Comal Trinity GCD in Comal County, the Hays Trinity GCD in Hays County, and the Trinity Glen Rose GCD in Bexar County. These GCDs give notice to area residents that the declaration of the PGMA means that their water availability and quality will be at risk within the next 50 years. The Hays County Development Regulations have specific requirements listed for subdivisions served by individual water wells producing local groundwater within the PGMA. These requirements can be found in Chapter 715, Sub-Chapter 3, Section 3.06 of the Hays County Development Regulations. GMAs are a different concept in that every county in the State is in one or more of sixteen GMAs. For the most part, the major aquifers are not split across multiple GMAs, and the goal is to manage entire aquifer systems across political subdivisions in a consistent way. GCDs and GMAs are discussed in Chapter 1 of this plan and on the TWDB website at http://www.twdb.texas.gov/groundwater/index.asp.

Districts may issue permits that regulate pumping of groundwater and spacing of wells within their jurisdictions. Multiple districts within a single GMA determine the DFCs of relevant aquifers within that area. DFCs are the desired, quantified conditions of groundwater resources, such as water levels, water quality, spring flows, or volumes at a specified time or times in the future or in perpetuity. TWDB staff has translated DFCs into MAG volumes using approved Groundwater Availability Models (GAMs) (or other approaches if a GAM is not applicable). A MAG volume is the amount of groundwater production, on an annual basis, that will achieve a DFC. The DFC in a specific location may not be achieved if groundwater production exceeds the MAG volume over the long term.

Therefore, in the regional water planning process, total anticipated groundwater production in any planning decade may not exceed the MAG volume in any county-aquifer location (total groundwater production includes quantities associated with both existing supplies and any recommended water management strategies [WMS]). This prevents regional water planning groups from recommending WMS with supply volumes that would result in exceeding (i.e., “overdrafting”) approved MAG volumes. Table 3-1 provides a summary of information pertinent to groundwater availability, existing supply, and permits by county, GCD, and aquifer for all major aquifers in Region L, with the exception of the Edwards Aquifer. In the rightmost column of Table 3-1, the remaining groundwater after accounting for the greater of permits issued or existing supplies is shown for 2070. This is the volume of groundwater that could be used for WMS. With respect to municipal utilities, it is important to note that the existing supplies, after generally accounting for the ratio of peak to average day water demands, are equal to the lesser of the tested well capacities as reported to the Texas Commission on Environmental Quality (TCEQ) or the MAG as calculated by the TWDB. Existing supplies are not necessarily representative of current or projected groundwater use.

In the case of the Edwards Aquifer, Senate Bill (SB) 3 of the 80th Texas Legislature required the EAA to cooperatively develop a Recovery Implementation Program (RIP) through a facilitated, consensus-based process that involves input from the United States Fish and Wildlife Service, other appropriate federal agencies, and all interested stakeholders, including those listed under Section 1.26A(e)(1) of the EAA Act. In 2013, the Edwards Aquifer Habitat Conservation Plan (EAHCP) was approved, which included four components that affect water supply from the Edwards Aquifer: (1) the Voluntary Irrigation Suspension Program Option, (2) additional municipal conservation measures, (3) San Antonio Water System (SAWS)

Aquifer Storage and Recovery (ASR) tradeoff, and (4) emergency Stage V critical period reductions.[1] For water supply planning purposes in the 2021 South Central Texas Regional Water Plan, the Edwards Aquifer HCP Workgroup recommended, and the regional water planning group approved, the assumption that existing supplies from the Edwards Aquifer would be based on full implementation of the HCP. The estimated reliable drought year availability from the EAA portion of the Edwards Aquifer is 243,401 acre-feet per year (acft/yr), including estimated exempt federal and domestic and livestock production. Availability is derived from contractual obligations associated with the EAHCP and from limitations imposed by SB 1477, also known as the EAA Act. It should be noted that for long-term planning purposes, programs contained within the EAHCP and associated with its fifteen-year incidental take permit may be adjusted as the plan is resubmitted for approval upon the expiration of the permit.

Table 3-1 Groundwater Availability (2070), Supply, and Balance by County, GCD, and Aquifer (acft/yr)

COUNTY	AQUIFER	GCD	AVAILABILITY SOURCE/ METHODOLOGY	2070 GROUNDWATER AVAILABILITY	2070 EXISTING SUPPLY	AVAILABILITY REMAINING FOR WMS
Atascosa	Carrizo-Wilcox	Evergreen	GR17-027 MAG (GMA13)	75,874	54,618	21,256
Atascosa	Edwards-BFZ Aquifer	Edwards Aquifer Authority	Contracts and limitations consistent with EAHCP and EAA Act	460	435	25
Atascosa	Queen City	Evergreen	GR17-027 MAG (GMA13)	4,302	4,234	68
Atascosa	Sparta	Evergreen	GR17-027 MAG (GMA13)	1,013	994	19
Atascosa	Yegua-Jackson	None	GR17-027 MAG (GMA13) non-relevant	856	448	408
Bexar	Carrizo-Wilcox	None	GR17-027 MAG (GMA13)	78,807	34,489	44,318
Bexar	Edwards-BFZ Aquifer	Edwards Aquifer Authority	Contracts and limitations consistent with EAHCP and EAA Act	202,356	190,392	11,964
Bexar	Trinity	Trinity-Glen Rose	GR16-023 MAG (GMA9)	24,856	13,321	11,535
Bexar	Trinity	None	Nueces Basin based on data from last planning cycle	223	50	173
Caldwell	Carrizo-Wilcox	Plum Creek and Gonzales County	GR17-027 MAG (GMA13)	54,189	9,528	44,661

[1] RECON Environmental, Inc., et al., "Edwards Aquifer Recovery Implementation Program – Habitat Conservation Plan," December 2011.

COUNTY	AQUIFER	GCD	AVAILABILITY SOURCE/ METHODOLOGY	2070 GROUNDWATER AVAILABILITY	2070 EXISTING SUPPLY	AVAILABILITY REMAINING FOR WMS
Caldwell	Edwards-BFZ Aquifer (Saline)	Edwards Aquifer Authority	GR16-033 MAG (GMA10)	1,437	0	1,437
Caldwell	San Marcos River Alluvium Aquifer	None	TWDB Published Reports and Data	271	0	271
Caldwell	Queen City Aquifer	Gonzales County	GR17-027 MAG (GMA13)	307	237	70
Caldwell	Trinity Aquifer	Edwards Aquifer Authority	GR16-033 MAG (GMA10)	10	0	10
Calhoun	Gulf Coast	Calhoun County	GR16-025 MAG (GMA15)	7,565	3,158	4,407
Comal	Edwards-BFZ Aquifer	Edwards Aquifer Authority	Contracts and limitations consistent with EAHCP and EAA Act	12,362	10,748	1,614
Comal	Trinity	Comal Trinity	GR16-023_MAG (GMA9); GR16-033 MAG (GMA10)	43,768	16,824	26,944
DeWitt	Gulf Coast	Pecan Valley	GR16-025 MAG (GMA15)	14,485	6,979	7,506
Dimmit	Carrizo-Wilcox	Wintergarden	GR17-027 MAG (GMA13)	4,129	3,892	237
Frio	Carrizo-Wilcox	Evergreen	GR17-027 MAG (GMA13)	77,353	75,601	1,752
Frio	Edwards-BFZ Aquifer	Evergreen	Evergreen Underground Water Conservation District, 10-40 MAG (GMA13)	23,213	0	23,213
Frio	Queen City Aquifer	Evergreen	GR17-027 MAG (GMA13)	4,113	3,941	172
Frio	Sparta Aquifer	Evergreen	GR17-027 MAG (GMA13)	624	600	24
Goliad	Gulf Coast	Goliad County	GR16-025 MAG (GMA15)	11,539	7,608	3,931
Gonzales	Carrizo-Wilcox	Gonzales County	GR17-027 MAG (GMA13)	86,055	61,904	24,151
Gonzales	Gulf Coast Aquifer System	Edwards Aquifer Authority	GR16-025 MAG, non-relevant	2	1	1
Gonzales	Queen City Aquifer	Gonzales County	GR17-027 MAG (GMA13)	5,067	2,425	2,642

COUNTY	AQUIFER	GCD	AVAILABILITY SOURCE/ METHODOLOGY	2070 GROUNDWATER AVAILABILITY	2070 EXISTING SUPPLY	AVAILABILITY REMAINING FOR WMS
Gonzales	Sparta Aquifer	Gonzales County	GR17-027 MAG (GMA13)	3,554	1,589	1,965
Gonzales	Yegua-Jackson	Gonzales County/non (partial)	GR17-027 MAG (GMA13)	4,713	629	4,084
Guadalupe	Carrizo-Wilcox	Guadalupe County	GR17-027 MAG (GMA13)	47,833	4,312	43,521
Guadalupe	Edwards-BFZ Aquifer	Edwards Aquifer Authority	Contracts and limitations consistent with EAHCP and EAA Act	221	202	19
Guadalupe	Trinity	None	GR16-033 MAG (GMA10)	660	660	0
Hays	Edwards-BFZ Aquifer (Saline and Fresh)	Edwards Aquifer Authority and Barton Springs Edwards Aquifer Conservation District	GR16-033 MAG (GMA10) and Contracts and limitations consistent with EAHCP and EAA Act	8,825	7,108	1,717
Hays	Trinity	Hays Trinity and BS Edwards and Plum Creek	GR16-023 (GMA9); GR16-033 MAG (GMA10)	7,551	4,945	2,606
Karnes	Carrizo-Wilcox	Evergreen	GR17-027 MAG (GMA13)	1,295	1,035	260
Karnes	Gulf Coast	Evergreen	GR16-025 MAG (GMA15)	2,751	2,741	10
Karnes	Yegua-Jackson	Evergreen	GR17-027 MAG (GMA13)	2,059	1,406	653
Kendall	Edwards-Trinity	Cow Creek	GR16-023 (GMA9)	199	172	27
Kendall	Trinity	Cow Creek	GR16-023 MAG (GMA9)	11,139	5,779	5,360
Kendall	Ellenburger San-Saba	Cow Creek	GR16-023 MAG (GMA9)	74	0	74
Kendall	Hickory	Cow Creek	GR16-023 MAG (GMA9)	140	0	140
La Salle	Carrizo-Wilcox	Wintergarden	GR17-027 MAG (GMA13)	6,863	6,804	59
La Salle	Queen City Aquifer	Wintergarden	GR17-027 MAG (GMA13)	2	1	1
La Salle	Sparta Aquifer	Wintergarden	GR17-027 MAG (GMA13)	983	983	0

COUNTY	AQUIFER	GCD	AVAILABILITY SOURCE/ METHODOLOGY	2070 GROUNDWATER AVAILABILITY	2070 EXISTING SUPPLY	AVAILABILITY REMAINING FOR WMS
La Salle	Yegua-Jackson	Wintergarden	GR17-027 MAG (GMA13) non-relevant	92	91	1
Medina	Carrizo-Wilcox	Medina County	GR17-027 MAG (GMA13)	2,646	2,646	0
Medina	Edwards-BFZ Aquifer	Edwards Aquifer Authority	Contracts and limitations consistent with EAHCP and EAA Act	25,678	24,268	1,410
Medina	Leona Gravel Aquifer	Medina County	Medina County GCD Mgmt Plan (2016, based on GMA13 and GMA10)	22,017	2,627	19,390
Medina	Trinity	Medina County	GR16-023 MAG (GMA9); GR16-033 MAG (GMA10)	9,161	5,827	3,334
Refugio	Gulf Coast	Refugio County	GR16-025 MAG (GMA15)	5,847	2,487	3,360
Uvalde	Austin Chalk Aquifer	Uvalde County	GR16-033 MAG (GMA10)	2,935	2,360	575
Uvalde	Buda Limestone Aquifer	Uvalde County	GR16-033 MAG (GMA10)	758	289	469
Uvalde	Carrizo-Wilcox	Uvalde County	GR17-027 MAG (GMA13)	828	828	0
Uvalde	Edwards-BFZ Aquifer	Edwards Aquifer Authority	Contracts and limitations consistent with EAHCP and EAA Act	15,367	15,237	130
Uvalde	Edwards-Trinity	Uvalde County	GR16-026 MAG (GMA7)	1,993	1,635	358
Uvalde	Leona Gravel Aquifer	Uvalde County	GR16-033 MAG (GMA 10)	9,385	8,012	1,373
Uvalde	Trinity	Uvalde County	GR16-033 MAG (GMA 10)	795	795	0
Victoria	Gulf Coast	Victoria County	GR16-025 MAG (GMA15)	59,963	24,153	35,810
Wilson	Carrizo-Wilcox	Evergreen	GR17-027 MAG (GMA13)	111,093	27,145	83,948
Wilson	Queen City Aquifer	Evergreen	GR17-027 MAG (GMA13)	945	290	655
Wilson	Sparta Aquifer	Evergreen	GR17-027 MAG (GMA13)	156	41	115

COUNTY	AQUIFER	GCD	AVAILABILITY SOURCE/ METHODOLOGY	2070 GROUNDWATER AVAILABILITY	2070 EXISTING SUPPLY	AVAILABILITY REMAINING FOR WMS
Wilson	Yegua-Jackson Aquifer	None	GR17-027 MAG (GMA13) non-relevant	827	319	508
Zavala	Carrizo-Wilcox	Wintergarden	GR17-027 MAG (GMA13)	34,695	32,322	2,373

Projected groundwater supplies available in the South Central Texas Region under drought of record conditions are 1,174,522 acft/yr in 2020, 1,134,704 acft/yr in 2040, and 1,139,279 acft/yr in 2070 (Table 3-2). Supplies from most aquifers are projected to hold steady on an annual basis throughout the 2020 to 2070 projection period. The supply available from the Carrizo-Wilcox Aquifer is projected to decrease from 618,272 acft/yr in 2020 to 581,660 acft/yr in 2070. The supplies available from the Gulf Coast Aquifer are projected to generally increase from 2020 to 2070, while the supplies available from the Sparta and Queen City Aquifers are projected to decline slightly over the same projection period. The remaining aquifers are projected to remain constant from 2020 to 2070.

3.1.2 Assumptions for Assessment of Groundwater Supply

1. Groundwater availability by county is subdivided into river basin parts of each county according to data supplied by the TWDB. Availability for existing groundwater users and new groundwater strategies are in accordance with the Modeled Available Groundwater estimates, as calculated by TWDB on or before June 1, 2018.

2. Groundwater availability during drought of record conditions from the EAA portion of the Edwards Aquifer is set at a total of 243,401 acft/yr. Initial regular permit amounts from the EAA are prorated down in accordance with EAA rules and implementation of the Edwards Aquifer HCP to achieve a total value of 243,401 acft/yr as the sum of all existing supplies, including exempt domestic and federal uses.

3. Municipal supplies from all aquifers except the EAA portion of the Edwards Aquifer are estimated according to the process established in the 2016 plan update:

    a. For cities using groundwater, supply is based on reported well capacities with adjustments to account for a peak to average day water demand ratio of 2:1. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular source.

    b. Based on data from the TWDB historic water use surveys and an evaluation of supplies developed for this plan, it was assumed that rural household (municipal) demand would be met from aquifers underlying that river basin portion of the county, and for several WUGs the existing supplies were set equal to the projected demands. This was done based on a number of factors. Rural household demands are statutorily exempt from regulatory conditions that may exist from the local groundwater conservation district. Modeled available groundwater (MAG) estimates are also not applicable to exempt rural municipal production. Estimates of rural municipal pumpage amounts in a county may be taken into consideration when evaluating MAGs in a county with respect to permitting by a groundwater conservation district (GCD); however, the MAGs will not impact the rural municipal pumpage itself.

Infrastructure issues are not applicable to rural municipal water supplies because they typically involve a domestic well located at the homestead, which is typically installed by the homeowner at the time of construction. Localized supply for each individual rural household is not capable of being used to meet other demands other than those at the same location as the domestic well, and therefore the supplies were set equal to the demands.

- The supplies for County-Other were assumed to be equal to demands for two counties: La Salle and Refugio Counties. In Refugio County the County-Other demands decrease over the 50-year planning period, from 364 acft/yr in 2020 to 355 acft/yr in 2070. As noted above, this decrease in rural household (County-Other) demand would not lead to excess supply because rural household supply can realistically only be used to meet rural household demand at the specific location where the well is located. In La Salle County, the County-Other demands increase by 36% over the 50-year planning period, from 302 acft/yr in 2020 to 412 acft/yr in 2070. As discussed above, supply to meet this increasing but highly localized demand is developed at the home site through the installation of an exempt domestic well, which is not subject to regulatory restrictions, and infrastructure is not a consideration. Therefore, the supplies for this WUG were set equal to the demand.
- In addition to the County-Other demands, 14 WUGs have supplies assumed to be equal to projected demands. For all but one of these WUGs, the projected demands either decrease, remain the same, or increase less than 140 acft/yr over the 50-year planning period. For these WUGs, it was assumed that infrastructure limitations would not exist due to the size of the WUG and because the changes in supply were very small.
- The only WUG with a projected increase in demand greater than 140 acft/yr is Carrizo Springs, which is projected to have a 20% increase in demands over the 50-year planning period from 1,623 acft/yr in 2020 to 1,952 acft/yr in 2070. The Carrizo Springs wells are not permitted by the Wintergarden GCD, and so they are not subject to the GCD’s regulations at this time. Because the increase in demand is only 20% over the 50-year planning period, it was assumed that infrastructure limitations would not exist.

The rural supply is generally set to at least the maximum demand during the planning period. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular source.

4. Industrial supply from groundwater (except for the EAA portion of the Edwards Aquifer) is associated with aquifers underlying the river basin portion of the county. The industrial supply is generally set equal to the maximum industrial groundwater pumpage over the 2012 to 2016 time period; however, some adjustments were made to some counties. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular source.

5. Steam-electric supply from groundwater (except for the EAA portion of the Edwards Aquifer) is associated with aquifers underlying the river basin portion of the county. The steam-electric supply is generally set equal to the maximum industrial groundwater pumpage over the 2012 to 2016 time period; however, some adjustments were made to some counties. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular source.

6. TWDB historic water use data indicates that almost all irrigation use is supplied by groundwater throughout most of the planning area. Irrigation supply from groundwater (except from the EAA portion of the Edwards Aquifer) is associated with aquifers underlying the river basin portion of the county. Irrigation demands in non-EAA portions of the planning area are estimated to remain unchanged for the planning period, and the demands are approximately equal to the average annual historic irrigation use within each county over the past ten years. Because the projected demands are equivalent to the recent historic use (i.e. current supplies), the irrigation supply is generally calculated as being equal to the projected demand in each decade; however, in some cases, this value is adjusted in response to supplied pumpage data. In cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular source.

7. TWDB historic water use data indicates that almost all mining use is supplied by groundwater throughout most of the planning area. Mining supply from groundwater (except from the EAA portion of the Edwards Aquifer) is associated with aquifers underlying the river basin portion of the county. Individual county projected mining demands in non-EAA portions of the planning area vary significantly across the region. Most counties show a decrease in mining demand over the 50-year planning period. However, two counties, Bexar and Guadalupe Counties, demonstrate a projected increase in mining demand. For counties with declining mining demand over the planning horizon, it was a reasonable assumption that supplies are equal to the projected (declining) demands because supplies for mining would not be converted to meet another use type. In Bexar County, the mining demand is projected to increase from 7,820 acft/yr in 2020 to 12,502 acft/yr in 2070. This projected increase is less than 1,000 acft/yr per decade, and it was assumed that the supply to meet this increase in demand would occur wherever the mining activities occurred. In Guadalupe County, the mining demand is projected to increase from 456 acft/yr in 2020 to 1,043 acft/yr in 2070. Because this is a relatively small increase in demand, it was also assumed that the supply in Guadalupe County would be developed as part of the increase in mining activities. Therefore, in both Bexar and Guadalupe Counties, the supply was assumed to be equal to the demand. It should be noted that in some cases, the mining supply value is adjusted in response to supplied pumpage data. In cases in which the total mining demand on that portion (i.e., county and river basin) of the aquifer exceeds the total availability, supply is prorated downward for every entity using that particular source.

8. For all areas within the planning region, livestock water demand is generally assumed to be supplied 50 percent from quantified groundwater sources and 50 percent from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills. This assumption is based on data from the TWDB historic water use estimates, which indicate that the counties within the planning area average approximately 57% groundwater supply to meet livestock use over the past ten years. Livestock water supply is set equal to projected livestock demand due to the nature of livestock water use. Livestock demand tends to match the available supply if the supply is not present the livestock numbers are reduced until they match

the available supply. Livestock demands are estimated to remain unchanged over the 50-year planning period for regional water planning purposes. Infrastructure is not a consideration for livestock supplies, and livestock pumpage is typically exempt from regulations; therefore, there are no regulatory considerations that might impact livestock groundwater supplies. Groundwater availability by county is subdivided into river basin parts of each county according to data supplied by the TWDB. Availability for existing groundwater users and new groundwater strategies are in accordance with the Modeled Available Groundwater estimates, as calculated by TWDB on or before June 1, 2018.

Table 3-2 Available Groundwater Supply by Aquifer

Aquifer Name	Annual Quantity Available (acft)					
	2020	2030	2040	2050	2060	2070
Austin Chalk Aquifer	2,935	2,935	2,935	2,935	2,935	2,935
Buda Limestone Aquifer	758	758	758	758	758	758
Carrizo-Wilcox Aquifer	618,272	583,058	580,400	583,265	580,510	581,660
Carrizo-Wilcox Aquifer ASR	0	0	0	0	0	0
Edwards-BFZ Aquifer (EAA And Non-EAA)	289,919	289,919	289,919	289,919	289,919	289,919
Edwards-Trinity-Plateau Aquifer	199	199	199	199	199	199
Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers	1,993	1,993	1,993	1,993	1,993	1,993
Ellenburger-San Saba Aquifer	74	74	74	74	74	74
Gulf Coast Aquifer System	95,599	100,595	97,480	97,321	102,165	102,152
Hickory Aquifer	140	140	140	140	140	140
Leona Gravel Aquifer	31,402	31,402	31,402	31,402	31,402	31,402
Queen City Aquifer	18,990	16,172	15,832	15,509	15,099	14,736
San Marcos River Alluvium Aquifer	271	271	271	271	271	271
Sparta Aquifer	7,260	6,704	6,591	6,493	6,408	6,330
Trinity Aquifer	98,163	98,163	98,163	98,163	98,163	98,163
Yegua-Jackson Aquifer	8,547	8,547	8,547	8,547	8,547	8,547
Total	**1,174,522**	**1,140,930**	**1,134,704**	**1,136,989**	**1,138,583**	**1,139,279**
Percent of Total						
Austin Chalk Aquifer	0.25%	0.26%	0.26%	0.26%	0.26%	0.26%
Buda Limestone Aquifer	0.06%	0.07%	0.07%	0.07%	0.07%	0.07%
Carrizo-Wilcox Aquifer	52.64%	51.10%	51.15%	51.30%	50.99%	51.06%
Carrizo-Wilcox Aquifer ASR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Edwards-BFZ Aquifer (EAA And Non-EAA)	24.68%	25.41%	25.55%	25.50%	25.46%	25.45%
Edwards-Trinity-Plateau Aquifer	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
Edwards-Trinity-Plateau, Pecos Valley, And Trinity Aquifers	0.17%	0.17%	0.18%	0.18%	0.18%	0.17%
Ellenburger-San Saba Aquifer	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%

Gulf Coast Aquifer System	8.14%	8.82%	8.59%	8.56%	8.97%	8.97%
Hickory Aquifer	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Leona Gravel Aquifer	2.67%	2.75%	2.77%	2.76%	2.76%	2.76%
Queen City Aquifer	1.62%	1.42%	1.40%	1.36%	1.33%	1.29%
San Marcos River Alluvium Aquifer	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
Sparta Aquifer	0.62%	0.59%	0.58%	0.57%	0.56%	0.56%
Trinity Aquifer	8.36%	8.60%	8.65%	8.63%	8.62%	8.62%
Yegua-Jackson Aquifer	0.73%	0.75%	0.75%	0.75%	0.75%	0.75%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

3.2 SURFACE WATER SUPPLIES

The South Central Texas Regional Water Planning Area (Region L) includes parts of the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca River Basins, and parts of the Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins. As indicated on Figure 3-4, however, the Nueces, San Antonio, and Guadalupe are the major river basins of interest in considering Region L surface water supplies. Although the Guadalupe and San Antonio River Basins have been delineated as separate river basins, the two rivers join prior to discharge into San Antonio Bay. In part because of the large concentration of senior water rights below the confluence of the two rivers, the two river basins are considered as one (i.e., the Guadalupe-San Antonio River Basin) when the surface water supplies available under existing water rights are evaluated.

3.2.1 Hydrologic Assumptions and Operational Procedures for Assessment of Surface Water Supply

The TCEQ's Water Availability Model (WAM) Run 3 is the typical baseline surface water availability model that is used to establish firm yields. The firm yield or reservoir availability is the maximum water volume that 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 will be totally utilized and all applicable permit conditions met. Anticipated sedimentation is the anticipated decrease in a reservoir's area-capacity condition resulting in projected firm yield decreases each decade.

The SCTRWPG adopted hydrologic assumptions for the 2021 South Central Texas Regional Water Plan, which were subsequently approved by the TWDB. Correspondence between the SCTRWPG and TWDB regarding the hydrologic assumptions and hydrologic variances is included in Appendix 3-A. The assumptions and additional information used to evaluate availability accurately for the plan are listed below:

1. WAM Run 3 for Surface Water Right Modeling
    a. Full exercise of existing surface water rights;
    b. Zero effluent discharges unless specifically required by a surface water right (hydropower, industrial rights, City of Victoria, etc.);

2. Operation of Canyon Reservoir at firm yield in accordance with CA #18-2074E, including subordination of all senior Guadalupe River hydropower permits to Canyon Reservoir[2];
3. Delivery of GBRA's present contractual obligations from Canyon Reservoir to points of diversion;
4. Firm supply of surface water right based on monthly availability;
5. New water rights evaluated in accordance with Environmental Flow Standards;
6. Operation of power plant reservoirs (Braunig, Calaveras, and Coleto Creek) subject to authorized consumptive uses at the reservoir, with makeup diversions as needed to maintain full conservation storage to the extent possible subject to senior water rights, instream flow constraints, and/or applicable contractual provisions[3];
7. Operation of Choke Canyon Reservoir/Lake Corpus Christi System at safe yield subject to the TCEQ Agreed Order regarding freshwater inflows to the Nueces Estuary;
8. Period of record for simulations:
    a. Guadalupe-San Antonio River Basin (1934-1989, Critical Drought = 1950s), and
    b. Nueces River Basin (1934-1997, Critical Drought = 1990s).

3.2.2 Surface Water Availability

Surface water supplies for the vast majority of the South Central Texas Region have been quantified using the Nueces and Guadalupe-San Antonio River Basin WAMs.[4,5] These WAMs were originally developed under a contract with the TCEQ. Supplemental daily time-step computational procedures (e.g., the Flow Regime Application Tool [FRAT]) have also been used to quantify water availability for new appropriations associated with potentially feasible WMS subject to TCEQ environmental flow standards. Copies of WAM data files are included as a digital appendix.

Surface water supply analyses for the South Central Texas Region have been completed using the WAMs to quantify the firm diversion associated with run-of-river water rights and to calculate the firm yields associated with the major reservoirs. These analyses were performed subject to specific hydrologic assumptions and operational procedures adopted by the SCTRWPG and approved by the TWDB for the assessment of surface water supply. See Appendix 3-A for correspondence between the SCTRWPG and TWDB regarding the hydrologic assumptions.

Reliability information, including firm (or minimum monthly) diversion, for water rights in the Nueces and Guadalupe–San Antonio River Basins is summarized in Appendix 3-B. Run-of-river water availability was determined based upon the minimum monthly diversion amount, as calculated in the appropriate WAM. Firm diversion and firm yield amounts have been assigned to specific water users, county-

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[2] The firm yield for Canyon Reservoir was determined using the "Region L WAM", which accounts for Federal Energy Regulatory Commission (FERC) requirements, a drought contingency trigger at the Spring Branch stream gauge, an agreement with Guadalupe Trout Unlimited, and various water rights and daily operations dependent on Canyon Reservoir. Use of this WAM was authorized for use by the TWDB in a hydrologic variance.
[3] The firm yields for Victor Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir were determined using the "Region L WAM".
[4] HDR, "Water Availability in the Guadalupe-San Antonio River Basin," Texas Natural Resource Conservation Commission (TNRCC), December 1999.
[5] HDR, "Water Availability in the Nueces River Basin," TNRCC, October 1999.

aggregated water user groups, river basins, and sources as appropriate. This assignment of firm diversion and yield amounts is representative of existing surface water supplies and is detailed by county, river basin, and water user group in DB22 (Appendix 2-A).

3.2.3 Major Reservoirs and Associated Water Rights

Major reservoirs in the SCTRWPA include Canyon Lake, the Medina Lake System, and three cooling lakes for power generation facilities, including Victor Braunig Lake, Coleto Creek Reservoir, and Calaveras Lake. All the major reservoirs within Region L are located in the Guadalupe-San Antonio River Basin and are identified on Figure 3-4. Owners and locations of major run-of-river rights having authorized annual consumptive use in excess of 10,000 acft/yr are also shown on Figure 3-4.

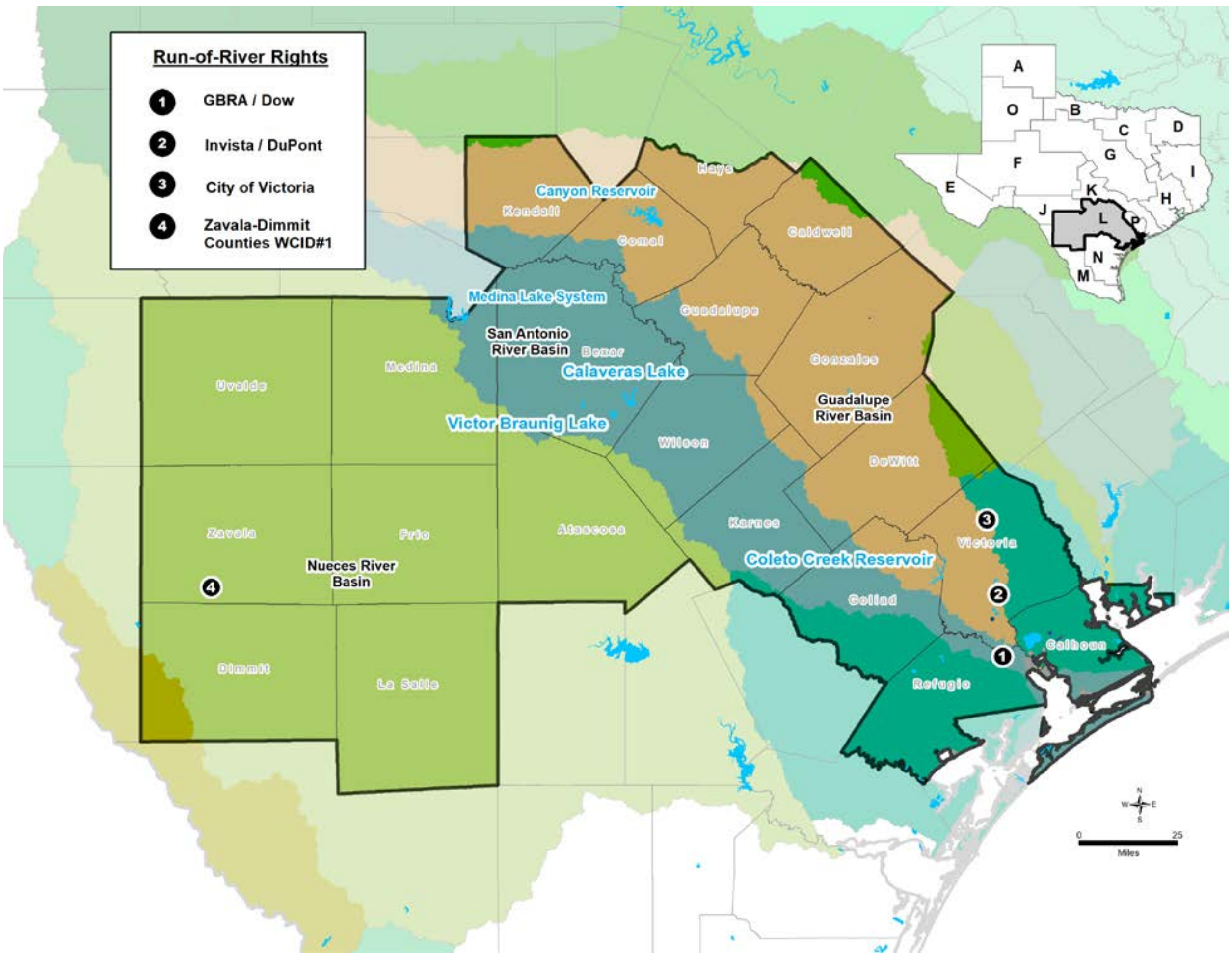

Figure 3-4 Major River Basins, Major Reservoirs, and Run-of-River Rights

Major reservoirs and associated water rights within the South Central Texas Region are summarized in Table 3-3. The firm yield, or dependable supply of water available during a repeat of the drought of record, was determined for each of these major reservoirs. The firm yield takes into account potential supply reductions as a result of sedimentation. A summary of the major reservoirs and firm yields is included in Table 3-3. Major reservoirs and other reservoirs and associated water rights are discussed in the following subsections.

3.2.3.1 Medina Lake System

The Medina Lake System is located on the Medina River, a tributary of the San Antonio River, in Medina and Bandera Counties. The Medina Lake System is owned by the Bexar-Medina-Atascosa Counties Water Control and Improvement District No. 1 (BMA) and has traditionally been used to supply irrigation water to farms in Bexar, Medina, and Atascosa Counties via the Medina Canal System. SAWS has contracts with BMA to obtain municipal water supplies from the Medina Lake System; these supplies are delivered via the bed and banks of the Medina River to a point of diversion near Von Ormy in southwestern Bexar County. The Medina Lake System is unique among the major reservoirs in the South Central Texas Region because waters impounded therein contribute recharge, estimated to average over 42,000 acft/yr,[6] to the Edwards Aquifer. Because of surface water "losses" to recharge and special conditions within Certificate of Adjudication No. 19-2130, as amended, it has been determined that the firm yield of the Medina Lake System in a repeat of the drought of record is essentially zero. Hence, the Medina Lake System has not been included as an existing source of surface water supply in Region L. Because of its location on the boundary of Regions L and J, the TWDB has designated the Medina Lake System as a special water resource. As Region L is not relying upon the Medina Lake System as a source of supply during drought, it is assumed that there are no conflicts with any water supply contracts or option agreements held by entities in the Plateau Region. It is further assumed that interests upstream of Medina Lake will obtain the necessary water rights permit(s) for diversion from the Medina River and/or its tributaries and will mitigate any associated impacts upon recharge of the Edwards Aquifer within Region L.

3.2.3.2 Victor Braunig Lake and Calaveras Lake

Braunig and Calaveras Lakes, owned by CPS Energy, are located in the San Antonio River Basin in Bexar County to the southeast of San Antonio and are used for steam-electric power plant cooling water. Runoff from the watersheds above the reservoirs and diversions from the San Antonio River (including treated effluent discharged by the San Antonio Water System) are used to maintain necessary lake levels to facilitate efficient power plant operations.

3.2.3.3 Canyon Reservoir

Constructed by the US Army Corps of Engineers, Canyon Reservoir is located in the Guadalupe River Basin in Comal County on the mainstem of the Guadalupe River. Uses of the reservoir include water supply for municipal, industrial, steam-electric power generation, irrigation, and hydroelectric power generation, as well as flood protection and recreation. Diversions from Canyon Reservoir are currently authorized up to an average of 120,000 acft/yr. Water supplies from Canyon Reservoir are managed by the Guadalupe-Blanco River Authority (GBRA) and made available to customers both within their 10 county district and in adjacent counties and/or river basins. Because a portion of its watershed is located in the Plateau Region (J), the TWDB has designated Canyon Reservoir as a special water resource. The South Central Texas Region (L) has included existing contracts between GBRA and entities in the Plateau Region in its assessments of surface water supplies using the Guadalupe-San Antonio River Basin Water Availability Model (GSA WAM). Pursuant to a Memorandum of Understanding (MOU) between GBRA and the Commissioners' Court of Kerr County, the SCTRWPG recognizes a potential commitment of

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[6] HDR Engineering, Inc. (HDR), "Edwards Aquifer Recharge Analyses," Trans-Texas Water Program, West Central Study Area, Phase II, Texas Water Development Board, San Antonio River Authority, et al., March 1998.

approximately 2,000 acft/yr from the firm yield of Canyon Reservoir for the calendar years 2021 through 2060. The hydrology studies of GBRA have indicated that a commitment of about 2,000 acft/yr would be necessary to allow permits for 6,000 acft/yr to be issued by TCEQ for diversion in Kerr County. No additional supplies from Canyon Reservoir are specifically reserved for entities within the Plateau Regional Water Planning Area (Region J) at this time. The SCTRWPG also recognizes commitments of about 600 acft/yr and 1,680 acft/yr from Canyon Reservoir to meet projected needs for the Cities of Blanco and Buda, respectively, located in the Lower Colorado Regional Water Planning Area (Region K).

3.2.3.4 Coleto Creek Reservoir

Coleto Creek Reservoir, owned by Coleto Creek Power (part of GDF SUEZ Energy North America) and operated by GBRA, is located at the border of Victoria and Goliad Counties in the lower Guadalupe River Basin and is a cooling reservoir for steam-electric power generation. Sources of water include runoff from the Coleto Creek watershed and diversions from the Guadalupe River, backed by stored water from Canyon Reservoir, when needed. The reservoir supplies water for steam-electric power generation at the Coleto Creek Power Station located in Goliad County.

3.2.3.5 Other Reservoirs

Lakes Dunlap, McQueeny, Placid, Nolte, Gonzales, and Wood, on the Guadalupe River between New Braunfels and Gonzales, form pools for hydroelectric power generation and are the sites of hydroelectric power plants providing service to the Guadalupe Valley Electric Cooperative. These reservoirs and water rights are owned by GBRA. In addition to those owned by GBRA, other small reservoirs and associated priority and non-priority water rights for hydroelectric power generation are located along the Guadalupe River at Seguin, Gonzales, and Cuero. Since hydroelectric power generation is a non-consumptive use of water, water available to these rights is not listed in Table 3-3. All water rights are, however, included on a priority basis in the assessment of surface water supply using the GSA WAM.

Table 3-3 List of Major Reservoirs

RESERVOIR	WATER RIGHT OWNER	CERTIFICATE OF ADJUDICATION NUMBER	AUTHORIZED DIVERSION (ACFT/YR)	FIRM YIELD IN 2020 (ACFT/YR)	PURPOSES
San Antonio River Basin					
Medina Lake System	Bexar-Medina-Atascosa Counties WCID #1	19-2130	70,750	0 [a]	Irrigation, municipal, domestic, livestock
Victor Braunig Lake	City Public Service Board of San Antonio	19-2161	12,000 [b]	<12,000 [c]	Steam-electric power generation
Calaveras Lake	City Public Service Board of San Antonio	19-2162	37,000 [d]	<37,000 [c]	Steam-electric power generation
Guadalupe River Basin					
Canyon Reservoir	Guadalupe-Blanco River Authority	18-2074	120,000 [e]	~120,000 [e]	Municipal, industrial, steam-electric, hydropower, irrigation, flood protection
Coleto Creek Reservoir	Coleto Creek Power	18-5486	24,160 [f]	<24,160 [c]	Steam-electric power generation

Notes

[a] Based on operation of the Medina Lake System in accordance with CA #19-2130C. Sedimentation is not expected to have an impact on firm yield.

[b] Includes Rights to divert up to 12,000 acft/yr from the San Antonio River to Braunig Lake and to consume up to 12,000 acft/yr at Braunig Lake.

[c] The reservoir and supplemental authorized diversions from the adjacent river could support a firm yield in excess of the authorized consumptive use; however, operations of steam-electric power generation facilities could be impaired. Sedimentation is not expected to have an impact on firm yield for Victor Braunig Lake, Calaveras Lake, or Coleto Creek Reservoir.

[d] Includes rights to divert up to 60,000 acft/yr of the unappropriated public waters of the San Antonio River including treated effluent to Calaveras Lake and to consume up to 37,000 acft/yr.

[e] The firm yield of Canyon Reservoir is dependent upon a number of factors including points of diversion for contracted supplies, Edwards Aquifer springflow, term recreational flow agreements, and discharge of treated effluent throughout the Guadalupe - San Antonio River Basin. Subject to the hydrologic assumptions and operational procedures listed in Section 3.2.1, estimates of Canyon Reservoir firm yield range from 86,280 acft/yr to 85,559 acft/yr in years 2020 and 2070, respectively. For purposes of regional water planning (including DB22), the projected firm yield for Canyon Reservoir has been quantified as 86,280 acft/yr in 2020, decreasing to 85,559 acft/yr in 2070 due to sedimentation.

[f] Includes rights to divert up to 24,160 acft/yr from the Guadalupe River to Coleto Creek Reservoir and to consume up to 24,160 acft/yr.

3.2.4 Run-of-River Water Rights

In addition to those associated with major reservoirs, surface water rights have been issued by the TCEQ and predecessor agencies to individuals, cities, industries, and water districts and authorities for diversion from flowing streams of the South Central Texas Region. Each right bears a priority date, diversion location, maximum diversion rate, and annual quantity of diversion. Some rights may include off-channel storage authorization, instream flow restrictions, and various special conditions. The principle of prior appropriation or "first-in-time-first-in-right" is applied, which means that the most senior, or oldest, right has first call on flows, with the second, third, and more recent rights having second, third, and later priorities for diversions. This procedure gives senior right holders priority when streamflows are low, as in periods of drought, and renders junior rights less reliable during droughts. The most junior water right holders may not be able to divert any water during severe droughts if so directed by the TCEQ acting through the South Texas Watermaster.

It is important to note that many run-of-river rights are for irrigation purposes, where chances are taken at planting time upon whether water will be available for crop production during the growing season. In fact, when reviewing applications for irrigation rights, TCEQ staff have traditionally considered whether 75 percent of the proposed diversion would be available in 75 percent of the years. Municipal, industrial, and steam-electric power users, however, typically require more reliable supplies than are available from run-of-river flows. Hence, these types of users will often develop storage and/or alternative supplies to increase the reliability of their run-of-river rights.

For the Nueces River Basin part of the South Central Texas Region, run-of-river water rights total more than 120,000 acft/yr and are primarily used for irrigation purposes. Consumptive run-of-river rights in the Guadalupe-San Antonio River Basin total over 446,000 acft/yr and are used primarily for irrigation, municipal, and industrial purposes.

3.2.5 Local Surface Water

Local surface water supplies are disbursed, limited, unnamed individual surface water supplies that, separately, are available only to particular non-municipal WUGs, such as livestock. These supplies are generally runoff collection, such as livestock supply ponds, and are assumed to be fresh water. Local surface water supplies were assumed to be used only for a portion of livestock and independent of other surface water sources listed (Table 3-4).

For the 2021 South Central Texas Regional Water Plan, local surface water supplies were assumed for all counties with livestock demand. For all areas within the planning region, livestock water demand is generally assumed to be supplied 50 percent from quantified groundwater sources and 50 percent from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills. This assumption is based on data from the TWDB historic water use estimates, which indicate that the counties within the planning area average approximately 57% groundwater supply to meet livestock use over the past ten years. Because the demands are based on a drought year scenario, it was assumed that ranchers will manage their livestock in such a way that populations will be maintained at a level that can be supported by a combination of local surface water supplies and known water or groundwater supplies.

Table 3-4 Local Surface Water Supplies (acft/yr)

Source County	Source Basin	2020	2030	2040	2050	2060	2070
Atascosa	Nueces	754	754	754	754	754	754
Bexar	Nueces	177	177	177	177	177	177
	San Antonio	402	402	402	402	402	402
Caldwell	Colorado	30	30	30	30	30	30
	Guadalupe	471	471	471	471	471	471
Calhoun	Colorado-Lavaca	64	64	64	64	64	64
	Lavaca-Guadalupe	92	92	92	92	92	92
	San Antonio-Nueces	16	16	16	16	16	16
Comal	Guadalupe	120	120	120	120	120	120
	San Antonio	9	9	9	9	9	9
Dewitt	Guadalupe	631	631	631	631	631	631
	Lavaca	282	282	282	282	282	282
	Lavaca-Guadalupe	9	9	9	9	9	9
	San Antonio	75	75	75	75	75	75
Dimmit	Nueces	220	220	220	220	220	220
	Rio Grande	24	24	24	24	24	24
Frio	Nueces	497	497	497	497	497	497
Goliad	Guadalupe	140	140	140	140	140	140
	San Antonio	215	215	215	215	215	215
	San Antonio-Nueces	209	209	209	209	209	209
Gonzales	Guadalupe	4,786	4,786	4,786	4,786	4,786	4,786
	Lavaca	53	53	53	53	53	53
Guadalupe	Guadalupe	650	650	650	650	650	650
Hays	Guadalupe	754	754	754	754	754	754
Karnes	Guadalupe	20	20	20	20	20	20
	San Antonio	558	558	558	558	558	558
	San Antonio-Nueces	10	10	10	10	10	10
Kendall	Colorado	6	6	6	6	6	6
	Guadalupe	159	159	159	159	159	159

	San Antonio	33	33	33	33	33	33
La Salle	Nueces	245	245	245	245	245	245
Medina	Nueces	519	519	519	519	519	519
	San Antonio	63	63	63	63	63	63
Refugio	San Antonio	12	12	12	12	12	12
	San Antonio-Nueces	225	225	225	225	225	225
Uvalde	Nueces	516	516	516	516	516	516
Victoria	Guadalupe	312	312	312	312	312	312
	Lavaca	2	2	2	2	2	2
	Lavaca-Guadalupe	196	196	196	196	196	196
	San Antonio	22	22	22	22	22	22
Wilson	Guadalupe	93	93	93	93	93	93
	Nueces	93	93	93	93	93	93
	San Antonio	759	759	759	759	759	759
Zavala	Nueces	594	594	594	594	594	594
Total		**15,117**	**15,117**	**15,117**	**15,117**	**15,117**	**15,117**

3.3 REUSE SUPPLIES

Reuse is the beneficial use of groundwater or surface water that has already been beneficially used. Reuse may be categorized as direct or indirect, and water can be used for potable and non-potable purposes. The most commonly used reuse supply is reclaimed water via municipal or industrial wastewater effluent treated to TCEQ-approved safe and suitable levels for the purpose for which they are reused. Reclaimed water is partitioned into two types: Type I and Type II. Type I reclaimed water may be used where public contact is likely (e.g., irrigation for public facilities or fire protection). Type II reclaimed water may be used in remote, restricted, or controlled, or limited-access areas where human contact is unlikely (e.g., power plant cooling or supply to non-recreational water bodies).

Current water supplies in the South Central Texas Region involving reuse of treated wastewater are associated with the Recycled Water Program of the SAWS and contractual commitments by the GBRA, city of San Marcos, and others. The following description and Table 3-5 summarize information reported to the SCTRWPG.

Table 3-5 Reported, Current Reuse Supplies by County

COUNTY	ENTITY	2020 REUSE SUPPLY* (ACFT/YR)	USE
Bexar	Fair Oaks Ranch	560	Type I - Irrigation

	Cibolo Creek Municipal Authority	2,518	Type I – Irrigation
	San Antonio River Authority	1,657	*Not Reported*
	San Antonio Water System	25,000*	Type I Irrigation; Type II Manufacturing, Cooling, Environmental
Comal	City of New Braunfels	107	Type I Irrigation; Type II Manufacturing, Cooling
Guadalupe	GBRA	445	Type I Irrigation; Type II Mining, Cooling
	City of Seguin	880	Type I Irrigation; Type II Cooling
Hays	City of Kyle	1,008	Type I Irrigation; Type II Cooling
	City of San Marcos	7,440	Type I Irrigation; Type II Cooling
Kendall	City of Boerne	65	Type I Irrigation
	Kendall County WCID #1	39	Type II Mining
		230	Type I Irrigation
* Projected reuse supply for 2020 decade.			

3.4 MAJOR WATER PROVIDERS

A new category for this round of planning, a major water provider (MWP) is defined by the SCTRWPG as any wholesale water provider (WWP), or municipal WUG that has demands greater than 20,000 acft/yr by 2070. Using this definition the following entities are identified as MWPs in the South Central Texas Region.

- Alliance Regional Water Authority (ARWA)
- Canyon Regional Water Authority (CRWA)
- Cibolo Valley Local Government Corporation (CVLGC)
- GBRA
- New Braunfels
- SAWS
- San Marcos

- Schertz-Seguin Local Government Corporation (SSLGC)
- Victoria

A summary of existing supplies for MWPs by decade and category of use is included in Table 3-6.

Table 3-6 Summary of Major Water Provider Existing Supplies

Major Water Provider (Provider Type)	Use Type	Existing Water Supply Projections (acft/yr) 2020	2030	2040	2050	2060	2070
ARWA (WWP)[1]	**Total**	**--**	**--**	**--**	**--**	**--**	**--**
WUG Supplies	--	--	--	--	--	--	--
Contract Supplies	--	--	--	--	--	--	--
CRWA (WWP)	**Total**	**26,817**	**26,817**	**26,817**	**26,817**	**26,817**	**26,817**
WUG Supplies	--	--	--	--	--	--	--
Contract Supplies	Municipal	26,817	26,817	26,817	26,817	26,817	26,817
CVLGC (WWP)[2]	**--**	**--**	**--**	**--**	**--**	**--**	**--**
WUG Supplies	--	--	--	--	--	--	--
Contract Supplies	--	--	--	--	--	--	--
New Braunfels (WUG)	**Total**	**19,430**	**19,430**	**19,430**	**19,430**	**19,430**	**19,430**
WUG Supplies	Municipal	19,430	19,430	19,430	19,430	19,430	19,430
Contract Supplies	--	--	--	--	--	--	--
San Marcos (WUG)	**Total**	**13,084**	**13,084**	**13,084**	**13,084**	**13,084**	**13,084**
WUG Supplies	Municipal	13,084	13,084	13,084	13,084	13,084	13,084
Contract Supplies	--	--	--	--	--	--	--
Victoria (WUG)	**Total**	**8,175**	**8,175**	**8,175**	**8,175**	**8,175**	**8,175**
WUG Supplies	Municipal	8,175	8,175	8,175	8,175	8,175	8,175
Contract Supplies	--	--	--	--	--	--	--
GBRA (WUG/WWP)	**Total**	**118,330**	**117,626**	**114,553**	**115,171**	**117,647**	**117,662**
WUG Supplies	Municipal	325	343	363	387	417	447
Contract Supplies	Irrigation	480	480	480	480	480	480
Contract Supplies	Manufacturing	30,355	30,341	30,327	30,309	30,287	30,265
Contract Supplies	Municipal	63,978	63,270	60,191	60,803	63,271	63,278
Contract Supplies	Steam-Electric	9,304	9,304	9,304	9,304	9,304	9,304
Contract Supplies	WWP	13,888	13,888	13,888	13,888	13,888	13,888
SAWS (WUG/WWP)	**Total**	**247,771**	**248,963**	**251,831**	**255,268**	**257,179**	**257,179**
WUG Supplies	Municipal	246,141	247,833	250,701	254,138	256,049	256,049
Contract Supplies	Municipal	1,630	1,130	1,130	1,130	1,130	1,130
SSLGC (WWP)	**Total**	**17,039**	**16,644**	**17,039**	**17,039**	**17,039**	**17,039**
WUG Supplies	--	--	--	--	--	--	--
Contract Supplies	Municipal	17,039	16,644	17,039	17,039	17,039	17,039

[1] ARWA has no existing supplies, but plans to develop new water supplies from three water management strategies included in the 2021 South Central Texas Regional Water Plan (See Chapter 5.2): ARWA/GBRA Project (Phase 1), ARWA Project (Phase 2), and ARWA Project (Phase 3).

[2] CVLGC comprises the Cities of Schertz and Cibolo. CVLGC has no existing supplies but plans to develop a water management strategy included in the 2021 South Central Texas Regional Water Plan (See the CVLGC Carrizo Project in Chapter 5.2.22).

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FINAL PLAN

APPENDIX 3-A: HYDROLOGIC ASSUMPTIONS REQUESTS AND APPROVALS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

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Region L
South Central Texas Regional Water Planning Group

c/o San Antonio River Authority
P.O. Box 839980
San Antonio, Texas 78283-9980

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May 2, 2018

Mr. Jeff Walker
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711

RE: Adoption of Hydrologic Assumptions and Operational Procedures for Assessment of Groundwater and Surface Water Supply

Dear Mr. Walker,

At its meeting on November 2, 2017, the South Central Texas Regional Water Planning Group (SCTRWPG) adopted hydrologic assumptions and operational procedures for the assessment of groundwater and surface water supply for development of the 2021 South Central Texas Regional Water Plan.

On behalf of the SCTRWPG, please accepted the enclosed documents. Attachment A (enclosed) outlines the hydrologic assumptions adopted by the SCTRWPG and the approved procedures for assessing water supply. Attachment B (enclosed) lists the hydrologic models approved by the SCTRWPG for the development of the 2021 Plan.

As always, please reach out to me or my staff with any questions you may have.

Sincerely,

Suzanne Scott
Region L Chair
General Manager, San Antonio River Authority

Cc:

Brian Perkins, SCTRWPG Technical Consultant, Black & Veatch

Steve Raabe, SCTRWPG Administrator, Director of Technical Services, San Antonio River Authority

Cole Ruiz, Intergovernmental Relations Coordinator, San Antonio River Authority

Ron Ellis, Team Lead, Regional Water Planning, Texas Water Development Board

Elizabeth McCoy, Planner, Regional Water Planning, Texas Water Development Board

Adopted
November 2, 2017

Attachment A

2021 South Central Texas Regional Water Plan

Hydrologic Assumptions and Operational Procedures for Assessment of Groundwater and Surface Water Supply

Surface Water

1. WAM Run 3 for all Surface Water Rights Modeling
    a. Full exercise of existing surface water rights
    b. Zero effluent discharges unless specifically required by a surface water right (hydropower, industrial rights, City of Victoria, etc.)
2. Operation of Canyon Reservoir at firm yield in accordance with CA #18-2074E, including subordination of all senior Guadalupe River hydropower permits to Canyon Reservoir
3. Delivery of GBRA's present contractual obligations from Canyon Reservoir to points of diversion
4. Firm supply of surface water rights based on monthly availability
5. New water rights evaluated in accordance with Environmental Flow Standards
6. Operation of power plant reservoirs (Braunig, Calaveras, and Coleto Creek) subject to authorized consumptive uses at the reservoir, with makeup diversions as needed to maintain full conservation storage to the extent possible subject to senior water rights, instream flow constraints, and/or applicable contractual provisions
7. Operation of Choke Canyon Reservoir/Lake Corpus Christi (CCR/LCC) System at safe yield subject to TCEQ Agreed Order regarding freshwater inflows to the Nueces Estuary
8. Period of record for simulations:
9. Guadalupe-San Antonio River Basin (1934-89, Critical Drought = 1950s)
10. Nueces River Basin (1934-97, Critical Drought = 1990s)

Groundwater

1. Reliability of Edwards Aquifer permits and resulting springflows consistent with Habitat Conservation Plan (Phase I) developed through the Edwards Aquifer Recovery Implementation Program for the period 1947-1989 (using the latest MODFLOW model). Pre-1947 (1934-1946) withdrawals, critical period management, and resulting springflows consistent with SB 3 (80th Texas Legislature) using GWSIM-IV and historical Edwards Aquifer recharge estimates developed by EUWD/HDR.

2. Reliability of existing groundwater permits and availability to new groundwater strategies in the Carrizo-Wilcox, Trinity, Gulf Coast, and other minor[1] aquifers will be in accordance with Modeled Available Groundwater estimates, as calculated by TWDB on or before June 1, 2018.
3. The SCTRWPG will use the process established during the 2016 Planning Cycle (Section 8.3.1 of the 2016 SCTRWP) to determine the amount of groundwater allocated to individual groundwater permits.

Reuse/Recycle Water

1. Source water available for a reuse water management strategy will be determined based on the estimated amount of water returned to a utility's WWTPs for each decade, less the amount of reuse water already being utilized as existing supply
    a. The amount of water returned to a utility's WWTP will be estimated at 50% of the utility's projected water demands, adjusted for water conservation and drought management strategies, unless site-specific information is available
    b. Example: [50% * (projected water demands for a utility - conservation WMS volumes - drought management WMS volumes)] – existing reuse supply

[1]*Where a DFC has been established*

Adopted
November 2, 2017

Attachment B
2021 South Central Texas Regional Water Plan
Hydrologic Models

Primary Models

- Guadalupe-San Antonio River Basin Water Availability Model (GSA WAM)[1]
- Nueces River Basin Water Availability Model (Nueces WAM)[1]
- Flow Regime Application Tool (FRAT)[1]
- MODFLOW Model of the Edwards Aquifer
- Southern Carrizo-Wilcox-Queen City-Sparta Groundwater Availability Model (GAM)[2]
- Central Carrizo-Wilcox-Queen City-Sparta GAM[2]
- Gulf Coast Groundwater Availability Model[2]
- Trinity Groundwater Availability Model[2]
- Any additional currently-approved WAM[1] or GAM[2] necessary

Additional Models

- Lower Nueces River Basin & Estuary Model (NUBAY)
- HSPF Models of the Edwards Aquifer Recharge Zones
- GWSIM-IV Model of the Edwards Aquifer

[1] *Latest version of WAMs and FRAT will be downloaded from the TCEQ Website by May 1, 2018*

[2] *Latest version of GAMs will be downloaded from the TWDB Website by May 1, 2018*

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

June 20, 2018

Ms. Suzanne Scott
Region L Chair
c/o San Antonio River Authority
P.O. Box 839980
San Antonio, TX 78283

RE: Region L Regional Water Planning Group (RWPG) request for approval to modify existing surface water availability hydrologic assumptions for development of the 2021 Region L Regional Water Plan (RWP)

Dear Ms. Scott:

The Texas Water Development Board (TWDB) has reviewed your request (dated May 2, 2018) 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 the following variances:

1. Use of the Flow Regime Application Tool, in conjunction with the Texas Commission on Environmental Quality's (TCEQ) Water Availability Model (WAM) RUN3, to evaluate environmental flows for new surface water management strategies (WMSs).
2. Determination of the upper limit of source water available for reuse WMSs based on the amount of water returned to a utility's wastewater treatment plants, estimated at 50% of the utility's projected water demands, adjusted for water conservation and drought management strategies, unless site-specific information is available. Indirect reuse WMSs may also be evaluated with TCEQ WAM RUN3.

For the purpose of evaluating potentially feasible water management strategies not included in the above list, the TCEQ WAM RUN3 is to be used.

While the TWDB authorizes these modification to evaluate existing water supplies for development of the 2021 Region L 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 contract Exhibit C, *Second Amended General Guidelines for Fifth Cycle of Regional Water Plan Development.*

If you have any questions, please do not hesitate to contact Elizabeth McCoy, project manager for Region L, at 512-475-1852 or via email at elizabeth.mccoy@twdb.texas.gov.

Sincerely,

Jeff Walker
Executive Administrator

c: Mr. Steve Raabe, San Antonio River Authority
Mr. Cole Ruiz, San Antonio River Authority
Mr. Brian Perkins, Black and Veatch Corp.
Ms. Elizabeth McCoy, TWDB

c/o San Antonio River Authority
100 East Guenther Street
San Antonio, Texas 78204
(210) 227-1373 Office
www.RegionLTexas.org

November 26, 2018

Elizabeth McCoy
Planner/ Project Manager (Region L)
Texas Water Development Board
Electronic Transmission: Elizabeth.mccoy@twdb.texas.gov

RE: Request for Hydrologic Variance in the 2021 Regional Water Plan

Dear Ms. McCoy,

At its November 1, 2018, meeting, the South Central Texas Regional Water Planning Group (SCTRWPG) authorized the planning group's designated political subdivision (San Antonio River Authority, i.e. SARA) to submit a hydrologic variance request to the Texas Water Development Board (TWDB).

GBRA's Canyon Reservoir Permit and use of the old "Region L WAM"

The Guadalupe-Blanco River Authority's (GBRA) permit, and subsequent amendments, to divert surface water from Canyon Reservoir is unique in that it does not specify a firm yield. GBRA's permit allows the diversion of up to 120,000 acre-feet in any given year, but the 5 year average diversion must not exceed 90,000 acre-feet per year. GBRA currently has contracts for sale of water diverted from Canyon Reservoir totaling close to 90,000 acre-feet per year in accordance with its permit.

In the 2016 Region L Regional Water Plan (RWP) and 2017 State Water Plan, the firm yield for Canyon Reservoir was calculated to be 88,400 acre-feet in the year 2070. However, the SCTRWPG used the old "Region L WAM" (i.e. Region L water availability model) to model Canyon Reservoirs supplies in the 2016 Plan. The Region L WAM modeled Canyon Reservoir based on a daily time step simulation. This model was used to simulate Federal Energy Regulatory Commission (FERC) requirements, a drought contingency trigger at the Spring Branch stream gauge, an agreement with Guadalupe Trout Unlimited, and various water rights and daily operations dependent on Canyon Reservoir. Additionally, the SCTRWPG assumed 2011 effluent figures in modeling Canyon Reservoir's existing supply.

Hydrologic Assumptions for the 2021 Regional Water Plan

The SCTRWPG adopted hydrologic assumptions for the development of its 2021 Regional Water Plan at its meeting on November 2, 2017. Those assumptions rely on the Texas Commission on Environmental Quality (TCEQ) Unmodified Guadalupe-San Antonio (GSA) WAM for the analysis of existing supplies, water management strategies, and cumulative effects. This model operates on a monthly time step simulation, and does not account for the FERC requirements, the drought contingency trigger at the Spring Branch stream gauge, or the agreement with Guadalupe Trout Unlimited and other water rights and daily operations dependent on Canyon Reservoir. Moreover, the 2021 RWP hydrologic assumptions assumes zero effluent discharge.

Under the TCEQ Unmodified GSA WAM and no effluent assumptions, Canyon Reservoir's firm yield is projected at about 75,000 acre-feet per year in the year 2070—a deficit of about 13,400 acre-feet from the 2016 RWP. This deficit is largely due to the difference between the monthly time step simulation used in the TCEQ Unmodified GSA WAM and the daily time step simulation used in the old Region L WAM.

Hydrologic Variance Request

The SCTRWPG's hydrologic variance, if authorized by TWDB, would only be used for establishing Canyon Reservoir's Existing Supply quantity, which would provide for a more accurate yield that is consistent with the actual conditions and operations set forth above. This variance would entail the following hydrologic assumptions for Canyon Reservoir's Existing Supply:

1. Use the Region L WAM (for purposes of using the daily time step simulation);
2. No effluent used; and
3. No other changes to any water rights.

The goal of this variance request is to simulate Canyon Reservoir's firm yield using the daily time step, which is more consistent with how the reservoir is actually operating in accordance with its permit, given the FERC requirements, drought contingency trigger at the Spring Branch stream gauge, the agreement with the Guadalupe Trout Unlimited, and the various water rights and daily operations dependent on Canyon Reservoir.

On behalf of the SCTRWPG, and in accordance with the action taken at its November 1, 2018, meeting, we ask the TWDB staff to grant this hydrologic variance request. Should you have any questions regarding this request, please contact myself (sbscott@sara-tx.org), Cole Ruiz (cruiz@sara-tx.org), or Brian Perkins (PerkinsRB@bv.com) by phone or email.

Sincerely,

Suzanne Scott, Chair
General Manager, San Antonio River Authority
Cc:

Brian Perkins P.E., Technical Consultant, Black and Veatch
Steve Raabe P.E., Region L Administrator, Director of Technical Services, San Antonio River Authority
Cole Ruiz, Intergovernmental Relations Coordinator, San Antonio River Authority
Hillary Lilly, Intergovernmental Relations Coordinator, San Antonio River Authority

Texas Water Development Board

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Phone (512) 463-7847, Fax (512) 475-2053

January 18, 2019

Ms. Suzanne Scott
Region L Chair
c/o San Antonio River Authority
P.O. Box 839980
San Antonio, TX 78283

RE: Region L Regional Water Planning Group (RWPG) request for approval to modify existing surface water availability hydrologic assumptions for development of the 2021 Region L Regional Water Plan (RWP)

Dear Ms. Scott:

The Texas Water Development Board (TWDB) has reviewed your request (dated November 26, 2018) for approval of alternative water supply assumptions to be used in determining existing surface water availability. This letter confirms that the TWDB approves the following variance:

- Use of the Region L Water Availability Model (WAM) to establish the existing supply for Canyon Reservoir (daily time step simulation with no use of effluent or other changes to any water rights).

For the purpose of evaluating potentially feasible water management strategies, the Texas Commission on Environmental Quality WAM Run 3 is to be used.

While the TWDB authorizes these modification to evaluate existing water supplies for development of the 2021 Region L 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 contract Exhibit C, *Second Amended General Guidelines for Fifth Cycle of Regional Water Plan Development.*

If you have any questions, please do not hesitate to contact Elizabeth McCoy, project manager for Region L, at 512-475-1852 or via email at elizabeth.mccoy@twdb.texas.gov.

Sincerely,

Jeff Walker
Executive Administrator

c: Mr. Steve Raabe, San Antonio River Authority
Mr. Cole Ruiz, San Antonio River Authority
Mr. Brian Perkins, Black and Veatch Corp.
Ms. Elizabeth McCoy, TWDB

From: Sarah Backhouse <Sarah.Backhouse@twdb.texas.gov>
Sent: Tuesday, September 1, 2020 1:54 PM
To: Suzanne Scott; Caitlin Heller; Hillary Lilly
Cc: Gonzalez, Lauren; Lagade, Junior; Snyder, Katherine; Elizabeth McCoy; Ron Ellis; Temple McKinnon; Matt Nelson; Jessica Zuba
Subject: Region L WAM Hydrologic Variance Approval

Good afternoon,

On August 26, 2020, the Region L technical consultants requested to use the Region L Water Availability Model (WAM), a modified version of the TCEQ's Guadalupe-San Antonio River Basin WAM, to model supplies for the Braunig, Calaveras, and Coleto Creek power plant reservoirs.

Based on review of the Region L draft response to TWDB's comments on the Initially Prepared Plan (IPP), follow up information from the Region L technical consultant, and review of the 2021 Region L hydrologic variances, it appears that the Region L hydrologic variances submitted in May and November of 2018 intended to request to model supplies for the Braunig, Calaveras, and Coleto Creek power plant reservoirs consistent with the way they are modeled in the Region L WAM. The Region L WAM more accurately considers reservoir operations in its analysis, including operation of the Braunig, Calaveras, and Coleto Creek power plant reservoirs at their authorized diversion amounts. Use of the Region L WAM to analyze these reservoirs is consistent with the approach used to develop the 2016 Region L Regional Water Plan.

This email serves as TWDB's authorization to use the Region L WAM to establish the existing surface water availability for the Braunig, Calaveras, and Coleto Creek power plant reservoirs in development of the 2021 Region L Regional Water Plan.

The Region L Regional Water Planning Group (RWPG) should be briefed on this approval. In addition, the RWPG should reference this approval in their response to TWDB's IPP Comment 11. TWDB will consider adoption of the final Region L Regional Water Plan with inclusion of this information in response to TWDB IPP Comment 11 as the RWPG's approval of the hydrologic variance.

Please let myself or Elizabeth McCoy know if you have any questions.

Best,
Sarah

Sarah Backhouse
Manager, Regional Water Planning
Water Use, Projections, and Planning
Texas Water Development Board
P.O. Box 13231, Austin, TX 78711
512-936-2387 | sarah.backhouse@twdb.texas.gov
www.twdb.texas.gov

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FINAL PLAN

APPENDIX 3-B: SURFACE WATER RELIABILITY

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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Appendix 3-B: Surface Water Reliability

Table 1: Surface Water Reliability

Basin	County	Use	Water Right ID No.	Authorized Diversion (acft/yr)	Volume Reliability (%)	Minimum Annual Supply (acft)	Owner
Guadalupe	Comal	MUN	C3829_3	400	100	400	CANYON REGIONAL WATER AUTHORITY
Guadalupe	Wilson	IRR	STORY_1	400	91.09	0	James D Story
San Antonio	Wilson	IRR	c2182_3	700	93.21	0	LEO V LYSSY ET AL
San Antonio	Wilson	IRR	c2182_4	166	39.01	0	LEO V LYSSY ET AL
Guadalupe	Comal	IRR	A5647_1	350	65.66	0	RIVER CROSSING HOLDINGS LLC
Guadalupe	Kendall	IRR	C2450_1	158	93.32	0	ROBERT L MOSTY ET AL
San Antonio	Wilson	IRR	C2179_1	47	100	47	A D D CORPORATION
San Antonio	Wilson	IRR	C2179_2	72	100	72	A D D CORPORATION
San Antonio	Wilson	IRR	C2179_3	39	100	39	A D D CORPORATION
San Antonio	Wilson	IRR	C2179_4	467	46.49	0	A D D CORPORATION
San Antonio	Medina	IRR	C2139_1	112	90.16	0	A L GILLIAM
San Antonio	Hays	IRR	P3888_1	290	47.13	0	ALAN D BARIBEAU ET UX
San Antonio	Caldwell	IRR	P3897_1	716	35.12	0	ALFRED J NEWMAN, ET UX
San Antonio	Karnes	IRR	P5062_1	100	92.57	0	ALFRED J RAHE
San Antonio	Karnes	IRR	C2188_1	40	93.59	0	ALFRED MOCZYGEMBA
San Antonio	Karnes	IRR	P4538_1	150	92.87	0	ALICE P JENDRUSCH ET AL
San Antonio	Wilson	IRR	C1148_1	11	98.75	0	ALLAN G LYNHAM ET UX
San Antonio	Wilson	IRR	P5587_1	300	28.99	0	ALOIS D KOLLODZIEJ ET UX
San Antonio	Karnes	IRR	C1168_1	30	98.9	0	ALOYS PAWELEK
San Antonio	Medina	IRR	SANTE_2	156	35.82	0	ALVIN C SANTLEBEN
San Antonio	Wilson	IRR	C1162_1	2	93.05	0	ALVIN PRUSKI
San Antonio	Wilson	IRR	C1162_2	78	73.17	0	ALVIN PRUSKI
San Antonio	Karnes	IRR	P3431_1	60	93.05	0	ANDREW RIVES ET UX
San Antonio	Bexar	IRR	C2150_1	62	97.55	0	ANGELINA BORDANO
San Antonio	Bexar	IRR	P4134_1	200	39.96	0	ANITA T WALSH ESTATE
San Antonio	Bexar	IRR	P5262_1	250	30.8	0	ANTHONY J GRANIERI
San Antonio	Bexar	IRR	C2142_1	197	89.94	0	ANTONIO MARIO FERNANDEZ
San Antonio	Bexar	IRR	C2154_2	200	50.01	0	ARNOLD ALBERT
San Antonio	Karnes	IRR	P5368_1	300	59.75	0	ARTHUR RAY YANTA ET UX
San Antonio	Bexar	IRR	C2160_1	116	92.98	0	BEN B MORRIS ESTATE
San Antonio	Wilson	IRR	P4121_1	38	46.64	0	BENITO D. CABRIALES ET UX
San Antonio	Wilson	IRR	C2183_2	100	100	100	BENJAMIN C PAWELEK
San Antonio	Bexar	IRR	P4135_1	200	40.17	0	BESSIE WALSH
San Antonio	Bexar	IRR	P4139_1	200	40.14	0	BESSIE WALSH
San Antonio	Bexar	MUN	C1959_1	150	90.46	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	MUN	C1966_1	481	94.11	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	MUN	C2144_1	215	94.38	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	MUN	C2144_2	93	93.8	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	MUN	C2144_3	308	28.19	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	MUN	C4768_1	89	99.06	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	MUN	C4768_2	417	98.59	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	MUN	C4768_3	4,494	27.31	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	MUN	P5549_1	2,250	26.32	0	BEXAR METROPOLITAN WATER DIST
San Antonio	Bexar	IRR	C2142_2	3	87.84	0	BEXAR, COUNTY OF
San Antonio	Medina	MUN	C2130_1	750	98.38	0	BEXAR-MEDINA-ATASCOSA COS WCID
San Antonio	Medina	MUN	C2130_2	170	97.96	0	BEXAR-MEDINA-ATASCOSA COS WCID
San Antonio	Medina	IRR	C2130_4	45,856	89.44	0	BEXAR-MEDINA-ATASCOSA COS WCID
San Antonio	Medina	MUN	C2130_6	19,974	92.36	0	BEXAR-MEDINA-ATASCOSA COS WCID
San Antonio	Wilson	IRR	C1152_1	35	93.85	0	BILL & MELVIN DEAGEN ET AL
San Antonio	Bexar	IRR	P5596_1	770	25.1	0	BILLY T MITCHELL
San Antonio	Bexar	IRR	C2141_1	75	82.17	0	BIPPERT FARMS
San Antonio	Bexar	MUN	P4136_2	276	39.48	0	BMWD
San Antonio	Bexar	MUN	P4137_2	566	39.18	0	BMWD
San Antonio	Bexar	MUN	P4138_3	152	39.24	0	BMWD

Basin	County	Use	Water Right ID No.	Authorized Diversion (acft/yr)	Volume Reliability (%)	Minimum Annual Supply (acft)	Owner
San Antonio	Wilson	IRR	P3994_1	1,056	46.2	0	BOENING ENTERPRISES
San Antonio	Karnes	IRR	C2184_1	120	52.54	0	BONNIE SKLOSS
San Antonio	Karnes	IRR	C2184_2	80	46.64	0	BONNIE SKLOSS
San Antonio	Bexar	IRR	C2146_1	215	92.87	0	BURRELL DAY
San Antonio	Wilson	IRR	C1151_1	86	99.11	0	CANYON REGIONAL WATER AUTHORITY
San Antonio	Bexar	MIN	P4025_1	431	46.04	0	CAPITOL AGGREGATES INC
San Antonio	Bexar	MIN	P4025_2	769	45.05	0	CAPITOL AGGREGATES INC
San Antonio	Bexar	MIN	P4025_3	3,304	27.27	0	CAPITOL AGGREGATES INC
San Antonio	Bexar	IRR	P4497_1	20	65.69	0	CARL RAY DRZYMALLA ET AL
San Antonio	Bexar	IRR	C2152_1	409	81.17	0	CAROLYN VANCE COOK
San Antonio	Karnes	IRR	P4002_1	80	73.55	0	CASPER F MOCZYGEMBA JR ET AL
San Antonio	Wilson	IRR	C2173_1	78	97.82	0	CECIL MARK RICHARDSON ET AL
San Antonio	Wilson	IRR	C2163_1	44	99.94	33.48	CHARLES HONEYCUTT, ET AL
San Antonio	Wilson	IRR	C2163_2	256	46.43	0	CHARLES HONEYCUTT, ET AL
San Antonio	Bandera	IRR	C2135_1	5	96.84	0	KITTIE NELSON FERGUSON
San Antonio	Karnes	IRR	P5044_1	150	92.62	0	CHARLES WAYNE HUBBARD ET AL
San Antonio	Bexar	IRR	C1146_1	26	98.73	0	CIBOLO CREEK MUNICIPAL AUTH
San Antonio	Kendall	MUN	C1143_1	523	99.14	0	CITY OF BOERNE
San Antonio	Kendall	MUN	C1143_2	310	99.03	0	CITY OF BOERNE
San Antonio	Bexar	IRR	P4105_1	150	88.43	0	CITY OF LIVE OAK
San Antonio	Bexar	IRR	C2156_1	294	99.04	0	CITY OF SAN ANTONIO
San Antonio	Bexar	IRR	C2159_1	60	97.44	0	CITY OF SAN ANTONIO
San Antonio	Bexar	IND	C2161_1	12,000	95.42	0	CITY OF SAN ANTONIO
San Antonio	Bexar	IND	C2162_2	60,000	73.73	0	CITY OF SAN ANTONIO
San Antonio	Bexar	IND	C2162_3	36,900	93.68	0	CITY OF SAN ANTONIO
San Antonio	Bexar	MUN	C2162_4	100	92.49	0	CITY OF SAN ANTONIO
San Antonio	Bexar	IND	C2162_5	11	92.64	0	CITY OF SAN ANTONIO
San Antonio	Goliad	IRR	P5220_1	90	91.96	0	CLARENCE F SCHENDEL ET UX
San Antonio	Karnes	IRR	C2189_1	350	97.62	0	CLEM R CANNON ET AL
San Antonio	Wilson	IRR	C2172_1	18	99.49	0	CLYDE R MAHA ET AL
San Antonio	Goliad	IRR	C2196_1	336	99.04	0	COLETO CATTLE COMPANY
San Antonio	Bexar	IRR	P4187_3	179	5.15	0	CURTIS HARRY MAHLA REVOCABLE TRUST
San Antonio	Wilson	IRR	C1163_1	80	100	80	CYNTHIA A TITZMAN ET VIR
San Antonio	Karnes	IRR	P4490_1	90	46.64	0	DANIEL R ANDERSON ET AL
San Antonio	Karnes	IRR	P5455_1	3	59.75	0	DAVID C. "CHARLIE" ZUNKER
San Antonio	Wilson	IRR	C1159_1	0	93.4	0	DEBORAH M IRWIN ET VIR
San Antonio	Wilson	IRR	P4484_1	5	46.64	0	DELBERT J KELLER
San Antonio	Wilson	IRR	P4484_2	200	92.95	0	DELBERT J KELLER
San Antonio	Wilson	IRR	P4484_3	100	92.84	0	DELBERT J KELLER
San Antonio	Karnes	IRR	P5296_1	74	93.28	0	DENNIS J MOY
San Antonio	Wilson	IRR	C2180_1	18	100	18	DONALD A OCKER ET AL
San Antonio	Wilson	IRR	C2180_2	110	100	110	DONALD A OCKER ET AL
San Antonio	Wilson	IRR	C2180_3	497	46.39	0	DONALD A OCKER ET AL
San Antonio	Bexar	IRR	C2148_1	8	92.27	0	DONALD G RAMBIE
San Antonio	Bexar	IRR	C1146_2	62	96.48	0	DOUG WISE
San Antonio	Wilson	IRR	C2165_1	50	93.21	0	ED WISEMAN MARITAL TRUST
San Antonio	Wilson	IRR	C2165_2	70	38.31	0	ED WISEMAN MARITAL TRUST
San Antonio	Goliad	IRR	P5313_1	100	97.11	0	EDWIN JACOBSON ET AL
San Antonio	Wilson	IRR	P5611_1	175	48.13	0	ELIAS DUGI, ET UX CIBO
San Antonio	Wilson	IRR	C1165_1	4	99.26	0	EMERYK KELLER
San Antonio	Bexar	IRR	C1942_1	886	91.04	0	ESPADA DITCH COMPANY
San Antonio	Karnes	IRR	P5532_1	3	55.81	0	FELIX BRONDER
San Antonio	Wilson	IRR	C2178_1	1	100	1.29	FELIX J JANEK JR ET UX
San Antonio	Wilson	IRR	C2178_2	5	100	5.4	FELIX J JANEK JR ET UX
San Antonio	Wilson	IRR	C2178_3	15	46.43	0	FELIX J JANEK JR ET UX
San Antonio	Karnes	IRR	P3767_1	20	93.55	0	FELIX MOCZYGEMBA
San Antonio	Karnes	IRR	P3808_1	232	46.64	0	FLAVIAN B MOCZYGEMBA

Basin	County	Use	Water Right ID No.	Authorized Diversion (acft/yr)	Volume Reliability (%)	Minimum Annual Supply (acft)	Owner
San Antonio	Karnes	IRR	C2190_1	100	100	100	FLORENCE S BAUMANN ET AL
San Antonio	Karnes	IRR	C2185_1	90	93.25	0	FRANCIS MOY & MARY MOY KOWALIK
San Antonio	Wilson	IRR	C2177_1	81	100	81	FRANK & J A LABUS
San Antonio	Karnes	IRR	C1167_1	5	99.26	0	FRANK B KRAWIETZ
San Antonio	Wilson	IRR	P5243_1	54	46.43	0	FRANK R BOLF
San Antonio	Wilson	IRR	C2181_1	64	100	64	FRED J LYSSY ET AL
San Antonio	Wilson	IRR	C2181_2	157	46.64	0	FRED J LYSSY ET AL
San Antonio	Wilson	IRR	C2181_3	159	46.64	0	FRED J LYSSY ET AL
San Antonio	Wilson	IRR	P5499_1	50	37.3	0	GARY ZOOK, ET UX
San Antonio	Wilson	IRR	C1159_2	13	93.4	0	GAYLON T CLICK ET UX
San Antonio	Wilson	IRR	C1159_3	16	93.4	0	GAYLON T CLICK ET UX
San Antonio	Victoria	IRR	P3861_1	200	46.64	0	GEO D POOL & RONALD R STINSON
San Antonio	Wilson	IRR	P5202_1	75	46.43	0	GEORGE R GAWLIK ET UX
San Antonio	Wilson	IRR	C1166_1	25	93.4	0	GERVAS JASKINIA ESTATE
San Antonio	Medina	IRR	C2134_1	17	92.93	0	GLENNIS W STEIN
San Antonio	Medina	IRR	P4149_1	20	38.6	0	GLENNIS W STEIN
San Antonio	Kerr	IRR	P4181_2	120	46.43	0	BERTRAND O BAETZ ESTATE ET AL
San Antonio	Kerr	IRR	P4181_1	86	46.64	0	BERTRAND O BAETZ ESTATE ET AL
San Antonio	Bexar	IRR	P4141_1	20	39.89	0	GULF LAND & INVESTMENT CO INC
San Antonio	Bexar	IND	P5337_1	25	22.02	0	H B ZACHRY CO
San Antonio	Bexar	IRR	P4141_2	23	39.89	0	H H GIRDLEY TRUSTEE
San Antonio	Wilson	IRR	C2168_1	16	95.45	0	H W FINCK
San Antonio	Karnes	IRR	C2192_1	140	99.04	0	HALLIS DAVENPORT REVC MAN TR
San Antonio	Medina	IRR	C2133_1	18	89.07	0	HARLEY & DOROTHY TSCHIRHART
San Antonio	Bexar	IND	P5469_2	1,500	52.46	0	HAUSMAN ROAD W S C
San Antonio	Karnes	IRR	P5333_1	90	59.54	0	HECTOR O HERRERA, ET UX
San Antonio	Karnes	IRR	P5333_2	300	59.69	0	HECTOR O HERRERA, ET UX
San Antonio	Karnes	IRR	P4503_1	55	46.64	0	HENRY D STRINGER JR
San Antonio	Karnes	IRR	P5306_1	200	92.51	0	HERBERT JOHN EWALD JR ET AL
San Antonio	Karnes	IRR	P5239_1	4	92.36	0	HOLY TRINITY CATHOLIC CHURCH
San Antonio	Medina	IRR	P4159_1	50	38.6	0	J C GRIFFITH
San Antonio	Medina	IRR	P4151_1	170	38.6	0	JAMES A OPPELT ET UX
San Antonio	Karnes	IRR	P4536_1	100	92.87	0	JAMES M & NANCY W BAILEY
San Antonio	Karnes	IRR	P4536_2	200	92.36	0	JAMES M & NANCY W BAILEY
San Antonio	Goliad	IRR	C2193_1	284	92.8	0	JAMES M PETTUS ET AL
San Antonio	Goliad	IRR	C2197_1	86	92.8	0	JAMES M PETTUS II
San Antonio	Bexar	IRR	C1170_1	17	99.82	4.09	JAMES N EVANS SR ET AL
San Antonio	Wilson	IRR	P5307_1	300	38.92	0	JAMES R LEININGER
San Antonio	Wilson	IRR	P5182_1	100	69.65	0	JAMES T WATSON
San Antonio	Wilson	IRR	C1164_1	6	93.4	0	JANE LYSSY OPIELA ET AL
San Antonio	Karnes	IRR	P5622_1	240	53.36	0	JAY E. BAKER ET AL SAN ANT
San Antonio	Kendall	IRR	C1142_1	4	94.23	0	JEB B MAEBIUS JR ET UX
San Antonio	Bexar	IRR	C2145_1	32	89.9	0	JERRY & MARIAM SPEARS
San Antonio	Wilson	IRR	C2169_1	29	100	29.34	JIMMY E HOLT ET UX
San Antonio	Goliad	IRR	C2195_1	410	97.22	0	JOE F FRENCH
San Antonio	Wilson	IRR	P5194_1	210	46.64	0	JOE R HOLLAWAY JR ET AL
San Antonio	Bexar	IRR	C2158_1	24	97.75	0	JOE S GARCIA JR ET UX
San Antonio	Goliad	IRR	P5079_1	114	91.96	0	JOHN C & SHERRY BROOKE
San Antonio	Wilson	IRR	C1161_1	15	93.4	0	JOHN DRZYMALA
San Antonio	Bexar	IRR	C1146_3	5	92.11	0	JOHN E NEWTON ET AL
San Antonio	Bexar	IRR	P4138_1	126	40.17	0	JOHN H SMALL
San Antonio	Bexar	IRR	C1146_4	8	91.4	0	JOHN K KOHLHAAS
San Antonio	Bexar	IRR	C1960_1	20	39.24	0	JOHN O SPICE
San Antonio	Bexar	IRR	P4141_3	179	39.89	0	JOHN POWELL WALKER TRUSTEE
San Antonio	Wilson	IRR	C2164_1	23	100	23	JOHN WILLIAM HELTON JR ET UX
San Antonio	Wilson	IRR	C2164_2	59	39.01	0	JOHN WILLIAM HELTON JR ET UX
San Antonio	Wilson	IRR	P5224_1	60	67.4	0	JOHNNY KOSUB & BETTY KOSUB

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San Antonio	Wilson	IRR	C1154_1	69	98.75	0	JONAH H WILSON
San Antonio	Bexar	IRR	C2147_1	28	94.12	0	JOSE LUIS AMADOR
San Antonio	Bexar	IRR	P4499_1	54	45.1	0	JOSEPH M STANUSH ET AL
San Antonio	Goliad	IRR	C2194_1	1,020	99.25	0	JULIA GANTT NEWTON ET AL
San Antonio	Bexar	IRR	C1962_1	10	45	0	JULIA H. KUSENER JACQUET ET AL
San Antonio	Victoria	IRR	P4117_1	950	92.44	0	JUNE PETTUS
San Antonio	Medina	IRR	P4140_1	185	38.6	0	KATHLEEN DAVENPORT CARSKADDEN
San Antonio	Medina	IRR	C2136_1	6	90.05	0	KITTIE NELSON FERGUSON
San Antonio	Guadalupe	IRR	P3837_1	21	46.64	0	LAWRENCE R HALLIBURTON ET UX
San Antonio	Bexar	MUN	P5517_1	7,500	39.16	0	LEON CREEK WSC
San Antonio	Bexar	IRR	C2155_1	240	99.75	0	LES MENDELSOHN
San Antonio	Wilson	IRR	P5264_1	130	39.01	0	LILLIAN S WISEMAN TRUST ET AL
San Antonio	Bexar	IRR	C1965_1	300	44.57	0	LOMAS SANTA FE LTD
San Antonio	Bexar	MUN	P5211_1	100	37.94	0	LONE STAR GROWERS CO
San Antonio	Bexar	MUN	P5211_2	2,900	25.63	0	LONE STAR GROWERS CO
San Antonio	Bexar	IRR	P4187_1	333	40.14	0	LOTTIE WALSH MAHLA ESTATE
San Antonio	Bexar	IRR	P4187_2	333	46.31	0	LOTTIE WALSH MAHLA ESTATE
San Antonio	Bexar	IRR	C2157_1	50	97.75	0	LOUIS PAWELEK
San Antonio	Wilson	IRR	P5633_1	130	84.7	0	LOUIS T. AND SONIA ROSENBERG
San Antonio	Wilson	IRR	P5633_2	20	0.25	0	LOUIS T. AND SONIA ROSENBERG
San Antonio	Bexar	IRR	P4294_1	40	91.36	0	MARY HARPER TUDHOPE
San Antonio	Bexar	IRR	P5265_1	35	42.19	0	MARY JAKSIK ZIGMOND
San Antonio	Karnes	IRR	P5043_1	150	92.54	0	MELANIE A JACOBS ET AL
San Antonio	Wilson	IRR	P5171_1	200	46.64	0	MESCALERO PROPERTIES
San Antonio	Bexar	MUN	C2140_1	963	78.52	0	METROPOLITAN RESOURCES INC
San Antonio	Bexar	IRR	C1933_1	480	75.03	0	MISSION CEMETERY CO
San Antonio	Wilson	IRR	C1160_1	140	93.4	0	MRS MAGGIE WEBER
San Antonio	Wilson	IRR	C2166_1	105	94.45	0	NICK KOLENDA
San Antonio	Wilson	IRR	C2166_2	95	39.01	0	NICK KOLENDA
San Antonio	Karnes	IRR	P4512_1	160	93.55	0	OLIVE L RIDLEY ET AL
San Antonio	Wilson	MUN	C1157_2	117	93.35	0	OSCAR SANDERS
San Antonio	Bexar	IRR	P5503_1	220	50.27	0	O-SPORTS GOLF DEVELOPMENT II
San Antonio	Wilson	IRR	C1150_1	200	98.75	0	PAT HIGGINS ESTATE
San Antonio	Goliad	IRR	P5478_1	300	60.02	0	PATRICIA PITTMAN LIGHT
San Antonio	Wilson	IRR	C1159_4	7	93.4	0	PATRICK NEIDORF
San Antonio	Hays	IRR	P3887_1	50	46.64	0	PATTILLO FAMILY FARMS INC
San Antonio	Bexar	IRR	P4141_4	77	39.89	0	PEOPLES SAVINGS & LOAN ASSN
San Antonio	Wilson	IRR	C2176_1	105	100	105	POTH LAND & CATTLE CO
San Antonio	Wilson	IRR	C2176_2	145	39.01	0	POTH LAND & CATTLE CO
San Antonio	Wilson	IRR	C2171_1	63	98.9	0	R C CARROLL
San Antonio	Wilson	IRR	P5559_1	99	49.97	0	RALPH MCGREW ET UX
San Antonio	Bexar	IRR	P5266_1	45	29.72	0	RANDALL K HOOVER ET UX
San Antonio	Bexar	IRR	C2149_1	32	98.57	0	RANDALL S PREISSIG TRUSTEE
San Antonio	Wilson	IRR	C1149_1	62	98.75	0	RAY SMITH ET UX
San Antonio	Wilson	IRR	P5395_1	254	38.26	0	RENATO MARTINEZ ET UX
San Antonio	Wilson	IRR	P5395_2	450	37.27	0	RENATO MARTINEZ ET UX
San Antonio	Wilson	IRR	C2169_2	18	100	17.66	RICHARD E ULLMANN ET UX
San Antonio	Karnes	IRR	P4561_1	525	92.44	0	RIO GRANDE RESOURCES CORP
San Antonio	Bexar	IRR	P5577_1	420	53.14	0	ROBERT L G WATSON
San Antonio	Wilson	IRR	C1171_1	80	98.08	0	ROSS OWEN SCULL
San Antonio	Wilson	IRR	C1171_2	250	73.91	0	ROSS OWEN SCULL
San Antonio	Wilson	IRR	C1171_3	330	68.47	0	ROSS OWEN SCULL
San Antonio	Goliad	IRR	C2199_1	325	99.04	0	SAM HOUSTON CLINTON ET AL
San Antonio	Wilson	IRR	P5308_1	100	57.12	0	SAM JARZOMBEK
San Antonio	De Witt	IRR	P3851_1	50	93.75	0	SAM M. KORZEKWA
San Antonio	Bexar	IRR	C1944_1	16	35.86	0	SAN ANTONIO MISSIONS NATL PARK
San Antonio	Bexar	IRR	P3476_1	100	74.98	0	SAN ANTONIO RANCH LTD

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San Antonio	Goliad	IRR	C2198_2	333	99.04	0	SAN ANTONIO RIVER AUTHORITY
San Antonio	Bexar	IRR	P4497_2	186	72.29	0	SAN ANTONIO RIVER AUTHORITY
San Antonio	Bexar	IRR	P4138_2	23	40.17	0	SAN ANTONIO WATER SYSTEM
San Antonio	Bexar	IRR	C1931_1	1,440	87.46	0	SAN JUAN DITCH WSC
San Antonio	Bexar	IRR	P4136_1	124	40.17	0	SAWS
San Antonio	Bexar	IRR	P4137_1	34	41.24	0	SAWS
San Antonio	Wilson	IRR	P5320_1	200	38.3	0	SHELBY KOEHLER ET UX
San Antonio	Wilson	MUN	C1155_1	42	98.86	0	SIESTA CATTLE COMPANY
San Antonio	Wilson	IRR	C2178_4	42	100	41.71	SIX J FARMS INC
San Antonio	Wilson	IRR	C2178_5	175	100	174.6	SIX J FARMS INC
San Antonio	Wilson	IRR	C2178_6	485	46.21	0	SIX J FARMS INC
San Antonio	Bexar	IRR	C2151_1	1,500	49.75	0	SOUTH LOOP LAND & CATTLE LC
San Antonio	Bexar	IRR	C2151_2	754	7.64	0	SOUTH LOOP LAND & CATTLE LC
San Antonio	Bexar	IRR	P5289_1	300	21.44	0	SOUTHEAST INVESTMENTS INC
San Antonio	Karnes	IRR	P5367_1	300	59.75	0	SUSIE LEE YANTA
San Antonio	Bexar	REC	C2019_1	241	96.82	0	THE BLUE WING CLUB
San Antonio	Bexar	REC	C2019_2	509	96.56	0	THE BLUE WING CLUB
San Antonio	Bexar	REC	C2019_3	250	96.43	0	THE BLUE WING CLUB
San Antonio	Bexar	IRR	P3852_1	50	93.55	0	THOMAS A KORZEKWA
San Antonio	Bexar	IRR	P3852_2	25	55.73	0	THOMAS A KORZEKWA
San Antonio	Wilson	IRR	C2167_1	17	100	17	TOMAS CAVAZOS
San Antonio	Karnes	IRR	P4407_1	50	92.87	0	TOMMY NAJVAR ET UX
San Antonio	Hays	IRR	P4170_1	15	38.6	0	TWAIN J JAGGE ET UX
San Antonio	Karnes	IRR	C2186_1	70	93.7	0	VINCENT LABUS JR
San Antonio	Bexar	IRR	P4498_1	83	48.95	0	VIRGINIA JAKSIK
San Antonio	Wilson	IRR	C1158_1	30	93.4	0	VIVA LEA MILLS
San Antonio	Guadalupe	IRR	P3837_2	29	46.64	0	W H HALLIBURTON, ESTATE OF
San Antonio	Wilson	IRR	C1159_5	3	93.4	0	WAYNE DODD ET AL TRUSTEES
San Antonio	Wilson	IRR	C1153_1	100	93.05	0	WAYNE H STROUD ET AL
San Antonio	Wilson	IRR	C1156_1	35	98.75	0	WAYNE H STROUD ET AL
San Antonio	Wilson	IRR	C2175_1	38	99.49	0	WELMA L R KIRCHOFF ET AL
San Antonio	Wilson	IRR	C2175_2	60	37.3	0	WELMA L R KIRCHOFF ET AL
San Antonio	Wilson	IRR	P4495_1	50	46.64	0	WILLIAM & IRENE C WALLS JR
San Antonio	Karnes	IRR	P5323_1	100	59.54	0	WILLIAM I DUBEL
San Antonio	Wilson	IRR	P5126_1	150	46.64	0	WILLIAM M PAVLISKA
San Antonio	Wilson	IRR	P5218_1	360	73.17	0	WILLIAM P REDDICK ET UX
San Antonio	Bexar	IRR	P4496_1	30	62.3	0	WILLIAM WALLS JR
San Antonio	Wilson	IRR	C2174_1	14	100	14	WILLIE HOSEK ESTATE
San Antonio	Kendall	IRR	C1144_1	48	97.17	0	WILLIS JAY HARPOLE
San Antonio	Kendall	IRR	C1144_2	7	97.02	0	WILLIS JAY HARPOLE
San Antonio	Karnes	IRR	P5002_1	150	92.57	0	WM A JEFFERS JR & ANN JACKSON
San Antonio	Medina	RCG	P3220_1	9,996	8.23	0	EDWARDS UNDERGROUND WD
Nueces	Uvalde	IRR	C3073_1	22	26.99	0	5653.041 ACRE RANCH LP
Nueces	Frio	LIV	P3914_1	19	6.31	0	A R GALLOWAY ET UX
Nueces	Frio	LIV	P3914_2	7	6.26	0	A R GALLOWAY ET UX
Nueces	Uvalde	IRR	C3064_1	150	31.81	0	ADANA TEAGUE
Nueces	Uvalde	IRR	C3173_1	1,000	3.4	0	ALVIN M RIMKUS
Nueces	La Salle	IRR	C3115_1	55	96.58	0	ANDREW DE LA GARZA ET AL
Nueces	Uvalde	IRR	P3989_1	56	5.43	0	ANTHONY C LEHOSKI ET UX
Nueces	Atascosa	IRR	C3216_1	20	14.34	0	ATASCOSA COWBOY RECREATION
Nueces	Zavala	IRR	C3076_1	200	16.77	0	BAKER CATTLE CO
Nueces	Uvalde	IRR	P5241_1	108	3.12	0	BARKAT LAND & CATTLE CO
Nueces	Zavala	IRR	C3092_1	684	44.02	0	BAYOU ROUGE LAND & CATTLE
Nueces	La Salle	IRR	C3107_1	210	43.32	0	BC GETAWAY LLC
Nueces	Medina	IRR	C3207_1	2,000	1.44	0	BEXAR-MEDINA-ATASCOSA WCID 1
Nueces	Medina	IRR	P4286_1	4	0.96	0	C H PIFER
Nueces	La Salle	IRR	C3108_1	298	31.54	0	C L PROPERTIES LLC

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Nueces	Zavala	IRR	C3088_1	150	77.69	0	CHAPARROSA RANCHES LTD
Nueces	Frio	IRR	C3212_1	25	2.48	0	CHARLES CURTIS RAMSEY ET UX
Nueces	La Salle	IRR	C3138_1	55	88.63	0	CHARLES D JOHNSON
Nueces	Dimmit	IRR	C3093_1	102	99.64	0	CHARLES LYDELL THALMANN
Nueces	Dimmit	IRR	C3093_2	1	99.6	0	CHARLES LYDELL THALMANN
Nueces	Dimmit	IRR	C3099_1	34	36.49	0	CHARLES W WILSON ET UX
Nueces	Dimmit	IRR	C3086_1	554	38.23	0	CHARLES W WILSON SR ET AL
Nueces	Frio	IRR	P3884_1	80	0.02	0	Claude D J Smith
Nueces	Uvalde	IRR	P4238_1	140	3.35	0	CON CAN ENTERPRISES INC
Nueces	Uvalde	MUN	P5497_1	35	2.18	0	CONCAN WATER SUPPLY CORPORATION
Nueces	Zavala	IRR	C3198_1	150	6.5	0	DENVER C CARNES
Nueces	Zavala	IRR	C3091_1	800	64.92	0	DOLPH BRISCOE III
Nueces	Zavala	IRR	C3091_2	400	63.83	0	DOLPH BRISCOE III
Nueces	Zavala	IRR	C3091_3	400	62.91	0	DOLPH BRISCOE III
Nueces	Zavala	IRR	C3091_4	498	62.17	0	DOLPH BRISCOE III
Nueces	Dimmit	IRR	C3097_1	231	99.64	0	DONALD E JACKSON, ET UX
Nueces	Zavala	IRR	C3074_1	200	16.77	0	DONALD R LINDENBORN JR TRUSTEE
Nueces	La Salle	IRR	C3136_1	200	99.16	0.04	DOROTHY M KINSEL
Nueces	La Salle	IRR	C3203_1	106	33.51	0	DOUGLAS A MILLER ET AL
Nueces	Frio	IRR	P4113_1	15	1.12	0	DR LESLIE R FRICKE
Nueces	Medina	RCH	C3192_1	6,012	0.14	0	EDWARDS AQUIFER AUTHORITY
Nueces	Medina	RCH	P3745_1	12,172	4.73	0	EDWARDS AQUIFER AUTHORITY
Nueces	Medina	RCH	P3806_1	42,258	2.67	0	EDWARDS AQUIFER AUTHORITY
Nueces	Uvalde	IRR	C3175_1	9	9.06	0	EL CAMINO GIRL SCOUT COUNCIL
Nueces	La Salle	IRR	C3201_1	649	35.55	0	EL JARDIN LP
Nueces	Atascosa	IRR	C3219_1	30	14.53	0	ERNKORUS LP
Nueces	La Salle	IRR	C3111_1	30	92.49	0	EUGENE WHITE
Nueces	Zavala	IRR	C3080_1	75	8.56	0	F F BONNETT ET UX
Nueces	Uvalde	IRR	C3065_1	720	100	720	F KENNETH BAILEY JR
Nueces	Frio	IRR	P4041_1	25	0	0	FLOYD B NEUMAN
Nueces	Frio	IRR	P4041_2	20	0.18	0	FLOYD B NEUMAN
Nueces	Atascosa	IRR	C3217_1	27	14.62	0	FRANCES S MARSH
Nueces	Frio	IRR	C3210_1	20	1.96	0	FRANCIS MALDONADO
Nueces	La Salle	IRR	C3116_1	33	96.5	0	FRANK S MORELLO JR
Nueces	La Salle	IRR	C3116_2	145	96.31	0	FRANK S MORELLO JR
Nueces	La Salle	IRR	C3105_1	150	99.79	0.51	FRANKLIN JERRY MEEKS
Nueces	La Salle	IRR	C3140_1	76	57.43	0	FRED HILLJE ESTATE
Nueces	Dimmit	IRR	C3098_1	60	68.19	0	FREDERICK JAY WHITECOTTON
Nueces	La Salle	IRR	C3112_1	47	97.64	0	FREDNA K DOBIE
Nueces	Uvalde	IRR	P5063_1	94	3.36	0	GAFFORD FAMILY PARTNERSHIP
Nueces	Uvalde	IRR	P5063_2	6	3.52	0	GAFFORD FAMILY PARTNERSHIP
Nueces	Frio	IRR	C3193_1	8	31.63	0	GEOFFREY A STONE
Nueces	La Salle	IRR	C3125_1	20	81.2	0	GEORGE & SHARON TRIGO
Nueces	Uvalde	IRR	C3194_1	50	3.36	0	GEORGE E LIGOCKY
Nueces	Uvalde	IRR	C3194_2	49	2.91	0	GEORGE E LIGOCKY
Nueces	Uvalde	IRR	C3066_1	10	30.91	0	GEORGE H MOFF
Nueces	Uvalde	IRR	P3988_1	28	3.48	0	GEORGE LIGOCKY
Nueces	La Salle	IRR	C3118_1	50	100	50	GLENN T ROBERTS ET UX
Nueces	La Salle	IRR	C3133_1	54	90.61	0	H B RAMSEY
Nueces	La Salle	IRR	C3133_2	296	89.74	0	H B RAMSEY
Nueces	La Salle	IRR	C3135_1	42	99.89	11.26	H B RAMSEY
Nueces	La Salle	IRR	C3135_2	38	88.54	0	H B RAMSEY
Nueces	La Salle	IRR	C3139_1	2,023	97.77	0	HOLLAND TEXAS DAM & IRR CO
Nueces	La Salle	IRR	C3131_1	50	88.3	0	IPO RANCH LP
Nueces	La Salle	IRR	C3132_1	195	88.3	0	IPO RANCH LP
Nueces	Zavala	IRR	C3078_1	200	16.77	0	JACK E RUTLEDGE ET UX
Nueces	Zavala	IRR	C3079_1	313	16.77	0	JACK RUTLEDGE

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Nueces	Dimmit	IRR	C3096_1	337	99.64	0	JAMES A WILSON JR
Nueces	Zavala	IRR	C3089_1	206	75.86	0	JAMES R PERLITZ ET AL
Nueces	Medina	IRR	P4506_1	40	1.82	0	JAMES THOMAS BAGBY JR
Nueces	Atascosa	IRR	C3218_1	7	14.35	0	JEROME W. SCHUCHART
Nueces	Atascosa	IRR	C3218_2	11	14.34	0	JEROME W. SCHUCHART
Nueces	Zavala	IRR	C3090_1	45	43.5	0	JIM G FERGUSON JR
Nueces	Zavala	IRR	C3090_2	65	27.99	0	JIM G FERGUSON JR
Nueces	Uvalde	IRR	C3166_1	35	36.08	0	JOE C KRANZ ET UX
Nueces	Frio	IRR	P4014_1	124	1.37	0	JOE H BERRY
Nueces	La Salle	IRR	C3120_1	200	100	200	JOE L GILBERT
Nueces	Frio	IRR	C3199_1	50	17.88	0	JOHN COALTER BAKER, ET AL
Nueces	Uvalde	IRR	C3163_1	113	35.9	0	JOHN HAMMAN JR ESTATE
Nueces	Uvalde	IRR	C3163_2	133	3.12	0	JOHN HAMMAN JR ESTATE
Nueces	Uvalde	IRR	C3170_1	19	9.54	0	JOHN M & MARY ANN BARKLEY
Nueces	Uvalde	IRR	C3169_1	40	35.51	0	JOHN S GRAVES JR ET AL
Nueces	Uvalde	IRR	C3168_1	4	36.01	0	JOHN THOMAS BUCHANAN
Nueces	Uvalde	IRR	C3168_2	37	35.54	0	JOHN THOMAS BUCHANAN
Nueces	Uvalde	IRR	C3069_1	134	44.54	0	JONATHAN H. WATFORD
Nueces	Uvalde	IRR	C3067_1	1,461	88.07	0	JOSEPH M MASSEY ET UX
Nueces	Zavala	IRR	C3077_1	200	16.77	0	K & M FARMS
Nueces	Medina	IRR	C3191_1	20	15.11	0	L S MOLLERE TRUSTEE
Nueces	La Salle	IRR	C3127_1	180	89.46	0	LEE M GATES ET UX
Nueces	Uvalde	IRR	P4352_1	110	14.5	0	LOUIS A WATERS
Nueces	La Salle	IRR	C3129_1	180	91.41	0	LOUISE G DAVIS
Nueces	Frio	IRR	C3208_1	230	1.3	0	LUCKEY CUSTOM FEEDLOT INC
Nueces	La Salle	IRR	C3123_1	70	100	70	LUIS ALLALA JR
Nueces	La Salle	IRR	C3123_2	130	99.95	67.08	LUIS ALLALA JR
Nueces	La Salle	IRR	C3106_1	20	94.89	0	M C WHITWELL ET UX
Nueces	La Salle	IRR	C3106_2	20	93.77	0	M C WHITWELL ET UX
Nueces	La Salle	IRR	C3109_1	10	47.33	0	M C WHITWELL ET UX
Nueces	Uvalde	IRR	C3167_1	11	36.01	0	MACONDA BROWN O'CONNOR
Nueces	Atascosa	IRR	C4772_1	2	98.41	0	MAGSONS NV
Nueces	La Salle	IRR	C3130_1	126	88.37	0	MANUEL M SANCHEZ ET AL
Nueces	Zavala	IRR	C3083_1	230	39.12	0	MARIO A ESCOBAR ET UX
Nueces	Uvalde	IRR	P4177_1	200	3.32	0	MARVIN G VERSTUYFT ET AL
Nueces	Uvalde	IRR	P4177_2	795	3.15	0	MARVIN G VERSTUYFT ET AL
Nueces	Uvalde	IRR	C3171_1	75	24.98	0	MICHAEL L STONER MARITAL DEDUCTION TRUST
Nueces	Frio	IRR	C3209_1	118	24.9	0	MIKE MORRIS
Nueces	Uvalde	IRR	C3072_1	200	82.39	0	MIRASOL RANCH FAMILY LTD PARTNERSHIP
Nueces	La Salle	IRR	C3110_1	22	47.08	0	MKM BUSINESS HOLDINGS LLC
Nueces	Uvalde	IRR	C3197_1	523	83.66	0	NAJAC PROPERTIES LTD
Nueces	Uvalde	IRR	C3197_2	305	81.7	0	NAJAC PROPERTIES LTD
Nueces	Dimmit	IRR	C3102_1	15	29.99	0	NEEDMORE RANCH INC
Nueces	La Salle	IRR	C3119_1	40	100	40	NORMA D GARCIA ET VIR
Nueces	Zavala	IRR	C3084_1	80	38.86	0	OPAL E C MARBURGER
Nueces	Uvalde	IRR	C3182_1	40	19.29	0	PAUL G SILBER JR
Nueces	La Salle	IRR	C3117_1	270	95.44	0	PRESIDIO RANCH, LP
Nueces	Uvalde	IND	C3087_1	10	85.69	0	R L WHITE COMPANY
Nueces	Dimmit	IRR	C3103_1	400	89.12	0	R W BRIGGS JR
Nueces	La Salle	IRR	C3114_1	199	97.19	0	RALPH P GUTTMAN
Nueces	La Salle	IRR	C3124_1	5	99.9	0	RAUL DEL TORO ET UX
Nueces	Dimmit	IRR	C3094_1	300	99.93	210.61	RESIDUAL TRUST OF ALBERT IVY SR
Nueces	Medina	IRR	C3189_1	40	7.69	0	RICHARD W SCHWEERS
Nueces	Uvalde	IRR	C3174_1	31	11.8	0	RIO GRANDE CHILDRENS HOME INC
Nueces	Frio	IRR	C3211_1	40	48.08	0	ROBERT ARTHUR BAKER ET AL

Basin	County	Use	Water Right ID No.	Authorized Diversion (acft/yr)	Volume Reliability (%)	Minimum Annual Supply (acft)	Owner
Nueces	Frio	IRR	C3211_2	60	17.78	0	ROBERT ARTHUR BAKER ET AL
Nueces	Uvalde	IRR	P5372_1	320	1.6	0	ROBERT L K LYNCH ET AL
Nueces	La Salle	IRR	C3134_1	398	88.86	0	ROCKY COMFORT PARTNERSHIP LTD
Nueces	Uvalde	IRR	P5325_1	255	5.1	0	RONALD E LEE JR
Nueces	Uvalde	IRR	C3068_1	310	86.38	0	RREP LTD
Nueces	La Salle	IRR	C3121_1	5	100	5	RUDY & TERESA RODRIGUEZ SR
Nueces	Dimmit	IRR	C3095_1	1,090	99.71	0	RUTH BOWMAN RUSSELL
Nueces	Dimmit	IRR	C3095_2	201	99.64	0	RUTH BOWMAN RUSSELL
Nueces	Atascosa	IRR	C3213_1	13	0.98	0	SAM COUNTISS
Nueces	Atascosa	S-E	P5511_1	120	2.37	0	SAN MIGUEL ELECTRIC COOP INC
Nueces	La Salle	IRR	C3122_1	30	100	30	SANTANA A MORIN ET AL
Nueces	La Salle	IRR	C3126_1	100	84.66	0	SILLER BROTHERS
Nueces	La Salle	IRR	C3126_2	260	63.34	0	SILLER BROTHERS
Nueces	La Salle	IRR	C3137_1	84	88.48	0	T G RANKIN
Nueces	Uvalde	IRR	P4305_1	1,140	3.4	0	TED ALLEN SANDERLIN ET AL
Nueces	Uvalde	IRR	C3172_1	1,000	3.4	0	THOMAS & GRETEL EKBAUM
Nueces	Zavala	IRR	C3081_1	390	38.36	0	THOREEN LIMITED PARTNERSHIP
Nueces	Medina	IRR	C3190_1	80	29.31	0	TJ HONDO RANCH LTD
Nueces	Uvalde	IRR	P3991_1	250	82.27	0	TURNER-PASCHE RANCH LLC
Nueces	Uvalde	MUN	P4505_1	200	13.61	0	UTOPIA WATER SUPPLY CORP
Nueces	La Salle	IRR	C3128_1	39	90.45	0	VALDA M GATES
Nueces	La Salle	IRR	C3104_1	250	97.84	0.04	WAITZ SUPER MARKET INC
Nueces	Uvalde	IRR	C3165_1	86	35.89	0	WALLACE S & ISABEL B WILSON
Nueces	Zavala	IRR	C3075_1	124	16.77	0	WALTER D MOORE
Nueces	Zavala	IRR	C3085_1	320	27.03	0	WARD L BOX
Nueces	Zavala	IRR	C3082_1	8,000	61.61	0	ZAVALA-DIMMIT CO WID 1
Nueces	Zavala	IRR	C3082_8	19,996	77.28	0	ZAVALA-DIMMIT CO WID 1
Nueces	Zavala	IRR	C3082_9	4	60.59	0	ZAVALA-DIMMIT CO WID 1
Nueces	Bexar	Other	C3196_1	40	8.77	0	SAN ANTONIO RANCH LTD
Nueces		Other	P3990_1	30	1.59	0	
Guadalupe	Guadalupe	IND	C3836_1	25	100	25	ACME BRICK COMPANY
Guadalupe	Guadalupe	IRR	P5604_1	8	62.01	0	ALBERT GREEN, ET UX SAN MA
Guadalupe	Guadalupe	IRR	C3840_1	34	87.32	0	ARNO NEUMANN
Guadalupe	Gonzales	IRR	P5038_1	66	76.1	0	ARTHUR DENNIS HUEBNER ET AL
Guadalupe	Comal	REC	P4114_1	3,711	4.3	0	BAD SCHOLOESS INC
Guadalupe	Comal	REC	P4114_2	1,289	7.88	0	BAD SCHOLOESS INC
Guadalupe	Kendall	IRR	P5501_1	5	18.21	0	BARRY T & KATHRYN B NALL
Guadalupe	Caldwell	IRR	P4080_1	425	72.01	0	BENO CORPORATION
Guadalupe	Kendall	IRR	P5490_1	10	71.62	0	BILLY J. & KARAN R. BOLES
Guadalupe	Hays	IRR	C3884_1	20	78.97	0	BRUCE COLLIE ET AL
Guadalupe	Hays	IRR	C3884_2	90	81.31	0	BRUCE COLLIE ET AL
Guadalupe	Comal	IRR	C3828_1	1	100	0.86	CAMP WARNECKE INC
Guadalupe	Caldwell	MUN	C3889_1	24	100	24	CANYON REGIONAL
Guadalupe	Guadalupe	IRR	C3834_1	71	100	71.48	CANYON REGIONAL WATER AUTH
Guadalupe	Guadalupe	MUN	C3834_2	19	100	18.52	CANYON REGIONAL WATER AUTH
Guadalupe	Victoria	IND	C5485_1	209,189	93.84	0	CENTRAL POWER & LIGHT CO
Guadalupe	Comal	IRR	C1955_1	10	47.81	0	CHESTER & RICKIE KRAUSE
Guadalupe	Gonzales	HYD	C3846_1	796,363	56.89	0	CITY OF GONZALES
Guadalupe	Gonzales	MUN	C3846_2	2,240	100	2240	CITY OF GONZALES
Guadalupe	Caldwell	IRR	C3898_1	20	88.83	0	CITY OF LULING
Guadalupe	Comal	IRR	C3826_2	100	24.36	0	CITY OF NEW BRAUNFELS
Guadalupe	Guadalupe	IRR	C3844_1	608	100	608	CITY OF VICTORIA
Guadalupe	Victoria	MUN	C3858_1	1,000	98.52	0	CITY OF VICTORIA
Guadalupe	Victoria	IRR	C3862_1	263	59.31	0	CITY OF VICTORIA
Guadalupe	Victoria	IRR	P4441_1	200	85.58	0	CITY OF VICTORIA
Guadalupe	De Witt	REC	P5294_1	15	93.81	0	CITY OF YORKTOWN
Guadalupe	Comal	IRR	C3817_1	79	88.94	0	CLARENCE B ANDERSON ET AL

Basin	County	Use	Water Right ID No.	Authorized Diversion (acft/yr)	Volume Reliability (%)	Minimum Annual Supply (acft)	Owner
Guadalupe	Calhoun	IRR	C5178_3	44,950	95.34	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	MUN	C5178_1	30,525	98.4	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Victoria	IND	C5486_1	20,000	94.53	0	COLETO CREEK POWER LP
Guadalupe	Comal	MUN	P4491_1	120	86.06	0	COMAL CO FRESH WSD #1
Guadalupe	Caldwell	IRR	P4373_1	300	66.45	0	CONTINENTAL WHOLESALE FLORISTS
Guadalupe	Caldwell	IRR	P4373_2	300	65.58	0	CONTINENTAL WHOLESALE FLORISTS
Guadalupe	Calhoun	IND	C5178_2	30,525	97.65	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Victoria	HYD	C3853_1	538,560	63.11	0	CUERO HYDROELECTRIC, INC.
Guadalupe	Calhoun	MUN	C5177_3	11,089	99.97	9642.5	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	IND	C5177_1	10,763	100	10763	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	IRR	C5177_2	10,763	100	10763	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	IND	C5177_4	10,000	99.67	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	MUN	C5177_5	4,316	99.37	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	IRR	C5176_1	3,315	98.93	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	IRR	C5173_1	1,250	100	1250	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	IND	C5173_2	1,250	100	1250	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Comal	IRR	C2060_2	80	68.42	0	DAVID MICHAEL HIXON 2011 TRUST ET AL
Guadalupe	Gonzales	IRR	P4075_1	225	70	0	DAVID S SHELTON
Guadalupe	Calhoun	IND	C5174_3	935	99.48	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Calhoun	IND	C5175_2	470	99.3	0	UNION CARBIDE CHEM & PLASTICS
Guadalupe	Calhoun	IND	P4586_1	272	82.09	0	DEL & GLORIA WILLIAMS, Crawfish Isle P
Guadalupe	Calhoun	IRR	P5381_1	150	82.57	0	BRETT BRATCHER
Guadalupe	Caldwell	IRR	P4033_1	300	73.91	0	DICK BROWN
Guadalupe	Gonzales	IRR	P3916_1	50	84.25	0	DON A LIGHTSEY ET UX
Guadalupe	Guadalupe	IRR	C3838_1	37	47.17	0	DONALD E NORED
Guadalupe	Guadalupe	IRR	P3973_1	73	34.71	0	DONALD J JOHNSON ET UX
Guadalupe	Kendall	IRR	C2069_1	30	95.76	0	DOUBLE U-SPRING BRANCH
Guadalupe	Gonzales	IRR	P4089_1	830	76.89	0	DR I V EPSTEIN
Guadalupe	Gonzales	IRR	C3847_1	250	98.75	0	DR JAMES W NIXON JR
Guadalupe	Victoria	IND	C3861_1	60,000	98.86	0	E I DU PONT DE NEMOURS
Guadalupe	Victoria	IRR	C3862_2	137	98.44	0	E I DUPONT DE NEMOURS & CO
Guadalupe	Kendall	IRR	C2064_1	4	97.68	0	EARL S DODERER ET UX
Guadalupe	Kendall	IRR	C2054_1	80	19.51	0	EDMUND BEHR ESTATE
Guadalupe	Comal	IRR	C2072_1	35	98.45	0	ELOY GARCIA JR ET UX
Guadalupe	Kendall	IRR	P5474_1	10	71.62	0	ELTON RUST
Guadalupe	Kendall	IRR	C2053_1	32	20.01	0	ERNO SPENRATH
Guadalupe	Kendall	IRR	C2050_2	136	72.84	0	ERWIN KLEMSTEIN, JOHN C MCCALEB, and ROBERT & MARGARET STEVEN (UNVERIFIED)
Guadalupe	De Witt	IRR	P4318_1	80	82.57	0	F T BUCHEL
Guadalupe	Comal	IRR	C2070_1	98	19.98	0	FRANK A STANUSH
Guadalupe	Comal	IRR	C2070_2	22	19.98	0	FRANK A STANUSH
Guadalupe	Hays	IRR	P5545_1	8	67.56	0	FRANK T & PAMELA H ARNOSKY
Guadalupe	Hays	IRR	C3902_1	30	85.04	0	FRITZ OTTO ANTON
Guadalupe	Kendall	IRR	C2063_1	44	88.84	0	FROST-LANCASTER PROPERTIES
Guadalupe	Kendall	IRR	C2065_1	10	19.89	0	G PHIL BERRYMAN ET UX
Guadalupe	Guadalupe	MUN	C3833_1	56	100	56	GARY A DITTMAR
Guadalupe	Guadalupe	MUN	C3833_2	5	100	5	GARY A DITTMAR
Guadalupe	Caldwell	IRR	P5857_1	1	84.38	0	GENE MILLIGAN
Guadalupe	Kendall	IRR	P5528_1	49	71.62	0	GEORGE A SCHMIDT ET UX
Guadalupe	Kendall	IRR	P5528_2	49	71.62	0	GEORGE A SCHMIDT ET UX
Guadalupe	Kendall	IRR	P4590_1	50	18.37	0	GEORGE M WILLIAMS SR ET AL
Guadalupe	Caldwell	IRR	C3890_1	50	88.83	0	GEORGE PARTNERSHIP LTD
Guadalupe	Hays	IRR	C3887_1	15	100	15	GREEN VALLEY FARMS INC
Guadalupe	Comal	IRR	C2071_1	1	99.05	0	GUADALUPE RIVER RANCH & CATTLE
Guadalupe	Guadalupe	REC	P5121_1	83	64.99	0	GUADALUPE SKI-PLEX HOME ASSOC
Guadalupe	Gonzales	HYD	C5172_1	585,599	56.41	0	GUADALUPE-BLANCO R A H-4

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Guadalupe	Gonzales	HYD	C5172_2	574,832	57	0	GUADALUPE-BLANCO R A H-5
Guadalupe	Guadalupe	HYD	C5488_1	663,892	50.74	0	GUADALUPE-BLANCO R A TP-1
Guadalupe	Guadalupe	HYD	C5488_2	659,995	50.85	0	GUADALUPE-BLANCO R A TP-3
Guadalupe	Guadalupe	HYD	C5488_3	655,323	50.98	0	GUADALUPE-BLANCO R A TP-4
Guadalupe	Guadalupe	HYD	C5488_4	624,781	52.73	0	GUADALUPE-BLANCO R A TP-5
Guadalupe	Kerr	IRR	C2041_2	109	85.19	0	THOMAS L BRUNDAGE ET AL
Guadalupe	Comal	EVN	C2074_1	10,000	98.3	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Comal	EVN	C2074_2	40,000	98.06	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Comal	MUN	C2074_7	40,000	98.21	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Caldwell	MUN	C3896_1	1,500	87.26	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Caldwell	MUN	C3896_2	1,300	73.34	0	GUADALUPE-BLANCO RIVER AUTH
Guadalupe	Caldwell	MUN	P5234_2	1,022	63.5	0	GUADALUPE-BLANCO RIVER AUTHORITY
Guadalupe	Kendall	IRR	C2065_2	10	19.89	0	GUY BODINE III ET UX
Guadalupe	Guadalupe	IND	P5240_1	31	71.33	0	H B SHANKLIN
Guadalupe	Kendall	IRR	C2047_1	20	88.84	0	H C SEIDENSTICKER
Guadalupe	Kendall	IRR	C2035_1	2	19.54	0	HARRY C MECKEL
Guadalupe	Bexar	IRR	C3886_1	150	79.81	0	HAYS COUNTY REC ASSOC INC
Guadalupe	Victoria	IND	P5376_1	2	100	2	HELDENFELS BROTHERS INC
Guadalupe	Caldwell	HYD	P4492_1	15,000	61.41	0	HYDRACO POWER INC
Guadalupe	De Witt	IRR	C3854_1	32	95.83	0	J D BRAMLETTE JR
Guadalupe	Comal	MUN	C3815_1	3	28.98	0	J D MURRELL
Guadalupe	Bexar	IRR	C3868_2	70	100	70	J R THORNTON, ET AL
Guadalupe	De Witt	IRR	C3851_1	182	97.82	0	JACK H BOOTHE
Guadalupe	Caldwell	IRR	C3900_2	500	86.37	0	JAMES D JAMISON
Guadalupe	Kerr	IRR	C2041_1	25	86.04	0	THOMAS L BRUNDAGE ET AL
Guadalupe	Bexar	IRR	C3863_1	1,237	99.04	0	JAN KNEBEL WHEELIS
Guadalupe	Hays	IRR	P4027_1	9	59.31	0	JESS WEBB ET UX
Guadalupe	Victoria	LIV	P5489_1	750	88.46	0	JESS Y WOMACK II
Guadalupe	Bexar	IRR	C3863_2	1,767	99.04	0	JESS YELL WOMACK II ET AL
Guadalupe	Kendall	IRR	C2051_1	2	86.15	0	JOE B. KERCHEVILLE
Guadalupe	Kendall	IRR	C2051_2	260	83.49	0	JOE B. KERCHEVILLE
Guadalupe	Victoria	IRR	P5012_1	140	62.12	0	JOE D. HAWES
Guadalupe	Kerr	IRR	C2043_3	20	18.65	0	MARY LEE EDWARDS
Guadalupe	Bexar	IRR	C3852_1	35	98.61	0	JOHN BRADEN JR ET AL
Guadalupe	Kerr	IRR	C2043_1	17	18.65	0	EDGAR SEIDENSTICKER ET UX
Guadalupe	Hays	MUN	C3888_1	320	91.12	0	JOHN F BAUGH
Guadalupe	Hays	IRR	P5426_1	165	67.97	0	JOHN G CURRIE
Guadalupe	Caldwell	IRR	P4518_1	120	80.51	0	JOHN H COX
Guadalupe	Guadalupe	IRR	P4502_1	600	68.17	0	JOHN SCOTT GREENE ET AL
Guadalupe	Caldwell	IRR	P4597_1	320	65.8	0	JOHN T O'BANION JR ET AL
Guadalupe	De Witt	IRR	C3850_1	80	98.75	0	JOSEPHINE B MUSSELMAN ET AL
Guadalupe	Kendall	IRR	C2049_1	5	19.87	0	KENNETH M & CYNTHIA RUSCH
Guadalupe	Gonzales	IRR	C3848_1	1,800	99.18	0	KING RANCH INC
Guadalupe	Kendall	IRR	C2068_1	72	84.97	0	KWW Ranches LTD
Guadalupe	Gonzales	IRR	C3908_1	670	88.79	0	LARRY E & PHYLIS A BROWNE
Guadalupe	Kendall	IRR	P5321_1	150	78.42	0	LARRY J LANGBEIN
Guadalupe	Comal	IRR	C1954_1	15	49.08	0	LAWRENCE D KRAUSE
Guadalupe	Comal	IRR	C1954_2	5	67.05	0	LAWRENCE D KRAUSE
Guadalupe	Guadalupe	IRR	C3841_1	5	64.33	0	LEO P CLOUD JR ET AL
Guadalupe	Guadalupe	IRR	C3843_1	27	100	27	LEONARD FLEMING
Guadalupe	Comal	IRR	C3828_2	2	100	2.14	LIBERTY PARTNERSHIP LTD
Guadalupe	Kendall	IRR	C2044_1	16	100	16.38	LION'S LAIR LLC
Guadalupe	De Witt	IRR	P5006_2	299	85.58	0	LORITA MAE FITZGERALD
Guadalupe	Kendall	IRR	C2061_1	16	19.46	0	LOUIS SCOTT FELDER ET UX
Guadalupe	Kerr	IRR	C2043_2	4	18.65	0	L J MANNERING ET UX
Guadalupe	Caldwell	IRR	P4110_1	240	73.01	0	LYNN STORM
Guadalupe	Bexar	IRR	C3881_1	40	100	40	LYON L BRINSMADE

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Guadalupe	Hays	IRR	C3901_1	100	32.65	0	M D HEATLY SR
Guadalupe	Kendall	IRR	P5534_1	20	71.62	0	MARGOT O BURRELL
Guadalupe	Kendall	IRR	C2061_2	18	19.46	0	MARJORIE RANZAU INGENHUETT
Guadalupe	Kendall	IRR	C2056_1	20	56.19	0	MARK E. WATSON, JR., ET UX
Guadalupe	Kendall	IRR	C2057_1	25	56.65	0	MARK E. WATSON, JR., ET UX
Guadalupe	Kendall	IRR	C2045_1	8	100	8	MARSHALL STEVES
Guadalupe	Caldwell	IRR	P4022_1	450	79.32	0	MARY ANN LANGFORD ET AL
Guadalupe	Victoria	IRR	P4182_1	200	85.86	0	MAXINE ROBSON KYLE ET AL
Guadalupe	Hays	MUN	C3887_2	772	100	772	MAXWELL
Guadalupe	Kerr	IRR	C2034_1	2	96.9	0	CHESTER P HEINEN ET AL
Guadalupe	Caldwell	IRR	C3899_1	1,180	88.79	0	MIGUEL CALZADA URQUIZA ET UX
Guadalupe	Comal	IND	C3829_1	100	100	100	MISSION VALLEY MILL HOLDINGS, LLC
Guadalupe	De Witt	IRR	C3855_1	26	98.75	0	MRS JOHN C LEY
Guadalupe	Kendall	IRR	C2061_3	37	19.46	0	MURRAY A WINN JR
Guadalupe	Victoria	IRR	P4020_1	100	85.86	0	NELSON PANTEL
Guadalupe	Comal	MUN	C3823_2	1,289	72.28	0	NEW BRAUNFELS UTILITIES
Guadalupe	Comal	HYD	C3824_1	124,870	5.34	0	NEW BRAUNFELS UTILITIES
Guadalupe	Comal	IRR	C3824_4	200	94.36	38.22	NEW BRAUNFELS UTILITIES
Guadalupe	Comal	MUN	C3824_5	2,240	99.65	67.69	NEW BRAUNFELS UTILITIES
Guadalupe	Comal	MUN	C3824_6	3,418	73.06	0	NEW BRAUNFELS UTILITIES
Guadalupe	Comal	MUN	C3830_2	5	72.2	0	NEW BRAUNFELS UTILITIES
Guadalupe	Hays	IRR	C3882_1	100	94.39	0.04	NEWTON B THOMPSON
Guadalupe	Kendall	IRR	C2058_1	40	19.98	0	OTTO KASTEN
Guadalupe	Guadalupe	IRR	C3835_1	19	81.05	0	OTTO VOIGT
Guadalupe	Kendall	IRR	C2044_2	2	100	1.62	PATRICIA GALT STEVES
Guadalupe	Bexar	IRR	C3870_1	3	99.78	0	PATRICIA RYAN
Guadalupe	De Witt	IRR	C3856_1	50	84.25	0	PATRICK B & MARY KARYN ELDER
Guadalupe	Comal	IRR	C3819_1	14	98.96	0	PATRICK S MOLAK
Guadalupe	Comal	MUN	C3819_2	9	99.26	0	PATRICK S MOLAK
Guadalupe	Comal	IRR	P4607_1	50	88.11	0	PURALLOY INC
Guadalupe	Guadalupe	IRR	C3832_1	44	100	44	RAY E DITTMAR
Guadalupe	Kendall	IRR	C2048_1	100	22.32	0	RAYMOND JAMES ROSE
Guadalupe	Gonzales	IRR	P5037_1	230	76.19	0	RICHARD D BRAMLET
Guadalupe	Comal	IRR	C3821_1	4	99.02	0	ROBERT & MARY RAE PRESTON
Guadalupe	Comal	IRR	C3821_2	1	100	1	ROBERT & MARY RAE PRESTON
Guadalupe	Hays	IRR	P5371_1	5	60.92	0	ROBERT BOURKE SIMPSON
Guadalupe	Kendall	IRR	C2059_1	39	19.98	0	ROBERT C REINARZ ET AL
Guadalupe	Comal	IRR	C3822_1	3	99.91	2.54	ROBERT KRUEGER ET AL
Guadalupe	Caldwell	IRR	P4569_2	240	66.09	0	ROBERT L BOOTHE
Guadalupe	Caldwell	IRR	P3857_1	144	84.25	0	ROBERT M KIEHN
Guadalupe	Victoria	IRR	P4062_1	90	86.14	0	RONALD A KURTZ ET UX
Guadalupe	Kendall	IRR	C2063_2	15	88.78	0	RONALD L BAETZ ET AL
Guadalupe	Kendall	IRR	C2066_1	5	20.01	0	ROY C SMITH ESTATE
Guadalupe	Hays	IRR	C3887_3	5	100	5	SAN MARCOS RIVER FOUNDATION
Guadalupe	Guadalupe	IRR	C3842_1	158	87.26	0	SARA DARILEK RAINWATER
Guadalupe	Guadalupe	MUN	C3839_1	7,000	100	7000	SEGUIN MUNICIPAL UTILITIES
Guadalupe	Guadalupe	IRR	C3839_3	200	100	200	SEGUIN MUNICIPAL UTILITIES
Guadalupe	Caldwell	IRR	C3904_1	28	79.73	0	SHERRY CHAPPELL
Guadalupe	Victoria	IND	C3859_1	110,000	85.43	0	SOUTH TEXAS ELECTRIC COOP INC
Guadalupe	Bexar	HYD	C3865_1	64,370	98.16	37910.28	SOUTHWEST TEXAS STATE UNIV
Guadalupe	Bexar	REC	C3865_2	700	90.36	0	SOUTHWEST TEXAS STATE UNIV
Guadalupe	Bexar	IND	C3865_3	534	89.77	0	SOUTHWEST TEXAS STATE UNIV
Guadalupe	Bexar	MUN	C3865_4	513	89.4	0	SOUTHWEST TEXAS STATE UNIV
Guadalupe	Bexar	IRR	C3865_5	100	89.01	0	SOUTHWEST TEXAS STATE UNIV
Guadalupe	Bexar	IND	C3866_1	60	80.17	0	SOUTHWEST TEXAS STATE UNIV
Guadalupe	Bexar	IRR	C3866_2	20	89.1	0	SOUTHWEST TEXAS STATE UNIV
Guadalupe	Bexar	IRR	C3866_3	20	57.18	0	SOUTHWEST TEXAS STATE UNIV

Basin	County	Use	Water Right ID No.	Authorized Diversion (acft/yr)	Volume Reliability (%)	Minimum Annual Supply (acft)	Owner
Guadalupe	Caldwell	MUN	C3895_2	580	85.04	0	STATE BANK & TRUST COMPANY
Guadalupe	Guadalupe	IND	C3837_1	34	100	34	STRUCTURAL METALS INC
Guadalupe	Kendall	IRR	C2064_2	8	96.2	0	SYBIL R JONES CO-TRUSTEE ET AL
Guadalupe	Gonzales	IRR	P4539_1	8	86.48	0	T PAUL SIDES
Guadalupe	Bexar	IRR	C3870_2	22	99.5	0	T R IMMEL ET UX
Guadalupe	Guadalupe	IRR	P4043_1	150	73.78	0	TERRAND LTD ET AL
Guadalupe	Kendall	IRR	C2060_1	10	19.98	0	TEXAS BEVERAGE PACKERS INC
Guadalupe	Medina	IND	C3869_1	10,000	99.48	0	TEXAS PARKS & WILDLIFE DEPT
Guadalupe	Caldwell	IRR	C3906_1	63	90.45	0	TEXAS PARKS & WILDLIFE DEPT
Guadalupe	Caldwell	IRR	C3906_2	12	93.17	0	TEXAS PARKS & WILDLIFE DEPT
Guadalupe	Kendall	MUN	P4106_1	25	90.8	0	TEXAS PARKS & WILDLIFE DEPT
Guadalupe	Guadalupe	IRR	P3600_3	750	73.02	0	THE LULING FOUNDATION
Guadalupe	Hays	IRR	P4027_2	82	59.31	0	THOMAS L HUSBANDS ET UX
Guadalupe	Caldwell	MUN	C3891_3	500	100	500	TRI-COMMUNITY WSC
Guadalupe	Kendall	IRR	C2067_1	20	20.16	0	TY RAMPY ET AL
Guadalupe	Kendall	IRR	C2067_2	20	48.11	0	TY RAMPY ET AL
Guadalupe	Goliad	IRR	C3820_1	4	99.15	0	VETERANS OF FOREIGN WARS
Guadalupe	Victoria	MUN	P5466_1	20,000	86.6	0	VICTORIA, CITY OF
Guadalupe	Victoria	MUN	C3860_2	260	78.71	0	W L LIPSCOMB ET AL
Guadalupe	Comal	REC	C3816_1	1,460	27.65	0	WHITEWATER SPORTS INC
Guadalupe	Kendall	IRR	C2046_1	28	20.16	0	WILLIAM G & MILDRED D SPROWLS
Guadalupe	Caldwell	MUN	P5092_2	150	63.55	0	WILLIAM JAMES WOOTEN ET AL
Guadalupe	Kendall	IRR	C2036_1	125	46.4	0	WILLIAM K ANDERSON ET UX
Guadalupe	Kendall	IRR	P5107_1	518	83.16	0	WILLIAM K ANDERSON ET UX
Guadalupe	Kendall	IRR	C2062_1	60	45.04	0	WILLIAM L PULS
Guadalupe	Guadalupe	HYD	CANSUBBU	25,364	0	0	GUADALUPE-BLANCO R A TP-1
Guadalupe	Kendall	IRR	C2052_1	232	88.84	0	ZARCO FOWARDING, INC

FINAL PLAN

CHAPTER 4: IDENTIFICATION OF WATER NEEDS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

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acft/yr	Acre-Foot per Year
ARWA	Alliance Reginoal Water Authority
CRWA	Canyon Regional Water Authority
CVLGC	Cibolo Valley Local Government Corporation
DB22	State Water Planning Database
GBRA	Guadalupe-Blanco River Authority
MAG	Modeled Available Groundwater
MUD	Municipal Utility District
MWP	Major Water Provider
SAWS	San Antonio Water System
SSLGC	Schertz-Seguin Local Government Corporation
SUD	Special Utility Districts
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board
WCID	Water Control and Improvement District
WSC	Water Supply Corporation
WUG	Water User Group
WWP	Wholesale Water Provider

CHAPTER 4: IDENTIFICATION OF WATER NEEDS

4.1 INTRODUCTION

In this chapter, the demand projections from Chapter 2 and the supply projections from Chapter 3 are compared to identify and estimate projected water needs in the South Central Texas Region through the year 2070. If projected demands exceed projected supplies for a water user group (WUG), the difference or shortage is identified as a water need for that WUG. To summarize, Chapter 2 presents demand projections for six types of water use: municipal, industrial, steam-electric, mining, irrigation, and livestock. These projections are intended to be representative of dry-year demands measured in acre-feet per year (acft/yr). Chapter 3 presents water supplies, as estimates of surface water availability (i.e., firm yield for reservoirs and firm diversions for run-of-river supplies) and Modeled Available Groundwater (MAG).

This chapter provides summaries of water needs (shortages) for each Water User Group (WUG) located in the South Central Texas Region. Region L has a projected annual water need of 203,707 acft/yr in 2020, increasing to 401,027 acft/yr by 2070 (Table 4-1).

For the purposes of this chapter, any supplies that result in a surplus are considered as a zero-value for the needs analysis. Secondary needs were also analyzed, which are calculated as the water needs that would remain after full implementation of all recommended conservation and direct reuse WMSs. The secondary needs analysis for WUGs is included in DB22 Reports 7 and 8 in Appendix 2-A. The second-tier needs analysis for major water providers (MWPs) is provided in Section 4.9.

Table 4-1 Projected Annual Water Need

NEED TYPE	PROJECTED NEEDS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Irrigation Needs	131,184	131,915	134,104	136,099	137,596	140,812
Municipal Needs	24,468	48,817	83,667	121,804	167,216	216,255
Mining Needs	15,921	16,809	15,105	12,334	10,454	9,180
Steam-Electric Power Needs	21,707	21,707	21,707	21,707	21,707	21,707
Manufacturing Needs	10,427	12,940	13,041	13,073	13,073	13,073
Livestock Needs	0	0	0	0	0	0
Total Needs	**203,707**	**232,188**	**267,624**	**305,017**	**350,046**	**401,027**

4.2 REGIONAL NEEDS SUMMARY

The TWDB's State Water Planning Database (DB22) distinguishes a WUG's supplies, demands, and needs by region, county, and basin. For the purposes of this chapter and needs analysis, any WUG's surplus on the basis of county or basin split was considered as a zero-value. This means that a split-WUG may have a need shown in this chapter but in practice, the WUG may have a surplus in another basin or county that offsets the needs. In other cases, needs may be better supplied near the location of the demand, requiring separate strategies in each area. If supply and demand centers are not fully connected across the water supply corporations (WSCs), special utility districts (SUD), or water control and improvement districts (WCID), new interconnections across their service areas may allow these entities to meet future needs as one system.

The following subsections describe the regional needs for the South Central Texas Regional Water Planning Area, grouped by WUG type and by county. Appendix 2-A provides summaries of WUG needs and surpluses by county and river basin.

4.2.1 Regional Needs by Water User Group Type

Figure 4-1 shows the total regional water needs through 2070.

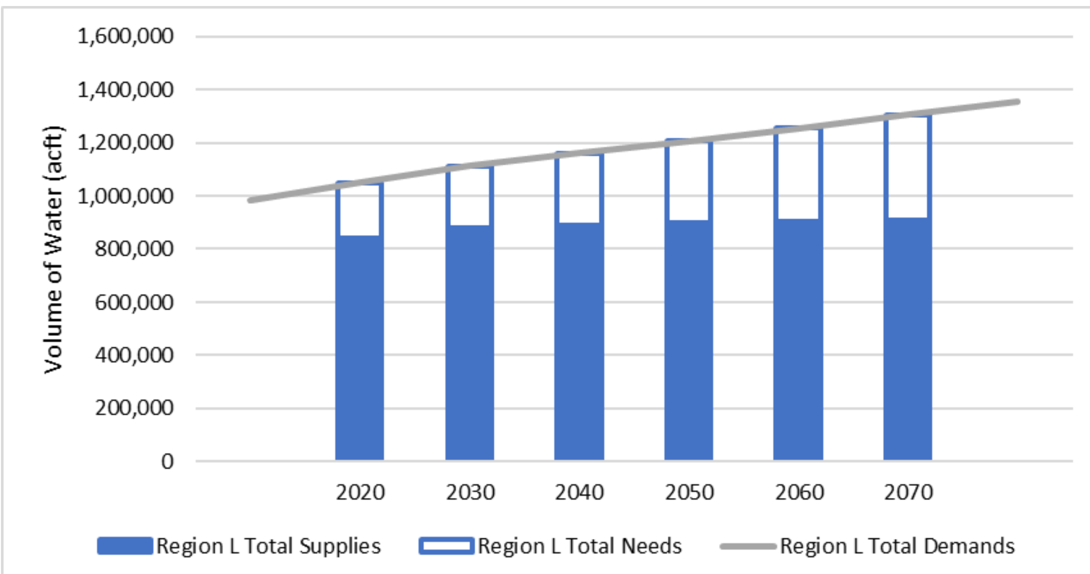

Figure 4-1 Total Regional Needs, Shown as a Portion of Total Demands (acft/yr)

The majority of needs in Region L come from irrigation. This is to be expected, as the irrigation demand projections are based on estimated use in a year where supplies are not limited from the reservoirs and there is little rainfall, or the highest demand scenario; whereas, the supplies are based on the drought of record. This shortage will be partially addressed in strategies discussed in detail in Chapter 5.

Municipal needs are significant and increase as the population increases over the planning horizon. While one-time purchases of water, rather than contractual agreements or purchase of water rights, are often used as a stopgap measure, this is not a reliable drought year supply strategy. Chapter 5 recommends the purchase of water rights, as well as development of new sources, conservation, and other strategies to address current and future needs of municipal WUGs and wholesale water providers.

Industrial users (mining, steam-electric, and manufacturing) supplies were evaluated using data provided to the Texas Water Development Board (TWDB) and Texas Commission on Environmental Quality (TCEQ) regarding groundwater wells, surface water use, and purchase of water from public water supplies. Needs in these categories will likely also require increased cooperation with municipalities for reuse of wastewater effluent as well as conservation and water efficiency measures. Strategies for meeting future water needs are discussed in Chapter 5.

4.2.2 Regional Needs by County

Table 4-2 provides a summary of projected water needs for each WUG in the planning area by county. Some needs are anticipated in almost every county in 2020, which will be evaluated individually in subsequent sections.

Table 4-2 Needs by County (acft/yr)

COUNTY	PROJECTED NEEDS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Atascosa County	752	878	994	1,110	1,321	1,517
Bexar County	12,387	27,016	47,872	68,266	90,218	112,499
Caldwell County	140	290	588	1,367	2,215	3,060
Calhoun County	14,088	14,088	14,088	14,088	14,176	14,207
Comal County	8,307	15,421	21,459	27,434	33,874	39,952
DeWitt County	2,036	1,935	637	267	-	-
Dimmit County	9,473	9,561	8,901	7,393	5,888	5,330
Frio County	611	771	2,751	4,673	6,543	8,497
Goliad County	388	388	388	388	388	388
Gonzales County	-	-	-	-	-	-
Guadalupe County	43	480	2,379	6,552	10,906	14,765
Hays County	35	1,654	5,529	9,791	17,587	29,359
Karnes County	2,550	1,976	2,008	1,457	1,407	1,378
Kendall County	1	283	674	1,332	2,980	4,390
La Salle County	5,272	5,446	4,957	3,538	2,122	1,441
Medina County	36,808	37,544	37,831	38,489	39,053	40,481
Refugio County	-	-	-	-	-	-
Uvalde County	43,173	43,773	44,193	44,779	45,420	46,079
Victoria County	42,123	44,159	44,868	45,602	46,313	46,924
Wilson County	4,285	5,175	6,398	7,758	9,487	10,895

COUNTY	PROJECTED NEEDS (ACFT/YR)					
	2020	2030	2040	2050	2060	2070
Zavala County	21,235	21,350	21,109	20,733	20,148	19,865
Total	**203,707**	**232,188**	**267,624**	**305,017**	**350,046**	**401,027**

4.3 MUNICIPAL NEEDS

There are 61 municipal WUGs with a projected need (shortage) between 2020 and 2070. The total municipal need for the region in 2020 is 24,468 acft/yr, increasing to 216,255 acft/yr in 2070 (Figure 4-2). Sixteen counties (Atascosa, Bexar, Caldwell, Calhoun, Comal, DeWitt, Frio, Goliad, Guadalupe, Hays, Karnes, Kendall, Medina, Uvalde, Victoria, and Wilson) are projected to have at least one WUG with a municipal need (shortage) during the planning period, as shown on Figure 4-3.

The need distribution is heavily concentrated in Bexar, Comal, and Hays Counties. Current supplies are estimated to be less than the 2020 demands for municipalities. As noted earlier, in some cases, this indicates that drought-year demands exceed normal supplies and that need is regularly met by short-term contracts for water. Other municipalities may experience persistent shortage.

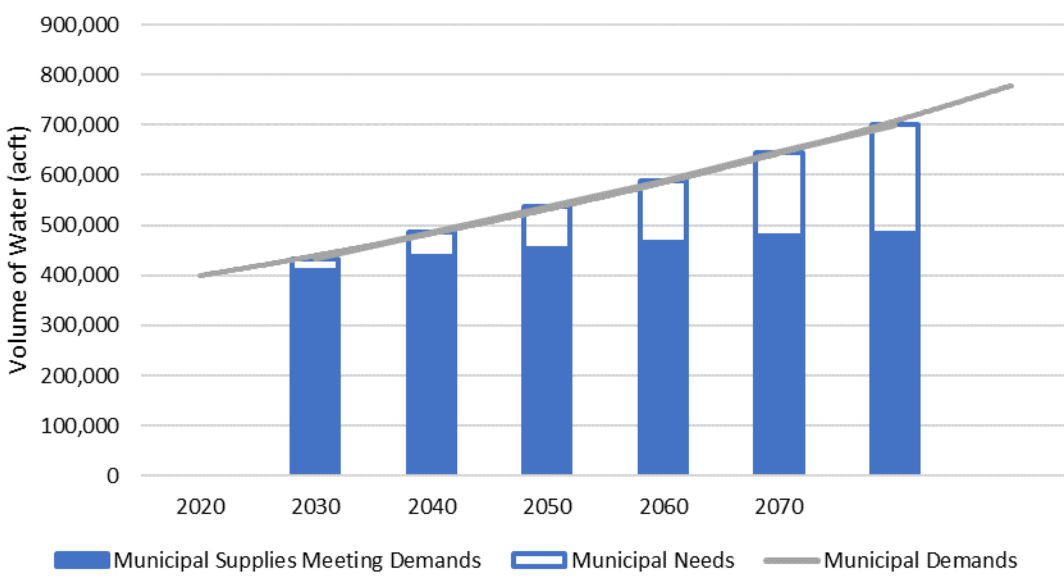

Figure 4-2 Municipal Needs, Shown as a Portion of Municipal Demands (acft/yr)

The need for municipal water is shown in white on Figure 4-2 and increases to 33 percent of the total demand by 2070. Figure 4-3 shows each county's portion of the total regional municipal needs. For Hays County, only the portion within Region L is presented. Municipal demands for each county are discussed in the following subsections. Chapter 5 will discuss water management strategies that have been identified to address projected municipal needs.

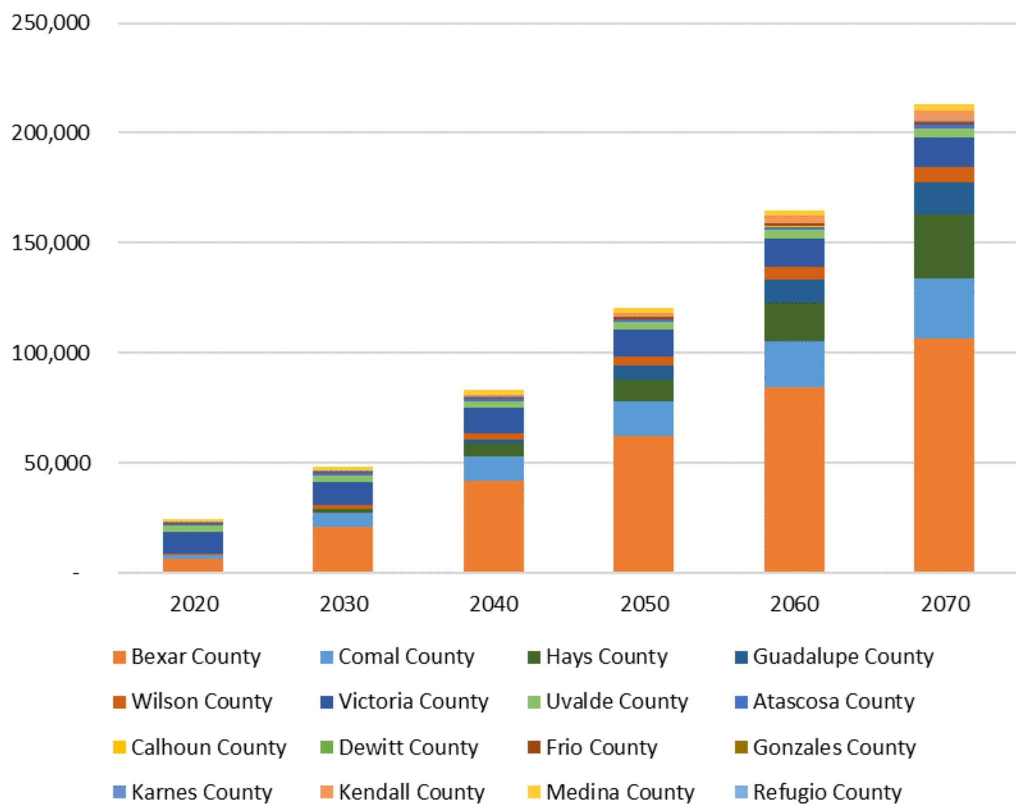

Figure 4-3 Municipal Needs, Shown by County (acft/yr)

4.3.1 Regional Water User Groups

Needs for WUGs that are split among one or more counties (regional WUGs) are aggregated in Table 4-3. As mentioned previously, for purposes of this chapter, surpluses are not considered in the calculation of needs (i.e., surpluses are converted to a value of zero). If surpluses had been considered in the needs calculation, then several regional WUGs would not demonstrate system-wide needs for certain decades, including Goforth SUD, Green Valley SUD, and San Antonio Water System.

Table 4-3 Regional Water User Groups Needs (acft/yr)

ENTITY	2020	2030	2040	2050	2060	2070
Benton City WSC	-	-	-	-	153	345
County Line SUD	-	-	-	207	530	852
Creedmoor-Maha WSC	-	-	-	-	-	-
Crystal Clear WSC	66	-	106	560	1,057	1,575
East Central SUD	-	-	-	-	-	-
El Oso WSC	37	50	26	31	176	185
Elmendorf	31	118	199	278	352	419
Fair Oaks Ranch	-	-	267	425	752	1,070
Goforth SUD	16	23	27	633	1,926	3,230
Gonzales County WSC	-	-	-	-	-	-
Green Valley SUD	-	-	107	896	1,856	2,469
Guadalupe-Blanco River Authority	-	-	-	-	-	-
Luling	-	49	227	412	608	799
Lytle	354	472	578	684	789	884
Martindale WSC	130	230	317	428	568	730
Maxwell WSC	-	-	-	-	-	-
McCoy WSC	-	-	-	-	-	-
New Braunfels	-	3,812	8,108	12,763	17,342	21,832
Nixon	-	-	-	-	-	-
San Antonio Water System	506	14,468	34,780	54,469	75,881	97,624
San Marcos	-	-	1,887	4,666	8,057	12,115
Schertz	-	-	889	3,294	5,858	8,385
Selma	-	57	151	241	324	403
Sunko WSC	-	-	-	-	-	-
Tri Community WSC	-	-	-	-	-	-
Water Services	-	236	241	260	376	485

4.3.2 Atascosa County Municipal Needs

Table 4-4 shows Atascosa County municipal water needs.

Table 4-4 Atascosa County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Benton City WSC	-	-	-	-	93	210
Charlotte	-	-	-	-	-	-
Jourdanton	-	-	-	-	-	-
Lytle	277	363	441	519	597	669
McCoy WSC	-	-	-	-	-	-
Pleasanton	-	-	-	-	-	-
Poteet	-	-	-	-	-	-
San Antonio Water System	475	515	553	591	631	638
County-Other	-	-	-	-	-	-
Total	**752**	**878**	**994**	**1,110**	**1,321**	**1,517**

4.3.3 Bexar County Municipal Needs

Table 4-5 shows Bexar County municipal water needs.

Table 4-5 Bexar County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Air Force Village II Inc.	104	126	145	144	144	144
Alamo Heights	942	993	965	953	950	950
Atascosa Rural WSC	871	1,119	1,353	1,588	1,811	2,017
Bexar County WCID 10	417	438	462	492	524	555
Converse	350	560	747	721	715	713
East Central SUD	-	-	-	-	-	-
Elmendorf	31	117	197	275	348	414
Fair Oaks Ranch	-	-	140	210	348	469
Fort Sam Houston	1,919	1,736	1,551	1,366	1,185	1,008
Green Valley SUD	-	-	-	-	-	-
Kirby	191	260	234	225	223	222
Lackland Air Force Base	9	-	-	-	-	-
Leon Valley	263	316	369	748	830	908
Live Oak	482	489	465	451	448	448
Lytle	7	10	14	17	20	23

ENTITY	2020	2030	2040	2050	2060	2070
Randolph Air Force Base	-	-	-	-	-	-
San Antonio Water System	-	13,874	34,102	53,717	75,049	96,746
Schertz	-	-	31	117	221	325
Selma	-	29	82	136	189	240
Shavano Park	264	346	422	498	568	633
The Oaks WSC	138	189	237	284	328	368
Universal City	299	314	256	224	217	216
Water Services	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**6,287**	**20,916**	**41,772**	**62,166**	**84,118**	**106,399**

4.3.4 Caldwell County Municipal Needs

Table 4-6 shows Caldwell County municipal water needs.

Table 4-6 Caldwell County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
County Line SUD	-	-	-	54	124	177
Goforth SUD	16	23	27	25	20	18
Gonzales County WSC	-	-	-	-	-	-
Lockhart	-	-	39	482	946	1,402
Luling	-	49	226	411	606	796
Martindale WSC	124	218	296	395	518	665
Maxwell WSC	-	-	-	-	-	-
Polonia WSC	-	-	-	-	-	-
San Marcos	-	-	-	-	1	2
Tri Community WSC	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**140**	**290**	**588**	**1,367**	**2,215**	**3,060**

4.3.5 Calhoun County Municipal Needs

Table 4-7 shows Calhoun County municipal water needs.

Table 4-7 Calhoun County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Guadalupe-Blanco River Authority	-	-	-	-	-	-
Point Comfort	-	-	-	-	-	-
Port Lavaca	-	-	-	-	-	-
Port O'Connor Municipal Utility District (MUD)	-	-	-	-	-	-
Seadrift	-	-	-	-	-	-
County-Other	-	-	-	-	88	119
Total	**-**	**-**	**-**	**-**	**88**	**119**

4.3.6 Comal County Municipal Needs

Table 4-8 shows Comal County municipal water needs.

Table 4-8 Comal County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Canyon Lake Water Service	-	-	-	-	-	931
Clear Water Estates Water System	627	806	987	1,171	1,352	1,528
Crystal Clear WSC	5	-	9	57	107	154
Fair Oaks Ranch	-	-	15	22	40	57
Garden Ridge	918	1,241	1,638	1,788	2,184	2,565
Green Valley SUD	-	-	-	-	-	-
Guadalupe-Blanco River Authority	-	-	-	-	-	-
KT Water Development	26	136	249	364	479	589
New Braunfels	-	3,812	7,678	11,786	15,821	19,787
San Antonio Water System	19	49	79	102	127	152
Schertz	-	-	49	219	457	732
Selma	-	-	-	1	1	1
Water Services	-	224	226	241	352	457
Wingert Water Systems	32	108	185	185	185	185
County-Other	-	43	52	80	119	164
Total	**1,627**	**6,419**	**11,167**	**16,016**	**21,224**	**27,302**

4.3.7 DeWitt County Municipal Needs

Table 4-9 shows DeWitt County municipal water needs.

Table 4-9 DeWitt County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Cuero	-	-	-	-	-	-
Gonzales County WSC	-	-	-	-	-	-
Yoakum	-	-	-	-	-	-
Yorktown	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**-**	**-**

4.3.8 Dimmit County Municipal Needs

Table 4-10 shows Dimmit County municipal water needs.

Table 4-10 Dimmit County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Asherton	-	-	-	-	-	-
Big Wells	-	-	-	-	-	-
Carrizo Hill WSC	-	-	-	-	-	-
Carrizo Springs	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**-**	**-**

4.3.9 Frio County Municipal Needs

Table 4-11 shows Frio County municipal water needs.

Table 4-11 Frio County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Benton City WSC	-	-	-	-	5	11
Dilley	-	-	-	-	-	-
Moore WSC	-	-	-	-	-	-
Pearsall	611	771	913	1,061	1,206	1,340
County-Other	-	-	-	-	-	-
Total	**611**	**771**	**913**	**1,061**	**1,211**	**1,351**

4.3.10 Goliad County Municipal Needs

Table 4-12 shows Goliad County municipal water needs.

Table 4-12 Goliad County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Goliad	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**-**	**-**

4.3.11 Gonzales County Municipal Needs

Table 4-13 shows Gonzales County municipal water needs.

Table 4-13 Gonzales County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Gonzales	-	-	-	-	-	-
Gonzales County WSC	-	-	-	-	-	-
Nixon	-	-	-	-	-	-
Smiley	-	-	-	-	-	-
Waelder	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**-**	**-**

4.3.12 Guadalupe County Municipal Needs

Table 4-14 shows Guadalupe County municipal water needs.

Table 4-14 Guadalupe County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Cibolo	-	40	484	704	813	866
Crystal Clear WSC	26	-	52	335	640	949
East Central SUD	-	-	-	-	-	-
Gonzales County WSC	-	-	-	-	-	-
Green Valley SUD	-	-	107	896	1,856	2,469
Luling	-	-	1	1	2	3
Marion	-	-	3	44	88	131
Martindale WSC	6	12	21	33	50	65
New Braunfels	-	-	430	977	1,521	2,045

ENTITY	2020	2030	2040	2050	2060	2070
Schertz	-	-	809	2,958	5,180	7,328
Seguin	11	-	-	93	210	331
Selma	-	28	69	104	134	162
Springs Hill WSC	-	-	-	-	-	-
Tri Community WSC	-	-	-	-	-	-
Water Services	-	12	15	19	24	28
County-Other	-	-	-	-	-	-
Total	**43**	**92**	**1,991**	**6,164**	**10,518**	**14,377**

4.3.13 Hays County Municipal Needs

Table 4-15 shows Hays County municipal water needs.

Table 4-15 Hays County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Buda	-	-	-	-	-	-
County Line SUD	-	-	-	153	406	675
Creedmoor-Maha WSC	-	-	-	-	-	-
Crystal Clear WSC	35	-	45	168	310	472
Goforth SUD	-	-	-	608	1,906	3,212
Kyle	-	1,407	2,860	2,845	2,835	2,831
Maxwell WSC	-	-	-	-	-	-
San Marcos	-	-	1,887	4,666	8,056	12,113
South Buda WCID 1	-	-	-	-	-	-
Texas State University	-	-	-	-	-	-
Wimberley WSC	-	247	737	1,351	2,045	2,836
County-Other	-	-	-	-	2,029	7,220
Total	**35**	**1,654**	**5,529**	**9,791**	**17,587**	**29,359**

4.3.14 Karnes County Municipal Needs

Table 4-16 shows Karnes County municipal water needs.

Table 4-16 Karnes County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
El Oso WSC	35	47	24	29	156	163
Falls City	-	-	-	-	-	-
Karnes City	319	305	280	267	256	232
Kenedy	-	-	-	-	-	-
Runge	-	-	-	-	-	-
Sunko WSC	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**354**	**352**	**304**	**296**	**412**	**395**

4.3.15 Kendall County Municipal Needs

Table 4-17 shows Kendall County municipal water needs.

Table 4-17 Kendall County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Boerne	-	-	-	236	1,250	2,249
Fair Oaks Ranch	-	-	112	193	364	544
Guadalupe-Blanco River Authority	-	-	-	-	-	-
Kendall County WCID 1	-	-	-	-	-	-
Kendall West Utility	-	282	561	902	1,365	1,596
County-Other	-	-	-	-	-	-
Total	**-**	**282**	**673**	**1,331**	**2,979**	**4,389**

4.3.16 La Salle County Municipal Needs

Table 4-18 shows La Salle County municipal water needs.

Table 4-18 La Salle County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Cotulla	-	-	-	-	-	-
Encinal WSC	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**-**	**-**

4.3.17 Medina County Municipal Needs

Table 4-19 shows Medina County municipal water needs.

Table 4-19 Medina County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Benton City WSC	-	-	-	-	55	124
Castroville	281	273	266	264	267	270
Devine	-	-	-	-	-	-
East Medina County SUD	140	212	274	335	398	455
Hondo	562	721	858	987	1,113	1,226
La Coste	38	50	60	70	82	92
Lytle	70	99	123	148	172	192
Medina County WCID 2	-	-	-	-	-	-
Medina River West WSC	-	-	-	-	-	-
Natalia	106	136	161	185	209	230
San Antonio Water System	12	30	46	59	74	88
West Medina WSC	48	74	97	118	137	155
Yancey WSC	121	192	256	314	372	423
County-Other	-	-	-	-	-	-
Total	**1,378**	**1,787**	**2,141**	**2,480**	**2,879**	**3,255**

4.3.18 Refugio County Municipal Needs

Table 4-20 shows Refugio County municipal water needs.

Table 4-20 Refugio County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Refugio	-	-	-	-	-	-
Woodsboro	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**-**	**-**

4.3.19 Uvalde County Municipal Needs

Table 4-9 shows Uvalde County municipal water needs.

Table 4-21 Uvalde County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Knippa WSC	-	-	-	-	-	-
Sabinal	146	178	205	237	269	301
Uvalde	2,434	2,747	3,019	3,331	3,655	3,972
Windmill WSC	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**2,580**	**2,925**	**3,224**	**3,568**	**3,924**	**4,273**

4.3.20 Victoria County Municipal Needs

Table 4-22 shows Victoria County municipal water needs.

Table 4-22 Victoria County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Quail Creek MUD	-	-	-	-	-	-
Victoria	8,935	9,790	10,454	11,124	11,755	12,295
Victoria County WCID 1	-	-	-	-	-	-
County-Other	831	891	936	1,000	1,080	1,151
Total	**9,766**	**10,681**	**11,390**	**12,124**	**12,835**	**13,446**

4.3.21 Wilson County Municipal Needs

Table 4-23 shows Wilson County municipal water needs.

Table 4-23 Wilson County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
East Central SUD	-	-	-	-	-	-
El Oso WSC	2	3	2	2	20	22
Elmendorf	-	1	2	3	4	5
Floresville	-	-	245	608	961	1,281
La Vernia	-	-	-	-	-	-
McCoy WSC	-	-	-	-	-	-
Nixon	-	-	-	-	-	-
Oak Hills WSC	468	658	846	1,019	1,186	1,338

ENTITY	2020	2030	2040	2050	2060	2070
Picosa WSC	-	-	19	58	99	137
Poth	-	-	-	-	35	97
SS WSC	425	1,108	1,867	2,640	3,600	4,133
Stockdale	-	-	-	-	-	-
Sunko WSC	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**895**	**1,770**	**2,981**	**4,330**	**5,905**	**7,013**

4.3.22 Zavala County Municipal Needs

Table 4-24 shows Zavala County municipal water needs.

Table 4-24 Zavala County Municipal Water Needs

ENTITY	2020	2030	2040	2050	2060	2070
Batesville WSC	-	-	-	-	-	-
Crystal City	-	-	-	-	-	-
Loma Alta Chula Vista Water System	-	-	-	-	-	-
Zavala County WCID 1	-	-	-	-	-	-
County-Other	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**-**	**-**

4.4 IRRIGATION NEEDS

Irrigation is the second largest water use type in Region L, behind municipal, and has the largest need. This is because of how the needs are calculated: using a year with maximum demand and minimum supply, because irrigation surface water rights are filled only after all domestic, municipal, and industrial water is set aside. The portion of demands that is met and the resulting needs are shown on Figure 4-4. A detailed discussion on how irrigation demands are estimated is included in Chapter 2, and more information about how water is allocated is included in Chapter 3.

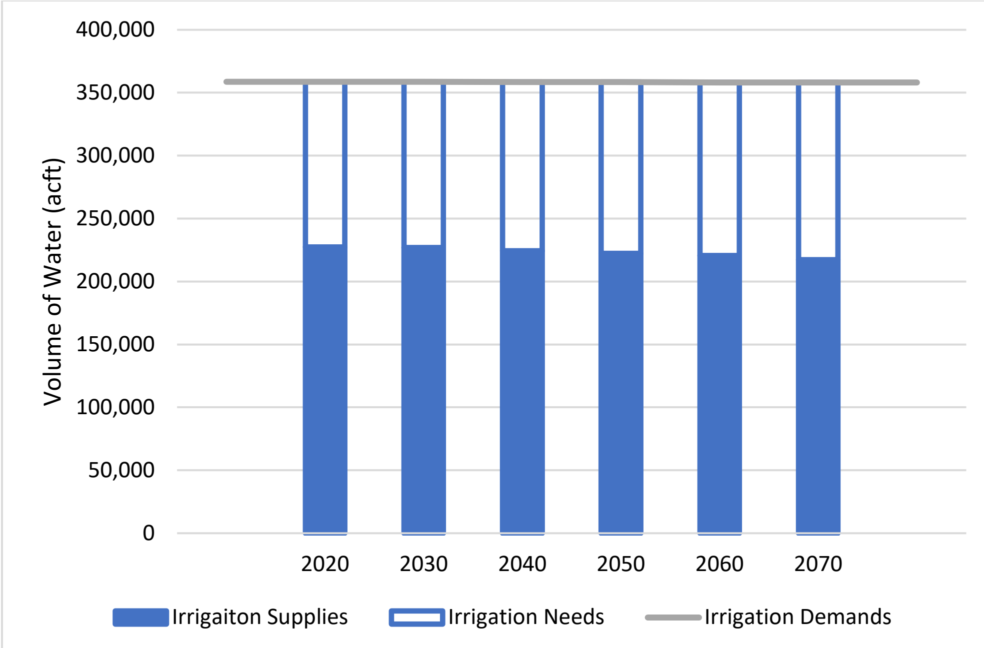

Figure 4-4 Irrigation Needs, Shown as a Portion of Irrigation Demands (acft/yr)

Irrigation needs are the highest in Medina and Uvalde Counties where there is the most heavily irrigated farmland, shown in Table 4-25. Needs are projected to decrease slightly as a result of decreasing demand. Increased efficiency may alleviate some of the impacts of drought on productivity for farmers. These needs represent the extent of shortage anticipated by farmers in years of limited supply.

Table 4-25 Irrigation Needs Projections, by County (acft/yr)

COUNTY	2020	2030	2040	2050	2060	2070
Atascosa	-	-	-	-	-	-
Bexar	3,318	3,318	3,318	3,318	3,318	3,318
Caldwell	-	-	-	-	-	-
Calhoun	14,088	14,088	14,088	14,088	14,088	14,088
Comal	33	33	33	33	33	33
DeWitt	318	318	265	265	-	-
Dimmit	5,249	5,249	5,249	5,249	5,249	5,249
Frio	-	-	1,838	3,612	5,332	7,146
Goliad	388	388	388	388	388	388
Gonzales	-	-	-	-	-	-
Guadalupe	-	-	-	-	-	-
Hays	-	-	-	-	-	-
Karnes	268	268	827	827	827	827

COUNTY	2020	2030	2040	2050	2060	2070
Kendall	1	1	1	1	1	1
La Salle	1,184	1,203	1,223	1,248	1,271	1,294
Medina	35,430	35,757	35,690	36,009	36,174	37,226
Refugio	-	-	-	-	-	-
Uvalde	40,491	40,746	40,867	41,109	41,394	41,704
Victoria	5,791	5,791	5,791	5,791	5,791	5,791
Wilson	3,390	3,405	3,417	3,428	3,582	3,882
Zavala	21,235	21,350	21,109	20,733	20,148	19,865
Total	**131,184**	**131,915**	**134,104**	**136,099**	**137,596**	**140,812**

4.5 STEAM-ELECTRIC POWER NEEDS

The current supplies for steam-electric power generation meet about 80 percent of the 2020 demands (Figure 4-5). This stems, in part, from the anticipated near-term growth of power generation demands, the likelihood of some short-term contractual water, and in part from increasingly efficient power generation in terms of consumptive water use. Water management strategies to address the needs of steam-electric power generation are discussed in Chapter 5. Table 4-26 shows needs projections for the steam-electric power use type.

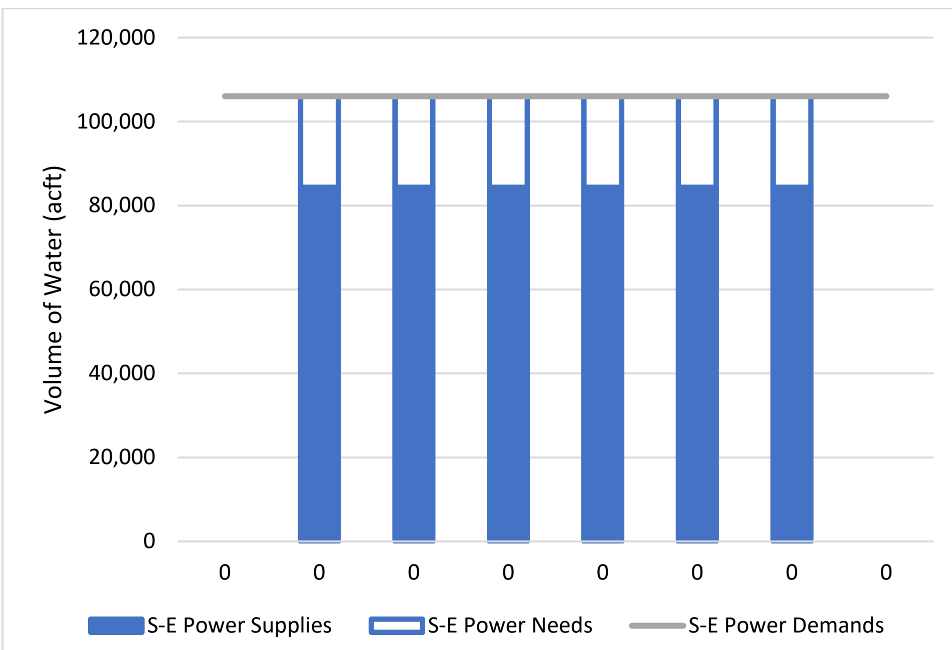

Figure 4-5 Steam-Electric Power Needs, Shown as a Portion of Steam-Electric Demands (acft/yr)

Table 4-26 Steam-Electric Power Needs Projections, by County (acft/yr)

COUNTY	2020	2030	2040	2050	2060	2070
Atascosa	-	-	-	-	-	-
Bexar	2,782	2,782	2,782	2,782	2,782	2,782
Frio	-	-	-	-	-	-
Goliad	-	-	-	-	-	-
Guadalupe	-	-	-	-	-	-
Victoria	18,925	18,925	18,925	18,925	18,925	18,925
Wilson	-	-	-	-	-	-
Total	**21,707**	**21,707**	**21,707**	**21,707**	**21,707**	**21,707**

4.6 MINING NEEDS

Current mining supplies appear to meet about 67 percent of the 2020 demands for mining water (Figure 4-6). Because of reporting limitations, there may be additional mining supplies from groundwater that would exceed the MAG values for some aquifer/county/river basin areas. Mining needs are shown in Table 4-27.

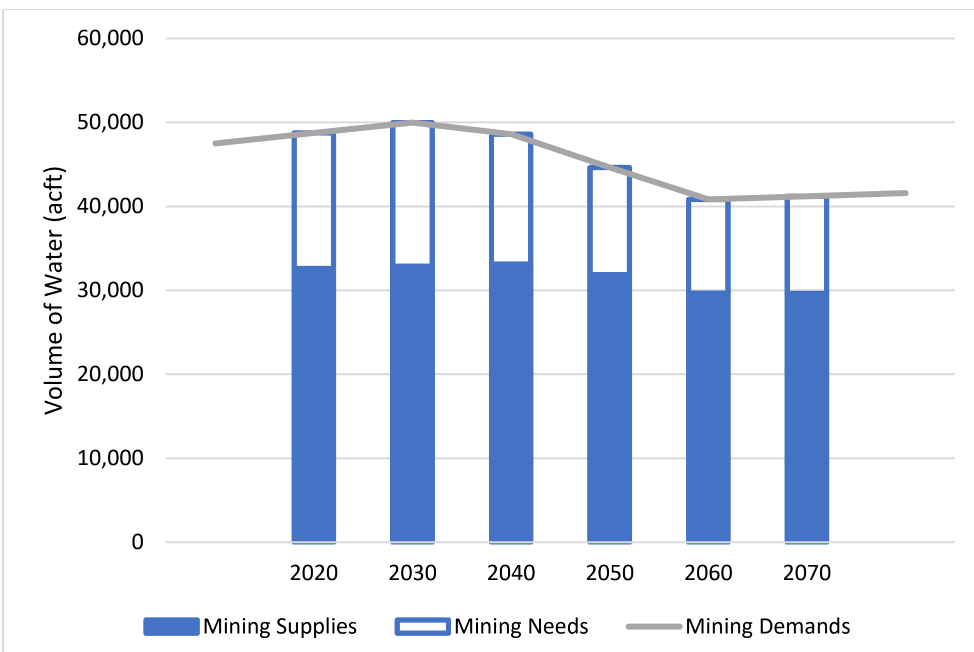

Figure 4-6 Mining Needs, Shown as a Portion of Mining Demands (acft/yr)

Table 4-27 Mining Needs Projections, by County (acft/yr)

COUNTY	2020	2030	2040	2050	2060	2070
Atascosa	-	-	-	-	-	-
Bexar	-	-	-	-	-	-
Caldwell	-	-	-	-	-	-
Calhoun	-	-	-	-	-	-
Comal	3,861	5,201	6,491	7,617	8,849	8,849
DeWitt	1,718	1,595	362	2	-	-
Dimmit	4,224	4,312	3,652	2,144	639	81
Frio	-	-	-	-	-	-
Goliad	-	-	-	-	-	-
Gonzales	-	-	-	-	-	-
Guadalupe	-	-	-	-	-	-
Karnes	1,928	1,356	764	179	13	1
La Salle	4,088	4,243	3,734	2,290	851	147
Medina	-	-	-	-	-	-
Refugio	-	-	-	-	-	-
Uvalde	102	102	102	102	102	102
Victoria	-	-	-	-	-	-
Wilson	-	-	-	-	-	-
Zavala	-	-	-	-	-	-
Total	**15,921**	**16,809**	**15,105**	**12,334**	**10,454**	**9,180**

4.7 MANUFACTURING NEEDS

Manufacturing needs are shown on Figure 4-7 and in Table 4-28. Water demand associated with manufacturing is met by both groundwater and surface water and comprises a relatively small portion of the regional demand and need. Current supplies meet 86 percent of 2020 projected demands. The need likely results in part due to the fact that the date of the most recent supply data (2015) is 5 years from the first date of demand data (2020) and to some portion of supplies from short-term contracts for water.

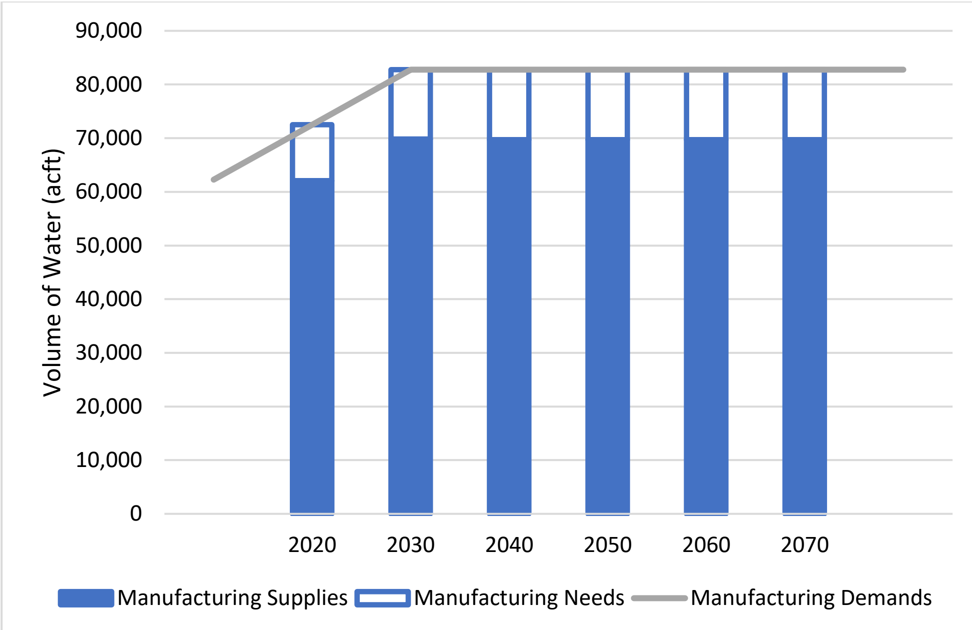

Figure 4-7 Manufacturing Needs, Shown as a Portion of Manufacturing Demands (acft/yr)

Table 4-28 Manufacturing Needs Projections, by County (acft/yr)

COUNTY	2020	2030	2040	2050	2060	2070
Atascosa	-	-	-	-	-	-
Bexar	-	-	-	-	-	-
Caldwell	-	-	-	-	-	-
Calhoun	-	-	-	-	-	-
Comal	2,786	3,768	3,768	3,768	3,768	3,768
DeWitt	-	22	10	-	-	-
Goliad	-	-	-	-	-	-
Gonzales	-	-	-	-	-	-
Guadalupe	-	388	388	388	388	388
Hays	-	-	-	-	-	-
Karnes	-	-	113	155	155	155
Kendall	-	-	-	-	-	-
Medina	-	-	-	-	-	-
Uvalde	-	-	-	-	-	-
Victoria	7,641	8,762	8,762	8,762	8,762	8,762
Wilson	-	-	-	-	-	-
Zavala	-	-	-	-	-	-
Total	**10,427**	**12,940**	**13,041**	**13,073**	**13,073**	**13,073**

4.8 LIVESTOCK NEEDS

Livestock demands are met by numerous groundwater wells, ephemeral streams and ponds, as well as surface water diversions, often classified together with lawn watering contracts or referred to here as Livestock Local Supplies. Even though needs are shown, these supplies are expected to be sufficient to meet the needs of the (stable) livestock demand. In particular areas there may be some difficulty providing sufficient water in a drought year, but overall ranchers are expected to manage their livestock within the available supplies.

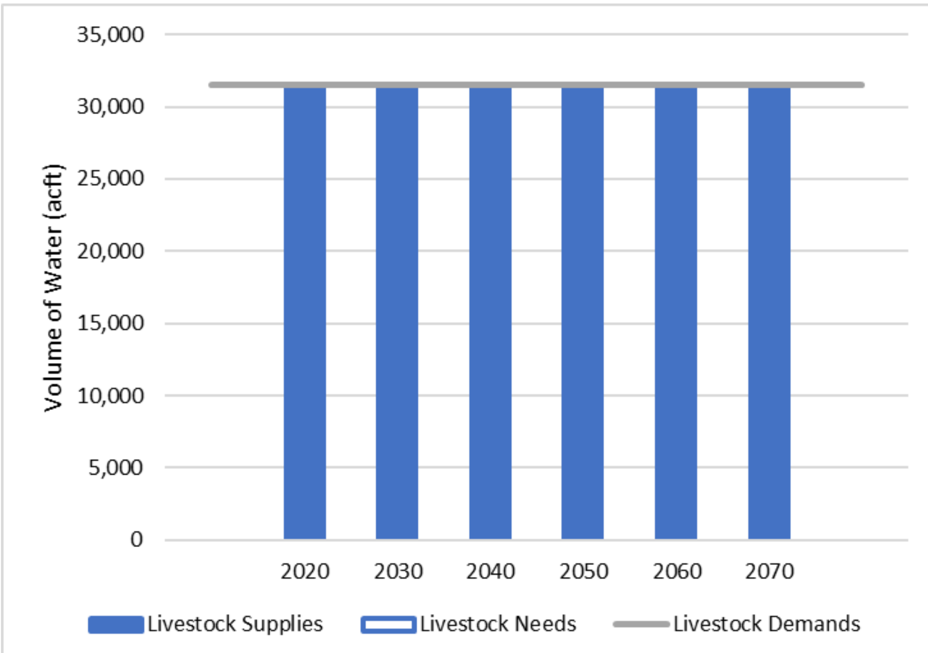

Figure 4-8 Livestock Needs, Shown as a Portion of Livestock Demands (acft/yr)

Irrigation needs are the highest in Medina and Uvalde Counties, where there is the most heavily irrigated farmland, shown in Table 4-29. Needs are projected to decrease slightly as a result of decreasing demand. Increased efficiency may alleviate some of the impacts of drought on productivity for farmers. These needs represent the extent of shortage anticipated by farmers in years of limited supply.

Table 4-29 Livestock Needs Projections, by County (acft/yr)

COUNTY	2020	2030	2040	2050	2060	2070
Atascosa	-	-	-	-	-	-
Bexar	-	-	-	-	-	-
Caldwell	-	-	-	-	-	-
Calhoun	-	-	-	-	-	-
Comal	-	-	-	-	-	-
DeWitt	-	-	-	-	-	-
Dimmit	-	-	-	-	-	-

COUNTY	2020	2030	2040	2050	2060	2070
Frio	-	-	-	-	-	-
Goliad	-	-	-	-	-	-
Gonzales	-	-	-	-	-	-
Guadalupe	-	-	-	-	-	-
Hays	-	-	-	-	-	-
Karnes	-	-	-	-	-	-
Kendall	-	-	-	-	-	-
La Salle	-	-	-	-	-	-
Medina	-	-	-	-	-	-
Refugio	-	-	-	-	-	-
Uvalde	-	-	-	-	-	-
Victoria	-	-	-	-	-	-
Wilson	-	-	-	-	-	-
Zavala	-	-	-	-	-	-
Total	**-**	**-**	**-**	**-**	**-**	**-**

4.9 MAJOR WATER PROVIDER NEEDS

A new category for this round of planning, a MWP is defined by the SCTRWPG as any wholesale water provider (WWP), or municipal WUG that has demands greater than 20,000 acft/yr by 2070. Using this definition the following entities are identified as MWPs in the South Central Texas Region.

- Alliance Regional Water Authority (ARWA)
- Canyon Regional Water Authority (CRWA)
- Cibolo Valley Local Government Corporation (CVLGC)
- Guadalupe-Blanco River Authority (GBRA)
- New Braunfels
- San Antonio Water System (SAWS)
- San Marcos
- Schertz-Seguin Local Government Corporation (SSLGC)
- Victoria

Water need projections for MWPs are provided in Table 4-30. Second tier needs for MWPs, which includes needs after direct reuse projects and conservations projects such as advanced municipal conservation (Section 5.1) and drought management (Section 5.2), are provided in Table 4-31.

Table 4-30 Major Water Providers Needs Projections, by Entity (acft/yr)

MAJOR WATER PROVIDER (PROVIDER TYPE)	USE TYPE	WATER NEED PROJECTIONS (ACFT/YR)					
		2020	2030	2040	2050	2060	2070
ARWA (WWP)[1]	**Total**	**--**	**--**	**--**	**--**	**--**	**--**
WUG Needs	--	--	--	--	--	--	--
Contract Needs	--	--	--	--	--	--	--
CRWA (WWP)	**Total**	**-**	**-**	**-**	**-**	**-**	**-**
WUG Needs	--	--	--	--	--	--	--
Contract Needs	Municipal	-	-	-	-	-	-
CVLGC (WWP)[2]	**--**	**--**	**--**	**--**	**--**	**--**	**--**
WUG Needs	--	--	--	--	--	--	--
Contract Needs	--	--	--	--	--	--	--
New Braunfels (WUG)	**Total**	**-**	**(3,649)**	**(8,108)**	**(12,763)**	**(17,342)**	**(21,832)**
WUG Needs	Municipal	-	(3,649)	(8,108)	(12,763)	(17,342)	(21,832)
Contract Needs	--	--	--	--	--	--	--
San Marcos (WUG)	**Total**	**-**	**-**	**(1,887)**	**(4,666)**	**(8,057)**	**(12,115)**
WUG Needs	Municipal	-	-	(1,887)	(4,666)	(8,057)	(12,115)
Contract Needs	--	--	--	--	--	--	--
Victoria (WUG)	**Total**	**(8,935)**	**(9,790)**	**(10,454)**	**(11,124)**	**(11,755)**	**(12,295)**
WUG Needs	Municipal	(8,935)	(9,790)	(10,454)	(11,124)	(11,755)	(12,295)
Contract Needs	--	--	--	--	--	--	--
GBRA (WUG/WWP)	**Total**	**(5,035)**	**(5,049)**	**(5,063)**	**(5,081)**	**(5,103)**	**(5,125)**
WUG Needs	Municipal	-	-	-	-	-	-
Contract Needs	Irrigation	-	-	-	-	-	-
Contract Needs	Manufacturing	(5,035)	(5,049)	(5,063)	(5,081)	(5,103)	(5,125)
Contract Needs	Municipal	-	-	-	-	-	-
Contract Needs	Steam-Electric	-	-	-	-	-	-
Contract Needs	WWP	-	-	-	-	-	-
SAWS (WUG/WWP)	**Total**	**(5,700)**	**(20,168)**	**(40,480)**	**(60,169)**	**(81,581)**	**(103,324)**
WUG Needs	Municipal	-	(14,468)	(34,780)	(54,469)	(75,881)	(97,624)
Contract Needs	Municipal	(5,700)	(5,700)	(5,700)	(5,700)	(5,700)	(5,700)

MAJOR WATER PROVIDER (PROVIDER TYPE)	USE TYPE	WATER NEED PROJECTIONS (ACFT/YR)					
		2020	2030	2040	2050	2060	2070
SSLGC (WWP)	Total	-	-	-	-	-	-
WUG Needs	--	--	--	--	--	--	--
Contract Needs	Municipal	-	-	-	-	-	-

[1] ARWA has no existing demands or supplies, and therefore has no existing needs.

[2] CVLGC comprises the cities of Schertz and Cibolo. CVLGC has no existing demands or supplies, and therefore has no existing needs.

Table 4-31 Major Water Providers Second Tier (Needs)/Surplus Projections, by Entity (acft/yr)

Major Water Provider (Provider Type)	Use Type	Water Second Tier Need Projections (acft/yr)					
		2020	2030	2040	2050	2060	2070
ARWA (WWP)[1]							
WUG Demands	-	-	-	-	-	-	-
Contract Demands	-	-	-	-	-	-	-
Existing Supplies	-	-	-	-	-	-	-
WMS Supplies - Direct Reuse	-	-	-	-	-	5,494	5,494
WMS Supplies - Con	-	-	-	-	-	-	-
WMS Supplies - DM	-	-	-	-	-	-	-
ARWA Second Tier (Needs)/Surplus	-	-	-	-	-	5,494	5,494
CRWA (WWP)							
WUG Demands	-	-	-	-	-	-	-
Contract Demands	26,817	26,817	26,817	26,817	26,817	26,817	26,817
Existing Supplies	26,817	26,817	26,817	26,817	26,817	26,817	26,817
WMS Supplies - Direct Reuse	-	-	-	-	-	-	-
WMS Supplies - Municipal Conservation	-	-	-	-	-	-	-
WMS Supplies - Drought Management	-	-	-	-	-	-	-
CRWA Second Tier (Needs)/Surplus	-	-	-	-	-	-	-
CVLGC (WWP)[2]							
WUG Demands	-	-	-	-	-	-	-
Contract Demands	-	-	-	-	-	-	-
Existing Supplies	-	-	-	-	-	-	-
WMS Supplies - Direct Reuse	-	-	-	-	-	-	-
WMS Supplies - Municipal Conservation	-	-	-	-	-	-	-
WMS Supplies - Drought Management	-	-	-	-	-	-	-
CVLGC Second Tier (Needs)/Surplus	-	-	-	-	-	-	-
New Braunfels (WUG)							

Major Water Provider (Provider Type)	Use Type	Water Second Tier Need Projections (acft/yr)					
		2020	2030	2040	2050	2060	2070
WUG Demands	18,588	23,079	23,079	27,538	32,193	36,772	41,262
Contract Demands	-	-	-	-	-	-	-
Existing Supplies	19,430	19,430	19,430	19,430	19,430	19,430	19,430
WMS Supplies - Direct Reuse	-	-	-	-	-	-	-
WMS Supplies - Municipal Conservation	663	2,240	2,240	4,381	5,814	7,168	8,631
WMS Supplies - Drought Management	-	-	-	-	-	-	-
New Braunfels Second Tier (Needs)/Surplus	**1,505**	**(1,409)**	**(1,409)**	**(3,727)**	**(6,949)**	**(10,174)**	**(13,201)**
San Marcos (WUG)							
WUG Demands	10,902	12,715	12,715	14,971	17,750	21,141	25,199
Contract Demands	-	-	-	-	-	-	-
Existing Supplies	13,084	13,084	13,084	13,084	13,084	13,084	13,084
WMS Supplies - Direct Reuse	-	-	-	-	3,808	3,808	3,808
WMS Supplies - Municipal Conservation	-	-	-	54	395	949	1,706
WMS Supplies - Drought Management	-	-	-	-	-	-	-
San Marcos Second Tier (Needs)/Surplus	**2,182**	**369**	**369**	**(1,833)**	**(463)**	**(3,300)**	**(6,601)**
Victoria (WUG)							
WUG Demands	17,110	17,965	17,965	18,629	19,299	19,930	20,470
Contract Demands	-	-	-	-	-	-	-
Existing Supplies	8,175	8,175	8,175	8,175	8,175	8,175	8,175
WMS Supplies - Direct Reuse	-	-	-	-	-	-	-
WMS Supplies - Municipal Conservation	809	2,199	2,199	3,642	5,158	6,705	7,516
WMS Supplies - Drought Management	490	-	-	-	-	-	-
Victoria Second Tier (Needs)/Surplus	**(7,636)**	**(7,591)**	**(7,591)**	**(6,812)**	**(5,966)**	**(5,050)**	**(4,779)**
GBRA (WUG/WWP)							
WUG Demands	325	343	343	363	387	417	447
Contract Demands	480	480	480	480	480	480	480
Contract Demands	35,390	35,390	35,390	35,390	35,390	35,390	35,390
Contract Demands	63,270	63,270	63,270	59,270	59,270	59,270	59,270
Contract Demands	9,304	9,304	9,304	9,304	9,304	9,304	9,304
Contract Demands	13,888	13,888	13,888	13,888	13,888	13,888	13,888
Existing Supplies	118,330	117,626	117,626	114,553	115,171	117,647	117,662
WMS Supplies - Direct Reuse	-	-	-	-	-	-	-
WMS Supplies - Municipal Conservation	-	-	-	-	-	-	-
WMS Supplies - Drought Management	-	-	-	-	-	-	-
GBRA Second Tier (Needs)/Surplus	**4,327**	**5,049**	**5,049**	**4,142**	**3,548**	**1,102**	**1,117**

Major Water Provider (Provider Type)	Use Type	Water Second Tier Need Projections (acft/yr)					
		2020	2030	2040	2050	2060	2070
SAWS (WUG/WWP)							
WUG Demands	239,028	262,301	262,301	285,481	308,607	331,930	353,673
Contract Demands	7,330	6,830	6,830	6,830	6,830	6,830	6,830
Existing Supplies	247,771	248,963	254,663	257,531	260,968	262,879	262,879
WMS Supplies - Direct Reuse	-	55,000	55,000	55,000	65,000	75,000	90,000
WMA Supplies - Advanced Meter Infastructure	426	606	606	510	-	-	-
WMS Supplies - Municipal Conservation	24,367	50,667	50,667	74,313	89,629	102,682	115,929
WMS Supplies - Drought Management	11,951	31,476	31,476	45,677	49,377	53,109	56,588
SAWS Second Tier (Needs)/Surplus	**38,157**	**117,581**	**123,281**	**140,720**	**149,537**	**154,910**	**164,893**
SSLGC (WWP)							
WUG Demands	-	-	-	-	-	-	-
Contract Demands	17,039	16,644	16,644	17,039	17,039	17,039	17,039
Existing Supplies	17,039	16,644	16,644	17,039	17,039	17,039	17,039
WMS Supplies - Direct Reuse	-	-	-	-	-	-	-
WMS Supplies - Municipal Conservation	-	-	-	-	-	-	-
WMS Supplies - Drought Management	-	-	-	-	-	-	-
SSLGC Second Tier (Needs)/Surplus	**-**	**-**	**-**	**-**	**-**	**-**	**-**

[1] ARWA supplies will be developed by three water management strategies included in the 2021 South Central Texas Regional Water Plan (See Chapter 5.2): -ARWA/GBRA Project (Phase 1), ARWA Project (Phase 2), and ARWA Project (Phase 3).

[2] CVLGC comprises of the cities of Schertz and Cibolo. The CVLGC Carrizo Project is the first major water management strategy project planned and developed by the corporation to provide water to both Schertz and Cibolo. This water management strategy is discussed in Chapter 5.2.

FINAL PLAN

CHAPTER 5: EVALUATION AND RECOMMENDATION OF WATER MANAGEMENT STRATEGIES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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CHAPTER 5 IS INCLUDED IN VOLUME 2

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FINAL PLAN

CHAPTER 6: IMPACTS OF THE REGIONAL WATER PLAN AND CONSISTENCY WITH PROTECTION OF RESOURCES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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#/100 mL	Number per 100 Milliliters
°C	Degrees Celsius
acft/yr	Acre-Feet per Year
ARWA	Alliance Regional Water Authority
ASR	Aquifer Storage and Recovery
cfs	Cubic Foot per Second
CRWA	Canyon Regional Water Authority
CVLGC	Cibolo Valley Local Government Corporation
DFC	Desired Future Condition
DO	Dissolved Oxygen
EAA	Edwards Aquifer Authority
EAHCP	Edwards Aquifer Habitat Conservation Plan
GAM	Groundwater Availability Model
GBRA	Guadalupe-Blanco River Authority
GIS	Geographic Information System
GMA	Groundwater Management Area
MAG	Modeled Available Groundwater
mg/L	Milligrams per Liter
msl	Mean Sea Level
NBU	New Braunfels Utilities
RWP	Regional Water Plan
RWPG	Regional Water Planning Group
SAWS	San Antonio Water System
SCTRWP	South Central Texas Regional Water Plan
SCTRWPG	South Central Texas Regional Water Planning Group
SGCN	Species of Greatest Conservation Need
SSLGC	Schertz-Seguin Local Government Corporation
S.U.	Standard Units
SUD	Special Utility District

TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VISPO	Voluntary Irrigation Suspension Program Option
WSC	Water Supply Corporation
WMS	Water Management Strategy
WUG	Water User Group

CHAPTER 6: IMPACTS OF THE REGIONAL WATER PLAN AND CONSISTENCY WITH PROTECTION OF RESOURCES

The 2021 South Central Texas Regional Water Plan (SCTRWP) provides for the orderly development, management, and conservation of water resources to meet the region's near and long-term water needs during drought. This chapter describes the impacts of the 2021 SCTRWP and how the 2021 SCTRWP is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. The chapter also presents a description of unmet needs, and the socioeconomic impacts of not meeting those needs.

6.1 CUMULATIVE EFFECTS OF REGIONAL WATER PLAN IMPLEMENTATION AND CONSISTENCY WITH LONG-TERM PROTECTION OF THE STATE'S WATER, AGRICULTURAL, AND NATURAL RESOURCES

In 2015, the 84th Texas Legislature designated five river or stream segments in South Central Texas Regional Water Planning Area (Region L) as having unique ecological value. In accordance with Title 31 of the Texas Administrative Code (TAC) Section 357.43(b)(2), Regional Water Planning Groups (RWPGs) must assess the impact of the regional water plan (RWP) on designated unique river or stream segments. The rules state, "The assessment shall be a quantitative analysis of the impact of the plan on the flows important to the river or stream segment, as determined by the RWPG, comparing current conditions to conditions with implementation of all recommended water management strategies (WMSs). The assessment shall also describe the impact of the plan on the unique features cited in the region's recommendation of that segment." To comply with these requirements and to assess the consistency with long-term protection of the state's resources, the South Central Texas Regional Water Planning Group (SCTRWPG) performed a cumulative effects analysis of full-implementation of the RWP. The following sections summarize the results of the cumulative effects analysis and describe the consistency with long-term protection of resources.

6.1.1 Water Resources

The cumulative effects of implementing the recommended WMSs described in the 2021 SCTRWP are quantified through long-term simulation of natural hydrologic processes including groundwater flow, precipitation, streamflow, aquifer recharge, springflow, and evaporation because they are affected by human influences such as aquifer pumpage, reservoirs, and diversions. Figure 6-1 illustrates the connectivity of the various groundwater and surface water models, as well as the WMSs of the 2021 SCTRWP.

The 2021 SCTRWP recognizes and honors all laws and existing permits applicable to water use for the state and regional water planning areas and, in the case of groundwater, recognizes and takes into account the programs and rules of groundwater conservation districts (GCDs) within the South Central Texas Water Planning Region, as well as Texas Water Development Board (TWDB) rules and guidance for regional water planning.

6.1.1.1 Groundwater and Springs

Cumulative effects of plan implementation for the Edwards Aquifer are based on full implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP), and for the Carrizo-Wilcox, Gulf Coast, and Trinity Aquifers are based on simulated impacts of the full implementation of the modeled available groundwater (MAGs) within each Groundwater Management Area (GMA). Each of these is described separately below.

The EAHCP was approved in 2013 by the U.S. Fish and Wildlife Service (USFWS). The 2021 RWP assumes full implementation of the EAHCP. Furthermore, the SCTRWPG agreed that springflows associated with EAHCP implementation be used in evaluating existing supplies and potentially feasible surface WMSs for the 2021 SCTRWP.

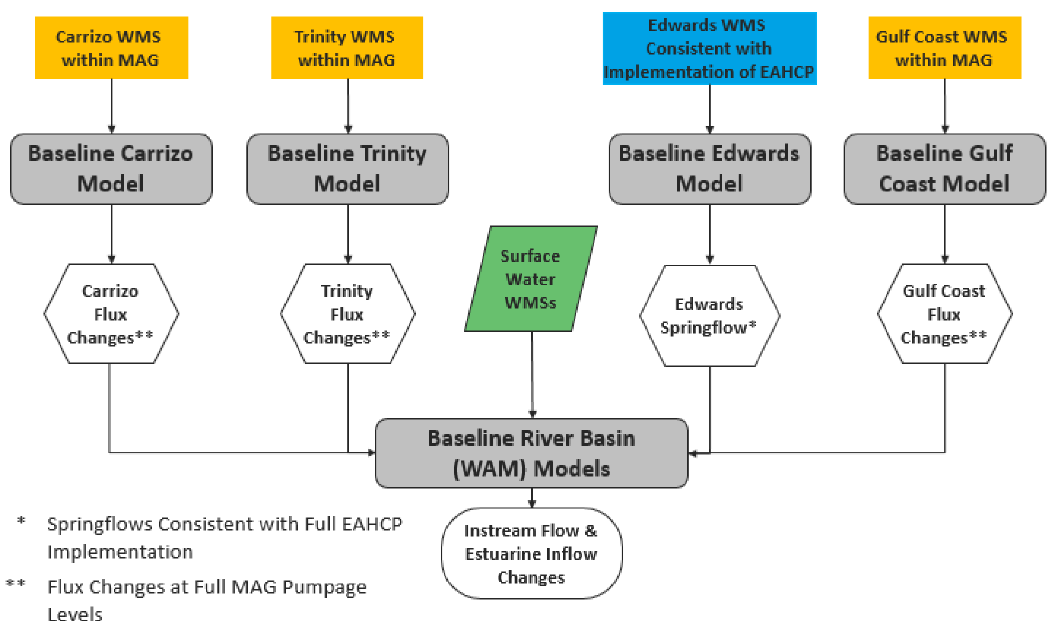


Figure 6-1 Flowchart for Assessment of Cumulative Effects of Regional Water Plan Implementation on Water Resources

The EAHCP includes four flow protection measures: Voluntary Irrigation Suspension Program Option (VISPO), Conservation Program, Use of San Antonio Water System (SAWS) Aquifer Storage and Recovery (ASR) with Tiered Leases and Pumping Off-Set, and Stage V Reductions. As of the issuance of this plan, each of these measures has been implemented to some degree. Figure 6-2 illustrates the effects of each measure on springflow at Comal and San Marcos Springs and reflects a May 2019 update to the EAHCP, which approves an adaptive management action that increases the forbearance in the VISPO program to 41,795 acre-feet per year (acft/yr). The green bars on Figure 6-2 represent SAWS forbearance in excess of the original forbearance amounts shown in the Interlocal Agreement between Edwards Aquifer Authority (EAA) and SAWS for use of the ASR facility for springflow protection, and the red bars represent SAWS forbearance less than the original forbearance amounts shown in the Interlocal Agreement.

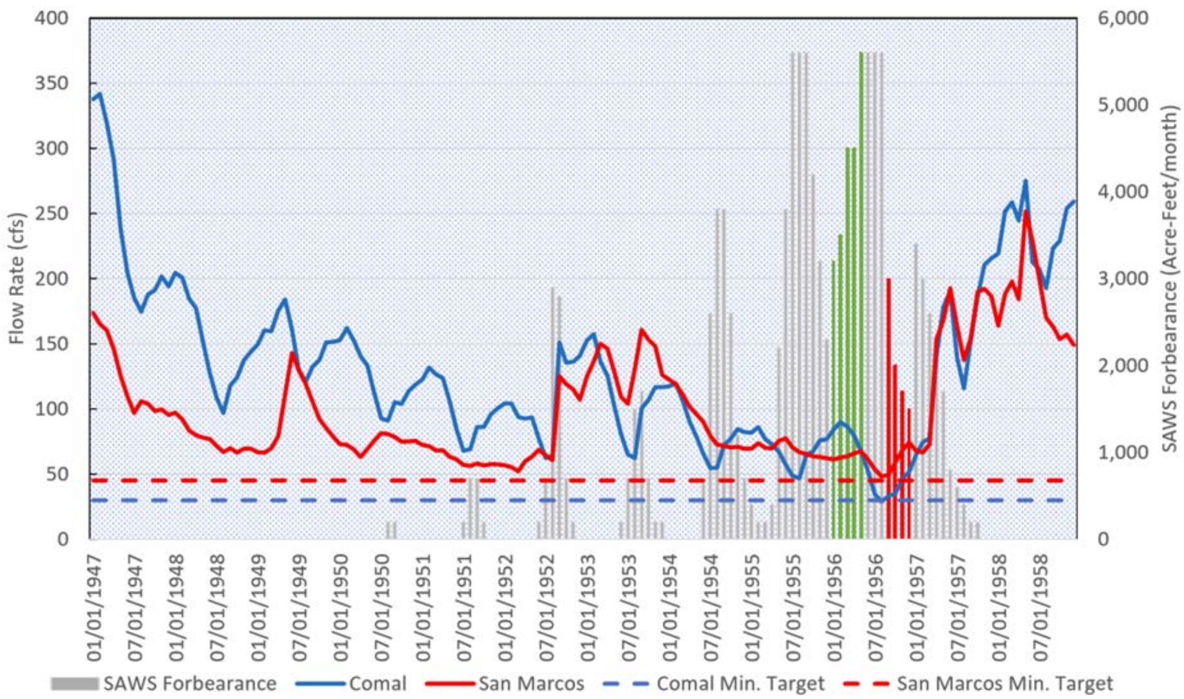


Figure 6-2 Comal and San Marcos Springs in Drought of Record

Effects of Pumpage on Aquifers

The long-term cumulative effects of recommended WMSs in the 2021 SCTRWP on the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers presented herein are based on model simulations performed by the TWDB in determining the MAG consistent with the Desired Future Condition (DFC) of the aquifers. For this analysis, it was assumed that the MAGs were fully implemented/produced, and therefore, the analysis was performed on the final simulations conducted by the TWDB for each aquifer to determine the MAGs. Drawdowns and hydrographs presented are all based on these model simulation results. In considering the effects of full MAG utilization for these three aquifers, the SCTRWPG recognizes that actual withdrawals may increase more slowly through time as local and export uses grow to full permitted or MAG levels.

Trinity Aquifer

The 2021 SCTRWP includes four recommended WMSs with source water from the Trinity Aquifer: Local Groundwater, New Braunfels Utilities (NBU) Trinity Well Field Expansion, Maxwell Water Supply Corporation (WSC) Trinity Well, and County Line Special Utility District (SUD) Trinity Well. These WMSs total approximately 9,000 acft/yr of new supply. Figure 6-3 illustrates hydrographs for representative Trinity Aquifer wells in Kendall and Bexar Counties for pumping consistent with full utilization of the MAG. Figure 6-4 illustrates maximum predicted drawdowns in the Trinity Aquifer associated with full utilization of the MAG from 2010 to 2060.

Carrizo-Wilcox Aquifer

The 2021 SCTRWP includes multiple recommended WMSs with source water from the Carrizo-Wilcox Aquifer. Table 6-1 lists these WMSs in the Carrizo-Wilcox Aquifer by county. Figure 6-5 illustrates hydrographs for representative Carrizo-Wilcox Aquifer wells in Gonzales and Wilson Counties for pumping consistent with full utilization of the MAG. Figure 6-6 and Figure 6-7 illustrate predicted drawdowns in the Carrizo and Upper Wilcox Aquifers associated with full utilization of the MAG for 2010 to 2070.

Gulf Coast Aquifer System

The 2021 SCTRWP includes two recommended WMSs with source water from the Gulf Coast Aquifer System: Local Groundwater and Victoria Groundwater-Surface Water Exchange. Figure 6-8 illustrates hydrographs for representative Gulf Coast Aquifer System wells in Goliad and Victoria Counties for pumping consistent with full utilization of the MAG. Figure 6-9, Figure 6-10, and Figure 6-11 illustrate predicted drawdowns in the Jasper, Evangeline, and Chicot Aquifers (the three main aquifer units within the Gulf Coast Aquifer System) associated with full utilization of the MAG for 2000 to 2070.

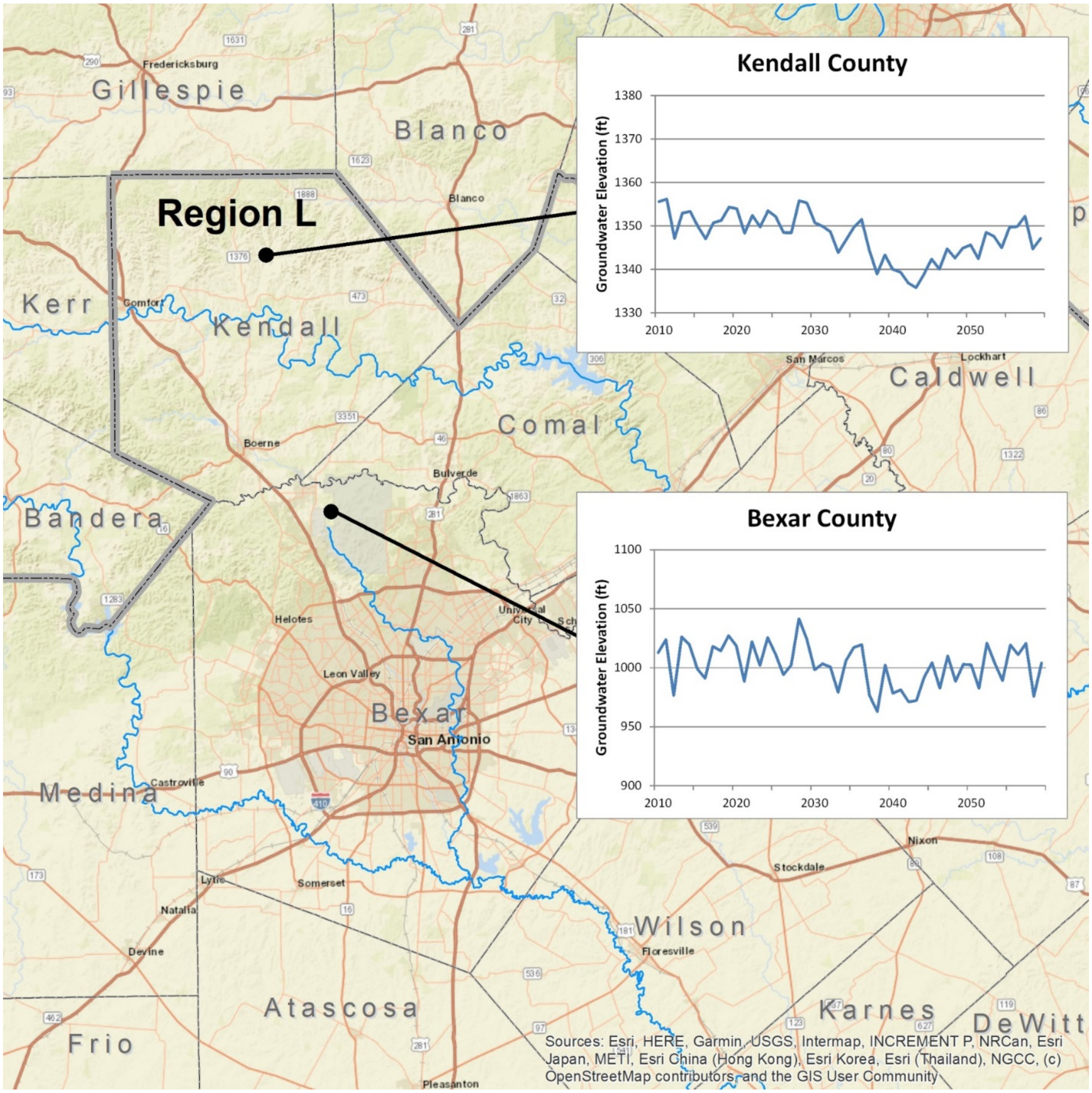


Figure 6-3 Trinity Aquifer Well Hydrographs

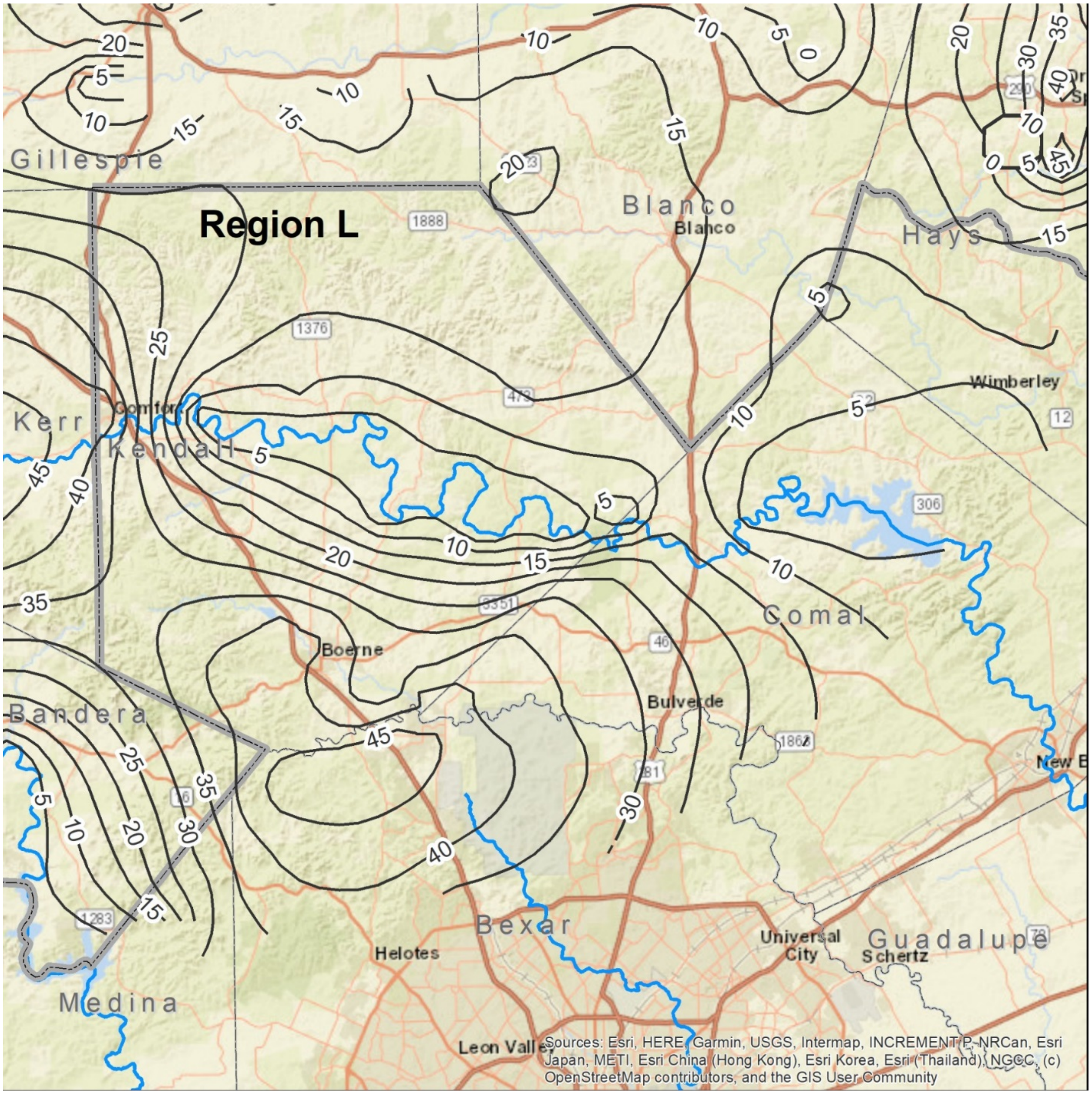


Figure 6-4 Trinity Aquifer Drawdown (feet) from 2010 to 2060

Table 6-1 Carrizo-Wilcox Water Management Strategies

WATER MANAGEMENT STRATEGY	SOURCE COUNTY/COUNTIES
Carrizo-Wilcox Conversions	Karnes
Local Groundwater	Various
SAWS Expanded Local Carrizo	Bexar
ARWA/GBRA Project (Phase 1)	Caldwell and Gonzales
ARWA Project (Phase 2)	Caldwell
SSLGC Brackish Wilcox	Gonzales
CRWA Wells Ranch - Phase 3	Guadalupe
SSLGC Expanded Carrizo	Guadalupe
CRWA Brackish Wilcox	Guadalupe and Wilson
CVLGC Carrizo	Wilson
SAWS Expanded Brackish Wilcox	Wilson
SS WSC Brackish Wilcox	Wilson

ARWA - Alliance Regional Water Authority; CRWA - Canyon Regional Water Authority; CVLGC - Cibolo Valley Local Government Corporation; GBRA - Guadalupe-Blanco River Authority; SSLGC - Schertz-Seguin Local Government Corporation

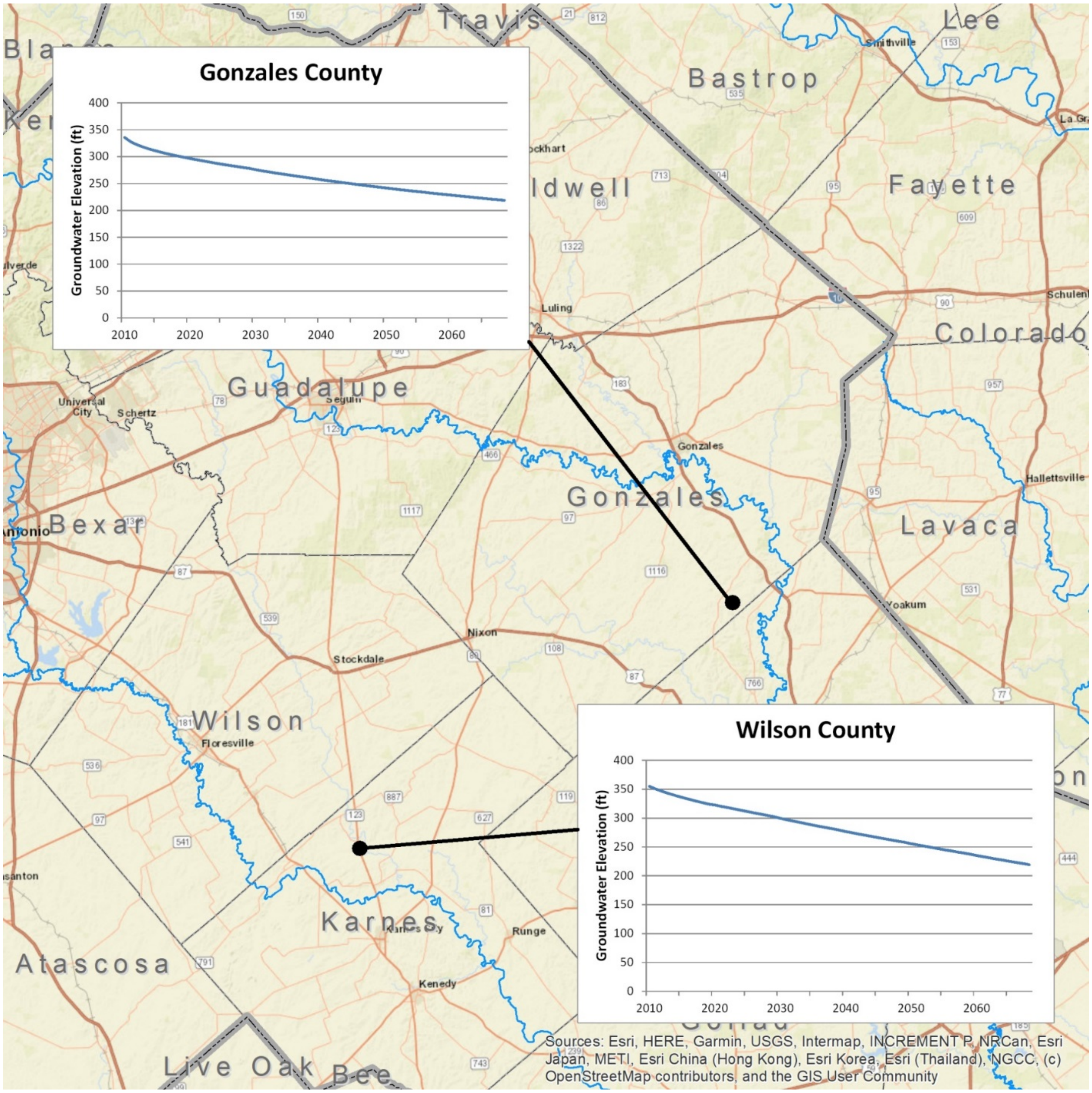


Figure 6-5 Carrizo-Wilcox Aquifer Well Hydrographs

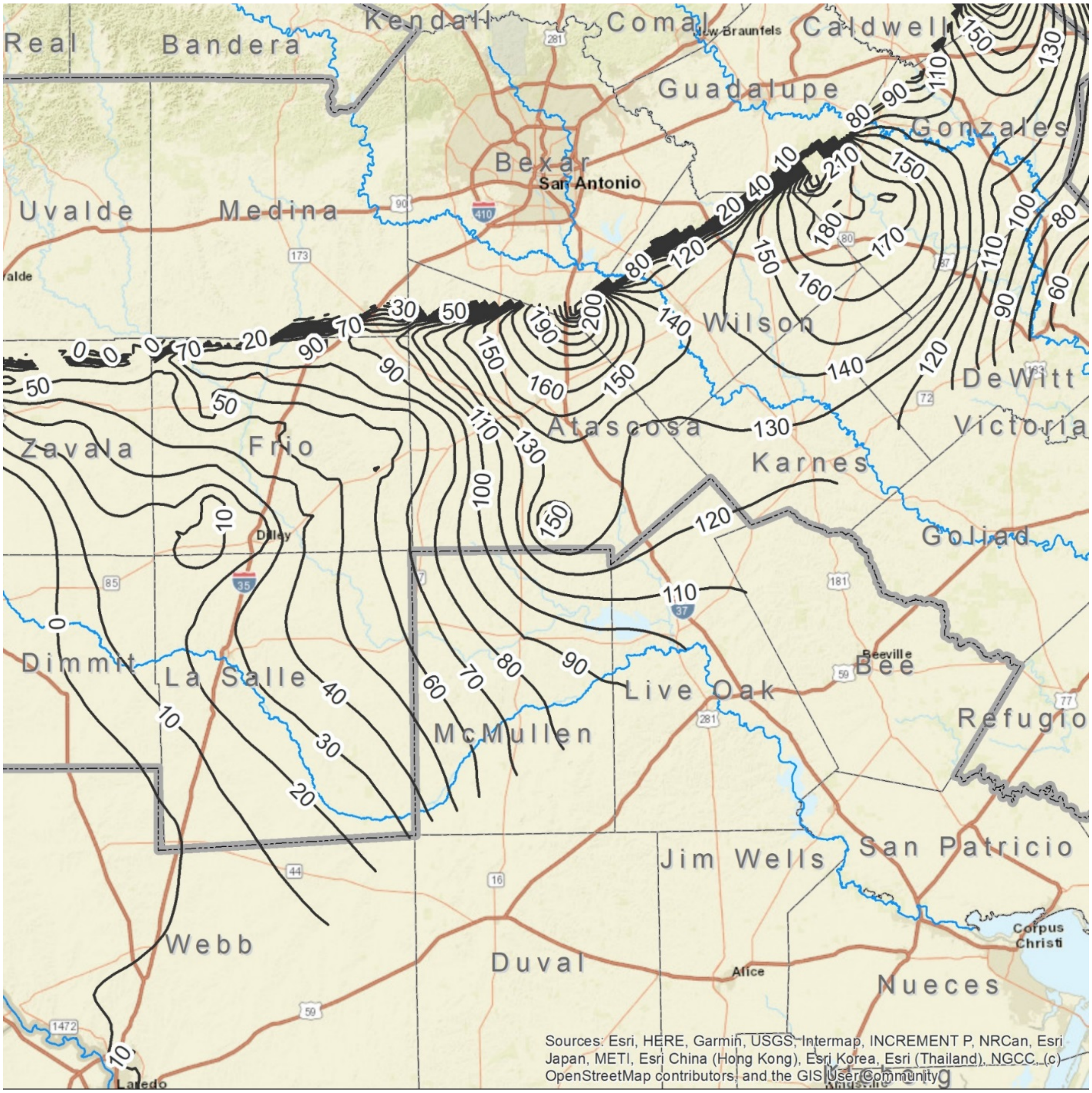


Figure 6-6 Carrizo Aquifer Drawdown (feet) from 2010 to 2070

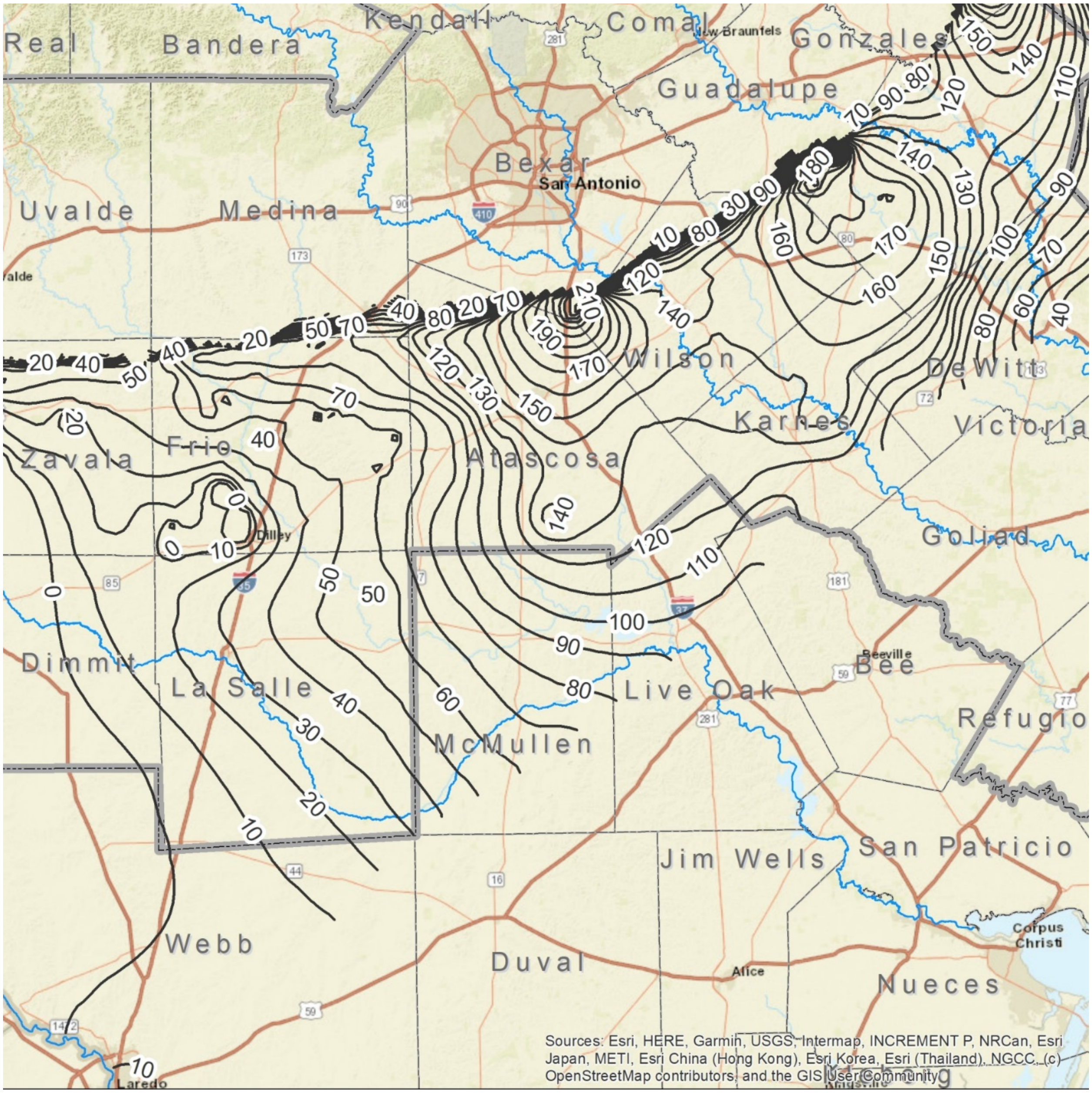


Figure 6-7 Upper Wilcox Aquifer Drawdown (feet) from 2010 to 2070

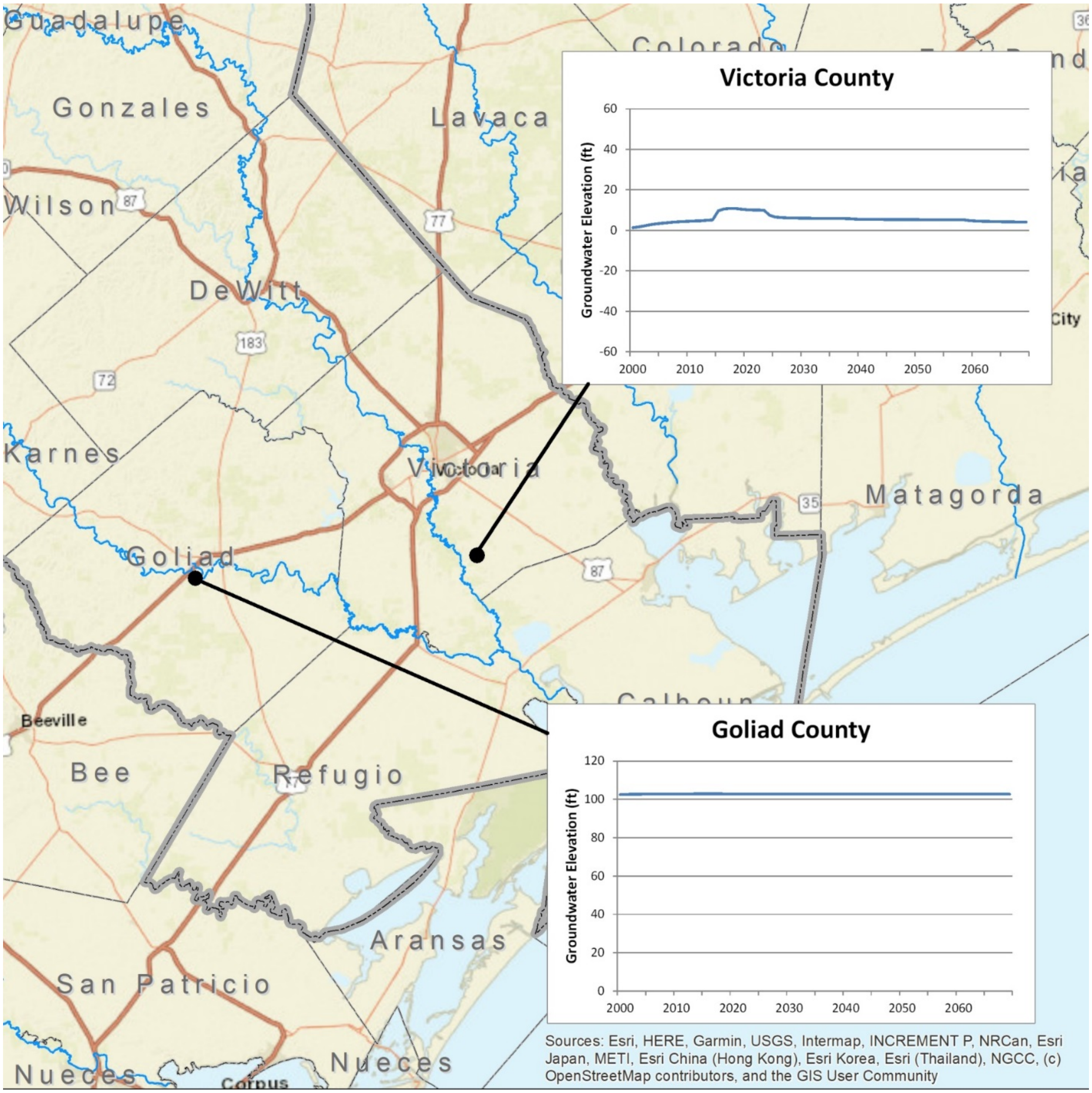


Figure 6-8 Gulf Coast Aquifer Well Hydrographs from 2000 to 2070

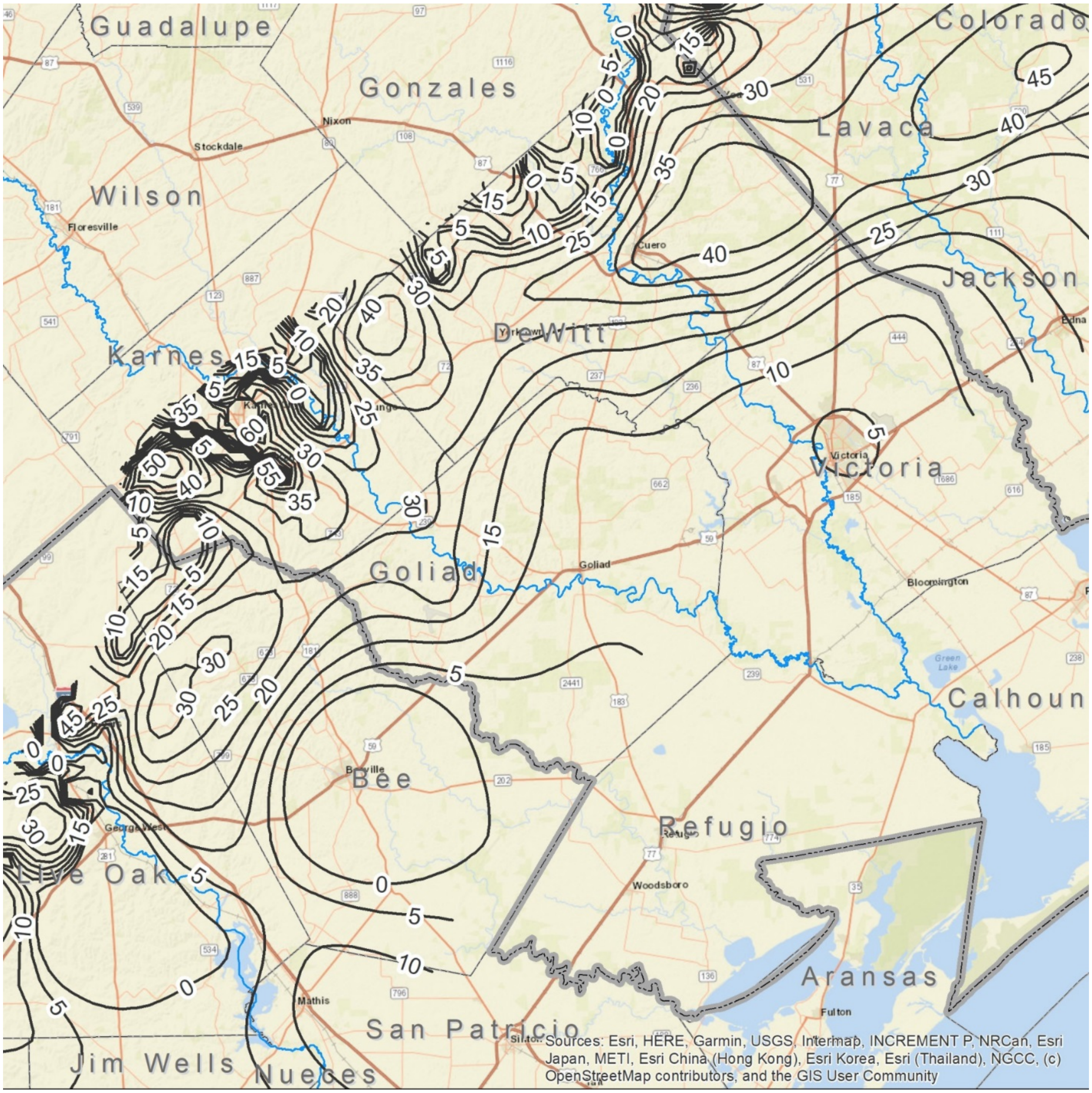


Figure 6-9 Jasper Aquifer Drawdown (feet) from 2000 to 2070

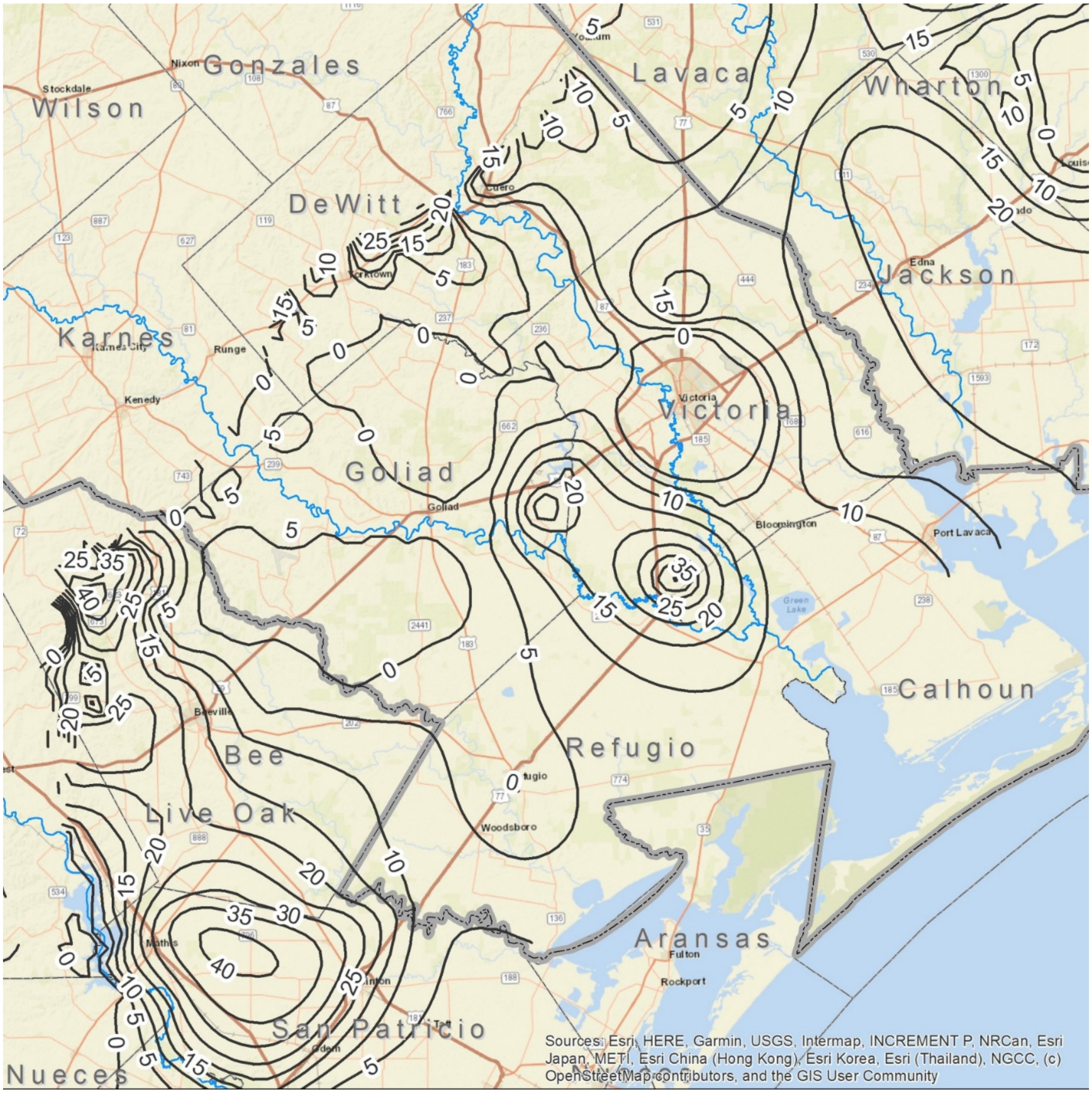


Figure 6-10 Evangeline Aquifer Drawdown (feet) from 2000 to 2070

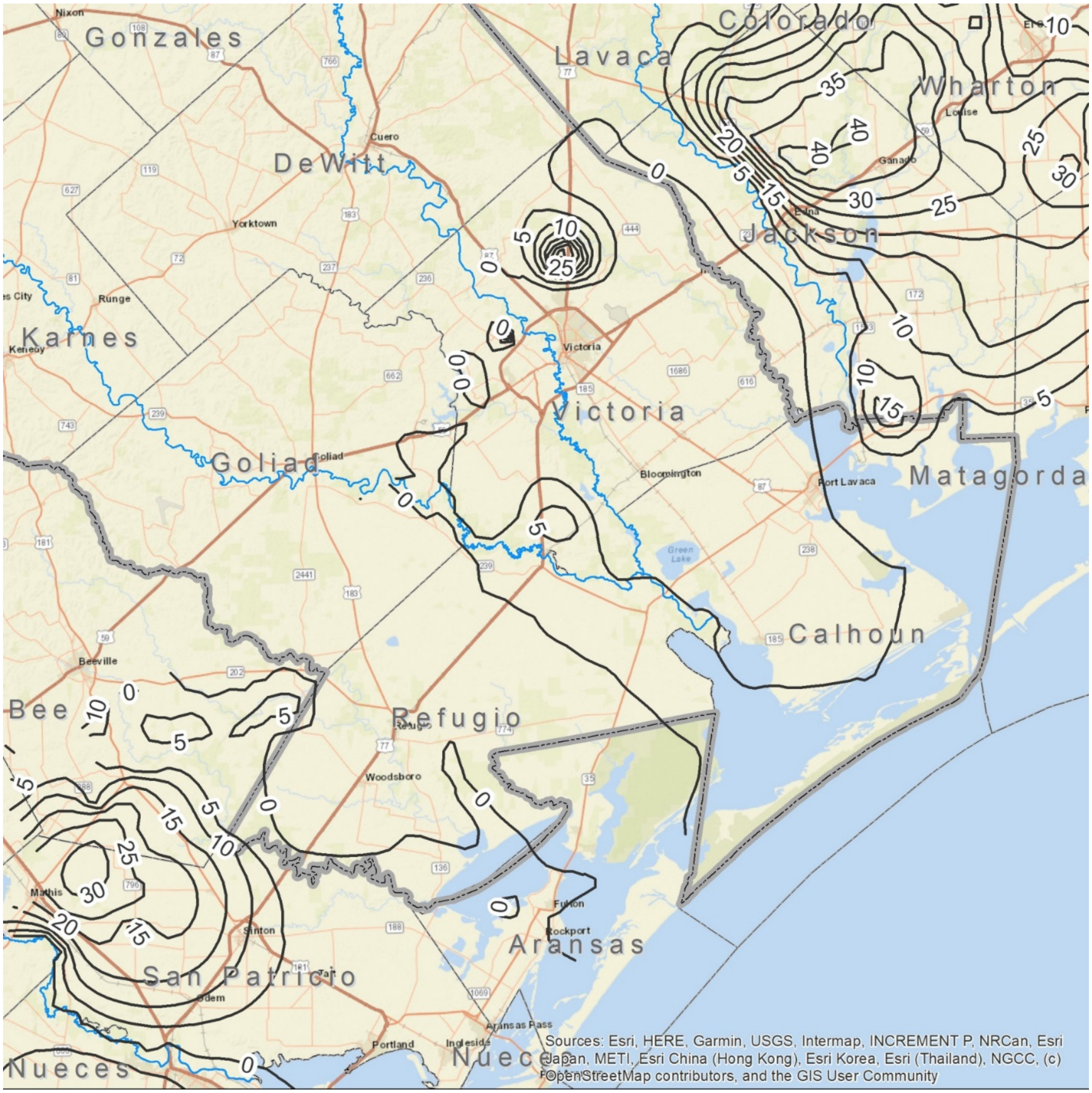


Figure 6-11 Chicot Aquifer Drawdown (feet) from 2000 to 2070

Effects of Aquifer Pumpage on Streamflow

In the 2021 SCTRWP, increases in groundwater pumpage are expected to outpace long-term recharge rates, which inevitably lead to aquifer-wide drawdowns. In many ways, GCDs have accounted and planned for this through the setting of DFCs, which translate to the MAG values used in developing the 2021 SCTRWP. With declining groundwater levels, surface water-groundwater interactions (or fluxes) change over time. For example, if an aquifer currently contributes flux (or base flow) to a stream where the aquifer outcrops and long-term groundwater production associated with a recommended WMS results in regional drawdown and reduced flux contribution to the stream, then streamflows will be reduced. These streamflow reductions would be expected to occur gradually over time and manifest at diffuse locations within the stream segment traversing the aquifer outcrop.

Groundwater Availability Models (GAMs) consistent with the MAG pumpage for the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers were used to extract the effects of long-term MAG pumpage on surface water-groundwater fluxes and estimate maximum expected streamflow changes. Table 6-2 summarizes the maximum predicted effects of MAG levels of pumpage, consistent with recommended WMSs in the 2021 SCTRWP, on long-term surface water-groundwater fluxes and streamflow during the planning period. These streamflow reductions associated with MAG levels of pumpage have been included in the Guadalupe-San Antonio Water Availability Model for simulation of associated effects on instream flows at selected locations and freshwater inflows to the Guadalupe Estuary. Streamflow reductions shown in Table 6-2 would be mitigated somewhat by the positive effects of recommended ASR projects by GBRA (Carrizo Aquifer, San Marcos River), New Braunfels (Trinity Aquifer, Guadalupe River), and Victoria (Gulf Coast Aquifer, Guadalupe River).

Table 6-2 SCTRWP Surface Water-Groundwater Flux Changes

AQUIFER	WATERSHED	BASELINE FLUX (CFS)	FLUX WITH PLAN (CFS)	STREAMFLOW CHANGE (CFS)
Trinity Aquifer	Cibolo Creek	-5.2	-4.5	-0.7
Trinity Aquifer	Guadalupe River	-53.8	-48.1	-5.6
Trinity Aquifer	Blanco River	-32.5	-30.3	-2.2
Carrizo-Wilcox Aquifer	San Antonio River	19.1	30.1	-11.0
Carrizo-Wilcox Aquifer	Cibolo Creek	-1.0	4.5	-5.5
Carrizo-Wilcox Aquifer	Guadalupe River	0.6	15.2	-14.6
Carrizo-Wilcox Aquifer	San Marcos River	-9.7	13.7	-23.4
Gulf Coast Aquifer	San Antonio River	-19.6	-14.0	-5.6
Gulf Coast Aquifer	Guadalupe River	-3.4	15.6	-19.0

cfs = cubic foot per second.

Note: Negative values indicate water is flowing FROM the aquifer TO the stream (i.e., a gaining stream). Positive values indicate water is flowing TO the aquifer FROM the stream (i.e., a losing stream). Streamflow Change is the difference between the Baseline Flux and the Flux with full implementation of the 2021 SCTRWP.

6.1.1.2 Surface Water

Potential cumulative effects of implementing the 2021 SCTRWP on instream flows and freshwater inflows to bays and estuaries have been assessed for seven locations in the Guadalupe-San Antonio River Basin as shown on Figure 6-12. Cumulative effects for stream and estuary locations in the Nueces River Basin have not been assessed, as there are no recommended WMSs in the 2021 SCTRWP expected to significantly affect flows in the Nueces River Basin or freshwater inflows to the Nueces Estuary. The "Baseline (Year 2070)" bars and flow curve includes full implementation of the EAHCP, full utilization of existing water rights, and no return flows from treated wastewater effluent discharges. The "With Regional Water Plan (Year 2070)" bars and flow curve are representative of the simulated cumulative effects of the 2021 SCTRWP on flows, with inclusion of all recommended WMSs. The "Environmental Flow Standard" flow curve shows the applicable environmental flow standards, in accordance with 30 TAC Section 298. The cumulative effects of implementation of the 2021 SCTRWP at selected locations in the Guadalupe – San Antonio River Basin are summarized on Figure 6-13 through Figure 6-21.

Streamflows in the Guadalupe River above the Comal River at New Braunfels (Figure 6-13) are not expected to change significantly during the planning period. The figure shows baseline flows crossing below the environmental flow standard flow frequency curve. This could be because of existing senior surface water rights that do not have to abide by environmental flow standards. Impacts to environmental flows could also be a result of the pulse flow translation calculation, since there is no established environmental flow standard at the Guadalupe River above Comal River at New Braunfels. The pulse flow translation calculation used a point downstream (Guadalupe River at Gonzales). The environmental flows on Figure 6-13 are shown for informational purposes only.

For the San Marcos River at Luling (Figure 6-14), streamflows are expected to show little to no change with implementation of the 2021 SCTRWP. The environmental flows on Figure 6-14 are shown for informational purposes only.

Guadalupe River at Victoria (Figure 6-15) streamflows with full implementation of the 2021 SCTRWP in the 2070 are expected to decrease compared to the Baseline (Year 2070) by a relatively uniform amount between the 15th and 85th percentiles. This modeled decrease may be due to the recommended GBRA Mid-Basin Water Supply Project and decreases in surface water-groundwater flux associated with several groundwater strategies in the Trinity and Carrizo-Wilcox Aquifers. Streamflows in the lower portion of the flow regime remain largely unchanged with implementation of the 2021 SCTRWP. The environmental flows on Figure 6-16 are shown for informational purposes only.

Streamflow comparisons indicate that streamflows with full implementation of the 2021 SCTRWP in 2070 at the San Antonio River at Falls City (Figure 6-16) and Goliad (Figure 6-17) are expected to remain generally unchanged for the highest 20 percent of streamflows and will decrease during low flow periods. WMSs affecting flows in the San Antonio River at Goliad include the CRWA Siesta Project. The decreases may also be due to anticipated decreases in the surface water-groundwater flux associated with several groundwater strategies in the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers. The environmental flows on Figure 6-16 and Figure 6-17 are shown for informational purposes only.

Streamflows/inflows for the Guadalupe River at the GBRA Diversion Dam and Saltwater Barrier near Tivoli (Figure 6-18) and the Guadalupe Estuary (Figure 6-19) would generally decrease with full implementation of all recommended WMSs in the 2021 SCTRWP. There are no environmental flow standards shown on Figure 6-18 because there are no environmental flow standards established for the control point near Tivoli, and there are no environmental flow standards downstream of Tivoli that could be used to translate the flow requirements upstream. The Guadalupe Estuary (San Antonio Bay and Estuary System) seasonal freshwater inflow standards for the spring and summer seasons are plotted on Figure 6-20 and Figure 6-21, respectively. Summaries of the anticipated modeled permitting frequency changes for the various inflow regimes are shown in Table 6-3 and Table 6-4 for the spring and summer seasons, respectively. The modeled permitting frequencies for the inflow flow regimes are all within the ranges specified in 30 TAC Section 298.380(a). Figure 6-20 and Figure 6-21 are shown for additional informational purposes only.

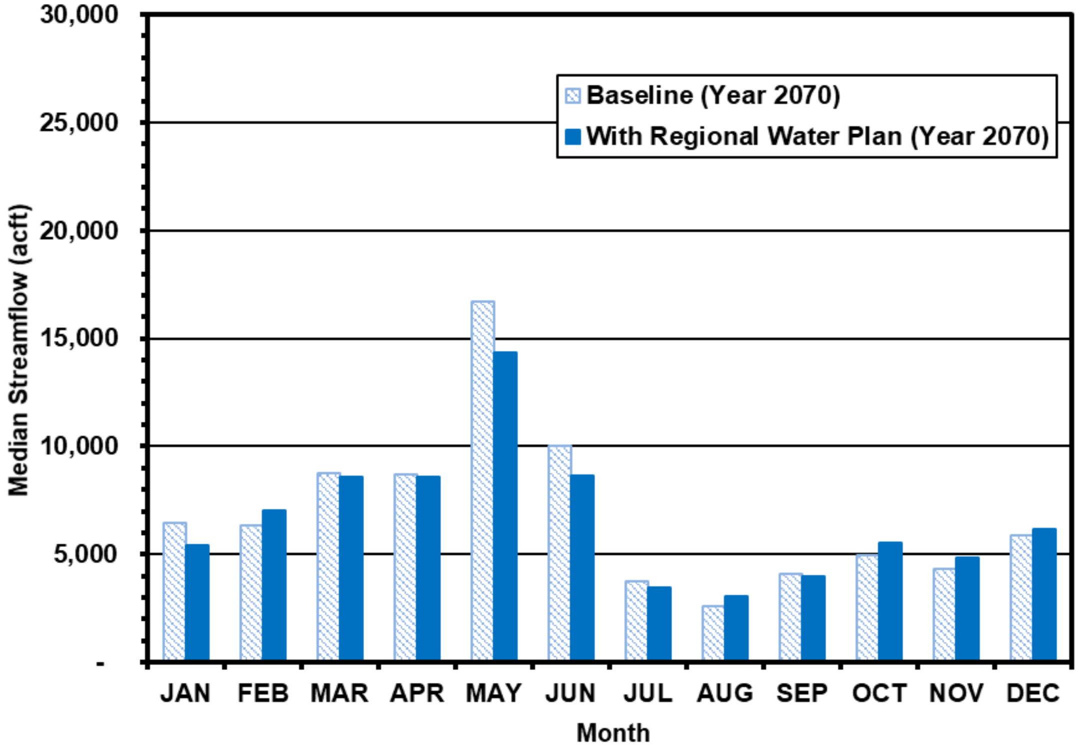
As recommended by the SCTRWPG in the 2011 and 2016 SCTRWPs, the legislature designated five Region L river and stream segments in 2015 as having unique ecological value, as follows:

1. The Nueces River from the northern boundary of Region L (downstream) to United States Geological Survey (USGS) gauge #08190000 (at Laguna);
2. The Frio River from the northern boundary of Region L (downstream) to USGS gauge #08195000 (at Concan);
3. The Sabinal River from the northern boundary of Region L (downstream) to its intersection with State Highway 187 (located approximately 2.7 miles upstream of USGS gauge #08198000 near Sabinal);
4. The San Marcos River extending from a point 0.4 miles upstream from its intersection with State Highway Loop 82 (in San Marcos) to its intersection with Interstate Highway 35; and
5. The Comal River from its intersection with East Klingemann Street in New Braunfels to its confluence with the Guadalupe River.

Implementation of the 2021 SCTRWP is not expected to have an effect on the Nueces, Frio, and Sabinal River segments designated as having unique ecological value, as no WMSs are recommended within or upstream of these segments. As shown on Figure 6-2, implementation of the 2021 SCTRWP, including full implementation of the EAHCP, is expected to increase long-term average spring discharges, which should serve to preserve or enhance the unique ecological value of the designated Comal River and San Marcos River segments.

1. Guadalupe River above Comal River @ New Braunfels
2. San Marcos River @ Luling
3. Guadalupe River @ Victoria
4. San Antonio River near Falls City
5. San Antonio River @ Goliad
6. Guadalupe River @ Saltwater Barrier near Tivoli
7. Guadalupe Estuary

Figure 6-12 Flow Assessment Locations



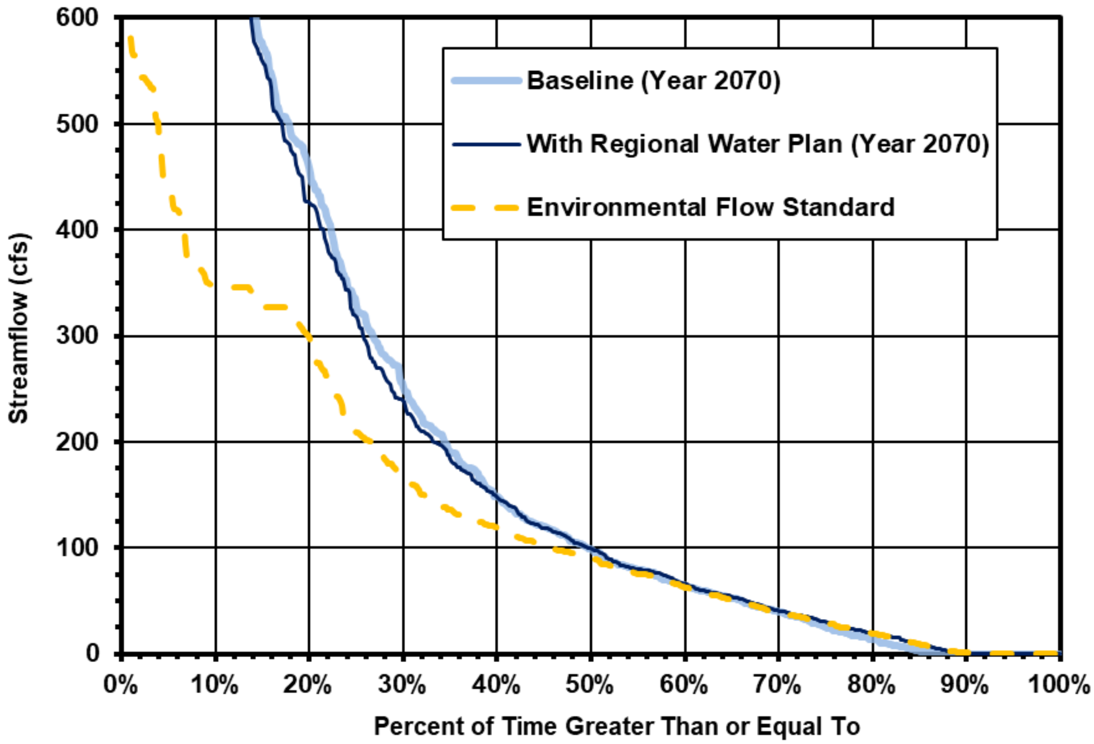


Figure 6-13 Guadalupe River Above Comal River at New Braunfels

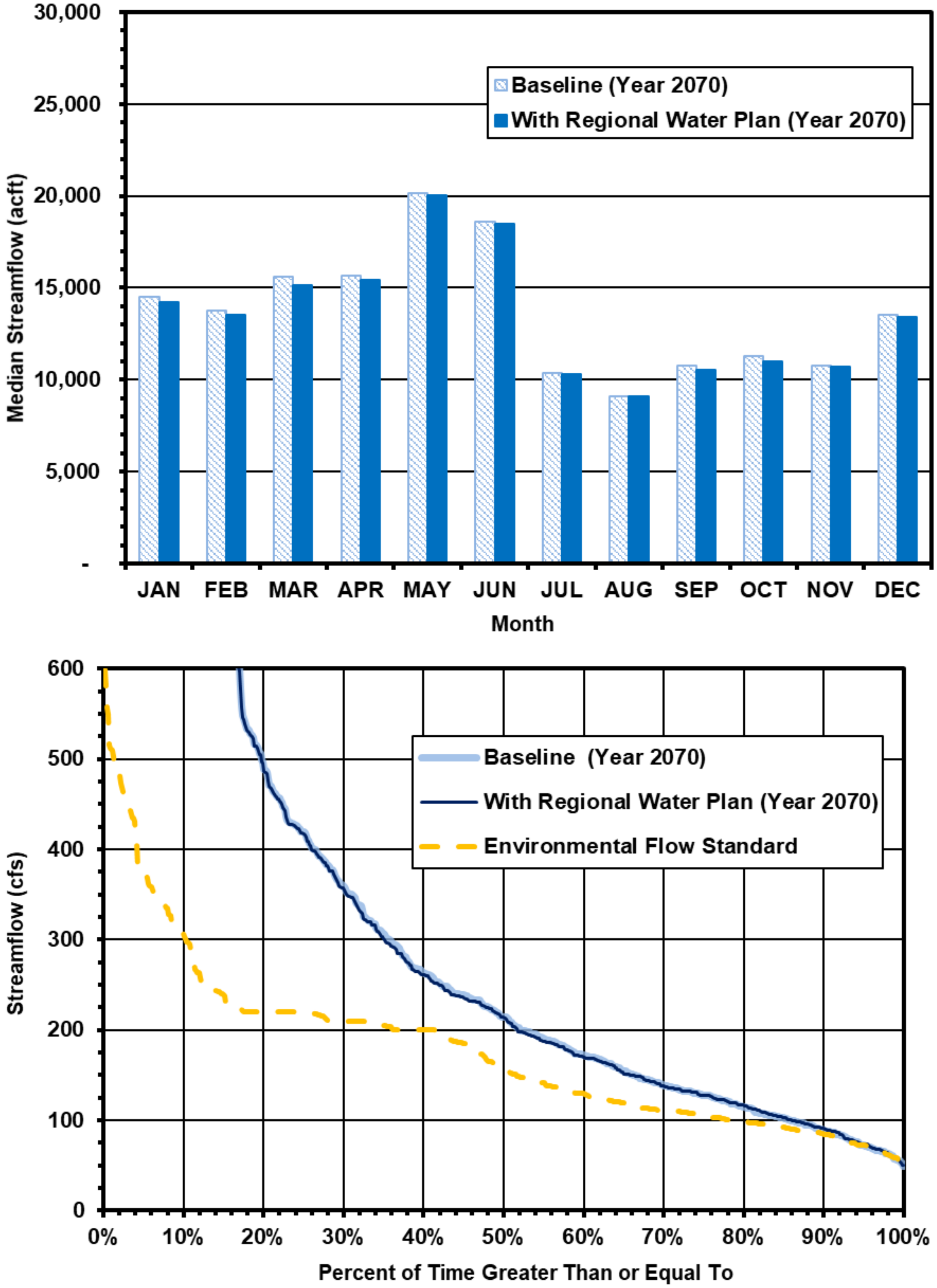
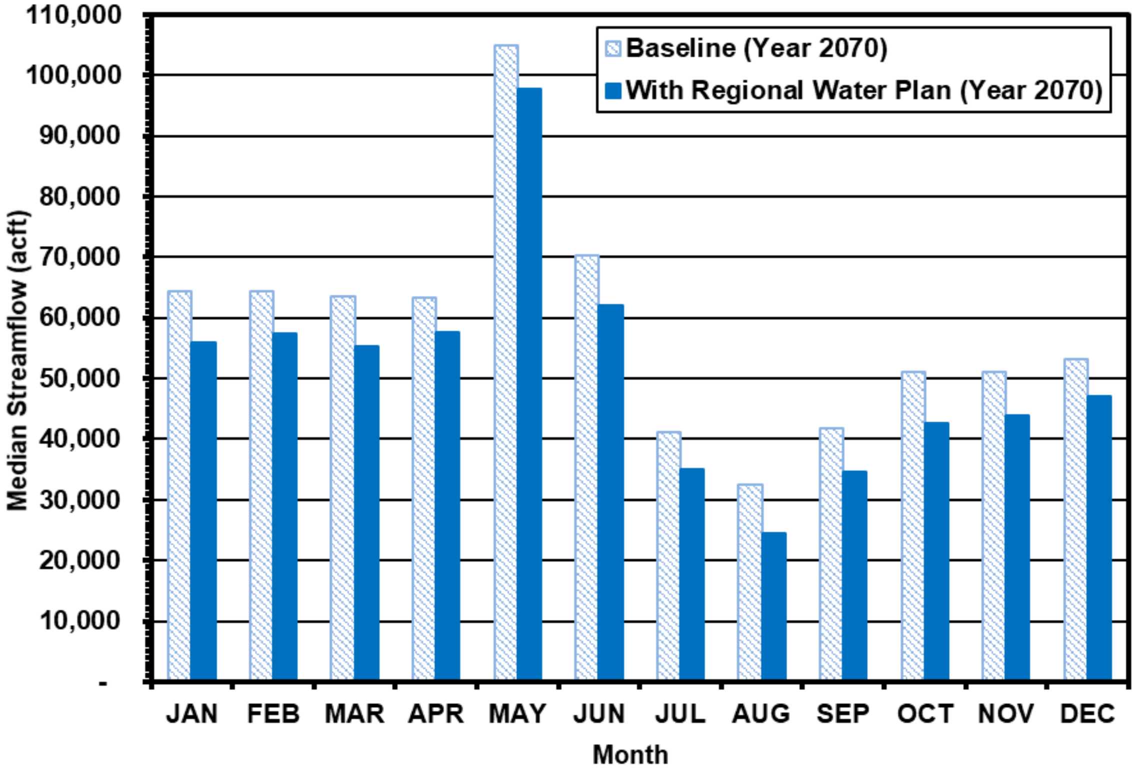


Figure 6-14 San Marcos River at Luling



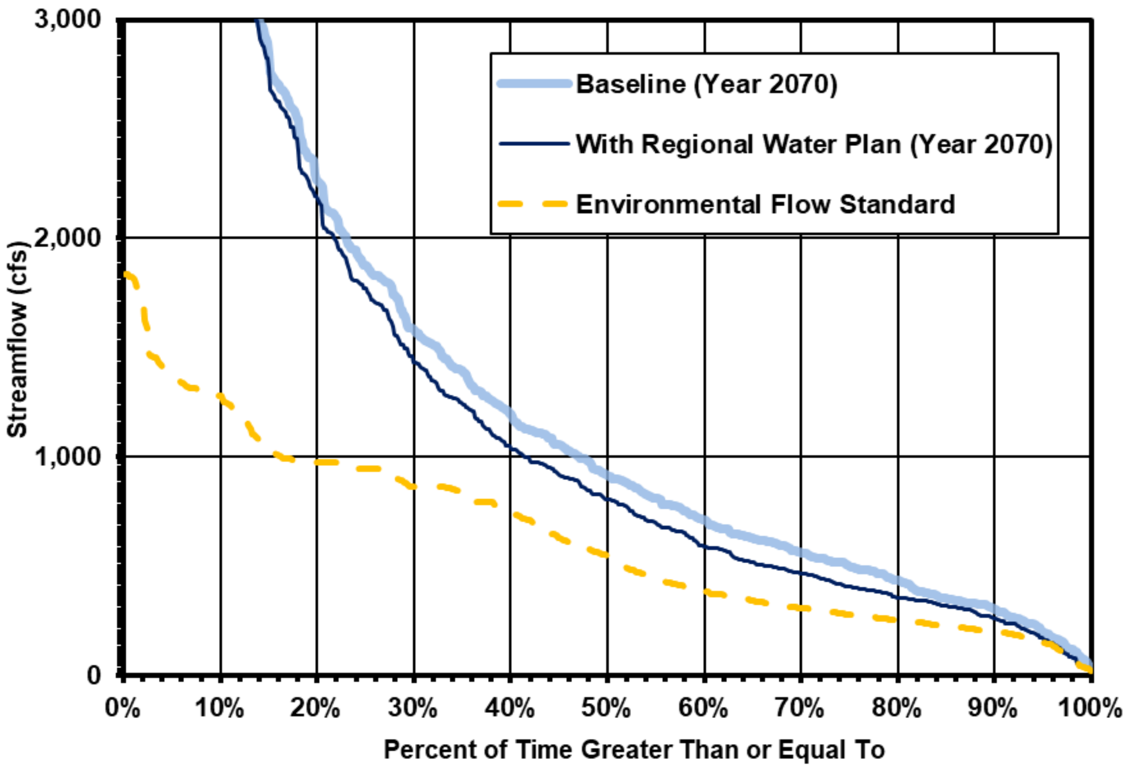
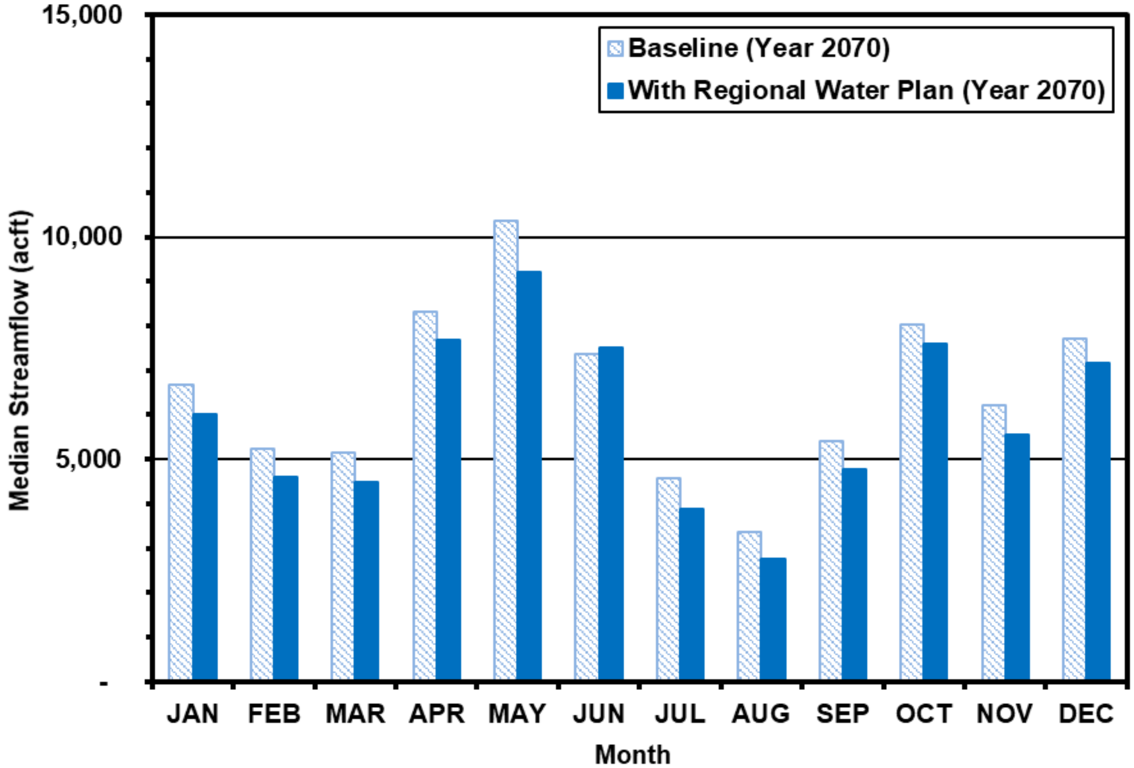


Figure 6-15 Guadalupe River at Victoria



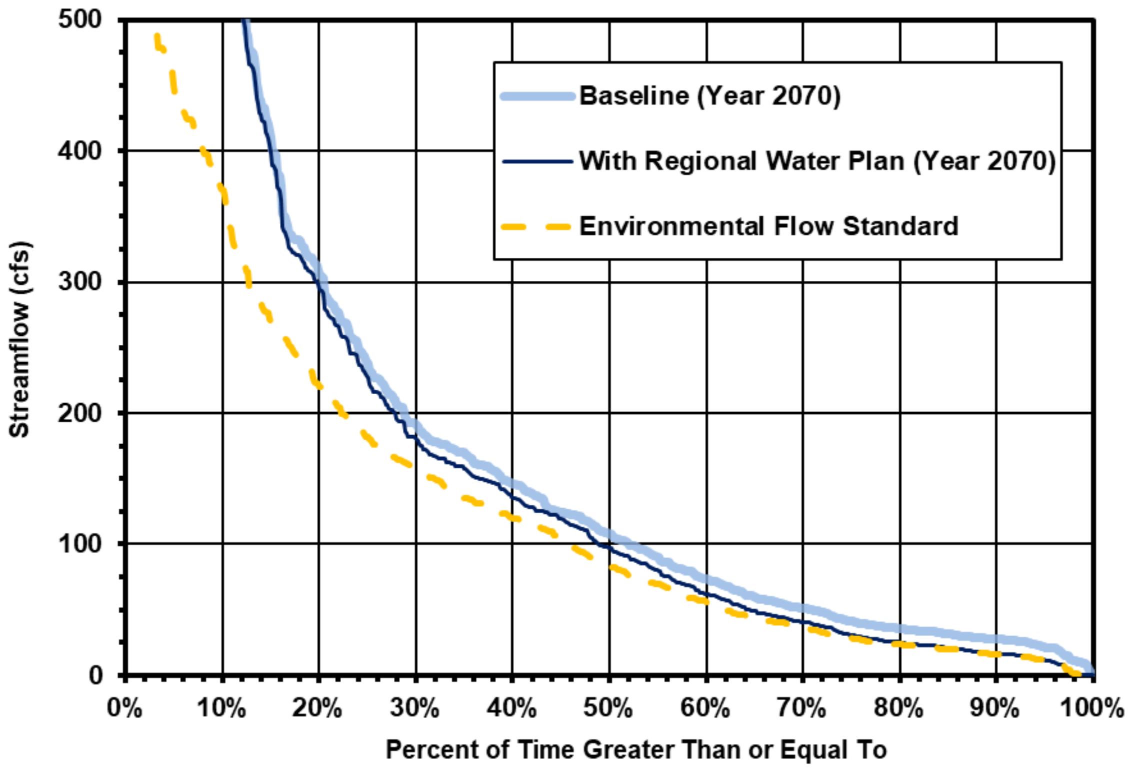


Figure 6-16 San Antonio River Near Falls City

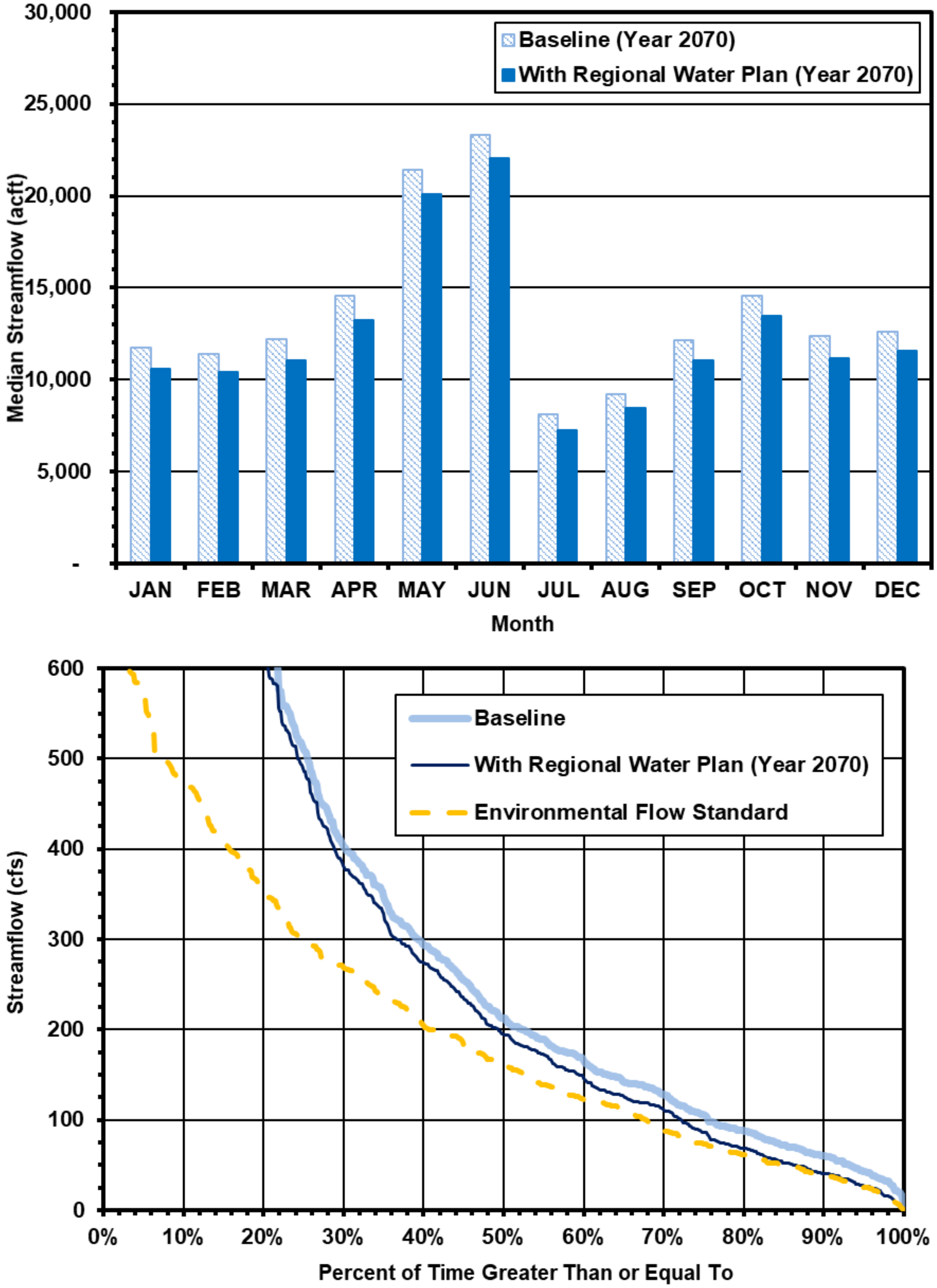


Figure 6-17 San Antonio River at Goliad

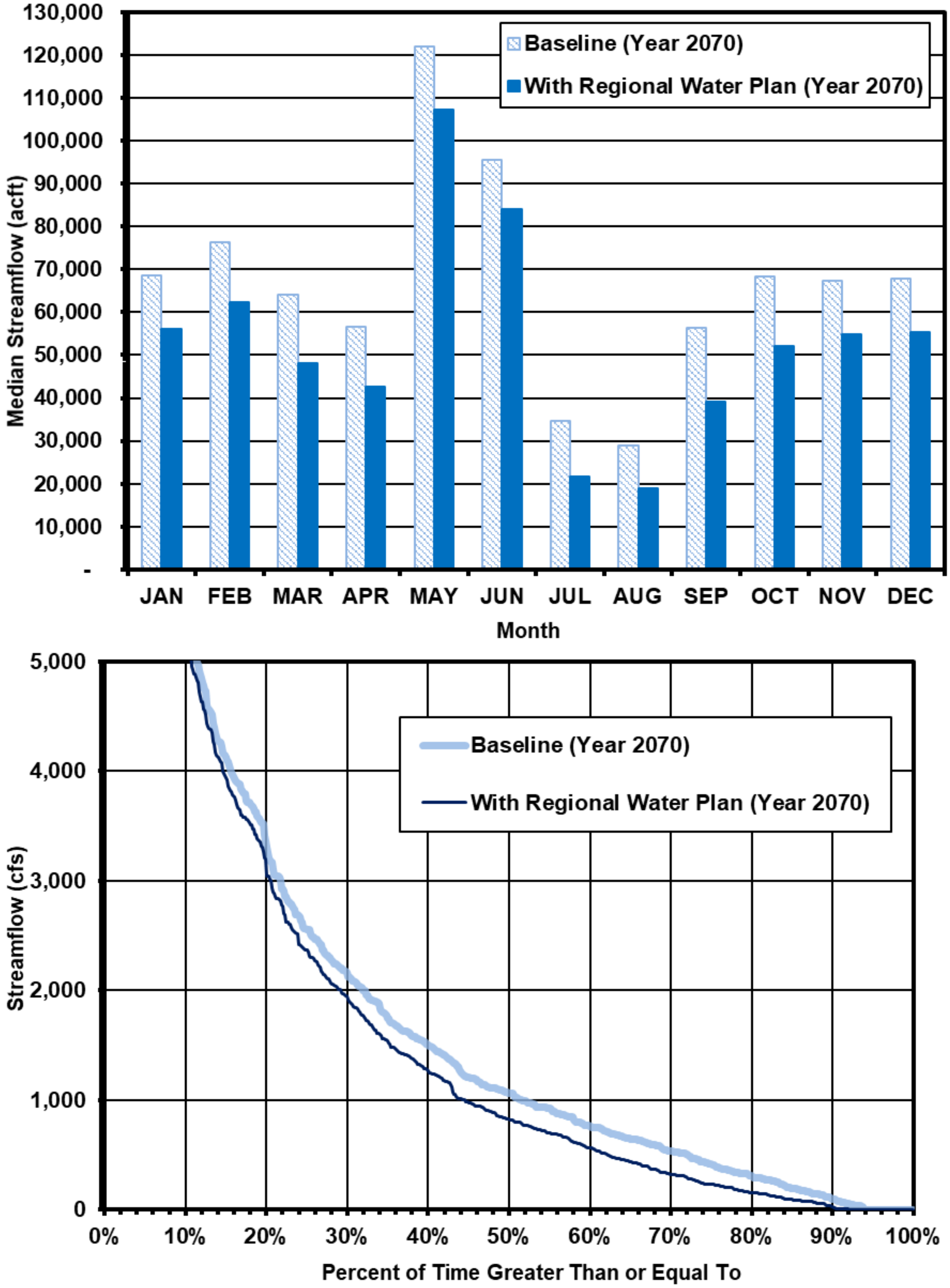
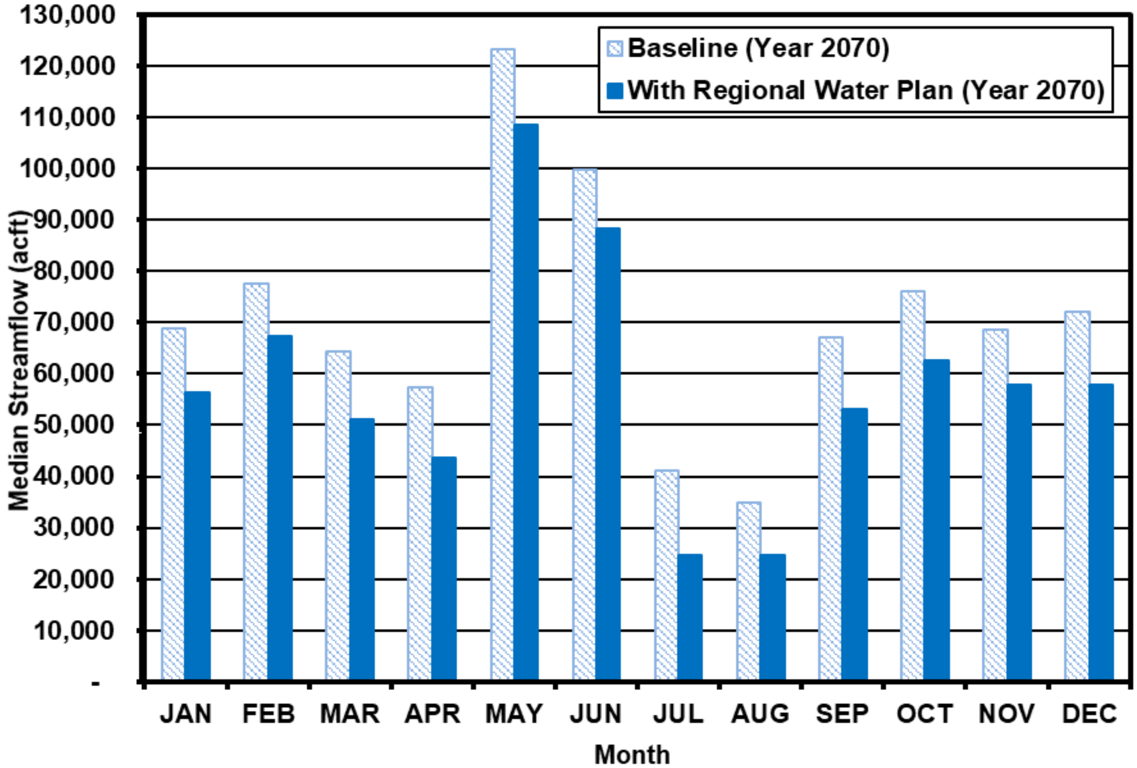


Figure 6-18 Guadalupe River at Diversion Dam and Saltwater Barrier Near Tivoli



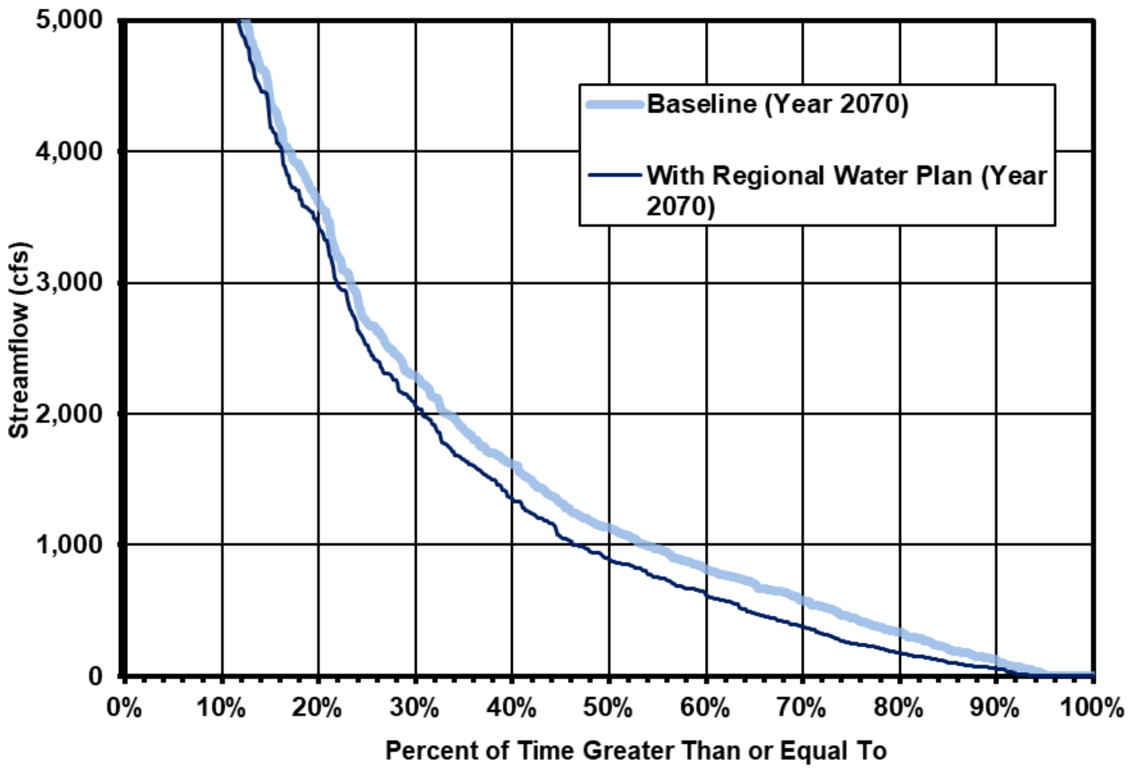


Figure 6-19 Guadalupe Estuary

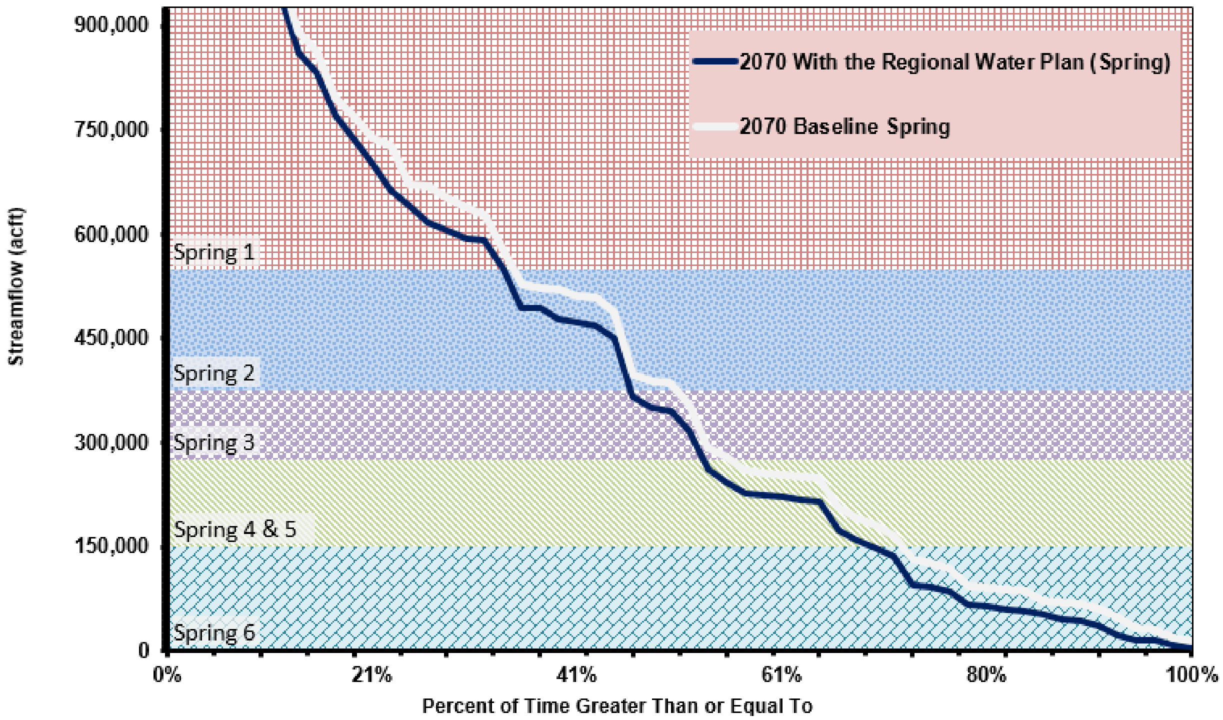


Figure 6-20 Guadalupe Estuary - Spring Season

Table 6-3 Guadalupe Estuary – Spring Season Environmental Flow Standard Permitting Frequencies

INFLOW REGIME	MODELED PERMITTING FREQUENCY CHANGE	GUADALUPE BAY SYSTEM FRESHWATER INFLOW STANDARD FOR SPRING
Spring 1	Δ = -0.4%	shall not be decreased by more than 5%
Spring 2	Δ = -3.3%	shall not be decreased by more than 5%
Spring 2 and 3	Δ = -1.5%	shall not be decreased by more than 5%
Spring 4 and 5	16.2%	shall not be increased to more than 67% of the total years
Spring 6	Δ = 2.9%	shall not be increased by more than 8%

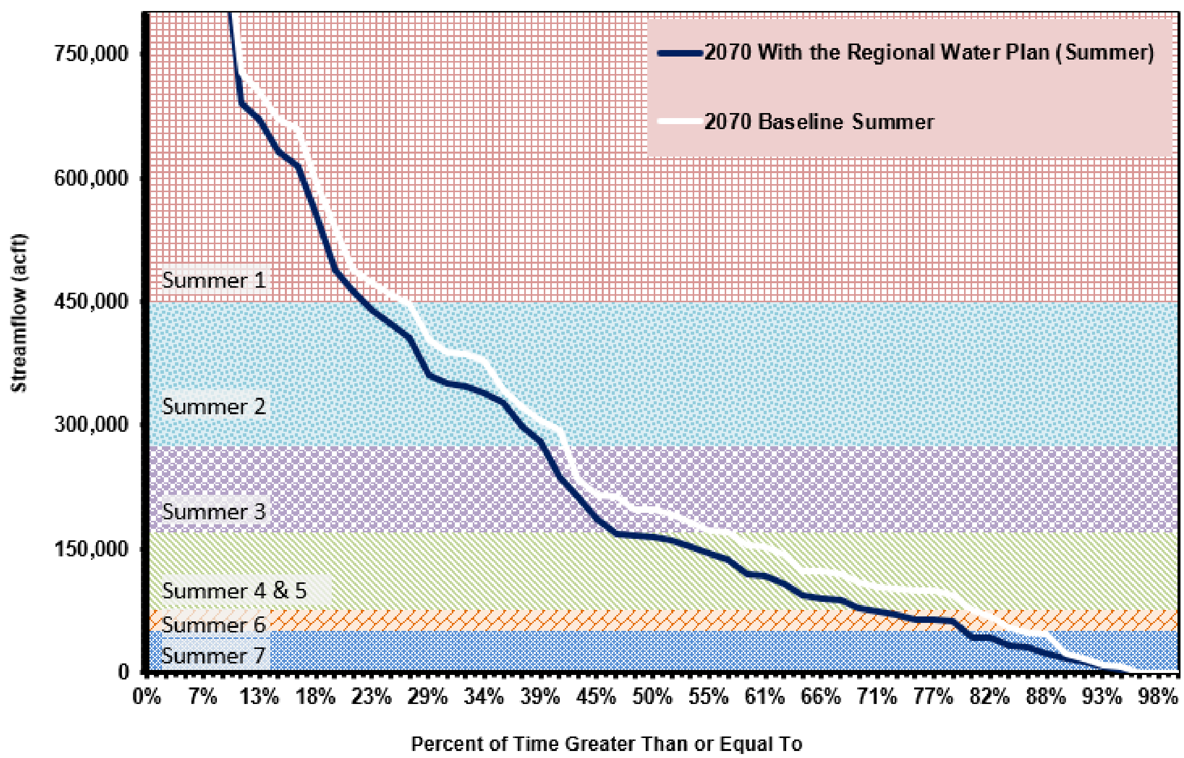


Figure 6-21 Guadalupe Estuary - Summer Season

Table 6-4 Guadalupe Estuary - Summer Season Environmental Flow Standard Permitting Frequencies

INFLOW REGIME	MODELED PERMITTING FREQUENCY CHANGE	GUADALUPE BAY SYSTEM FRESHWATER INFLOW STANDARD FOR SUMMER
Summer 1	Δ = -3.7	shall not be decreased by more than 5%
Summer 2	Δ = 1.8%	shall not be decreased by more than 5%
Summer 1 and 2	Δ = -1.9%	shall not be decreased by more than 5%
Summer 4 and 5	1.2%	shall not be increased to more than 10%
Summer 7	Δ = 5.6%	shall not be increased by more than 8%

6.1.1.3 Impacts of Water Management Strategies on Key Water Quality Parameters

In accordance with 31 TAC Section 357.40(b)(5), the SCTRWPG must consider the major impacts of recommended WMSs on key parameters of water quality. Furthermore, the SCTRWP must include a comparison of conditions with the recommended WMSs to current conditions using best available data (31 TAC Section 357.34(d)(8).

The SCTRWPG has selected the following water quality parameters to be considered in a qualitative water quality analysis:

- Chlorides;
- Sulfates;
- Total Dissolved Solids (TDS);
- Dissolved Oxygen (DO);
- pH Range;
- Indicator Bacteria;
- Temperature; and
- Nitrates.

Table 6-5 contains median values for these eight water quality parameters for each of the water supply sources of the WMSs recommended in the 2021 SCTRWP. Values are shown in milligrams per liter (mg/L), standard units (S.U.), number per 100 milliliters (#/100 mL), degrees Celsius (°C). In addition, the SCTRWPG has considered the impacts of implementation of the 2021 SCTRWP on recreation, aquatic life, domestic water supply, and agriculture.

Table 6-5 Median Values of Key Parameters of Water Quality

WATER SOURCE	CHLORIDES (MG/L)	SULFATES (MG/L)	TOTAL DISSOLVED SOLIDS (MG/L)	DISSOLVED OXYGEN (MG/L)	PH (S.U.)	INDICATOR BACTERIA (#/100 ML)	TEMPERATURE (°C)	NITRATES (MG/L)
Edwards Groundwater	20	18	321	6.2	7.4	0	21	0.9
Gonzales-Carrizo Aquifer	23	39	248	0.0	7.5	0	35	<0.1
Bexar-Carrizo Aquifer	37	27	190	0.0	6.1	0	26	<0.1
Bastrop/Lee-Simsboro Aquifer	23	54	121	0.0	7.3	0	24	<0.1
Bexar-Wilcox Aquifer	145	258	1200	1.0	7.6	0	21	0.6
Trinity Aquifer	23	37	294	1.0	7.5	0	23	1.0
Gulf Coast Aquifer	253	90	877	2.0	7.8	0	29	0.5
San Antonio River	120	110	610	7.9	7.9	194	23	3.9
Cibolo Creek	71	47	530	6.2	7.6	91	25	5.4
Guadalupe River	31	36	380	7.6	7.9	100	23	1.1

WATER SOURCE	CHLORIDES (MG/L)	SULFATES (MG/L)	TOTAL DISSOLVED SOLIDS (MG/L)	DISSOLVED OXYGEN (MG/L)	PH (S.U.)	INDICATOR BACTERIA (#/100 ML)	TEMPERATURE (°C)	NITRATES (MG/L)
Lavaca River	40	16	490	7.9	8.1	160	23	0.2

Potential water quality impacts considered herein are associated with source and receiving water characteristics, treatment requirements, blending compatibility, and treated effluent quality and quantity. For the purposes of this general assessment, it is assumed that wastewater treatment standards and plant performance will continue to improve over time. Other applicable assumptions are consistent with those described in Chapter 6.1 regarding cumulative effects of RWP implementation.

Table 6-6 identifies water quality parameters that are potentially affected by types of WMSs. As it is understood that any future wastewater discharges, potable water deliveries, and/or recycled water use will be in compliance with Texas Commission on Environmental Quality (TCEQ) requirements, water quality impact scores presented herein may be viewed as relative indicators of concern or risk among water quality parameters potentially affecting or affected by a project.

Table 6-6 Impacts of Recommended Water Management Strategies on Key Parameters of Water Quality

WATER QUALITY PARAMETER	WATER MANAGEMENT STRATEGY TYPE							
	EXPANDED SURFACE WATER	NEW RESERVOIRS	GROUNDWATER-SURFACE WATER EXCHANGE	EXPANDED GROUNDWATER	ASR	INDIRECT REUSE	VOLUNTARY REDISTRIBUTION	WATER CONSERVATION
TDS	●	●	●	●	●	●	●	●
DO	●	●		●		●	●	●
pH	●	●	●	●		●	●	
Bacteria	●	●		●		●	●	
Temperature	●	●	●	●		●	●	
Nitrates	●	●		●		●	●	●

Individual WMSs are expected to have minor, if any, impacts on water quality. However, cumulative impacts of multiple strategies, combined with external factors such as extreme weather conditions could result in effects to aquatic species and habitats. For example, many fish and freshwater mussel species are sensitive to changes in DO, temperature, salinity, and ammonia nitrogen. All these parameters may be exacerbated in low flow and drought conditions.

The SCTRWPG has addressed the potential effects of 2021 SCTRWP implementation on recreation and aquatic life through application of the environmental flow standards adopted by the TCEQ in the technical evaluation of surface WMSs involving new appropriations. The cumulative effects analyses (Chapter 6.1) and environmental assessment (Chapter 6.2) also provide information relevant to potential effects of plan implementation on recreation and aquatic life.

Nine strategies could potentially impact domestic water use and agricultural water use: Drought Management, Carrizo Conversions, Edwards Transfers, Recycled Water Programs, Surface Water Rights, Expanded Local Carrizo for SAWS, CRWA Wells Ranch Project, Carrizo Aquifer for CVLGC, and/or Regional Carrizo for SSLGC Project Expansion. Two other strategies may provide benefits to domestic and/or agricultural water use: Municipal Water Conservation and/or GBRA Lower Basin Storage.

6.1.2 Agricultural Resources

Agricultural resources may be impacted by the 2021 SCTRWP through the conversion of agricultural land uses to well fields, water treatment facilities, pipelines, or other appurtenant structures. Additionally, the redistribution of water from rural and agricultural areas would reduce the amount of water available for irrigation and livestock purposes.

6.1.2.1 Impacts on Agricultural Resources

To evaluate potential impacts on agricultural resources, construction impacts for each of the WMSs were estimated based on the acreage of agricultural land impacted according to TPWD mapping. These impacts are summarized for WMSs 10 through 33, which are the WMSs for which conceptual geographic location information was available. Impacts are described for each of these WMSs in Section 5.2. Overall, construction activities for the combined WMS have the potential to affect 19,163 acres of agricultural land, including 14,885 acres of land mapped by TPWD as row crops, and 4,278 acres of land mapped as tame/disturbance grassland, which may include areas used for grazing and hay production.

6.1.2.2 Impacts of Voluntary Redistribution of Water from Rural and Agricultural Areas

The 2021 SCTRWP is based, in part, on voluntary transfer or redistribution of water resources to meet projected needs. Voluntary redistribution is the acquisition of water by willing buyers from willing sellers, subject to conditions of existing groundwater management plans and rules of GCDs, in the case of groundwater supplies, and subject to existing surface water permits and water available from such permits (refer to Chapters 3.1 and 3.2 for descriptions of methods used in determining quantities of groundwater and surface water available to meet projected water demands in the 2021 SCTRWP). Voluntary transfers of water include the underlying principles that (1) a local area's projected needs are met before consideration is given to movement of water from rural and agricultural areas to meet projected needs at more distant locations; (2) compensation will be made to water owners for water to meet projected needs of others; and (3) an evaluation is made of the social and economic impacts of voluntary transfers of water from rural and agricultural areas.

In the development of the SCTRWP, the following principles have been followed: (1) water conservation has been the first WMS recommended to meet projected needs (shortages) of water user groups (WUGs); and (2) all other recommended WMSs including movement of water from rural and agricultural areas must be based on the voluntary transfer concept and principles. The WMSs of the 2021 SCTRWP were selected and sized in compliance with DFCs and MAG so as to limit impacts upon the supplies of water projected to be needed for use in rural and agricultural areas. In addition, the costing of each WMS includes estimated payments to landowners from which groundwater would be obtained and to holders of surface water rights to clearly reflect that implementation of these WMSs would include compensation of the owners of the water by those who would obtain and use the water (i.e., the willing seller-willing buyer condition underlying the voluntary transfer concept).

Major recommended WMSs of the SCTRWP that may involve voluntary redistribution of water from rural and agricultural areas within Region L are listed in Table 6-7, along with the portion of the firm new supply potentially considered a voluntary redistribution:[1]

Table 6-7 Recommended WMS Involving Voluntary Redistribution of Water

2021 WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)
SAWS Expanded Brackish Project	70,160
SS WSC Brackish Wilcox Groundwater Project	1,120
CRWA Brackish Carrizo-Wilcox Project	14,700
CVLGC Carrizo Project	10,000
Karnes City Local Groundwater	444
Total	**96,242**

In total, up to 96,242 acft/yr of water from rural and agricultural areas in the 2021 South Central Texas Regional Water Plan may be redistributed for use in urban areas in the future.

Source counties for the WMSs listed above have projected needs for additional water supply (or have projected surpluses less than the volume associated with the recommended WMS); therefore, third-party economic impacts of redistribution may occur as future supplies alternatives to local groundwater are developed. Implementation of the recommended WMSs could result in (1) drawdown of the water table, increasing local area pump lifts in the aquifer areas from which groundwater would be obtained; and would (2) provide payments to landowners for groundwater and to holders of surface water permits for use of surface water at rates negotiated between buyer and seller. Voluntary redistribution of water from rural and agricultural areas is likely to result in reduction of areas engaged in active crop production, and/or changes in crop species and productivity.

In addition, implementation of recommended WMSs can be expected to result in construction and associated expenditures in local areas where such projects are constructed, but neither the economic

1 Surface Water Rights is not included as supply quantities are not specified.

benefits of such expenditures, nor the subsequent economic development that might result from such expenditures, are estimated in this plan.

6.1.3 Natural Resources

6.1.3.1 Regional Environment

Region L spans southern Texas from Hays and Caldwell Counties in the north to the Guadalupe Estuary on the Gulf Coast, to the headwaters of the Nueces River in Uvalde County. The region exhibits a unique biological diversity as a consequence of its location in an area of transition between major vegetational and faunal regions to the north, east, and south (respectively, the Balconian, Texan, and Tamaulipan),[2] and its position astride migration corridors important to numerous bird, bat, and insect populations. Locally, the prairie and coastal ecoregions circumscribe sets of habitats, plants, and animals distinct from those of the Central Texas Plateau and the more tropical affinities of the Southern Texas Plains. The major population centers in Region L are located along the eastern and southern margins of the Edwards Plateau, where a series of rugged, wooded canyons are traversed by clear, spring fed streams intimately associated with the cavernous limestone Edwards Aquifer that provides the present major water supply for the region.

Omernik[3] utilized criteria that included topography, climate, vegetation type, and land use characteristics to divide the United States into ecological regions, or ecoregions, that exhibit more or less distinct sets of physical habitats and species. According to updated classification based on Omernik's criteria, Region L includes parts of five Ecoregions: the Edwards Plateau, Southern Texas Plains, Texas Blackland Prairies, East Central Texas Plains, and the Western Gulf Coastal Plains.[4] Focusing specifically on Texas, and excluding explicit land use criteria, Gould[5] delineated 10 vegetational areas, which generally correspond to the portions of Omernik's Ecoregions that extend into the state. The corresponding names for the vegetational areas found in Region L are the Edwards Plateau, South Texas Plains, Blackland Prairies, Post Oak Savannah, and the Gulf Prairies and Marshes (Figure 6-22).

The Edwards Plateau vegetational area encompasses approximately 24 million acres of tall or mid-grass understory and a brushy, savanna-type overstory complex. Soils are generally shallow over limestone or caliche. Prevalent woody species include live oak (*Quercus virginiana*) and other oaks (*Q. fusiformis*, *Q. buckleyi*, *Q sinuata* var. *breviloba*), ashe junipers (*Juniperus ashei*), cedar elm (*Ulmus crassifolia*), mesquite (*Prosopis* sp.), various species of acacia (*Acacia* sp.), and sumacs (*Rhus* ssp., including the prairie flame-leaf (*Rhus copallina* var. *lanceolata*). The most important climax grasses of this area include switchgrass (*Panicum virgatum*), several species of bluestem (*Schizachyrium* and *Andropogon* spp.),

2 Blair, W. Frank, "The Biotic Provinces of Texas," Texas Journal of Science 2(1):93-117, 1950.
3 Omernik, James M., "Ecoregions of the Conterminous United States," Annals of the Association of American Geographers, 77(1) pp. 118-125, 1987.
4 Griffith, G.E., Bryce, S.A., Omernik, J.M., Comstock, J.A., Rogers, A.C., Harrison, B., Hatch, S.L., and Bezanson, D., 2004, Ecoregions of Texas (color poster with map, descriptive text, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:2,3000,000).
5 Gould, F.W. 1975. The Grasses of Texas. Texas A&M University Press, College Station, Texas.

gramas (*Bouteloua* spp.), Indiangrass (*Sorghastrum nutans*), Canadian wild rye (*Elymus canadensis*), buffalograss (*Buchloe dactyloides*), and curly mesquite (*Hilaria belangeri*).[6]

As a result of land management practices since European settlement, the proportion of juniper and mesquite have increased into this presumed climax of largely grassland or savannah, except on the steeper slopes, which have continually supported dense cedar-oak woodlands. Bald cypress (*Taxodium distichum*) occurs along perennial streams and rivers, while pecan (*Carya illinoinensis*), Arizona and little walnut (*Juglans major, J. microcarpa*), hackberry (*Celtis laevigata*), black and sandbar willow (*Salix nigra, S. interior*), and eastern cottonwood (*Populus deltoides*) are more widely distributed in riparian areas of both perennial and intermittent streams. Cultivated fields are generally in the relatively broad, level stream valleys where deeper alluvial soils have accumulated.[7] Upland agriculture consists primarily of livestock grazing and harvest of cedar and oak for fence posts and firewood, respectively.

The South Texas Plains vegetational area encompasses approximately 20 million acres of level to rolling topography, with elevations ranging from 1,000 ft-mean sea level (msl) to about sea level. Soil types cover a wide range, from clays to sandy loams, creating variations in soil drainage and moisture-holding capacities. Although there are large areas of cultivated land, most of the area is still used as rangeland. The South Texas Plains region originally supported a grassland or savannah climax vegetation.[8] However, long periods of grazing and the reduction of fire has affected these plant communities and led to an increase of woody plant species within the area. Species which have increased in the area include honey mesquite (*Prosopis glandulosa*), post oak (*Q. stellata*), live oak, several acacias (*Acacia* spp.), and members of the cactus family (Cactaceae). Distinct differences in climax plant communities and successional patterns occur on the many range sites that are found in this region.

Elevations in the Blackland Prairies vegetational area range from 300 to 800 ft-msl. Uniform, dark-colored calcareous clays, which are interspersed with gray acid sandy loams, constitute the fertile blackland soils. According to Thomas, most of this region is, or has been, under cultivation, although there are some excellent native hay meadows and a few unplowed ranches remaining.[9] The characteristic vegetation of the Blackland Prairies, which includes little bluestem (*Schizachyrium scoparium*) as the climax dominant grass species of the region, is considered to be a true prairie. Big bluestem (*Andropogon gerardi*), Indiangrass, switchgrass, sideoats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*), tall dropseed (*Sporobolus asper*), silver bluestem (*Bothriochloa saccharoides*), and Texas wintergrass (*Nasella leucotricha*) are other important grasses found in the region.[10] If heavy grazing is allowed, Texas wintergrass, buffalograss, Texas grama (*Bouteloua rigidiseta*), smutgrass (*Sporobolus indicus*), and many annuals may increase or invade the prairies, causing deterioration of the native communities.[11] Other locally invasive species include mesquite in the southern portion of the Blackland Prairies, and post oak and blackjack oak in areas that include medium to light-textured soils.

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6 Correll, D.S., and M.C. Johnston, "Manual of Vascular Plants of Texas," Texas Research Foundation, Renner, Texas, 1979.
7 Ibid.
8 Thomas, G.W, Op. Cit., 1975.
9 Thomas, G.W, "Texas Plants – An Ecological Summary," In: F.W. Gould. 1975. Texas Plants – a Checklist and Ecological Summary. Texas Agricultural Experiment Station, MP-585/Rev., College Station, Texas, 1975.
10 Correll, D.S., and M.C. Johnston, Op. Cit., 1979.
11 Ibid.

Grasses that have been used to seed improved pastures within the Blackland Prairies include dallisgrass (*Paspalum dilatatum*), common and coastal bermudagrass (*Cynodon dactylon*), and some native species.

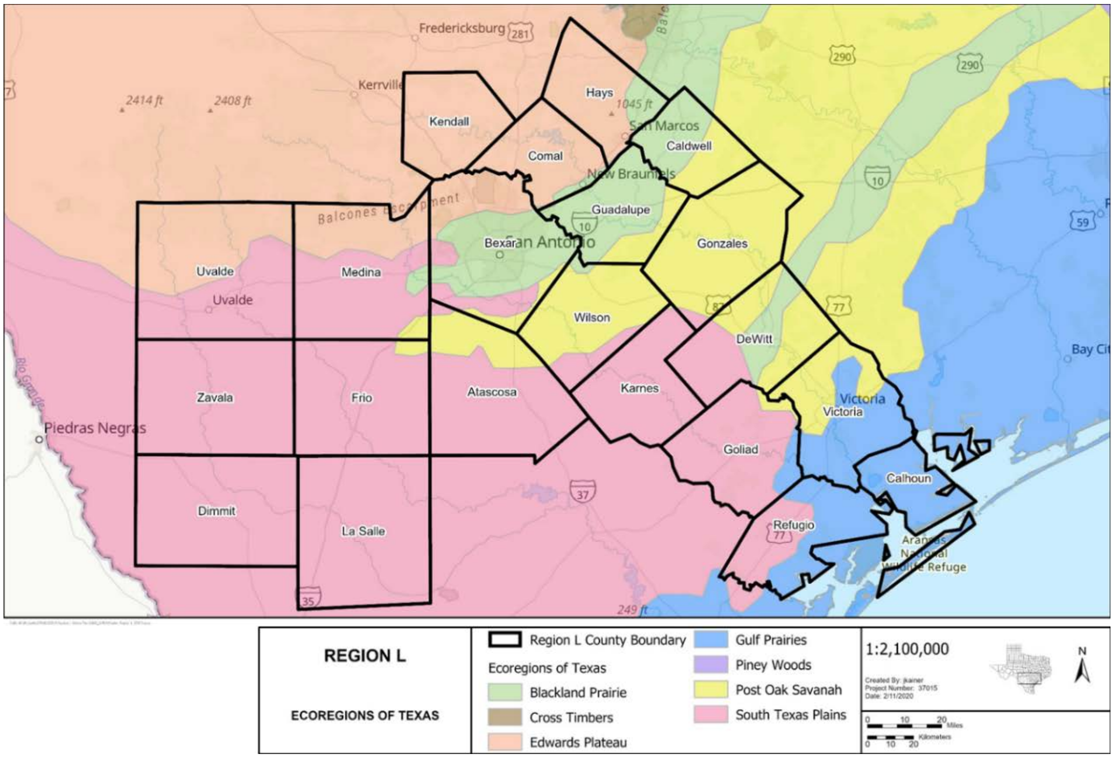

Figure 6-22 Gould's Vegetational Areas within Region L

The Post Oak Savannah vegetational area, which covers approximately 8.5 million acres, consists of gently rolling or hilly country, with elevations ranging from 300 to 800 ft-msl. Upland soils of the region include light-colored acid sandy loams or sands. Bottomland soils contain light brown to dark gray acidic soils, with textures which range from sandy loams to clays. This area is characterized by pasturelands which include frequent stands of woodland and occasional areas of cropland. The dominant species of the Post Oak Savannah is post oak, which occurs in open stands with a ground cover of grasses.[12] Other associated species include blackjack oak (*Quercus marilandica*), black hickory (*Carya texana*), cedar elm (*Ulmus crassifolia*), and eastern redcedar (*Juniperus virginiana*). This vegetation type is considered to be either a part of the Eastern Deciduous Forest association or as part of the Prairie association.[13,14,15,16] During the last few decades, many areas of open savannah have been converted into dense woodland stands of post oak and winged elm (*Ulmus alata*). This has occurred as a result of overgrazing, abandonment from cultivation, and removal of fire. Grazing is the major land use of both upland and bottomland sites within this vegetation type. Large acreages of both upland and bottomland forests have been cleared for grazing and most of these are in tame pasture.

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12 Ibid.
13 Tharp, B.C., "The Vegetation of Texas," Texas Acad. Sci., Anson Jones Press, Houston, 1939.
14 Braun, E.L., "Deciduous Forests of Eastern North America," Hafner Publishing Co., Inc., New York, 1950.
15 Weaver, J.E. and F.E. Clements, "Plant Ecology," 2nd Ed. McGraw-Hill Book Co., New York, 1938.
16 Daubenmire, Rexford, "Plant Geography with Special Reference to North America," Academic Press, New York, 1978.

The Gulf Prairies and Marshes vegetational area of Texas consists of about 9,500,000 acres. This nearly level, slowly drained plain is less than 150 ft-msl in elevation and is cut by sluggish rivers, creeks, bayous, and sloughs. Habitats include coastal salt marshes, dunes, prairies, river bottoms, and freshwater ponds. Soils types include acid sands, sandy loams and clays. The upland prairie soils tend to be heavier textured acid clays or clay loams. Much of the region is fertile farmland or pastureland. The climax vegetation of the region is mostly tall grass prairie or post oak savannah.[17] Principal grasses are big bluestem, little bluestem, seacoast bluestem (*S. scoparium* var. *litoralis*), Indiangrass, eastern gamma grass (*Tripsacum dactyloides*), Texas wintergrass, switchgrass, and gulf cordgrass (*Spartina* spp.). Seashore saltgrass (*Distichlis spicata*) occurs on moist saline sites within the area. Since the region is used heavily for ranching and agriculture, this extensive disturbance has allowed invader species, such as mesquite, huisache (*Acacia smallii*), prickly pear (*Opuntia* spp.), acacia (*Acacia* spp.), ragweed (*Ambrosia psilostachya*), broomweed (*Xanthocephalum* spp.) and others to become well established.[18,19] Heavy grazing and/or abandoned farmland has changed the predominant grasses to species such as broomsedge (*Andropogon virginicus*), smutgrass, and threeawns (*Aristida* spp.), and introduced bermudagrass, fescue (*Festuca* spp.), and dallisgrass.

Within this area, large acreages of both upland and bottomland forests have been cleared for grazing, and much of this land is planted with domestic grasses. Major creek and river floodplains may retain more or less well-developed hardwood forests, but upland areas are generally cleared for cultivation or pasturage. However, uplands support scattered, dense, shrubby thickets of oak, huisache, and mesquite and occasional freshwater marshes in relict drainages. Principal tree and shrub species normally observed in upland areas include live oak, post oak, cedar elm, hackberry, honey mesquite, huisache, and yaupon (*Ilex vomitoria*).[20,21,22]

In addition to the physiographic and biological diversity of Region L, it is also the location of a unique, region-wide geologic feature called the Edwards Aquifer. The Edwards Aquifer, together with the karst geology of its recharge zone and the remaining major perennial springs, constitute a unique set of habitats in which a significant concentration of isolated, endemic species has developed. The porous to cavernous limestones and dolomites making up the Edwards Aquifer are also the groundwater source that presently supplies water to the City of San Antonio and numerous other users. The Edwards Aquifer is the only underground aquatic habitat in Texas in which vertebrate species live,[23] and it supports a surprisingly diverse ecosystem. The aquifer has three parts: the drainage or catchment area (contribution zone), the recharge zone, and the reservoir zone (artesian zone). Input to the aquifer comes from rainfall over the watershed as a whole, but recharge occurs primarily in the beds of streams

17 Correll, D.S., and M.C. Johnston, Op. Cit., 1979.
18 Johnston, M.C., "The Vascular Plants of Texas, A List Updating the Manual of the Vascular Plants of Texas," Austin, Texas, 1988.
19 Thomas, G.W, Op. Cit., 1975.
20 U.S. Bureau of Reclamation, "Palmetto Bend Project – Texas Final Environmental Impact Statement," Bureau of Reclamation, U.S. Department of the Interior, 1974.
21 Soil Conservation Service, "Soil Survey of Calhoun County, Texas," Soil Conservation Service, Temple, Texas, 1978.
22 Texas Department of Water Resources, "Land Use/Land Cover Maps of Texas," Austin, Texas. LP-62, 1977, Reprinted 1978.
23 Edwards, Robert J., Glen Longley, Randy Moss, John Ward, Ray Mathews, and Bruce Stewart, "A Classification of Texas Aquatic Communities with Special Consideration toward the Conservation of Endangered and Threatened Taxa," Vol. 41, No. 3, The Texas Journal of Science, University of Texas at Austin, Austin, Texas, 1989.

atop or traversing the recharge zone. The recharge zone consists of a band of fractured and cavernous limestone (karst geology) through which surface water enters the aquifer. In addition to the aquatic fauna of the aquifer, the karst limestones in the upland portions of the recharge and contributing zones also harbor a number of endemic, terrestrial cave species.

Where rivers flowing across the plateau have carved deep canyons and exposed the base of the Edwards Limestone, spring fed streams arise and flow south and eastward over the less permeable older formations to the recharge zone, at the base of which a set of large springs (e.g., Leona, San Antonio, Comal, and San Marcos Springs) emerge that support still more species of limited distribution. In addition to their importance as water supplies, the large springs and their associated rivers are also of regional economic importance as scenic and recreational destinations.

Species listed by the federal or state governments as endangered or threatened, species that are candidates for listing as endangered and threatened, and species of greatest conservation need (SGCN) as designated by the TPWD are listed and discussed in terms of the potential impacts of each WMS in Volume II. Many of the listed endangered species are associated with the canyons, caves, and springs on the eastern and southern edges of the Edwards Plateau (Hays and Comal Counties, and northern Bexar County) and in the wetland and brackish environments of Calhoun and Refugio Counties.

Listed species tend to fall into one of two broad categories. One category includes widespread, but rare, species whose populations do not appear to be dependent on specific habitat resources that are (at this time) in limited supply (e.g., foraging and nesting areas). These include many of the birds, such as the eagles and hawks that suffered population declines as a result of persistent pesticide toxicity, and Whooping Cranes that were decimated by market hunting. Other listed species tend to be rare because their habitat requirements are met in only a few locations. This second category includes migratory songbirds with specific nesting requirements (e.g., Golden-cheeked Warbler) and reaches the extremes of endemism in the spring and cave species found along the edges of the Edwards Plateau in Bexar, Comal, and Hays Counties.

In addition to listed threatened and endangered species, several non-native invasive aquatic species pose significant risk to ecosystems and water projects within Region L. These species include zebra mussel (*Dreissena polymorpha*), apple snail (*Pomacea* sp.), which has been detected in the San Antonio River, tilapia (*Oreochromis aurea*), and sailfin catfish (*Pterygoplichthys disjunctivus*). These non-native invasive species can consume native aquatic vegetation, compete with native species for food items, and disrupt habitat for native species. Additional discussion on potential impacts from non-native invasive aquatic species is provided in Section 5.2.

In support of the regional water planning process, TPWD screened Texas rivers and streams for reaches or segments that support significant biological resources or functions, or whose continued flows were deemed critical to the maintenance of a downstream resource or public property. Stream reaches identified by TPWD as Ecologically Significant River and Stream Segments in Region L are listed, along with the listing criteria employed in the identification process, in a TPWD report.[24] Segment locations

24 Texas Parks & Wildlife Department, "Ecologically Significant River and Stream Segments of Region L (South Central) Regional Water Planning Area," (http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_rp_v3400_1163.pdf), July 2005.

are shown on Figure 6-23. In the 2016 SCTRWP, five of these river or stream segments were recommended by the SCTRWPG to be designated by the Texas Legislature as having unique ecological value. In 2015, the Texas Legislature designated the recommended stream segments as having unique ecological value. Furthermore, the SCTRWPG considers the segments identified by TPWD as a guide for recommending additional segments for future legislative designation (refer to Chapter 8).

Table 6-8 Ecologically Significant River and Stream Segments Identified by TPWD in the South Central Texas Regional Water Planning Area

SEGMENT NAME	BIOLOGICAL FUNCTION	HYDROLOGIC FUNCTION	RIPARIAN CONSERVATION	WATER QUALITY AQUATIC LIFE/USES	ENDANGERED OR THREATENED SPECIES OR UNIQUE COMMUNITIES
Aransas River	Extensive estuarine wetland habitat	Water quality and flood attenuation performed by estuarine and freshwater wetlands.			Reddish egret (ST), piping plover (FT, ST), white-faced ibis (ST), and wood stork (ST)
Arenosa Creek				Ecoregion stream	
Blanco River		Edwards and Trinity Aquifers Discharge	Blanco State Park	Overall use	Blanco blind salamander (ST)
Carpers Creek				Ecoregion stream	Diverse benthic macroinvertebrate community
Comal River	Significant overall habitat value	Edwards Aquifer Discharge	Landa Park	High water quality and exceptional aquatic life use	Fountain darter (FE/SE), Comal Springs riffle beetle (FE), Comal Springs dryopid beetle (FE), Peck's Cave amphipod (FE/SE), and Comal blind salamander (ST).
Cypress Creek		Trinity Aquifer Discharge, Edwards Aquifer Contributing Zone		Overall use	
Frio River	Texas Natural River Systems Nominee	Edwards Aquifer Recharge and Discharge	Garner State Park	Overall use, aesthetic value	Multiple spring-dependent listed species

SEGMENT NAME	BIOLOGICAL FUNCTION	HYDROLOGIC FUNCTION	RIPARIAN CONSERVATION	WATER QUALITY AQUATIC LIFE/USES	ENDANGERED OR THREATENED SPECIES OR UNIQUE COMMUNITIES
Garcitas Creek	Estuarine wetlands display significant overall habitat value			Ecoregion stream	One of few locales where the Texas palmetto occurs naturally
Geronimo Creek				Ecoregion stream	
Guadalupe River, Upper		Edwards Aquifer Discharge	Guadalupe River State Park	Overall use, #2 scenic river in Texas	
Guadalupe River, Middle					Contains two of only four known remaining populations of the Golden orb (C, ST)
Guadalupe River, Lower	Freshwater and marine wetlands display significant overall habitat value		Victoria Municipal Park, Guadalupe Delta WMA	Overall use	Whooping crane (FE, SE), unique and extensive marsh communities
Honey Creek	Significant overall habitat value.	Groundwater discharge and recharge.	Honey Creek State Natural Area		Presence of several species of concern
Mission River	Freshwater and marine wetlands provide significant overall habitat value	Water quality and flood attenuation performed by estuarine and freshwater wetlands.			
Nueces River	Texas Natural River System nominee	Edwards Aquifer Recharge and Discharge		Aesthetic, Top 100 Texas Natural Areas List	Multiple spring-dependent species
Sabinal River	Texas Natural River System nominee	Edwards Aquifer Recharge and Discharge		Aesthetic	Multiple spring-dependent species

SEGMENT NAME	BIOLOGICAL FUNCTION	HYDROLOGIC FUNCTION	RIPARIAN CONSERVATION	WATER QUALITY AQUATIC LIFE/USES	ENDANGERED OR THREATENED SPECIES OR UNIQUE COMMUNITIES
San Marcos River, Upper	Significant overall habitat value.	Edwards Aquifer Discharge	Multiple University and City parks, San Marcos River State Scientific Area	Overall use	Fountain darter (FE/SE), Texas blind salamander (FE/SE), San Marcos salamander (FT/ST), Texas wild rice (FE/SE) and Comal Springs riffle beetle (FE).
San Marcos River, Lower			Palmetto State Park		Significant due to presence of the American eel and the Golden orb (C, ST)
San Miguel Creek				Ecoregion stream	
West Nueces River		Edwards Aquifer Discharge and Recharge			Multiple spring-dependent species
West Verde Creek		Edwards Aquifer Discharge and Recharge	Hill County State Natural Area		Multiple spring-dependent species
FE=Federally Endangered FT=Federally Threatened C=Federal Candidate Species SE=State Endangered ST=State Threatened Source: Norris, Chad W., Daniel W. Moulton, Albert El-Hage and David Bradsby. 2005. Ecologically Significant River & Stream Segments of Region L (South Central) Regional Water Planning Area. Texas Parks and Wildlife, Austin, Texas.					

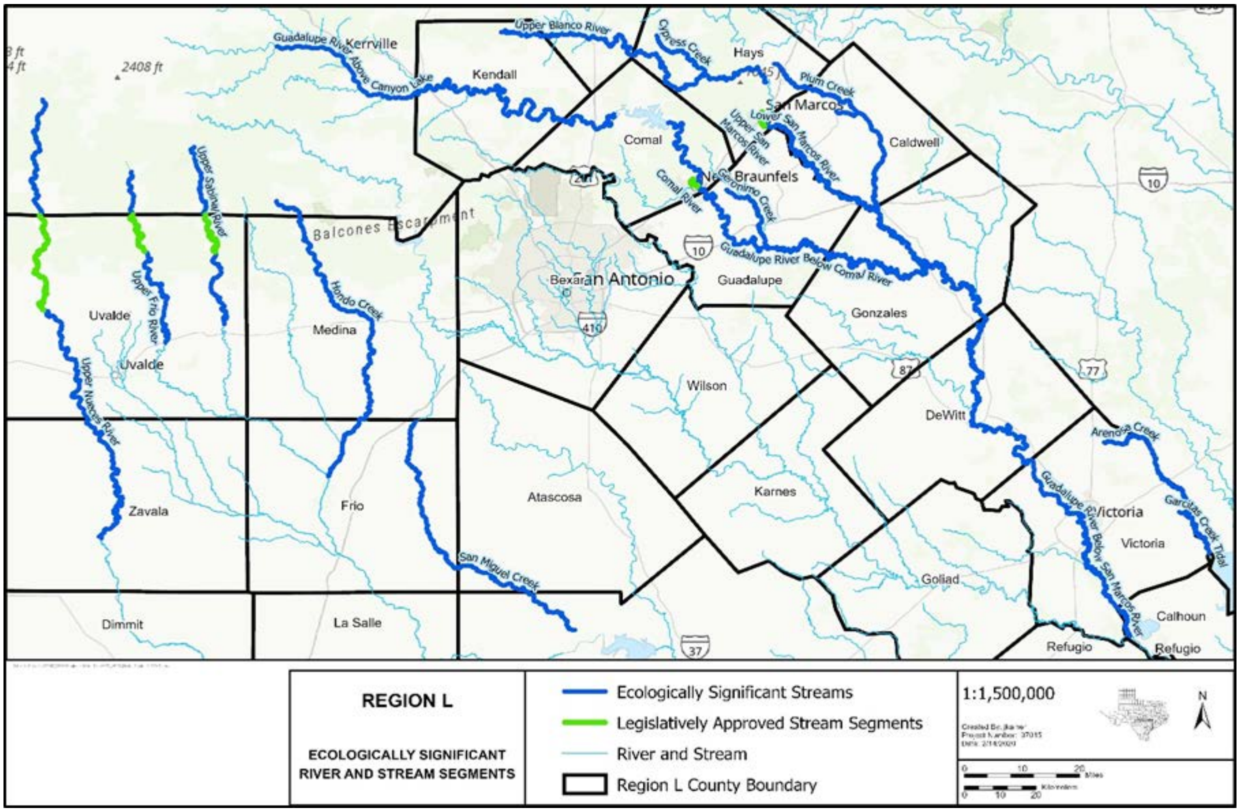

Figure 6-23 Ecologically Significant Stream and River Segments for Region L

6.1.3.2 Environmental Impacts

The environmental impacts of implementation of WMSs in the 2021 SCTRWP were evaluated for construction effects and operational effects. Construction effects are generally due to temporary or permanent disturbances of vegetation and soils, although in specific locations and circumstances, waste disposal, construction in aquatic habitats, noise, or airborne particulates may also be important factors. Operational effects may include, but is not limited to, impacts to vegetation, habitats, or endangered species through ongoing maintenance practices or changes in streamflows, water quality, or groundwater availability from ongoing project operations. The potential environmental effects of each WMS were evaluated individually, and the results are summarized in Section 5.2 of the 2021 SCTRWP (Volume 2). Individual WMSs may each result in negligible or minor construction or operational impacts, but, taken as a whole, the entire suite of WMSs may result in more substantial impacts to specific resources. The evaluation in this section focuses on the cumulative impact of all recommended WMSs included in the 2021 SCTRWP.

It should be noted that the information available for analysis of potential impacts of WMSs has changed substantially since similar analyses were performed for regional water plans prior to 2016. Earlier analyses were heavily dependent on paper maps and the transfer of information by hand to those maps. Lengths of pipelines and reservoir areas were also determined by measurements on available maps of variable scale. For the 2016 and 2021 SCTRWPs, information used to evaluate potential environmental impacts resulting from WMSs was primarily produced using Geographic Information Systems (GIS) shapefiles and recent aerial photography. This method of analysis allows for a more site-specific evaluation of the potential issues associated with a specific WMS. Much of the baseline data used to perform the analyses are readily available in GIS shapefiles, including TPWD vegetation mapping, stream data, soil map units, etc. In addition, recent aerial photography of the project areas provides an opportunity to evaluate potential habitat impacts based on the actual vegetation type that exists within the project areas rather than a large-scale evaluation of general vegetation types.

The environmental assessments of individual WMSs should be regarded as high-level preliminary reviews in the sense that neither environmental nor engineering site-specific studies have been performed to verify the published data used, finalize facility locations and operational routines, and identify locations where risks to environmental resources can be avoided or minimized and compensation for unavoidable impacts can be proposed. Most of the facilities evaluated herein have been designed and located only in a conceptual sense; the actual locations of intakes, pipeline rights-of-way, reservoirs, and other project features will not be finally determined until site-specific field studies and land acquisition programs have been completed. As each individual WMS undergoes detailed designs and environmental permitting, many, if not most, of the potential impacts discussed in the respective WMSs evaluations can be avoided or significantly mitigated by relocation of project elements or changes in construction methods (for example, directional drilling under streams for pipeline construction). This is particularly the case with respect to facilities such as pipelines and individual well pads and less so for reservoirs, for which there may be limited suitable sites.

Potential adverse terrestrial environmental and cultural resources impacts are minimized in the 2021 SCTRWP by the recommendation of strategies that maximize the efficient use of existing surface water resources, or which develop groundwater supplies, including brackish groundwater. These WMSs avoid the extensive habitat conversions and streamflow changes that can accompany comparable new surface water development. The estimated new firm water supplies provided by the WMSs recommended in the 2021 SCTRWP are included in the impacts summary tables (Table 6-9through Table 6-14).

Proposed facilities for the recommended WMSs may include facilities with relatively small footprints, such as wells or pump stations, or those with larger footprints, such as major pipelines or storage reservoirs. As previously discussed, facility construction involves both temporary and permanent impacts. However, there is typically flexibility in the siting of facilities that can avoid or minimize environmental impacts. Table 6-9 summarizes the types of potential environmental and cultural impacts associated with the various facility types.

Table 6-9 Potential Impacts of Different Types of Project Components

FACILITY TYPE	POTENTIAL TEMPORARY IMPACTS	POTENTIAL PERMANENT OR LONG-TERM IMPACTS
Well Fields	• Construction: soil disturbance, noise, dust • Disturbance of buried archaeological sites	• Well pad clearing • Groundwater drawdown
Pump Stations; Water Treatment Plants	• Construction: soil disturbance, noise, dust • Disturbance of buried archaeological sites	• Conversion of native vegetation or agricultural areas to industrial land use • Treated water outfalls: water quality changes
Pipelines	• Construction: soil disturbance, noise, dust • Disturbance of buried archaeological sites • Soil erosion/sedimentation of streams • Trenching of stream crossings: dewatering of construction area or temporary stream diversions	• Long-term maintenance (e.g., mowing), conversion of vegetation community • Introduction of non-native plant species
Intakes/Outfalls	• Construction: soil disturbance, noise, dust • Disturbance of buried archaeological sites • Soil erosion/sedimentation of streams • Dewatering of construction area	• Water quality changes • Water quantity/flow changes
Reservoirs	• Construction: soil disturbance, noise, dust • Disturbance of buried archaeological sites • Soil erosion/sedimentation of streams	• Loss of native woody or herbaceous vegetation • Loss of agricultural area

In conjunction with applicable environmental regulatory and permitting requirements, field studies conducted prior to design and easement procurement can substantially reduce the potential to adversely affect unique habitats, endangered species, historic and prehistoric sites, and other resources that are present only at specific locations. For example, where sensitive resources at stream crossings cannot be adequately protected or avoided, horizontal directional drilling can be considered as a construction option to avoid disturbance of aquatic habitats.

Five recommended strategies, the GBRA Mid-Basin Project (ASR), GBRA New Appropriation (Lower Basin), GBRA Lower Basin Storage, NBU ASR Project, and Victoria ASR Project include off-channel reservoirs or ASR facilities that will be used to ensure firm supplies throughout a drought comparable to the most severe on record. This water supply storage is necessary because the existing water rights and the unappropriated water are either not physically present during low flow periods or are unavailable due to the demands of senior water rights or environmental flow needs. Protection of senior water rights and compliance with environmental flow standards effectively minimizes effects of these projects on low streamflows. Several of the recommended WMSs include transmission pipelines that traverse several ecologically distinct regions, which can increase the number of habitat types affected by the project and thereby increase the potential for adverse effects to particular species.

The WMSs that include development of large amounts of groundwater may reduce the potential environmental and cultural resources impacts compared to development of similar volumes of surface water. However, local residents of the areas that would be affected have expressed concerns about declining well levels and potential impacts to springs and streamflows. Development of a large amount of groundwater from the Carrizo-Wilcox Aquifer will result in some reductions in streamflow in both the San Antonio and Guadalupe Rivers and in inflows to the Guadalupe Estuary. Groundwater drawdowns may also affect seasonal flow in streams systems that include groundwater contributions.

The location and extent of potential disturbances to environmental and cultural resources are based on the descriptions and environmental assessments of the WMSs in Chapter 5.2 (Volume 2). Pipeline routes were produced digitally, and pipeline lengths and areas were calculated using ArcMap GIS software. A 100 foot wide construction corridor was assumed for all pipelines. Areas of reservoirs and ancillary facilities such as water treatment plants, pump stations, storage units, and wells were based on conceptual designs developed for the RWP.

For recommended WMSs, the environmental impacts assessment was completed using a matrix approach to perform a series of parallel evaluations of each WMS for its potential to impact the following resource categories:

- Endangered and Threatened Species;
- Vegetation and Land Use;
- Water Quality and Aquatic Habitats; and
- Cultural Resources.

The impacts assessment approach is described for each resource category in the following sections.

Endangered and Threatened Species

The potential impacts of the individual WMSs were first evaluated with respect to state- or federally-listed endangered and threatened species, federal candidate species, and state species of concern using a two-part index system.

First, each WMS was evaluated with respect to its potential impact on the species present by assigning a numerical value from 0 to 2 according to the relative size of project impacts:

- 0 - No or negligible habitat impacts;
- 1 - Minimal habitat impacts; or
- 2 - Moderate or greater potential habitat impacts.

Second, the number of federal- or state-listed, or proposed listed, endangered and threatened species with potential habitat impacts was tabulated for each WMS. This analysis was based on current county species lists produced by TPWD and USFWS. For WMSs that are considered administrative approaches or have general, conceptual locations that do not lend themselves to GIS-based environmental impacts analyses, the number of species impacted was estimated using best professional judgment. The assumed number of species impacted were 1 per proposed project for WMSs 1 through 7; 2 per proposed project for WMS 8, and 6 per proposed project for WMS 9.

The two scores were then multiplied to obtain a final impact assessment for that species and strategy. The summed impact assessment scores are listed, and the overall endangered and threatened species impact values for each of the State Water Plans are presented in Table 6-10.

As was observed in the 2016 SCTRWP analysis, higher species impact scores are associated with projects requiring long pipelines, as well as projects that include reservoir construction.

Table 6-10 Summary of Potential Impacts to Endangered, Threatened, and Species of Greatest Conservation Need from Water Management Strategies

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL SPECIES IMPACT SCORE
1	Advanced Water Conservation	167,148	0
2	Drought Management	56,588	0
3	Edwards Transfers	5,906	0
4	Local Groundwater	28,240	16
5	Local Groundwater Conversions	0	0
6	Surface Water Rights	0	0
7	Balancing Storage	0	0
8	Facilities Expansion	95,675	48
9	Recycled Water Strategies	52,388	120
10	SAWS Expanded Local Carrizo Project	21,000	4
11	SAWS Expanded Brackish Groundwater Project	70,160	7
12	ARWA/GBRA Project (Phase I)	30,000	24

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL SPECIES IMPACT SCORE
13	ARWA Project (Phase 2)	20,999	16
14	ARWA Project (Phase 3)	5,494	16
15	GBRA Mid-Basin (Phase 2)	27,000	22
16	GBRA Lower Basin Storage	59,780	18
17	GBRA Lower Basin New Appropriation	40,500	18
18	GBRA Victoria Steam-Electric Project	23,925*	14
19	CRWA Wells Ranch (Phase 3)	7,000	10
20	CRWA Siesta Project	5,042	14
21	CRWA Brackish Carrizo-Wilcox Project	14,700	8
22	CVLGC Carrizo Project	10,000	14
23	SSLGC Expanded Carrizo Project	6,000	14
24	SSLGC Expanded Brackish Wilcox Project	5,000	6
25	NBU ASR	10,818	2
26	NBU Trinity Well Field Expansion	3,360	4
27	City of Victoria ASR	7,900	1
28	City of Victoria Groundwater-Surface Water Exchange	8,544	2
29	SS WSC Brackish Carrizo-Wilcox Project	1,120	4
30	Martindale Alluvial Well	240	18
31	Maxwell WSC Trinity Well	230	8
32	County Line SUD Trinity Well Field	740	12
33	County Line SUD Brackish Edwards Well Field	1,500	12

* The 23,925 acft yield for the GBRA Victoria Steam-Electric Project is purchased from the 40,500 acft yield for GBRA Lower Basin New Appropriation.

Vegetation and Land Use

To evaluate potential impacts on vegetation and wildlife habitats and land use, each of the WMSs was evaluated based on the area of each habitat type disturbed by construction activities and the level of potential impacts on those resources. The potential level, or severity, of impacts to vegetation and land use was evaluated by assigning an expected impact score:

- 0 - No or negligible vegetation impacts, or mostly affecting existing urban area;
- 1 - Low to moderate impacts = low level of permanent vegetation loss and/or vegetation conversion of pipeline corridors; or
- 2 - Moderate to high impacts = habitat is permanently removed through inundation or construction.

The impact score of each type of disturbance was then multiplied by the estimated area in acres of non-urban vegetation impacts. For WMSs that are considered administrative approaches or have general, conceptual locations that do not lend themselves to GIS-based environmental impacts analyses, the area impacted was estimated using best professional judgement. The assumed estimated area was 1 acre per proposed project for WMSs 1 through 7; 5 acres per proposed project for WMS 8, and 20 acres per proposed project for WMS 9.

Adjusted impact values are summed for the habitats potentially affected by each WMS, and overall vegetation and habitat scores are shown in Table 6-11.

Table 6-11 Summary of Potential Impacts to Vegetation and Land Use

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL HABITAT IMPACT SCORE
1	Advanced Water Conservation	167,148	0
2	Drought Management	56,588	0
3	Edwards Transfers	5,906	0
4	Local Groundwater	28,240	32
5	Local Groundwater Conversions	0	0
6	Surface Water Rights	0	0
7	Balancing Storage	0	0
8	Facilities Expansion	95,675	120
9	Recycled Water Strategies	52,388	400
10	SAWS Expanded Local Carrizo Project	21,000	428
11	SAWS Expanded Brackish Groundwater Project	70,160	409

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL HABITAT IMPACT SCORE
12	ARWA/GBRA Project (Phase I)	30,000	25,661
13	ARWA Project (Phase 2)	20,999	3224
14	ARWA Project (Phase 3)	5,494	289
15	GBRA Mid-Basin (Phase 2)	27,000	5278
16	GBRA Lower Basin Storage	59,780	44,055
17	GBRA Lower Basin New Appropriation	40,500	44,962
18	GBRA Victoria Steam-Electric Project	23,925*	651
19	CRWA Wells Ranch (Phase 3)	7,000	136
20	CRWA Siesta Project	5,042	217
21	CRWA Brackish Carrizo-Wilcox Project	14,700	1,466
22	CVLGC Carrizo Project	10,000	4,147
23	SSLGC Expanded Carrizo Project	6,000	438
24	SSLGC Expanded Brackish Wilcox Project	5,000	510
25	NBU ASR	10,818	0
26	NBU Trinity Well Field Expansion	3,360	0
27	City of Victoria ASR	7,900	0
28	City of Victoria Groundwater-Surface Water Exchange	8,544	0
29	SS WSC Brackish Carrizo-Wilcox Project	1,120	21
30	Martindale Alluvial Well	240	15
31	Maxwell WSC Trinity Well	230	278
32	County Line SUD Trinity Well Field	740	1,602
33	County Line SUD Brackish Edwards Well Field	1,500	1,602

* The 23,925 acft yield for the GBRA Victoria Steam-Electric Project is purchased from the 40,500 acft yield for GBRA Lower Basin New Appropriation.

Water Quality and Aquatic Habitats

Potential impacts to water quality and aquatic habitats were assessed in two ways: (1) direct impacts to streams during construction of pipeline crossings and/or intake or outfall structures; and (2) potential impacts to stream flow regimes.

For construction impacts, the general level of potential project impacts, both temporary and permanent, was assigned a rating as follows:

- 0 - No stream impacts;
- 1 - Low to moderate impacts; or
- 2 - Moderate to high impacts.

This rating was multiplied by a factor representing the number of potential stream crossings and intake or outfall structures:

- 0 - No stream crossings or structures;
- 1 - From 1 to 25 potential crossings and structures;
- 2 - From 26 to 50 potential crossings and structures;
- 3 - From 51 to 75 potential crossings and structures; or
- 4 - 76 or more potential crossings and structures.

For WMSs that are considered administrative approaches or have general, conceptual locations that do not lend themselves to GIS-based environmental impacts analyses, the stream impact crossing factor per proposed project was determined based on a review of similar projects. Results of the construction impacts analysis are provided in Table 6-12.

Table 6-12 Summary of Potential Stream Construction Impacts

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL STREAM CONSTRUCTION IMPACT SCORE
1	Advanced Water Conservation	167,148	0
2	Drought Management	56,588	0
3	Edwards Transfers	5,906	0
4	Local Groundwater	28,240	2
5	Local Groundwater Conversions	0	0
6	Surface Water Rights	0	0
7	Balancing Storage	0	0
8	Facilities Expansion	95,675	2

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL STREAM CONSTRUCTION IMPACT SCORE
9	Recycled Water Strategies	52,388	4
10	SAWS Expanded Local Carrizo Project	21,000	2
11	SAWS Expanded Brackish Groundwater Project	70,160	2
12	ARWA/GBRA Project (Phase I)	30,000	8
13	ARWA Project (Phase 2)	20,999	4
14	ARWA Project (Phase 3)	5,494	4
15	GBRA Mid-Basin (Phase 2)	27,000	8
16	GBRA Lower Basin Storage	59,780	8
17	GBRA Lower Basin New Appropriation	40,500	8
18	GBRA Victoria Steam-Electric Project	23,925*	2
19	CRWA Wells Ranch (Phase 3)	7,000	1
20	CRWA Siesta Project	5,042	1
21	CRWA Brackish Carrizo-Wilcox Project	14,700	2
22	CVLGC Carrizo Project	10,000	8
23	SSLGC Expanded Carrizo Project	6,000	4
24	SSLGC Expanded Brackish Wilcox Project	5,000	0
25	NBU ASR	10,818	1
26	NBU Trinity Well Field Expansion	3,360	0
27	City of Victoria ASR	7,900	1
28	City of Victoria Groundwater-Surface Water Exchange	8,544	1
29	SS WSC Brackish Carrizo-Wilcox Project	1,120	0
30	Martindale Alluvial Well	240	1
31	Maxwell WSC Trinity Well	230	1
32	County Line SUD Trinity Well Field	740	1
33	County Line SUD Brackish Edwards Well Field	1,500	1

* The 23,925 acft yield for the GBRA Victoria Steam-Electric Project is purchased from the 40,500 acft yield for GBRA Lower Basin New Appropriation.

For potential stream flow and water quality impacts, the general level of potential project impacts, both temporary and permanent, was assigned a rating as follows:

- 0 - No stream impacts;
- 1 - Low to moderate impacts; or
- 2 - Moderate to high impacts.

This rating was multiplied by a factor representing types of potential stream and water quality impacts, as presented in Chapter 6.1.1.3. For this factor, a point was assigned for each of the following:

- Potential streamflow reductions;
- Potential alterations to streamflow hydrograph (e.g., seasonal alterations);
- Potential changes to bay inflows; and
- Increased groundwater use in the Trinity or Carrizo-Wilcox aquifers.

For WMSs that are considered administrative approaches or have general, conceptual locations that do not lend themselves to GIS-based environmental impacts analyses, the potential stream and water quality impacts factors were based on potential impacts of the WMS as a whole. Results of the stream flow and water quality impacts analysis are provided in Table 6-13.

Table 6-13 Summary of Potential Stream Flow/Water Quality Impacts

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL STREAM FLOW/ WATER QUALITY IMPACT SCORE
1	Advanced Water Conservation	167,148	1
2	Drought Management	56,588	1
3	Edwards Transfers	5,906	0
4	Local Groundwater	28,240	0
5	Local Groundwater Conversions	0	0
6	Surface Water Rights	0	6
7	Balancing Storage	0	0
8	Facilities Expansion	95,675	2
9	Recycled Water Strategies	52,388	0
10	SAWS Expanded Local Carrizo Project	21,000	1
11	SAWS Expanded Brackish Groundwater Project	70,160	1
12	ARWA/GBRA Project (Phase I)	30,000	2

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL STREAM FLOW/ WATER QUALITY IMPACT SCORE
13	ARWA Project (Phase 2)	20,999	2
14	ARWA Project (Phase 3)	5,494	1
15	GBRA Mid-Basin (Phase 2)	27,000	6
16	GBRA Lower Basin Storage	59,780	6
17	GBRA Lower Basin New Appropriation	40,500	6
18	GBRA Victoria Steam-Electric Project	23,925*	3
19	CRWA Wells Ranch (Phase 3)	7,000	1
20	CRWA Siesta Project	5,042	4
21	CRWA Brackish Carrizo-Wilcox Project	14,700	2
22	CVLGC Carrizo Project	10,000	2
23	SSLGC Expanded Carrizo Project	6,000	2
24	SSLGC Expanded Brackish Wilcox Project	5,000	1
25	NBU ASR	10,818	1
26	NBU Trinity Well Field Expansion	3,360	1
27	City of Victoria ASR	7,900	1
28	City of Victoria Groundwater-Surface Water Exchange	8,544	2
29	SS WSC Brackish Carrizo-Wilcox Project	1,120	1
30	Martindale Alluvial Well	240	2
31	Maxwell WSC Trinity Well	230	1
32	County Line SUD Trinity Well Field	740	1
33	County Line SUD Brackish Edwards Well Field	1,500	1

*The 23,925 acft yield for the GBRA Victoria Steam-Electric Project is purchased from the 40,500 acft/yr yield for GBRA Lower Basin New Appropriation.

Cultural Resources

As outlined in Chapter 5.2, a cultural resources probability model was conducted for individual WMSs based on conceptual project site locations. Results of the potential cultural resources impact scores are summarized in Table 6-14. For WMSs that are considered administrative approaches or have general, conceptual locations that do not lend themselves to GIS-based environmental impacts analyses, the impact scores were assigned a rating as follows:

- 0 - No or negligible impacts;
- 1 - Minimal and/or temporary impacts, mostly expansions to existing facilities; minor study and permitting requirements; or
- 2 - Moderate potential impacts, may include new transmission lines, moderate study, and permitting requirements.

The impact rating score was then multiplied by the number of proposed WMS projects to yield an overall potential impact score.

Table 6-14 Summary of Potential Impacts to Cultural Resources from Water Management Strategies

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL CULTURAL RESOURCES IMPACT SCORE
1	Advanced Water Conservation	167,148	0
2	Drought Management	56,588	0
3	Edwards Transfers	5,906	0
4	Local Groundwater	28,240	16
5	Local Groundwater Conversions	0	0
6	Surface Water Rights	0	0
7	Balancing Storage	0	0
8	Facilities Expansion	95,675	24
9	Recycled Water Strategies	52,388	20
10	SAWS Expanded Local Carrizo Project	21,000	13.5
11	SAWS Expanded Brackish Groundwater Project	70,160	32
12	ARWA/GBRA Project (Phase I)	30,000	187
13	ARWA Project (Phase 2)	20,999	54.5
14	ARWA Project (Phase 3)	5,494	187
15	GBRA Mid-Basin (Phase 2)	27,000	109.5

NO.	WATER MANAGEMENT STRATEGY	FINAL DECADE FIRM YIELD (ACFT/YR)	POTENTIAL CULTURAL RESOURCES IMPACT SCORE
16	GBRA Lower Basin Storage	59,780	19
17	GBRA Lower Basin New Appropriation	40,500	174
18	GBRA Victoria Steam-Electric Project	23,925*	46
19	CRWA Wells Ranch (Phase 3)	7,000	15
20	CRWA Siesta Project	5,042	91.5
21	CRWA Brackish Carrizo-Wilcox Project	14,700	109.5
22	CVLGC Carrizo Project	10,000	97
23	SSLGC Expanded Carrizo Project	6,000	103
24	SSLGC Expanded Brackish Wilcox Project	5,000	137.5
25	NBU ASR	10,818	50
26	NBU Trinity Well Field Expansion	3,360	67.5
27	City of Victoria ASR	7,900	2
28	City of Victoria Groundwater-Surface Water Exchange	8,544	2
29	SS WSC Brackish Carrizo-Wilcox Project	1,120	11
30	Martindale Alluvial Well	240	85
31	Maxwell WSC Trinity Well	230	73
32	County Line SUD Trinity Well Field	740	237
33	County Line SUD Brackish Edwards Well Field	1,500	237

*The 23,925 acft yield for the GBRA Victoria Steam-Electric Project is purchased from the 40,500 acft/yr yield for GBRA Lower Basin New Appropriation.

6.1.4 Effects on Navigation

None of the WMSs recommended for implementation in the 2021 SCTRWP are expected to have any direct effects on navigation.

6.1.5 Environmental Benefits and Concerns

The SCTRWPG has identified the following potentially significant environmental benefits and concerns associated with the implementation of the 2021 SCTRWP.

6.1.5.1 Environmental Benefits

- Emphasis on conservation, drought management, reuse, groundwater development, and use of existing surface water rights avoids or delays projects with greater impacts.
- Implementation of the Edwards Aquifer Habitat Conservation Plan and development of non-Edwards supplies contribute to springflow maintenance and endangered species protection.
- Plan avoids impacts associated with development of new mainstem reservoirs.
- Increased reliance on ASR facilitates storage during wet periods for use during dry periods without evaporation and terrestrial habitat losses.
- Increased reliance on brackish groundwater resources, potentially reducing reliance on fresh groundwater.
- Projects will not exceed environmental flow standards.

6.1.5.2 Environmental Concerns

- Reductions in instream flows and freshwater inflows to bays and estuaries associated with surface water supply and direct consumptive reuse projects.
- Projects located in stream segments identified by TPWD as ecologically significant.[25]
- Effects on small springs and reductions in flux entering streams from aquifers associated with groundwater development.
- Potential interaction of climate variability with other identified impacts.

6.2 SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING IDENTIFIED WATER NEEDS

Identified water needs are potential water supply shortages based on the difference between projected water demands and existing water supplies. Identified water needs are presented in Chapter 4 of the 2021 SCTRWP. Title 31 of the TAC Section 357.4(a) requires that the social and economic impacts of not meeting regional identified water needs be evaluated by the SCTRWPG. The TWDB completes these analyses for RWPGs, upon request. The TWDB performed the required analyses for the 2021 SCTRWP,

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25 Segments and projects are summarized as follows:
Lower Guadalupe River – GBRA Lower Basin New Appropriation, GBRA Victoria County Steam-Electric Project, GBRA Lower Basin Storage Project, City of Victoria ASR Project, City of Victoria Groundwater-Surface Water Exchange.
Middle Guadalupe River – GBRA Mid-Basin Project (ASR), SSLGC Expanded Carrizo Project (Guadalupe County).

and the estimated socioeconomic impacts of not meeting projected water shortages are presented in Appendix 6-A. It is worth noting that because of the ongoing nature of plan development, the water supply needs utilized for the analysis may differ slightly from the identified water supply needs in the Initially Prepared Plan and the final adopted RWP.

In summary, Region L could experience $16.57 billion in income losses and almost 100,514 job losses in 2020 if no WMSs are implemented to meet projected shortages. These potential income losses in 2020 are allocated among water use sectors as follows: municipal (2 percent), manufacturing (20 percent), irrigation (<1 percent), mining (72.4 percent), and steam-electric power generation (4.5 percent). Similarly, Region L could experience $9.38 billion in income losses and about 94,978 job losses in 2070 if no WMSs are implemented to meet projected shortages. These potential income losses in 2070 are allocated among water use sectors as follows: municipal (35 percent), manufacturing (46 percent), irrigation (1 percent), mining (10 percent), and steam-electric power generation (8 percent).

6.3 DESCRIPTIONS OF UNMET NEEDS

Unmet needs are the portion of an identified water need that is not met by recommended WMSs. The 2021 SCTRWP does not include any unmet needs for the municipal and livestock use types; however, there are some unmet needs for the irrigation, manufacturing, mining, and steam-electric power sectors.

Table 6-15 summarizes the needs that remain unmet in the 2021 SCTRWP after implementation of recommended WMSs. The 2021 SCTRWP did not recommend WMSs to meet some irrigation needs, manufacturing, mining, and steam-electric needs as strategies to meet those needs may be cost-prohibitive. As shown in the TWDB socioeconomic impact analyses, however, these unmet needs represent only about 1 percent of the potential income losses in 2070, considering projected shortages in all water use sectors.

While there are unmet irrigation needs for counties in the Nueces River Basin (Uvalde, Medina, Zavala, Frio, Dimmit, La Salle, and Atascosa Counties), there are potential projects that may be developed in the future to satisfy water needs.

Table 6-15 Summary of Unmet Needs for the South Central Texas Region

			UNMET NEEDS* (ACFT/YR)					
NO.	WUG	COUNTY	2020	2030	2040	2050	2060	2070
1	Irrigation, Bexar	Bexar	4,152	4,152	4,152	4,152	4,152	4,152
2	Irrigation, Calhoun	Calhoun	14,088	14,088	14,088	14,088	14,088	14,088
3	Irrigation, Comal	Comal	33	33	33	33	33	33
4	Irrigation, DeWitt	DeWitt	318	318	265	265	0	0
5	Irrigation, Dimmit	Dimmit	5,249	5,249	5,249	5,249	5,249	5,249
6	Irrigation, Frio	Frio	0	0	1,838	3,612	5,332	7,146

NO.	WUG	COUNTY	UNMET NEEDS* (ACFT/YR)					
			2020	2030	2040	2050	2060	2070
7	Irrigation, Goliad	Goliad	388	388	388	388	388	388
8	Irrigation, Karnes	Karnes	352	352	911	911	911	911
9	Irrigation, Kendall	Kendall	1	1	1	1	1	1
10	Irrigation, La Salle	La Salle	1,184	1,203	1,223	1,248	1,271	1,294
11	Irrigation, Medina	Medina	37,636	38,392	38,254	38,898	39,075	40,143
12	Irrigation, Uvalde	Uvalde	43,021	43,333	43,333	43,423	43,672	44,101
13	Irrigation, Victoria	Victoria	5,791	5,791	5,791	5,791	5,791	5,791
14	Irrigation, Wilson	Wilson	3,390	3,405	3,417	3,428	11,153	11,453
15	Irrigation, Zavala	Zavala	21,235	21,350	21,109	20,733	20,148	19,865
16	Manufacturing, Victoria	Victoria	7,641	0	0	0	0	0
17	Mining, Dimmit	Dimmit	4,224	4,312	3,652	2,144	639	81
18	Mining, Karnes	Karnes	2,020	1,448	841	179	13	1
19	Mining, La Salle	La Salle	4,088	4,243	3,734	2,290	851	147
20	Steam Electric Power, Victoria	Victoria	18,925	0	0	0	0	0
Total			**173,736**	**148,058**	**148,279**	**146,833**	**152,767**	**154,844**

*WUG supplies and projected demands are entered for each of a WUG's region-county-basin divisions. The unmet needs shown in the WUG Unmet Needs report are calculated by first deducing the WUG's split projected demand from the sum of its total existing water supply volume and all associated recommended WMS water volumes. If the WUG split has a greater future supply volume than projected demand in any given decade, this amount is considered a surplus volume. In order to display only unmet needs associated with the WUG split, these surplus volumes are updated to a zero, and the unmet needs water volumes are shown as absolute values.

FINAL PLAN

APPENDIX 6-A: TWDB SOCIOECONOMIC IMPACTS OF PROJECTED WATER SHORTAGES FOR THE SOUTH CENTRAL TEXAS (REGION L) REGIONAL WATER PLANNING AREA

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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Socioeconomic Impacts of Projected Water Shortages

for the South Central Texas (Region L) Regional Water Planning Area

Prepared in Support of the 2021 Region L Regional Water Plan

Texas Water Development Board

Dr. John R. Ellis
Water Use, Projections, & Planning Division
Texas Water Development Board

November 2019

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Executive Summary

Evaluating the social and economic impacts of not meeting identified water needs is a required analysis in the regional water planning process. The Texas Water Development Board (TWDB) estimates these impacts for regional water planning groups (RWPGs) and summarizes the impacts in the state water plan. The analysis presented is for the South Central Texas Regional Water Planning Group (Region L).

Based on projected water demands and existing water supplies, Region L identified water needs (potential shortages) that could occur within its region under a repeat of the drought of record for six water use categories (irrigation, livestock, manufacturing, mining, municipal and steam-electric power). The TWDB then estimated the annual socioeconomic impacts of those needs—if they are not met—for each water use category and as an aggregate for the region.

This analysis was performed using an economic impact modeling software package, IMPLAN (Impact for Planning Analysis), as well as other economic analysis techniques, and represents a snapshot of socioeconomic impacts that may occur during a single year repeat of the drought of record with the further caveat that no mitigation strategies are implemented. Decade specific impact estimates assume that growth occurs, and future shocks are imposed on an economy at 10-year intervals. The estimates presented are not cumulative (i.e., summing up expected impacts from today up to the decade noted), but are simply snapshots of the estimated annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated water supplies and demands for that same decade.

For regional economic impacts, income losses and job losses are estimated within each planning decade (2020 through 2070). The income losses represent an approximation of gross domestic product (GDP) that would be foregone if water needs are not met.

The analysis also provides estimates of financial transfer impacts, which include tax losses (state, local, and utility tax collections); water trucking costs; and utility revenue losses. In addition, social impacts are estimated, encompassing lost consumer surplus (a welfare economics measure of consumer wellbeing); as well as population and school enrollment losses.

IMPLAN data reported that Region L generated close to $148 billion in GDP (2018 dollars) and supported roughly 1.6 million jobs in 2016. The Region L estimated total population was approximately 2.9 million in 2016.

It is estimated that not meeting the identified water needs in Region L would result in an annually combined lost income impact of approximately $16.6 billion in 2020, and $9.3 billion in 2070 (Table ES-1). It is also estimated that the region would lose approximately 100,500 jobs in 2020, and 95,000 in 2070.

All impact estimates are in year 2018 dollars and were calculated using a variety of data sources and tools including the use of a region-specific IMPLAN model, data from TWDB annual water use estimates, the U.S. Census Bureau, Texas Agricultural Statistics Service, and the Texas Municipal League.

Table ES-1 Region L socioeconomic impact summary

Regional Economic Impacts	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$16,571	$17,246	$14,600	$11,679	$9,674	$9,384
Job losses	100,514	107,453	96,710	86,976	85,393	94,978
Financial Transfer Impacts	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Tax losses on production and imports ($ millions)*	$1,775	$1,794	$1,433	$1,032	$740	$663
Water trucking costs ($ millions)*	$3	$4	$6	$8	$9	$13
Utility revenue losses ($ millions)*	$70	$146	$268	$400	$560	$723
Utility tax revenue losses ($ millions)*	$1	$3	$5	$7	$10	$14
Social Impacts	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Consumer surplus losses ($ millions)*	$67	$80	$118	$184	$342	$651
Population losses	18,454	19,728	17,756	15,969	15,678	17,438
School enrollment losses	3,530	3,773	3,396	3,054	2,999	3,335

* Year 2018 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

1 Introduction

Water shortages during a repeat of the drought of record would likely curtail or eliminate certain economic activity in businesses and industries that rely heavily on water. Insufficient water supplies could not only have an immediate and real impact on the regional economy in the short term, but they could also adversely and chronically affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages could disrupt activity in homes, schools and government, and could adversely affect public health and safety. For these reasons, it is important to evaluate and understand how water supply shortages during drought could impact communities throughout the state.

As part of the regional water planning process, RWPGs must evaluate the social and economic impacts of not meeting water needs (31 Texas Administrative Code §357.33 (c)). Due to the complexity of the analysis and limited resources of the planning groups, the TWDB has historically performed this analysis for the RWPGs upon their request. Staff of the TWDB's Water Use, Projections, & Planning Division designed and conducted this analysis in support of Region L, and those efforts for this region as well as the other 15 regions allow consistency and a degree of comparability in the approach.

This document summarizes the results of the analysis and discusses the methodology used to generate the results. Section 1 provides a snapshot of the region's economy and summarizes the identified water needs in each water use category, which were calculated based on the RWPG's water supply and demand established during the regional water planning process. Section 2 defines each of ten impact assessment measures used in this analysis. Section 3 describes the methodology for the impact assessment and the approaches and assumptions specific to each water use category (i.e., irrigation, livestock, manufacturing, mining, municipal, and steam-electric power). Section 4 presents the impact estimates for each water use category with results summarized for the region as a whole. Appendix A presents a further breakdown of the socioeconomic impacts by county.

1.1 Regional Economic Summary

The Region L Regional Water Planning Area generated close to $148 billion in gross domestic product (2018 dollars) and supported roughly 1.6 million jobs in 2016, according to the IMPLAN dataset utilized in this socioeconomic analysis. This activity accounted for 8.6 percent of the state's total gross domestic product of 1.73 trillion dollars for the year based on IMPLAN. Table 1-1 lists all economic sectors ranked by the total value-added to the economy in Region L. The real estate, finance, and manufacturing sectors generated more than 27 percent of the region's total value-added and were also significant sources of tax revenue. The top employers in the region were in the public administration, health care, and retail trade sectors. Region L's estimated total population was roughly 2.9 million in 2016, approximately 10 percent of the state's total.

This represents a snapshot of the regional economy as a whole, and it is important to note that not all economic sectors were included in the TWDB socioeconomic impact analysis. Data considerations prompted use of only the more water-intensive sectors within the economy because damage estimates could only be calculated for those economic sectors which had both reliable income and water use estimates.

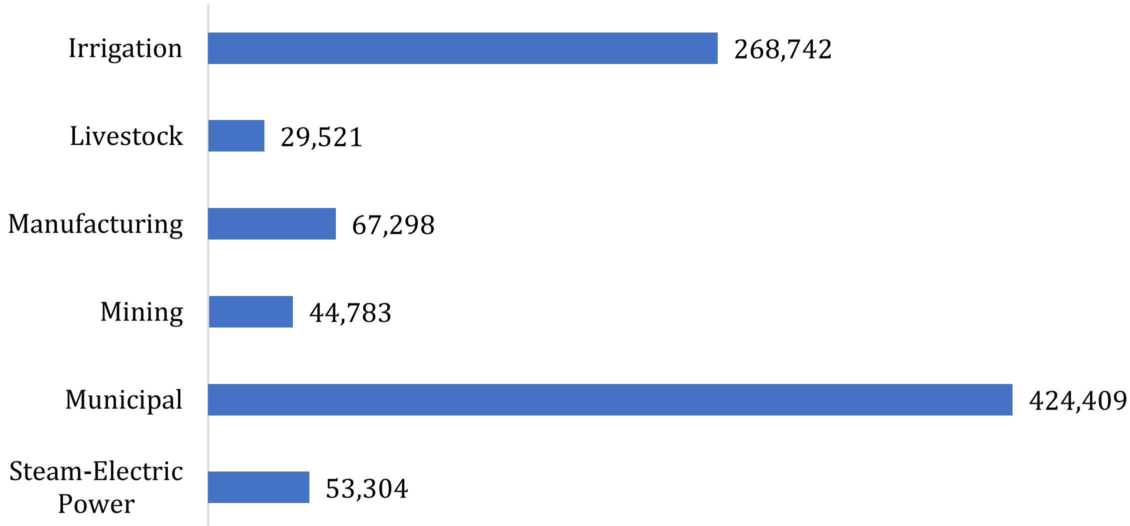
Table 1-1 Region L regional economy by economic sector*

Economic sector	Value-added ($ millions)	Tax ($ millions)	Jobs
Public Administration	$23,573.9	$(202.2)	233,720
Real Estate and Rental and Leasing	$15,515.7	$2,278.1	67,656
Finance and Insurance	$13,382.4	$1,120.4	109,447
Manufacturing	$11,484.3	$399.0	64,959
Health Care and Social Assistance	$10,396.6	$133.1	171,474
Retail Trade	$9,296.3	$2,156.9	158,939
Mining, Quarrying, and Oil and Gas Extraction	$8,492.5	$1,188.7	32,890
Professional, Scientific, and Technical Services	$8,348.1	$242.7	98,810
Wholesale Trade	$8,182.9	$1,400.0	47,605
Construction	$7,788.3	$122.6	110,766
Accommodation and Food Services	$6,028.2	$903.0	149,509
Transportation and Warehousing	$5,605.6	$194.9	52,917
Administrative and Support and Waste Management and Remediation Services	$5,103.9	$129.3	108,945
Information	$4,281.1	$953.1	25,718
Other Services (except Public Administration)	$4,150.0	$423.9	87,960
Utilities	$1,984.1	$247.7	4,421
Arts, Entertainment, and Recreation	$1,276.1	$264.1	29,315
Management of Companies and Enterprises	$1,259.6	$43.0	15,266
Educational Services	$991.2	$43.6	27,800
Agriculture, Forestry, Fishing and Hunting	$830.2	$29.7	33,150
Grand Total	$147,971.1	$12,071.5	1,631,267

*Source: 2016 IMPLAN for 536 sectors aggregated by 2-digit NAICS (North American Industry Classification System)

Figure 1-1 illustrates Region L's breakdown of the 2016 water use estimates by TWDB water use category. The categories with the highest use in Region L in 2016 were municipal (48 percent) and irrigation (30 percent). Notably, more than 26 percent of the state's mining water use occurred within Region L.

Figure 1-1 Region L 2016 water use estimates by water use category (in acre-feet)



Source: TWDB Annual Water Use Estimates (all values in acre-feet)

1.2 Identified Regional Water Needs (Potential Shortages)

As part of the regional water planning process, the TWDB adopted water demand projections for water user groups (WUG) in Region L with input from the planning group. WUG-level demand projections were established for utilities that provide more than 100 acre-feet of annual water supply, combined rural areas (designated as county-other), and county-wide water demand projections for five non-municipal categories (irrigation, livestock, manufacturing, mining and steam-electric power). The RWPG then compared demands to the existing water supplies of each WUG to determine potential shortages, or needs, by decade.

Table 1-2 summarizes the region's identified water needs in the event of a repeat of the drought of record. Demand management, such as conservation, or the development of new infrastructure to increase supplies, are water management strategies that may be recommended by the planning group to address those needs. This analysis assumes that no strategies are implemented, and that the identified needs correspond to future water shortages. Note that projected water needs generally increase over time, primarily due to anticipated population growth, economic growth, or declining supplies. To provide a general sense of proportion, total projected needs as an overall percentage of total demand by water use category are also presented in aggregate in Table 1-2. Projected needs for individual water user groups within the aggregate can vary greatly and may reach 100% for a given WUG and water use category. A detailed summary of water needs by WUG and county appears in Chapter 4 of the 2021 Region L Regional Water Plan.

Table 1-2 Regional water needs summary by water use category

Water Use Category		2020	2030	2040	2050	2060	2070
Irrigation	water needs (acre-feet per year)	131,184	131,915	134,104	136,099	137,596	140,812
	% of the category's total water demand	37%	37%	37%	38%	38%	39%
Livestock	water needs (acre-feet per year)	1,674	1,668	1,757	1,852	1,930	1,930
	% of the category's total water demand	5%	5%	6%	6%	6%	6%
Manufacturing	water needs (acre-feet per year)	10,429	12,939	13,040	13,072	13,072	13,072
	% of the category's total water demand	14%	16%	16%	16%	16%	16%
Mining	water needs (acre-feet per year)	16,147	17,125	15,491	12,786	11,170	11,578
	% of the category's total water demand	33%	34%	32%	29%	27%	28%
Municipal*	water needs (acre-feet per year)	26,557	51,105	88,889	129,728	179,452	229,740
	% of the category's total water demand	6%	11%	17%	22%	28%	33%
Steam-electric power	water needs (acre-feet per year)	21,707	21,707	21,707	21,707	21,707	21,707
	% of the category's total water demand	20%	20%	20%	20%	20%	20%
Total water needs (acre-feet per year)		**207,698**	**236,459**	**274,988**	**315,244**	**364,927**	**418,839**

* Municipal category consists of residential and non-residential (commercial and institutional) subcategories.

2 Impact Assessment Measures

A required component of the regional and state water plans is to estimate the potential economic and social impacts of potential water shortages during a repeat of the drought of record. Consistent with previous water plans, ten impact measures were estimated and are described in Table 2-1.

Table 2-1 Socioeconomic impact analysis measures

Regional economic impacts	**Description**
Income losses - value-added	The value of output less the value of intermediate consumption; it is a measure of the contribution to gross domestic product (GDP) made by an individual producer, industry, sector, or group of sectors within a year. Value-added measures used in this report have been adjusted to include the direct, indirect, and induced monetary impacts on the region.
Income losses - electrical power purchase costs	Proxy for income loss in the form of additional costs of power as a result of impacts of water shortages.
Job losses	Number of part-time and full-time jobs lost due to the shortage. These values have been adjusted to include the direct, indirect, and induced employment impacts on the region.
Financial transfer impacts	**Description**
Tax losses on production and imports	Sales and excise taxes not collected due to the shortage, in addition to customs duties, property taxes, motor vehicle licenses, severance taxes, other taxes, and special assessments less subsidies. These values have been adjusted to include the direct, indirect and induced tax impacts on the region.
Water trucking costs	Estimated cost of shipping potable water.
Utility revenue losses	Foregone utility income due to not selling as much water.
Utility tax revenue losses	Foregone miscellaneous gross receipts tax collections.
Social impacts	**Description**
Consumer surplus losses	A welfare measure of the lost value to consumers accompanying restricted water use.
Population losses	Population losses accompanying job losses.
School enrollment losses	School enrollment losses (K-12) accompanying job losses.

2.1 Regional Economic Impacts

The two key measures used to assess regional economic impacts are income losses and job losses. The income losses presented consist of the sum of value-added losses and the additional purchase costs of electrical power.

Income Losses - Value-added Losses

Value-added is the value of total output less the value of the intermediate inputs also used in the production of the final product. Value-added is similar to GDP, a familiar measure of the productivity of an economy. The loss of value-added due to water shortages is estimated by input-output analysis using the IMPLAN software package, and includes the direct, indirect, and induced monetary impacts on the region. The indirect and induced effects are measures of reduced income as well as reduced employee spending for those input sectors which provide resources to the water shortage impacted production sectors.

Income Losses - Electric Power Purchase Costs

The electrical power grid and market within the state is a complex interconnected system. The industry response to water shortages, and the resulting impact on the region, are not easily modeled using traditional input/output impact analysis and the IMPLAN model. Adverse impacts on the region will occur and are represented in this analysis by estimated additional costs associated with power purchases from other generating plants within the region or state. Consequently, the analysis employs additional power purchase costs as a proxy for the value-added impacts for the steam-electric power water use category, and these are included as a portion of the overall income impact for completeness.

For the purpose of this analysis, it is assumed that power companies with insufficient water will be forced to purchase power on the electrical market at a projected higher rate of 5.60 cents per kilowatt hour. This rate is based upon the average day-ahead market purchase price of electricity in Texas that occurred during the recent drought period in 2011. This price is assumed to be comparable to those prices which would prevail in the event of another drought of record.

Job Losses

The number of jobs lost due to the economic impact is estimated using IMPLAN output associated with each TWDB water use category. Because of the difficulty in predicting outcomes and a lack of relevant data, job loss estimates are not calculated for the steam-electric power category.

2.2 Financial Transfer Impacts

Several impact measures evaluated in this analysis are presented to provide additional detail concerning potential impacts on a portion of the economy or government. These financial transfer impact measures include lost tax collections (on production and imports), trucking costs for imported water, declines in utility revenues, and declines in utility tax revenue collected by the state. These measures are not solely adverse, with some having both positive and negative impacts. For example, cities and residents would suffer if forced to pay large costs for trucking in potable water. Trucking firms, conversely, would benefit from the transaction. Additional detail for each of these measures follows.

Tax Losses on Production and Imports

Reduced production of goods and services accompanying water shortages adversely impacts the collection of taxes by state and local government. The regional IMPLAN model is used to estimate reduced tax collections associated with the reduced output in the economy. Impact estimates for this measure include the direct, indirect, and induced impacts for the affected sectors.

Water Trucking Costs

In instances where water shortages for a municipal water user group are estimated by RWPGs to exceed 80 percent of water demands, it is assumed that water would need to be trucked in to support basic consumption and sanitation needs. For water shortages of 80 percent or greater, a fixed, maximum of $35,000[1] per acre-foot of water applied as an economic cost. This water trucking cost was utilized for both the residential and non-residential portions of municipal water needs.

Utility Revenue Losses

Lost utility income is calculated as the price of water service multiplied by the quantity of water not sold during a drought shortage. Such estimates are obtained from utility-specific pricing data provided by the Texas Municipal League, where available, for both water and wastewater. These water rates are applied to the potential water shortage to estimate forgone utility revenue as water providers sold less water during the drought due to restricted supplies.

Utility Tax Losses

Foregone utility tax losses include estimates of forgone miscellaneous gross receipts taxes. Reduced water sales reduce the amount of utility tax that would be collected by the State of Texas for water and wastewater service sales.

[1] Based on staff survey of water hauling firms and historical data concerning transport costs for potable water in the recent drought in California for this estimate. There are many factors and variables that would determine actual water trucking costs including distance to, cost of water, and length of that drought.

2.3 Social Impacts

Consumer Surplus Losses for Municipal Water Users

Consumer surplus loss is a measure of impact to the wellbeing of municipal water users when their water use is restricted. Consumer surplus is the difference between how much a consumer is willing and able to pay for a commodity (i.e., water) and how much they actually have to pay. The difference is a benefit to the consumer's wellbeing since they do not have to pay as much for the commodity as they would be willing to pay. Consumer surplus may also be viewed as an estimate of how much consumers would be willing to pay to keep the original quantity of water which they used prior to the drought. Lost consumer surplus estimates within this analysis only apply to the residential portion of municipal demand, with estimates being made for reduced outdoor and indoor residential use. Lost consumer surplus estimates varied widely by location and degree of water shortage.

Population and School Enrollment Losses

Population loss due to water shortages, as well as the associated decline in school enrollment, are based upon the job loss estimates discussed in Section 2.1. A simplified ratio of job and net population losses are calculated for the state as a whole based on a recent study of how job layoffs impact the labor market population.[2] For every 100 jobs lost, 18 people were assumed to move out of the area. School enrollment losses are estimated as a proportion of the population lost based upon public school enrollment data from the Texas Education Agency concerning the age K-12 population within the state (approximately 19%).

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[2] Foote, Andrew, Grosz, Michel, Stevens, Ann. "Locate Your Nearest Exit: Mass Layoffs and Local Labor Market Response." University of California, Davis. April 2015, http://paa2015.princeton.edu/papers/150194. The study utilized Bureau of Labor Statistics data regarding layoffs between 1996 and 2013, as well as Internal Revenue Service data regarding migration, to model the change in the population as the result of a job layoff event. The study found that layoffs impact both out-migration and in-migration into a region, and that a majority of those who did move following a layoff moved to another labor market rather than an adjacent county.

3 Socioeconomic Impact Assessment Methodology

This portion of the report provides a summary of the methodology used to estimate the potential economic impacts of future water shortages. The general approach employed in the analysis was to obtain estimates for income and job losses on the smallest geographic level that the available data would support, tie those values to their accompanying historic water use estimate, and thereby determine a maximum impact per acre-foot of shortage for each of the socioeconomic measures. The calculations of economic impacts are based on the overall composition of the economy divided into many underlying economic sectors. Sectors in this analysis refer to one or more of the 536 specific production sectors of the economy designated within IMPLAN, the economic impact modeling software used for this assessment. Economic impacts within this report are estimated for approximately 330 of these sectors, with the focus on the more water-intensive production sectors. The economic impacts for a single water use category consist of an aggregation of impacts to multiple, related IMPLAN economic sectors.

3.1 Analysis Context

The context of this socioeconomic impact analysis involves situations where there are physical shortages of groundwater or surface water due to a recurrence of drought of record conditions. Anticipated shortages for specific water users may be nonexistent in earlier decades of the planning horizon, yet population growth or greater industrial, agricultural or other sector demands in later decades may result in greater overall demand, exceeding the existing supplies. Estimated socioeconomic impacts measure what would happen if water user groups experience water shortages for a period of one year. Actual socioeconomic impacts would likely become larger as drought of record conditions persist for periods greater than a single year.

3.2 IMPLAN Model and Data

Input-Output analysis using the IMPLAN software package was the primary means of estimating the value-added, jobs, and tax related impact measures. This analysis employed regional level models to determine key economic impacts. IMPLAN is an economic impact model, originally developed by the U.S. Forestry Service in the 1970's to model economic activity at varying geographic levels. The model is currently maintained by the Minnesota IMPLAN Group (MIG Inc.) which collects and sells county and state specific data and software. The year 2016 version of IMPLAN, employing data for all 254 Texas counties, was used to provide estimates of value-added, jobs, and taxes on production for the economic sectors associated with the water user groups examined in the study. IMPLAN uses 536 sector-specific Industry Codes, and those that rely on water as a primary input were assigned to their appropriate planning water user categories (irrigation, livestock, manufacturing, mining, and municipal). Estimates of value-added for a water use category were obtained by summing value-added estimates across the relevant IMPLAN sectors associated with that water use category. These calculations were also performed for job losses as well as tax losses on production and imports.

The adjusted value-added estimates used as an income measure in this analysis, as well as the job and tax estimates from IMPLAN, include three components:

- ***Direct effects*** representing the initial change in the industry analyzed;
- ***Indirect effects*** that are changes in inter-industry transactions as supplying industries respond to reduced demands from the directly affected industries; and,
- ***Induced effects*** that reflect changes in local spending that result from reduced household income among employees in the directly and indirectly affected industry sectors.

Input-output models such as IMPLAN only capture backward linkages and do not include forward linkages in the economy.

3.3 Elasticity of Economic Impacts

The economic impact of a water need is based on the size of the water need relative to the total water demand for each water user group. Smaller water shortages, for example, less than 5 percent, are generally anticipated to result in no initial negative economic impact because water users are assumed to have a certain amount of flexibility in dealing with small shortages. As a water shortage intensifies, however, such flexibility lessens and results in actual and increasing economic losses, eventually reaching a representative maximum impact estimate per unit volume of water. To account for these characteristics, an elasticity adjustment function is used to estimate impacts for the income, tax and job loss measures. Figure 3-1 illustrates this general relationship for the adjustment functions. Negative impacts are assumed to begin accruing when the shortage reaches the lower bound 'b1' (5 percent in Figure 3-1), with impacts then increasing linearly up to the 100 percent impact level (per unit volume) once the upper bound reaches the 'b2' level shortage (40 percent in Figure 3-1).

To illustrate this, if the total annual value-added for manufacturing in the region was $2 million and the reported annual volume of water used in that industry is 10,000 acre-feet, the estimated economic measure of the water shortage would be $200 per acre-foot. The economic impact of the shortage would then be estimated using this value-added amount as the maximum impact estimate ($200 per acre-foot) applied to the anticipated shortage volume and then adjusted by the elasticity function. Using the sample elasticity function shown in Figure 3-1, an approximately 22 percent shortage in the livestock category would indicate an economic impact estimate of 50% of the original $200 per acre-foot impact value (i.e., $100 per acre-foot).

Such adjustments are not required in estimating consumer surplus, utility revenue losses, or utility tax losses. Estimates of lost consumer surplus rely on utility-specific demand curves with the lost consumer surplus estimate calculated based on the relative percentage of the utility's water shortage. Estimated changes in population and school enrollment are indirectly related to the elasticity of job losses.

Assumed values for the lower and upper bounds 'b1' and 'b2' vary by water use category and are presented in Table 3-1.

Figure 3-1 Example economic impact elasticity function (as applied to a single water user's shortage)

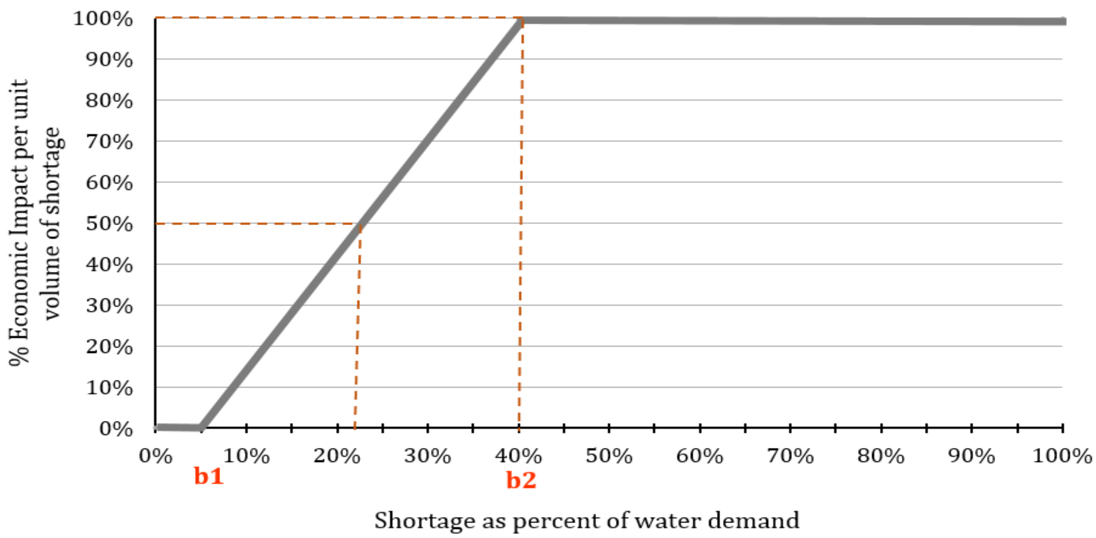

Table 3-1 Economic impact elasticity function lower and upper bounds

Water use category	Lower bound (b1)	Upper bound (b2)
Irrigation	**5%**	**40%**
Livestock	**5%**	**10%**
Manufacturing	**5%**	**40%**
Mining	**5%**	**40%**
Municipal (non-residential water intensive subcategory)	**5%**	**40%**
Steam-electric power	**N/A**	**N/A**

3.4 Analysis Assumptions and Limitations

The modeling of complex systems requires making many assumptions and acknowledging the model's uncertainty and limitations. This is particularly true when attempting to estimate a wide range of socioeconomic impacts over a large geographic area and into future decades. Some of the key assumptions and limitations of this methodology include:

1. The foundation for estimating the socioeconomic impacts of water shortages resulting from a drought are the water needs (potential shortages) that were identified by RWPGs as part of the

regional water planning process. These needs have some uncertainty associated with them but serve as a reasonable basis for evaluating the potential impacts of a drought of record event.

2. All estimated socioeconomic impacts are snapshots for years in which water needs were identified (i.e., 2020, 2030, 2040, 2050, 2060, and 2070). The estimates are independent and distinct "what if" scenarios for each particular year, and water shortages are assumed to be temporary events resulting from a single year recurrence of drought of record conditions. The evaluation assumed that no recommended water management strategies are implemented. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals, and the resulting impacts are estimated. Note that the estimates presented are not cumulative (i.e., summing up expected impacts from today up to the decade noted), but are simply snapshots of the estimated annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated water supplies and demands for that same decade.

3. Input-output models such as IMPLAN rely on a static profile of the structure of the economy as it appears today. This presumes that the relative contributions of all sectors of the economy would remain the same, regardless of changes in technology, availability of limited resources, and other structural changes to the economy that may occur in the future. Changes in water use efficiency will undoubtedly take place in the future as supplies become more stressed. Use of the static IMPLAN structure was a significant assumption and simplification considering the 50-year time period examined in this analysis. To presume an alternative future economic makeup, however, would entail positing many other major assumptions that would very likely generate as much or more error.

4. This is not a form of cost-benefit analysis. That approach to evaluating the economic feasibility of a specific policy or project employs discounting future benefits and costs to their present value dollars using some assumed discount rate. The methodology employed in this effort to estimate the economic impacts of future water shortages did not use any discounting methods to weigh future costs differently through time.

5. All monetary values originally based upon year 2016 IMPLAN and other sources are reported in constant year 2018 dollars to be consistent with the water management strategy requirements in the State Water Plan.

6. IMPLAN based loss estimates (income-value-added, jobs, and taxes on production and imports) are calculated only for those IMPLAN sectors for which the TWDB's Water Use Survey (WUS) data was available and deemed reliable. Every effort is made in the annual WUS effort to capture all relevant firms who are significant water users. Lack of response to the WUS, or omission of relevant firms, impacts the loss estimates.

7. Impacts are annual estimates. The socioeconomic analysis does not reflect the full extent of impacts that might occur as a result of persistent water shortages occurring over an extended duration. The drought of record in most regions of Texas lasted several years.

8. Value-added estimates are the primary estimate of the economic impacts within this report. One may be tempted to add consumer surplus impacts to obtain an estimate of total adverse economic impacts to the region, but the consumer surplus measure represents the change to the wellbeing of households (and other water users), not an actual change in the flow of dollars through the economy. The two measures (value-added and consumer surplus) are both valid impacts but ideally should not be summed.

9. The value-added, jobs, and taxes on production and import impacts include the direct, indirect and induced effects to capture backward linkages in the economy described in Section 2.1. Population and school enrollment losses also indirectly include such effects as they are based on the associated losses in employment. The remaining measures (consumer surplus, utility revenue, utility taxes, additional electrical power purchase costs, and potable water trucking costs), however, do not include any induced or indirect effects.

10. The majority of impacts estimated in this analysis may be more conservative (i.e., smaller) than those that might actually occur under drought of record conditions due to not including impacts in the forward linkages in the economy. Input-output models such as IMPLAN only capture backward linkages on suppliers (including households that supply labor to directly affected industries). While this is a common limitation in this type of economic modeling effort, it is important to note that forward linkages on the industries that use the outputs of the directly affected industries can also be very important. A good example is impacts on livestock operators. Livestock producers tend to suffer substantially during droughts, not because there is not enough water for their stock, but because reductions in available pasture and higher prices for purchased hay have significant economic effects on their operations. Food processors could be in a similar situation if they cannot get the grains or other inputs that they need. These effects are not captured in IMPLAN, resulting in conservative impact estimates.

11. The model does not reflect dynamic economic responses to water shortages as they might occur, nor does the model reflect economic impacts associated with a recovery from a drought of record including:
    a. The likely significant economic rebound to some industries immediately following a drought, such as landscaping;
    b. The cost and time to rebuild liquidated livestock herds (a major capital investment in that industry);
    c. Direct impacts on recreational sectors (i.e., stranded docks and reduced tourism); or,
    d. Impacts of negative publicity on Texas' ability to attract population and business in the event that it was not able to provide adequate water supplies for the existing economy.

12. Estimates for job losses and the associated population and school enrollment changes may exceed what would actually occur. In practice, firms may be hesitant to lay off employees, even in difficult economic times. Estimates of population and school enrollment changes are based on regional evaluations and therefore do not necessarily reflect what might occur on a statewide basis.

13. **The results must be interpreted carefully. It is the general and relative magnitudes of impacts as well as the changes of these impacts over time that should be the focus rather than the absolute numbers.** Analyses of this type are much better at predicting relative percent differences brought about by a shock to a complex system (i.e., a water shortage) than the precise size of an impact. To illustrate, assuming that the estimated economic impacts of a drought of record on the manufacturing and mining water user categories are $2 and $1 million, respectively, one should be more confident that the economic impacts on manufacturing are twice as large as those on mining and that these impacts will likely be in the millions of dollars. But one should have less confidence that the actual total economic impact experienced would be $3 million.

14. The methodology does not capture "spillover" effects between regions – or the secondary impacts that occur outside of the region where the water shortage is projected to occur.

15. The methodology that the TWDB has developed for estimating the economic impacts of unmet water needs, and the assumptions and models used in the analysis, are specifically designed to estimate potential economic effects at the regional and county levels. Although it may be tempting to add the regional impacts together in an effort to produce a statewide result, the TWDB cautions against that approach for a number of reasons. The IMPLAN modeling (and corresponding economic multipliers) are all derived from regional models – a statewide model of Texas would produce somewhat different multipliers. As noted in point 14 within this section, the regional modeling used by TWDB does not capture spillover losses that could result in other regions from unmet needs in the region analyzed, or potential spillover gains if decreased production in one region leads to increases in production elsewhere. The assumed drought of record may also not occur in every region of Texas at the same time, or to the same degree.

4 Analysis Results

This section presents estimates of potential economic impacts that could reasonably be expected in the event of water shortages associated with a drought of record and if no recommended water management strategies were implemented. Projected economic impacts for the six water use categories (irrigation, livestock, manufacturing, mining, municipal, and steam-electric power) are reported by decade.

4.1 Impacts for Irrigation Water Shortages

Fifteen of the 21 counties in the region are projected to experience water shortages in the irrigated agriculture water use category for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 4-1. Note that tax collection impacts were not estimated for this water use category. IMPLAN data indicates a negative tax impact (i.e., increased tax collections) for the associated production sectors, primarily due to past subsidies from the federal government. However, it was not considered realistic to report increasing tax revenues during a drought of record.

Table 4-1 Impacts of water shortages on irrigation in Region L

Impact measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$66	$66	$67	$67	$67	$68
Job losses	1,217	1,225	1,232	1,234	1,238	1,267

* Year 2018 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.2 Impacts for Livestock Water Shortages

Eleven of the 21 counties in the region are projected to experience water shortages in the livestock water use category for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 4-2.

Table 4-2 Impacts of water shortages on livestock in Region L

Impact measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$18	$18	$20	$21	$23	$23
Jobs losses	664	660	731	772	820	820
Tax losses on production and imports ($ millions)*	$1	$1	$1	$1	$1	$1

* Year 2018 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.3 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the region are projected to occur in five of the 21 counties in the region for at least one decade of the planning horizon. Estimated impacts to this water use category appear in Table 4-3.

Table 4-3 Impacts of water shortages on manufacturing in Region L

Impacts measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$3,349	$4,250	$4,283	$4,296	$4,296	$4,296
Job losses	21,100	27,846	28,069	28,155	28,155	28,155
Tax losses on production and Imports ($ millions)*	$221	$279	$281	$282	$282	$282

* Year 2018 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.4 Impacts of Mining Water Shortages

Mining water shortages in the region are projected to occur in 12 of the 21 counties in the region for one or more decades within the planning horizon. Estimated impacts to this water use type appear in Table 4-4.

Table 4-4 Impacts of water shortages on mining in Region L

Impacts measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$11,992	$11,666	$8,617	$5,081	$2,229	$985
Job losses	70,538	68,993	51,650	31,445	15,269	8,466
Tax losses on production and Imports ($ millions)*	$1,514	$1,465	$1,067	$608	$235	$67

* Year 2018 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.5 Impacts for Municipal Water Shortages

Sixteen of the 21 counties in the region are projected to experience water shortages in the municipal water use category for one or more decades within the planning horizon.

Impact estimates were made for two sub-categories within municipal water use: residential and non-residential. Non-residential municipal water use includes commercial and institutional users, which are further divided into non-water-intensive and water-intensive subsectors including car wash, laundry, hospitality, health care, recreation, and education. Lost consumer surplus estimates were made only for needs in the residential portion of municipal water use. Available IMPLAN and TWDB Water Use Survey data for the non-residential, water-intensive portion of municipal demand allowed these sectors to be included in income, jobs, and tax loss impact estimate.

Trucking cost estimates, calculated for shortages exceeding 80 percent, assumed a fixed, maximum cost of $35,000 per acre-foot to transport water for municipal use. The estimated impacts to this water use category appear in Table 4-5.

Table 4-5 Impacts of water shortages on municipal water users in Region L

Impacts measure	2020	2030	2040	2050	2060	2070
Income losses[1] ($ millions)*	$407	$507	$873	$1,474	$2,321	$3,273
Job losses[1]	6,995	8,729	15,028	25,370	39,911	56,270
Tax losses on production and imports[1] ($ millions)*	$39	$49	$84	$142	$223	$314
Trucking costs ($ millions)*	$3	$4	$6	$8	$9	$13
Utility revenue losses ($ millions)*	$70	$146	$268	$400	$560	$723
Utility tax revenue losses ($ millions)*	$1	$3	$5	$7	$10	$14

[1] Estimates apply to the water-intensive portion of non-residential municipal water use.
* Year 2018 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.6 Impacts of Steam-Electric Water Shortages

Steam-electric water shortages in the region are projected to occur in two of the 21 counties in the region for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 4-6.

Note that estimated economic impacts to steam-electric water users:

- Are reflected as an income loss proxy in the form of estimated additional purchasing costs for power from the electrical grid to replace power that could not be generated due to a shortage;
- Do not include estimates of impacts on jobs. Because of the unique conditions of power generators during drought conditions and lack of relevant data, it was assumed that the industry would retain, perhaps relocating or repurposing, their existing staff in order to manage their ongoing operations through a severe drought.
- Do not presume a decline in tax collections. Associated tax collections, in fact, would likely increase under drought conditions since, historically, the demand for electricity increases during times of drought, thereby increasing taxes collected on the additional sales of power.

Table 4-6 Impacts of water shortages on steam-electric power in Region L

Impacts measure	2020	2030	2040	2050	2060	2070
Income Losses ($ millions)*	$740	$740	$740	$740	$740	$740

* Year 2018 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

4.7 Regional Social Impacts

Projected changes in population, based upon several factors (household size, population, and job loss estimates), as well as the accompanying change in school enrollment, were also estimated and are summarized in Table 4-7.

Table 4-7 Region-wide social impacts of water shortages in Region L

Impacts measure	2020	2030	2040	2050	2060	2070
Consumer surplus losses ($ millions)*	$67	$80	$118	$184	$342	$651
Population losses	18,454	19,728	17,756	15,969	15,678	17,438
School enrollment losses	3,530	3,773	3,396	3,054	2,999	3,335

* Year 2018 dollars, rounded. Entries denoted by a dash (-) indicate no estimated economic impact. Entries denoted by a zero ($0) indicate estimated income losses less than $500,000.

Appendix A - County Level Summary of Estimated Economic Impacts for Region L

County level summary of estimated economic impacts of not meeting identified water needs by water use category and decade (in 2018 dollars, rounded). Values are presented only for counties with projected economic impacts for at least one decade.
(* Entries denoted by a dash (-) indicate no estimated economic impact)

		Income losses (Million $)*						Job losses					
County	Water Use Category	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070
ATASCOSA	MUNICIPAL	$6.52	$8.70	$12.68	$16.54	$20.57	$24.16	112	150	218	285	354	416
ATASCOSA Total		**$6.52**	**$8.70**	**$12.68**	**$16.54**	**$20.57**	**$24.16**	**112**	**150**	**218**	**285**	**354**	**416**
BEXAR	IRRIGATION	$0.92	$0.92	$0.92	$0.92	$0.92	$0.92	19	19	19	19	19	19
BEXAR	MUNICIPAL	$102.48	$113.74	$254.91	$517.90	$907.12	$1,401.82	1,765	1,958	4,389	8,918	15,620	24,139
BEXAR	STEAM ELECTRIC POWER	$94.79	$94.79	$94.79	$94.79	$94.79	$94.79	-	-	-	-	-	-
BEXAR Total		**$198.18**	**$209.44**	**$350.62**	**$613.61**	**$1,002.83**	**$1,497.53**	**1,784**	**1,978**	**4,409**	**8,937**	**15,640**	**24,158**
CALDWELL	MUNICIPAL	$1.21	$1.61	$4.71	$10.35	$22.89	$38.76	20	26	77	174	389	662
CALDWELL Total		**$1.21**	**$1.61**	**$4.71**	**$10.35**	**$22.89**	**$38.76**	**20**	**26**	**77**	**174**	**389**	**662**
CALHOUN	IRRIGATION	$2.32	$2.32	$2.32	$2.32	$2.32	$2.32	54	54	54	54	54	54
CALHOUN	LIVESTOCK	$3.26	$3.26	$3.26	$3.26	$3.26	$3.26	147	147	147	147	147	147
CALHOUN	MINING	$13.51	$14.10	$10.57	$7.05	$2.68	$1.01	96	100	75	50	19	7
CALHOUN	MUNICIPAL	-	-	$0.00	$0.06	$0.15	$0.29	-	-	0	1	3	5
CALHOUN Total		**$19.09**	**$19.68**	**$16.15**	**$12.68**	**$8.41**	**$6.87**	**297**	**301**	**276**	**252**	**223**	**213**
COMAL	IRRIGATION	$0.01	$0.01	$0.01	$0.01	$0.01	$0.01	0	0	0	0	0	0
COMAL	MANUFACTURING	$1,900.96	$2,571.00	$2,571.00	$2,571.00	$2,571.00	$2,571.00	16,829	22,761	22,761	22,761	22,761	22,761
COMAL	MINING	$327.57	$440.34	$548.92	$643.67	$762.34	$895.31	2,907	3,908	4,872	5,713	6,766	7,946
COMAL	MUNICIPAL	$35.17	$74.22	$189.22	$350.61	$472.41	$587.96	606	1,278	3,258	6,037	8,135	10,125
COMAL Total		**$2,263.71**	**$3,085.57**	**$3,309.15**	**$3,565.30**	**$3,805.77**	**$4,054.28**	**20,342**	**27,947**	**30,891**	**34,511**	**37,662**	**40,832**
DEWITT	IRRIGATION	$0.26	$0.26	$0.19	$0.19	-	-	6	6	4	4	-	-
DEWITT	MANUFACTURING	-	$0.65	-	-	-	-	-	9	-	-	-	-
DEWITT	MINING	$1,674.17	$1,554.31	$115.83	-	-	-	9,704	9,010	671	-	-	-
DEWITT Total		**$1,674.44**	**$1,555.23**	**$116.02**	**$0.19**	**-**	**-**	**9,710**	**9,024**	**675**	**4**	**-**	**-**
DIMMIT	IRRIGATION	$3.97	$3.97	$3.97	$3.97	$3.97	$3.97	65	65	65	65	65	65
DIMMIT	MINING	$4,116.25	$4,202.00	$3,558.84	$2,089.31	$622.70	$18.57	23,860	24,357	20,629	12,111	3,609	108
DIMMIT Total		**$4,120.22**	**$4,205.97**	**$3,562.81**	**$2,093.27**	**$626.67**	**$22.54**	**23,925**	**24,422**	**20,694**	**12,176**	**3,674**	**173**

County	Water Use Category	Income losses (Million $)* 2020	2030	2040	2050	2060	2070	Job losses 2020	2030	2040	2050	2060	2070
FRIO	IRRIGATION	-	-	-	-	$0.30	$0.91	-	-	-	-	7	20
FRIO	MUNICIPAL	$10.81	$16.41	$21.97	$26.05	$29.61	$32.90	186	283	378	449	510	567
FRIO Total		**$10.81**	**$16.41**	**$21.97**	**$26.05**	**$29.91**	**$33.81**	**186**	**283**	**378**	**449**	**516**	**586**
GOLIAD	IRRIGATION	$0.03	$0.03	$0.03	$0.03	$0.03	$0.03	1	1	1	1	1	1
GOLIAD	MUNICIPAL	$0.18	$0.14	$0.11	$0.11	$0.10	$0.10	3	2	2	2	2	2
GOLIAD Total		**$0.21**	**$0.17**	**$0.15**	**$0.14**	**$0.13**	**$0.13**	**4**	**3**	**3**	**3**	**3**	**3**
GUADALUPE	MANUFACTURING	-	$17.48	$17.48	$17.48	$17.48	$17.48	-	179	179	179	179	179
GUADALUPE	MUNICIPAL	$0.03	$0.05	$8.19	$58.02	$144.05	$205.33	1	1	141	999	2,480	3,536
GUADALUPE Total		**$0.03**	**$17.53**	**$25.67**	**$75.50**	**$161.53**	**$222.81**	**1**	**179**	**320**	**1,178**	**2,659**	**3,714**
HAYS	LIVESTOCK	$8.58	$8.58	$8.58	$8.58	$8.58	$8.58	261	261	261	261	261	261
HAYS	MUNICIPAL	$2.56	$12.63	$73.92	$152.60	$322.83	$505.05	40	217	1,267	2,616	5,510	8,606
HAYS Total		**$11.14**	**$21.22**	**$82.51**	**$161.19**	**$331.41**	**$513.63**	**301**	**478**	**1,528**	**2,876**	**5,771**	**8,867**
KARNES	IRRIGATION	$0.13	$0.13	$0.68	$0.68	$0.68	$0.68	2	2	12	12	12	12
KARNES	MANUFACTURING	-	-	$34.37	$47.14	$47.14	$47.14	-	-	232	319	319	319
KARNES	MINING	$1,876.79	$1,319.99	$743.71	$109.72	$11.62	$0.97	10,879	7,651	4,311	636	67	6
KARNES	MUNICIPAL	$5.16	$5.08	$4.66	$4.57	$6.57	$6.40	89	88	80	79	113	110
KARNES Total		**$1,882.09**	**$1,325.20**	**$783.41**	**$162.10**	**$66.00**	**$55.19**	**10,970**	**7,741**	**4,635**	**1,045**	**511**	**446**
KENDALL	MUNICIPAL	-	$2.14	$4.91	$8.12	$31.23	$75.35	-	37	85	140	538	1,297
KENDALL Total		**-**	**$2.14**	**$4.91**	**$8.12**	**$31.23**	**$75.35**	**-**	**37**	**85**	**140**	**538**	**1,297**
LA SALLE	IRRIGATION	$0.19	$0.19	$0.20	$0.21	$0.22	$0.23	6	6	6	7	7	7
LA SALLE	MINING	$3,983.72	$4,134.76	$3,638.75	$2,231.58	$829.29	$68.54	23,092	23,967	21,092	12,935	4,807	397
LA SALLE Total		**$3,983.91**	**$4,134.96**	**$3,638.95**	**$2,231.80**	**$829.51**	**$68.77**	**23,098**	**23,973**	**21,099**	**12,942**	**4,814**	**405**
MEDINA	IRRIGATION	$18.46	$18.63	$18.60	$18.76	$18.85	$19.40	353	356	355	359	360	371
MEDINA	MINING	-	-	-	-	-	$0.25	-	-	-	-	-	2
MEDINA	MUNICIPAL	$16.32	$20.84	$25.35	$30.35	$34.73	$38.37	281	359	437	523	598	661
MEDINA Total		**$34.78**	**$39.48**	**$43.95**	**$49.11**	**$53.58**	**$58.02**	**634**	**715**	**792**	**881**	**958**	**1,034**
UVALDE	IRRIGATION	$25.48	$25.64	$25.72	$25.87	$26.05	$26.25	455	458	460	462	466	469
UVALDE	LIVESTOCK	$5.38	$5.28	$6.53	$8.19	$9.42	$9.42	207	203	251	315	362	362
UVALDE	MUNICIPAL	$60.80	$68.72	$75.60	$83.44	$91.59	$99.55	1,047	1,183	1,302	1,437	1,577	1,714
UVALDE Total		**$91.66**	**$99.65**	**$107.85**	**$117.51**	**$127.06**	**$135.23**	**1,709**	**1,845**	**2,013**	**2,214**	**2,405**	**2,546**
VICTORIA	IRRIGATION	$1.44	$1.44	$1.44	$1.44	$1.44	$1.44	33	33	33	33	33	33
VICTORIA	MANUFACTURING	$1,447.95	$1,660.38	$1,660.38	$1,660.38	$1,660.38	$1,660.38	4,270	4,897	4,897	4,897	4,897	4,897
VICTORIA	MUNICIPAL	$164.14	$179.88	$192.09	$204.46	$216.14	$226.15	2,826	3,097	3,308	3,521	3,722	3,894
VICTORIA	STEAM ELECTRIC POWER	$644.82	$644.82	$644.82	$644.82	$644.82	$644.82	-	-	-	-	-	-

County	Water Use Category	Income losses (Million $)* 2020	2030	2040	2050	2060	2070	Job losses 2020	2030	2040	2050	2060	2070
VICTORIA Total		**$2,258.36**	**$2,486.52**	**$2,498.74**	**$2,511.10**	**$2,522.79**	**$2,532.80**	**7,130**	**8,027**	**8,237**	**8,450**	**8,651**	**8,824**
WILSON	IRRIGATION	$0.82	$0.83	$0.84	$0.85	$0.93	$1.12	18	18	18	18	20	24
WILSON	LIVESTOCK	$1.25	$1.25	$1.80	$1.25	$1.25	$1.25	50	50	72	50	50	50
WILSON	MUNICIPAL	$1.13	$2.85	$4.96	$11.07	$20.87	$31.14	19	49	85	191	359	536
WILSON Total		**$3.20**	**$4.93**	**$7.60**	**$13.16**	**$23.06**	**$33.51**	**87**	**117**	**176**	**259**	**429**	**610**
ZAVALA	IRRIGATION	$11.74	$11.80	$11.67	$11.46	$11.14	$10.98	205	206	204	200	195	192
ZAVALA Total		**$11.74**	**$11.80**	**$11.67**	**$11.46**	**$11.14**	**$10.98**	**205**	**206**	**204**	**200**	**195**	**192**
REGION L Total		**$16,571.30**	**$17,246.20**	**$14,599.51**	**$11,679.18**	**$9,674.50**	**$9,384.38**	**100,514**	**107,453**	**96,710**	**86,976**	**85,393**	**94,978**

FINAL PLAN

CHAPTER 7: DROUGHT RESPONSE INFORMATION, ACTIVITIES, AND RECOMMENDATIONS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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BFZ	Balcones Fault Zone
cfs	Cubic Feet per Second
DCP	Drought Contingency Plan
EAA	Edwards Aquifer Authority
El	Elevation
ft-msl	Feet Mean Sea Level
GBRA	Guadalupe-Blanco River Authority
GSA	Guadalupe-San Antonio
EAHCP	Edwards Aquifer Habitat Conservation Plan
MAG	Modeled Available Groundwater
NCDC	National Climatic Data Center
PDSI	Palmer Drought Severity Index
RWA	Regional Water Alliance
SAWS	San Antonio Water System
SCTRWP	South Central Texas Regional Water Plan
SCTRWPG	South Central Texas Regional Water Planning Group
SUD	Special Utility District
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board
USGS	United States Geological Survey
VISPO	Voluntary Irrigation Suspension Program Option
WAM	Water Availability Model
WCID	Water Control and Improvement District
WMS	Water Management Strategy
WSC	Water Supply Corporation
WTP	Water Treatment Plant
WUG	Water User Group
WWP	Wholesale Water Provider

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CHAPTER 7: DROUGHT RESPONSE INFORMATION, ACTIVITIES, AND RECOMMENDATIONS

Droughts are of great importance to the planning and management of water resources in Texas. Although droughts can occur in all climatic zones, they have the greatest potential to become environmental disasters in dry or arid regions such as Texas. It is not uncommon for mild droughts to occur over short periods of time in Texas; however, there is no concrete way to predict how long or severe a drought will be while it is occurring. The only defense available to drought-prone water user groups (WUGs), such as those in the South Central Texas Region (Region L), is proper planning and preparation for worst-case scenarios. This requires understanding of drought patterns and the historical droughts in the region.

Because of significant population growth throughout Texas, which is expected to continue in the Region L area according to Texas Water Development Board (TWDB) projections, the demand for water has increased. With growing demand and the threat of climate change contributing to water scarcity, planning is even more important to prevent shortages, deterioration of water quality, and lifestyle/financial impacts on water suppliers and users. This chapter presents information on drought preparedness in the South Central Texas Region, including regional droughts of record, current drought preparations and response, existing and potential emergency interconnects, emergency responses to local drought conditions, region-specific drought response recommendations, drought water management strategies (WMSs), and other drought-related considerations and recommendations.

7.1 DROUGHTS OF RECORD IN THE REGIONAL WATER PLANNING AREA

One of the best tools in drought preparedness is a thorough understanding of the drought of record, or the worst drought to occur for an area during the available period of record. However, there are many ways that the "worst drought" can be defined (degree of dryness, agricultural impacts, socioeconomic impacts, effects of precipitation, etc.). Regional water planning focuses on hydrological drought, which is typically the type of drought associated with the largest shortfalls in surface and/or subsurface water supply. The frequency and severity of hydrological drought is often defined on a watershed or river basin scale, although it could be different from one area to the next, even within a planning region.

7.1.1 Current Drought of Record

In terms of severity and duration, the devastating drought of the 1950s is considered the drought of record for most of the state, including the South Central Texas Region. By 1956, 244 of the 254 counties were considered disaster areas. This drought lasted almost a decade in many places and affected not only Texas but other states throughout the nation as well. The 1950s drought has been used by water resource engineers and managers as a benchmark drought for water supply planning since the regional water planning process was implemented.

For the Guadalupe-San Antonio (GSA) River Basin within the South Central Texas Region, the drought of the 1950s remains the drought of record. In the upper portions of the GSA River Basin, the 1950s drought generally started in summer of 1947 and continued into early 1957. In the lower basin area near the Gulf Coast, the drought generally was a 3 year period between 1954 and 1956.

Until recently, the 1950s drought was the drought of record for the Nueces River Basin as well. However, the 1990s drought was severe and prolonged enough that it is now considered the drought of record for the Nueces River Basin within the South Central Texas Region.

7.1.2 Potential Droughts of Record

Although the 1950s and 1990s droughts are considered the drought of record for the GSA River Basin and the Nueces River Basin, respectively, there have been several droughts that have been considered as potential droughts of records. Two recent droughts, in 2008 and 2011, have been discussed, but not widely accepted, as potential new droughts of record for parts of the state.

In 2011, decreased precipitation led to substantial declines in streamflow throughout the state, resulting in severe drought. Record high temperatures also occurred June through August, leading to increased evaporation rates. The net evaporation was so high that by August 4, 2011, state climatologist John Nielson-Gammon declared 2011 to be the worst one-year drought on record in Texas.[1] The 2011 water year statewide annual precipitation was 11.27 inches, more than 2 inches below the previous record in 1956 of 13.91 inches. While the 2011 water year drought was severe and can provide helpful information to water planners and managers throughout the state, the duration of the 1950s and 1990s droughts combined with the overall severity in the South Central Texas Region suggests that these are still the best choices as the drought of record for regional planning purposes for the GSA River Basin and the Nueces River Basin, respectively.

7.1.3 Drought Indicators

7.1.3.1 Water Availability Modeling

Engineers and planners often use surface water models to demonstrate the effects of historical droughts on water supply. Surface water effects are more readily observed than groundwater effects, and reservoir supplies that were not built before historic droughts can be assessed using historic hydrology. The primary tool used to observe the performance of reservoirs and surface water supplies under historic drought conditions in the South Central Texas Region is the Texas Commission on Environmental Quality (TCEQ) water availability model (WAM). The TCEQ has developed WAMs for individual river and coastal basins. For the South Central Texas Region, the relevant WAMs include the GSA River Basin WAM, Nueces River Basin WAM, Lavaca-Guadalupe Coastal Basin WAM, San Antonio-Nueces Coastal Basin WAM, and Nueces-Rio Grande Coastal Basin WAM.

The GSA WAM is used for the South Central Texas Regional Water Plan (SCTRWP) to determine the available flow and firm yields for surface water projects and to observe the cumulative effects on the SCTRWP. The GSA WAM includes hydrologic information from 1934 through 1989 and supports the use of the 1950s drought as the drought of record for all Region L reservoirs. The Nueces WAM includes hydrologic information from 1934 through 1996 and supports the use of the 1990s drought as the drought of record for all Region L reservoirs. However, the GSA WAM and Nueces WAM have not been

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[1] Winters, K.E. A historical perspective on precipitation, drought severity, and streamflow in Texas during 1951–56 and 2011. U.S. Geological Survey Scientific Investigations Report 2013–5113, p.1 http://pubs.usgs.gov/sir/2013/5113. 2013.

updated to include hydrology and precipitation information to assess periods of drought after 1989 and 1996, respectively.

7.1.3.2 Drought Indices

Several drought indices have been developed to assess drought severity using climatic and other quantitative inputs, such as precipitation, temperature, streamflow, soil moisture, and groundwater and reservoir levels. The Palmer Drought Severity Index (PDSI) was one of the first comprehensive efforts using precipitation and temperature for estimating the moisture of a region.[2] PDSI values range from -10 to +10. Index values greater than 0.5 correspond to wetter than normal conditions, and values lower than -3 indicate severe to extreme drought. PDSI information is available for climate regions across the country through 2019, which makes the PDSI a helpful tool for analyzing droughts that is not included in the WAMs.

Most of the South Central Texas Region lies in Texas Climate Divisions 7 and 9, with small portions contained within Climate Divisions 6 and 8 (Figure 7-1). A graph of yearly PDSI values for Texas Climate Divisions 6, 7, 8, and 9 shows that while the 1908 drought and more recent drought in the early 21st century were severe, the drought of the 1950s was the most intense over a longer period of time, supporting the continued use of this drought as the drought of record for Region L (Figure 7-2 through Figure 7-5).

[2] Data from NOAA, National Climatic Data Center (NCDC). U.S. Department of Commerce. https://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp#.

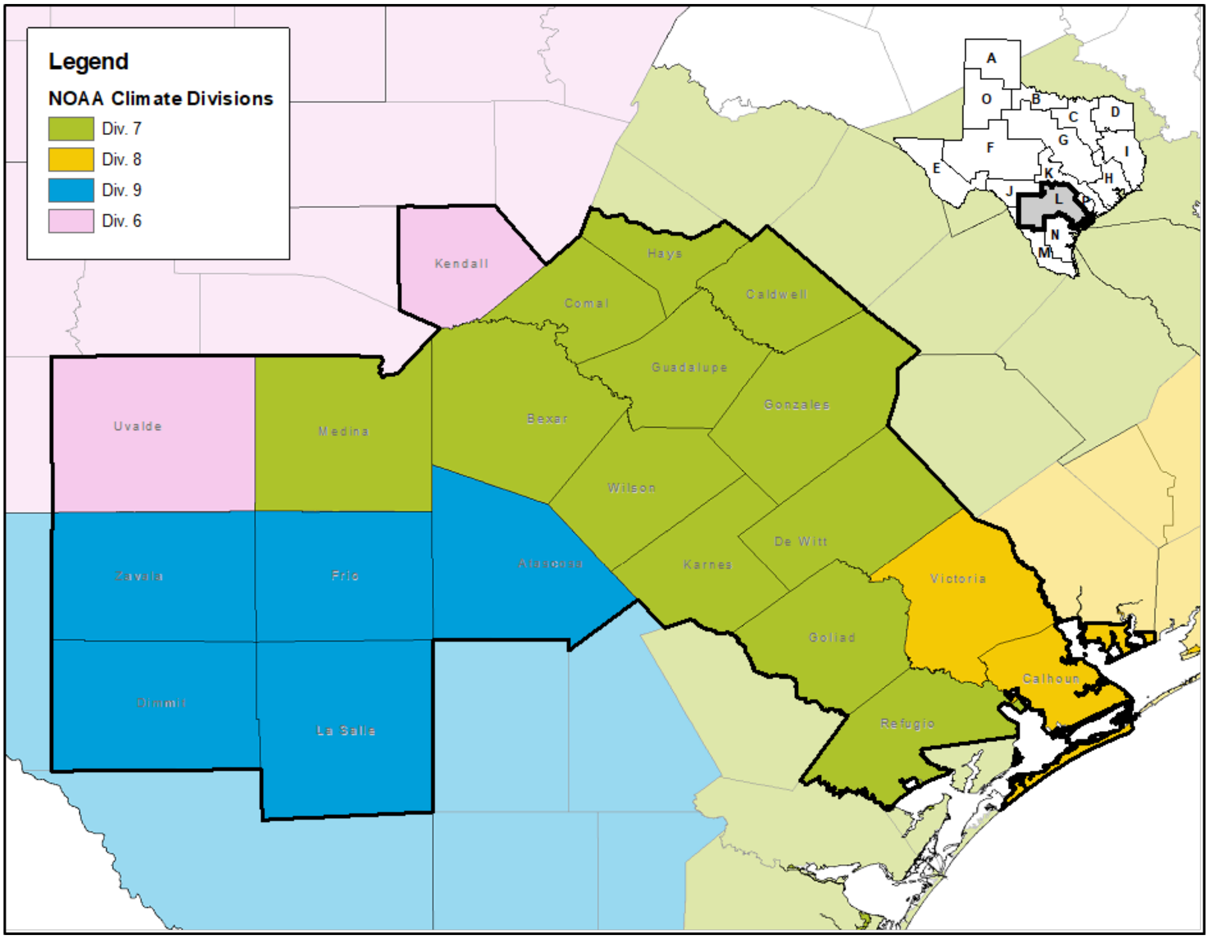

Figure 7-1 **NOAA Climate Divisions in the South Central Texas Region**

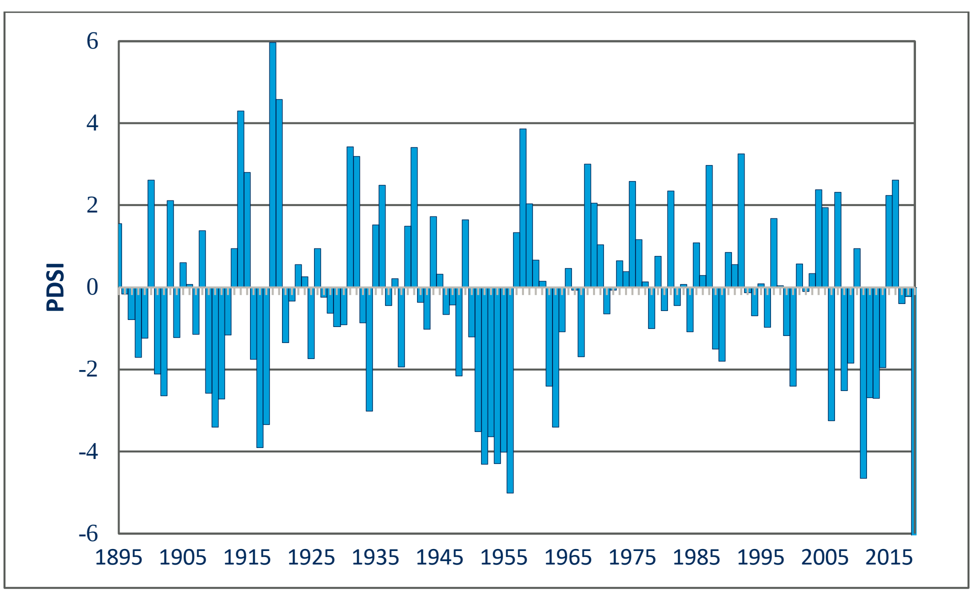

Figure 7-2 **Palmer Drought Severity Index: Division 6**

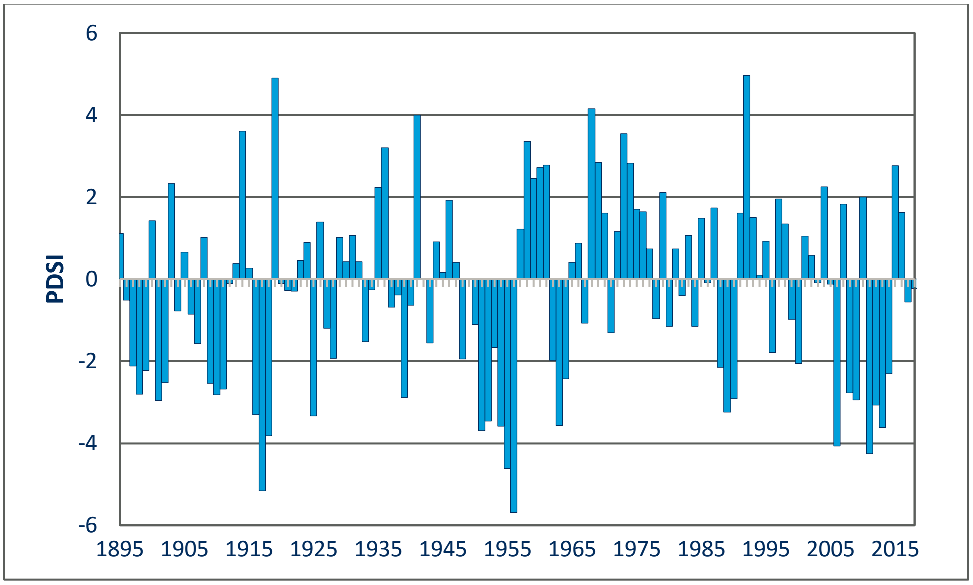

Figure 7-3 **Palmer Drought Severity Index: Division 7**

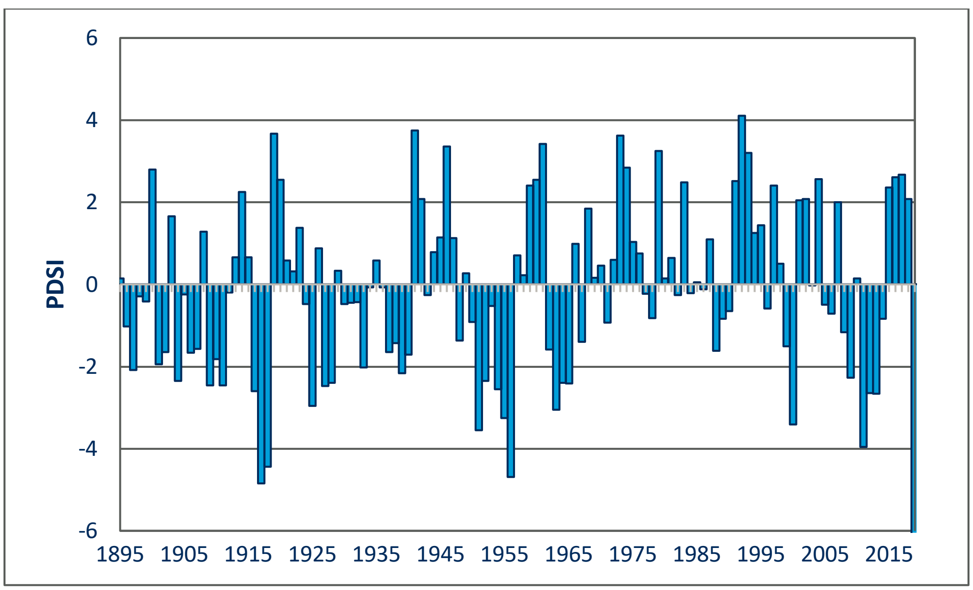

Figure 7-4 **Palmer Drought Severity Index: Division 8**

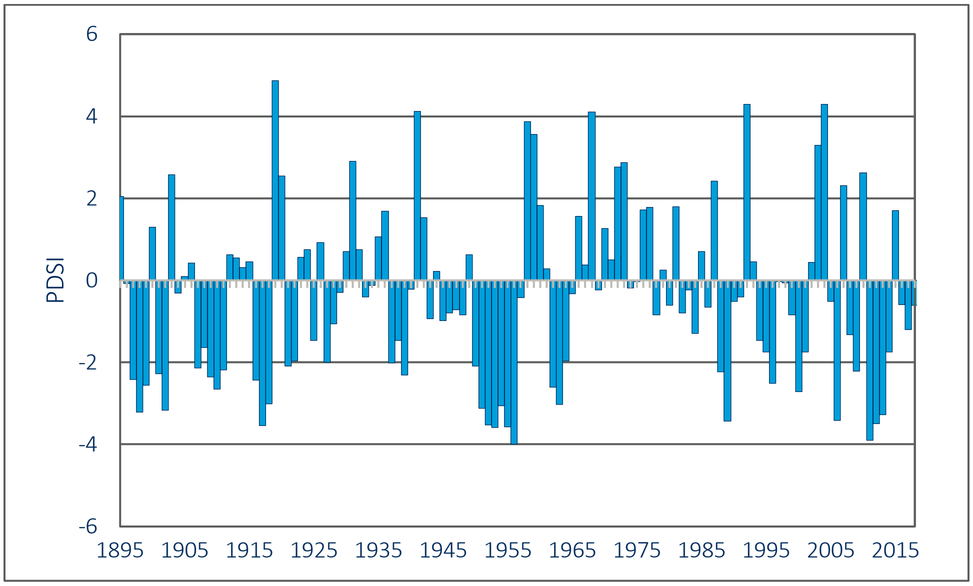

Figure 7-5 Palmer Drought Severity Index: Division 9

7.2 CURRENT DROUGHT PREPARATIONS AND RESPONSE

7.2.1 Overall Current Drought Preparations in South Central Texas Region

All WUGs in the South Central Texas Region prepare for drought by participating in the regional water planning process, which attempts to meet projected water demands during a drought of severity equivalent to the drought of record. WUGs that provide accurate information to TWDB and consider recommendations accepted by the regional water planning group should be able to supply water to customers throughout drought periods. In addition, all wholesale water providers (WWPs) and most municipalities develop individual drought contingency plans (DCPs) or emergency action plans to be implemented at various stages of a drought. Common responses include restriction of irrigation practices to certain days and times, the limitation of vehicle washing to those times or to commercial providers, and prohibiting washing of impervious surfaces. Several DCPs include restrictions on irrigation for golf courses specifically, as well as other athletic fields. Less-common responses include surcharges for usage above a certain allotment.

Throughout Texas including the GSA River Basin, water rights are issued under the prior appropriation system. Curtailment of water rights has become necessary in recent droughts. The South Texas Watermaster Program is responsible for managing surface water rights in an area in South Central Texas according to "run-of-the-river" rights. The program has jurisdiction over the GSA and Nueces river basins, as well as the Lavaca River Basin. Six watermaster deputies patrol the 50 counties in the jurisdictional area and enforce compliance with water rights.

7.2.2 Drought Response Triggers

Through timely implementation of drought response measures, it is possible to meet the goals of the DCP by avoiding, minimizing, or mitigating risks and impacts of water shortages and drought. To accomplish this, DCPs are built around a collection of drought responses and triggers that are based on various drought stages. Stages are generally similar for all DCPs but can vary from entity to entity. Stage I will normally represent mild water shortage conditions, and the severity of the situation will increase through the stages until emergency water conditions are reached and, in some cases, a water allocation stage is determined.

The South Central Texas Regional Water Planning Group (SCTRWPG) compiled stage, trigger, and response information for 26 DCPs in the region including those from WWPs, WUGs, and County-Other suppliers. The majority of the DCPs in the South Central Texas Region have a voluntary Stage I and mandatory Stage II and III categories. Most entities included a Stage IV, and a few entities specified a Stage V and/or Stage VI scenario. Target reductions, triggers, and responses are included for most stages. A summary of DCP triggers and responses for Region L entities can be found in Appendix 7-A.

In accordance with Title 31 of the Texas Administrative Code (31 TAC) §357.42(b)(2), the SCTRWPG considered whether there exists any unnecessary or counterproductive variations in drought response strategies. The SCTRWPG recognizes that each entity develops drought response measures and tailors them to their own unique circumstances and goals. In an effort to ensure that local water managers can continue to manage their local water supplies, the SCTRWPG chose to deem no variations in drought response strategies as unnecessary or counterproductive.

7.2.3 Regional Water Supplier Roles in Droughts

The Texas Commission on Environmental Quality (TCEQ) requires all wholesale public water suppliers, retail public water suppliers serving 3,300 connections or more, and irrigation districts to submit DCPs. In accordance with the requirements of Title 30 of the Texas Administrative Code (TAC) Section 288(b), DCPs must be updated every 5 years and adopted by retail public water providers. The TCEQ defines a DCP as "a strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies." According to a TCEQ handbook, the underlying philosophy of drought contingency planning is the following:

- While often unpreventable, short-term water shortages and other water supply emergencies can be anticipated;
- The potential risks and impacts of drought or other emergency conditions can be considered and evaluated in advance of an actual event; and, most importantly,
- Response measures and best management practices can be determined with implementation procedures defined, again in advance, to avoid, minimize, or mitigate the risks and impacts of drought-related shortages and other emergencies.

Model DCPs are available on TCEQ's website; however, it is not possible to create a model DCP that will adequately address local concerns throughout the State of Texas. The conditions that define a water shortage can be location-specific because most communities in the South Central Texas Region rely primarily on local water supplies. For example, some communities rely on reservoirs that are regularly operated at full conditions. In this case, a shortage could exist when the supplies are at 75 percent. Other reservoirs may rarely refill and be considered a concern at 25 percent capacity. Similarly, unique aquifer systems are considered at risk under location-specific conditions. While the approach to planning may be different between entities, all DCPs should include the following:

- Specific, quantified targets for water use reductions;
- Drought response stages;
- Triggers to begin and end each stage;
- Supply management measures;
- Demand management measures;
- Descriptions of drought indicators;
- Notification procedures;
- Enforcement procedures;
- Procedures for granting exceptions;
- Public input to the plan;
- Ongoing public education;
- Adoption of plan; and
- Coordination with regional water planning group.

For water suppliers such as those in Region L, the primary goal of DCP development is to have a plan that can ensure an uninterrupted supply of water in an amount that can satisfy essential human needs. A secondary but also important goal is to minimize negative impacts on quality of life, the economy, and the local environment. To meet these goals, action needs to be taken quickly, which is why an approved DCP needs to be in place before drought conditions occur.

In accordance with 30 TAC Section 288, most Region L entities have submitted DCPs to TCEQ for implementation when local shortages occur. The SCTRWPG obtained or referenced previously-existing DCPs for 26 WUGs and WWPs. These plans identify multiple triggers for initiation and termination of drought stages, responses to be implemented, and reduction targets for each stage. The plans also include information regarding public notification procedures and enforcement measures. Some WUGs or WWPs have included a method of granting a variance should the need arise. The most recent DCPs for each entity in the South Central Texas Region range in date from 2014 to 2020.

7.3 EXISTING AND POTENTIAL EMERGENCY INTERCONNECTS

A goal of the regional planning process is to ensure a connected supply that meets or exceeds drought of record demands for the next 50 years. However, it is also important for regions to plan for emergency supplies in the event of a prolonged drought or an interruption/impairment of supply from an existing source. An emergency interconnection between two collaborating municipal water user groups (WUGs) can serve as an alternative means of providing emergency drinking water in lieu of trucking in supply or other expensive options. In accordance with 30 TAC Section 357 regional water planning guidelines, information was collected regarding existing emergency interconnections and potential future emergency interconnections that could be used in event of an emergency shortage of water.

In 2009, an interconnection study was prepared for the Regional Water Alliance[3] (RWA) that compiled information regarding existing interconnections and proposed several potential interconnections across

[3] HDR. "Regional Water Alliance Water System Interconnection Study." 2009.

the region. In 2013 and 2015, the SCTRWPG conducted surveys of municipal WUGs, WWPs, and major municipal centers regarding the existing and potential emergency interconnects. In these previous studies and surveys, information was collected and maintained in a confidential manner. The 2016 SCTRWP included a confidential report submitted to the TWDB.

For the 2021 SCTRWP, high level information was collected regarding existing and potential emergency interconnections. Non-confidential information from the previous reports and surveys was compiled and used as the basis for information requests for the 2021 SCTRWP efforts. In January 2020, a survey was emailed to WUGs in the South Central Texas Region to request information regarding existing and future potential emergency interconnections. As part of the survey, individual municipalities were asked to confirm or update interconnect information including the emergency water user and provider. In the South Central Texas Region, 50 existing emergency interconnections were identified among 38 WUGs, and eight potential emergency interconnects were identified. Of the 38 WUGs with existing interconnections, 29 WUGs had one interconnection, six WUGs had two interconnections, and three WUGs had three interconnections. Existing and potential emergency interconnection information for the South Central Texas Region is summarized in Appendix 7-B.

7.4 EMERGENCY RESPONSES TO LOCAL DROUGHT CONDITIONS OR LOSS OF MUNICIPAL SUPPLY

The regional and state water plans aim to prepare entities for worst case drought scenarios using the drought of record described in Section 7.1. However, entities may find themselves in a local drought or facing a loss of municipal supply. While rare, it is important to have a backup plan in case of infrastructure failure or water supply contamination. This is especially important for smaller entities that rely on a sole source of supply. While many entities and WWPs have DCPs as described in Section 7.2, it is less common for small municipalities or County-Other WUGs to have these emergency plans. An analysis of a broad range of emergency response options was performed for all County-Other WUGs and for small WUGs with a 2010 historical population estimate less than 7,500 and a sole supply source. For purposes of this evaluation, entities evaluated for emergency responses to local drought conditions or loss of municipal supply were assumed to have 180 days or less of remaining supply.

A WUG relying on groundwater is considered sole source if all its supplies come from the same aquifer, regardless of varying groundwater districts or combination of contractual and local development supplies. A WUG relying on surface water is considered sole source if its supply comes from one river intake or one reservoir, regardless of the number of contracts in place. A WUG with a contract to purchase water from a WWP was not considered sole-source if various supplies were held by the WWP. WUGs with both groundwater and surface water supplies were not included, except for County-Other entities.

A broad range of emergency situations could result in the loss of reliable municipal supply, and it is not possible to plan one solution to meet any possible emergency; for that reason, a range of possible responses was selected for each entity according to source type and location. WUGs were analyzed for potential additional fresh water and brackish water wells according to the existence of appropriate aquifers in the area. Modeled available groundwater (MAG) availability was not considered since the wells were assumed to be temporary over the course of an emergency. WUGs with nearby surface water were analyzed for curtailment of junior water rights and for releases from upstream reservoirs. Additional yield availability was not analyzed for reservoir releases as in the case of a temporary, localized emergency, special arrangements can be made.

A nearby entity that could provide supply in case of an isolated incident was identified for applicable WUGs, and existing interconnects were noted if information was available. In addition, trucking in water was considered as a supply option under severe circumstances. Any infrastructure required for implementation of the options is also reported. A total of 96 entities were analyzed, including 21 County-Other WUGs. The results of this analysis are included in Table 7-1.

Table 7-1 Summary of Emergency Supply Options

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Atascosa	Charlotte	1,695	Carrizo-Wilcox	GW	1,985	339			•		•	•
Atascosa	County-Other, Atascosa	-	Various GW	GW	6,766	868			•	•	•	•
Atascosa	Jourdanton	4,125	Carrizo-Wilcox	GW	4,829	1021			•		•	•
Atascosa	McCoy Water Supply Corporation (WSC)	6,500	Various GW	GW	7,239	942			•		•	•
Atascosa	Poteet	3,306	Carrizo-Wilcox	GW	3,871	478			•		•	•
Bexar	Air Force Village II Inc.	685	Edwards-BFZ	GW	742	188					•	•
Bexar	Alamo Heights	7,012	Edwards-BFZ	GW	8,073	2210					•	•
Bexar	Bexar County Water Control and Improvement District (WCID) 10	5,257	Edwards-BFZ	GW	5,462	1174					•	•
Bexar	County-Other, Bexar	-	Various GW	GW	15,689	2,075			•	•	•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Bexar	Fort Sam Houston	1,063	Edwards-BFZ	GW	1,224	2596					•	•
Bexar	Leon Valley	6,920	Edwards-BFZ	GW	8,200	1401					•	•
Bexar	Randolph Air Force Base	1,557	Edwards-BFZ	GW	1,793	121					•	•
Bexar	Selma	5,804	Various GW	GW	5,005	1221			•		•	•
Bexar	Shavano Park	1,906	Edwards-BFZ	GW	2,194	693					•	•
Bexar	The Oaks WSC	1,376	Various GW	GW	1,704	298			•		•	•
Bexar	Water Services	3,987	Trinity	GW	3,613	1134			•		•	•
Caldwell	Aqua WSC	1,360	Carrizo-Wilcox	GW	260	284			•		•	•
Caldwell	County-Other, Caldwell	-	Various GW	GW	1,194	142			•	•	•	•
Caldwell	Creedmoor-Maha WSC	1,415	Various GW	GW	1,508	189			•		•	•
Caldwell	Luling	5,445	Carrizo-Wilcox	GW	6,699	959			•		•	•
Caldwell	Polonia WSC	5,734	Carrizo-Wilcox	GW	2,303	890			•		•	•
Caldwell	Tri Community WSC	1,133	Guadalupe Run-Of-River	SW	1,377	177	•	•			•	•
Calhoun	County-Other, Calhoun	-	Gulf Coast	GW	3,121	363			•	•	•	•
Calhoun	Point Comfort	737	Texana Lake	SW	829	87	•	•			•	•
Calhoun	Seadrift	1,364	Gulf Coast	GW	1,534	256			•	•	•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Comal	Clear Water Estates Water System	430	Trinity	GW	559	677			•		•	•
Comal	County-Other, Comal	-	Blend	Blend	7,041	1,191	•	•	•	•	•	•
Comal	Garden Ridge	3,259	Various GW	GW	3,243	1785			•		•	•
Comal	KT Water Development	915	Trinity	GW	1,271	432			•		•	•
DeWitt	County-Other, DeWitt	-	Gulf Coast	GW	9,136	1,245			•	•	•	•
DeWitt	Cuero	6,640	Gulf Coast	GW	6,892	1826			•	•	•	•
DeWitt	Yoakum	2,165	Gulf Coast	GW	2,195	390			•	•	•	•
DeWitt	Yorktown	2,165	Gulf Coast	GW	2,247	396			•	•	•	•
Dimmit	Asherton	1,084	Carrizo-Wilcox	GW	1,180	238			•		•	•
Dimmit	Big Wells	697	Carrizo-Wilcox	GW	759	121			•		•	•
Dimmit	Carrizo Hill WSC	631	Carrizo-Wilcox	GW	686	119			•		•	•
Dimmit	Carrizo Springs	5,509	Carrizo-Wilcox	GW	5,994	1623			•		•	•
Dimmit	County-Other, Dimmit	-	Carrizo-Wilcox	GW	2,256	310			•		•	•
Frio	County-Other, Frio	-	Carrizo-Wilcox	GW	3,177	411			•		•	•
Frio	Dilley	4,148	Carrizo-Wilcox	GW	4,623	1091			•		•	•
Frio	Moore WSC	505	Carrizo-Wilcox	GW	577	112			•		•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Goliad	County-Other, Goliad	-	Gulf Coast	GW	6,138	751			•	•	•	•
Goliad	Goliad	1,959	Gulf Coast	GW	2,289	460			•	•	•	•
Gonzales	County-Other, Gonzales	-	Carrizo-Wilcox	GW	2,277	272			•		•	•
Gonzales	Nixon	7	Carrizo-Wilcox	GW	2,542	396			•		•	•
Gonzales	Smiley	550	Carrizo-Wilcox	GW	604	122			•		•	•
Gonzales	Waelder	1,132	Queen City	GW	1,244	213			•		•	•
Guadalupe	County-Other, Guadalupe	-	Blend	Blend	1,432	167	•	•	•	•	•	•
Hays	Buda	915	Canyon Lake	SW	1,658	298					•	•
Hays	South Buda WCID 1	682	Trinity	GW	1,350	214			•		•	•
Hays	Texas State University	4,861	Edwards-Balcones Fault Zone (BFZ)	GW	4,861	928					•	•
Hays	Wimberley WSC	3,619	Trinity	GW	9,178	1015			•		•	•
Karnes	County-Other, Karnes	-	Various GW	GW	3,062	434			•	•	•	•
Karnes	El Oso WSC	3,522	Various GW	GW	224	754			•	•	•	•
Karnes	Falls City	603	Carrizo-Wilcox	GW	630	141			•		•	•
Karnes	Karnes City	3,109	Carrizo-Wilcox	GW	3,242	608			•		•	•
Karnes	Kenedy	3,440	Gulf Coast	GW	3,587	1411			•	•	•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Karnes	Runge	1,235	Gulf Coast	GW	1,288	263			•	•	•	•
Karnes	Sunko WSC	3,530	Carrizo-Wilcox	GW	183	719			•		•	•
Kendall	County-Other, Kendall	-	Blend	Blend	18,938	2,312	•	•	•	•	•	•
Kendall	Kendall County WCID 1	2,520	Trinity	GW	2,977	283			•		•	•
Kendall	Kendall West Utility	2,031	Trinity	GW	2,505	311			•		•	•
La Salle	Cotulla	3,664	Carrizo-Wilcox	GW	4,138	1291			•		•	•
La Salle	County-Other, La Salle	-	Carrizo-Wilcox	GW	2,617	302			•		•	•
La Salle	Encinal WSC	903	Carrizo-Wilcox	GW	1,021	214			•		•	•
Medina	Castroville	2,829	Edwards-BFZ	GW	2,846	838					•	•
Medina	County-Other, Medina	-	Various GW	GW	7,317	948			•	•	•	•
Medina	Devine	4,222	Various GW	GW	4,425	648			•		•	•
Medina	East Medina County Special Utility District (SUD)	6,945	Edwards-BFZ	GW	7,419	723					•	•
Medina	La Coste	1,341	Edwards-BFZ	GW	1,535	152					•	•
Medina	Medina County WCID 2	633	Various GW	GW	698	139			•		•	•
Medina	Medina River West WSC	996	Various GW	GW	755	116			•		•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Medina	Natalia	1,492	Edwards-BFZ	GW	1,708	292					•	•
Medina	West Medina WSC	960	Edwards-BFZ	GW	1,147	237					•	•
Medina	Yancey WSC	5,543	Edwards-BFZ	GW	1,110	711					•	•
Refugio	County-Other, Refugio	-	Gulf Coast	GW	3,061	364			•	•	•	•
Refugio	Refugio	2,861	Gulf Coast	GW	2,979	568			•	•	•	•
Refugio	Woodsboro	1,581	Gulf Coast	GW	1,647	269			•	•	•	•
Uvalde	County-Other, Uvalde	-	Various GW	GW	6,019	858			•	•	•	•
Uvalde	Knippa WSC	687	Various GW	GW	740	154			•		•	•
Uvalde	Sabinal	1,688	Edwards-BFZ	GW	1,844	443					•	•
Uvalde	Windmill WSC	1,443	Austin Chalk	GW	1,620	356			•		•	•
Victoria	County-Other, Victoria	-	Gulf Coast	GW	22,094	2,584			•	•	•	•
Victoria	Quail Creek MUD	1,505	Gulf Coast	GW	1,645	192			•	•	•	•
Victoria	Victoria County WCID 1	2,156	Gulf Coast	GW	2,331	253			•	•	•	•
Wilson	County-Other, Wilson	-	Carrizo-Wilcox	GW	7,395	876			•		•	•
Wilson	Floresville	6,425	Carrizo-Wilcox	GW	8,123	1933			•		•	•
Wilson	Oak Hills WSC	4,359	Carrizo-Wilcox	GW	5,511	921			•		•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Wilson	Picosa WSC	2,000	Carrizo-Wilcox	GW	32	240			•		•	•
Wilson	Poth	1,879	Carrizo-Wilcox	GW	2,375	381			•		•	•
Wilson	Stockdale	1,470	Carrizo-Wilcox	GW	1,858	391			•		•	•
Zavala	Batesville WSC	1,191	Carrizo-Wilcox	GW	1,242	211			•		•	•
Zavala	County-Other, Zavala	-	Carrizo-Wilcox	GW	1,466	243			•		•	•
Zavala	Crystal City	7,138	Carrizo-Wilcox	GW	8,063	1702			•		•	•
Zavala	Loma Alta Chula Vista Water System	618	Carrizo-Wilcox	GW	735	235			•		•	•
Zavala	Zavala County WCID 1	1,490	Carrizo-Wilcox	GW	1,683	480			•		•	•

GW - groundwater; SW - surface water.

7.5 REGION-SPECIFIC DROUGHT RESPONSE RECOMMENDATIONS AND MODEL DROUGHT CONTINGENCY PLANS

The SCTRWPG acknowledges that DCPs are a useful drought management tool for entities with both surface and groundwater sources and recommends that all entities consider adopting a DCP in preparation for drought conditions. The SCTRWPG also recommends that, in accordance with TCEQ guidelines, entities update their DCPs every 5 years because triggers can change as wholesale and retail water providers reassess their contracts and supplies.

The SCTRWPG obtained 26 DCPs from across the region. Of the 26 DCPs, one of these participating WUGs relies solely on surface water, 13 entities rely solely on groundwater and 12 of them utilize both sources to meet needs.

Water utilities within Region L have recently implemented drought contingency measures in response to drought conditions. Since adoption of the 2016 Regional Water Plan (at the end of 2016), SAWS and

Edwards Aquifer Authority (EAA) both activated stage I contingency measures during the summer of 2017 and stage I and II contingency measures during the summer of 2018. At the time of writing this chapter, Stage 1 drought restrictions were implemented by both SAWS and EAA as recently as July 2020. GBRA indicated that they have no records of activating drought contingency measures since adoption of the 2016 Regional Water Plan.

7.5.1 Recommended Surface Water Triggers and Responses

Surface water accounts for approximately 26 percent of 2020 existing municipal supplies in South Central Texas Region. With such a variety of supply sources, it is difficult to create a set of triggers and responses that will fit the needs of all WUGs in the regional planning area. The SCTRWPG recognizes that supplies are understood best by the operators and suggests that WUGs without DCPs look to the DCPs of their water providers for these surface supplies.

For entities without DCPs supplying themselves with local surface water, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region. An example of triggers and responses from the DCP for Guadalupe-Blanco River Authority (GBRA) is presented in Table 7-2. GBRA was selected as a representative example because it provides water to several entities throughout South Central Texas Region and relies on various types of surface water triggers that can be applied throughout the region. The DCP includes five water stages ranging from "Mild Water Shortage" to "Emergency Water Shortage." The triggers depend on parameters such as storage levels, reservoir elevations, and system failures. The responses include categories ranging from home irrigation limits to pool and fountain restrictions.

Table 7-2 Model Drought Contingency Plan for Surface Water Based on GBRA

DROUGHT STAGE	WATER TYPE	TRIGGER	RESPONSE
Stage 1 – Mild Water Shortage	Canyon Reservoir	Reservoir less than or equal to Elevation (El) 895 feet mean sea level (ft-msl)	• Achieve voluntary 5% reduction in comparison to the average monthly usage of contracted water from shortage for that time period of the calendar year
	Hydroelectric Lakes	Comal Springs 24 hour flow rate is at or below 250 cubic feet per second (cfs)	• No water waste • No washing impervious outdoor ground covering • No landscape watering between 10 a.m. and 8 p.m. unless by handheld device or recycled water • Swimming pools must be at least 25% covered by an evaporative shield when not in use • Vehicles may only be washed at commercial locations or Monday and Friday before 10 a.m. or after 8 p.m.
	Luling Water Right	Production at Luling Water Treatment Plant (WTP) is 2.5 mgd or greater for 7 days or flow at United States Geological Survey (USGS) 08172000 drops below 130 cfs	• Achieve a voluntary 5% reduction in daily water demand for each retail utility utilizing the GBRA Luling WTP

DROUGHT STAGE	WATER TYPE	TRIGGER	RESPONSE
	Lower Basin Water Right	When flow over top of the saltwater barrier is 6 inches or less for 5 consecutive days	• Achieve voluntary reduction of 5% in total domestic water usage during each month of this stage
Stage 2 – Moderate Water Shortage	Canyon Reservoir	Reservoir less than or equal to El 890 ft-msl	• Achieve voluntary 10% reduction in comparison to the average monthly usage of contracted water from shortage for that time period of the calendar year
	Hydroelectric Lakes	Comal Springs 24 hour flow rate is at or below 200 cfs	• All Stage 1 responses • Irrigation limited to three designated days per week during restricted hours unless handheld device used • Vehicle washing is permissible only by using bucket and/or handheld hose equipped with a quick shutoff nozzle on designated watering days or at a commercial location • Water may not be used for ornamental fountains unless recycled
	Luling Water Right	Flow at USGS 08172000 drops below 80 cfs	• Achieve a 10% reduction in daily water demand for each retail utility utilizing the GBRA Luling WTP
	Lower Basin Water Right	Sustained flow over the saltwater barrier is not occurring	• Achieve voluntary reduction of 10% in total domestic water usage during each month of this stage
Stage 3 – Severe Water Shortage	Canyon Reservoir	Reservoir less than or equal to El 885 ft-msl	• Achieve voluntary 15% reduction in comparison to the average monthly usage of contracted water from shortage for that time period of the calendar year • Initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code 11.039
	Hydroelectric Lakes	Comal Springs 24 hour flow rate is at or below 150 cfs	• All Stage 1 and 2 responses • Irrigation limited to two designated days per week during restricted hours unless handheld device used • Water may not be used for ornamental fountains • Vehicle washing is permissible only by using a bucket and/or a handheld hose equipped with a quick shutoff nozzle on designated watering days or at a commercial location
	Luling Water Right	Flow at USGS 08172000 drops below 40 cfs	• Achieve a 15% reduction in daily water demand for each retail utility utilizing the GBRA Luling WTP • Initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code 11.039

DROUGHT STAGE	WATER TYPE	TRIGGER	RESPONSE
	Lower Basin Water Right	The release of stored water from Canyon Dam to supplement run-of-river permitted supply When voluntary Stage 2 measures are ineffective in reducing water usage	• Achieve voluntary reduction of 15% in total domestic water usage during each month of this stage • Initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code 11.039
Stage 4 – Critical/ Emergency Water Shortage	Canyon Reservoir	Loss of capability to provide water service Contamination of supply source Drought of greater severity than the drought of record	• General Manager shall assess severity of the problem and identify the actions needed and time required to resolve the problem
	Hydroelectric Lakes	Comal Springs average 24 hour flow rate is at or below 100 cfs	• All Stage 1, 2 and 3 responses • Irrigation limited to one designated day per week during restricted hours unless handheld device used • Filling of new and existing pools is prohibited • Vehicle washing is permissible only at a commercial location
	Luling Water Right	Loss of capability to provide water service Contamination of supply source Water ceases to flow past Zedler Dam	• General Manager shall assess severity of the problem and identify the actions needed and time required to resolve the problem
	Lower Basin Water Right	When municipal demands of GBRA customers in Calhoun County is being met by the permitted release of stored water in Canyon Dam	• Achieve voluntary reduction of 20% in total domestic water usage during each month of this stage • Initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code 11.039
Stage 5 – Emergency	Hydroelectric Lakes	Comal Springs average 24 hour flow rate is at or below 50 cfs	• General Manager convenes emergency session to consider emergency rules or responses
	Lower Basin Water Right	Loss of capability to provide water service Contamination of supply source May occur at any time and is not dependent on being preceded by Stages 1 through 4	• Achieve voluntary reduction of 50% in total domestic water usage during each month of this stage • General Manager convenes emergency session to consider emergency rules or responses

7.5.2 Recommended Groundwater Triggers and Responses

Groundwater accounts for approximately 71 percent of 2020 existing municipal supplies. Entities in South Central Texas Region utilize both brackish and non-brackish wells in four major formations. With such a variety of supply sources, it is difficult to create a set of triggers and responses that will fit the needs of each WUG in the regional planning area. The SCTRWPG recognizes that supplies are understood best by the operators and suggests that WUGs without DCPs look to the DCPs of their water providers for these surface supplies.

For entities without DCPs supplying themselves with local groundwater, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region. An example of triggers and responses from the DCP for the San Antonio Water System (SAWS) is presented in Table 7-3. SAWS was selected as a representative example because it is the largest provider of groundwater in the South Central Texas Region. The DCP includes four water stages. The triggers depend on parameters such as supply and well levels. The responses include categories ranging from residential irrigation limits to commercial and irrigation use reductions.

Table 7-3 Model Drought Contingency Plan for Groundwater Based on SAWS

DROUGHT STAGE	TRIGGER	RESPONSE
Stage 1	Edwards Aquifer (Well J-17) 10 day rolling average level falls to 660 ft-msl	• Cites encouraged to reduce water main flushing and to implement leak detection and survey repairs • Voluntary reduction on power production water • No water waste • Lawn watering is limited to 1 day per week at restricted times unless by handheld device • Pools must be covered by at least 25% evaporation block when not in active use • Aesthetic water features prohibited • No person may wash an impervious outdoor ground covering • Golf courses, parks, and fields must submit conservation plans • Customers are requested to minimize or discontinue nonessential water use. Outdoor commercial fountains must have variance to operate • Vehicles may only be washed at commercial locations or once per week on Saturday or Sunday with no water waste • Golf courses, parks, and fields must submit conservation plans and follow irrigation schedule
Stage 2	Edwards Aquifer (Well J-17) 10 day rolling average level falls to 650 ft-msl	• All Stage 1 responses • Irrigation system, sprinkler, or soaker hose watering limited to 1 day per week at further restricted times unless by handheld device • Drip irrigation and handheld device watering allowed any day at restricted times • Hotels must offer "no linen exchange program"
Stage 3	Stage 3 water use reduction measures may be implemented when Edwards Aquifer (Well J-17) 10 day rolling average level falls to 640 ft-msl	• All Stages 1 and 2 responses • Irrigation system, sprinkler, and soaker hose watering limited to 1 day every other week at restricted times. • Drip irrigation limited to restricted times and 3 days a week

DROUGHT STAGE	TRIGGER	RESPONSE
Stage 4	After a 30 day monitoring period once Stage 3 is declared, the city manager, or designee, in consultation with SAWS president/CEO or designee, may declare or delay Stage 4	• All Stages 1, 2, and 3 responses • A surcharge is assessed on all accounts used or assumed to be used for landscape irrigation

7.5.3 Recommended Triggers and Responses for Irrigation and Steam-electric Uses

As mentioned previously, it is difficult to create a set of drought triggers and responses that will fit the needs of all WUGs in the regional planning area. Irrigation and Steam-electric water use categories each represent 10 percent or more of water demands in any decade. For entities supplying significant amounts of water to customers for irrigation and steam-electric uses, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region.

An example of triggers and responses from the EAA Critical Period/Drought Management Plan is presented in Figure 7-6. EAA was selected as a representative example because their Critical Period Management Plan applies to municipal, industrial, and irrigation users that are authorized to withdraw more than 3 acre-feet. The Critical Period Management Plan includes five critical period water stages. The triggers depend on 10-day average spring and index well levels and the responses are stepwise, mandatory withdrawal reductions.

CRITICAL PERIOD TRIGGERS, STAGES, AND WITHDRAWAL REDUCTIONS

EDWARDS AQUIFER AUTHORITY

The following Critical Period triggers and percent reductions apply to all Municipal, Industrial and Irrigation users authorized to withdraw more than 3 acre-feet.

San Antonio Pool

Critical Period is declared in the San Antonio Pool when the 10-day average of the rate of springflow at either the Comal or San Marcos springs, or aquifer reading at the J-17 Index Well in Bexar County drops below the Stage I trigger level. Likewise, a more restrictive stage of Critical Period is activated by any one of these triggers. However, the declaration of a less restrictive stage of Critical Period requires the 10-day averages of all three trigger levels to be above the activation thresholds of the particular stage in effect at the time.

TRIGGER (based on 10-day average)	CRITICAL PERIOD STAGE I	CRITICAL PERIOD STAGE II	CRITICAL PERIOD STAGE III	CRITICAL PERIOD STAGE IV	CRITICAL PERIOD STAGE V
Index Well J-17 Level (MSL)	<660	<650	<640	<630	<625
San Marcos Springs Flow (CFS)	<96	<80	N/A	N/A	N/A
Comal Springs Flow (CFS)	<225	<200	<150	<100	<45/40*
Withdrawal Reduction	20%	30%	35%	40%	44%

Uvalde Pool

The Uvalde Pool enters Critical Period at Stage II based on the 10-day average of aquifer level readings at the J-27 Index Well in Uvalde County.

TRIGGER (based on 10-day average)	CRITICAL PERIOD STAGE I	CRITICAL PERIOD STAGE II	CRITICAL PERIOD STAGE III	CRITICAL PERIOD STAGE IV	CRITICAL PERIOD STAGE V
Index Well J-27 Level (MSL)	N/A	<850	<845	<842	<840
San Marcos Springs Flow (CFS)	N/A	N/A	N/A	N/A	N/A
Comal Springs Flow (CFS)	N/A	N/A	N/A	N/A	N/A
Withdrawal Reduction	N/A	5%	20%	35%	44%

**San Antonio Pool only:* In order to enter into Critical Period Stage V, the applicable springflow trigger is either less than 45 cfs based on a ten-day rolling average or less than 40 cfs based on a three-day rolling average. Expiration of Critical Period Stage V is based on a ten-day rolling average of 45 cfs or greater.*

Definitions: (MSL) Mean Sea Level; (CFS) Cubic Feet Per Second

Figure 7-6 EAA Critical Period Management Summary

For irrigation uses, the SCTRWPG also suggests review of the Voluntary Irrigation Suspension Program Option (VISPO) of the Edwards Aquifer Habitat Conservation Plan (EAHCP). VISPO is available for irrigation users who wish to help protect springflow for federally listed threatened and endangered species that rely heavily on the Comal and San Marcos Springs. The enrollment term is for a period of five years. VISPO compensates enrolled irrigation permit holders for enrollment and also pays an additional suspension rate in years when irrigation suspension is required due to index well levels. VISPO is triggered when the J-17 index well in Bexar County is at or below 635 feet on October 1; the response is for enrolled permit holders to suspend irrigation for the following calendar year. If VISPO is not triggered, then the permit holder may use or lease enrolled water permits during the non-suspension years. More information regarding the EAHCP VISPO can be found on the Edwards Aquifer Authority website (https://www.edwardsaquifer.org/).

7.5.4 Model Drought Contingency Plans

The TCEQ has prepared model DCPs for wholesale and retail water suppliers to provide guidance and suggestions to entities regarding the preparation of DCPs. Not all items in the model will apply to every system's situation, but the overall model can be used as a starting point for most entities. The SCTRWPG suggests that the TCEQ model DCPs be used in conjunction with drought contingency measures such as those described in Sections 7.5.1, 7.5.2, and 7.5.3 for entities wishing to develop a new DCP. The TCEQ model DCPs can be found on TCEQ's website: (https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/contingency.html)

7.6 DROUGHT WATER MANAGEMENT STRATEGIES

Regional water planning guidelines in 30 TAC Section 357 state that "Regional water plan development shall include an evaluation of all water management strategies the regional water planning group determines to be potentially feasible, including drought management measures including water demand management [30 TAC Section 357.7(a)(7)(B)]." As defined here, drought management means the periodic activation of approved DCPs resulting in short-term demand reduction and/or rationing. This reduction in demand is then considered a "supply" source. Using this approach, an entity may make the conscious decision not to develop firm water supplies greater than or equal to projected water demands with the understanding that demands will have to be reduced or go unmet during times of drought. Using this rationale, an economic impact of not meeting projected water demands can be estimated and compared with the costs of other potentially feasible WMSs in terms of annual unit costs.

A drought management analysis was performed to calculate the potential supply and cost of reducing the 2020 demand by 5, 10, 15, and 20 percent for all entities with needs in 2020. The methodology and results of this analysis can be found in more detail in Subsection 5.2.2. For WUGs with needs in 2020, the SCTRWPG recommends a 5 percent reduction in demands for the drought management strategy. Table 7-4 shows the yield for 38 entities with needs in 2020.

Table 7-4 Drought Management WMS Yield

ENTITY	COUNTY	2020 YIELD USING 5 PERCENT DEMAND REDUCTION (ACFT/YR)
Air Force Village II, Inc.	Bexar	3
Alamo Heights	Bexar	50
Atascosa Rural WSC	Bexar	59
Bexar County WCID 10	Bexar	33
Castroville	Medina	17
Clear Water Estates Water System	Comal	4
Converse	Bexar	101
Crystal Clear WSC	Hays	92
East Medina County SUD	Medina	43
El Oso WSC [1]	Karnes	19
Elmendorf	Bexar	8
Fort Sam Houston	Bexar	5

ENTITY	COUNTY	2020 YIELD USING 5 PERCENT DEMAND REDUCTION (ACFT/YR)
Garden Ridge	Comal	47
Goforth SUD [1]	Caldwell	109
Hondo	Medina	51
Karnes City	Karnes	23
Kirby	Bexar	32
KT Water Development	Comal	7
La Coste	Medina	8
Lackland Air Force Base	Bexar	67
Leon Valley	Bexar	65
Live Oak	Bexar	48
Lytle	Atascosa	18
Martindale WSC	Caldwell	21
Natalia	Medina	6
Oak Hills WSC	Wilson	28
Pearsall	Frio	26
SS WSC	Wilson	95
Sabinal	Uvalde	14
Seguin	Guadalupe	228
Shavano Park	Bexar	47
The Oaks WSC	Bexar	9
Universal City	Bexar	192
Uvalde	Uvalde	103
Victoria	Victoria	490
West Medina WSC	Medina	7
Wingert Water Systems	Comal	10
Yancey WSC	Medina	40
	Total	**2,225**

[1] WUGs are split between Region L and other regions (Regions K or N). Split region specific Region L volumes are detailed in Section 5.3.

Beginning in 2020, SAWS has requested utility-specific drought management and supply reduction goals. SAWS prefers to utilize a multi-decadal approach to drought management. SAWS is considering a 5 percent demand reduction for 2020, a 12 percent demand reduction for 2030, and 16 percent demand reductions for 2040 to 2070. Table 7-5 shows the demand reductions and projected yields for SAWS throughout the planning period.

Table 7-5 SAWS Drought Management Analysis

	2020	2030	2040	2050	2060	2070
% Reduction	5%	12%	16%	16%	16%	16%
Yield (acft/yr)	11,951	31,476	45,677	49,377	53,109	56,588

7.7 OTHER DROUGHT-RELATED CONSIDERATIONS AND RECOMMENDATIONS

7.7.1 Monitoring and Assessment

The SCTRWPG recommends that all entities monitor state and local drought conditions to prepare and facilitate decisions. Several state and local agencies monitor and report on conditions with up-to-date information. A few informative sources are listed below:

San Antonio Water System Drought Restrictions:
http://www.saws.org/conservation/droughtrestrictions/

Guadalupe-Blanco River Authority Drought/Conservation:
http://www.gbra.org/drought/default.aspx

TWDB Drought Information:
http://waterdatafortexas.org/drought/

TCEQ Drought Information:
https://www.tceq.texas.gov/response/drought

Palmer Drought Severity Index:
http://www.ncdc.noaa.gov/temp-and-precip/drought/historical-palmers/

Regional Planning Group Information:
http://www.regionltexas.org/

7.7.2 Drought Preparedness Council and Recommendations

The SCTRWPG supports the efforts of the Texas Drought Preparedness Council, as outlined in its 2019 letter to planning groups, and recommends that entities review information developed by the council. The council was established by the legislature in 1999 and is composed of representatives from 16 state agencies as well as appointees of the governor. The council is responsible for assessment and public reporting of drought monitoring and water supply conditions, advising the governor on significant drought conditions, recommending response plans for drought-related disasters, advising regional water planning groups on drought-related issues in the regional water plans, coordinating local, state, and federal drought-response planning, and submitting a report to the legislature every odd numbered year.

The Drought Preparedness Council recommended planning groups to follow the outline template for Chapter 7, of which this 2021 SCTRWP chapter is based. The council also recommended development of region-specific model DCPs for all water use categories in the region that account for more than 10 percent of water demands in any decade over the 50-year planning horizon. For Region L, the applicable use categories are municipal, irrigation, and steam-electric use categories. As described in Section 7.5.4, the SCTRWPG suggests that the TCEQ model DCPs be used in conjunction with recommended drought contingency measures described in Sections 7.5.1, 7.5.2, and 7.5.3 for entities wishing to develop a new DCP. The SCTRWPG developed and included region-specific recommendations in this chapter for municipal (See Section 7.5.1 and Section 7.5.2), as well as irrigation and steam-electric (See Section 7.5.3 uses. The TCEQ model DCPs can be found on TCEQ's website: (https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/contingency.html).

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APPENDIX 7-A: SUMMARY OF DROUGHT CONTINGENCY MEASURES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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Appendix 7-A: Summary of Drought Contingency Plan Measures

Table 1: Drought Contingency Plan Measures

Entity Name	DCP Date	Stage Number	Triggers										Responses										Water Supply	
			WWP	Demand/Capacity Based	Failure/Contamination	Groundwater Level	Season	Reservoir Level	Supply-Based	Well Pumping Time/Flow	Storage Tank Recovery Time	Other	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Mandatory Reduction	Notification of Public Agencies or Specific Users	Prohibited Use	Discontinue Water Diversions	Potential Suspend Service	Water Allocation	Others	Surface Water	Ground Water
Aqua WSC	2020	1		•						•	•				•			•		•		•		•
		2		•						•	•				•			•		•				
		3		•						•	•				•			•		•				
		4		•						•	•							•		•				
Canyon Lake WSC	2019	1		•				•	•			•			•							•	•	•
		2		•				•							•			•						
		3		•				•			•		•		•			•				•		
		4										•	•	•	•	•	•	•				•		
		Emergency			•			•			•	•	•	•	•	•	•	•				•		
Canyon Regional Water Authority	2019	1						•					•				•					•	•	•
		2						•					•			•	•							
		3						•					•			•	•		•		•			
		4			•							•	•				•							
City of Buda	2019	1		•	•							•			•			•					•	•
		2		•	•							•			•			•						
		3		•	•							•			•			•						
		4		•	•							•			•			•						
City of Converse	2015	1	•			•								•		•		•				•		•
		2	•			•								•	•	•		•				•		
		3	•			•	•							•	•	•		•				•		
		4	•			•	•							•	•	•		•				•		
		5	•			•	•							•	•	•		•				•		
Crystal Clear SUD	2019	1			•						•				•								•	•
		2			•						•				•			•						
		3			•						•				•			•						
		4			•						•				•			•						
		5			•						•							•						
County Line Special Utility District	2019	1	•							•	•	•			•								•	•
		2	•							•	•	•			•			•						
		3	•							•	•	•			•			•						
		4	•							•	•	•			•			•				•		
		5			•										•	•		•				•		

Entity Name	DCP Date	Stage Number	Triggers										Responses										Water Supply	
			WWP	Demand/Capacity Based	Failure/Contamination	Groundwater Level	Season	Reservoir Level	Supply-Based	Well Pumping Time/Flow	Storage Tank Recovery Time	Other	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Mandatory Reduction	Notification of Public Agencies or Specific Users	Prohibited Use	Discontinue Water Diversions	Potential Suspend Service	Water Allocation	Others	Surface Water	Ground Water
Goforth Special Utility District	2019	Conservation Period					•															•		
		1	•	•					•				•				•	•				•		
		2	•	•					•		•		•		•		•	•				•	•	•
		3	•	•					•		•		•		•		•	•				•		
		4	•	•	•				•				•		•		•	•			•	•		
Guadalupe Blanco River Authority	2019	1		•				•	•			•			•		•	•		•		•		
		2		•				•	•			•			•	•	•	•	•			•		
		3		•				•	•			•			•	•	•	•	•		•		•	•
		4		•	•				•			•	•		•		•	•	•		•			
		5		•	•				•			•	•		•		•	•	•		•			
City of Kyle	2014	1					•								•									
		2										•			•			•					•	•
		3										•			•			•						
City of Marion	2014	1						•		•					•									
		2						•		•					•		•	•					•	•
		3						•		•					•		•							
		4		•	•			•		•					•		•	•			•			
McCoy WSC	2019	1		•					•			•			•							•		
		2		•					•		•				•			•				•		•
		3	•	•	•				•			•			•		•	•						
City of New Braunfels	2019	1				•			•						•									
		2				•			•						•			•					•	•
		3				•			•						•			•						
		4					•					•										•		
City of Port Lavaca	2019	1							•						•		•							
		2							•						•	•	•	•						
		3						•	•						•	•	•	•					•	
		4						•	•						•	•	•	•		•				
		5			•			•	•							•		•						
City of San Marcos	2019	1			•	•			•						•			•						
		2			•	•			•						•			•						
		3			•	•			•						•			•					•	•
		4			•	•			•						•			•						
		5		•	•	•			•			•			•			•				•		

Entity Name	DCP Date	Stage Number	Triggers										Responses										Water Supply	
			WWP	Demand/Capacity Based	Failure/Contamination	Groundwater Level	Season	Reservoir Level	Supply-Based	Well Pumping Time/Flow	Storage Tank Recovery Time	Other	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Mandatory Reduction	Notification of Public Agencies or Specific Users	Prohibited Use	Discontinue Water Diversions	Potential Suspend Service	Water Allocation	Others	Surface Water	Ground Water
Jourdanton	2019	1		●		●				●	●				●			●						●
		2				●				●	●				●			●						
		3								●	●				●			●						
		4								●	●				●			●				●		
		5			●										●			●						
SAWS	2019	1				●									●			●				●	●	●
		2				●									●			●				●		
		3				●									●			●				●		
		4		●		●			●			●		●	●			●				●		
City of Schertz	2019	1		●		●						●			●			●						●
		2		●		●						●			●			●						
		3		●	●	●						●			●			●						
		4		●	●	●						●						●						
S.S. Local Government Corporation	2019	1		●	●	●						●					●							●
		2		●	●	●						●					●							
		3		●	●	●						●					●							
		4		●	●	●						●	●	●			●			●	●			
S.S. WSC	2014	1		●											●									●
		2		●											●			●						
		3		●											●			●						
		4		●											●			●						
		5			●													●		●		●		
Sunko Water Supply Corporation	2019	1			●					●	●				●									●
		2			●					●	●				●			●						
		3			●					●	●				●			●						
		4			●					●	●				●			●				●		
		5			●													●				●		
TBM Resident WSC	2017	1										●			●			●						●
		2		●									●		●									
		3		●											●			●				●		
		4		●									●		●			●				●		
Three Oaks WSC	2019	1								●	●	●			●									●
		2								●	●	●			●			●						
		3								●	●	●			●			●						
		4								●	●	●		●	●			●						
		Emergency			●													●						

Entity Name	DCP Date	Stage Number	Triggers										Responses										Water Supply	
			WWP	Demand/Capacity Based	Failure/Contamination	Groundwater Level	Season	Reservoir Level	Supply-Based	Well Pumping Time/Flow	Storage Tank Recovery Time	Other	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Mandatory Reduction	Notification of Public Agencies or Specific Users	Prohibited Use	Discontinue Water Diversions	Potential Suspend Service	Water Allocation	Others	Surface Water	Ground Water
Universal City	2019	1				●									●		●	●		●				●
		2				●									●		●	●		●				
		3				●						●			●		●	●		●				
		4			●	●						●		●	●		●	●		●				
City of Victoria	2019	1							●			●										●	●	●
		2							●			●			●									
		3						●				●			●			●						
		4						●							●			●				●		
		5		●	●							●						●			●			
Victoria County WCID No. 1	2019	1																						●
		2		●											●			●						
		3		●											●			●						
		4		●	●										●			●						

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APPENDIX 7-B: EXISTING AND POTENTIAL EMERGENCY INTERCONNECTIONS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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Appendix 7-B: Summary of Existing and Potential Emergency Interconnects

Table 1: Existing Emergency Interconnects

No.	Existing or Potential Emergency Interconnect	Emergency User	Emergency Provider
1	Existing	90 Ranch WSC	East Medina County SUD
2	Existing	Alamo Heights	SAWS
3	Existing	Benton City WSC	Lytle
4	Existing	Cadillac Water	SAWS
5	Existing	Cibolo	Green Valley SUD
6	Existing	City of Seguin	Springs Hill WSC
7	Existing	Creedmoore-Maha WSC	Aqua WSC
8	Existing	Creedmoore-Maha WSC	City of Austin
9	Existing	Crystal Clear	Springs Hill WSC
10	Existing	East Central SUD	La Vernia
11	Existing	East Central SUD	Springs Hill WSC
12	Existing	East Medina County SUD Unit 1	Natalia
13	Existing	El Oso WSC	Karnes City
14	Existing	Fair Oaks Ranch	SAWS
15	Existing	Gonzales County WSC	City of Smiley
16	Existing	Gonzales County WSC	City of Gonzales
17	Existing	Green Valley SUD	City of Cibolo
18	Existing	Green Valley SUD	Schertz
19	Existing	Green Valley SUD	Springs Hill WSC
20	Existing	Kyle	City of San Marcos
21	Existing	Leon Valley	SAWS
22	Existing	Live Oak	SAWS
23	Existing	Live Oak	Selma
24	Existing	Live Oak	Universal City
25	Existing	Lytle	Benton City WSC
26	Existing	Marion	CRWA
27	Existing	Marion	Green Valley SUD
28	Existing	Martindale WSC	Maxwell WSC
29	Existing	Medina County WCID 2	West Medina WSC
30	Existing	Natalia	East Medina County WSC
31	Existing	Oak Village North	Rim Rock Ranch
32	Existing	Polonia WSC	Polonia WSC North
33	Existing	Polonia WSC North	Lockhart
34	Existing	Polonia WSC South	Lockhart
35	Existing	Rim Rock Ranch	Oak Village North
36	Existing	Schertz	SAWS
37	Existing	Selma	Live Oak
38	Existing	Selma	Universal City
39	Existing	Shavano Park	SAWS
40	Existing	Smiley	Gonzales WSC
41	Existing	South Buda WCID 1	Southwest Water Co.
42	Existing	Southwest Water Co.	SAWS
43	Existing	Springs Hill WSC	Canyon Regional WA
44	Existing	Springs Hill WSC	City of Sequin
45	Existing	Springs Hill WSC	Green Valley SUD
46	Existing	Stockdale	Sunko WSC
47	Existing	Sunko WSC	Stockdale

No.	Existing or Potential Emergency Interconnect	Emergency User	Emergency Provider
48	Existing	West Medina WSC	D'Hanis
49	Existing	West Medina WSC	Hondo
50	Existing	Yancey WSC	SAWS

Table 2: Potential Emergency Interconnects

No.	Existing or Potential Emergency Interconnect	Emergency User	Emergency Provider
1	Potential	Atascosa Rural WSC	East Medina SUD
2	Potential	Cibolo	Schertz
3	Potential	County Line SUD	City of Kyle
4	Potential	Crystal Clear WSC	San Marcos
5	Potential	Crystal Clear WSC	NBU
6	Potential	East Medina County SUD	Atascosa Rural WSC
7	Potential	Texas State University	San Marcos
8	Potential	Wimberley WSC	Aqua WSC

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CHAPTER 8: POLICY RECOMMENDATIONS AND UNIQUE SITES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

17 AUGUST 2020

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List of Abbreviations

DFC	Desired Future Condition
EAA	Edwards Aquifer Authority
GAM	Groundwater Availability Model
GCD	Groundwater Conservation District
GMA	Groundwater Management Area
HB	House Bill
MAG	Modeled Available Groundwater
RWPG	Regional Water Planning Group
SAWS	San Antonio Water System
SB	Senate Bill
SCTRWPG	South Central Texas Regional Water Planning Group
SWIFT	State Water Implementation Fund for Texas
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TWC	Texas Water Code
TWDB	Texas Water Development Board
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VISPO	Voluntary Irrigation Suspension Program Option
WAM	Water Availability Model
WMS	Water Management Strategy
WUG	Water User Group

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CHAPTER 8: POLICY RECOMMENDATIONS AND UNIQUE SITES

Chapter 31, Section 357.43 of the Texas Administrative Code (TAC) specifies that the Regional Water Plan shall include recommendations on regulatory, administrative, or legislative issues. The South Central Texas Regional Water Planning Group (SCTRWPG) establishes these recommendations to facilitate the orderly development, management, and conservation of water resources.

The following chapter provides regulatory, administrative, or legislative recommendations developed by the SCTRWPG and identifies recommendations for designation of ecologically unique river and stream segments and unique sites for reservoir construction.

8.1 IRRIGATION WATER

8.1.1 Irrigation Water Needs

The SCTRWPG finds that, under current conditions and regional water planning guidelines, it is not practical for the SCTRWPG to develop water management strategies (WMSs) designed to develop new water supplies or infrastructure for agricultural water users for projected irrigation water shortages. The complexity of the factors that influence decisions regarding the development of agricultural water supplies (e.g., commodity prices; variability of quality and quantity of local, privately-owned water resources; broad geographic distribution of needs; and other economic considerations of individual agricultural producers) substantially limits the SCTRWPG's ability to conceive of and evaluate discrete strategies to supply water for future water needs in many cases. In addition, in the Edwards Aquifer Authority (EAA) area, certain irrigation users voluntarily curtail water use by contract with EAA to artificially lower irrigation demand during drought as part of EAA's Voluntary Irrigation Suspension Program Option (VISPO). Outside of the EAA area, agricultural users participate in Texas Water Development Board (TWDB) irrigation conservation programs, which also reduce irrigation water use. Refer to Appendix 6-A for a summary of the unmet needs and a quantitative description of the socioeconomic impacts of not meeting these needs.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG recommends that the TWDB, in cooperation with the agriculture industry agencies and trade groups in Texas, undertake studies of the factors that influence decisions regarding development of irrigation water supplies for the purpose of developing the best approach to (1) project future irrigation water needs and (2) identify the instances in which regional water planning efforts would be the most appropriate mechanism for developing strategies to meet future needs.

8.1.2 Agricultural Water Conservation Programs

Legislative Recommendation: The SCTRWPG recommends adequately funding the agricultural water conservation programs provided by the TWDB.

Other Recommendation: None.

8.1.3 Water Use Information

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG recommends that the TWDB develop the necessary programs and processes to accurately estimate annual water use for irrigation, including water use associated with agricultural activities unrelated to federal or state funding programs, and livestock watering categories.

8.2 COLLABORATION BETWEEN REGIONAL PLANNING AREAS

Given the number of proposals to transport large amounts of water within the areas represented by the SCTRWPG and surrounding regional water planning groups (RWPGs), the legislature should review the Texas Water Code (TWC) to determine what, if any, changes should be made to address regional and interregional conflicts. Any changes to the code should include a provision for state funding to the TWDB to support comprehensive technical studies to ensure that interested entities have the scientific data required to analyze and respond to such proposals. The technical studies and scientific data are essential to fully evaluate the effects of the proposals on the local communities, the environment, property owners, and the economy. House Bill (HB) 807 of the 86th Texas legislative session requires the TWDB to develop and appoint an interregional planning council. The purpose of the council is to improve coordination among the regional water planning groups, to improve communication between each regional planning group and TWDB, to facilitate dialogue regarding WMSs that could affect multiple regional water planning areas, and to share best practices regarding operation of the regional water planning process. The SCTRWPG will continue to support coordination among and between regions and will support the new interregional planning group in their charge.

Legislative Recommendation: None.

Other Recommendation: In order to ensure effectiveness of the recommendations developed as part of the interregional planning council, the SCTRWPG encourages the TWDB to fund and support the interregional planning group's recommendations.

8.3 GROUNDWATER

8.3.1 Groundwater Management

The SCTRWPG respects the rules and regulations of groundwater conservation districts (GCDs), as it does those of all other subdivisions of the state and state agencies. The SCTRWPG respects the decision of the Texas Supreme Court that groundwater is a private property right (Chapter 36 TWC). The SCTRWPG believes that all rules should be adopted pursuant to accepted administrative procedures based on the standards of rationality, equity, and scientific evidence. The SCTRWPG supports the determinations of modeled available groundwater (MAG) based on a desired future condition (DFC) established by a groundwater management area (GMA) pursuant to Chapter 36 of the TWC. The SCTRWPG supports the use of aquifer monitoring programs developed by GCDs within a GMA to evaluate achievement of and compliance with DFCs.

Legislative Recommendation: None.

Other Recommendation: To improve the evaluation of WMSs, the following are recommended as optional guidance for other RWPGs or for the TWDB to provide to other RWPGs. Recognizing the management challenges facing GCDs with multiple recommended WMSs potentially seeking permits to withdraw groundwater supplies in excess of amounts determined to be available, the SCTRWPG approved the following series of recommendations applicable at appropriate locations in the 2021 Regional Water Plan:

- **Other Recommendation No. 1:** When allocated groundwater exceeds the MAG in any decade, the SCTRWPG recommends that exempt use be maintained at the full estimated amount, while the permitted and grandfathered use amounts are reduced proportionately for planning purposes so that the total firm supply equals the MAG.
- **Other Recommendation No. 2:** Where potentially feasible WMSs are contemplated that require new permits and allocated groundwater exceeds the MAG, show a firm supply of zero in the plan for the WMSs for planning purposes, but explain that groundwater for the WMSs may be obtained under existing permits through the Carrizo/Wilcox Transfers WMS or under new permits issued in accordance with GCD rules.
- **Other Recommendation No. 3:** Where potentially feasible WMSs are contemplated that require new permits and allocated groundwater is less than the MAG, but allocated groundwater plus WMSs exceeds the MAG, show firm supplies of no more than the difference between allocated groundwater and the MAG in the plan for planning purposes, but explain that supplemental groundwater for the WMSs may be obtained under existing permits through the Carrizo/Wilcox Transfers WMS or under new permits issued in accordance with GCD rules.
- **Other Recommendation No. 4:** For potentially feasible WMSs with firm supplies proportionately reduced or shown as zero for MAG compliance, evaluate facilities and costs for WMSs at both the reduced firm supply value associated with MAG compliance without transfers and at the supply amount that the sponsor seeks to develop.
- **Other Recommendation No. 5:** For existing groundwater supplies that are fully permitted, or grandfathered, by a GCD and are proportionately reduced in quantity for planning purposes in this plan for MAG compliance, include the following explanatory note in the regional water plan document and database at appropriate locations:

  "For each aquifer in the region, the GCDs have adopted desired future conditions (DFCs). In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB currently requires that groundwater availability for each aquifer be limited for planning purposes to the modeled available groundwater (MAG) for the aquifer. This has resulted, for planning purposes only, in adjustments to supply amounts in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments. SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports the GCDs' discretion to issue permits and grandfather historical users for amounts in excess of the MAG. SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If the MAG is increased during or after this planning cycle, SCTRWPG may amend this Plan to adjust groundwater supply numbers that are affected by the new MAG amount."

- **Other Recommendation No. 6:** For potentially feasible WMSs that have GCD permits for a portion of the needed supply and the remainder is not yet permitted, include the following explanatory note in the regional water plan document and database at appropriate locations:

  "For each aquifer in the region, the GCDs have adopted desired future conditions (DFCs). In some GCDs, full use of all groundwater supplies (permitted, grandfathered and exempt) may result in non-achievement of the DFCs for an aquifer. To ensure consistency with the DFCs, TWDB currently requires that groundwater availability for each aquifer be limited for planning purposes to the MAG for the aquifer. This has resulted, for planning purposes only, in adjustments to permit amounts, and a lack of firm water available for future permits in this plan for some areas for certain time periods. This should not be construed as recommending or requiring that GCDs make these adjustments or deny future permit applications. SCTRWPG recognizes and supports the ability of permit holders to exercise their rights to groundwater use in accordance with their permits and it recognizes and supports the GCDs discretion to issue permits and grandfather historical users for amounts in excess of the MAG. SCTRWPG may not modify groundwater permits that GCDs have already issued or limit future permits that GCDs may issue. If the MAG is increased during or after this planning cycle, SCTRWPG may amend this Plan to adjust groundwater supply numbers that are affected by the new MAG amount."

8.3.2 Groundwater Sustainability

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG recommends the management of groundwater resources toward the goal of long-term sustainability and recommends WMSs that support achievement of this goal. This recommendation is intended to help protect all users of aquifers, to help preserve the long-term integrity of aquifers, and to build awareness of the effects of groundwater production and development on those aquifers. The SCTRWPG recommends that anyone implementing any WMS within this Regional Water Plan relying on groundwater resources incorporate groundwater monitoring of both quantity and quality, recharge protection and enhancement, conservation methods and related practices, as determined to be appropriate by local groundwater districts. Where no district exists, the developer should monitor impacts and, when appropriate, take corrective action consistent with the goal of groundwater sustainability.

8.3.3 Shared Groundwater Resources Among Planning Regions

Legislative Recommendation: None.

Other Recommendation: In the event a water user group (WUG) relies on a groundwater WMS to meet the WUG's demand during the planning period and the strategy would have a significant impact on a groundwater resource shared among planning region(s), notice should be provided to the region(s) of the proposed date of implementation and anticipated acre-feet per year demand on the shared groundwater resource.

8.3.4 Reliance on Groundwater and Surface Water for Future Needs

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG recognizes a need to rely on both groundwater and surface water resources to develop a practical and reasonable plan to address water needs within the region for the future. The SCTRWPG recommends that the state provide incentives to develop conjunctive use projects that more efficiently utilize groundwater and surface water.

8.3.5 Land Stewardship

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG encourages state support of implementing or enhancing land stewardship management practices that are shown to augment the quality and quantity of surface water and groundwater resources.

8.3.6 Notice of Groundwater Projects

Legislative Recommendation: Where no GCD exists, the SCTRWPG recommends that the Texas Legislature develop a process requiring public notice that clearly describes the project and its economic and environmental impacts prior to initiation of the project. The public notice should be published in a newspaper of general circulation and a copy sent to the County Clerk's Office, within the county or counties in which the project is located.

Other Recommendation: None.

8.3.7 Coordination of Regional Water Planning and Groundwater Management Area Processes

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG experiences significant planning issues caused by Regional Water Planning Rule §357.32(d) that requires the use of MAGs (which are appropriately developed to be consistent with DFCs) which lack the necessary definition or detail to be sufficient for determining available groundwater for existing supplies and recommended WMSs. While Regional Water Planning Rule §357.32(d)(3) allows an RWPG to apply for a MAG Peak Factor which, if approved, would "allow temporary increases in annual availability for planning purposes," this does not address the long-term considerations included in managing to the DFC.

The difference between groundwater permits being managed at the groundwater district level to the more-comprehensive DFC, and RWPGs utilizing the MAG as a cap, creates a regional water planning scenario whereby WUGs are unable to rely on the full permitted production volume during a 50-year regional water planning horizon. In instances where a WUG baseloads a water supply, the full volume is utilized each year, leaving no volume remaining for utilization of the MAG Peak Factor. This has the potential for limiting an existing supply or a recommended WMS based on the MAG. This limitation then necessitates that a WUG create an additional WMS in the Regional Water Plan, which it does not intend to implement, just to ensure that it there are no "paper" shortages in the plan.

The SCTRWPG recommends that 31 TAC §357.32 be revised to allow RWPGs to:

1. Develop groundwater availability volumes based on MAGs, DFCs, and factors similar to those utilized by GCDs in issuing permits under Section 36.1132 of the TWC; and
2. Use the groundwater availability volumes to evaluate existing water supplies and recommended water management strategies.

8.3.8 Groundwater Availability Model Updates

Legislative Recommendation: The SCTRWPG recommends that the hydrologic information for groundwater availability models (GAMs) be updated to include available hydrologic data periodically at least every 10 years so that hydrologic data in the models include data to within 10 years of the most-recent available year of data. The SCTRWPG also recommends that sufficient funding be allocated to the TWDB to accomplish this task. Although a new drought of record has not occurred since the 1950s, the recommended update would increase the simulation period and thereby increase the overall functionality of the models.

Other Recommendation: The SCTRWPG recommends that a systematic process be put in place, such that changes to the TWDB GAMs are documented, and that those changes are associated with official numbered versions of each of the GAMs. Furthermore, these rules should require that the most recent version for each basin GAM is made available through the TWDB website for use by both the RWPGs and the public at all times.

8.4 SURFACE WATER

8.4.1 Surface Water Rights Monitoring and Administration

Legislative Recommendation: The Texas Commission on Environmental Quality (TCEQ) should be adequately staffed and funded to ensure the legal and appropriate use of permitted surface water rights through comprehensive monitoring and administrative programs, such as the Watermaster program. Such monitoring and administrative programs should address surface water/groundwater interactions in cooperation with appropriate GCDs and the administration of water rights. The SCTRWPG reaffirms its commitment to safeguarding the integrity of water rights.

Other Recommendation: None.

8.4.2 Reliance on Groundwater and Surface Water for Future Needs

Legislative Recommendation: The SCTRWPG recognizes a need to rely on both groundwater and surface water resources to develop a practical and reasonable plan to address water needs within the region for the future. The SCTRWPG recommends that the state provide incentives to develop conjunctive use projects that more efficiently utilize groundwater and surface water.

Other Recommendation: None.

8.4.3 Surface Water Availability Model Updates

Legislative Recommendation: The SCTRWPG recommends that the Water Availability Models (WAMs) for the Guadalupe-San Antonio River Basin and Nueces River Basin be updated to include available hydrologic data from the most recent available year of data. The SCTRWPG also recommends that sufficient funding to accomplish this task be allocated to the TCEQ. Although a new drought of record has not occurred for the Guadalupe-San Antonio Basin since the 1950s, the recommended update would increase the simulation period by at least 50 percent and facilitate development of improved estimates of channel losses and missing streamflow records (especially those during the drought of record) throughout the watersheds. Furthermore, an extension of the Guadalupe-San Antonio WAM naturalized flow set would enhance the permitting process by providing additional hydrologic data used in the determination of the attainment frequencies associated with freshwater inflow regimes. Periodic updates to the Guadalupe-San Antonio and Nueces WAMs should be performed at least every 10 years so that hydrologic data included in the models is within 10 years of the current date.

Other Recommendation: The SCTRWPG recommends that a systematic process be put in place, such that changes to the TCEQ WAMs are documented, and that those changes are associated with official numbered versions of each of the WAMs. Furthermore, these rules should require that the most recent version for each basin WAM be made available through the TCEQ website for use by both the RWPGs and the public at all times.

8.5 CONSERVATION

8.5.1 Implementation of Water Conservation Advisory Committee Recommendations

Legislative and Other Recommendations: The SCTRWPG recognizes and supports recent legislative focus on successfully passing legislation that promotes implementation of broad-based conservation measures throughout the state. The SCTRWPG supports legislation and funding to implement the HB 4 (2007) Water Conservation Advisory Committee's recommendations, particularly the statewide public education programs such as Water IQ, further definition of gallons per capita per day objectives, and the development of regional conservation data that can be used by the SCTRWPG members to optimize future conservation efforts. The SCTRWPG also supports further efforts by the legislature and state agencies that aggressively promote practical and successful water conservation measures as an important component to future water plans.

8.6 INNOVATIVE STRATEGIES

8.6.1 Assistance for Alternative Water Supply Strategies

Legislative Recommendation: The legislature should increase funding to assist water planning regions and local water entities in developing demonstration projects for alternative water supply strategies and technologies, such as, but not limited to, desalination and direct potable reuse. By funding demonstration projects for alternative technologies, the state can help local water management entities avoid adverse impacts to the environment, to property rights, and to local socio-economic conditions. In this way, the state can play a crucial role in guiding regions to water supply solutions that meet needs. Funding to demonstrate the feasibility and value of innovative long-term strategies can help achieve cost-saving, efficient regional and local water management solutions.

Other Recommendation: None.

8.6.2 Seawater Desalination

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG supports the funding of state and/or federal programs for research and potential incentives to make desalination more affordable.

8.6.3 Assistance for Alternative Rangeland Management

Legislative Recommendation: The SCTRWPG encourages the legislature to increase funding to the Texas State Soil and Water Conservation Board for the purpose of studying the effectiveness of proven rangeland management practices.

Other Recommendation: None.

8.6.4 Rainwater Harvesting and Other Systems

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG encourages the study of the effectiveness of rainwater harvesting systems in both commercial and residential new development. The SCTRWPG recommends the TWDB develop programs to educate the public and building industry on the potential benefits of rainwater harvesting, water reuse, and gray water systems.

8.6.5 Weather Modification

Legislative Recommendation: None.

Other Recommendation: Weather modification could potentially support water supplies in general and the state should continue to support the existing Weather Modification Program and the development of innovative technology.

8.6.6 Drought Management

The SCTRWPG used the TWDB Drought Management Costing Tool for the 2021 South Central Texas Regional Water Plan to estimate economic impacts associated with implementation of drought management as a WMS. Application of this methodology for regional water planning purposes has facilitated comparison of drought management to other potentially feasible WMSs on a unit cost basis. The SCTRWPG has found, and the San Antonio Water System (SAWS) has demonstrated, that WUGs having sufficient flexibility to focus on discretionary outdoor water use first and avoid water use reductions in the commercial and manufacturing use sectors may find some degrees of drought management to be economically viable and cost-competitive with other WMSs.

Legislative Recommendation: None.

Other Recommendation: Recognizing that implementation of appropriate WMSs is a matter of local choice, the SCTRWPG recommends due consideration of economically viable drought management as an interim strategy to meet near-term needs through demand reduction until such time as economically viable long-term water supplies can be developed.

8.6.7 Water Reuse

The SCTRWPG recognizes the potential to augment water supply by reuse of treated municipal wastewater, agricultural return flows, and industrial process water. The SCTRWPG has recommended multiple WMSs that enable utilities and industries to extend use of their existing water resources through treatment and reuse of water.

Legislative Recommendation: The SCTRWPG encourages the legislature to amend the TWC to add a new chapter to include reuse in the state's administration of water rights.

Other Recommendation: The SCTRWPG recommends that the state, through the TWDB and TCEQ (1) financially support research for determining appropriate technology and risk mitigation approaches necessary to significantly expand water reuse with appropriate protections for the public, environment, and worker health; and (2) assist the funding and development of incentive programs to advance water reuse projects.

8.6.8 One Water

In recent years, municipalities have begun to view water resources from a holistic, system-wide approach, known as One Water. One Water is a decentralized concept that views all water resources as valuable. The majority of laws and regulations in Texas are not structured in such a way as to encourage or incentivize One Water approaches. In December 2019, the Meadows Center for Water and the Environment published a report entitled, *Regulatory Impediments to Implementing One Water in Texas*. According to the 2019 Meadows Center Report:

> One Water projects are still not the norm. This is, in part, due to the current regulatory framework’s inability to accommodate more innovative water reuse strategies, where the risk to public health is significant or not well understood. For example, federal drinking water regulations are necessary to protect public drinking water supplies, but they create onerous regulatory hurdles for smaller, onsite systems that may seek to use alternative sources, such as rainwater. Additionally, although onsite non-potable reuse of blackwater is a hallmark of the One Water approach, existing regulations in Texas make it extremely difficult for developers to construct onsite blackwater reuse systems. Finally, the lack of regulations that govern water reuse in Texas could actually stymie the development of One Water projects as developers often prefer clear regulatory and permitting paths over case by case decision making by regulators.

Legislative Recommendation: The SCTRWPG encourages the legislature to review existing state laws regarding rainwater, non-potable on-site reuse, and blackwater reuse systems to enable and incentivize implementation of One Water Projects.

Other Recommendation: The SCTRWPG recommends that the TWDB and TCEQ (1) financially support research for determining appropriate technology and risk mitigation approaches necessary to significantly expand One Water with appropriate protections for the public, environment, and worker health, in consideration of and with respect to impacts on existing water rights; and (2) assist the funding and development of incentive programs to advance One Water in Texas.

8.7 ENVIRONMENTAL

8.7.1 Support of Habitat Conservation Plans

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG supports the state's use of habitat conservation plans as approved by the United States Fish and Wildlife Service (USFWS), resulting in the issuance of an incidental take permit that allow for protection of endangered species and the development of adequate water supplies for the region.

8.7.2 Ecosystem Health, Quality of Life, and Growth Management for Texas

The rapid growth occurring in South Central Texas has the potential to negatively impact quality of life. Human demands for water and infrastructure development may outstrip the ability of all of the region's resources to respond and to be sustainable.

Legislative Recommendation: State water policies should address these issues and evaluate land use and the health of its ecosystem in order to prepare for the future and support a sustainable quality of life for all Texans.

Other Recommendation: None

8.7.3 Ecologically Unique Stream Segments and Unique Reservoir Sites

8.7.3.1 Designation of Five Unique Stream Segments

In accordance with TWC 16.051(f), the legislature may designate a river or stream segment of unique ecological value. The legislature has clarified that the designation of a stream segment as having unique ecological value "solely means that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in a specific river or stream segment designated by the legislature." In the 2011 and 2016 Regional Water Plans, the SCTRWPG recommended five stream segments as having unique ecological value for designation by the Texas Legislature. In 2015, House Bill 1016 (HB 1016, 84th Texas Legislature) designated the following five river or stream segments as being of unique ecological value:

1. The Nueces River from the northern boundary of Region L [downstream] to United States Geological Survey (USGS) gauge #08190000 [at Laguna];
2. The Frio River from the northern boundary of Region L [downstream] to USGS gauge #08195000 [at Concan];
3. The Sabinal River from the northern boundary of Region L [downstream] to its intersection with State Highway 187 [located approximately 2.7 miles upstream of USGS gauge #08198000 near Sabinal];

4. The San Marcos River extending from a point 0.4 miles upstream from its intersection with State Highway Loop 82 [in San Marcos] to its intersection with Interstate Highway 35; and
5. The Comal River from its intersection with East Klingemann Street in New Braunfels to its confluence with the Guadalupe River.

In designating the five river or stream segments, HB 1016 further clarified the effect of designation of a river or stream segment as being of unique ecological value as follows:

1. Means only that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in the designated segment;
2. Does not affect the ability of a state agency or political subdivision of the state to construct, operate, maintain, or replace a weir, a water diversion, flood control, drainage, or water supply system, a low water crossing, or a recreational facility in the designated segment;
3. Does not prohibit the permitting, financing, construction, operation, maintenance, or replacement of any WMS to meet projected water supply needs recommended in, or designated as an alternative in, the 2011 or 2016 Regional Water Plan for Region L; and
4. Does not alter any existing property right of an affected landowner.

Legislative Recommendation: The SCTRWPG is appreciative of legislative action in the form of HB 1016. The SCTRWPG encourages the state to continue funding the TCEQ and other entities in monitoring the water quality of the five river and stream segments designated as being of unique ecological value.

Other Recommendation: None.

8.7.3.2 Recognition of Potential Additional Stream Segments of Unique Ecological Value

The SCTRWPG believes that designating ecologically unique stream segments raises public awareness and voluntary stewardship that can result in the preservation of the character and environmental function of these segments. The SCTRWPG recognizes the ecologically significant stream segments designated by Texas Parks and Wildlife Department (TPWD) in July 2005 (refer to Chapter 6). The SCTRWPG shall consider these stream segments as a guide for recommending additional stream segments of unique ecological value for future legislative designation.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG recommends increased TWDB funding to be allocated for future planning cycles to conduct analyses necessary for designation of additional stream segments.

8.7.3.3 Unique Reservoir Sites

There are no unique reservoir sites recommended for designation by the SCTRWPG at this time.

Legislative Recommendation: None.

Other Recommendation: None.

8.7.4 Instream Flows and Bays and Estuaries

The SCTRWPG is appreciative of legislative action in the form of Senate Bill 3 (SB 3, 80th Texas Legislature) that established and funded an environmental flows process integrating best-available science and diverse regional stakeholder input into the process for selecting appropriate instream flow and freshwater inflow goals on a stream-by-stream and estuary-by-estuary basis. The appropriate balance of environmental and human needs during severe drought has significant effects on the firm yield and associated cost of potential water supply projects. The 2016 Regional Water Plans were the first to be prepared using environmental flow standards adopted pursuant to the SB 3 process. The RWPG is equally appreciative of SB 2 (77th Texas Legislature) and supports continuation of the studies within the South Central Texas Regional Water Planning Area.

Legislative Recommendation: The SCTRWPG recommends that the legislature provide definitive direction on continued stakeholder involvement and scientific review of the process for evaluating potential changes to the adopted environmental flow standards.

Other Recommendation: The SCTRWPG encourages completion of the Texas Instream Flow Studies Program and improvement of the state's bays and estuaries freshwater inflow studies.

8.7.5 Environmental Studies

The SCTRWPG recognizes that significant needs exist in Bexar and the surrounding counties and that new supplies need to be developed in the Guadalupe River and San Antonio River watersheds. There are issues related to environmental impacts that need further study to determine feasibility of a range of recommended surface water, groundwater, reuse, and conjunctive use WMSs.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG recommends that additional environmental studies be undertaken to be able to evaluate the effects of such projects on the ecosystems that rely on inflow to San Antonio Bay and flows of the Guadalupe River and San Antonio River watersheds.

8.7.6 Water Quality

The primary focus of the regional water planning process is to ensure that water supplies are identified in sufficient quantity to meet future water demands; however, the SCTRWPG also recognizes that the quality of those water supplies is also important to protect. Protecting groundwater and surface water supplies from contamination not only helps to reduce the cost to treat water to public drinking water standards, but also reduces pollutants that may harm the ecological health of the basin.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG recommends that the TCEQ and local governments promote practices and/or regulations to avoid or mitigate threats to water quality in surface water and groundwater sources.

8.8 PROVIDING AND FINANCING WATER AND WASTEWATER SYSTEMS

8.8.1 Funding

The SCTRWPG believes that state funding should be provided as a key incentive for partnership in funding from local, regional, and federal governmental agencies.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG encourages more active state support in solicitation of federal funding for development of new water supply sources, especially when the need for which is based in part upon federal requirements, such as the Endangered Species Act.

8.8.2 Plan Implementation

The SCTRWPG wishes to recognize the legislature's efforts in implementing the State Water Implementation Fund for Texas (SWIFT) program and also supports ongoing and expanded support for financing methods by the State of Texas for water supply projects recommended within adopted Regional Water Plans. The SWIFT program has been in existence since its first loan closing in 2015. As of December 1, 2018, the TWDB has provided $497,255,000 in SWIFT funds to four entities for six projects within the South Central Texas regional water planning area.

Most WUGS go through the process of the "open market" to sell bonds for capital improvements. Unfortunately, this process is more attractive than SWIFT funding as the owner of the bonds on the open market bears responsibility for regulatory approvals, using the bond proceeds for applicable projects, and fiduciary responsibility for bond proceeds. This is most often completed with third party audit of the bond expenditures, after project completion. The private bond market "polices" the prospective bond projects, by bidding interest rates and terms, to evaluate risks for repayment, financial strengths and past bond market experience. This process allows for water projects to be completed in a timely manner.

Current SCTRWPG experience with the SWIFT program is that the process is burdensome, intrusive, and redundant, and TWDB is understaffed. Although SWIFT rates are only 1/2 to 1 point below market, there exists too much regulation from TWDB, which prevents projects from being completed in a timely manner. Examples of over-regulation include initial project planning, design reviews, environmental regulatory approvals, bidding, and construction administration. Many of these reviews and determinations are completed outside the TWDB, and TWDB only reviews and signs-off on outside approvals. In addition, TWDB requires project financial oversight for approval of project budgets, draw requests, construction progress review, and close-out. This oversight review is time-consuming and repetitive.

In addition to the over-regulation, TWDB is understaffed. Some SCTRWPG members are currently under their fourth project manager at TWDB for obtaining SWIFT funding. Understaffing results in resubmittals of all components of the project and reintroduction/education of TWDB staff on what their predecessor approved.

Legislative Recommendation: Given the current level of effort necessary to obtain SWIFT funding from the TWDB, the SCTRWPG encourages the legislature to review all components of the SWIFT program in an effort to streamline its processes and achieve the intent of the program, which is to construct water projects in a timely manner.

Other Recommendation: None.

8.8.3 Continuation of Regional Water Planning

Legislative Recommendation: None.

Other Recommendation: The SB 1 Regional Water Planning Process is an important program, and funding should be continued to sustain the work of the RWPGs.

8.8.4 Guiding Principles for Development of the 2021 Regional Water Plan

In response to comments raised by members of the SCTRWPG and the public during the review of the initially prepared 2016 Regional Water Plan, the SCTRWPG categorized strategic topic areas for discussion to enable the group to improve its development of the 2021 Regional Water Plan. The process was referred to as the 2021 Plan Enhancement Process. The SCTRWPG discussed each topic area and over the course of several SCTRWPG meetings in 2016 and 2017 and developed guiding principles that are included in whole as Appendix 8-A. The following provides a list of the Guiding Principles established by the SCTRWPG:

- Appropriateness and adequacy of how demand and need are determined;
- Role of Regional Water Planning Groups in influencing population growth and land use;
- Conflicts of interests with respect to planning group members;
- The role of the planning group in influencing water development plans of water suppliers;
- The role of the planning group in influencing permitting entities;
- The adequacy of evaluating the plan's effects on freshwater inflows to San Antonio Bay, and the adequacy of environmental assessments of individual water management strategies;
- Minimum Standards for Water Management Strategies;
- Recommended Water Management Strategies;
- Management Supply;
- The Role of Reuse within the Regional Water Plan; and
- Identifying special studies or evaluations deemed important to enhance the 2021 plan, the identification of outside funding sources, and the extent to which innovative strategies should be used.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG recommends a similar process could be beneficial for other planning groups as it resulted in a shared understanding among the planning group members on how the related specific issues would be addressed during the regional planning process.

8.8.5 Notification of Counties with Proposed Water Management Strategies in Regional Water Plans

The SCTRWPG recognizes the importance of local stakeholder involvement during development of water supply projects. The first step in achieving local stakeholder involvement is notification of planned water projects. While the TWDB has notification requirements associated with the public hearings and publication of the Initially Prepared Plan and Final Regional Water Plan, there are no requirements to notify a county of water supply projects or WMSs that are planned to be located within their respective county.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG will undertake a process to determine if additional notice should be given to counties where recommended WMSs are proposed to be located.

8.8.6 Role of the TWDB with Other State and Federal Agencies

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG supports the concept that the TWDB be responsible for facilitating the funding and permitting of projects in the State Water Plan by other state and federal agencies. Frequently, intergovernmental cooperation and engagement among agencies is necessary for the planning and implementation of water-related projects. In instances where state representation is warranted, the TWDB should be the agency to coordinate and engage with federal agencies during permitting and decision-making processes.

8.9 DATA

8.9.1 Water Data Collection

Legislative Recommendation: The legislature should fully fund the cooperative, federal-state-local program of basic water data collection, including (1) stream gages-quantity and quality, (2) groundwater monitoring-water levels and quality, (3) hydrographic surveys and sediment accumulation in reservoirs, (4) water surface evaporation rates, (5) water use data for all WUGs, (6) population projections, and (7) Clean Rivers Program.

Other Recommendation: None.

8.9.2 Access to State Water Data

The SCTRWPG recognizes the significant efforts that the TWDB has undertaken to make regional water planning and state water planning data available to and usable by the public.

Legislative Recommendation: None.

Other Recommendation: There should be adequate funding for the critical roles of TWDB, TCEQ, and TPWD in facilitating access to water data essential for local and regional planning and plan implementation purposes.

8.9.3 Population and Water Demand Projections

The SCTRWPG recognizes that the TWDB bases its water demand projections on patterns of population and economic growth while also permitting revisions of state data to incorporate additional information developed by the planning regions. The SCTRWPG appreciates that the TWDB has facilitated more active involvement of the RWPGs in refining water demand projections for use in the 2021 Regional Water Plans. Nevertheless, some groups believe that the methodology puts an unfair limitation on access to water for future growth, particularly in areas that may experience more rapid change than they have in the past. The SCTRWPG recognizes the significant progress made by the TWDB in refining the methodology for population and water demand projections, specifically with the transition from city-based projections to utility-based projections. However, the SCTRWPG has continued to experience challenges with the lack of flexibility within the methodology to address rapidly growing municipal water demands.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG encourages greater TWDB flexibility through relaxation of current methodological assumptions holding county, regional, and state population projection totals fixed. Water demand projections used in developing the Regional Water Plan should be consensus figures arrived at by using TWDB data along with local input from the cities, counties, and groundwater districts.

8.9.4 Consideration of Climate Variability

Regional Water Plans are based on drought of record conditions using historical hydrologic data. Historically, the TWDB has not used climate models to predict impacts to future water resources in Texas because forecasting tools have not been able to provide the resolution needed for water planning. The SCTRWPG recognizes that more sophisticated models are continuously being developed for use on global and regional levels. Furthermore, Texas utilities are increasingly incorporating climate change impacts into water availability models (WAMs) and other models to determine water demands, supplies, and availability for use in long-range water resource studies.

Legislative Recommendation: As recommended by the TWDB, the SCTRWPG encourages the legislature to fund relevant studies and models to incorporate available climate models.

Other Recommendation: The SCTRWPG encourages the TWDB to reassess available climate models and consider the appropriateness of incorporating them into regional water planning.

8.10 OTHER ISSUES

8.10.1 Water Management Strategies

Inclusion of a WMS in this plan, as either a recommended or alternative WMS, is not an endorsement by this planning group of that WMS for permitting, financing, or for any reason other than as a water supply that has met TWDB standards for being considered as a potential water supply for regional planning purposes.

Legislative Recommendation: None.

Other Recommendation: None.

8.10.2 Planning for System Management Water Supplies

As mentioned in Section 8.8.4, Guiding Principles for Development of the 2021 Regional Water Plan, the SCTRWPG developed guiding principles to enhance the development of the 2021 SCTRWP. Guiding Principle No. IX, Management Supply, establishes the following (also refer to Appendix 8-A for the complete Guiding Principles document):

> The cumulative supply of the recommended water management strategies may include an amount of supply in excess of the amount needed to meet regional needs as considered necessary by the SCTRWPG to allow for such things as uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability.
>
> **Identified Needs without a Recommended Water Management Strategy** – For water needs that are not satisfied by recommended water management strategies, the SCTRWPG will provide a narrative explaining why the need is not satisfied.
>
> **Alternative Strategies in the Regional Water Plan** – The SCTRWPG will include alternative water management strategies that sponsors wish to have identified as alternatives to one or more of their recommended water management strategies.
>
> **Conceptual Approaches (Water Management Strategies Needing Further Study) in the Regional Water Plan** – The SCTRWPG will acknowledge conceptual and innovative approaches to developing water supplies, reducing water demand, and increasing efficiency of supplying water as may be proposed by others, but need further study.

Legislative Recommendation: None.

Other Recommendation: The SCTRWPG encourages other RWPGs to develop and implement processes and policies similar to the Guiding Principles established by the SCTRWPG. In particular, the SCTRWPG encourages other RWPGs to consider developing a similar policy to Guiding Principle No. IX regarding management water supplies.

8.10.3 Public Education on Water

The SCTRWPG recognizes and appreciates that the Texas Legislature established the Water IQ Program in 2007. The Water IQ Program is a statewide public awareness program that complements existing local and regional conservation efforts while also communicating to communities that may not have financial resources to develop a program of their own.

In the South Central Texas Region, several entities have active public education, outreach, and public awareness programs that are focused on water resources, water use, conservation, and resource protection.

Legislative Recommendation: The state should fund a statewide program to educate the general public about water in coordination with the Agricultural Extension Service offices. The program should produce water-related materials with special components adapted for each water planning region and should also include a component comparable to the "Major Rivers" program that would be available to the public schools through the Regional Education Service Centers and by other means.

Other Recommendation: The SCTRWPG supports continued funding to support implementation of the Water Conservation Task Force recommendations, particularly the statewide public education programs, such as Water IQ. The SCTRWPG encourages partnerships with local and regional utilities who have active education programs, and who may have the ability to offer students opportunities for field trips to water supply, treatment, and other facilities. The SCTRWPG also encourages partnership with the Texas American Water Works Association Education Division.

8.10.4 Planning Requirements

Legislative Recommendation: None.

Other Recommendation: There should be no changes in the regional water planning process or additional planning requirements, except through the formal rule-making procedure. Contract requirements should be established and in place prior to submission of grant proposals.

FINAL PLAN

APPENDIX 8-A: GUIDING PRINCIPLES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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South Central Texas Regional Water Planning Group

Bylaws and Guiding Principles[1]

[1] These Bylaws and Guiding Principles are current as of February 15, 2018.

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Acronyms

SCTRWPG:	**South Central Texas Regional Water Planning Group**
South Texas RWPA:	**South Texas RWPA**
TAC:	**Texas Administrative Code**
TCEQ:	**Texas Commission on Environmental Quality**
TDA:	**Texas Department of Agriculture**
TPWD:	**Texas Parks and Wildlife Department**
TWDB:	**Texas Water Development Board**

Preamble

In 2015, the SCTRWPG developed, adopted, and began to pursue the *2021 Plan Enhancement Process* to improve and clarify the principles by which the SCTRWPG develops its regional water plans.

The TAC requires regional water planning groups to consider timely agency and public comments after the submittal of the Initially Prepared Plan (IPP), and to include in the final adopted plan summaries of all timely written and oral comments received, along with a planning group response explaining any resulting revisions, or justification as to why revisions are unwarranted (*see* 31 TAC § 357.21). To thoroughly consider the comments received from agencies and members of the public, former Chair of the SCTRWPG, Con Mims formed a workgroup comprised of SCTRWPG members and their staff, representing a broad mix of stakeholder interests groups across the region. Many comments received gave rise to fundamental questions central to regional water planning processes and philosophies, the implications of which required the utmost attention of the full SCTRWPG. The workgroup recommended adding the *2021 Plan Enhancement Process* to Chapter 8 (*Policy Recommendations & Unique Sites*) of the 2016 South Central Texas Regional Water Plan. Adopted by SCTRWPG in late 2015, the *2021 Plan Enhancement Process* sought to improve and clarify the principles that guide SCTRWPG decisions.

Beginning in February 2016, the SCTRWPG took up the issues identified by *2021 Plan Enhancement Process* as topics requiring careful consideration of the full Planning Group. From February 2016 to November 2017, the fruits of *2021 Plan Enhancement Process* came to bear in the form of the eleven SCTRWPG Guiding Principles contained herein.

The SCTRWPG Guiding Principles reflect the consensus driven decision making process outlined in Article X, section 2 of the SCTRWPG Bylaws, and generally serve several purposes. From the outset of *2021 Plan Enhancement Process*, the intent has been to provide a thorough response to the comments received following the adoption of the 2015 IPP. The SCTRWPG Guiding Principles serve as a response to the questions raised by those public and agency comments, and identified in the *2021 Plan Enhancement Process*.

Secondly, the Guiding Principles serve as a touchstone for which to reference during the making of any and all SCTRWPG decisions. In this way, the Guiding Principles supplement the SCTRWPG Bylaws, as well as the Water Planning Rules set out in Chapter 357 of the TAC.

Lastly, this document seeks to reconcile competing interests at the onset of the planning process, develop a shared understanding of the approach to regional water planning, and to encourage consensus based decision making throughout the planning cycle. The Guiding Principles may serve to inform future policy recommendations by the SCTRWPG. It is the intent of the SCTRWPG to incorporate, or reflect in some manner, these Guiding Principles in Chapter 8 of future regional water plans.

SCTRWPG BYLAWS

ARTICLE I NAMES

Section 1 Organization

The official name of this organization shall be the “South Central Texas Regional Water Planning Group” (SCTRWPG).

Section 2 Regional Water Planning Area

The official name of the regional water planning area designated as Region L by the TWDB in accordance with 31 TAC Chapter 357 on February 19, 1998, shall be the “South Central Texas Regional Water Planning Area” (South Central Texas RWPA). The South Central Texas RWPA consists of Atascosa, Bexar, Caldwell, Calhoun, Comal, DeWitt, Dimmit, Frio, Goliad, Gonzales, Guadalupe, Karnes, Kendall, La Salle, Medina, Refugio, Uvalde, Victoria, Wilson, Zavala and part of Hays Counties.

ARTICLE II ESTABLISHMENT AND PURPOSE

The SCTRWPG was established by appointment of an initial coordinating body of the TWDB on February 19, 1998, and subsequent additional appointments by the initial coordinating body. The purpose of the SCTRWPG shall be to provide comprehensive regional water planning and to carry out the related responsibilities placed on regional water planning groups by state law, including Texas Water Code Chapter 16 and TWDB rules, including 31 TAC Chapters 355, 357 and 358, in and for the South Central RWPA.

ARTICLE III PRINCIPAL ADMINISTRATIVE OFFICE

The principal administrative office of the SCTRWPG shall be the principal business offices of the San Antonio River Authority. The administrative officer of the SCTRWPG for purposes of the Texas Open Records Act shall be designated and hold office until replaced by the SCTRWPG. The Chair of the SCTRWPG shall ensure that the mailing address and physical address of the principal office and administrative officer are provided to all members of the SCTRWPG and the Executive Administrator of the TWDB.

ARTICLE IV RESPONSIBILITIES

The SCTRWPG shall have the responsibility for performing the functions defined in Texas Water Code, Chapter 16 and in 31 TAC Chapters 355, 357 and 358 related to regional water planning groups for the South Central Texas RWPA. Foremost among those responsibilities shall be the development of a regional water plan for the South Central Texas RWPA that identifies both short and long-term water supply needs and recommends water management strategies for addressing them.

ARTICLE V VOTING MEMBERSHIP

Section 1 Composition

The initial voting members of the SCTRWPG include the initial coordinating body appointed by the TWDB on February 19, 1998, plus the additional voting members appointed by the initial coordinating body to ensure adequate representation of the interests comprising the South Central Texas RWPA stated in Texas Water Code §16.053(c), if present and other interests determined by the SCTRWPG, to include representatives appointed by Groundwater Management Areas in accordance with Section §16.053(c). Thereafter, the voting membership of the SCTRWPG shall include persons added and exclude those removed as provided under this Article and any 31 TAC § 357.4(g)(4) member selected for voting membership under Article VI.

Section 2 Terms of Office

Except for members appointed by Groundwater Management Areas under Texas Water Code Section §16.053(c). Terms of office for voting members shall be five years

Section 3 Conditions of Membership

In order to be eligible for voting membership on the SCTRWPG, a candidate must represent the interest for which a member is sought, be willing to participate in the regional water planning process, and abide by these Bylaws.

Section 4 Selection of Members

At least forty-five calendar days prior to the expiration of the term of a voting member, or within two weeks following a Planning Group meeting at which the Planning Group decides to replace a voting member, the SCTRWPG will post public notice in a newspaper of general circulation in each county located in whole or in part in the South Central Texas RWPA soliciting nominations for a successor, identifying the particular interest for which nominations are sought, stating the conditions of membership, delineating the method for submitting nominations, and establishing a deadline for submission of nominations between thirty and forty-five calendar days from the date that public notice was posted. Members of the SCTRWPG may also submit nominations in the manner prescribed in the public notice.

The Executive Committee will receive and process the nominations and after the deadline for submitting nominations, will recommend a nominee for the position to the voting membership as a whole, giving strong consideration to a consensus nominee from those individuals and entities that collectively represent that interest. The Executive Committee shall consider and report all nominations received but may consider only persons who meet the conditions of membership. The voting membership as a whole is not bound by the recommendation of the Executive Committee and may consider any nominee who meets the conditions of membership.

The voting members shall attempt to make a decision for a successor by consensus. If efforts to reach consensus fail, the Chair shall call for a vote on a nominee. An affirmative vote of a majority of the voting membership shall be required to elect a nominee as a new voting member. If voting fails to select a new voting member, the voting members shall consider other nominations until a new member can be selected by consensus or affirmative majority vote of the voting membership.

In addition to selecting new voting members to fill vacancies caused by removal, resignation or the expiration of a term, the voting members may add members to ensure adequate representation of the interests comprising the South Central Texas RWPA by using the selection process set forth in this section. In both the consideration of nominees and the selection of new voting members, the Executive Committee and other voting members shall strive to achieve geographic, ethnic and gender diversity.

Outgoing voting members shall be given the opportunity to fully participate in the selection process for their successors and shall serve until successors take office. However, no member shall participate in a vote in which he/she is a nominee.

A membership created by a Groundwater Management Area in accordance with Texas Water Code §16.053(c) shall be maintained by that Groundwater Management Area. The Planning Group shall notify a Groundwater Management Area of a vacancy created by its appointed member.

Section 5 Attendance

All members shall make a good faith effort to attend all SCTRWPG meetings and hearings. Records of attendance shall be kept by the Secretary at all SCTRWPG meetings and hearings and presented as part of the minutes. Voting members of the SCTRWPG who have missed three consecutive regular meetings, or at least one-half of all meetings in the preceding twelve months, shall be considered to have engaged in excessive absenteeism and are subject to removal from membership under Section 7 of this Article. The Planning Group shall notify any Groundwater Management Area of excessive absenteeism, as defined in this section, of a member appointed by that Groundwater Management Area under Texas Water Code §16.053(c) and request its consideration of replacing that member. Members are encouraged to notify the Chair if they will miss a meeting and/or send a designated alternate.

Section 6 Code of Conduct

Members and designated alternates of the SCTRWPG shall ethically conduct the business of the SCTRWPG and shall avoid any form or appearance of a conflict of interest, real or apparent, by observing the following:

(a) No member or designated alternate of the SCTRWPG shall knowingly:
   (1) Solicit or accept gratuities, favors or anything of monetary value from suppliers or potential suppliers of services, materials or equipment, including subcontractors under recipient contracts or any other person who has a substantial financial interest in the regional water plan; or
   (2) Participate in the selection, award or administration of a procurement where the member or designated alternate has a financial or other substantive interest in the organization being considered for award. Such conflict may be due to any of the following having a financial or familial relationship with the organization:
      i) the member or designated alternate;
      ii) the member's or designated alternate's family;
      iii) the member's or designated alternate's business partner(s); or
      iv) a person or organization that employs, or is about to employ any of the persons listed in (i)-(iii) above; or
   (3) Participates in any deliberation, decision or vote that would constitute a conflict of interest under federal, state or local law.
(b) Potential conflicts of interest shall be clearly stated by the voting member or designated alternate prior to any deliberation or action on an agenda item with which the voting member or designated alternate may be in conflict. Where the potential conflict is restricted to a divisible portion of an agenda item, the Chair may divide the agenda item into parts for deliberation and voting purposes. An abstention from participation in deliberations, decisions or voting and the reasons therefore shall be noted in the minutes.

Section 7 Removal of Voting Members

(a) Grounds for Removal of Voting Members. The following shall constitute grounds for removal of a voting member:
   (1) Engaging in excessive absenteeism as defined under Section 5 of this Article;

(2) Incapacity;
(3) Failure to abide by the code of conduct provisions set forth under Section 6 of this Article;
(4) appointment of a successor by the voting members upon expiration of the member's term;
(5) Change in status so that the member no longer represents the interest he/she was selected to represent;
(6) Falsifying documents;
(7) Any other serious violation of these Bylaws as may be determined by the voting members; or
(8) The voting member's designated alternate engages in any acts described in subdivisions (3), (6) or (7) of this subsection.

(b) Process for Removing Voting Members. Voting members may be removed at any time for any of the grounds for removal of voting members set forth in subsection (a) of this section. Any member with knowledge or suspicion that a voting member or designated alternate has engaged in acts or that events have occurred constituting grounds for removal under subsection (a) of this section shall report such information or suspicion to the Chair. The Chair, upon discovering or receiving such information, shall make a written request to that member for an explanation as to why he/she should not be removed from voting membership. The member shall make written response to the Chair within fifteen calendar days from the date of receipt of the Chair's request. Within five calendar days of receipt of the member's response, the Chair shall forward copies of the response to the Executive Committee. The Chair shall place an item on the next meeting agenda calling for the removal of the member if, 1) after meeting the Executive Committee continues to suspect that grounds for removal may exist; 2) the member fails to make a timely response to the Chair's request; or 3) the Chair or a majority of the Executive Committee requests its inclusion on the agenda after reviewing the written response from the accused member. At the meeting, the member subject to the possible removal action may request evidence of why he/she should not be removed. The voting members may remove the member by affirmative vote of a majority of the voting membership. The member subject to the removal action shall not participate in any way in the removal decision, nor shall his/her membership count as part of the total voting membership for purposes of calculating the vote.

(c) A Groundwater Management Area whose appointed member has acted in a way that constitutes grounds for removal, under subsection (a), above, shall be so notified by the Planning Group with a request for the Groundwater Management Area's consideration of replacement of that member.

ARTICLE VI NON-VOTING MEMBERSHIP

Section 1 Mandatory Members

The voting members of the SCTRWPG shall add the non-voting members set forth in 31 TAC §357.4(g)(1)-(g)(3) and (g)(5) and accept the designees appointed by the entities set forth therein. Such designees shall have no terms of office and shall serve until replaced by the designating entity. However, if the voting members decide by consensus or affirmative majority vote of the voting membership, that a particular designee is hindering the regional water planning efforts of the SCTRWPG, the Chair shall make a written request to the entity within ten calendar days requesting the designation of another person to serve as the entity's designee.

Section 2 Discretionary Members

The voting members of the SCTRWPG may add or remove as a non-voting member an entity set forth in 31 TAC §357.4(h) by consensus or by a majority vote of the voting membership. If an entity is added, the Chair shall make a written request within ten calendar days to the entity requesting the designation of a person to serve until replaced by the designating entity or until the entity is removed as a non-voting member. However, if the voting members determine by consensus or by a majority vote of the voting membership that a particular entity's designee is hindering the regional water planning efforts of the SCTRWPG but also that the entity should remain as a non-voting member, the Chair shall make a written request to the entity within ten calendar days requesting the designation of another person to serve as the entity's designee.

Section 3 Code of Conduct

All non-voting members shall comply with the code of conduct provisions under Section 6 Article V of these Bylaws.

ARTICLE VII DESIGNATED ALTERNATES

Each member may designate an alternate to represent him/her when he/she is unable to attend a meeting or hearing. Each member must notify the Chair of the name of the member's designated alternate prior to the meeting or hearing at which the designated alternate will appear on behalf of the member. If the member fails to provide such notice, the Chair may forbid the participation of the designated alternate at the meeting or hearing. The Chair shall not recognize the designation of more than one alternate per member at any given time.

The designated alternate shall enjoy the same voting privileges, or lack thereof, and shall be bound by the same duties, terms and conditions as the member they represent, except as otherwise provided in these Bylaws. However, a designated alternate for a voting member who serves as an officer shall not be allowed to serve in the capacity as an officer in the member's absence.

Because it is important in achieving consensus for all members to participate actively, keep up-to-date on the progress of the group, and develop a common base of information, members shall in good faith attempt to minimize the number of time they are absent from meetings or are represented by their designated alternates.

The Administrative Officer shall maintain a current list of all members and their designated alternates.

ARTICLE VIII OFFICERS

Section 1 Officers; Restrictions and Terms of Office

Voting members of the SCTRWPG shall elect from the voting membership a Chair, Vice-Chair and Secretary to serve as officers. Each officer shall serve a term of one calendar year.

Except as provided under Section 4 of this Article, an officer shall serve a term of one calendar year. Except as provided under Section 4 of this Article, an officer shall serve until his/her successor takes office. No two voting members representing the same interest shall serve as officers at the same time. Elections shall be held annually, with no restrictions on the number of consecutive terms an individual may serve as an officer other than those that apply because of his/her status as a voting member under these Bylaws.

Section 2 Selection

Officers shall be elected at the first meeting of each calendar year. Nominations shall be made from the floor by voting members. The voting members shall elect officers from among the nominees by consensus or by affirmative vote of a majority of the voting membership.

Section 3 Removal of Officers

Any officer may be removed from office for any of the grounds for removal of voting members set forth under Article V of these Bylaws, or for repeated failure to carry out the duties of the office, by a consensus or by majority vote of the voting membership. Removal of an officer shall be set as an agenda item at the next scheduled meeting upon written request signed by five voting members to the Chair or Secretary. The Chair or Secretary receiving the request shall notify the officer in writing that he/she shall be subject to a removal action at the next scheduled meeting. At that meeting, the officer subject to the possible removal action may present evidence of why he/she should not be removed. If the Chair is the subject of the possible removal action, The Vice-Chair shall preside over the meeting during the agenda item concerning the Chair's removal. The officer subject to the removal action shall not participate in any way in the removal decision, nor shall his/her membership count as part of the total membership for purposes of calculating the vote. The notice of the meeting shall be posted in accordance with the Open Meetings Act and shall state that the issue of possibly removing the officer will be on the agenda. Any vacancy caused by the removal shall be filled as provided under Section 4 of this Article.

Section 4 Vacancies of Officers

Whenever an officer vacancy exists, the vacancy shall be filled at the next properly noticed SCTRWPG meeting. Nominations shall be made from the floor by voting members. The voting members shall elect a replacement officer from among the nominees by consensus or by affirmative vote of a majority of the voting membership. The next highest-ranking officer shall serve in the vacant position until a successor takes office, unless the office of the Secretary becomes vacant, in which case the Chair shall appoint a willing voting member to serve as Secretary until the successor to the Secretary takes office. The person selected to fill a vacancy for an officer shall serve for the unexpired term of his/her predecessor in office.

Section 5 Duties of Each Officer

(a) Chair: The Chair shall be the executive officer of the SCTRWPG. The Chair will preside at all meetings of the SCTRWPG and perform all duties provided by these Bylaws. The Chair may establish and appoint such committees as may be necessary or desirable to assist in conducting the business of the SCTRWPG, or as may be directed by the SCTRWPG. If the Chair is unable to carry out his/her duties, the Vice-Chair shall assume the duties of the Chair.

(b) Vice-Chair: The Vice-Chair shall assist the Chair in the discharge of his/her duties and, in the absence of the Chair, shall assume the Chair's full responsibilities and duties. In the event the Chair is unable to carry out his/her duties, the Vice-Chair shall serve as Chair until the SCTRWPG elects a new Chair under Section 4 of this Article. The Vice-Chair shall perform other duties as assigned by the Chair or these Bylaws.

(c) Secretary: The Secretary or the Administrative Officer shall maintain the minutes and take attendance of the SCTRWPG meetings. The minutes and attendance shall be kept as part of the SCTRWPG official records. The Secretary, or the Administrative Officer, shall ensure that all notices are properly posted as provided in the Bylaws, as required by law and as required by the Texas Open Meetings Act. The Secretary shall perform other duties as assigned by the Chair or these Bylaws. If both the Chair and Vice-Chair are unable to carry out the duties of the Chair, the Secretary shall assume the duties of the Chair.

Section 6 Executive Committee

The Executive Committee shall be composed of five SCTRWPG members, including the Chair, Vice-Chair, Secretary and two members-at-large. No two voting members representing the same interest shall serve as members of the Executive Committee at the same time. The two members-at-large shall be elected annually in the same manner and with the same terms as set forth for the election of officers under this Article. Members-at-large shall be removed and their vacancies filled in the manner prescribed for officers under this Article.

The Executive Committee shall be responsible for carrying out the duties imposed on it in these Bylaws. The voting members of the SCTRWPG may delegate any administrative decisions to the Executive Committee unless provided otherwise in these Bylaws.

All meetings of the Executive Committee shall comply with the provisions related to meetings generally as set forth in Article IX of these Bylaws.

ARTICLE IX MEETINGS

Section 1 Open Meetings and Notice

All meetings of the SCTRWPG, its committees and/or sub-groups, shall be posted and open to the public in the manner of a governmental body under the Texas Open Meetings Act and as set forth in TWDB rules. All actions of the SCTRWPG shall be deliberated and undertaken in open meeting, unless otherwise authorized by the Texas Open Meetings Act. The time and place of meetings shall be set to facilitate, to the greatest extent possible, the participation of the public in the regional water planning process. Copies of all materials presented or discussed shall be made available for public inspection prior to and following any meeting of the SCTRWPG, to the extent reasonably possible.

Section 2 Regular or Called Meetings

At the first meeting of each calendar year, the SCTRWPG shall establish and adopt a regular meeting schedule for the ensuing year. The Chair or a majority of the voting members of the SCTRWPG may also call a special or emergency meeting of the SCTRWPG. The Secretary or Administrative Officer shall ensure that an advance notice and an agenda for regular meetings will be provided to the full membership of the SCTRWPG at least seven calendar days in advance by first class U.S. Mail, facsimile or electronic mail. Supporting information and member-requested materials shall be distributed to the full membership with the notice and agenda or at the meeting, as deemed appropriate by the Chair.

Section 3 Agenda

The Secretary of the SCTRWPG shall ensure that agendas are prepared and distributed for all meetings, in accordance with this Article. Items shall be placed on the agenda at the request of any voting member of the SCTRWPG. Copies of the agenda and all supporting information shall be made available for public inspection prior to and following any meeting of the SCTRWPG.

Section 4 Quorum

A quorum of the SCTRWPG shall be a simple majority of the voting members or their designated alternates excluding vacancies. No less than a quorum shall be necessary to conduct any business of the SCTRWPG.

Section 5 Applicability of Robert's Rules of Order

Except as otherwise provided in these Bylaws, meetings of the SCTRWPG shall be conducted under the provisions of the most current edition of *Robert's Rules of Order*. However, failure to follow such rules shall not constitute grounds for appeal of an action or a decision of the SCTRWPG.

Section 6 Public Meetings Required by Law

The SCTRWPG shall post notice and conduct public meetings specifically required by statute and/or TWDB rule, including those set forth for preplanning, draft regional water plan presentation, adoption of amendments to the regional water plan, and final regional water plan adoption, in accordance with the requirements of the relevant state law and/or TWDB rules. Notification requirements may be different from those in Section 1 of this Article and are specifically delineated in Texas Water Code §16.053 and/or31 TAC §357.12.

Section 7 Minutes

(a) The Secretary shall ensure that minutes of all meetings of the SCTRWPG are prepared. The minutes shall:
   (1) state the subject of each deliberation;
   (2) indicate each vote, order, decision or other action taken;
   (3) indicate those members in attendance, noting the presence of a quorum, and noting the presence of those members of the public who participate in the course of the meeting;
   (4) represent an accurate summary of the meeting's record; and state any other information required by these Bylaws to be included in the minutes.

(b) The Secretary shall ensure that true copies of the minutes are provided to the full membership as soon as possible following the meeting.

ARTICLE X MAKING DECISIONS

Section 1 Applicability; No Written Proxies

(a) Unless the method for making a particular decision is set forth in these Bylaws, the SCTRWPG, its committees and subgroups shall make all decisions using the process set forth in Section 2 of this Article

(b) Written proxies shall not be allowed in any decision-making by the SCTRWPG, its committees or its subgroups. However, designated alternates shall be allowed to participate in decision making as set forth in these Bylaws. (Moved to Article VII)

Section 2 Decision-Making Process

(a) Use of Consensus. The SCTRWPG shall attempt to make decisions using a consensus decision-making process. Consensus is an agreement built by identifying and exploring all members' interests and by assembling a package agreement which satisfies these interests to the greatest extent possible. A consensus is reached when all voting members agree that their major interests have been taken into consideration and addressed in a satisfactory manner so that they can support the decision of the group. The process of building consensus involves the development of alternatives and the assessment of the impacts of those alternatives.

Consensus does not necessarily mean unanimity. Some members may strongly endorse a particular solution while others may accept it as a workable agreement. A member can participate in the consensus without embracing each element of the agreement with the same fervor as other members, or necessarily having each of his/her interests satisfied to the fullest extent. In a consensus agreement, the members recognize that, given the combination of gains and trade-offs in the decision package and given the current circumstances and alternative options, the resulting agreement is the best one the voting members can make at this time.

(b) Failure to Reach Consensus. If after good faith negotiations it appears likely to the Chair that the voting members will be unable to reach consensus, the Chair shall entertain the following:

(1) a motion to put the issue to a vote to be conclusively decided by agreement of a majority of the voting membership; or
(2) a motion to put the issue to a vote as to whether to submit the issue to Alternative Dispute Resolution ("ADR") as set forth under Section 3 of this Article and identifying the members that shall participate in the ADR procedure

("ADR members"), such motion to be decided either by consensus or agreement of not less than a majority of the voting membership.

(c) Decision-Making Process for Committees. Committees established in accordance with these Bylaws shall use the process described in subsection (a) and (b)(1), above.

Section 3 Alternative Dispute Resolution

(a) If a vote under Section 2 (b)(2) of this Article prevails, the ADR members shall agree upon the method of ADR and the use of a mutually acceptable impartial third party to facilitate resolution of the dispute. The ADR procedures shall be in writing, shall be executed by all ADR members before ADR begins, and shall include the following:
   (1) The type or series of ADR criteria determined by all ADR members to be appropriate for the size and complexity of the issue, project or proposed action in dispute;
   (2) The length of time to be allowed the parties to engage in any ADR procedure;
   (3) The name(s) of the impartial third party who will facilitate any process, procedure or method by which a resolution may be agreed upon;
   (4) An agreement between all ADR members as to the method of payment for any costs associated with an ADR procedure, such method being subject to approval by the SCTRWPG;
   (5) An agreement between all ADR members that the impartial third party may not compel the ADR members to enter into a binding agreement, nor shall the impartial third party have the authority to sanction or penalize any ADR member;
   (6) An agreement between all ADR members that, by mutual consent, they may permit persons who are not ADR members to be included as participants in discussion and as experts;
   (7) An agreement between all ADR members that they will continue with ADR procedures through the time frame established in subdivision (2) of this subsection until a settlement is reached, one of the ADR members withdraws from the process, or the impartial third party

concludes and informs the parties that ADR measures are not working; and

(8) An agreement between all ADR members that any ADR procedure used shall provide the method(s) by which any agreement between the parties shall become effective, such as a change order to a plan or a written agreement governing the issue.

(b) An agreement or settlement reached under this section shall not become binding on the ADR members until all ADR members agree in writing to all of the terms of the agreement or settlement.

(c) If the ADR members reach an agreement on the issue, the voting members shall once again consider the issue using the decision-making process set forth under Section 2 of this Article. However, if the voting members fail to reach consensus on the issue a second time, the Chair shall call for a vote as provided under Section 2(b)(1) of this Article. The parties shall use the procedures set forth in this Article until the issue is resolved or abandoned.

Section 4 Final Adoption of Regional Water Plan; Amendments

The voting members of the SCTRWPG shall finally adopt the regional water plan for the South Central Texas RWPA and any amendments thereto in accordance with this article.

ARTICLE XI BOOKS AND RECORDS

Section 1 Required Documents and Retainment

Records of the SCTRWPG, in accordance with the Public Information Act, shall be kept at the principal office of the SCTRWPG for a period of at least five years. Minutes shall be maintained at the principal office of the SCTRWPG for as long as the SCTRWPG exists and for a period of five years thereafter.

Section 2 Inspection and Copying

Records of the SCTRWPG shall be available for inspection and copying at the principal administrative office during normal business hours. Procedures and fees for copying and inspection shall be the same as those used by the political subdivision housing the principal office of the SCTRWPG for inspection and copying of its own public records.

Section 3 Availability of Reports

All reports, planning documents and work products resulting from projects funded by the TWDB shall be made available to the TWDB, the TPWD and the TCEQ or their successor agencies. At least one copy of the approved regional water plan shall be placed in the county clerk's office for each county and in at least one public library of each county having land within the South Central Texas RWPA, in accordance with state law.

ARTICLE XII COMMITTEES

Section 1 Establishment

The SCTRWPG may by motion establish committees and subgroups to assist and advise the SCTRWPG in the development of the regional water management plan. The committee or subgroup may be formed to address specific issues assigned by the SCTRWPG and may have a specified term of membership.

Section 2 Membership

Membership in the committees and subgroups shall generally follow the requirements and procedures of Article V of these Bylaws; membership of the committees and subgroups should be inclusive, rather than exclusive, in nature; the interests identified in the initial coordinating body will be invited to participate, as well as other interests that have been identified. Appointment to committees or subgroups shall be made by the Chair. The terms of office for all members of committees and subgroups shall be either upon the expiration of the term, if any, specified by the SCTRWPG in the establishing motion for the committee or subgroup, or upon the expiration of the persons' membership in the SCTRWPG.

Section 3 Officers

The Chair, Vice-Chair and Secretary of a committee or subgroup established by the SCTRWPG shall be elected from the members of the committee or subgroup. The Chair, Vice-Chair and Secretary of the committee or subgroup established by the SCTRWPG shall be elected to their respective offices by a majority affirmative vote of the members of the committee or subgroup. Additional committee or subgroup officers with associated responsibilities may be created as necessary by a majority affirmative vote of the members of the committee or subgroup. The additional officers shall be elected by a majority affirmative vote of the members of the committee or subgroup.

Section 4 Meetings

Requirements and procedures for committee or subgroup meetings shall follow those established in Article IX of these Bylaws, including requirements for notice. Committees or subgroups may adopt their own rules of procedure, if authorized by the SCTRWPG and the rules are not in conflict with state law, TWDB rules or these Bylaws.

Section 5 Books and Records

Requirements and procedures for committee or subgroup books and records shall follow those established for the SCTRWPG in Article XI of these Bylaws.

Section 6 Code of Conduct

Members of a committee or subgroup are subject to the requirements of Article V, Section 6 of these Bylaws.

ARTICLE XIII COMPENSATION AND REIMBURSEMENT

Section 1 Compensation

Members of the SCTRWPG are not to be compensated for their time.

Section 2 Reimbursement

Reimbursement of a SCTRWPG member’s expenses will be issued from the local agency funds made available through interlocal funding agreements. Requests for reimbursement of travel and other expenses must meet the following requirements to be eligible:

a. The member must submit a completed Expense Report and appropriate receipts.
b. Requested reimbursement for travel expenses must be in conformance with the State rate that is in effect at the time the travel was conducted.
c. The Administrative Agency will issue a check to the member after the completed expense report has been approved by the Chair or Vice-Chair of the SCTRWPG and the mileage and rates have been verified.

All expenses, except those specifically listed below, are eligible for reimbursement under this policy:

a. Cost incurred by a SCTRWPG member eligible for reimbursement by the member's employer.

ARTICLE XIV CONTRACTUAL SERVICES

The voting members of the SCTRWPG shall make all decisions related to final approval of persons or entities selected to provide contractual services for the SCTRWPG, including all services related to preparation, development or revisions of the regional water plan for the South Central Texas RWPA. However, the voting members may delegate to the Executive Committee the authority to make all administrative decisions concerning amendments to TWDB Research and Planning Fund grant contracts for services related to regional water planning, except those decisions concerning amendments related to scopes of work and budgets.

ARTICLE XV ADOPTING AND AMENDING THE BYLAWS

These Bylaws shall have full force and effect upon approval and adoption by the voting members of the SCTRWPG, acting on behalf of the interests comprising the South Central Texas RWPA, and upon submission to the TWDB in compliance with 31 TAC § 357.4. The voting members shall adopt these Bylaws and any amendment thereto by consensus or by affirmative vote of not less than two-thirds of the voting membership. The Secretary shall ensure that proposed amendments to the Bylaws are provided to the full membership no later than ten calendar days prior to the next regular meeting of the SCTRWPG when such amendments are to be considered.

February 2, 2012

Chair, SCTRWPG Date

SCTRWPG GUIDING PRINCIPLES

PRINCIPLE I APPROPRIATENESS AND ADEQUACY OF HOW DEMAND AND NEED ARE DETERMINED

Adopted: August 4, 2016

The SCTRWPG generally defers to the TWDB on matters related to population and water demand projections. However, the SCTRWPG retains the duty to review TWDB projections on a case by case basis. Where the SCTRWPG finds a discrepancy in TWDB's projections, and can adequately justify its findings by verifying one or more of the "criteria for adjustment*,*" TWDB – in consultation with TDA, TCEQ, and TPWD – may adjust population and/or water demand projections accordingly (see generally *General Guidelines for Fifth Cycle of Regional Water Plan Development,* Article 2. *Population and Water Demand Projections*). Consistent with Chapter 8 of the 2016 Regional Water Plan for Region L, the SCTRWPG supports greater TWDB flexibility through relaxation of current methodological assumptions holding regional and state population projection totals fixed (see Chapter 8.9.3 *Population and Water Demand Projections)*. Water demand projections used in developing the Regional Water Plan should be consensus figures arrived at by using TWDB data along with local input from the cities, counties, and groundwater districts.

PRINCIPLE II ROLE OF REGIONAL WATER PLANNING GROUPS IN INFLUENCING POPULATION GROWTH AND LAND USE

Adopted August 4, 2016

Where the concepts of population growth and land use necessarily interrelate with the Regional Water Plan, the SCTRWPG shall, to the greatest extent possible, develop strategies to meet future projected demands. However, it is neither the role, nor the responsibility of the SCTRWPG to influence population growth or land use. While the SCTRWPG has a duty to remain cognizant of the sensitive relationship between the Regional Water Plan, population growth and land use, decisions concerning permitting and influencing population growth are inherently local, and remain wholly independent from the regional water planning process.

PRINCIPLE III CONFLICTS OF INTERESTS WITH RESPECT TO PLANNING GROUP MEMBERS

Adopted August 4, 2016

a) Active Planning Group Members

All disclosures pursuant to Article V, Section 6 of the SCTRWPG Bylaws, are the responsibility of the planning group member or designated alternate who has the potential conflict of interest. Therefore, disclosures are the responsibility of the planning group member or designated alternate. If the voting member choses to abstain from participation in deliberations, decisions, or voting, pursuant to Article V, Section 6 of the SCTRWPG Bylaws, the reason for abstention shall be noted in the minutes.

SCTRWPG Bylaw Excerpt

> *Potential conflicts of interest shall be clearly stated by the voting member or designated alternate prior to any deliberation or action on an agenda item with which the joint member or designated alternate may be in conflict. Where the potential conflict is restricted to a divisible portion of an agenda item, the Chair may divide the agenda item into parts for deliberation and voting purpose. An abstention from participation in deliberations, decisions or voting and the reason therefore shall be noted in the minutes.* (see *SCTRWPG Bylaws*, Article V, Section 6, (b))

b) Nomination Process

Where the SCTRWPG is soliciting nominations to fill vacancies on the planning group, nominators shall provide information regarding the nominee's current employer, and provide a description of the nominee's experience that qualifies him/her for the position in the interest group being sought to represent.

Additionally, nominees shall agree to abide by the Code of Conduct, which is incorporated in the SCTRWPG Bylaws (see *SCTRWPG Bylaws*, Article V, Section 6). As per the Bylaws, the Executive Committee will conduct an interview process whereby nominees will be evaluated. Prior to the interview, nominees will be provided a copy of the Bylaws. During the interview process, nominees will be asked if they are willing to agree to the Bylaws, and specifically, if they are willing to comply with the Code of Conduct.

PRINCIPLE IV THE ROLE OF THE PLANNING GROUP IN INFLUENCING WATER DEVELOPMENT PLANS OF WATER SUPPLIERS

Adopted: November 3, 2016

The role of the SCTRWPG is to ensure water needs are met with identified potentially feasible water management strategies. It is not the role of the SCTRWPG to influence or interfere with local water planning decisions. In the absence of a planning group recommended potentially feasible water management strategy to meet an identified need, the SCTRWPG may evaluate and report, as required, the social, environmental and economic impacts of not meeting the identified need.

PRINCIPLE V THE ROLE OF THE PLANNING GROUP IN INFLUENCING PERMITTING ENTITIES

Adopted: November 3, 2016

Decisions made at the planning group level are non-regulatory, and are intended for planning purposes only. While some decisions made by the SCTRWPG could inevitably affect some decisions made by the governing boards of permitting entities, it is neither the responsibility, nor the role of the SCTRWPG to influence or interfere with the regulatory decisions made by the governing boards of permitting entities.

PRINCIPLE VI THE ADEQUACY OF EVALUATING THE PLAN'S EFFECTS ON FRESHWATER INFLOWS TO SAN ANTONIO BAY, AND THE ADEQUACY OF ENVIRONMENTAL ASSESSMENTS OF INDIVIDUAL WATER MANAGEMENT STRATEGIES

Adopted: November 2, 2017

The SCTRWPG's evaluation of the Plan's effect on instream flows and freshwater inflows to the San Antonio Bay, and Plan's environmental assessments of individual water management strategies are currently meeting the regulations and statutes for regional water planning. The SCTRWPG believes a structural reorganization of the data presented will benefit the understanding of the Plan's environmental assessments. The SCTRWPG will:

- **a)** Initiate environmental assessments earlier into the regional planning process;
- **b)** Eliminate environmental assessment comparisons of current plan to past plans;
- **c)** Consolidate threatened and endangered species information into the appendix rather than repeating in each water management strategy write-up;
- **d)** Update baseline year data to most current for potential impacts to vegetation and terrestrial habitat;
- **e)** Adjust distances for cultural resource sites;
- **f)** Include current conditions and streamflow protected by environmental flow standards in updated tabular form improving the way in which the data is presented;
- **g)** Include target flow regimes based on environmental freshwater inflow standards in updated tabular form improving the way in which the data is presented; and
- **h)** Include high level narrative of climate variability.

The SCTRWPG believes this environmental assessment structural reorganization will reflect realistic environmental impacts of the recommended water management strategies for both the public and planning group members.

PRINCIPLE VII MINIMUM STANDARDS FOR WATER MANAGEMENT STRATEGIES

Adopted: November 2, 2017

For a proposed strategy to be designated by the SCTRWPG as a water management strategy in the regional water plan, the proposed strategy must:

a) supply water, reduce water demands, or otherwise satisfy one or more identified needs;
b) include an evaluation and description consistent with standards used by the SCTRWPG and its technical consultants as required by TWDB Rules;
c) satisfy all relevant requirements established by the TWDB, including environmental flow standards;
d) identify one or more entities, with sufficient ability and willingness to implement the strategy, as being the strategy's sponsor(s);
e) identify all entities, as reasonably possible, who own any existing or planned infrastructure or existing permit that could be affected by the proposed strategy as being strategy participants; and
f) identify groundwater conservation districts or TCEQ with jurisdiction over the proposed strategy.

PRINCIPLE VIII RECOMMENDED WATER MANAGEMENT STRATEGIES

Adopted: November 2, 2017

The SCTRWPG strives to develop a regional water plan that recommends water management strategies sufficient to supply water to all identified needs projected in the planning horizon for the region.

The SCTRWPG prefers designating water management strategies as recommended or alternative using a consensus approach while respecting the strategy sponsor(s)' wishes.

Prior to designating any water management strategies as recommended, the SCTRWPG will review the water management strategies to evaluate costs and environmental sensitivity of each water management strategy per TWDB Rules.

PRINCIPLE IX MANAGEMENT SUPPLY

Adopted: November 2, 2017

The cumulative supply of the recommended water management strategies may include an amount of supply in excess of the amount needed to meet regional needs as considered necessary by the SCTRWPG to allow for such things as uncertainty associated with long-term planning, problems with project implementation, changing weather conditions, flexibility of sponsors in choosing projects to implement, and changes in project viability.

Identified Needs without a Recommended Water Management Strategy

For water needs that are not satisfied by recommended water management strategies, the SCTRWPG will provide a narrative explaining why the need is not satisfied.

Alternative Strategies in the Regional Water Plan

The SCTRWPG will include alternative water management strategies that sponsors wish to have identified as alternatives to one or more of their recommended water management strategies.

Conceptual Approaches (Water Management Strategies Needing Further Study) in the Regional Water Plan

The SCTRWPG will acknowledge conceptual and innovative approaches to developing water supplies, reducing water demand, and increasing efficiency of supplying water as may be proposed by others, but need further study.

PRINCIPLE X THE ROLE OF REUSE WITHIN THE REGIONAL WATER PLAN

Adopted: November 2, 2017

The SCTRWPG generally defers to the TWDB rules for regional water planning as contained in the TAC on matters related to surface water supply analysis. For surface water supply analysis, the SCTRWPG will use the most current Water Availability Models from the TCEQ to evaluate supplies, as required by section 357.32 (c) of the TAC. As per section 357.32 of the TAC, the SCTRWPG will assume full utilization of existing water rights and no return flows when using Water Availability Models.

The SCTRWPG agrees that effluent will be depicted in the Regional Water Plan only in cases of direct and/ or indirect reuse water management strategies, or where a preexisting contract for the supply of reuse is in place. Additionally, the SCTRWPG will not use effluent in the estimates of cumulative effects absent a direct and/or indirect reuse water management strategy or a preexisting contract

PRINCIPLE XI IDENTIFYING SPECIAL STUDIES OR EVALUATIONS DEEMED IMPORTANT TO ENHANCE THE 2021 PLAN, THE IDENTIFICATION OF OUTSIDE FUNDING SOURCES, AND THE EXTENT TO WHICH INNOVATIVE STRATEGIES SHOULD BE USED

Adopted: November 2, 2017

The SCTRWPG recognizes that there are no identifiable outside funding sources for special studies or evaluations. However, the SCTRWPG remains willing to consider evaluating any proposed water management strategies and special studies allowable under section 357.34 of the TAC.

FINAL PLAN

CHAPTER 9: WATER INFRASTRUCTURE FUNDING RECOMMENDATIONS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

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CHAPTER 9: WATER INFRASTRUCTURE FUNDING RECOMMENDATIONS

9.1 INTRODUCTION

Senate Bill 2 (77th Texas Legislature) requires that an Infrastructure Financing Report (IFR) be incorporated into the regional water planning process. In order to meet this requirement, each Regional Water Planning Group (RWPG) is required to examine the funding needed to implement the water management strategies and projects identified and recommended in the region's 2021 Regional Water Plan.

9.2 OBJECTIVES OF THE INFRASTRUCTURE FINANCING REPORT

The primary objective of the Infrastructure Financing Report is to determine the financing options proposed by political subdivisions to meet future water infrastructure needs (including the identification of any State funding sources considered).

9.3 METHODS AND PROCEDURES

For the South Central Texas Regional Water Planning Area, all municipal water user groups and wholesale water providers having water needs and recommended water management strategies in the Regional Water Plan with an associated capital cost were surveyed using the questionnaire provided by the TWDB. Individual municipalities and wholesale water providers were emailed a survey to complete, scan, and return to Black & Veatch.

For each project with an identified capital cost, the survey respondents were asked to enter only the amounts that they wish to receive from one or more of the TWDB programs listed below and the year in which the funds are needed:

- Planning, Design, Permitting, and Acquisition: Costs were entered into this category if the entity wants to participate in TWDB programs offering subsidized interest and deferral of principal and interest for planning, design, acquisition, and permitting costs.
- Construction Funding: Costs were entered into this category if the entity wants to obtain subsidized interest for all construction costs, including planning, design, and construction.

In addition, entities were asked the amount of state participation anticipated with each project.

9.4 SURVEY RESPONSES

The South Central Texas RWPG sent survey forms to 24 municipal water user groups and wholesale water providers. The RWPG received twelve responses, which included details for 36 projects, a 50 percent response rate (Table 9-1; Appendix 9-A). The twelve responses represent about 92 percent of the estimated capital costs of water management strategies included in the Regional Water Plan. Of those responding, the survey shows that approximately $3,638,000,000 would be sought through the state participation programs. It is unclear how the remaining 6 percent of capital costs for survey respondents would be paid, but those costs might be covered through local cash reserves, bonds, or private funding. Furthermore, it is unclear how the remaining costs for those entities not responding to the survey would be financed.

Table 9-1 Responses to the Infrastructure Finance Report Survey

SPONSOR ENTITY NAME	PROJECT NAME	IFR ELEMENT	IFR ELEMENT VALUE	YEAR OF NEED
Alliance Regional Water Authority	ARWA Phase 2	Planning, Design, Permitting & Acquisition Funding	$19,600,000.00	2035
Alliance Regional Water Authority	ARWA Phase 2	Construction Funding	$110,926,000.00	2037
Alliance Regional Water Authority	ARWA Phase 2	Percent State Participation In Owning Excess Capacity	$0.00	
Alliance Regional Water Authority	ARWA Phase 3	Planning, Design, Permitting & Acquisition Funding	$17,261,000.00	2055
Alliance Regional Water Authority	ARWA Phase 3	Construction Funding	$59,297,000.00	2060
Alliance Regional Water Authority	ARWA Phase 3	Percent State Participation In Owning Excess Capacity	$0.00	
Alliance Regional Water Authority	ARWA/GBRA Shared Facilities Project	Planning, Design, Permitting & Acquisition Funding	$57,295,000.00	2019
Alliance Regional Water Authority	ARWA/GBRA Shared Facilities Project	Construction Funding	$171,000,000.00	2020
Alliance Regional Water Authority	ARWA/GBRA Shared Facilities Project	Percent State Participation In Owning Excess Capacity	$0.00	
Canyon Regional Water Authority	CRWA - Brackish Wilcox Groundwater	Planning, Design, Permitting & Acquisition Funding	$52,165,000.00	2030
Canyon Regional Water Authority	CRWA - Brackish Wilcox Groundwater	Construction Funding	$125,779,000.00	2030
Canyon Regional Water Authority	CRWA - Brackish Wilcox Groundwater	Percent State Participation In Owning Excess Capacity	0%	
Canyon Regional Water Authority	CRWA Siesta Project	Planning, Design, Permitting & Acquisition Funding	$31,579,000.00	2040
Canyon Regional Water Authority	CRWA Siesta Project	Construction Funding	$75,582,000.00	2040
Canyon Regional Water Authority	CRWA Siesta Project	Percent State Participation In Owning Excess Capacity	0%	
Canyon Regional Water Authority	CRWA Wells Ranch (Phase 3)	Planning, Design, Permitting & Acquisition Funding	$8,930,000.00	2030
Canyon Regional Water Authority	CRWA Wells Ranch (Phase 3)	Construction Funding	$50,470,000.00	2030
Canyon Regional Water Authority	CRWA Wells Ranch (Phase 3)	Percent State Participation In Owning Excess Capacity	0%	

SPONSOR ENTITY NAME	PROJECT NAME	IFR ELEMENT	IFR ELEMENT VALUE	YEAR OF NEED
Canyon Regional Water Authority	FE - CRWA Expanded Lake Dunlap WTP	Planning, Design, Permitting & Acquisition Funding	$3,035,000.00	2030
Canyon Regional Water Authority	FE - CRWA Expanded Lake Dunlap WTP	Construction Funding	$17,165,000.00	2030
Canyon Regional Water Authority	FE - CRWA Expanded Lake Dunlap WTP	Percent State Participation In Owning Excess Capacity	0%	
Canyon Regional Water Authority	FE - CRWA Hays Caldwell WTP Expansion	Planning, Design, Permitting & Acquisition Funding	$2,888,000.00	2020
Canyon Regional Water Authority	FE - CRWA Hays Caldwell WTP Expansion	Construction Funding	$14,369,000.00	2020
Canyon Regional Water Authority	FE - CRWA Hays Caldwell WTP Expansion	Percent State Participation In Owning Excess Capacity	0%	
Cibolo Valley Local Government Corporation	Cibolo Valley LGC Carrizo Project	Planning, Design, Permitting & Acquisition Funding	$12,000,000.00	2026
Cibolo Valley Local Government Corporation	Cibolo Valley LGC Carrizo Project	Construction Funding	$57,382,000.00	2031
Cibolo Valley Local Government Corporation	Cibolo Valley LGC Carrizo Project	Percent State Participation In Owning Excess Capacity	0%	
County Line SUD	County Line SUD Brackish Edwards Project	Planning, Design, Permitting & Acquisition Funding	N/A	2050
County Line SUD	County Line SUD Brackish Edwards Project	Construction Funding	N/A	2050
County Line SUD	County Line SUD Brackish Edwards Project	Percent State Participation In Owning Excess Capacity	N/A	
County Line SUD	County Line Trinity Wellfield	Planning, Design, Permitting & Acquisition Funding	N/A	2050
County Line SUD	County Line Trinity Wellfield	Construction Funding	N/A	2050
County Line SUD	County Line Trinity Wellfield	Percent State Participation In Owning Excess Capacity	N/A	
County Line SUD	Reuse - County Line SUD	Planning, Design, Permitting & Acquisition Funding	$200,000.00	2021
County Line SUD	Reuse - County Line SUD	Construction Funding	$1,800,000.00	2022
County Line SUD	Reuse - County Line SUD	Percent State Participation In Owning Excess Capacity	0%	
El Oso WSC	El Oso Region L Groundwater Development	Planning, Design, Permitting & Acquisition Funding	$1,553,115.00	2021
El Oso WSC	El Oso Region L Groundwater Development	Construction Funding	$9,908,200.00	2021

SPONSOR ENTITY NAME	PROJECT NAME	IFR ELEMENT	IFR ELEMENT VALUE	YEAR OF NEED
El Oso WSC	El Oso Region L Groundwater Development	Percent State Participation In Owning Excess Capacity	$0.00	
Guadalupe-Blanco River Authority	ARWA/GBRA Shared Facilities Project	Planning, Design, Permitting & Acquisition Funding	$41,504,000.00	2020
Guadalupe-Blanco River Authority	ARWA/GBRA Shared Facilities Project	Construction Funding	$83,008,000.00	2021
Guadalupe-Blanco River Authority	ARWA/GBRA Shared Facilities Project	Percent State Participation In Owning Excess Capacity	0%	
Guadalupe-Blanco River Authority	FE - GBRA Western Canyon WTP Expansion	Planning, Design, Permitting & Acquisition Funding	$7,984,333.30	2024
Guadalupe-Blanco River Authority	FE - GBRA Western Canyon WTP Expansion	Construction Funding	$15,968,666.70	2026
Guadalupe-Blanco River Authority	FE - GBRA Western Canyon WTP Expansion	Percent State Participation In Owning Excess Capacity	0%	
Guadalupe-Blanco River Authority	FE - Hays County Pipeline	Planning, Design, Permitting & Acquisition Funding	$8,495,333.00	2020
Guadalupe-Blanco River Authority	FE - Hays County Pipeline	Construction Funding	$16,990,667.00	2021
Guadalupe-Blanco River Authority	FE - Hays County Pipeline	Percent State Participation In Owning Excess Capacity	0%	
Guadalupe-Blanco River Authority	GBRA Lower Basin Storage	Planning, Design, Permitting & Acquisition Funding	$21,823,333.00	2020
Guadalupe-Blanco River Authority	GBRA Lower Basin Storage	Construction Funding	$43,646,667.00	2021
Guadalupe-Blanco River Authority	GBRA Lower Basin Storage	Percent State Participation In Owning Excess Capacity	0%	
Guadalupe-Blanco River Authority	GBRA MBWSP	Planning, Design, Permitting & Acquisition Funding	$120,913,800.00	2020
Guadalupe-Blanco River Authority	GBRA MBWSP	Construction Funding	$282,132,200.00	2023
Guadalupe-Blanco River Authority	GBRA MBWSP	Percent State Participation In Owning Excess Capacity	0%	
Guadalupe-Blanco River Authority	GBRA New Appropriation (Lower Basin)	Planning, Design, Permitting & Acquisition Funding	$114,588,000.00	2021
Guadalupe-Blanco River Authority	GBRA New Appropriation (Lower Basin)	Construction Funding	$267,372,000.00	2021
Guadalupe-Blanco River Authority	GBRA New Appropriation (Lower Basin)	Percent State Participation In Owning Excess Capacity	0%	
Guadalupe-Blanco River Authority	GBRA Victoria County Steam Electric Project	Planning, Design, Permitting & Acquisition Funding	$35,178,000.00	2022

SPONSOR ENTITY NAME	PROJECT NAME	IFR ELEMENT	IFR ELEMENT VALUE	YEAR OF NEED
Guadalupe-Blanco River Authority	GBRA Victoria County Steam Electric Project	Construction Funding	$82,082,000.00	2024
Guadalupe-Blanco River Authority	GBRA Victoria County Steam Electric Project	Percent State Participation In Owning Excess Capacity	0%	
Maxwell WSC	Maxwell WSC - Trinity Wellfield	Planning, Design, Permitting & Acquisition Funding	$1,000,000.00	2023
Maxwell WSC	Maxwell WSC - Trinity Wellfield	Construction Funding	$6,971,000.00	2021
Maxwell WSC	Maxwell WSC - Trinity Wellfield	Percent State Participation In Owning Excess Capacity	0%	
New Braunfels	FE - NBU Seguin Interconnect	Planning, Design, Permitting & Acquisition Funding	$0.00	2020
New Braunfels	FE - NBU Seguin Interconnect	Construction Funding	$2,428,000.00	2020
New Braunfels	FE - NBU Seguin Interconnect	Percent State Participation In Owning Excess Capacity	0%	
New Braunfels	FE - NBU South WTP Expansion	Planning, Design, Permitting & Acquisition Funding	$0.00	2020
New Braunfels	FE - NBU South WTP Expansion	Construction Funding	$27,701,000.00	2020
New Braunfels	FE - NBU South WTP Expansion	Percent State Participation In Owning Excess Capacity	0%	
New Braunfels	NBU - Trinity Development	Planning, Design, Permitting & Acquisition Funding	$0.00	2020
New Braunfels	NBU - Trinity Development	Construction Funding	$19,155,000.00	2020
New Braunfels	NBU - Trinity Development	Percent State Participation In Owning Excess Capacity	0%	
New Braunfels	New Braunfels Utilities ASR	Planning, Design, Permitting & Acquisition Funding	$0.00	2020
New Braunfels	New Braunfels Utilities ASR	Construction Funding	$39,198,000.00	2020
New Braunfels	New Braunfels Utilities ASR	Percent State Participation In Owning Excess Capacity	0%	
S S WSC	Brackish Wilcox Groundwater For SS WSC	Planning, Design, Permitting & Acquisition Funding	$3,000,000.00	2040
S S WSC	Brackish Wilcox Groundwater For SS WSC	Construction Funding	$7,000,000.00	2040-2042
S S WSC	Brackish Wilcox Groundwater For SS WSC	Percent State Participation In Owning Excess Capacity	50%	

SPONSOR ENTITY NAME	PROJECT NAME	IFR ELEMENT	IFR ELEMENT VALUE	YEAR OF NEED
San Antonio Water System	FE - CPS Direct Recycle Pipeline	Planning, Design, Permitting & Acquisition Funding	$8,897,250.00	2030
San Antonio Water System	FE - CPS Direct Recycle Pipeline	Construction Funding	$26,691,750.00	2035
San Antonio Water System	FE - CPS Direct Recycle Pipeline	Percent State Participation In Owning Excess Capacity	0%	
San Antonio Water System	FE - SAWS Expanded ASR Treatment Plant	Planning, Design, Permitting & Acquisition Funding	$9,877,000.00	2026
San Antonio Water System	FE - SAWS Expanded ASR Treatment Plant	Construction Funding	$29,631,000.00	2028
San Antonio Water System	FE - SAWS Expanded ASR Treatment Plant	Percent State Participation In Owning Excess Capacity	0%	
San Antonio Water System	FE - SAWS Western Integrated Pipeline (Phase 2)	Planning, Design, Permitting & Acquisition Funding	$38,424,171.00	N/A
San Antonio Water System	FE - SAWS Western Integrated Pipeline (Phase 2)	Construction Funding	$74,614,829.00	2021
San Antonio Water System	FE - SAWS Western Integrated Pipeline (Phase 2)	Percent State Participation In Owning Excess Capacity	0%	
San Antonio Water System	Recycled Water Program - SAWS	Planning, Design, Permitting & Acquisition Funding	$45,937,300.00	2035
San Antonio Water System	Recycled Water Program - SAWS	Construction Funding	$137,811,900.00	2038
San Antonio Water System	Recycled Water Program - SAWS	Percent State Participation In Owning Excess Capacity	0%	
San Antonio Water System	SAWS - Expanded Brackish Wilcox Project	Planning, Design, Permitting & Acquisition Funding	$180,791,250.00	2038
San Antonio Water System	SAWS - Expanded Brackish Wilcox Project	Construction Funding	$542,373,750.00	2040
San Antonio Water System	SAWS - Expanded Brackish Wilcox Project	Percent State Participation In Owning Excess Capacity	0%	
San Antonio Water System	SAWS - Expanded Local Carrizo	Planning, Design, Permitting & Acquisition Funding	$8,693,650.00	2038
San Antonio Water System	SAWS - Expanded Local Carrizo	Construction Funding	$16,145,350.00	2040
San Antonio Water System	SAWS - Expanded Local Carrizo	Percent State Participation In Owning Excess Capacity	0%	
Schertz-Seguin Local Government Corporation	Brackish Wilcox Groundwater For SSLGC	Planning, Design, Permitting & Acquisition Funding	$10,000.00	2032

SPONSOR ENTITY NAME	PROJECT NAME	IFR ELEMENT	IFR ELEMENT VALUE	YEAR OF NEED
Schertz-Seguin Local Government Corporation	Brackish Wilcox Groundwater For SSLGC	Construction Funding	$59,651,000.00	2035
Schertz-Seguin Local Government Corporation	Brackish Wilcox Groundwater For SSLGC	Percent State Participation In Owning Excess Capacity	0%	
Schertz-Seguin Local Government Corporation	SSLGC Expanded Carrizo Project	Planning, Design, Permitting & Acquisition Funding	$8,000,000.00	2018
Schertz-Seguin Local Government Corporation	SSLGC Expanded Carrizo Project	Construction Funding	$58,500,000.00	2021
Schertz-Seguin Local Government Corporation	SSLGC Expanded Carrizo Project	Percent State Participation In Owning Excess Capacity	26%	
Victoria	Victoria - ASR	Planning, Design, Permitting & Acquisition Funding	$21,100,000.00	2015
Victoria	Victoria - ASR	Construction Funding	$14,500,000.00	2020
Victoria	Victoria - ASR	Percent State Participation In Owning Excess Capacity	0%	
San Antonio Water System	SAWS - Automated Meter Infrastructure	Planning, Design, Permitting & Acquisition Funding	52015000	N/A
San Antonio Water System	SAWS - Automated Meter Infrastructure	Construction Funding	$156,045,000.00	2021
San Antonio Water System	SAWS - Automated Meter Infrastructure	Percent State Participation In Owning Excess Capacity	0%	

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FINAL PLAN

APPENDIX 9-A: INFRASTRUCTURE FINANCE REPORT RESULTS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

SponsorEntityName	SponsorEntityPrimaryRegion	ProjectName	WMSProjectSponsorRegion	IFRElementName	IFRElementValue	YearOfNeed	IFR Project Data Id	EntityRwpId	WMS ProjectId	IFRProject ElementsId
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA PHASE 2	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$19,600,000.00	2035		2978	3853	1
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA PHASE 2	L	CONSTRUCTION FUNDING	$110,926,000.00	2037		2978	3853	2
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA PHASE 2	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	$0.00			2978	3853	3
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA PHASE 3	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$17,261,000.00	2055		2978	4137	1
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA PHASE 3	L	CONSTRUCTION FUNDING	$59,297,000.00	2060		2978	4137	2
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA PHASE 3	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	$0.00			2978	4137	3
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA/GBRA SHARED FACILITIES PROJECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$57,295,000.00	2019		2978	2665	1
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA/GBRA SHARED FACILITIES PROJECT	L	CONSTRUCTION FUNDING	$171,000,000.00	2020		2978	2665	2
ALLIANCE REGIONAL WATER AUTHORITY	L	ARWA/GBRA SHARED FACILITIES PROJECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	$0.00			2978	2665	3
CANYON REGIONAL WATER AUTHORITY	L	CRWA - BRACKISH WILCOX GROUNDWATER	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$52,165,000.00	2030		20	2115	1
CANYON REGIONAL WATER AUTHORITY	L	CRWA - BRACKISH WILCOX GROUNDWATER	L	CONSTRUCTION FUNDING	$125,779,000.00	2030		20	2115	2
CANYON REGIONAL WATER AUTHORITY	L	CRWA - BRACKISH WILCOX GROUNDWATER	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			20	2115	3
CANYON REGIONAL WATER AUTHORITY	L	CRWA SIESTA PROJECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$31,579,000.00	2040		20	2116	1
CANYON REGIONAL WATER AUTHORITY	L	CRWA SIESTA PROJECT	L	CONSTRUCTION FUNDING	$75,582,000.00	2040		20	2116	2
CANYON REGIONAL WATER AUTHORITY	L	CRWA SIESTA PROJECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			20	2116	3
CANYON REGIONAL WATER AUTHORITY	L	CRWA WELLS RANCH (PHASE 3)	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$8,930,000.00	2030		20	3838	1
CANYON REGIONAL WATER AUTHORITY	L	CRWA WELLS RANCH (PHASE 3)	L	CONSTRUCTION FUNDING	$50,470,000.00	2030		20	3838	2
CANYON REGIONAL WATER AUTHORITY	L	CRWA WELLS RANCH (PHASE 3)	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			20	3838	3
CANYON REGIONAL WATER AUTHORITY	L	FE - CRWA EXPANDED LAKE DUNLAP WTP	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$3,035,000.00	2030		20	4241	1
CANYON REGIONAL WATER AUTHORITY	L	FE - CRWA EXPANDED LAKE DUNLAP WTP	L	CONSTRUCTION FUNDING	$17,165,000.00	2030		20	4241	2
CANYON REGIONAL WATER AUTHORITY	L	FE - CRWA EXPANDED LAKE DUNLAP WTP	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			20	4241	3
CANYON REGIONAL WATER AUTHORITY	L	FE - CRWA HAYS CALDWELL WTP EXPANSION	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$2,888,000.00	2020		20	2651	1
CANYON REGIONAL WATER AUTHORITY	L	FE - CRWA HAYS CALDWELL WTP EXPANSION	L	CONSTRUCTION FUNDING	$14,369,000.00	2020		20	2651	2
CANYON REGIONAL WATER AUTHORITY	L	FE - CRWA HAYS CALDWELL WTP EXPANSION	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			20	2651	3
CIBOLO VALLEY LOCAL GOVERNMENT CORPORATION	L	CIBOLO VALLEY LCG CARRIZO PROJECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$12,000,000.00	2026		2977	2087	1
CIBOLO VALLEY LOCAL GOVERNMENT CORPORATION	L	CIBOLO VALLEY LCG CARRIZO PROJECT	L	CONSTRUCTION FUNDING	$57,382,000.00	2031		2977	2087	2
CIBOLO VALLEY LOCAL GOVERNMENT CORPORATION	L	CIBOLO VALLEY LCG CARRIZO PROJECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2977	2087	3
COUNTY LINE SUD	L	COUNTY LINE SUD BRACKISH EDWARDS PROJECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	N/A	2050		366	3840	1
COUNTY LINE SUD	L	COUNTY LINE SUD BRACKISH EDWARDS PROJECT	L	CONSTRUCTION FUNDING	N/A	2050		366	3840	2
COUNTY LINE SUD	L	COUNTY LINE SUD BRACKISH EDWARDS PROJECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	N/A			366	3840	3
COUNTY LINE SUD	L	COUNTY LINE TRINITY WELLFIELD	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	N/A	2050		366	3837	1
COUNTY LINE SUD	L	COUNTY LINE TRINITY WELLFIELD	L	CONSTRUCTION FUNDING	N/A	2050		366	3837	2
COUNTY LINE SUD	L	COUNTY LINE TRINITY WELLFIELD	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	N/A			366	3837	3

COUNTY LINE SUD	L	REUSE - COUNTY LINE SUD	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$200,000.00	2021		366	1941	1
COUNTY LINE SUD	L	REUSE - COUNTY LINE SUD	L	CONSTRUCTION FUNDING	$1,800,000.00	2022		366	1941	2
COUNTY LINE SUD	L	REUSE - COUNTY LINE SUD	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			366	1941	3
EL OSO WSC	L	EL OSO REGION L GROUNDWATER DEVELOPMENT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$1,553,115.00	2021		694	4321	1
EL OSO WSC	L	EL OSO REGION L GROUNDWATER DEVELOPMENT	L	CONSTRUCTION FUNDING	$9,908,200.00	2021		694	4321	2
EL OSO WSC	L	EL OSO REGION L GROUNDWATER DEVELOPMENT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	$0.00			694	4321	3
GUADALUPE-BLANCO RIVER AUTHORITY	L	ARWA/GBRA SHARED FACILITIES PROJECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$41,504,000.00	2020		63	2665	1
GUADALUPE-BLANCO RIVER AUTHORITY	L	ARWA/GBRA SHARED FACILITIES PROJECT	L	CONSTRUCTION FUNDING	$83,008,000.00	2021		63	2665	2
GUADALUPE-BLANCO RIVER AUTHORITY	L	ARWA/GBRA SHARED FACILITIES PROJECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			63	2665	3
GUADALUPE-BLANCO RIVER AUTHORITY	L	FE - GBRA WESTERN CANYON WTP EXPANSION	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$7,984,333.30	2024		63	2109	1
GUADALUPE-BLANCO RIVER AUTHORITY	L	FE - GBRA WESTERN CANYON WTP EXPANSION	L	CONSTRUCTION FUNDING	$15,968,666.70	2026		63	2109	2
GUADALUPE-BLANCO RIVER AUTHORITY	L	FE - GBRA WESTERN CANYON WTP EXPANSION	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			63	2109	3
GUADALUPE-BLANCO RIVER AUTHORITY	L	FE - HAYS COUNTY PIPELINE	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$8,495,333.00	2020		63	4242	1
GUADALUPE-BLANCO RIVER AUTHORITY	L	FE - HAYS COUNTY PIPELINE	L	CONSTRUCTION FUNDING	$16,990,667.00	2021		63	4242	2
GUADALUPE-BLANCO RIVER AUTHORITY	L	FE - HAYS COUNTY PIPELINE	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			63	4242	3
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA LOWER BASIN STORAGE	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$21,823,333.00	2020		63	2111	1
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA LOWER BASIN STORAGE	L	CONSTRUCTION FUNDING	$43,646,667.00	2021		63	2111	2
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA LOWER BASIN STORAGE	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			63	2111	3
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA MBWSP	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$120,913,800.00	2020		63	2108	1
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA MBWSP	L	CONSTRUCTION FUNDING	$282,132,200.00	2023		63	2108	2
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA MBWSP	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			63	2108	3
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA NEW APPROPRIATION (LOWER BASIN)	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$114,588,000.00	2021		63	2112	1
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA NEW APPROPRIATION (LOWER BASIN)	L	CONSTRUCTION FUNDING	$267,372,000.00	2021		63	2112	2
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA NEW APPROPRIATION (LOWER BASIN)	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			63	2112	3
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA VICTORIA COUNTY STEAM ELECTRIC PROJECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$35,178,000.00	2022		63	2110	1
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA VICTORIA COUNTY STEAM ELECTRIC PROJECT	L	CONSTRUCTION FUNDING	$82,082,000.00	2024		63	2110	2
GUADALUPE-BLANCO RIVER AUTHORITY	L	GBRA VICTORIA COUNTY STEAM ELECTRIC PROJECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			63	2110	3
MAXWELL WSC	L	MAXWELL WSC - TRINITY WELLFIELD	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$1,000,000.00	2023		1697	3696	1
MAXWELL WSC	L	MAXWELL WSC - TRINITY WELLFIELD	L	CONSTRUCTION FUNDING	$6,971,000.00	2021		1697	3696	2
MAXWELL WSC	L	MAXWELL WSC - TRINITY WELLFIELD	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			1697	3696	3
NEW BRAUNFELS	L	FE - NBU SEGUIN INTERCONNECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$0.00	2020		1987	4244	1
NEW BRAUNFELS	L	FE - NBU SEGUIN INTERCONNECT	L	CONSTRUCTION FUNDING	$2,428,000.00	2020		1987	4244	2
NEW BRAUNFELS	L	FE - NBU SEGUIN INTERCONNECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			1987	4244	3
NEW BRAUNFELS	L	FE - NBU SOUTH WTP EXPANSION	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$0.00	2020		1987	4243	1
NEW BRAUNFELS	L	FE - NBU SOUTH WTP EXPANSION	L	CONSTRUCTION FUNDING	$27,701,000.00	2020		1987	4243	2

NEW BRAUNFELS	L	FE - NBU SOUTH WTP EXPANSION	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			1987	4243	3
NEW BRAUNFELS	L	NBU - TRINITY DEVELOPMENT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$0.00	2020		1987	1815	1
NEW BRAUNFELS	L	NBU - TRINITY DEVELOPMENT	L	CONSTRUCTION FUNDING	$19,155,000.00	2020		1987	1815	2
NEW BRAUNFELS	L	NBU - TRINITY DEVELOPMENT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			1987	1815	3
NEW BRAUNFELS	L	NEW BRAUNFELS UTILITIES ASR	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$0.00	2020		1987	2437	1
NEW BRAUNFELS	L	NEW BRAUNFELS UTILITIES ASR	L	CONSTRUCTION FUNDING	$39,198,000.00	2020		1987	2437	2
NEW BRAUNFELS	L	NEW BRAUNFELS UTILITIES ASR	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			1987	2437	3
S S WSC	L	BRACKISH WILCOX GROUNDWATER FOR SS WSC	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$3,000,000.00	2040		2797	2210	1
S S WSC	L	BRACKISH WILCOX GROUNDWATER FOR SS WSC	L	CONSTRUCTION FUNDING	$7,000,000.00	2040-2042		2797	2210	2
S S WSC	L	BRACKISH WILCOX GROUNDWATER FOR SS WSC	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	50%			2797	2210	3
SAN ANTONIO WATER SYSTEM	L	FE - CPS DIRECT RECYCLE PIPELINE	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$8,897,250.00	2030		2849	2107	1
SAN ANTONIO WATER SYSTEM	L	FE - CPS DIRECT RECYCLE PIPELINE	L	CONSTRUCTION FUNDING	$26,691,750.00	2035		2849	2107	2
SAN ANTONIO WATER SYSTEM	L	FE - CPS DIRECT RECYCLE PIPELINE	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2849	2107	3
SAN ANTONIO WATER SYSTEM	L	FE - SAWS EXPANDED ASR TREATMENT PLANT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$9,877,000.00	2026		2849	4245	1
SAN ANTONIO WATER SYSTEM	L	FE - SAWS EXPANDED ASR TREATMENT PLANT	L	CONSTRUCTION FUNDING	$29,631,000.00	2028		2849	4245	2
SAN ANTONIO WATER SYSTEM	L	FE - SAWS EXPANDED ASR TREATMENT PLANT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2849	4245	3
SAN ANTONIO WATER SYSTEM	L	FE - SAWS WESTERN INTEGRATED PIPELINE (PHASE 2)	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$38,424,171.00	N/A		2849	2339	1
SAN ANTONIO WATER SYSTEM	L	FE - SAWS WESTERN INTEGRATED PIPELINE (PHASE 2)	L	CONSTRUCTION FUNDING	$74,614,829.00	2021		2849	2339	2
SAN ANTONIO WATER SYSTEM	L	FE - SAWS WESTERN INTEGRATED PIPELINE (PHASE 2)	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2849	2339	3
SAN ANTONIO WATER SYSTEM	L	RECYCLED WATER PROGRAM - SAWS	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$45,937,300.00	2035		2849	2105	1
SAN ANTONIO WATER SYSTEM	L	RECYCLED WATER PROGRAM - SAWS	L	CONSTRUCTION FUNDING	$137,811,900.00	2038		2849	2105	2
SAN ANTONIO WATER SYSTEM	L	RECYCLED WATER PROGRAM - SAWS	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2849	2105	3
SAN ANTONIO WATER SYSTEM	L	SAWS - EXPANDED BRACKISH WILCOX PROJECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$180,791,250.00	2038		2849	2338	1
SAN ANTONIO WATER SYSTEM	L	SAWS - EXPANDED BRACKISH WILCOX PROJECT	L	CONSTRUCTION FUNDING	$542,373,750.00	2040		2849	2338	2
SAN ANTONIO WATER SYSTEM	L	SAWS - EXPANDED BRACKISH WILCOX PROJECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2849	2338	3
SAN ANTONIO WATER SYSTEM	L	SAWS - EXPANDED LOCAL CARRIZO	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$8,693,650.00	2038		2849	2103	1
SAN ANTONIO WATER SYSTEM	L	SAWS - EXPANDED LOCAL CARRIZO	L	CONSTRUCTION FUNDING	$16,145,350.00	2040		2849	2103	2
SAN ANTONIO WATER SYSTEM	L	SAWS - EXPANDED LOCAL CARRIZO	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2849	2103	3
SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	L	BRACKISH WILCOX GROUNDWATER FOR SSLGC	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$10,000.00	2032		1999	2119	1
SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	L	BRACKISH WILCOX GROUNDWATER FOR SSLGC	L	CONSTRUCTION FUNDING	$59,651,000.00	2035		1999	2119	2
SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	L	BRACKISH WILCOX GROUNDWATER FOR SSLGC	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			1999	2119	3
SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	L	SSLGC EXPANDED CARRIZO PROJECT	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$8,000,000.00	2018		1999	2117	1
SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	L	SSLGC EXPANDED CARRIZO PROJECT	L	CONSTRUCTION FUNDING	$58,500,000.00	2021		1999	2117	2

SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	L	SSLGC EXPANDED CARRIZO PROJECT	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	26%			1999	2117	3
VICTORIA	L	VICTORIA - ASR	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$21,100,000.00	2015		2409	2396	1
VICTORIA	L	VICTORIA - ASR	L	CONSTRUCTION FUNDING	$14,500,000.00	2020		2409	2396	2
VICTORIA	L	VICTORIA - ASR	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2409	2396	3
SAN ANTONIO WATER SYSTEM	L	SAWS - Automated Meter Infastructure	L	PLANNING, DESIGN, PERMITTING & ACQUISITION FUNDING	$52,015,000.00	N/A		2849	Addition	1
SAN ANTONIO WATER SYSTEM	L	SAWS - Automated Meter Infastructure	L	CONSTRUCTION FUNDING	$156,045,000.00	2021		2849	Addition	2
SAN ANTONIO WATER SYSTEM	L	SAWS - Automated Meter Infastructure	L	PERCENT STATE PARTICIPATION IN OWNING EXCESS CAPACITY	0%			2849	Addition	3

FINAL PLAN

CHAPTER 10: PUBLIC PARTICIPATION AND PLAN ADOPTION

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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List of Abbreviations

ARWA	Alliance Regional Water Authority
CRWA	Canyon Regional Water Authority
CVLGC	Cibolo Valley Local Government Corporation
IPP	Initially Prepared Plan
GBRA	Guadalupe-Blanco River Authority
RWPG	Regional Water Planning Group
SARA	San Antonio River Authority
SAWS	San Antonio Water System
SCTRWP	South Central Texas Regional Water Plan
SCTRWPG	South Central Texas Regional Water Planning Group
SSLGC	Schertz-Seguin Local Government Corporation
TAC	Texas Administrative Code
TWDB	Texas Water Development Board
WMS	Water Management Strategy
WUG	Water User Group
WWP	Wholesale Water Provider

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CHAPTER 10: PUBLIC PARTICIPATION AND PLAN ADOPTION

Development of the 2021 South Central Texas Regional Water Plan (SCTRWP) included workgroups to address issues of particular importance, coordination with water user groups (WUGs) and wholesale water providers (WWPs), coordination with other planning regions, and active public participation throughout the planning process. These key activities are described in Subsections 10.1 through 10.5. This chapter documents public hearings, comments from the public and regulatory agencies, and responses to those comments.

10.1 2021 PLAN ENHANCEMENT PROCESS

Beginning in 2015 and following submittal of the final 2016 SCTRWP, the South Central Texas Regional Water Planning Group (SCTRWPG) undertook the 2021 Plan Enhancement Process whereby the planning group, as a whole, would discuss and take appropriate action to (1) thoroughly consider comments received from agencies and members of the public; and (2) improve the 2021 SCTRWP. The 2021 Plan Enhancement Process sought to improve and clarify the principles that guide SCTRWPG decisions. Over the course of several SCTRWPG meetings from February 2016 to November 2017, the SCTRWPG considered several issues and compiled eleven SCTRWPG Guiding Principles (Refer to Appendix 8-A for a complete compilation of the Guiding Principles).

The Guiding Principles serve as a touchstone for which to reference when the SCTRWPG makes decisions. The Guiding Principles also seek to reconcile competing interests at the onset of the planning process, develop a shared understanding of the approach to regional water planning, and encourage consensus based decision making throughout the planning cycle. The Guiding Principles were included in Chapter 8: Policy Recommendations and Unique Sites as a recommendation to other regional water planning groups to develop a similar process.

The following provides a list of the Guiding Principles established by the SCTRWPG:

- Appropriateness and adequacy of how demand and need are determined;
- Role of Regional Water Planning Groups in influencing population growth and land use;
- Conflicts of interests with respect to planning group members;
- The role of the planning group in influencing water development plans of water suppliers;
- The role of the planning group in influencing permitting entities;
- The adequacy of evaluating the plan's effects on freshwater inflows to San Antonio Bay, and the adequacy of environmental assessments of individual water management strategies (WMSs);
- Minimum Standards for WMSs;
- Recommended WMSs;
- Management Supply;

- The Role of Reuse within the Regional Water Plan; and
- Identifying special studies or evaluations deemed important to enhance the 2021 plan, the identification of outside funding sources, and the extent to which innovative strategies should be used.

10.2 WORKGROUPS

As in previous planning cycles, the SCTRWPG formed workgroups focused on issues of particular importance or concern. Each workgroup was charged to identify issue(s) and to develop potential resolutions and consensus recommendations for consideration and potential action by the SCTRWPG. Topics of discussion by each workgroup are reflected in the minutes of the SCTRWPG meetings and throughout the 2021 SCTRWP. Support for these workgroups was provided by the plan administrator (San Antonio River Authority [SARA]), technical and public participation consultants, water utilities, state agencies, groundwater conservation districts, contracted researchers, and other stakeholders. The eight (7) workgroups assembled for the 2021 Plan are listed, in alphabetical order, below along with their respective workgroup and/or relevant technical consultant meeting date(s).

- Environmental Assessment – April 5, 2017; April 26, 2017May 24, 2017
- Effluent, Modeling, and Reuse – May 2017; August 2017
- Innovative Strategies – May 2017
- Major Water Providers – April 2018
- Minimum Standards – April 2017; June 2017; July 2017
- Policy Recommendations – July 2019; April 2019; August 2019; October 2019
- Staff Workgroup – quarterly meetings 2015 to 2020.

The Staff Workgroup, comprised of the SCTRWPG Executive Committee and representatives of the plan administrator, the Texas Water Development Board (TWDB), water suppliers, and the technical and public participation consultants, convened at least one week in advance of each SCTRWPG meeting. The Staff Workgroup provided a preliminary review of materials prepared by the technical and public participation consultants, refined SCTRWPG meeting agendas, and prepared administrative matters for consideration and potential action by the SCTRWPG.

10.3 COORDINATION WITH WATER USER GROUPS AND WHOLESALE WATER PROVIDERS

The technical consultant met and/or corresponded with representatives of all WWPs and many WUGs throughout the development of the 2021 SCTRWP. The following summarizes meeting/corresponding dates with WUGs and WWPs:

- Alliance Regional Water Authority (ARWA) – August 2019; September 2019; October 2019
- Canyon Regional Water Authority (CRWA) – February 2017; May 2019; July 2019; October 2019; January 2020
- Cibolo Valley Local Government Corporation (CVLGC) – July 2019; August 2019; October 2019

- Guadalupe-Blanco River Authority (GBRA) – August 2019; September 2019; October 2019; January 2020; February 2020
- San Antonio Water System (SAWS)– April 2017; November 2017; May 2018; June 2019; October 2019; November 2019; January 2020; February 2020
- Schertz-Seguin Local Government Corporation (SSLGC) – July 2019; August 2019; October 2019
- General WUGs – November 2016; March 2017; May 2017; January 2020; February 2020

While there are specific months listed above, the SCTRWPG has been in continuous communication with the WWPs and WUGs with regards to contract demands, WMSs, and population/demand projections. These meetings and correspondence generally focused on accurate portrayal of existing water supplies and contractual commitments, projected water demands, and potentially feasible WMSs sponsored by the WWPs or WUG to meet future needs. In addition to meetings and telephone correspondence, all WWPs and WUGs were afforded opportunities to provide information regarding existing supplies, projected demands, emergency interconnections, and sponsored WMSs through emailed surveys.

10.4 COORDINATION WITH OTHER PLANNING REGIONS

The South Central Texas Regional Water Planning Area (Region L) is surrounded by five adjacent planning areas, including: Plateau (J), Lower Colorado (K), Rio Grande (M), Coastal Bend (N), and Lavaca (P). The 2021 SCTRWP includes one recommended WMS, Local Groundwater, with source water originating in Bee County in Region N. To the extent necessary, coordination with each of these regions was accomplished through chair correspondence, regional water planning group (RWPG) liaisons, and/or technical consultant collaboration. Subjects of coordination, correspondence, or collaboration included projected demands, confirmation of WUG allocations among regions, and specific WMSs of interest (e.g., GBRA Mid-Basin Project). The SCTRWPG is aware of no interregional conflicts involving recommended WMSs included in the 2021 SCTRWP.

10.5 PUBLIC PARTICIPATION

Public participation was an integral element in all phases of development of the 2021 SCTRWP. All SCTRWPG meetings were preceded by required notice and open to the public. Opportunities for public comment were available at the beginning and end of every SCTRWPG meeting, and summaries of comments received are included in the approved minutes of each meeting. Communication of information was facilitated and supported by the SARA-maintained Region L website[1] and by the TWDB website[2]. Throughout the planning process, SCTRWPG members, SARA, and the technical and public participation consultants provided responses to inquiries from the public.

[1] San Antonio River Authority, 2020. "South Central Texas Regional Water Planning Group". Region L Website - http://www.regionltexas.org/.

[2] Texas Water Development Board, 2020. "Regional Water Planning". TWDB Website, Regional Water Planning page - http://www.twdb.texas.gov/waterplanning/rwp/index.asp.

New to the Regional Water Planning process this cycle, beginning in 2019 were the adoptions of the Open Meetings Act[3] and Public Information Act[4], which require members of governmental bodies to participate in education training and open records training pursuant to Sections 551.005 and 552.012 of the Texas Government Code, respectively. These Acts in conjunction determine how open meetings are operated and public information is made available to the public. More information can be found on the Office of the Texas Attorney General website (https://www.texasattorneygeneral.gov/). As described above, the SCTRWPG has routinely abided by such open forums and information prior to the adoption of these acts and has been able to appropriately incorporate the requirements. The SCTRWPG met all requirements under the Texas Open Meetings Act and Public Information Act in accordance with Title 31 of the Texas Administrative Code (31 TAC) Sections 357.12, 357.21, and 357.50(f).

10.6 INITIALLY PREPARED PLAN ADOPTION

The Initially Prepared Plan (IPP) was adopted by the SCTRWPG during the regularly scheduled meeting on February 20, 2020. The adopted IPP was submitted to the TWDB and made available for review and comment on March 3, 2020. Hardcopies and electronic versions of the IPP were made available to county clerks and public libraries throughout the region and on the internet.

10.7 TWDB COMMENTS ON INITIALLY PREPARED PLAN AND RESPONSES

The TWDB provided written comments on the IPP on June 17, 2020 (Appendix 10-A). Responses to these comments, as approved by consensus of the SCTRWPG during its September 3, 2020, meeting are shown in Appendix 10-B, and the changes are reflected in appropriate locations throughout the adopted 2021 SCTRWP.

10.8 PUBLIC HEARINGS AND RESPONSES TO COMMENTS ON INITIALLY PREPARED PLAN

The IPP was adopted by the SCTRWPG during the regularly scheduled meeting on February 20, 2020. The adopted IPP was submitted to the TWDB and made available for review and comment on March 3, 2020. Hardcopies and electronic versions of the IPP were made available to county clerks and public libraries throughout the region and on the internet.

At the February 20, 2020, meeting, the SCTRWPG scheduled three public hearings to take place in 2020 on May 7, 21, and 28 in the cities of San Marcos, San Antonio, and Victoria, respectively. Beginning in mid-March 2020, the COVID-19 pandemic prompted local and state-wide stay-at-home orders in order to slow the spread of the novel coronavirus. On March 16, 2020, the Texas Governor granted the Office of the Attorney General's request for temporary suspension of certain open-meeting statutes to allow for telephonic or videoconference meetings of governmental bodies that are accessible to the public. The TWDB recommended that RWPGs hold virtual public hearings, as resources allow. In response to these developments, the SCTRWPG held virtual public hearings via GoToMeeting on the originally-scheduled dates of May 7, 21, and 28th. Public testimony was accepted at all three meetings. A total of

[3] Office of the Texas Attorney General. "Open Meetings Act". https://www.texasattorneygeneral.gov/open-government/open-meetings-act-training.

[4] Office of the Texas Attorney General. "Public Information Act". https://www.texasattorneygeneral.gov/open-government/governmental-bodies/pia-and-oma-training-resources/public-information-act-training.

two oral comments were received during these public hearings. Written comments regarding the IPP were accepted from the public through July 20, 2020, and from other state and federal agencies through August 19, 2020. A total of four written comments were received from the public and from other state and federal agencies. Responses to public comments and from other state and federal agencies, as approved by consensus of the SCTRWPG during its September 3, 2020, meeting are shown in Appendix 10-C, and the changes are reflected in appropriate locations throughout the adopted 2021 SCTRWP.

10.9 FINAL REGIONAL WATER PLAN ADOPTION

The 2021 SCTRWP was certified complete and adopted by a majority vote of the SCTRWPG at its regularly scheduled meeting on September 3, 2020, and submitted to the TWDB by November 5, 2020, for approval and integration into the 2022 State Water Plan.

FINAL PLAN

APPENDIX 10-A: TWDB COMMENT LETTER ON THE 2021 REGION L IPP

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

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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

Ms. Suzanne Scott, Chair
c/o San Antonio River Authority
100 East Guenther St.
San Antonio, Texas 78283

Re: Texas Water Development Board Comments for the South Central Texas (Region L) Regional Water Planning Group Initially Prepared Plan, Contract No. 1548301840

Dear Ms. Scott:

Texas Water Development Board (TWDB) staff have completed their review of the Initially Prepared Plan (IPP) submitted by March 3, 2020 on behalf of the South Central Texas Regional Water Planning Group (RWPG). The attached comments follow this format:

- **Level 1:** Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements; and,

- **Level 2:** Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.

Please note that rule references are based on recent revisions to 31 Texas Administrative Code (TAC) Chapter 357, adopted by the TWDB Board on June 4, 2020. 31 TAC § 357.50(f) requires the RWPG to consider timely agency and public comment. Section 357.50(g) requires the final adopted plan include summaries of all timely written and oral comments received, along with a response explaining any resulting revisions or why changes are not warranted. Copies of TWDB's Level 1 and 2 written comments and the region's responses must be included in the final, adopted regional water plan (*Contract Exhibit C, Section 13.1.2)*.

Standard to all planning groups is the need to include certain content in the final regional water plans that was not yet available at the time that IPPs were prepared and submitted. In your final regional water plan, please be sure to also incorporate the following:

a) Completed results from the RWPG's infrastructure financing survey for sponsors of recommended projects with capital costs, including an electronic version of the survey spreadsheet *[31 TAC § 357.44]*;

b) Completed results from the implementation survey, including an electronic version of the survey spreadsheet *[31 TAC § 357.45(a)]*;
c) Documentation that comments received on the IPP were considered in the development of the final plan *[31 TAC § 357.50(f)]*; and
d) Evidence, such as a certification in the form of a cover letter, that the final, adopted regional water plan is complete and adopted by the RWPG *[31 TAC § 357.50(h)(1)]*.

Please ensure that the final plan includes updated State Water Planning Database (DB22) reports, and that the numerical values presented in the tables throughout the final, adopted regional water plan are consistent with the data provided in DB22. For the purpose of development of the 2022 State Water Plan, water management strategy and other data entered by the RWPG in DB22 shall take precedence over any conflicting data presented in the final regional water plan *[Contract Exhibit C, Sections 13.1.3 and 13.2.2]*.

Additionally, subsequent review of DB22 data is being performed. If issues arise during our ongoing data review, they will be communicated promptly to the planning group to resolve. Please anticipate the need to respond to additional comments regarding data integrity, including any source overallocations, prior to the adoption of the final regional water plans.

The provision of certain content in an electronic-only form is permissible as follows: Internet links are permissible as a method for including model conservation and drought contingency plans within the final regional water plan; hydrologic modeling files may be submitted as electronic appendices, however all other regional water plan appendices should also be incorporated in hard copy format within each plan *[31 TAC § 357.50(g)(2)(C), Contract Exhibit C, Section 13.1.2 and 13.2.1]*.

The following items must accompany, the submission of the final, adopted regional water plan:

1. The prioritized list of all recommended projects in the regional water plan, including an electronic version of the prioritization spreadsheet *[31 TAC § 357.46];* and,
2. All hydrologic modeling files and GIS files, including any remaining files that may not have been provided at the time of the submission of the IPP but that were used in developing the final plan *[31 TAC § 357.50(g)(2)(C), Contract Exhibit C, Section 13.1.2, and 13.2.1].*

The following general requirements that apply to recommended water management strategies must be adhered to in all final regional water plans including:

1. Regional water plans must not include any recommended strategies or project costs that are associated with simply maintaining existing water supplies or replacing existing infrastructure. Plans may include only infrastructure costs that are associated with volumetric increases of treated water supplies delivered to water user groups or that result in more efficient use of existing supplies *[31 TAC § 357.10(39), § 357.34(e)(3)(A), Contract Exhibit C, Sections 5.5.2 and 5.5.3]*; and,

2. Regional water plans must not include the costs of any retail distribution lines or other infrastructure costs that are not directly associated with the development of additional supply volumes (e.g., via treatment) other than those line replacement costs related to projects that are for the primary purpose of achieving conservation savings via water loss reduction *[§ 357.34(e)(3)(A), Contract Exhibit C, Section 5.5.3]*.

Please be advised that, within the attached document, your region has received a comment specifically requesting that the RWPG provide the basis for how the RWPG considers it feasible that certain water management strategies will actually be implemented by January 5, 2023 (see Level 1, Comment 1), especially for projects with long lead times. This comment is aimed at making sure RWPGs do not present projects in their plans to provide water during the 2020 decade that cannot reasonably be expected to be online, *and provide water supply*, by January 5, 2023. For project types whose drought yields rely on *previously stored water*, the 2020 supply volume should take into consideration reasonably expected accumulated storage that would already be available in the event of drought. The RWPG must adequately address this Level 1 comment in the final, adopted regional water plan, which might require making changes to your regional plan.

It is preferable that RWPGs adopt a realistic plan that acknowledges the likelihood of unmet needs in a near-term drought, rather than to present a plan that overlooks reasonably foreseeable, near-term shortages due to the inclusion of unrealistic project timelines. If a '2020' decade project cannot reasonably be expected to come online by January 2023, for example if a reservoir has not started the permitting process, it should be moved to the 2030 decade. Any potential supply gaps (unmet needs) created by moving out projects to the 2030 decade may be shown as simply 'unmet' in the 2020 decade or be shown as met by a 'demand management' strategy. Doing so will appropriately reflect the fact that some entities would likely face an actual shortage if a drought of record were to occur in the very near future despite projects (that may be included in the plan but associated with a later decade) that will eventually address those same potential shortages in future years.

It is imperative that you provide the TWDB with information on how you intend to address this comment and all other comments well in advance of your adoption the regional water plan to ensure that the response is adequate for the Executive Administrator to recommend the plan to the TWDB Board for consideration in a timely and efficient manner. Your TWDB project manager will review and provide feedback to ensure all IPP comments and associated plan revisions have been addressed adequately. Failure to adequately address this comment (or any Level 1 comment) may result in the delay of the TWDB Board approval of your final regional water plan.

As a reminder, the deadline to submit the final, adopted regional water plan and associated material to the TWDB is **October 14, 2020**. Any remaining data revisions to DB22 must be communicated to Sabrina Anderson at Sabrina.Anderson@twdb.texas.gov by **September 14, 2020.**

If you have any questions regarding these comments or would like to discuss your approach to addressing any of these comments, please do not hesitate to contact Elizabeth McCoy at (512) 475-1852 or Elizabeth.McCoy@twdb.texas.gov. TWDB staff will be available to assist you in any way possible to ensure successful completion of your final regional water plan.

Sincerely,

Jessica Pena Zuba Digitally signed by Jessica Pena Zuba
Date: 2020.06.17 08:31:47 -05'00'

Date: 6/17/2020

Jessica Zuba
Deputy Executive Administrator
Water Supply and Infrastructure

Attachment

c w/att.: Ms. Caitlin Heller, San Antonio River Authority
Ms. Lauren Gonzalez, Black & Veatch

TWDB comments on the Initially Prepared 2021 South Central Texas (Region L) Regional Water Plan.

Level 1: Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.

1. Chapter 5 and the State Water Planning Database (DB22). The plan includes the following recommended water management strategies (WMS) by WMS type, providing supply in 2020 (not including demand management): 18 *groundwater wells & other*, six *other direct reuse*, two *aquifer storage and recovery*, and six *other surface water*. **Strategy supply with an online decade of 2020 must be constructed and delivering water by January 5, 2023**.
    a) Please confirm that all strategies shown as providing supply in 2020 are expected to be providing water supply by January 5, 2023. *[31 § TAC 357.10(21); Contract Exhibit C, Section 5.2]*
    b) Please provide the specific basis on which the planning group anticipates that it is feasible that the two *aquifer storage and recovery* and six *other surface water* WMSs will all actually be online and providing water supply by January 5, 2023. For example, provide information on actions taken by sponsors and anticipated future project milestones that demonstrate sufficient progress toward implementation. *[31 § TAC 357.10(21); Contract Exhibit C, Section 5.2]*
    c) In the event that the resulting adjustment of the timing of WMSs in the plan results in an increase in near-term unmet water needs, please update the related portions of the plan and DB22 accordingly, and also indicate whether 'demand management' will be the WMS used in the event of drought to address such water supply shortfalls or if the plan will show these as simply 'unmet'. If municipal shortages are left 'unmet' and without a 'demand management' strategy to meet the shortage, please also ensure that adequate justification is included in accordance with 31 TAC § 357.50(j). *[TWC § 16.051(a); 31 § TAC 357.50(j); [31 TAC § 357.34(i)(2); Contract Exhibit C, Section 5.2]*
    d) **Please be advised that, in accordance with Senate Bill 1511, 85th Texas Legislature, the planning group will be expected to rely on its next planning cycle budget to amend its 2021 Regional Water Plan during development of the 2026 Regional Water Plan, if recommended WMSs or projects become infeasible, for example, due to timing of projects coming online.** Infeasible WMSs include those WMSs where proposed sponsors have not taken an affirmative vote or other action to make expenditures necessary to construct or file applications for permits required in connection with implementation of the WMS on a schedule in order for the WMS to be completed by the time the WMS is needed to address drought in the plan. *[TWC § 16.053(h)(10); 31 TAC § 357.12(b)]*

2. Section 2.3.4.6, page 2-23. It appears that 2020 steam-electric water demand projections by county are missing from Table 2-12. Please revise the table to present the demands by county in the final, adopted regional water plan. *[31 TAC § 357.31(e)(1)]*

3. Section 2.3.5, page 2-25. Table 2-13 does not appear to present any demand projections for Alliance Regional Water Authority (ARWA) or Cibolo Valley Local Government Corporation (CVLGC), however this is clarified in the table footnote for ARWA. Please add a clarifying footnote to Table 2-13 noting why demands are not presented for CVLGC in the final, adopted regional water plan. *[31 TAC § 357.31(b)]*

4. Chapter 2. The plan does not appear to include a summary of water savings due to plumbing code savings. Please include a summary of the municipal demand savings due to plumbing fixture requirements in the final, adopted regional water plan. *[31 TAC § 357.31(d)]*

5. Chapter 2. The plan in several instances does not appear to report Board-adopted water demand projections. Water demands presented for Caldwell, DeWitt, and Hays Counties and total regional demands presented in Table 2-4 do not appear to be consistent with Board-adopted water demand projections; and, Tables 2-7 and 2-9 present appear to present incorrect demand projections for Hays County and total regional demands. For example, the regional total in Table 2-4 is presented as 1,048,291 acre-ft/year in 2020; 1,112,911 acre-ft/yr in 2030; 1,160,856 acre-ft/yr in 2040; 1,207,238 acre-ft/yr in 2050; 1,255,062 acre-ft/yr in 2060; and 1,305,824 acre-ft/yr in 2070. TWDB Board-adopted water demands for Region L is 1,050,964 acre-ft/year in 2020, 1,114,948 acre-ft/yr in 2030; 1,164,107 acre-ft/yr in 2040; 1,211,327 acre-ft/yr in 2050; 1,263,897 acre-ft/yr in 2060; and 1,320,128 acre-ft/yr in 2070. Please review water demands reported in Tables 2-4 through 2-9 and 2-11 and all water demand values presented in the text of Section 2.3 and revise to include Board-adopted water demands in the final, adopted regional water plan. *[31 TAC § 357.31(e)(1)]*

6. Appendix 2-A. The plan includes some DB22 reports that appear blank due to the region not having relevant data for these reports. Please provide a cover page to the DB22 report appendix indicating the reason for these report contents being blank.

7. Section 3.1.1, page 3-3. The plan states that "SCTRWPG did not receive any such information from a commissioners' court" for counties or parts of counties not in a groundwater conservation district, however the plan does not appear to include information on the Hill Country Priority Groundwater Management Area (PGMA), which is partially located within the region. Please note how the Hill Country PGMA was considered in the final, adopted regional water plan. *[31 TAC § 357.22(a)(6)]*

8. Section 3.1.1, page 3-3. The plan does not appear to document the methodology used to develop estimates of groundwater availability for non-relevant aquifers and local aquifers, such as the Austin Chalk, Buda, and Leona Gravel. The electronic GAM appendix appears to include a brief summary of this information, however

information on how RWPG-estimated groundwater availabilities were determined should be included in the final, adopted regional water plan; including specifying which aquifers used TWDB compatible availabilities. *[Contract Exhibit C, Section 3.5.2]*

9. Section 3.1.2, pages 3-7 and 3-9. Please provide justification as to why rural municipal, irrigation, mining, and livestock existing water supplies were set equal to demands during the planning period in the final, adopted regional water plan. *[Contract Exhibit C, Section 3.7 item 4]*

10. Chapter 3, Section 3.2. Please include the methodology used to estimate local surface water supplies, including clarifying if these supplies were estimated under drought of record conditions and a include table that lists the volume of each local surface water supply in the final, adopted regional water plan. *[31 TAC § 357.32(a); Contract Exhibit C, Sections 3.2 and 3.7]*

11. Section 3.2. It is not clear from the plan whether reservoir sedimentation has been accounted for in reservoirs (except Canyon Lake) where the available supply is a constant across all planning decades (2020 through 2070). Please clarify how sedimentation was considered in supply estimates for major reservoirs. If sedimentation was not considered, please include revised supply estimates that account for sedimentation in the final, adopted regional water plan. *[Contract Exhibit C, Section 3.2]*

12. Chapter 3. The plan does not appear to include the evaluation results of existing supplies for major water providers (MWP). Please report existing supplies for MWP by decade and category of use in the final, adopted regional water plan. *[31 TAC § 357.32(g)]*

13. Appendix 3-A, Attachment B lists multiple GAM models, however it is not clear whether the region used GAM models to develop non-MAG availabilities. If models were used for non-MAG availabilities, please include the model information required by contract with the final, adopted regional water plan. *[Contract Exhibit C, Section 3.5.4]*

14. Section 4.9, page 4-23, Table 4-30. The plan does not appear to include identified water need volumes for MWPs reported by category of use including municipal, mining, manufacturing, irrigation, steam electric, mining, and livestock. Please report the results of the needs analysis for MWPs by categories of use as applicable in the region in the final, adopted regional water plan. *[31 TAC § 357.33(b)]*

15. Chapter 4. The following tables appear to present information on projected water needs that are inconsistent with data reported in DB22 at the time of review: Tables 4-1 through 4-3, Tables 4-5 through 4-9, Table 4-12, Tables 4-14 through 4-16, Table 4-19, Table 4-23, and Tables 4-27 through 4-29. Please carefully review all data in the tables and related text and revise as necessary to present data consistent with DB22 in the final, adopted regional water plan. *[31 TAC § 357.33(b)]*

16. Chapter 4. The plan does not appear to include a secondary needs analysis for MWPs. Please present the results of the secondary needs analysis by decade for MWPs in the final, adopted regional water plan. *[31 TAC § 357.33(e)]*

17. Chapter 5. The plan does not appear to define a threshold for significant water needs or provide a specific assessment of the potential for aquifer storage and recovery (ASR) projects to meet those needs. Please include information on how the planning groups defines significant water need and provide a specific assessment of the potential for ASR projects to meet those needs in the final, adopted regional water plan. *[TWC § 16.053(e)(10); 31 TAC § 357.34(h)]*

18. Chapter 5. WMS and associated project evaluations presented in the plan do not appear to include quantitative reporting of reliability or anticipated strategy water losses. Please provide this information for all strategy evaluations in the final, adopted regional water plan. *[31 TAC § 357.34(e)(3)(A); Contract Exhibit C, Section 5.2.3]*

19. Chapter 5. The plan does not appear to provide a quantitative reporting of impacts to agricultural resources for each WMS evaluation. Please include a quantitative reporting of impacts to agricultural resources as part of each WMS evaluation in the final, adopted regional water plan. *[31 TAC § 357.34(e)(3)(C)]*

20. Section 5.2. Several WMS projects, such as the SAWS Expanded Local Carrizo Project, SAWS Expanded Brackish Groundwater Project, County Line SUD Trinity Well Field, and County Line SUD Brackish Edwards Project, appear to present a single project cost that combines the cost of multiple project phases. Please present costs for individual project phases separately in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.6]*

21. Chapter 5. The plan does not appear to provide documentation of why seawater desalination was not recommended. Please include documentation of why seawater desalination was not selected as a recommended WMS in the final, adopted regional water plan. *[TWC § 16.053(e)(5)(j); Contract Exhibit C, Section 5.2; 31 TAC § 357.34(g)]*

22. Pages 5.2.1-26 through 5.2.1-30. Table 5.2.1-10 appears to report advanced water conservation strategy supplies for several split region WUGs such as Aqua WSC, Buda, Canyon Lake Water Service, and El Oso WSC inconsistently with strategy supplies reported in DB22. Strategy supplies for Randolph Air Force Base, County-Other Hays, and San Antonio Water System presented in Table 5.2.1-10 also appear inconsistent with supplies reported in DB22. Please reconcile this information as necessary in the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*

23. Page 5.2.2-1 to 5.2.2-9. The plan notes in Section 5.2.2 that the drought management strategy was considered only for WUGs with needs in the 2020 decade. It appears that several WUGs with needs in 2020 were not included in the analysis such as County-Other Victoria, Elmendorf, and Goforth SUD. Please document the reason why drought management was recommended for some but not other WUGs with

2020 needs or for entities that have anticipated needs after 2020 in the final, adopted regional water plan. *[31 TAC § 357.34(i)(1)]*

24. Chapter 5. It appears that WMSs were not identified and recommended for all WUGs with needs, specifically irrigation and mining WUGs with unmet needs. If no feasible WMSs were able to be identified for these WUGs, including drought management (as demand management), please provide an explanation in the final, adopted regional water plan. *[31 TAC § 357.35(d)]*

25. Page 5.2.4-11. In several instances in Tables 5.2.4-5 and 5.2.4-6 project yields or unit costs do not match those reported in DB22. For example, strategy supplies for Atascosa Rural WSC, El Oso WSC, and Mining- Comal County, and unit costs for Manufacturing- Karnes County appear to be inconsistently reported in the referenced tables and DB22. Please review this information and revise as necessary in the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*

26. Section 5.2. In several instances total capital costs presented for project evaluations in Section 5.2 do not appear to match those reported in DB22. For example, capital costs for Reuse-County Line SUD, SAWS-Expanded Brackish Wilcox Project, and SSLGC Expanded Carrizo Project appear to be inconsistently reported in Section 5.2 and DB22. Please reconcile this information as necessary in the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*

27. Page 5.2.14-3. The evaluation for the ARWA Project (Phase 3) appears to provide strategy supplies for the following entities: Buda, County Line SUD, County Line SUD, Green Valley SUD, Kyle, and San Marcos. Strategy supplies for ARWA Project (Phase 3) do not appear to be included in DB22 for these entities. Please review this information and if recommended for the above mentioned WUGs, please report this information in DB22 for the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*

28. Section 5.2.4. Tables 5.2.4-1 and 5.2.4-4 appear to present a summary of recommended well field projects related to the local groundwater strategy for multiple water users. DB22 does not appear to include all of the projects presented in these tables. For example, DB22 does not have related projects for the following entities: Atascosa Rural WSC, Luling, KT Water Development, Water Services Inc, Winder Water Systems, County-Other Calhoun, Calhoun, El Oso, Mining- Comal, Mining- Uvalde, Manufacturing- Karnes, and Manufacturing DeWitt. Please reconcile this information as necessary in the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*

29. Pages 5.2.3-4 and 5.3-21. Recommended Edwards Transfer strategy supplies appear to be inconsistently reported for Alamo Heights and Leon Valley in Table 5.2.3-2, Table 5.3.2-4, Table 5.3.2-24, and DB22. Please clarify the supply provided by Edwards Transfers for these two entities and present consistently in the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*

30. Section 5.2.9. Several recycled water projects appear to include costs for infrastructure components that do not appear to belong in the regional water plan, such as expansions of distribution service into new areas (Boerne) and single-family developments (SAWS). Please review the project components evaluated in each of recycled water strategy projects presented in Section 5.2.9.2 and remove any components associated with reuse distribution lines directly to residences or commercial businesses in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.5.3]*

31. Section 5.2.16. The GBRA Lower Basin Storage Project evaluation does not appear to present land costs broken out separately for land area and purchase cost in conservation pool footprint, mitigation land area and purchase cost, and construction costs of embankment/dam separate from transmission facilities. Please provide broken-out land costs for this reservoir project in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.5]*

32. Pages 5.2.22-1. It is not clear from the Section 5.2.22 strategy evaluation for Cibolo Valley Local Government Corporation Carrizo Project when the strategy and associated projects are anticipated to come online. DB22 shows this strategy as providing supply in 2020 with the associated project coming online in 2030. Please clarify the anticipated online decade for water supply for this WMS and associated WMSPs and revise as necessary to ensure that the projects needed to implement strategies are online prior to the WMS supply online decade. *[31 TAC § 357.10(21); Contract Exhibit C, Section 5.2]*

33. Section 5.2. It is not clear in several WMS evaluations in which decade the strategy is anticipated to provide supply. For example, in Section 5.2.10, it is not clear when the three phases of the SAWS Expanded Local Carrizo Project are anticipated to begin providing supplies. Please include the anticipated online dates in each of the WMS and WMSP evaluations in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.2]*

34. Page 5.2.30-1. The evaluation for the Martindale WSC Alluvial Well notes that the strategy is planned for the 2030 decade. The planning database show this strategy as providing supplies in the 2020 decade. Please reconcile as necessary to ensure WMSs shown as providing supply in a planning decade come online prior to the initial decade year. *[31 TAC § 357.10(21); Contract Exhibit C, Section 5.2]*

35. Page 5.3-41. Section 5.3.4.4 summarizes the water supply plan for the Manufacturing, Calhoun County WUG but does not reference the Lavaca Off-Channel Reservoir which is assigned as an alternative WMS in DB22 for this Region L WUG. Please confirm this alternative WMS has been appropriately assigned to Manufacturing, Calhoun County in DB22 and revise if necessary or include clarification on the Sponsor and WUG relationship and refer readers to the Region P 2021 Regional Water Plan for the WMS evaluation information in the final, adopted regional water plan. *[31 TAC § 357.35(g)(3)]*

36. Section 5.3. In several instances in Section 5.3 recommended water supply plan tables, the plan appears to present strategy supplies that are inconsistent with those reported in DB22. For example, Table 5.3.2-6 presents strategy supplies for Local Groundwater and Facilities Expansion that do not match supplies for those strategies that are reported in DB22. Please review and revise as necessary in the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*

37. Section 5.3. It appears that potential errors in calculated water needs identified in Chapter 4 (as noted in comment number 15) were carried through to tables in Chapter 5 Section 5.3. Please carefully review tables and text in Section 5.3 and revise as necessary to accurately present WUG needs in the final, adopted regional water plan. *[31 TAC § 357.35(g)(1)]*

38. Section 5.3. The plan appears to include non-recommended strategies in the county summary tables with a zero yield. For example, Table 5.3.11-8 includes advanced water conservation as a recommended WMS for Marion with a zero yield, however advanced water conservation does not appear to be a recommended WMS for Marion in DB22. Please remove all zero yield strategy references from the County Summary tables in the plan to avoid confusion, since regional water plans may not include zero yield recommended strategies. [31 TAC § 357.34(d)]

39. Section 5.4. The plan does not appear to present 'management supply factors' for MWPs Please report management supply factors for all MWPs by decade in the final, adopted regional water plan. *[31 TAC § 357.35(g)(2)]*

40. Chapter 5. The plan does not appear to include a strategy evaluation for the City of Kenedy well field, which is included in the contract scope of work under Task 5A subtask 21(ii) Additional Strategies. Please clarify why the evaluation was not included for this potentially feasible strategy in the final, adopted regional water plan. *[Contract Scope of Work, Task 5A]*

41. Pages 6-40 and 6-41. Section 6.1.3.2 appears to note that several WMSs such as Water Conservation, Drought Management, Facilities Expansions, Local Groundwater, and Recycled Water Strategies, were not evaluated for environmental impacts. Please include a quantitative reporting of environmental impacts for all evaluated WMSs and projects in the final, adopted regional water plan. *[31 TAC § 357.34(e)(3)(B)]*

42. Section 7.7.1, page 7-23. The plan appears to discuss the outdated, *2014* recommendations from the Drought Preparedness Council. Please indicate how the planning group considered relevant recommendations from the Drought Preparedness Council that were provided in an August *2019* letter to the planning groups in the final, adopted regional water plan. *[31 TAC § 357.42(h)]*

43. Section 7.4. Please confirm whether the entities evaluated for emergency responses to local drought conditions or loss of municipal supply were assumed to have 180 days or less of remaining supply. *[Contract Exhibit C, Section 7.4]*

44. Chapter 7. The plan does not appear to include a discussion of whether drought contingency measures have been recently implemented (for example, since adoption of the last regional water plan) in response to drought conditions. Please describe this in the final, adopted regional water plan. *[Contract Scope of Work, Task 7, subtask 3]*

45. Chapter 7. The plan does not appear to include discussion of unnecessary or counterproductive variations in drought response strategies that may impede drought response efforts. Please include discussion of any unnecessary or counterproductive variations in drought response strategies that were identified by the planning group in the final, adopted regional water plan. *[TWC § 16.053(e)(3)(E); 31 TAC § 357.42(b)(2)]*

46. Section 11.2.1, page 11-2. Projections summarized in Section 11.2.1 for the 2021 plan total municipal water demand and total regional demand appear to be inconsistent with water demand projections reported in DB22. Please reconcile this information as necessary in the final, adopted regional water plan. *[31 TAC § 357.45(c)(1)]*

47. Page 11-4. Table 11-2 summarizes modeling assumptions for the 2016 and 2021 South Central Texas Regional Water Plans. The table appears to show several assumptions incorrectly indicated as being used only for the *2021* plan. For example, 2021 assumptions related to Edwards Aquifer withdrawals, operations of Canyon Reservoir, GBRA deliveries, operation of power plant reservoirs, and operation of Choke Canyon Reservoir appear to have been assumptions for the 2016 plan (based on appendix J of the 2016 plan) as well. Please reconcile this information as appropriate in the final, adopted regional water plan. *[31 TAC § 357.45(c)(2)]*

48. Page 11-6. Section 11.2.3 notes the total availability in 2020 is 1,449,057 acre-feet per year. This is inconsistent with total availability reported in DB22 for 2020, 1,511,657 acre-feet per year. Please reconcile this data as necessary in the final, adopted regional water plan. *[31 TAC § 357.45(c)(3)]*

49. Page 11-9. Section 11.2.5 presents a summary of total regional needs in 2020 and 2070. The values presented appear to be inconsistent with the needs reported in DB22. Please reconcile this data as necessary in the final, adopted regional water plan. *[31 TAC § 357.45(c)(3)]*

50. Chapter 11. Please provide a brief summary of how the 2016 Plan differs from the 2021 Plan with regards to recommended and alternative WMS *projects* in the final, adopted regional water plan. *[31 TAC § 357.45(c)(4)]*

51. Chapter 11. The plan does not appear to assess the progress of the 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. Please provide a general assessment of these items in the final, adopted regional water plan. *[TWC § 16.053(e)(12); 31 TAC § 357.45(b)]*

52. The GIS files submitted did not appear to include the locations of every recommended WMS project. Please include the locations of every recommended WMS project listed in the final, adopted regional water plan with the final GIS data submitted. *[Contract Exhibit C, Section 13.1.2]*

Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.

1. Page 3-11. Please consider clarifying if the firm yield values reported in Table 3.3 are based on the original WAM run or projected firm yield for 2020 or 2070.
2. Page 3-11. Please consider clarifying why Table 3-3 provides a "firm yield" of 70,750 acre-feet per year for Lake Medina when page 3-12 notes that firm yield for Lake Medina is "essentially zero".
3. Page 3-14. Section 3.2.3 includes a reference to an Appendix 3-C, which appears to be a typo for Appendix 3-B. Please revise this reference in the final plan.
4. Section 3.2. Please consider including a summary table with sedimentation information for each major reservoir in the final, adopted regional water plan.
5. Chapter 3. Please consider including maps showing the location and extent of all minor aquifers within the planning area that are considered for current and future water supplies in the final plan.
6. Section 3.2.2, page 3-14 and Appendix 3B. Section 3.2 of the General Guidelines for Fifth Cycle of Regional Water Plan Development (Exhibit C) defines when minimum monthly diversion and minimum annual diversion may be used in determining run-of-river water availability. Please consider clarifying when minimum monthly diversion or minimum annual diversion is used to determine the firm diversion of run-of-river water supplies in the final plan.
7. Appendix 3-B. Please consider changing the title of Appendix 3-B to 'Surface Water Availability Analysis using WAM Run3'.
8. Chapter 3. Please consider clarifying how projected rating curves for each decade are derived.
9. Chapter 5. Please consider including a list of all identified WMS that were considered for each identified water need in the region using Table E template provided in Appendix 1 of Exhibit C.
10. Section 5.2, Table 5.2.1-7, page 5.2.1-18. The advanced conservation strategy evaluation recommends municipal WUGs with 2011 water use greater than 140 GPCD reduce per capita water use by 1 percent per year until 140 GPCD is reached and after which reduce per capita water use by 1/4 percent per year for the remainder of the planning period. Table 5.2.1-7 appears to show the recommended

advanced conservation strategy would reduce per capita water use from 160 GPCD in 2011 to 124 GPCD in 2070 for Comal, County-Other. The resulting demand reduction supplies for Comal, County-Other from advanced conservation would account for 60 percent of the WUG's demand in 2070 which may appear difficult to achieve. Please consider clarifying the reasonableness of the recommended advanced conservation yield for Comal County-Other.

11. Page 5.2-1. Section 5.2 presents the methodology used to evaluate water management strategies for environmental impacts but does not present the results of this analysis. Please consider adding text to Section 5.2 that refers readers to Chapter 6 for the results of the quantified environmental impact evaluation.

12. Section 5.2.1 and 5.5. The plan includes rainwater harvesting and reuse in the list of advance water conservation measures, and brush control in the list of irrigation conservation measures. While the TWDB acknowledges that the conservation best practices guide includes these practices as conservation, for regional water planning purposes, these strategy types should not be classified as conservation (with the exception of mining recycling) and will be categorized as such in DB22. Please consider clarifying this information within Section 5.5 for consistency with data reporting in the final, adopted regional water plan. *[Contract Exhibit C, Section 5.6]*

13. Page 7-21. Section 7.5.3 states that TCEQ model drought contingency plans (DCP) are provided in Appendix 7A. TCEQ model DCPs do not appear to be included in Appendix 7A. Please consider adding a copy of the TCEQ model DCP to Appendix 7A or revising Section 7.5.3 text in the final, adopted regional water plan.

14. The GIS files submitted for WMS projects do not include the minimum required metadata. Please include at a minimum, metadata about the data's projection, with the final GIS data submitted. *[Contract Exhibit D, Section 2.4.1]*

15. The GIS files submitted for WMS projects do not adhere to the contractually required naming convention. Please rename the GIS files following the naming convention outlined in Exhibit D, Section 2.4.5 in the final GIS data submitted. *[Contract Exhibit D, Section 2.4.5]*

16. The GIS files submitted for WMS projects do not include all of the required attribute fields listed in Table 1 of Exhibit D, Section 2.4.5. Please include the following attribute fields in all submitted WMS project GIS data with the final GIS files submitted: Datum. *[Contract Exhibit D, Section 2.4.5]*

FINAL PLAN

APPENDIX 10-B: TWDB COMMENTS ON IPP AND SCTRWPG RESPONSES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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APPENDIX 10-B: Texas Water Development Board Comments and Responses

This appendix provides the comments received from the Texas Water Development Board (TWDB) and the South Central Texas Regional Water Planning Group's (SCTRWPG's) responses. Comments from the public and other federal/state agencies regarding the 2021 Region L IPP are compiled in Appendix 10-C, along with the SCTRWPG's responses. An overview and summary of comments is included in Chapter 10. The following provides a list of Level 1 Comments and Level 2 comments. Each comment includes the SCTRWPG's response and indicates any revisions made to the final plan to address the comment.

Level 1: Comments, questions, and data revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
1.a	Chapter 5 and the State Water Planning Database (DB22).	The plan includes the following recommended water management strategies (WMS) by WMS type, providing supply in 2020 (not including demand management): 18 groundwater wells & other, six other direct reuse, two aquifer storage and recovery, and six other surface water. Strategy supply with an online decade of 2020 must be constructed and delivering water by January 5, 2023. a) Please confirm that all strategies shown as providing supply in 2020 are expected to be providing water supply by January 5, 2023. [31 § TAC 357.10(21); Contract Exhibit C, Section 5.2]	The South Central Texas (Region L) technical consultant, Black & Veatch, reached out to sponsors with projects beginning in 2020 to verify whether projects providing a supply in 2020 will be online by January 5, 2023. Based on responses received from sponsors, six projects have a revised implementation decade from 2020 to 2030, including the following WMSs/WMS projects: SAWS Facilities Expansion CPS Direct Recycling Pipeline, SAWS Recycled Water Strategies Recycled Water Program, GBRA Lower Basin New Appropriation Project, GBRA Victoria County Steam-Electric Project, GBRA Facilities Expansion Hays County Pipeline Project, NBU Facilities Expansion South WTP Expansion, and the Martindale WSC Alluvial Well. The RWP and DB22 have been updated to reflect revised decades for these WMS Projects.
1.b	Chapter 5 and the State Water Planning Database (DB22).	b) Please provide the specific basis on which the planning group anticipates that it is feasible that the two aquifer storage and recovery and six other surface water WMSs will all actually be online and providing water supply by January 5, 2023. For example, provide information on actions taken by sponsors and anticipated future project milestones that demonstrate sufficient progress toward implementation. [31 § TAC 357.10(21); Contract Exhibit C, Section 5.2]	The Region L technical consultant requested status updates from project sponsors regarding actions taken and anticipated future project milestones that demonstrate sufficient progress toward implementation by the January 5, 2023 deadline. • The NBU ASR Project is currently completing the Phase 3 Demonstration Project, with Phase 4 Cycle Testing anticipated to begin in September 2020. Recovery of stored water to the NBU distribution system is planned for Summer 2021. Phase 5 Wellfield Expansion is planned to occur after three full cycle testing periods. Therefore, it is feasible that the NBU ASR Project will actually be online and providing water supply by the January 5, 2023 deadline. • The Victoria ASR Project has already rehabilitated and converted a retired drinking water well into an ASR well. The City of Victoria has been conducting cycle testing for the past year and plans to begin recovery of stored water in Summer 2020, pending TCEQ approval. A second well (Wellfield expansion) is planned to be

No.	IPP Reference	TWDB Comment	SCTRWPG Response
			completed by the end of 2021 and recovering water by the end of 2022. Therefore, it is feasible that the City of Victoria ASR Project will actually be online and providing water supply by the January 5, 2023 deadline. • The SAWS Western Integration Pipeline (Phase 2) (Facilities Expansion WMS) has completed the acquisition and design phase and is currently being advertised to bid. Construction of the project is scheduled to be completed by December 2022. Therefore, this WMS will be online and providing supply by the January 5, 2023 deadline. • The Springs Hill WSC Lake Placid WTP Expansion (Facilities Expansion WMS) is in the feasibility phase of the project. Water rights have been secured for the expansion and construction is expected to be completed by mid- to late-2021. Therefore, it is feasible that the Lake Placid WTP Expansion for Springs Hill WSC will actually be online and providing water supply by the January 5, 2023 deadline. • The NBU South WTP Expansion (Facilities Expansion WMS) is currently in the design phase and will be implemented in the 2030 decade. • The CRWA Hays Caldwell WTP Expansion is a shared project with the City of San Marcos and all permits have now been secured. In April 2020, a project study was performed. Construction for this project is planned to start in January 2021 and be completed by 2022, at which time it will be providing water supply. Therefore, it is feasible that the CRWA Hays Caldwell WTP Expansion will be online and providing supply by the January 5, 2023 deadline. • CRWA has secured the permits necessary for the Lake Dunlap WTP Expansion. A feasibility study was completed in 2020, and CRWA is planning to pursue design for the expansion. Therefore, it is feasible that the CRWA Hays Caldwell WTP Expansion will be online and providing supply by the January 5, 2023 deadline. • The GBRA Lower Basin Storage Project is planned for the 2020 decade. Feasibility studies were completed in 2018, and water rights have been secured. The sponsor plans to begin the design phase of this project within a year and have construction completed in 2022. Therefore, it is feasible that the GBRA Lower Basin Storage Project will be online and providing supply by the January 5, 2023 deadline. • The GBRA Lower Basin New Appropriation Project will be implemented in the 2030 decade, along with the GBRA Victoria County Steam-Electric Project. • The GBRA Hays County Pipeline Project (Facilities Expansion WMS) will be implemented in the 2030 decade.
1.c			

No.	IPP Reference	TWDB Comment	SCTRWPG Response
	Chapter 5 and the State Water Planning Database (DB22).	c) In the event that the resulting adjustment of the timing of WMSs in the plan results in an increase in near-term unmet water needs, please update the related portions of the plan and DB22 accordingly, and also indicate whether 'demand management' will be the WMS used in the event of drought to address such water supply shortfalls or if the plan will show these as simply 'unmet'. If municipal shortages are left 'unmet' and without a 'demand management' strategy to meet the shortage, please also ensure that adequate justification is included in accordance with 31 TAC § 357.50(j). [TWC § 16.051(a); 31 § TAC 357.50(j); [31 TAC § 357.34(i)(2); Contract Exhibit C, Section 5.2]	With revisions to timing of the WMSs, there are no near-term unmet needs for municipal WUGs. However, there are two additional non-municipal WUGs with unmet needs in the 2020 decade, including Victoria County Manufacturing and Victoria County Steam-Electric Power. Therefore, the plan and DB22 have been updated accordingly to show the additional WUGs with unmet needs. Since there are no municipal unmet needs, a justification for municipal shortages is not necessary for inclusion in the RWP.
1.d	Chapter 5 and the State Water Planning Database (DB22).	d) Please be advised that, in accordance with Senate Bill 1511, 85th Texas Legislature, the planning group will be expected to rely on its next planning cycle budget to amend its 2021 Regional Water Plan during development of the 2026 Regional Water Plan, if recommended WMSs or projects become infeasible, for example, due to timing of projects coming online. Infeasible WMSs include those WMSs where proposed sponsors have not taken an affirmative vote or other action to make expenditures necessary to construct or file applications for permits required in connection with implementation of the WMS on a schedule in order for the WMS to be completed by the time the WMS is needed to address drought in the plan. [TWC § 16.053(h)(10); 31 TAC § 357.12(b)]	The South Central Texas Regional Water Planning Group acknowledges this comment.
2	Section 2.3.4.6, page 2-23	It appears that 2020 steam-electric water demand projections by county are missing from Table 2-12. Please revise the table to present the demands by county in the final, adopted regional water plan. [31 TAC § 357.31(e)(1)]	2020 Steam-electric demand projections by county were added to Table 2-12.
3	Section 2.3.5, page 2-25	Table 2-13 does not appear to present any demand projections for Alliance Regional Water Authority (ARWA) or Cibolo Valley Local Government Corporation (CVLGC), however this is clarified in the table footnote for ARWA. Please add a clarifying footnote to Table 2-13 noting why	Language has been added to Chapter 2.3.5, as follows: "ARWA and CVLGC are two MWPs that are categorized as WWPs. While these two WWPs have existing contracts to provide water to entities, their supplies would be developed as part of a WMS included in this RWP. Therefore, both their contract demands are zero. Footnotes are provided in Table 2-13."

No.	IPP Reference	TWDB Comment	SCTRWPG Response
		demands are not presented for CVLGC in the final, adopted regional water plan. [31 TAC § 357.31(b)]	Furthermore, a clarifying footnote has been included in Table 2-13, as follows: "1 ARWA has executed contracts with San Marcos, CRWA, Kyle, and Buda to sell water that will be developed by three water management strategies included in the 2021 South Central Texas Regional Water Plan (See Chapter 5.2): ARWA/GBRA Project (Phase 1), ARWA Project (Phase 2), and ARWA Project (Phase 3). 2 CVLGC comprises the cities of Schertz and Cibolo, which are contracted with CVLGC to provide water that would be developed by a water management strategy included in the 2021 South Central Texas Regional Water Plan (See the CVLGC Carrizo Project in Chapter 5.2.22)."
4	Chapter 2	The plan does not appear to include a summary of water savings due to plumbing code savings. Please include a summary of the municipal demand savings due to plumbing fixture requirements in the final, adopted regional water plan. [31 TAC § 357.31(d)]	Chapter 2 has been revised to add Table 2-11, which includes a summary of the municipal water demand savings due to plumbing fixture requirements.
5	Chapter 2	The plan in several instances does not appear to report Board-adopted water demand projections. Water demands presented for Caldwell, DeWitt, and Hays Counties and total regional demands presented in Table 2-4 do not appear to be consistent with Board-adopted water demand projections; and, Tables 2-7 and 2-9 present appear to present incorrect demand projections for Hays County and total regional demands. For example, the regional total in Table 2-4 is presented as 1,048,291 acre-ft/year in 2020; 1,112,911 acre-ft/yr in 2030; 1,160,856 acre-ft/yr in 2040; 1,207,238 acre-ft/yr in 2050; 1,255,062 acre-ft/yr in 2060; and 1,305,824 acre-ft/yr in 2070. TWDB Board-adopted water demands for Region L is 1,050,964 acre-ft/year in 2020, 1,114,948 acre-ft/yr in 2030; 1,164,107 acre-ft/yr in 2040; 1,211,327 acre-ft/yr in 2050; 1,263,897 acre-ft/yr in 2060; and 1,320,128 acre-ft/yr in 2070. Please review water demands reported in Tables 2-4 through 2-9 and 2-11 and all water demand values presented in the text of Section 2.3 and revise to include Board-adopted water demands in the final, adopted regional water plan. [31 TAC § 357.31(e)(1)]	The SCTRWPG technical consultant worked with TWDB staff to revise the demands for WUGs that are split between Region L, Region K, and Region N. Chapters 2, 4, and 5 have been revised to incorporate the Board-adopted water demands and needs.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
6	Appendix 2-A	The plan includes some DB22 reports that appear blank due to the region not having relevant data for these reports. Please provide a cover page to the DB22 report appendix indicating the reason for these report contents being blank.	A cover page has been added to the DB22 report appendix to indicate the reason for some report contents being blank.
7	Section 3.1.1, page 3-3	The plan states that "SCTRWPG did not receive any such information from a commissioners' court" for counties or parts of counties not in a groundwater conservation district, however the plan does not appear to include information on the Hill Country Priority Groundwater Management Area (PGMA), which is partially located within the region. Please note how the Hill Country PGMA was considered in the final, adopted regional water plan. [31 TAC § 357.22(a)(6)]	The following language has been added to Section 3.1.1: "There are several Priority Groundwater Management Areas (PGMAs) around the State, with portions of the Hill Country PGMA located within Region L. PGMAs are established to ensure management of groundwater in areas with critical groundwater problems and to consider to the need for creating Groundwater Conservation Districts (GCDs). PGMAs are designated or delineated by the Texas Commission on Environmental Quality (TCEQ) for areas that are experiencing, or are expected to experience critical groundwater problems within 50 years, including shortages of surface water or groundwater, land subsidence resulting from groundwater withdrawal, or contamination of groundwater supplies. Each Region L county located within the Hill Country PGMA has a GCD: The Comal Trinity GCD in Comal County , the Hays Trinity GCD in Hays County, and the Trinity Glen Rose GCD in Bexar County. These GCDs give notice to area residents that the declaration of the PGMA means that their water availability and quality will be at risk within the next 50 years. The Hays County Development Regulations have specific requirements listed for subdivisions served by individual water wells producing local groundwater within the PGMA. These requirements can be found in Chapter 715, Sub-Chapter 3, Section 3.06 of the Hays County Development Regulations. GMAs are a different concept in that every county in the State is in one or more of sixteen GMAs. For the most part, the major aquifers are not split across multiple GMAs, and the goal is to manage entire aquifer systems across political subdivisions in a consistent way. GCDs and GMAs are discussed in Chapter 1 of this plan and on the TWDB website at http://www.twdb.texas.gov/groundwater/index.asp."
8	Section 3.1.1, page 3-3	The plan does not appear to document the methodology used to develop estimates of groundwater availability for non-relevant aquifers and local aquifers, such as the Austin Chalk, Buda, and Leona Gravel. The electronic GAM appendix appears to include a brief summary of this information, however information on how RWPG-estimated groundwater availabilities were determined should be included in the final, adopted regional water plan; including specifying which	A summary of the methodology or the relevant GAM report used to develop estimates of groundwater availability for non-relevant aquifers and local aquifers has been added to Chapter 3, Table 3-1.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
		aquifers used TWDB compatible availabilities. [Contract Exhibit C, Section 3.5.2]	
9	Section 3.1.2, pages 3-7 and 3-9	Please provide justification as to why rural municipal, irrigation, mining, and livestock existing water supplies were set equal to demands during the planning period in the final, adopted regional water plan. [Contract Exhibit C, Section 3.7 item 4]	Section 3.1.2 in Chapter 3 has been revised to more clearly describe the assumptions for assessing groundwater supplies. Included in the assumptions are justifications for setting existing groundwater supplies equal to demands for some WUGs categorized as rural municipal, irrigation, mining, and livestock.
10	Chapter 3, Section 3.2	Please include the methodology used to estimate local surface water supplies, including clarifying if these supplies were estimated under drought of record conditions and a include table that lists the volume of each local surface water supply in the final, adopted regional water plan. [31 TAC § 357.32(a); Contract Exhibit C, Sections 3.2 and 3.7]	Local surface water supplies were identified for livestock uses only. Methodology used to develop livestock demand can be used to infer that sufficient water will be available to meet demands. A new Section 3.2.4: Local Surface Water was added to the chapter, which indicates the methodology for estimating local surface water supplies and includes a table of the local surface water supply volumes as Table 3-3.
11	Chapter 3, Section 3.2	It is not clear from the plan whether reservoir sedimentation has been accounted for in reservoirs (except Canyon Lake) where the available supply is a constant across all planning decades (2020 through 2070). Please clarify how sedimentation was considered in supply estimates for major reservoirs. If sedimentation was not considered, please include revised supply estimates that account for sedimentation in the final, adopted regional water plan. [Contract Exhibit C, Section 3.2]	Reservoir sedimentation was not considered in the IPP for Medina Lake, Victor Braunig Lake, Calaveras Lake, or Coleto Creek Reservoir; however, the final plan has been revised to account for sedimentation in the determination of supply estimates for all major reservoirs in Region L. In previous cycles, the firm yields for the power plant reservoirs (Braunig Lake, Calaveras Lake, and Coleto Creek Reservoir) were determined using the “Region L Water Availability Model (WAM)” since it more accurately considers reservoir operations in its analysis, including operation of the reservoirs at their authorized diversion amounts. On August 26, 2020, the Region L technical consultants requested to use the Region L WAM for Braunig, Calaveras, and Coleto Creek power plant reservoirs because it appears that the Region L hydrologic variances submitted in May and November of 2018 intended to request to model supplies consistent with the way they are modeled in the Region L WAM. On September 1, 2020, the TWDB provided an authorization via email to use the Region L WAM to establish the existing surface water availability for Braunig Calaveras, and Coleto Creek power plant reservoirs in development of the 2021 Region L Regional Water Plan. Chapter 3 has been revised to indicate that sedimentation was considered in supply estimates for all major reservoirs, and further describes that the supply estimates for these power plant reservoirs are not expected to be impacted as a result of sedimentation. Additionally, Appendix 3-A: Hydrologic Assumptions Requests and Approvals, has been revised to include additional correspondence on hydrologic variances, including the September 1,

No.	IPP Reference	TWDB Comment	SCTRWPG Response
			2020, authorization to use the Region L WAM in the 2021 Region L Regional Water Plan.
12	Chapter 3	The plan does not appear to include the evaluation results of existing supplies for major water providers (MWP). Please report existing supplies for MWP by decade and category of use in the final, adopted regional water plan. [31 TAC § 357.32(g)]	Table 3.5 was added to the RWP to include an evaluation of existing supplies for MWPs by decade and category of use.
13	Appendix 3-A	Attachment B lists multiple GAM models, however it is not clear whether the region used GAM models to develop non-MAG availabilities. If models were used for non-MAG availabilities, please include the model information required by contract with the final, adopted regional water plan. [Contract Exhibit C, Section 3.5.4]	Appendix 3-B includes correspondence regarding the approved hydrologic assumptions used in the 2021 Region L Regional Water Plan. Since the approved hydrologic assumptions have not changed, this appendix is not anticipated to be revised. No models were used to develop non-MAG availabilities; however, a description of the methodologies and assumptions used for non-MAG availabilities has been included in the narrative of Chapter 3, and the source of data for all groundwater availabilities has been included in Table 3-1.
14	Section 4.9, page 4-23, Table 4-30	The plan does not appear to include identified water need volumes for MWPs reported by category of use including municipal, mining, manufacturing, irrigation, steam electric, mining, and livestock. Please report the results of the needs analysis for MWPs by categories of use as applicable in the region in the final, adopted regional water plan. [31 TAC § 357.33(b)]	Table 4.30 was added to the RWP to include an evaluation of identified water needs for MWPs by decade and category of use.
15	Chapter 4	The following tables appear to present information on projected water needs that are inconsistent with data reported in DB22 at the time of review: Tables 4-1 through 4-3, Tables 4-5 through 4-9, Table 4-12, Tables 4-14 through 4-16, Table 4-19, Table 4-23, and Tables 4-27 through 4-29. Please carefully review all data in the tables and related text and revise as necessary to present data consistent with DB22 in the final, adopted regional water plan [31 TAC § 357.33(b)]	Data in the tables and related text have been reviewed and revised, as necessary, to present data consistent with DB22 in the RWP.
16	Chapter 4	The plan does not appear to include a secondary needs analysis for MWPs. Please present the results of the secondary needs analysis by decade for MWPs in the final, adopted regional water plan. [31 TAC § 357.33(e)]	Table 4.31 was added to the RWP to include an evaluation of secondary needs for MWPs by decade.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
17	Chapter 5	The plan does not appear to define a threshold for significant water needs or provide a specific assessment of the potential for aquifer storage and recovery (ASR) projects to meet those needs. Please include information on how the planning groups defines significant water need and provide a specific assessment of the potential for ASR projects to meet those needs in the final, adopted regional water plan. [TWC § 16.053(e)(10); 31 TAC § 357.34(h)]	Language was added to Section 5.1 to include the threshold for significant identified needs and a specific assessment of the potential for ASR projects to meet those needs.
18	Chapter 5	WMS and associated project evaluations presented in the plan do not appear to include quantitative reporting of reliability or anticipated strategy water losses. Please provide this information for all strategy evaluations in the final, adopted regional water plan. [31 TAC § 357.34(e)(3)(A); Contract Exhibit C, Section 5.2.3]	Information was added to the WMS Evaluations in Chapter 5.2 to specifically include the quantitative reporting of reliability and anticipated strategy water losses.
19	Chapter 5	The plan does not appear to provide a quantitative reporting of impacts to agricultural resources for each WMS evaluation. Please include a quantitative reporting of impacts to agricultural resources as part of each WMS evaluation in the final, adopted regional water plan. [31 TAC § 357.34(e)(3)(C)]	Information was added to the Environmental Considerations section of each WMS evaluation that includes the quantitative reporting of impacts to agricultural resources. Generally, this information includes the following statement: "Based on TPWD vegetation mapping, the project may have the potential to impact ____ acres of agricultural resources, including __ acres mapped as row crops, and __ acres of disturbance or tame grassland which may include pasture areas used for grazing." Chapter 6 has been revised to include a summary table of the quantitative impacts on agricultural resources for all WMSs.
20	Section 5.2	Several WMS projects, such as the SAWS Expanded Local Carrizo Project, SAWS Expanded Brackish Groundwater Project, County Line SUD Trinity Well Field, and County Line SUD Brackish Edwards Project, appear to present a single project cost that combines the cost of multiple project phases. Please present costs for individual project phases separately in the final, adopted regional water plan. [Contract Exhibit C, Section 5.6]	WMS evaluations have been revised to also include costs for individual project phases.
21	Chapter 5	The plan does not appear to provide documentation of why seawater desalination was not recommended. Please include documentation of why seawater desalination was not selected as a recommended WMS in the final, adopted	The following language was added to Chapter 5.1: "As indicated in Table 5.1-1, the SCTRWPG recommended inclusion of several Aquifer Storage and Recovery (ASR) strategies and brackish groundwater desalination strategies in the 2021 SCTRWP. The SCTRWPG includes WMSs in the RWP at the request of WUG or WWP sponsors. For the 2021 SCTRWP, seawater

No.	IPP Reference	TWDB Comment	SCTRWPG Response
		regional water plan. [TWC § 16.053(e)(5)(j); Contract Exhibit C, Section 5.2; 31 TAC § 357.34(g)]	desalination was not included as a recommended WMS because it was not requested for inclusion by WUGs and the majority of needs in the region can be met by fresh water, groundwater, brackish groundwater, reuse and conservation WMSs. There are several seawater desalination facilities currently being planned within Texas; seawater desalination may become a feasible and cost-effective strategy for Region L in the future.”
22	Pages 5.2.1-26 through 5.2.1-30	Table 5.2.1-10 appears to report advanced water conservation strategy supplies for several split region WUGs such as Aqua WSC, Buda, Canyon Lake Water Service, and El Oso WSC inconsistently with strategy supplies reported in DB22. Strategy supplies for Randolph Air Force Base, County-Other Hays, and San Antonio Water System presented in Table 5.2.1-10 also appear inconsistent with supplies reported in DB22. Please reconcile this information as necessary in the final, adopted regional water plan. [31 TAC §357.35(g)(1)]	Inconsistencies between DB22 and the RWP narrative were investigated and reconciled for the final RWP.
23	Page 5.2.2-1 to 5.2.2-9	The plan notes in Section 5.2.2 that the drought management strategy was considered only for WUGs with needs in the 2020 decade. It appears that several WUGs with needs in 2020 were not included in the analysis such as County-Other Victoria, Elmendorf, and Goforth SUD. Please document the reason why drought management was recommended for some but not other WUGs with 2020 needs or for entities that have anticipated needs after 2020 in the final, adopted regional water plan. [31 TAC § 357.34(i)(1)]	The following language was added to Section 5.2.2.2: "Drought Management was not included as a recommended WMS for County-Other WUGs in the 2021 RWP due to data limitations for determining drought management supplies for these WUGs."
24	Chapter 5	It appears that WMSs were not identified and recommended for all WUGs with needs, specifically irrigation and mining WUGs with unmet needs. If no feasible WMSs were able to be identified for these WUGs, including drought management (as demand management), please provide an explanation in the final, adopted regional water plan. [31 TAC § 357.35(d)]	The following statement in Chapter 6 has been revised, as follows: "Table 6 15 summarizes the needs that remain unmet in the 2021 SCTRWP after implementation of recommended WMSs. The 2021 SCTRWP did not recommend WMSs to meet some mining and irrigation needs, as strategies to meet those needs may be cost-prohibitive. As shown in the TWDB socio-economic impact analyses, however, these unmet needs represent only about 1 percent of the potential income losses in 2070 considering projected shortages in all water use sectors."
25	Page 5.2.4-11	In several instances in Tables 5.2.4-5 and 5.2.4-6 project yields or unit costs do not match those reported in DB22. For	The inconsistencies identified in Tables 5.2.4-5 and 5.2.4-6 have been identified and have been revised to match data reported in DB22.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
		example, strategy supplies for Atascosa Rural WSC, El Oso WSC, and Mining- Comal County, and unit costs for Manufacturing- Karnes County appear to be inconsistently reported in the referenced tables and DB22. Please review this information and revise as necessary in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	
26	Section 5.2	In several instances total capital costs presented for project evaluations in Section 5.2 do not appear to match those reported in DB22. For example, capital costs for Reuse-County Line SUD, SAWS-Expanded Brackish Wilcox Project, and SSLGC Expanded Carrizo Project appear to be inconsistently reported in Section 5.2 and DB22. Please reconcile this information as necessary in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	Total capital cost inconsistencies for project evaluations in Section 5.2 have been identified and revised to match data reported in DB22.
27	Page 5.2.14-3	The evaluation for the ARWA Project (Phase 3) appears to provide strategy supplies for the following entities: Buda, County Line SUD, County Line SUD, Green Valley SUD, Kyle, and San Marcos. Strategy supplies for ARWA Project (Phase 3) do not appear to be included in DB22 for these entities. Please review this information and if recommended for the above mentioned WUGs, please report this information in DB22 for the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	Delivery volumes listed in the RWP for the ARWA Project (Phase 3) have been incorporated into DB22 for consistency.
28	Section 5.2.4	Tables 5.2.4-1 and 5.2.4-4 appear to present a summary of recommended well field projects related to the local groundwater strategy for multiple water users. DB22 does not appear to include all of the projects presented in these tables. For example, DB22 does not have related projects for the following entities: Atascosa Rural WSC, Luling, KT Water Development, Water Services Inc, Winder Water Systems, County-Other Calhoun, Calhoun, El Oso, Mining- Comal, Mining- Uvalde, Manufacturing- Karnes, and Manufacturing DeWitt. Please reconcile this information as necessary in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	Projects related to the Local Groundwater WMS have been reconciled and have been included in DB22 related to the listed WUGs.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
29	Pages 5.2.3-4 and 5.3-21	Recommended Edwards Transfer strategy supplies appear to be inconsistently reported for Alamo Heights and Leon Valley in Table 5.2.3-2, Table 5.3.2-4, Table 5.3.2-24, and DB22. Please clarify the supply provided by Edwards Transfers for these two entities and present consistently in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	Edwards Transfer strategy supplies have been reconciled for Alamo Heights and Leon Valley in the final plan and DB22.
30	Section 5.2.9	Several recycled water projects appear to include costs for infrastructure components that do not appear to belong in the regional water plan, such as expansions of distribution service into new areas (Boerne) and single-family developments (SAWS). Please review the project components evaluated in each of recycled water strategy projects presented in Section 5.2.9.2 and remove any components associated with reuse distribution lines directly to residences or commercial businesses in the final, adopted regional water plan. [Contract Exhibit C, Section 5.5.3]	Costs for recycled water projects were reviewed and revised for consistency with Exhibit C requirements. Components associated with reuse distribution lines directly to residence or commercial businesses were removed. The language in Section 5.2.9 was also revised for clarity.
31	Section 5.2.16	The GBRA Lower Basin Storage Project evaluation does not appear to present land costs broken out separately for land area and purchase cost in conservation pool footprint, mitigation land area and purchase cost, and construction costs of embankment/dam separate from transmission facilities. Please provide broken-out land costs for this reservoir project in the final, adopted regional water plan. [Contract Exhibit C, Section 5.5]	The costs for this WMS are directly from the Unified Costing Model. Language was added to the narrative to explain how the costs for mitigation were determined and included land areas associated with the various project components.
32	Pages 5.2.22-1	It is not clear from the Section 5.2.22 strategy evaluation for Cibolo Valley Local Government Corporation Carrizo Project when the strategy and associated projects are anticipated to come online. DB22 shows this strategy as providing supply in 2020 with the associated project coming online in 2030. Please clarify the anticipated online decade for water supply for this WMS and associated WMSPs and revise as necessary to ensure that the projects needed to implement strategies are online prior to the WMS supply online decade. [31 TAC § 357.10(21); Contract Exhibit C, Section 5.2]	The anticipated online decade for this WMS is 2030. DB22 has been revised for consistency with the RWP.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
33	Section 5.2	It is not clear in several WMS evaluations in which decade the strategy is anticipated to provide supply. For example, in Section 5.2.10, it is not clear when the three phases of the SAWS Expanded Local Carrizo Project are anticipated to begin providing supplies. Please include the anticipated online dates in each of the WMS and WMSP evaluations in the final, adopted regional water plan. [Contract Exhibit C, Section 5.2]	The RWP narrative has been revised to explicitly state the online decades for each WMS.
34	Page 5.2.30-1	The evaluation for the Martindale WSC Alluvial Well notes that the strategy is planned for the 2030 decade. The planning database show this strategy as providing supplies in the 2020 decade. Please reconcile as necessary to ensure WMSs shown as providing supply in a planning decade come online prior to the initial decade year. [31 TAC § 357.10(21); Contract Exhibit C, Section 5.2]	The online decade for this WMS was confirmed with the sponsor to be 2030. To ensure consistency, DB22 and the RWP have been reviewed and revised to indicate the online decade of 2030.
35	Page 5.3-41	Section 5.3.4.4 summarizes the water supply plan for the Manufacturing, Calhoun County WUG but does not reference the Lavaca Off-Channel Reservoir which is assigned as an alternative WMS in DB22 for this Region L WUG. Please confirm this alternative WMS has been appropriately assigned to Manufacturing, Calhoun County in DB22 and revise if necessary or include clarification on the Sponsor and WUG relationship and refer readers to the Region P 2021 Regional Water Plan for the WMS evaluation information in the final, adopted regional water plan. [31 TAC § 357.35(g)(3)]	The SCTRWPG technical consultant coordinated with Region P and TWDB staff to determine whether the Lavaca Off-Channel Reservoir Alternative WMS is accurately represented in the 2021 RWP and in DB22 for Manufacturing, Calhoun. Based on discussions, it was determined that the Lavaca Off-Channel Reservoir Alternative WMS should be removed as a WMS supply for Manufacturing, Calhoun. Therefore, the final plan does not include a reference to this Region P Alternative WMS, as it is not anticipated to provide supply to any WUGs in Region L.
36	Section 5.3	In several instances in Section 5.3 recommended water supply plan tables, the plan appears to present strategy supplies that are inconsistent with those reported in DB22. For example, Table 5.3.2-6 presents strategy supplies for Local Groundwater and Facilities Expansion that do not match supplies for those strategies that are reported in DB22. Please review and revise as necessary in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	Inconsistencies between DB22 and the RWP narrative were investigated and reconciled for the final RWP.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
37	Section 5.3	It appears that potential errors in calculated water needs identified in Chapter 4 (as noted in comment number 15) were carried through to tables in Chapter 5 Section 5.3. Please carefully review tables and text in Section 5.3 and revise as necessary to accurately present WUG needs in the final, adopted regional water plan. [31 TAC § 357.35(g)(1)]	Chapter 5.3 has been reviewed and revised based on the corrections made to Chapter 4.
38	Section 5.3	The plan appears to include non-recommended strategies in the county summary tables with a zero yield. For example, Table 5.3.11-8 includes advanced water conservation as a recommended WMS for Marion with a zero yield, however advanced water conservation does not appear to be a recommended WMS for Marion in DB22. Please remove all zero yield strategy references from the County Summary tables in the plan to avoid confusion, since regional water plans may not include zero yield recommended strategies. [31 TAC § 357.34(d)]	Zero yield strategy references have been removed from the County Summary and WUG supply balance tables in Chapter 5.3.
39	Section 5.4	The plan does not appear to present 'management supply factors' for MWPs Please report management supply factors for all MWPs by decade in the final, adopted regional water plan. [31 TAC § 357.35(g)(2)]	Table 5.4-13 was added to the RWP to include an evaluation of existing supplies for MWPs by decade and category of use.
40	Chapter 5	The plan does not appear to include a strategy evaluation for the City of Kenedy well field, which is included in the contract scope of work under Task 5A subtask 21(ii) Additional Strategies. Please clarify why the evaluation was not included for this potentially feasible strategy in the final, adopted regional water plan. [Contract Scope of Work, Task 5A]	The following statement was added to Chapter 5.1: "A well field project for the City of Kenedy was initially identified and explored as a potentially feasible WMS. However, the City of Kenedy's well field project was not developed to a level where it could be appropriately evaluated for inclusion as a potentially feasible WMS, in accordance with the Region L process and guiding principles. Therefore, the SCTRWPG elected not to include the City of Kenedy well field project as a potentially feasible WMS. The City of Kenedy and their representatives were advised that they may request an amendment to the 2021 SCTRWP to add the WMS in the future, if desired."
41	Pages 6-40 and 6-41	Section 6.1.3.2 appears to note that several WMSs such as Water Conservation, Drought Management, Facilities Expansions, Local Groundwater, and Recycled Water Strategies, were not evaluated for environmental impacts. Please include a quantitative reporting of environmental	Chapter 6 tables were revised to include quantitative impacts for WMS Nos 1 through 9 for Endangered and Threatened Species, Vegetation and Land Use, Water Quality and Aquatic Habitats, and Cultural Resources.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
		impacts for all evaluated WMSs and projects in the final, adopted regional water plan. [31 TAC § 357.34(e)(3)(B)]	
42	Section 7.7.1, page 7-23	The plan appears to discuss the outdated, 2014 recommendations from the Drought Preparedness Council. Please indicate how the planning group considered relevant recommendations from the Drought Preparedness Council that were provided in an August 2019 letter to the planning groups in the final, adopted regional water plan. [31 TAC § 357.42(h)]	Section 7.7.1 was updated to discuss the 2019 recommendations from the Texas Drought Preparedness Council and how the SCTRWPG has considered those recommendations. Additionally, a new section was added as Section 7.5.3 to discuss the recommended DCPs for irrigation and steam-electric water uses.
43	Section 7.4	Please confirm whether the entities evaluated for emergency responses to local drought conditions or loss of municipal supply were assumed to have 180 days or less of remaining supply. [Contract Exhibit C, Section 7.4]	Entities evaluated for emergency responses were assumed to have 180 days or less of remaining supply. The language was revised, as follows: "An analysis of a broad range of emergency response options was performed for all County-Other WUGs and for small WUGs with a 2010 historical population estimate less than 7,500 and a sole supply source. For purposes of this evaluation, entities evaluated for emergency responses to local drought conditions or loss of municipal supply were assumed to have 180 days or less of remaining supply."
44	Chapter 7	The plan does not appear to include a discussion of whether drought contingency measures have been recently implemented (for example, since adoption of the last regional water plan) in response to drought conditions. Please describe this in the final, adopted regional water plan. [Contract Scope of Work, Task 7, subtask 3]	The following language was added to Chapter 7: "Water utilities within Region L have recently implemented drought contingency measures in response to drought conditions. Since adoption of the 2016 Regional Water Plan (at the end of 2016), SAWS and EAA both activated stage I contingency measures during the summer of 2017 and stage I and II contingency measures during the summer of 2018. At the time of writing this chapter, Stage 1 drought restrictions were implemented by both SAWS and EAA as recently as July 2020. GBRA indicated that they have no records of activating drought contingency measures since adoption of the 2016 Regional Water Plan."
45	Chapter 7	The plan does not appear to include discussion of unnecessary or counterproductive variations in drought response strategies that may impede drought response efforts. Please include discussion of any unnecessary or counterproductive variations in drought response strategies that were identified by the planning group in the final, adopted regional water plan. [TWC § 16.053(e)(3)(E); 31 TAC § 357.42(b)(2)]	The SCTRWPG previously determined that there were no unnecessary or counterproductive variations in drought response strategies. The following text was added to the end of Section 7.2.2: "In accordance with Title 31 of the Texas Administrative Code (31 TAC) §357.42(b)(2), the SCTRWPG considered whether there exists any unnecessary or counterproductive variations in drought response strategies. The SCTRWPG recognizes that each entity develops drought response measures and tailors them to their own unique circumstances and goals. In an effort to ensure that local water managers can continue to manage their local water supplies, the SCTRWPG chose to

No.	IPP Reference	TWDB Comment	SCTRWPG Response
			deem no variations in drought response strategies as unnecessary or counterproductive."
46	Section 11.2.1, page 11-2	Projections summarized in Section 11.2.1 for the 2021 plan total municipal water demand and total regional demand appear to be inconsistent with water demand projections reported in DB22. Please reconcile this information as necessary in the final, adopted regional water plan. [31 TAC § 357.45(c)(1)]	Inconsistencies between DB22 and the RWP narrative were investigated and information reconciled for the final RWP.
47	Page 11-4	Table 11-2 summarizes modeling assumptions for the 2016 and 2021 South Central Texas Regional Water Plans. The table appears to show several assumptions incorrectly indicated as being used only for the 2021 plan. For example, 2021 assumptions related to Edwards Aquifer withdrawals, operations of Canyon Reservoir, GBRA deliveries, operation of power plant reservoirs, and operation of Choke Canyon Reservoir appear to have been assumptions for the 2016 plan (based on appendix J of the 2016 plan) as well. Please reconcile this information as appropriate in the final, adopted regional water plan. [31 TAC § 357.45(c)(2)]	The summary of modeling assumptions was revised to be consistent with the hydrologic assumptions included as an appendix to Chapter 3.
48	Page 11-6	Section 11.2.3 notes the total availability in 2020 is 1,449,057 acre-feet per year. This is inconsistent with total availability reported in DB22 for 2020, 1,511,657 acre-feet per year. Please reconcile this data as necessary in the final, adopted regional water plan. [31 TAC § 357.45(c)(3)]	Inconsistencies between DB22 and the RWP narrative were investigated and reconciled for the final RWP.
49	Page 11-9	Section 11.2.5 presents a summary of total regional needs in 2020 and 2070. The values presented appear to be inconsistent with the needs reported in DB22. Please reconcile this data as necessary in the final, adopted regional water plan. [31 TAC § 357.45(c)(3)]	Inconsistencies between DB22 and the RWP narrative were investigated and reconciled for the final RWP.
50	Chapter 11	Please provide a brief summary of how the 2016 Plan differs from the 2021 Plan with regards to recommended and alternative WMS projects in the final, adopted regional water plan. [31 TAC § 357.45(c)(4)]	A summary of the differences between the 2016 Plan and 2021 Plan with regards to WMS projects was added to the final RWP.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
51	Chapter 11	The plan does not appear to assess the progress of the 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. Please provide a general assessment of these items in the final, adopted regional water plan. [TWC § 16.053(e)(12); 31 TAC § 357.45(b)]	A new subsection 11.2.7 was added to Chapter 11. In general, the assessment demonstrates that the prevailing approach for entities within the SCTRWPA is to coordinate and collaborate in order to achieve regionalization. Based on the array of collaborative projects and partnerships, the SCTRWPA has been successful in encouraging cooperation among WUGs for the purpose of achieving economies of scale or otherwise incentivizing WMSs that benefit the entire RWPA. The SCTRWPG is committed to encouraging continued cooperation among WUGs and is always looking for ways to achieve economies of scale for the benefit of the region and the state.
52	GIS Files	The GIS files submitted did not appear to include the locations of every recommended WMS project. Please include the locations of every recommended WMS project listed in the final, adopted regional water plan with the final GIS data submitted. [Contract Exhibit C, Section 13.1.2]	The GIS files have been revised to include locations for every recommended WMS Project.

Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional water plan.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
1	Page 3-11	Please consider clarifying if the firm yield values reported in Table 3.3 are based on the original WAM run or projected firm yield for 2020 or 2070.	Table 3.3 has been revised for clarity regarding the firm yield values.
2	Page 3-11	Please consider clarifying why Table 3-3 provides a "firm yield" of 70,750 acre-feet per year for Lake Medina when page 3-12 notes that firm yield for Lake Medina is "essentially zero".	The narrative explains that while Lake Medina typically has a firm yield of 70,570 acft, when evaluated under the drought of record conditions after accounting for surface water “losses” to recharge and special conditions within Certificate of Adjudication No. 19-2130, that the firm yield of the Medina Lake System in a repeat of the drought of record is essentially zero. The table was revised to reflect the firm yield of zero.
3	Page 3-14	Section 3.2.3 includes a reference to an Appendix 3-C, which appears to be a typo for Appendix 3-B. Please revise this reference in the final plan.	The references to appendices in Chapter 3 have been revised for accuracy.
4	Section 3.2	Please consider including a summary table with sedimentation information for each major reservoir in the final, adopted regional water plan.	Sedimentation information was incorporated into Table 3-3.
5	Chapter 3	Please consider including maps showing the location and extent of all minor aquifers within the planning area that are considered for current and future water supplies in the final plan.	A map of minor aquifers was added to the chapter as Figure 3-3.
6	Section 3.2.2, page 3-14	Section 3.2 of the General Guidelines for Fifth Cycle of Regional Water Plan Development (Exhibit C) defines when minimum monthly diversion and minimum annual diversion may be used in determining run-of-river water availability. Please consider clarifying when minimum monthly diversion or minimum annual diversion is used to determine the firm diversion of run-of-river water supplies in the final plan.	The following clarifying language was added to Section 3.2.3: "Run-of-river water availability was determined based upon the minimum monthly diversion amount, as calculated in the appropriate WAM."
7	Appendix 3-B	Please consider changing the title of Appendix 3-B to "Surface Water Availability Analysis using WAM Run3".	The title for Appendix 3-B will remain unchanged.
8	Chapter 3	Please consider clarifying how projected rating curves for each decade are derived.	This comment is acknowledged.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
9	Chapter 5	Please consider including a list of all identified WMS that were considered for each identified water need in the region using Table E template provided in Appendix 1 of Exhibit C.	The Table E template was considered for inclusion in the RWP; however, it was determined that the current table is an accurate representation for this RWP.
10	Section 5.2, Table 5.2.1-7, page 5.2.1-18	The advanced conservation strategy evaluation recommends municipal WUGs with 2011 water use greater than 140 GPCD reduce per capita water use by 1 percent per year until 140 GPCD is reached and after which reduce per capita water use by 1/4 percent per year for the remainder of the planning period. Table 5.2.1-7 appears to show the recommended advanced conservation strategy would reduce per capita water use from 160 GPCD in 2011 to 124 GPCD in 2070 for Comal, County-Other. The resulting demand reduction supplies for Comal, County-Other from advanced conservation would account for 60 percent of the WUG's demand in 2070 which may appear difficult to achieve. Please consider clarifying the reasonableness of the recommended advanced conservation yield for Comal County-Other.	Comal County-Other does not have identified needs for the planning horizon. The Advanced Water Conservation WMS sets conservation goals that can be achieved through active water conservation techniques and is not expressly used to meet a WUG's needs. Furthermore, there are multiple entities that have per capita water use below 140 GPCD in the region. Given the 50-year planning horizon, it is reasonable to set a goal for reducing per capita use by 36 gpcd.
11	Page 5.2-1	Section 5.2 presents the methodology used to evaluate water management strategies for environmental impacts but does not present the results of this analysis. Please consider adding text to Section 5.2 that refers readers to Chapter 6 for the results of the quantified environmental impact evaluation.	Language was added to Section 5.2 that refers the reader to the quantitative reporting of impacts in Chapter 6.
12	Section 5.2.1 and 5.5	The plan includes rainwater harvesting and reuse in the list of advance water conservation measures, and brush control in the list of irrigation conservation measures. While the TWDB acknowledges that the conservation best practices guide includes these practices as conservation, for regional water planning purposes, these strategy types should not be classified as conservation (with the exception of mining recycling) and will be categorized as such in DB22. Please consider clarifying this information within Section 5.5 for consistency with data reporting in the final, adopted regional water plan. [Contract Exhibit C, Section 5.6]	Footnotes were added to Chapter 5.2.1 and 5.5 to clarify that rainwater harvesting and reuse are not classified as water conservation measures for the purposes of the regional water plan and DB22.

No.	IPP Reference	TWDB Comment	SCTRWPG Response
13	Page 7-21	Section 7.5.3 states that TCEQ model drought contingency plans (DCP) are provided in Appendix 7A. TCEQ model DCPs do not appear to be included in Appendix 7A. Please consider adding a copy of the TCEQ model DCP to Appendix 7A or revising Section 7.5.3 text in the final, adopted regional water plan.	This text has been revised in Section 7.5.3 (Now Section 7.5.4) to remove reference to TCEQ Model DCPs in an appendix. Instead, the reader is referred to the TCEQ's website.
14	GIS Files	The GIS files submitted for WMS projects do not include the minimum required metadata. Please include at a minimum, metadata about the data's projection, with the final GIS data submitted. [Contract Exhibit D, Section 2.4.1]	Required metadata has been added to the GIS data.
15	GIS Files	The GIS files submitted for WMS projects do not adhere to the contractually required naming convention. Please rename the GIS files following the naming convention outlined in Exhibit D, Section 2.4.5 in the final GIS data submitted. [Contract Exhibit D, Section 2.4.5]	Required naming convention has been applied to the GIS files.
16	GIS Files	The GIS files submitted for WMS projects do not include all of the required attribute fields listed in Table 1 of Exhibit D, Section 2.4.5. Please include the following attribute fields in all submitted WMS project GIS data with the final GIS files submitted: Datum. [Contract Exhibit D, Section 2.4.5]	Required attribute fields are included with the GIS data.

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FINAL PLAN

APPENDIX 10-C: PUBLIC AND AGENCY COMMENTS ON IPP AND SCTRWPG RESPONSES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

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APPENDIX 10-C: Public and Agency Comments and Responses

This appendix provides the comments received from the public and federal/state agencies regarding the 2021 Region L IPP; TWDB comments in their entirety are included in Appendix 10-A, a summary of the TWDB's comments and the SCTRWPG's responses are compiled in Appendix 10-B. An overview and summary of comments is included in Chapter 10 of the SCTRWP. The following provides a list of each comment received from the public and federal/state agencies and includes the SCTRWPG's response. If applicable, the SCTRWPG's response describes revisions made to the final plan to address the comment. Comments are numbered sequentially and cross-reference with Table 1: Commenter Information.

Public and Agency Comments and SCTRWPG Responses

COMMENT NO. 1:

Terry Burns, representing the Chair of the San Antonio (Alamo Area) Sierra Club. I want to make some general comments regarding the proposed plan. There is a lot of good data. I find that first of all the goals for per capita water municipally use reductions are totally inadequate with many areas even in year 2070 using in excess or close to 200 gallons per day. Way unnecessary and way out of line. This should be far lower. You also have no commercial or non-municipal reduction goals to speak of which should be corrected. In addition, you show electricity production usage at essentially unchanged levels and I would expect by 2070 there will be no fossil fuel energy production in the entire area and that will result in large decrease in water use and need. Most egregiously I think in this plan I see there is zero mention of climate change and you're predicting out to 2070 on the basis of current climate data and information about storms and precipitation. This is totally unrealistic, makes no sense what so ever. The world is changing rapidly. You need to use available modeling. The fourth climate assessment that the US Government put out in 2018 includes our area and has information. This is vitally important to incorporate into your water predictions, and I urge you to do so. In addition, I would urge an element of caution regarding the population predictions. You know, Detroit in the 1960's predicting to be one of the largest cities in the country and we see how that turned out. It's hard to know what is going to happen with COVID-19 but we may not continue growing at the rate we have, and we ought to have some margins of error in this modeling, so we can see upper and lower points of reference. Please consider these seriously comments as you go forward. Thank you very much.

RESPONSE TO COMMENT NO. 1:

The 2021 Regional Water Plan (RWP) is an update of the 2016 RWP. The emphasis of the population/demand projections in the 2021 RWP is to transition 2017 State Water Plan (SWP) data from political boundaries to utility service area boundaries, making limited modifications based on relevant changed conditions. The TWDB provides population projections to RWPGs. The TWDB has a prescribed process and minimum data requirements by which modifications to population projections can be requested by individual water user groups (WUGs). It is not within the regional water planning group's purview to modify population projections.

The SCTRWPG recognizes the importance of water conservation as a primary water management strategy and recommends every WUG implement water conservation measures. Region L will continue to emphasize importance of conservation to reduce water use. The SCTRWPG has incorporated recommendations from the Water Conservation Advisory Council (WCAC), which recommends a goal of 140 gallons per capita per day (gpcd) or less. WUGs may choose to incorporate utility-specific goals beyond those identified by the SCTRWPG.

The SCTRWPG appreciates your comment regarding climate change and climate variability. While climate variability is mentioned in Chapters 6 and 7 of the IPP; the plan uses drought of record conditions and historical hydrological data to estimate water demands and supplies and does not currently incorporate climate models to predict impacts to future water resources. In response to your comment, the SCTRWPG has added legislative and policy recommendations to the final RWP for the TWDB to reassess available climate models and consider the appropriateness of incorporating them into regional water planning. Please see Section 8.9.4 of Chapter 8 for additional information.

The final plan's cumulative impacts evaluation and associated environmental concerns section is consistent with the TWDB's rules and requirements for quantitatively evaluating the impact of the plan on natural resources. Furthermore, the evaluations for the cumulative effects analysis are consistent with the SCTRWPG's guiding principle that establishes minimum evaluation requirements and processes for the cumulative effects evaluation in Chapter 6. The WMS evaluations conducted for the 2021 RWP are included in Chapter 5.2 and describe in further detail the environmental impacts that would be expected for individual WMS projects. The WMS evaluations are for planning purposes only; implementation of the projects by sponsors will likely require coordination with state and federal agencies and/or additional review of environmental impacts and mitigation requirements as part of the regulatory and permitting process.

COMMENT NO. 2:

I concur with many of Terry Burns concerns. I also wanted to note that the population projections, although they are originated by the state, are extremely conservative based upon the current rate of natural growth and that's not even allowing for immigration to the area, over-looking a fifty (50) year period and we all know water demand is positively correlated with population. Along with Terry I want to say that the projections of GPCD are not even in keeping in with many of the much lower levels which some of the municipalities have already achieved. In the long term, there is a way to always avoid all of these problems and eventually everyone is going to have to deal with that which is to use the technology that will be used. For instance, this week in SpaceX, and which has been used by every astronaut ever, which is Net-Zero water. There are some industries that could easily adopt Net-Zero. I think that forward-looking Region L and all of its entities should start to educate themselves on Net-Zero water and start considering what would be to implement that and what would it take to do so. Would there be any municipal or state ordinances or laws that would need to be changed or advocated for. And also, what incentives might help those who are able to readily adapt to reusing the same water over and over within their cycle to do so. Thank you so much.

RESPONSE TO COMMENT NO. 2:

The 2021 Regional Water Plan (RWP) is an update of the 2016 RWP. The emphasis of the population/demand projections in the 2021 RWP is to transition 2017 State Water Plan (SWP) data from political boundaries to utility service area boundaries, making limited modifications based on relevant changed conditions. The TWDB provides population projections to RWPGs. The TWDB has a prescribed process and minimum data requirements by which modifications to population projections can be requested by individual water user groups (WUGs). It is not within the regional water planning group's purview to modify population projections.

The SCTRWPG recognizes the importance of water conservation as a primary water management strategy and recommends every WUG implement water conservation measures. Region L will continue to emphasize importance of conservation to reduce water use. The SCTRWPG has incorporated recommendations from the Water Conservation Advisory Council (WCAC), which recommends a goal of 140 gallons per capita per day (gpcd) or less. WUGs may choose to incorporate utility-specific goals beyond those identified by the SCTRWPG.

The SCTRWPG appreciates your comment regarding net-zero water. In response to your comment, the SCTRWPG has incorporated an additional legislative and policy recommendation into Chapter 8 regarding research and funding to support expansions of One Water. While net-zero water is typically used for smaller, facility-specific applications, One Water is a reuse-based approach that view drinking water, wastewater, stormwater, and other resources as a singular resource to be managed holistically and sustainably. Please see Section 8.6.8 of Chapter 8 for more information.

COMMENT NO. 3:

My name is Terry Burns, M.D., Chair of the San Antonio (Alamo) Group of the Sierra Club, the nation's oldest, and largest volunteer based environmental organization. I write in follow up to the oral comments I provided to the May 28th on line hearing.

The failure of this plan to address Climate Change is a FATAL FLAW. Predictions out to 2070 MUST take account of predicted climate changes. I refer you to https://nca2018.globalchange.gov. There is a whole section on changes in the Southern Great Plains. These data and predictions MUST be considered. We are looking at an average 7-8 degree Fahrenheit temperature rise by 2070. And since the publication of this report carbon emissions have continued and modeling continues to be refined, and the rapidity and extent of these predicted changes continues to increase. We are looking at OVER 100 DAYS of temperatures above 95 degrees by 2070. This plan will be pure science fiction without incorporation of climate data.

This plan shows essentially no changes in predicted non-municipal water uses. This seems highly unlikely. One example is the unchanged prediction for steam-electric power. By 2070, there will probably be ZERO steam-electric power left in Region L, and so this use will disappear. Agriculture use will be greatly impacted by climate change. In addition to warming there will be more intermittency and variability in rain fall and stream flows, with severe storms and intervening intense droughts. Agricultural irrigation and livestock production will be under tremendous pressure to change crops, change livestock, and change water use. I see no accounting of these pressures. I also see no water saving management proposals for these non-municipal categories, and the absence of pre-existing data is not at all a satisfactory excuse for not including such proposals.

This plan shows vast differences in municipal water use in Region L. The existing differences SHOULD serve as motivation for aggressive proposals to reduce greatly these differences. We find wealthy San Antonio area urban enclaves using 200-300 gpcd currently, and barely achieving any reductions 50 YEARS LATER. For example, Alamo Heights currently shows 244 gpcd, and achieves 235 gpcd. Shavano Park goes from 282 to 276 gpcd. These changes are attributed to institution of low flow plumbing fixtures, but seem essentially within margin of statistical error. Advanced Conservation methods are predicted to achieve no additional benefit in Alamo Heights for some reason, while Shavano Park does show significant improvement from 265 to160 gpcd. SAWS itself is at about 118 gpcd and only achieves 110 gpcd with the lesser or advanced conservation effort. The implication seems to be that additional municipal water use reductions will be modest and difficult to achieve. Sierra Club asserts that these goals for rural and urban municipalities are FAR TOO MODEST. All municipal areas in Region L should be able to achieve less than 100 gpcd by 2070, and should aim for less than 70 gpcd. You currently show total Region L municipal water use rising from about 450,000 A-F/year to about 680,000. This increase, even with your projected population increases, could be largely eliminated with more ambitious water conservation goals. In particular you show 30% of residential water use state wide due to landscape watering. Anticipated climate changes will have a huge impact on this. Unless landscaping practices change and more drought tolerant plantings are adopted the costs of maintaining the current water hungry landscapes will become extreme.

It is good that Drought Management Plan proposals show a range of options from 5 to 20 %. It is UNCONSCIONABLE that the Region L 2021 Plan should choose a goal of 5%, the least ambitious option. SAWS alone could achieve 56,588 Acre Feet of water savings using the 20% figure. Of course SAWS spent $3 Billion on Vista Ridge in order to NEVER implement any beyond Stage 2 Drought Management Plan actions.

Finally, environmental impacts in the Plan are fairly cursory: “The environmental assessments of individual WMSs should be regarded as high-level preliminary”. 6.1.5.1 Environmental Benefits, calls as benefits largely things like the absence of new dams, and plans to “not exceed environmental flow standards.” These are beneficial in being LESS NEGATIVE than other actions but not in the sense of IMPROVING our water resources environment. The 6.1.5.2 Environmental Concerns are, however, of huge importance, ESPECIALLY in the face of predicted climate change impacts:

“Reductions in instream flows and freshwater inflows to bays and estuaries associated with surface water supply and direct consumptive reuse projects.

■ Projects located in stream segments identified by TPWD as ecologically significant.25

■ Effects on small springs and reductions in flux entering streams from aquifers associated with groundwater development.

Potential interaction of climate variability with other identified impacts.”

These NEGATIVE SERIOUS IMPACTS need far more detailed analysis and mitigation planning.

In summary, I thank Black & Veatch for the extensive data collection and preparation of this Draft Plan. I URGE REGION L TO GO WAY BEYOND THE VERY MODEST PROPOSALS IN THIS REPORT. As it stands it outlines a future of hugely over extended costly and unnecessary water infrastructure. It also totally ignores climate change.

Sincerely,
Terry Burns, M.D.
Chair, Alamo regional Group, Lone Star Chapter, Sierra Club

RESPONSE TO COMMENT NO. 3:

The SCTRWPG appreciates your comment regarding climate change and climate variability. While climate variability is mentioned in Chapters 6 and 7 of the IPP; the plan uses drought of record conditions and historical hydrological data to estimate water demands and supplies and does not currently incorporate climate models to predict impacts to future water resources. In response to your comment, the SCTRWPG has added legislative and policy recommendations to the final RWP for the TWDB to reassess available climate models and consider the appropriateness of incorporating them into regional water planning. Please see Section 8.9.4 of Chapter 8 for additional information.The SCTRWPG recognizes the importance of water conservation as a primary water management strategy and recommends every WUG implement water conservation measures. Region L will continue to emphasize importance of conservation to reduce water use. The SCTRWPG has incorporated recommendations from the Water Conservation Advisory Council (WCAC), which recommends a goal of 140 gallons per capita per day (gpcd) or less. WUGs may choose to incorporate utility-specific goals beyond those identified by the SCTRWPG.Alamo Heights and Shavano Park were mentioned as achieving 235 GPCD and 276 GPCD in the 2070 decade, respectively. However, these values are representative of Passive Water Conservation effects, which are the result of low flow plumbing fixtures and without incorporation of additional, more advanced water conservation measures. In fact, after applying the Region L Advanced Water Conservation Goals, the resulting per capita water use goals for Alamo Heights and Shavano Park are projected to decrease from 2011 to 2070 as follows: from 255 GPCD to 141 GPCD and from 290 GPCD to 160 GPCD in 2070, respectively. In the final plan, Section 5.2.1 Advanced Water Conservation WMS has been revised and reorganized to clarify the difference between passive conservation and Advanced Water Conservation. Additionally, SAWS was mentioned as having 118 GPCD that reduces to 100 GPCD by 2070 with Advanced Water conservation; however, this is not the case. A corrected summary of SAWS' GPCD with Advanced Water Conservation has been included in Section 5.2.1.5. With the incorporation of SAWS' utility-specific water conservation goals and their planned Advanced Meter Infrastructure (AMI) Project the 2070 per capita water use is anticipated to be well below 100 GPCD by 2070. The Drought Management WMS is meant to be a short-term reduction in demand as a result of periodic activation of approved drought contingency plans (DCPs). This WMS was applied to WUGs that have needs in the 2020 decade. The SCTRWPG evaluated reductions of 5% to 20% and ultimately chose to use 5% as the demand reduction standard for most WUGs due to significantly greater total annual costs associated with reductions greater than 5%. WUGs have the choice to implement utility-specific reduction goals beyond the 5%, if desired. For example, SAWS has utility-specific drought management goals under this WMS. The final plan's cumulative impacts evaluation and associated environmental concerns section is consistent with the TWDB's rules and requirements for quantitatively evaluating the impact of the plan on natural resources. Furthermore, the evaluations for the cumulative effects analysis are consistent with the SCTRWPG's guiding principle that establishes minimum evaluation requirements and processes for the cumulative effects evaluation in Chapter 6. The WMS evaluations conducted for the 2021 RWP are included in Chapter 5.2 and describe in further detail the environmental impacts that would be expected for individual WMS projects. The WMS evaluations are for planning purposes only; implementation of the projects by sponsors will likely require coordination with state and federal agencies and/or additional review of environmental impacts and mitigation requirements as part of the regulatory and permitting process.

COMMENT NO. 4:

For the past 2 years the Texas State Soil and Water Conservation Board (TSSWCB) has been participating in the Texas Water Development Board's (TWDB) Regional Water Planning meetings as directed by Senate Bill 1511, passed in the 2017 legislative session. We appreciate being included in the process and offer these constructive comments to the regional water plans and ultimately the State water plan.

As you may know 82% of Texas' land area is privately-owned and are working lands, involved in agricultural, timber, and wildlife operations. These lands are important as they provide substantial economic, environmental, and recreational resources that benefit both the landowners and public. They also provide ecosystem services that we all rely on for everyday necessities, such as air and water quality, carbon sequestration, and wildlife habitat.

With that said, these working lands are where the vast majority of our rain falls and ultimately supply the water for all of our needs, such as municipal, industrial, wildlife, and agricultural to name a few. Texas' private working lands are a valuable resource for all Texans.

Over the years, the private landowners of these working lands have been good stewards of their property. In an indirect way they have been assisting the 16 TWDB's Regional Water Planning Groups in achieving their goals through voluntary incentive-based land conservation practices.

It has been proven over time if a raindrop is controlled where it hits the ground there can be a benefit to both water quality and water quantity. Private landowners have been providing benefits to our water resources by implementing Best Management Practices (BMP) that slow water runoff and provide for soil stabilization, which also slows the sedimentation of our reservoirs and allows for more water infiltration into our aquifers.

Some common BMPs include brush management, prescribed grazing, fencing, grade stabilization, irrigation land leveling, terrace, contour farming, cover crop, residue and tillage management, and riparian herbaceous cover.

The TSSWCB has been active with agricultural producers since 1939 as the lead agency for planning, implementing, and managing coordinated natural resource conservation programs for preventing and abating agricultural and sivicultural nonpoint sources of water pollution.

The TSSWCB also works to ensure that the State's network of over 2,000 flood control dams are protecting lives and property by providing operation, maintenance, and structural repair grants to local government sponsors.

The TSSWCB successfully delivers technical and financial assistance to private landowners of Texas through Texas' 216 local Soil and Water Conservation Districts (SWCD) which are led by 1,080 locally elected district directors who are active in agriculture. Through the TSSWCB Water Quality Management Plan Program (WQMP), farmers, ranchers, and silviculturalists receive technical and financial assistance to voluntarily conserve and protect our natural resources. Participants receive assistance with conservation practices, BMPs, that address water quality, water quantity, and soil erosion while promoting the productivity of agricultural lands. This efficient locally led conservation delivery system ensures that those most affected by conservation programs can make decisions on how and what programs will be implemented voluntarily on their private lands.

Over time, lands change ownership and many larger tracts are broken up into smaller parcels. Most new landowners did not grow up on working lands and therefore may not have a knowledge of land management techniques. The TSSWCB is writing new WQMPs for these new landowners who are implementing BMPs on their land. Education and implementation of proper land management and BMPs continues to be essential. Voluntary incentive-based programs are essential to continue to address soil and water conservation in Texas.

These BMPs implemented for soil and water conservation provide benefits not only to the landowner but ultimately to all Texans and our water supply.

RESPONSE TO COMMENT NO. 4:

The SCTRWPG appreciates the letter provided by the Texas State Soil and Water Conservation Board and acknowledges the comments. No revisions to the plan are necessary at this time.

COMMENT NO. 5:

Thank you for seeking review and comment from the Texas Parks and Wildlife Department ("TPWD") on the 2021 Initially Prepared Regional Water Plan (IPP) for the South Central Texas Region L Water Planning Area (SCTRWPA). Thank you for the Region's responsiveness to TPWD's comments in previous planning cycles. Water impacts every aspect of TPWD's mission to manage and conserve the natural and cultural resources of Texas. Although TPWD has limited regulatory authority over the use of state waters, we are the agency charged with primary responsibility for protecting the state's fish and wildlife resources. To that end, TPWD offers these comments intended to help avoid or minimize impacts to state fish and wildlife resources. TPWD understands that regional water planning groups are guided by 31 TAC §357 when preparing regional water plans. These water planning rules spell out requirements related to natural resource and environmental protection. Accordingly, TPWD staff reviewed the IPP with a focus on the following questions:

• Does the IPP include a quantitative reporting of environmental factors including the effects on environmental water needs and habitat?
• Does the IPP include a description of natural resources and threats to natural resources due to water quantity or quality problems?
• Does the IPP discuss how these threats will be addressed?
• Does the IPP describe how it is consistent with long-term protection of natural resources? Does the IPP include water conservation as a water management strategy?
• Does the IPP include Drought Contingency Plans?
• Does the IPP recommend any stream segments be nominated as ecologically unique?
• Does the IPP address concerns raised by TPWD in connection with the 2016 Water Plan?

The population of the 20 county SCTRWPA is estimated to grow from about 3.0 million in 2020 to about 5.2 million by 2070, an increase of 73 percent. Water demands are expected to grow from about 1.05 million acre-feet (ac-ft) to approximately 1.3 million ac-ft in 2070. Water conservation, including drought management, and water reuse are expected to meet 41 percent of future water needs. The IPP includes the development of four brackish groundwater desalination projects, comprising 14 percent of future supplies. Three new aquifer storage and recovery (ASR) projects are recommended in the IPP to provide approximately 7 percent of future supplies in the region. From the perspective of environmental impacts, ASR projects are generally preferred over surface reservoirs since habitat impacts can be minimized. Finally, new surface water development projects such as the GBRA Lower Basin Project are expected to meet 15 percent of future needs and groundwater wells are expected to meet 22 percent of future needs.

The IPP includes a description of natural resources as well as a detailed quantitative reporting of environmental factors. A brief description of natural resources including fish and wildlife resources is provided in Chapter 1.2.4. Chapter 5 outlines each water management strategy and the threats from each WMS. Chapter 6 outlines threats to environmental and natural resources due to water quantity and quality issues. Chapter 6 also addresses the cumulative environmental effects of the full implementation of the plan. The long-term cumulative effects of recommended WMSs on the Edwards Aquifer are based on the full implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) and for the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers are based on protection of Desired Future Condition (DFC) of the aquifers assuming full implementation of the Modeled Available Groundwater (MAG) within each Groundwater Management Area.

Potential cumulative effects of implementation of the 2021 SCTRWP on instream flows and freshwater inflows to bays and estuaries was assessed for seven locations in the Guadalupe-San Antonio (GSA) River Basin. Baseline modeled stream flow for the year 2070 is compared to stream flow with full implementation of the plan for 2070. For the seven sites assessed stream flows with full plan implementation generally stay above flow standards except at very low flows. The causes of the streams to drop below flow standards are thought to be existing senior water rights that do not have to adhere to flow standards, the GBRA Mid Basin Project, and the CRWA Siesta Project. Freshwater inflow into the GSA estuaries are within ranges specified by SB 3 environmental flow standards found at 30 TAC Section 298.380(a).

State and Federal species of greatest conservation need (SGCN) including threatened and endangered species and candidates for listing as threatened or endangered species are listed and discussed in terms of the potential impacts of each WMS in Volume II. According to the IPP there is also a listing of these species by county Appendix G. TPWD was not able to locate Appendix G. The TPWD is particularly concerned about declining freshwater mussel populations, reflected in the 2009 Texas Parks and Wildlife Commission's decision to list 15 species of freshwater mussels as threatened. In order to avoid adverse impacts to aquatic resources and potential civil and criminal liability, the department recommends entities coordinate with the department to develop a plan to avoid impacts to aquatic resources and, in some instances, relocate aquatic resources outside of the project area. There have been recent updates (March 30, 2020) to the list of federal and state listed species and Species of Greatest Conservation need, including species in Region L counties. We recommend that you update tables found in Volume II and Appendix G with the latest information that is available at https://tpwd.texas.gov/huntwild/wild/wildlife diversity/nongame/listed-species/.

Chapter 6 briefly discusses the spread of invasive exotic species and their potential negative environmental impacts. TPWD requests this threat be addressed by any water management strategies that involve the transfer of surface water. The introduction of invasive exotic species can directly and/or indirectly impact native species, their habitats and associated ecosystem functions, recreational opportunities (e.g., anglers and boaters) and the public water supply and other water infrastructure negatively. In particular, the zebra mussel is an invasive freshwater mollusk that could affect water management by clogging intake structures and fouling pipelines, resulting in increased maintenance needs and potentially hazardous conditions for workers. The presence of zebra mussels also raises concerns with the transfer of water from affected waterbodies that may require mitigation to prevent transfer of zebra mussels. The potential transport of zebra mussels and other invasive species via pipelines falls under Parks and Wildlife Code §66.007(n) and §66.0072(g) To prevent the transmission of invasive species TPWD recommends avoiding transport of water from water bodies where these species are known to occur, including rivers downstream of infested lakes. If this is unavoidable, effective mitigative measures should be considered and implemented for preventing the transfer of zebra mussels. Canyon Reservoir is known to be infested with zebra mussels. In addition zebra mussels have been found in several lakes downstream on the Guadalupe River. Please be advised TPWD regularly updates information on the TPWD website to clearly identify lakes with zebra mussels in Texas, as it is subject to change; this information can be found at: https://tpwd.texas.gov/huntwild/wild/species/exotic/zebramusselmap.phtml.

TPWD recommends that the Region L IPP identify areas with infestations to prevent the spread of zebra mussels via water transfer and the negative impacts from invasive, exotic or nuisance species on the State’s natural resources, economy, and recreation that would result from their introduction into new water bodies.

The SCTRWPG is to be commended for its strong emphasis and on water conservation, reuse and drought contingency planning. The IPP includes municipal water conservation water management strategies. Water conservation in the industrial and steam-electric power generation use categories are encouraged as well. According to the IPP, per capita water use in Region L is projected to decline over the planning period from 128 gallons per person per day in 2020 to 117 gallons per person per day in 2070, bringing it well under the Texas Water Conservation Task Force goal of 140 gallons per person per day.

While TPWD is pleased to see that many of our earlier comments have been addressed, concerns remain regarding potential impacts associated with several strategies. Several water management strategies are recommended for stream segments identified by TPWD as ecologically significant. Increased groundwater development may impact small springs and adversely impact groundwater-surface water interactions. New appropriations from the Guadalupe River and/or increased use of previously unused water rights from the Guadalupe River will impact instream flows and freshwater inflows to San Antonio Bay that will likely reduce long-term inflows and increase bay salinities, potentially leading to complex estuarine community changes. Brackish groundwater desalination can be an ecologically advantageous strategy, as long as issues such as brine disposal options are carefully considered. Recognition is deserved for drought management as a water management strategy, aquifer storage and recovery projects, use of off-channel reservoirs, use of recycled water for non-potable uses for several water user groups, and an ecological analysis of the impact of the 2021 plan. TPWD looks forward to continued coordination with project sponsors in an effort to avoid and/or minimize threats to fish and wildlife resources.

The 2021 IPP is a well written and organized report with detailed descriptions of natural resources and potential impacts. TPWD highly commends SCTRWPG's efforts that have resulted in the successful designation of five segments recommended in the IPP as ecologically unique and agrees with the statement " ...designating ecologically unique stream segments raises public awareness and voluntary stewardship that can result in the preservation of the character and environmental function of these segments." In addition, TPWD appreciates the recommendations regarding completion of the Texas Instream Flow Studies as well as funding for access to water data.

Thank you for your consideration of these comments. TPWD looks forward to continuing to work with the planning group to develop water supply strategies that not only meet the future water supply needs of the region but also preserve the ecological health of the region's aquatic resources.

RESPONSE TO COMMENT NO. 5:

The TPWD county species lists were updated on March 30, 2020, which was after the SCTRWPG performed evaluations of WMS and after the Initially Prepared Plan (IPP) was submitted to the TWDB and made available for public review. The evaluations of impacts to threatened and endangered species and species of greatest conservation need (SGCN) included in this regional water plan were based on the TPWD county species lists available at the time of WMS evaluation. Project implementation would require independent review of impacts to threatened and endangered species and SGCN as part of the regulatory permitting for the project. Most updates in the TPWD county species lists reflected additions, deletions, or revisions of SGCN. Revisions to state-listed species included updates to freshwater mussels to reflect taxonomic revisions and updates to the status of black-capped vireo and bald eagle, which are no longer considered endangered or threatened. For the 2026 Regional Water Plan, the SCTRWPG will use the most-recent TPWD lists available for the WMS evaluations. For Region L, WMSs are evaluated approximately 1.5 to 2 years prior to final plan adoption; therefore, the WMSs for the 2026 plan will likely be evaluated in years 2023 and 2024.

In response to your comment regarding zebra mussels and negative impacts of invasive exotic species, an invasive species section was added to Chapter 5.2, including a narrative regarding zebra mussels and their deleterious impacts to aquatic ecosystems.

COMMENT NO. 6:

The following revisions are to McCoy WSC numbers in the given tables:

Population Projections
Page 141 Atascosa County 2020 = 8009, 2030 = 9228, 2040 = 10328, 2050 = 11421, 2060 = 12441, 2070 = 13389
Page 146 Nueces Basin 2020 = 378, 2030 = 464, 2040 = 548, 2050 = 624, 2060 = 696, 2070 = 761
Page 146 San Antonio Basin 2020 = 31, 2030 = 39, 2040 = 45, 2050 = 51, 2060 = 57, 2070 = 62

Demand Projections
Page 149 Nueces Basin 2020 = 996, 2030 = 1106, 2040 = 1215, 2050 = 1331, 2060 = 1449, 2070 = 1545
Page 157 Nueces Basin 2020 = 47, 2030 = 56, 2040 = 64, 2050 = 73, 2060 = 81, 2070 = 88
Page 157 San Antonio Basin 2020 = 4, 2030 = 5, 2040 = 5, 2050 = 6, 2060 = 7, 2070 = 7

Existing Water Supply
Page 167 Queen City Aquifer 2020 = 2260, 2030 = 2251, 2040 = 2247, 2050 = 2243, 2060 = 2241, 2070 = 2237
Page 167 Carrizo-Wilcox Aquifer 2020 = 88, 2030 = 89, 2040 = 89, 2050 = 89, 2060 = 89, 2070 = 89
Page 183 Carrizo-Wilcox Aquifer 2020 = 108, 2030 = 114, 2040 = 118, 2050 = 122, 2060 = 125, 2070 = 126
Page 183 Queen City Aquifer 2020-2070 = 6
Page 184 Carrizo-Wilcox Aquifer 2020 = 8, 2030 = 10, 2040 = 11, 2050 = 10, 2060 = 10, 2070 = 12

Needs/Surplus
Page 185 2020 = 1354, 2030 = 1236, 2040 = 1121, 2050 = 1002, 2060 = 880, 2070 = 782

Page 193 Nueces Basin 2020 = 53, 2030 = 50, 2040 = 46, 2050 = 42, 2060 = 37, 2070 = 31
Page 193 San Antonio Basin 2020 = 5, 2030 = 5, 2040 = 5, 2050 = 4, 2060 = 4, 2070 = 4

RESPONSE TO COMMENT NO. 6:

The 2021 Regional Water Plan (RWP) is an update of the 2016 RWP. The emphasis of the population/demand projections in the 2021 RWP is to transition 2017 State Water Plan (SWP) data from political boundaries to utility service area boundaries, making limited modifications based on relevant changed conditions. The TWDB provides population projections to RWPGs. The TWDB has a prescribed process and minimum data requirements by which modifications to population projections can be requested by individual water user groups (WUGs). For example, in the 2021 RWP, increases in population for one WUG would have required corresponding decreases for another WUG within the same county. In March 2017, the SCTRWPG requested input via email from WUGs, including McCoy WSC, regarding proposed population, water demands, and existing supplies. The SCTRWPG also notes that McCoy WSC has surplus supplies (no needs/shortages) for all decades in the planning period and would not require water management strategies developed to meet needs during the planning horizon. The SCTRWPG set a deadline of November 2017 for WUGs to provide supporting documentation for population and water demand revisions. As of November 2017, the SCTRWPG had not received feedback from McCoy WSC regarding population, water demands, and existing supplies. In April 2018, the TWDB subsequently adopted the population and water demands for use in the 2021 Regional Water Plan, which included the proposed population and demands that were initially sent to McCoy WSC for review and input.

The SCTRWPG appreciates McCoy WSC's engagement with Regional Water Plan development and recognizes the desire to have data reported consistently among water resources plans. However, given the previous requests for input, the previous opportunities for involvement in the development of population and water demand projections, the surplus supplies for the planning horizon, and the time constraints associated with revising population and water demand projections at this stage in plan development, the SCTRWPG acknowledges the comment and recommends no changes to the 2021 RWP at this time. The SCTRWPG encourages McCoy WSC to engage with the next cycle of Regional Water Planning (2026 RWP) in order to ensure that population, demands, and supplies are appropriately represented in future plans.

Table 1: Commenter Information

Comment No.	Date	Medium (verbal, mail, email)	Entity Representation	Name
1	5/28/2020	Verbal, Public Hearing	Sierra Club, San Antonio (Alamo) Group	Terry Burns, M.D.
2	5/28/2020	Verbal, Public Hearing	Public	Rachel Cywinski
3	6/8/2020	Written, email	Sierra Club, San Antonio (Alamo) Group	Terry Burns, M.D.
4	6/18/2020	Written, email	Texas State Soil and Water Conservation Board	Barry Mahler (Chairman) and Rex Isom (Executive Director)
5	7/20/2020	Written, email	Texas Parks & Wildlife Department	Cindy Loeffler (Chief)
6	7/20/2020	Written, spreadsheet	McCoy Water Supply Corporation	Kerry McCollough

FINAL PLAN

CHAPTER 11: COMPARISON TO THE PREVIOUS REGIONAL WATER PLAN

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

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acft/yr	Acre-foot per Year
ARWA	Alliance Regional Water Authority
CRWA	Canyon Regional Water Authority
EAHCP	Edwards Aquifer Habitat Conservation Plan
GBRA	Guadalupe-Blanco River Authority
NBU	New Braunfels Utilities
SAWS	San Antonio Water System
SCTRWP	South Central Texas Regional Water Plan
SCTRWPG	South Central Texas Regional Water Planning Group
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board
WMS	Water Management Strategy
WMSP	Water Management Strategy Project
WUG	Water User Group

CHAPTER 11: Comparison to the Previous Regional Water Plan

11.1 IMPLEMENTATION OF PREVIOUS REGIONAL WATER PLAN

The previous water plan was the 2016 South Central Texas Regional Water Plan (SCTRWP). To assess the level of implementation of the 2016 SCTRWP and to identify impediments to the development of previously recommended water management strategies (WMSs) and Water Management Strategy Projects (WMSPs), a survey was sent to Water User Groups (WUGs) in the South Central Texas Region. The survey included information regarding the project description and infrastructure type. The purpose of the implementation survey is to update the South Central Texas Regional Water Planning Group (SCTRWPG) on several aspects of the proposed WMSs and WMSPs, including the level of implementation currently achieved, the initial volume of water provided, the funds expended to date, project cost, funding source, and year the project went on line. If the project was a phased project, the WUGs were inquired about the ultimate volume, project cost, and year that the project would reach maximum capacity. If the project was not implemented, the WUGs were asked to comment as to impediments to implementation. The survey also included a question regarding inclusion of the previous project in the 2021 SCTRWP for both phased and non-implemented projects. Current findings of the survey (as of February 1, 2020) are summarized in Table 11-1. The full list of projects, including responses gathered to date, can be found in Appendix 11-A. The RWPG will continue to update the implementation survey until adoption of the 2021 Regional Water Plan in October 2020.

Table 11-1 Summary of Implementation Survey

RELATED SPONSOR ENTITY	ACQUISITION AND DESIGN PHASE	CURRENTLY OPERATING	FEASIBILITY STUDY ONGOING	NOT IMPLEMENTED	OFFICIAL ACTION TO INITIATE PROJECT
Canyon Regional Water Authority	2	1			
Cibolo Valley Local Government Corporation	1				
County Line WSC					1
Guadalupe Blanco River Authority			3	2	
New Braunfels	1	2			
San Antonio Water System	2	3		3	3
Schertz-Seguin Local Government Corporation	2				

RELATED SPONSOR ENTITY	ACQUISITION AND DESIGN PHASE	CURRENTLY OPERATING	FEASIBILITY STUDY ONGOING	NOT IMPLEMENTED	OFFICIAL ACTION TO INITIATE PROJECT
Victoria	1	1			

11.2 COMPARISON TO PREVIOUS REGIONAL WATER PLAN

With each regional water planning cycle, population and water demand projections can potentially change for each WUG. Population can change because of updated data, either from the latest census or better estimates from the Texas State Demographer. Water demands can change due to changes in population or variations in per capita water use values, which are affected by conservation efforts, drought measures, and shifting of water uses. In addition, there are new, different, or removed WUGs as a result of the Texas Water Development Board (TWDB) transitioning from political boundary-based WUGs in the 2016 SCTRWP to utility-based WUGs in the 2021 SCTRWP. Chapter 11 compares the 2016 SCTRWP to the 2021 SCTRWP in regards to water demands, source water availability, drought of record, existing supplies, needs, and WMSs. Both the 2016 and the 2021 SCTRWPs have a planning horizon of 2020 to 2070.

11.2.1 Water Demand Projections

In general, water demand projections for the region were similar between the 2016 SCTRWP and the 2021 SCTRWP. Between 2020 and 2050, municipal water demand projections for the 2021 SCTRWP are lower than the 2016 SCTRWP. In the 2016 SCTRWP, municipal water demands ranged from 469,065 acre-feet per year (acft/yr) in 2020 to 754,306 acft/yr by the 2070 decade (Figure 11-1). In the 2021 plan, municipal water demand ranges from 433,481 acft/yr in 2020 to 700,477 acft/yr by 2070.

Non-municipal demands for the 2021 SCTRWP are projected to remain relatively flat over the planning period (Figure 11-2). The 2021 SCTRWP has higher projections for 2020 through 2030, but then decrease below the 2016 SCTRWP projections from 2040 through 2070. The total water demands for all entities in the region are projected to increase. Compared to the 2016 SCTRWP, the 2021 SCTRWP total water demand projections are lower than those projected in the 2016 SCTRWP, which projected demands from 1,070,354 acft/yr in 2020 to 1,433,835 acft/yr in 2070 (Figure 11-3). The total water demand projections for the 2021 SCTRWP increase from 1,050,964 acft/yr in 2020 to 1,320,128 acft/yr in 2070.

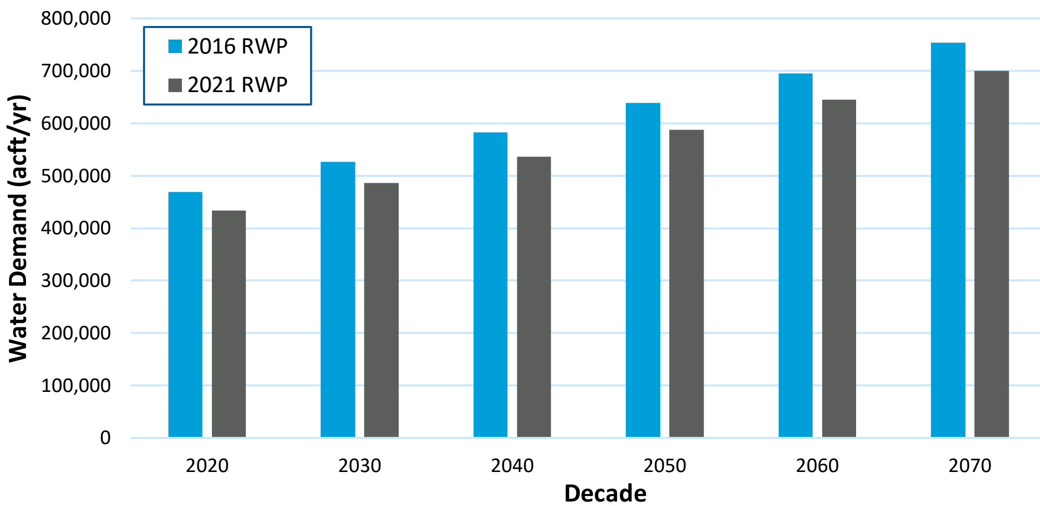

Figure 11-1 Municipal Water Demand Projections

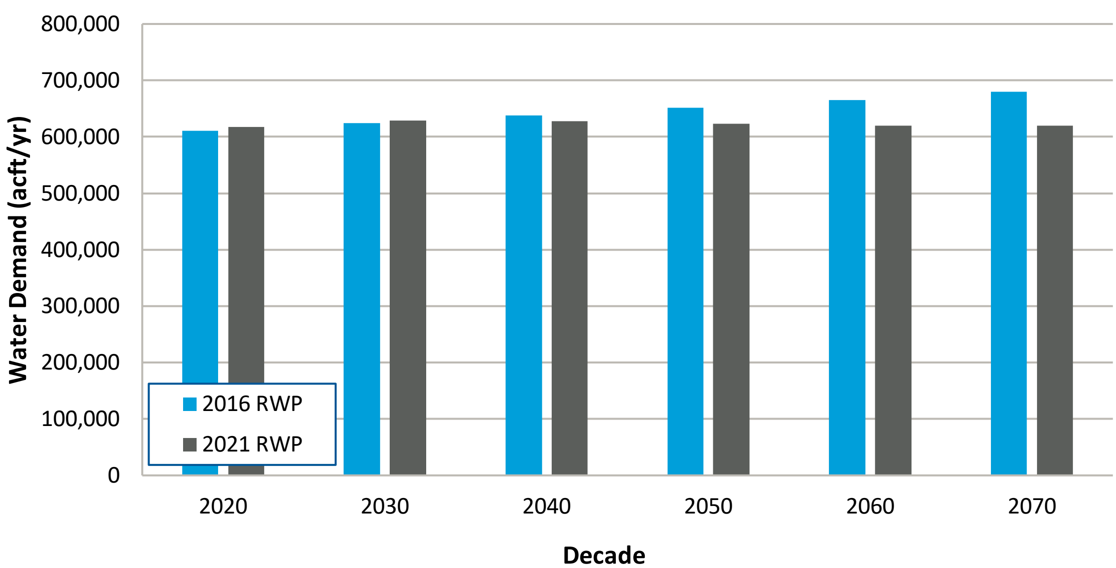

Figure 11-2 Non-Municipal Water Demand Projections

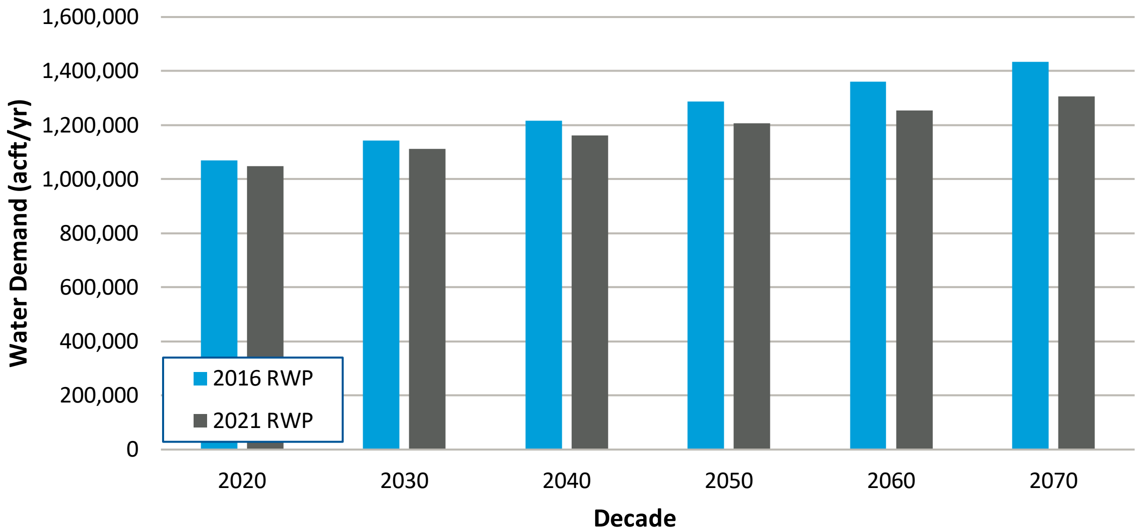

Figure 11-3 Total Water Demand Projections

11.2.2 Drought of Record and Assumptions

The drought of record in the Guadalupe-San Antonio River Basin is the drought of the 1950s and did not change from the 2016 SCTRWP. The drought of record for the Nueces River Basin is the drought of the 1990s and did not change from the 2016 SCTRWP. Water modeling assumptions associated with both plans are listed in Table 11-2. See Appendix 3-A for correspondence between the SCTRWPG and TWDB regarding the hydrologic assumptions.

Table 11-2 Hydrologic and Modeling Assumptions

2016 SCTRWP	2021 SCTRWP
Surface Water Assumptions	
Full exercise of surface water rights. Data files updated with latest existing permanent water rights	WAM Run 3 may be used for all Surface Water Rights Modeling for existing supplies, WMS evaluations, and cumulative effects evaluation. a. Full exercise of surface water rights b. Zero effluent discharges unless specifically required by a surface water right (hydropower, industrial rights, City of Victoria, etc.)
Effluent discharge / return flow in the Guadalupe - San Antonio River Basin will be that reported for 2006 and adjusted for current SAWS direct recycled water commitments. Smaller reuse commitments of San Marcos, New Braunfels, Seguin, Kyle, San Antonio River Authority, and/or Cibolo Creek Municipal Authority, as well as others marketing reuse water (Gonzales, Kenedy, etc) may be considered to the extent data is available.	

2016 SCTRWP	2021 SCTRWP
Canyon Reservoir. No. 18-2074E, including subordination of all senior Guadalupe River hydropower permits to Operation of Canyon Reservoir at firm yield in accordance with Certificate of Adjudication	Operation of Canyon Reservoir at firm yield in accordance with CA #18-2074E, including subordination of all senior Guadalupe River hydropower permits to Canyon Reservoir may be used for evaluating existing supplies, WMS evaluations, and cumulative effects evaluation.
Delivery of GBRA's present contractual obligations from Canyon Reservoir to points of diversion.	Delivery of GBRA's present contractual obligations from Canyon Reservoir to points of diversion may be used for evaluating existing supplies.
Firm supply of surface water rights based on monthly availability.	Firm supply of surface water rights based on monthly availability may be used for evaluating existing supplies, WMS evaluations.
	New water rights evaluated may be in accordance with Environmental Flow Standards for evaluating WMS evaluations, and cumulative effects evaluation.
Operation of power plant reservoirs (Braunig, Calaveras, and Coleto Creek) subject to authorized consumptive uses at the reservoir, with makeup diversions as needed to maintain full conservation storage to the extent possible subject to senior water rights, instream flow constraints, and/or applicable contractual provisions.	Operation of power plant reservoirs (Braunig, Calaveras, and Coleto Creek) subject to authorized consumptive uses at the reservoir, with makeup diversions as needed to maintain full conservation storage to the extent possible subject to senior water rights, instream flow constraints, and/or applicable contractual provisions may be used for evaluating existing supplies, WMS evaluations, and cumulative effects evaluation.
Use of the Region L GSA WAM which more accurately models the Canyon Reservoir permit, Coleto Creek Diversions, the Medina Lake System, and the CPS lakes (Calaveras and Braunig), also for the purpose of evaluating existing supplies.	Use of the Region L WAM may be used to establish existing supply for Canyon Reservoir and power plant reservoirs, Braunig, Calaveras, and Coleto Creek (daily time step simulation with no use of effluent or other changes to any water rights).
Operation of Choke Canyon Reservoir/Lake Corpus Christi System at safe yield subject to the TCEQ Agreed Order regarding freshwater inflows to the Nueces Estuary.	Operation of Choke Canyon Reservoir/Lake Corpus Christi (CCR/LCC) System at safe yield subject to TCEQ Agreed Order regarding freshwater inflows to the Nueces Estuary may be used for evaluating cumulative effects evaluation.
Period of record for simulations: Guadalupe-San Antonio River Basin (1934-89, Critical Drought = 1950s) and Nueces River Basin (1934-97, Critical Drought = 1990s)	Period of record for simulations: Guadalupe- San Antonio River Basin (1934-89, Critical Drought = 1950s) and Nueces River Basin (1934-97, Critical Drought = 1990s)
Ground Water Assumptions	
Edwards Aquifer withdrawals, critical period management, and resulting springflows consistent with Habitat Conservation Plan (Phase I) developed through the Edwards Aquifer Recovery Implementation Program (pending approval by USFWS) for the period 1947-1989. Pre-1947 withdrawals, critical period management, and resulting springflows consistent with SB 3 (80th Texas Legislature) using GWSIM-IV and historical Edwards Aquifer recharge estimates developed by EUWD/HDR	The following may be used for evaluating existing supplies, WMS evaluations, and cumulative effects evaluation: Reliability of Edwards Aquifer permits and resulting springflows consistent with Habitat Conservation Plan (Phase I) developed through the Edwards Aquifer Recovery Implementation Program for the period 1947-1989 (using the latest MODFLOW model). Pre-1947 (1934-1946) withdrawals, critical period management, and resulting springflows consistent with SB 3 (goth Texas Legislature) using GWSIM-IV and historical Edwards Aquifer recharge estimates developed by EUWD/HDR.

2016 SCTRWP	2021 SCTRWP
	When evaluating existing supplies, WMS evaluations, and cumulative effects evaluation, reliability of existing groundwater permits and availability to new groundwater strategies in the Carrizo-Wilcox, Trinity, Gulf Coast, and other minor aquifers will be in accordance with Modeled Available Groundwater estimates, as calculated by TWDB on or before June 1, 2018.
	When evaluating existing supplies, WMS evaluations, and cumulative effects evaluation, the SCTRWPG will use the process established during the 2016 Planning Cycle (Section 8.3.1 of the 2016 SCTRWP) to determine the amount of groundwater allocated to individual groundwater permits.
Reuse/Recycle Water	
	When evaluating existing supplies, WMS evaluations, and cumulative effects evaluation, source water available for reuse water management strategy will be determined based on the estimated amount of water returned to a utility's WWTPs for each decade, less the amount of reuse water already being utilized as existing supply 1. The amount of water returned to a utility's WWTP will be estimated at 50% of the utility's projected water demands, adjusted for water conservation and drought management strategies, unless site-specific information is available 2. Example: [50% * (projected water demands for a utility – conservation WMS volumes – drought management WMS volumes)] – existing reuse supply

11.2.3 Source Water Availability

Approximately 81 percent of the water available in the South Central Texas region comes from groundwater sources. The total available groundwater has increased in the 2021 SCTRWP over the available groundwater from the 2016 SCTRWP. Figure 11-4 shows that groundwater availability has increased during the 2021 planning cycle and remains relatively constant through 2070.

Surface water availability accounts for about 16 percent of water availability in the region and is less for each decade in the 2021 SCTRWP when compared to the 2016 SCTRWP (Figure 11-5). The total water availability is notably higher throughout the planning period in the 2021 SCTRWP. Availability is highest in 2020 at 1,511,928 acft/yr, and then remains relatively constant for the next five decades averaging 1,488,847 acft/yr in the 2021 plan. The average total availability in the 2016 SCTRWP was 1,297,357 acft/yr (Figure 11-6).

There are significant differences in the modeling assumptions for technical evaluation of surface water availability for WMSs in the 2016 and 2021 SCTRWPs (Table 11-2).

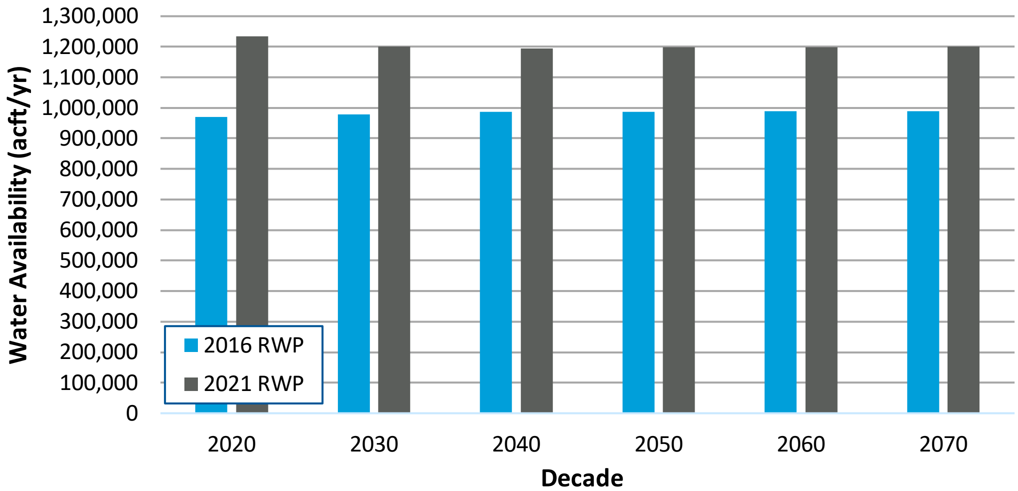

Figure 11-4 Groundwater Availability

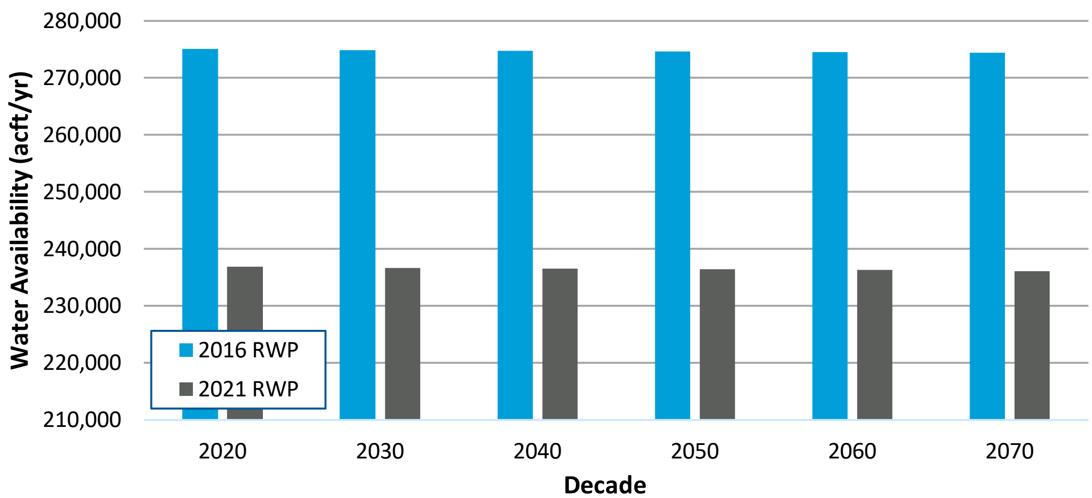

Figure 11-5 Surface Water Availability

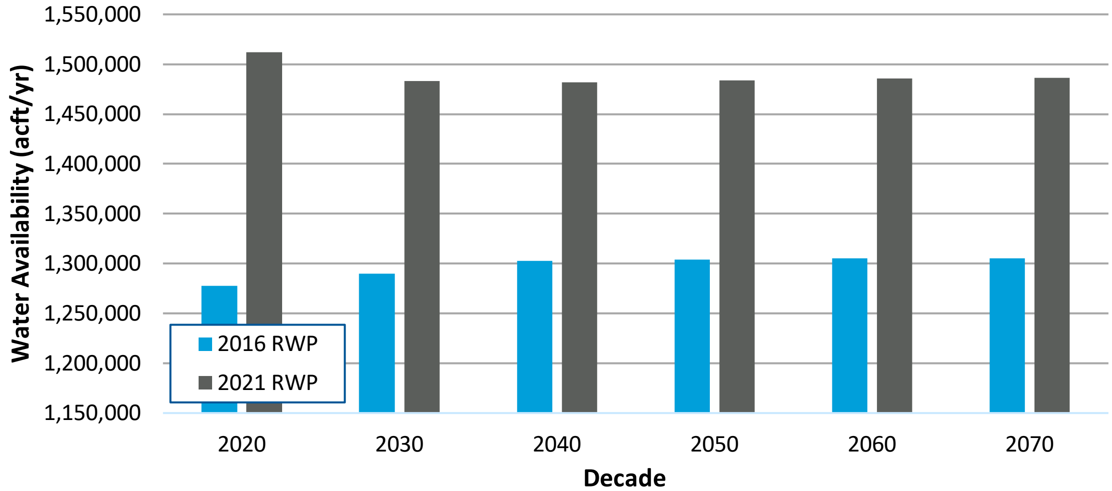

Figure 11-6 Total Water Availability

11.2.4 Existing Water Supplies

Existing water supplies in the 2021 SCTRWP are relatively similar to those projected in the 2016 SCTRWP. Existing municipal supplies have increased by 52,704 acft/yr from 2020 through 2070 (Figure 11-7); however, existing water supplies for non-municipal WUGs have decreased by an average of 115,928 acft/yr over the planning horizon (Figure 11-8). Finally, total supplies in the 2021 SCTRWP have decreased by an average of 25,052 acft/yr compared to the 2021 SCTRWP. The most significant difference is in the 2020 decade where the 2021 SCTRWP projects existing water supplies to be 36,733 acft/yr less than in the 2016 SCTRWP (Figure 11-9).

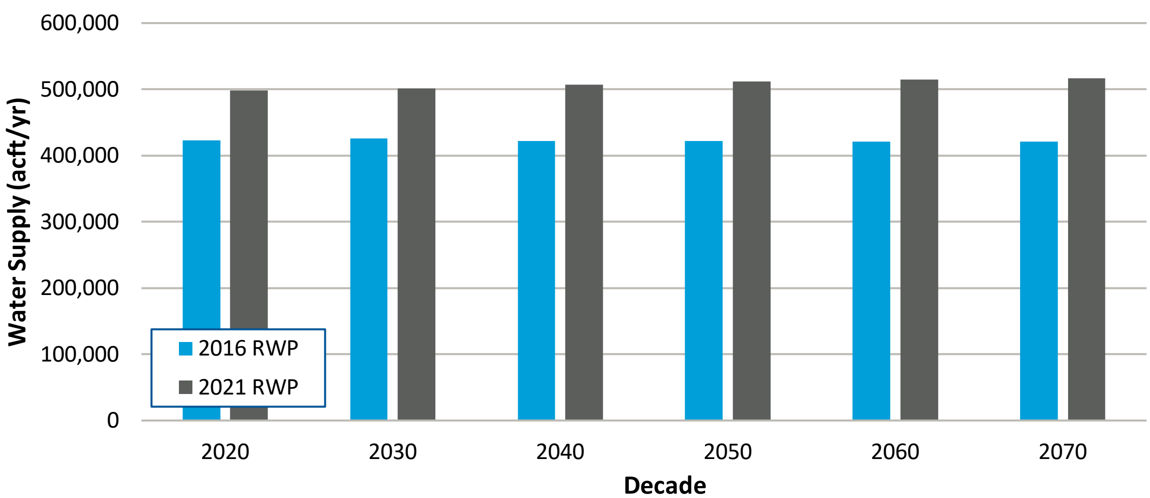

Figure 11-7 Existing Water Supplies for Municipal WUGs

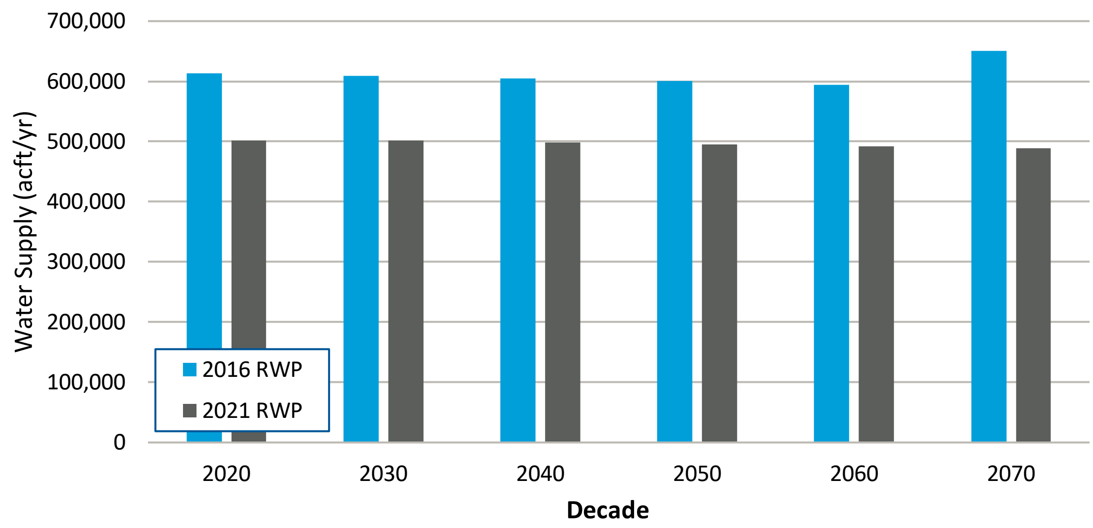

Figure 11-8 Existing Water Supplies for Non-Municipal WUGs

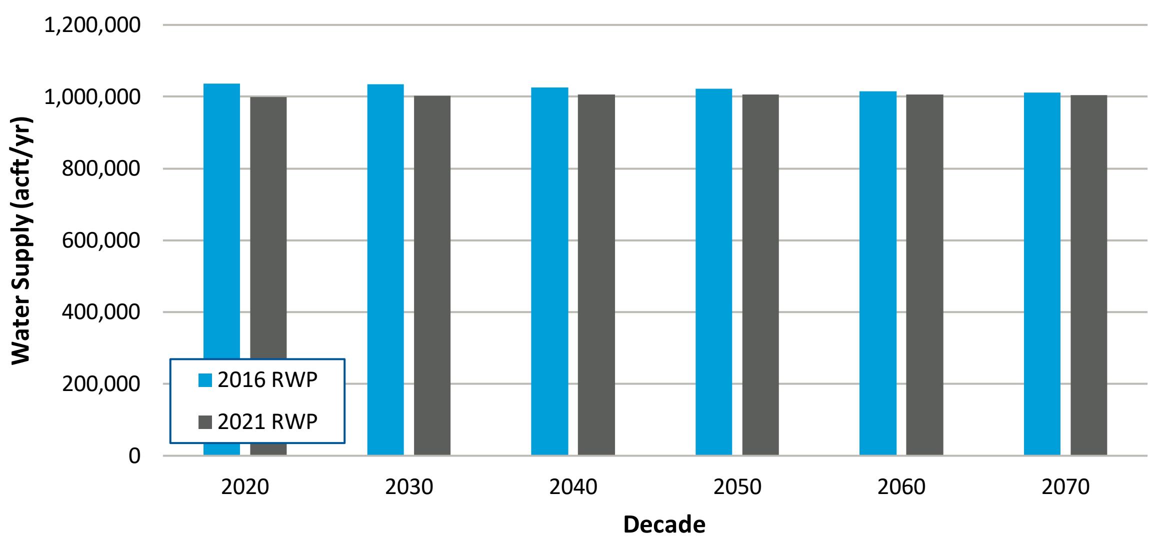

Figure 11-9 Existing Water Supplies for All WUGs

11.2.5 Needs

Municipal need projections increase for each decade in both the 2016 and 2021 SCTRWPs; however, the municipal needs are less for each comparable decade in the 2021 SCTRWP (Figure 11-10). On the other hand, non-municipal need projections have increased in the 2021 SCTRWP (Figure 11-11). The total WUG needs for the 2021 SCTRWP increase from 203,707 acft/yr in the 2020 decade to401,027 acft/yr in the 2070 decade, but are less than the needs identified in the 2016 SCTRWP.

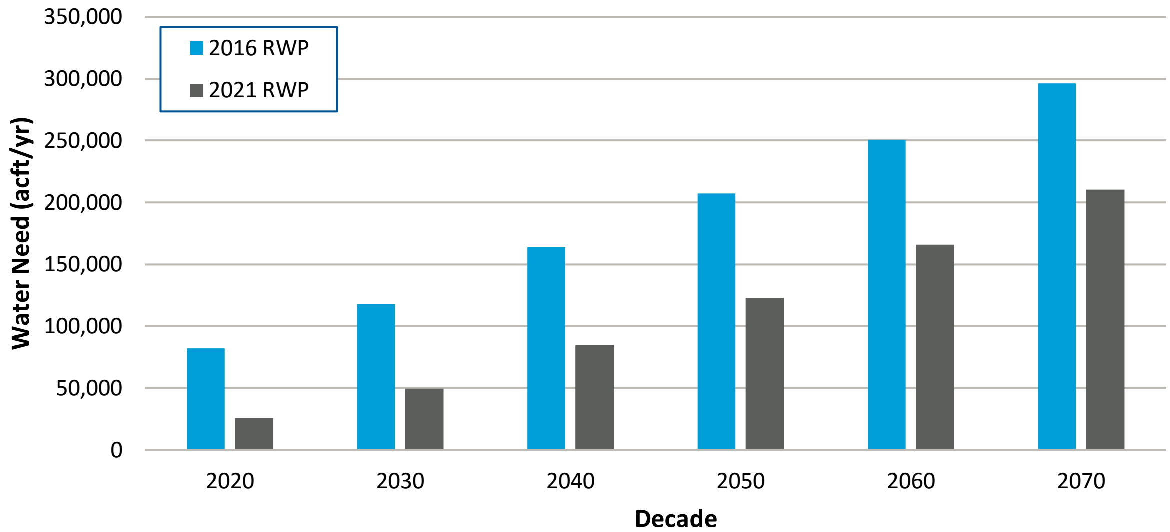

Figure 11-10 Municipal WUG Needs

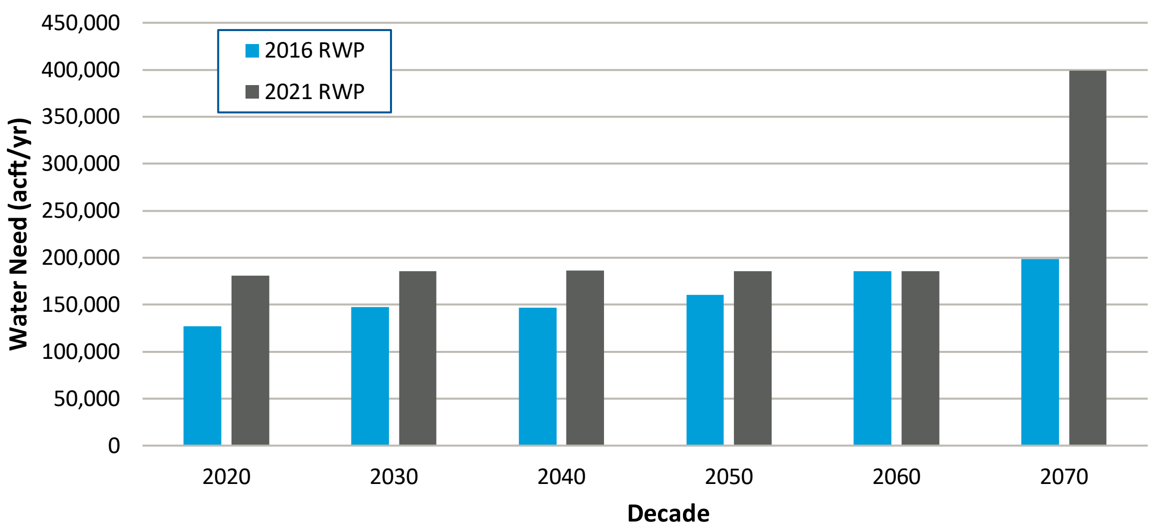

Figure 11-11 Non-Municipal WUG Needs

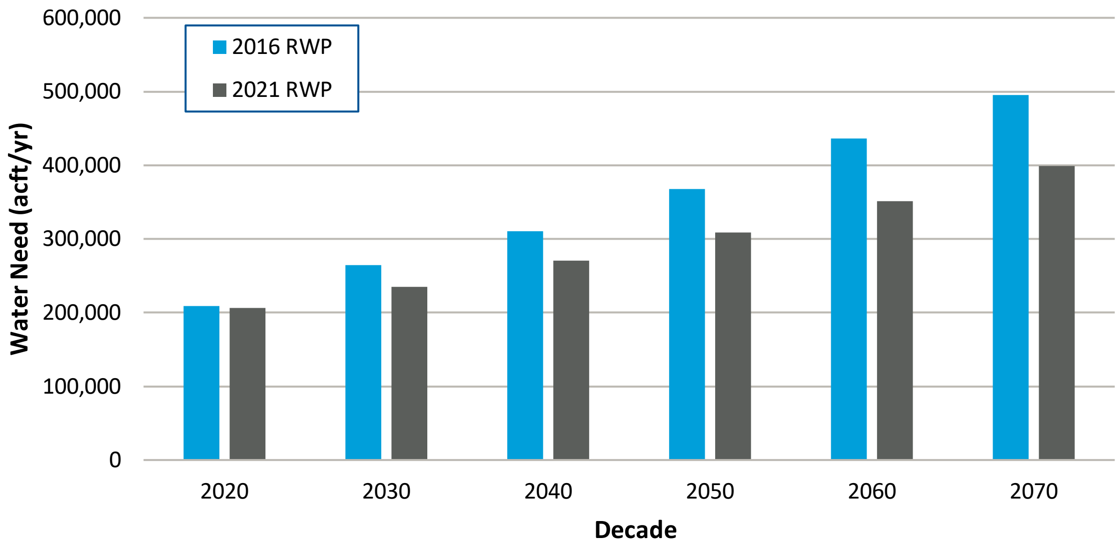

Figure 11-12 Total Needs

11.2.6 Recommended and Alternative Water Management Strategies

The 2016 SCTRWP included 81 recommended WMSs and 20 alternative WMSs; whereas the 2021 SCTRWP recommends 96 WMSs and no alternative WMSs. The total volume of recommended strategies in the 2021 Plan for the year 2070 is 718,617 acft/yr, with no alternative WMSs. The 2016 SCTRWP new supplies were projected to be 816,705 acft/yr and alternative strategies were projected to be 518,219 acft/yr.

Table 11-3 Comparison of 2016 and 2021 RWP Projects

	2016 RWP		2021 RWP	
	REC	ALT	REC	ALT
ASR	4	2	2	0
Brackish Groundwater	5	5	5	0
Desalination	2	0	0	0
Drought Management	29	0	39	0
Edwards Transfers	1	0	1	0
Facilities Expansion	3	0	12	0
Fresh Groundwater	15	10	12	0
Water Right Conversion	4	0	7	0
Water Conservation	7	0	2	0
Reuse	7	0	9	0
Surface Water	5	3	4	0
Total	**82***	**20**	**97***	**0**

***The CRWA Siesta project is supplied, included in both the 2016 and 2021 RWP, includes both surface water and reuse supplies. Because of this, the project appears to be double counted in the above analysis.**

11.2.7 Assessment of Progress Toward Regionalization

In accordance with 31 TAC §357.45(b), planning groups must "assess the progress of the RWPA in encouraging cooperation between WUGs for the purpose of achieving economies of scale and otherwise incentivizing WMSs that benefit the entire RWPA." This rule is new for this cycle of planning, and because it became effective shortly before Plan adoption (on June 28, 2020), the TWDB provided guidance that RWPGs may provide a general assessment of the progress toward regionalization, as opposed to the more prescriptive requirements identified in the adopted rule.

Several WMSs in the 2016 RWP were combined or separated in the 2021 RWP to accommodate cooperative agreements among WUGs and WWPs. For example, the ARWA/GBRA Project (Phase 1) that is included in the 2021 RWP is considered as one WMS project in this assessment. However, in the 2016 RWP, the project components were represented in multiple WMS projects, which were combined to achieve capital and operational costs savings from economies of scale and to avoid unnecessary construction of additional pipelines and infrastructure.

For many years, the SCTRWPA has encouraged cooperation and collaboration among WUGs for the purpose of achieving economies of scale. For example, the SCTRWPG encourages active participation in cooperative organizations like the Regional Water Alliance. Consisting of more than 20 water utilities in the SCTRWPA, the Regional Water Alliance serves to share knowledge, resources, and realize region-wide efficiencies and economies of scale in the development, distribution, and operation of water projects for the mutual benefit of a diverse customer base.

Additionally, WWPs such as ARWA, CRWA, CVLGC, and SSLGC are partnerships of one or more utilities that share water supplies and costs of infrastructure development. Further, the EAA HCP is an example of local partnerships and coordination in an effort to provide overall benefit to the springs systems and the species that inhabit those springs. Partners participating in the EAA HCP include the following:

- Edwards Aquifer Authority;
- The City of New Braunfels;
- The City of San Marcos;
- The City of San Antonio acting by and through its SAWS Board of Trustees;
- GBRA;
- Texas State University;
- Texas Parks and Wildlife Department (TPWD); and
- United States Fish and Wildlife Service (USFWS).

This assessment demonstrates that the prevailing approach for entities within the SCTRWPA is to coordinate and collaborate in order to achieve regionalization. Based on the array of collaborative projects and partnerships, the SCTRWPA has been successful in encouraging cooperation among WUGs for the purpose of achieving economies of scale or otherwise incentivizing WMSs that benefit the entire RWPA. The SCTRWPG is committed to encouraging continued cooperation among WUGs and is always looking for ways to achieve economies of scale for the benefit of the region and the state.

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FINAL PLAN

APPENDIX 11-A: IMPLEMENTATION SURVEY RESULTS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Database ID	Has Sponsor taken affirmative vote or actions?* (TWC 16.053(h)(10))	If yes, in what year did this occur?	If yes, by what date is the action on schedule for implementation?	At what level of implementation is the project currently?*	If not implemented, why?* (When "If other, please describe" is selected, please add the descriptive text to that field)
L	BRACKISH WILCOX GROUNDWATER FOR SAWS	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2102	Yes	2005	Project online	Currently operating	
L	BRACKISH WILCOX GROUNDWATER FOR SSLGC	2020	PROJECT SPONSOR(S): SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	RECOMMENDED WMS PROJECT	2119	Yes	2018	2030	Acquisition and design phase	N/A
L	CIBOLO VALLEY LCG CARRIZO PROJECT	2020	PROJECT SPONSOR(S): CIBOLO VALLEY LOCAL GOVERNMENT CORPORATION	RECOMMENDED WMS PROJECT	2087	Yes	2015	2023	Acquisition and design phase	N/A
L	CPS DIRECT RECYCLE PIPELINE	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2107	No	N/A	N/a	Sponsor has taken official action to initiate project	
L	CRWA WELLS RANCH PROJECT PHASE II	2020	PROJECT SPONSOR(S): CANYON REGIONAL WATER AUTHORITY	RECOMMENDED WMS PROJECT	2114	Yes	2015		Currently operating	
L	EXPANDED BRACKISH WILCOX PROJECT - SAWS	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2338	No	N/A	N/A	Sponsor has taken official action to initiate project	
L	EXPANDED LOCAL CARRIZO FOR SAWS	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2103	Yes	2014	2040	Sponsor has taken official action to initiate project	
L	GBRA - MBWSP - CONJUNCTIVE USE WITH ASR (OPTION 3A)	2020	PROJECT SPONSOR(S): GUADALUPE BLANCO RIVER AUTHORITY	RECOMMENDED WMS PROJECT	2663	Yes	2020 Budget Bo	2020	Feasibility study ongoing	Demand has yet to develop
L	GBRA LOWER BASIN STORAGE	2020	PROJECT SPONSOR(S): GUADALUPE BLANCO RIVER AUTHORITY	RECOMMENDED WMS PROJECT	2111	Yes	2017 Budget	2025	Feasibility study ongoing	
L	INTEGRATED WATER-POWER PROJECT	2020	PROJECT SPONSOR(S): GUADALUPE BLANCO RIVER AUTHORITY	RECOMMENDED WMS PROJECT	2110	No			Not implemented	Costs to high
L	MEDINA LAKE OPTIMIZATION	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2535	No	N/A	N/A	Not implemented	If other, please describe.
L	MUNICIPAL WATER CONSERVATION (SUBURBAN)	2020	WUG REDUCING DEMAND: NEW BRAUNFELS	RECOMMENDED DEMAND REDUCTION STRATEGY WITHOUT WMS PROJECT	9044	Yes	2019	2020	Currently operating	
L	MUNICIPAL WATER CONSERVATION (URBAN) - VICTORIA	2020	WUG REDUCING DEMAND: VICTORIA	RECOMMENDED DEMAND REDUCTION STRATEGY WITHOUT WMS PROJECT	20578	No				
L	NEW BRAUNFELS UTILITIES ASR	2020	PROJECT SPONSOR(S): NEW BRAUNFELS	RECOMMENDED WMS PROJECT	2437	Yes	2011	2020	Currently operating	
L	RECYCLED WATER PROGRAM - SAWS	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2105	No	N/A	N/A	Not implemented	Too soon
L	REGIONAL CARRIZO FOR SSLGC PROJECT EXPANSION	2020	PROJECT SPONSOR(S): SCHERTZ-SEGUIN LOCAL GOVERNMENT CORPORATION	RECOMMENDED WMS PROJECT	2117	Yes	2016	2021	Acquisition and design phase	N/A
L	REUSE - COUNTY LINE WSC	2020	PROJECT SPONSOR(S): COUNTY LINE WSC	RECOMMENDED WMS PROJECT	1941	No			Sponsor has taken official action to initiate project	
L	REUSE - NEW BRAUNFELS	2020	PROJECT SPONSOR(S): NEW BRAUNFELS	RECOMMENDED WMS PROJECT	1823	No				
L	SAWS ADVANCED METER INFRASTRUCTURE	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2873	Yes	2019	2026	Acquisition and design phase	
L	SAWS VISTA RIDGE INTEGRATION	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2640	Yes	2014	2020	Currently operating	
L	SAWS WATER RESOURCES INTEGRATED PIPELINE	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2339	Yes	2014	2021	Acquisition and design phase	
L	VICTORIA GROUNDWATER - SURFACE WATER EXCHANGE	2020	WMS SUPPLY RECIPIENT: VICTORIA	RECOMMENDED WMS SUPPLY WITHOUT WMS PROJECT	31859	Yes	2000	2000	All phases fully implemented	
L	VISTA RIDGE PROJECT - SAWS	2020	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2104	Yes	2014	2020	Currently operating	

Planning Region	WMS or WMS Project Name	What impediments presented to implementation?* (When "If other, please describe" is selected, please add the descriptive text to that field)	Current water supply project yield (ac-ft/yr)	Funds expended to date ($)	Project Cost ($)	Year the project is online?*	Is this a phased project?*	(Phased) Ultimate volume (ac-ft/yr)	(Phased) Ultimate project cost ($)	Year project reaches maximum capacity?*	What is the project funding source(s)?*	Funding Mechanism if Other?
L	BRACKISH WILCOX GROUNDWATER FOR SAWS	N/A	11,200	$202,497,127	$208,195,721	2016	No			2020	TWDB - Other	WIFF - Portion
L	BRACKISH WILCOX GROUNDWATER FOR SSLGC		5000	$ -	$ 69,651,000.00		No	N/A	N/A	2050	Other	Local
L	CIBOLO VALLEY LCG CARRIZO PROJECT		10000	$ 1,200,000.00	$ 69,382,300.00		No	N/A	N/A	2050	TWDB - Other	N/A
L	CPS DIRECT RECYCLE PIPELINE				$ 35,589.00		No					
L	CRWA WELLS RANCH PROJECT PHASE II		7829	$ 40,000,000.00	$ 43,000,000.00	2019	No	N/A	N/A	2019	TWDB - SWIFT	
L	EXPANDED BRACKISH WILCOX PROJECT - SAWS	N/A	0	$ -	$ 723,175,000.00		Yes	72360		2065		
L	EXPANDED LOCAL CARRIZO FOR SAWS	N/A	0	$ 699,208.00	$ 24,839,000.00		Yes	21000		2050		
L	GBRA - MBWSP - CONJUNCTIVE USE WITH ASR (OPTION 3A)		0	$ 5,000.00	$ 403,000,000.00		Yes	27000	403000000		TWDB - SWIFT	Contract Revenue Bonds
L	GBRA LOWER BASIN STORAGE		0	$ 20,000.00	$ 65,000,000.00		Yes	59780	65000000	2035	TWDB - SWIFT	Contract Revenue Bonds
L	INTEGRATED WATER-POWER PROJECT		0	$ -	$ 1,600,000,000.00	2020	No	100000	1600000000		TWDB - SWIFT	Contract Revenue Bonds
L	MEDINA LAKE OPTIMIZATION		0		N/A		No					
L	MUNICIPAL WATER CONSERVATION (SUBURBAN)					2020	Yes	8631		2070		
L	MUNICIPAL WATER CONSERVATION (URBAN) - VICTORIA											
L	NEW BRAUNFELS UTILITIES ASR				$ 39,198,000.00	2020	No					
L	RECYCLED WATER PROGRAM - SAWS	N/A	0	$ -	$ 183,749,000.00		Yes	40000		2070		
L	REGIONAL CARRIZO FOR SSLGC PROJECT EXPANSION		6500	$ 4,000,000.00	$ 66,500,000.00	2023	No	N/A	N/A	2035	TWDB - Other	N/A
L	REUSE - COUNTY LINE WSC		100	$ 10,000.00	$ 2,000,000.00	2022	Yes	250	5000000	2040	TWDB - Other	
L	REUSE - NEW BRAUNFELS		73.7									
L	SAWS ADVANCED METER INFRASTRUCTURE		N/A	$ 1,525,000.00	$ 213,500,000.00	2022	Yes	N/A	213500000	2025	Other	We are planning to self fund part of the project and also will apply for TWDB funding in 2021
L	SAWS VISTA RIDGE INTEGRATION		N/A	$ 197,826,802.00	$ 206,357,507.00	2020	No	N/A			Other	
L	SAWS WATER RESOURCES INTEGRATED PIPELINE		N/A	$ 149,903,660.00	$ 224,710,288.00	2017	Yes	N/A	224298111	2025	TWDB - Other	State Revolving Fund
L	VICTORIA GROUNDWATER - SURFACE WATER EXCHANGE		4680				No					
L	VISTA RIDGE PROJECT - SAWS		50000			2020	No					

Planning Region	WMS or WMS Project Name	Included in 2021 plan?*	Does the project or WMS involve reallocation of flood control?*	Does the project or WMS provide any measurable flood risk reduction?*	Optional Comments
L	BRACKISH WILCOX GROUNDWATER FOR SAWS	No	No	No	Survey answer: Current Supply
L	BRACKISH WILCOX GROUNDWATER FOR SSLGC	Yes	No	No	Comments by data recorder: Column J: "Planning" Year project online Col P: 2035
L	CIBOLO VALLEY LCG CARRIZO PROJECT	Yes	No	No	Comments by data recorder: Column J: "Water Rights Acquired" Column P: 2035 (year online) Column U funding: "Local/TWDB"
L	CPS DIRECT RECYCLE PIPELINE	Yes	No	No	
L	CRWA WELLS RANCH PROJECT PHASE II	Yes	No	No	Comments by data recorder: Column J: "Completing Punch List"
L	EXPANDED BRACKISH WILCOX PROJECT - SAWS	Yes	No	No	Survey answer: Phased decade of need starting in 2040 completed 2065
L	EXPANDED LOCAL CARRIZO FOR SAWS	Yes	No	No	Survey answer: Phased for the 2040 decade
L	GBRA - MBWSP - CONJUNCTIVE USE WITH ASR (OPTION 3A)	Yes	No	No	Comments by data recorder: Implementation (Col J): "Conceptual Studies" Year online (Col P): 2029 Year project max capacity (Col T): 2039
L	GBRA LOWER BASIN STORAGE	Yes	No	No	Comments by data recorder: Implementation (Col J): "Conceptual Studies" Year online (Col P): 2029
L	INTEGRATED WATER-POWER PROJECT	No	No	No	Comments by data reviewer: Revise entries, not phased yet answers given for phased project
L	MEDINA LAKE OPTIMIZATION	No	No	No	Survey answer: Supply Offline. Optiminzation no longer a WMS
L	MUNICIPAL WATER CONSERVATION (SUBURBAN)	Yes	No	No	Comments by data recorder: Answer (phased) Ultimate Cost: $ 5,178,526/yr
L	MUNICIPAL WATER CONSERVATION (URBAN) - VICTORIA	No	No	No	"Under current plan for water conservation w/drought contingency plan"
L	NEW BRAUNFELS UTILITIES ASR	Yes	No	No	
L	RECYCLED WATER PROGRAM - SAWS	Yes	No	No	
L	REGIONAL CARRIZO FOR SSLGC PROJECT EXPANSION	Yes	No	No	Comments by data recorder: Implementation (Col J): "Under design" Funding sources (Col U): "Local/TWDB"
L	REUSE - COUNTY LINE WSC	Yes	No	No	Comments by data recorder: Column J answer: "Preliminary"
L	REUSE - NEW BRAUNFELS	No	No	No	
L	SAWS ADVANCED METER INFRASTRUCTURE	Yes	No	No	
L	SAWS VISTA RIDGE INTEGRATION	No	No	No	
L	SAWS WATER RESOURCES INTEGRATED PIPELINE	Yes	No	No	Survey answer: "Phase 1 Online"
L	VICTORIA GROUNDWATER - SURFACE WATER EXCHANGE	Yes	No	No	Survey answer: "Only exchanged when river falls below subsistence level." Comments by data recorder: Year project online and max capacity (Col P and Col T): 2000
L	VISTA RIDGE PROJECT - SAWS	Yes	No	No	Survey answer: "Current contractual supply"

Planning Region	WMS or WMS Project Name	Database Online Decade	Related Sponsor Entity and/or Benefitting WUGs	Implementation Survey Record Type	Database ID	Has Sponsor taken affirmative vote or actions?* (TWC 16.053(h)(10))	If yes, in what year did this occur?	If yes, by what date is the action on schedule for implementation?	At what level of implementation is the project currently?*	If not implemented, why?* (When "If other, please describe" is selected, please add the descriptive text to that field)
L	WESTERN CANYON WTP EXPANSION	2020	PROJECT SPONSOR(S): GUADALUPE BLANCO RIVER AUTHORITY	RECOMMENDED WMS PROJECT	2109	Yes	2020	2029	Feasibility study ongoing	
L	BRACKISH WILCOX GROUNDWATER FOR CRWA	2030	PROJECT SPONSOR(S): CANYON REGIONAL WATER AUTHORITY	RECOMMENDED WMS PROJECT	2115	No	N/A	N/A	Acquisition and design phase	
L	CRWA SIESTA PROJECT	2030	PROJECT SPONSOR(S): CANYON REGIONAL WATER AUTHORITY	RECOMMENDED WMS PROJECT	2116	Yes	1998	N/A	Acquisition and design phase	
L	NEW BRAUNFELS UTILITIES - TRINITY DEVELOPMENT	2030	PROJECT SPONSOR(S): NEW BRAUNFELS	RECOMMENDED WMS PROJECT	1815	Yes	2020	2023	Acquisition and design phase	
L	TWA TRINITY AQUIFER DEVELOPMENT	2030	PROJECT SPONSOR(S): TEXAS WATER ALLIANCE	RECOMMENDED WMS PROJECT	2075	Yes				
L	VICTORIA ASR	2030	PROJECT SPONSOR(S): VICTORIA	RECOMMENDED WMS PROJECT	2396	Yes	2005	2021	Acquisition and design phase	
L	SEAWATER DESALINATION - SAWS	2050	PROJECT SPONSOR(S): SAN ANTONIO WATER SYSTEM	RECOMMENDED WMS PROJECT	2106	No	N/A	N/A	Not implemented	
L	VICTORIA COUNTY STEAM-ELECTRIC PROJECT	2050	PROJECT SPONSOR(S): GUADALUPE BLANCO RIVER AUTHORITY	RECOMMENDED WMS PROJECT	2113	No			Not implemented	Need has not yet developed

Planning Region	WMS or WMS Project Name	What impediments presented to implementation?* (When "If other, please describe" is selected, please add the descriptive text to that field)	Current water supply project yield (ac-ft/yr)	Funds expended to date ($)	Project Cost ($)	Year the project is online?*	Is this a phased project?*	(Phased) Ultimate volume (ac-ft/yr)	(Phased) Ultimate project cost ($)	Year project reaches maximum capacity?*	What is the project funding source(s)?*	Funding Mechanism if Other?
L	WESTERN CANYON WTP EXPANSION		0	$ 50,000.00	$ 13,528,000.00		Yes	5600	13528000		TWDB - SWIFT	Contract Revenue Bonds
L	BRACKISH WILCOX GROUNDWATER FOR CRWA		14700	No	$ 177,944,000.00		No	N/A	N/A	2030		Open Market… Currently unfunded but will be seeking SWIFT
L	CRWA SIESTA PROJECT		5042	$ 480,000.00	$ 107,161,000.00		No	N/A	N/A	2040		Open Market… Currently unfunded but will be seeking SWIFT
L	NEW BRAUNFELS UTILITIES - TRINITY DEVELOPMENT		4189		$ 19,155,000.00		No					
L	TWA TRINITY AQUIFER DEVELOPMENT											
L	VICTORIA ASR		5050	$ 750.00	$ 2,500,000.00	2022	Yes	14070	35.6	2040	TWDB - Other	Victoria Sales Tax; TWDB; Groundwater Dist.
L	SEAWATER DESALINATION - SAWS	N/A	0	$ -	$ -		No	0				
L	VICTORIA COUNTY STEAM-ELECTRIC PROJECT		0	$ 10,000.00	$ 117,260,000.00		No	23925	117260000		TWDB - SWIFT	Contract Revenue Bonds

Planning Region	WMS or WMS Project Name	Included in 2021 plan?*	Does the project or WMS involve reallocation of flood control?*	Does the project or WMS provide any measurable flood risk reduction?*	Optional Comments
L	WESTERN CANYON WTP EXPANSION	Yes	No	No	Comments by data recorder: Implementation (Col J): "studies" Project online and max capacity (Col P and T): 2029
L	BRACKISH WILCOX GROUNDWATER FOR CRWA	Yes	No	No	Comments by data recorder: Answer recorded for Column J is "Engineering Report" Year project online "P": 2030
L	CRWA SIESTA PROJECT	Yes	No	No	Comments by data recorder: Answer recorded for Column J is "Engineering Report, Purchased land, hold some water rights, have executed contracts" Column N: "purchased property costs" Column P: 2040
L	NEW BRAUNFELS UTILITIES - TRINITY DEVELOPMENT	Yes	No	No	Comments by data recorder: Current water supply: 3.74 MGD Project online by 2030 (Column P)
L	TWA TRINITY AQUIFER DEVELOPMENT				
L	VICTORIA ASR	Yes	No	No	Survey answer: "Oct 2014, TWDB, Regional ASR and Off Channel Storage" Comments by data recorder: Implementation level (Col J): "Phase III" Values for Col N and S in thousands? Millions?
L	SEAWATER DESALINATION - SAWS	No	No	No	Survey answer: "No longer a WMS"
L	VICTORIA COUNTY STEAM-ELECTRIC PROJECT	Yes	No	No	Comments by data recorder: Year online and max capacity (Col P and Col T): 2029