South Central Texas Regional Water Planning Area

2016 Initially Prepared Plan

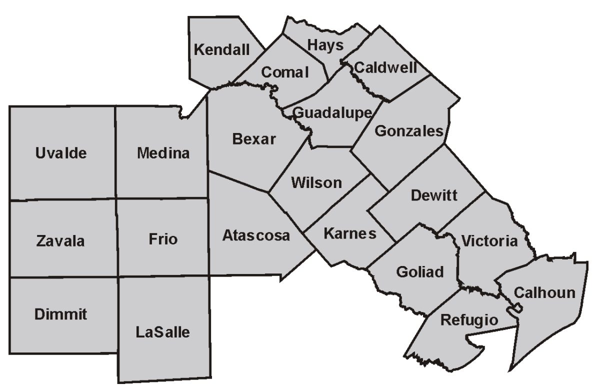
Volume I — Executive Summary and Initially Prepared Plan

Prepared by:

South Central Texas Regional Water Planning Group

With administration by:

San Antonio River Authority



With technical assistance by:

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South Central Texas Regional Water Planning Group Members

Name	***Interest***	***Membership***	***Affiliation***
Con Mims	River Authorities	Chair, Ex. Comm.	Nueces RA
Tim Andruss	Water Districts	Vice Chair, Ex. Comm.	Victoria County GCD
Gary Middleton	Municipalities	Secretary, Ex. Comm.	City of Victoria
Donna Balin	Environmental	At-Large Ex. Comm.	
Kevin Janak	Electric Generation	At-Large Ex. Comm.	Coleto Creek Power
Gene Camargo	Water Utilities	Member	McCoy WSC
Rey Chavez	Industries	Member	San Antonio Manufacturers Assoc.
Alan Cockerell	Agriculture	Member	
Will Conley	Counties	Member	Hays County Commissioner
Don Dietzmann	GMA Representative	Member	GMA 9
Art Dohmann	GMA Representative	Member	GMA 15
Blair Fitzsimons	Agriculture	Member	
Vic Hilderbran	GMA Representative	Member	GMA 7
John Kight	Counties	Member	Kendall County Commissioner
Russel Labus	Water Districts	Member	Evergreen UWCD
Glenn Lord	Industries	Member	Dow Chemical
Doug McGookey	Small Business	Member	Geologist
Dan Meyer	GMA Representative	Member	GMA 10
Iliana Peña	Environmental	Member	Mitchell Lake Audubon Center
Robert Puente	Municipalities	Member	San Antonio Water System
Steve Ramsey	Water Utilities	Member	New Braunfels Utilities
David Roberts	Small Business	Member	
Roland Ruiz	Water Districts	Member	Edwards Aquifer Authority
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Thomas Taggart	Municipalities	Member	San Marcos
Dianne Wassenich	Public	Member	
Bill West	River Authorities	Member	Guadalupe-Blanco River Authority
Adam Yablonski	Agriculture	Member	Rancher

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Common Abbreviations

acft	acre-feet
acft/yr	acre-feet per year
ASR	Aquifer Storage and Recovery
cfs	cubic feet per second
CRWA	Canyon Regional Water Authority
DFC	Desired Future Conditions
EAA	Edwards Aquifer Authority
IPP	Initially Prepared Plan
GBRA	Guadalupe-Blanco River Authority
GCD	Groundwater Conservation District
GAM	Groundwater Availability Model
GMA	Groundwater Management Area
GPM or gpm	gallons per minute
HCPUA	Hays/Caldwell Public Utility Agency
kW-hr	kilowatt hours
LNRA	Lavaca-Navidad River Authority
MAG	Modeled Available Groundwater
MGD or mgd	million gallons per day
mg/L	milligrams per liter
NBU	New Braunfels Utilities
NRA	Nueces River Authority
OCR	Off-channel Reservoir
RWP	Regional Water Plan
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
SHWSC	Springs Hill Water Supply Corporation
SSLGC	Schertz-Seguin Local Government Corporation
SWG	Staff Workgroup
SWP	State Water Plan
TAMU	Texas A&M University
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TWA	Texas Water Alliance
TWDB	Texas Water Development Board
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
UWCD	Underground Water Conservation District
WAM	Water Availability Model
WMS	Water Management Strategies
WSC	Water Supply Corporation
WUG	Water User Group
WWP	Wholesale Water Provider

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2016 South Central Texas Regional Water Plan 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, Water for Texas, January 2012, was produced by the TWDB and based on approved regional water plans pursuant to requirements of Senate Bill 1 (SB1), enacted in 1997 by the 75th Texas Legislature. As stated in SB1, the purpose of the regional water planning effort is to:

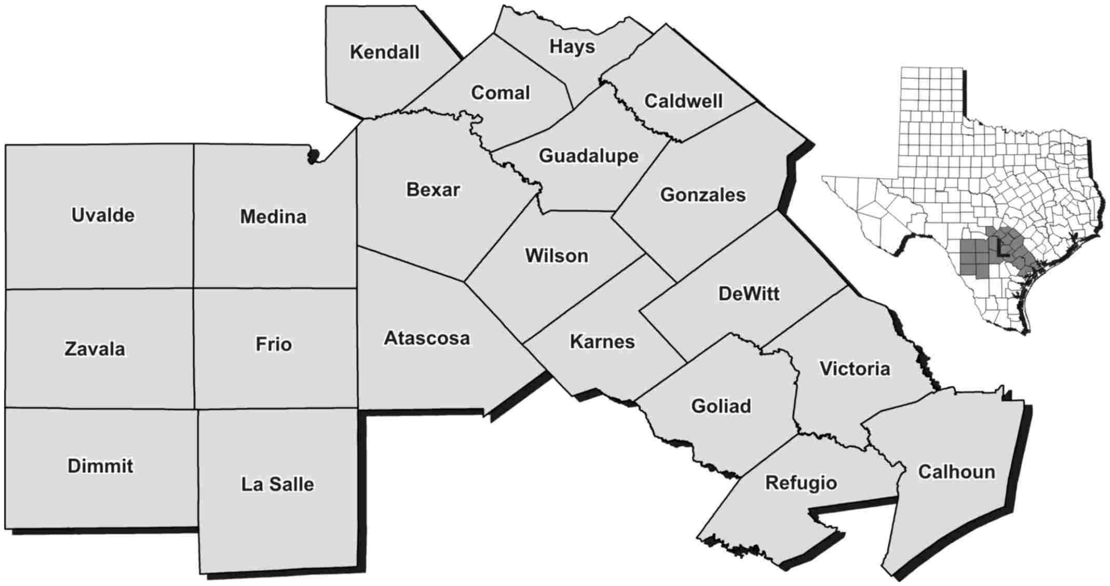
> *"Provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect 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 planning regions and appointed members to the regional planning groups. As shown in Figure ES-1, the South Central Texas Region (Region L) includes all of 20 counties as well as the portion of Hays County located in the Guadalupe River Basin. The South Central Texas Regional Water Planning Group (SCTRWPG) has a total of 30 voting members. 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.

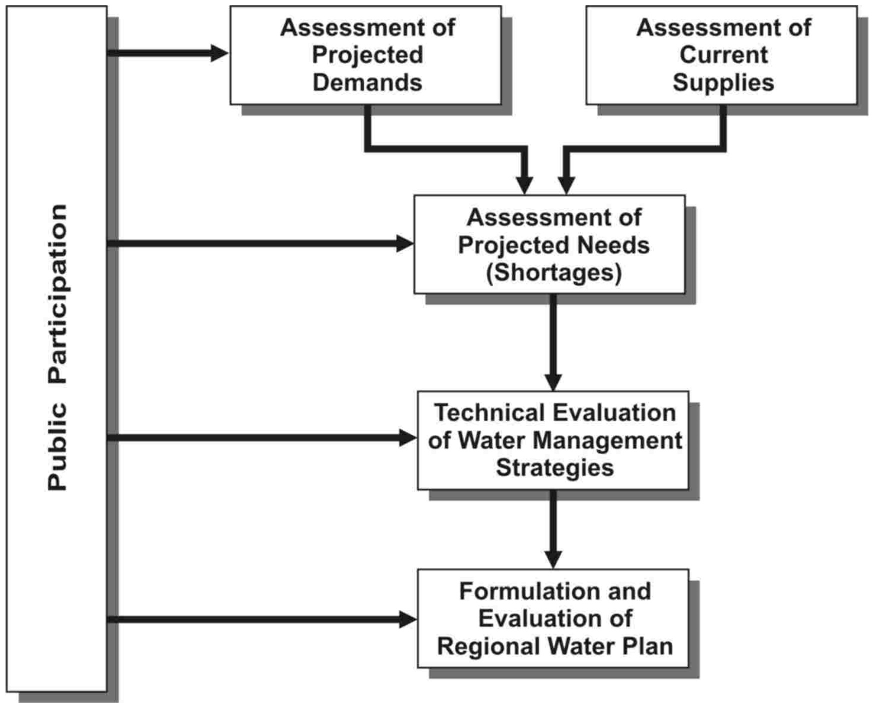
The SCTRWPG adopted bylaws to govern its operations and, in accordance with its bylaws, selected the San Antonio River Authority (SARA) to serve as its administrative agency (Qualified Political Subdivision) to: (1) Develop scopes of work; (2) Apply for TWDB planning grants; (3) Contract with the TWDB for the grants; and (4) Manage the development of the Regional Water Plan, including supervision of technical and public participation consultants. Members of the SCTRWPG and key staff of several participants serve as an ad hoc Staff Workgroup to review and guide SARA and consultants' work.

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



Pursuant to Regional and State Water Planning Guidelines (Texas Administrative Code, Title 31, Part 10, Chapters 357 and 358), the SCTRWPG developed the 2001, 2006, and 2011 South Central Texas Regional Water Plans, which were then integrated into Water for Texas – 2002, 2007, and 2012, respectively, by the TWDB. The 2016 South Central Texas Regional Water Plan, of which this Executive Summary is a part, represents the fourth update of a regional water plan as presently required to occur on a five-year cycle. The TWDB will integrate this Regional Water Plan into a State Water Plan to be issued in 2017. 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 & 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 22 inches in Dimmit County up to 40 inches in Calhoun County.

ES.3 Population, Water Demands, Existing Supplies, and Needs

In order to develop water plans to meet future water needs, it is necessary to make projections of future water demands for the region. Integrating information from the 2010 Census and reported water uses from the around the state, the TWDB provided draft population and water demand projections for cities, rural areas, and water user groups within each of the 21 counties of the region. **The population of the South Central Texas Region is estimated to be about 3.0 million in 2020 and projected to grow to about 5.2 million by 2070 (Table ES-1).**

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 municipal population, water demands, existing supplies, and needs is shown in Table ES-1. Please note that municipal is presented in two parts: Municipal and County-Other. Total municipal water use in the South Central Texas Region in 2020 is expected to be 469,065 acft/yr, increasing to 754,306 acft/yr by 2070. Existing supplies range from 472,417 acft/yr in 2020 to 469,926 acft/yr in 2070. Municipal needs are projected to be 79,372 acft/yr in 2020, increasing to 315,347 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 123,983 acft/yr of water in 2020 and 178,820 acft/yr in 2070. Existing supplies for industries range from 140,868 acft/yr in 2020 to 140,980 acft/yr by 2070. The projected needs for industrial use are 6,616 acft/yr in 2020, increasing to 40,376 acft/yr by 2070. A regional summary of industrial water demands, existing supplies, and needs is shown 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 37,919 acft/yr in 2020 to 40,692 acft/yr by 2070. The projected needs for mining use are 10,822 acft/yr in 2020, decreasing to 666 acft/yr by 2070. A regional summary of mining water demands, existing supplies, and needs is shown in Table ES-1.

Eight counties (Atascosa, Bexar, Calhoun, Frio, Goliad, Guadalupe, Hays, and Victoria) of the region use cooling and boiler feed water in steam-electric power production. Steam-Electric generation in the region is projected to use 59,901 acft/yr of water in 2020 and 152,702 acft/yr in 2070. The existing supply for steam-electric generation is 105,262 acft/yr for all decades. The projected needs for steam-electric generation are 4,506 acft/yr in 2020, increasing to 70,696 acft/yr by 2070. A regional summary of steam-electric water demands, existing supplies, and needs is shown in Table ES-1.

Livestock water is fresh water used in the raising of cattle, chickens, and other animals. Cumulative livestock demand in the region is projected to be 24,038 acft/yr in all decades. Existing supply for livestock is also projected to be 24,038 acft/yr in all decades. Therefore, there are no needs associated with livestock in the 2016 SCTRWP. A regional summary of livestock water demands, existing supplies, and needs is shown in Table ES-1.

Table ES-1 Water User Group Category Summary

REGION L	2020	2030	2040	2050	2060	2070
MUNICIPAL						
POPULATION	2,788,524	3,234,681	3,628,444	3,999,545	4,358,152	4,701,382
DEMANDS (acre-feet per year)	438,567	493,023	542,713	593,050	640,769	690,745
EXISTING SUPPLIES (acre-feet per year)	420,057	419,607	417,927	417,704	417,404	417,161
NEEDS (acre-feet per year)*	(77,863)	(114,869)	(159,380)	(204,960)	(250,122)	(296,267)
COUNTY-OTHER						
POPULATION	212,941	241,867	291,092	336,582	412,033	490,646
DEMANDS (acre-feet per year)	30,498	33,783	39,708	45,544	53,787	63,561
EXISTING SUPPLIES (acre-feet per year)	52,360	51,987	52,108	52,345	52,560	52,765
NEEDS (acre-feet per year)*	(1,509)	(1,706)	(1,890)	(3,502)	(10,907)	(19,080)
MANUFACTURING						
DEMANDS (acre-feet per year)	123,983	135,026	145,993	155,671	167,307	178,820
EXISTING SUPPLIES (acre-feet per year)	140,868	140,868	140,905	140,956	140,980	140,980
NEEDS (acre-feet per year)*	(6,616)	(10,213)	(13,778)	(19,265)	(29,210)	(40,376)
MINING						
DEMANDS (acre-feet per year)	48,738	49,976	48,601	44,647	40,831	41,209
EXISTING SUPPLIES (acre-feet per year)	37,919	39,495	39,971	39,584	38,894	40,692
NEEDS (acre-feet per year)*	(10,822)	(10,481)	(8,694)	(5,147)	(2,073)	(666)
STEAM ELECTRIC POWER						
DEMANDS (acre-feet per year)	59,901	89,807	101,070	122,845	146,639	152,702
EXISTING SUPPLIES (acre-feet per year)	105,262	105,262	105,262	105,262	105,262	105,262
NEEDS (acre-feet per year)*	(4,506)	(29,778)	(37,178)	(53,599)	(70,696)	(70,696)
LIVESTOCK						
DEMANDS (acre-feet per year)	24,038	24,038	24,038	24,038	24,038	24,038
EXISTING SUPPLIES (acre-feet per year)	24,038	24,038	24,038	24,038	24,038	24,038
NEEDS (acre-feet per year)*	0	0	0	0	0	0
IRRIGATION						
DEMANDS (acre-feet per year)	344,629	330,377	317,106	304,772	293,076	282,760
EXISTING SUPPLIES (acre-feet per year)	245,522	240,287	235,606	231,217	226,841	222,971
NEEDS (acre-feet per year)*	(105,799)	(97,325)	(89,057)	(81,302)	(73,968)	(67,383)
REGION TOTALS						
POPULATION	3,001,465	3,476,548	3,919,536	4,336,127	4,770,185	5,192,028
DEMANDS (acre-feet per year)	1,070,354	1,156,030	1,219,229	1,290,567	1,366,447	1,433,835
EXISTING SUPPLIES (acre-feet per year)	1,026,026	1,021,544	1,015,817	1,011,106	1,005,979	1,003,869
NEEDS (acre-feet per year)*	(207,115)	(264,372)	(309,977)	(367,775)	(436,976)	(494,468)

**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.*

The TWDB irrigation water use data show annual use for irrigation to grow cotton, grain, vegetables, and tree crops in the South Central Texas. Irrigation water use for the region is projected to be 344,629 acft/yr of water in 2020, decreasing to 282,760 acft/yr by 2070. Existing supplies for irrigation are 245,522 acft/yr in 2020 and 222,971 acft/yr in 2070. The projected needs for irrigation are 105,799 acft/yr in 2020, decreasing to 67,383 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 generation, mining, irrigation, and livestock uses. Projected water demands are expected to grow by 363,481 acft/yr (34 percent) during the 50-year planning horizon (2020-2070), while existing supply is expected to decrease by 22,157 acft/yr (2 percent) over the same time period. Water needs are expected to more than double from 207,115 acft/yr in 2020 to 494,468 acft/yr in 2070.

In accordance with TWDB guidelines, the SCTRWPG identified nine Wholesale Water Providers that supply or plan to supply water in the South Central Texas Region. These providers are listed in Table ES-2, along with a general description of their service areas. TWDB guidance defines a Wholesale Water Provider as a provider such as a river authority, water supply corporation, or city that has, or is expected to have, contracts to sell more than 1,000 acft wholesale in a year. The SCTRWPG has worked with each of the Wholesale Water Providers in an effort to quantify their projected demands, which typically include the demands of several cities, utilities, and other water user groups.

Table ES-2 Wholesale Water Providers and Service Areas

Wholesale 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
Hays/Caldwell Public Utility Agency (HCPUA)	Caldwell, Comal, Guadalupe, and Hays Counties
Lavaca-Navidad River Authority (LNRA)	Calhoun County
Schertz-Seguin Local Government Corporation (SSLGC)	Schertz, Seguin, Selma, Universal City, Garden Ridge, and Springs Hill WSC
Springs Hill WSC	Springs Hills WSC, La Vernia, Crystal Clear WSC, and East Central WSC
Texas Water Alliance	Gonzales, Guadalupe, Comal, Hays, and Caldwell Counties

A second-tier needs analysis will be performed to identify water needs by WUG/WWP after implementation of conservation and direct reuse strategies. Such analysis will be presented in a Second-Tier Identified Water Needs table when it becomes available from TWDB.

ES.4 Water Supply and Source Balance

There are five major and three minor aquifers supplying water to the region. The five major aquifers are the Edwards (Balcones Fault Zone), Carrizo-Wilcox[1], Trinity, Gulf Coast, and Edwards-Trinity (Plateau) Aquifers. The three minor aquifers are the Sparta, Queen City, and Yegua-Jackson 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 limited to the Modeled Available Groundwater (MAG) estimates based on Desired Future Conditions (DFC) established by Groundwater Management Area (GMA) pursuant to House Bill 1763 of the 79th Texas Legislature as well as the permitting authority of groundwater conservation districts. In the case of the Edwards Aquifer, the Edwards Aquifer Habitat Conservation Plan (EAHCP) has established the Initial Regular Permit (IRP), critical period management restrictions, and water supply components necessary to maintain minimum springflows at Comal and San Marcos Springs.

Development of surface water resources has been limited in the South Central Texas Region because of the presence of significant quantities of groundwater. The largest run-of-river water rights are concentrated below the confluence of the Guadalupe and San Antonio Rivers and are held by the Guadalupe-Blanco River Authority and Dow Chemical Company. These diversion rights total about 175,500 acft/yr. Significant water rights associated with existing reservoirs are held by the Guadalupe-Blanco River Authority (Canyon Reservoir), Bexar-Medina-Atascosa Counties WCID #1 (Medina Lake System), CPS Energy (Calaveras and Braunig Lakes), and Coleto Creek Power (Coleto Creek Reservoir). Authorizations for consumptive use associated with these reservoirs total about 230,000 acft/yr. Table ES-3 is the source water balance report presenting remaining water available from each source in Region L after allocation of existing supplies to meet projected demands and calculate needs. Table ES-3 will be updated to reflect allocation of future supplies from water management strategies in the final regional water plan.

[1] Although traditionally identified by the as one major aquifer, the Carrizo and Wilcox formations are generally separated by an aquitard which serves to limit or preclude hydrologic connectivity between the two formations in some portions of the planning region.

Table ES-3 Source Water Balance Report

REGION L									
GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
AUSTIN CHALK AQUIFER	UVALDE	NUECES	FRESH	1,155	1,155	1,155	1,155	1,155	1,155
BUDA LIMESTONE AQUIFER	UVALDE	NUECES	FRESH	233	233	233	233	233	233
CARRIZO-WILCOX AQUIFER	ATASCOSA	NUECES	FRESH	19,758	22,232	24,736	28,094	31,628	32,788
CARRIZO-WILCOX AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	5	5	5	5	5	5
CARRIZO-WILCOX AQUIFER	BEXAR	NUECES	FRESH	8,884	8,884	8,884	8,884	8,884	8,884
CARRIZO-WILCOX AQUIFER	BEXAR	SAN ANTONIO	FRESH	3,475	3,475	3,475	3,475	3,304	3,304
CARRIZO-WILCOX AQUIFER	CALDWELL	COLORADO	FRESH	293	295	298	300	302	303
CARRIZO-WILCOX AQUIFER	CALDWELL	GUADALUPE	FRESH	32,297	31,912	31,935	31,383	31,407	31,417
CARRIZO-WILCOX AQUIFER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	DIMMIT	RIO GRANDE	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	FRIO	NUECES	FRESH	3,237	3,329	3,427	3,620	3,786	5,827
CARRIZO-WILCOX AQUIFER	GONZALES	GUADALUPE	FRESH	14,965	23,754	29,227	29,801	30,195	30,218
CARRIZO-WILCOX AQUIFER	GONZALES	LAVACA	FRESH	75	75	75	75	75	75
CARRIZO-WILCOX AQUIFER	GUADALUPE	GUADALUPE	FRESH	5,406	5,786	7,457	7,890	8,293	8,174
CARRIZO-WILCOX AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	847	823	801	772	740	700
CARRIZO-WILCOX AQUIFER	KARNES	GUADALUPE	FRESH	7	56	102	144	186	188
CARRIZO-WILCOX AQUIFER	KARNES	NUECES	FRESH	0	5	9	11	13	13
CARRIZO-WILCOX AQUIFER	KARNES	SAN ANTONIO	FRESH	1	0	0	0	1	1
CARRIZO-WILCOX AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	MEDINA	NUECES	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	MEDINA	SAN ANTONIO	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	WILSON	GUADALUPE	FRESH	335	429	523	628	739	757
CARRIZO-WILCOX AQUIFER	WILSON	NUECES	FRESH	2,216	2,945	3,677	4,341	5,028	5,246
CARRIZO-WILCOX AQUIFER	WILSON	SAN ANTONIO	FRESH	3,512	6,301	9,127	12,186	15,434	16,593
CARRIZO-WILCOX AQUIFER	ZAVALA	NUECES	FRESH	0	1	1	0	1	0
EDWARDS-BFZ AQUIFER	ATASCOSA	NUECES	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	BEXAR	SAN ANTONIO	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	CALDWELL	COLORADO	SALINE	64	64	64	64	64	64

Table ES-3 Source Water Balance Report (continued)

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
EDWARDS-BFZ AQUIFER	CALDWELL	GUADALUPE	SALINE	134	134	134	134	134	134
EDWARDS-BFZ AQUIFER	COMAL	GUADALUPE	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	COMAL	SAN ANTONIO	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	FRIO	NUECES	FRESH	23,213	23,213	23,213	23,213	23,213	23,213
EDWARDS-BFZ AQUIFER	GUADALUPE	GUADALUPE	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	FRESH	680	680	680	680	680	680
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	SALINE	235	235	235	235	235	235
EDWARDS-BFZ AQUIFER	MEDINA	NUECES	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	MEDINA	SAN ANTONIO	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	BEXAR	NUECES	FRESH	0	0	0	0	0	0
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	COLORADO	FRESH	0	0	0	0	0	0
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	GUADALUPE	FRESH	0	0	0	0	0	0
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	SAN ANTONIO	FRESH	160	160	160	160	160	160
EDWARDS-TRINITY-PLATEAU AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
GUADALUPE RIVER ALLUVIUM AQUIFER	CALDWELL	GUADALUPE	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER	CALHOUN	COLORADO-LAVACA	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER	CALHOUN	GUADALUPE	FRESH	15	15	15	15	15	15
GULF COAST AQUIFER	CALHOUN	LAVACA	FRESH	2	2	2	2	2	2
GULF COAST AQUIFER	CALHOUN	LAVACA-GUADALUPE	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER	CALHOUN	SAN ANTONIO-NUECES	FRESH	4	4	4	4	4	4
GULF COAST AQUIFER	DEWITT	GUADALUPE	FRESH	87	233	824	1,411	1,998	2,263
GULF COAST AQUIFER	DEWITT	LAVACA	FRESH	698	705	749	799	912	968
GULF COAST AQUIFER	DEWITT	LAVACA-GUADALUPE	FRESH	393	393	393	393	393	393
GULF COAST AQUIFER	DEWITT	SAN ANTONIO	FRESH	207	223	285	348	409	437
GULF COAST AQUIFER	GOLIAD	GUADALUPE	FRESH	38	38	38	38	38	38
GULF COAST AQUIFER	GOLIAD	SAN ANTONIO	FRESH	3,604	3,604	3,604	3,604	3,604	3,604
GULF COAST AQUIFER	GOLIAD	SAN ANTONIO-NUECES	FRESH	355	355	355	355	355	355
GULF COAST AQUIFER	GONZALES	GUADALUPE	FRESH	1,866	1,866	1,866	1,866	1,866	1,866
GULF COAST AQUIFER	GONZALES	LAVACA	FRESH	182	182	182	182	182	182
GULF COAST AQUIFER	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER	KARNES	NUECES	FRESH	0	0	1	5	8	10
GULF COAST AQUIFER	KARNES	SAN ANTONIO	FRESH	0	1	0	0	1	1
GULF COAST AQUIFER	KARNES	SAN ANTONIO-NUECES	FRESH	0	0	0	0	23	32
GULF COAST AQUIFER	REFUGIO	SAN ANTONIO	FRESH	1,491	1,491	1,491	1,492	1,493	1,493
GULF COAST AQUIFER	REFUGIO	SAN ANTONIO-NUECES	FRESH	24,438	24,435	24,453	24,465	24,478	24,487
GULF COAST AQUIFER	VICTORIA	GUADALUPE	FRESH	2	0	10	17	24	29

Table ES-3 Source Water Balance Report (continued)

REGION L									
				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
GROUNDWATER	COUNTY	BASIN	SALINITY	2020	2030	2040	2050	2060	2070
GULF COAST AQUIFER	VICTORIA	LAVACA	FRESH	207	207	207	207	207	207
GULF COAST AQUIFER	VICTORIA	LAVACA-GUADALUPE	FRESH	1	0	8	15	22	26
GULF COAST AQUIFER	VICTORIA	SAN ANTONIO	FRESH	898	898	899	900	900	900
LEONA GRAVEL AQUIFER	MEDINA	NUECES	FRESH	16,551	16,396	16,266	16,134	15,967	15,785
LEONA GRAVEL AQUIFER	MEDINA	SAN ANTONIO	FRESH	3,828	3,777	3,683	3,639	3,584	3,523
LEONA GRAVEL AQUIFER	UVALDE	NUECES	FRESH	256	262	183	78	0	0
QUEEN CITY AQUIFER	ATASCOSA	NUECES	FRESH	1,683	1,650	1,542	1,437	1,339	1,339
QUEEN CITY AQUIFER	CALDWELL	GUADALUPE	FRESH	71	71	71	71	71	71
QUEEN CITY AQUIFER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	DIMMIT	RIO GRANDE	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	FRIO	NUECES	FRESH	2,174	2,014	1,912	1,816	1,875	2,075
QUEEN CITY AQUIFER	GONZALES	GUADALUPE	FRESH	3,847	3,847	3,847	3,847	3,847	3,847
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	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	KARNES	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	WILSON	GUADALUPE	FRESH	107	94	83	73	65	65
QUEEN CITY AQUIFER	WILSON	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	WILSON	SAN ANTONIO	FRESH	896	775	668	574	492	492
QUEEN CITY AQUIFER	ZAVALA	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	ATASCOSA	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	FRIO	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	GONZALES	GUADALUPE	FRESH	1,940	1,940	1,940	1,940	1,940	1,940
SPARTA AQUIFER	GONZALES	LAVACA	FRESH	23	23	23	23	23	23
SPARTA AQUIFER	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	KARNES	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	WILSON	GUADALUPE	FRESH	16	14	12	10	9	9
SPARTA AQUIFER	WILSON	NUECES	FRESH	39	34	29	24	21	21
SPARTA AQUIFER	WILSON	SAN ANTONIO	FRESH	154	137	121	108	97	97
SPARTA AQUIFER	ZAVALA	NUECES	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	BEXAR	NUECES	FRESH	222	222	222	222	222	222
TRINITY AQUIFER	BEXAR	SAN ANTONIO	FRESH	26,679	25,759	24,966	24,095	23,100	21,997
TRINITY AQUIFER	CALDWELL	GUADALUPE	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	COMAL	GUADALUPE	FRESH	24,729	23,389	22,099	20,973	19,562	17,982
TRINITY AQUIFER	COMAL	SAN ANTONIO	FRESH	3,211	3,155	3,101	3,054	2,996	2,930

Table ES-3 Source Water Balance Report (continued)

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
TRINITY AQUIFER	GUADALUPE	GUADALUPE	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	HAYS	GUADALUPE	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	KENDALL	COLORADO	FRESH	86	86	86	86	86	86
TRINITY AQUIFER	KENDALL	GUADALUPE	FRESH	3,715	3,715	3,715	3,715	3,715	3,715
TRINITY AQUIFER	KENDALL	SAN ANTONIO	FRESH	2,440	2,440	2,440	2,440	2,440	2,440
TRINITY AQUIFER	MEDINA	NUECES	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	MEDINA	SAN ANTONIO	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	ATASCOSA	NUECES	FRESH	407	407	407	407	407	407
YEGUA-JACKSON AQUIFER	FRIO	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	GONZALES	GUADALUPE	FRESH	211	211	211	211	211	211
YEGUA-JACKSON AQUIFER	GONZALES	LAVACA	FRESH	3	3	3	3	3	3
YEGUA-JACKSON AQUIFER	KARNES	GUADALUPE	FRESH	65	65	65	65	65	65
YEGUA-JACKSON AQUIFER	KARNES	NUECES	FRESH	12	12	12	12	12	12
YEGUA-JACKSON AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	396	410
YEGUA-JACKSON AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	WILSON	GUADALUPE	FRESH	43	43	43	43	43	43
YEGUA-JACKSON AQUIFER	WILSON	NUECES	FRESH	143	143	143	143	143	143
YEGUA-JACKSON AQUIFER	WILSON	SAN ANTONIO	FRESH	380	380	380	380	380	380
GROUNDWATER TOTAL SOURCE WATER BALANCE				**249,641**	**261,932**	**273,327**	**279,259**	**285,975**	**288,047**

REGION L

REUSE	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
DIRECT REUSE	BEXAR	SAN ANTONIO	FRESH	0	0	0	0	0	0
DIRECT REUSE	COMAL	GUADALUPE	FRESH	0	0	0	0	0	0
DIRECT REUSE	GUADALUPE	GUADALUPE	FRESH	1	1	1	1	1	1
DIRECT REUSE	HAYS	GUADALUPE	FRESH	0	0	0	0	0	0
DIRECT REUSE	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
DIRECT REUSE	KENDALL	GUADALUPE	FRESH	0	0	0	0	0	0
DIRECT REUSE	KENDALL	SAN ANTONIO	FRESH	0	0	0	0	0	0
REUSE TOTAL SOURCE WATER BALANCE				**1**	**1**	**1**	**1**	**1**	**1**

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
BOERNE LAKE/RESERVOIR	RESERVOIR	SAN ANTONIO	FRESH	0	0	0	0	0	0

Table ES-3 Source Water Balance Report (continued)

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
CALAVERAS LAKE/RESERVOIR	RESERVOIR	SAN ANTONIO	FRESH	0	0	0	0	0	0
CANYON LAKE/RESERVOIR	RESERVOIR	GUADALUPE	FRESH	9,170	9,051	10,987	10,974	10,968	10,964
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	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	GONZALES	GUADALUPE	FRESH	2,315	2,315	2,315	2,315	2,315	2,315
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	143	143	143	143	143	143
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	0	0	0	0	0	0
GUADALUPE RUN-OF-RIVER	HAYS	GUADALUPE	FRESH	0	0	0	0	0	0
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

Table ES-3 Source Water Balance Report (continued)

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	CALHOUN	LAVACA-GUADALUPE	FRESH	0	0	0	0	0	0
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	0	0	0	0	0	0
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	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	KARNES	SAN ANTONIO	FRESH	0	0	0	0	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

Table ES-3 Source Water Balance Report (concluded)

REGION L									
				SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
SURFACE WATER	COUNTY	BASIN	SALINITY	2020	2030	2040	2050	2060	2070
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	GOLIAD	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	0	0	0	0	0	0
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
SURFACE WATER TOTAL SOURCE WATER BALANCE				11,681	11,562	13,498	13,485	13,479	13,475
REGION L TOTAL SOURCE WATER BALANCE				261,323	273,495	286,826	292,745	299,455	301,523

ES.5 Social and Economic Impacts of Not Meeting Projected Water Needs

The SCTRWPG identified 79 individual water user groups that showed an unmet need during drought-of-record supply conditions during the 2020 to 2070 planning period. Of the 21 counties of the South Central Texas Region, 19 have water user groups with projected water needs (shortages). Summaries of unmet needs and the socio-economic impacts of not meeting needs will be included once that information is available from the TWDB.

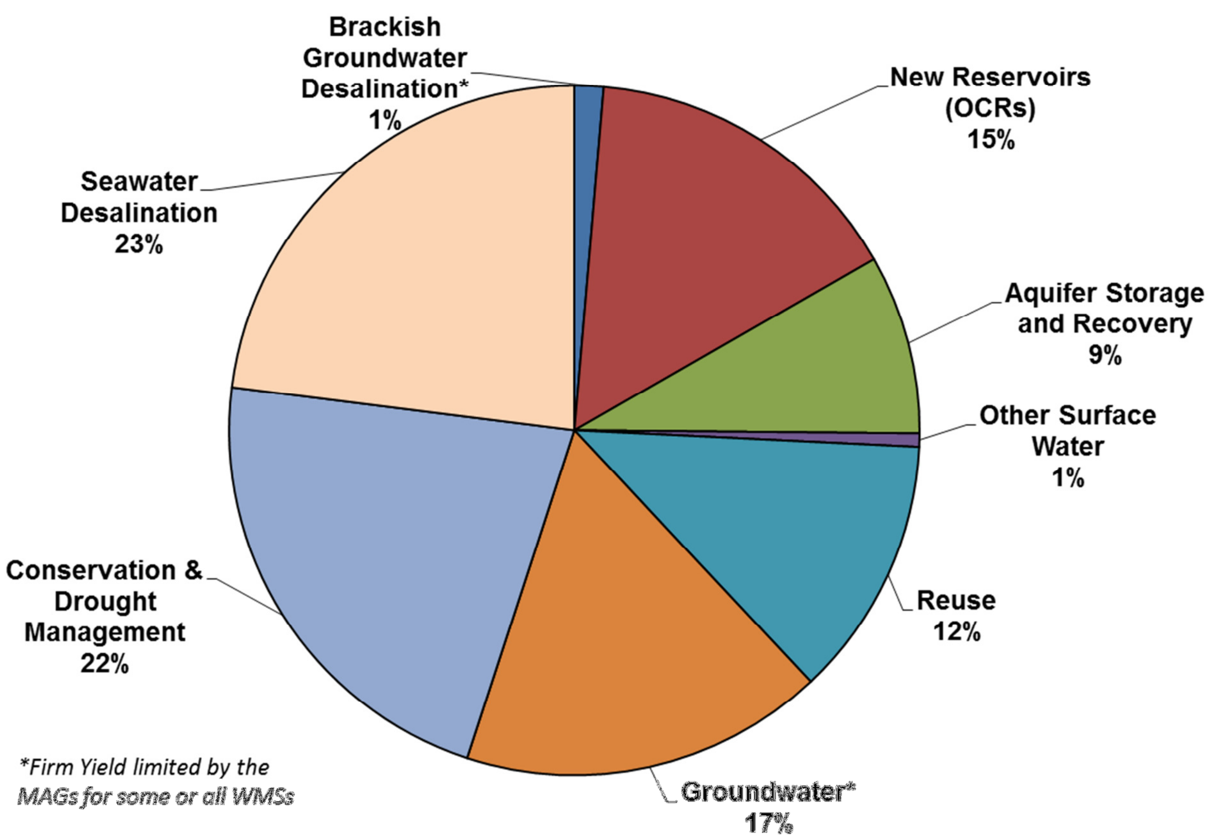
ES.6 Water Management Strategies to Meet Projected Water Needs

The regional water planning process includes making projections of the water needs of each water user group, identification of potentially feasible water management strategies (WMS) through public input, and evaluation of such strategies in accordance with TWDB rules. Technical evaluation of water management strategies includes calculation of potential quantity of water available during drought conditions, reliability of supplies, cost of water delivered to the water users' distribution systems in a form ready to be distributed for end use, environmental and implementation issues, effects upon other water resources of the state, threats to agricultural and natural resources, consistency comparisons among strategies, recreational effects, third party social and economic impacts of voluntary transfers, efficient use of existing supplies, and water quality considerations.

ES.7 South Central Texas Regional Water Plan

The South Central Texas Regional Water Plan includes recommended water management strategies that emphasize water conservation, reuse, aquifer storage and recovery, groundwater desalination, seawater desalination, new off-channel reservoirs, new groundwater, and new surface water supplies. **Water management strategies recommended to meet projected needs in the South Central Texas Region could produce new supplies in excess of 799,000 acft/yr in 2070 and may be categorized by source as shown in Figure ES-3.**

Figure ES-3 Sources of New Supply



Water management strategies emphasizing **conservation,** including drought management, comprise about 175,707 acft/yr (22 percent) of recommended new supplies at an estimated unit cost of $684/acft/yr[2].

The 2016 SCTRWP includes the **reuse** in the form of the Direct Recycled Water Programs water management strategy at 97,763 acft/yr which could represent approximately 12 percent of the recommended new supplies.

Water management strategies that simultaneously develop **fresh groundwater** supplies and limit depletion of storage in regional aquifers comprise about 17 percent of recommended new supplies and include:

- Local Groundwater Supplies (Carrizo-Wilcox, Gulf Coast, Leona Gravels, Yegua-Jackson, and Trinity) (7,837 acft/yr @ $130/acft/yr - $5,316/acft/yr);
- Hays/Caldwell PUA Project (21,833 acft/yr @ $1,926/acft/yr);
- TWA Regional Carrizo – MAG Limited (15,000 acft/yr @ $2,490/acft/yr);
- TWA Trinity Project (5,000 acft/yr @ $613/acft/yr);
- CRWA Wells Ranch Project – Phase 2 – MAG Limited (7,829 acft/yr @ $858/acft/yr);
- Vista Ridge Project – MAG Limited (34,894 acft/yr @ $2,177/acft/yr);
- New Braunfels Trinity (1,090 acft/yr @ $634/acft/yr);
- Hays Forestar Project- MAG Limited (12,356 acft/yr @ $1,942/acft/yr);
- Victoria Groundwater-Surface Water Exchange (8,544 acft/yr @ $0/acft/yr);
- Cibolo Valley LGC Carrizo Project (10,000 acft/yr @ $1,834/acft/yr);
- Regional Carrizo for SSLGC Project Expansion (6,500 acft/yr @ $1,070/acft/yr); and
- Expanded Local Carrizo for SAWS - MAG Limited (5,419 acft/yr @ $700/acft/yr)

Water management strategies that simultaneously develop **brackish groundwater** supplies and limit depletion of storage in regional aquifers comprise about 1 percent of recommended new supplies and include:

- Brackish Wilcox Groundwater for CRWA - MAG Limited (3,839 acft/yr @ $2,619/acft/yr);
- Brackish Wilcox Groundwater for SAWS - MAG Limited (5,622 acft/yr @ $1,289/acft/yr);
- Expanded Brackish Project for SAWS - MAG Limited (0 acft/yr);
- Brackish Wilcox (Gonzales Co.) - MAG Limited (1,392 acft/yr @ $5,032/acft/yr); and
- Brackish Wilcox Groundwater for SSWSC - MAG Limited (0 acft/yr).

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[2] $684/acft/yr is an average cost of municipal water conservation. Actual unit costs vary from WUG to WUG and from decade to decade.

Water management strategies that develop new **surface water** supplies comprise 1 percent of recommended new supplies and include:

- CRWA Siesta Project (5,042 acft/yr @ $1,186/acft/yr).

Water management strategies that involve **new reservoirs** (off-channel storage) comprise approximately 15 percent of recommended new supplies and include:

- GBRA Lower Basin Storage (51,800 acft/yr @ $140 acft/yr);
- GBRA New Appropriation (Lower Basin) (42,000 acft/yr @ $591/acft/yr); and
- Victoria County Steam-Electric (29,100 acft/yr @ $1,255/acft/yr).

Water management strategies that involve **aquifer storage and recovery (ASR)** comprise approximately 9 percent of recommended new supplies and include:

- GBRA Mid-Basin Project – ASR (50,000 acft/yr @ $1,637/acft/yr);
- Victoria ASR (7,900 acft/yr @ $192/acft/yr);
- New Braunfels ASR + WTP Expansion (8,300 acft/yr @$462acft/yr); and
- Uvalde ASR (1,155 acft/yr @ $2,803/acft/yr).

Finally, the Regional Water Plan includes the development of two **seawater desalination** projects, comprising 23 percent of the recommended new supplies:

- SAWS Seawater Desalination (84,023 acft/yr @ $2,713/acft/yr); and
- GBRA Integrated Water-Power Project (100,000 acft/yr @ $2,393/acft/yr).

In addition to projects utilizing new and reuse supplies, the SCTRWPG has identified several reallocation projects within the region that include:

- Edwards Aquifer Habitat Conservation Plan
- Edwards Transfers (11,772 acft/yr @ $1,415);
- Carrizo Conversions (Municipal, Mining, and Irrigation Users);
- Western Canyon WTP Expansion (Up to 5,600 acft/yr capacity);
- SAWS Water Resources Integration Pipeline (84,000 acft/yr capacity);
- Dos Rios WWTP - CPS Pipeline (50,000 acft/yr);
- Hays County Pipeline Project (15,314 acft/yr);
- Purchase from Wholesale Water Provider;
- Surface Water Rights;
- Balancing Storage; and
- Other Local Facilities Expansions.

The South Central Texas Regional Water Planning Group identifies alternative water management strategies that have been technically evaluated in accordance with TWDB rules and may, subject to an appropriate amendment process defined by TWDB rules, replace a recommended water management strategy in the 2016 Regional Water Plan (see Appendix E).

Implementation of the 2016 South Central Texas Regional Water Plan will result in the development of new water supplies that will be reliable in the event of a repeat of the most severe drought on record. Implementation of all recommended water management strategies is not likely to be necessary in order to meet projected needs within the planning period. The SCTRWPG explicitly recognizes the difference between additional supplies and projected needs as System Management Supplies and has recommended water management strategies over and above those apparently needed to meet projected demands in the Regional Water Plan for the following reasons:

- To recognize both the long lead times and the uncertainty associated with risk factors that may prevent implementation of water management strategies and necessitate replacement strategies;
- To preserve flexibility for water user groups or wholesale water suppliers to select the most feasible projects among several consistent with the Regional Plan and, therefore, ensure that such projects are potentially eligible for permitting and funding;
- To serve as additional supplies in the event that rules, regulations, or other restrictions limit use of any planned strategies; and/or
- To ensure adequate supplies in the event of a drought more severe than that which occurred historically.

Costs associated with the implementation and long-term operations and maintenance of water management strategies 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 the larger urban areas**. Annual unit costs for recommended water management strategies for municipal supply in the 2011 South Central Texas Regional Water Plan (in September 2013 dollars) are estimated to range from a low of about $140/acft/yr for GBRA Lower Basin Storage (500 acre site) to a high of about $5,032/acft/yr for the MAG Limited Brackish Wilcox (Gonz Co) for SSLGC strategy and average about $1,298/acft/yr.**

ES.8 Water Plan Summary

Recommended water management strategies to meet the projected needs of each city, utility, water user group, and wholesale water provider in the South Central Texas Region will be summarized in the Recommended Water Management Strategy – Roll-up Summary table when available from TWDB. Likewise, alternative water management strategies will be summarized in the Alternative Water Management Strategy – Summary table once available from TWDB.

1 Description of the South Central Texas Region
[31 TAC §357.30]

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 very 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. In water planning for the South Central Texas Region, these factors, together with the numerous potential water management strategies available to the South Central Texas Region, are taken into account herein.

1.2 Physical Description of the 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, Colorado, and Lavaca River Basins, and the Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins (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.

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 is rather persistent from late May through September, accompanied by prevailing southeasterly winds. There is little change in the day-to-day summer weather, except for the occasional thunderstorm, which produces 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 38 inches per year in DeWitt County in the eastern 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 portions of the region to western portions. There is also a general trend of increasing precipitation from inland areas to coastal areas.

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.

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

Table 1-1 South Central Texas Region – List of Counties Location by River Basin and Edwards Aquifer Area

County	Edwards Aquifer Area[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	X	X	X							
Bexar	X	X	X							
Caldwell	X			X	X					
Calhoun				X		X		X	X	
Comal	X		X	X						
DeWitt			X	X			X	X		
Dimmit		X								X
Frio		X								
Goliad			X	X					X	
Gonzales				X			X			
Guadalupe	X		X	X						
Hays (Part)	X			X						
Karnes		X	X	X					X	
Kendall			X	X	X					
LaSalle		X								
Medina	X	X	X							
Refugio			X						X	
Uvalde	X	X								
Victoria			X	X			X	X		
Wilson		X	X	X						
Zavala		X								

An X in the column indicates that all or part of the county is located in the River or Coastal Basin named in the column heading.
[1]Edwards Aquifer Area is the area within the Edwards Aquifer Authority statutory boundaries.

Table 1-2 Climatological Data for the South Central Texas Region

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.

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 3 years.

1.2.2 General Geology[2]

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

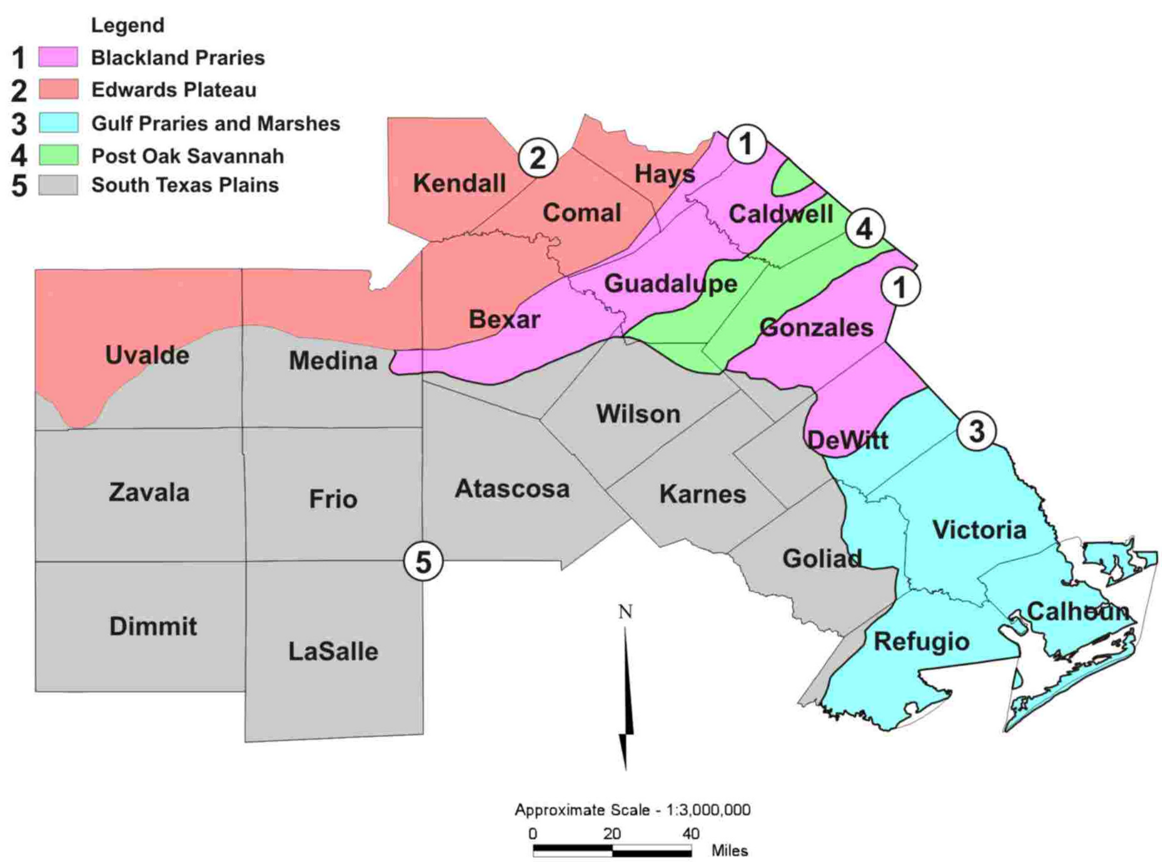
[2] TWDB, Op. Cit., May 1977.

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[3]

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 tropical thorn scrub to the south. The essence of this landscape consists of dendritic networks of wooded stream corridors populated by typically eastern species that dissect upland grasslands, and savannahs that harbor western species. The vegetational areas containing portions of the South Central Texas Region are the Edwards Plateau, South Texas Plains, Blackland Prairies, Gulf Prairies and Marshes, and the Post Oak Savannah (Figure 1-1). Each area is described below.

Figure 1-1 Eco-Regions — South Central Texas Region



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,

3 HDR Engineering, Inc. (HDR), et al., "Trans-Texas Water Program, West Central Study Area, Phase I Interim Report," Volume 2, San Antonio River Authority, et al., May 1994.

and the western 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.

Noteworthy is the growth of Bald cypress (*Taxodium distichum*) 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 curlymesquite (*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.

South Texas Plains

South of San Antonio, including all or parts of Uvalde, Zavala, Dimmit, Medina, Frio, LaSalle, Bexar, Atascosa, Wilson, Karnes, DeWitt, Goliad, and Refugio Counties, lies the South Texas Plains vegetational area, which is characterized by subtropical dryland vegetation consisting of small trees, shrubs, cactus, weeds, and grasses. 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 savannahs. 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.

There are distinct differences in the original plant communities on various soils. Dominant grasses on the sandy loam soils are seacoast bluestem (*Schizachyrium scoparium* var. *littoralis*), bristlegrasses (*Setaria* spp.), and silver bluestem (*Bothriochloa saccharoides*). Dominant grasses on the clay and clay loams are silver bluestem, Arizona cottontop (*Trichachne californica*), buffalograss, common curlymesquite, bristlegrasses, gramas, and Texas wintergrass (*Stipa leucotricha*). Gulf cordgrass (*Spartina* spp.) and seashore saltgrass (*Distichlis spicata*) characterize low saline areas. In the post oak and live oak savannahs, the grasses are mainly seacoast bluestem, Indiangrass, and switchgrass (*Panicum virgatum*).

Blackland Prairies

This area, including parts of Bexar, Comal, Guadalupe, Hays, Caldwell, Gonzales, and DeWitt Counties, while called a “prairie,” has timber along the streams, including a variety of oaks, pecan (*Carya illinoinensis*), cedar elm, and mesquite. In its native state, it was largely a grassy plain.

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.

Gulf Prairies and Marshes

The Gulf Prairies and Marshes vegetational area includes all or parts of Victoria, DeWitt, Goliad, Refugio, and Calhoun Counties. There are two subunits: (1) the marsh and salt grasses immediately at tidewater; and (2) a little farther inland, a strip of bluestems and tall grasses, with some gramas in the western part. Many of these grasses make excellent grazing. 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 Gulf Prairies 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.

Post Oak Savannah

This secondary forest region, also called the Post Oak Belt, includes parts of Guadalupe, Caldwell, Wilson, and Gonzales Counties. It is immediately west of the primary forest region, with less annual rainfall and a little 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, and mesquite has become a serious problem. In addition, the control of wildfires has affected the encroachment of brush species on Savannah range lands. Such plants as broomsedge, broomweed, and ragweed have replaced good forage plants.

1.2.4 Natural Resources

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, and Edwards-Trinity (Plateau) Aquifers. In addition to these water resources, the area also overlies six minor aquifers (Queen City, Sparta, Austin Chalk, Buda Limestone, Leona Gravel, and Yegua-Jackson). Details about these water resources are presented in Chapters 1.7 and 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.

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 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. There are a number of species listed in the planning region by the U.S. Fish and Wildlife Service 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.

Table 1-3 Agricultural Resources — 2012 South Central Texas Region

County	Total Land Area (acres)	Farms and Ranches (number)	Land in Farms and Ranches (acres)	Average Size (acres)	Total Cropland (acres)	Harvested Cropland (acres)	Irrigated Land (acres)
Atascosa	788,480	1,987	665,287	335	108,097	47,358	26,658
Bexar	798,080	2,457	342,882	140	89,092	50,580	8,271
Caldwell	349,440	1,623	310,433	191	55,928	41,074	633
Calhoun	327,680	264	184,094	697	60,536	51,280	5,795
Comal	359,680	1,104	205,018	186	14,070	6,946	422
De Witt	581,760	1,711	536,411	314	49,680	36,120	618
Dimmit	851,840	367	677,023	1,845	44,329	6,839	4,794
Frio	725,120	651	713,262	1,096	152,921	83,205	60,494
Goliad	546,560	1,175	494,930	421	32,990	23,566	744
Gonzales	683,520	1,674	609,790	364	68,954	49,443	7,817
Guadalupe	455,040	2,241	383,109	171	112,126	87,090	1,941
Hays (part)[1]	239,360	720	122,503	170	15,158	7,604	516
Karnes	480,000	1,288	464,641	361	82,701	49,674	905
Kendall	424,320	1,387	369,951	267	27,527	10,459	912
LaSalle	952,960	446	634,847	1,423	44,049	19,437	7,018
Medina	849,920	1,976	833,587	422	141,396	103,912	51,418
Refugio	492,800	259	474,709	1,833	86,511	79,336	1,235
Uvalde	996,480	640	977,281	1,527	139,831	84,546	49,531
Victoria	565,120	1,533	437,805	286	80,151	62,400	3,315
Wilson	516,480	2,444	439,689	180	103,263	71,403	12,437
Zavala	831,360	287	692,850	2,414	95,980	35,313	29,384
Total	**12,816,000**	**26,234**	**10,570,102**	**403**	**1,605,290**	**1,007,585**	**274,858**

[1]Estimate for that portion of Hays County located in the planning region (50%).
Source: 2012 Census of Agriculture, Vol. 1 Geographic Area Series, "Table 1: County Summary Highlights — 2012."

Agricultural Resources

Of the 12.8 million acres of land area in the planning region, over 10.57 million acres (83 percent) are classified as farmland and ranchland (Table 1-3). In 2012, there were 26,234 farms and ranches in the region with an average size of 403 acres. Of the 10.57 million acres of farmland, over 1.60 million acres were classified as cropland, of which about 1.01 million acres were harvested in 2012. Approximately 17 percent (274,858 acres) of the total cropland in the region was reported to be irrigated in 2012[4]. The leading irrigation counties are located in the western part of the region and include Frio, Medina, Uvalde, Zavala, and Atascosa. The sum of irrigated acres in these five counties increased by 22.0 percent between 2007 and 2012. In Medina and Uvalde Counties, which rely primarily on the Edwards Aquifer, irrigated acres increased by 24.8 and 9.2 percent, respectively, between 2007 and 2012. 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 Chapters 1.4.2 and 1.4.3, respectively.

1.2.5 Major Water Demand Centers

In the South Central Texas Region, there are four major water demand centers. These centers are the Interstate Highway 35 (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, LaSalle, 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.

1.3 Population and Demography

1.3.1 Historical and Recent Trends in Population

According to the Bureau of the Census, 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

4 2012 Census of Agriculture, Volume 1 Geographic Area Series, “Table 1. County Summary Highlights: 2012.”

(3.07 percent), while the slowest growing counties were Gonzales (0.21 percent), LaSalle (0.29 percent), Calhoun (0.51 percent), and Goliad (0.57 percent). Chapter 2.1 summarizes population projections through the year 2070 for the South Central Texas Region.

Table 1-4 Population Growth — 1960 to 2010 South Central Texas Region

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
LaSalle	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]Estimate that 80 percent of the total county population resides within the planning area.
Source: Bureau of the Census, Decadal Censuses of 1960, 1970, 1980, 1990, 2000, and 2010, U.S. Department of Commerce.

There are 119 cities or other water supply entities (excluding County-Other) in the South Central Texas Region for which the TWDB has made population and water demand projections. Of the 119 cities and entities, 52 have a projected population in 2020 greater than 5,000. These entities are relatively equally distributed among the 21 counties in the planning region and are located in three commonly used regional references (Coastal, Hill Country, and Winter Garden) (Table 1-5). Bexar County contains 16 entities having a projected population of 5,000 or more, including San Antonio and its surrounding suburbs. Four counties, Goliad, Karnes, La Salle, and Refugio, do not have an entity of 5,000 or greater in projected population by 2020.

1.3.2 Demographic Characteristics

In 2010, 83 percent of the South Central Texas Region population resided in urban areas, while only 17 percent resided in rural areas (Figure 1-2). LaSalle 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 1-6).

Age distribution across the region is characterized by a relatively young population. The two age groups that include 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) (Figure 1-3). 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 1-3).

Table 1-5 Major Entities in the South Central Texas Region*

City Name	County Name	Regional Classification	City Name	County Name	Regional Classification
Alamo Heights	Bexar	Hill Country	Live Oak	Bexar	Hill Country
Atascosa Rural WSC	Bexar	Hill Country	Lockhart	Caldwell	Hill Country
Benton City WSC	Atascosa	Winter Garden	Luling	Caldwell	Hill Country
Boerne	Kendall	Hill Country	Maxwell WSC	Caldwell	Hill Country
Bulverde	Comal	Hill Country	McCoy WSC	Atascosa	Winter Garden
Canyon Lake WSC	Comal	Hill Country	New Braunfels	Comal	Hill Country
Carrizo Springs	Dimmit	Winter Garden	Oak Hills WSC	Wilson	Winter Garden
Cibolo	Guadalupe	Hill Country	Pearsall	Frio	Winter Garden
Converse	Bexar	Hill Country	Pleasanton	Atascosa	Winter Garden
Crystal City	Zavala	Winter Garden	Plum Creek WC	Hays	Hill Country
Crystal Clear WSC	Guadalupe	Hill Country	Polonia WSC	Caldwell	Hill Country
Cuero	DeWitt	Coastal	Port Lavaca	Calhoun	Coastal
East Central SUD	Bexar	Hill Country	SS WSC	Wilson	Winter Garden
East Medina County SUD	Medina	Hill Country	San Antonio	Bexar	Hill Country
Fair Oaks Ranch	Bexar	Hill Country	San Antonio Water System	Bexar	Hill Country
Floresville	Wilson	Winter Garden	San Marcos	Hays	Hill Country
Goforth SUD	Hays	Hill Country	Schertz	Guadalupe	Hill Country
Gonzales	Gonzales	Coastal	Seguin	Guadalupe	Hill Country
Gonzales County WSC	Gonzales	Coastal	Selma	Bexar	Hill Country
Green Valley SUD	Guadalupe	Hill Country	Springs Hill WSC	Guadalupe	Hill Country
Helotes	Bexar	Hill Country	Terrell Hills	Bexar	Hill Country
Hondo	Medina	Hill Country	Universal City	Bexar	Hill Country
Kirby	Bexar	Hill Country	Uvalde	Uvalde	Winter Garden
Kyle	Hays	Hill Country	Victoria	Victoria	Coastal
Lackland AFB	Bexar	Hill Country	Windcrest	Bexar	Hill Country
Leon Valley	Bexar	Hill Country	Yancey WSC	Medina	Winter Garden

* Entities with a projected population of 5,000 or more in 2020.

Figure 1-2 Percentages of Population Residing in Urban and Rural Areas (2010) South Central Texas Region

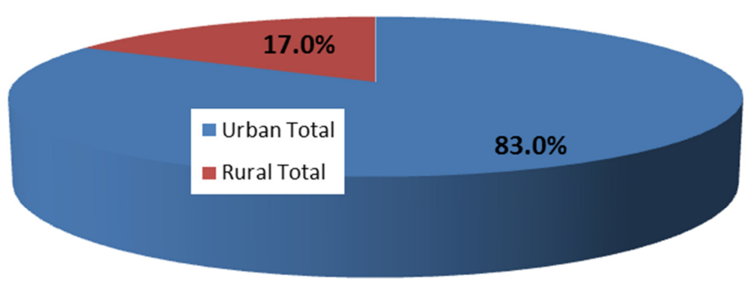
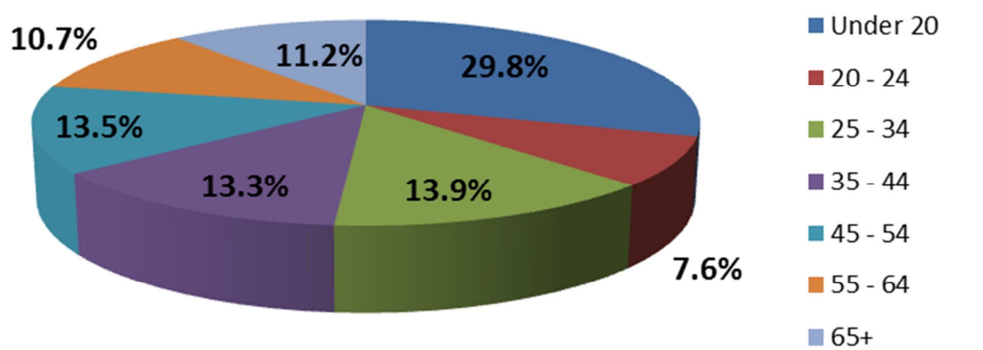


Table 1-6 County Population and Area South Central Texas Region

County	Population (2010)	Area (sq. mi.)	Population Density	County	Population (2010)	Area (sq. mi.)	Population Density
Atascosa	44,911	1,232	36.5	Hays (part)	125,686	374	336.1
Bexar	1,714,773	1,247	1,375.1	Karnes	14,824	750	19.8
Caldwell	38,066	546	69.7	Kendall	33,410	663	50.4
Calhoun	21,381	512	41.8	LaSalle	6,886	1,489	4.6
Comal	108,472	562	193.0	Medina	46,006	1,328	34.6
DeWitt	20,097	909	22.1	Refugio	7,383	770	9.6
Dimmit	9,996	1,331	7.5	Uvalde	26,405	1,557	17.0
Frio	17,217	1,133	15.2	Victoria	86,793	883	98.3
Goliad	7,210	854	8.4	Wilson	42,918	807	53.2
Gonzales	19,807	1,068	18.5	Zavala	11,677	1,299	9.0
Guadalupe	131,533	711	185.0	Total	2,535,451	20,025	126.6

Source: U.S. Census Bureau, U.S. Department of Commerce.

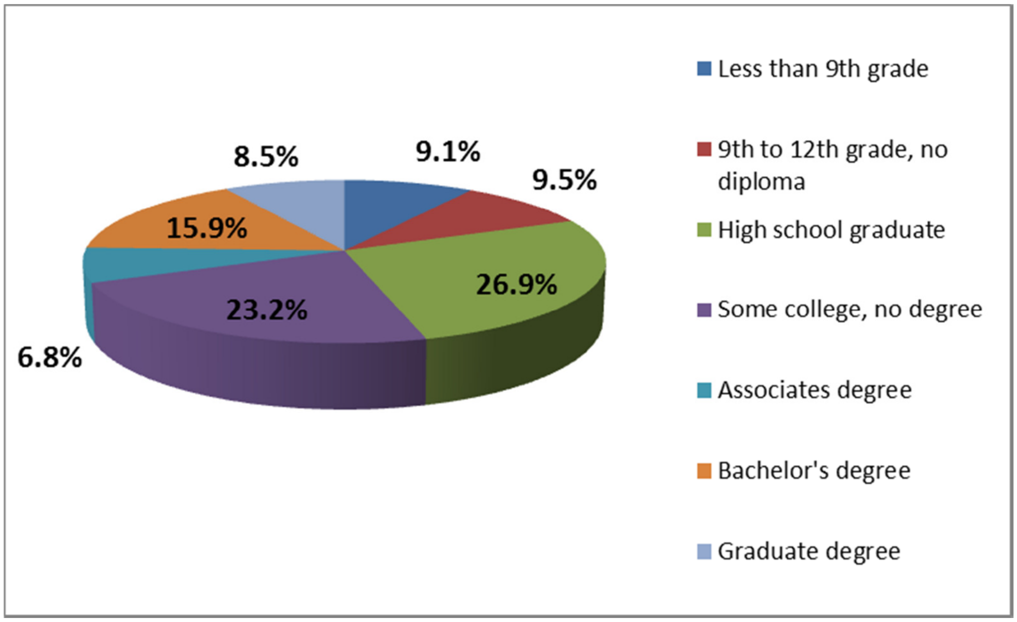
Figure 1-3 Age Distribution of the Population (2010) South Central Texas Region



Source : 2010 U.S. Census Data

The regional population can also be characterized by its level of education. 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 1-4).

Figure 1-4 Level of Educational Achievement (2010) South Central Texas Region



1.4 Economy — Major Sectors and Industries

1.4.1 Summary of the South Central Texas 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 solid growth in recent years. Table 1-7 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 48 percent of regional economic activity summarized in Table 1-7. Fabricated metal products, industrial machinery, petrochemicals, and food processing form the core of the manufacturing sector, which accounts for approximately 27 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 3 percent of regional economic activity. Finally, oil and gas production dominate the mining sector of the economy and, together, represent about 22 percent of the regional economic activity summarized in Table 1-7. Additional information regarding the agricultural, livestock, mining, manufacturing, and trades and services sectors is presented in the following sections.

Table 1-7 Summary of Economic Activity South Central Texas Region

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	$0	$57	$28	$709	$25	**$1,283**
Bexar	$18,346	$12,305	$18	$55	$11	$0	**$30,735**
Caldwell	$353	$90	$52	$11	$165	$1	**$672**
Calhoun	$343	(D)	$14	$28	$15	$12	**$412**
Comal	$2,685	$1,094	$6	(D)	$0	$0	**$3,784**
DeWitt	$205	$110	$54	$8	$1,614	$475	**$2,466**
Dimmit	$83	$0	$27	$9	$1,206	$295	**$1,619**
Frio	$146	$0	$75	$109	$337	$20	**$687**
Goliad	$41	$0	$16	$4	$25	$42	**$127**
Gonzales	$287	$445	$495	$23	$2,253	$74	**$3,575**
Guadalupe	$1,965	$2,154	$31	$30	$94	$0	**$4,274**
Hays (part)[5]	$1,849	$974	$4	$4	$0	$0	**$2,830**
Karnes	$151	$0	$17	$11	$3,774	$325	**$4,277**
Kendall	$1,149	$181	$10	$2	$2,061	$353	**$3,757**
LaSalle	$85	$0	$7	$12	$0	$0	**$104**
Medina	$580	$75	$51	$65	$0	$0	**$771**
Refugio	$80	$0	$10	$33	$310	$41	**$475**
Uvalde	$483	$204	$51	$62	$0	$0	**$799**
Victoria	$2,216	(D)	$20	$28	$50	$17	**$2,331**
Wilson	$250	$0	$74	$28	$244	$3	**$600**
Zavala	$38	$0	$44	$29	$291	$5	**$407**
Total	**$31,798**	**$17,631**	**$1,129**	**$577**	**$13,159**	**$1,687**	**$65,982**

1. Source: 2007 Economic Census, U.S. Department of Commerce.
2. Source: 2012 Census of Agriculture, Volume 1 Geographic Area Series, "Table 1. County Summary Highlights: 2012."
3. Determined by using the number of barrels produced as reported to the Texas Railroad Commission times $94.05/bbl (the average price for 2010).
4. Determined by using the mcf produced as reported to the Texas Railroad Commission times $2.65/mcf (the average price for 2010).
5. Estimated that 70% of economic activity within Hays County takes place within the planning region.

1.4.2 Agricultural Production

It is estimated that over 1.6 million acres in the South Central Texas Region were used in crop production in 2012. Of this total, only 274,858 acres (17.1 percent) were irrigated while the remaining 82.9 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 2012 Census of Agriculture, all crops grown in the South Central Texas Region had a market value of over $577 million in 2012. The leading agricultural producing counties in the region, by market value of products, are Frio, Medina, Uvalde, Bexar, and Refugio. The major crops grown in the region include corn, grain sorghum, wheat, soybeans, and cotton (Livestock Production).

According to the 2012 Census of Agriculture, livestock marketed in the South Central Texas region had a value of over $1.1 billion, or about 1.9 times the value of all crop production (Table 1-7). 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 97 percent of these types of chickens within the region. Table 1-9 provides a county-by-county summary of livestock production. In 2012, the leading livestock producing counties in the region by market value were Gonzales, Frio, and Wilson Counties (Table 1-7).

Corn and grain sorghum have historically been the leading crops in the region. In 2012, it was estimated that over 16 million bushels of corn were harvested in the South Central Texas Region. The leading corn producing counties in the region are Medina, Uvalde, Frio, and Victoria (Table 1-8). Grain sorghum also contributes significantly to the agricultural sector. In 2012, it was estimated that over 10 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 1-8). 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 3.5 million bushels of wheat harvested in 2012. The leading wheat producing counties in the region are Uvalde, Frio, Medina, and Guadalupe (Table 1-8).

Because of favorable climatic and soil conditions, the coastal counties of Calhoun and Victoria are able to produce rice. In 2012, these two counties combined produced over 244,000 hundredweight (cwt) of rice (Table 1-8). Cotton production is widespread throughout the region. In 2012, the 19 counties in which cotton is produced combined to harvest over 229,000 bales. (Table 1-8). Leading counties for cotton production were Medina, Refugio, and Uvalde.

Soybean production in the region reportedly occurs in 8 counties, but total production and leading counties are uncertain due to data withheld to avoid disclosure of production by individual producers.

1.4.3 Livestock Production

According to the 2012 Census of Agriculture, livestock marketed in the South Central Texas region had a value of over $1.1 billion, or about 1.9 times the value of all crop production (Table 1-7). 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 97 percent of these types of chickens within the region. Table 1-9 provides a county-by-county summary of livestock production. In 2012, the leading livestock producing counties in the region by market value were Gonzales, Frio, and Wilson Counties (Table 1-7).

Table 1-8 Summary of Farm Production Data – 2012 South Central Texas Region

County	Selected Crops Harvested						
	Corn (bushels)	***Grain Sorghum (bushels)***	***Wheat (bushels)***	***Rice (100 lbs)***	***Cotton (bales)***	***Soybeans (bushels)***	***Hay, Alfalfa, Other (tons)***
Atascosa	245,467	130,084	97,986	0	7,832	0	58,129
Bexar	560,423	196,090	272,033	0	2,279	5,048	52,825
Caldwell	324,561	373,036	77,210	0	6,944	0	36,301
Calhoun	1,080,956	1,705,194	0	244,331	21,945	(D)	7,953
Comal	10,938	(D)	(D)	0	0	(D)	12,046
DeWitt	364,501	36,952	9,707	0	338	(D)	53,171
Dimmit	(D)	47,231	61,230	0	2,334	0	1,500
Frio	1,963,896	262,777	691,404	0	9,553	0	22,832
Goliad	176,014	99,876	0	0	1,015	0	23,273
Gonzales	383,321	141,554	20,572	0	(D)	0	68,437
Guadalupe	1,178,629	1,146,854	554,946	0	6,181	0	58,801
Hays (part)[1]	102,311	31,741	51,526	0	(D)	0	5,316
Karnes	456,655	280,867	58,341	0	7,610	0	40,100
Kendall	0	0	5,724	0	0	0	12,813
LaSalle	218,000	189,478	61,754	0	(D)	0	5,138
Medina	3,174,626	423,194	638,557	0	44,249	(D)	54,610
Refugio	446,321	2,702,320	(D)	0	42,856	2,580	10,810
Uvalde	2,564,466	679,626	751,572	0	42,186	(D)	28,865
Victoria	1,455,015	1,325,277	(D)	(D)	18,819	(D)	40,132
Wilson	943,030	447,069	222,437	0	3,064	0	91,344
Zavala	579,481	315,100	274,370	0	12,521	0	9,315
Total	**16,228,611+(D)**	**10,534,320+(D)**	**3,849,369+(D)**	**244,331+(D)**	**229,726+(D)**	**7,628+(D)**	**693,711**

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

Table 1-9 Summary of Livestock Production Data — 2012 South Central Texas Region

County	Livestock and Poultry						
	Cattle & Calves (Number)	Beef Cattle (Number)	Milk Cows (Number)	Hogs & Pigs (Number)	Sheep & Lambs (Number)	Layers & Pullets (Number)	Broilers (Number)
Atascosa	73,016	(D)	(D)	283	1,308	2,562	(D)
Bexar	31,309	(D)	(D)	1,566	3,601	4,382	1,688
Caldwell	35,524	(D)	(D)	554	1,283	(D)	2,224,698
Calhoun	14,729	9,769	0	(D)	404	1,656	(D)
Comal	11,312	7,219	0	312	3,278	9,571	3,883
DeWitt	83,556	53,023	0	328	811	(D)	925
Dimmit	16,596	(D)	(D)	(D)	358	717	30
Frio	50,587	18,947	180	154	299	332	(D)
Goliad	40,230	(D)	(D)	212	394	1,242	315
Gonzales	114,100	63,976	0	464	762	5,262,354	86,673,265
Guadalupe	41,264	25,886	126	1,673	2,661	39,941	(D)
Hays (part)[1]	7,426	4,448	0	95	825	2,069	37
Karnes	43,003	29,932	0	165	311	670	0
Kendall	13,812	(D)	(D)	444	9,773	5,903	378
LaSalle	18,821	12,405	0	70	464	139	0
Medina	44,069	(D)	(D)	991	2,805	3,397	(D)
Refugio	20,637	(D)	(D)	75	(D)	269	0
Uvalde	43,084	17,778	8	24	6,935	1,031	(D)
Victoria	48,765	34,194	55	460	484	1,721	16
Wilson	76,972	(D)	(D)	637	1,424	3,736	(D)
Zavala	38,767	(D)	(D)	44	169	330	0
Total	**867,579**	**277,577+(D)**	**369+(D)**	**8,551+(D)**	**38,349+(D)**	**5,342,022+(D)**	**88,905,235+(D)**

[1]Estimates that 50 percent of all livestock production in Hays County occurs in the planning region.
(D) – Withheld to avoid disclosing data for individual producers.
Source: 2012 Census of Agriculture, Volume 1 Geographic Area Series, "Table 1. County Summary Highlights: 2012."

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 five counties (Comal, Hays, La Salle, Medina, and Uvalde) in the region had economic activity derived from oil and gas production in 2012. Oil and gas production in the remaining 16 counties generated over $14.5 billion in 2012. The leading oil and gas producing counties in the region were Karnes, Gonzales, Kendall, DeWitt, and Dimmit (Table 1-7).

1.4.5 Manufacturing[5]

In 2007, manufacturing facilities contributed over $17.5 billion in sales in the South Central Texas Region (Table 1-7).[6] The leading manufacturing counties in the region for which data are disclosed, by value of shipments, are Bexar, Guadalupe, Comal, and Hays. Significant economic activity associated with manufacturing also occurs in Calhoun and Victoria Counties, though data is 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[7]

In 2007, wholesale trade, retail trade, and services contributed over $31.5 billion in sales or receipts in the South Central Texas Region (Table 1-7).[8] The leading trades and services counties, by value of sales or receipts, in the region are Bexar, Comal, Victoria, Guadalupe, and Hays.

1.5 Water Uses[9]

Water use in 2012 within the South Central Texas Region as reported to or estimated by the TWDB is summarized by source for each of the use types in Table 1-10.

In 2012, total water use in the region was estimated to be 981,165 acft/yr. Municipal use accounted for 407,564 acft (or 41.5%) and irrigation use accounted for 370,626 acft (or 37.8%) of the total water use within the region. Surface water use totaled 230,403 acft (23.5%) and groundwater use made up the remaining 750,762 acft (76.5%). Surface water is the primary source for manufacturing and steam-electric power generation uses and groundwater is the primary source for other use types.

[5] Source: 2007 Economic Census, U.S. Department of Commerce.
[6] Data for 2007 are the most recent data available.
[7] Source: 2007 Economic Census, U.S. Department of Commerce.
[8] Data for 2007 are the most recent data available.
[9] Data provided by the TWDB.

Table 1-10 Summary of Water Use – 2012 (acft/yr) South Central Texas Region

Use Type	Total Use (2012)	% of Total	Use by Source		% by Source	
			Surface Water	Ground-water	Surface Water	Ground-water
Municipal	407,564	41.5%	66,036	341,528	16.2%	83.8%
Manufacturing	67,514	6.9%	54,062	13,452	80.1%	19.9%
Mining	46,245	4.7%	2,805	43,440	6.1%	93.9%
Steam-Electric	66,587	6.8%	55,530	11,057	83.4%	16.6%
Irrigation	370,626	37.8%	43,093	327,533	11.6%	88.4%
Livestock	22,629	2.3%	8,877	13,752	39.2%	60.8%
Total	**981,165**	**100.0%**	**230,403**	**750,762**	**23.5%**	**76.5%**

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 has contracts to sell more than 1,000 acft of water wholesale in any one year during the five years immediately preceding the adoption of the most recent regional water plan. Under this definition, the list of WWPs for the South Central Texas Region includes:

- San Antonio Water System (SAWS);
- Guadalupe-Blanco River Authority (GBRA);
- Canyon Region Water Authority (CRWA);
- Schertz-Sequin Local Government Corporation (SSLGC); and
- Springs Hill WSC (SHWSC).

In addition, the recently-formed Texas Water Alliance (TWA), the Cibolo Valley Local Government Corporation (CVLGC), and the Hays-Caldwell Public Utility Agency (HCPUA) are included as WWPs because they are expected to enter into contracts to sell more than 1,000 acft/yr wholesale during the planning period. Each wholesale water provider is briefly described in the following sections. Detailed water demand projections for each wholesale water provider are presented in Chapter 2.10.

1.6.1 San Antonio Water System

The San Antonio Water System (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 1.3 million people in the urbanized portion of Bexar County. SAWS provides part or all of the water supplies for fourteen 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, Elmendorf, Hill County Village, Hollywood Park, Olmos Park, Somerset, and Terrell Hills, and provides part of the water supply for Helotes, Leon Valley, Live Oak, East Central WSC, and Atascosa Rural WSC.

1.6.2 Guadalupe-Blanco River Authority

The Guadalupe-Blanco River Authority (GBRA) was created by the Texas Legislature in 1933 for the purposes of developing, storing, preserving, and distributing 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, treatment of 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 in the process of developing water supplies from sources including surface water in the Guadalupe-San Antonio River Basin and developing transmission and treatment facilities to deliver these supplies to customers.

1.6.3 Canyon Regional Water Authority

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 water supply corporations, cities, and districts responsible for acquiring, treating, and transporting potable water (Chapter 2.10). CRWA owns and operates treatment plants at Lake Dunlap on the Guadalupe River and in far western Caldwell County near the San Marcos River for surface water purchased from the GBRA or leased from other water rights owners.

1.6.4 Schertz-Seguin Local Government Corporation

The Cities of Schertz, located partially in Guadalupe County and partially in Bexar County, and Seguin, located in Guadalupe County, joined to create the Schertz-Seguin Local Government Corporation (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 (Chapter 2.10). The Carrizo 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 and Wilcox Aquifers.

1.6.5 Springs Hill WSC

Springs Hill Water Supply Corporation (WSC) is a retail and wholesale water supplier serving customers located primarily in Guadalupe County. Springs Hill WSC provides retail water service within the WSC's service area as well as wholesale water to Crystal Clear WSC. A portion of the Springs Hill WSC service area is located inside the City of Seguin. In addition, a portion of the service area is also included in the projected demands for Guadalupe County-Other.

1.6.6 Texas Water Alliance

The Texas Water Alliance (TWA) is a group of landowners located in northeast Gonzales County organized for the purpose of selling groundwater on a wholesale basis to WWPs and water user groups (WUGs) most likely located in the South Central Texas Regional Water Planning Area (Region L). To date, several WWPs and WUGs have shown measures of interest in groundwater supplies potentially available from northeast Gonzales County. Although TWA has obtained groundwater production permits from the Gonzales County Underground Water Conservation District, it is uncertain at this time which one or more of these entities will enter into water supply agreements with the TWA.

1.6.7 Hays-Caldwell Public Utility Agency

The Hays-Caldwell Public Utility Agency (HCPUA) was formed by the Canyon Regional Water Authority, 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. 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.

1.6.8 Cibolo Valley Local Government Corporation

The Cibolo Valley Local Government Corporation (CVLGC) is a partnership between the Cities of Cibolo and Schertz created to develop more groundwater supplies within the local area.

1.7 Water Resources and Quality Considerations

1.7.1 Groundwater[10]

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 1-5). The six minor aquifers are the Austin Chalk, Buda Limestone, Leona Gravel, Sparta, Queen City, and Yegua-Jackson. 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.

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-BFZ distinguishes this aquifer from the Edwards-Trinity (Plateau) and the

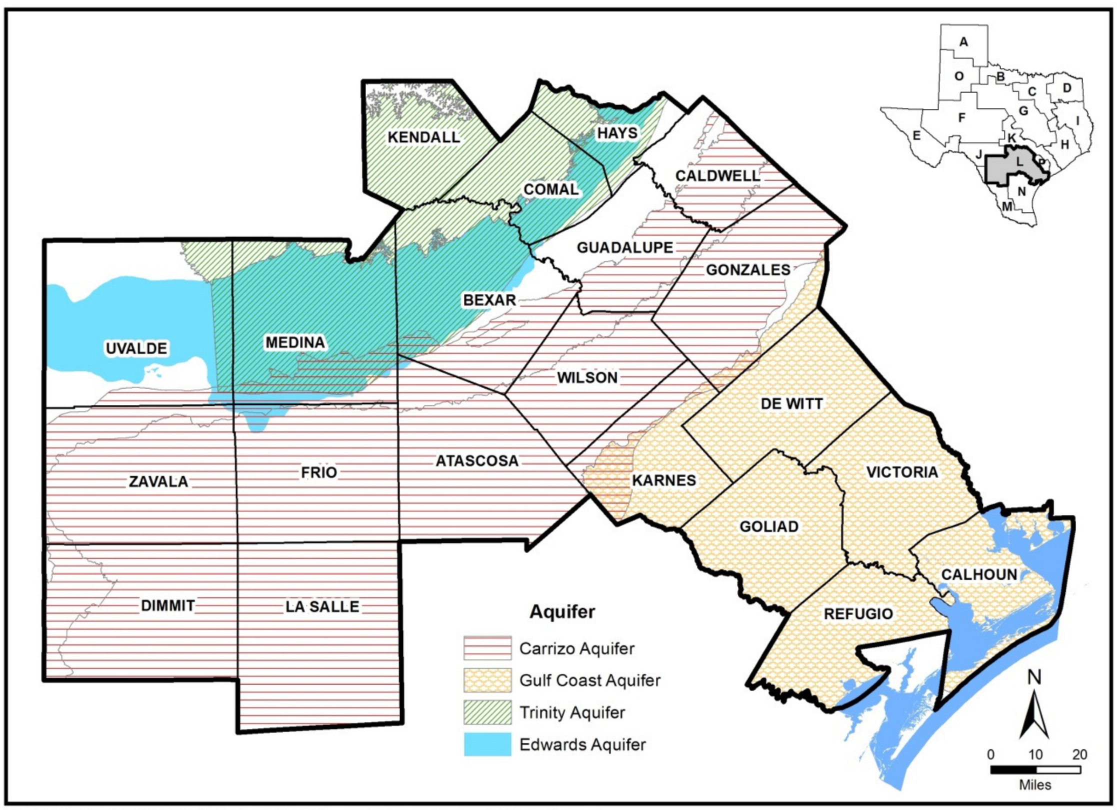
10 Data supplied by the Texas Water Development Board.

Edwards-Trinity (High Plains) Aquifers, however, in this document, it will be referred to as the Edwards Aquifer (Figure 1-5).

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 of total dissolved solids. 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 water levels and spring flows 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.

Figure 1-5 Major Aquifers — South Central Texas Region



W:\007755\000000000167424_2016_Region_L_Plan\GIS\map_docs\arcmap\Region_L_Maj_Aquifers.mxd

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 milligrams per liter of total dissolved solids in the outcrop, whereas softer groundwater with total dissolved solids of more than 1,000 milligrams per liter may occur in the confined zone. High iron and manganese content is 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 milligrams per liter. Irrigation accounts for slightly more than half the water pumped, and pumping for municipal supply accounts for another 40 percent. 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.

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 milligrams per liter in the east and southeast to between 1,000 and 5,000 milligrams per liter, 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.

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 Aquifers, which are comprised 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 milligrams per liter of total dissolved solids, but declines to the south, where it typically contains 1,000 to more than 10,000 milligrams per liter of total dissolved solids 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 from municipal, industrial, 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.

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 composed predominantly 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 milligrams per liter, 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.

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 units 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 milligrams per liter of total dissolved solids; however, water quality deteriorates with depth (below about 2,000 feet), where the groundwater has an average concentration of 800 milligrams per liter 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.

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.

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 owning to 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.

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 are similar to the Edwards Aquifer and there is likely some interconnectivity between the aquifers. While most wells completed in this formations are for domestic or livestock use, there are some higher flowing municipal wells as well.

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 stream flow, 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.

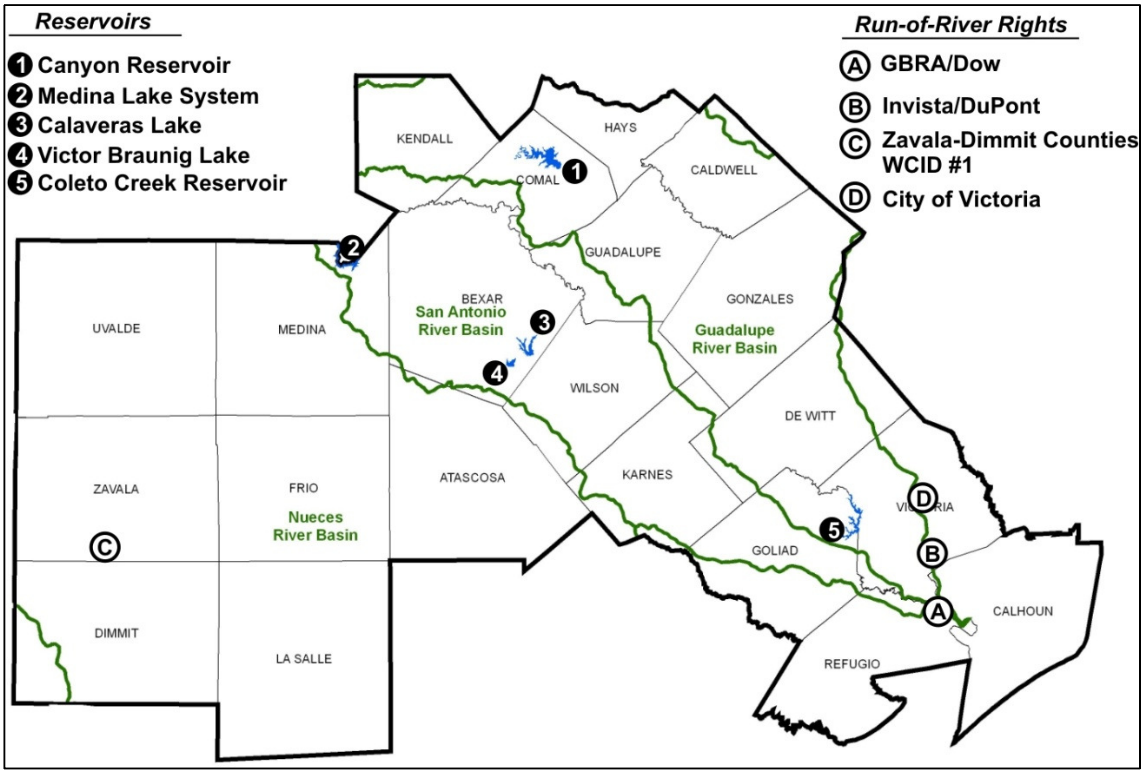
1.7.2 Surface Water

The South Central Texas Region includes parts of the Rio Grande, Nueces, San Antonio, Guadalupe, Colorado, and Lavaca River Basins and parts of the Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces Coastal Basins (Figure 1-6). Existing surface water supplies of the region include those derived from storage reservoirs and run-of-river water rights. 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.

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.

Figure 1-6 Major River Basins, Reservoirs, and Run-of-River Rights



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 WCID #1, which total 28,000 acft/yr.

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 (Bexar 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).

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 (175,501 acft/yr), INVISTA/DuPont (33,000 acft/yr), and the City of Victoria (27,007 acft/yr).

Lower Colorado River Basin

Only a small portion of Kendall and Caldwell Counties is located in that part of the Lower Colorado River Basin located inside the planning region. 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.

Lavaca River Basin

Small portions of DeWitt, Gonzales, and Victoria Counties are located in that part of the Lavaca River Basin inside the planning region. 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.

Coastal Basins

Parts of the Colorado-Lavaca, Lavaca-Guadalupe, and San Antonio-Nueces 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 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. The San Antonio-Nueces Coastal Basin obtains imported surface water supplied from the Nueces River Basin.

1.7.3 Major Springs

According to selected references,[11,12] there are six major springs located within the planning area (Comal, San Marcos, Hueco, Leona, San Antonio, and San Pedro Springs).

Comal Springs: Comal Springs is located in Landa Park, New Braunfels in Comal County. Comal Springs discharges water from the Edwards 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, an Habitat Conservation Plan (EAHCP) was published in November 2012 and approved by the U.S. Fish & Wildlife Service in February 2013. Flow protection measures in the EAHCP seek to ensure a minimum monthly average discharge from Comal Springs in excess of 30 cfs in a repeat of the drought of record. Long-term average discharge from Comal Springs is about 290 cfs.

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 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.

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. There are two

11 TWDB, “Major and Historical Springs of Texas (Report #189),” March 1975.

12 Brune, Gunnar, “Springs of Texas,” Volume I, Branch-Smith, Inc., Fort Worth, Texas, 1981.

main springs issuing 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.

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.

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

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.

1.7.4 Surface Water Quality

Surface water quality within the South Central Texas Region is generally good with typical values for criteria such as total dissolved solids (TDS), chlorides, sulfates, dissolved oxygen, pH, bacteria, and temperature in compliance with applicable Texas Surface Water Quality Standards. Within the South Central Texas Region, these standards are specified for 18 stream segments in the Guadalupe River Basin, 13 stream segments in the San Antonio River Basin, 12 stream segments in the Nueces River Basin, 2 stream segments in the San Antonio – Nueces Coastal Basin, and the Victoria Barge Canal in the Lavaca – Guadalupe Coastal Basin. With the exception of the Victoria Barge Canal, all of these segments support contact recreation and most support domestic water supply. Aquatic life uses are characterized as exceptional in 20 percent of these segments and high in an additional 70 percent of the segments.

Pursuant to Section 303(d) of the federal Clean Water Act, the most recent list of impaired water bodies for which effluent limitations are not stringent enough to implement water quality standards was issued in 2012. This list includes 28 inland water bodies intersecting the South Central Texas Region with 8, 12, 7, and 1 in the Guadalupe, San Antonio, Nueces, and Mission River systems (including tributary segments), respectively. Total Maximum Daily Loads (TMDLs) are being determined for 5 of these bodies, standards are under review for 7, and additional data is needed for 16. The most common impaired parameters are bacteria, dissolved oxygen, and fish community. In addition, Carancahua, Guadalupe, and Mission Bays are currently listed with bacteria as the impaired parameter because oysters occur in these waters.

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. Noted impaired water quality parameters in some water bodies does not preclude development of proximate or upstream water management strategies, but does point to the importance of appropriate wastewater treatment, management of non-point source pollutants, and compliance with environmental flow standards.

1.8 Threats to Agricultural and Natural Resources

Pursuant to 31 TAC 357.30, the South Central Texas Regional Water Planning Group (SCTRWPG) has identified the following threats to agriculture in the South Central Texas Regional Water Planning Area:

- 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.
- Deterioration of water quality, such 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.
- Temporary or permanent inundation of aquatic, riparian, and terrestrial habitats associated with surface water impoundment.

Technical evaluations of water management strategies (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 agriculture or natural resources are expected to be addressed or affected by a water management strategy and/or the plan. Following is a summary of 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 water management strategies 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 evaluation of proposed new appropriations and quantify 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.

- Acreage temporarily or permanently inundated by a planned reservoir and the frequency of such inundation.

1.9 Summary of Existing Plans

1.9.1 2012 State Water Plan[13]

In Section 26.051 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. As currently specified in Sections 16.055 and 16.056, the Plan is to be periodically reviewed and updated and serve as a flexible guide to state policy for the development of its water resources. The TCEQ shall consider the State Water Plan in its water regulatory actions, although its actions are not bound by the Plan.

The 2012 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 75th 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, based on reasonable projected uses of water, affordable water supply availability, and the goal of conservation of the State's natural resources.

The 2012 State Water Plan includes water management strategies for the South Central Texas Region that could produce new supplies of as much as 765,738 acft in 2060. Selected water management strategies contained in the plan are summarized below:

Three Brackish Groundwater Desalination (Wilcox Aquifer) projects would provide a total of up to 42,220 acft/yr of water in the year 2060 with a capital cost of $378 million.

Hays/Caldwell Public Utility Agency Project would provide up to 33,314 acft/yr of groundwater (Carrizo Aquifer) in 2060 with a capital cost of $308 million.

Guadalupe-Blanco River Authority Mid-Basin Project would provide 25,000 acft/yr of Guadalupe run-of-river supplies stored in an off-channel reservoir starting in 2020 with a capital cost of $547 million.

Off-channel reservoir project (Lower Colorado River Authority/San Antonio Water System) would provide 90,000 acft/yr of water starting in 2030 with a capital cost of $2 billion.

Recycled Water Programs would provide up to 41,737 acft/yr of water in 2060 with a capita cost of $465 million.

Seawater Desalination Project would provide 84,012 acft/yr of water in 2060 with a capital cost of $1.3 billion.

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13 TWDB, State Water Plan: Water for Texas – 2012, Austin, Texas, 2012.

Conservation strategies account for 11 percent of the total amount of water that would be provided by the region's recommended water management strategies.

1.9.2 2011 Regional Water Plan

The 2011 South Central Texas Regional Water Plan was adopted in January 2011. The SCT Regional Water Plan, outlines the water management strategies recommended by the planning group to meet the identified needs in the region. These water management strategies are listed in Appendix A.2 of the 2012 State Water Plan.

1.9.3 Local Water Plans

During this planning process the South Central Texas Planning Group worked with each local entity to develop a water management plan to meet any identified needs. These plans are reflected in Chapter 5 of this document.

1.9.4 Current Preparations for Drought

Under requirements of Senate Bill 1 of the 75th Texas Legislature, drought contingency plans are required by the TCEQ for wholesale water providers, irrigation districts, and retail water suppliers. Senate Bill 1 also specifies that TCEQ require 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 prepare a water conservation plan. In addition, conservation plans are commonly included in the management plans of groundwater conservation districts.

All drought contingency plans 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 the irrigation of landscaped areas, to wash any motor vehicle, to fill or add water to any indoor or outdoor swimming pool, operation of any ornamental fountain, and the irrigation of golf courses.

The groundwater conservation district management plans also contain conservation plans that set goals and objectives for conserving groundwater within the district. 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 by 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, in order 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 Conservation and Reuse Plan designed to reduce the use of potable water for non-potable applications.

Senate Bill 3 of the 80th Texas Legislature established critical period management provisions and the Edwards Aquifer Habitat Conservation Plan established flow protection measures to address Edwards Aquifer management and springflow during times of drought. 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 South Central Texas Regional Water Plan relies upon local water management agencies and water utilities drought contingency plans to identify factors specific to each source of water supply to be considered in determining whether to initiate a drought response, and actions to be taken as part of the response. Chapter 7 includes additional information and recommendations of the SCTRWPG regarding drought management.

1.10 Water Loss Audits

In accordance with 31 TAC 357.30, the South Central Texas 2016 Regional Water Plan 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 §358.6 of this title (relating to Water Loss Audits). In addition, in accordance with 31 TAC 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 §358.6 of this title (relating to Water Loss Audits).

The 2010 Water Loss Data presented herein were submitted to the Texas Water Development Board (TWDB) by water utilities in Texas as required by HB 3338 of the 78th Texas Legislature. HB 3338 required the TWDB to compile the information included in the water audits by type of retail public utility and by regional water planning area, and provide that information to the regional planning groups for use in identifying appropriate water management strategies in the development of their regional water plan. The water loss data presented below were acquired as part of the 2010 Water Loss Audit reporting requirements. The methodology used relies upon self-reporting data provided by public utilities, and due to this, the self-reported data may be suspect and in need of further refinement.

The TWDB provided the list of 115 public utilities of the South Central Texas Water Planning Region that filed a water loss audit report. Table 1-11 summarizes a portion of that data for each of the 115 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.

The cutoff point the TWDB uses for inclusion of a water utility as a Water User Group (WUG) member for which population projections and water demand projections are made for regional planning is 280 acft of deliveries during the first year of the planning period, which in the present case is 2010. Of the 115 public utilities that responded to the water loss survey, 60 reported having delivered less than 280 acft in 2010, and 55 reported having delivered more than 280 acft in 2010.

The 115 water utilities that responded to the water loss survey, reported having served 2,198,808 people in 2010 (about 87 percent of the 2010 regional population) (Table 1-11). Total reported quantity of water produced was 319,179 acre-feet, with a reported quantity of water loss of 50,620 acre-feet (Table 1-11). The quantity of water loss, as a percent of estimated total water originating at the source is calculated at about 15.9 percent (Table 1-11).

Table 1-11 Water Loss Audit – 2010 South Central Texas Water Planning Region

No.	Utility Name	Retail Pop Served	System Input Volume (acft)	Water Loss (acft)	Water Loss (%)	Total Cost Of Loss ($)
Utilities with Input Volumes of Less Than 280 acft/yr						
1	ARROWHEAD WATER SYSTEM	96	14	14	98.7%	9,001
2	BERRY OAKS WATER CO	102	22	4	18.4%	7,448
3	BMWD BULVERDE HILLS	954	85	9	11.1%	1,969
4	BMWD GERONIMO FOREST WATER SYSTEM	477	62	13	21.2%	1,068
5	BMWD OAKLAND ESTATES	495	55	18	33.0%	4,265
6	BMWD WEST VIEW SUBDIVISION	636	59	16	28.0%	2,570
7	BMWD WOODS OF SPRING BRANCH	102	8	1	8.7%	635
8	CADILLAC WATER CORPORATION	62	53	5	9.6%	-
9	CARRIZO HILL WSC	708	116	4	3.1%	5,187
10	CITY OF AUSTWELL	192	27	9	35.8%	61,888
11	CITY OF BAYSIDE	400	32	1	3.4%	8,599,276
12	CITY OF BIG WELLS	704	91	16	17.5%	8,784
13	CITY OF CHRISTINE	465	28	2	6.3%	6,026
14	CITY OF FALLS CITY	601	102	17	16.7%	21,543
15	CITY OF LA COSTE	1,295	131	17	13.3%	10,956
16	CITY OF MARION	2,000	212	7	3.3%	5,745
17	CITY OF NATALIA	1,663	242	84	34.7%	22,390
18	CITY OF POINT COMFORT	781	177	(38)	-21.6%	(43,728)
19	CITY OF SMILEY	550	92	13	13.8%	4,818
20	CITY OF STOCKDALE	2,175	251	52	20.6%	74,316
21	CITY OF WOODSBORO	1,685	222	54	24.3%	44,330
22	CREEKWOOD ESTATES	762	66	16	24.0%	5,539
23	CREEKWOOD RANCHES WSC	465	39	4	11.3%	9,916
24	DALE WSC	480	41	8	18.8%	2,359
25	EAGLES PEAK RANCH WSC	150	22	5	22.9%	1,395
26	EAST MEDINA COUNTY SUD UNIT 2	2,700	233	57	24.4%	43,536
27	EAST MEDINA COUNTY SUD UNIT 3	800	49	3	6.8%	2,673
28	FASHING PEGGY WSC	435	53	18	34.4%	11,846
29	FRIO CIELO RANCH ASSOCIATION WATER SYSTEM	47	13	1	10.0%	-
30	GBRA CALHOUN COUNTY RURAL WATER SYSTEM	3,909	241	21	8.7%	19,839
31	GBRA CORDILLERA RANCH	500	195	27	14.1%	31,354
32	GBRA PORT LAVACA	-	169	68	40.1%	55
33	GREY FOREST WATER SYSTEM	420	59	0	0.4%	135
34	HICKORY HILL WATER	291	30	10	33.0%	6,337
35	KENDALL COUNTY UTILITY CO	3,085	276	60	21.8%	92,578
36	KINGS POINT WSC	40	35	5	13.7%	1,759
37	KNIPPA WSC	750	125	25	19.8%	544
38	MOSS WOODS SUBDIVISION WATER SYSTEM	102	10	2	16.9%	535
39	NEW ALSACE WSC	200	30	8	27.2%	11,457

No.	Utility Name	Retail Pop Served	System Input Volume (acft)	Water Loss (acft)	Water Loss (%)	Total Cost Of Loss ($)
40	NORTH POINT SUBDIVISION	68	7	1	8.5%	1,007
41	PICOSA WSC	714	172	22	13.0%	18,388
42	PLATTEN CREEK WATER SYSTEM	83	11	3	30.6%	4,780
43	POLONIA WSC SOUTH	1,626	228	72	31.5%	22,850
44	REBECCA CREEK MUD	1,308	127	49	38.3%	134,785
45	REFUGIO COUNTY WCID 1	630	70	5	7.1%	25,324
46	ROCKY CREEK SUBDIVISION WATER SYSTEM	90	9	2	25.4%	3,401
47	SCENIC HEIGHTS	1,935	134	25	18.4%	-
48	SEVEN OAKS WATER SUPPLY	135	13	2	18.1%	632
49	SHADY OAKS WATER COMPANY	357	39	9	22.5%	5,722
50	SJWTX GLENWOOD SUBDIVISION	190	40	5	12.0%	7,781
51	SJWTX STALLION SPRINGS	257	22	5	22.8%	8,299
52	SJWTX SUMMIT NORTH SUBDIVISION	22	7	4	60.9%	6,571
53	SPRING BRANCH INDIAN HILLS ESTATES WSC	471	35	4	11.1%	256
54	SUNILANDINGS UTILITIES	20	7	3	47.2%	1,195
55	THE OAKS WSC	1,161	244	30	12.2%	13,715
56	TRI COMMUNITY WSC	1,200	150	45	29.8%	13,742
57	UTOPIA WSC	744	74	22	29.5%	1,179
58	VILLE DALSACE WATER SUPPLY	250	47	0	0.9%	467
59	WEST MEDINA WSC	960	213	43	20.4%	35,364
60	WESTHAVEN WATER COMPANY	270	79	40	50.6%	15,639
	Subtotal Utilities with Less Than 280 acft/yr	**3,770**	**5,493**	**1,048**	**19.1%**	**9,411,441**
	Utilities with Input Volumes of More Than 280 acft					
61	ATASCOSA RURAL WSC	9,321	1,041	128	12.3%	27,389
62	BENTON CITY WSC	13,491	1,407	365	25.9%	231,359
63	BMWD CASTLE HILLS	8,079	1,477	101	6.8%	46,833
64	BMWD CHAPARRAL	2,754	296	50	16.8%	16,333
65	BMWD HILL COUNTRY	39,714	9,788	1,582	16.2%	542,486
66	BMWD NORTH WEST	50,073	5,584	753	13.5%	146,647
67	BMWD NORTHEAST	45,375	4,808	639	13.3%	127,637
68	BMWD SOUTHSIDE	106,590	15,639	4,371	28.0%	700,022
69	BMWD TIMBERWOOD PARK	16,215	2,355	504	21.4%	89,091
70	CITY OF BOERNE	11,432	1,827	153	8.4%	81,582
71	CITY OF CASTROVILLE	2,808	569	119	20.9%	126,559
72	CITY OF CIBOLO	15,000	1,325	(31)	-2.3%	(96,495)
73	CITY OF CONVERSE	22,284	2,044	356	17.4%	169,961
74	CITY OF COTULLA	3,614	1,399	577	41.2%	263,055
75	CITY OF CUERO	6,640	1,627	393	24.2%	48,221
76	CITY OF DEVINE	4,140	658	101	15.3%	66,153
77	CITY OF DILLEY	3,674	1,037	227	21.9%	91,620
78	CITY OF GARDEN RIDGE	3,450	1,020	71	6.9%	226,976
79	CITY OF GOLIAD	2,059	346	68	19.7%	106,874

No.	Utility Name	Retail Pop Served	System Input Volume (acft)	Water Loss (acft)	Water Loss (%)	Total Cost Of Loss ($)
80	CITY OF JOURDANTON	3,909	681	113	16.6%	25,889
81	CITY OF KIRBY	8,673	860	180	21.0%	27,379
82	CITY OF LA VERNIA	1,134	296	68	23.0%	44,054
83	CITY OF LIVE OAK	8,120	1,281	36	2.8%	18,756
84	CITY OF LOCKHART	12,700	1,637	151	9.2%	175,695
85	CITY OF LULING	5,401	688	35	5.1%	32,771
86	CITY OF LYTLE	3,700	491	115	23.5%	75,122
87	CITY OF NEW BRAUNFELS UTILITIES	61,410	11,355	1,239	10.9%	891,007
88	CITY OF NIXON	2,246	797	9	1.1%	4,327
89	CITY OF PEARSALL	7,157	1,256	(46)	-3.7%	(4,646,115)
90	CITY OF POTH	1,850	334	69	20.7%	86,869
91	CITY OF REFUGIO	2,941	520	23	4.4%	22,585
92	CITY OF SCHERTZ	35,058	4,152	130	3.1%	79,809
93	CITY OF SEGUIN	21,126	5,994	718	12.0%	561,889
94	CITY OF UNIVERSAL CITY	19,084	2,558	233	9.1%	172,609
95	CITY OF VICTORIA	62,592	10,955	967	8.8%	419,148
96	CITY OF YOAKUM	5,815	968	136	14.1%	13,036
97	CLWSC CANYON LAKE SHORES	9,253	1,470	199	13.5%	341,838
98	CLWSC TRIPLE PEAK PLANT	12,427	1,626	480	29.5%	786,650
99	CRYSTAL CLEAR WSC	13,506	1,670	294	17.6%	223,942
100	EAST MEDINA COUNTY SUD UNIT 1	5,300	541	155	28.6%	117,506
101	EL OSO WSC	4,803	757	294	38.8%	221,887
102	GONZALES COUNTY WSC	7,140	1,661	431	26.0%	151,952
103	GREEN VALLEY SUD	33,128	2,675	220	8.2%	0
104	KENDALL COUNTY WCID 1	2,700	300	50	16.8%	13,435
105	MAXWELL WSC	5,700	466	90	19.3%	67,493
106	MCCOY WSC	8,900	832	134	16.1%	87,430
107	OAK HILLS WSC	4,359	568	59	10.4%	24,713
108	POLONIA WSC NORTH	4,464	493	96	19.5%	17,969
109	PORT OCONNOR MUD	4,308	315	29	9.3%	18,168
110	S S WSC	13,104	1,530	104	6.8%	79,081
111	SAN ANTONIO WATER SYSTEM	1,360,284	195,662	31,458	16.1%	14,996,067
112	SPRINGS HILL WSC	25,000	2,635	528	20.0%	585,540
113	SUNKO WSC	3,720	440	56	12.8%	16,253
114	YANCEY WSC	5,543	640	140	21.8%	46,517
115	ZAVALA COUNTY WCID 1	1,770	335	54	16.1%	14,365
Subtotal Utilities with More than 280 acft/yr		**2,155,038**	**313,686**	**49,572**	**15.8**	**18,827,938**
	TOTAL	**2,198,808**	**319,179**	**50,620**	**15.9**	**28,239,379**

1.11 Drought of Record

The historic 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 gaged streamflows for the Guadalupe River at Victoria and the San Antonio River at Goliad, there were three consecutive years in the 1950s drought (1954-1956) during which streamflows in each year were less than those in 2011. Similarly, total Edwards Aquifer recharge in 2011 was twice that for 1956. Focusing on Edwards Aquifer recharge in the Nueces River Basin only, recharge in 2011 was 28 percent greater than that in 1956. Even though the current drought has persisted through the preparation of this plan, moving average analyses of Edwards Aquifer recharge indicate that current drought is less severe than that of the 1950s for durations ranging from 1 to 10 years. Hence, it is appropriate to use the 1950s drought as the drought of record for evaluation of existing supplies and water management strategies in the 2016 South Central Texas Regional Water Plan.

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2 Population and Water Demand Projections [31 TAC §357.31]

In order to develop water plans to meet future water needs, it is necessary to make projections of future population and water demands for the region. For purposes of the South Central Texas Region, the TWDB has made both population and water demand projections for cities, rural areas, and water using purposes for each of the counties of the region (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) (see Table 1-1 in Chapter 1). In accordance with TWDB Rules, Section 357.31(e), which states, "In developing regional water plans, regional water planning groups (RWPGs) shall use population and water demand projections developed by the executive administrator that will be contained in the next state water plan and adopted by the TWDB after consultation with the RWPGs, Texas Commission on Environmental Quality (TCEQ), Texas Department of Agriculture (TDA), and the Texas Parks and Wildlife Department (TPWD). The TWDB-approved population and water demand projections are presented in this chapter.

2.1 Population Projections

Based on the population projections provided by the TWDB, the population of the South Central Texas Region is projected increase from 3,001,465 in 2020 to 5,192,028 by 2070 (an increase of 73.0 percent) (Table 2-1 and Figure 2-1). Approximately 68.6 percent of the population of the region is projected to reside in the San Antonio River Basin in the year 2070, with 24.2 percent in the Guadalupe River Basin (Table 2-2).

The TWDB population projections for 181 municipal water user groups (individual cities and water supply districts and/or authorities) and 47 rural areas of each county and part of county of each river basin area of the South Central Texas Region (L) are shown in Appendix A.

2.2 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 because they are similar types of uses and they are usually served treated water, of drinking quality, from a common system (e.g., a public water system). The projected quantity of water needed for municipal purposes depends upon 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 228 municipal water user groups of the South Central Texas Water Planning Region (Appendix A).

Per capita water use in Region L is projected to decline over the planning period from 140 gallons per capita per day (gpcd) in year 2020 to 130 gpcd in 2070 (Figure 2-2). However, due to projected population growth between 2020 and 2070, municipal water demand in Region L is projected to increase from 469,065 acft/yr in 2020 to 754,306 acft/yr in 2070 (Figure 2-2 and Table 2-2).[1] The projected municipal water demand for each county in the region is shown in Table 2-2. Since Bexar County has the highest population, it also has the largest projected water demand, with almost 59 percent of the total projected municipal water demand for the region by the year 2070 (Table 2-2).

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

Table 2-1 Population Projections South Central Texas Region Individual Counties with River Basin Summaries

	Projections					
	2020	***2030***	***2040***	***2050***	***2060***	***2070***
Counties						
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	140,825	178,399	216,562	255,092	293,362	330,099
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
LaSalle	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
Total	**3,001,465**	**3,476,548**	**3,919,536**	**4,336,127**	**4,770,185**	**5,192,028**
River and Coastal Basin Summaries						
Rio Grande	24	25	27	28	29	30
Nueces	180,570	202,005	221,162	239,571	256,483	271,891
San Antonio	2,192,262	2,512,602	2,797,947	3,071,710	3,326,587	3,561,150
Guadalupe	555,051	681,755	814,463	933,374	1,090,528	1,257,651
Lower Colorado	4,819	5,902	6,980	8,044	9,121	10,168
Lavaca	3,683	3,818	3,892	3,963	4,016	4,059
Colorado-Lavaca	1,631	1,823	2,010	2,190	2,369	2,541
Lavaca-Guadalupe	54,987	59,842	64,156	68,181	71,905	75,335
San Antonio-Nueces	8,438	8,776	8,899	9,066	9,147	9,203
Total	**3,001,465**	**3,476,548**	**3,919,536**	**4,336,127**	**4,770,185**	**5,192,028**
Source: Texas Water Development Board (TWDB), Consensus Projections adopted by the TWDB, October 17, 2013.						

Figure 2-1 Summary of South Central Texas Region Projected Population

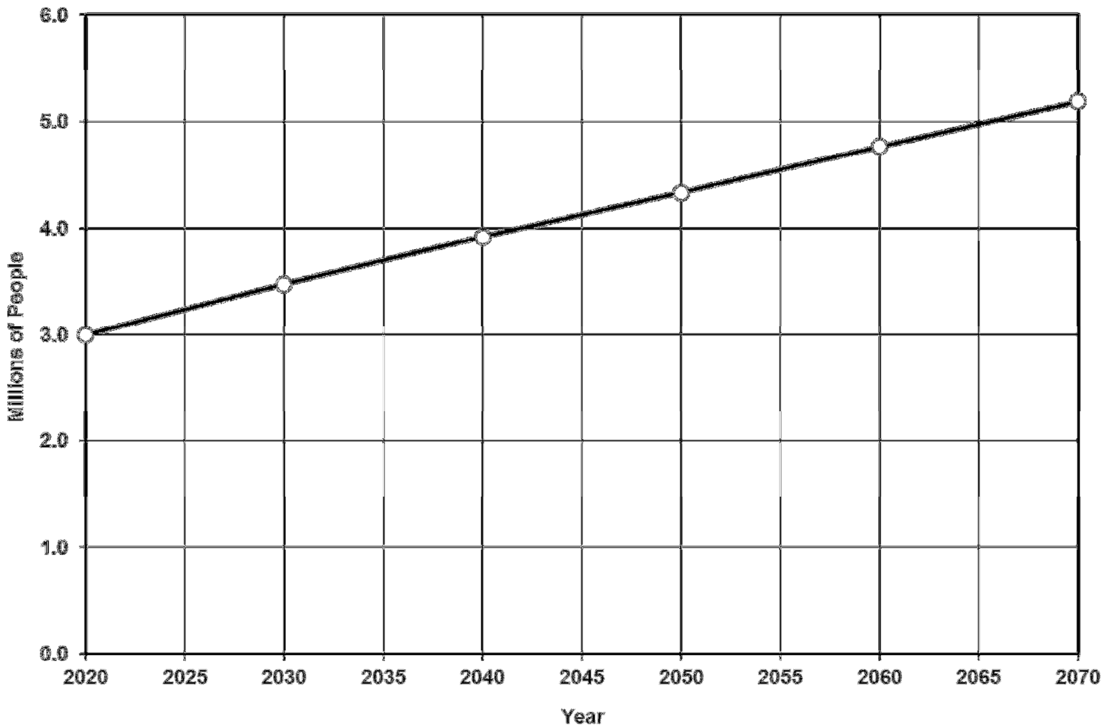


Figure 2-2 Projected Per Capita Water Use and Municipal Water Demand South Central Texas Region – 2020 to 2070

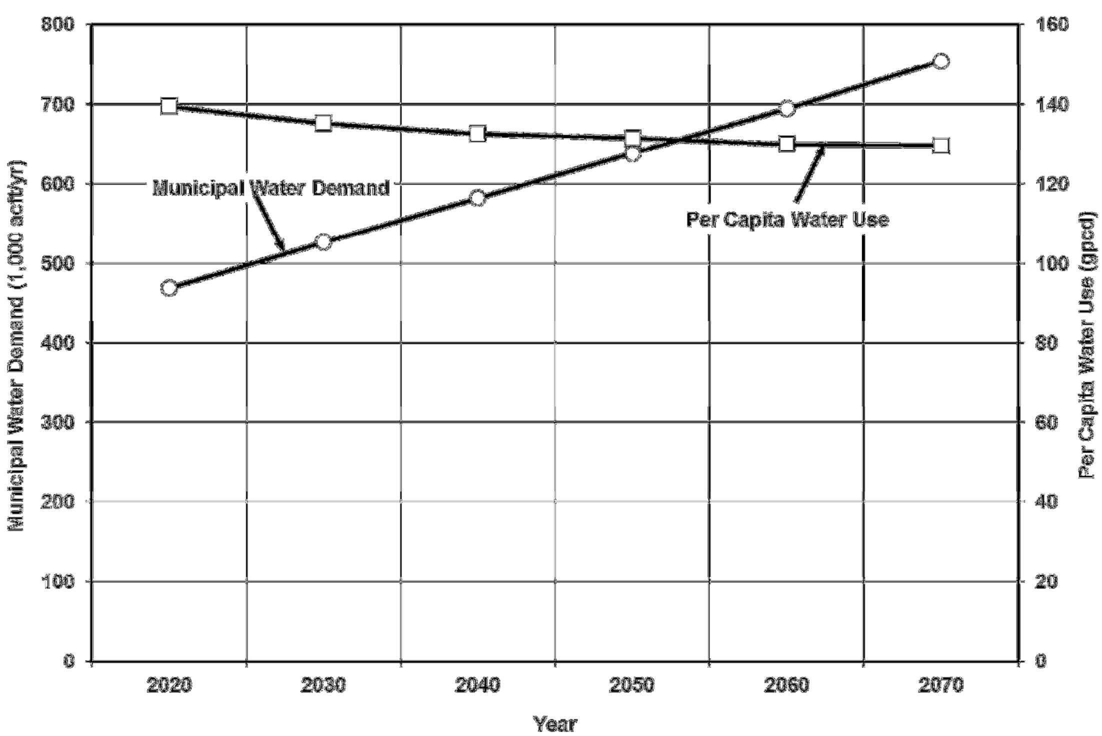


Table 2-2 Municipal Water Demand Projections South Central Texas Region Individual Counties with River Basin Summaries

	Projections					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Counties						
Atascosa	8,044	9,039	9,968	10,937	11,904	12,814
Bexar	299,108	328,843	357,189	386,788	416,083	443,319
Caldwell	6,182	7,328	8,491	9,693	10,938	12,177
Calhoun	2,980	3,204	3,445	3,708	3,998	4,287
Comal	24,810	30,597	36,568	42,704	48,918	54,917
DeWitt	4,642	4,681	4,665	4,685	4,054	4,079
Dimmit	3,396	3,582	3,692	3,839	2,759	2,829
Frio	3,636	3,917	4,181	4,454	4,713	4,954
Goliad	1,646	1,802	1,899	1,935	1,444	1,461
Gonzales	5,404	5,818	6,267	6,789	6,473	7,001
Guadalupe	25,585	32,439	37,560	42,706	48,066	53,367
Hays (Part)	24,053	30,202	37,760	44,231	55,455	68,315
Karnes	3,675	3,718	3,674	3,651	3,471	3,471
Kendall	6,766	8,335	10,014	11,679	13,460	15,216
LaSalle	2,603	2,800	2,988	3,219	2,329	2,462
Medina	7,643	8,329	8,919	9,477	10,032	10,530
Refugio	1,682	1,681	1,649	1,665	1,195	1,199
Uvalde	5,892	6,295	6,644	7,052	7,484	7,906
Victoria	20,160	21,089	21,805	22,552	23,278	23,904
Wilson	8,407	10,106	11,804	13,330	14,756	16,120
Zavala	2,751	3,001	3,239	3,500	3,746	3,978
Total	**469,065**	**526,806**	**582,421**	**638,594**	**694,556**	**754,306**
River and Coastal Basin Summaries						
Rio Grande	4	4	5	5	4	4
Nueces	33,587	36,468	39,107	41,934	42,395	44,874
San Antonio	333,943	372,598	407,828	444,052	479,587	513,393
Guadalupe	88,660	104,211	121,391	137,868	157,757	180,594
Lower Colorado	600	707	820	933	1,057	1,177
Lavaca	683	687	683	685	604	608
Colorado-Lavaca	181	193	209	227	244	262
Lavaca-Guadalupe	9,604	10,125	10,588	11,081	11,598	12,080
San Antonio-Nueces	1,803	1,813	1,790	1,809	1,310	1,314
Total	**469,065**	**526,806**	**582,421**	**638,594**	**694,556**	**754,306**
Source: Texas Water Development Board (TWDB); Consensus Projections adopted by the TWDB, October 17, 2013.						

2.3 Industrial 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 123,983 acft of water in 2020 and 178,820 acft/yr in 2070, a 44 percent increase (Figure 2-3 and Table 2-3). As can be seen in Figure 2-3, manufacturing water demand is projected to increase throughout the planning period.

Figure 2-3 Projections of Industrial, Steam-Electric, and Mining Water Demands South Central Texas Region – 2020 to 2070

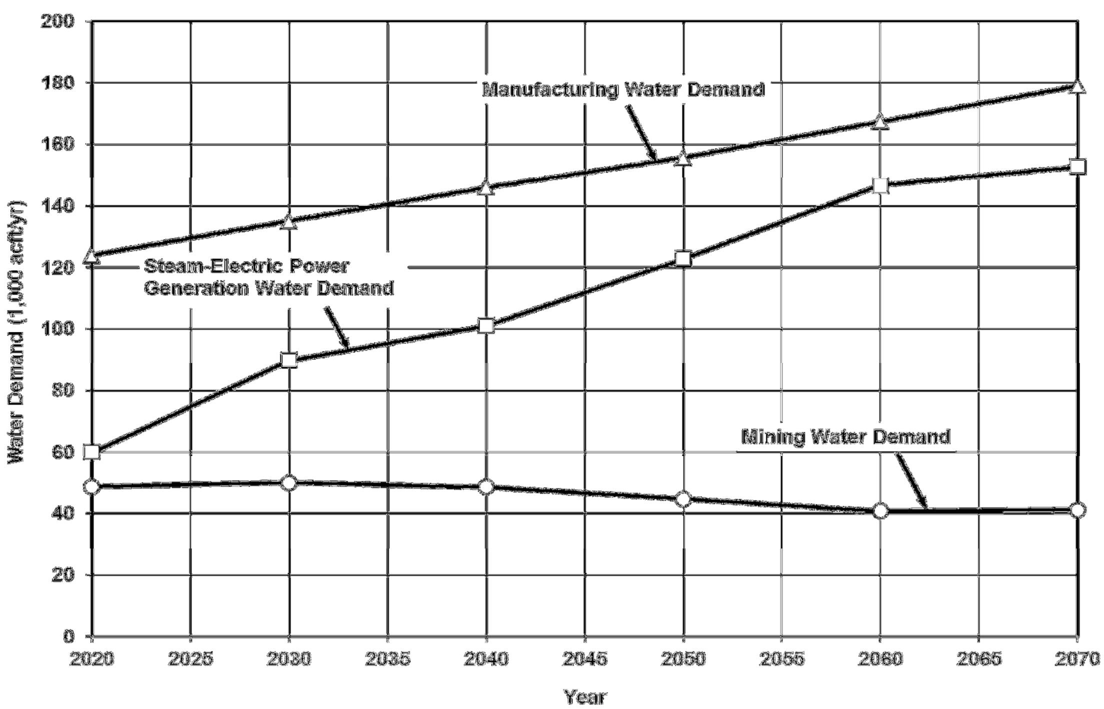


Table 2-3 Industrial Water Demand Projections South Central Texas Region Individual Counties with River Basin Summaries

	Projections					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Counties						
Atascosa	12	12	12	12	12	12
Bexar	22,737	25,264	27,802	30,035	32,461	35,083
Caldwell	8	9	10	11	12	13
Calhoun	54,857	59,235	63,575	67,406	72,238	76,419
Comal	8,563	9,314	10,045	10,672	11,553	12,507
DeWitt	550	586	622	652	702	756
Dimmit	0	0	0	0	0	0
Frio	0	0	0	0	0	0
Goliad	34	51	68	85	102	122
Gonzales	1,671	1,794	1,914	2,020	2,163	2,316
Guadalupe	3,003	3,300	3,585	3,830	4,161	4,524
Hays (Part)	107	122	138	152	165	179
Karnes	171	175	179	182	192	203
Kendall	0	0	0	0	0	0
LaSalle	0	0	0	0	0	0
Medina	48	52	56	60	65	70
Refugio	0	0	0	0	0	0
Uvalde	289	300	311	321	342	364
Victoria	30,977	33,815	36,640	39,165	42,005	45,051
Wilson	10	10	10	10	10	10
Zavala	946	987	1,026	1,058	1,124	1,194
Total	**123,983**	**135,026**	**145,993**	**155,671**	**167,307**	**178,820**
River and Coastal Basin Summaries						
Rio Grande	0	0	0	0	0	0
Nueces	1,288	1,343	1,397	1,442	1,533	1,630
San Antonio	23,054	25,611	28,178	30,439	32,903	35,567
Guadalupe	44,564	48,603	52,594	56,123	60,352	64,902
Lower Colorado	0	0	0	0	0	0
Lavaca	220	234	249	261	281	302
Colorado-Lavaca	30,171	32,579	34,966	37,073	39,731	42,030
Lavaca-Guadalupe	24,686	26,656	28,609	30,333	32,507	34,389
San Antonio-Nueces	0	0	0	0	0	0
Total	**123,983**	**135,026**	**145,993**	**155,671**	**167,307**	**178,820**

Source: Texas Water Development Board (TWDB); Consensus Projections adopted by the TWDB, October 17, 2013.

2.4 Steam-Electric Power Water Demand Projections

Steam-electric power generation in Texas is concentrated in ten privately-owned utilities, which account for 85 percent of generation. Nine percent of power generation occurs in facilities that are both publicly and privately held, and 6 percent is from publicly owned utilities. The 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, Hays, and Victoria) 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 59,901 acft/yr in 2020 and increase to 152,702 acft/yr by 2070 (a 155 percent increase) (Table 2-4 and Figure 2-3).

2.5 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, natural gas and for sand and gravel washing. Many counties in the South Central Texas Region are part of the Eagleford 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 Region L 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 2-5 and Figure 2-3).

Table 2-4 Steam-Electric Power Water Demand Projections South Central Texas Region Individual Counties with River Basin Summaries

	Projections					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Counties						
Atascosa	4,817	6,101	5,997	7,336	7,672	7,819
Bexar	25,215	29,501	32,275	35,355	38,775	42,526
Caldwell	0	0	0	0	0	0
Calhoun	0	0	0	0	0	0
Comal	0	0	0	0	0	0
DeWitt	0	0	0	0	0	0
Dimmit	0	0	0	0	0	0
Frio	555	417	398	158	189	163
Goliad	17,080	17,080	17,080	17,080	17,080	17,080
Gonzales	0	0	0	0	0	0
Guadalupe	5,984	4,941	5,136	5,585	7,515	8,371
Hays (Part)	730	965	1,982	2,708	3,688	5,023
Karnes	0	0	0	0	0	0
Kendall	0	0	0	0	0	0
LaSalle	0	0	0	0	0	0
Medina	0	0	0	0	0	0
Refugio	0	0	0	0	0	0
Uvalde	0	0	0	0	0	0
Victoria	5,530	30,802	38,202	54,623	71,720	71,720
Wilson	0	0	0	0	0	0
Zavala	0	0	0	0	0	0
Total	**59,901**	**89,807**	**101,070**	**122,845**	**146,639**	**152,702**
River and Coastal Basin Summaries						
Rio Grande	0	0	0	0	0	0
Nueces	5,362	6,518	6,395	7,494	7,861	7,982
San Antonio	25,215	29,501	32,275	35,355	38,775	42,526
Guadalupe	29,324	53,788	62,400	79,996	100,003	102,194
Lower Colorado	0	0	0	0	0	0
Lavaca	0	0	0	0	0	0
Colorado-Lavaca	0	0	0	0	0	0
Lavaca-Guadalupe	0	0	0	0	0	0
San Antonio-Nueces	0	0	0	0	0	0
Total	**59,901**	**89,807**	**101,070**	**122,845**	**146,639**	**152,702**

Source: Texas Water Development Board (TWDB); Consensus Projections adopted by the TWDB, October 17, 2013.

Table 2-5 Mining Water Demand Projections South Central Texas Region Individual Counties with River Basin Summaries

	Projections					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
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)	0	0	0	0	0	0
Karnes	2,528	1,919	1,288	662	35	2
Kendall	0	0	0	0	0	0
LaSalle	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**
River and Coastal Basin Summaries						
Rio Grande	654	665	577	376	175	81
Nueces	21,187	21,448	20,057	16,244	12,126	10,243
San Antonio	12,879	13,116	13,146	13,259	13,520	14,577
Guadalupe	13,203	13,981	14,248	14,376	14,800	16,176
Lower Colorado	11	9	6	4	2	1
Lavaca	506	476	351	228	104	48
Colorado-Lavaca	26	27	20	15	9	6
Lavaca-Guadalupe	59	62	47	34	22	14
San Antonio-Nueces	213	192	149	111	73	63
Total	**48,738**	**49,976**	**48,601**	**44,647**	**40,831**	**41,209**
Source: Texas Water Development Board (TWDB); Consensus Projections adopted by the TWDB, October 17, 2013.						

2.6 Irrigation Water Demand Projections

In 2020, is it projected that irrigated agriculture will account for approximately 51 percent of the total water used in the state. It is projected that approximately 9.4 million acft of water will be used to grow a variety of crops ranging from food and feed grains to fruits, vegetables, and cotton. Of this 9.4 million acft of water to be used for irrigation in Texas, groundwater will be approximately 70 percent and surface water will be about 30 percent. The TWDB irrigation water demand projections show annual use in the South Central Texas Region to be 344,629 acft/yr in 2020, about 3.7 percent of the total projected irrigation water use in Texas in 2020 (Figure 2-4 and Table 2-6). Projected irrigation water demands in the region in 2070 are 282,760 acft/yr, about 18.0 percent less than those in 2020 (Figure 2-4 and Table 2-6). The projected decline is based upon expected increases in irrigation efficiency and reductions in profitability of irrigated agriculture.

Figure 2-4 Projections of Irrigation and Livestock Water Demands South Central Texas Region – 2020 to 2070

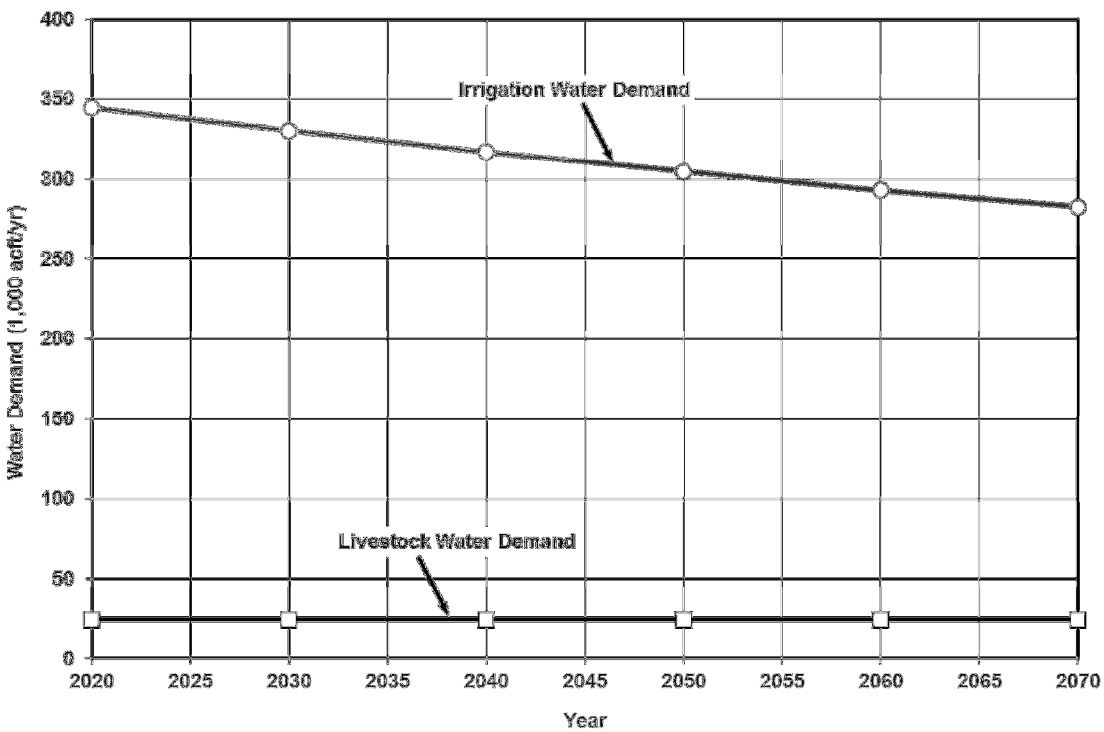


Table 2-6 Irrigation Water Demand Projections South Central Texas Region Individual Counties with River Basin Summaries

	Projections					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Counties						
Atascosa	26,594	25,703	24,845	24,020	23,223	22,498
Bexar	11,626	11,135	10,664	10,213	9,781	9,401
Caldwell	618	549	488	433	384	350
Calhoun	13,472	11,935	10,894	10,148	9,453	8,726
Comal	429	390	351	312	275	252
DeWitt	1,485	1,485	1,485	1,485	1,485	1,485
Dimmit	5,775	5,715	5,485	5,249	5,023	4,869
Frio	70,831	68,327	65,932	63,638	61,423	59,412
Goliad	3,200	3,200	3,200	3,200	3,200	3,200
Gonzales	2,413	2,080	1,792	1,545	1,333	1,193
Guadalupe	413	366	321	307	305	284
Hays (Part)	650	644	638	632	626	620
Karnes	655	593	536	485	438	403
Kendall	375	367	359	352	346	339
LaSalle	4,636	4,493	4,354	4,220	4,090	3,971
Medina	57,464	55,070	52,776	50,579	48,473	46,615
Refugio	652	652	652	652	652	652
Uvalde	65,722	63,152	60,682	58,310	56,030	54,004
Victoria	21,215	21,215	21,215	21,215	21,215	21,215
Wilson	12,182	10,831	9,640	8,592	7,685	7,009
Zavala	44,222	42,475	40,797	39,185	37,636	36,262
Total	**344,629**	**330,377**	**317,106**	**304,772**	**293,076**	**282,760**
River and Coastal Basin Summaries						
Rio Grande	755	747	717	686	657	637
Nueces	272,582	262,017	251,774	241,968	232,576	224,274
San Antonio	28,827	27,177	25,658	24,269	23,000	21,958
Guadalupe	8,360	7,782	7,437	7,078	6,769	6,546
Lower Colorado	19	17	15	13	12	11
Lavaca	846	846	846	846	846	846
Colorado-Lavaca	713	630	575	536	499	461
Lavaca-Guadalupe	31,432	29,978	28,993	28,287	27,629	26,941
San Antonio-Nueces	1,096	1,093	1,091	1,089	1,088	1,086
Total	**344,629**	**330,377**	**317,106**	**304,772**	**293,076**	**282,760**

Source: Texas Water Development Board (TWDB); Consensus Projections adopted by the TWDB, October 17, 2013.

2.7 Livestock Water Demand Projections

In the South Central Texas Region in 2012, livestock production was valued at approximately $1.1 billion, which was 1.9 times the value of crops produced in the region during that year. There were reported to be approximately 867,500 million head of cattle and calves, 95 million chickens, 38,300 head of sheep and lambs, and about 8,500 hogs and pigs in Region L livestock production in 2012. Although livestock production is an 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 24,038 acft/yr (Figure 2-4 and Table 2-7). It is projected that water used for livestock purposes will remain constant throughout the planning period (Figure 2-4 and Table 2-7).

2.8 Total Water Demand Projections

Total water demand projections for the South Central Texas Region are the sum of water demand projections for municipal, manufacturing, steam-electric power generation, mining, irrigation, and livestock water use sectors (Table 2-2 through Table 2-7) and are summarized in Table 2-8 and Figure 2-5. Total Region L water demands are projected to be 1,070,354 acft/yr in 2020, 1,219,229 acft/yr in 2040, and 1,433,835 acft/yr in 2070 (Table 2-8 and Figure 2-5).

The use sector compositions of projected water demands in Region L are summarized at years 2020, 2040, and 2070 in Table 2-9. As shown in Table 2-9, municipal, manufacturing, and steam-electric percentages of total water demands are expected increase while irrigation, mining, and livestock percentages are expected to increase during the planning period.

Figure 2-5 Total Water Demand Projections South Central Texas Region – 2020 to 2070

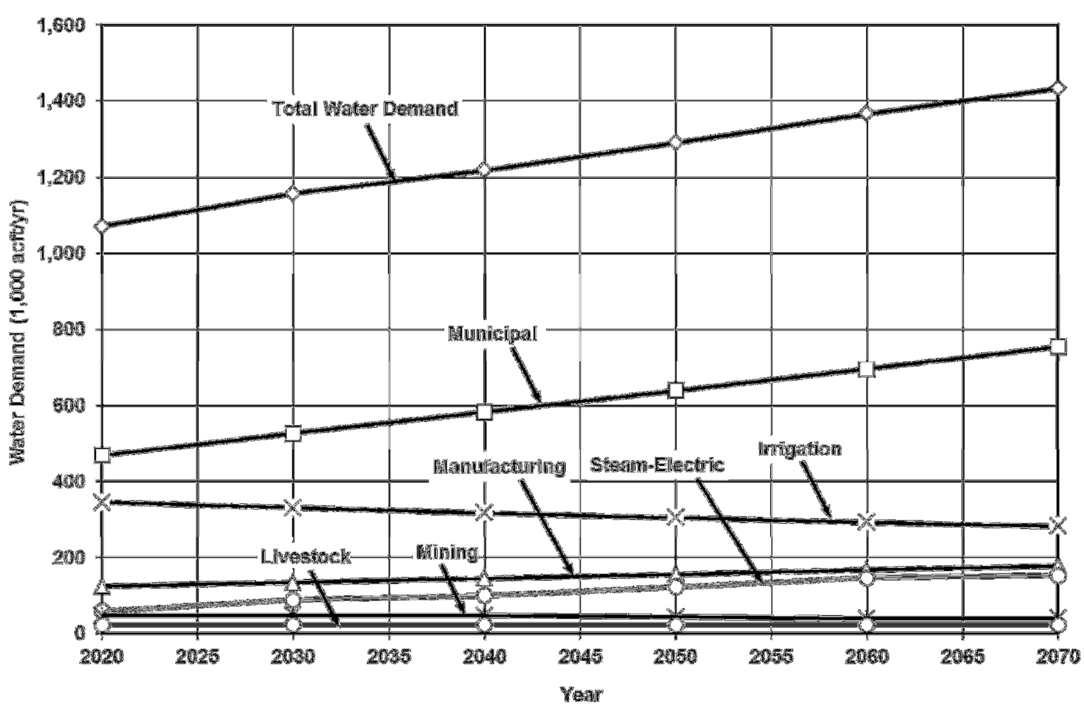


Table 2-7 Livestock Water Demand Projections South Central Texas Region Individual Counties with River Basin Summaries

	Projections					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Counties						
Atascosa	1,509	1,509	1,509	1,509	1,509	1,509
Bexar	1,158	1,158	1,158	1,158	1,158	1,158
Caldwell	1,008	1,008	1,008	1,008	1,008	1,008
Calhoun	344	344	344	344	344	344
Comal	258	258	258	258	258	258
DeWitt	1,994	1,994	1,994	1,994	1,994	1,994
Dimmit	488	488	488	488	488	488
Frio	994	994	994	994	994	994
Goliad	1,128	1,128	1,128	1,128	1,128	1,128
Gonzales	4,736	4,736	4,736	4,736	4,736	4,736
Guadalupe	1,046	1,046	1,046	1,046	1,046	1,046
Hays (Part)	410	410	410	410	410	410
Karnes	1,168	1,168	1,168	1,168	1,168	1,168
Kendall	395	395	395	395	395	395
LaSalle	610	610	610	610	610	610
Medina	1,165	1,165	1,165	1,165	1,165	1,165
Refugio	636	636	636	636	636	636
Uvalde	1,031	1,031	1,031	1,031	1,031	1,031
Victoria	1,165	1,165	1,165	1,165	1,165	1,165
Wilson	1,737	1,737	1,737	1,737	1,737	1,737
Zavala	1,058	1,058	1,058	1,058	1,058	1,058
Total	**24,038**	**24,038**	**24,038**	**24,038**	**24,038**	**24,038**
River and Coastal Basin Summaries						
Rio Grande	49	49	49	49	49	49
Nueces	7,033	7,033	7,033	7,033	7,033	7,033
San Antonio	4,531	4,531	4,531	4,531	4,531	4,531
Guadalupe	9,938	9,938	9,938	9,938	9,938	9,938
Lower Colorado	84	84	84	84	84	84
Lavaca	421	421	421	421	421	421
Colorado-Lavaca	66	66	66	66	66	66
Lavaca-Guadalupe	854	854	854	854	854	854
San Antonio-Nueces	1,062	1,062	1,062	1,062	1,062	1,062
Total	**24,038**	**24,038**	**24,038**	**24,038**	**24,038**	**24,038**

Source: Texas Water Development Board (TWDB); Consensus Projections adopted by the TWDB, October 17, 2013.

Table 2-8 Total Water Demand Projections South Central Texas Region Individual Counties with River Basin Summaries

	Projections					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Counties						
Atascosa	45,047	46,407	46,266	47,026	46,798	46,695
Bexar	367,664	404,641	438,621	473,953	509,657	543,989
Caldwell	7,939	8,992	10,069	11,191	12,362	13,557
Calhoun	71,705	74,773	78,299	81,636	86,052	89,788
Comal	42,660	50,555	58,562	66,459	74,986	83,562
DeWitt	11,836	11,719	10,961	10,238	8,885	8,615
Dimmit	14,578	14,786	14,002	12,400	9,585	8,798
Frio	77,233	74,905	72,683	70,230	67,939	65,913
Goliad	23,538	23,711	23,825	23,878	23,404	23,441
Gonzales	15,824	15,635	15,522	15,508	14,729	15,247
Guadalupe	36,487	42,642	48,287	54,229	61,977	68,632
Hays (Part)	25,950	32,343	40,928	48,133	60,344	74,547
Karnes	8,197	7,573	6,845	6,148	5,304	5,247
Kendall	7,536	9,097	10,768	12,426	14,201	15,950
LaSalle	12,466	12,675	12,215	10,868	8,409	7,719
Medina	68,171	66,673	65,147	63,688	62,364	61,252
Refugio	3,036	3,038	2,988	2,991	2,507	2,502
Uvalde	75,595	73,694	71,705	69,993	68,451	67,179
Victoria	79,119	108,161	119,083	138,761	159,410	163,073
Wilson	24,265	24,232	24,356	24,451	24,587	25,080
Zavala	51,508	49,778	48,097	46,360	44,496	43,049
Total	**1,070,354**	**1,156,030**	**1,219,229**	**1,290,567**	**1,366,447**	**1,433,835**
River and Coastal Basin Summaries						
Rio Grande	1,462	1,465	1,348	1,116	885	771
Nueces	341,039	334,827	325,763	316,115	303,524	296,036
San Antonio	428,449	472,534	511,616	551,905	592,316	632,552
Guadalupe	194,049	238,393	268,008	305,379	349,619	380,350
Lower Colorado	714	817	925	1,034	1,155	1,273
Lavaca	2,676	2,664	2,550	2,441	2,256	2,225
Colorado-Lavaca	31,156	33,495	35,836	37,917	40,549	42,825
Lavaca-Guadalupe	66,635	67,675	69,091	70,589	72,610	74,278
San Antonio-Nueces	4,174	4,160	4,092	4,071	3,533	3,525
Total	**1,070,354**	**1,156,030**	**1,219,229**	**1,290,567**	**1,366,447**	**1,433,835**
Source: Texas Water Development Board (TWDB); Consensus Projections adopted by the TWDB, October 17, 2013.						

Table 2-9 Composition of Projected Water Demands South Central Texas Region 2020, 2040, and 2070

	2020		2040		2070	
Water Use	***acft***	***% Total***	***Acft***	***% Total***	***acft***	***% Total***
Municipal	469,065	43.82%	582,421	47.77%	754,306	52.61%
Manufacturing	123,983	11.58%	145,993	11.97%	178,820	12.47%
Steam-Electric Power	59,901	5.60%	101,070	8.29%	152,702	10.65%
Mining	48,738	4.55%	48,601	3.99%	41,209	2.87%
Irrigation	344,629	32.20%	317,106	26.01%	282,760	19.72%
Livestock	24,038	2.25%	24,038	1.97%	24,038	1.68%
Total	**1,070,354**	**100.00%**	**1,219,229**	**100.00%**	**1,433,835**	**100.00%**

2.9 Water Demand Projections for Counties and River Basins

In accordance with TWDB water planning rules, water demand projections are tabulated by river and coastal basin, county or part of county located within the river or coastal basin, and city, water purveyor, or rural area of each county or part of county for the South Central Texas Region (Appendix A).

2.10 Water Demand Projections for Wholesale Water Providers

The TWDB defines a Wholesale Water Provider (WWP) as any person or entity, including river authorities and irrigation districts, that has contracts to sell more than 1,000 acft of water wholesale in any one year during the five years immediately preceding the adoption of the last regional water plan. Under this definition, the list of WWPs for the South Central Texas Region includes:

- San Antonio Water System (SAWS);
- Guadalupe-Blanco River Authority (GBRA);
- Canyon Regional Water Authority (CRWA);
- Schertz-Sequin Local Government Corporation (SSLGC); and
- Springs Hill WSC (SHWSC).

In addition, the more recently-formed Texas Water Alliance (TWA), Cibolo Valley Local Government Corporation (CVLGC), and Hays-Caldwell Public Utility Agency (HCPUA) are included as WWPs because they are expected to enter into contracts to sell more than 1,000 acft/yr wholesale during the planning period.

2.10.1 San Antonio Water System

The San Antonio Water System (SAWS) provides part or all of the water supplies for itself and fourteen other 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, Elmendorf, Hill County Village, Hollywood Park, Olmos Park, Somerset, and Terrell Hills and provides part of the water supply for Helotes, Leon Valley, Live Oak, East Central WSC, Von Ormy, and Atascosa Rural WSC. Projected water demands for SAWS are 347,340 acft/yr in 2020, 401,565 acft/yr in 2040, and 487,619 acft/yr in 2070 (Table 2-10).

Table 2-10 San Antonio Water System Water Demand Projections

Water Purchaser	Year					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Balcones Heights	518	566	612	662	711	758
Castle Hills	395	375	359	351	350	349
China Grove	316	350	381	413	445	474
Elmendorf	311	397	478	556	629	696
Helotes	1,613	1,989	2,340	2,681	2,996	3,286
Hill Country Village	234	230	226	224	224	224
Hollywood Park	949	953	959	969	983	997
Leon Valley	558	579	600	624	652	678
Live Oak	1,803	1,806	1,794	1,787	1,786	1,786
Olmos Park	564	623	678	736	791	843
San Antonio	235,329	258,657	280,788	303,809	326,645	347,873
SAWS (outside of San Antonio)	30,536	34,094	37,530	41,060	44,554	47,826
Somerset	221	240	259	279	300	319
Terrell Hills	1,299	1,276	1,257	1,247	1,245	1,245
Von Ormy	70	70	70	70	70	70
East Central WSC	448	448	448	448	448	448
Alamo Heights	796	848	820	807	805	805
Atascosa Rural WSC	1,167	1,446	1,708	1,970	2,218	2,448
Kirby	137	207	181	172	169	169
The Oaks WSC	0	0	1	60	114	165
County-Other (Bexar)	0	0	0	1,898	4,082	6,084
Hays County	5,000	5,000	5,000	5,000	5,000	5,000
CPS Energy	50,000	50,000	50,000	50,000	50,000	50,000
Industrial (Bexar County)	15,076	15,076	15,076	15,076	15,076	15,076
Total Demand	**347,340**	**375,230**	**401,565**	**430,899**	**460,293**	**487,619**

2.10.2 Guadalupe-Blanco River Authority

The Guadalupe-Blanco River Authority (GBRA) supplies potable and raw water for municipal, industrial, irrigation, and steam-electric purposes through management of run-of-river water rights on the Guadalupe and San Marcos Rivers and storage rights in Canyon Reservoir. As of January 2013, GBRA had contracts to provide water to over 40 public and private entities. Projected demands for present and future GBRA water supply customers are 176,378 acft/yr in 2020, 215,591 acft/yr in 2040, and 312,288 acft/yr in 2070 (Table 2-11).

Table 2-11 Guadalupe-Blanco River Authority Water Demand Projections

Water Purchaser	Year					
	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Municipal (Canyon Reservoir)						
Upper Basin - At or above Canyon Reservoir						
Canyon Lake WSC	6,000	6,000	6,000	6,000	6,000	6,000
City of Blanco (through Canyon Lake WSC)	600	600	600	600	600	600
HH Ranch Properties	250	250	250	250	250	250
Domestic Contracts	10	10	10	10	10	10
Canyon Lake WSC (formerly Rebecca Creek MUD)	130	130	130	130	130	130
Kendall County Rural	0	0	0	0	0	0
Kerr County MOU	0	2,000	2,000	2,000	2,000	2,000
Upstream Diversion Contracts	155	155	155	155	155	155
WW Sports	1	1	1	1	1	1
Yacht Club	10	10	10	10	10	10
SJWTX - Bulverde (Western Canyon)	400	400	400	400	400	400
SJWTX – Park Village (Western Canyon)	322	322	322	322	322	322
City of Boerne (Western Canyon)	3,611	3,611	3,948	4,906	5,895	6,869
City of Fair Oaks Ranch (Western Canyon)	1,850	1,850	1,850	1,850	1,850	1,850
Cordillera Ranch (Western Canyon)	1,000	1,000	1,000	1,000	1,000	1,000
DH Invest.-Johnson Ranch (Western Canyon)	400	400	400	400	400	400
Lerin Hills (Western Canyon)	750	750	750	750	750	750
Kendall & Tapatio (Western Canyon)	750	750	750	750	750	750
Comal Trace (Western Canyon)	100	100	100	100	100	100
SAWS (Western Canyon)	2,017	2,017	0	0	0	0
Western Canyon Sub-Total	*11,200*	*11,200*	*9,520*	*10,478*	*11,467*	*12,441*
Total Upper Basin Municipal (Canyon Reservoir)	**18,356**	**20,356**	**18,676**	**19,634**	**20,623**	**21,597**
Mid Basin- Below Canyon Dam to Above Victoria						
CRWA – Guadalupe River Basin Customers	4,000	4,000	4,000	4,000	4,000	4,000
CRWA – Cibolo	1,350	1,350	1,350	1,350	1,350	1,350
CRWA – East Central SUD	1,400	1,400	1,400	1,400	1,400	1,400
CRWA – Green Valley SUD	1,800	1,800	1,800	1,800	1,800	1,800
CRWA – Marion	100	100	100	100	100	100
CRWA – Springs Hill WSC	1,925	1,925	1,925	1,925	1,925	1,925
CRWA Dunlap Current Contract Subtotal	*10,575*	*10,575*	*10,575*	*10,575*	*10,575*	*10,575*
CRWA Dunlap Future Contract	0	0	0	0	0	0
Comal County Rural	0	0	0	0	0	0
New Braunfels Utilities	9,720	10,072	10,921	11,789	12,668	13,519
Crystal Clear WSC	800	800	800	800	800	800
City of Seguin	1,000	1,000	1,000	1,000	1,000	1,000
Dittmar, Gary	5	5	5	5	5	5
Dittmar, Ray	5	5	5	5	5	5
Gonzales County WSC	700	700	700	700	700	700
Green Valley SUD	1,000	1,000	1,000	1,000	1,000	1,000
Springs Hill WSC	2,500	2,500	2,500	2,500	2,500	2,500
Canyon Regional Water Authority (H/C WTP)	2,038	2,038	2,038	2,038	2,038	2,038
Wimberley & Wimberley WSC	0	0	410	1,020	1,712	2,502
Hays County Rural	0	0	0	1,169	6,714	12,872
City of Niederwald (San Marcos WTP)	62	81	105	134	166	203
City of Buda (San Marcos WTP)	1,680	1,680	1,680	1,680	1,680	1,680
City of Kyle (San Marcos WTP)	5,443	5,443	5,443	5,443	5,443	5,443
Sunfield MUD (San Marcos WTP)	3,136	3,136	3,136	3,136	3,136	3,136
Plum Creek WC/Monarch (San Marcos WTP)	560	560	560	560	560	560

Table 2-11 Guadalupe-Blanco River Authority Water Demand Projections

Water Purchaser	Year					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
City of San Marcos (San Marcos WTP)	10,000	10,000	10,000	10,000	10,000	10,000
Goforth WSC (San Marcos WTP)	1,050	1,050	1,050	1,050	1,050	1,143
San Marcos WTP Sub-Total	*21,931*	*21,950*	*21,974*	*22,003*	*22,035*	*22,165*
Total Mid Basin Municipal (Canyon Reservoir)	**50,274**	**50,645**	**51,928**	**54,604**	**61,752**	**69,681**
Lower Basin – At or Below Victoria						
City of Victoria (pursuant to Canyon Amendment)	1,240	1,240	1,240	1,240	1,240	1,240
Total Lower Basin Municipal (Canyon Reservoir)	**1,240**	**1,240**	**1,240**	**1,240**	**1,240**	**1,240**
Industrial/Steam-Electric (Canyon Reservoir)						
Mid Basin – Below Canyon Dam to Above Victoria						
Acme Brick	25	25	25	25	25	25
CMC Steel	700	700	700	700	700	700
Guadalupe County	2	2	2	2	2	2
Temple Inland (St. Gyp.)	258	258	258	258	258	258
Guadalupe County Manufacturing	0	0	0	163	494	854
Comal Fair	1	1	1	1	1	1
Comal Road Department	3	3	3	3	3	3
Comal County Manufacturing	4,130	4,881	5,612	6,239	7,120	8,074
GPP (Panda Energy)	6,840	6,840	6,840	6,840	6,840	6,840
Hays Energy LP	2,464	2,464	2,464	2,464	2,464	2,464
Total Mid Basin Industrial/SE (Canyon Reservoir)	**14,423**	**15,174**	**15,905**	**16,695**	**17,907**	**19,221**
Lower Basin – At or Below Victoria						
Coleto Creek	6,000	6,000	6,000	6,000	6,000	6,000
Dow/UCC	100	100	100	100	100	100
Total Lower Basin Industrial/SE (Canyon Reservoir)	**6,100**	**6,100**	**6,100**	**6,100**	**6,100**	**6,100**
Irrigation (Canyon Reservoir)						
Irrigation Contracts (Upper Basin)	**250**	**250**	**250**	**250**	**250**	**250**
Irrigation Contracts (Mid-Basin)	**342**	**342**	**342**	**342**	**342**	**342**
Canyon Reservoir Total	**90,985**	**94,107**	**94,441**	**98,865**	**108,214**	**118,431**
Mid-Basin Municipal (San Marcos Run-of-River)						
Lockhart	1,120	1,120	1,120	1,484	1,947	2,402
Luling	1,680	1,680	1,680	1,680	1,684	1,875
Mid-Basin Municipal (San Marcos Run-of-River) Total	**2,800**	**2,800**	**2,800**	**3,164**	**3,631**	**4,277**
Lower Basin Municipal (Run-of-River, Firm)						
Calhoun County Rural WSC	1,500	1,500	1,500	1,500	1,500	1,500
Port Lavaca	4,480	4,480	4,480	4,480	4,480	4,480
Port O'Conner MUD	1,120	1,120	1,120	1,120	1,120	1,120
Victoria County Rural	0	0	0	0	0	0
Total Lower Basin Municipal (Run-of-River, Firm)	**7,100**	**7,100**	**7,100**	**7,100**	**7,100**	**7,100**
Lower Basin Industrial/SE (Run-of-River, Firm)						
INEOS	3,300	3,300	3,300	3,300	3,300	3,300
Seadrift Coke	1,000	1,000	1,000	1,000	1,000	1,000
Dow/UCC	20,000	20,000	20,000	20,000	20,000	20,000
Calhoun County Industry (Lavaca-Guadalupe)	0	0	0	2,456	7,288	11,469
Calhoun County Industry (Colorado-Lavaca)	30,000	30,000	30,000	30,000	30,000	30,000
Region N Needs (Industry & S-E)	0	0	0	0	20,000	20,000

Table 2-11 Guadalupe-Blanco River Authority Water Demand Projections

Water Purchaser	Year					
	2020 (acft)	*2030 (acft)*	*2040 (acft)*	*2050 (acft)*	*2060 (acft)*	*2070 (acft)*
Victoria County Industry	3,215	6,053	8,878	11,403	14,243	17,289
Victoria County Steam Electric	4,506	29,778	37,178	53,599	70,696	70,696
Total Lower Basin Industrial/SE (Run-of-River, Firm)	**62,021**	**90,131**	**100,356**	**121,758**	**166,527**	**173,754**
Lower Basin Industrial/SE (Run-of-River, Interruptible)						
Calhoun & Victoria Counties	**0**	**0**	**0**	**0**	**0**	**0**
Total Lower Basin Industrial/SE (Run-of-River, Interruptible)	**0**	**0**	**0**	**0**	**0**	**0**
Lower Basin Irrigation (Run-of-River, Interruptible)						
Irrigation Agreements	**13,472**	**11,935**	**10,894**	**10,148**	**9,453**	**8,726**
Lower Basin (Run-of-River, Firm) Total	**69,121**	**97,231**	**107,456**	**128,858**	**173,627**	**180,854**
Lower Basin (Run-of-River, Interruptible) Total	**13,472**	**11,935**	**10,894**	**10,148**	**9,453**	**8,726**
Total Demand	**156,378**	**186,073**	**195,591**	**221,035**	**254,925**	**272,288**
Total Upper Basin Demand	18,606	20,606	18,926	19,884	20,873	21,847
Total Mid Basin Demand	67,839	68,961	70,975	74,805	83,632	93,521
Total Lower Basin Demand	89,933	116,506	125,690	146,346	190,420	196,920
Total Demand	**176,378**	**206,073**	**215,591**	**241,035**	**294,925**	**312,288**

2.10.3 Canyon Regional Water Authority

Canyon Regional Water Authority (CRWA) is a water planning and development agency for water purveyors that serve large areas of Guadalupe County, and portions of Bexar, Caldwell, Hays, Wilson, and Comal Counties. CRWA provides all or part of the water supply for 11 entities: SAWS, Cibolo, County Line WSC, East Central WSC, Green Valley SUD, La Vernia, Marion, Martindale WSC, Springs Hills WSC, Maxwell WSC, and Crystal Clear WSC. The total amounts of water needed by CRWA to meet its customers' projected demands are 25,747 acft/yr in 2020, 28,366 acft/yr in 2040, and 39,678 acft/yr in 2070 (Table 2-12).

2.10.4 Schertz-Seguin Local Government Corporation

The Schertz-Seguin Local Government Corporation (SSLGC) supplies water to the cities of Schertz and Seguin as well as Selma, Springs Hill WSC, Converse, and Universal City. The total amounts of water needed by SSLGC to meet its customers' projected demands are 18,756 acft/yr in 2020, 21,350 acft/yr in 2040, and 24,150 acft/yr in 2070 (Table 2-13).

2.10.5 Springs Hill Water Supply Corporation

Springs Hill WSC provides retail water service within its service area as well as wholesale water to Crystal Clear WSC. A portion of the Springs Hill WSC service area is located inside the City of Seguin. In addition, a portion of the service area is also included in the projected demands for Guadalupe County-Other. The total amounts of water needed by Springs Hill WSC to meet its customers' projected demands are 2,437 acft/yr in 2020, 3,102 acft/yr in 2040, and 5,043 acft/yr in 2070 (Table 2-14).

Table 2-12 Canyon Regional Water Authority Water Demand Projections

Water Purchaser	Year					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
San Antonio Water System	6,800	6,800	6,800	6,800	6,800	6,800
City of Cibolo	4,331	4,331	4,331	4,331	4,331	4,331
East Central WSC	1,900	2,400	2,400	2,400	2,400	2,400
Green Valley SUD	5,990	6,990	6,990	10,990	10,990	15,990
City of La Vernia	400	425	481	533	584	629
City of Marion	200	200	200	200	200	200
Springs Hills WSC	2,025	2,025	2,025	2,025	2,025	2,025
Crystal Clear WSC	800	1,300	1,300	1,800	2,300	2,823
County Line SUD	1,308	1,308	1,386	1,559	1,748	1,949
Martindale	190	221	256	292	330	367
Maxwell WSC	900	900	900	900	900	900
Total Demand	**25,747**	**28,011**	**28,366**	**33,102**	**33,873**	**39,678**

Table 2-13 Schertz-Seguin Local Government Corporation Water Demand Projections

Water Purchaser	Year					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Schertz	10,835	10,079	9,868	11,583	11,179	10,414
Seguin	3,165	3,921	4,666	5,326	6,028	6,719
Selma	1,050	1,066	1,154	1,241	1,320	1,395
Springs Hill WSC	840	840	840	840	840	840
Converse	500	500	500	500	500	500
Universal City	1,216	1,231	1,172	1,139	1,133	1,132
Cibolo	1,000	2,000	3,000	3,000	3,000	3,000
Garden Ridge	150	150	150	150	150	150
Total Demand	**18,756**	**19,787**	**21,350**	**23,779**	**24,150**	**24,150**

Table 2-14 Springs Hill Water Supply Corporation Water Demand Projections

Water Purchaser	Year					
	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Springs Hill WSC	1,417	1,621	1,845	2,080	2,337	2,594
City of Seguin (served by SHWSC)	481	512	599	788	988	1,190
Guadalupe County-Other (served by SHWSC)	489	520	609	801	1,004	1,209
Crystal Clear WSC	50	50	50	50	50	50
Total Demand	**2,437**	**2,703**	**3,102**	**3,719**	**4,379**	**5,043**

2.10.6 Texas Water Alliance

The Texas Water Alliance (TWA) is a group of landowners located in northeast Gonzales County organized for the purpose of selling groundwater on a wholesale basis to wholesale water providers (WWPs) and water user groups (WUGs) most likely located in the South Central Texas Regional Water Planning Area (Region L). To date, all of the WUGs listed in Table 2-15, as well as some WWPs (e.g., SAWS, GBRA, and HCPUA), have shown some measure of interest in groundwater supplies potentially available from northeast Gonzales County. Although TWA has obtained groundwater production permits from the Gonzales County Underground Water Conservation District (GCUWCD), it is uncertain at this time which entities will enter into water supply agreements with the TWA and/or other proximate landowners for use of this groundwater. The estimated amounts of water needed by TWA to meet potential customer demands are shown in Table 2-15 and total 4,000 acft/yr in 2020, 6,620 acft/yr in 2040, and 20,000 acft/yr in 2070.

Table 2-15 Texas Water Alliance Water Demand Projections

Water Purchaser	Year					
	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Canyon Lake WSC / SJWTX	0	521	2,210	3,926	5,640	7,291
Comal County Rural Areas	0	0	0	0	0	0
Kendall Co Rural Areas	0	0	0	0	0	0
Wimberley	0	0	410	1,020	1,712	2,502
Woodcreek	0	0	0	0	0	0
Hays County Rural Areas	0	0	0	585	3,357	6,207
Region K Demands	4,000	4,000	4,000	4,000	4,000	4,000
Total Demand	**4,000**	**4,521**	**6,620**	**9,531**	**14,709**	**20,000**

2.10.7 Hays-Caldwell Public Utility Agency

The Hays-Caldwell Public Utility Agency (HCPUA) is comprised of CRWA, Buda, Kyle, and San Marcos and was created 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. 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. The estimated amounts of water needed by the HCPUA to meet potential customer demands are shown in Table 2-16 and total 3,182 acft/yr in 2020, 9,125 acft/yr in 2040, and 21,833 acft/yr in 2070.

Table 2-16 Hays-Caldwell Public Utility Agency Water Demand Projections

Water Purchaser	***Year***					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
CRWA (Lake Dunlap System)	2,182	2,634	1,634	3,744	3,744	3,744
CRWA (Hays Caldwell System)	1,000	2,000	3,000	3,000	3,000	3,000
Buda	0	667	1,690	2,974	4,033	4,426
Kyle	0	1,348	2,801	2,787	2,776	2,772
San Marcos	0	0	0	1,965	4,576	7,891
Total Demand	**3,182**	**6,649**	**9,125**	**14,470**	**18,129**	**21,833**

2.10.8 Cibolo Valley Local Government Corporation

The Cibolo Valley Local Government Corporation (CVLGC) is a partnership between the Cities of Cibolo and Schertz created to develop more groundwater supplies within the local area. The estimated amounts of water needed by the CVLGC to meet potential customer demands are shown in Table 2-17 and total 0 acft/yr in 2020, 3,441 acft/yr in 2040, and 10,000 acft/yr in 2070.

Table 2-17 Cibolo Valley Local Government Corporation Water Demand Projections

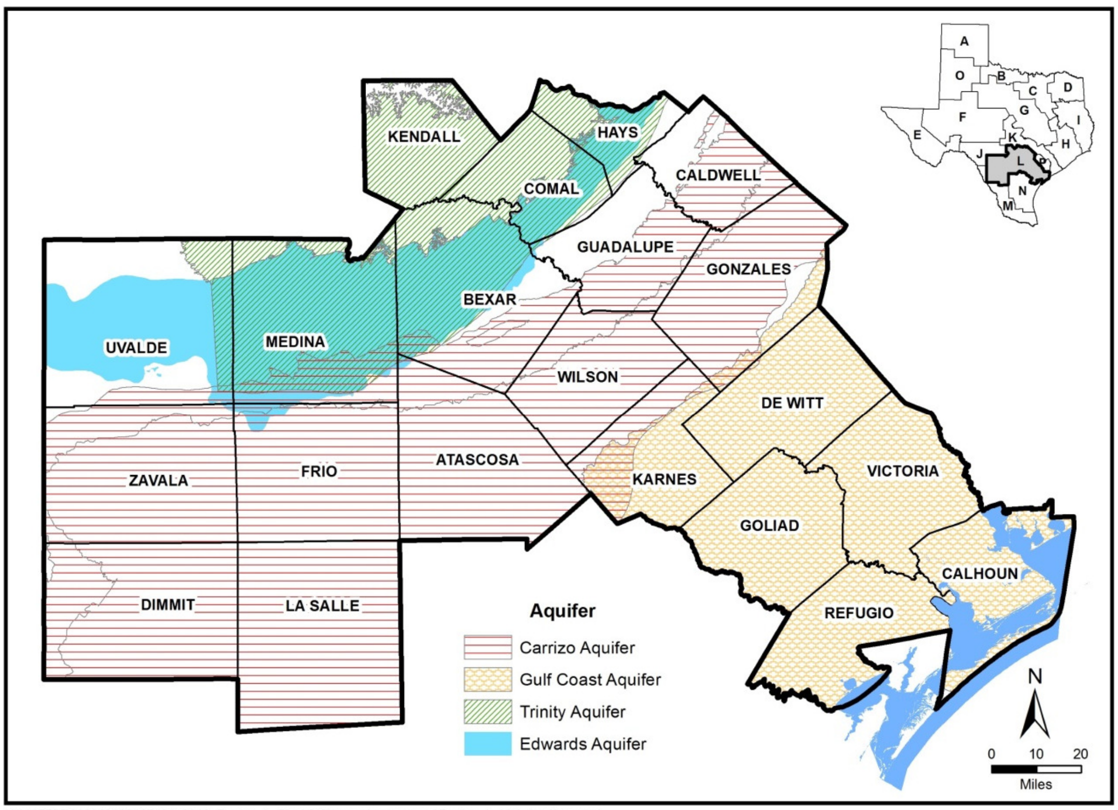
Water Purchaser	***Year***					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Cibolo	0	2,116	3,441	4,740	5,196	5,196
Schertz	0	0	0	0	2,235	4,804
Total Demand	**0**	**2,116**	**3,441**	**4,740**	**7,431**	**10,000**

3 Water Supply Analyses
[31 TAC §357.32]

3.1 Groundwater Supplies

There are five major and six minor aquifers supplying water to the South Central Texas Region. The five major aquifers are the Edwards-Balcones Fault Zone (including the Barton Springs Segment), Carrizo-Wilcox[1], Trinity, Gulf Coast, and Edwards-Trinity (Plateau) Aquifers (Figure 3-1). The six minor aquifers are the Austin Chalk, Buda Limestone, Leona Gravel, Sparta, Queen City, and Yegua-Jackson Aquifers. Chapter 1.7.1 includes more detailed descriptions of the aquifers, including water quality characteristics.

Figure 3-1 Major Aquifers — South Central Texas Region

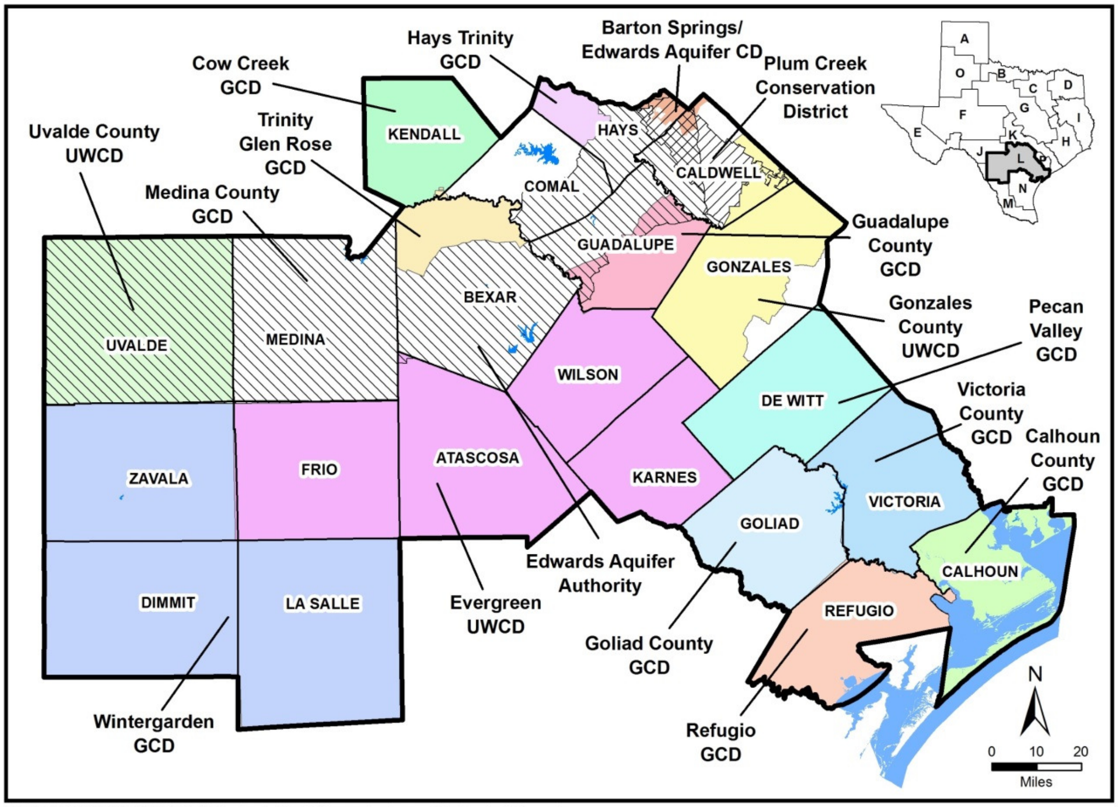


There are 17 groundwater conservation districts (GCDs) in the South Central Texas Region (Figure 3-2). A GCD serves all or a portion of each county in the region. The responsibilities and authorities of these GCDs vary depending upon creating legislation and governing law, and some districts are not responsible for all aquifers within the geographic boundaries of the district. For example, the statutory district of the Edwards

[1] Although traditionally identified by the Texas Water Development Board as one major aquifer, the Carrizo and Wilcox formations are generally separated by an aquitard which serves to limit hydraulic connectivity between the two formations in some portions of the planning region.

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 3-2 Groundwater Conservation Districts



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3.1.1 Groundwater Availability

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 groundwater conservation districts except in locations that do not have a district. 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 average 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). This prevents regional water planning groups from recommending water management strategies 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. 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 Water Management Strategies. 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 3 of the 80th Texas Legislature requires the EAA to cooperatively develop a Recovery Implementation Program (RIP) through a facilitated, consensus-based process that involves input from the USFWS, other appropriate federal agencies, and all interested stakeholders, including those listed under Section 1.26A(e)(1) of the EAA Act. SB 3 further directed the EAA and other state agencies to participate in the EARIP and to jointly prepare, along with other stakeholders, a “program document that may be in the form of a habitat conservation plan (HCP) used in the issuance of an incidental take permit.” The HCP is required to provide recommendations for withdrawal adjustments based on a combination of spring discharge rates of the San Marcos and Comal Springs and levels at the J-17 and J-27 index wells during critical periods to ensure that federally listed, threatened, and endangered species associated with the Aquifer will be protected at all times, including throughout a repeat of the drought of record. The approved HCP includes four components which affect water supply from the Edwards Aquifer: 1) the Voluntary Irrigation Suspension Program Option (VISPO); 2) additional municipal conservation measures; 3) SAWS ASR tradeoff; and 4) emergency Stage V critical period reductions.[2] For water supply planning purposes in the 2016 South Central Texas Regional Water Plan, the EAHCP 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. This produces a total supply from the EAA portion of the Edwards Aquifer of about 293,000 acft/yr including estimated exempt federal and domestic and livestock production.

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

Projected groundwater supplies available in the South Central Texas Region under drought of record conditions are 970,213 acft/yr in 2020, 986,136 acft/yr in 2040, and 989,028 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 increase from 379,026 acft/yr in 2020 to 399,733 acft/yr in 2070. The supplies available from the Gulf Coast, Sparta, and Queen City Aquifers are projected to decline slightly over the 2020 to 2070 projection period.

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. Groundwater supplies for municipal utilities relying on non-Edwards aquifers are based upon well capacities obtained from the TCEQ Water Utility Database.

2. Groundwater availability during drought of record conditions from the EAA portion of the Edwards Aquifer is set at a total of 293,053 acft/yr. Initial regular permit amounts from the EAA as of March 22, 2013 are prorated down in accordance with EAA rules and implementation of the EAHCP to achieve a total value of 293,053 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 generally estimated as follows:

   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 downwards for every entity using that particular source.

   b. For rural areas, it is assumed that the rural household (municipal) demand would be met from aquifers underlying that river basin portion of the county. 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 downwards 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 2007 to 2011 time period; however, some adjustments were made to some counties. In cases in which the total demand on that portion (i.e. county & river basin) of the aquifer exceeds the total availability, supply is prorated downwards 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 2007 to 2011 timer 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 downwards for every entity using that particular source.

6. 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. The irrigation supply is generally calculated as being equal to the projected demand in each decade; however, in some cases, this value is adjusted due 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 downwards for every entity using that particular source.

7. 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. The mining supply is calculated as being equal to the projected demand in each decade; however, in some cases, this value is adjusted due 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 downwards for every entity using that particular source.

8. For all areas within the planning region, livestock water demand is generally assumed to be met 50 percent from quantified groundwater sources and 50 percent from local surface water and unquantified groundwater sources such as stock tanks, streams, and windmills. Livestock water supply is set equal to projected livestock demand.

Table 3-1 Available Groundwater Supply for the Gulf Coast, Carrizo-Wilcox, Trinity, and Edwards Trinity Aquifers

County	Aquifer	GCD	2070 Modeled Available Groundwater (MAG) Volume (acft/yr)	2070 Existing Supply (acft/yr)	Availability Remaining for WMS (acft/yr)
Atascosa	Carrizo-Wilcox	Evergreen	75,808	43,020	32,788
Bexar	Carrizo-Wilcox	None	26,107	13,919	12,188
	Trinity	Trinity-Glen Rose	45,077	22,858	22,219
Caldwell	Carrizo-Wilcox	Plum Creek & Gonzales County	43,560	7,545	36,015
Calhoun	Gulf Coast	Calhoun County	2,995	2,974	21
Comal	Trinity	None	39,498	23,586	15,912
DeWitt	Gulf Coast	Pecan Valley	14,616	11,363	3,253
Dimmit	Carrizo-Wilcox	Wintergarden	3,359	3,359	0
Frio	Carrizo-Wilcox	Evergreen	70,030	64,203	5,827
Goliad	Gulf Coast	Goliad County	11,699	7,702	3,997
Gonzales	Carrizo-Wilcox	Gonzales County	75,970	39,880	36,090
	Gulf Coast	None	2,083	35	2,048
Guadalupe	Carrizo-Wilcox	Guadalupe County	14,041	5,167	8,874
Hays	Trinity	Hays Trinity	7,270	7,270	0
Karnes	Carrizo-Wilcox	Evergreen	1,280	1,078	202
	Gulf Coast	Evergreen	3,116	3,075	41
Kendall	Edwards-Trinity	Cow Creek	318	158	160
	Trinity	Cow Creek	11,139	4,898	6,241
La Salle	Carrizo-Wilcox	Wintergarden	6,454	6,454	0
Medina	Carrizo-Wilcox	Medina County	2,533	2,533	0
	Trinity	Medina County	7,869	7,869	0
Refugio	Gulf Coast	Refugio County	29,328	3,348	25,980
Uvalde	Carrizo-Wilcox	Uvalde County	828	828	0
	Edwards-Trinity	Uvalde County	1,635	1,635	0
	Trinity	Uvalde County	639	639	0
Victoria	Gulf Coast	Victoria County	35,694	34,532	1,162
Wilson	Carrizo-Wilcox	Evergreen	44,794	22,198	22,596
Zavala	Carrizo-Wilcox	Wintergarden	34,969	34,969	0

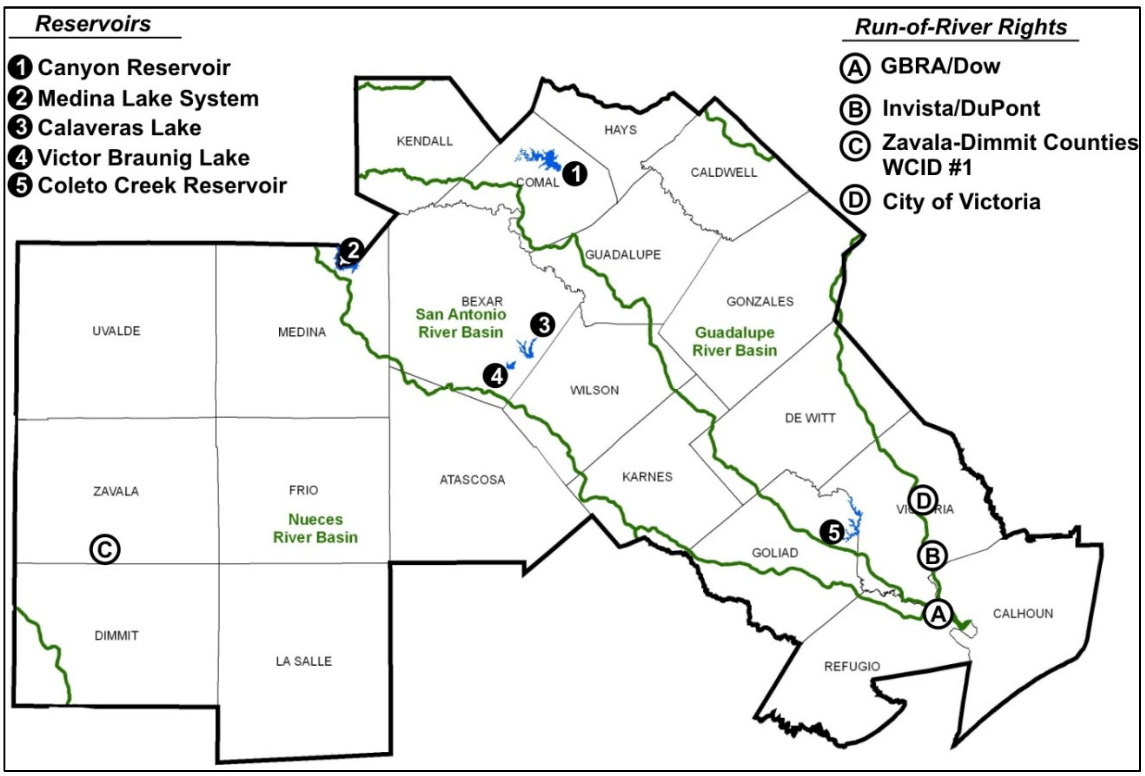
Table 3-2 Available Groundwater Supply by Aquifer

Aquifer Name	Annual Quantity Available 2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Edwards (EAA)	293,053	293,053	293,053	293,053	293,053	293,053
Edwards (Non-EAA/Frio County)	23,213	23,213	23,213	23,213	23,213	23,213
Barton-Springs Edwards	307	307	307	307	307	307
Saline Edwards	433	433	433	433	433	433
Carrizo-Wilcox	379,026	387,711	395,891	397,609	399,733	399,733
Trinity	111,492	111,492	111,492	111,492	111,492	111,492
Gulf Coast	99,670	99,659	99,644	99,637	99,531	99,531
Edwards-Trinity (Plateau)	1,953	1,953	1,953	1,953	1,953	1,953
Austin Chalk	2,935	2,935	2,935	2,935	2,935	2,935
Buda Limestone	758	758	758	758	758	758
Leona Gravel	31,402	31,402	31,402	31,402	31,402	31,402
Sparta	6,590	6,494	6,407	6,332	6,275	6,275
Queen City	15,840	15,498	15,107	14,741	14,402	14,402
Yegua-Jackson	3,541	3,541	3,541	3,541	3,541	3,541
Total	970,213	978,449	986,136	987,406	989,028	989,028
Percent of Total						
Edwards (EAA)	30.21%	29.95%	29.72%	29.68%	29.63%	29.63%
Edwards (Non-EAA/Frio County)	2.39%	2.37%	2.35%	2.35%	2.35%	2.35%
Barton-Springs Edwards	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%
Saline Edwards	0.04%	0.04%	0.04%	0.04%	0.04%	0.04%
Carrizo-Wilcox	39.07%	39.63%	40.15%	40.27%	40.42%	40.42%
Trinity	11.49%	11.39%	11.31%	11.29%	11.27%	11.27%
Gulf Coast	10.27%	10.19%	10.10%	10.09%	10.06%	10.06%
Edwards-Trinity (Plateau)	0.20%	0.20%	0.20%	0.20%	0.20%	0.20%
Austin Chalk	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%
Buda Limestone	0.08%	0.08%	0.08%	0.08%	0.08%	0.08%
Leona Gravel	3.24%	3.21%	3.18%	3.18%	3.18%	3.18%
Sparta	0.68%	0.66%	0.65%	0.64%	0.63%	0.63%
Queen City	1.63%	1.58%	1.53%	1.49%	1.46%	1.46%
Yegua-Jackson	0.36%	0.36%	0.36%	0.36%	0.36%	0.36%
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 in Figure 3-3, 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 evaluating surface water supplies available under existing water rights. All of the major reservoirs within Region L are located in the Guadalupe-San Antonio River Basin and are identified in Figure 3-3. Owners and locations of major run-of-river rights having authorized annual consumptive use in excess of 10,000 acft/yr are also shown in Figure 3-3. Major reservoirs and run-of-river water rights are discussed in the following subsections.

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



3.2.1 Major Reservoirs and Associated Water 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, for each of these reservoirs is also listed in Table 3-3. Additional information regarding each of the major reservoirs is provided in the following paragraphs.

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. The San Antonio Water System (SAWS) has contracts with BMA to obtain municipal water supplies from the Medina Lake System which 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,[3] to the Edwards Aquifer. Because of surface water "losses" to recharge and special conditions within Certificate of Adjudication #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.

Braunig and Calaveras Lakes, owned by the 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.

Constructed by the U.S. 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 90,000 acft/yr. Water supplies from Canyon Reservoir are managed by the Guadalupe-Blanco River Authority (GBRA) and made available to customers both within their ten-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 approximately 2,000 acft/yr from the firm yield of Canyon Reservoir for the calendar years 2021 through 2060. GBRA's hydrology studies

[3] 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.

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).

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.

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, there are other small reservoirs and associated priority and non-priority water rights for hydroelectric power generation 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 (acft/yr)	Purposes
San Antonio River Basin					
Medina Lake System	Bexar-Medina-Atascosa Counties WCID #1	19-2130	66,750	0[2]	Irrigation, municipal, domestic, livestock
Victor Braunig Lake	City Public Service Board of San Antonio	19-2161	12,000[3]	>12,000[4]	Steam-electric power generation
Calaveras Lake	City Public Service Board of San Antonio	19-2162	37,000[5]	>37,000[4]	Steam-electric power generation
Guadalupe River Basin					
Canyon Reservoir	Guadalupe-Blanco River Authority	18-2074	90,000[6]	~90,000[6]	Municipal, industrial, steam-electric, hydropower, irrigation, flood protection
Coleto Creek Reservoir	Coleto Creek Power	18-5486	24,160[7]	>24,160[4]	Steam-electric power generation

1 Based on operation of the Medina Lake System in accordance with CA #19-2130C.

2 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.

3 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.

4 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.

5 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 3.2.3.1, estimates of Canyon Reservoir firm yield range from 89,100 acft/yr to 88,400 acft/yr in years 2020 and 2070, respectively.

7 Includes rights to divert up to 20,000 acft/yr from the Guadalupe River to Coleto Creek Reservoir and to consume up to 24,160 acft/yr.

3.2.2 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 or not water will be available for crop production during the growing season. In fact, when reviewing applications for irrigation rights, TCEQ staff has 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.

3.2.3 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 Water Availability Models (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 aka. FRAT) have also been used to quantify water availability for new appropriations associated with potentially feasible water management strategies subject to TCEQ environmental flow standards.

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, calculate the firm yields associated with Canyon Reservoir and the Medina Lake System, and ensure the reliability of authorized consumptive uses associated with steam-electric power generation at 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. Reliability

[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.

information, including firm (or minimum monthly) diversion, for water rights in the Nueces and Guadalupe–San Antonio River Basins is summarized in Appendix C. Firm diversion and firm yield amounts have been assigned to specific water users, county-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 the regional water planning database (DB17).

Hydrologic Assumptions and Operational Procedures for Assessment of Surface Water Supply

1. Full exercise of surface water rights.
2. Edwards Aquifer withdrawals, critical period management, and resulting springflows for the 1947-1989 period consistent with the Edwards Aquifer Habitat Conservation Plan approved by the U.S. Fish & Wildlife Service and developed through the Edwards Aquifer Recovery Implementation Program.
3. Operation of Canyon Reservoir at firm yield in accordance with Certificate of Adjudication No. 18-2074E, including subordination of all senior Guadalupe River hydropower permits to Canyon Reservoir.
4. Delivery of GBRA’s present contractual obligations from Canyon Reservoir to points of diversion.
5. Effluent discharge / return flow in the Guadalupe - San Antonio River Basin is that reported for 2006, adjusted for current SAWS direct recycled water commitments. Smaller reuse commitments of San Marcos, New Braunfels, Seguin, Kyle, San Antonio River Authority, and Cibolo Creek Municipal Authority are considered to the extent data was readily available.
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 the TCEQ Agreed Order regarding freshwater inflows to the Nueces Estuary.
8. Period of record for simulations: Guadalupe-San Antonio River Basin (1934-1989, Critical Drought = 1950s) and Nueces River Basin (1934-1997, Critical Drought = 1990s).

3.3 Reuse Supplies

Current water supplies in the South Central Texas Region involving reuse of treated wastewater are associated with the Recycled Water Program of the San Antonio Water System (SAWS) and contractual commitments by the Guadalupe-Blanco River Authority (GBRA), City of San Marcos, and others. In Bexar County, 560 acft/yr of reuse water has been included as a supply for Fair Oaks Ranch, 4,076 acft/yr has been included as a supply to industrial uses, and 6,776 acft/yr has been assigned to SAWS to non-industrial uses. A reuse supply of 107 acft/yr from the City of New Braunfels has been included as a reuse supply in Comal County. A reuse supply of 1,413 acft/yr (629 acft/yr from

Seguin and 784 acft/yr from GBRA) has been included as a supply in Guadalupe County. A reuse supply of 4,119 acft/yr (199 acft/yr from Kyle, 3,696 acft/yr from San Marcos, and 224 acft/yr from Wimberley) has been included as a supply in Hays County. A reuse supply of 30 acft/yr from the City of Kenedy has been included as a supply in Karnes County. Finally, a reuse supply of 271 acft/yr (230 acft/yr from Kendall County WCID #1, 34 acft/yr from GBRA, and 7 acft/yr from the City of Boerne) has been included as a supply source in Kendall County.

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4 Identification of Water Needs
[31 TAC §357.33]

4.1 Water Needs Projections by Water User Group

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, the difference or shortage, is identified as a water need for that water user group. As a recap, 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. Municipal water demand projections are shown for each entity that supplied more than 280 acft of water in the year 2010, and for the County-Other category in each county. Chapter 3 presents estimates of surface water availability (i.e. firm yield for reservoirs and firm diversions for run-of-river supplies) and Modeled Available Groundwater.

This chapter provides summaries of the water needs (shortages) for each Water User Group (WUG) located in the South Central Texas Region. Table 4-1 provides a summary of projected water needs for each WUG in the planning area by county. If a WUG provides service in multiple counties, it is listed only in its "primary" county in Table 4-1. Table 4-2 lists WUGs that provide service in multiple counties and the "primary" county to which that WUG has been assigned for presentation herein. Region L has a projected annual water need of 205,625 acft in 2020, increasing to 493,249 acft by 2070 (Table 4-1, end of table).

Table 4-1 Summary of Water Needs (Shortages) by WUG

Water User Group	Year 2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Atascosa County						
Benton City WSC	0	0	0	0	0	25
Charlotte	0	0	0	0	0	0
Jourdanton	0	0	0	0	0	0
Lytle	171	257	333	409	484	554
McCoy WSC	0	0	0	0	0	0
Pleasanton	0	0	0	0	0	0
Poteet	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**171**	**257**	**333**	**409**	**484**	**579**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**171**	**257**	**333**	**409**	**484**	**579**
Bexar County						
Alamo Heights	796	848	820	807	805	805
Atascosa Rural WSC	1,167	1,446	1,708	1,970	2,218	2,448
Balcones Heights	0	0	0	0	0	0
Castle Hills	0	0	0	0	0	0
China Grove	0	0	0	0	0	0
Converse	903	1,111	1,297	1,272	1,265	1,264
East Central SUD	0	0	107	312	525	724
Elmendorf	0	0	0	0	0	0
Fair Oaks Ranch	0	0	0	0	0	0
Helotes	0	0	0	0	0	0
Hill Country Village	0	0	0	0	0	0
Hollywood Park	0	0	0	0	0	0
Kirby	137	207	181	172	169	169
Lackland AFB	0	0	0	0	0	0
Leon Valley	97	147	196	254	317	377
Live Oak	0	0	0	0	0	0
Olmos Park	0	0	0	0	0	0
Randolph AFB	0	0	0	0	0	0
San Antonio	61,812	85,743	110,450	134,057	157,476	179,247
San Antonio Water System	3,686	7,244	10,680	14,210	17,704	20,976

Table 4-1 (Continued)

Water User Group	Year 2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Bexar County (continued)						
Selma	0	16	105	191	270	345
Shavano Park	425	555	677	797	909	1,013
Somerset	0	0	0	0	0	0
St. Hedwig	0	0	0	0	0	0
Terrell Hills	0	0	0	0	0	0
The Oaks WSC	0	0	1	60	114	165
Universal City	416	431	372	339	333	332
Von Ormy	0	0	0	0	0	0
Water Services Inc.	0	0	0	0	0	0
Windcrest	326	343	361	388	420	451
County-Other	0	0	0	1,898	4,082	6,084
Municipal Total	**69,765**	**98,091**	**126,955**	**156,727**	**186,607**	**214,400**
Manufacturing	0	0	0	0	1,058	3,680
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	5,116	4,625	4,154	3,703	3,271	2,891
Livestock	0	0	0	0	0	0
County Total	**74,881**	**102,716**	**131,109**	**160,430**	**190,936**	**220,971**
Caldwell County						
Aqua WSC	0	0	0	0	0	0
Creedmoor-Maha WSC	0	0	0	0	0	0
Lockhart	188	613	1,042	1,484	1,947	2,402
Luling	0	41	218	402	596	787
Martindale	0	31	66	102	140	177
Maxwell WSC	0	0	0	0	0	0
Mustang Ridge	0	0	0	0	0	0
Polonia WSC	0	0	0	88	266	442
County-Other	0	0	0	0	0	0
Municipal Total	**188**	**685**	**1,326**	**2,076**	**2,949**	**3,808**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**188**	**685**	**1,326**	**2,076**	**2,949**	**3,808**

Table 4-1 (Continued)

Water User Group	Year					
	2020 (acft)	***2030 (acft)***	***2040 (acft)***	***2050 (acft)***	***2060 (acft)***	***2070 (acft)***
Calhoun County						
Calhoun County WS	0	0	0	0	0	0
Point Comfort	0	0	0	0	0	0
Port Lavaca	0	0	0	0	0	0
Port O'Connor MUD	0	0	0	0	0	0
Seadrift	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**0**	**0**	**0**	**0**	**0**	**0**
Manufacturing	0	0	0	2,161	6,993	11,174
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	12,273	10,736	9,695	8,949	8,254	7,527
Livestock	0	0	0	0	0	0
County Total	**12,273**	**10,736**	**9,695**	**11,110**	**15,247**	**18,701**
Comal County						
Bulverde	0	0	0	0	0	0
Canyon Lake WSC	0	521	2,210	3,926	5,640	7,291
Garden Ridge	1,023	1,599	2,188	2,786	3,383	3,957
New Braunfels	0	791	4,187	7,658	11,175	14,580
County-Other	0	0	0	0	0	0
Municipal Total	**1,023**	**2,911**	**8,585**	**14,370**	**20,198**	**25,828**
Manufacturing	4,130	4,881	5,612	6,239	7,120	8,074
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**5,153**	**7,792**	**14,197**	**20,609**	**27,318**	**33,902**
DeWitt County						
Cuero	0	0	0	0	0	0
Yoakum	0	0	0	0	0	0
Yorktown	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**0**	**0**	**0**	**0**	**0**	**0**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	44	38	16	2	0	0
Irrigation	74	68	39	6	0	0
Livestock	0	0	0	0	0	0
County Total	**118**	**106**	**55**	**8**	**0**	**0**

Table 4-1 (Continued)

Water User Group	Year 2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Dimmit County						
Asherton	28	46	61	77	0	0
Big Wells	0	0	0	0	0	0
Carrizo Springs	267	399	476	578	0	0
County-Other	297	326	340	362	171	184
Municipal Total	**592**	**771**	**877**	**1,017**	**171**	**184**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	4,826	4,908	4,244	2,731	1,222	519
Irrigation	3,372	3,312	3,082	2,846	2,620	2,466
Livestock	0	0	0	0	0	0
County Total	**8,790**	**8,991**	**8,203**	**6,594**	**4,013**	**3,169**
Frio County						
Dilley	0	0	0	0	0	0
Pearsall	0	0	0	0	0	19
County-Other	0	0	0	0	0	0
Municipal Total	**0**	**0**	**0**	**0**	**0**	**19**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**0**	**0**	**0**	**0**	**0**	**19**
Goliad County						
Goliad	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**0**	**0**	**0**	**0**	**0**	**0**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**0**	**0**	**0**	**0**	**0**	**0**
Gonzales County						
Gonzales	0	0	0	174	92	310
Gonzales County WSC	0	0	0	75	0	63
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
Municipal Total	**0**	**0**	**0**	**249**	**92**	**373**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**0**	**0**	**0**	**249**	**92**	**373**

Table 4-1 (Continued)

Water User Group	Year 2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Guadalupe County						
Cibolo	1,417	3,897	5,222	6,521	7,847	9,149
Crystal Clear WSC	0	50	482	959	1,481	2,023
Green Valley SUD	82	297	533	796	1,095	1,391
Marion	0	0	0	0	0	0
New Berlin	0	0	0	0	0	0
Santa Clara	0	0	0	15	35	55
Schertz	0	0	1,035	3,410	5,943	8,438
Seguin	0	0	0	0	0	0
Springs Hill WSC	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**1,499**	**4,244**	**7,272**	**11,701**	**16,401**	**21,056**
Manufacturing	0	0	0	163	494	854
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**1,499**	**4,244**	**7,272**	**11,864**	**16,895**	**21,910**
Hays County						
Buda	0	0	0	0	0	0
County Line SUD	0	0	78	251	440	641
Goforth SUD	0	0	0	0	0	93
Kyle	0	1,348	2,801	2,787	2,776	2,783
Mountain City	11	17	25	35	47	60
Niederwald	62	81	105	134	166	203
Plum Creek Water Company	0	0	0	0	0	0
San Marcos	0	0	0	1,965	4,576	7,891
Texas State University – San Marcos	0	140	2,630	3,721	4,831	5,967
Uhland	0	0	0	0	0	0
Wimberley	0	0	174	456	778	1,146
Wimberley WSC	0	0	236	564	934	1,356
Woodcreek	0	0	0	0	0	0
County-Other	0	0	0	1,109	6,654	12,812
Municipal Total	**73**	**1,586**	**6,049**	**11,022**	**21,202**	**32,952**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**73**	**1,586**	**6,049**	**11,022**	**21,202**	**32,952**

Table 4-1 (Continued)

Water User Group	Year 2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Karnes County						
El Oso WSC	0	0	0	0	0	0
Falls City	0	0	0	0	0	0
Karnes City	336	322	298	285	249	249
Kenedy	161	189	179	178	151	151
Runge	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**497**	**511**	**477**	**463**	**400**	**400**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	1,864	1,292	700	115	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**2,361**	**1,803**	**1,177**	**578**	**400**	**400**
Kendall County						
Boerne	0	0	0	650	1,639	2,613
Kendall County WCID #1	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**0**	**0**	**0**	**650**	**1,639**	**2,613**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**0**	**0**	**0**	**650**	**1,639**	**2,613**
LaSalle County						
Cotulla	0	16	155	323	0	0
Encinal	0	0	0	0	0	0
County-Other	22	56	90	133	0	0
Municipal Total	**22**	**72**	**245**	**456**	**0**	**0**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	4,088	4,243	3,734	2,290	851	147
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**4,110**	**4,315**	**3,979**	**2,746**	**851**	**147**

Table 4-1 (Continued)

Water User Group	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Medina County						
Castroville	224	217	210	208	211	214
Devine	0	0	0	0	0	0
East Medina SUD	0	0	0	0	11	70
Hondo	523	680	816	943	1,068	1,180
La Coste	10	20	28	37	47	56
Natalia	101	129	153	176	199	220
Yancey WSC	28	95	154	208	261	309
County-Other	0	0	0	0	0	0
Municipal Total	**886**	**1,141**	**1,361**	**1,572**	**1,797**	**2,049**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	31,529	29,144	26,850	24,653	22,547	20,689
Livestock	0	0	0	0	0	0
County Total	**32,415**	**30,285**	**28,211**	**26,225**	**24,344**	**22,738**
Refugio County						
Refugio	0	0	0	0	0	0
Woodsboro	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**0**	**0**	**0**	**0**	**0**	**0**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**0**	**0**	**0**	**0**	**0**	**0**
Uvalde County						
Sabinal	121	153	181	212	245	277
Uvalde	943	1,233	1,484	1,772	2,072	2,365
County-Other	0	0	0	0	0	0
Municipal Total	**1,064**	**1,386**	**1,665**	**1,984**	**2,317**	**2,642**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	29,683	27,370	24,992	22,831	20,818	19,102
Livestock	0	0	0	0	0	0
County Total	**30,747**	**28,756**	**26,657**	**24,815**	**23,135**	**21,744**

Table 4-1 (Continued)

Water User Group	Year 2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Victoria County						
Victoria	2,413	3,269	3,932	4,602	5,233	5,774
County-Other	0	0	0	0	0	0
Municipal Total	**2,413**	**3,269**	**3,932**	**4,602**	**5,233**	**5,774**
Manufacturing	2,178	5,016	7,841	10,366	13,206	16,252
Steam-Electric Power	4,506	29,778	37,178	53,599	70,696	70,696
Mining	0	0	0	0	0	0
Irrigation	5,002	5,002	5,002	5,002	5,002	5,002
Livestock	0	0	0	0	0	0
County Total	**14,359**	**43,325**	**54,213**	**73,829**	**94,397**	**97,984**
Wilson County						
Floresville	0	8	405	770	1,124	1,445
La Vernia	0	0	0	0	0	0
Oak Hills WSC	0	0	0	0	0	0
Poth	0	0	0	0	0	0
SS WSC	0	0	0	0	0	234
Stockdale	0	0	0	0	0	0
Sunko WSC	0	0	0	0	0	117
County-Other	0	0	0	0	0	0
Municipal Total	**0**	**8**	**405**	**770**	**1,124**	**1,796**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Livestock	0	0	0	0	0	0
County Total	**0**	**8**	**405**	**770**	**1,124**	**1,796**
Zavala County						
Crystal City	0	0	0	0	0	0
Zavala County WCID #1	0	0	0	0	0	0
County-Other	0	0	0	0	0	0
Municipal Total	**0**	**0**	**0**	**0**	**0**	**0**
Manufacturing	0	0	0	0	0	0
Steam-Electric Power	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Irrigation	18,487	16,805	14,980	13,049	11,193	9,443
Livestock	0	0	0	0	0	0
County Total	**18,487**	**16,805**	**14,980**	**13,049**	**11,193**	**9,443**

Table 4-1 (Concluded)

Water User Group	Year					
	2020 (acft)	2030 (acft)	2040 (acft)	2050 (acft)	2060 (acft)	2070 (acft)
Region L (All Counties)						
Municipal	78,193	114,932	159,482	208,068	260,614	314,473
Manufacturing	6,308	9,897	13,453	18,929	28,871	40,034
Steam-Electric Power	4,506	29,778	37,178	53,599	70,696	70,696
Mining	10,822	10,481	8,694	5,138	2,073	666
Irrigation	105,796	97,322	89,054	81,299	73,965	67,380
Livestock	0	0	0	0	0	0
Region L Total	**205,625**	**262,410**	**307,861**	**367,033**	**436,219**	**493,249**

Table 4-2 WUGs Providing Service in Multiple Counties

WUG	Counties Served (Primary County Highlighted)			
Benton City WSC	Atascosa	Frio	Medina	
County Line SUD	Caldwell	Hays		
Creedmoor-Maha WSC	Caldwell	Hays		
Crystal Clear WSC	Comal	Guadalupe	Hays	
East Central SUD	Bexar	Guadalupe	Wilson	
El Oso WSC	Karnes	Wilson		
Elmendorf	Bexar	Wilson		
Fairoaks Ranch	Bexar	Comal	Kendall	
Goforth SUD	Caldwell	Hays		
Gonzales County WSC	Caldwell	DeWitt	Gonzales	Guadalupe
Green Valley SUD	Bexar	Comal	Guadalupe	
Luling	Caldwell	Guadalupe		
Lytle	Atascosa	Bexar	Medina	
Maxwell WSC	Caldwell	Hays		
McCoy WSC	Atascosa	Wilson		
New Braunfels	Comal	Guadalupe		
Niederwald	Caldwell	Hays		
Nixon	Gonzales	Wilson		
San Antonio	Bexar	Medina		
San Antonio Water System	Atascosa	Bexar	Comal	Medina
San Marcos	Caldwell	Hays		
Schertz	Bexar	Comal	Guadalupe	
Selma	Bexar	Comal	Guadalupe	
Sunko WSC	Karnes	Wilson		
Uhland	Caldwell	Hays		
Water Services Inc.	Bexar	Guadalupe	Kendall	

4.1.1 Municipal WUGs with Needs

There are 60 municipal WUGs with a projected need (shortage) between 2020 and 2070. The total municipal need for the region in 2020 is 78,193 acft/yr, increasing to 314,473 acft/yr in 2070 (Table 4-1). Sixteen counties (Atascosa, Bexar, Caldwell, Comal, Dimmit, Frio, Gonzales, Guadalupe, Hays, Karnes, Kendall, La Salle, Medina, Uvalde, Victoria, and Wilson) are projected to have at least one WUG with a municipal need (shortage) during the planning period, as shown in Figure 4-1.

4.1.2 Industrial WUGs with Needs

The total industrial need for the region in 2020 is 6,308 acft/yr, increasing to 40,034 acft/yr in 2070 (Table 4-1). Five counties (Bexar, Calhoun, Comal, Guadalupe, and Victoria) are projected to have an industrial need (shortage) during the planning period, as shown in Figure 4-2.

4.1.3 Steam-Electric WUGs with Needs

The total steam-electric need for the region in 2020 is 4,506 acft/yr, increasing to 70,696 acft/yr in 2070 (Table 4-1). One county (Victoria) is projected to have a steam-electric need (shortage) during the planning period, as shown in Figure 4-3.

4.1.4 Mining WUGs with Needs

The total mining need for the region in 2020 is 10,822 acft/yr, decreasing to 666 acft/yr in 2070 (Table 4-1). Four counties (DeWitt, Dimmit, Karnes, and La Salle) are projected to have a mining need (shortage) during the planning period, as shown in Figure 4-4.

4.1.5 Irrigation WUGs with Needs

The total irrigation need for the region in 2020 is 105,536 acft/yr, decreasing to 67,380 acft/yr in 2070 (Table 4-1). Eight counties (Bexar, Calhoun, DeWitt, Dimmit, Medina, Uvalde, Victoria, and Zavala) are projected to have an irrigation need (shortage) during the planning period, as shown in Figure 4-5.

4.1.6 Livestock WUGs with Needs

There are no projected livestock needs within the planning period.

Figure 4-1 Municipal Water Needs

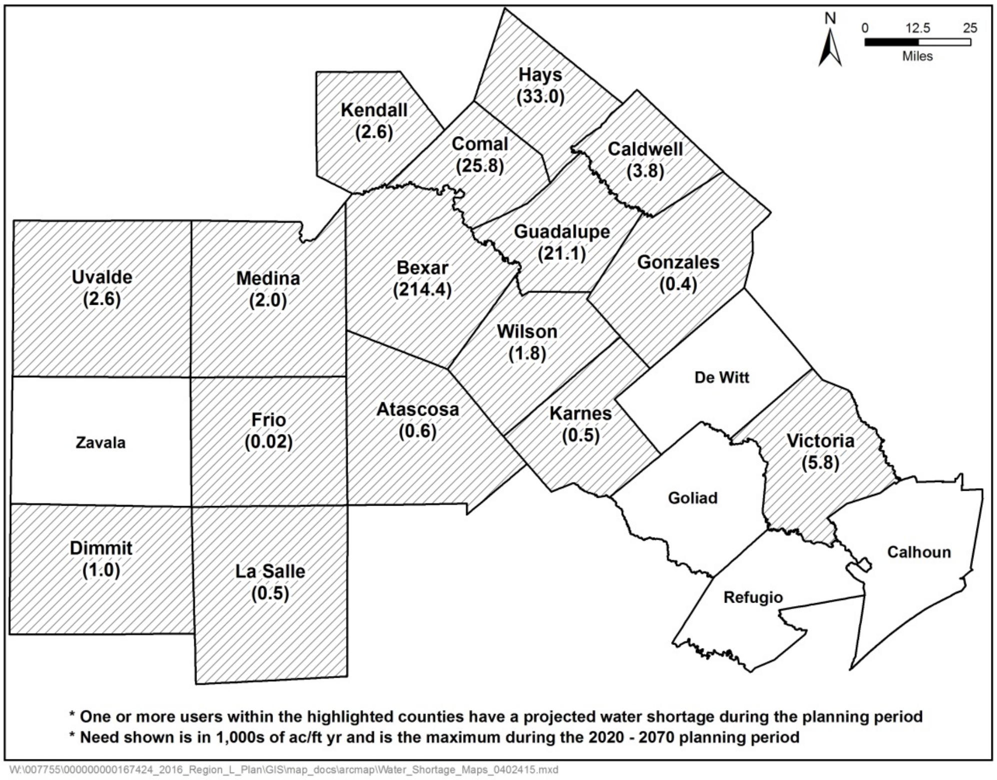

Figure 4-2 Industrial Water Needs

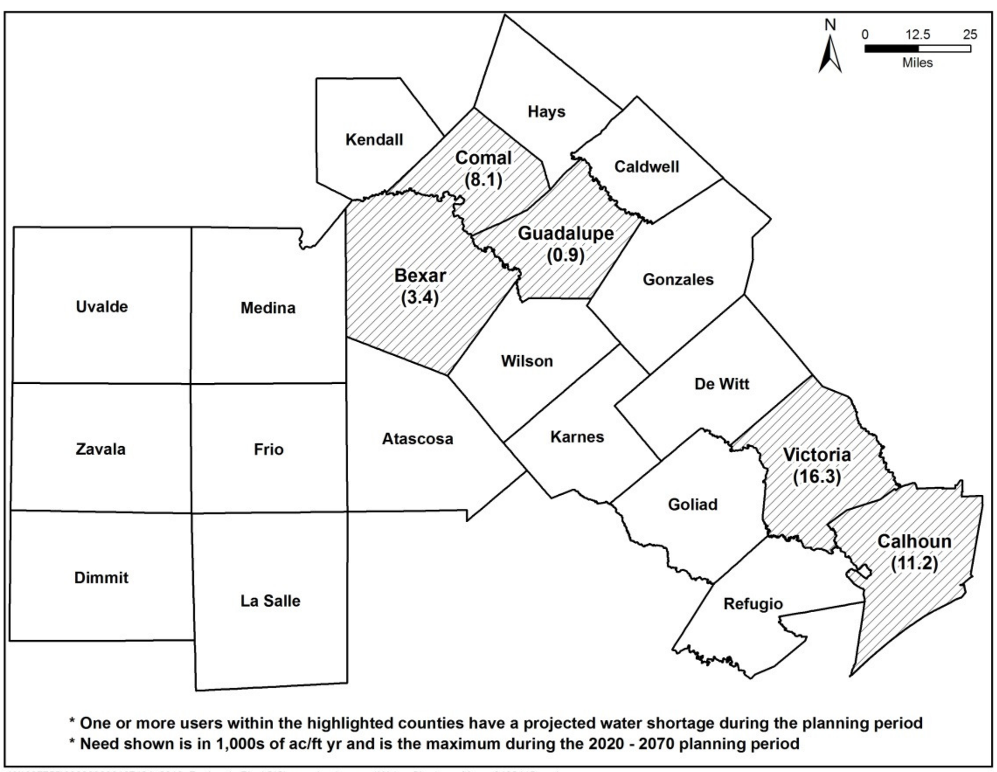

Figure 4-3 Steam-Electric Water Needs

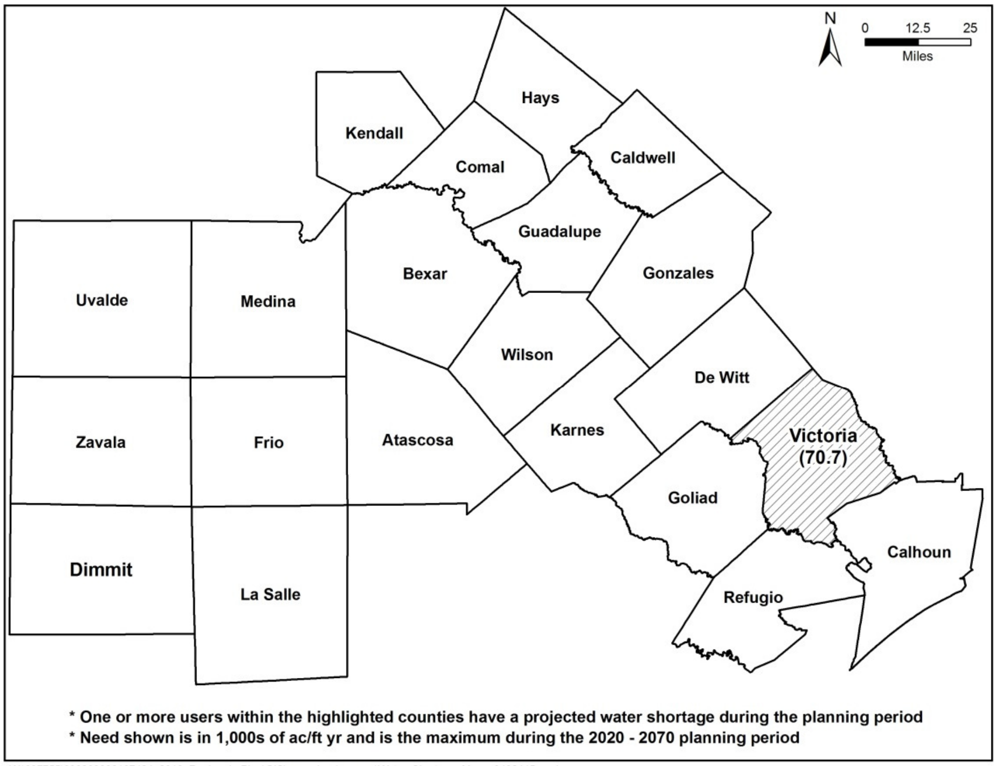

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Figure 4-4 Mining Water Needs

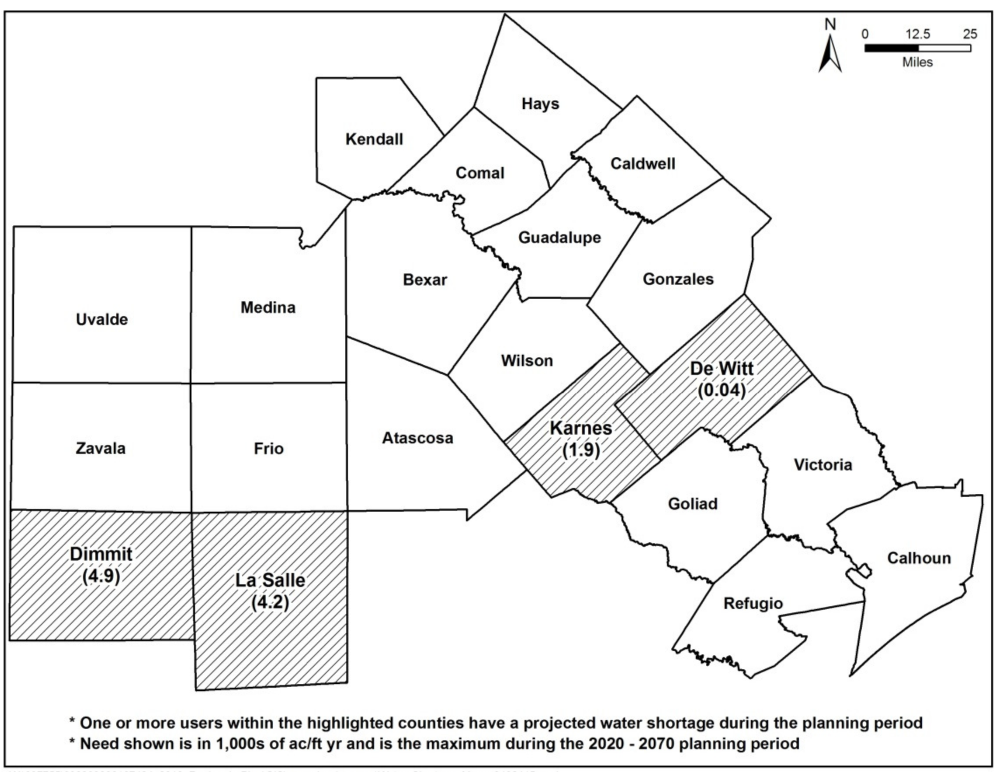

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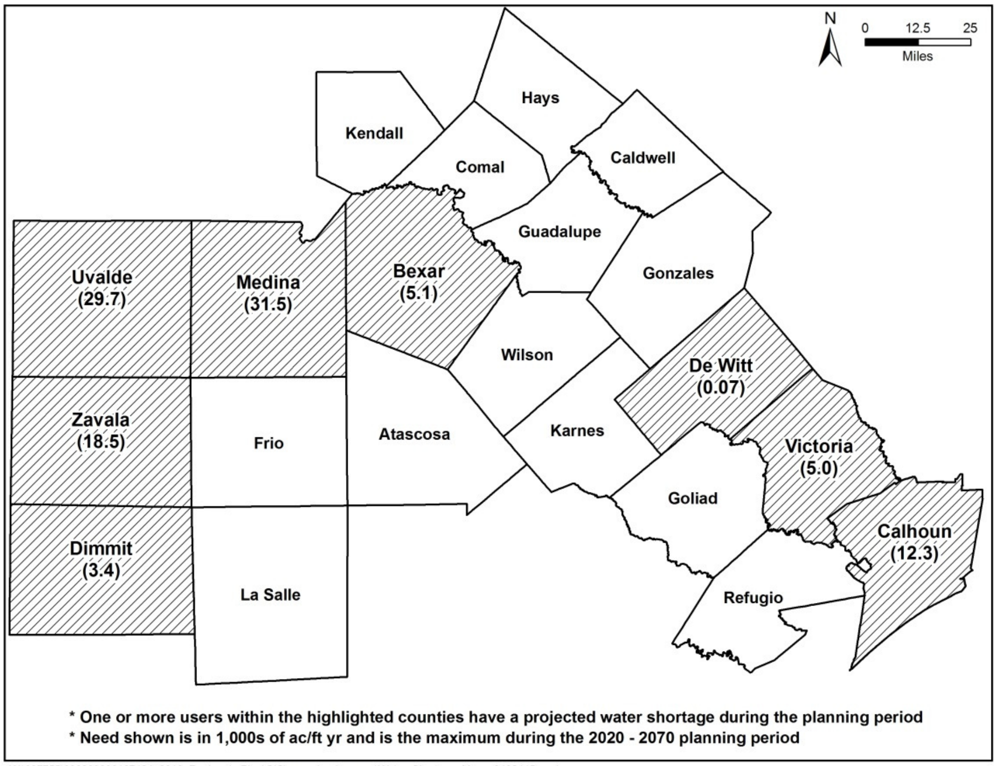
Figure 4-5 Irrigation Water Needs



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4.2 Water Needs Projections by Wholesale Water Provider

A summary of projected water demands, existing supplies, and needs (shortages) for each Wholesale Water Provider (WWP) in the South Central Texas planning region is provided in Table 4-3. Projected water demands for each WWP are estimated on the basis of existing and/or future contracts with water user groups (WUGs) expected to continue receiving water or acquire new water supplies from the WWP. Supplies for each WWP are determined in accordance with procedures and assumptions described in Chapter 3 and are identified by source in Table 4-3. The Texas Water Alliance, San Antonio Water System (SAWS), Cibolo Valley Local Government Corporation (CVLGC), Hays-Caldwell Public Utility Agency (HCPUA), Guadalupe-Blanco River Authority (GBRA), Canyon Regional Water Authority (CRWA), and Schertz-Seguin Local Government Corporation (SSLGC) each have projected needs for additional water supply throughout the planning period. The Springs Hill WSC (SHWSC), on the other hand, has existing supplies in excess of projected demands throughout the planning period. These existing supplies in excess of projected demand are identified in Table 4-3 as System Management Supplies.

Table 4-3 Water Demands, Supplies, and Needs (Shortages) by Wholesale Water Providers

Wholesale Water Provider	*Demand/Supply/Need*	*Year (acft)*					
		2020	*2030*	*2040*	*2050*	*2060*	*2070*
San Antonio Water System (SAWS)	**Demand**	**347,340**	**375,230**	**401,565**	**430,899**	**460,293**	**487,619**
	Supply						
	Edwards Aquifer with EAHCP[1]	172,640	172,640	172,640	172,640	172,640	172,640
	Carrizo Aquifer (Bexar County)	9,900	9,900	9,900	9,900	9,900	9,900
	Carrizo Aquifer (Gonzales County)	11,688	11,418	11,688	11,688	11,688	11,688
	Carrizo Aquifer (Gonzales County) – SSLGC Excess	0	0	0	0	0	0
	Gonzales Co. WSC	1,000	1,000	1,000	1,000	1,000	1,000
	Trinity Aquifer[2]	2,000	2,000	2,000	2,000	2,000	2,000
	Direct Reuse[3]	25,000	30,000	35,000	35,000	35,000	35,000
	Run-of-River (San Ant.)	4,045	4,045	4,045	4,045	4,045	4,045
	CRWA	6,390	6,390	6,390	6,390	6,390	6,390
	GBRA (Canyon)	4,000	4,000	0	0	0	0
	Total Supply	**236,663**	**241,393**	**242,663**	**242,663**	**242,663**	**242,663**
	System Management Supplies / (Needs)	**(110,677)**	**(133,837)**	**(158,902)**	**(188,236)**	**(217,630)**	**(244,956)**
Guadalupe-Blanco River Authority (GBRA)	Upper Basin Demand	18,606	20,606	18,926	19,884	20,873	21,847
	Mid-Basin Demand	67,839	68,961	70,975	74,805	83,632	93,521
	Lower Basin Demand (excludes interruptible demands)	76,461	104,571	114,796	136,198	180,967	188,194
	Total Demand	**162,906**	**194,138**	**204,697**	**230,887**	**285,472**	**303,562**
	Supply						
	Canyon Reservoir (Firm, Daily Basis)	89,100	88,960	88,820	88,680	88,540	88,400
	San Marcos Run-of-River Rights (Firm)	0	0	0	0	0	0
	Lower Basin Run-of-River Rights (Firm, Daily Basis)	44,213	44,213	44,213	44,213	44,213	44,213
	Total Supply	**133,313**	**133,173**	**133,033**	**132,893**	**132,753**	**132,613**
	System Management Supplies / (Needs)						
	Canyon Reservoir	(1,885)	(5,147)	(5,621)	(10,185)	(19,674)	(30,031)
	San Marcos Run-of-River Rights	(2,800)	(2,800)	(2,800)	(3,164)	(3,631)	(4,277)
	Lower Basin Run-of-River Rights	(24,908)	(53,018)	(63,243)	(84,645)	(129,414)	(136,641)
	Total	**(29,593)**	**(60,965)**	**(71,664)**	**(97,994)**	**(152,719)**	**(170,949)**
Canyon Regional Water Authority (CRWA)	**Demand**	**25,747**	**28,011**	**28,366**	**33,102**	**33,873**	**39,678**
	Supply						
	GBRA Lake Dunlap	10,575	10,575	10,575	10,575	10,575	10,575
	Wells Ranch Phase I	5,200	5,200	5,200	5,200	5,200	5,200
	Run-of-River Water Rights	490	490	490	490	490	490
	GBRA – Hays/Caldwell	2,038	2,038	2,038	2,038	2,038	2,038
	Water Right Leases	540	540	540	540	540	540
	Total Supply	**18,843**	**18,843**	**18,843**	**18,843**	**18,843**	**18,843**
	System Management Supplies / (Needs)	**(6,904)**	**(9,168)**	**(9,523)**	**(14,259)**	**(15,030)**	**(20,835)**

Table 4-3 (Concluded)

Wholesale Water Provider	*Demand/Supply/Need*	*Year (acft)*					
		2020	*2030*	*2040*	*2050*	*2060*	*2070*
Schertz-Seguin Local Government Corporation (SSLGC)	**Demand**	**18,756**	**19,787**	**21,350**	**23,779**	**24,150**	**24,150**
	Supply						
	Carrizo Aquifer (Gonzales County)[4]	17,039	16,644	17,039	17,039	17,039	17,039
	Total Supply	**17,039**	**16,644**	**17,039**	**17,039**	**17,039**	**17,039**
	System Management Supplies / (Needs)	**(1,717)**	**(3,143)**	**(4,311)**	**(6,740)**	**(7,111)**	**(7,111)**
Springs Hill WSC	**Demand**	**2,437**	**2,703**	**3,102**	**3,719**	**4,379**	**5,043**
	Supply						
	CRWA (Canyon Reservoir)	1,925	1,925	1,925	1,925	1,925	1,925
	CRWA (Wells Ranch)	100	100	100	100	100	100
	GBRA (Canyon Reservoir)	2,850	2,850	2,850	2,850	2,850	2,850
	Carrizo Aquifer (Guadalupe County)	1,107	1,107	1,107	1,107	1,107	1,107
	Carrizo Aquifer (Gonzales County) (SSLGC)	722	722	722	722	722	722
	Total Supply	**6,704**	**6,704**	**6,704**	**6,704**	**6,704**	**6,704**
	System Management Supplies / (Needs)	**4,267**	**4,001**	**3,602**	**2,985**	**2,325**	**1,661**
Texas Water Alliance (TWA)	**Demand**	**4,000**	**4,521**	**6,620**	**9,531**	**14,709**	**20,000**
	Supply						
	TWA-Carrizo (GMA 13)	0	0	0	0	0	0
	TWA-Trinity (GMA 10)	0	0	0	0	0	0
	TWA-Trinity (GMA 9)	0	0	0	0	0	0
	Total Supply	**0**	**0**	**0**	**0**	**0**	**0**
	System Management Supplies / (Needs)	**(4,000)**	**(4,521)**	**(6,620)**	**(9,531)**	**(14,709)**	**(20,000)**
Hays-Caldwell Public Utility Agency (HCPUA)	**Demand**	**3,182**	**6,649**	**9,125**	**14,470**	**18,129**	**21,833**
	Supply						
	Total Supply	**0**	**0**	**0**	**0**	**0**	**0**
	System Management Supplies / (Needs)	**(3,182)**	**(6,649)**	**(9,125)**	**(14,470)**	**(18,129)**	**(21,833)**
Cibolo Valley Local Government Corporation (CVLGC)	**Demand**	**0**	**2,116**	**3,441**	**4,740**	**7,431**	**10,000**
	Supply						
	Total Supply	**0**	**0**	**0**	**0**	**0**	**0**
	System Management Supplies / (Needs)	**0**	**(2,116)**	**(3,441)**	**(4,740)**	**(7,431)**	**(10,000)**

1. Includes SAWS permits as presented in EAA's permit files, with full implementation of the EAHCP.
2. Total permitted volume is 22,660 acft/yr; however, SAWS only considers 2,000 acft/yr to be a firm supply.
3. Amount excludes commitments to streams and lakes.
4. Permitted production as of September 2013, less 12% loss rate.

5.1 Recommended Water Management Strategy Descriptions

[31 TAC §357.34]

A brief description of each of the recommended water management strategies included in the 2016 South Central Texas Regional Water Plan is provided in Chapter 5.1. Descriptions include the dependable (firm) water supply during drought and an estimated annual unit cost (in September 2013 dollars) for water at full operating capacity during the debt service period (if applicable).

5.1.1 Municipal Water Conservation

The Municipal Water Conservation water management strategy includes conservation practices and programs to reduce per capita water use in cities by amounts in addition to reductions already incorporated into the Texas Water Development Board (TWDB) water demand projections. The SCTRWPG established municipal water conservation goals as follows:

- For municipal Water User Groups (WUGs) with water use of 140 gpcd and greater, the goal is to reduce per capita water use by one percent per year until the level of 140 gpcd is reached, after which, the goal is to reduce per capita water use by one-fourth percent per year for the remainder of the planning period; and
- For municipal WUGs having year 2000 water use of less than 140 gpcd, the goal is to reduce per capita water use by one-fourth percent per year (0.25% per year).

Best Management Practices (BMPs) for water conservation, as identified by the Water Conservation Implementation Task Force, are recommended as means of achieving these municipal water conservation goals. The objective of municipal water conservation programs is to reduce the per capita water use without adversely affecting the quality of life of the people involved. Planned municipal water conservation focuses on the following specific BMPs:

- 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);
- The selection and use of more efficient water-using appliances (e.g., clothes washers and dishwashers);
- Modifying and/or installing lawn and landscaping systems to use grass and plants that require less water;
- Repair of plumbing and water-using appliances to reduce leaks; and
- Modification of personal behavior that controls the use of plumbing fixtures, appliances, and lawn watering methods.

The SCTRWPG recognizes that meeting the water conservation goals through implementation of these, or other, BMPs represents the highest practicable level of water conservation pursuant to 31 TAC 357.34(f)(2)(C). Planned additional municipal water conservation focused on these BMPs could effectively increase supply through demand reduction in the South Central Texas Region by 96,288 acft/yr in the year 2070 at unit costs ranging from $681 per acft/yr to $770 per acft/yr. Volume II, Chapter 5.2.1 includes a detailed discussion of this water management strategy.

5.1.2 Drought Management

The TWDB has adopted the SCTRWPG's general methodology for estimating the economic impacts associated with implementation of drought management as a water management strategy. Application of this methodology for regional water planning purposes has facilitated comparison of drought management to other potentially feasible water management strategies on a unit cost basis (Chapter 5.2.2). The SCTRWPG has found, and the San Antonio Water System (SAWS) has demonstrated, that water user groups 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 water management strategies. Recognizing that implementation of appropriate water management strategies 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. Hence, new demand reductions associated with the 5 percent drought management scenario are shown at year 2020 for each municipal water user group with projected needs for additional water supply at year 2020. A total demand reduction of 2,839 acft/yr in 2020 was calculated for 28 WUGs at an average unit cost of $1,431/acft/yr. Volume II, Chapter 5.2.2 includes a detailed discussion of this recommended water management strategy.

5.1.3 Facilities Expansions

Several WUGs are interested in projects to expand major components of their existing infrastructure (facilities) so they can continue to provide a safe and reliable water supply to their customers during the planning period. These facilities expansions are considered to be independent of any potential water management strategies to acquire a new water supply, and instead are intended to address expected future improvements to the water system, such as the installation of new water transmission facilities or additional water treatment. Volume II, Chapter 5.2.3 summarizes the expansions associated with this recommended water management strategy. Eleven facilities expansion projects are identified for nine entities. The capacities of the projects range from 672 acft/yr to 84,000 acft/yr.

5.1.4 Direct Recycled Water Programs

The Direct Recycled Water Programs water management strategy involves direct reuse of reclaimed municipal wastewater for non-potable uses such as irrigation of golf courses, parks, and open spaces of cities, landscape watering of large office and business complexes, cooling of large office and business complexes, steam-electric power plant cooling, process or wash water for mining operations, irrigation of farms that produce livestock feed and forage, irrigation of farms that produce sod, ornamentals, and landscape plants, and for instream uses such as riverwalks and waterways. This strategy is being planned within the region by entities including SAWS, SARA, CCMA, New

Braunfels Utilities, the City of Kyle, and the City of San Marcos and can be expanded as the quantities of municipal wastewater increase with population growth. By 2070, the participating entities are projected to directly reuse 97,763 acft/yr of treated wastewater at unit costs ranging from $458/acft/yr to $1,500/acft/yr. An advantage of this strategy is that the water has already been developed and brought to the locations of many of the uses listed above. Volume II, Chapter 5.2.4 includes a detailed discussion of this recommended water management strategy.

5.1.5 Edwards Aquifer Habitat Conservation Plan

The Edwards Aquifer Habitat Conservation Plan (EAHCP) is identified as both an existing supply and a water management strategy in the 2016 SCTRWP. It is an existing supply in that the existing supply for users of the Edwards Aquifer is calculated assuming full implementation of the EAHCP. Likewise, springflows consistent with full implementation of the EAHCP are assumed when calculating existing surface water supply. The EAHCP is considered a water management strategy as well due to the phased implementation of the program elements. The EAHCP is included as a strategy so that these program elements may be eligible for TWDB funding. The unit cost for the EAHCP, based on an increase in firm Edwards Aquifer supply of about 50,600 acft/yr, is $345/acft/yr. Volume II, Chapter 5.2.5 includes a detailed discussion of this recommended water management strategy.

5.1.6 Edwards Transfers

The Edwards Transfers water management strategy is based upon the provisions of Senate Bill 1477, as amended, which created the Edwards Aquifer Authority, established a withdrawal permit system, and allows a permit holder to sell or lease up to 50 percent of his irrigation rights. In the 2016 Regional Water Plan, Edwards transfers are included to meet projected needs of 16 municipal water user groups and provide a firm supply of about 11,800 acft/yr by 2070. The Initial Regular Permit (IRP) volume needed to obtain this firm supply is about 20,100 acft/yr accounting for critical period withdrawal reductions. As implementation of the EAHCP is expected to use all remaining unrestricted irrigation permits, large municipalities having alternative supplies are considered the primary sources for Edwards Transfers in the 2016 SCTRWP. Based on what it might cost a large municipality to construct and operate projects to replace Edwards water leased to other municipalities, typical unit costs are estimated at $1,415 per acft/yr. Volume II, Chapter 5.2.6 includes a detailed discussion of this recommended water management strategy.

5.1.7 Local Groundwater Supplies

Local Groundwater Supplies (Carrizo-Wilcox and/or Yegua-Jackson)

The Local Carrizo water management strategy involves the phased development or expansion of well fields in the Carrizo-Wilcox Aquifer[1] for the purposes of meeting local municipal needs in Atascosa, Caldwell, Dimmit, Frio, Karnes, La Salle, Medina, Wilson, and Zavala Counties. Planned implementation of this strategy provides new dependable

[1] In the case of Karnes City, potential source could be Carrizo-Wilcox and/or Yegua-Jackson Aquifers.

supplies totaling about 3,388 acft/yr for the South Central Texas Region in 2070 at estimated unit costs ranging from $516/acft/yr to $5,150/acft/yr. Volume II, Chapter 5.2.7 includes a detailed discussion of this recommended water management strategy.

Local Groundwater Supplies (Trinity)

The Local Trinity water management strategy involves the development of 3,245 acft/yr of water supply from the Trinity Aquifer in Comal, Hays, and Kendall Counties. Estimated unit costs range from $673/acft/yr to $1,635/acft/yr. Volume II, Chapter 5.2.7 includes a detailed discussion of this recommended management strategy.

Local Groundwater Supplies (Gulf Coast)

The Local Gulf Coast water management strategy involves development of 309 acft/yr for new local municipal and mining supplies in the Gulf Coast Aquifer in DeWitt and Karnes Counties. Estimated unit costs for the new supplies range from $130/acft/yr to $3,111/acft/yr. Volume II, Chapter 5.2.7 includes a detailed discussion of this recommended water management strategy.

Local Groundwater Supplies (Leona Gravels)

The Local Leona Gravels water management strategy involves development of 895 acft/yr for new local municipal supplies in the Leona Gravels Aquifer in Medina County. Estimated unit costs for the new supplies range from $2,565/acft/yr to $5,317/acft/yr. Volume II, Chapter 5.2.7 includes a detailed discussion of this recommended water management strategy.

5.1.8 Local Carrizo Conversions

The Local Carrizo Conversions water management strategy is intended to be used by WUGs where the Local Groundwater WMS is the primary recommended strategy to meet their needs and the groundwater available is limited due to Modeled Available Groundwater (MAG) estimates. The strategy includes purchasing and/or leasing existing irrigation or mining groundwater permits and converting the type of use to municipal. Local Carrizo Conversions are intended to be used within the same county and between willing sellers and willing buyers. Volume II, Chapter 5.2.8 includes a detailed discussion of this recommended water management strategy.

5.1.9 NBU Aquifer Storage & Recovery

NBU is considering an Aquifer Storage and Recovery (ASR) (dual-purpose wells) project to more effectively use their existing supplies. NBU expects an ASR strategy to provide a long-term supply during drought-of-record (DOR), defer construction of a second water treatment plant, meet seasonal demands when restrictions are imposed, meet demands at the ends of the distribution system, and provide an emergency supply. The concept of an ASR system is to store water during times of plenty and to recover the water during times of shortage. The NBU ASR project is expected to add 8,300 acft/yr of new supply by 2070, when coupled with a WTP expansion of 7.5 MGD, at a unit cost of $462/acft/yr. Volume II, Chapter 5.2.9 includes a detailed discussion of this recommended water management strategy.

5.1.10 NBU Trinity Aquifer

NBU is considering adding Trinity Aquifer wells as another water supply source. The strategy includes a Trinity well field, production facilities, and integration into the current distribution system. The NBU Trinity Aquifer project is expected to add 1,090 acft/yr at a unit cost of $634/acft/yr. Volume II, Chapter 5.2.10 includes a detailed discussion of this recommended water management strategy.

5.1.11 Expanded Carrizo for Schertz-Seguin Local Government Corporation (SSLGC)

The Expanded Carrizo for Schertz-Seguin Local Government Corporation (SSLGC) water management strategy involves the expansion of well fields located in Guadalupe County by the SSLGC. The SSLGC was created to develop and operate a wholesale water supply system to serve the long-term needs of several communities located in Guadalupe and Bexar Counties. This strategy focuses on the development of additional well fields and associated collection and treatment systems as primary transmission facilities for delivery of water to customers are operating at this time. Planned implementation of this strategy will provide an additional dependable annual supply of approximately 6,500 acft/yr at an estimated unit cost of $1,070/acft/yr. Volume II, Chapter 5.2.11 includes a detailed discussion of this recommended water management strategy.

5.1.12 Brackish Wilcox for SSLGC

The Brackish Wilcox for SSLGC water management strategy involves the installation of wells into the brackish portion of the Wilcox Aquifer within the same Gonzales County well field currently utilized by SSLGC for fresh Carrizo water. This strategy focuses on the development of additional wells and associated collection and treatment systems. Envisioned implementation of this strategy will provide an additional dependable annual supply of approximately 5,000 acft/yr. However, due to MAG limitations within Gonzales County, the recommend firm supply from this project is 1,278 acft/yr at an estimated unit cost of $5,032/acft/yr. Volume II, Chapter 5.2.12 includes a detailed discussion of this recommended water management strategy.

5.1.13 Brackish Wilcox Groundwater for SS WSC

The Brackish Wilcox Groundwater for SS Water Supply Corporation (SSWSC) water management strategy includes developing a brackish groundwater supply from the Wilcox Aquifer in Wilson County for the SSWSC. It is envisioned to produce an average annual water supply of 1.0 MGD (1,120 acft/yr) at a peak rate of 2.0 MGD. The project facilities are planned to be located in the vicinity of the SSWSC Sutherland Springs Road Plant, which is located about 3 miles west-northwest of Sutherland Springs. The facilities include Wilcox Aquifer wells to provide a brackish groundwater supply, water treatment plant for pretreatment and desalination, delivery of treated water to the existing distribution system, and concentrate disposal to deep injection wells. Due to MAG limitations within Wilson County, the recommend firm supply from this project is 0 acft/yr. Volume II, Chapter 5.2.13 includes a detailed discussion of this recommended water management strategy.

5.1.14 Cibolo Valley LGC Carrizo Project

The Cibolo Valley LGC Carrizo Project is a water management strategy to develop a groundwater supply from the Carrizo Aquifer in Wilson County. The project is envisioned to deliver up to 10,000 acft/yr to the cities of Cibolo and Schertz, however, due to MAG limitations within Wilson County, the recommend firm supply from this project is 0 acft/yr. By adding conversion of groundwater permits from irrigation to municipal, the Cibolo Valley LGC Carrizo Project has a firm supply of 10,000 acft/yr as a recommended water management strategy. Volume II, Chapter 5.2.14 includes a detailed discussion of this recommended water management strategy.

5.1.15 Uvalde ASR

Uvalde is considering an Aquifer Storage and Recovery (ASR) (dual-purpose wells) project in conjunction with new wells in the Austin Chalk and Buda Limestone Aquifers to develop a new firm water supply. Uvalde expects this ASR strategy to provide a long-term supply during drought-of-record for Uvalde, Sabinal, and Knippa. The concept of an ASR system is to store water during times of plenty and to recover the water during times of shortage. The Uvalde ASR project is envisioned to add 4,000 acft/yr of new supply by 2070. However, due to MAG limitations within Uvalde County, the recommend firm supply from this project is 1,155 acft/yr at a unit cost of $2,803/acft/yr. Volume II, Chapter 5.2.15 includes a detailed discussion of this recommended water management strategy.

5.1.16 CRWA Wells Ranch Project – Phase II

Canyon Regional Water Authority (CRWA) is in the planning, permitting, and construction stages of Phase II of their Wells Ranch Project, straddling the border of Guadalupe and Gonzales Counties. Phase II is envisioned to supply an additional 10,629 acft/yr in the future. However, due to MAG limitations, the recommended firm supply of the project is 7,829 acft/yr at a unit cost of $858/acft/yr. Volume II, Chapter 5.2.16 includes a detailed discussion of this recommended water management strategy.

5.1.17 CRWA Siesta Project

The Canyon Regional Water Authority (CRWA) Siesta Project is planned as a conjunctive use project using interruptible diversions from Cibolo Creek in Wilson County along with treated effluent from wastewater treatment facilities operated by San Antonio River Authority (SARA) as raw water sources for treatment and distribution as a new municipal water supply for CRWA members. Should treated effluent from wastewater treatment facilities not be available, the project could include brackish groundwater as an alternate back-up source. The Siesta Project involves the acquisition/lease of additional water rights and amendment of a surface water right presently held by CRWA in order to increase authorized diversions from Cibolo Creek by CRWA from 42 acft/yr to 5,042 acft/yr. Planned implementation of this strategy could provide an additional dependable annual supply of approximately 5,042 acft/yr at an estimated cost of $1,886/acft/yr. Volume II, Chapter 5.2.17 includes a detailed discussion of this recommended water management strategy.

5.1.18 Brackish Wilcox Groundwater for CRWA

The Brackish Wilcox Groundwater for CRWA water management strategy includes developing a brackish groundwater supply from the Wilcox Aquifer in Guadalupe and Wilson Counties for CRWA members. It is envisioned to produce an average annual water supply of 14,700 acft/yr with a 1.3 peaking factor. Due to MAG limitations, the recommended firm supply of this project is 3,839 acft/yr at a unit cost of $2,619/acft/yr. The well field is planned for northern Wilson County and southern Guadalupe County near SH 123. The water will be delivered to the Liessner Booster Station for distribution to participating water utilities. Volume II, Chapter 5.2.18 includes a detailed discussion of this recommended water management strategy.

5.1.19 Brackish Wilcox Groundwater for SAWS

Brackish Wilcox Groundwater for SAWS is a water management strategy based on the development of brackish groundwater in the Wilcox Aquifer in southern Bexar County. The project consists of three phases that are envisioned to produce a total of 33,600 acft/yr of potable water. Due to MAG limitations, the recommend firm supply of this project is 5,622 acft/yr at a unit cost of $1,289/acft/yr. Volume II, Chapter 5.2.19 includes a detailed discussion of this recommended water management strategy.

5.1.20 Expanded Brackish Groundwater for SAWS

The Expanded Brackish Groundwater for SAWS water management strategy is envisioned to produce up to 50,000 acft/yr of brackish groundwater from the Wilcox Aquifer in Wilson County. Due to MAG limitations, the recommend firm supply of this project is 0 acft/yr. The project is in two phases that would deliver the brackish water to SAWS desalination plant in southern Bexar County. Volume II, Chapter 5.2.20 includes a detailed discussion of this recommended water management strategy.

5.1.21 Expanded Local Carrizo Groundwater for SAWS

The Expanded Local Carrizo Groundwater for SAWS water management strategy is envisioned to produce up to 30,000 acft/yr of fresh groundwater from the Carrizo Aquifer in Bexar County. Due to MAG limitations, the recommend firm supply of this project is 5,419 acft/yr at a unit cost of $700/acft/yr. Volume II, Chapter 5.2.21 includes a detailed discussion of this recommended water management strategy.

5.1.22 SAWS Seawater Desalination

The SAWS Seawater Desalination water management strategy involves the long-term development of intake and treatment facilities on the north shore of San Antonio Bay near Seadrift and transmission of treated water for integration and use in Bexar County. This water management strategy utilizes a source of water that is essentially unlimited; however, costs of treatment and location for brine discharge (as may affect marine habitat and species) remain concerns. Planned implementation of this strategy will provide a dependable annual supply of approximately 84,000 acft by 2070 at an estimated unit cost of $2,713/acft/yr. Volume II, Chapter 5.2.22 includes a detailed discussion of this recommended water management strategy.

5.1.23 SAWS Vista Ridge

SAWS has contracted with Vista Ridge Consortium for up to 50,000 acft/yr of groundwater supply from Burleson County, Texas. Vista Ridge holds permits from the Post Oak Savannah Groundwater Conservation District for withdrawal of up to 70,000 acft/yr from the Carrizo–Wilcox Aquifer in Burleson County. The project includes a well field, collection system, treatment, and 143 miles of 54-inch and 60-inch transmission pipelines, and will deliver water to northern Bexar County for integration into the SAWS distribution system. Due to MAG limitations, the recommended firm supply for this project is 34,894 acft/yr by 2070 at a unit cost of $2,177/acft/yr. Volume II, Chapter 5.2.23 includes a detailed discussion of this recommended water management strategy.

5.1.24 Hays County Forestar Project

Hays County has contracted with Forestar for up to 45,000 acft/yr of groundwater supply from Lee County, Texas. Forestar currently holds permits from the Lost Pines Groundwater Conservation District for withdrawal of up to 12,000 acft/yr from the Carrizo–Wilcox Aquifer in Lee County and has applied for the additional 33,000 acft/yr. Due to MAG limitations, the recommended firm supply for this project is 12,356 acft/yr by 2070 at a unit cost of $1,942/acft/yr. Volume II, Chapter 5.2.24 includes a detailed discussion of this recommended water management strategy.

5.1.25 Hays/Caldwell PUA Project

The Hays/Caldwell PUA Project envisions the development of about 35,690 acft/yr of dependable supply from the Carrizo Aquifer in Caldwell and Gonzales Counties. The HCPUA currently holds 10,300 acft/yr of groundwater permits from the Gonzales County Underground Water Conservation District (GCUWCD) in Caldwell County. Due to MAG limitations, the recommended firm supply for the project is 21,833 acft/yr at an estimated unit cost of $1,926/acft/yr. Volume II, Chapter 5.2.25 includes a detailed discussion of this recommended water management strategy.

5.1.26 TWA Carrizo Project

The Texas Water Alliance (TWA) is currently has groundwater leases in Gonzales County and permits from the GCUWCD for up to 15,000 acft/yr of Carrizo Aquifer groundwater for delivery to entities in Guadalupe, Hays, and Comal Counties. Due to MAG limitations, the recommended firm supply of the project is 14,680 acft/yr at an estimated unit cost of $2,490/acft/yr. Volume II, Chapter 5.2.26 includes a more detailed discussion of this recommended water management strategy.

5.1.27 TWA Trinity Project

TWA is considering a Trinity Aquifer well field in western Comal County for up to 5,000 acft/yr of new supply for delivery to entities in Comal and Hays Counties. Currently, there is not a groundwater conservation district in Comal County to regulate the Trinity Aquifer. The estimated unit cost of the project is $613/acft/yr. Volume II, Chapter 5.2.27 includes a more detailed discussion of this recommended water management strategy.

5.1.28 GBRA Mid-Basin Water Supply Project – ASR

The Guadalupe-Blanco River Authority (GBRA) is in the planning and permitting stages of a phased Mid-Basin Water Supply Project (MBWSP) to provide supplemental water supplies directly to participants in Comal, Caldwell, Hays, and/or Guadalupe Counties. GBRA is currently considering four general formulations of the MBWSP using available surface water and/or groundwater supply sources to ensure unrestricted delivery of a firm yield of up to 50,000 acft/yr. The recommended water management strategy focuses on an Aquifer Storage and Recover (ASR) formulation which includes run-of-river diversions from the Guadalupe River near Gonzales, treatment, and transmission to participants or ASR wells in Gonzales County for storage and subsequent recovery during periods when run-of-river diversions are limited. The project has a firm yield of 50,000 acft/yr at an estimated unit cost of $1,637/acft/yr. GBRA's Application No. 12378 for the surface water rights associated with this water management strategy has been declared administratively complete by the Texas Commission on Environmental Quality (TCEQ). Volume II, Chapter 5.2.33 includes a detailed discussion of this recommended water management strategy.

5.1.29 GBRA New Appropriation (Lower Basin)

The GBRA New Appropriation (Lower Basin) water management strategy involves diversion of up to 189,484 acft/yr under a new appropriation from the Guadalupe River in Calhoun County using existing gravity-flow diversion facilities located immediately upstream of GBRA's Saltwater Barrier and Diversion Dam at a rate of diversion not to exceed 500 cfs (within the existing 622 cfs maximum authorized diversion rate) and authorization to impound up to 200,000 acft in Calhoun County. The diversions and storage will serve municipal and industrial water users in GBRA's ten-county statutory district and are the subject of Application No. 12482 for surface water rights pending before the TCEQ. The firm supply from this strategy, with a 150,000 acft off-channel reservoir, is 42,000 acft/yr available at a unit cost of $591/acft/yr for raw water at the reservoir. Volume II, Chapter 5.2.34 includes a detailed discussion of this recommended water management strategy.

5.1.30 GBRA Lower Basin Storage

The GBRA and Dow Chemical Company (Dow), individually and collectively, own surface water rights in the lower Guadalupe – San Antonio River Basin authorizing diversions totaling 175,501 acre-feet per year (acft/yr). In order to firm up the GBRA/Dow water rights, a 12,500 acft off-channel reservoir supplied from the GBRA Main Canal by a new intake, pump station, and appurtenant transmission facilities is recommended for implementation. The estimated project firm yield is 51,800 acft/yr available at a unit cost of $140/acft/yr for raw water at the reservoir or Main Canal. Volume II, Chapter 5.2.35 includes a detailed discussion of this recommended water management strategy.

5.1.31 Victoria County Steam-Electric Project

The Victoria County Steam-Electric Project involves the development of a reliable supply of cooling water to serve a future power plant in Victoria County. Water available under

GBRA/Dow existing surface water rights would be diverted from the GBRA Main Canal and delivered to an off-channel cooling reservoir in Victoria County. Using a junior portion of the GBRA/Dow existing water rights, the firm supply of the project is 29,100 acft/yr at an estimated unit cost of $1,225/acft/yr for raw water. Volume II, Chapter 5.2.37 includes a detailed discussion of this recommended water management strategy.

5.1.32 GBRA Integrated Water-Power Project (IWPP)

GBRA is considering desalination of seawater from the Gulf of Mexico as a potential source of freshwater supplies for municipal and industrial use. The GBRA Integrated Water Power Project (IWPP) water management strategy includes a large-scale seawater desalination water treatment plant with a finished water production capacity of 100,000 acft/yr (89.3 MGD). For regional water planning purposes, GBRA proposes a preliminary water treatment plant location in Calhoun County and transmission facilities to accommodate potential delivery of 50,000 acft/yr to Calhoun and Victoria Counties and 50,000 acft/yr to DeWitt and Gonzales Counties. The estimated unit cost of water for this project is $2,393/acft/yr. Volume II, Chapter 5.2.38 includes a detailed discussion of this recommended water management strategy.

5.1.33 Purchase from Wholesale Water Provider

The Purchase from Wholesale Water Provider water management strategy involves the purchase of water supplies from, or participation in the development of new water supplies with, an identified Wholesale Water Provider. Wholesale water providers include the San Antonio Water System (SAWS), Guadalupe-Blanco River Authority (GBRA), Canyon Regional Water Authority (CRWA), Schertz-Seguin Local Government Corporation (SSLGC), Springs Hill Water Supply Corporation (SHWSC), the Texas Water Alliance (TWA), Hays Caldwell Public Utility Agency (HCPUA), and Cibolo Valley Local Government Corporation (CVLGC). Costs for this management strategy generally include those for purchase, treatment, transmission, and distribution of water, and are approximated by a weighted system cost to the WWP associated with developing new supplies through phased implementation of one or more water management strategies. Proposed new purchases from WWPs in the region total approximately 368,000 acft/yr in 2070 at unit costs ranging from $510/acft to $2,490/acft. Chapter 5.2.41 includes a detailed discussion of this recommended water management strategy.

5.1.34 Surface Water Rights

The Surface Water Rights water management strategy is included to explicitly recognize that use of water supplies made available under existing water rights by lease or purchase agreements between willing buyers and willing sellers is an activity consistent with the 2016 SCTRWP. The additions of diversion points or types and places of use for existing surface water rights are also activities consistent with the 2016 SCTRWP if necessary authorizations are obtained pursuant to TCEQ rules and applicable law. Volume II, Chapter 5.2.42 includes a more detailed discussion of this recommended water management strategy.

5.1.35 Balancing Storage

The Balancing Storage water management strategy is included to explicitly recognize that storage is needed at several locations within the region in order to firm up supplies from run-of-river diversions or interruptible groundwater sources and to ensure that supplies delivered through long distance conveyance facilities are available during drought and of sufficient quantity to meet daily and seasonal demands. The addition of Balancing Storage on the surface or in an aquifer (ASR) is an activity consistent with the 2016 SCTRWP, if necessary authorizations are obtained pursuant to TCEQ or groundwater conservation district rules and applicable law. Volume II, Chapter 5.2.43 includes a more detailed discussion of this recommended water management strategy.

5.1.36 Victoria ASR

The City of Victoria is considering an ASR project to aid in firming up their existing run-of-river water supplies. The strategy involves retrofitting six existing wells and construction of 10 new ASR wells. Because the Victoria WTP has excess capacity and all the wells are within the city limits, no costs are necessary for treatment or transmission. The strategy will yield approximately 7,900 acft/yr at an estimated unit cost of $192/acft/yr. Volume II, Chapter 5.2.45 includes a more detailed discussion of this recommended water management strategy.

5.1.37 Victoria Groundwater-Surface Water Exchange

The City of Victoria plans to expand their groundwater-surface water exchange, a program in which surface water diversions during times they would otherwise be restricted may continue as a result of fresh groundwater discharge into a tributary of the Guadalupe River. Hence, the recommended water management strategy is adding special conditions authorizing groundwater offset to more of Victoria's current water rights thereby increasing firm supply from surface water by 8,544 acft/yr at little, if any, additional cost. Volume II, Chapter 5.2.46 includes a more detailed discussion of this recommended water management strategy.

5.1.38 List of Alternative Water Management Strategies

The following is the list of alternative water management strategies in the 2016 SCTRWP:

1. Local Groundwater Supplies (Various Aquifers) (See Chapter 5.2.7)
2. Brackish Wilcox for SSLGC - Envisioned (See Chapter 5.2.12)
3. Brackish Wilcox for SS WSC - Envisioned (See Chapter 5.2.13)
4. Cibolo Valley LGC Carrizo Project - Envisioned (See Chapter 5.2.14)
5. Uvalde ASR - Envisioned (See Chapter 5.2.15)
6. CRWA Wells Ranch - Phase 2 - Envisioned (See Chapter 5.2.16)
7. Brackish Wilcox Groundwater for CRWA - Envisioned (See Chapter 5.2.18)
8. Brackish Wilcox Groundwater for SAWS - Envisioned (See Chapter 5.2.19)

9. SAWS Expanded Brackish Project - Envisioned (See Chapter 5.2.20)
10. SAWS Expanded Local Carrizo - Envisioned (See Chapter 5.2.21)
11. Vista Ridge Project - Envisioned (See Chapter 5.2.23)
12. Hays Forestar Project - Envisioned (See Chapter 5.2.24)
13. Hays/Caldwell PUA Project - Phase I & II - Envisioned (See Chapter 5.2.25)
14. TWA Carrizo Project - Envisioned (See Chapter 5.2.26)
15. HCPUA/TWA Joint Project (See Chapter 5.2.28)
16. HCPUA/TWA/GBRA Joint Project (See Chapter 5.2.29)
17. GBRA Mid-Basin Water Supply Project – Carrizo Only (See Chapter 5.2.30)
18. GBRA Mid-Basin Water Supply Project – Surface Water (See Chapter 5.2.31)
19. GBRA Mid-Basin Water Supply Project – Conjunctive Use (See Chapter 5.2.32)
20. Luling ASR (See Chapter 5.2.36)
21. Lavaca Off-Channel Reservoir (See Chapter 5.2.40)

5.1.39 List of Water Management Strategies Needing Further Study and/or Funding

The following is the list of water management strategies that need further study and/or funding in the 2016 SCTRWP:

1. Storage above Canyon Reservoir – ASR (See Chapter 5.2.39)
2. Brush Management in Gonzales County (See Chapter 5.2.44)

5.2 Water Management Strategy Evaluations

Water management strategy evaluations can be found in Volume II of the 2016 South Central Texas Regional Water Plan.

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5.3 Water User Group Plans by County

The proposed plan to meet the specific needs of municipal, industrial, steam-electric power, and mining water user groups located within the region is to implement water conservation programs to reduce water demands to the extent possible, and develop additional groundwater and surface water supplies located as near as possible to each respective water user to the extent that supplies are available. As local supply development potentials for each respective user group are exhausted, water management strategies located at greater distances from the water users are recommended.

In the case of the irrigation water user group, the South Central Texas Regional Water Planning Group found that, at the present time, it is not economically feasible to meet all of the projected irrigation water need (shortage). However, the proposed plan encourages the irrigation water conservation to meet as much as possible of the projected irrigation needs of the region. Therefore, each individual irrigation water user is encouraged to install Low Energy Precision Application (LEPA), or other efficient irrigation systems which will result in irrigation water savings due to lower irrigation water application requirements.

In the case of “Rural Area Residential and Commercial” (individual households and business establishments) water users, the projections have included local surface and groundwater quantities to meet projected needs. However, no specific plans have been formulated to supply the projected quantities of water needed. Instead, it is presumed that those individual households and businesses that are located in rural areas, and rural and investor owned water supply districts, authorities, and companies (those that supplied less than 280 acft or had populations less than 500 in year 2010) that operate public water supply systems to serve rural areas will meet these needs either from locally available supplies, or through arrangements to obtain water from other water utilities. Plans are included for all public water suppliers (cities and water supply districts and authorities) that provided 280 acft or more and/or had populations of 500 or more in year 2010.

Water management strategies recommended for implementation to meet projected needs or shortages in each of the 21 counties within the South Central Texas Region are summarized in a table included as Appendix E. These figures and tables illustrate the phased implementation of water management strategies within each county to meet the needs of WUGs located within the county. Counties are presented in alphabetical order from Atascosa County to Zavala County. The counties having the greatest combined municipal, industrial, steam-electric, and mining needs and, hence, needing the greatest quantities of new water supply are Bexar, Comal, Hays, and Victoria. Particular attention to the notes in each county table is encouraged. More detailed information regarding allocation of new water supplies to specific cities and other water user groups within each county may be found in the detailed plans for each of the 21 counties of the South Central Texas Planning Region, which are presented in alphabetic order in the following subsections. In each county plan, each water user group of the county is listed, and water conservation has been included in the plan for each municipal water user and the irrigation user group, where appropriate. In addition, if the water user group has a need (shortage) during the planning horizon, one or more water management strategies are recommended to meet the need.

The total unit costs of potable water (surface water treated to regulatory standards for public supply and/or groundwater that meets regulatory standards for public supply), delivered to the water user groups' retail distribution systems were computed as follows. For water user groups whose needs can be met from a single local source by an individual water management strategy that can be scheduled and sized to meet that particular need, such as local groundwater for the City of Floresville, annual and unit costs in September 2013 prices are presented for additional wells to be added at the time of the projected need. Costs were calculated in accordance with TWDB guidance and are presented in Volume II and the following county tables. In this case, and in many cases described herein, water treatment and associated facilities were sized to meet peak day demands, which are approximately twice average day demands. Both debt service and operation and maintenance costs are calculated accordingly.

For water user groups that do not have the potential to implement readily available individual water management strategies using local sources of supply to meet their individual needs at the time these needs are projected to occur, such as utilities of Bexar, Caldwell, Comal, Guadalupe, and Hays Counties, large-scale water management strategies to meet regional needs involving two or more water user groups are recommended by the SCTRWPG in the regional water plan. In the latter cases, total and unit costs (September 2013 prices) are calculated to obtain, convey, treat, and deliver potable water (surface and/or groundwater that meets regulatory standards for public supply) to the respective water user groups' retail distribution systems. As was the case for individual local systems, the costs are computed according to TWDB guidance and are reported in Volume II and are tabulated in the respective county tables on the following pages.

It was necessary to allocate the costs of large-scale, regional water management strategies among the water user groups they are intended to serve. The allocation procedure was to prorate the total annual costs to each water user group to be supplied from a water management strategy based on the water user group's proportion or share of quantity obtained from that strategy in each decade. In this way, a unit cost representative of the strategy in full operation is shown for all participating water user groups. Water user groups may actually be required to begin paying their pro-rata share of annual debt service at the time the strategy is implemented based on their ultimate share of the new supply whether or not they have begun taking water. The basis for this principle of dividing debt service among water user groups is to facilitate the development of a strategy to its relevant size, and to assure that those user groups who need the water will have invested in and thereby reserved their respective shares so that water will be there when needed. In the case of the South Central Texas Region, many water user groups will need the water as soon as the water management strategy can be implemented. It is important to note that individual water user groups could participate in the development of a water management strategy in the cost sharing manner outlined here, and then lease part or all of their respective shares to others until they have grown enough to fully utilize them. Therefore, few, if any user groups would be paying debt service for idle capacity.

It has been assumed that one or more wholesale water providers will implement the large-scale, distantly located water management strategies recommended in the Regional Plan, and since these supplies are needed as soon as possible, the water user groups (customers) will begin paying debt service and operation and maintenance costs on the basis of their pro-rata share of the quantities of water taken. For example, if SAWS implements a strategy, SAWS and its customers will use the water and pay all the costs. If some other supplier implements a strategy, the costs would be prorated among the users on the basis of the proportion of the quantity taken.

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5.3.1 Atascosa County Water Supply Plan

Table 5.3.1-1 lists each water user group in Atascosa County and its corresponding management supply or shortage in 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.1-1. Atascosa County Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage		Comment
	2020 (acft/yr)	2070 (acft/yr)	
Benton City WSC	975	-25	Projected shortage (2070 Only)
City of Charlotte	346	143	No projected shortage
City of Jourdanton	1135	550	No projected shortage
City of Lytle	-171	-554	Projected shortage (2020 through 2070)
McCoy WSC	633	70	No projected shortage
City of Pleasanton	1,494	92	No projected shortage
City of Poteet	946	688	No projected shortage
Rural Area Residential and Commercial	511	1	No projected shortage
Industrial/Manufacturing	0	0	No projected shortage
Steam-Electric Power	3,848	836	No projected shortage
Mining	0	0	No projected shortage
Irrigation	0	0	No projected shortage
Livestock	0	0	No projected shortage

5.3.1.1 Benton City WSC

Current water supply for Benton City WSC is obtained from the Carrizo-Wilcox Aquifer. Benton City WSC is projected to need additional water supplies prior to 2070. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Benton City WSC implement the following water supply plan to meet their projected needs (Table 5.3.1-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 57 acft/yr by 2070.

- A Local Carrizo Groundwater[1] with conversion from Irrigation sources to be implemented prior to 2070 can provide an additional 80 acft/yr.

Table 5.3.1-2. Recommended Water Supply Plan for Benton City WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	—	—	—	—	—	25
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	57
Local Carrizo Groundwater with Conversion	—	—	—	—	—	80
Total New Supply	—	—	—	—	—	**137**

Estimated costs of the recommended plan to meet Benton City WSC's projected needs are shown in Table 5.3.1-3.

Table 5.3.1-3. Recommended Plan Costs by Decade for Benton City WSC

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$43,874
Unit Cost ($/acft)	—	—	—	—	—	$770
Local Carrizo Groundwater Carrizo with Conversion						
Annual Cost ($/yr)	—	—	—	—	—	$88,000
Unit Cost ($/acft)	—	—	—	—	—	$3,520

5.3.1.2 City of Charlotte

The City of Charlotte is projected to have adequate water supplies available from the Carrizo-Wilcox Aquifer to meet the city's projected demands during the planning period.

Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Charlotte implement the following water supply plan (Table 5.3.1-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 9 acft/yr by 2020, increasing to 74 acft/yr of supply in 2070.

[1] See Chapter 8.3.1, Recommendation #6

Table 5.3.1-4. Recommended Water Supply Plan for the City of Charlotte

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	9	28	33	44	58	74
Total New Supply	**9**	**28**	**33**	**44**	**58**	**74**

Estimated costs of the recommended plan for the City of Charlotte are shown in Table 5.3.1-5.

Table 5.3.1-5. Recommended Plan Costs by Decade for the City of Charlotte

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$6,991	$21,461	$25,400	$33,786	$44,643	$57,119
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.1.3 City of Jourdanton

Current water supply for City of Jourdanton is obtained from the Carrizo-Wilcox Aquifer and is projected to have adequate supply through 2070. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Jourdanton implement the following water supply plan (Table 5.3.1-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 36 acft/yr by 2020, increasing to 415 acft/yr of supply in 2070.

Table 5.3.1-6. Recommended Water Supply Plan for the City of Jourdanton

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	36	119	219	307	360	415
Total New Supply	**36**	**119**	**219**	**307**	**360**	**415**

Estimated costs of the recommended plan for the City of Jourdanton are shown in Table 5.3.1-7.

Table 5.3.1-7. Recommended Plan Costs by Decade for the City of Jourdanton

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$27,831	$91,285	$168,382	$236,383	$276,914	$319,757
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.1.4 City of Lytle

Current water supply for the City of Lytle is obtained from the Edwards Aquifer. Lytle is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Lytle implement the following water supply plan to meet the projected needs for the city (Table 5.3.1-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 18 acft/yr by 2020, increasing to 207 acft/yr of supply in 2070.
- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional 171 acft/yr by 2020, increasing to 554 acft/yr by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 9 acft/yr in 2020.

Table 5.3.1-8. Recommended Water Supply Plan for the City of Lytle

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	171	257	333	409	484	554
Recommended Plan						
Municipal Water Conservation	18	69	120	144	174	207
Edwards Transfers	171	257	333	409	484	554
Drought Management	9	—	—	—	—	—
Total New Supply	**198**	**326**	**453**	**553**	**658**	**761**

Estimated costs of the recommended plan to meet the City of Lytle's projected needs are shown in Table 5.3.1-9.

Table 5.3.1-9. Recommended Plan Costs by Decade for the City of Lytle

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$12,281	$46,811	$82,035	$98,248	$118,816	$141,303
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Edwards Transfers						
Annual Cost ($/yr)	$38,646	$58,082	$75,258	$92,434	$109,384	$125,204
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Drought Management						
Annual Cost ($/yr)	$4,244	—	—	—	—	—
Unit Cost ($/acft)	$147	—	—	—	—	—

5.3.1.5 McCoy WSC

McCoy WSC is projected to have adequate water supplies available from the Carrizo-Wilcox Aquifer to meet projected demands during the planning period.

5.3.1.6 City of Pleasanton

The City of Pleasanton is projected to have adequate water supplies available from the Carrizo-Wilcox Aquifer to meet the city's projected demands during the planning period.

Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Pleasanton implement the following water supply plan (Table 5.3.1-10).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 89 acft/yr by 2020, increasing to 1,062 acft/yr of supply in 2070.

Table 5.3.1-10. Recommended Water Supply Plan for the City of Pleasanton

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	89	289	531	795	926	1,062
Total New Supply	**89**	**289**	**531**	**795**	**926**	**1,062**

Estimated costs of the recommended plan for the City of Pleasanton are shown in Table 5.3.1-11.

Table 5.3.1-11. Recommended Plan Costs by Decade for the City of Pleasanton

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$60,616	$196,898	$361,560	$541,633	$630,511	$722,965
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.1.7 City of Poteet

The City of Poteet is projected to have adequate water supplies available from the Carrizo-Wilcox Aquifer to meet the city's projected demands during the planning period.

5.3.1.8 Rural Area Residential and Commercial

Rural areas are projected to have adequate water supplies available from the Carrizo-Wilcox and Sparta Aquifers to meet their projected demands during the planning period.

5.3.1.9 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Carrizo-Wilcox Aquifer to meet the water user group's projected demand during the planning period.

5.3.1.10 Steam-Electric Power

Steam-Electric is projected to have adequate water supplies available from the Carrizo-Wilcox Aquifer to meet the water user group's projected demand during the planning period.

5.3.1.11 Mining

Mining is projected to have adequate water supplies available from the Carrizo-Wilcox and Queen City Aquifers to meet the water user group's projected demand during the planning period.

5.3.1.12 Irrigation

Irrigation is projected to have adequate water supplies available from the Edwards, Carrizo-Wilcox, Sparta, and Queen City Aquifers, and run-of-river rights.

5.3.1.13 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

5.3.2 Bexar County Water Supply Plan

Table 5.3.2-1 lists each water user group in Bexar County and its corresponding management supply or shortage in 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.2-1. Bexar County Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage		Comment
	2020 (acft/yr)	2070 (acft/yr)	
City of Alamo Heights	-796	-805	Projected shortage (2020 through 2070)
Atascosa Rural WSC	-1167	-2448	Projected shortage (2020 through 2070)
City of Balcones Heights	0	0	No projected shortage
City of Castle Hills	395	349	No projected shortage
City of China Grove	316	474	No projected shortage
City of Converse	-903	-1,246	Projected shortage (2020 through 2070)
East Central SUD	289	-724	Projected shortage (2040 through 2070)
City of Elmendorf	311	696	No projected shortage
City of Fair Oaks Ranch	1,707	302	No projected shortage
Green Valley SUD			See Guadalupe County
City of Helotes	0	0	No projected shortage
City of Hill Country Village	0	0	No projected shortage
City of Hollywood Park	0	0	No projected shortage
City of Kirby	-137	-169	Projected shortage (2020 through 2070)
City of Lytle			See Atascosa County
Lackland AFB (CDP)	946	1,041	No projected shortage
City of Leon Valley	-97	-377	Projected shortage (2020 through 2070)
City of Live Oak	512	551	No projected shortage
City of Olmos Park	0	0	No projected shortage
Randolph AFB	1,903	1,849	No projected shortage
City of San Antonio	-61,812	-179,247	Projected shortage (2020 through 2070)

Concluded on next page

Table 5.3.2-1(Concluded)

Water User Group	Management Supply/Shortage		Comment
	2020 (acft/yr)	2060 (acft/yr)	
City of Schertz			See Guadalupe County
City of Selma	516	-345	Projected shortage (2030 through 2070)
City of Shavano Park	-425	-1,013	Projected shortage (2020 through 2070)
City of Somerset	0	0	No projected shortage
City of St. Hedwig	0	0	No projected shortage
The Oaks WSC	121	-165	Projected shortage (2040 through 2070)
City of Terrell Hills	0	0	No projected shortage
City of Universal City	-416	-332	Projected shortage (2020 through 2070)
Von Ormy	70	6	No projected shortage
Water Service Inc. (Apex)	454	92	No projected shortage
Windcrest (WC&ID No. 10)	-326	-451	Projected shortage (2020 through 2070)
Rural Area Residential and Commercial	4,337	-6,084	Projected shortage (2050 through 2070)
Industrial/Manufacturing	8,666	-3,680	Projected shortage (2060 through 2070)
Steam-Electric Power	23,685	6,374	No projected shortage
Mining	0	0	No projected shortage
Irrigation	-5,116	-2,891	Projected shortage (2020 through 2070)
Livestock	0	0	No projected shortage

5.3.2.1 City of Alamo Heights

Current water supply for the City of Alamo Heights is obtained from the Edwards Aquifer. Alamo Heights is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Alamo Heights implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 104 acft/yr by 2020, increasing to 895 acft/yr of supply in 2070.

- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional supply of 796 acft/yr by 2020, increasing to 805 acft/yr of additional supply by 2070.
- Purchase from Wholesale Water Provider (SAWS) to be implemented prior to 2020. This strategy can provide an additional supply of 796 acft/yr by 2020, increasing to 805 acft/yr of additional supply by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 111 acft/yr in 2020.

Table 5.3.2-2. Recommended Water Supply Plan for the City of Alamo Heights

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	796	848	820	807	805	805
Recommended Plan						
Municipal Water Conservation	104	280	442	601	755	895
Edwards Transfers	796	848	820	807	805	805
Purchase from WWP (SAWS)	796	848	820	807	805	805
Drought Management	111	—	—	—	—	—
Total New Supply	**1,807**	**1,976**	**2,082**	**2,215**	**2,365**	**2,505**

Estimated costs of the recommended plan to meet the City of Alamo Heights's projected needs are shown in Table 5.3.2-3.

Table 5.3.2-3. Recommended Plan Costs by Decade for the City of Alamo Heights

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$70,646	$190,887	$301,248	$409,449	$513,948	$609,687
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Edwards Transfers						
Annual Cost ($/yr)	$179,896	$191,648	$185,320	$182,382	$181,930	$181,930
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Purchase from WWP (SAWS)						
Annual Cost ($/yr)	$542,000	$644,000	$256,000	$1,097,000	$1,042,000	$492,000
Unit Cost ($/acft)	$680	$760	$312	$1,360	$1,295	$611
Drought Management						
Annual Cost ($/yr)	$87,612	—	—	—	—	—
Unit Cost ($/acft)	$791	—	—	—	—	—

5.3.2.2 Atascosa Rural WSC

Current water supply for Atascosa Rural WSC is obtained from the Edwards Aquifer. Atascosa Rural WSC is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Atascosa Rural WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.2-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 55 acft/yr by 2070.
- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional supply of 1,167 acft/yr by 2020, increasing to 2,448 acft/yr of additional supply by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 80 acft/yr by 2020.
- Purchase from Wholesale Water Provider (SAWS) to be implemented prior to 2020. This strategy can provide an additional supply of 1,167 acft/yr by 2020 increasing to 2,448 in 2070.
- Facilities Expansions (System Interconnections)

Table 5.3.2-4. Recommended Water Supply Plan for Atascosa Rural WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	1,167	1,446	1,708	1,970	2,218	2,448
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	55
Edwards Transfers	1,167	1,446	1,708	1,970	2,218	2,448
Drought Management	80	—	—	—	—	—
Purchase from WWP (SAWS)	1,167	1,446	1,708	1,970	2,218	2,448
Facilities Expansions	—	—	—	—	—	—
Total New Supply	**2,414**	**2,892**	**3,416**	**3,940**	**4,436**	**4,951**

Estimated costs of the recommended plan to meet Atascosa Rural WSC's projected needs are shown in Table 5.3.2-5.

Table 5.3.2-5. Recommended Plan Costs by Decade for Atascosa Rural WSC

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$42,130
Unit Cost ($/acft)	—	—	—	—	—	$770
Edwards Transfers						
Annual Cost ($/yr)	$263,742	$326,796	$386,008	$445,220	$501,268	$553,248
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Drought Management						
Annual Cost ($/yr)	$41,503	—	—	—	—	—
Unit Cost ($/acft)	$520	—	—	—	—	—
Purchase from WWP (SAWS)						
Annual Cost ($/yr)	$794,000	$1,099,000	$533,000	$2,678,000	$2,871,000	$1,495,000
Unit Cost ($/acft)	$680	$760	$312	$1,360	$1,295	$611
Facilities Expansions						
Annual Cost ($/yr)						
Unit Cost ($/acft)						

5.3.2.3 City of Balcones Heights

The City of Balcones Heights is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Balcones Heights implement the following water supply plan (Table 5.3.2-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 12 acft/yr by 2060, increasing to 32 acft/yr of supply in 2070.

Table 5.3.2-6. Recommended Water Supply Plan for the City of Balcones Heights

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	12	32
Total New Supply	**—**	**—**	**—**	**—**	**12**	**32**

Estimated costs of the recommended plan for the City of Balcones Heights are shown in Table 5.3.2-7.

Table 5.3.2-7. Recommended Plan Costs by Decade for the City of Balcones Heights

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	$8,324	$21,726
Unit Cost ($/acft)	—	—	—	—	$681	$681

5.3.2.4 City of Castle Hills

The City of Castle Hills is projected to have adequate water supplies available from the Edwards Aquifer through SAWS to meet the city's projected demands during the planning period.

5.3.2.5 City of China Grove

The City of China Grove is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of China Grove implement the following water supply plan (Table 5.3.2-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 13 acft/yr by 2020, increasing to 155 acft/yr of supply in 2070.

Table 5.3.2-8. Recommended Water Supply Plan for the City of China Grove

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	13	40	71	107	138	155
Total New Supply	**13**	**40**	**71**	**107**	**138**	**155**

Estimated costs of the recommended plan for the City of China Grove are shown in Table 5.3.2-9.

Table 5.3.2-9. Recommended Plan Costs by Decade for the City of China Grove

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$8,898	$27,460	$48,483	$72,919	$93,878	$105,416
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.2.6 City of Converse

Current water supply for the City of Converse is obtained from the Edwards Aquifer. Converse is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Converse implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-10).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 9 acft/yr by 2070.
- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional supply of 903 acft/yr by 2020, increasing to 1,264 acft/yr of additional supply by 2070.
- Purchase from WWP (CRWA) to be implemented prior to 2020. This strategy can provide an additional 903 acft/yr of supply by 2030, increasing to 1,264 by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 127 acft/yr by 2020

Table 5.3.2-10. Recommended Water Supply Plan for the City of Converse

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	903	1,111	1,297	1,272	1,265	1,264
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	9
Edwards Transfers	903	1,111	1,297	1,272	1,265	1,264
Purchase from WWP (CRWA)	903	1,111	1,297	1,272	1,265	1,264
Drought Management	127	—	—	—	—	—
Total New Supply	**1,933**	**2,222**	**2,594**	**2,544**	**2,530**	**2,537**

Estimated costs of the recommended plan to meet the City of Converse's projected needs are shown in Table 5.3.2-11.

Table 5.3.2-11. Recommended Plan Costs by Decade for the City Converse

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$6,196
Unit Cost ($/acft)	—	—	—	—	—	$681
Edwards Transfers						
Annual Cost ($/yr)	$204,078	$251,086	$293,122	$287,472	$285,890	$285,664
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Purchase from WWP (CRWA)						
Annual Cost ($/yr)	$1,053,000	$1,681,000	$1,541,000	$930,000	$940,000	$939,000
Unit Cost ($/acft)	$1,167	$1,513	$1,188	$731	$743	$743
Drought Management						
Annual Cost ($/yr)	$130,834	—	—	—	—	—
Unit Cost ($/acft)	$1,032	—	—	—	—	—

5.3.2.7 East Central SUD

East Central SUD obtains groundwater supplies from the Edwards and Carrizo-Wilcox Aquifers and surface water from Canyon Reservoir to meet the city's projected demands during the planning period. East Central SUD is projected to need additional water supplies prior to 2040. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Converse implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-12).

- Purchase from WWP (CRWA) to be implemented prior to 2030. This strategy can provide an additional 500 acft/yr of supply by 2030, increasing to 724 by 2070.

Table 5.3.2-12. Recommended Water Supply Plan for the City of East Central SUD

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	0	0	107	312	525	724
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	—
Additional Purchase from CRWA	—	500	500	500	525	724
Total New Supply	**—**	**500**	**500**	**500**	**525**	**724**

Estimated costs of the recommended plan for the City of Elmendorf are shown in Table 5.3.2-15.

Table 5.3.2-13. Recommended Plan Costs by Decade for the City of East Central sUD

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—

5.3.2.8 City of Elmendorf

The City of Elmendorf is projected to have adequate water supplies available from the Edwards Aquifer through the San Antonio Water System (SAWS) to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Elmendorf implement the following water supply plan (Table 5.3.2-14).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 2 acft/yr by 2050, increasing to 36 acft/yr of supply in 2070.

Table 5.3.2-14. Recommended Water Supply Plan for the City of Elmendorf

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	2	17	35
Total New Supply	**—**	**—**	**—**	**2**	**17**	**35**

Estimated costs of the recommended plan for the City of Elmendorf are shown in Table 5.3.2-15.

Table 5.3.2-15. Recommended Plan Costs by Decade for the City of Elmendorf

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	$1,577	$11,616	$23,999
Unit Cost ($/acft)	—	—	—	$681	$681	$681

5.3.2.9 City of Fair Oaks Ranch

The City of Fair Oaks Ranch is projected to have adequate water supplies available from the Trinity Aquifer and Canyon Reservoir to meet the city’s projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Fair Oaks Ranch implement the following water supply plan (Table 5.3.2-16).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 116 acft/yr by 2020, increasing to 1,407 acft/yr of supply in 2070.

Table 5.3.2-16. Recommended Water Supply Plan for the City of Fair Oaks Ranch

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	116	331	580	822	1,127	1,407
Total New Supply	**116**	**331**	**580**	**822**	**1,127**	**1,407**

Estimated costs of the recommended plan for the City of Fair Oaks Ranch are shown in Table 5.3.2-17.

Table 5.3.2-17. Recommended Plan Costs by Decade for the City of Fair Oaks Ranch

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$78,671	$225,686	$395,247	$559,601	$767,777	$958,175
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.2.10 City of Helotes

The City of Helotes is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Helotes implement the following water supply plan (Table 5.3.2-18).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 67 acft/yr by 2020, increasing to 476 acft/yr of supply in 2070.
- Facilities Expansions (System Interconnects).

Table 5.3.2-18. Recommended Water Supply Plan for the City of Helotes

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	67	132	195	276	370	476
Total New Supply	**67**	**132**	**195**	**276**	**370**	**476**

Estimated costs of the recommended plan for the City of Helotes' are shown in Table 5.3.2-19.

Table 5.3.2-19. Recommended Plan Costs by Decade for the City of Helotes

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$45,746	$89,643	$132,600	$187,903	$252,278	$324,389
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.2.11 City of Hill Country Village

The City of Hill Country Village is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Hill Country Village implement the following water supply plan (Table 5.3.2-20).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 10 acft/yr by 2020, increasing to 70 acft/yr of supply in 2070.

Table 5.3.2-20. Recommended Water Supply Plan for the City of Hill Country Village

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	10	27	43	58	66	70
Total New Supply	**10**	**27**	**43**	**58**	**66**	**70**

Estimated costs of the recommended plan to meet the City of Hill Country Village's projected needs are shown in Table 5.3.2-21.

Table 5.3.2-21. Recommended Plan Costs by Decade for the City of Hill Country Village

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$6,769	$18,635	$29,106	$39,677	$44,931	$47,591
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.2.12 City of Hollywood Park

The City of Hollywood Park is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Hollywood Park implement the following water supply plan (Table 5.3.2-22).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 53 acft/yr by 2020, increasing to 407 acft/yr of supply in 2070.

Table 5.3.2-22. Recommended Water Supply Plan for the City of Hollywood Park

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	53	126	198	269	340	407
Total New Supply	**53**	**126**	**198**	**269**	**340**	**407**

Estimated costs of the recommended plan to meet the City of Hollywood Park's projected needs are shown in Table 5.3.2-23.

Table 5.3.2-23. Recommended Plan Costs by Decade for the City of Hollywood Park

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$36,332	$86,083	$134,577	$182,882	$231,239	$277,122
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.2.13 City of Kirby

Current water supply for the City of Kirby is obtained from the Edwards Aquifer. Kirby is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Kirby implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-24).

- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional supply of 137 acft/yr by 2020, increasing to 169 acft/yr of additional supply by 2070.

- Purchase from Wholesale Water Provider (SAWS) to be implemented prior to 2020. This strategy can provide an additional supply of 137 acft/yr by 2020, increasing to 169 acft/yr of additional supply by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional supply of 47 acft/yr by 2020.

Table 5.3.2-24. Recommended Water Supply Plan for the City of Kirby

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	137	207	181	172	169	169
Recommended Plan						
Edwards Transfers	137	207	181	172	169	169
Purchase from WWP (SAWS)	137	207	181	172	169	169
Drought Management	47	—	—	—	—	—
Total New Supply	**321**	**414**	**362**	**344**	**338**	**338**

Estimated costs of the recommended plan to meet the City of Kirby's projected needs are shown in Table 5.3.2-25.

Table 5.3.2-25. Recommended Plan Costs by Decade for the City of Kirby

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Edwards Transfers						
Annual Cost ($/yr)	$30,962	$46,782	$40,906	$38,872	$38,194	$38,194
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Purchase from WWP (SAWS)						
Annual Cost ($/yr)	$93,000	$157,000	$57,000	$234,000	$219,000	$103,000
Unit Cost ($/acft)	$680	$760	$312	$1,360	$1,295	$611
Drought Management						
Annual Cost ($/yr)	$8,672	—	—	—	—	—
Unit Cost ($/acft)	$184	—	—	—	—	—

5.3.2.14 Lackland AFB (CDP)

Current water supply for Lackland AFB is obtained from the Edwards Aquifer. Lackland AFB is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period.

5.3.2.15 City of Leon Valley

The City of Leon Valley obtains water supplies available from the Edwards Aquifer. Leon Valley is expected to have needs prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Leon Valley implement the following water supply plan (Table 5.3.2-26).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 55 acft/yr by 2020, increasing to 294 acft/yr in 2070.
- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional supply of 97 acft/yr by 2020, increasing to 377 acft/yr of additional supply by 2070.
- Purchase from Wholesale Water Provider (SAWS) to be implemented prior to 2020. This strategy can provide an additional supply of 97 acft/yr by 2020, increasing to 377 acft/yr of additional supply by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 93 acft/yr by 2020.

Table 5.3.2-26. Recommended Water Supply Plan for the City of Leon Valley

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	97	147	196	254	317	377
Recommended Plan						
Municipal Water Conservation	55	136	149	182	236	294
Edwards Tranfers	97	147	196	254	317	377
Purchase from WWP (SAWS)	97	147	196	254	317	377
Drought Management	93	—	—	—	—	—
Total New Supply	**342**	**430**	**541**	**690**	**870**	**1,048**

Estimated costs of the recommended plan for the City of Leon Valley are shown in Table 5.3.2-27.

Table 5.3.2-27. Recommended Plan Costs by Decade for the City of Leon Valley

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$37,747	$92,726	$101,752	$124,209	$160,390	$200,182
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Edwards Transfers						
Annual Cost ($/yr)	$21,922	$33,222	$44,296	$57,404	$71,642	$85,202
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Purchase from WWP (SAWS)						
Annual Cost ($/yr)	$66,000	$112,000	$61,000	$345,000	$410,000	$230,000
Unit Cost ($/acft)	$680	$760	$312	$1,360	$1,295	$611
Drought Management						
Annual Cost ($/yr)	$244,245	—	—	—	—	—
Unit Cost ($/acft)	$2,626	—	—	—	—	—

5.3.2.16 City of Live Oak

The City of Live Oak is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Live Oak implement the following water supply plan (Table 5.3.2-28).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 94 acft/yr by 2020, increasing to 440 acft/yr of supply in 2070.

Table 5.3.2-28. Recommended Water Supply Plan for the City of Live Oak

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	94	276	297	333	385	440
Total New Supply	**94**	**276**	**297**	**333**	**385**	**440**

Estimated costs of the recommended plan for the City of Live Oak are shown in Table 5.3.2-29.

Table 5.3.2-29. Recommended Plan Costs by Decade for the City of Live Oak

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$63,818	$188,293	$202,314	$226,909	$262,102	$299,746
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.2.17 City of Olmos Park

The City of Olmos Park is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Olmos Park implement the following water supply plan (Table 5.3.2-30).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 21 acft/yr by 2020, increasing to 244 acft/yr of supply in 2070.

Table 5.3.2-30. Recommended Water Supply Plan for the City of Olmos Park

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	21	68	123	188	215	244
Total New Supply	**21**	**68**	**123**	**188**	**215**	**244**

Estimated costs of the recommended plan for the City of Olmos Park are shown in Table 5.3.2-31.

Table 5.3.2-31. Recommended Plan Costs by Decade for the City of Olmos Park

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$14,298	$46,214	$83,654	$127,764	$146,283	$166,246
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.2.18 City of San Antonio

Current water supply for the City of San Antonio is obtained from the Edwards, Trinity, and Carrizo Aquifers, Canyon Reservoir, CRWA, SSLGC run-of-river rights, and direct reuse. San Antonio is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that San Antonio implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-32).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 7,386 acft/yr by 2050, increasing to 40,300 acft/yr of supply in 2070.
- Purchase from WWP (SAWS) to be implemented prior to 2020. This strategy can provide an additional supply of 61,812 acft/yr by 2020, increasing to 179,247 acft/yr of additional supply by 2070. See Chapter 5.4 for a list of recommended water management strategies.

Table 5.3.2-32. Recommended Water Supply Plan for the City of San Antonio

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	61,812	85,743	110,450	134,057	157,476	179,247
Recommended Plan						
Municipal Water Conservation	—	—	—	7,386	22,583	40,300
Purchase from WWP (SAWS)	61,812	85,743	110,450	134,057	157,476	179,247
Total New Supply	59,763	81,130	105,837	136,830	175,446	214,934

Estimated costs of the recommended plan to meet the City of San Antonio's projected needs are shown in Table 5.3.2-33.

Table 5.3.2-33. Recommended Plan Costs by Decade for the City of San Antonio

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	$4,431,856	$13,550,060	$24,179,745
Unit Cost ($/acft)	—	—	—	$600	$600	$600
Purchase from WWP (SAWS)						
Annual Cost ($/yr)	$42,053,000	$65,148,000	$34,490,000	$182,267,000	$203,860,000	$109,484,000
Unit Cost ($/acft)	$680	$760	$312	$1,360	$1,295	$611

5.3.2.19 Randolph AFB

Randolpf AFB is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Randolpf AFB implement the following water supply plan (Table 5.3.2-34).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 3 acft/yr by 2020, increasing to 21 acft/yr of supply in 2070.

Table 5.3.2-34. Recommended Water Supply Plan for the City of Randolpf AFB

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	3	5	9	13	17	21
Total New Supply	**3**	**5**	**9**	**13**	**17**	**21**

Estimated costs of the recommended plan for Randolph AFB are shown in Table 5.3.2-35.

Table 5.3.2-35. Recommended Plan Costs by Decade for Randolpf AFB

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$2,386	$4,235	$7,167	$10,065	$13,116	$16,264
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.2.20 City of Selma

Current water supply for the City of Selma is obtained from the Edwards and Carrizo Aquifers and SSLGC Contract. Selma is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Selma implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-36).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 60 acft/yr by 2020, increasing to 295 acft/yr of supply in 2070.
- Purchase from WWP (SSLGC) to be implemented prior to 2020. This strategy can provide an additional 16 acft/yr of supply by 2030, increasing to 345 acft/yr by 2070.

Table 5.3.2-36. Recommended Water Supply Plan for the City of Selma

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	16	104	191	270	345
Recommended Plan						
Municipal Water Conservation	60	106	147	194	242	295
Purchase from WWP (SSLGC)	—	16	104	191	270	345
Total New Supply	60	122	251	385	512	640

Estimated costs of the recommended plan to meet the City of Selma's projected needs are shown in Table 5.3.2-37.

Table 5.3.2-37. Recommended Plan Costs by Decade for the City of Selma

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$41,046	$71,966	$100,203	$132,164	$165,050	$201,177
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Purchase from WWP (SSLGC)						
Annual Cost ($/yr)	—	$17,000	$58,000	$108,000	$153,000	$195,000
Unit Cost ($/acft)	—	$1,070	$559	$567	$566	$566

5.3.2.21 City of Shavano Park

Current water supply for the City of Shavano Park is obtained from the Edwards Aquifer. Shavano Park is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Shavano Park implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-38).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 67 acft/yr by 2020, increasing to 709 acft/yr of supply in 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 55 acft/yr by 2020.
- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional supply of 425 acft/yr by 2020, increasing to 1,013 acft/yr of additional supply by 2070.

Table 5.3.2-38. Recommended Water Supply Plan for the City of Shavano Park

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	425	555	677	797	909	1,013
Recommended Plan						
Municipal Water Conservation	67	174	296	429	567	709
Drought Management	55	—	—	—	—	—
Edwards Transfers	425	555	677	797	909	1,013
Total New Supply	**547**	**729**	**973**	**1,226**	**1,476**	**1,722**

Estimated costs of the recommended plan to meet the City of Shavano Park's projected needs are shown in Table 5.3.2-39.

Table 5.3.2-39. Recommended Plan Costs by Decade for the City of Shavano Park

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$45,736	$118,440	$201,294	$291,821	$386,415	$482,491
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Drought Management						
Annual Cost ($/yr)	$14,194	—	—	—	—	—
Unit Cost ($/acft)	$257	—	—	—	—	—
Edwards Transfers						
Annual Cost ($/yr)	$96,050	$125,430	$153,002	$180,122	$205,434	$228,938
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226

5.3.2.22 City of Somerset

The City of Somerset is projected to have adequate water supplies available from run-of-river rights to meet the city's projected demands during the planning period.

5.3.2.23 City of St. Hedwig

The City of St. Hedwig is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of St. Hedwig implement the following water supply plan (Table 5.3.2-40).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 3 acft/yr in 2070.

Table 5.3.2-40. Recommended Water Supply Plan for the City of St. Hedwig

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	3
Total New Supply	**—**	**—**	**—**	**—**	**—**	**3**

Estimated costs of the recommended plan for the City of St. Hedwig are shown in Table 5.3.2-41.

Table 5.3.2-41. Recommended Plan Costs by Decade for the City of St. Hedwig

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$2,242
Unit Cost ($/acft)	—	—	—	—	—	$770

5.3.2.24 Terrell Hills

The City of Terrell Hills is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Terrell Hills implement the following water supply plan (Table 5.3.2-42).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 52 acft/yr by 2020, increasing to 400 acft/yr of supply in 2070.

Table 5.3.2-42. Recommended Water Supply Plan for the City of Terrell Hills

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	52	148	237	325	379	400
Total New Supply	**52**	**148**	**237**	**325**	**379**	**400**

Estimated costs of the recommended plan for the City of Terrell Hill are shown in Table 5.3.2-43.

Table 5.3.2-43. Recommended Plan Costs by Decade for the City of Terrell Hills

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$35,390	$100,928	$161,426	$221,031	$257,885	$272,469
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.2.25 The Oaks WSC

Current water supply for the Oaks WSC is obtained from the SAWS and the Trinity Aquifer. The Oaks WSC is projected to need additional water supplies prior to 2040. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Shavano Park implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-44).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 15 acft/yr by 2020, increasing to 111 acft/yr of supply in 2070.
- Purchase from WWP (SAWS) to be implemented by 2020. This strategy can provide an additional 1 acft/yr by 2040, increasing to 165 acft/yr of supply in 2070.

Table 5.3.2-44. Recommended Water Supply Plan for the Oaks WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	1	60	114	165
Recommended Plan						
Municipal Water Conservation	15	42	54	71	90	111
Purchase from WWP (SAWS)	—	—	1	60	114	165
Total New Supply	**15**	**42**	**55**	**131**	**204**	**276**

Estimated costs of the recommended plan to meet the Oaks WSC projected needs are shown in Table 5.3.2-45.

Table 5.3.2-45. Recommended Plan Costs by Decade for the Oaks WSC

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$11,732	$32,291	$41,678	$54,738	$68,970	$85,606
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Purchase from WWP (SAWS)						
Annual Cost ($/yr)	—	—	$312	$82,000	$148,000	$101,000
Unit Cost ($/acft)	—	—	$713	$1,360	$1,295	$611

5.3.2.26 City of Universal City

Current water supply for the City of Universal City is obtained from the Edwards and Carrizo Aquifers. Universal City is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Universal City implement the following water supply plan to meet the projected needs for the city (Table 5.3.2-46).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 69 acft/yr by 2060, increasing to 143 acft/yr of supply in 2070.
- Purchase from WWP (SSLGC) to be implemented prior to 2020. This strategy can provide an additional 416 acft/yr of supply by 2020, decreasing to 332 acft/yr by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 160 acft/yr by 2020.

Table 5.3.2-46. Recommended Water Supply Plan for the City of Universal City

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	416	431	372	339	333	332
Recommended Plan						
Municipal Water Conservation	—	—	—	—	69	143
Purchase from WWP (SSLGC)	416	431	372	339	333	332
Drought Management	160	—	—	—	—	—
Total New Supply	**576**	**431**	**372**	**339**	**402**	**475**

Estimated costs of the recommended plan to meet the City of Universal City's projected needs are shown in Table 5.3.2-47.

Table 5.3.2-47. Recommended Plan Costs by Decade for the City of Universal City

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	$46,811	$97,362
Unit Cost ($/acft)	—	—	—	—	$681	$681
Purchase from WWP (SSLGC)						
Annual Cost ($/yr)	$458,000	$461,000	$208,000	$192,000	$189,000	$188,000
Unit Cost ($/acft)	$1,101	$1,070	$559	$567	$566	$566
Drought Management						
Annual Cost ($/yr)	$48,727	—	—	—	—	—
Unit Cost ($/acft)	$305	—	—	—	—	—

5.3.2.27 Von Ormy

The City of Von Ormy is projected to have adequate water supplies available from the Trinity Aquifer and purchases from Atascosa Rural/SAWS to meet the city's projected demands during the planning period.

5.3.2.28 Water Service Inc. (Apex)

Water Service Inc. (Apex) is projected to have adequate water supplies available from the Edwards Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Water Service Inc. implement the following water supply plan (Table 5.3.2-48).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 17 acft/yr by 2020, increasing to 95 acft/yr of supply in 2070.

Table 5.3.2-48. Recommended Water Supply Plan for Water Service Inc.

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	17	18	22	41	66	95
Total New Supply	**17**	**18**	**22**	**41**	**66**	**95**

Estimated costs of the recommended plan to meet Water Service Inc.'s projected needs are shown in Table 5.3.2-49.

Table 5.3.2-49. Recommended Plan Costs by Decade for Water Service Inc.

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$12,740	$14,173	$16,767	$31,250	$51,179	$73,530
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.2.29 City of Windcrest

The City of Windcrest obtains its water supply from the Edwards Aquifer and is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Windcrest implement the following water supply plan (Table 5.3.2-50).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 51 acft/yr by 2020, increasing to 372 acft/yr of supply in 2070.
- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional 326 acft/yr by 2020 increasing to 451 acft/yr of supply in 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 60 acft/yr by 2020.

Table 5.3.2-50. Recommended Water Supply Plan for the City of Windcrest

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	326	343	361	388	420	451
Recommended Plan						
Municipal Water Conservation	51	139	228	309	340	372
Edwards Transfers	326	343	361	388	420	451
Drought Management	60	—	—	—	—	—
Total New Supply	**437**	**482**	**589**	**697**	**760**	**823**

Estimated costs of the recommended plan to meet the City of Windcrest's projected needs are shown in Table 5.3.2-51.

Table 5.3.2-51. Recommended Plan Costs by Decade for the City of Windcrest

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$34,770	$94,877	$155,513	$210,736	$231,295	$253,038
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

Edwards Transfers						
Annual Cost ($/yr)	$73,676	$77,518	$81,586	$87,688	$94,920	$101,926
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Drought Management						
Annual Cost ($/yr)	$31,013	—	—	—	—	—
Unit Cost ($/acft)	$516	—	—	—	—	—

5.3.2.30 Rural Area Residential and Commercial

Current water supply for Rural Areas is obtained from the Edwards Aquifer, Trinity Aquifer, and Canyon Reservoir. Rural Areas are projected to need additional water supplies prior to 2050. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected needs for rural areas (Table 5.3.2-52).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 223 acft/yr in 2020, increasing to 3,088 acft/yr of supply in 2070.
- Purchase from WWP (SAWS) to be implemented prior to 2020. This strategy can provide an additional 1,898 acft/yr in 2050, increasing to 6,048 acft/yr of supply in 2070 .

Table 5.3.2-52. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	1,898	4,082	6,048
Recommended Plan						
Municipal Water Conservation	223	749	1,281	1,807	2,419	3,088
Purchase from WWP (SAWS)	—	—	—	1,898	4,082	6,048
Total New Supply	**223**	**749**	**1,281**	**3,705**	**6,501**	**9,136**

Estimated costs of the recommended plan to meet the projected needs of rural areas are shown in Table 5.3.2-53.

Table 5.3.2-53. Recommended Plan Costs by Decade for Rural Areas

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$172,049	$576,396	$986,256	$1,391,124	$1,862,891	$2,377,630
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Purchase from WWP (SAWS)						
Annual Cost ($/yr)	—	—	—	$2,581,000	$5,284,000	$3,694,000
Unit Cost ($/acft)	—	—	—	$1,360	$1,295	$611

5.3.2.1 Industrial/Manufacturing

Current water supply for industrial is obtained from the Edwards Aquifer, Trinity Aquifer, run-of-river rights, and direct reuse. Industrial is projected to need additional water supplies prior to 2060. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual industrial operations implement the following water supply plan to meet the projected needs for industrial (Table 5.3.2-54).

- Purchase from WWP (SAWS) to be implemented prior to 2060. This strategy can provide an additional 1,058 acft/yr of supply in 2060, increasing to 3,680 acft/yr of additional supply in 2070. See Chapter 5.4 for an individual project list.

Table 5.3.2-54. Recommended Water Supply Plan for Industrial

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	1,058	3,680
Recommended Plan						
Purchase from WWP (SAWS)	—	—	—	—	1,058	3,680
Total New Supply	—	—	—	—	1,058	3,680

Estimated costs of the recommended plan to meet the Industrial projected needs are shown in Table 5.3.2-55.

Table 5.3.2-55. Recommended Plan Costs by Decade for Industrial

Plan Element	2020	2030	2040	2050	2060	2070
Purchase from WWP (SAWS)						
Annual Cost ($/yr)	—	—	—	—	$1,370,000	$2,248,000
Unit Cost ($/acft)	—	—	—	—	$1,295	$611

5.3.2.2 Steam-Electric Power

Steam-electric power is projected to have adequate water supplies available from Victor Braunig Lake and Calaveras Lake to meet the water user group's projected demand during the planning period.

5.3.2.3 Mining

Current water supply for mining is obtained from the Carrizo Aquifer. Mining is is projected to have adequate water supplies available.

5.3.2.4 Irrigation

Current water supply for Irrigation is obtained from the Edwards Aquifer, Carrizo Aquifer, and run-of-river rights. Irrigation is projected to need additional water supplies prior to 2020. Due to limited economically feasible supplies for irrigation, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual Irrigators implement the following water supply plan to meet the projected needs for Irrigation (Table 5.3.2-56).

- Irrigation Water Conservation, while not a recommended strategy, is encouraged and can provide additional supply when possible. The SCTRWPG has determined that it is not economically feasible for agricultural producers to pay for additional supplies to meet projected needs.

Table 5.3.2-56. Recommended Water Supply Plan for Irrigation

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	5,116	4,625	4,154	3,703	3,271	2,891
Recommended Plan						
Irrigation Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.2.5 Livestock

Current water supply for livestock is obtained from the Edwards, Carrizo, and Trinity Aquifers and local sources. Livestock is projected to have adequate water supplies available.

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5.3.3 Caldwell County Water Supply Plan

Table Table 5.3.3-1 lists each water user group in Caldwell County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.3-1. Caldwell County Management Supply/Shortage by Water User Group

Water User Group	*Management Supply/Shortage*		*Comment*
	2020 (acft/yr)	*2070 (acft/yr)*	
Aqua WSC	315	30	No projected shortage
County Line WSC			See Hays County
Creedmoor-Maha WSC	0	0	No projected shortage
Goforth WSC			See Hays County
Gonzales County WSC			See Gonzales County
City of Lockhart	-188	-2402	Projected shortage (2020 through 2070)
City of Luling	134	-787	Projected shortage (2030 through 2070)
City Martindale	0	-177	Projected shortage (2030 through 2070)
Maxwell WSC	800	350	No projected shortage
City of Mustang Ridge	0	0	No projected shortage
City of Niederwald			See Hays County
Polonia WSC	409	-541	Projected shortage (2050 through 2070)
Rural Area Residential and Commercial	1290	595	No projected shortage
Industrial/Manufacturing	5	0	No projected shortage
Steam-Electric Power	0	0	No projected demand
Mining	0	0	No projected shortage
Irrigation	34	302	No projected shortage
Livestock	0	0	No projected shortage

5.3.3.1 Aqua WSC

Aqua WSC is projected to have adequate water supplies available from the Carrizo Aquifer. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Aqua WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.3-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 9 acft/yr by 2020, increasing to 66 acft/yr of supply in 2070.

Table 5.3.3-2. Recommended Water Supply Plan for Aqua WSC

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	9	15	22	33	48	66
Total New Supply	**9**	**15**	**22**	**33**	**48**	**66**

Estimated costs of the recommended plan to meet Aqua WSC's projected needs are shown in Table 5.3.3-3.

Table 5.3.3-3. Recommended Plan Costs by Decade for Aqua WSC

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$6,807	$11,705	$16,900	$25,455	$36,925	$50,677
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.3.2 Creedmoor-Maha WSC

Creedmoor-Maha WSC is projected to have adequate water supplies available from the Edwards (Barton Springs) Aquifer.

5.3.3.3 City of Lockhart

Current water supply for the City of Lockhart is obtained from the Carrizo Aquifer and Guadalupe-Blanco River Authority run-of-river rights. Lockhart is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Lockhart implement the following water supply plan to meet the projected needs for the city (Table 5.3.3-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 72 acft/yr by 2070.

- Purchase from WWP (GBRA) to be implemented prior to 2020. This strategy can provide an additional 1,120 acft/yr in 2020 increasing to 2,402 acft/yr by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 113 acft/yr by 2020.

Table 5.3.3-4. Recommended Water Supply Plan for the City of Lockhart

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	188	613	1,042	1,484	1,947	2,402
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	72
Purchase from WWP (GBRA)	1,120	1,120	1,120	1,484	1,947	2,402
Drought Management	113	—	—	—	—	—
Total New Supply	**1,233**	**1,120**	**1,120**	**1,484**	**1,947**	**2,474**

Estimated costs of the recommended plan to meet the City of Lockhart's projected needs are shown in Table 5.3.3-5.

Table 5.3.3-5. Recommended Plan Costs by Decade for the City of Lockhart

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$49,011
Unit Cost ($/acft)	—	—	—	—	—	$681
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	$1,823,000	$1,823,000	$717,000	$1,031,000	$1,320,000	$1,430,000
Unit Cost ($/acft)	$1,627	$1,627	$640	$695	$678	$596
Drought Management						
Annual Cost ($/yr)	$29,702	—	—	—	—	—
Unit Cost ($/acft)	$264	—	—	—	—	—

5.3.3.4 City of Luling

Current water supply for the City of Luling is obtained from the Carrizo Aquifer and Guadalupe-Blanco River Authority run-of-river rights. Luling is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Luling implement the following water supply plan to meet the projected needs for the city (Table 5.3.3-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 3 acft/yr by 2070.
- Purchase from WWP (GBRA) to be implemented prior to 2020. This strategy can provide an additional 1,680 acft/yr from 2020 increasing to 1,875 by 2070.

Table 5.3.3-6. Recommended Water Supply Plan for the City of Luling

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	0	41	218	402	596	787
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	3
Purchase from WWP (GBRA)	1,680	1,680	1,680	1,680	1,684	1,875
Total New Supply	**1,680**	**1,680**	**1,680**	**1,680**	**1,684**	**1,878**

Estimated costs of the recommended plan to meet the City of Luling's projected needs are shown in Table 5.3.3-7.

Table 5.3.3-7. Recommended Plan Costs by Decade for the City of Luling

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$2,573
Unit Cost ($/acft)	—	—	—	—	—	$770
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	$2,734,000	$2,734,000	$1,075,000	$1,167,000	$1,142,000	$1,117,000
Unit Cost ($/acft)	$1,627	$1,627	$640	$695	$678	$596

5.3.3.5 City of Martindale

The City of Martindale is obtained from run-of-river rights. The City of Martindale is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that The City of Martindale implement the following water supply plan to meet the projected needs for the City (Table 5.3.3-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 1 acft/yr by 2070.
- Purchase from Wholesale Water Provider (CRWA) to be implemented prior to 2030. This strategy can provide an additional supply of 31 acft/yr by 2030, increasing to 177 acft/yr of additional supply by 2070.

- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 9 acft/yr by 2020.

Table 5.3.3-8. Recommended Water Supply Plan for the City of Martindale

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	31	66	102	140	177
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	1
Purchase from CRWA	—	31	66	102	140	177
Drought Management	9	—	—	—	—	—
Total New Supply	**9**	**31**	**66**	**102**	**140**	**178**

Estimated costs of the recommended plan for the City of Martindale are shown in Table 5.3.3-9.

Table 5.3.3-9. Recommended Plan Costs by Decade for the City of Martindale

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$397
Unit Cost ($/acft)	—	—	—	—	—	$770
Purchase from CRWA						
Annual Cost ($/yr)	—	$47,000	$78,000	$75,000	$104,000	$131,000
Unit Cost ($/acft)	—	$1,513	$1,188	$731	$743	$743
Drought Management						
Annual Cost ($/yr)	$153,755	—	—	—	—	—
Unit Cost ($/acft)	$16,444	—	—	—	—	—

5.3.3.6 Maxwell WSC

Maxwell WSC is projected to have adequate water supplies available from the Edwards Aquifer, Canyon Reservoir, and run-of-river rights through Canyon Regional Water Authority (CRWA) for the planning period.

5.3.3.7 City of Mustang Ridge

The City of Mustang Ridge is projected to have adequate water supplies available from the Carrizo Aquifer. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Mustang Ridge implement the following water supply plan (Table 5.3.3-10).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 1 acft/yr of supply in 2070.

Table 5.3.3-10. Recommended Water Supply Plan for the City of Mustang Ridge

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	1
Total New Supply	**—**	**—**	**—**	**—**	**—**	**1**

Estimated costs of the recommended plan to meet the City of Mustang Ridge's projected needs are shown in Table 5.3.3-11.

Table 5.3.3-11. Recommended Plan Costs by Decade for the City of Mustang Ridge

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$772
Unit Cost ($/acft)	—	—	—	—	—	$770

5.3.3.8 Polonia WSC

Current water supply for Polonia WSC is obtained from the Carrizo Aquifer. Polonia WSC is projected to need additional water supplies prior to 2050. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Polonia WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.3-12).

- Local Wilcox Groundwater[2] with conversion from Irrigation sources to be implemented prior to 2050 can provide an additional 146 acft/yr by 2050, increasing to 541 acft/yr in 2070.

[2] See Chapter 8.3.1, Recommendation #6

Table 5.3.3-12. Recommended Water Supply Plan for Polonia WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	146	341	541
Recommended Plan						
Local Wilcox Groundwater with Conversion	—	—	—	146	341	541
Total New Supply	**—**	**—**	**—**	**146**	**341**	**541**

Estimated costs of the recommended plan to meet Polonia WSC's projected needs are shown in Table 5.3.3-13.

Table 5.3.3-13. Recommended Plan Costs by Decade for Polonia WSC

Plan Element	2020	2030	2040	2050	2060	2070
Local Wilcox Groundwater with Conversion						
Annual Cost ($/yr)	—	—	—	$276,000	$276,000	$276,000
Unit Cost ($/acft)	—	—	—	$510	$510	$250

5.3.3.9 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Carrizo Aquifer, Queen City Aquifer, and run-of-river rights to meet their projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected needs for rural areas (Table 5.3.3-14).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 2 acft/yr by 2070.

Table 5.3.3-14. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	2
Total New Supply	**—**	**—**	**—**	**—**	**—**	**2**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.3-15.

Table 5.3.3-15. Recommended Plan Costs by Decade for Rural Areas

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$1,436
Unit Cost ($/acft)	—	—	—	—	—	$770

In addition, the Tri-Community WSC in Rural Caldwell County is considering the addition of Local Carrizo Groundwater from a new well and interconnections with Maxwell WSC and/or City of Luling.

5.3.3.10 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group's projected demands during the planning period.

5.3.3.11 Steam-Electric Power

There is no projected steam-electric power water demand in Caldwell County, therefore no water management strategies are recommended for this water user group.

5.3.3.12 Mining

Mining is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group's projected demands during the planning period.

5.3.3.13 Irrigation

Irrigation is projected to have adequate water supplies available from the Carrizo Aquifer, Queen City Aquifer, and run-of-river rights to meet the water user group's projected demands during the planning period.

5.3.3.14 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demands during the planning period.

5.3.4 Calhoun County Water Supply Plan

Table 5.3.4-1 lists each water user group in Calhoun County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.4-1. Calhoun County Management Supply/Shortage by Water User Group

Water User Group	***Management Supply/Shortage***		***Comment***
	2020 (acft/yr)	***2070 (acft/yr)***	
Calhoun County WSC	1,144	1,010	No projected shortage
City of Point Comfort	91	51	No projected shortage
City of Port Lavaca	2,553	1,694	No projected shortage
Port O' Connor MUD	1,210	1,168	No projected shortage
City of Seadrift	472	354	No projected shortage
Rural Area Residential and Commercial	181	64	No projected shortage
Industrial/Manufacturing *	10,388	-11,174	Projected shortage (2050 through 2070)
Steam-Electric Power	0	0	No projected shortage
Mining	3	43	No projected shortage
Irrigation	-12,273	-7,527	Projected shortage (2020 through 2070)
Livestock	0	0	No projected shortage

**These values represent the sum of the Surplus/Shortage values for each river basin and/or across the entire county. These values may differ from the Need value reported in other tables because the Need represents only the sum of the shortages.*

5.3.4.1 Calhoun County WSC

Calhoun County WSC is projected to have adequate water supplies available from run-of-river rights of the Guadalupe-Blanco River Authority (GBRA) to meet the WSC's projected demands during the planning period.

5.3.4.2 City of Point Comfort

The City of Point Comfort is projected to have adequate water supplies available from Lake Texana to meet the city's projected demands during the planning period.

5.3.4.3 City of Port Lavaca

The City of Port Lavaca is projected to have adequate water supplies available from run-of-river rights of the Guadalupe-Blanco River Authority (GBRA) to meet the city's projected demands during the planning period

5.3.4.4 Port O' Connor MUD

Port O' Connor MUD is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period.

5.3.4.5 City of Seadrift

The City of Seadrift is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Seadrift implement the following water supply plan (Table 5.3.4-2).

- Municipal Water Conservation to be implemented or enhanced in the future. This strategy can provide an additional 6 acft/yr by 2020, increasing to 41 acft/yr of supply in 2070.

Table 5.3.4-2. Recommended Water Supply Plan for the City of Seadrift

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	6	14	16	22	31	41
Total New Supply	6	14	16	22	31	41

Estimated costs of the recommended plan for the City of Seadrift are shown in Table 5.3.4-3.

Table 5.3.4-3. Recommended Plan Costs by Decade for the City of Seadrift

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$4,942	$10,868	$12,482	$17,194	$23,821	$31,643
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.4.6 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Gulf Coast Aquifer and run-of-river rights of the Guadalupe-Blanco River Authority (GBRA) to meet their projected demands during the planning period.

5.3.4.7 Industrial/Manufacturing

Calhoun County Industrial obtains water supplies available from the Gulf Coast Aquifer, Lake Texana, and run-of-river rights of the Guadalupe-Blanco River Authority (GBRA) to meet the water user group's current demands. The following water supply plan is recommended for Calhoun County Industrial (Table 5.3.4-4).

- Purchase from WWP (GBRA) to be implemented by 2050. This strategy can provide an additional 2,161 acft by 2050 increasing to 11,174 acft/yr by 2070.

An alternative water management strategy to meet the 10,000 acft/yr of needs for Formosa Plastics could be obtained from Purchase from WWP (LNRA) to be implemented by 2020. This strategy can provide an additional 10,000 acft/yr by 2050, continuing through 2070.

Table 5.3.4-4. Recommended Water Supply Plan for Industrial

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	2,161	6,993	11,174
Recommended Plan						
Purchase from WWP (GBRA)	—	—	—	2,161	6,993	11,174
Total New Supply	**—**	**—**	**—**	**2,161**	**6,393**	**11,174**

Estimated costs of the recommended plan for Industrial are shown in Table 5.3.4-5.

Table 5.3.4-5. Recommended Plan Costs by Decade for Industrial

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	—	—	—	$1,502,000	$4,743,000	$6,654,000
Unit Cost ($/acft)	—	—	—	$695	$678	$596

5.3.4.8 Steam-Electric Power

Steam-electric power is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demands during the planning period.

5.3.4.9 Mining

Mining is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demands during the planning period.

5.3.4.10 Irrigation

Current water supply for Irrigation is obtained from run-of-river rights. Irrigation is projected to need additional water supplies prior to 2020. Due to limited economically feasible supplies for irrigation, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual Irrigators implement the following water supply plan to meet the projected needs for Irrigation (Table 5.3.4-4).

- Irrigation Water Conservation, while not a recommended strategy, is encouraged and can provide additional supply when possible. The SCTRWPG has determined that it is not economically feasible for agricultural producers to pay for additional supplies to meet projected needs.

Table 5.3.4-6. Recommended Water Supply Plan for Irrigation

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	12,273	10,736	9,695	8,949	8,254	7,527
Recommended Plan						
Irrigation Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.4.11 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demands during the planning period.

5.3.5 Comal County Water Supply Plan

Table 5.3.5-1 lists each water user group in Comal County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.5-1. Comal County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage 2020 (acft/yr)	Management Supply/Shortage 2070 (acft/yr)	Comment
San Antonio Water Supply			See Bexar County
City of Bulverde	0	0	No projected shortage
Canyon Lake WSC	0	-7,468	Projected shortage (2030 through 2070)
Crystal Clear WSC			See Guadalupe County
Fair Oaks Ranch			See Bexar County
City of Garden Ridge	-1023	-3,957	Projected shortage (2020 through 2070)
Green Valley SUD			See Guadalupe County
City of New Braunfels	2,491	-14,580	Projected shortage (2020 through 2060)
City of Schertz			See Guadalupe County
City of Selma			See Bexar County
Water Service Inc.			See Bexar County
Rural Area Residential and Commercial*	814	971	No projected shortage
Industrial/Manufacturing *	-4,130	-8,074	Projected shortage (2020 through 2070)
Steam-Electric Power	0	0	No projected demand
Mining	0	0	No projected shortage
Irrigation	496	673	No projected shortage
Livestock	0	0	No projected shortage

These values represent the sum of the Surplus/Shortage values for each river basin and/or across the entire county. These values may differ from the Need value reported in other tables because the Need represents only the sum of the shortages.

5.3.5.1 City of Bulverde

The City of Bulverde is is projected to have adequate water supplies available from Canyon Reservoir and Trinity Aquifer through Canyon Lake Water Service Company to meet the water user group's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Bulverde implement the following water supply plan (Table 5.3.5-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 1 acft/yr by 2050, increasing to 71 acft/yr of supply in 2070.

Table 5.3.5-2. Recommended Water Supply Plan for the City of Bulverde

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**
Recommended Plan						
Municipal Water Conservation	—	—	—	1	32	71
Total New Supply	—	—	—	1	32	71

Estimated costs of the recommended plan to meet the City of Bulverde's projected needs are shown in Table 5.3.5-3.

Table 5.3.5-3. Recommended Plan Costs by Decade for the City of Bulverde

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	$918	$22,089	$48,303
Unit Cost ($/acft)	—	—	—	$681	$681	$681

5.3.5.2 Canyon Lake WSC

Current water supply for Canyon Lake WSC is obtained from Canyon Reservoir and the Trinity Aquifer. Canyon Lake WSC is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Canyon Lake WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.5-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 75 acft/yr by 2050, increasing to 638 acft/yr of supply in 2070.
- Purchase from WWP (TWA) to be implemented prior to 2030. This strategy can provide an additional 671 acft/yr by 2030, increasing to 7,468 acft/yr in 2070.

Table 5.3.5-4. Recommended Water Supply Plan for Canyon Lake WSC

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	671	2,373	4,095	5,814	7,468
Recommended Plan						
Municipal Water Conservation	—	—	—	75	321	638
Purchase from WWP (TWA)	—	671	2,373	4,095	5,814	7,468
Total New Supply	**—**	**671**	**2,373**	**4,170**	**6,135**	**8,106**

Estimated costs of the recommended plan to meet Canyon Lake WSC's projected needs are shown in Table 5.3.5-5.

Table 5.3.5-5. Recommended Plan Costs by Decade for Canyon Lake WSC

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	$57,425	$246,793	$491,637
Unit Cost ($/acft)	—	—	—	$770	$770	$770
Purchase from WWP (TWA)						
Annual Cost ($/yr)		$1,629,000	$2,104,000	$3,572,000	$4,146,000	$5,257,000
Unit Cost ($/acft)		$2,428	$887	$872	$713	$704

5.3.5.3 City of Garden Ridge

Current water supply for the City of Garden Ridge is obtained from the Edwards Aquifer. Garden Ridge is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Garden Ridge implement the following water supply plan to meet the projected needs for the city (Table 5.3.5-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 101 acft/yr by 2020, increasing to 1,941 acft/yr of supply in 2070.
- A Local Trinity Groundwater water management strategy to be implemented prior to 2020 can provide an additional 2,000 acft/yr by 2020 through 2070.
- Purchase from WWP (SSLGC) to be implemented prior to 2020. This strategy can provide an additional 150 acft/yr by 2020 throgh 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 83 acft/yr by 2020.

An alternative water management strategy for the City of Garden Ridge, if groundwater permits from Gonzales County are unable to be obtained, is Purchase from WWP (CRWA).

Table 5.3.5-6. Recommended Water Supply Plan for the City of Garden Ridge

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	1,023	1,599	2,188	2,786	3,383	3,957
Recommended Plan						
Municipal Water Conservation	101	319	625	1,008	1,453	1,941
Local Trinity Groundwater	2,000	2,000	2,000	2,000	2,000	2,000
Purchase from WWP (SSLGC)	150	150	150	150	150	150
Drought Management	83	—	—	—	—	—
Total New Supply	**2,334**	**2,469**	**2,775**	**3,158**	**4,603**	**4,091**

Estimated costs of the recommended plan to meet the City of Garden Ridge's projected needs are shown in Table 5.3.5-7.

Table 5.3.5-7. Recommended Plan Costs by Decade for the City of Garden Ridge

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$68,986	$217,018	$425,538	$686,136	$989,613	$1,321,586
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Local Trinity Groundwater						
Annual Cost ($/yr)	$1,346,354	$1,346,354	$326,000	$326,000	$326,000	$326,000
Unit Cost ($/acft)	$673	$673	$163	$163	$163	$163
Purchase from WWP (SSLGC)						
Annual Cost ($/yr)	$165,000	$161,000	$84,000	$85,000	$85,000	$85,000
Unit Cost ($/acft)	$1,101	$1,070	$559	$567	$566	$566
Drought Management						
Annual Cost ($/yr)	$24,150	—	—	—	—	—
Unit Cost ($/acft)	$291	—	—	—	—	—

5.3.5.4 City of New Braunfels

Current water supply for the City of New Braunfels is obtained from the Edwards Aquifer, Canyon Reservoir, and run-of-river rights. New Braunfels is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that New Braunfels implement the following water supply plan to meet the projected needs for the city (Table 5.3.5-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 644 acft/yr by 2020, increasing to 8,346 acft/yr of supply in 2070.
- The NBU ASR water management strategy to be implemented prior to 2020 can provide an additional 8,300 acft/yr of new supply.
- The NBU Trinity water management strategy to be implemented prior to 2030 can provide an additional 1,090 acft/yr.
- Direct Recycled Water to be implemented before 2020. This Strategy can provide an additional supply of 7,025 acft/yr by 2020 increasing to 11,709 acft/yr by 2070.

Table 5.3.5-8. Recommended Water Supply Plan for the City of New Braunfels

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	791	4,187	7,658	11,175	14,580
Recommended Plan						
Municipal Water Conservation	644	2,174	4,237	5,624	6,932	8,346
New Braunfels Utilities ASR	8,300	8,300	8,300	8,300	8,300	8,300
New Braunfels Utilities Trinity	—	1,090	1,090	1,090	1,090	1,090
Reuse	7,025	7,901	8,568	9,610	10,714	11,709
Total New Supply	**15,969**	**19,817**	**23,044**	**25,492**	**27,915**	**30,296**

Estimated costs of the recommended plan to meet the City of New Braunfels' projected needs are shown in Table 5.3.5-9.

Table 5.3.5-9. Recommended Plan Costs by Decade for the City of New Braunfels

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$438,597	$1,480,654	$2,885,069	$3,829,607	$4,720,620	$5,683,862
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
New Bruanfels ASR						
Annual Cost ($/yr)	$3,834,600	$3,842,900	$1,635,100	$1,635,100	$1,635,100	$1,635,100
Unit Cost ($/acft)	$462	$463	$197	$197	$197	$197
New Bruanfels Trinity						
Annual Cost ($/yr)	—	$691,000	$691,000	$193,000	$193,000	$193,000
Unit Cost ($/acft)	—	$634	$634	$177	$177	$177
Reuse						
Annual Cost ($/yr)	$5,629,910	$5,629,910	$5,629,910	$5,629,910	$5,629,910	$5,629,910
Unit Cost ($/acft)	$481	$481	$481	$481	$481	$481

5.3.5.5 Rural Area Residential and Commercial

Rural Area Residential and Commercial in Comal County is expected to have adequate supply through 2070, therefore no water management strategies are recommended for this water user group.

5.3.5.6 Industrial/Manufacturing

Current water supply for industrial is obtained from the Edwards Aquifer, Canyon Reservoir, and run-of-river rights. Industrial is projected to need additional water supplies prior to the year 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual industrial operations implement the following water supply plan to meet the projected needs for industrial (Table 5.3.5-10).

- Purchase from WWP (GBRA) is to be implemented prior to 2020. This strategy can provide an additional 4,130 acft/yr of supply in 2020, increasing to 8,074 acft/yr of additional supply in 2070.
- Recycled water from NBU could also be implemented as a way to meet industrial needs in Comal County.

Table 5.3.5-10. Recommended Water Supply Plan for Industrial

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	4,130	4,881	5,612	6,239	7,120	8,074
Recommended Plan						
Purchase from WWP (GBRA)	4,130	4,881	5,612	6,239	7,120	8,074
Total New Supply	**4,130**	**4,881**	**5,612**	**6,239**	**7,120**	**8,074**

Estimated costs of the recommended plan to meet the industrial projected needs are shown in Table 5.3.5-11.

Table 5.3.5-11. Recommended Plan Costs by Decade for Industrial

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	$6,721,000	$7,943,000	$3,592,000	$4,336,000	$4,829,000	$4,808,000
Unit Cost ($/acft)	$1,627	$1,627	$640	$695	$678	$596

5.3.5.7 Steam-Electric Power

There is no projected steam-electric power water demand in Comal County, therefore no water management strategies are recommended for this water user group.

5.3.5.8 Mining

Current water supply for mining is obtained from the Trinity Aquifer. Mining is not projected to need additional water supplies over the planning period.

5.3.5.9 Irrigation

Irrigation is projected to have adequate water supplies available from the Edwards Aquifer, Canyon Reservoir, and run-of-river rights to meet the water user group's projected demand during the planning period.

5.3.5.10 Livestock

Current water supply for livestock is obtained from the Trinity Aquifer and local sources. Livestock is projected to have adequate water supplies through 2070.

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5.3.6 DeWitt County Water Supply Plan

Table 5.3.6-1 lists each water user group in DeWitt County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.6-1. DeWitt County Management Supply/Shortage by Water User Group

Water User Group	***Management Supply/Shortage***		***Comment***
	2020 (acft/yr)	***2070 (acft/yr)***	
City of Cuero	1,847	2,087	No projected shortage
Gonzales County WSC			See Gonzales County
City of Yoakum	700	751	No projected shortage
City of Yorktown	972	972	No projected shortage
Rural Area Residential and Commercial	49	272	No projected shortage
Industrial/Manufacturing	219	44	No projected shortage
Steam-Electric Power	0	0	No projected demand
Mining	-44	0	Projected shortage (2020 through 2050)
Irrigation	-74	0	Projected shortage (2020 through 2050)
Livestock	0	0	No projected shortage

5.3.6.1 City of Cuero

The City of Cuero is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Cuero implement the following water supply plan (Table 5.3.6-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 270 acft/yr by 2020, increasing to 767 acft/yr of supply in 2070.

Table 5.3.6-2. Recommended Water Supply Plan for the City of Cuero

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	270	333	381	452	656	767
Total New Supply	**270**	**333**	**381**	**452**	**656**	**767**

Estimated costs of the recommended plan for the City of Cuero are shown in Table 5.3.6-3.

Table 5.3.6-3. Recommended Plan Costs by Decade for the City of Cuero

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$207,927	$256,718	$293,330	$347,757	$505,470	$590,560
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.6.2 City of Yoakum

The City of Yoakum is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Yoakum implement the following water supply plan (Table 5.3.6-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 42 acft/yr by 2020, increasing to 64 acft/yr of supply in 2070.

Table 5.3.6-4. Recommended Water Supply Plan for the City of Yoakum

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	42	51	26	7	56	64
Total New Supply	**42**	**51**	**26**	**7**	**56**	**64**

Estimated costs of the recommended plan for the City of Yoakum are shown in Table 5.3.6-5.

Table 5.3.6-5. Recommended Plan Costs by Decade for the City of Yoakum

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$32,103	$39,184	$20,326	$5,703	$42,990	$49,376
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.6.3 City of Yorktown

The City of Yorktown is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Yorktown implement the following water supply plan (Table 5.3.6-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 47 acft/yr by 2020, increasing to 59 acft/yr of supply in 2070.

Table 5.3.6-6. Recommended Water Supply Plan for the City of Yorktown

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	47	51	28	12	51	59
Total New Supply	**47**	**51**	**28**	**12**	**51**	**59**

Estimated costs of the recommended plan for the City of Yorktown are shown in Table 5.3.6-7.

Table 5.3.6-7. Recommended Plan Costs by Decade for the City of Yorktown

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$36,512	$39,650	$21,882	$9,234	$39,042	$45,375
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.6.4 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Gulf Coast Aquifer to meet their projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan for rural areas (Table 5.3.6-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 40 acft/yr in 2020.

Table 5.3.6-8. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	40	—	—	—	—	—
Total New Supply	**40**	**—**	**—**	**—**	**—**	**—**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.6-9.

Table 5.3.6-9. Recommended Plan Costs by Decade for Rural Areas

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$30,709	—	—	—	—	—
Unit Cost ($/acft)	$770	—	—	—	—	—

5.3.6.1 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demand during the planning period.

5.3.6.2 Steam-Electric Power

There is no projected steam-electric power water demand in DeWitt County, therefore no water management strategies are recommended for this water user group.

5.3.6.3 Mining

Current water supply for Irrigation is obtained from the Gulf Coast Aquifer. Mining is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual Irrigators implement the following water supply plan to meet the projected needs for Irrigation (Table 5.3.6-10).

- Local Gulf Coast Aquifer development to be implemented by 2020. This strategy can provide an additional 44 acft/yr by 2020 through 2070.

Table 5.3.6-10. Recommended Water Supply Plan for Mining

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	44	38	16	2	0	0
Recommended Plan						
Local Gulf Coast Groundwater	44	44	44	44	44	44
Total New Supply	44	44	44	44	44	44

Estimated costs of the recommended plan to meet the Irrigation projected needs are shown in Table 5.3.6-11.

Table 5.3.6-11. Recommended Plan Costs by Decade for Mining

Plan Element	2020	2030	2040	2050	2060	2070
Local Gulf Coast Groundwater						
Annual Cost ($/yr)	$20,000	$20,000	$11,000	$11,000	$11,000	$11,000
Unit Cost ($/acft)	$455	$455	$250	$250	$250	$250
**Costs not available due to lack of relevant data.*						

5.3.6.4 Irrigation

Current water supply for Irrigation is obtained from the Gulf Coast Aquifer and run-of-river rights. Irrigation is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual Irrigators implement the following water supply plan to meet the projected needs for Irrigation (Table 5.3.6-12).

Table 5.3.6-12. Recommended Water Supply Plan for Irrigation

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	74	68	39	6	0	0
Recommended Plan						
Local Gulf Coast Groundwater	75	75	75	75	75	75
Total New Supply	**75**	**75**	**75**	**75**	**75**	**75**

Estimated costs of the recommended plan to meet the Irrigation projected needs are shown in Table 5.3.6-13.

Table 5.3.6-13. Recommended Plan Costs by Decade for Irrigation

Plan Element	2020	2030	2040	2050	2060	2070
Local Gulf Coast Groundwater						
Annual Cost ($/yr)	$34,125	$34,125	$18,750	$18,750	$18,750	$18,750
Unit Cost ($/acft)	$455	$455	$250	$250	$250	$250
**Costs not available due to lack of relevant data.*						

5.3.6.5 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

5.3.7 Dimmit County Water Supply Plan

Table 5.3.7-1 lists each water user group in Dimmit County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.7-1. Dimmit County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage 2020 (acft/yr)	Management Supply/Shortage 2070 (acft/yr)	Comment
City of Asherton	-28	26	Projected shortage (2020 through 2050)
City of Big Wells	77	110	No projected shortage
City of Carrizo Springs	-267	100	Projected shortage (2020 through 2050)
Rural Area Residential and Commercial	-297	-184	Projected shortage (2020 through 2070)
Industrial/Manufacturing	0	0	No projected demand
Steam-Electric Power	0	0	No projected demand
Mining	-4,826	-519	Projected shortage (2020 through 2070)
Irrigation	-3,372	-2,466	Projected shortage (2020 through 2070)
Livestock	0	0	No projected shortage

5.3.7.1 City of Asherton

Current Supplies for the City of Asherton come from the Carrizo Aquifer. The city of Asherton is projected to need additional water supplies from 2020 through 2050. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Carrizo Springs implement the following water supply plan (Table 5.3.7-2):

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 82 acft/yr by 2020, increasing to 123 acft/yr of supply in 2050 then decreasing to 72 acft/yr of supply in 2070.
- Local Carrizo Groundwater[3] could be implemented; however the MAG limits availability within Carrizo Aquifer in Dimmit County.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 17 acft/yr by 2020.

[3] See Chapter 8.3.1, Recommendation #6

Table 5.3.7-2. Recommended Water Supply Plan for the City of Asherton

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	28	46	61	77	0	0
Recommended Plan						
Municipal Water Conservation	82	101	118	123	65	72
Local Carrizo (MAG limited)	0	0	0	0	0	0
Drought Management	17	—	—	—	—	—
Total New Supply	**99**	**101**	**118**	**123**	**65**	**72**

Estimated costs of the recommended plan for the City of Asherton are shown in Table 5.3.7-3.

Table 5.3.7-3. Recommended Plan Costs by Decade for the City of Asherton

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$63,156	$77,600	$90,994	$94,699	$49,878	$55,204
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Carrizo (MAG limited)						
Annual Cost ($/yr)	N/A	N/A	N/A	N/A	N/A	N/A
Unit Cost ($/acft)	N/A	N/A	N/A	N/A	N/A	N/A
Drought Management						
Annual Cost ($/yr)	$313	—	—	—	—	—
Unit Cost ($/acft)	$18	—	—	—	—	—

5.3.7.2 City of Big Wells

The City of Big Wells is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Big Wells implement the following water supply plan (Table 5.3.7-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 41 acft/yr by 2020, decreasing to 11 acft/yr of supply in 2070.

Table 5.3.7-4. Recommended Water Supply Plan for the City of Big Wells

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	41	38	33	31	8	11
Total New Supply	**41**	**38**	**33**	**31**	**8**	**11**

Estimated costs of the recommended plan for the City of Big Wells are shown in Table 5.3.7-5.

Table 5.3.7-5. Recommended Plan Costs by Decade for the City of Big Wells

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$31,904	$29,638	$25,293	$23,549	$6,142	$8,391
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.7.3 City of Carrizo Springs

Current Supplies for the City of Carrizo Springs come from the Carrizo Aquifer. The City of Carrizo Springs is projected to need additional water supplies from 2020 through 2050. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Carrizo Springs implement the following water supply plan (Table 5.3.7-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 267 acft/yr by 2020, increasing to 578 acft/yr of supply in 2050.
- Local Carrizo Groundwater[4] could be implemented; however the MAG limits availability within Carrizo Aquifer in Dimmit County.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 114 acft/yr by 2020.

[4] See Chapter 8.3.1, Recommendation #6

Table 5.3.7-6. Recommended Water Supply Plan for the City of Carrizo Springs

	2020 (acft/yr)	**2030 (acft/yr)**	**2040 (acft/yr)**	**2050 (acft/yr)**	**2060 (acft/yr)**	**2070 (acft/yr)**
Projected Need (Shortage)	267	399	476	578	0	0
Recommended Plan						
Municipal Water Conservation	579	715	809	939	629	765
Local Carrizo (MAG limited)	0	0	0	0	0	0
Drought Management	114	—	—	—	—	—
Total New Supply	**693**	**715**	**809**	**939**	**629**	**765**

Estimated costs of the recommended plan for the City of Carrizo Springs are shown in Table 5.3.7-7.

Table 5.3.7-7. Recommended Plan Costs by Decade for the City of Carrizo Springs

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$445,550	$550,882	$622,607	$722,820	$484,178	$588,857
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Carrizo (MAG limited)						
Annual Cost ($/yr)	N/A	N/A	N/A	N/A	N/A	N/A
Unit Cost ($/acft)	N/A	N/A	N/A	N/A	N/A	N/A
Drought Management						
Annual Cost ($/yr)	$136,751	—	—	—	—	—
Unit Cost ($/acft)	$1,205	—	—	—	—	—

5.3.7.4 Rural Area Residential and Commercial

Current water supply for Rural Areas is obtained from the Carrizo Aquifer. Rural Areas are projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected needs for rural areas (Table 5.3.7-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 109 acft/yr in 2020 decreasing to 5 acft/yr of supply by 2070.
- Conversion of Irrigation surface water rights could provide an additional 297 acft/yr of supply in 2020 decreasing to 184 acft/yr in 2070.

Table 5.3.7-8. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	297	326	340	362	171	184
Recommended Plan						
Municipal Water Conservation	109	99	77	64	—	5
Irrigation Surface Water Right Conversion	297	326	340	362	171	184
Total New Supply	**406**	**425**	**417**	**426**	**171**	**189**

Estimated costs of the recommended plan to meet the projected needs of rural areas are shown in Table 5.3.7-9.

Table 5.3.7-9. Recommended Plan Costs by Decade for Rural Areas

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$83,592	$76,605	$58,977	$49,264	—	$3,643
Unit Cost ($/acft)	$770	$770	$770	$770	—	$770
Irrigation Surface Water Right Conversion						
Annual Cost ($/yr)	$1,041,000	$1,041,000	$450,000	$450,000	$450,000	$450,000
Unit Cost ($/acft)	$2,876	$2,876	$1,244	$1,244	$1,244	$1,244

5.3.7.1 Industrial/Manufacturing

There is no projected industrial water demand in Dimmit County, therefore no water management strategies are recommended for this water user group.

5.3.7.2 Steam-Electric Power

There is no projected steam-electric power water demand in Dimmit County, therefore no water management strategies are recommended for this water user group.

5.3.7.3 Mining

Current water supply for Mining is obtained from the Carrizo Aquifer and run-of-river rights. Mining is projected to need additional water supplies prior to 2020. Due to a lack of supply in the county, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual mining companies implement the following water supply plan to meet the projected needs for Mining (Table 5.3.7-10).

- Mining Water Conservation to be implemented prior to 2020. Actual needs reduced could vary greatly.

Table 5.3.7-10. Recommended Water Supply Plan for Mining

	2020 (acft/yr)	**2030 (acft/yr)**	**2040 (acft/yr)**	**2050 (acft/yr)**	**2060 (acft/yr)**	**2070 (acft/yr)**
Projected Need (Shortage)	4,826	4,908	4,244	2,731	1,222	519
Recommended Plan						
Mining Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.7.4 Irrigation

Current water supply for Irrigation is obtained from the Carrizo Aquifer and run-of-river rights. Irrigation is projected to need additional water supplies prior to 2020. Due to limited economically feasible supplies for irrigation, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual Irrigators implement the following water supply plan (Table 5.3.7-11).

- Irrigation Water Conservation, while not a recommended strategy, is encouraged and can provide additional supply when possible. The SCTRWPG has determined that it is not economically feasible for agricultural producers to pay for additional supplies to meet projected needs.

Table 5.3.7-11. Recommended Water Supply Plan for Irrigation

	2020 (acft/yr)	**2030 (acft/yr)**	**2040 (acft/yr)**	**2050 (acft/yr)**	**2060 (acft/yr)**	**2070 (acft/yr)**
Projected Need (Shortage)	3,372	3,312	3,082	2,846	2,620	2,466
Recommended Plan						
Irrigation Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.7.5 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group’s projected demand during the planning period.

5.3.8 Frio County Water Supply Plan

Table Table 5.3.8-1 lists each water user group in Frio County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.8-1. Frio County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage 2020 (acft/yr)	Management Supply/Shortage 2070 (acft/yr)	Comment
Benton City WSC			See Atascosa County
City of Dilley	1,082	702	No projected shortage
City of Pearsall	710	-19	Projected shortage (2070 Only)
Rural Area Residential and Commercial	492	305	No projected shortage
Industrial/Manufacturing	0	0	No projected demand
Steam-Electric Power	0	392	No projected shortage
Mining	0	0	No projected shortage
Irrigation	0	0	No projected shortage
Livestock	0	0	No projected shortage

5.3.8.1 City of Dilley

The City of Dilley is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Dilley implement the following water supply plan (Table 5.3.8-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 48 acft/yr by 2020, increasing to 470 acft/yr of supply in 2070.

Table 5.3.8-2. Recommended Water Supply Plan for the City of Dilley

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	48	136	233	341	425	470
Total New Supply	**48**	**136**	**233**	**341**	**425**	**470**

Estimated costs of the recommended plan for the City of Dilley are shown in Table 5.3.8-3.

Table 5.3.8-3. Recommended Plan Costs by Decade for the City of Dilley

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$36,945	$104,880	$179,741	$262,291	$327,456	$361,969
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.8.2 City of Pearsall

The City of Pearsall is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Pearsall implement the following water supply plan (Table 5.3.8-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 81acft/yr by 2020, increasing to 655 acft/yr of supply in 2070.
- A Local Carrizo Groundwater[5] conversion from Irrigation sources to be implemented prior to 2070 can provide an additional 20 acft/yr.

[5] See Chapter 8.3.1, Recommendation #6

Table 5.3.8-4. Recommended Water Supply Plan for the City of Pearsall

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	19
Recommended Plan						
Municipal Water Conservation	81	247	434	497	573	655
Local Carrizo Groundwater with Conversion	—	—	—	—	—	20
Total New Supply	**81**	**247**	**434**	**497**	**573**	**675**

Estimated costs of the recommended plan for the City of Pearsall are shown in Table 5.3.8-5.

Table 5.3.8-5. Recommended Plan Costs by Decade for the City of Pearsall

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$55,279	$168,525	$295,294	$338,413	$390,470	$446,287
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Local Carrizo Conversion						
Annual Cost ($/yr)	—	—	—	—	—	$103,000
Unit Cost ($/acft)	—	—	—	—	—	$5,000

5.3.8.3 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Carrizo Aquifer to meet their projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan for rural areas (Table 5.3.8-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 2 acft/yr in 2070.

Table 5.3.8-6. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	2
Total New Supply	**—**	**—**	**—**	**—**	**—**	**2**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.8-7.

Table 5.3.8-7. Recommended Plan Costs by Decade for Rural Areas

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$1,791
Unit Cost ($/acft)	—	—	—	—	—	$770

5.3.8.1 Industrial/Manufacturing

There is no projected industrial water demand in Frio County, therefore no water management strategies are recommended for this water user group.

5.3.8.2 Steam-Electric Power

Steam-electric power is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group’s projected demand during the planning period.

5.3.8.3 Mining

Mining is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group’s projected demand during the planning period.

5.3.8.4 Irrigation

Irrigation is projected to have adequate water supplies available from the Carrizo Aquifer, Queen City Aquifer, Sparta Aquifer, and run-of-river rights to meet the water user group’s projected demand during the planning period.

5.3.8.5 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group’s projected demand during the planning period.

5.3.9 Goliad County Water Supply Plan

Table 5.3.9-1 lists each water user group in Goliad County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.9-1. Goliad County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage 2020 (acft/yr)	Management Supply/Shortage 2070 (acft/yr)	Comment
City of Goliad	193	253	No projected shortage
Rural Area Residential and Commercial	177	302	No projected shortage
Industrial/Manufacturing	88	0	No projected shortage
Steam-Electric Power	9,880	9,880	No projected shortage
Mining	0	0	No projected shortage
Irrigation	975	975	No projected shortage
Livestock	0	0	No projected shortage

5.3.9.1 City of Goliad

The City of Goliad is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Goliad implement the following water supply plan (Table 5.3.9-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 174 acft/yr by 2020, increasing to 133 acft/yr of supply in 2070.

Table 5.3.9-2. Recommended Water Supply Plan for the City of Goliad

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	174	228	264	254	120	133
Total New Supply	**174**	**228**	**264**	**254**	**120**	**133**

Estimated costs of the recommended plan for the City of Goliad are shown in Table 5.3.9-3.

Table 5.3.9-3. Recommended Plan Costs by Decade for the City of Goliad

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$133,974	$175,423	$203,279	$195,580	$92,270	$102,041
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.9.2 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Gulf Coast Aquifer to meet their projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan for rural areas (Table 5.3.9-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 221 acft/yr in 2020 decreasing to 0 acft/yr of supply in 2070.

Table 5.3.9-4. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	221	232	213	161	—	—
Total New Supply	**221**	**232**	**213**	**161**	**—**	**—**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.9-5.

Table 5.3.9-5. Recommended Plan Costs by Decade for Rural Areas

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$170,121	$178,457	$164,088	$124,053	—	—
Unit Cost ($/acft)	$770	$770	$770	$770	—	—

5.3.9.1 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demand during the planning period.

5.3.9.2 Steam-Electric Power

Current water supply for steam-electric power is obtained from the Gulf Coast Aquifer and Coleto Creek Reservoir. Steam-electric power is projected to have adequate supplies through the planning period.

5.3.9.3 Mining

Mining is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demand during the planning period.

5.3.9.4 Irrigation

Irrigation is projected to have adequate water supplies available from the Gulf Coast Aquifer and run-of-river rights to meet the water user group's projected demand during the planning period.

5.3.9.5 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

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5.3.10 Gonzales County Water Supply Plan

Table 5.3.10-1 lists each water user group in Gonzales County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.10-1. Gonzales County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage		Comment
	2020 (acft/yr)	2070 (acft/yr)	
City of Gonzales	385	-310	Projected shortage (2050 through 2070)
Gonzales County WSC	531	-63	Projected shortage (2050 & 2070)
City of Nixon	2,209	2,059	No projected shortage
City of Smiley	89	48	No projected shortage
City of Waelder	373	305	No projected shortage
Rural Area Residential and Commercial	150	45	No projected shortage
Industrial/Manufacturing	716	71	No projected shortage
Steam-Electric Power	0	0	No projected demand
Mining	0	0	No projected shortage
Irrigation	1,190	2,410	No projected shortage
Livestock	0	0	No projected shortage

5.3.10.1 City of Gonzales

The City of Gonzales obtains its supply from the Carrizo Aquifer and run-of-river rights. The city is projected to have a shortage beginning in 2050. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Gonzales implement the following water supply plan (Table 5.3.10-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 183 acft/yr by 2020, increasing to 1,035 by 2070.
- Local Carrizo Groundwater[6] to be implemented by 2050. This strategy can provide an additional 310 acft/yr by 2050 through 2070.

[6] See Chapter 8.3.1, Recommendation #6

Table 5.3.10-2. Recommended Water Supply Plan for the City of Gonzales

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	174	92	310
Recommended Plan						
Municipal Water Conservation	183	318	475	695	901	1,035
Local Carrizo Groundwater	—	—	—	310	310	310
Total New Supply	**183**	**318**	**475**	**1,005**	**1,211**	**1,345**

Estimated costs of the recommended plan for the City of Gonzales are shown in Table 5.3.10-3.

Table 5.3.10-3. Recommended Plan Costs by Decade for the City of Gonzales

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$140,645	$244,789	$365,937	$535,160	$693,809	$797,073
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Carrizo Groundwater						
Annual Cost ($/yr)	—	—	—	$239,000	$239,000	$72,000
Unit Cost ($/acft)	—	—	—	$771	$771	$232

5.3.10.2 Gonzales County WSC

Current water supply for Gonzales County WSC is obtained from the Carrizo Aquifer and Canyon Reservoir. Gonzales County WSC is projected to have a shortage in 2050 and 2070. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Gonzales County WSC implement the following water supply plan (Table 5.3.10-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 281 acft/yr by 2020, increasing to 1,140 acft/yr of supply in 2070.
- Local Carrizo Groundwater[7] to be implemented by 2050. This strategy can provide an additional 75 acft/yr by 2050 through 2070.
- Facilities Expansions (System Interconnects)

[7] See Chapter 8.3.1, Recommendation #6

Table 5.3.10-4. Recommended Water Supply Plan for Gonzales County WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	75	0	63
Recommended Plan						
Municipal Water Conservation	281	425	620	839	895	1,140
Local Carrizo Groundwater	—	—	—	75	75	75
Total New Supply	**281**	**425**	**620**	**914**	**970**	**1,215**

Estimated costs of the recommended plan for Gonzales County WSC are shown in Table 5.3.10-5.

Table 5.3.10-5. Recommended Plan Costs by Decade for Gonzales County WSC

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$216,285	$326,922	$477,447	$646,305	$689,290	$877,990
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Carrizo Groundwater						
Annual Cost ($/yr)	—	—	—	$121,000	$121,000	$33,000
Unit Cost ($/acft)	—	—	—	$1,613	$1,613	$440

5.3.10.3 City of Nixon

The City of Nixon is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Nixon implement the following water supply plan (Table 5.3.10-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 21 acft/yr by 2060, increasing to 37 acft/yr of supply in 2070.

Table 5.3.10-6. Recommended Water Supply Plan for the City of Nixon

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	21	37
Total New Supply	**—**	**—**	**—**	**—**	**21**	**37**

Estimated costs of the recommended plan for the City of Nixon are shown in Table 5.3.10-7.

Table 5.3.10-7. Recommended Plan Costs by Decade for the City of Nixon

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	$16,519	$28,398
Unit Cost ($/acft)	—	—	—	—	$770	$770

5.3.10.1 City of Smiley

The City of Smiley is projected to have adequate water supplies available from the Carrizo-Wilcox Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Smiley implement the following water supply plan (Table 5.3.10-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 11 acft/yr by 2020, increasing to 43 acft/yr of supply in 2070.

Table 5.3.10-8. Recommended Water Supply Plan for the City of Smiley

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	11	18	27	33	37	43
Total New Supply	**11**	**18**	**27**	**33**	**37**	**43**

Estimated costs of the recommended plan for the City of Waelder are shown in Table 5.3.10-9.

Table 5.3.10-9. Recommended Plan Costs by Decade for the City of Smiley

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$8,297	$13,973	$21,159	$25,232	$28,316	$32,898
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.10.2 City of Waelder

The City of Waelder is projected to have adequate water supplies available from the Queen City Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Waelder implement the following water supply plan (Table 5.3.10-10).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 16 acft/yr by 2020, increasing to 42 acft/yr of supply in 2070.

Table 5.3.10-10. Recommended Water Supply Plan for the City of Waelder

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	16	22	20	24	33	42
Total New Supply	**16**	**22**	**20**	**24**	**33**	**42**

Estimated costs of the recommended plan for the City of Waelder are shown in Table 5.3.10-11.

Table 5.3.10-11. Recommended Plan Costs by Decade for the City of Waelder

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$12,118	$17,002	$15,737	$18,166	$25,460	$32,271
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.10.3 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Carrizo Aquifer to meet their projected demands during the planning period.

5.3.10.4 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Carrizo Aquifer and Sparta Aquifer to meet the water user group's projected demand during the planning period.

5.3.10.5 Steam-Electric Power

There is no projected steam-electric power water demand in Gonzales County, therefore no water management strategies are recommended for this water user group.

5.3.10.6 Mining

Mining is projected to have adequate water supplies available from the Carrizo Aquifer, Sparta Aquifer, and Queen City Aquifer to meet the water user group's projected demand during the planning period.

5.3.10.7 Irrigation

Irrigation is projected to have adequate water supplies available from the Carrizo Aquifer, Sparta Aquifer, Queen City Aquifer, Gulf Coast Aquifer, Canyon Reservoir, and run-of-river rights to meet the water user group's projected demand during the planning period.

5.3.10.8 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

5.3.11 Guadalupe County Water Supply Plan

Table 5.3.11-1 lists each water user group in Guadalupe County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.11-1. Guadalupe County Management Supply/Shortage by Water User Group

Water User Group	*Management Supply/Shortage*		*Comment*
	2020 (acft/yr)	*2070 (acft/yr)*	
City of Cibolo	666	-7,066	Projected shortage (2030 through 2070)
Crystal Clear WSC	341	-2,023	Projected shortage (2030 through 2070)
East Central SUD			See Bexar County
Green Valley SUD	-82	-1,391	Projected shortage (2020 through 2070)
City of Marion	168	27	No projected shortage
Martindale WSC			See Caldwell County
City of New Berlin	0	0	No projected shortage
City of New Braunfels			See Comal County
Santa Clara	39	-55	Projected shortage (2050 through 2070)
City of Schertz*	4,363	-8,438	Projected shortage (2050 through 2070)
City of Seguin	0	0	No projected shortage
City of Selma			See Bexar County
Springs Hill WSC	3,917	1,311	No projected shortage
Water Service Inc.			See Bexar County
Rural Area Residential and Commercial	1,883	1,659	No projected shortage
Industrial/Manufacturing	664	-854	No projected shortage
Steam-Electric Power	7,808	5,421	No projected shortage
Mining	0	0	No projected shortage
Irrigation	549	678	No projected shortage
Livestock	0	0	No projected shortage

These values represent the sum of the Surplus/Shortage values for each river basin and/or across the entire county. These values may differ from the Need value reported in other tables because the Need represents only the sum of the shortages.

5.3.11.1 City of Cibolo

Current water supply for the City of Cibolo is obtained from Canyon Reservoir through CRWA. The City is projected to have a shortage beginning in 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Cibolo implement the following water supply plan (Table 5.3.11-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 48 acft/yr by 2040, increasing to 975 acft/yr of supply in 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 267 acft/yr by 2020
- Purchase from WWP (CRWA) to be implemented prior to 2020. This strategy can provide an additional 1,781 acft/yr for 2020 through 2070.
- Purchase from WWP (CVLGC) to be implemented prior to 2030. This strategy utilizes new Carrizo supply and can provide an additional 2,116 acft/yr by 2030, increasing to 5,196 acft/yr of supply in 2070.
- Purchase from Green Valley SUD to be implemented prior to 2060. This strategy can provide an additional 870 by 2060 increasing to 2,172 by 2070.

Table 5.3.11-2. Recommended Water Supply Plan for the City of Cibolo

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	1,417	3,897	5,222	6,521	7,847	9,149
Recommended Plan						
Municipal Water Conservation	—	—	48	297	609	975
Drought Management	267	—	—	—	—	—
Purchase from WWP (CRWA)	1,781	1,781	1,781	1,781	1,781	1,781
Purchase from WWP(CVLGC)	—	2,116	3,441	4,740	5,196	5,196
Purchase from Green Valley SUD	—	—	—	—	870	2,172
Total New Supply	**2,048**	**3,897**	**5,270**	**6,818**	**8,456**	**10,124**

Estimated costs of the recommended plan for the City of Cibolo are shown in Table 5.3.11-3.

Table 5.3.11-3. Recommended Plan Costs by Decade for the City of Cibolo

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	$32,538	$202,336	$414,507	$663,929
Unit Cost ($/acft)	—	—	$681	$681	$681	$681
Drought Management						
Annual Cost ($/yr)	$158,913	—	—	—	—	—
Unit Cost ($/acft)	$595	—	—	—	—	—
Purchase from WWP (CRWA)						
Annual Cost ($/yr)	$2,078,000	$2,695,000	$2,116,000	$1,303,000	$1,323,000	$1,323,000
Unit Cost ($/acft)	$1,167	$1,513	$1,188	$731	$743	$743
Purchase from WWP (CVLGC)						
Annual Cost ($/yr)	—	$3,881,000	$4,188,000	$5,769,000	$6,324,000	$6,324,000
Unit Cost ($/acft)	—	$1,834	$1,217	$1,217	$1,217	$1,217
Purchase from Green Valley SUD						
Annual Cost ($/yr)	—	—	—	—	$646,000	$1,614,000
Unit Cost ($/acft)	—	—	—	—	$743	$743

5.3.11.2 Crystal Clear WSC

Current water supply for Crystal Clear WSC is obtained from the Edwards Aquifer, Canyon Reservoir, and run-of-river rights. Crystal Clear WSC is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Crystal Clear WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.11-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 82 acft/yr by 2070.
- Purchase from WWP (CRWA) to be implemented prior to 2020 can provide an additional 800 acft/yr by 2020, increasing to 2,280 by 2070.

Alternative water management strategies identified by Crystal Clear WSC include Local groundwater supplies, Brackish Edwards, and/or Purchase from WWP (GBRA).

Table 5.3.11-4. Recommended Water Supply Plan for Crystal Clear WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	50	482	959	1,481	2,023
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	82
Purchase from WWP (CRWA)	800	2,280	2,280	2,280	2,280	2,280
Total New Supply	**800**	**2,280**	**2,280**	**2,280**	**2,280**	**2,362**

Estimated costs of the recommended plan to meet Crystal Clear WSC's projected needs are shown in Table 5.3.11-5.

Table 5.3.11-5. Recommended Plan Costs by Decade for Crystal Clear WSC

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$63,366
Unit Cost ($/acft)	—	—	—	—	—	$770
Purchase from WWP (CRWA)						
Annual Cost ($/yr)	$933,000	$3,451,000	$2,709,000	$1,668,000	$1,694,000	$1,694,000
Unit Cost ($/acft)	$1,167	$1,513	$1,188	$731	$743	$743

5.3.11.3 Green Valley SUD

Current water supply for Green Valley SUD is obtained from the Edwards Aquifer and Canyon Reservoir. Green Valley SUD is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Green Valley SUD implement the following water supply plan to meet the projected needs for the SUD (Table 5.3.11-6).

- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 91 acft/yr by 2020.
- Purchase from WWP (CRWA) to be implemented by 2020 and can provide an additional 3,490 acft/yr in 2020 increasing to 13,490 acft/yr in 2070.

Alternative water management strategies identified by Green Valley SUD include Purchase from WWP (GBRA).

Table 5.3.11-6. Recommended Water Supply Plan for Green Valley SUD

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	82	297	533	796	1,095	1,391
Recommended Plan						
Drought Management	91	—	—	—	—	—
Purchase water from WWP (CRWA)	3,490	4,490	4,490	8,490	8,490	13,490
Total New Supply	**3,581**	**4,490**	**4,490**	**8,490**	**8,490**	**13,490**

Estimated costs of the recommended plan to meet Green Valley SUD's projected need are shown in Table 5.3.11-7.

Table 5.3.11-7. Recommended Plan Costs by Decade for Green Valley SUD

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Drought Management						
Annual Cost ($/yr)	$175,734	—	—	—	—	—
Unit Cost ($/acft)	$1,930	—	—	—	—	—
Purchase from WWP (CRWA)						
Annual Cost ($/yr)	$4,072,000	$6,795,000	$5,334,000	$6,209,000	$6,307,000	$10,022,000
Unit Cost ($/acft)	$1,167	$1,513	$1,188	$731	$743	$743

5.3.11.4 City of Marion

Current water supply for the City of Marion is obtained from the Edwards Aquifer and Canyon Reservoir through CRWA. Marion is not projected to need additional water supplies throughout the planning period.

5.3.11.5 City of New Berlin

Current water supply for the City of New Berlin is purchased from East Central SUD. The City of New Berlin is not projected to need additional water supplies during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Marion implement the following water supply plan (Table 5.3.11-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 4 acft/yr by 2020, increasing to 24 acft/yr of supply in 2070.

Table 5.3.11-8. Recommended Water Supply Plan for the City of New Berlin

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	4	6	9	13	19	24
Total New Supply	**4**	**6**	**9**	**13**	**19**	**24**

Estimated costs of the recommended plan to meet the City of New Berlin's projected needs are shown in Table 5.3.11-9.

Table 5.3.11-9. Recommended Plan Costs by Decade for the City of New Berlin

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	3,080	4,620	6,930	10,010	14,630	18,480
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.11.6 City of Santa Clara

Current water supply for the City of Santa Clara is obtained from the Carrizo Aquifer via Green Valley SUD. Santa Clara is projected to need additional water supplies by 2050. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Santa Clara implement the following water supply plan. (Table 5.3.11-10).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 1 acft/yr by 2070.
- Increase purchase from Green Valley SUD to be implemented prior to 2050. This strategy can provide an additional 15 acft/yr by 2050, increasing to 55 acft/yr of supply in 2070.

Table 5.3.11-10. Recommended Water Supply Plan for the City of Santa Clara

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	15	35	55
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	1
Purchase from Green Valley SUD	—	—	—	15	35	55
Total New Supply	**—**	**—**	**—**	**15**	**35**	**56**

Estimated costs of the recommended plan to meet the City of Santa Clara's projected needs are shown in Table 5.3.11-11.

Table 5.3.11-11. Recommended Plan Costs by Decade for the City of Santa Clara

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$487
Unit Cost ($/acft)	—	—	—	—	—	$770
Purchase from Green Valley SUD						
Annual Cost ($/yr)	—	—	—	$11,000	$26,000	$41,000
Unit Cost ($/acft)	—	—	—	$731	$743	$743

5.3.11.7 City of Schertz

Current water supply for the City of Schertz is obtained from the Edwards Aquifer and Carrizo Aquifer. Schertz is projected to need additional water supplies prior to 2040. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Schertz implement the following water supply plan to meet the projected needs for the city (Table 5.3.11-12).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 240 acft/yr by 2020, increasing to 1,935 acft/yr of supply in 2070.
- Purchase from WWP (SSLGC) to be implemented prior to 2020. This strategy utilizes new Carrizo supply and can provide an additional 501 acft/yr by 2020, increasing to 3,634 acft/yr of supply in 2070.
- Purchase from WWP (CVLGC) to be implemented prior to 2060. This strategy utilizes new Carrizo supply and can provide an additional 2,235 acft/yr by 2060, increasing to 4,804 acft/yr of supply in 2070.

Table 5.3.11-12. Recommended Water Supply Plan for the City of Schertz

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	1,035	3,410	5,943	8,438
Recommended Plan						
Municipal Water Conservation	240	370	614	957	1,406	1,935
Purchase from WWP (SSLGC)	501	896	1,035	3,410	3,708	3,634
Purchase from WWP (CVLGC)	—	—	—	—	2,235	4,804
Total New Supply	**240**	**370**	**1,649**	**4,367**	**7,349**	**10,373**

Estimated costs of the recommended plan to meet the City of Schertz's projected needs are shown in Table 5.3.11-13.

Table 5.3.11-13. Recommended Plan Costs by Decade for the City of Schertz

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$163,434	$252,087	$418,337	$651,584	$957,561	$1,317,526
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Purchase from WWP (SSLGC)						
Annual Cost ($/yr)	$552,000	$959,000	$578,000	$1,932,000	$2,101,000	$2,059,000
Unit Cost ($/acft)	$1,101	$1,070	$559	$567	$566	$566
Purchase from WWP (CVLGC)						
Annual Cost ($/yr)	—	—	—	—	$2,720,000	$5,846,000
Unit Cost ($/acft)	—	—	—	—	$1,217	$1,217

5.3.11.8 City of Seguin

The City of Seguin is projected to have adequate water supplies available from the Carrizo Aquifer, Canyon Reservoir, and run-of-river rights to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Seguin implement the following water supply plan (Table 5.3.11-14).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 65 acft/yr by 2050, increasing to 491 acft/yr of supply in 2070.

Alternative water management strategies identified by City of Seguin include Purchase from WWP (SSLGC), Purchase from WWP (GBRA), and/or Purchase from WWP (TWA).

Table 5.3.11-14. Recommended Water Supply Plan for the City of Seguin

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	65	257	494
Total New Supply	**—**	**—**	**—**	**65**	**257**	**494**

Estimated costs of the recommended plan for the City of Seguin are shown in Table 5.3.11-15.

Table 5.3.11-15. Recommended Plan Costs by Decade for the City of Seguin

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	$44,492	$174,773	$336,618
Unit Cost ($/acft)	—	—	—	$681	$681	$681

5.3.11.9 Springs Hill WSC

Springs Hill WSC is projected to have adequate water supplies available from the Carrizo Aquifer and Canyon Reservoir to meet the WSC's projected demands during the planning period.

5.3.11.10 Rural Area Residential and Commercial

Current water supply for Rural Areas is obtained from the Edwards Aquifer, Carrizo Aquifer, Queen City Aquifer, Canyon Reservoir, and run-of-river rights. Rural Areas are projected to have adequate water supplies through 2070. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan (Table 5.3.11-16).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 27 acft/yr in 2060 increasing to 79 acft/yr in 2070.

Table 5.3.11-16. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	27	79
Total New Supply	**—**	**—**	**—**	**—**	**27**	**79**

Estimated costs of the recommended plan for the rural areas are shown in Table 5.3.11-17.

Table 5.3.11-17. Recommended Plan Costs by Decade for Rural Areas

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	$20,992	$60,537
Unit Cost ($/acft)	—	—	—	—	$770	$770

5.3.11.11 Industrial/Manufacturing

Current water supply for industrial is obtained from the Edwards Aquifer, Carrizo Aquifer, Canyon Reservoir, and run-of-river rights. Industrial is projected to need additional water supplies prior to the year 2050. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual industrial operations implement the following water supply plan to meet the projected needs for industrial (Table 5.3.11-18).

- Purchase from WWP (GBRA) is to be implemented prior to 2050. This strategy can provide an additional 163 acft/yr of supply in 2050, increasing to 854 acft/yr of additional supply in 2070.

Table 5.3.11-18. Recommended Water Supply Plan for Industrial

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	163	494	854
Recommended Plan						
Purchase from WWP (GBRA)	—	—	—	163	494	854
Total New Supply	**—**	**—**	**—**	**163**	**494**	**854**

Estimated costs of the recommended plan to meet the industrial projected needs are shown in Table 5.3.11-19.

Table 5.3.11-19. Recommended Plan Costs by Decade for Industrial

Plan Element	2020	2030	2040	2050	2060	2070
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	—	—	—	$695	$678	$596
Unit Cost ($/acft)	—	—	—	$113,000	$335,000	$509,000

5.3.11.12 Steam-Electric Power

Current water supply for steam-electric power is obtained from Canyon Reservoir and direct reuse. Steam-electric power is projected to have adequate water supplies through 2070.

5.3.11.13 Mining

Mining is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group's projected demand during the planning period.

5.3.11.14 Irrigation

Irrigation is projected to have adequate water supplies available from the Carrizo Aquifer, Canyon Reservoir, and run-of-river rights to meet the water user group's projected demand during the planning period.

5.3.11.15 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

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5.3.12 Hays County Water Supply Plan

Table 5.3.12-1 lists each water user group in Hays County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.12-1. Hays County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage		Comment
	2020 (acft/yr)	2070 (acft/yr)	
Buda	0	0	No projected shortage
County Line WSC	178	-641	Projected shortage (2040 through 2070)
Creedmoor-Maha WSC			See Caldwell County
Crystal Clear WSC			See Guadalupe County
Goforth WSC	0	-525	Projected shortage (2070)
City of Kyle	1,176	-2,783	Projected shortage (2030 through 2070)
Maxwell WSC			See Caldwell County
City of Mountain City	-11	-60	Projected shortage (2020 and 2070)
City of Niederwald	-62	-203	Projected shortage (2020 through 2070)
Plum Creek Water Company	0	-184	Projected shortage (2030 through 2070)
City of San Marcos	0	-7,891	Projected shortage (2050 through 2070)
Texas State University-San Marcos	0	-5,967	Projected shortage (2030 through 2070)
City of Uhland	0	0	No projected shortage
City of Wimberley	218	-1,146	Projected shortage (2040 through 2070)
Wimberley WSC	233	-1,356	Projected shortage (2040 through 2070)
City of Woodcreek	716	473	No projected shortage
Rural Area Residential and Commercial	3,101	-12,812	Projected shortage (2050 through 2070)
Industrial/Manufacturing	573	501	No projected shortage
Steam-Electric Power	4,646	353	No projected shortage
Mining	0	0	No projected shortage
Irrigation	88	118	No projected shortage
Livestock	0	0	No projected shortage

5.3.12.1 City of Buda

The City of Buda is projected to have adequate water supplies available from the GBRA to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Buda implement the following water supply plan (Table 5.3.12-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 14 acft/yr by 2020, increasing to 196 acft/yr of supply in 2070.

Table 5.3.12-2. Recommended Water Supply Plan for the City of Buda

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	14	48	70	103	144	196
Total New Supply	**14**	**48**	**70**	**103**	**144**	**196**

Estimated costs of the recommended plan for the City of Buda are shown in Table 5.3.12-3.

Table 5.3.12-3. Recommended Plan Costs by Decade for the City of Buda

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$10,760	$37,306	$54,283	$79,031	$111,057	$151,206
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.12.2 County Line WSC

Current water supply for County Line WSC is obtained from the Edwards Aquifer, Canyon Reservoir, and run-of-river rights. County Line WSC is projected to need additional water supplies prior to 2040. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that County Line WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.12-4).

- Purchase from WWP (CRWA) to be implemented prior to 2020. This strategy can provide an additional 78 acft/yr by 2040, increasing to 641 acft/yr by 2070.
- Reuse can be purchased from the City of Kyle and could supply 50 acft/yr starting in 2020.

Alternative water management strategies identified by County Line WSC include Brackish Barton Springs Edwards.

Table 5.3.12-4. Recommended Water Supply Plan for County Line WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	78	251	440	641
Recommended Plan						
Purchase from WWP (CRWA)	—	—	78	251	440	641
Reuse	50	50	50	50	50	50
Total New Supply	**50**	**50**	**128**	**301**	**490**	**691**

Estimated costs of the recommended plan to meet County Line WSC's projected needs are shown in Table 5.3.12-5.

Table 5.3.12-5. Recommended Plan Costs by Decade for County Line WSC

Plan Element	2020	2030	2040	2050	2060	2070
Purchase from WWP (CRWA)						
Annual Cost ($/yr)	—	—	$93,000	$184,000	$327,000	$476,000
Unit Cost ($/acft)	—	—	$1,188	$731	$743	$743
Reuse						
Annual Cost ($/yr)	$35,500	$35,500	$35,500	$35,500	$35,500	$35,500
Unit Cost ($/acft)	$710	$710	$710	$710	$710	$710

5.3.12.3 Goforth WSC

Current water supply for Goforth WSC is obtained from the Edwards (Barton Springs) Aquifer. Goforth WSC is projected to need additional water supplies prior to 2070. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Goforth WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.12-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 2 acft/yr by 2070.
- Purchase from WWP (GBRA) to be implemented prior to 2070. This strategy can provide an additional 525 acft/yr by 2070.

Table 5.3.12-6. Recommended Water Supply Plan for Goforth WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	525
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	2
Purchase from WWP (GBRA)	—	—	—	—	—	525
Total New Supply	—	—	—	—	—	**527**

Estimated costs of the recommended plan to meet Goforth WSC's projected needs are shown in Table 5.3.12-7.

Table 5.3.12-7. Recommended Plan Costs by Decade for Goforth WSC

Recommended Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$1,368
Unit Cost ($/acft)	—	—	—	—	—	$770
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	—	—	—	—	—	$313,000
Unit Cost ($/acft)	—	—	—	—	—	$596

5.3.12.4 City of Kyle

Current water supply for the City of Kyle is obtained from the Edwards Aquifer, Edwards (Barton Springs) Aquifer, and Canyon Reservoir. City of Kyle is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Kyle implement the following water supply plan to meet the projected needs for the city (Table 5.3.12-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 53 acft/yr by 2050, increasing to 480 acft/yr of supply in 2070.
- Hays/Caldwell PUA Project[8] to be implemented prior to 2030. This strategy can provide an additional supply of 1,348 acft/yr by 2030, increasing to 2,783 acft/yr by 2070.
- Direct Recycle Programs to be implemented before 2020 can provide an additional supply of 2,329 acft/yr by 2020 increasing to 4,063 by 2070.

An alternative water management strategy for the City of Kyle, if groundwater permits from Gonzales County are unable to be obtained, is Purchase from WWP (GBRA).

Table 5.3.12-8. Recommended Water Supply Plan for the City of Kyle

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	1,348	2,801	2,787	2,776	2,783
Recommended Plan						
Municipal Water Conservation	—	—	—	53	266	480
Hays/Caldwell PUA Project	—	1,348	2,801	2,787	2,776	2,783
Direct Recycle Programs	2,329	3,591	4,318	4,284	4,172	4,063
Total New Supply	**2,329**	**4,939**	**7,119**	**7,124**	**7,214**	**7,326**

Estimated costs of the recommended plan to meet the City of Kyle’s projected needs are shown in Table 5.3.12-9.

[8] See Chapter 8.3.1, Recommendation #6

Table 5.3.12-9. Recommended Plan Costs by Decade for the City of Kyle

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	$35,795	$180,934	$327,067
Unit Cost ($/acft)	—	—	—	$681	$681	$681
Hays/Caldwell PUA Project						
Annual Cost ($/yr)	—	$2,596,000	$2,070,000	$2,060,000	$2,051,000	$2,057,000
Unit Cost ($/acft)	—	$1,926	$739	$739	$739	$739
Directy Recycle Programs						
Annual Cost ($/yr)	$1,653,590	$2,549,610	$3,065,780	$3,041,640	$2,962,120	$2,884,730
Unit Cost ($/acft)	$710	$710	$710	$710	$710	$710

5.3.12.5 City of Mountain City

Current water supply for the City of Mountain City is obtained from the Edwards (Barton Springs) Aquifer. Mountain City is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Mountain City implement the following water supply plan to meet the projected needs for the city (Table 5.3.12-10).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 1 acft/yr by 2070.
- Local Trinity Groundwater[9] to be implemented by 2020 can provide an additional 60 acft/yr by 2020, continuing through 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 1 acft/yr by 2020.

[9] See Chapter 8.3.1, Recommendation #6

Table 5.3.12-10. Recommended Water Supply Plan for the City of Mountain City

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	11	17	25	35	47	60
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	1
Local Trinity Groundwater	60	60	60	60	60	60
Drought Maanagement	1	—	—	—	—	—
Total New Supply	**61**	**60**	**60**	**60**	**60**	**61**

Estimated costs of the recommended plan to meet the City of Mountain City's projected needs are shown in Table 5.3.12-11.

Table 5.3.12-11. Recommended Plan Costs by Decade for the City of Mountain City

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$540
Unit Cost ($/acft)	—	—	—	—	—	$770
Local Trinity Groundwater						
Annual Cost ($/yr)	$78,000	$78,000	$78,000	$78,000	$78,000	$78,000
Unit Cost ($/acft)	$1,300	$1,300	$1,300	$1,300	$1,300	$1,300
Drought Management						
Annual Cost ($/yr)	$17	—	—	—	—	—
Unit Cost ($/acft)	$14	—	—	—	—	—

5.3.12.6 City of Niederwald

Current water supply for the City of Niederwald is obtained from the Edwards (Barton Springs) Aquifer. Niederwald is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Niederwald implement the following water supply plan to meet the projected needs for the city (Table 5.3.12-12).

- Purchase from WWP (GBRA) to be implemented prior to 2020. This strategy can provide an additional 62 acft/yr by 2020, increasing to 203 acft/yr of supply in 2070.

- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 4 acft/yr by 2020.

Table 5.3.12-12. Recommended Water Supply Plan for the City of Niederwald

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	62	81	105	134	166	203
Recommended Plan						
Purchase from WWP (GBRA)	62	81	105	134	166	203
Drought Management	4	—	—	—	—	—
Total New Supply	**66**	**81**	**105**	**134**	**166**	**203**

Estimated costs of the recommended plan to meet the City of Niederwald's projected needs are shown in Table 5.3.12-13.

Table 5.3.12-13. Recommended Plan Costs by Decade for the City of Niederwald

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	$101,000	$132,000	$67,000	$93,000	$113,000	$121,000
Unit Cost ($/acft)	$1,627	$1,627	$640	$695	$678	$596
Drought Management						
Annual Cost ($/yr)	$5,441	—	—	—	—	—
Unit Cost ($/acft)	$1,451	—	—	—	—	—

5.3.12.7 Plum Creek Water Company

Plum Creek Water Company obtains water supplies from the Edwards (Barton Springs) Aquifer. Plum Creek Water Company is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Niederwald implement the following water supply plan to meet the projected needs for the city (Table 5.3.12-14).

- Local Trinity Groundwater to be implemented by 2030 can provide an additional 185 acft/yr by 2030, continuing through 2070.

Table 5.3.12-14. Recommended Water Supply Plan for the City of Plum Creek WC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	185	184	185	184	184
Recommended Plan						
Local Trinity Groundwater	0	185	185	185	185	185
Total New Supply	**0**	**185**	**185**	**185**	**185**	**185**

Estimated costs of the recommended plan to meet the City of Mountain City's projected needs are shown in Table 5.3.12-15

Table 5.3.12-15. Recommended Plan Costs by Decade for Plum Creek WC

Plan Element	2020	2030	2040	2050	2060	2070
Local Trinigty Groundwater						
Annual Cost ($/yr)	—	$168,535	$168,535	$34,965	$34,965	$34,965
Unit Cost ($/acft)	—	$911	$911	$189	$189	$189

5.3.12.8 City of San Marcos

Current water supply for the City of San Marcos is obtained from the Edwards Aquifer, Canyon Reservoir, and run-of-river rights. San Marcos is projected to need additional water supplies prior to 2050. San Marcos provides potable water to the Texas State University-San Marcos. Texas State University –San Marcos is projected to need additional supply by 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that San Marcos implement the following water supply plan to meet the projected needs for the city (Table 5.3.12-16).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 179 acft/yr by 2020, increasing to 3,588 acft/yr of supply in 2070.
- Direct Recycle Programs to be implemented prior to 2020 for both San Marcos and Texas State University-San Marcos can provide an additional 1,932 acft/yr by 2020, increasing to by 8,341 2070.
- Purchase from WWP (HCPUA)[10] to be implemented prior to 2050 can provide an additional 1,965 acft/yr by 2050, increasing to 7,891 by 2070.
- Purchase from WWP (GBRA) to be implemented fpr Texas State University-San Marcos prior to 2040 can provide an additional 2,380 acft/yr by 2040, increasing to 5,717 by 2070.

[10] See Chapter 8.3.1, Recommendation #6

Table 5.3.12-16. Recommended Water Supply Plan for the City of San Marcos

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
City of San Marcos Projected Need (Shortage)	0	0	0	1,965	4,576	7,891
Texas State University – San Marcos Projected Need (Shortage)	0	140	2,630	3,721	4,831	5,967
Recommended Plan (City of San Marcos)						
Municipal Water Conservation	179	778	1,122	1,684	2,507	3,588
Direct Recycle Programs	1,932	2,637	3,710	4,957	6,406	8,091
Purchase from WWP (HCPUA)	—	—	—	1,965	4,576	7,891
Recommended Plan (Texas State University –San Marcos)						
San Marcos Direct Recycle Programs	—	250	250	250	250	250
Purcase from WWP (GBRA)	—	—	2,380	3,471	4,581	5,717
Total New Supply	**2,111**	**3,665**	**7,462**	**12,327**	**18,320**	**25,537**

Estimated costs of the recommended plan to meet the City of San Marcos' projected needs are shown in Table 5.3.12-17.

Table 5.3.12-17. Recommended Plan Costs by Decade for the City of San Marcos

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation (City of San Marcos)						
Annual Cost ($/yr)	$121,953	$529,930	$764,316	$1,146,686	$1,706,984	$2,443,551
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681
Purchase from HCPUA (City of San Marcos)						
Annual Cost ($/yr)	—	—	—	$1,452,000	$3,382,000	$5,831,000
Unit Cost ($/acft)	—	—	—	$739	$739	$739
Direct Recycle Programs (City of San Marcos)						
Annual Cost ($/yr)	$1,678,908	$2,291,553	$3,223,990	$4,307,633	$5,566,814	$7,031,079
Unit Cost ($/acft)	$869	$869	$869	$869	$869	$869
Direct Recycle Programs (Texas State University)						
Annual Cost ($/yr)	$217,250	$217,250	$217,250	$217,250	$217,250	$217,250
Unit Cost ($/acft)	$869	$869	$869	$869	$869	$869
Purchase from GBRA (Texas State University)						
Annual Cost ($/yr)	—	—	2,380	3,471	4,581	5,717
Unit Cost ($/acft)	—	—	$640	$695	$678	$596

5.3.12.9 City of Uhland

The City of Uhland is projected to have adequate water supplies available from County Line SUD to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Uhland implement the following water supply plan (Table 5.3.12-18).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 5 acft/yr by 2020, increasing to 19 acft/yr of supply in 2070.

Table 5.3.12-18. Recommended Water Supply Plan for the City of Uhland

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	5	19
Total New Supply	**—**	**—**	**—**	**—**	**5**	**19**

Estimated costs of the recommended plan for the City of Uhlandare shown in Table 5.3.12-19.

Table 5.3.12-19. Recommended Plan Costs by Decade for the City of Uhland

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	$4,160	$14,501
Unit Cost ($/acft)	—	—	—	—	$770	$770

5.3.12.10 City of Wimberley

Current water supply for the City of Wimberley is obtained from the Trinity Aquifer. Wimberley WSC is projected to need additional water supplies prior to 2040. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Wimberley implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.12-20).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 10 acft/yr by 2020, increasing to 272 acft/yr of supply in 2070.
- Purchase from WWP (GBRA) to be implemented prior to 2070. This strategy can provide an additional 112 acft/yr of supply in 2070.
- Purchase from WWP (TWA) to be implemented prior to 2070. This strategy can provide 113 acft/yr of supply in 2070.
- Hays Forestar Project[11] to be implemented prior to 2040. This strategy can provide an additional 174 acft/yr of supply in 2040 increasing to 921 acft/yr by 2070.

[11] See Chapter 8.3.1, Recommendation #6

Table 5.3.12-20. Recommended Water Supply Plan for the City of Wimberley

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	174	456	778	1,146
Recommended Plan						
Municipal Water Conservation	10	55	78	123	187	272
Purchase from WWP (GBRA)	—	—	—	—	—	112
Purchase from WWP (TWA)	—	—	—	—	—	113
Hays Forestar Project	—	—	174	456	778	921
Total New Supply	**10**	**55**	**252**	**579**	**965**	**1,418**

Estimated costs of the recommended plan to meet The City of Wimberley's projected needs are shown in Table 5.3.12-21.

Table 5.3.12-21. Recommended Plan Costs by Decade for the City of Wimberley

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$7,628	$41,983	$59,715	$94,409	$143,966	$209,536
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	—	—	—	—	—	$67,000
Unit Cost ($/acft)	—	—	—	—	—	$596
Purchase from WWP (TWA)						
Annual Cost ($/yr)	—	—	—	—	—	$80,000
Unit Cost ($/acft)	—	—	—	—	—	$704
Hays Forestar Project						
Annual Cost ($/yr)	—	—	$231,594	$606,936	$474,580	$561,810
Unit Cost ($/acft)	—	—	$1,331	$1,331	$610	$610

5.3.12.11 Wimberley WSC

Current water supply for Wimberley WSC is obtained from the Trinity Aquifer. Wimberley WSC is projected to need additional water supplies prior to 2040. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Wimberley implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.12-22).

- Purchase from WWP (GBRA) to be implemented prior to 2070. This strategy can provide an additional 133 acft/yr of supply in 2070.
- Purchase from WWP (TWA) to be implemented prior to 2070. This strategy can provide 133 acft/yr of supply in 2070.
- Hays Forestar Project[12] to be implemented prior to 2040. This strategy can provide an additional 236 acft/yr of supply in 2040 increasing to 1,090 acft/yr by 2070.

Table 5.3.12-22. Recommended Water Supply Plan for Wimberley WSC

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	236	564	934	1,356
Recommended Plan						
Purchase from WWP (GBRA)	—	—	—	—	—	133
Purchase from WWP (TWA)	—	—	—	—	—	133
Hays Forestar Project	0	0	236	564	934	1,090
Total New Supply	**0**	**0**	**236**	**564**	**934**	**1,356**

Estimated costs of the recommended plan to meet Wimberley WSC's projected needs are shown in Table 5.3.12-23.

Table 5.3.12-23. Recommended Plan Costs by Decade for Wimberley WSC

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	—	—	—	—	—	$79,000
Unit Cost ($/acft)	—	—	—	—	—	$596
Purchase from WWP (TWA)						
Annual Cost ($/yr)	—	—	—	—	—	$94,000
Unit Cost ($/acft)	—	—	—	—	—	$704
Hays Forestar Project						
Annual Cost ($/yr)	—	—	$314,116	$750,684	$569,740	$664,900
Unit Cost ($/acft)	—	—	$1,331	$1,331	$610	$610

[12] See Chapter 8.3.1, Recommendation #6

5.3.12.12 City of Woodcreek

The City of Woodcreek is projected to have adequate supplies from theTrinity Aquifer to meet needs through the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Woodcreek implement the following water supply plan (Table 5.3.12-24).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 10 acft/yr by 2020, increasing to 76acft/yr of supply in 2070.

Table 5.3.12-24. Recommended Water Supply Plan for the City of Woodcreek

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	10	25	31	41	57	76
Total New Supply	**10**	**25**	**31**	**41**	**57**	**76**

Estimated costs of the recommended plan to meet the City of Woodcreek's projected needs are shown in Table 5.3.12-25.

Table 5.3.12-25. Recommended Plan Costs by Decade for the City of Woodcreek

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$6,791	$16,810	$21,032	$28,109	$38,780	$51,651
Unit Cost ($/acft)	$681	$681	$681	$681	$681	$681

5.3.12.13 Rural Area Residential and Commercial

Current water supply for Rural Areas is obtained from the Edwards Aquifer and Trinity Aquifer. Rural Areas are projected to need additional water supplies by 2050. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts, authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan (Table 5.3.12-26).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 354 acft/yr by 2070.
- Purchase from WWP (GBRA) to be implemented prior to 2070. This strategy can provide an additional 1,263 acft/yr of supply in 2070.
- Purchase from WWP (TWA) to be implemented prior to 2070. This strategy can provide 1,263 acft/yr of supply in 2070.

- Hays Forestar Project to be implemented prior to 2050. This strategy can provide an additional 1,169 acft/yr of supply in 2050 increasing to 10,345 acft/yr by 2070

Alternative water management strategies identified by Rural Hays County include Hays/Caldwell PUA Project, Purchase from WWP (GBRA), and/or Rainwater Harvesting.

Table 5.3.12-26. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	1,109	6,654	12,812
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	354
Purchase from WWP (GBRA)	—	—	—	—	—	1,263
Purchase from WWP (TWA)	—	—	—	—	—	1,263
Hays Forestar Project	0	0	0	1,169	6,714	10,345
Total New Supply	**0**	**0**	**0**	**1,169**	**6,714**	**13,225**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.12-27.

Table 5.3.12-27. Recommended Plan Costs by Decade for Rural Areas

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$272,643
Unit Cost ($/acft)	—	—	—	—	—	$770
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	—	—	—	—	—	$752,000
Unit Cost ($/acft)	—	—	—	—	—	$596
Purchase from WWP (TWA)						
Annual Cost ($/yr)	—	—	—	—	—	$889,000
Unit Cost ($/acft)	—	—	—	—	—	$704
Hays Forestar Project						
Annual Cost ($/yr)	—	—	—	$1,555,939	$8,936,334	$6,310,450
Unit Cost ($/acft)	—	—	—	$1,331	$1,331	$610

5.3.12.14 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Edwards Aquifer and run-of-river rights to meet the water user group's projected demand during the planning period.

5.3.12.15 Steam-Electric Power

Current water supply for steam-electric power is obtained from Canyon Reservoir and reclaimed water. Steam-electric power is projected to have adequate water supplies available during the Planning Period.

5.3.12.16 Mining

Current water supply for mining is obtained from the Trinity Aquifer. Mining is projected to have adequate water supplies available during the planning period.

5.3.12.17 Irrigation

Irrigation is projected to have adequate water supplies available from the Edwards Aquifer and run-of-river rights to meet the water user group's projected demand during the planning period.

5.3.12.18 Livestock

Current water supply for livestock is obtained from the Trinity Aquifer and local sources. Livestock is projected to have adequate water supplies through 2070.

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5.3.13 Karnes County Water Supply Plan

Table 5.3.13-1 lists each water user group in Karnes County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.13-1. Karnes County Management Supply/Shortage by Water User Group

Water User Group	*Management Supply/Shortage*		*Comment*
	2020 (acft/yr)	*2070 (acft/yr)*	
El Oso WSC	123	161	No projected shortage
City of Falls City	73	111	No projected shortage
City of Karnes City	-336	-249	Projected shortage (2020 through 2070)
City of Kenedy	-161	-151	Projected shortage (2020 through 2070)
City of Runge	43	47	No projected shortage
Sunko WSC			See Wilson County
Rural Area Residential and Commercial	46	61	No projected shortage
Industrial/Manufacturing	58	17	No projected shortage
Steam-Electric Power	0	0	No projected demand
Mining	-1,864	56	Projected shortage (2020 through 2050)
Irrigation	190	441	No projected shortage
Livestock	0	0	No projected shortage

5.3.13.1 El Oso WSC

El Oso WSC is projected to have adequate water supplies available from the Carrizo Aquifer to meet the WSC's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that El Oso WSC implement the following water supply plan (Table 5.3.13-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 49 acft/yr by 2020, increasing to 137 acft/yr of supply in 2070.

Table 5.3.13-2. Recommended Water Supply Plan for El Oso WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	49	96	126	135	127	137
Total New Supply	**49**	**96**	**126**	**135**	**127**	**137**

Estimated costs of the recommended plan for El Oso WSC are shown in Table 5.3.13-3.

Table 5.3.13-3. Recommended Plan Costs by Decade for El Oso WSC

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$37,374	$73,562	$97,068	$103,692	$97,632	$105,764
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.13.2 City of Falls City

The City of Falls City is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Falls City implement the following water supply plan (Table 5.3.13-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 10 acft/yr by 2020, increasing to 43 acft/yr of supply in 2070.

Table 5.3.13-4. Recommended Water Supply Plan for the City of Falls City

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	10	22	30	38	40	43
Total New Supply	**10**	**22**	**30**	**38**	**40**	**43**

Estimated costs of the recommended plan for the City of Falls City are shown in Table 5.3.13-5.

Table 5.3.13-5. Recommended Plan Costs by Decade for the City of Falls City

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$7,617	$16,623	$22,787	$29,306	$30,870	$32,791
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.13.3 City of Karnes City

The City of Karnes City obtains its water supply from the Carrizo Aquifer and is projected to have a shortage prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Karnes City implement the following water supply plan (Table 5.3.13-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 48 acft/yr in 2020, increasing to 112 acft/yr in 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 31 acft/yr by 2020.
- Local Carrizo-Wilcox/Yegua Jackson Groundwater[13] Conversion (Mining) to be implemented prior to 2020. This strategy can provide an additional 336 acft/yr in 2020 decreasing to 249 acft/yr in 2070 to meet needs in Karnes City while increasing the need for Karnes County Mining.

Table 5.3.13-6. Recommended Water Supply Plan for the City of Karnes City

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	336	322	298	285	249	249
Recommended Plan						
Municipal Water Conservation	48	95	108	107	100	112
Drought Management	31	—	—	—	—	—
Local Carrizo-Wilcox/Yegua Jackson Groundwater with Conversion (Mining)	336	322	298	285	249	249
Total New Supply	**415**	**417**	**406**	**392**	**349**	**361**

Estimated costs of the recommended plan for the City of Karnes City are shown in Table 5.3.13-7.

[13] See Chapter 8.3.1, Recommendation #6

Table 5.3.13-7. Recommended Plan Costs by Decade for the City of Karnes City

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$36,731	$73,148	$83,101	$82,126	$77,382	$86,510
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Drought Management						
Annual Cost ($/yr)	$235,400	_	_	_	_	_
Unit Cost ($/acft)	$7,533	_	_	_	_	_
Local Carrizo-Wilcox/Yegua Jackson Groundwater with Conversion (Mining)						
Annual Cost ($/yr)	$378,000	$362,000	$97,000	$93,000	$81,000	$81,000
Unit Cost ($/acft)	$1,124	$1,124	$326	$326	$326	$326

5.3.13.4 City of Kenedy

Current water supply for the City of Kenedy is obtained from the Gulf Coast Aquifer. Kenedy is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Kenedy implement the following water supply plan to meet the projected needs for the city (Table 5.3.13-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 145 acft/yr by 2020, increasing to 568 acft/yr of supply in 2070.
- Local Gulf Coast Groundwater to be implemented prior to 2020 can provide an additional 190 acft/yr by 2040, through 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 71 acft/yr by 2020. An alternative water management strategy identified by the City of Kenedy is obtaining surface water rights from the San Antonio River.

Table 5.3.13-8. Recommended Water Supply Plan for the City of Kenedy

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	161	189	179	178	151	151
Recommended Plan						
Municipal Water Conservation	145	268	352	437	484	568
Local Gulf Coast Groundwater	190	190	190	190	190	190
Drought Management	71	—	—	—	—	—
Total New Supply	**406**	**458**	**542**	**627**	**674**	**758**

Estimated costs of the recommended plan to meet the City of Kenedy's projected needs are shown in Table 5.3.13-9.

Table 5.3.13-9. Recommended Plan Costs by Decade for the City of Kenedy

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$111,810	$206,503	$270,705	$336,232	$373,048	$437,655
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Gulf Coast Groundwater						
Annual Cost ($/yr)	$591,000	$591,000	$326,000	$326,000	$326,000	$326,000
Unit Cost ($/acft)	$3,111	$3,111	$1,716	$1,716	$1,716	$1,716
Drought Management						
Annual Cost ($/yr)	$4,346	—	—	—	—	—
Unit Cost ($/acft)	$61	—	—	—	—	—

5.3.13.5 City of Runge

The City of Runge is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Runge implement the following water supply plan (Table 5.3.13-10).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 19 acft/yr by 2020, increasing to 54 acft/yr of supply in 2070.

Table 5.3.13-10. Recommended Water Supply Plan for the City of Runge

	2020 (acft/yr)	**2030 (acft/yr)**	**2040 (acft/yr)**	**2050 (acft/yr)**	**2060 (acft/yr)**	**2070 (acft/yr)**
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	19	36	48	52	50	54
Total New Supply	**19**	**36**	**48**	**52**	**50**	**54**

Estimated costs of the recommended plan for the City of Runge are shown in Table 5.3.13-11.

Table 5.3.13-11. Recommended Plan Costs by Decade for the City of Runge

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$14,454	$27,702	$36,740	$40,340	$38,492	$41,652
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.13.6 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Carrizo Aquifer and the Gulf Coast Aquifer to meet their projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected needs for rural areas (Table 5.3.13-12).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 7 acft/yr by 2020, increasing to 29 acft/yr of supply in 2070.

Table 5.3.13-12. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	**2030 (acft/yr)**	**2040 (acft/yr)**	**2050 (acft/yr)**	**2060 (acft/yr)**	**2070 (acft/yr)**
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	7	16	15	17	15	29
Total New Supply	**7**	**16**	**15**	**17**	**15**	**29**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.13-13.

Table 5.3.13-13. Recommended Plan Costs by Decade for Rural Areas

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$5,095	$12,463	$11,791	$13,061	$11,253	$22,148
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.13.7 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demand during the planning period.

5.3.13.8 Steam-Electric Power

There is no projected steam-electric power water demand in Karnes County, therefore no water management strategies are recommended for this water user group.

5.3.13.9 Mining

Current water supply for Mining is obtained from the Carrizo Aquifer and Gulf Coast Aquifer. Mining is projected to need additional water supplies prior to 2020. Due to a lack of supply in the county, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual mining companies implement the following water supply plan to meet the projected needs for Mining (Table 5.3.13-14).

- Mining Water Conservation to be implemented prior to 2020. Actual needs reduced could vary greatly.

Table 5.3.13-14. Recommended Water Supply Plan for Mining

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	1,864	1,292	700	115	0	0
Recommended Plan						
Mining Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.13.10 Irrigation

Irrigation is projected to have adequate water supplies available from the Gulf Coast Aquifer and run-of-river rights to meet the water user group's projected demand during the planning period.

5.3.13.11 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group’s projected demand during the planning period.

5.3.14 Kendall County Water Supply Plan

Table 5.3.14-1 lists each water user group in Kendall County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.14-1. Kendall County Management Supply/Shortage by Water User Group

Water User Group	***Management Supply/Shortage***		***Comment***
	2020 (acft/yr)	***2070 (acft/yr)***	
City of Boerne	2,159	-2,613	Projected shortage (2050 through 2070)
City of Fair Oaks Ranch			See Bexar County
Water Service Inc.			See Bexar County
Kendall County WCID #1	472	244	No projected shortage
Rural Area Residential and Commercial*	5,427	5,427	No projected shortage
Industrial/Manufacturing	0	0	No projected demand
Steam-Electric Power	0	0	No projected demand
Mining	0	0	No projected shortage
Irrigation	28	84	No projected shortage
Livestock	0	9	No projected shortage

**These values represent the sum of the Surplus/Shortage values for each river basin and/or across the entire county. These values may differ from the Need value reported in other tables because the Need represents only the sum of the shortages.*

5.3.14.1 City of Boerne

Current water supply for the City of Boerne is obtained from the Trinity Aquifer, Canyon Reservoir, and Boerne Lake. Boerne is projected to need additional water supplies prior to 2040. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Boerne implement the following water supply plan to meet the projected needs for the city (Table 5.3.14-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 136 acft/yr by 2020, increasing to 2,294 acft/yr of supply in 2070.
- Local Trinity Groundwater to be implemented prior to 2050 can provide an additional 1000 acft/yr by 2050, through 2070.

- Western Canyon WTP Expansion to be implemented can provide an additional 639 acft/yr in 2060, increasing to 1,613 acft/yr by 2070.

Table 5.3.14-2. Recommended Water Supply Plan for the City of Boerne

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	650	1639	2613
Recommended Plan						
Municipal Water Conservation	136	484	985	1,513	1,888	2,294
Local Trinity Groundwater	—	—	—	1,000	1,000	1,000
Western Canyon Expansion	—	—	—	—	639	1,613
Total New Supply	**136**	**484**	**985**	**2,513**	**2,527**	**3,907**

Estimated costs of the recommended plan to meet the City of Boerne's projected needs are shown in Table 5.3.14-3.

Table 5.3.14-3. Recommended Plan Costs by Decade for the City of Boerne

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$104,744	$372,887	$758,194	$1,165,336	$1,454,070	$1,766,724
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Trinity Groundwater						
Annual Cost ($/yr)	—	—	$1,635,000	$1,635,000	$1,019,000	$1,019,000
Unit Cost ($/acft)	—	—	$1,635	$1,635	$1,019	$1,019
Western Canyon Expansion						
Annual Cost ($/yr)	—	—	—	—	$220,000	$555,000
Unit Cost ($/acft)	—	—	—	—	$344	$344

5.3.14.2 Kendall County WCID #1

Kendall County WCID #1 is projected to have adequate water supplies available from the Trinity Aquifer and Reuse to meet the WCID's projected demands during the planning period.

5.3.14.3 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Edwards-Trinity Aquifer, Trinity Aquifer, and Canyon Reservoir during the planning period.

Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan (Table 5.3.14-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 13 acft/yr in 2070.

Table 5.3.14-4. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	13
Total New Supply	**—**	**—**	**—**	**—**	**—**	**13**

Estimated costs of the recommended plan to meet the projected needs of rural areas are shown in Table 5.3.14-5.

Table 5.3.14-5. Recommended Plan Costs by Decade for Rural Areas

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$9,900
Unit Cost ($/acft)	—	—	—	—	—	$770

5.3.14.4 Industrial/Manufacturing

There is no projected industrial water demand in Kendall County, therefore no water management strategies are recommended for this water user group.

5.3.14.5 Steam-Electric Power

There is no projected steam-electric power water demand in Kendall County, therefore no water management strategies are recommended for this water user group.

5.3.14.6 Mining

Mining is projected to have adequate water supplies available from the Trinity Aquifer to meet the water user group's projected demand during the planning period.

5.3.14.7 Irrigation

Current water supply for irrigation is obtained from the Trinity Aquifer and run-of-river rights. Irrigation is projected to have adequate water supplies through 2070.

5.3.14.8 Livestock

Current water supply for livestock is obtained from the Trinity Aquifer and local sources. Livestock is projected to have adequate water supply through 2070.

5.3.15 La Salle County Water Supply Plan

Table 5.3.15-1 lists each water user group in LaSalle County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.15-1. La Salle County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage 2020 (acft/yr)	Management Supply/Shortage 2070 (acft/yr)	Comment
City of Cotulla	132	233	Projected shortage (2030-2050)
City of Encinal	55	67	No projected shortage
Rural Area Residential and Commercial	-22	16	Projected shortage (2020-2050)
Industrial/Manufacturing	0	0	No projected demand
Steam-Electric Power	0	0	No projected demand
Mining	-4,088	-147	Projected shortage (2020-2070)
Irrigation	0	655	No projected shortage
Livestock	0	0	No projected shortage

5.3.15.1 City of Cotulla

Current water supply for The City of Cotulla is obtained from the Carrizo Aquifer. The City of Cotulla is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected needs for rural areas (Table 5.3.15-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 531 acft/yr by 2050, increasing to 721 acft/yr in 2070.
- Local Carrizo Groundwater[14] with Conversion from Mining to be implemented prior to 2030. This strategy can provide an additional 16 acft/yr in 2030 increasing to 323 acft/yr in 2070 to meet needs in Cotulla while increasing the need for Cotulla County Mining.

[14] See Chapter 8.3.1, Recommendation #6

Table 5.3.15-2. Recommended Water Supply Plan for the City of Cotulla

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	16	155	323	0	0
Recommended Plan						
Municipal Water Conservation	531	666	798	972	577	721
Local Carrizo Groundwater with Conversion (Mining)	—	16	155	323	323	323
Total New Supply	**531**	**682**	**953**	**1,295**	**577**	**721**

Estimated costs of the recommended plan for the City of Cotulla are shown in Table 5.3.15-3.

Table 5.3.15-3. Recommended Plan Costs by Decade for the City of Cotulla

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$408,504	$512,469	$614,181	$748,749	$444,049	$555,196
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Carrizo Groundwater with Conversion (Mining)						
Annual Cost ($/yr)	—	$14,000	$140,000	$105,000	$105,000	$105,000
Unit Cost ($/acft)	—	$905	$905	$326	$326	$326

5.3.15.2 City of Encinal

The City of Encinal is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Encinal implement the following water supply plan (Table 5.3.15-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 58 acft/yr by 2020, increasing to 63 acft/yr of supply in 2070.

Table 5.3.15-4. Recommended Water Supply Plan for the City of Encinal

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	58	72	86	107	58	63
Total New Supply	**58**	**72**	**86**	**107**	**58**	**63**

Estimated costs of the recommended plan for the City of Encinal are shown in Table 5.3.15-5.

Table 5.3.15-5. Recommended Plan Costs by Decade for the City of Encinal

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$45,010	$55,451	$66,420	$82,447	$44,384	$48,840
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.15.3 Rural Area Residential and Commercial

Current water supply for Rural Areas is obtained from the Carrizo Aquifer. Rural Areas are projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected needs for rural areas (Table 5.3.15-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 107 acft/yr by 2020, decreasing to 5 acft/yr in 2070.
- Local Carrizo Groundwater[15] with Conversion (Mining) to be implemented prior to 2020. This strategy can provide an additional 22 acft/yr in 2020 increasing to 133 acft/yr in 2050 to meet needs in rural areas while increasing the need for Cotulla County Mining.

[15] See Chapter 8.3.1, Recommendation #6

Table 5.3.15-6. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	22	56	90	133	0	0
Recommended Plan						
Municipal Water Conservation	107	104	100	107	—	5
Local Carrizo Groundwater with Conversion (Mining)	22	56	90	133	133	133
Total New Supply	**129**	**160**	**190**	**240**	**133**	**138**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.15-7.

Table 5.3.15-7. Recommended Plan Costs by Decade for Rural Areas

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$82,008	$79,791	$76,690	$82,184	—	$4,228
Unit Cost ($/acft)	$770	$770	$770	$770	—	$770
Local Carrizo Groundwater with Conversion (Mining)						
Annual Cost ($/yr)	$35,000	$88,000	$61,000	$90,000	$90,000	$90,000
Unit Cost ($/acft)	$1,569	$1,569	$677	$677	$677	$677

5.3.15.4 Industrial/Manufacturing

There is no projected industrial water demand in LaSalle County, therefore no water management strategies are recommended for this water user group.

5.3.15.5 Steam-Electric Power

There is no projected steam-electric power water demand in LaSalle County, therefore no water management strategies are recommended for this water user group.

5.3.15.6 Mining

Current water supply for Irrigation is obtained from the Carrizo-Wilcox. Mining is projected to need additional water supplies prior to 2020. Due to a lack of supply in the county, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual Irrigators implement the following water supply plan to meet the projected needs for Irrigation (Table 5.3.15-8).

- Mining Water Conservation to be implemented prior to 2020. Actual needs reduced could vary greatly.

Table 5.3.15-8. Recommended Water Supply Plan for Mining

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	4,088	4,243	3,734	2,290	851	147
Recommended Plan						
Mining Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.15.7 Irrigation

Irrigation is projected to have adequate water supplies available from the Carrizo Aquifer, Sparta Aquifer, and run-of-river rights to meet the water user group's projected demand during the planning period.

5.3.15.8 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

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5.3.16 Medina County Water Supply Plan

Table 5.3.16-1 lists each water user group in Medina County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.16-1. Medina County Management Supply/Shortage by Water User Group

Water User Group	***Management Supply/Shortage***		***Comment***
	2020 (acft/yr)	***2070 (acft/yr)***	
Benton City WSC			See Atascosa County
Bexar Metropolitan Water District			See Bexar County
City of Castroville	-224	-214	Projected shortage (2020 through 2070)
City of Devine	88	19	No projected shortage
East Medina SUD	257	-70	Projected shortage (2060 through 2070)
City of Hondo	-523	-1,180	Projected shortage (2020 through 2070)
City of La Coste	-10	-56	Projected shortage (2020 through 2070)
City of Lytle			See Atascosa County
City of Natalia	-101	-220	Projected shortage (2020 through 2070)
Yancey WSC	-28	-309	Projected shortage (2020 through 2070)
Rural Area Residential and Commercial*	1,265	1,008	Projected shortage (2020 through 2060)
Industrial/Manufacturing	1,906	1,884	No projected shortage
Steam-Electric Power	0	0	No projected demand
Mining	0	50	No projected shortage
Irrigation*	-31,529	20,689	Projected shortage (2020 through 2070)
Livestock	0	0	No projected shortage

**These values represent the sum of the Surplus/Shortage values for each river basin and/or across the entire county. These values may differ from the Need value reported in other tables because the Need represents only the sum of the shortages.*

5.3.16.1 City of Castroville

Current water supply for the City of Castroville is obtained from the Edwards Aquifer. Castroville is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Castroville implement the following water supply plan to meet the projected needs for the city (Table 5.3.16-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 44 acft/yr by 2020, increasing to 319 acft/yr of supply in 2070.

- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional 224 acft/yr by 2020, decreasing with need to 214 by 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 40 acft/yr by 2020.
- Local Leona Gravels Groundwater to be implemented prior to 2020 can provide an additional 225 acft/yr by 2040, through 2070.

Table 5.3.16-2. Recommended Water Supply Plan for the City of Castroville

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	224	217	210	208	211	214
Recommended Plan						
Municipal Water Conservation	44	104	159	214	268	319
Edwards Transfers	224	217	210	208	211	214
Drought Management	40	—	—	—	—	—
Local Leona Gravels Groundwater	225	225	225	225	225	225
Total New Supply	**533**	**546**	**594**	**647**	**704**	**758**

Estimated costs of the recommended plan to meet the City of Castroville's projected needs are shown in Table 5.3.16-3.

Table 5.3.16-3. Recommended Plan Costs by Decade for the City of Castroville

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$33,590	$80,151	$122,411	$164,533	$206,671	$245,424
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Edwards Transfers						
Annual Cost ($/yr)	$50,624	$49,042	$47,460	$47,008	$47,686	$48,364
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Drought Management						
Annual Cost ($/yr)	$8,974	—	—	—	—	—
Unit Cost ($/acft)	$226	—	—	—	—	—
Local Leona Gravels Groundwater						
Annual Cost ($/yr)	$644,000	$644,000	$349,000	$349,000	$349,000	$349,000
Unit Cost ($/acft)	$2,862	$2,862	$1,551	$1,551	$1,551	$1,551

5.3.16.2 City of Devine

The City of Devine is projected to have adequate water supplies available from the Edwards Aquifer and the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Devine implement the following water supply plan (Table 5.3.16-4).

- Municipal Water Conservation to be implemented or enhanced in the future. This strategy can provide an additional 4 acft/yr by 2070.

Table 5.3.16-4. Recommended Water Supply Plan for the City of Devine

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	4
Total New Supply	**—**	**—**	**—**	**—**	**—**	**4**

Estimated costs of the recommended plan for the City of Devine are shown in Table 5.3.16-5.

Table 5.3.16-5. Recommended Plan Costs by Decade for the City of Devine

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$3,250
Unit Cost ($/acft)	—	—	—	—	—	$770

5.3.16.3 East Medina SUD

Current water supply for East Medina SUD is obtained from the Edwards Aquifer. East Medina SUD is projected to need additional water supplies prior to 2060. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that East Medina SUD implement the following water supply plan to meet the projected needs for the SUD (Table 5.3.16-6).

- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional 11 acft/yr by 2060, increasing to 70 acft/yr of supply in 2070.
- Local Leona Gravels Groundwater to be implemented prior to 2020 can provide an additional 75 acft/yr by 2060, through 2070.

Table 5.3.16-6. Recommended Water Supply Plan for East Medina SUD

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	0	0	0	0	11	70
Recommended Plan						
Edwards Transfers	—	—	—	—	11	70
Local Leona Gravels Groundwater	—	—	—	—	75	75
Total New Supply	**—**	**—**	**—**	**—**	**86**	**145**

Estimated costs of the recommended plan to meet East Medina SUD's projected needs are shown in Table 5.3.16-7.

Table 5.3.16-7. Recommended Plan Costs by Decade for East Medina SUD

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Edwards Transfers						
Annual Cost ($/yr)	—	—	—	—	$2,486	$15,820
Unit Cost ($/acft)	—	—	—	—	$226	$226
Local Leona Gravels Groundwater						
Annual Cost ($/yr)	—	—	—	—	$336,000	$336,000
Unit Cost ($/acft)	—	—	—	—	$4,480	$4,480

5.3.16.4 City of Hondo

Current water supply for the City of Hondo is obtained from the Edwards Aquifer. Hondo is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Hondo implement the following water supply plan to meet the projected needs for the city (Table 5.3.16-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 87 acft/yr by 2020, increasing to 747 acft/yr of supply in 2070.
- Edwards Transfers to be implemented prior to 2020. This strategy can provide an additional 523 acft/yr by 2020, increasing to 1,180 acft/yr of supply in 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 103 acft/yr by 2020.

Table 5.3.16-8. Recommended Water Supply Plan for the City of Hondo

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	523	680	816	943	1,068	1,180
Recommended Plan						
Municipal Water Conservation	87	258	446	593	669	747
Edwards Transfers	523	680	816	943	1,068	1,180
Drought Management	103	—	—	—	—	—
Total New Supply	**626**	**938**	**1,262**	**1,536**	**1,737**	**1,927**

Estimated costs of the recommended plan to meet the City of Hondo's projected needs are shown in Table 5.3.16-9.

Table 5.3.16-9. Recommended Plan Costs by Decade for the City of Hondo

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$67,221	$198,518	$343,739	$456,875	$515,014	$575,301
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Edwards Transfers						
Annual Cost ($/yr)	$118,198	$153,680	$184,416	$213,118	$241,368	$266,680
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Drought Management						
Annual Cost ($/yr)	$67,015	—	—	—	—	—
Unit Cost ($/acft)	$653	—	—	—	—	—

5.3.16.5 City of La Coste

Current water supply for the City of La Coste is obtained from the Edwards Aquifer. La Coste is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that La Coste implement the following water supply plan to meet the projected needs for the city (Table 5.3.16-10).

- Edwards Transfers to be implemented prior to 2020 can provide an additional 10 acft/yr by 2020, increasing to 56 acft/yr of supply in 2070.
- Local Leona Gravels Groundwater to be implemented prior to 2020 can provide an additional 60 acft/yr by 2060, through 2070.

- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 6 acft/yr by 2020.

Table 5.3.16-10. Recommended Water Supply Plan for the City of La Coste

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	10	20	28	37	47	56
Recommended Plan						
Edwards Transfers	10	20	28	37	47	56
Local Leona Gravels Groundwater	60	60	60	60	60	60
Drought Management	6	—	—	—	—	—
Total New Supply	76	80	88	97	107	116

Estimated costs of the recommended plan to meet the City of La Coste's projected needs are shown in Table 5.3.16-11.

Table 5.3.16-11. Recommended Plan Costs by Decade for the City of La Coste

Plan Element	2020	2030	2040	2050	2060	2070
Edwards Transfers						
Annual Cost ($/yr)	$2,260	$4,520	$6,328	$8,362	$10,622	$12,656
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Local Leona Gravels Groundwater						
Annual Cost ($/yr)	$319,000	$319,000	$176,000	$176,000	$176,000	$176,000
Unit Cost ($/acft)	$5,317	$5,317	$2,933	$2,933	$2,933	$2,933
Drought Management						
Annual Cost ($/yr)	$2,295	—	—	—	—	—
Unit Cost ($/acft)	$361	—	—	—	—	—

5.3.16.6 City of Natalia

Current water supply for the City of Natalia is obtained from the Edwards Aquifer. Natalia is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Natalia implement the following water supply plan to meet the projected needs for the city (Table 5.3.16-12).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 8 acft/yr by 2020, increasing to 54 acft/yr of supply in 2070.
- Edwards Transfers to be implemented prior to 2020 can provide an additional 101 acft/yr by 2020, increasing to 220 acft/yr of supply in 2070.
- Local Leona Gravels Groundwater to be implemented prior to 2020 can provide an additional 225 acft/yr by 2060, through 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 14 acft/yr by 2020.

Table 5.3.16-12. Recommended Water Supply Plan for the City of Natalia

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	101	129	153	176	199	220
Recommended Plan						
Municipal Water Conservation	8	22	26	32	42	54
Edwards Transfers	101	129	153	176	199	220
Local Leona Gravels Groundwater	225	225	225	225	225	225
Drought Management	14	—	—	—	—	—
Total New Supply	**348**	**376**	**404**	**433**	**466**	**499**

Estimated costs of the recommended plan to meet the City of Natalia's projected needs are shown in Table 5.3.16-13.

Table 5.3.16-13. Recommended Plan Costs by Decade for the City of Natalia

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$6,000	$17,299	$19,681	$24,823	$32,604	$41,423
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Edwards Transfers						
Annual Cost ($/yr)	$22,826	$29,154	$34,578	$39,776	$44,974	$49,720
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Local Leona Gravels Groundwater						
Annual Cost ($/yr)	$634,000	$634,000	$348,000	$348,000	$348,000	$348,000
Unit Cost ($/acft)	$2,818	$2,818	$1,547	$1,547	$1,547	$1,547
Drought Management						
Annual Cost ($/yr)	$10,618	—	—	—	—	—
Unit Cost ($/acft)	$756	—	—	—	—	—

5.3.16.7 Yancey WSC

Current water supply for Yancey WSC is obtained from the Edwards Aquifer. Yancey WSC is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Yancey WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.16-14).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 11 acft/yr by 2070.
- Edwards Transfers to be implemented prior to 2020 can provide an additional 28 acft/yr by 2020, increasing to 309 acft/yr of supply in 2070.
- Local Leona Gravels Groundwater to be implemented prior to 2020 can provide an additional 310 acft/yr by 2020, through 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 33 acft/yr by 2020.
- Facilities Expansions (System Upgrades)

Table 5.3.16-14. Recommended Water Supply Plan for Yancey WSC

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	28	95	154	208	261	309
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	11
Edwards Transfers	28	95	154	208	261	309
Local Leona Gravels Groundwater	310	310	310	310	310	310
Drought Management	33	—	—	—	—	—
Total New Supply	**371**	**405**	**464**	**518**	**571**	**630**

Estimated costs of the recommended plan to meet Yancey WSC's projected needs are shown in Table 5.3.16-15.

Table 5.3.16-15. Recommended Plan Costs by Decade for Yancey WSC

Recommended Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$8,145
Unit Cost ($/acft)	—	—	—	—	—	$770
Edwards Transfers						
Annual Cost ($/yr)	$6,328	$21,470	$34,804	$47,008	$58,986	$69,834
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Local Leona Gravels Groundwater Supplies						
Annual Cost ($/yr)	$4,278,000	$4,278,000	$437,000	$437,000	$437,000	$437,000
Unit Cost ($/acft)	$2,565	$2,565	$1,410	$1,410	$1,410	$1,410
Drought Management						
Annual Cost ($/yr)	$120,620	—	—	—	—	—
Unit Cost ($/acft)	$3,655	—	—	—	—	—

5.3.16.8 Rural Area Residential and Commercial

Rural Areas have adequate water supplies available from the Edwards Aquifer, Trinity Aquifer, and the Carrizo Aquifer to meet the water user group's projected demand during the planning period. . Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected needs for rural areas (Table 5.3.16-14).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 27 acft/yr by 2070.

Table 5.3.16-16. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	—	27
Total New Supply	—	—	—	—	—	**27**

Estimated costs of the recommended plan to meet the projected needs of rural areas are shown in Table 5.3.16-15.

Table 5.3.16-17. Recommended Plan Costs by Decade for Rural Areas

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	$20,555
Unit Cost ($/acft)	—	—	—	—	—	$770

5.3.16.9 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Edwards Aquifer to meet the water user group's projected demand during the planning period.

5.3.16.10 Steam-Electric Power

There is no projected steam-electric power water demand in Medina County, therefore no water management strategies are recommended for this water user group.

5.3.16.11 Mining

Mining is projected to have adequate water supplies available from the Carrizo Aquifer and the Trinity Aquifer to meet the water user group's projected demand during the planning period.

5.3.16.12 Irrigation

Current water supply for irrigation is obtained from the Edwards Aquifer, Carrizo Aquifer, and run-of-river rights. Irrigation is projected to need additional water supplies prior to 2020. Due to limited economically feasible supplies for irrigation, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual irrigators implement the following water supply plan to meet a portion of the projected needs for irrigation (Table 5.3.16-18).

- Irrigation Water Conservation, while not a recommended strategy, is encourage and can provide additional supply when possible. The SCTRWPG has determined that it is not economically feasible for agricultural producers to pay for additional supplies to meet projected needs.

Table 5.3.16-18. Recommended Water Supply Plan for Irrigation

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	31,529	29,144	26,850	24,653	22,547	20,689
Recommended Plan						
Irrigation Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.16.13 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

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5.3.17 Refugio County Water Supply Plan

Table 5.3.17-1 lists each water user group in Refugio County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.17-1. Refugio County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage 2020 (acft/yr)	Management Supply/Shortage 2070 (acft/yr)	Comment
City of Refugio	431	654	No projected shortage
City of Woodsboro	243	347	No projected shortage
Rural Area Residential and Commercial	5	163	No projected shortage
Industrial/Manufacturing	0	0	No projected demand
Steam-Electric Power	0	0	No projected demand
Mining	0	0	No projected shortage
Irrigation	0	0	No projected shortage
Livestock	0	0	No projected shortage

5.3.17.1 City of Refugio

The City of Refugio is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Refugio implement the following water supply plan (Table 5.3.17-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 157 acft/yr by 2020, decreasing to 120 acft/yr of supply in 2070.

Table 5.3.17-2. Recommended Water Supply Plan for the City of Refugio

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	157	147	112	69	109	120
Total New Supply	**157**	**147**	**112**	**69**	**109**	**120**

Estimated costs of the recommended plan for the City of Refugio are shown in Table 5.3.17-3.

Table 5.3.17-3. Recommended Plan Costs by Decade for the City of Refugio

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$120,607	$113,208	$86,598	$53,003	$83,787	$92,717
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.17.2 City of Woodsboro

The City of Woodsboro is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Woodsboro implement the following water supply plan (Table 5.3.17-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 68 acft/yr by 2020, decreasing to 26 acft/yr of supply in 2070.

Table 5.3.17-4. Recommended Water Supply Plan for the City of Woodsboro

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	68	43	6	—	20	26
Total New Supply	**68**	**43**	**6**	**—**	**20**	**26**

Estimated costs of the recommended plan for the City of Woodsboro are shown in Table 5.3.17-5.

Table 5.3.17-5. Recommended Plan Costs by Decade for the City of Woodsboro

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$52,192	$32,830	$4,849	—	$15,183	$19,741
Unit Cost ($/acft)	$770	$770	$770	—	$770	$770

5.3.17.3 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Gulf Coast Aquifer to meet their projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the rural areas implement the following water supply plan (Table 5.3.17-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 68 acft/yr by 2020, decreasing to 26 acft/yr of supply in 2030.

Table 5.3.17-6. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	68	43	6	—	20	26
Total New Supply	**68**	**43**	**6**	**—**	**20**	**26**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.17-7.

Table 5.3.17-7. Recommended Plan Costs by Decade for Rural Areas

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$52,192	$32,830	$4,849	—	$15,183	$19,741
Unit Cost ($/acft)	$770	$770	$770	—	$770	$770

5.3.17.4 Industrial/Manufacturing

There is no projected industrial water demand in Refugio County, therefore no water management strategies are recommended for this water user group.

5.3.17.5 Steam-Electric Power

There is no projected steam-electric power water demand in Refugio County, therefore no water management strategies are recommended for this water user group.

5.3.17.6 Mining

Mining is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demand during the planning period.

5.3.17.7 Irrigation

Irrigation is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demand during the planning period.

5.3.17.8 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

5.3.18 Uvalde County Water Supply Plan

Table 5.3.18-1 lists each water user group in Uvalde County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.18-1. Uvalde County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage 2020 (acft/yr)	Management Supply/Shortage 2070 (acft/yr)	Comment
City of Sabinal	-121	-277	Projected shortage (2020 through 2070)
City of Uvalde	-943	-2,365	Projected shortage (2020 through 2070)
Rural Area Residential and Commercial	2,938	2,190	No projected shortage
Industrial/Manufacturing	102	117	No projected shortage
Steam-Electric Power	0	0	No projected demand
Mining	0	0	No projected shortage
Irrigation	-29,683	-19,102	Projected shortage (2020 through 2070)
Livestock	0	0	No projected shortage

5.3.18.1 City of Sabinal

Current water supply for the City of Sabinal is obtained from the Edwards Aquifer. Sabinal is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Sabinal implement the following water supply plan to meet the projected needs for the city (Table 5.3.18-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 20 acft/yr by 2020, increasing to 204 acft/yr of supply in 2070.
- Edwards Transfers to be implemented prior to 2020 can provide an additional 121 acft/yr by 2020, decreasing to 277 acft/yr of supply in 2070.
- Uvalde ASR[16] to be implemented prior to 2020 can provide an additional 121 acft/yr for 2020 increasing to 277 acft/yr by 2070.

[16] See Chapter 8.3.1, Recommendation #6

- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 22 acft/yr by 2020.

Table 5.3.18-2. Recommended Water Supply Plan for the City of Sabinal

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	121	153	181	212	145	277
Recommended Plan						
Municipal Water Conservation	20	57	97	141	184	204
Edwards Transfers	121	153	181	212	145	277
Uvalde ASR	277	277	277	277	277	277
Drought Management	22	—	—	—	—	—
Total New Supply	**284**	**363**	**459**	**565**	**474**	**758**

Estimated costs of the recommended plan to meet the City of Sabinal's projected needs are shown in Table 5.3.18-3.

Table 5.3.18-3. Recommended Plan Costs by Decade for the City of Sabinal

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$15,783	$43,904	$75,021	$108,793	$141,463	$157,070
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Edwards Transfers						
Annual Cost ($/yr)	$27,346	$34,578	$40,906	$47,912	$32,770	$62,602
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Uvalde ASR						
Annual Cost ($/yr)	$451,233	$451,233	$103,044	$103,044	$103,044	$103,044
Unit Cost ($/acft)	$1,629	$1,629	$372	$372	$372	$372
Drought Management						
Annual Cost ($/yr)	$8,215	—	—	—	—	—
Unit Cost ($/acft)	$369	—	—	—	—	—

5.3.18.2 City of Uvalde

Current water supply for the City of Uvalde is obtained from the Edwards Aquifer. Uvalde is projected to need additional water supplies prior to 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Uvalde implement the following water supply plan to meet the projected needs for the city (Table 5.3.18-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 178 acft/yr by 2020, increasing to 1,796 acft/yr of supply in 2070.
- Uvalde ASR[17] to be implemented prior to 2020 can provide an additional 943 acft/yr by 2020 increasing to 2,365 acft/yr by 2070.
- Edwards Transfers to be implemented prior to 2020 can provide an additional 943 acft/yr by 2020, increasing to 2,365 acft/yr of supply in 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 203 acft/yr by 2020.

Table 5.3.18-4. Recommended Water Supply Plan for the City of Uvalde

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	943	1,233	1,484	1,772	2,072	2,365
Recommended Plan						
Municipal Water Conservation	178	511	874	1,279	1,612	1,796
Uvalde ASR	943	1,233	1,484	1,772	2,072	2,365
Edwards Transfers	943	1,233	1,484	1,772	2,072	2,365
Drought Management	203	—	—	—	—	—
Total New Supply	**3,689**	**4,109**	**4,723**	**5,416**	**6,049**	**6,526**

Estimated costs of the recommended plan to meet the City of Uvalde's projected needs are shown in Table 5.3.18-5.

[17] See Chapter 8.3.1, Recommendation #6

Table 5.3.18-5. Recommended Plan Costs by Decade for the City of Uvalde

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$137,169	$393,130	$672,837	$985,194	$1,241,470	$1,382,663
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Uvalde ASR						
Annual Cost ($/yr)	$3,852,585	$3,852,585	$879,780	$879,780	$879,780	$879,780
Unit Cost ($/acft)	$1,629	$1,629	$372	$372	$372	$372
Edwards Transfers						
Annual Cost ($/yr)	$213,118	$278,658	$335,384	$400,472	$468,272	$534,490
Unit Cost ($/acft)	$226	$226	$226	$226	$226	$226
Drought Management						
Annual Cost ($/yr)	$206,377	—	—	—	—	—
Unit Cost ($/acft)	$1,021	—	—	—	—	—

5.3.18.3 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Edwards Aquifer and Carrizo Aquifer to meet their projected demands during the planning period.

5.3.18.4 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Edwards Aquifer to meet the water user group’s projected demand during the planning period.

5.3.18.5 Steam-Electric Power

There is no projected steam-electric power water demand in Uvalde County, therefore no water management strategies are recommended for this water user group.

5.3.18.6 Mining

Mining is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group’s projected demand during the planning period.

5.3.18.7 Irrigation

- Current water supply for irrigation is obtained from the Edwards Aquifer and run-of-river rights. Irrigation is projected to need additional water supplies prior to 2020. Due to limited economically feasible supplies for irrigation, these needs remain unmet. Working within the planning criteria established by the

SCTRWPG and the TWDB, it is recommended that individual irrigators implement the following water supply plan to meet a portion of the projected needs for irrigation (Irrigation Water Conservation, while not a recommended strategy, is encouraged and can provide additional supply when possible. The SCTRWPG has determined that it is not economically feasible for agricultural producers to pay for additional supplies to meet projected needs.

Table 5.3.18-6).

- Irrigation Water Conservation, while not a recommended strategy, is encouraged and can provide additional supply when possible. The SCTRWPG has determined that it is not economically feasible for agricultural producers to pay for additional supplies to meet projected needs.

Table 5.3.18-6. Recommended Water Supply Plan for Irrigation

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	29,683	27,370	24,992	22,831	20,818	19,102
Recommended Plan						
Irrigation Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.18.8 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

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5.3.19 Victoria County Water Supply Plan

Table 5.3.19-1 lists each water user group in Victoria County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.19-1.Victoria County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage		Comment
	2020 (acft/yr)	2070 (acft/yr)	
City of Victoria	2,413	5,774	No projected shortage
Rural Area Residential and Commercial	424	41	No projected shortage
Industrial/Manufacturing	-2,178	-16,252	Projected shortage (2020 through 2060)
Steam-Electric Power	-4,506	-70,696	Projected shortage (2020 through 2070)
Mining	0	0	No projected shortage
Irrigation	-5,265	-5265	Projected shortage (2020 through 2070)
Livestock	0	0	No projected shortage

5.3.19.1 City of Victoria

Current water supply for the City of Victoria is obtained from the Gulf Coast Aquifer and run-of-river rights. The City of Victoria is projected to need additional water supplies starting in the planning year 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Victoria implement the following water supply plan (Table 5.3.19-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 809 acft/yr by 2020, increasing to 7,517 acft/yr of supply in 2070.
- Drought Management to be implemented or enhanced in the immediate future. This strategy can provide an additional 856 acft/yr by 2020.
- Victoria County ASR to be implemented by 2030 can provide an additional supply of 7,900 acft by 2030, continuing through 2070.
- Groundwater-Surface Water exchange to be implemented by 2020 can provide an additional 8,544 acft of water by 2020.

Surface Water Rights and Balancing Storage have been identified as recommended water management strategies.

Table 5.3.19-2. Recommended Water Supply Plan for the City of Victoria

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	2,413	3,269	3,932	4,602	5,233	5,774
Recommended Plan						
Municipal Water Conservation	809	2,200	3,642	5,158	6,705	7,517
Drought Management	856	—	—	—	—	—
Victoria ASR	—	7,900	7,900	7,900	7,900	7,900
Groundwater-Surface Water Exchange	8,544	8,544	8,544	8,544	8,544	8,544
Total New Supply	$10,209	$18,644	$20,086	$21,602	$23,149	$23,961

Estimated costs of the recommended plan for the City of Victoria are shown in Table 5.3.19-3.

Table 5.3.19-3. Recommended Plan Costs by Decade for the City of Victoria

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$485,608	$1,319,926	$2,185,010	$3,094,642	$4,022,958	$4,510,364
Unit Cost ($/acft)	$600	$600	$600	$600	$600	$600
Drought Management						
Annual Cost ($/yr)	$12,788	—	—	—	—	—
Unit Cost ($/acft)	$15	—	—	—	—	—
Victoria ASR						
Annual Cost ($/yr)	—	$1,516,800	$1,516,800	$1,516,800	$1,516,800	$1,516,800
Unit Cost ($/acft)	—	$192	$192	$192	$192	$192
Groundwater-Surface Water Exchange						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—

5.3.19.2 Rural Area Residential and Commercial

Rural Areas is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet thier projected demands during the planning period.

5.3.19.3 Industrial/Manufacturing

Current water supply for industrial is obtained from the Gulf Coast Aquifer and run-of-river rights. Industrial is projected to need additional water supplies starting in the planning year 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual industrial operations implement the following water supply plan to meet the projected needs for Industrial (Table 5.3.19-4).

- Purchase from WWP (GBRA) to be implemented in 2020. This strategy can provide an additional 2,178 acft/yr of supply in 2020 increasing to 16,252 acft/yr in 2070.

Table 5.3.19-4. Recommended Water Supply Plan for Industrial

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	2,178	5,016	7,841	10,366	13,206	16,252
Recommended Plan						
Purchase from WWP (GBRA)	2,178	5,016	7,841	10,366	13,206	16,252
Total New Supply	**2,178**	**5,016**	**7,841**	**10,366**	**13,206**	**16,252**

Estimated costs of the recommended plan to meet the industrial projected needs are shown in Table 5.3.19-5.

Table 5.3.19-5. Recommended Plan Costs by Decade for Industrial

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	$3,544,000	$8,163,000	$5,019,000	$7,204,000	$8,956,000	$9,679,000
Unit Cost ($/acft)	$1,627	$1,627	$640	$695	$678	$596

5.3.19.4 Steam-Electric Power

Steam-electric power obtains water supply from the Gulf Coast Aquifer and run-of-river rights to meet the water user group’s needs. The entity is expected to have a shortage prior to 2020. The following water supply plan is recommended for Steam-Electric Power for Victoria County (Table 5.3.19-6).

- Purchase from WWP (GBRA) to be implemented in 2020. This strategy can provide an additional 4,506 acft/yr starting in 2012, increasing to 70,696 acft/yr by 2070.

Table 5.3.19-6. Recommended Water Supply Plan for Steam-Electric Power

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	4,506	29,778	37,178	53,599	70,696	70,696
Recommended Plan						
Purchase from WWP (GBRA)	4,506	29,778	37,178	53,599	70,696	70,696
Total New Supply	**4,506**	**29,778**	**37,178**	**53,599**	**70,696**	**70,696**

Estimated costs of the recommended plan to meet the Steam-Electric Power projected needs are shown in Table 5.3.19-7.

Table 5.3.19-7. Recommended Plan Costs by Decade for Steam-Electric Power

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Purchase from WWP (GBRA)						
Annual Cost ($/yr)	$7,333,000	$48,460,000	$23,798,000	$37,247,000	$47,946,000	$42,102,000
Unit Cost ($/acft)	$1,627	$1,627	$640	$695	$678	$596

5.3.19.5 Mining

Mining is projected to have adequate water supplies available from the Gulf Coast Aquifer to meet the water user group's projected demand during the planning period.

5.3.19.6 Irrigation

Current water supply for irrigation is obtained from the Gulf Coast Aquifer and run-of-river rights. Irrigation is projected to need additional water supplies prior to 2020. Due to limited economically feasible supplies for irrigation, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual irrigators implement the following water supply plan to meet a portion of the projected needs for irrigation (Table 5.3.20-10).

- Irrigation Water Conservation, while not a recommended strategy, is encouraged and can provide additional supply when possible. The SCTRWPG has determined that it is not economically feasible for agricultural producers to pay for additional supplies to meet projected needs.

Table 5.3.19-8. Recommended Water Supply Plan for Irrigation

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	5,265	5,265	5,265	5,265	5,265	5,265
Recommended Plan						
Irrigation Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.19.7 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

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5.3.20 Wilson County Water Supply Plan

Table 5.3.20-1 lists each water user group in Wilson County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.20-1. Wilson County Management Supply/Shortage by Water User Group

Water User Group	***Management Supply/Shortage***		***Comment***
	2020 (acft/yr)	***2070 (acft/yr)***	
East Central SUD			See Bexar County
El Oso WSC			See Karnes County
City of Floresville	396	-1,445	Projected shortage (2030 and 2070)
City of La Vernia	269	7	No projected shortage
McCoy WSC			See Atascosa County
Oak Hills WSC	959	106	No projected shortage
City of Poth	955	718	No projected shortage
SS WSC	1,607	-234	Projected shortage (2070 only)
City of Stockdale	1,378	1,020	No projected shortage
Sunko WSC*	488	-117	Projected shortage (2070 only)
Rural Area Residential and Commercial	1,434	49	No projected shortage
Industrial/Manufacturing	0	0	No projected shortage
Steam-Electric Power	0	0	No projected demand
Mining	0	0	No projected shortage
Irrigation	3,085	1,211	No projected shortage
Livestock	0	0	No projected shortage

**These values represent the sum of the Surplus/Shortage values for each river basin and/or across the entire county. These values may differ from the Need value reported in other tables because the Need represents only the sum of the shortages.*

5.3.20.1 City of Floresville

Current water supply for the City of Floresville is obtained from the Carrizo Aquifer. Floresville is projected to need additional water supplies prior to 2030. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Floresville implement the following water supply plan to meet the projected needs for the city (Table 5.3.20-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 80 acft/yr by 2020, increasing to 1,288 acft/yr of supply in 2070.
- Local Carrizo Groundwater with conversions to be implemented prior to 2030 can provide an additional 1,450 acft/yr by 2030, through 2070.

Table 5.3.20-2. Recommended Water Supply Plan for the City of Floresville

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	8	405	770	1,124	1,445
Recommended Plan						
Municipal Water Conservation	80	272	525	823	1,122	1,288
Local Carrizo Groundwater with Conversions	—	1,450	1,450	1,450	1,450	1,450
Total New Supply	**80**	**1,722**	**1,975**	**2,273**	**2,572**	**2,738**

Estimated costs of the recommended plan to meet the City of Floresville's projected needs are shown in Table 5.3.20-3.

Table 5.3.20-3. Recommended Plan Costs by Decade for the City of Floresville

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$61,446	$209,311	$403,998	$633,905	$864,101	$992,139
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Carrizo Groundwater with Conversions						
Annual Cost ($/yr)	—	$530,000	$530,000	$173,000	$173,000	$173,000
Unit Cost ($/acft)	—	$366	$366	$119	$119	$119

5.3.20.2 City of La Vernia

Current water supply for the City of La Vernia is obtained from the Carrizo Aquifer. La Vernia is projected to have adequate water supplies through the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that La Vernia implement the following water supply plan (Table 5.3.20-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 11 acft/yr by 2020, increasing to 149 acft/yr of supply in 2070.

Table 5.3.20-4. Recommended Water Supply Plan for the City of La Vernia

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	11	39	74	106	128	149
Total New Supply	**11**	**39**	**74**	**106**	**128**	**149**

Estimated costs of the recommended plan for the City of La Vernia are shown in Table 5.3.20-5.

Table 5.3.20-5. Recommended Plan Costs by Decade for the City of La Vernia

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$8,358	$29,646	$56,892	$81,954	$98,368	$114,407
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.20.3 Oak Hills WSC

Current water supply for Oak Hills WSC is obtained from the Carrizo Aquifer. Oak Hills WSC is projected to have adequate water supplies through the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Oak Hills WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.20-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 30 acft/yr by 2020, increasing to 244 acft/yr of supply in 2070.

Table 5.3.20-6 Recommended Water Supply Plan for Oak Hills WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	30	72	100	139	189	244
Total New Supply	**30**	**72**	**100**	**139**	**189**	**244**

Estimated costs of the recommended plan to meet Oak Hills WSC's projected needs are shown in Table 5.3.20-7.

Table 5.3.20-7. Recommended Plan Costs by Decade for Oak Hills WSC

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$23,205	$55,085	$77,213	$107,232	$145,242	$187,551
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.20.4 City of Poth

The City of Poth is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Poth implement the following water supply plan (Table 5.3.20-8).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 7 acft/yr by 2020, increasing to 65 acft/yr of supply in 2070.

Table 5.3.20-8. Recommended Water Supply Plan for the City of Poth

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	7	9	14	27	44	65
Total New Supply	**7**	**9**	**14**	**27**	**44**	**65**

Estimated costs of the recommended plan for the City of Poth are shown in Table 5.3.20-9

Table 5.3.20-9. Recommended Plan Costs by Decade for the City of Poth

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$5,319	$6,796	$10,973	$20,418	$34,261	$49,711
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.20.5 SS WSC

Current water supply for SS WSC is obtained from the Carrizo Aquifer. SS WSC is projected to to have a shortage prior to 2070. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that SS WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.20-10).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 11 acft/yr by 2060, increasing to 104 acft/yr of supply in 2070.
- Brackish Wilcox Groundwater for SS WSC[18] with conversions to be implemented by 2070 if conversions are applied. This strategy can provide an additional 234 acft/yr by 2070.

Table 5.3.20-10. Recommended Water Supply Plan for SS WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	234
Recommended Plan						
Municipal Water Conservation	—	—	—	—	11	104
Brackish Wilcox Groundwater for SS WSC with Conversions	—	—	—	—	—	234
Total New Supply	—	—	—	—	—	**234**

Estimated costs of the recommended plan to meet SS WSC's projected needs are shown in Table 5.3.20-11.

[18] See Chapter 8.3.1, Recommendation #6

Table 5.3.20-11. Recommended Plan Costs by Decade for SS WSC

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	$8,254	$79,766
Unit Cost ($/acft)	—	—	—	—	$770	$770
Brackish Wilcox Groundwater for SS WSC with Conversions						
Annual Cost ($/yr)	—	—	—	—	—	$597,636
Unit Cost ($/acft)	—	—	—	—	—	$2,554

5.3.20.6 City of Stockdale

The City of Stockdale is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Stockdale implement the following water supply plan (Table 5.3.20-12).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 13 acft/yr by 2020, increasing to 197 acft/yr of supply in 2070.

Table 5.3.20-12. Recommended Water Supply Plan for the City of Stockdale

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	13	49	97	141	168	197
Total New Supply	**13**	**49**	**97**	**141**	**168**	**197**

Estimated costs of the recommended plan for the City of Stockdale are shown in Table 5.3.20-13.

Table 5.3.20-13. Recommended Plan Costs by Decade for the City of Stockdale

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	$9,841	$37,391	$74,541	$108,220	$129,599	$152,014
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.20.7 Sunko WSC

Current water supply for Sunko WSC is obtained from the Carrizo Aquifer. Sunko WSC is projected to need additional water supplies prior to 2070. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Sunko WSC implement the following water supply plan to meet the projected needs for the WSC (Table 5.3.20-14).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 83 acft/yr by 2020, increasing to 154 acft/yr of supply in 2070.
- Local Carrizo Groundwater with Conversions to be implemented prior to 2070. This strategy can provide an additional 120 acft/yr by 2070.

Table 5.3.20-14. Recommended Water Supply Plan for Sunko WSC

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	117
Recommended Plan						
Municipal Water Conservation	83	107	145	153	112	154
Local Carrizo Groundwater with Conversions	—	—	—	—	—	120
Total New Supply	—	—	—	—	—	**274**

Estimated costs of the recommended plan to meet Sunko WSC's projected needs are shown in Table 5.3.20-15.

Table 5.3.20-15. Recommended Plan Costs by Decade for Sunko WSC

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$63,704	$82,538	$111,785	$117,658	$86,304	$118,214
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770
Local Carrizo Groundwater with Conversions						
Annual Cost ($/yr)	—	—	—	—	—	$96,000
Unit Cost ($/acft)	—	—	—	—	—	$800

5.3.20.8 Rural Area Residential and Commercial

Rural Areas are projected to have adequate water supplies available from the Carrizo Aquifer and run-of-river rights to meet their projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected need for rural areas (Table 5.3.20-16).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 4 acft/yr by 2060, increasing to 73 acft/yr in 2070.

Table 5.3.20-16. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	—	—	—	—	4	73
Total New Supply	**—**	**—**	**—**	**—**	**4**	**73**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.20-17.

Table 5.3.20-17. Recommended Plan Costs by Decade for Rural Areas

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	$2,920	$55,957
Unit Cost ($/acft)	—	—	—	—	$770	$770

5.3.20.9 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group's projected demand during the planning period.

5.3.20.10 Steam-Electric Power

There is no projected steam-electric power water demand in Wilson County, therefore no water management strategies are recommended for this water user group.

5.3.20.11 Mining

Mining is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group's projected demand during the planning period.

5.3.20.12 Irrigation

Irrigation is projected to have adequate water supplies available from the Carrizo Aquifer, Sparta Aquifer, Queen City Aquifer, and run-of-river rights to meet the water user group's

5.3.20.13 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected needs during the planning period.

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5.3.21 Zavala County Water Supply Plan

Table 5.3.21-1 lists each water user group in Zavala County and its corresponding management supply or shortage in years 2020 and 2070. For each water user group with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.3.21-1. Zavala County Management Supply/Shortage by Water User Group

Water User Group	Management Supply/Shortage 2020 (acft/yr)	Management Supply/Shortage 2070 (acft/yr)	Comment
City of Crystal City	1,821	1,068	No projected shortage
Zavala County WCID #1	795	575	No projected shortage
Rural Area Residential and Commercial	328	74	No projected shortage
Industrial/Manufacturing	488	240	No projected shortage
Steam-Electric Power	0	0	No projected demand
Mining	0	0	No projected shortage
Irrigation	-18,487	-9,443	Projected shortage (2020 through 2070)
Livestock	0	0	No projected shortage

5.3.21.1 City of Crystal City

The City of Crystal City is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the City of Crystal City implement the following water supply plan (Table 5.3.21-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 60 acft/yr by 2020, increasing to 654 acft/yr of supply in 2070.

Table 5.3.21-2. Recommended Water Supply Plan for the City of Crystal City

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	60	197	354	497	573	654
Total New Supply	**60**	**197**	**354**	**497**	**573**	**654**

Estimated costs of the recommended plan for the City of Crystal City are shown in Table 5.3.21-3.

Table 5.3.21-3. Recommended Plan Costs by Decade for the City of Crystal City

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation						
Annual Cost ($/yr)	$46,295	$151,309	$272,943	$382,840	$441,413	$503,324
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.21.2 Zavala County WCID #1

Zavala County WCID #1 is projected to have adequate water supplies available from the Carrizo Aquifer to meet the city's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that the WCID implement the following water supply plan (Table 5.3.21-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 24 acft/yr by 2020, increasing to 282 acft/yr of supply in 2070.

Table 5.3.21-4. Recommended Water Supply Plan for Zavala County WCID #1

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	24	66	113	168	224	282
Total New Supply	**24**	**66**	**113**	**168**	**224**	**282**

Estimated costs of the recommended plan for Zavala County WCID #1are shown in Table 5.3.21-5.

Table 5.3.21-5. Recommended Plan Costs by Decade for Zavala County WCID #1

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$18,179	$50,942	$86,666	$128,979	$172,400	$217,088
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.21.3 Rural Area Residential and Commercial

Rural areas are projected to have adequate water supplies available from the Carrizo Aquifer to meet their projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that rural area water supply districts and authorities and individual households and/or businesses not served by public water supply systems implement the following water supply plan to meet the projected needs for rural areas (Table 5.3.21-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy can provide an additional 10 acft/yr by 2020, increasing to 98 acft/yr in 2070.

Table 5.3.21-6. Recommended Water Supply Plan for Rural Areas

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation	10	23	37	55	75	98
Total New Supply	**10**	**23**	**37**	**55**	**75**	**98**

Estimated costs of the recommended plan for rural areas are shown in Table 5.3.21-7.

Table 5.3.21-7. Recommended Plan Costs by Decade for Rural Areas

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation						
Annual Cost ($/yr)	$7,726	$17,669	$28,144	$42,334	$57,995	$75,404
Unit Cost ($/acft)	$770	$770	$770	$770	$770	$770

5.3.21.4 Industrial/Manufacturing

Industrial is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group's projected demand during the planning period.

5.3.21.5 Steam-Electric Power

There is no projected steam-electric water demand in Zavala County, therefore no water management strategies are recommended for this water user group.

5.3.21.6 Mining

Mining is projected to have adequate water supplies available from the Carrizo Aquifer to meet the water user group's projected demand during the planning period.

5.3.21.7 Irrigation

Current water supply for irrigation is obtained from the Carrizo Aquifer. Irrigation is projected to need additional water supplies prior to 2020. Due to limited economically feasible supplies for irrigation, these needs remain unmet. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that individual irrigators implement the following water supply plan to meet a portion of the projected needs for irrigation (Table 5.3.21-8).

- Irrigation Water Conservation, while not a recommended strategy, is encouraged and can provide additional supply when possible. The SCTRWPG has determined that it is not economically feasible for agricultural producers to pay for additional supplies to meet projected needs.

Table 5.3.21-8. Recommended Water Supply Plan for Irrigation

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	18,487	16,805	14,980	13,049	11,193	9,443
Recommended Plan						
Irrigation Water Conservation	ND	ND	ND	ND	ND	ND
Total New Supply	—	—	—	—	—	—
ND – Not Determined due to uncertainty						

5.3.21.8 Livestock

Livestock is projected to have adequate water supplies available from local sources to meet the water user group's projected demand during the planning period.

5.4 Water Supply Plans for Wholesale Water Providers

Table 5.4-1 lists each Wholesale Water Provider identified by the SCTRWPG and their corresponding management supply or shortage in years 2020 and 2070. For each Wholesale Water Provider with a projected shortage, or need, a water supply plan has been developed and is presented in the following subsections.

Table 5.4-1. Wholesale Water Providers

Major Water Provider	Management Supply/Shortage		Comment
	2020 (acft/yr)	2070 (acft/yr)	
San Antonio Water System (SAWS)	-110,677	-244,956	Projected Shortages (2020 through 2070)
Guadalupe-Blanco River Authority (GBRA)	-9,593	-170,949	Projected Shortages (2020 through 2070)
Canyon Regional Water Authority (CRWA)	-8,204	-21,343	Projected Shortages (2020 through 2070)
Cibolo Valley Local Government Corporation (CVLGC)	0	-10,000	Projected Shortages (2030 through 2070)
Hays/Caldwell Public Utility Agency (HCPUA)	-3,182	-21,833	Projected Shortages (2020 through 2070)
Schertz-Seguin Local Government Corporation (SSLGC)	-5,776	-7,111	Projected Shortages (2020 through 2070)
Springs Hill WSC (SHWSC)	4,267	1,661	Projected Surplus
Texas Water Alliance (TWA)	0	-22,575	Projected Shortages (2040 through 2070)

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5.4.1 San Antonio Water System (SAWS)

Current water supply for SAWS is obtained from the Edwards Aquifer, Trinity Aquifer, Carrizo-Wilcox Aquifer, Canyon Reservoir, Aquifer Storage and Recovery (ASR), and Direct Reuse. SAWS is projected to need additional water supplies prior to the year 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that SAWS implement the following water supply plan to meet the projected needs for SAWS (Table 5.4-2).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy has been assigned to each individual Water User Group (WUG) based on the Municipal Water Conservation water management strategy recommended by the SCTRWPG.
- Brackish Wilcox Groundwater for SAWS to be implemented starting by 2020. This strategy can provide an additional 5,622 acft/yr of supply by 2020.
- Expanded Local Carrizo to be implemented by 2020. This strategy can provide an additional 5,500 acft/yr of supply for the year 2020 decreasing to 5,419 acft/yr by 2060.
- Vista Ridge Consortium to be implemented prior to 2020. This strategy can provide an additional 19,442 acft in 2020 increasing to 34,894 acft/yr by 2070.
- Expanded Brackish Wilcox Project to be implemented prior to 2030 has no yield under the existing MAG.
- Direct Recycled Water Programs to be implemented prior to 2020. This strategy can provide an additional 5,000 acft/yr of supply by the year 2020 increasing to 40,000 by 2070.
- Drought Management to be implemented prior to 2020. This strategy can provide an additional 14,764 acft/yr of supply for the year 2020 increasing to 68,190 acft/yr by 2070.
- Advanced Meter Infrustructure
- Facilities Expansions/Integration Pipelines1
- Seawater Desalination to be implemented prior to 2050. This strategy can provide an additional 84,023 acft/yr of supply by 2050.
- CPS Direct Recycle Pipeline to be implemented prior to 2020 can provide 50,000 acft/yr of non-potable supply.

The following are alternative water management strategies: Brackish Groundwater for Saws (Envisioned), Expanded Local Carrizo (Envisioned), Vista Ridge Consortium (Envisioned), Expanded Brackish Project (Envisioned).

[1] Systems and pipelines have no associated firm yield, but are necessary to deliver new sources of supply to SAWS customers.

Table 5.4-2. Recommended Water Supply Plan for SAWS

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	110,677	133,837	158,902	188,236	217,630	244,956
Recommended Plan						
Municipal Water Conservation	15,974	10,704	6,901	7,284	8,004	2,792
EAHCP[1]	0	0	0	0	0	0
Brackish Wilcox Groundwater for SAWS	5,622	5,622	5,622	5,622	5,622	5,622
Expanded Local Carrizo	5,500	5,500	5,500	5,500	5,419	5,419
Vista Ridge Project	19,442	24,240	28,711	32,685	34,894	34,894
Expanded Brackish Wilcox Project	0	0	0	0	0	0
Direct Recycled Water Programs	5,000	5,000	5,000	15,000	25,000	40,000
Water Resources Integration Pipeline[2]	0	0	0	0	0	0
Drought Management	14,674	38,517	55,536	59,877	64,184	68,190
Advanced Meter Infrastructure	0	0	0	0	0	0
Seawater Desalination (75 MGD)	0	0	0	84,023	84,023	84,023
CPS Direct Recycle Pipeline	50,000	50,000	50,000	50,000	50,000	50,000
Total New Supply	**116,211**	**139,582**	**157,269**	**259,990**	**277,145**	**290,940**

[1] Includes all elements of the HCP (VISPO, conservation, SAWS ASR & Irrigation Transfers, and Critical Period Stage V).
[2] Systems and pipelines have no associated firm yield, but are necessary to deliver new sources of supply to SAWS customers.

Estimated costs of the recommended plan to meet the SAWS projected needs are shown in Table 5.4-3.

Table 5.4-3. Recommended Plan Costs by Decade for SAWS

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
Drought Management						
Annual Cost ($/yr)	$5,235,016	$25,564,017	$49,759,715	$53,650,066	$57,508,305	$61,098,462
Unit Cost ($/acft)	$357	$664	$896	$896	$896	$896
Brackish Wilcox Groundwater for SAWS						
Annual Cost ($/yr)	$7,247,000	$7,247,000	$2,755,000	$2,755,000	$2,755,000	$2,755,000
Unit Cost ($/acft)	$1,289	$1,289	$490	$490	$490	$490
Expanded Local Carrizo						
Annual Cost ($/yr)	$3,850,000	$3,850,000	$2,541,000	$2,541,000	$2,504,000	$2,504,000
Unit Cost ($/acft)	$700	$700	$462	$462	$462	$462
Vista Ridge Project						
Annual Cost ($/yr)	$42,325,000	$52,770,000	$23,112,000	$26,311,000	$28,090,000	$28,090,000
Unit Cost ($/acft)	$2,177	$2,177	$805	$805	$805	$805
Expanded Brackish Wilcox Project						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
Direct Recycled Water Programs						
Annual Cost ($/yr)	$2,290,000	$2,290,000	$720,000	$2,160,000	$3,600,000	$5,760,000
Unit Cost ($/acft)	$458	$458	$144	$144	$144	$144
Water Resource Integration Pipeline						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
Seawater Desalination						
Annual Cost ($/yr)	—	—	—	$227,949,000	$227,949,000	$94,849,000
Unit Cost ($/acft)	—	—	—	$2,713	$2,713	$1,129
CPS Direct Recycle Pipeline						
Annual Cost ($/yr)	$2,500,000	$2,500,000	$500,000	$500,000	$500,000	$500,000
Unit Cost ($/acft)	$50	$50	$10	$10	$10	$10

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5.4.2 Guadalupe-Blanco River Authority (GBRA)

Current water supply for GBRA is obtained from Canyon Reservoir and run-of-river rights. GBRA is projected to need additional water supplies by 2020 to meet the Wholesale Water Provider's projected demands. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that GBRA implement the following water supply plan to meet the projected needs for GBRA (Table 5.4-4).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy has been assigned to each individual Water User Group (WUG) based on the Municipal Conservation water management strategy recommended by the SCTRWPG.
- GBRA Mid-Basin Water Supply Project (Surface Water with ASR) to be implemented prior to 2020. This strategy can provide an additional 50,000 acft/yr for 2020 through 2070.
- Western Canyon WTP Expansion to be implemented by 2060. The project doesn't increase GBRA's supplies, but allows them to deliver additional existing supplies from Canyon Reservoir to customers in Comal and Kendall Counties.
- Integrated Water-Power Project (Upper & Mid Basin) to be implemented prior to 2060. This strategy can provide an additional 100,000 acft/yr for 2020 through 2070.
- GBRA Lower Basin Storage (500 acre Site)[2] to be implemented prior to 2020. This strategy can provide an additional 51,800 acft/yr for 2020 through 2070.
- GBRA New Appropriation (Lower Basin) to be implemented prior to 2050. This strategy can provide an additional 42,000 acft/yr for 2050 through 2070.
- Victoria County Steam-Electic to be implemented prior to 2050. This strategy can provide an additional 29,100 acft/yr for 2050 through 2070.

The following are alternative water management strategies: Luling ASR, MBWSP-Carrizo Groundwater (Option 0), MBWSP-Surface Water w/ Off-Channel Reservoir (Option 2A), MBWSP Conjunctive Use w/ASR (Option 3A), HPCUA/TWA/GBRA Shared Facilities Project, and Storage above Canyon Reservoir (ASR).

[2] Firm yield estimate based on off-channel storage of 2,500 acft.

Table 5.4-4. Recommended Water Supply Plan for GBRA

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	29,593	60,965	71,664	97,994	152,719	170,949
Recommended Plan						
Municipal Water Conservation[1]	—	—	—	—	—	—
MBWSP - Surface Water w/ ASR (Option 3C)	50,000	50,000	50,000	50,000	50,000	50,000
Western Canyon WTP Expansion	—	—	—	—	—	—
Integrated Water-Power Project (Upper & Mid Basin)	100,000	100,000	100,000	100,000	100,000	100,000
GBRA Lower Basin Storage (500 acre Site)	51,800	51,800	51,800	51,800	51,800	51,800
GBRA New Appropriation (Lower Basin)	—	—	—	42,000	42,000	42,000
Victoria County Steam-Electric Project	—	—	—	29,100	29,100	29,100
Total New Supply	**151,800**	**151,800**	**151,800**	**222,900**	**272,900**	**272,900**

[1] Assigned by Water User Group based on Municipal Conservation water management strategy recommended by SCTRWPG.

Estimated costs of the recommended plan to meet the GBRA projected needs are shown in Table 5.4-5.

Table 5.4-5. Recommended Plan Costs by Decade for GBRA

Plan Element	2020	2030	2040	2050	2060	2070
***Municipal Water Conservation*[1]**						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
MBWSP - Surface Water w/ ASR (Option 3C)						
Annual Cost ($/yr)	$81,850,000	$81,850,000	$20,250,000	$20,250,000	$20,250,000	$20,250,000
Unit Cost ($/acft)	$1,637	$1,637	$405	$405	$405	$405
Western Canyon WTP Expansion						
Annual Cost ($/yr)	—	—	—	—	$1,926,000	$1,926,000
Unit Cost ($/acft)	—	—	—	—	$344	$344
Integrated Water-Power Project (Upper, Lower & Mid Basin)						
Annual Cost ($/yr)	$239,300,000	$239,300,000	$105,300,000	$105,300,000	$105,300,000	$105,300,000
Unit Cost ($/acft)	$2,393	$2,393	$1,053	$1,053	$1,053	$1,053
GBRA Lower Basin Storage (500 acre Site)						
Annual Cost ($/yr)	$7,252,000	$7,252,000	$3,626,000	$3,626,000	$932,400	$932,400
Unit Cost ($/acft)	$140	$140	$70	$70	$18	$18
GBRA New Appropriation (Lower Basin)						
Annual Cost ($/yr)	—	—	—	$24,822,000	$24,822,000	$14,196,000
Unit Cost ($/acft)	—	—	—	$591	$591	$338
Victoria County Steam-Electric Project						
Annual Cost ($/yr)	—	—	—	$35,647,000	$35,647,000	$22,251,000
Unit Cost ($/acft)	—	—	—	$1,225	$1,225	$799

[1] *These costs have been assigned to the individual Water User Groups.*

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5.4.3 Canyon Regional Water Authority (CRWA)

Current water supply for CRWA is obtained from GBRA, various existing surface water rights and leases, and the Carrizo Aquifer. CRWA is projected to need additional water supplies prior to the year 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that CRWA implement the following water supply plan to meet the projected needs for CRWA (Table 5.4-6).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy has been assigned to each individual member Water User Group (WUG) based on the Municipal Conservation water management strategy recommended by the SCTRWPG, and quantities are not tabulated in the CRWA tables referenced here.
- CRWA Wells Ranch Project Phase II[3] to be implemented prior to 2020. This strategy can provide an additional 7,829 acft/yr of supply for the years 2020 through 2070.
- Hays/Caldwell PUA Project[4] to be implemented prior to 2020. This strategy can provide an additional 3,182 acft/yr of supply in the year 2020, increasing to 6,744 acft/yr of additional supply by 2070.
- Brackish Wilcox Groundwater for CRWA[5] to be implemented prior to 2030. This strategy can provide an additional 1,112 acft/yr of supply by year 2030, increasing to 3,839 acft/yr by 2070.
- CRWA Siesta Project to be implemented prior to 2030. This strategy can provide an additional 5,042 acft/yr for 2030 through 2070.

Table 5.4-6. Recommended Water Supply Plan for CRWA

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	8,204	11,448	11,725	15,788	16,050	21,343
Recommended Plan						
Municipal Water Conservation[1]	—	—	—	—	—	—
CRWA Wells Ranch Project Phase II	7,829	7,658	7,829	7,829	7,829	7,829
Hays/Caldwell PUA Project	3,182	4,634	4,634	6,744	6,744	6,744
Brackish Wilcox Groundwater for CRWA	—	1,112	2,791	3,323	3,839	3,839
CRWA Siesta Project	—	5,042	5,042	5,042	5,042	5,042
Total New Supply	**11,011**	**18,446**	**20,296**	**22,938**	**23,454**	**23,454**

[1]Assigned by Water User Group based on Municipal Conservation water management strategy recommended by SCTRWPG.

[3] See Chapter 8.3.1, Recommendation #6
[4] See Chapter 8.3.1, Recommendation #6
[5] See Chapter 8.3.1, Recommendation #6

Estimated costs of the recommended plan to meet the CRWA projected needs are shown in Table 5.4-7.

Table 5.4-7. Recommended Plan Costs by Decade for CRWA

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation[1]						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
CRWA Wells Ranch Project Phase II						
Annual Cost ($/yr)	$6,264,000	$6,264,000	$3,829,000	$3,829,000	$3,829,000	$3,829,000
Unit Cost ($/acft)	$800	$800	$489	$489	$489	$489
Hays/Caldwell PUA Project						
Annual Cost ($/yr)	$5,294,210	$7,710,046	$3,196,668	$4,652,207	$4,652,207	$4,652,207
Unit Cost ($/acft)	$1,664	$1,664	$690	$690	$690	$690
Brackish Wilcox Groundwater for RWA						
Annual Cost ($/yr)	—	$2,443,450	$6,132,795	$3,778,726	$4,365,491	$4,365,491
Unit Cost ($/acft)	—	$2,197	$2,197	$1,137	$1,137	$1,137
CRWA Siesta Project						
Annual Cost ($/yr)	—	$9,507,000	$9,507,000	$3,750,000	$3,750,000	$3,750,000
Unit Cost ($/acft)	—	$1,886	$1,886	$744	$744	$744
[1] *These costs have been assigned to the individual Water User Groups.*						

5.4.4 Cibolo Valley Local Government Corporation (CVLGC)

CVLGC is projected to need additional water supplies prior to the year 2030. There is no current supply for CVLGC. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that CVLGC implement the following water supply plan to meet the projected needs for CVLGC (Table 5.4-12).

- CVLGC Carrizo Project[6] in Wilson County with Transfers to be implemented prior to 2020. This strategy can provide an additional 10,000 acft/yr of supply in the year 2020 through 2070.

Table 5.4-8. Recommended Water Supply Plan for CVLGC

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	0	2,116	3,441	4,740	7,431	10,000
Recommended Plan						
Municipal Water Conservation[1]	—	—	—	—	—	—
Carrizo Aquifer Development with Transfers	10,000	10,000	10,000	10,000	10,000	10,000
Total New Supply	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**

[1] Assigned by Water User Group based on Municipal Conservation water management strategy recommended by SCTRWPG.

Estimated costs of the recommended plan to meet the SSLGC projected needs are shown in Table 5.4-13.

Table 5.4-9. Recommended Plan Costs by Decade for CVLGC

Plan Element	***2020***	***2030***	***2040***	***2050***	***2060***	***2070***
Municipal Water Conservation[1]						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
Carrizo Aquifer Development with Conversion/Transfer						
Annual Cost ($/yr)	$18,341,000	$18,341,000	$12,170,000	$12,170,000	$12,170,000	$12,170,000
Unit Cost ($/acft)	$1,834	$1,834	$1,217	$1,217	$1,217	$1,217

[1] These costs have been assigned to the individual Water User Groups.

[6] See Chapter 8.3.1, Recommendation #6

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5.4.5 Hays-Caldwell Public Utility Agency (HCPUA)

HCPUA is projected to need additional water supplies prior to the year 2020. There is no current Supply for HCPUA. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that HCPUA implement the following water supply plan to meet the projected needs for HCPUA (Table 5.4-12).

- Hays/Caldwell PUA Project[7] to be implemented prior to 2020. This strategy can provide an additional 10,300 acft/yr of supply in the year 2020, increasing to 21,833 acft/yr of additional supply through 2060.

Alternative water management strategies for HCPA are the HCPUA/TWA Shared Facilities Project[8] and the HCPUA/TWA/GBRA Shared Facilities Project[9].

Table 5.4-10. Recommended Water Supply Plan for HCPUA

	2020 (acft/yr)	*2030 (acft/yr)*	*2040 (acft/yr)*	*2050 (acft/yr)*	*2060 (acft/yr)*	*2070 (acft/yr)*
Projected Need (Shortage)	3,182	6,649	9,125	14,470	18,129	21,833
Recommended Plan						
Municipal Water Conservation[1]	—	—	—	—	—	—
Hays/Caldwell PUA Project	10,300	15,000	15,000	21,831	21,833	21,833
Total New Supply	10,300	15,000	15,000	21,831	21,833	21,833
[1] Assigned by Water User Group based on Municipal Conservation water management strategy recommended by SCTRWPG.						

Estimated costs of the recommended plan to meet the SSLGC projected needs are shown in Table 5.4-13.

Table 5.4-11. Recommended Plan Costs by Decade for HCPUA

Plan Element	*2020*	*2030*	*2040*	*2050*	*2060*	*2070*
Municipal Water Conservation[1]						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
Hays/Caldwell PUA Project						
Annual Cost ($/yr)	$2,769,000	$2,769,000	$476,000	$476,000	$476,000	$476,000
Unit Cost ($/acft)	$1,664	$1,664	$690	$690	$690	$690
[1] These costs have been assigned to the individual Water User Groups.						

[7] See Chapter 8.3.1, Recommendation #6
[8] See Chapter 8.3.1, Recommendation #6
[9] See Chapter 8.3.1, Recommendation #6

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5.4.6 Schertz-Seguin Local Government Corporation (SSLGC)

Current water supply for SSLGC is obtained from the Carrizo Aquifer. SSLGC is projected to need additional water supplies prior to the year 2020. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that SSLGC implement the following water supply plan to meet the projected needs for SSLGC (Table 5.4-12).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy has been assigned to each individual Water User Group (WUG) based on the Municipal Conservation water management strategy recommended by the SCTRWPG.
- Regional Carrizo for SSLGC Project Expansion to be implemented prior to 2020. This strategy can provide an additional 6,500 acft/yr of supply in the year 2020 through 2070.
- Brackish Wilcox (Gonzolas County)[10] to be implemented prior to 2020. This strategy can provide an additional 52 acft/yr of supply in the year 2020, decreasing to 0 acft/yr in 2030 before increasing to 1,278 acft/yr by 2070.

Table 5.4-12. Recommended Water Supply Plan for SSLGC

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	5,776	5,720	7,043	7,116	7,111	7,111
Recommended Plan						
Municipal Water Conservation[1]	—	—	—	—	—	—
Regional Carrizo for SSLGC Project Expansion	6,500	6,500	6,500	6,500	6,500	6,500
Brackish Wilcox (Gonzolas Co.)	52	0	1,215	1,278	1,278	1,278
Total New Supply	**6,552**	**6,500**	**7,715**	**7,778**	**7,778**	**7,778**

[1] Assigned by Water User Group based on Municipal Conservation water management strategy recommended by SCTRWPG.

Estimated costs of the recommended plan to meet the SSLGC projected needs are shown in Table 5.4-13.

[10] See Chapter 8.3.1, Recommendation #6

Table 5.4-13. Recommended Plan Costs by Decade for SSLGC

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation [1]						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
Regional Carrizo for SSLGC Project Expansion						
Annual Cost ($/yr)	$6,955,000	$6,955,000	$2,489,500	$2,489,500	$2,489,500	$2,489,500
Unit Cost ($/acft)	$1,070	$1,070	$383	$383	$383	$383
Brackish Wilcox (Gonzales County)						
Annual Cost ($/yr)	$260,225	$260,225	$1,821,771	$1,917,000	$1,916,325	$1,916,325
Unit Cost ($/acft)	$5,032	$5,032	$1,500	$1,500	$1,500	$1,500

[1] These costs have been assigned to the individual Water User Groups.

5.4.7 Springs Hill WSC (SHWSC)

Springs Hill WSC is projected to have adequate water supplies available from the Carrizo Aquifer and Canyon Reservoir to meet the WSC's projected demands during the planning period. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that Springs Hill WSC implement the following water supply plan (Table 5.4-14).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy has been assigned to each individual Water User Group (WUG) based on the Municipal Conservation water management strategy recommended by the SCTRWPG.

Table 5.4-14. Recommended Water Supply Plan for Springs Hill WSC

	2020 (acft/yr)	2030 (acft/yr)	2040 (acft/yr)	2050 (acft/yr)	2060 (acft/yr)	2070 (acft/yr)
Projected Need (Shortage)	0	0	0	0	0	0
Recommended Plan						
Municipal Water Conservation[1]	—	—	—	—	—	—
Total New Supply	—	—	—	—	—	—

[1] Assigned by Water User Group (WUG) based on Municipal Conservation water management strategy recommended by SCTRWPG.

Estimated costs of the recommended plan for Springs Hill WSC are shown in Table 5.4-15.

Table 5.4-15. Recommended Plan Costs by Decade for Springs Hill WSC

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation[1]						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—

[1] These costs have been assigned to the individual Water User Groups.

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5.4.8 Texas Water Alliance (TWA)

Texas Water Alliance is projected to have shortages during the planning period. There is no current supply for TWA. Working within the planning criteria established by the SCTRWPG and the TWDB, it is recommended that TWA implement the following water supply plan (Table 5.4-16).

- Municipal Water Conservation to be implemented or enhanced in the immediate future. This strategy has been assigned to each individual Water User Group (WUG) based on the Municipal Conservation water management strategy recommended by the SCTRWPG.
- TWA Regional Carrizo[11] is to be implemented by 2020. This strategy can provide an additional supply of 5,000 acft/yr in 2020 increasing to 15,000 by 2070.
- TWA Trinity is to be implemented by 2030. This strategy can provide an additional supply of 500 acft/yr, starting in 2030, increasing to 5,000 by 2060.

Table 5.4-16. Recommended Water Supply Plan for Texas Water Alliance

	2020 (acft/yr)	***2030 (acft/yr)***	***2040 (acft/yr)***	***2050 (acft/yr)***	***2060 (acft/yr)***	***2070 (acft/yr)***
Projected Need (Shortage)	4,000	4,521	6,620	9,531	14,709	20,000
Recommended Plan						
Municipal Water Conservation[1]	—	—	—	—	—	—
TWA Regional Carrizo	5,000	14,680	14,680	14,680	14,680	15,000
TWA Trinity	—	500	500	500	5,000	5,000
Total New Supply	5,000	15,180	15,180	15,180	19,680	20,000

[1]Assigned by Water User Group (WUG) based on Municipal Conservation water management strategy recommended by SCTRWPG.

Estimated costs of the recommended plan for Texas Water Alliance are shown in Table 5.4-17.

[11] See Chapter 8.3.1, Recommendation #6

Table 5.4-17. Recommended Plan Costs by Decade for Texas Water Alliance

Plan Element	2020	2030	2040	2050	2060	2070
Municipal Water Conservation[1]						
Annual Cost ($/yr)	—	—	—	—	—	—
Unit Cost ($/acft)	—	—	—	—	—	—
TWA Regional Carrizo						
Annual Cost ($/yr)	$12,450,000	$36,553,200	$13,153,280	$13,153,280	$13,153,280	$13,200,000
Unit Cost ($/acft)	$2,490	$2,490	$896	$896	$896	$880
TWA Trinity						
Annual Cost ($/yr)	—	$306,500	$306,500	$88,000	$880,000	$880,000
Unit Cost ($/acft)	—	$613	$613	$176	$176	$176

[1] These costs have been assigned to the individual Water User Groups.

5.5 Water Conservation

[31 TAC §357.34]

The South Central Texas Regional Water Planning Group (SCTRWPG) strongly supports water conservation, and for the 2016 Regional Water Plan has recommended municipal water conservation water management strategies. Water conservation in the industrial and steam-electric power generation use categories are encouraged as well. Each of the water conservation water management strategies is described briefly below.

Municipal Water Conservation: The South Central Texas Regional Water Planning Group established municipal water conservation goals, as follows:

- For municipal water user groups (WUGs) with water use of 140 gpcd and greater, reduction of per capita water use by 1 percent per year until the level of 140 gpcd is reached, after which, the rate of reduction of per capita water use is one-fourth percent (0.25 percent) per year for the remainder of the planning period; and
- For municipal WUGs having year 2000 water use of less than 140 gpcd, reduction of per capita water use by one-fourth percent per year.

The municipal water conservation water management strategy included in the 2006, 2011, and 2016 Regional Water Plans is based upon water conservation Best Management Practices (BMPs) for municipal water users, as included in the Water Conservation Implementation Task Force November 2004 Report to the 79th Texas Legislature. The list of Municipal Water Conservation BMPs is as follows:

1. System Water Audit and Water Loss;
2. Water Conservation Pricing;
3. Prohibition on Wasting Water;
4. Showerhead, Aerator, and Toilet Flapper Retrofit;
5. Residential Ultra-Low Flow Toilet Replacement Programs;
6. Residential Clothes Washer Incentive Program;
7. School Education;
8. Water Survey for Single-Family and Multi-Family Customers;
9. Landscape Irrigation Conservation and Incentives;
10. Water-Wise Landscape Design and Conversion Programs;
11. Athletic Field Conservation;
12. Golf Course Conservation;
13. Metering of all New Connections and Retrofitting of Existing Connections;
14. Wholesale Agency Assistance Programs;
15. Conservation Coordinator;
16. Reuse of Reclaimed Water;
17. Public Information;
18. Rainwater Harvesting and Condensate Reuse;
19. New Construction Graywater;
20. Park Conservation; and
21. Conservation Programs for Industrial, Commercial, and Institutional Accounts.

The SCTRWPG acknowledges and supports the creation and activities of the Water Conservation Advisory Council created by House Bill 4 and Senate Bill 3 of the 80th Texas Legislature. In addition, the SCTRWPG acknowledges and supports the implementation of House Bill 2667 of the 81st Texas Legislature relating to performance standards for plumbing fixtures sold in Texas.

The Municipal Water Conservation water management strategy includes retrofit of plumbing fixtures, adoption and use of efficient clothes washers, and significant reduction of lawn and landscape watering. The combined plumbing fixtures, clothes washers, and lawn watering water conservation practices would reduce municipal water demand by 7,603 acft/yr in 2020, 25,661 acft/yr in 2040, and 96,287 acft/yr in 2070 (Chapter 5.2.1).

In 2020, total cost for implementation and administration of the municipal water conservation water management strategy to meet the Region L goals, as described in the municipal water conservation water management strategy Chapter 5.2.1), is $5.53 million ($727/acft/yr), increasing to $18.18 million ($708/acft/yr) in 2040, and to $63.61 in 2070 ($661/acft/yr).

Irrigation Water Conservation: The irrigation water conservation water management strategy is based upon water conservation Best Management Practices for agricultural water, as included in the Water Conservation Implementation Task Force November 2004 Report to the 79th Texas Legislature. The list of Irrigation BMPs is as follows:

1. Irrigation Scheduling;
2. Volumetric Measurement of Irrigation Water Use;
3. Crop Residue Management and Conservation Tillage;
4. On-farm Irrigation audit;
5. Furrow Dikes;
6. Land Leveling;
7. Contour Farming;
8. Conservation of Supplemental Irrigated Farmland to Dry-Land Farmland;
9. Brush Control/Management;
10. Lining of On-Farm Irrigation Ditches;
11. Replacement of On-/farm Irrigation Ditches with Pipelines;
12. Low Pressure Center Pivot Sprinkler Irrigation Systems;
13. Drip/Micro-Irrigation System;
14. Gated and Flexible Pipe for Field Water Distribution Systems;
15. Surge Flow Irrigation for Field Water Distribution Systems;
16. Linear Move Sprinkler Irrigation Systems;
17. Lining of District Irrigation Canals;
18. Replacement of District Irrigation Canals and Lateral Canals with Pipelines;
19. Tailwater Recovery and Use System; and
20. Nursery Production Systems.

Best Management Practices of Low Energy Precision Application (LEPA) techniques can reduce water needed per acre by 20 percent of the rates estimated to have been used in Region L in year 2000.

Industrial, Steam-Electric Power, and Mining Water Conservation: Best Management Practices for industrial, steam-electric power, and mining water conservation, as included in the Water Conservation Implementation Task Force November 2004 Report to the 79th Texas Legislature are as follows:

1. Industrial Water Audit;
2. Industrial Water Waste Reduction;
3. Industrial Submetering;
4. Cooling Towers;
5. Cooling Systems Other than Cooling Towers;
6. Industrial Alternative Sources and Reuse of Process Water;
7. Rinsing/Cleaning;
8. Water Treatment;
9. Boiler and Steam Systems;
10. Refrigeration (including Chilled Water);
11. Once-through Cooling;
12. Management and Employee Programs;
13. Industrial Landscape; and
14. Industrial Site Specific Conservation.

BMPs of air cooling, reuse of treated wastewater, and onsite collection and use of precipitation runoff for mining are recommended. Potential quantities and costs, however, could not be estimated due to lack of data.

Model Municipal Water Conservation Plan: The model municipal water conservation plan required for the South Central Texas Regional Water Plan has the following components:

A. Utility Profile

   I. Population and Customer Data

   II. Water Use Data for Service Area

   III. Water Supply System Data

   IV. Wastewater System Data

B. Requirements for Water Conservation Plans for Municipal Water Use by Public Water Suppliers

   1. Specific, Quantified 5 and 10 year water conservation targets and goals for municipal water use, in gallons per capita per day
   2. Metering Devices – Description Required
   3. Universal Metering – Program Required
   4. Unaccounted-For Water Use – Measures to Determine and Control
   5. Continuing Public Education & Information – Program Description Required
   6. Non-Promotional Water Rate Structure – Required, and included in Water Conservation Plan
   7. Reservoir Systems Operation Plan – Required, if Applicable
   8. Enforcement Procedure & Plan Adoption – Means of Implementation and Enforcement Requirements
   9. Coordination with the Regional Water Planning Group(s) – Documentation of consistency with Regional Water Plans
   10. Additional Requirements
       a. Program for Leak Detection, Repair, and Water Loss Accounting
       b. Record Management System, and
       c. Plan Review and Update every 5 years.

Water conservation information and guidance in the development of municipal water conservation plans can be found at the following web site:

- www.tceq.state.tx.us/permitting/water_supply/water_rights/conserve.html

Model Irrigation Water Conservation Plan: There is no model irrigation water conservation plan in the South Central Texas Regional Water Plan. A form is provided by TCEQ to assist in conservation plan development for individually operated irrigation systems at the following web site:

- www.tceq.state.tx.us/assets/public/permitting/watersupply/water_rights/10238.pdf

Model Industrial/Mining Water Conservation Plan: There is no model industrial/mining water conservation plan in the South Central Texas Regional Water Plan. A form is provided by TCEQ to assist in conservation plan development for industrial/mining water use at the following web site:

- www.tceq.state.tx.us/assets/public/permitting/forms/10213.pdf

Recommendation: The South Central Texas Regional Water Planning Group strongly recommends the implementation of the Municipal, Industrial, Irrigation, Steam-Electric Power Generation, and Mining Water Conservation, and that each water user develop, implement, and maintain a Water Conservation Plan that meets or exceeds the requirements of applicable law.

6 Impacts of the Regional Water Plan and Consistency with Protection of Water Resources, Agricultural Resources, and Natural Resources

[31 TAC §357.40 & 31 TAC §357.41]

The 2016 South Central Texas Regional Water Plan (2016 Plan) is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources and is based on principles outlined in the Texas Administrative Code Chapter 357. The 2016 Plan was formulated and developed with an understanding of the importance of orderly development, management, and conservation of water resources to meet the Region's near and long-term water needs during drought. The plan 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 within the South Central Texas Water Planning Region (Chapter 3) as well as the Texas Water Development Board rules and guidance for regional water planning.

The 2016 Plan identifies actions and policies necessary to meet the Region's projected municipal, industrial, steam-electric power, mining, livestock, and some irrigation needs, by developing and recommending water management strategies (WMS) to meet these needs at a reasonable cost (Chapter 5). It was not possible, however, to develop economically feasible strategies to meet most of the projected needs of irrigated agriculture. A socioeconomic impact analysis was performed to estimate the economic loss associated with not meeting these needs (Appendix F).

Development of the 2016 Plan included consideration of some environmental information resulting from site-specific studies and ongoing water development projects when evaluating water management strategies. A list of endangered and threatened species and species of concern for each county of the region was obtained from the Texas Parks & Wildlife Department (TPWD) and the possible habitats for these species were considered for each water management strategy (Chapter 5.2 and Appendix G). In addition, an environmental assessment, potential environmental effects analysis, and cumulative effects analyses were performed for the recommended water management strategies of the plan (Chapters 6.1 and 6.2). Chapter 6.3 summarizes the environmental benefits and concerns associated with implementation of the 2016 South Central Texas Regional Water Plan.

The 2016 Plan includes water conservation and drought management water management strategies based upon municipal water conservation best management practices (BMPs), and initiatives to respond to drought conditions by the municipal water user groups, and the use of water conservation BMPs in the irrigation water use group.

The 2016 SCTRWP is based, in part, on voluntary transfers of water resources to meet projected needs, including the underlying principles that local area projected needs to

2070 are met before any consideration is given to movement of water from rural and agricultural areas to meet projected needs at more distant locations, that compensation will be made to water owners for water to meet projected needs of others, and an evaluation made of the social and economic impacts of voluntary transfers of water from rural and agricultural areas.

The South Central Texas Regional Water Planning Group (SCTRWPG) conducted quarterly public meetings during the 2016 planning cycle and based its decisions upon the best available information. The SCTRWPG coordinated water planning and management activities with local, regional, state, and federal agencies and cooperated and coordinated with Regions N, P, K, G, and J (Coastal Bend, Lavaca, Lower Colorado, Brazos G, and Plateau, respectively) to identify common needs and cooperative opportunities.

The SCTRWPG has conditionally recommended that five stream segments be designated as having unique ecological value by the Texas Legislature. The SCTRWPG developed policy recommendations for the 2016 Plan including agricultural water, transport of water, groundwater, surface water, conservation, innovative strategies, the environment, providing and financing water and wastewater systems, data, and other issues (Chapter 8).

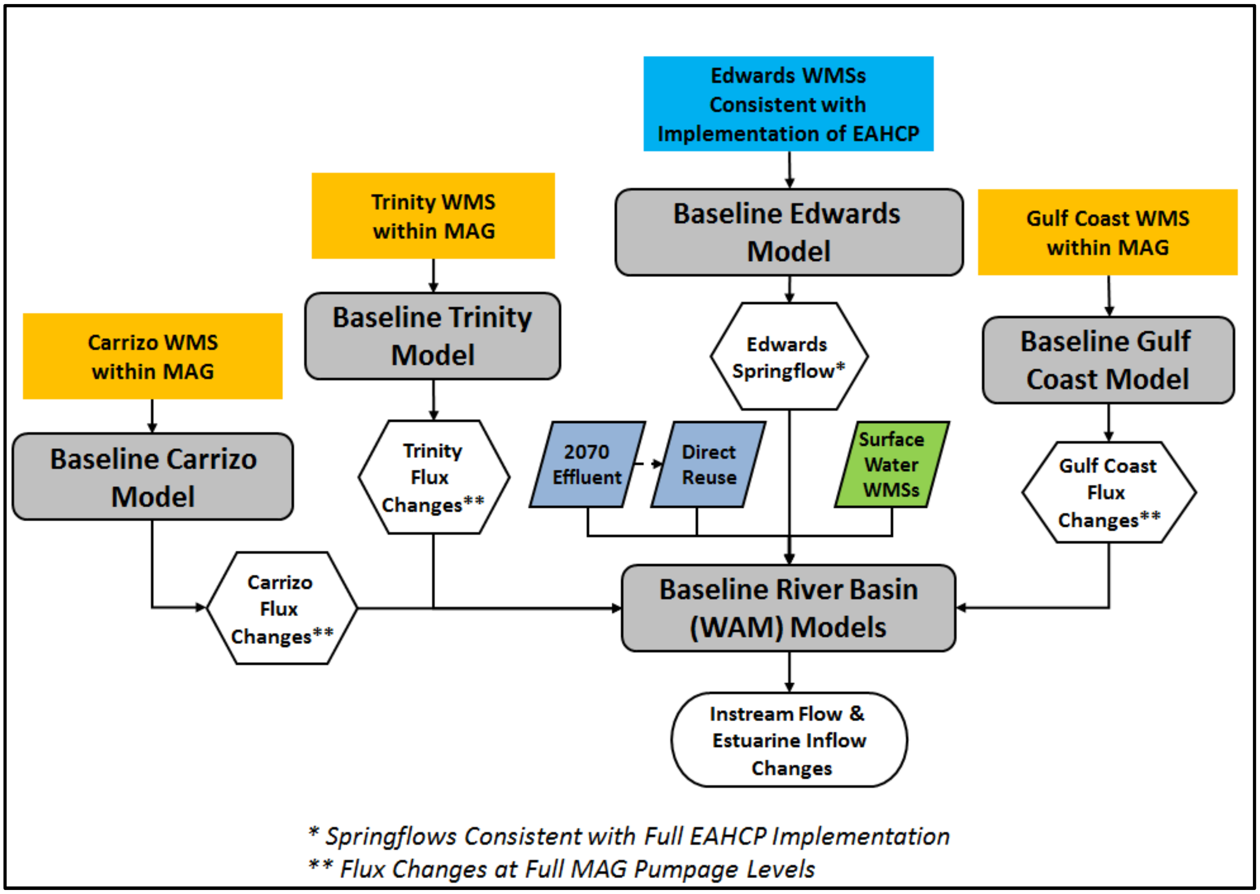
6.1 Cumulative Effects of Regional Water Plan Implementation

The cumulative effects are quantified through long-term simulation of natural hydrologic processes including precipitation, streamflow, aquifer recharge, springflow, and evaporation as they are affected by human influences such as aquifer pumpage, reservoirs, diversions, and the discharge of treated effluent. Figure 6-1 illustrates the connectivity of the various groundwater and surface water models, as well as the water management strategies of the 2016 Plan.

6.1.1 Groundwater and Springs

Cumulative effects of plan implementation for the Edwards Aquifer are presented based on full implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP). The EAHCP was approved in 2013 by the US Fish and Wildlife Service. On March 14, 2013, the SCTRWPG agreed that the EAHCP be considered a recommended water management strategy (WMS) in implementation for the 2016 Regional Water Plan. Furthermore, the SCTRWPG agreed that springflows associated with EAHCP implementation be used in evaluating existing supplies and potentially feasible surface water management strategies for the 2016 Plan.

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 SAWS 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. Graphics illustrating the effects of each measure on springflow at Comal Springs (Figure 6-2) and San Marcos Springs (Figure 6-3) during a repeat of the drought of record are presented herein.

Figure 6-2 Comal Springs in Drought of Record

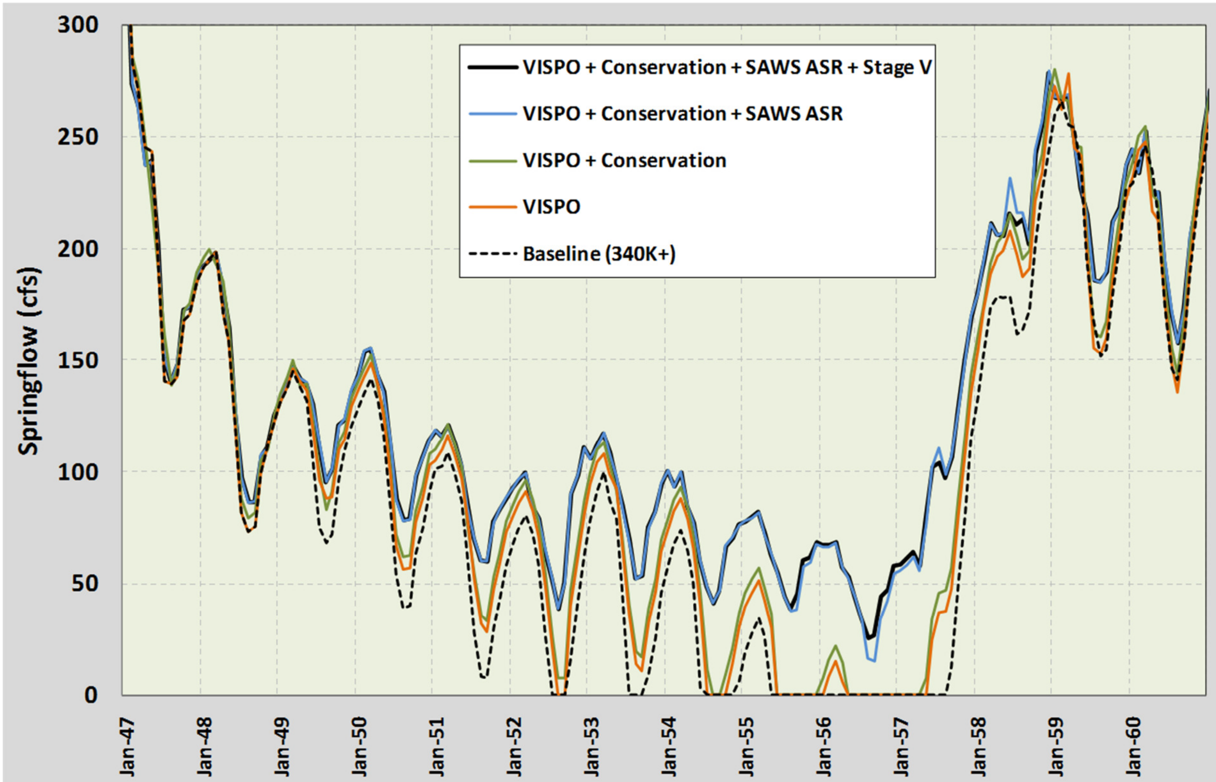
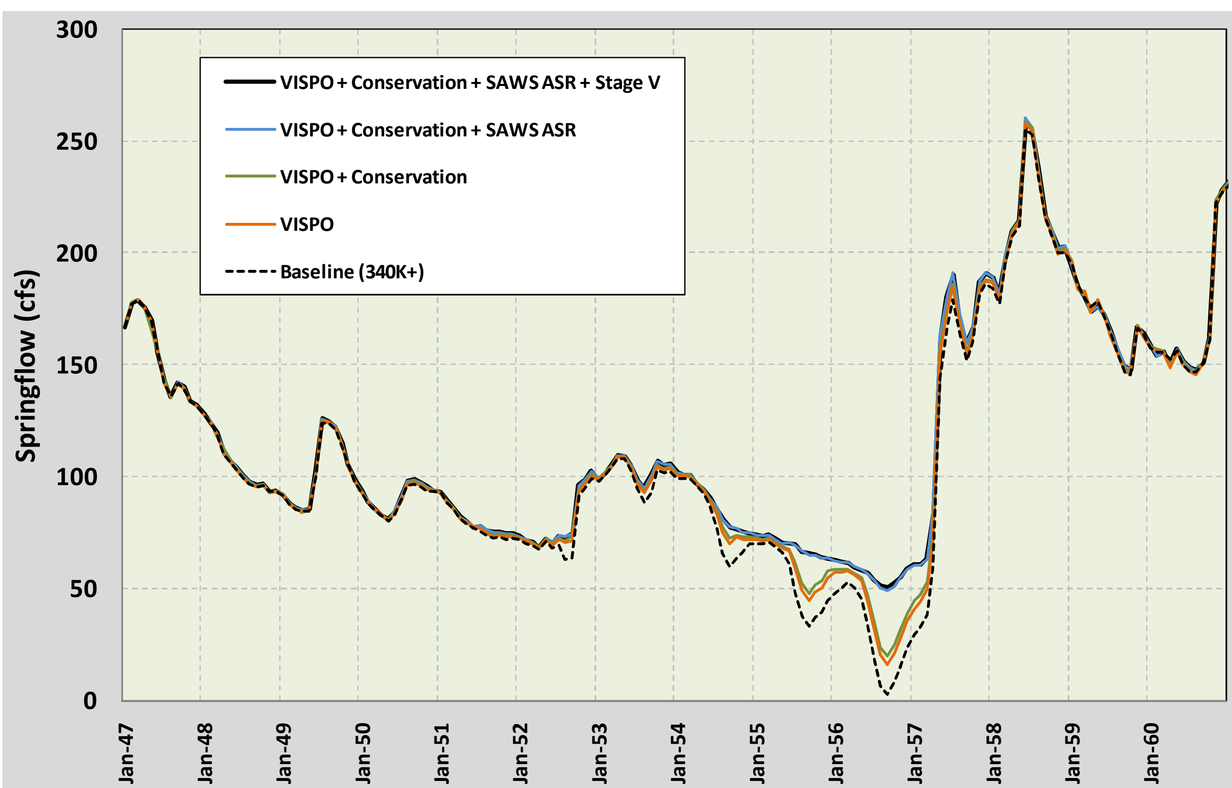


Figure 6-3 San Marcos Springs in Drought of Record



Effects of Pumpage on Aquifers

The long-term cumulative effects of recommended water management strategies in the 2016 Plan on the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers presented herein are consistent with model simulations performed by the TWDB in determining the Modeled Available Groundwater (MAG) consistent with the Desired Future Condition (DFC) of the aquifers. 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.

The 2016 SCTRWP includes three recommended water management strategies with source water from the Trinity Aquifer: Local Groundwater, NBU Trinity, and TWA Trinity. These WMSs total about 15,000 acft/yr of new supply. Figure 6-4 illustrates hydrographs for representative Trinity Aquifer wells in Kendall and Bexar Counties for pumping consistent with full utilization of the MAG. Figure 6-5 illustrates maximum expected drawdowns in the Trinity Aquifer associated with pumpage of the MAG from 2010 to 2060.

Figure 6-4 Trinity Aquifer Well Hydrographs

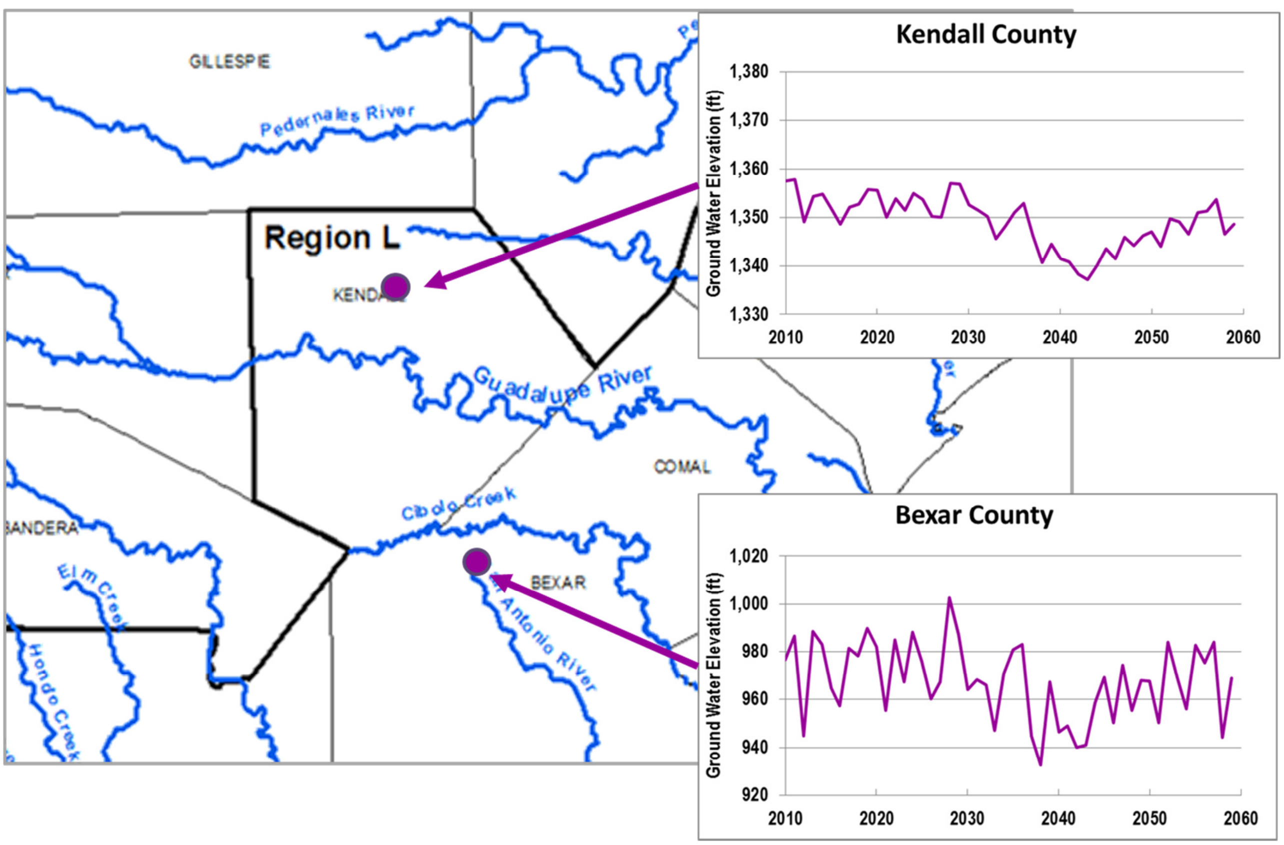
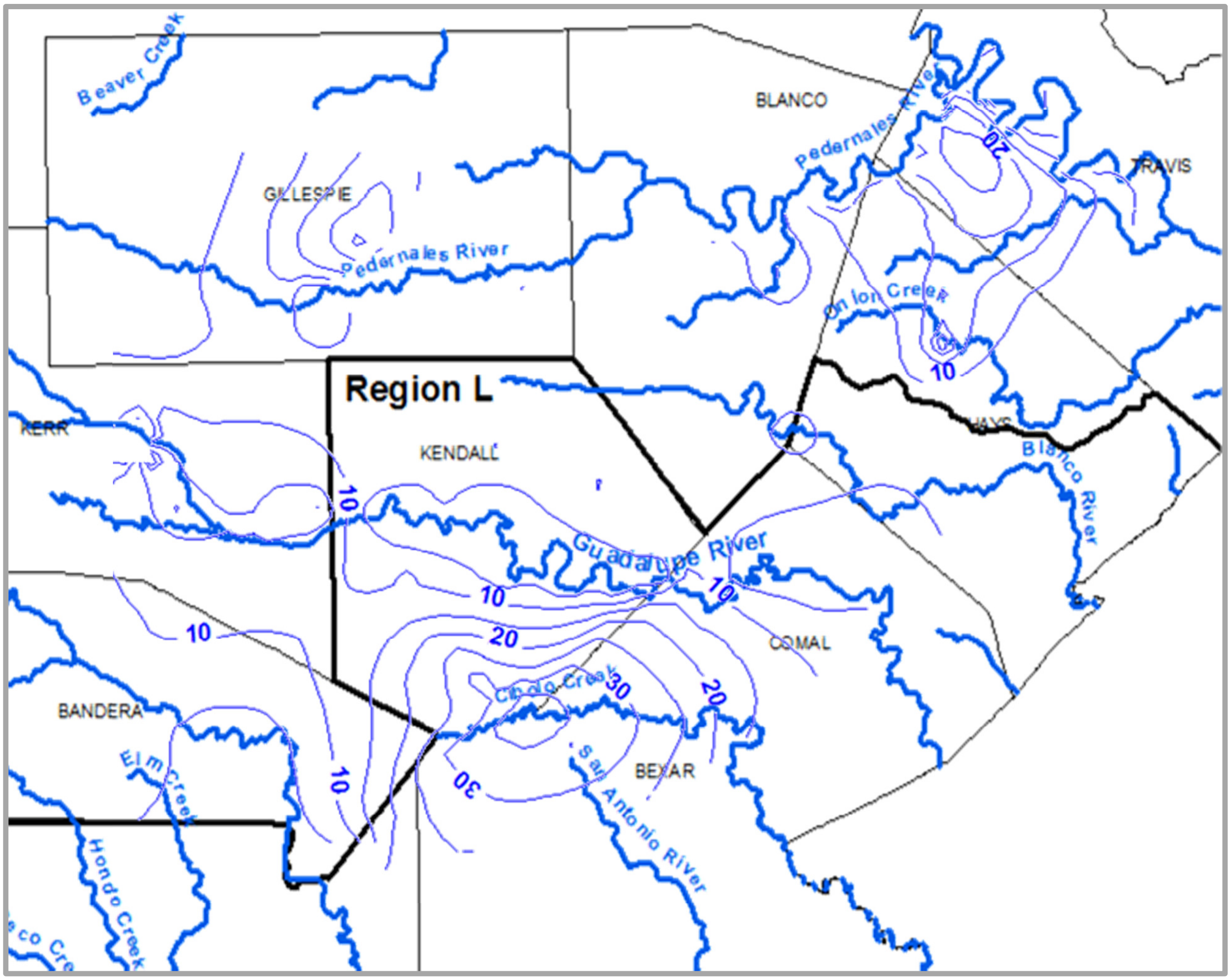


Figure 6-5 Trinity Aquifer Drawdowns (2010-2060)



The 2016 SCTRWP includes multiple recommended water management strategies with source water from the Carrizo-Wilcox Aquifer. Table 6-1 lists these water management strategies in the Carrizo-Wilcox Aquifer by county. Figure 6-6 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 illustrates expected drawdowns in the Carrizo-Wilcox Aquifer associated with pumpage of the MAG for 2010 to 2060.

Table 6-1 Carrizo-Wilcox Water Management Strategies

Water Management Strategy	Source County/Counties
Local Groundwater	Various
SAWS Expanded Local Carrizo	Bexar
SAWS Local Brackish Wilcox	Bexar
Hays/Caldwell PUA	Caldwell and Gonzales
SSLGC Brackish Wilcox	Gonzales
TWA Carrizo	Gonzales
CRWA Wells Ranch - Phase 2	Guadalupe
SSLGC Expanded Carrizo	Guadalupe
CRWA Brackish Wilcox	Guadalupe & Wilson
CVLGC Carrizo	Wilson
SAWS Expanded Brackish Wilcox	Wilson
SS WSC Brackish Wilcox	Wilson

Figure 6-6 Carrizo-Wilcox Aquifer Well Hydrographs

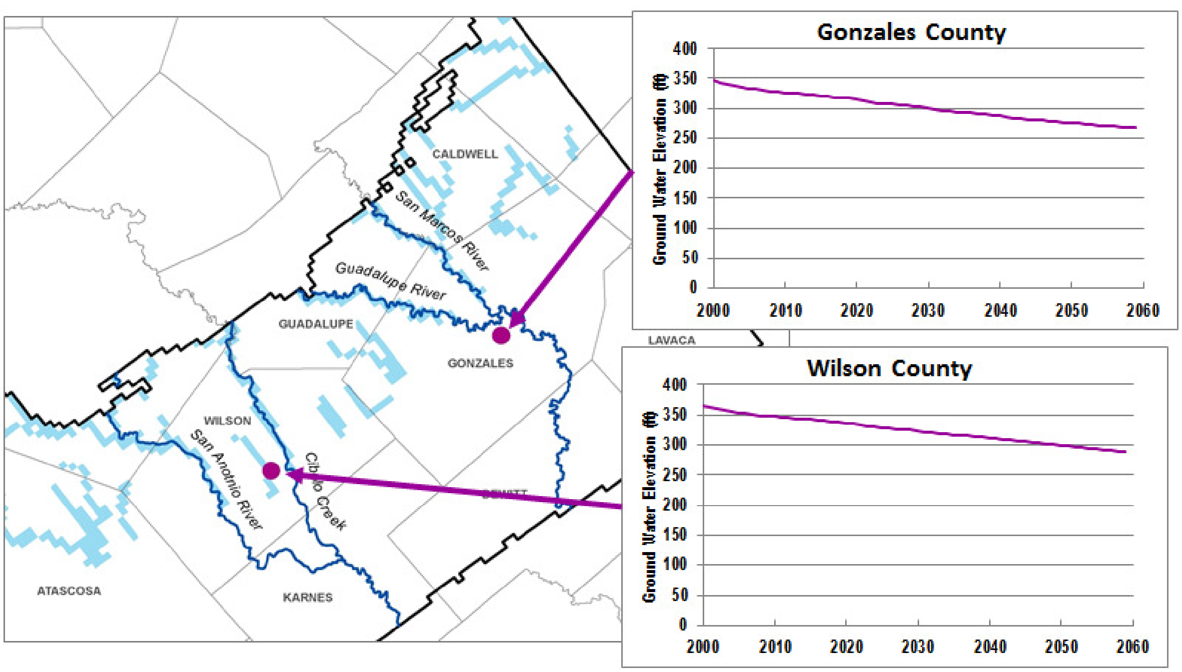
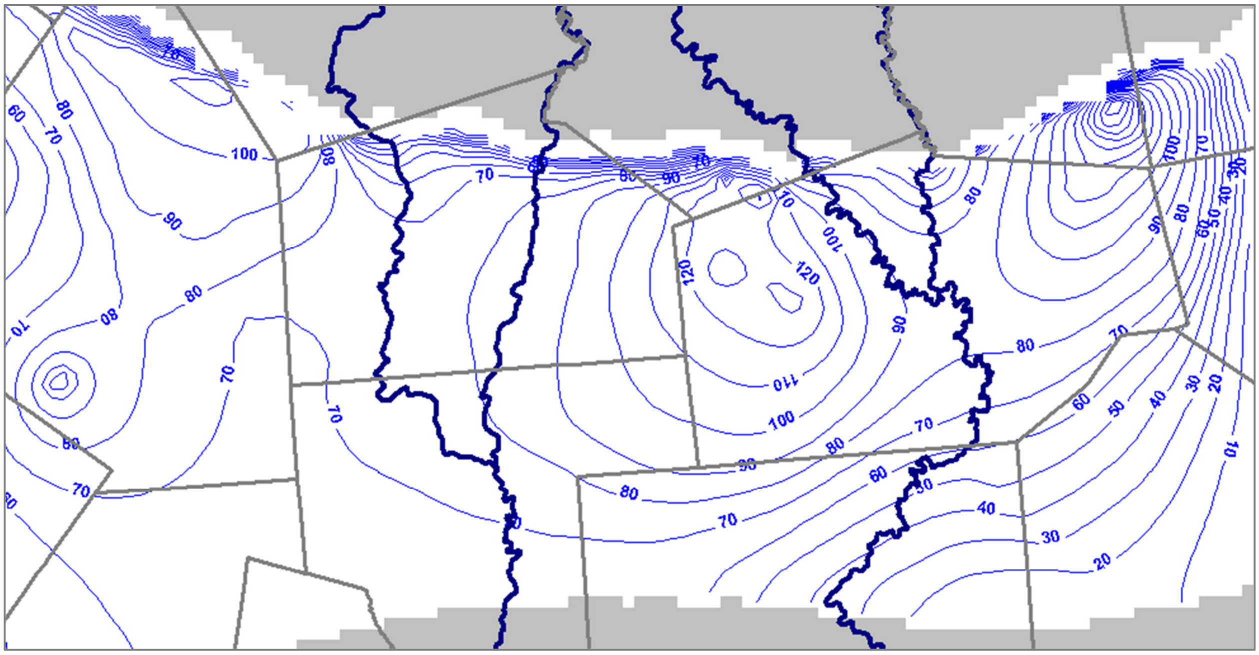


Figure 6-7 Carrizo-Wilcox Aquifer Drawdowns (2000-2060)



The 2016 SCTRWP includes only one recommended water management strategy with source water from the Gulf Coast Aquifer – Local Groundwater. Figure 6-8 illustrates hydrographs for representative Gulf Coast Aquifer wells in Goliad and Victoria Counties for pumping consistent with full utilization of the MAG. Figure 6-9 illustrates expected drawdowns in the Gulf Coast Aquifer associated with pumpage of the MAG for 2010 to 2060.

Figure 6-8 Gulf Coast Aquifer Well Hydrographs

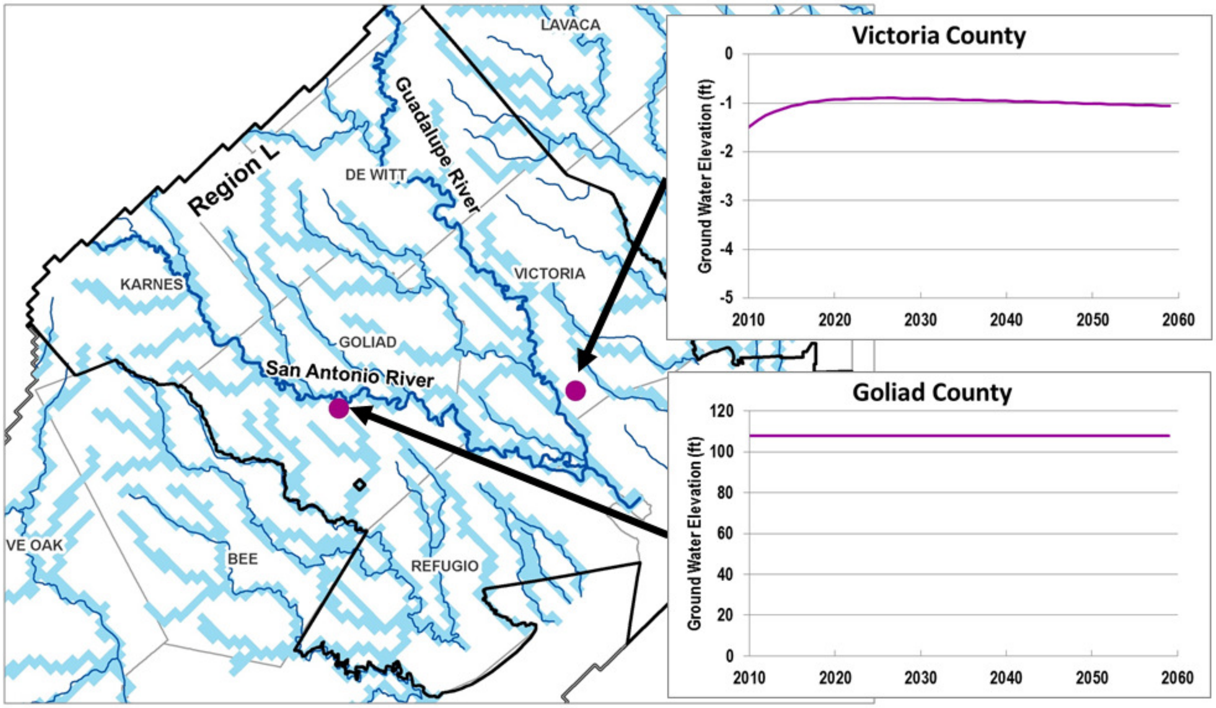
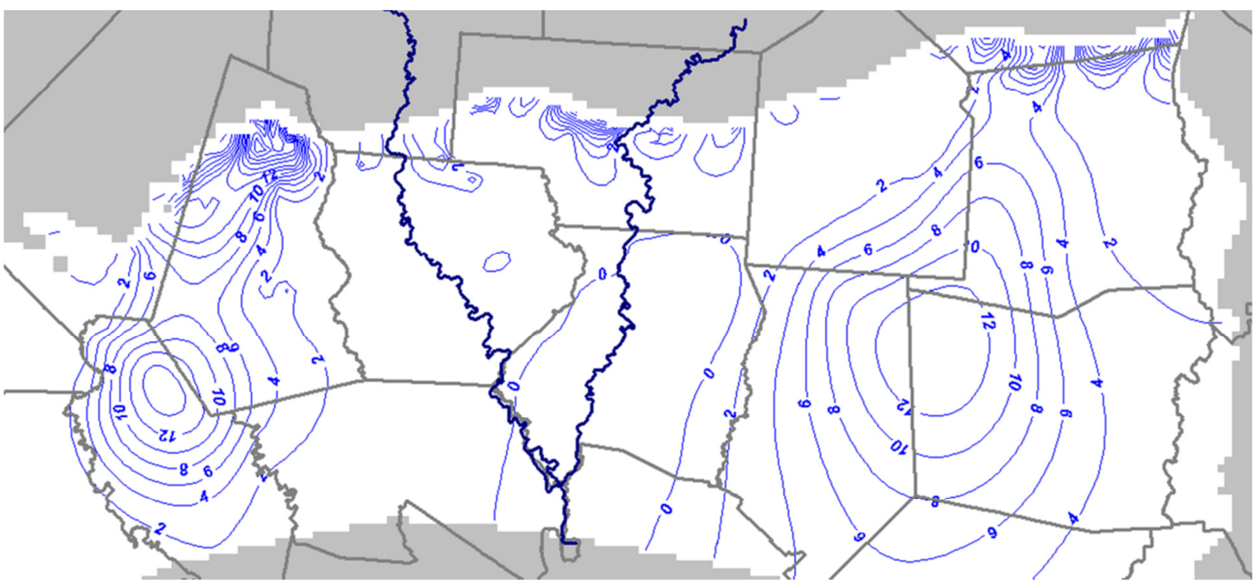


Figure 6-9 Gulf Coast Aquifer Drawdowns (2010-2060)



Effects of Aquifer Pumpage on Streamflow

In the 2016 SCTRWP, increases in groundwater pumpage are expected to outpace long-term recharge rates, which inevitably leads to aquifer-wide drawdowns. In many ways, GCDs have accounted for and planned for this through the setting of DFCs, which translate to the MAG values used in developing the 2016 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 potential effects of MAG levels of pumpage, consistent with recommended WMSs in the 2016 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 GSAWAM 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	-2.9	-2.2	-0.7
Trinity Aquifer	Guadalupe River	-33.1	-25.0	-8.1
Trinity Aquifer	Blanco River	-28.6	-24.6	-3.9
Carrizo-Wilcox Aquifer	San Antonio River	14.5	24.3	-9.8
Carrizo-Wilcox Aquifer	Cibolo Creek	-2.6	1.8	-4.4
Carrizo-Wilcox Aquifer	Guadalupe River	-0.4	3.8	-4.2
Carrizo-Wilcox Aquifer	San Marcos River	-11.0	8.1	-19.2
Gulf Coast Aquifer	San Antonio River	-10.0	-9.7	-0.4
Gulf Coast Aquifer	Guadalupe River	-7.1	-6.7	-0.4

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).*

6.1.2 Surface Water

Potential cumulative effects of implementation of the 2016 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 in Figure 6-10. Cumulative effects for stream and estuary locations in the Nueces River Basin have not been assessed, as there are no recommended WMSs in the 2016 SCTRWP expected to significantly affect flows in the Nueces River Basin or freshwater inflows to the Nueces Estuary. The baseline for consideration of effects on flows includes full implementation of the EAHCP, full utilization of existing water rights, and treated effluent discharge representative of current conditions. The cumulative effects of 2016 SCTRWP implementation on flows at selected locations in the Guadalupe – San Antonio River Basin are summarized in Figure 6-11 through Figure 6-17.

Streamflows in the Guadalupe River above Comal River at New Braunfels (Figure 6-11) are not expected to change significantly during the planning period.

For the San Marcos River at Luling (Figure 6-12), streamflows are expected to decrease by a relatively uniform amount primarily due to decreases in the surface water-groundwater fluxes associated with groundwater pumpage consistent with the MAGs in the Trinity and Carrizo-Wilcox Aquifers.

Guadalupe River at Victoria (Figure 6-13) streamflows are expected to decrease between the 15^{th} and 85^{th} percentiles due to recommended Direct Recycle Programs, the 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. Of these decreases, Direct Recycle Programs and MAG pumpage constitute about 50 percent of the changes in streamflows. Streamflows in the lower portion of the flow regime remain largely unchanged with implementation of the 2016 SCTRWP.

Streamflow comparisons indicate that flows in the San Antonio River at Falls City (Figure 6-14) and Goliad (Figure 6-15) will remain generally unchanged for the highest 70 percent of streamflows and will decrease during low flow periods. WMSs affecting flows in the San Antonio River include large direct recycle projects and decreases in the surface water-groundwater flux associated with several groundwater strategies in the Trinity, Carrizo-Wilcox, and Gulf Coast Aquifers.

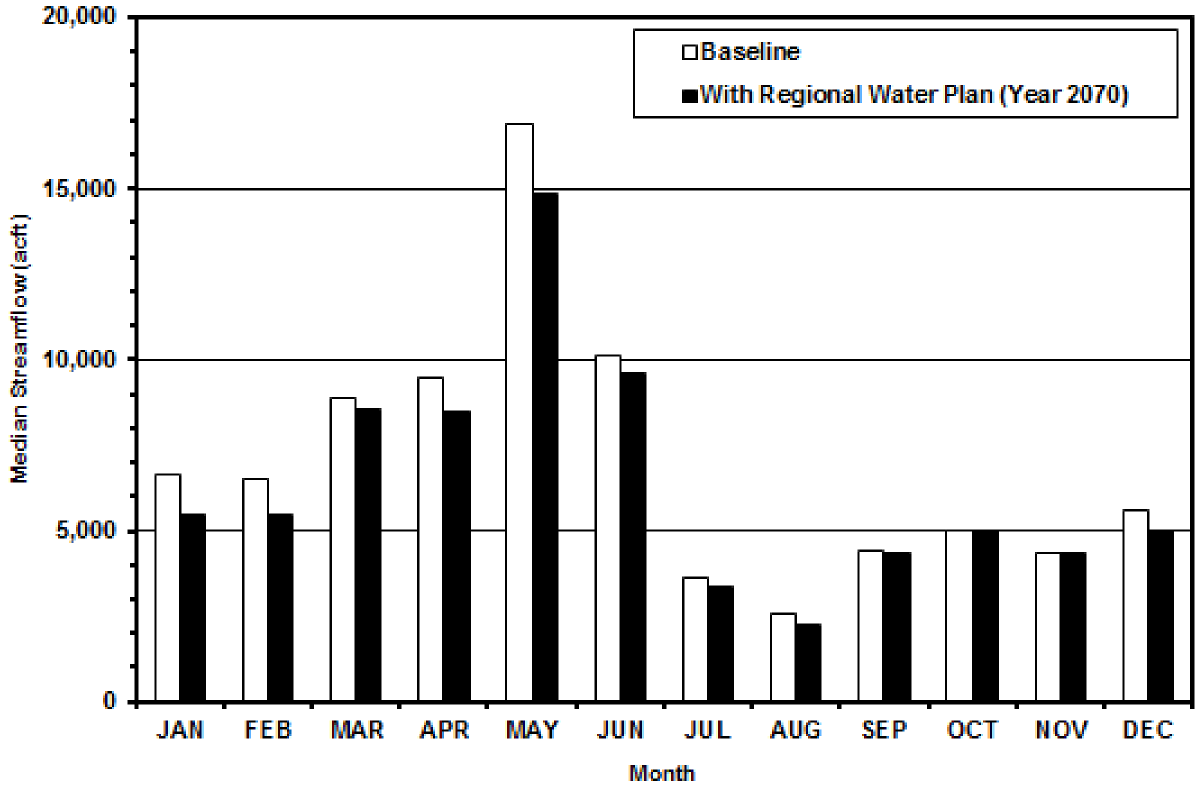
Streamflows/inflows for the Guadalupe River at the GBRA Diversion Dam & Saltwater Barrier near Tivoli (Figure 6-16) and the Guadalupe Estuary (Figure 6-17) would generally decrease with full implementation of all recommended WMSs in the 2016 SCTRWP.

The SCTRWPG has recommended legislative designation of five stream segments in Region L as having unique ecological value. These segments and the bases for recommended designation are described in Appendix H. Implementation of the 2016 SCTRWP is not expected to have any effect on the Nueces, Frio, and Sabinal River segments having unique ecological value as no WMSs are recommended within or upstream of these segments. As shown in Figure 6-2 and Figure 6-3, implementation of the 2016 SCTRWP, including full implementation of the EAHCP (a recommended WMS), is expected to increase long-term average spring discharges which should serve to preserve or enhance the ecological values of the Comal River and San Marcos River segments recommended for designation.

Figure 6-10 Flow Assessment Locations

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 6-11 Guadalupe River above Comal River at New Braunfels



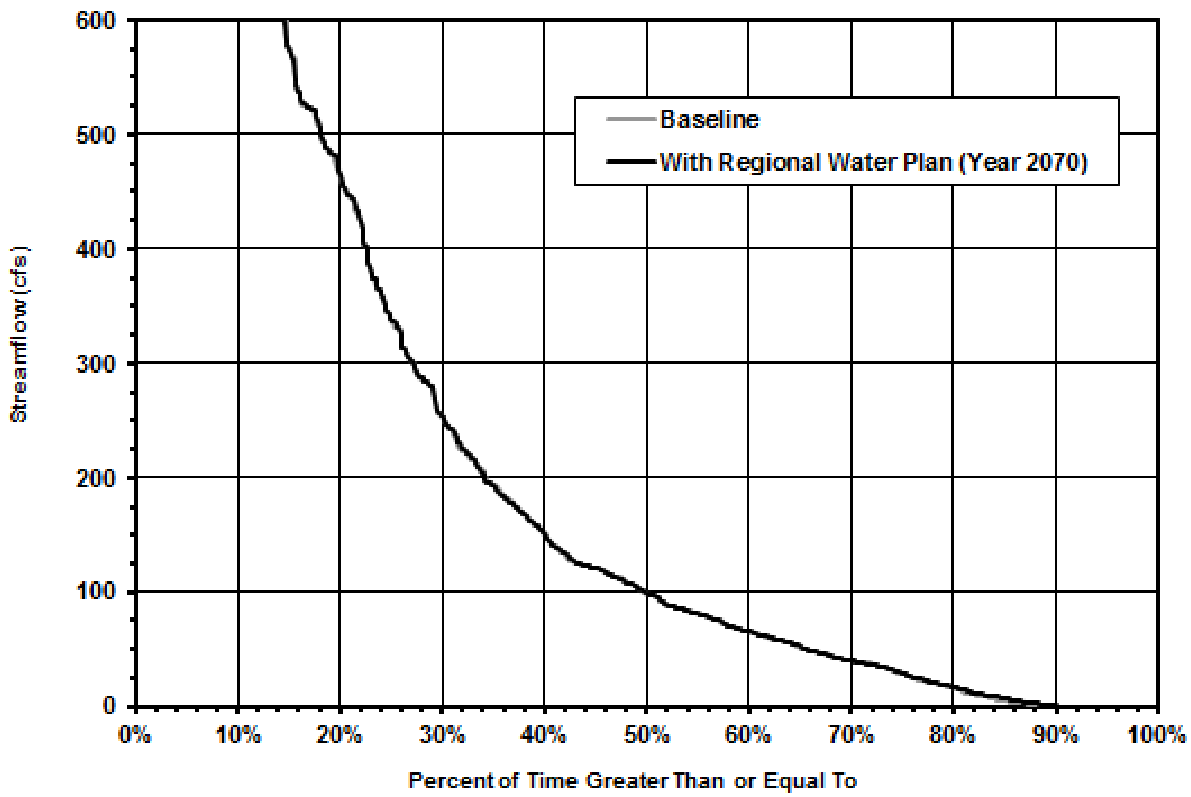
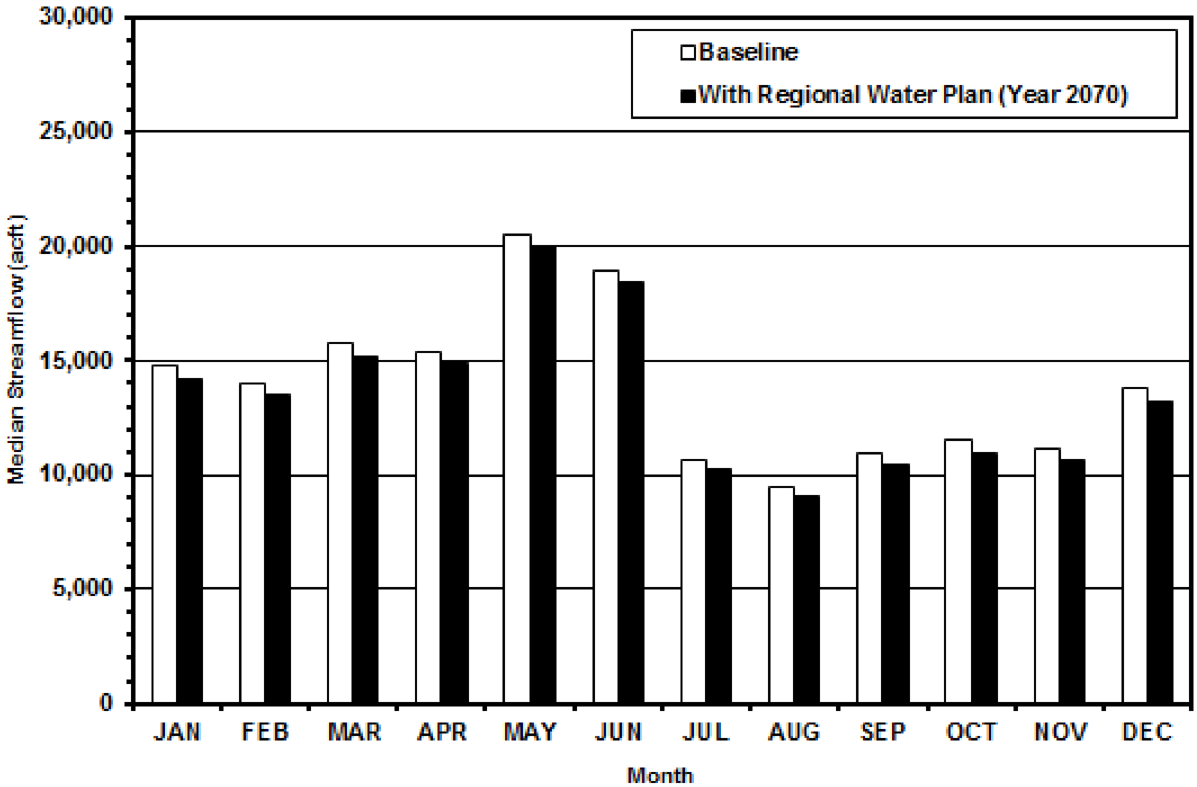


Figure 6-12 San Marcos River at Luling



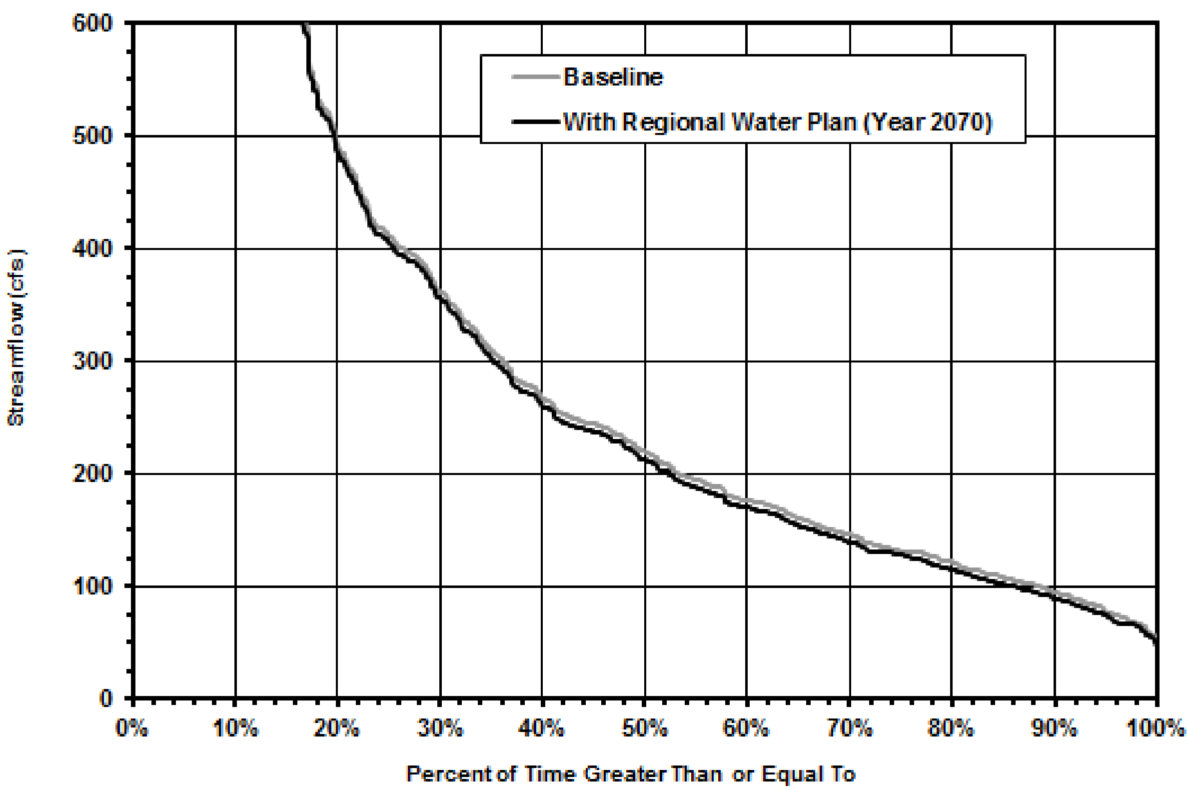
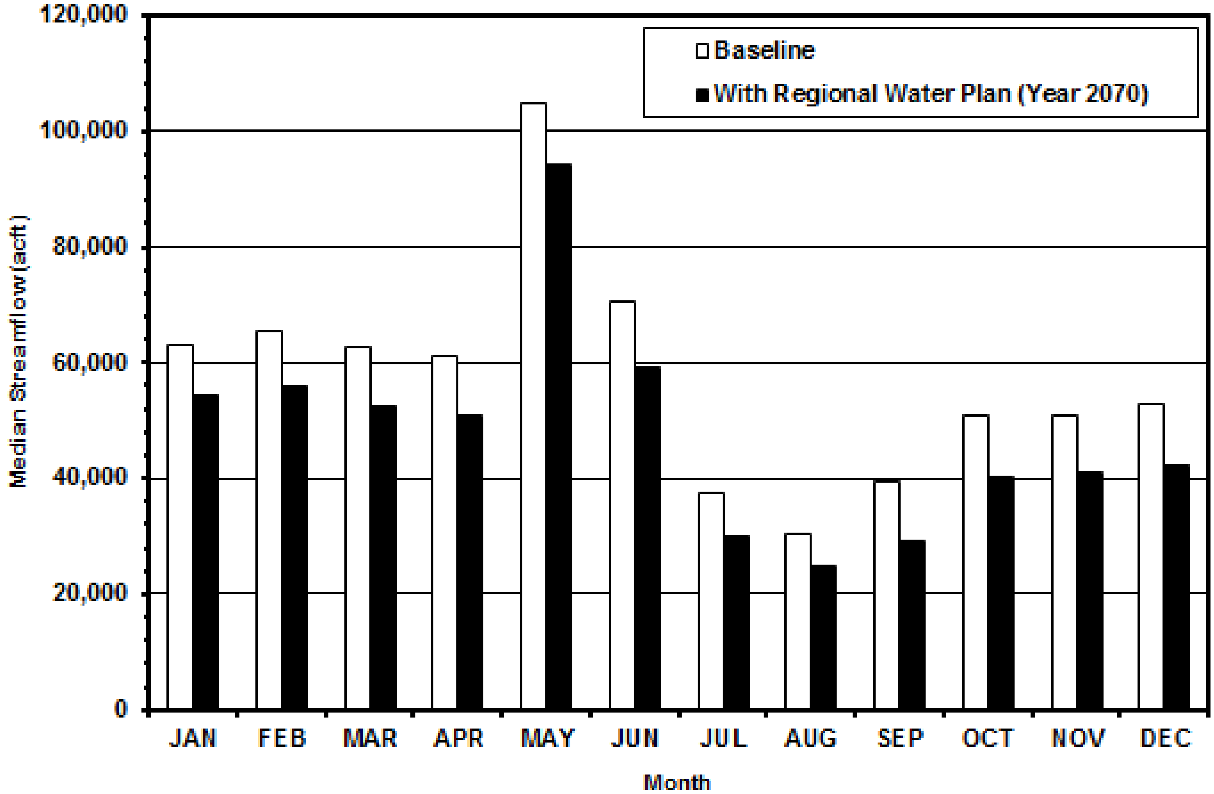


Figure 6-13 Guadalupe River at Victoria



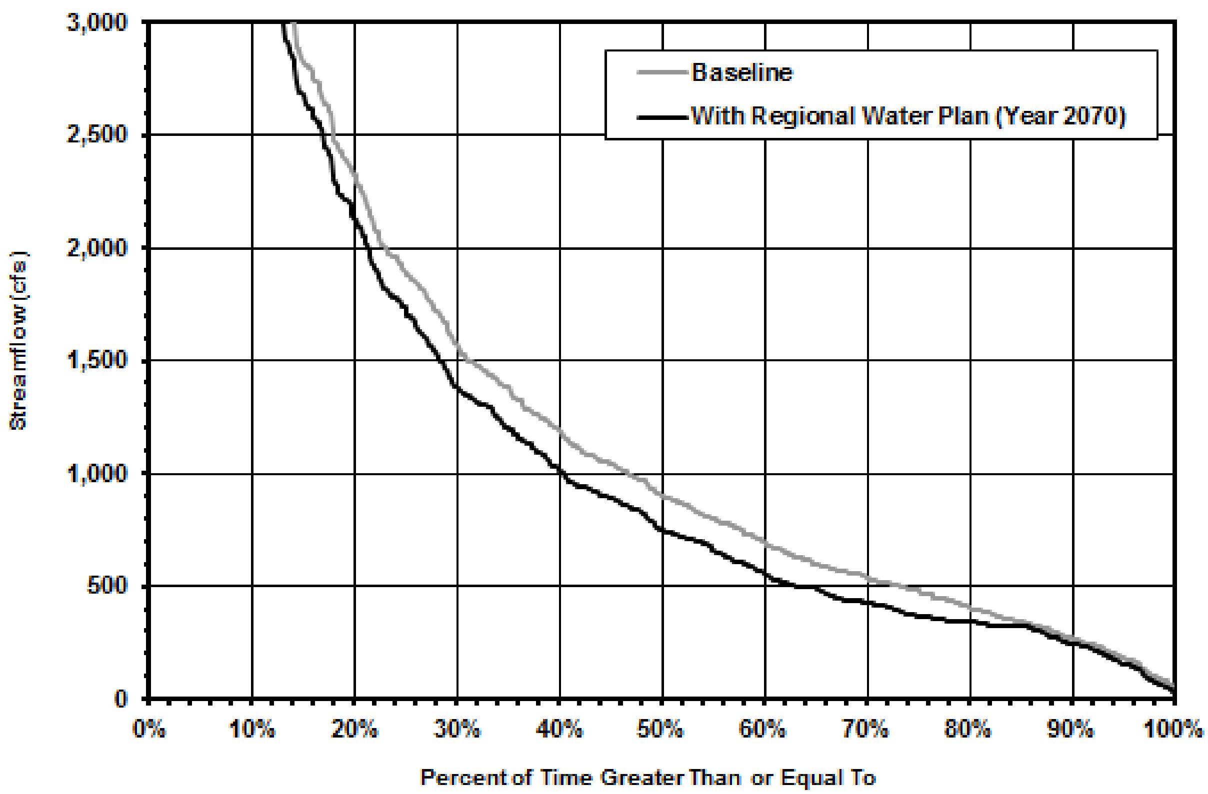
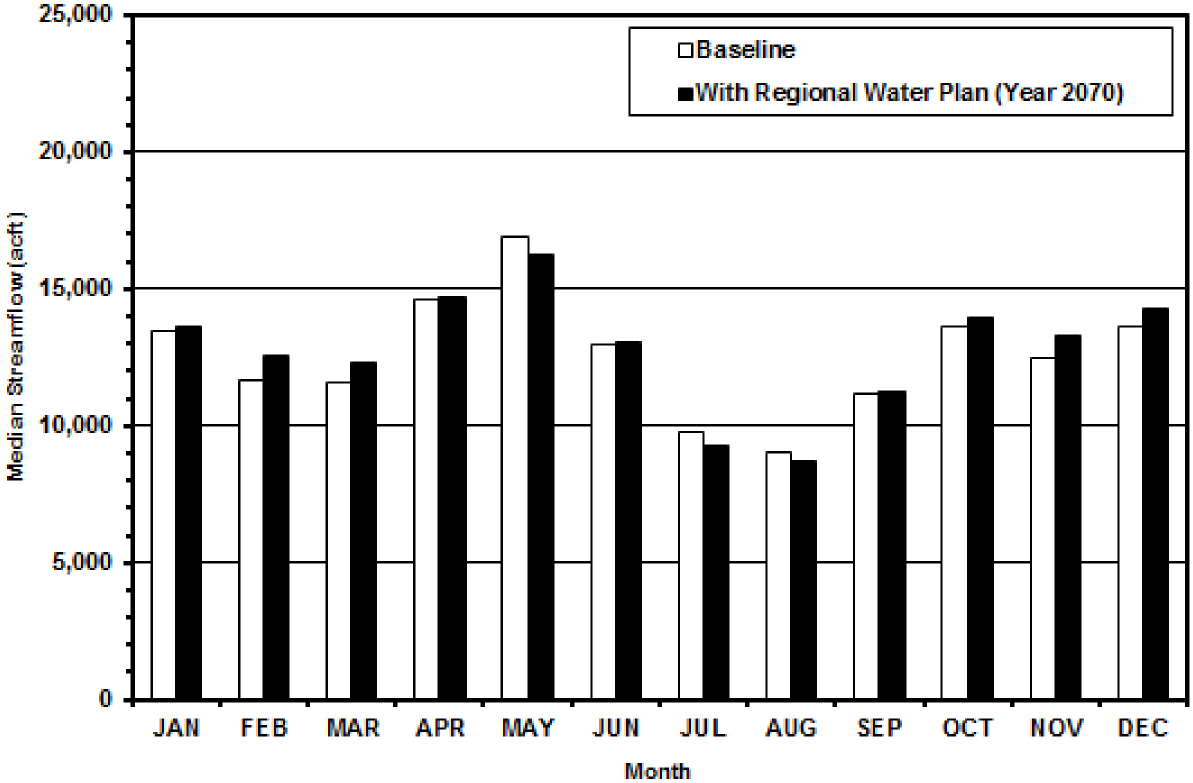


Figure 6-14 San Antonio River near Falls City



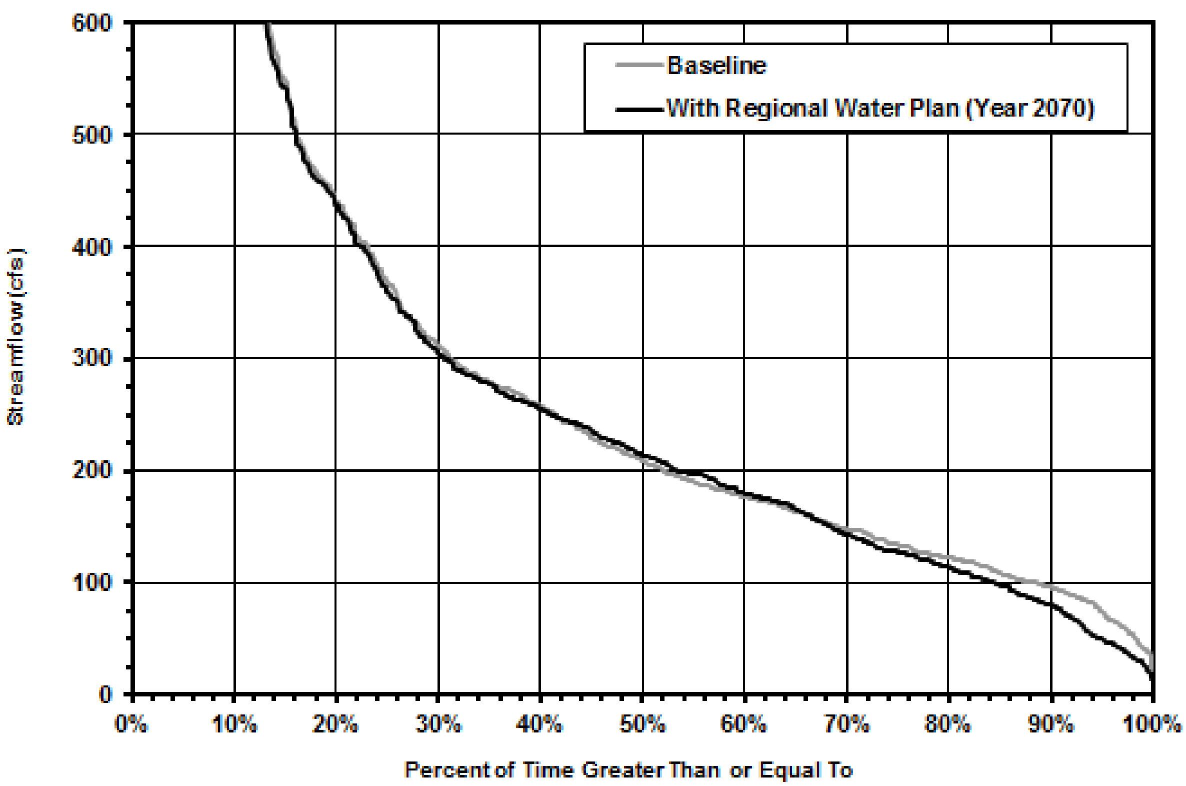
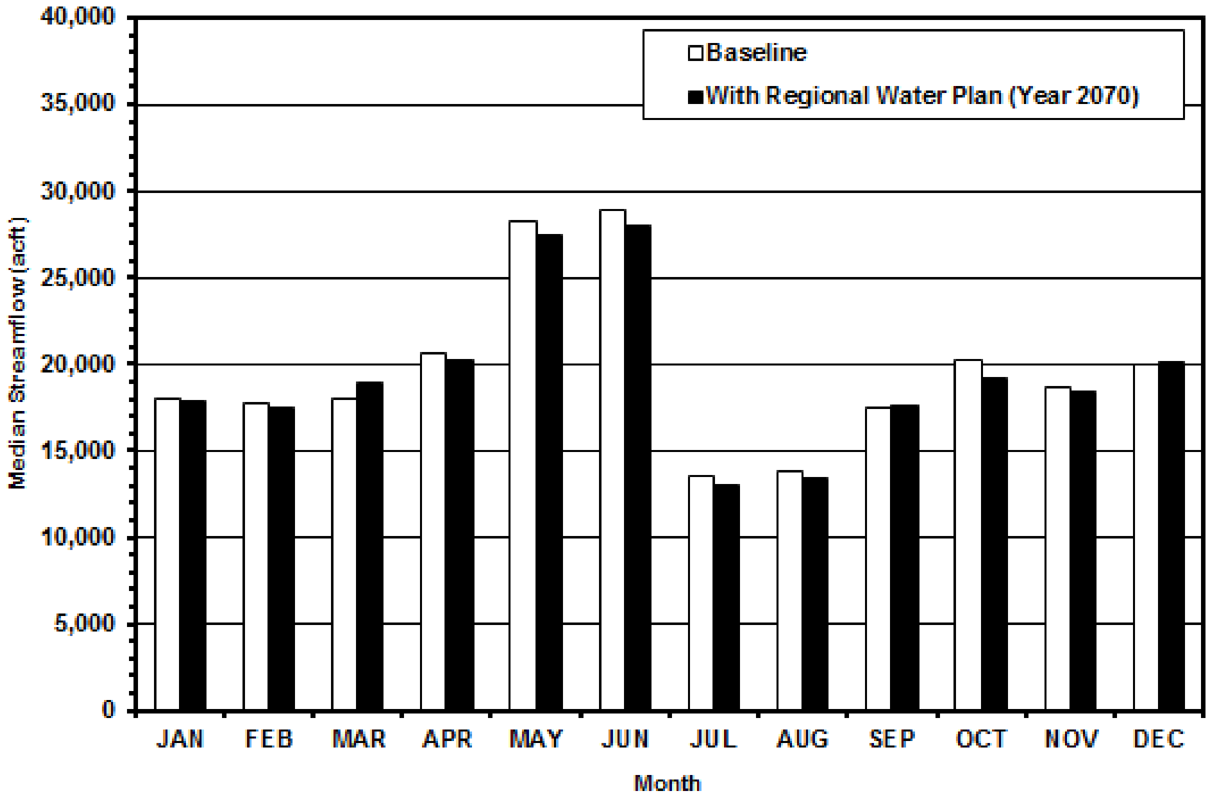


Figure 6-15 San Antonio River at Goliad



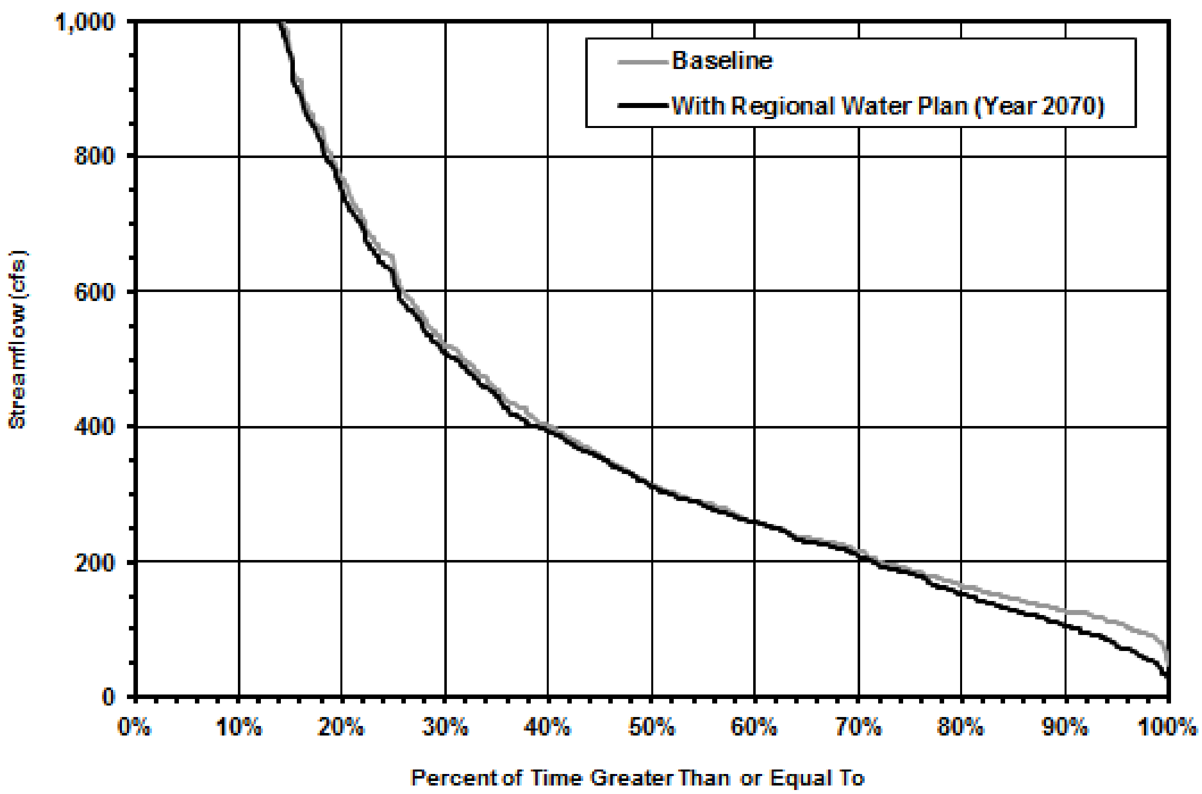
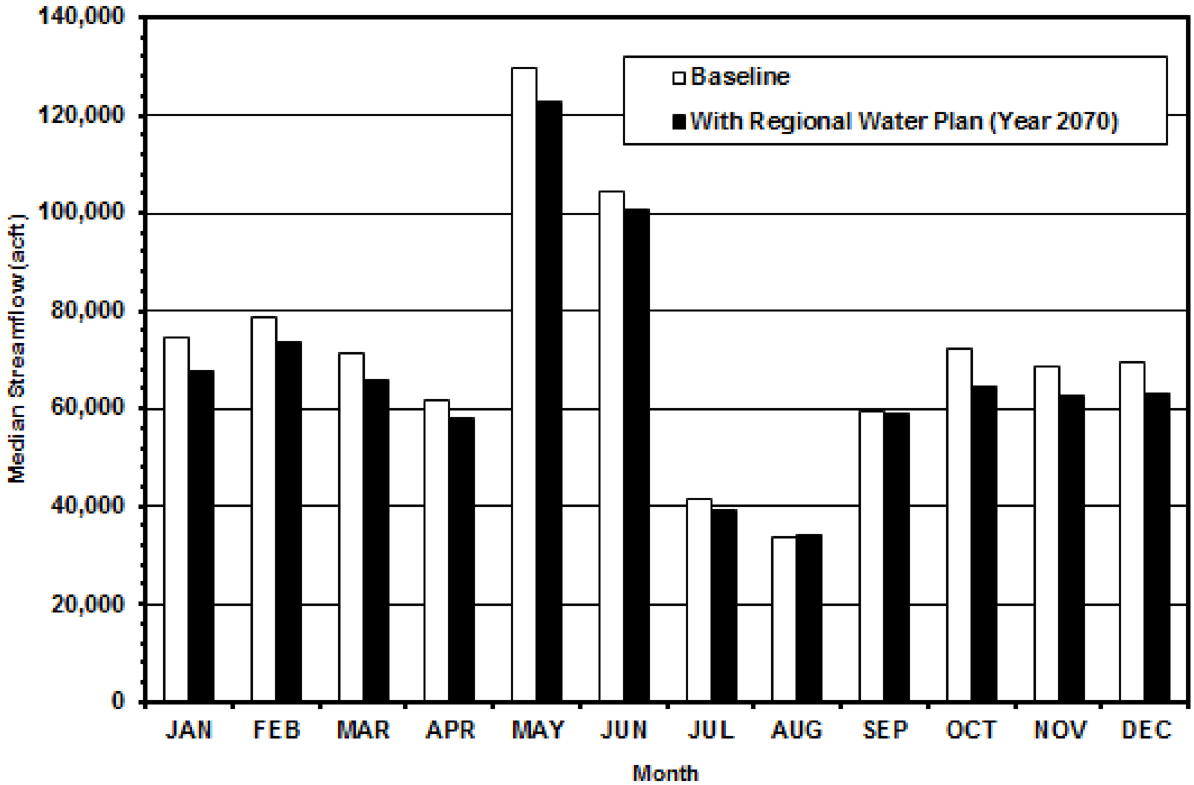


Figure 6-16 Guadalupe River at Diversion Dam and Saltwater Barrier near Tivoli



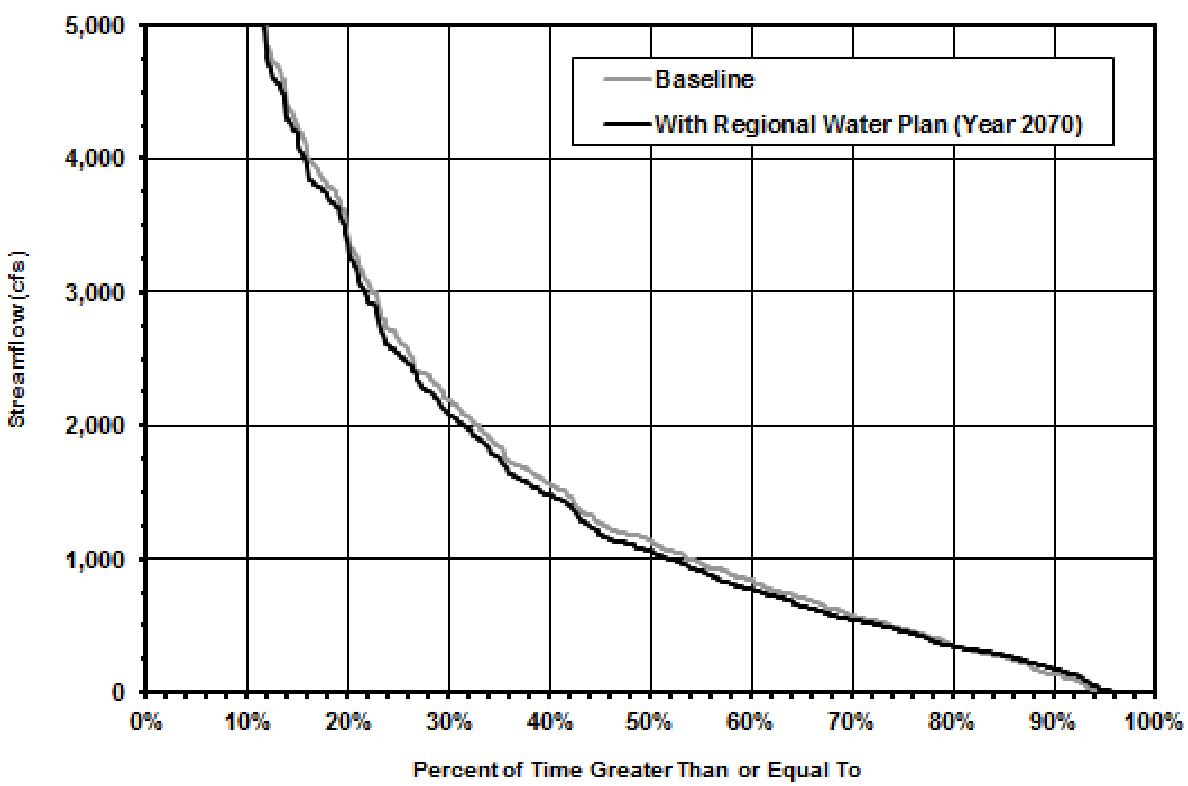
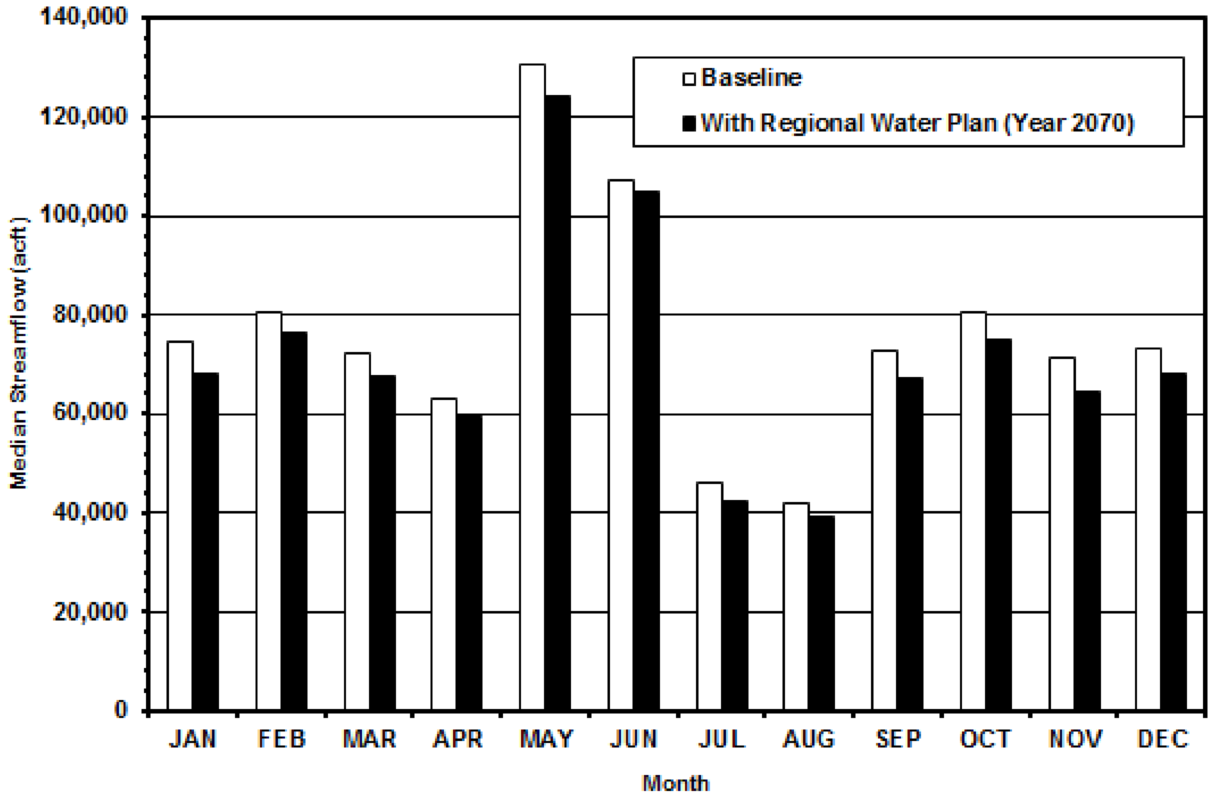
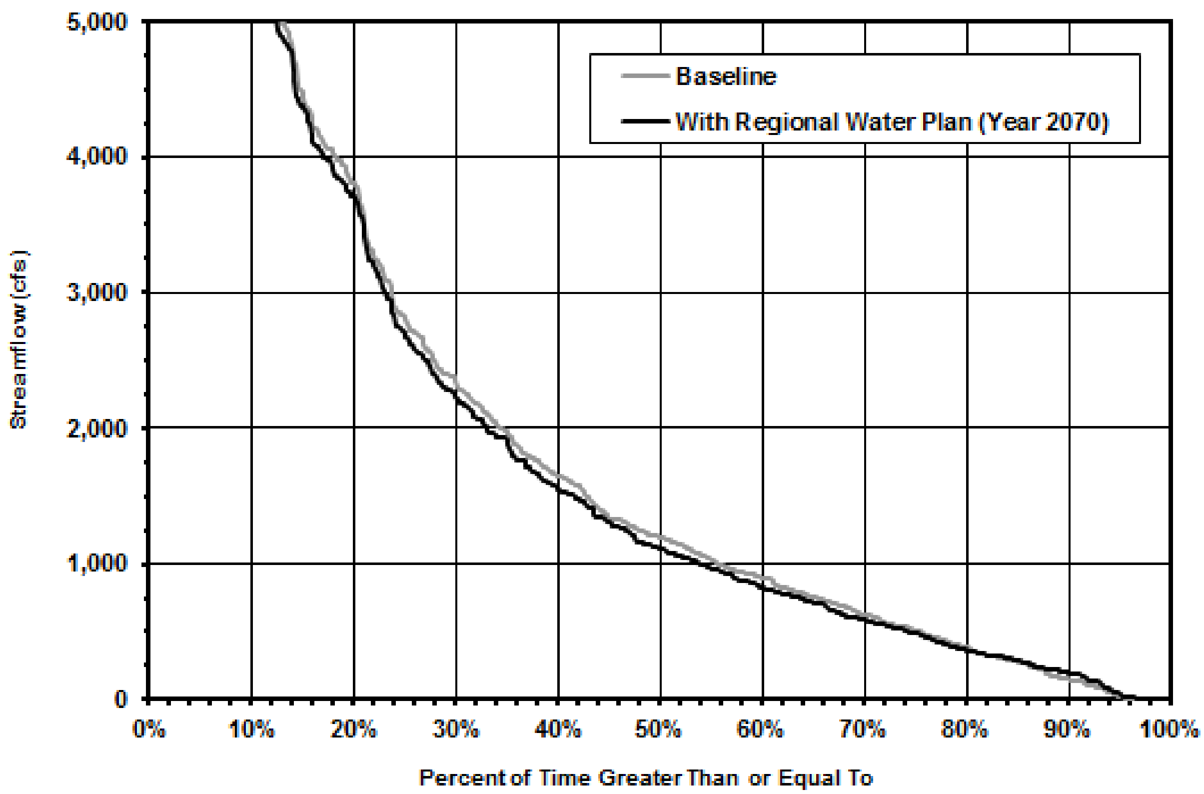


Figure 6-17 Guadalupe Estuary





6.2 Environmental Assessment

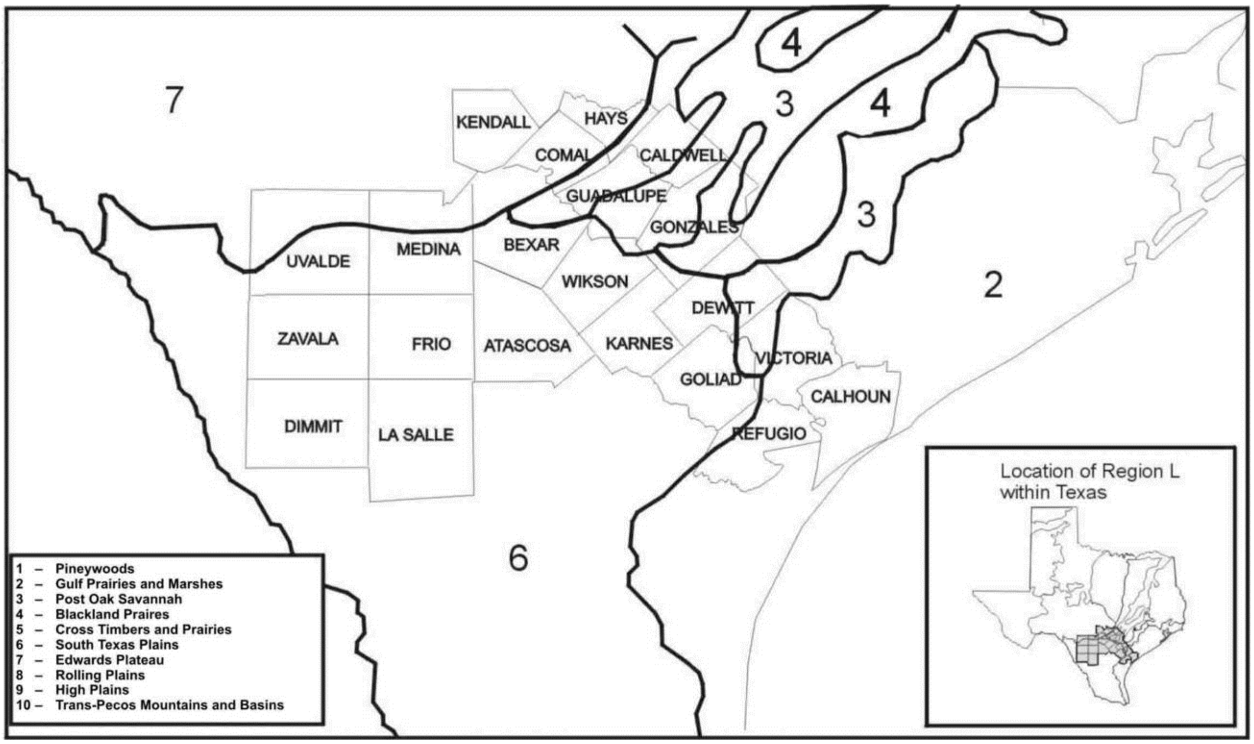
6.2.1 Regional Environment

The South Central Texas Regional Water Planning Area (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 Tamulipan)[1], 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[2] 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.[3] Focusing specifically on Texas, and excluding explicit land use criteria, Gould[4] delineated ten 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 6-18).

[1] Blair, W. Frank, "The Biotic Provinces of Texas," Texas Journal of Science 2(1):93-117, 1950.
[2] Omernik, James M., "Ecoregions of the Conterminous United States," Annals of the Association of American Geographers, 77(1) pp. 118-125, 1987.
[3] 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).
[4] Gould, F.W. 1975. The Grasses of Texas. Texas A&M University Press, College Station, Texas.

Figure 6-18 Gould's Vegetational Areas within Region L



The Edwards Plateau vegetational area encompasses approximately 24 million acres of tall or mid-grass understory and a brushy, savanna-type overstory complex of 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.), gramas (*Bouteloua* spp.), Indiangrass (*Sorghastrum nutans*), Canadian wild rye (*Elymus canadensis*), buffalograss (*Buchloe dactyloides*) and curly mesquite (*Hilaria belangeri*).[5]

Juniper and mesquite brush are generally considered invaders into this presumed climax of largely grassland or savannah, except on the steeper slopes which have continually supported a dense cedar-oak thicket. 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 soils have accumulated.[6] 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-msl to about sea level. Soil types cover a wide range, from clays to sandy loams, creating variations in soil

[5] Correll, D.S., and M.C. Johnston, "Manual of Vascular Plants of Texas," Texas Research Foundation, Renner, Texas, 1979.
[6] Ibid.

drainage and moisture-holding capacities. Though 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.[7] However long periods of grazing and the reduction of fire has affected these plant communities and led to an increase of brush 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.[8] 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 (*Stipa leucotricha*) are other important grasses found in the region.[9] 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.[10] Other invasive species include mesquite in the southern portion of the Blackland Prairies, and post oak and blackjack oak in areas which include medium to light-textured soils. 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.

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.[11] 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 either considered to be a part of the Eastern Deciduous Forest association or as part of the Prairie association.[12,13,14,15] During the last few decades, many areas of open savannah have been converted into dense woodland

[7] Thomas, G.W, Op. Cit., 1975.
[8] 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.
[9] Correll, D.S., and M.C. Johnston, Op. Cit., 1979.
[10] Ibid.
[11] Ibid.
[12] Tharp, B.C., "The Vegetation of Texas," Texas Acad. Sci., Anson Jones Press, Houston, 1939.
[13] Braun, E.L., "Deciduous Forests of Eastern North America," Hafner Publishing Co., Inc., New York, 1950.
[14] Weaver, J.E. and F.E. Clements, " Plant Ecology," 2nd Ed. McGraw-Hill Book Co., New York, 1938.
[15] Daubenmire, Rexford, "Plant Geography with Special Reference to North America," Academic Press, New York, 1978.

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.

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.[16] 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.[17,18] 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 acreage 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*).[19,20,21]

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

[16] Correll, D.S., and M.C. Johnston, Op. Cit., 1979.
[17] Johnston, M.C., "The Vascular Plants of Texas, A List Updating the Manual of the Vascular Plants of Texas," Austin, Texas, 1988.
[18] Thomas, G.W, Op. Cit., 1975.
[19] U.S. Bureau of Reclamation, "Palmetto Bend Project – Texas Final Environmental Impact Statement," Bureau of Reclamation, U.S. Department of the Interior, 1974.
[20] Soil Conservation Service, "Soil Survey of Calhoun County, Texas," Soil Conservation Service, Temple, Texas, 1978.
[21] Texas Department of Water Resources, "Land Use/Land Cover Maps of Texas," Austin, Texas. LP-62, 1977, Reprinted 1978.

live[22] and it supports a surprisingly diverse ecosystem. The aquifer has three parts: the drainage, or catchment area, the recharge zone, and the reservoir zone. Input to the aquifer comes from rainfall over the watershed as a whole, but recharge occurs primarily in the beds of streams 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 other species of concern are listed and discussed in terms of the potential impacts of each water management strategy in Volume II, and are included by county in Appendix G. Endangered species are not distributed uniformly throughout Region L; they tend to be most densely abundant in 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 (i.e., Golden-cheeked Warbler and Black-Capped Vireo), 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 support of the regional water planning process, the Texas Parks and Wildlife Department (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.[23] Segment locations are shown in Figure 6-19. The SCTRWPG has recommended that portions of five of these segments be designated by the Texas

[22] 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.

[23] 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.

Legislature as having unique ecological value (Chapter 8 and Appendix H). Furthermore, the SCTRWPG considers the segments identified by TPWD as a guide for recommending additional segments for future legislative designation (Chapter 8).

With respect to Cultural Resources, Region L is the location of much of the earliest European activity in Texas, including concentrations of important historical sites on Matagorda Bay, along the Guadalupe and San Antonio Rivers, in Bexar County, and at the perennial springs along the margin of the Edwards Plateau. Prehistoric sites also tend to be concentrated in many of the same areas, and Region L contains some of the oldest Native American habitation sites known in the United States. Large National Historic Districts encompass areas on the lower Guadalupe and San Antonio Rivers that are particularly rich in both historic and prehistoric remains.

Table 6-3 Ecologically Significant River and Stream Segments Identified by TPWD in the South Central Texas Regional Water Planning Area

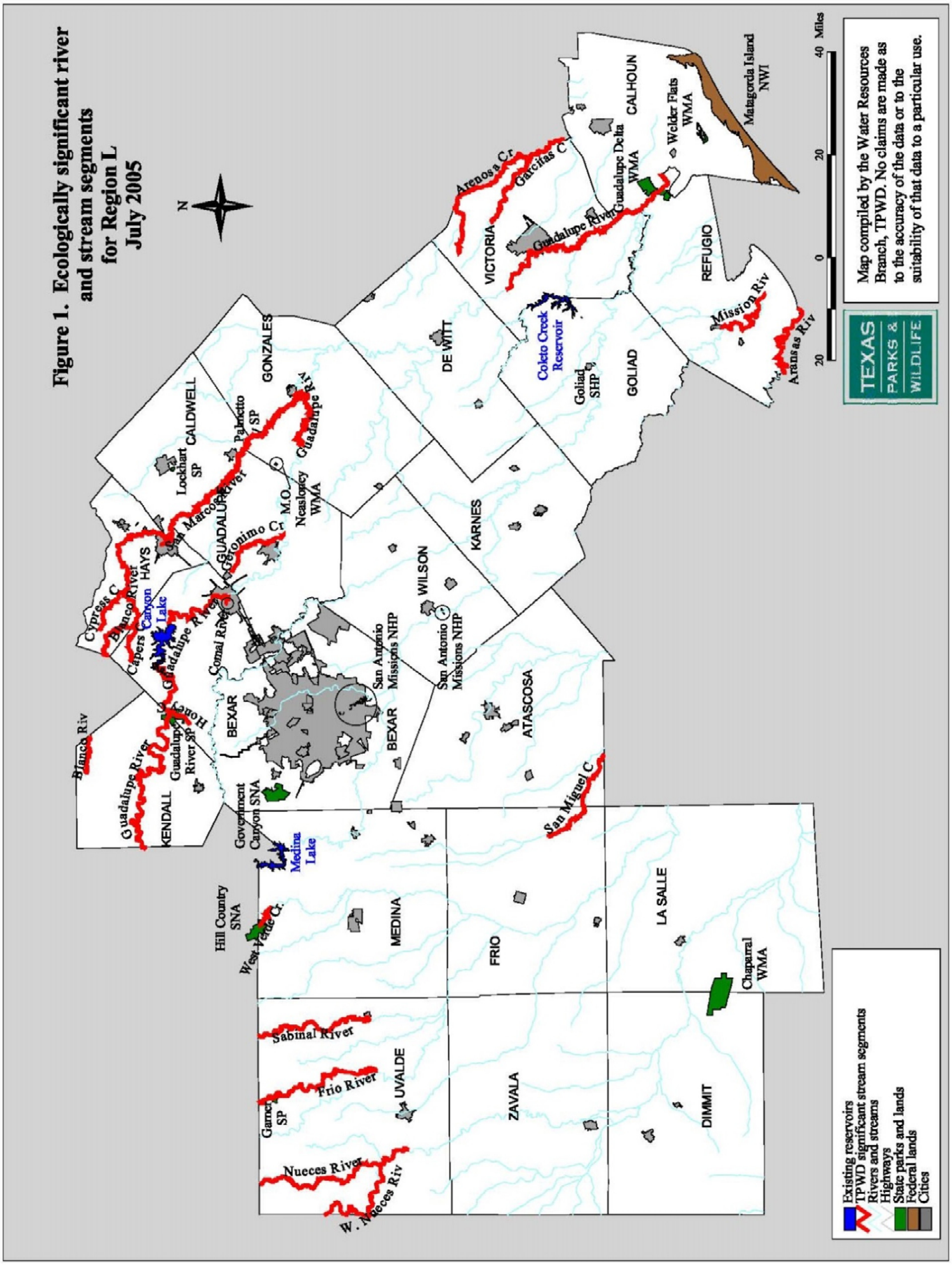
Segment Name	*Biological Function*	*Hydrologic Function*	*Riparian Conservation*	*Water Quality Aquatic Life/Uses*	*Endangered or Threatened Species or Unique Communities*
Aransas River	Extensive estuarine wetland habitat	Water quality and flood attenuation performed by estuarine and freshwater wetlands.			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
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	

Table 6-3 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*
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
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 6-19 Ecologically Significant Stream and River Segments for Region L



6.2.2 Environmental Effects

In attempting to evaluate the environmental effects of any activity, it is often useful to consider the effects of construction and operations separately. Construction effects are generally due to 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. Operations effects may include (for example) impacts to vegetation, habitats, or endangered species through maintenance practices or changes in streamflows, water quality, or groundwater availability. The potential environmental effects of each water management strategy were evaluated individually and the results are included with the technical evaluation of that strategy in Chapter 5.2 (Volume II). The evaluation in this section focuses on the cumulative impact of all recommended water management strategies in the 2016 SCTRWP, and how that compares with the potential impacts of water management strategies recommended for the South Central Texas Region in past state water plans.

It should be noted that the information available for analysis of potential impacts of water management strategies has changed substantially since similar analyses were performed for previous regional water plans. 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. Presently, information used to evaluate potential environmental impacts resulting from water management strategies is 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 water management strategy. For example, the TPWD Natural Diversity Database shapefiles include areas which represent documented occurrences of specific species within a project area. In addition, recent aerial photography of the project areas provides an opportunity to evaluate potential habitat impacts based on the actual vegetation type which exists within the project areas rather than a large scale evaluation of general vegetation types.

The environmental assessments of individual water management strategies should be regarded as “worst case” and preliminary 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, identify locations where risks to environmental resources can be avoided or minimized, and propose compensation for unavoidable impacts. 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. For that reason, many, if not most, of the potential impacts discussed in the respective water management strategies evaluations, can be avoided or significantly mitigated by relocation of project elements. 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 a limited set of suitable sites.

Some of the water management strategies considered in this regional water plan are expected to involve little potential impact to environmental or cultural resources, except secondarily with respect to changes in land use practices that may affect wildlife habitats and uses in both rural and urban areas. These would seem to include the Water Conservation, Drought Management, Facilities Expansions, Local Groundwater, and Recycled Water strategies, as well as strategies that reallocate previously permitted and developed water among different sets of users (e.g., Surface Water Rights which are generally moving water presently authorized for consumptive use from irrigation to municipal uses). Hence, these strategies are not included in the assessment of environmental effects.

Potential adverse environmental and cultural resources impacts are minimized in the 2016 SCTRWP by the recommendation of strategies that maximize the efficient use of existing surface water resources, or which develop groundwater and seawater supplies. These water management strategies 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 water management strategies recommended in the 2016 SCTRWP and included in the assessment of environmental effects are summarized in Table 6-4 along with strategies included in previous State Water Plans.

Regardless of water source and location, all the recommended water management strategies comprising the Regional Water Plan involve the construction of dispersed facilities that typically have substantial flexibility in terms of alignment or site selection such as water intakes, off-channel storage, pipelines, and well fields. The recommended strategies typically result in only relatively localized disturbances. While a major pipeline may disturb several hundred acres in total, effects are generally minor at the landscape scale because construction and maintenance activities are dispersed among the much larger physiographic and habitat elements in which they are placed. In comparison with storage reservoir projects, the total land area impacted by a well field or river diversion and transmission pipeline is smaller, often by orders of magnitude. 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.

Table 6-4 Estimated Firm Yields of Water Management Strategies in State Water Plans (acft/yr)

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
G-16C1	Cuero Reservoir	152,606	152,606					
G-17C1	Lindenau (Sandies) Reservoir	80,836	80,836	80,836				
G-40	Cloptin Crossing Reservoir	32,458						
G-21	Lockhart Reservoir	5,627						
S-14D	Applewhite Reservoir	4,032	4,032					
S-16C	Goliad Reservoir	99,687	99,687					
S-15C	Cibolo Reservoir	33,200						
S-15Da	Cibolo Reservoir w/ SA River		69,925	69,925				
LGWSP	Lower Guadalupe Water Supply Project				104,487			
LGWSP	LGWSP for GBRA Needs					63,072		
LSWP	LCRA-SAWS Water Project				150,000	150,000	90,000	
SCTN-3c	Simsboro Aquifer				55,000			
L-18a	Edwards Recharge Projects				21,577	21,577	21,577	
SCTN-17	Seawater Desalination				84,012	84,012	84,012	84,012
CZ-10C	Carrizo Aquifer - Wilson & Gonzales				16,000			
CZ-10D	Carrizo Aquifer - Gonzales & Bastrop				27,500			
G-24	Wimberley and Woodcreek Water Supply Project				4,636	4,636	4,480	0
	Canyon Amendment			40,000	40,000			
	Regional Carrizo for SAWS					62,588	11,700	
	SSLGC Carrizo Project Expansion				12,800	12,800		
	Hays/Caldwell PUA					15,000	35,000	21,833

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
	Recycled Water Program Expansion		97,000		52,215	36,258		
	Brackish Wilcox Desalination					5,662		
	Wells Ranch Project				9,000	9,000	11,000	
	CRWA Siesta Project				5,042	5,042	5,042	5,042
	GBRA Simsboro Aquifer						50,000	
	GBRA-Exelon Project--River Diversion Option						49,126	
	GBRA New Appropriation (Lower Basin)						11,500	42,000
	GBRA Mid Basin (Surface Water)						25,000	50,000
	GBRA Lower Basin Storage						26,452	51,800
	Regional Carrizo for SSLGC						10,364	5,720
	Brackish Wilcox Groundwater for SAWS						26,400	5,622
	Brackish Wilcox Groundwater for Regional Water Alliance						11,200	3,839
	Brackish Wilcox Groundwater for SSWSC						1,120	0
	Medina Lake Firm-Up (ASR)						13,730	
	Lavaca River Off-Channel Reservoir						26,242	10,000
	Storage Above Canyon (ASR)						3,140	
	TWA Regional Carrizo						27,000	15,000
	CRWA Wells Ranch Phase 2							7,829
	Cibolo Valley LGC							0
	GBRA IWPP							100,000

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
	Victoria Co. Steam Electric							29,100
	SAWS Expanded Local Carrizo Project							5,419
	SAWS Vista Ridge							34,894
	SAWS Expanded Brackish Wilcox Groundwater							0
	Brackish Wilcox (Gonzales Co.) MAG Limited							1,392
	TWA Trinity							5,000
	New Braunfels ASR and WTP Expansion							8,300
	New Braunfels Trinity							1,090
	Hays Co. Forestar							12,356
	Uvalde ASR							1,155
	Victoria ASR							7,900
	Victoria Off-channel Storage							N/A
	SAWS CPS Pipeline							N/A
Totals		**408,446**	**504,086**	**190,761**	**582,269**	**469,647**	**544,085**	**590,303**

Five recommended river diversion strategies, the GBRA Mid-Basin Project (ASR), GBRA New Appropriation (Lower Basin), Lavaca River Off-Channel Reservoir, GBRA Lower Basin Storage, and Victoria County Steam Electric include off-channel reservoir (OCR) or aquifer storage and recovery (ASR) facilities which 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. The GBRA Mid-Basin Project includes longer transmission pipelines that traverse several ecologically distinct regions, which inflate the potential effects of the project on vegetation and terrestrial habitats, place project facilities adjacent to more protected species, and increase the potential for adverse effects.

The water management strategies that include development of large amounts of groundwater all avoid the potential environmental and cultural resources impacts usually attendant 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. However, modeling the net effect on streamflows in the San Antonio and Guadalupe Rivers of complete implementation of all the currently recommended water management strategies has not indicated significant changes in streamflows in either river. These groundwater projects do, however, include transmission pipelines from the well fields to the users which may include similar consequent effects as noted for the GBRA Mid-Basin Project in the previous paragraph.

The seawater desalination projects involve little construction disturbance except for the necessary raw water intakes or wells and transmission pipelines. Use of either seawater or brackish bay water sources will entail potential impacts due to impingement and entrainment of aquatic organisms at the intake, and to the need to discharge water 2-3 times as salty as the raw water. Potential impacts from desalination operations can be avoided or significantly minimized by appropriate site selection and design of intake and discharge structures based on the biological and hydrodynamic characteristics of the receiving water. The Seawater Desalination and GBRA IWPP strategies each include a long transmission pipeline for delivery of water from the Texas Gulf Coast to the central part of the state.

In order to assess the potential cumulative environmental impacts of all the recommended water management strategies having quantifiable impacts, a method was developed to numerically characterize the environmental effects of each water management strategy in terms such that very different kinds of impacts could be aggregated and the results compared. To evaluate the resulting impact scores of the 2016 SCTRWP (which will become a part of the 2017 State Water Plan) relative to the possible universe of water management strategies available to the region, we compare the present set of recommended water management strategies to those proposed for the South Central Texas Region in previous State Water Plans.

The location and extent of potential disturbances to environmental and cultural resources are based on the descriptions and environmental assessments of the water management strategies in Chapter 5.2 (Volume II) and updated information developed by HDR Engineering, Inc. during the current regional water planning effort. Pipeline routes were produced digitally by HDR and pipeline lengths and areas were calculated using ArcMap geographic information system software. A 30-foot permanent easement corridor was assigned to pipelines with pipe diameters less than 36 inches and a 40-foot corridor for those with diameters greater than 36 inches. A 100-foot temporary construction corridor was assumed for all pipelines. Areas inundated by reservoirs recommended in the 2016 SCTRWP were obtained from GIS analyses. The areas for smaller ancillary facilities such as water treatment plants, pump stations, storage units, and wells were estimated and added to the total impact area of each project.

Recommended water management strategies that involve only reallocation of previously appropriated water using existing infrastructure are not included in this analysis. These strategies, which include conservation, some reuse, transfer of water among user groups, and local groundwater development, do not generally require additional reservoirs, pipelines, or other structures that would have significant environmental impacts. For consistency with water planning evaluation protocols used in this report, diversion and use of currently appropriated water is not considered to result in certain aquatic habitat impacts.

This assessment was completed using a matrix approach to perform a series of parallel evaluations of each water management strategy for its potential to impact:

1. Endangered and Threatened Species;
2. Vegetation and Wildlife Habitats;
3. Water Quality and Aquatic Habitats; and/or
4. Cultural Resources.

The impact values were tabulated, summed for all water management strategies in each of the State Water Plans, and the aggregate scores normalized by dividing them by the total firm yield of the respective State Water Plan strategies (Table 6-5), and again by the average score of the seven State Water Plans.

Endangered and Threatened Species

The potential impacts of the individual water management strategies 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 species was assigned a score that reflected its status — 1 for state species of concern or federal candidate species; 2 for threatened; or 3 for endangered. In cases where status varies among state and federal agencies, the higher status was used. This analysis included current county species lists produced by TPWD and mapped occurrences of endangered and threatened species within Region L obtained from the TPWD Natural Diversity Database.

Each water management strategy was then evaluated with respect to its potential impact on the species present by assigning a numerical value from zero (0) to three (3) to each instance in which construction or operational disturbances could result in an impact to one of these species according to the following criteria:

0 - No adverse impact expected, or project in historic range only;

1 - Species known to occur within county, but not likely to be impacted;

2 - Species or potential habitat known to occur within the project area, may impact habitats or individuals of widespread species; or

3 - Species or habitat present within the project area, significant reductions in critical habitat or population of endemic species possible.

Each potential impact score was then multiplied by the status score to obtain a final impact assessment for that species and strategy. Status, potential impact, and impact assessment scores are shown in the Endangered, Threatened, and Species of Concern tables in the respective water management strategy discussions in Chapter 5.2 (Volume II). 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 6-5.

The potential impacts to endangered and threatened species associated with the seven State Water Plans are compared in Figure 6-20, which indicates a higher potential for impacts to occur in the 2017 State Water Plan. This finding is a direct result of the changing nature of the water management strategies; many small projects requiring long pipelines that cross numerous ecologically distinct areas, and those constructed in regions where many protected species occur will have more project facilities adjacent to sensitive species and habitats, and thus higher impact potential, than larger, more compact projects that are not located in areas of many protected species. In Table 6-5, the highest impact scores go to the water management strategies located in areas of relatively high protected species density and the projects requiring the longest pipelines.

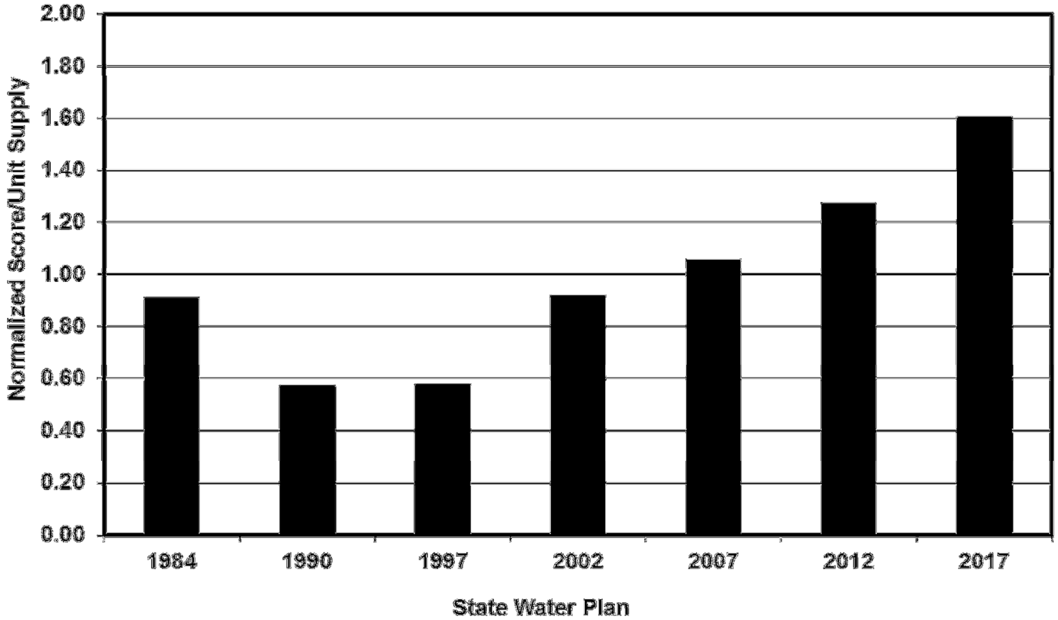
Table 6-5 Potential Impacts to Endangered, Threatened, and Species of Concern from Water Management Strategies in State Water Plans

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
G-16C1	Cuero Reservoir	70	70					
G-17C1	Lindenau (Sandies) Reservoir	74	74	74				
G-40	Cloptin Crossing Reservoir	67						
G-21	Lockhart Reservoir	40						
S-14D	Applewhite Reservoir	66	66					
S-16C	Goliad Reservoir	78	78					
S-15C	Cibolo Reservoir	53						
S-15Da	Cibolo Reservoir w/ SA River		59	59				
LGWSP	Lower Guadalupe Water Supply Project				91			
LGWSP	LGWSP for GBRA Needs					114		
LSWP	LCRA-SAWS Water Project				103	103	85	
SCTN-3c	Simsboro Aquifer				68			
L-18a	Edwards Recharge Projects				84	84	84	
SCTN-17	Seawater Desalination				67	67	67	77
CZ-10C	Carrizo Aquifer - Wilson & Gonzales				46			
CZ-10D	Carrizo Aquifer - Gonzales & Bastrop				65			
	Regional Carrizo for SAWS					47	30	
	Hays/Caldwell PUA					19	19	36
G-24	Wimberley and Woodcreek Water Supply Project				78	78	35	35

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
	Brackish Wilcox Desalination					44		
	Wells Ranch Project				21	21	21	
	CRWA Siesta Project				23	23	23	28
	GBRA Simsboro Aquifer						38	
	GBRA-Exelon Project--River Diversion Option						66	
	GBRA New Appropriation (Lower Basin)						56	47
	GBRA Mid Basin (Surface Water)						37	35
	GBRA Lower Basin Storage						34	47
	Regional Carrizo for SSLGC						30	
	Brackish Wilcox Groundwater for SAWS						28	25
	Brackish Wilcox Groundwater for Regional Water Alliance						27	21
	Brackish Wilcox Groundwater for SSWSC						4	4
	Medina Lake Firm-Up (ASR)						53	
	Lavaca River Off-Channel Reservoir						33	33
	Storage above Canyon (ASR)						54	
	TWA Regional Carrizo						42	35
	CRWA Wells Ranch Phase 2							18
	Cibolo Valley LGC							19
	GBRA IWPP							101
	Victoria Co. Steam Electric							77

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
	SAWS Expanded Local Carrizo Project							19
	SAWS Vista Ridge							62
	SAWS Expanded Brackish Wilcox Groundwater							25
	Expanded Carrizo for SSLGC							20
	Brackish Wilcox (Gonzales Co.) MAG Limited							20
	TWA Trinity							32
	New Braunfels ASR and WTP Expansion							43
	New Braunfels Trinity							41
	Hays Co. Forestar							32
	Uvalde ASR							26
	Victoria ASR							6
	Victoria Off-channel Storage							13
	SAWS CPS Pipeline							9
Factor 1,000	**Raw Score**	**448**	**347**	**133**	**646**	**600**	**860**	**986**
	Score / Unit Supply	**1.097**	**0.688**	**0.697**	**1.109**	**1.278**	**1.581**	**1.936**
	Normalized Score / Unit Supply	**1.020**	**0.640**	**0.649**	**1.032**	**1.188**	**1.470**	**1.603**
	Rank	**3**	**1**	**2**	**4**	**5**	**6**	**7**

Figure 6-20 Cumulative Potential Impact Scores for Endangered, Threatened, and Species of Concern



Vegetation and Wildlife Habitats

To evaluate potential impacts on vegetation and wildlife habitats, each of the water management strategies was given a "total adjusted impact value" based on the area of each habitat type disturbed by construction activities and the level of potential impacts on those resources. For each water management strategy, the total land area potentially disturbed was divided into categories based on types of disturbance. For example, inundation of land due to the construction of a reservoir versus the temporary construction corridor of a pipeline easement. The potential level, or severity, of impacts to vegetation and wildlife was evaluated by assigning an expected impact score:

1 - Low impacts = temporary habitat disturbance (e.g., a pipeline construction corridor);

2 - Medium impacts = permanent or continuing habitat disturbance that does not entirely destroy its original ecological functions; or

3 - High impacts = habitat is permanently removed through inundation or construction.

The area of each type of disturbance was then divided into four categories of habitat type with corresponding scores reflecting their relative values (e.g., forests and wetlands are generally considered more important ecologically than grassland types):

1 - 0-30% canopy cover (grasslands, shrub land and cropland);

2 - 31-70% canopy cover (brush lands, and parkland);

3 - 70-100% canopy cover (woods and forestland); or

4 - All wetland and wooded riparian areas regardless of canopy cover.

These four categories were based on a clustering of the eight Physiognomic Regions of vegetation provided by the TPWD.[24] A digital map of the vegetation types of Texas was then situated over the project area and used to determine the proportions of the four habitat categories potentially affected by each water management strategy.

The product of the level of impact score times the habitat value score times the acreage affected is the adjusted impact value. Adjusted impact values are summed for the habitats potentially affected by each water management strategy and overall vegetation and habitat scores are shown in Table 6-6. Figure 6-21 presents a graphical comparison of seven State Water Plans. These results are clearly the opposite of those obtained above for protected species; the 2016 SCTRWP (2017 State Water Plan) exhibits a lesser impact to this environmental resource category than earlier state water plans. In this case, the large areas to be inundated in the storage reservoir projects recommended in the 1984 to 1997 State Water Plans eliminated large areas of terrestrial and flowing aquatic habitat, replacing them with a lake-type environment.

[24] McMahan, Roy G. Frye, Kirby L. Brown. 1984. The Vegetation Types of Texas Including Cropland. Texas Parks and Wildlife Department. Austin. Texas.

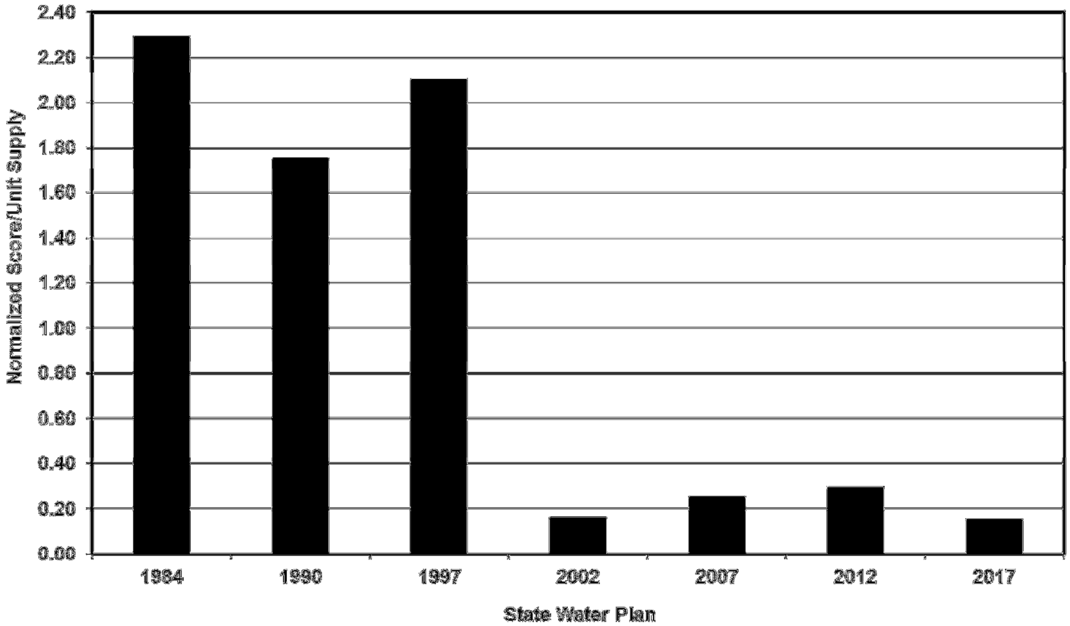
Table 6-6 Potential Impacts to Vegetation and Wildlife Habitats from Water Management Strategies in State Water Plans

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
G-16C1	Cuero Reservoir	243,933	243,933					
G-17C1	Lindenau (Sandies) Reservoir	242,980	242,980	242,980				
G-40	Cloptin Crossing Reservoir	30,171						
G-21	Lockhart Reservoir	13,639						
S-14D	Applewhite Reservoir	12,712	12,712					
S-16C	Goliad Reservoir	136,422	136,422					
S-15C	Cibolo Reservoir	84,604						
S-15Da	Cibolo Reservoir w/ SA River		84,717	84,717				
LGWSP	Lower Guadalupe Water Supply Project				10,816			
LGWSP	LGWSP for GBRA Needs					12,004		
LSWP	LCRA-SAWS Water Project				26,739	55,798	21,799	
SCTN-3c	Simsboro Aquifer				4,422			
L-18a	Edwards Recharge Projects				13,769	13,769	13,769	
SCTN-17	Seawater Desalination				4,343	4,343	4,343	3,191
CZ-10C	Carrizo Aquifer - Wilson & Gonzales				3,088			
CZ-10D	Carrizo Aquifer - Gonzales & Bastrop				8,762			
	Regional Carrizo for SAWS					4,797	1,790	
	Hays/Caldwell PUA					1,890	1,934	2,668

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
G-24	Wimberley and Woodcreek Water Supply Project				1,128	1,128	674	674
	Brackish Wilcox Desalination					478		
	Wells Ranch Project				1,307	1,307	1,307	
	CRWA Siesta Project				1,149	1,149	1,149	817
	GBRA Simsboro Aquifer						2,982	
	GBRA-Exelon Project--River Diversion Option						15,063	
	GBRA New Appropriation (Lower Basin)						12,400	6,227
	GBRA Mid Basin (Surface Water)						34,767	1,783
	GBRA Lower Basin Storage						1,829	636
	Brackish Wilcox Groundwater for SAWS						72	122
	Brackish Wilcox Groundwater for Regional Water Alliance						836	743
	Brackish Wilcox Groundwater for SSWSC						118	90
	Medina Lake Firm-Up (ASR)						688	
	Lavaca River Off-Channel Reservoir						9,371	9371
	Storage above Canyon (ASR)						453	
	TWA Regional Carrizo						4,274	2837
	CRWA Wells Ranch Phase 2							27
	Cibolo Valley LGC							1726
	GBRA IWPP							4472
	Victoria Co. Steam Electric							15420

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
	SAWS Expanded Local Carrizo Project							253
	SAWS Vista Ridge							5381
	SAWS Expanded Brackish Wilcox Groundwater							519
	Expanded Carrizo for SSLGC							855
	Brackish Wilcox (Gonx. Co.) MAG Limited							854
	TWA Trinity							30
	New Braunfels ASR and WTP Expansion							433
	New Braunfels Trinity							80
	Hays Co. Forestar							3112
	Uvalde ASR							1574
	Victoria ASR							54
	Victoria Off-channel Storage							39
	SAWS CPS Pipeline							53
Factor 1	**Raw Score**	**764,461**	**720,764**	**327,697**	**75,525**	**96,663**	**129,618**	**64,041**
	Score / Unit Supply	**1.872**	**1.430**	**1.718**	**0.130**	**0.206**	**0.238**	**0.126**
	Normalized Score / Unit Supply	**2.008**	**1.534**	**1.843**	**0.139**	**0.221**	**0.256**	**0.154**
	Rank	**7**	**5**	**6**	**2**	**3**	**4**	**1**

Figure 6-21 Cumulative Potential Impact Scores for Vegetation and Wildlife Habitats



Water Quality and Aquatic Habitats

Potential impacts to water quality and aquatic habitats were assessed in a single stage as each water management strategy was evaluated with respect to a list of eight potential impact classes and assigned an appropriate score for each occurrence of the eight evaluation categories:

(1) Inundation/Conversion of lotic to lentic habitat: Score =1;

(2) Streamflow reductions: Score=1, or 0.25 if compliant with environmental flow standards;

(3) Alteration of flood frequency (below storage reservoirs): Score=1;

(4) Alteration of physio-chemical characteristics of streamflow: Score=1, or 0.25 if compliant with environmental flow standards;

(5) Blocks aquatic migration (any dam on a perennial stream): Score=1;

(6) Alteration of annual hydrograph: Score=1, or 0.25 if compliant with environmental flow standards;

(7) Construction disturbances: Score=1 each for outfalls, intakes, pipeline stream crossings, or dams (maximum value of 4); and

(8) Bay and Estuary inflows: Score=1, or 0.25 if compliant with environmental flow standards.

Scores were tabulated for each water management strategy and summed for each State Water Plan.

The State Water Plans were also scored on the net flow impacts following implementation of all recommended water management strategies on major streams at selected locations. Net flow impact scores were based on the following scale, with the greatest impact score being associated with the greatest potential change in streamflow or freshwater inflow:

0 - Flow increase or no change at low (less than 50th percentile), no change or minor decrease at high flows;

1 - Moderate decrease at low flows (less than 10 percent between 25th and 50th percentiles);

2 - Moderate decrease at low flows, (greater than 20 percent decrease between 50th and 75th percentiles);

3 - Greater than 10 percent decrease between 25th and 50th percentiles; or

4 - Greater than 10 percent decrease between 25th and 50th percentiles, greater than 20 percent decrease between 50th and 75th percentiles.

The summed water quality/habitat and net stream flow scores for each State Water Plan, divided by the plan yields, were added together and normalized. The results are presented in Table 6-7 and Figure 6-22 is a graphical comparison of the seven water plans. The impact score for the 2016 SCTRWP is in the midrange of the seven water plans.

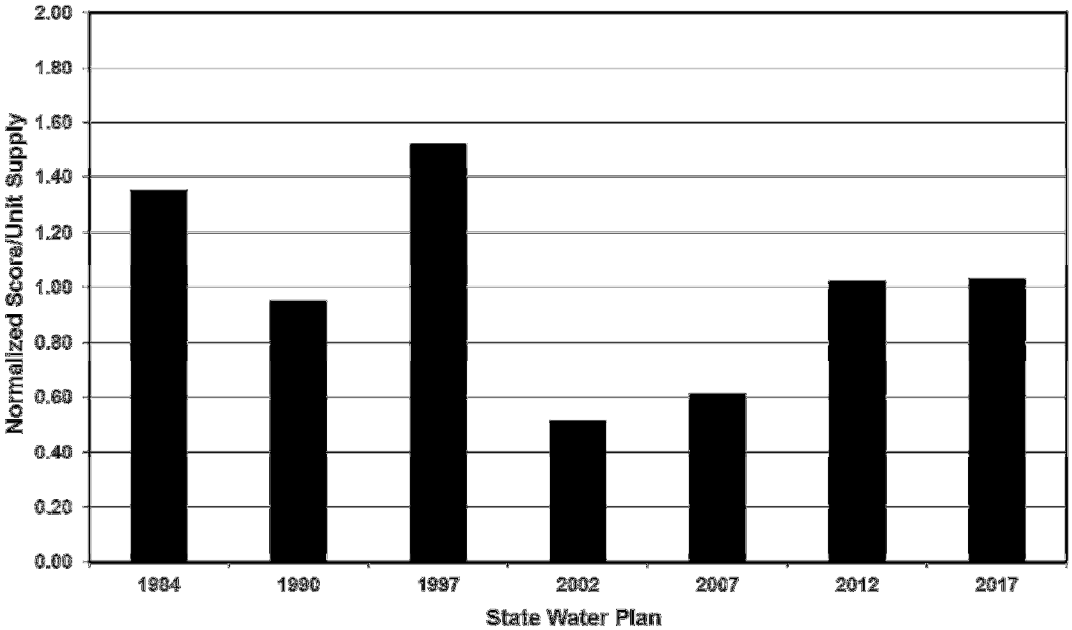
Table 6-7 Potential Impacts to Water Quality and Aquatic Habitats from Water Management Strategies in State Water Plans

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
G-16C1	Cuero Reservoir	6.00	6.00					
G-17C1	Lindenau (Sandies) Reservoir	7.00	7.00	7.00				
G-40	Cloptin Crossing Reservoir	5.75						
G-21	Lockhart Reservoir	5.75						
S-14D	Applewhite Reservoir	5.00	5.00					
S-16C	Goliad Reservoir	6.00	6.00					
S-15C	Cibolo Reservoir	6.00						
S-15Da	Cibolo Reservoir w/ SA River		7.00	7.00				
LGWSP	Lower Guadalupe Water Supply Project				4.00			
LGWSP	LGWSP for GBRA Needs					4.00		
LSWP	LCRA-SAWS Water Project				6.00	6.00	6.00	
SCTN-3c	Simsboro Aquifer				1.00			
L-18a	Edwards Recharge Projects				3.25	3.25	3.25	
SCTN-17	Seawater Desalination				2.00	2.00	2.00	2.00
CZ-10C	Carrizo Aquifer - Wilson & Gonzales				1.00			
CZ-10D	Carrizo Aquifer - Gonzales & Bastrop				1.00			
	Regional Carrizo for SAWS					1.00	1.00	
	Hays/Caldwell PUA					1.00	1.00	1.00
G-24	Wimberley and Woodcreek Water Supply Project				1.00	1.00	1.00	
	Brackish Wilcox Desalination					0.00		
	Wells Ranch Project				1.00	1.00	1.00	
	CRWA Siesta Project				2.5	2.5	2.5	3.0
	GBRA Simsboro Aquifer						1.00	

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
	GBRA-Exelon Project--River Diversion Option						4.00	
	GBRA New Appropriation (Lower Basin)						4.00	4.00
	GBRA Mid Basin (Surface Water)						5.00	3.00
	GBRA Lower Basin Storage						0	1.00
	Regional Carrizo for SSLGC						1.00	
	Brackish Wilcox Groundwater for SAWS						1.00	1.00
	Brackish Wilcox Groundwater for Regional Water Alliance						1.00	1.00
	Brackish Wilcox Groundwater for SSWSC						0	1.00
	Medina Lake Firm-Up (ASR)						2.00	
	Lavaca River Off-Channel Reservoir						5.00	5.00
	Storage above Canyon (ASR)						3.00	
	TWA Regional Carrizo						1.00	1.00
	CRWA Wells Ranch Phase 2							1.00
	Cibolo Valley LGC							1.00
	GBRA IWPP							1.00
	Victoria Co. Steam Electric							2.00
	SAWS Expanded Local Carrizo Project							1.00
	SAWS Vista Ridge							1.00
	SAWS Expanded Brackish Wilcox Groundwater							1.00
	Expanded Carrizo for SSLGC							1.00
	Brackish Wilcox (Gonx. Co.) MAG Limited							1.00
	TWA Trinity							1.00
	New Braunfels ASR and WTP Expansion							1.00
	New Braunfels Trinity							1.00

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
	Hays Co. Forestar							1.00
	Uvalde ASR							1.00
	Victoria ASR							1.00
	Victoria Off-channel Storage							1.00
	SAWS CPS Pipeline							2.00
Raw Score		**42**	**31**	**14**	**23**	**22**	**45**	**42**
Score / Unit Supply		**1.016**	**0.615**	**0.734**	**0.391**	**0.463**	**0.822**	**0.825**
Net Streamflow Change								
Guadalupe River @ Cuero/Victoria		4	4	4	0	0	1	3
San Antonio River @ Falls City		0	4	4	0	0	0	1
San Antonio/Guadalupe River @ Saltwater Barrier		4	4	4	0	0	1	1
Colorado River @ Bay City		0	0	0	4	4	4	0
Total		**8**	**12**	**12**	**4**	**4**	**6**	**5**
Score / Unit Supply		**0.196**	**0.238**	**0.629**	**0.069**	**0.085**	**0.110**	**0.098**
Combined Score / Unit Supply		**1.212**	**0.853**	**1.363**	**0.459**	**0.548**	**0.933**	**0.482**
Normalized Combined Score / Unit Supply		**1.355**	**0.953**	**1.523**	**0.513**	**0.613**	**1.043**	**1.030**
Rank		**6**	**3**	**7**	**1**	**2**	**5**	**4**

Figure 6-22 Cumulative Potential Impact Scores for Water Quality and Aquatic Habitats



Cultural Resources

Assessment of potential impacts to historical sites included evaluation of data provided by the Texas Historical Commission which included the locations of National Register Districts, National Register Properties, State Historic Sites, Historical Markers, and cemeteries within the state. Possible impacts to these historical sites were determined according to their proximity to the probable construction areas and the type of site, if known. All historical sites within a mile of the pipeline corridor were entered into the impact matrix along with their distances from the project disturbance area and any other details relevant to determining probable impact. Impact scores are based on the following scale, with the greatest impact score being associated with the permanent inundation of any historical site:

- 0 - Historical sites mapped greater than 0.50 mile from the project disturbance;
- 1 - Historical sites between 0.25 and 0.50 mile from the project disturbance;
- 2 - Historical sites less than 0.25 mile from the project disturbance; or
- 3 - Permanently inundated historical sites.
- 1 - An additional impact point assigned for any cemetery.

Potential impacts to archaeological resources were estimated by compiling the number of proposed disturbances to landforms considered to be of relatively high potential for containing buried archaeological deposits. The high-potential areas were defined as stream terraces bordering both perennial and intermittent streams. A probable impact index was devised which includes factors reflecting the site potential and type of disturbance for each instance of the activity, with the greatest impact score being associated with the permanent inundation of any stream:

For Pipeline Routes the values used are as follows:

1.5 - Perennial stream crossings;

1.0 - Intermittent stream crossings;

2.5 - Construction parallel to perennial stream channels; or

2.0 - Construction parallel to intermittent stream channels.

For Reservoir Areas the values used are as follows:

4.0 - Intermittent streams inundated; or

5.0 - Perennial streams inundated.

For each water management strategy, impact values for historical sites were added to the potential archaeological site impact estimates to arrive at the total impact values shown in Table 6-8. Figure 6-23 presents a graphical comparison of the seven State Water Plans.

The high impact scores for water management strategies which include long pipelines also reflect the large number of stream terrace crossings that will occur as pipelines are constructed across major rivers and their tributaries.

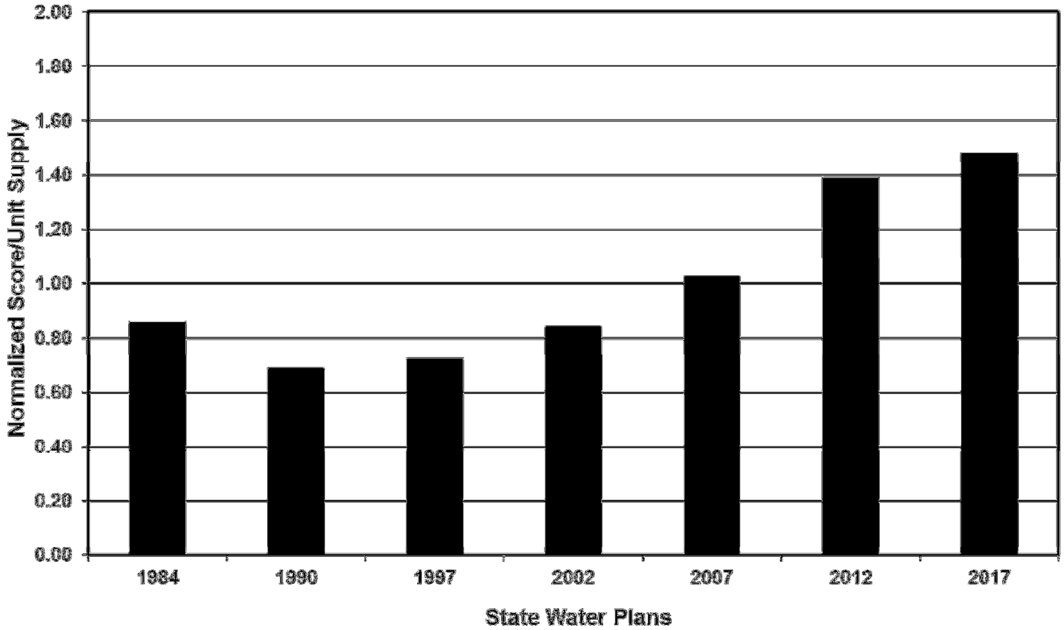
Table 6-8 Potential Impacts to Cultural Resources from Water Management Strategies in State Water Plans

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
G-16C1	Cuero Reservoir	184	184					
G-17C1	Lindenau (Sandies) Reservoir	176	176	176				
G-40	Cloptin Crossing Reservoir	22						
G-21	Lockhart Reservoir	22						
S-14D	Applewhite Reservoir	55	55					
S-16C	Goliad Reservoir	144	144					
S-15C	Cibolo Reservoir	44						
S-15Da	Cibolo Reservoir w/ SA River		79	79				
LGWSP	Lower Guadalupe Water Supply Project for GBRA Needs				83	114		
LSWP	LCRA-SAWS Water Project				267	267	267	
SCTN-3c	Simsboro Aquifer				89			

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
L-18a	Edwards Recharge Projects				26	26	26	
SCTN-17	Seawater Desalination				151	151	151	93
CZ-10C	Carrizo Aquifer - Wilson & Gonzales				79			
CZ-10D	Carrizo Aquifer - Gonzales & Bastrop				85			
	Regional Carrizo for SAWS					125	85	
	Hays/Caldwell PUA					72	72	120
G-24	Wimberley/Woodcreek from Canyon				23	23	31	
	Brackish Wilcox Desalination					7		
	Wells Ranch Project				54	54	54	
	CRWA Siesta Project				47	47	47	57
	GBRA Simsboro Aquifer						172	
	GBRA-Exelon Project--River Diversion Option						14	
	GBRA New Appropriation (Lower Basin)						0	5
	GBRA Mid Basin (Surface Water)						178	109
	GBRA Lower Basin Storage						0	3
	Brackish Wilcox Groundwater for SAWS						0	16
	Brackish Wilcox Groundwater for Regional Water Alliance						21	23
	Brackish Wilcox Groundwater for SSWSC						0	4
	Medina Lake Firm-Up (ASR)						57	
	Lavaca River Off-Channel Reservoir						15	15
	Storage above Canyon (ASR)						17	

ID#	Water Management Strategy	State Water Plan						
		1984	1990	1997	2002	2007	2012	2017
	TWA Regional Carrizo						187	94
	CRWA Wells Ranch Phase 2							4
	Cibolo Valley LGC							79
	GBRA IWPP							184
	Victoria Co. Steam Electric							13
	SAWS Expanded Local Carrizo Project							17
	SAWS Vista Ridge							164
	SAWS Expanded Brackish Wilcox Groundwater							52
	Expanded Carrizo for SSLGC							42
	Brackish Wilcox (Gonx. Co.) MAG Limited							41
	TWA Trinity							14
	New Braunfels ASR and WTP Expansion							46
	New Braunfels Trinity							0
	Hays Co. Forestar							89
	Uvalde ASR							66
	Victoria ASR							31
	Victoria Off-channel Storage							4
	SAWS CPS Pipeline							3
Factor 10,000	**Raw Score**	**646**	**637**	**254**	**904**	**886**	**1,392**	**1,388**
	Score / Unit Supply	**15.816**	**12.637**	**13.315**	**15.517**	**18.855**	**25,584**	**27.253**
	Normalized Score / Unit Supply	**0.933**	**0.745**	**0.785**	**0.915**	**1.112**	**1.509**	**1.479**
	Rank	**4**	**1**	**2**	**3**	**5**	**7**	**6**

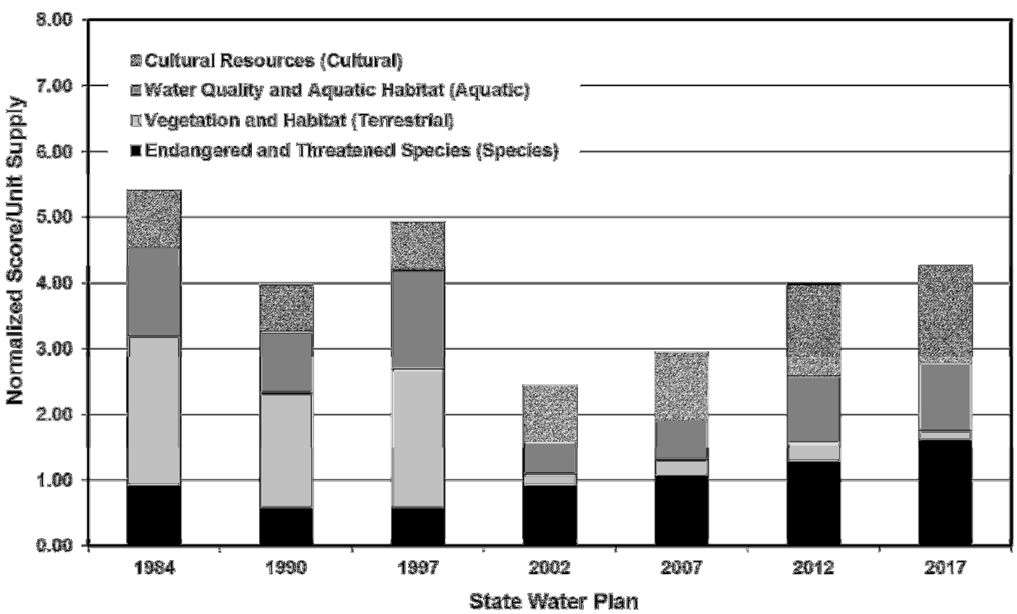
Figure 6-23 Cumulative Potential Impacts to Cultural Resources



Composite Comparison

Figure 6-24 is a composite comparison of the seven State Water Plans aggregating the results of the assessments of the individual environmental resource categories.

Figure 6-24 Cumulative Potential Impact Scores for South Central Texas Regional Water Planning Area



It is apparent from this comparison that, despite avoidance of the large mainstem reservoirs in the early state water plans, the 2016 SCTRWP could have significant overall effects on the environment and cultural resources per unit of new water supply developed. This observation is due, in part, to the greater number and smaller sizes of the water management strategies included in the 2016 SCTRWP as compared to all previous state water plans. For example, the environmental assessment of the 2016 SCTRWP includes 27 recommended strategies while the 1990 plan included only six strategies to develop essentially the same new firm water supply. The broad geographic distribution and lengthy pipelines to key demand centers associated with many strategies in the 2016 SCTRWP create more opportunities to encounter important species and cultural resources. Because the nature of many of the projects in the 2016 SCTRWP is such that actual impacts can be identified and avoided or mitigated based on information from field studies required by permitting agencies, realized impacts are expected to be significantly less than the potential impacts discussed herein. This would not be expected to be the case with respect to the major reservoir projects in the early state water plans, which offer little opportunity for impact avoidance due to inflexibility in size and location, and whose primary impacts (permanent disturbance, inundation of lotic and terrestrial habitats, and concentrated streamflow perturbations) may not be amenable to minimization or compensation.

6.3 Impacts of Water Management Strategies on Key Parameters of Water Quality

In accordance with 31 TAC §357.40(b)(5), the South Central Texas Regional Planning Group (SCTRWPG) must consider the major impacts of recommended water management strategies on key parameters of water quality. Furthermore, the SCTRWPG is to compare conditions with the recommended water management strategies to current conditions using best available data (31 TAC §357.34(d)(8).

The SCTRWPG has selected the following water quality constituents 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 6-9 contains median values for these eight water quality parameters for each of the water supply sources of the water management strategies recommended in the 2016 SCTRWP. In addition, the SCTRWPG has considered the impacts of implementation of the 2016 SCTRWP on recreation, aquatic life, domestic water supply, and agriculture.

Table 6-9 Median Values of Key Parameters of Water Quality

Water Source	Chlorides (mg/L)	Sulfates (mg/L)	Total Dissolved Solids (TDS) (mg/L)	Dissolved Oxygen (DO) (mg/L)	pH	Indicator Bacteria (#/100 ml)	Temperature (Deg 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
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 regional water plan implementation.

Table 6-10 summarizes a general qualitative assessment of the potential impacts of the implementation of recommended water management strategies on the key parameters of water quality listed above. Each water quality parameter was assigned an impact level associated with the implementation of each recommended water management strategy. A value of ‘0’ is used to indicate that no impacts are expected; a value of ‘1’ indicates minimal impacts are expected; a value of ‘2’ indicates moderate impacts are expected; and a value of ‘3’ indicates severe impacts are expected from the implementation of the water management strategy. As it is understood that any future wastewater discharges, potable water deliveries, and/or recycled water use will be in compliance with 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 6-10 Impacts of Recommended Water Management Strategies on Key Parameters of Water Quality

Water Management Strategy	Water Quality Parameter								
	Chlorides	Sulfates	Total Dissolved Solids (TDS)	Dissolved Oxygen (DO)	pH	Indicator Bacteria	Temperature	Nitrates	Total Score
Conservation									
Municipal Water Conservation	0	0	0	0	0	0	0	0	0
Drought Management	0	0	0	0	0	0	0	0	0
Available Resources, Water Rights, & Reservoirs									
Carrizo Conversions	0	0	0	1	0	0	0	0	1
Edwards Transfers	0	0	0	0	0	0	0	0	0
Victoria County Steam-Electric Project	0	0	1	0	0	0	2	0	3
Victoria Groundwater-Surface Water Exchange	1	0	1	0	0	0	0	1	3
GBRA Lower Basin Storage (500 acre site)	0	0	0	0	0	0	0	0	0
Recycled Water Programs	0	0	0	1	0	1	0	0	2
Balancing Storage	0	0	0	1	0	0	0	0	1
Purchase from Wholesale Water Providers	0	0	0	0	0	0	0	0	0
Surface Water Rights	0	0	0	0	0	0	0	0	0
Facilities Expansions	0	0	0	0	0	0	0	0	0
Groundwater									
Hays/Caldwell PUA Project-Phase I & II - MAG-Limited	0	0	0	1	1	0	0	0	2
TWA Trinity Project	0	0	0	0	0	0	0	0	0
TWA Regional Carrizo-MAG Limited	0	0	0	1	0	0	1	0	2
Brackish Wilcox Groundwater for SAWS – MAG Limited	1	1	1	1	0	0	1	0	5
Expanded Local Carrizo for SAWS – MAG Limited	0	0	0	1	0	0	0	0	1
Brackish Wilcox Groundwater for CRWA-MAG Limited	1	1	1	1	0	0	1	0	5
CRWA Wells Ranch Project-MAG Limited	0	0	0	1	1	0	0	0	2
Carrizo Aquifer (Wilson Co) for CVLGC- w/conversions	0	0	0	1	1	0	0	0	2
Vista Ridge Consortium - MAG-Limited	0	0	0	1	0	0	1	0	2
Expanded Brackish Project for SAWS-MAG Limited	1	1	1	1	0	0	1	0	5
Regional Carrizo for SSLGC Project Expansion	0	0	0	1	1	0	0	0	2
Brackish Wilcox (Gonz. County) for SSLGC -Mag Limited	1	1	1	1	0	0	1	0	5
New Braunfels Trinity	0	0	0	0	0	0	0	0	0
Hays Forestar-MAG Limited	0	0	0	1	0	0	1	0	2
Brackish Wilcox Groundwater for SSWSC-MAG Limited	1	1	1	1	0	0	1	0	5
Local Groundwater Supplies (Leona Gravel)	0	0	0	0	0	0	0	0	0
Local Groundwater Supplies (BS Edwards - Brackish)	1	1	1	1	0	0	0	0	4
Local Groundwater Supplies	0	0	1	1	0	0	0	0	2

Table 6-10 Impacts of Recommended Water Management Strategies on Key Parameters of Water Quality

Water Management Strategy	Water Quality Parameter								
	Chlorides	**Sulfates**	**Total Dissolved Solids (TDS)**	**Dissolved Oxygen (DO)**	**pH**	**Indicator Bacteria**	**Temperature**	**Nitrates**	**Total Score**
(Wilcox)									
Local Groundwater Supplies (Carrizo)	0	0	0	1	0	0	0	0	1
Local Groundwater Supplies (Trinity)	0	0	0	0	0	0	0	0	0
Local Groundwater Supplies (Gulf Coast)	1	0	1	0	0	0	0	0	2
Conjunctive Use									
Uvalde ASR-MAG Limited	0	0	0	0	0	0	0	0	0
Victoria ASR	0	0	0	0	0	0	0	0	0
New Braunfels ASR +WTP Expansion	0	0	0	0	0	0	0	0	0
CRWA Siesta Project	0	0	0	1	0	1	0	1	3
Surface Water									
GBRA Mid-Basin (Surface Water)	0	0	0	0	0	0	0	0	0
GBRA New Appropriation (Lower Basin)	0	0	0	0	0	1	0	1	2
Seawater									
GBRA Integrated water-Power Project	2	1	1	0	0	0	0	0	4
SAWS Seawater Desalination	2	1	1	0	0	0	0	0	4
Key for Water Quality Parameter Scores: 0 = No impacts are expected; 1 = Minimal impacts are expected; 2 = Moderate impacts are expected; 3 = Severe impacts are expected									

In general, the water management strategies recommended for implementation are expected to have little, if any, measurable impacts on water quality. Only three of the recommended water management strategies score as high as a '2' for any water quality parameter. These three strategies are the Victoria County Steam-Electric Project (temperature), GBRA Integrated Water Power Project (chlorides), and SAWS Seawater Desalination (chlorides). Only the Brackish Groundwater strategies received scores (though none greater than '1') in four or more of the key water quality parameters. 36 percent of the recommended water management strategies received a score of zero (no impacts expected) and 73 percent received a score greater than zero in two or less of the key water quality parameters. It is anticipated that none of the recommended water management strategies will have associated effects on water quality sufficient to impact recreation or instream aquatic life uses to a significant degree.

The SCTRWPG has addressed the potential effects of 2016 SCTRWP implementation on recreation and aquatic life through application of the environmental flow standards adopted by the TCEQ in the technical evaluation of surface water management strategies 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.

Thirteen (13) strategies could potentially impact domestic water use and agricultural water use: Drought Management, Carrizo Conversions, Edwards Transfers, Recycled

Water Programs, Surface Water Rights, Hays/Caldwell PUA Project, TWA Regional Carrizo, Expanded Local Carrizo for SAWS, CRWA Wells Ranch Project, Carrizo Aquifer for CVLGC, Vista Ridge Consortium, Regional Carrizo for SSLGC Project Expansion, and/or Hays Forestar. Two other strategies may provide benefits to domestic and/or agricultural water use: Municipal Water Conservation and/or GBRA Lower Basin Storage.

6.4 Impacts of Voluntary Redistribution of Water from Rural and Agricultural Areas

Similar to third-party impacts of voluntary redistribution, the Regional Water Plan shall include a quantitative reporting of socioeconomic impacts on agricultural resources including analysis of third-party gross business activity and employment impacts of moving water from rural and agricultural areas.[25] In this case, voluntary redistribution is the acquisition of water by willing buyers from willing sellers, subject to conditions of existing groundwater management plans and rules of Groundwater Conservation Districts, in the case of groundwater supplies, and subject to existing surface water permits and water available from such permits (see 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 SCTRWP).

In the development of the SCTRWP, the following principles have been followed: (1) water conservation has been the first water management strategy recommended to meet projected needs (shortages) of water user groups (WUGs); and (2) all other recommended water management strategies including movement of water from rural and agricultural areas must be based on the voluntary transfer concept, as will be further explained below. The water management strategies of the 2016 SCTRWP were selected and sized in compliance with Desired Future Conditions (DFCs) and Modeled Available Groundwater (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 water management strategy 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 water management strategies 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).

Recommended water management strategies of the SCTRWP that may involve voluntary redistribution of water from rural and agricultural areas within Region L are listed as follows, along with the portion of the firm new supply potentially considered a voluntary redistribution:[26]

- Vista Ridge Consortium 34,894 acft/yr
- Hays/Caldwell PUA Project 21,833 acft/yr
- TWA Regional Carrizo 15,000 acft/yr
- Hays Forestar 12,356 acft/yr

[25] It is important to note that the most likely places from which water can be obtained to meet the needs of municipalities and other water users of the South Central Texas Region are rural areas, many of which are also agricultural areas.
[26] Surface Water Rights is not included as supply quantities are not specified.

• CVLGC Carrizo Aquifer w/ Conversions	10,000 acft/yr
• CRWA Wells Ranch Project	7,829 acft/yr
• Regional Carrizo for SSLGC Project Expansion	5,720 acft/yr
Total	**107,632 acft/yr**

With the exception of the SSLGC strategy above, the associated quantities are limited by MAG and the sponsors have expressed interest in increasing the firm yield of each strategy if DFCs are changed and MAG increases.

Source counties for the water management strategies (WMS) listed above have projected needs for additional water supply (or have projected surpluses less than the volume associated with the listed WMS) so third-party economic impacts of transfers may occur as future supplies alternative to local groundwater are developed. Implementation of the recommended water management strategies would 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. In addition, implementation of recommended water management strategies can be expected to result in construction and associated expenditures in local areas where such projects are constructed, but neither the economic benefits of such expenditures, nor the subsequent economic development that might result from such expenditures are estimated due to lack of information pertaining to such activities.

Although it is not possible to estimate total costs of any additional pump lifts or deepening of wells resulting from implementation of recommended water management strategies in the SCTRWP due to lack of information about location and numbers of wells that might be affected, estimates for a single family home range from less than $2.00 per year, where additional lift might be 25 feet, to less than $10.00 per year if lift is increased by 150 feet.

6.5 Social and Economic Impacts of Not Meeting Projected Water Needs

Section 357.4(a) of the rules for implementing Senate Bill 1 requires that the social and economic impacts of not meeting regional water supply needs be evaluated by the SCTRWPG. The TWDB is required to provide technical assistance, upon request, to complete the evaluations. The SCTRWPG has requested technical assistance of the TWDB to perform the required analyses, but results will not be available until Summer 2015. Table 6-11 summarizes the needs that remain unmet in the 2016 SCTRWP. This section will be completed prior to final approval of the 2016 SCTRWP.

Table 6-11 Summary of Needs That Remain Unmet

WUG	Unmet Needs (acft/yr)					
	2020	2030	2040	2050	2060	2070
Bexar County-Irrigation	5,116	4,625	4,154	3,703	3,271	2,891
Calhoun County-Irrigation	12,273	10,736	9,695	8,949	8,254	7,527
Dimmit County-Mining	4,826	4,908	4,244	2,731	1,222	519
Dimmit County-Irrigation	3,372	3,312	3,082	2,846	2,620	2,466
Karnes County-Mining	1,864	1,292	700	115	0	0
La Salle County-Mining	4,088	4,243	3,734	2,290	851	147
Medina County-Irrigation	31,529	29,144	26,850	24,653	22,547	20,689
Uvalde County-Irrigation	29,683	27,370	24,992	22,831	20,818	19,102
Victoria County- Irrigation	5,265	5,265	5,265	5,265	5,265	5,265
Zavala County-Irrigation	18,487	16,805	14,980	13,049	11,193	9,443

6.6 Effects on Navigation

None of the water management strategies recommended for implementation in the 2016 SCTRWP are expected to have any direct effects on navigation. Any saltwater intake, brine disposal, or water transmission pipelines associated with the GBRA Integrated Water Power Project, SAWS Seawater Desalination, or Victoria County Steam-Electric strategies will avoid or be buried beneath shipping lanes.

6.7 Environmental Benefits and Concerns

The South Central Texas Regional Water Planning Group has identified the following significant environmental benefits and concerns associated with the implementation of the 2016 SCTRWP.

6.7.1 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 Aquifer Storage and Recovery (ASR) facilitates storage during wet periods for use during dry periods without evaporation and terrestrial habitat losses.

- Long-term reliance on seawater desalination is perceived to have fewer associated impacts than development of new (fresh) surface water supplies.

6.7.2 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.[27]
- Effects on small springs and reductions in flux entering streams from aquifers associated with groundwater development.
- Intake siting, brine disposal, and effects on marine species and habitat associated with seawater desalination projects.

[27] Segments and projects are summarized as follows:

- Lower Guadalupe River – GBRA Lower Basin New Appropriation, Victoria County Steam-Electric Project, GBRA Lower Basin Storage, Victoria ASR, Victoria Groundwater – Surface Water Exchange
- Middle Guadalupe River – GBRA Mid-Basin Project (ASR), SSLGC Expansion Carrizo Aquifer (Guadalupe County)
- Lower San Marcos River – San Marcos Direct Reuse, HCPUA Project, TWA Carrizo Project

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7 Drought Management

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 Region L, is proper planning and preparation for worst case scenarios. This requires understanding of drought patterns and the historical droughts in the region.

Due to significant population growth throughout Texas, which is expected to continue in the Region L area based on 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 Region L's drought preparedness including; regional droughts of record, current model drought contingency plans, emergency interconnects, and responses to local drought conditions.

7.1 Droughts of Record in the RWPA

7.1.1 Background

One of the best tools in drought preparedness is a thorough understanding of the drought of record (DOR), or the worst drought to occur for a particular 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 types 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.

7.1.2 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 Region L planning area. By 1956, 244 of the 254 counties were considered disaster areas. This drought lasted almost a decade in many places and not only affected Texas, but other states throughout the nation as well. The 1950's 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. Two recent droughts centered around 2008 and 2011 have been discussed but not widely accepted as potential new droughts of record for parts of the state.

For the Guadalupe-San Antonio River Basin within Region L, the drought of the 1950s remains the drought of record. In the upper portions of the river basin, the 1950's 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 many believe it should be considered the new drought of record.

7.1.3 Drought Indicators

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 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 Region L reservoirs under historic drought conditions is TCEQ's Guadalupe-San Antonio River Basin Water Availability Model (GSA WAM). The GSA WAM is the same tool used to determine the available flow and firm yields of surface water projects in the RWP.

The GSA WAM model includes hydrologic information from 1934 through 1989 and supports the use of the 1950's drought as the drought of record for all Region L reservoirs. However, it has not been updated to include information from more recent periods of drought.

Drought Indices

Several Drought Indices have been developed to assess the effect of a drought through parameters such as severity, duration and spatial extent. The Palmer Drought Severity Index (PDSI) was one of the first comprehensive efforts using precipitation and temperature for estimating the moisture of a region. PDSI values greater than 0.49 correspond to wetter than normal conditions and values from -0.5 to 6 represent varying degrees of drought. Information is available for climate regions across the country through 2014, which makes the PDSI a helpful tool for analyzing droughts, not included in the GSA WAM.

Most of Region L lies in Texas Climate Divisions 7 and 9. A graph of yearly PDSI values for Texas Climate Division 7 and 9 show that while the 1908 and more recent drought in the early 21st century were severe, the drought of the 1950's 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 7.1-1).

Figure 7.1-1 Parmer Drought Severity Index: Division 7

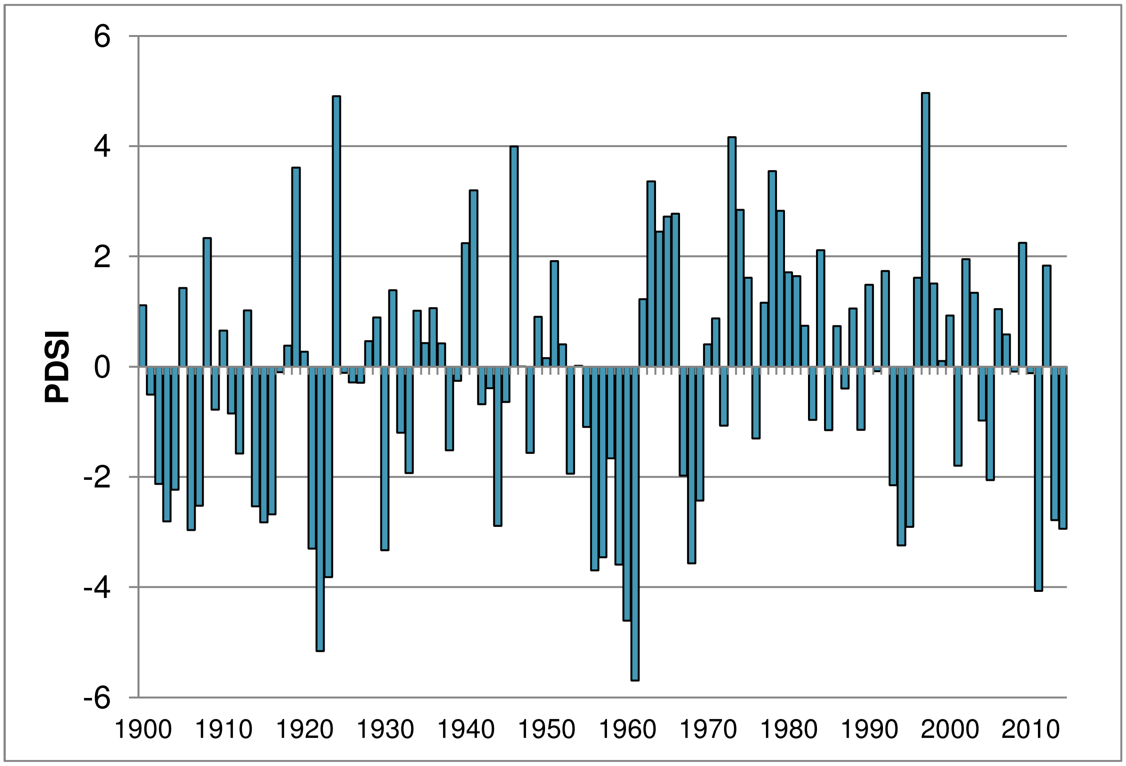
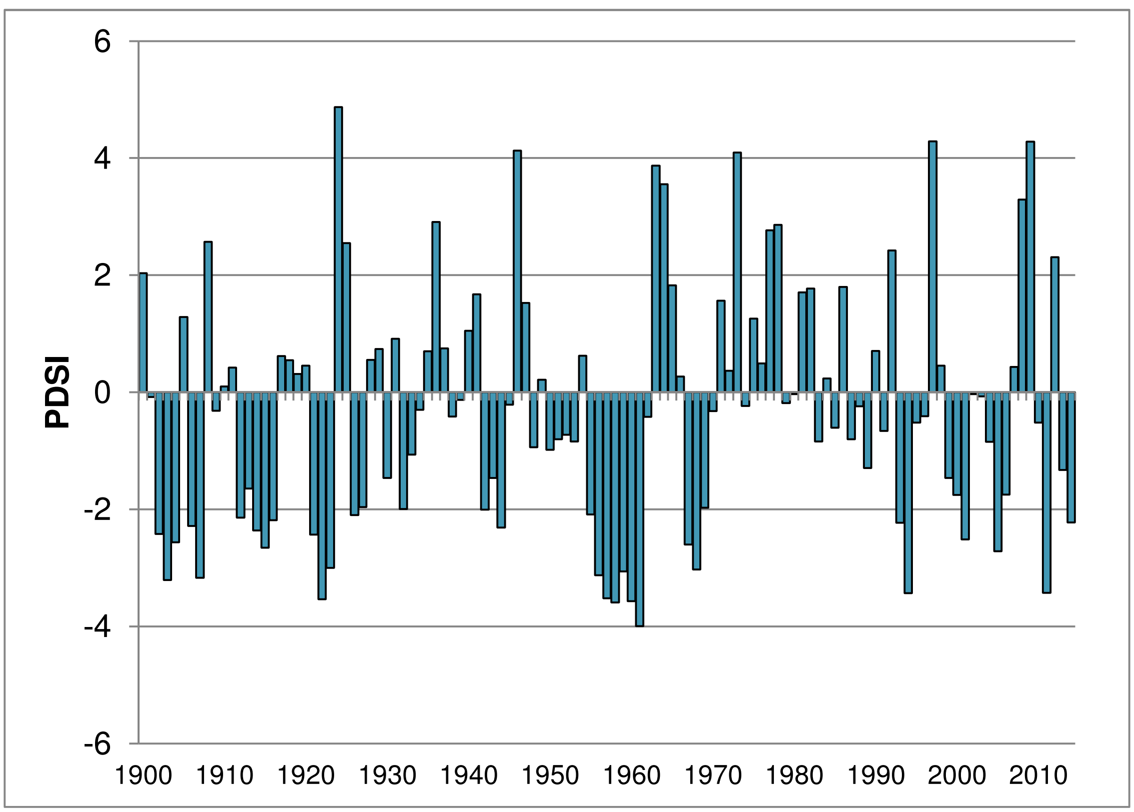


Figure 7.1-2 Parmer Drought Severity Index: Division 9



7.1.4 Recent Drought Discussion

Throughout the 2011 water year, a severe drought occurred from decreased precipitation resulting in substantial declines in streamflow throughout the state. Record high temperatures also occurred June through August leading to an increase in evaporation rates. The net evaporation was so high that by August 4, 2011, state climatologist John Nielson-Gammon declared 2011 to be the worst 1-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 1950's drought combined with the over all severity for almost a decade in region L suggests that it is still the best choice as the DOR for regional planning purposes.

7.2 Current Drought Preparations and Response

7.2.1 Current Drought Preparations and Responses

WUG Level Planning

All WUGs in Region L prepare for drought by participating in the regional planning process. The regional planning process 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 planning group should be able to supply water to customers throughout drought periods. In addition, all wholesale water providers and most municipalities develop individual drought contingency plans or emergency action plans to be implemented at various stages of a drought.

Basin Responses

Throughout Texas including the Guadalupe-San Antonio River Basin, water rights are issued under the prior appropriation system. During times of shortage, 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 based on "run of the river" rights. The program has jurisdiction over the Guadalupe-San-Antonio and Nueces River Basins, as well as the Lavaca River Basin. Five watermaster deputies will patrol the 50 counties in the jurisdictional area and enforce compliance with water rights.

7.2.2 Overall Assessment of Local Drought Contingency Plans

While you can not perfectly predict the timing, severity and length of a drought, you can safely assume that it is an inevitable component of the Texas climate. For this reason, it is critical to plan for these occurrences with policy outlining adjustments to use,

[1] Winters, K.E., 2013, 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

allocation, and conservation in response to drought conditions. Drought and other circumstances that interrupt the reliable supply or water quality of a source often lead to water shortages. When a water shortages occurs there is generally a greater demand on the already decreased supply as individuals attempt to keep lawns green etc. If this behavior is unaddressed there can be an increase in the rate of water supply depletion.

TCEQ requires all wholesale public water suppliers, retail public water suppliers serving 3,300 connections or more, and irrigation districts to submit drought contingency plans (DCPs). In accordance with the requirements of Texas Administrative Code §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."[2] According to a TCEQ handbook[3] the underlying philosophy of drought contingency planning is that:

- 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 Drought Contingency plans 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 very location specific because most communities in Region L 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 DCP's should include:

- 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,

[2] http://www.twdb.texas.gov/conservation/training/archives/more-than-a-drop-workshop/doc/5_%20TCEQ%20Rules.pdf
[3] https://www.tceq.texas.gov/assets/public/comm_exec/pubs/archive/rg424.pdf

- 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. In order 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 Texas Administrative Code (*Title 30 §288*), most Region L entities have submitted DCPs to TCEQ for implementation when local shortages occur. Region L was able to obtain DCPs for 17 WUGs and WWPs. These plans identify multiple triggers for initiation and termination of drought stages, responses to be implemented and reduction targets based on 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 Region L range in date from 2013 to 2015.

7.2.3 Summary of Existing Triggers and Responses

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. In order to accomplish this, DCP's are built around a collection of drought responses and triggers based on various drought stages. Stages are generally similar for all DCP's but can vary from entity to entity. Stage one 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.

Region L compiled stage, trigger, and response information for 17 DCP's in the region including those from WWPs, WUGs and County-Other suppliers. The majority of the DCPs in the 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. Triggers and responses for Region L entities can be found in Appendix I.

7.3 Existing 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 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 Compliance with Texas Administrative Code (TAC), Chapter 357

Regional Water Planning Guidelines, available information on existing major water infrastructure facilities that may be used for interconnections in event of an emergency shortage of water was collected.

For the Region L Water Planning Area, all municipal water user groups were sent a survey in 2013 regarding their water supply and use. As part of the survey, individual municipalities were asked to confirm or update information regarding the existence of emergency interconnects integrated with their system and the provider of the potential emergency supply. Of the 119 Municipal WUGs in Region L, 16 responded to the survey and only five reported having emergency interconnects. A second e-mail survey based on the template provided by the TWDB in the First Amended General Guidelines for Development of the 2016 RWPs was sent in 2015 to wholesale water providers and major municipal centers. Three entities returned the email survey contributing an additional seven emergency interconnects.

An interconnection study was completed by HDR for the Regional Water Alliance[4] (RWA) in 2009 that compiled information regarding existing interconnections and proposed several potential interconnections across the region. Of the 8 existing interconnects identified in this study, 5 had known pipe diameters. The TCEQ Texas Drinking Water Watch database (TCEQ database) was used as a final source of emergency interconnection information. 18 interconnects were noted from the TCEQ database bringing the total to 35 reported emergency interconnects from 4 sources. While this should not be considered a comprehensive list, it is the extent of information available at this time. Information on existing and potential interconnect supply capacity or location was not available from any source. Information on existing and potential interconnect supply source or location was not available from the surveys and reports available. In accordance with Texas Water Code §16.053(r) the information gathered is considered confidential and was submitted to the executive administrator, but not included in the regional plan.

7.4 Emergency Response to Local Drought Conditions or Loss of Municipal Supply

The regional and state water plans aim to prepare entities for worst case drought scenarios based on the drought of record as described in Chapter 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 back up 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 wholesale water providers have DCP's as described in Chapter 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 small WUGs with 2010 Census populations less than 7,500 and a sole supply source as well as for all County-Other WUGs in the Region.

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

[4] HDR, "Regional Water Alliance Water System Interconnection Study", 2009.

source if their supply comes from one river intake or one reservoir, regardless of the number of contracts in place. A WUG with contract with most WWPs was not considered sole-source due to various supplies held by the WWPs. WUGs with both groundwater and surface water supplies were not included, with the exception of county-other entities.

A broad range of emergency situations could result in a 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 were selected for each entity based on source type and location. WUGs were analyzed for potential additional fresh water and brackish water wells based on the existence of appropriate aquifers in the area. MAG availability was not considered since the wells are assumed 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 the 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 72 entities were analyzed including 21 county-other WUGs. The results of this analysis are included in Table 7.4-1.

Table 7.4-1 Summary of Emergency Supply Options

Entity							Potential Emergency Water Supply Sources						Implementation Requirements		
County	WUG Name	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	Known Existing Interconnect	Potential Entity Providing Supply	Type of Infrastructure Required
ATASCOSA	ATASCOSA COUNTY-OTHER		Various GW	GW	7,177	922		x	x		x	x		Benton City	Wells, Pipes
ATASCOSA	CHARLOTTE	1715	Carrizo-Wilcox Aquifer	GW	2,008	344			x		x	x		Benton City	Wells, Pipes
ATASCOSA	JOURDANTON	3871	Carrizo-Wilcox Aquifer	GW	4,532	959			x		x	x		Benton City	Wells, Pipes
ATASCOSA	LYTLE	2492	Edwards Aquifer	GW	2,985	577					x	x		SAWS	Pipes
ATASCOSA	MCCOY WSC	6645	Carrizo-Wilcox Aquifer	GW	7,679	952			x		x	x		Pleasanton	Wells, Pipes
ATASCOSA	POTEET	3260	Carrizo-Wilcox Aquifer	GW	3,817	472			x		x	x		Benton City	Wells, Pipes
BEXAR	ALAMO HEIGHTS	7031	Edwards Aquifer	GW	8,095	2,216					x	x		SAWS	Pipes
BEXAR	BEXAR COUNTY-OTHER		Blend	Blend	28,013	5,239		x	x		x	x		SAWS	Wells, Pipes
BEXAR	SHAVANO PARK	3035	Edwards Aquifer	GW	3,494	1,104					x	x	SAWS		
BEXAR	WATER SERVICES INC	2838	Trinity Aquifer	GW	4,629	746			x		x	x		SAWS	Wells, Pipes
BEXAR	WINDCREST	5364	Edwards Aquifer	GW	5,573	1,203					x	x		SAWS	Pipes
CALDWELL	CALDWELL COUNTY-OTHER		Blend	Blend	6,089	725		x	x		x	x		Lockhart/Luling	Wells, Pipes
CALDWELL	LULING	5411	Carrizo-Wilcox Aquifer	GW	6,682	954			x		x	x		Lockhart	Wells, Pipes
CALDWELL	MUSTANG RIDGE	861	Purchase from Creedmore-Maha	Blend	527	71			x		x	x		Buda	Wells, Pipes
CALDWELL	NIEDERWALD	565	Barton Springs Aquifer	GW	761	75			x		x	x		Buda	Wells, Pipes
CALDWELL	POLONIA WSC	5567	Carrizo-Wilcox Aquifer	GW	7,082	878			x		x	x	Lockhart		Wells, Pipes
CALHOUN	CALHOUN COUNTY WS	3209	Run-of-River (Guad - GBRA)	SW	4,401	356	x	x		x	x			GBRA	Wells,Pipes, Treatment
CALHOUN	CALHOUN COUNTY-OTHER		Gulf Coast Aquifer	GW	2,094	244			x	x	x	x		Port Lavaca	Wells,Pipes, Treatment
CALHOUN	POINT COMFORT	737	Lake Texana (LNRA)	SW	829	87		x		x	x			LNRA	Wells,Pipes, Treatment
CALHOUN	SEADRIFT	1364	Gulf Coast Aquifer	GW	1,534	256			x	x	x			GBRA	Wells,Pipes, Treatment
COMAL	COMAL COUNTY-OTHER		Blend	Blend	24,820	4,196		x	x		x	x		Canyon Lake WSC	Wells, Pipes
DEWITT	CUERO	6841	Gulf Coast Aquifer	GW	7,100	1,882	x		x		x			GBRA	Wells, Pipes
DEWITT	DEWITT COUNTY-OTHER		Gulf Coast Aquifer	GW	9,009	1,228	x		x		x			GBRA	Wells, Pipes
DEWITT	YORKTOWN	2092	Gulf Coast Aquifer	GW	2,171	383			x		x	x		Cuero	Wells, Pipes
DIMMIT	ASHERTON	1084	Carrizo-Wilcox Aquifer	GW	1,180	238			x		x	x		Carrizo Springs	Wells, Pipes
DIMMIT	BIG WELLS	697	Carrizo-Wilcox Aquifer	GW	759	121			x		x	x		Carrizo Springs	Wells, Pipes
DIMMIT	CARRIZO SPRINGS	5368	Carrizo-Wilcox Aquifer	GW	5,841	1,582	x		x		x				Wells, Pipes
DIMMIT	DIMMIT COUNTY-OTHER		Carrizo-Wilcox Aquifer	GW	3,095	426			x		x	x		Carrizo Springs	Wells, Pipes
FRIO	DILLEY	3894	Carrizo-Wilcox Aquifer	GW	4,340	1,025			x		x	x		Pearsall	Wells, Pipes
FRIO	FRIO COUNTY-OTHER		Carrizo-Wilcox Aquifer	GW	4,081	528			x		x	x		Pearsall	Wells, Pipes
GOLIAD	GOLIAD	1908	Gulf Coast Aquifer	GW	2,230	448			x		x				Wells, Pipes
GOLIAD	GOLIAD COUNTY-OTHER		Gulf Coast Aquifer	GW	6,197	758			x		x				Wells, Pipes
GONZALES	GONZALES COUNTY-OTHER		Carrizo-Wilcox Aquifer	GW	3,154	367			x		x	x		Gonzales	Wells, Pipes
GONZALES	NIXON	2385	Carrizo-Wilcox Aquifer	GW	2,620	408			x		x	x		SSLGC	Wells, Pipes
GONZALES	SMILEY	550	Carrizo-Wilcox Aquifer	GW	603	122			x		x	x		SSLGC	Wells, Pipes
GONZALES	WAELDER	1065	Queen City Aquifer	GW	1,170	201			x		x	x		Gonzales	Wells, Pipes
GUADALUPE	GUADALUPE COUNTY-OTHER		Blend	Blend	9,123	1,067		x	x		x	x		SSLGC	Wells, Pipes
HAYS	HAYS COUNTY-OTHER		Blend	Blend	16,777	2,062		x	x		x	x		San Marcos	Wells, Pipes
HAYS	MOUNTAIN CITY	648	Barton Springs Aquifer	GW	199	23					x	x		Kyle	Pipes
HAYS	PLUM CREEK WATER COMPAN	3875	Trinity Aquifer	GW	5,072	357			x		x	x		Kyle	Wells, Pipes
HAYS	WIMBERLEY	3550	Trinity Aquifer	GW	3,627	626			x		x				Wells, Pipes
HAYS	WIMBERLEY WSC	1450	Trinity Aquifer	GW	4,063	450			x		x				Wells, Pipes
HAYS	WOODCREEK	1457	Trinity Aquifer	GW	1,641	282			x		x				Wells, Pipes
KARNES	FALLS CITY	611	Carrizo-Wilcox Aquifer	GW	638	143			x		x				Wells, Pipes
KARNES	KARNES CITY	3042	Carrizo-Wilcox Aquifer	GW	3,172	595			x		x				Wells, Pipes
KARNES	KARNES COUNTY-OTHER		Various GW	GW	4,173	592		x	x		x				Wells, Pipes
KARNES	KENEDY	3296	Gulf Coast Aquifer	GW	3,437	1,352			x		x				Wells, Pipes
KARNES	RUNGE	1031	Gulf Coast Aquifer	GW	1,075	220			x		x				Wells, Pipes
KARNES	SUNKO WSC	3720	Carrizo-Wilcox Aquifer	GW	4,661	758			x		x				Wells, Pipes
KENDALL	KENDALL COUNTY-OTHER		Blend	Blend	22,092	2,696		x	x		x				Wells, Pipes
LA SALLE	COTULLA	3603	Carrizo-Wilcox Aquifer	GW	4,069	1,270			x		x				Wells, Pipes
LA SALLE	ENCINAL	559	Carrizo-Wilcox Aquifer	GW	632	145			x		x				Wells, Pipes
LA SALLE	LA SALLE COUNTY-OTHER		Carrizo-Wilcox Aquifer	GW	3,075	355			x		x	x		Cotulla	Wells, Pipes
MEDINA	CASTROVILLE	2680	Edwards Aquifer	GW	2,696	794					x	x		SAWS	Pipes
MEDINA	LACOSTE	1119	Edwards Aquifer	GW	1,281	127					x	x		SAWS	Pipes
MEDINA	MEDINA COUNTY-OTHER		Various GW	GW	9,699	1,257		x	x		x	x		Hondo	Wells, Pipes
MEDINA	NATALIA	1431	Edwards Aquifer	GW	1,638	281					x	x		Lytle	Pipes
MEDINA	YANCEY WSC	5543	Edwards Aquifer	GW	5,890	660					x	x	SAWS		
REFUGIO	REFUGIO	2890	Gulf Coast Aquifer	GW	3,009	574			x	x	x				Wells,Pipes, Treatment
REFUGIO	REFUGIO COUNTY-OTHER		Gulf Coast Aquifer	GW	3,103	370			x	x	x				Wells,Pipes, Treatment
REFUGIO	WOODSBORO	1512	Gulf Coast Aquifer	GW	1,575	258			x	x	x				Wells,Pipes, Treatment
UVALDE	SABINAL	1695	Edwards Aquifer	GW	1,852	445					x	x		Uvalde	Pipes
UVALDE	UVALDE COUNTY-OTHER		Various GW	GW	9,786	1,395		x	x		x	x		Uvalde	Wells, Pipes
VICTORIA	VICTORIA COUNTY-OTHER		Gulf Coast Aquifer	GW	26,070	3,050			x		x	x		Victoria	Wells, Pipes
WILSON	FLORESVILLE	6448	Carrizo-Wilcox Aquifer	GW	8,152	1,940			x		x				Wells, Pipes
WILSON	OAK HILLS WSC	4359	Carrizo-Wilcox Aquifer	GW	5,405	904			x		x				Wells, Pipes
WILSON	POTH	1908	Carrizo-Wilcox Aquifer	GW	2,412	387			x		x				Wells, Pipes
WILSON	STOCKDALE	1442	Carrizo-Wilcox Aquifer	GW	1,823	384			x		x				Wells, Pipes
WILSON	WILSON COUNTY-OTHER		Blend	Blend	12,592	1,493		x	x		x				Wells, Pipes
ZAVALA	CRYSTAL CITY	7138	Carrizo-Wilcox Aquifer	GW	8,063	1,702			x		x				Wells, Pipes
ZAVALA	ZAVALA COUNTY WCID 1	1200	Carrizo-Wilcox Aquifer	GW	0	0			x		x				Wells, Pipes
ZAVALA	ZAVALA COUNTY-OTHER		Carrizo-Wilcox Aquifer	GW	3,454	572			x		x				Wells, Pipes

7.5 Region Specific Drought Response Recommendations and Model Drought Contingency Plans

Region L acknowledges that DCPs are a useful drought management tool for entities with both surface and groundwater sources and recommends that all entitles consider adopting a DCP in preparation for drought conditions. The region also recommends that in accordance with TCEQ guidelines, entities update their DCPs every 5 years as triggers can change as wholesale and retail water providers reassess their contracts and supplies. Region L obtained 17 drought contingency plans from across the region. Six of these participating water providers and WUGs rely solely on surface water, one entity relied solely on groundwater and 10 of them utilize both sources to meet needs.

7.5.1 Drought Response Recommendations for Surface Water

Surface water accounts for approximately 16 percent of 2020 existing municipal supplies in Region L and is sold by five wholesale water providers. 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. Region L 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, Region L suggests reviewing the drought responses and recommendations used by similar entities in the region. An example of triggers and responses from the DCP for GBRA is presented below (Table 7.5-1). GBRA was selected as a representative example because they provide water to several entities throughout Region L and rely on various types of surface water triggers that can be applied throughout the Region. The DCP includes four 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 7.5-1 Example Surface Water Drought Contingency Plan Based On GBRA

Drought Stage	Trigger	Actions
Stage I – Mild Water Shortage	* Canyon reservoir is less than or equal to EL. 895 ft-msl * Comal Springs 24 hr. flow rate flow rate is at or below 250 cfs * Production at Lulling WTP is 2.5MGD or greater for 7 days *Flow at USGS #08172000 drops below 130 cfs	• No person may Waste Water • No person may wash an impervious outdoor ground covering • No person may use water for landscaping between 10 am and 8pm unless by hand help 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 10am or after 8 pm
Stage II – Water Warning	* Canyon reservoir is less than or equal to EL. 890 ft-msl * Comal Springs 24 hr. flow rate flow rate is at or below 200 cfs * Flow at USGS #08172000 drops below 80cfs	• All Stage I Actions • Irrigation limited to designated days 3 days a weeks during restricted hours unless hand held device used • Vehicle washing is only permissible by using a five gallon container and/or a hand held 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
Stage III – Water Emergency	* Canyon reservoir is less than or equal to EL. 885 ft-msl *Comal Springs 24 hr. flow rate flow rate is at or below 150 cfs *Flow at USGS #08172000 drobs below 40 cfs	• All Stage I and II Actions • Irrigation limited to designated days 2 days a weeks during restricted hours unless hand held device used • Water may not be used for ornamental fountains • Vehicle washing is only permissible by using a five gallon container and/or a hand held hose equipped with a quick shutoff nozzle on designated watering days or at a commercial location.
Stage IV – Water Crisis	* Loss of capability to provide water service * Contamination of supply source * Drought of greater severity than the DOR *Comal Springs average 24 hr. flow rate flow Rate is at or below 100 cfs * Water ceses to flow past Zelder Dam	• All Stage I, II and III Actions • Irrigation limited to designated days 1 days a weeks during restricted hours unless hand held device used • Filling of new and existing pools is prohibited • Vehicle washing is only permissible at a commercial location.

7.5.2 Drought Response Recommendations for Groundwater

Groundwater accounts for approximately 84 percent of 2020 existing municipal supplies. Entities in Region L 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. Region L recognizes that supplies are understood best by the operators and suggests that WUGs without DCPs look to the DCP's of their water providers for these surface supplies.

For entities without DCPs supplying themselves with local groundwater, Region L suggests reviewing the drought responses and recommendations used by similar entities in the region. An example of triggers and responses from the DCP for SAWS is presented below (Table7.4-1). SAWS was selected as a representative example because they are the largest provider of Groundwater to Region L. 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 7.4-1 Based On SAWS

Drought Stage	Trigger	Actions
Stage I	Edwards Aquifer Level in the Index well J-17 falls to 660 ft msl.	• Irrigation limited to 1 day a week at restricted times unless by hand held device. • Cites encouraged to reduces water main flushing and to implement leak detection and survey repairs • Voluntary reduction on power production water • Pools must be covered by at east 25% evaporation block when not in active use. • Aesthetic water features prohibited • No person may wash an impervious outdoor ground covering • Golf cources, parks and fields must submit conservation plans • Customers are requested to minimize or discontinue non-essential water use.
Stage II	Edwards Aquifer Level in the Index well J-17 falls to 650 ft msl.	• Irrigation limited to 1 day a week at further restricted times unless by hand held device. • Hotels must offer "no linen exchange program" • Filling of pools is prohibited unless 30% from alternative source • Golf Courses have limited watering schedule and are charges surcharge in non-conforming.
Stage III	*Edwards Aquifer Level in the Index well J-17 falls to 640 ft msl. *Total supply is insufficient to meet demands and comply with regulations	• All actions listed in Stage II • Irrigation limited to 1 day every other week at restricted times unless by hand held device. • Hand Held watering limited to restricted times and three days a week • Hotels must limit linen exchange to once every 3 nights or entire stay. • New Landscape is only permited if less that 50% is turf • Golf Course must implement 30% use reduction
Stage IV	After a 30-day monitoring period once stage III is declared, the total supply is insufficient to meet demand while complying with regulations.	• All actions listed in Stages II and III • A surcharge is assessed on all irrigation accounts • A surcharge is assessed on all residential accounts • Only SAWS certified vehicle wash facilities can opperate • Additional restrictions including but not limited to ban on lawn watering with irrigation systems may be established at discretion of city council.

7.5.3 Model Drought Contingency Plans

TCEQ has prepared model drought contingency plans for wholesale and retail water suppliers to provide guidance and suggestions to entities with regard to the preparation of drought contingency plans. 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. Region L suggests that the TCEQ Model DCPs should be used in conjunction with drought contingency measures such as those listed above for Abilene and Thrall for entities wishing to develop a new DCP. The TCEQ model drought contingency plans can be found in Appendix I or on TCEQ's website:

(https://www.tceq.texas.gov/permitting/water_rights/contingency.html/#contents).

7.6 Drought Management WMS

Texas Administrative Code (TAC), Chapter 357 Regional Water Planning Guidelines, states 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 [357.7(a)(7)(B)]." As defined here, drought management means the periodic activation of approved drought contingency plans 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 water management strategies in terms of annual unit costs.

A drought management analysis was completed that calculated 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 Chapter 5.2.2. Region L recommends a 5 percent Drought Management strategy for those entities with needs in 2020. Table 7.6-1 shows the recommended 5 percent yield for the 28 entities with 2020 needs and the alternative yields for higher reductions.

Table 7.6-1 Drought Management Firm Yield

Entity	Yield (acft)			
	5%	10%	15%	20%
Alamo Heights	111	222	332	443
Asherton	17	34	51	68
Atascosa Rural WSC	80	160	239	319
Carrizo Springs	114	227	341	454
Castroville	40	79	119	159
Cibolo	267	534	801	1,069
Converse	127	254	380	507
Garden Ridge	83	166	249	332
Green Valley SUD	91	182	273	364
Hondo	103	205	308	411
Karnes City	31	63	94	125
Kenedy	71	142	213	284
Kirby	47	94	141	188
LaCoste	6	13	19	25
Leon Valley	93	186	279	372
Lockhart	113	225	338	450
Lytle	29	58	87	115
Martindale	9	19	28	37
Mountain City	1	2	4	5
Natalia	14	28	42	56
Niederwald	4	8	11	15
Sabinal	22	45	67	89
Shavano Park	160	320	479	639
Universal City	203	405	608	810
Uvalde	856	1,711	2,567	3,422
Victoria	60	120	180	241
Windcrest	33	66	99	132
Yancey WSC	111	222	332	443

San Antonio Water System (SAWS), who does not have a need in 2020, also requested to be included in the drought management analysis. 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 2040, and 16 percent demand reductions for 2050-2070. Table 7.6-2 shows the requested reductions and projected yields for SAWS throughout the planning period.

Table 7.6-2 SAWS Drought Management Analysis

	2020	2030	2040	2050	2060	2070
% Reduction	5%	12%	16%	16%	16%	16%
Yield (acft)	14,674	38,517	55,536	59,877	64,184	68,190

7.7 Other Drought Recommendations

7.7.1 Model Updates

It is of upmost importance that regional water planning groups have the most up to date information available to make decisions. The GSA WAM is used to determine both the drought of record and the firm yield of reservoirs, but has not been updated in almost 20 years. Region L recommends that the Texas Legislature approve a budget for TCEQ to pursue updating WAMs before the next regional planning cycle. This will be especially important if the duration of the recent drought continues or the severity increases.

7.7.2 Monitoring and Assessment

Region L recommends that all entities monitor the drought situation around the state and locally in order to prepare and facilitate decisions. Several state and local agencies are monitoring and reporting 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
- Parmer Drought Severity Index: http://www.ncdc.noaa.gov/temp-and-precip/drought/historical-palmers/
- Regional Planning Group Information: http://www.regionltexas.org/

In addition, Region L supports the efforts of the Texas Drought Preparedness Council (DPC) and recommends that entities review information developed by the council. The Drought preparedness council was established by the legislature in 1999 and is composed of 15 representatives from several state agencies. The council is responsible for assessment and public reporting of drought monitoring and water supply conditions, advising the governor on drought conditions, and ensuring effective coordination among agencies. The DCP is currently promoting outreach to inform entities of the assistance they can provide and looking for input as to how they can be more useful. Region L suggests that entities take advantage of the resources available to them through the DCP such as the Drought Annex which describes the activities that help minimize potential impacts of drought and outlines an effective mechanism for proactive monitoring and assessment and was published in 2014. More information on the DCP can be found on the Texas Department of Public Safety website (http://www.txdps.state.tx.us/dem/CouncilsCommittees/droughtCouncil/stateDroughtPrepCouncil.htm).

8 Policy Recommendations & Unique Sites [31 TAC §357.43]

8.1 Agricultural Water

8.1.1 Irrigation Water Needs

The South Central Texas Regional Water Planning Group (SCTRWPG) finds that, under current conditions and regional water planning guidelines, it is not practical for the SCTRWPG to develop water management strategies (WMS) 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. See Appendix F for a summary of the unmet needs and a quantitative description of the socioeconomic impacts of not meeting these needs.

The SCTRWPG recommends that the Texas Water Development Board (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

The SCTRWPG recommends adequately funding the agricultural water conservation programs provided by the TWDB.

8.1.3 Water Use Information

The SCTRWPG recommends that 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 Transport of Water

8.2.1 Water Transport Proposals

Given the number of proposals to transport large amounts of water within the areas represented by the SCTRWPG and surrounding regional water planning groups, the legislature should review the Texas Water Code 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 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.

8.2.2 Collaboration Between Regional Planning Areas

The SCTRWPG recommends that the Legislature clarify that the boundaries of the regional water planning regions were drawn primarily to define water planning regions and were not intended as barriers to prevent water transport from one region to another or to favor one region over another for any reason.

8.3 Groundwater

8.3.1 Groundwater Management

The SCTRWPG respects the rules and regulations of groundwater conservation districts, 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 Desired Future Conditions (DFC) established by Groundwater Management Area (GMA) pursuant to Chapter 36 of the Texas Water Code. The SCTRWPG supports the use of aquifer monitoring programs developed by groundwater conservation districts within a GMA to evaluate achievement of and compliance with DFCs.

Recognizing the management challenges facing groundwater conservation districts with multiple recommended water management strategies 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 2016 Regional Water Plan.

Recommendation #1: When allocated groundwater exceeds the MAG in any decade, the Workgroup 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.

Recommendation #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.

Recommendation #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.

Recommendation #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.

Recommendation #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."*

Recommendation #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 modeled available groundwater (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

The SCTRWPG recommends the management of groundwater resources toward the goal of long-term sustainability and recommends WMS 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. The SCTRWPG recommends that the Texas Legislature and/or TCEQ develop a process requiring certified letters be sent to the Commissioners Court in the county/counties where the well field is located clearly describing the project.

8.3.3 Shared Groundwater Resources among Planning Regions

In the event a Water User Group relies on a groundwater management strategy to meet the Water User Group'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. The SCTRWPG provided such notice to the Lower Colorado (K) and Brazos G planning regions with regard to the Hays County – Forestar Project and the Vista Ridge Project (SAWS) recommended to meet projected needs in the 2016 South Central Texas Regional Water Plan.

8.3.4 Reliance on Groundwater and Surface Water for Future Needs

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

The SCTRWPG encourages State support of implementing or enhancing land stewardship management practices that are shown to augment the quality and quantity of the state-owned surface water and privately-owned groundwater resources.

8.3.6 Development and Use of Groundwater

The SCTRWPG encourages legislation that promotes public or private entities planning to develop groundwater projects to provide an economic analysis of the impact to communities, instream flows, and bay and estuary systems incurred by movement of the groundwater.

8.3.7 Coordination of Regional Water Planning and Groundwater Management Area Processes

The SCTRWPG recognizes that having the most current information on available groundwater supplies is critical to the planning process. The 83rd Texas Legislature, through SB1282, extended the deadline for GMAs to submit DFCs to May 1, 2016. This has created a compressed schedule that may impact the 2021 regional water plans. For example, if the Technical Memorandum for the 2021 Region L Plan is due to the TWDB by February 2018 and MAGs are released up to 24 months after the DFCs are submitted, then the new MAGs based upon May 2016 DFCs would be available three months after the due date of the Technical Memorandum for the 2021 Region L Plan. Thus, the Technical Memorandum for the 2021 Region L Plan could have to be prepared using the current MAGs based upon the DFCs established in 2010. It is the recommendation of the SCTRWPG that the TWDB release MAGs within 14 months of DFC submittal in May 2016.

8.4 Surface Water

8.4.1 Surface Water Rights Monitoring and Administration

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 groundwater conservation districts and the administration of downstream water rights. The SCTRWPG reaffirms its commitment to safeguarding the integrity of downstream water rights.

8.4.2 Reliance on Groundwater and Surface Water for Future Needs

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.

8.4.3 Surface Water Availability Model (WAM) Updates

The SCTRWPG recommends that the Guadalupe – San Antonio River Basin Water Availability Model (GSA WAM) be updated using available hydrologic data for at least the 1990-2013 historical period and that funding sufficient to accomplish this task be allocated to the TCEQ. Although a new drought of record has not occurred since the 1950s, the recommended update would increase the simulation period by 43 percent and facilitate development of improved estimates of channel losses and missing streamflow records (esp. those during the drought of record) throughout the watersheds. Periodic updates to this model should be performed at intervals so that hydrologic data in the models includes data to within five years of the current date.

8.5 Conservation

8.5.1 Conservation Planning Guidelines

The Because of the central role of conservation in achieving the water supply objectives of the South Central Texas Regional Water Plan, the SCTRWPG has previously adopted the Water Conservation Implementation Task Force recommendations to establish GPCD Targets and Goals related to average annual reductions in residential indoor use. The SCTRWPG recognizes that the creation of conservation programs and the selection of specific conservation technologies is a matter of local choice and recommends that the water user groups reference the Water Conservation Best Management Practices Guide, TWDB Report 362, as an educational tool that can facilitate understanding of the importance of conservation efforts and the wide range of methods available for use.

Region L has addressed, defined, and adopted the most reasonably practical level of conservation to be:

1. For Water Use Groups (WUGS) with per capita water use of 140 gallons per capita per day (gpcd) and greater in year 2011, reduce gpcd by 1 percent per year until reaching 140 gpcd, and reduce gpcd by 0.25 percent per year thereafter.
2. For WUGS with per capita water use less than 140 gpcd in year 2011, reduce gpcd by 0.25 percent per year.

8.5.2 Implementation of Water Conservation Advisory Committee Recommendations

SCTRWPG recognizes and supports recent legislative focus on successfully passing legislation which 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 gpcd definitions, 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

The State 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.

8.6.2 Brackish Groundwater and Seawater Desalination

The SCTRWPG supports the funding of state and/or federal programs for research and potential incentives to make desalination more affordable. Should financial incentives, technical advances, and/or other factors make a seawater desalination strategy similar to that described in Chapter 5 sufficiently attractive to a water user group or WWP that implementation prior to year specified herein is desired, it is explicitly recognized by the SCTRWPG that such rescheduled implementation is consistent with the 2016 South Central Texas Regional Water Plan.

8.6.3 Codification of Seawater Desalination

The SCTRWPG recognizes the importance of seawater desalination as a source of new, drought-proof, water supply that can be integrated with other regional water supply strategies. The SCTRWPG encourages the Legislature to amend the Water Code to add a new Chapter to include seawater in the State's administration of water rights and supply.

8.6.4 Assistance for Alternative Rangeland Management (Brush Management)

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 brush control programs integrated with proven rangeland management practices.

8.6.5 Rainwater Harvesting and Other Systems

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 re-use, and gray water systems.

8.6.6 Weather Modification

The SCTRWPG urges the state to continue to support the existing Weather Modification Program.

8.6.7 Drought Management

The SCTRWPG has applied the TWDB's Costing Tool for Regional Water Planning including the general methodology for estimating the economic impacts associated with implementation of drought management as a water management strategy. Application of this methodology for regional water planning purposes has facilitated comparison of drought management to other potentially feasible water management strategies on a unit cost basis. The SCTRWPG has found, and the San Antonio Water System (SAWS) has demonstrated, that water user groups 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 water management strategies. Recognizing that implementation of appropriate water management strategies 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.

8.6.8 Aquifer Storage and Recovery

The SCTRWPG urges the state to continue to support existing and development of new Aquifer Storage and Recovery (ASR) facilities to supplement water supplies during extended drought and seasonal peaking conditions.

The SCTRWPG recognizes the value of ASR facilities as an effective way to store large volumes of water while avoiding evaporative losses experienced with reservoirs. The application and effectiveness of ASR varies with the geological formation of an aquifer. To date the application of ASR in Region L has been in the storage of groundwater from one aquifer in another aquifer where water quality between the water injected and stored and the natural occurring groundwater supply are similar or could mix without risk to the water quality of both sources. One advantage of this innovative ASR storage option could be to divert and store surface water flows that occur during floods and make the stored water available to meet established environmental flow standards during drought; however, the surface water injected would need to be treated to such a quality as to not cause water quality concerns in the receiving aquifer and be suitable for its ultimate use upon recovery. The SCTRWPG recommends that the TWDB and the TCEQ support the implementation of ASR storage for surface water supplies as an alternative to reservoirs and for support of environmental flows.

8.6.9 Water Reuse

The SCTRWPG recognizes the potential offered by the reuse of treated municipal wastewater, agricultural return flows, and industrial process water to augment water supply. The SCTRWPG has approved multiple water management strategies that enable utilities and industries to extend use of their existing water resources through treatment and reuse of water. 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 public, environmental, and worker health; and 2) assist the funding and development of incentive programs to advance water reuse projects. The SCTRWPG encourages the Legislature to amend the Water Code to add a new chapter to include reuse in the State's administration of water rights.

8.7 Environmental

8.7.1 Protection of Edwards Aquifer Springflow

The SCTRWPG supports implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) as approved by the United States Fish & Wildlife Service (USFWS), resulting in the issuance of an Incidental Take Permit. The SCTRWPG recognizes that the EAHCP was developed to "protect the federally-listed species potentially affected by the management and use of the Aquifer and certain other activities in the Comal and San Marcos ecosystems (EAHCP Sec. 1.2.1)." Recognizing that implementation of the EAHCP is an ongoing, phased process, the SCTRWPG approved the following recommendations during its meeting of March 14, 2013:

> "The Edwards Aquifer Habitat Conservation Plan (EAHCP) Workgroup recommends that the South Central Texas Regional Water Planning Group include the EAHCP as a recommended Water Management Strategy in the 2016 South Central Texas Regional Water Plan and use the spring flows associated with EAHCP implementation as an hydrologic modeling assumption for computation of existing surface water supplies and technical evaluation of water management strategies. The EAHCP Workgroup further recommends that existing water supplies from the Edwards Aquifer in the 2016 South Central Texas Regional Water Plan be those associated with EAHCP implementation and in specific amounts to be determined in consultation with the Edwards Aquifer Authority."

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. Texas should focus on 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.

8.7.3 Ecologically Unique Stream Segments and Unique Reservoir Sites

Designation of Five Unique Stream Segments

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." The SCTRWPG conditionally recommends to the Texas Legislature that, in accordance with Subsection 16.051 of the Texas Water Code, it designate the following five stream segments in Region L as having unique ecological value:

- The Nueces River from the northern boundary of Region L downstream to United States Geological Survey (USGS) gauge # 08190000 at Laguna;
- The Frio River from the northern boundary of Region L downstream to USGS gauge #08195000 at Concan;
- The Sabinal River from the northern boundary of Region L downstream to the State Highway 187 crossing located approximately 2.7 miles upstream of USGS gauge #08198000 near Sabinal;
- The San Marcos River extending from IH 35 up to a point 0.4 miles upstream of Loop 82 in San Marcos; and
- The Comal River extending from the confluence with the Guadalupe River upstream to Klingemann Street in New Braunfels.

Because the consequences of such designations by the Legislature are not well understood, these recommendations are conditioned upon legislation providing for these designations containing the following clarifying provisions or substantially similar provisions approved by Region L:

The designation of a river or stream segment as being of unique ecological value:

- Does not affect the ability of a state agency or political subdivision of the state to finance, 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;
- Does not prohibit the permitting, financing, construction, operation, maintenance, or replacement of any water management strategy to meet projected water supply needs recommended in, or designated as an alternative in, either the 2011 or 2016 regional water plans for Region L; and
- Does not alter any existing property right of an affected landowner.

The SCTRWPG Recommendation of Stream Segments Having Unique Ecological Value for Legislative Designation is included as Appendix H, along with a letter from Texas Parks & Wildlife Department summarizing their review of the recommendation package.

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 in July 2005 (See 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. The SCTRWPG recommends increased TWDB funding to be allocated for future planning cycles to conduct analyses necessary for designation of additional stream segments.

8.7.4 Instream Flows and Bays and Estuaries

The SCTRWPG is appreciative of legislative action in the form of Senate Bill 3 (SB3, 80th Texas Legislature) that established and funded an environmental flows process integrating best-available science and diverse regional stakeholder input into the process for selection of 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 very significant effects on the firm yield and associated cost of potential water supply projects. The 2016 regional water plans are the first to be prepared using environmental flow standards adopted pursuant to the SB3 process.

The SCTRWPG encourages completion of the Texas Instream Flow Studies Program and improvement of the State's bays and estuaries freshwater inflow studies, with special attention paid to the report of the Science Advisory Committee of the Study Commission on Water for Environmental Flows.

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 water management strategies. Therefore, 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. 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 Plan Implementation

Given the unprecedented level of time and money expended in the development of Regional Water Plans across the state, the SCTRWPG urges the Legislature to act promptly to help ensure full implementation of these plans.

8.8.2 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.

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.

8.8.3 State Water Implementation Fund for Texas

In 2013, the Texas Legislature authorized transferring $2 billion from the state's "Rainy Day Fund" to create a new loan program to fund projects in the state water plan and make financing water projects more affordable. The creation of the State Water Implementation Fund for Texas (SWIFT), as this program has become known, was approved by Texas voters in November 2013. According to the TWDB website, the SWIFT is estimated to fund approximately $27 billion in water supply projects over the next 50 years. The program will apply not less than 20 percent of SWIFT financial assistance for water conservation and reuse projects and an additional 10 percent will be for projects serving rural areas, including agricultural conservation projects. Since its approval, the TWDB has worked with the regional water planning groups to develop criteria to prioritize projects to be eligible to receive the SWIFT loans. The TWDB began accepting applications in late 2014 with the first loan closings to occur in late 2015.

The SCTRWPG supports the SWIFT as a reliable financing source for project sponsors to fund projects and will be monitoring its first implementation cycle. Based upon the results of this initial process, the SCTRWPG reserves the right to offer suggestions to the TWDB aimed at maximizing the program's future effectiveness.

8.8.4 State Water Plan Implementation

State support is fundamental for the successful implementation of the water resources projects in the State Water Plan resulting from the SB1 Regional Planning Process. Specifically, State support for implementation of the State Plan should include sufficient funding for TWDB and TCEQ to administer their programs and activities associated with planning, financing, and permitting of the projects in the State Plan.

8.8.5 Continuation of Regional Water Planning

The SB1 Planning Process is an important program, and funding should be continued to sustain the work of the Regional Water Planning Groups.

8.8.6 Role of the TWDB

The SCTRWPG supports the concept that a state agency (TWDB) be responsible for implementation of and advocacy for projects in the State Water Plan with regard to funding and permitting at the state and federal levels.

8.9 Data

8.9.1 Water Data Collection

The Legislature should fully fund the cooperative, federal-state-local program of basic water data collection, including: (a) Stream gages-quantity and quality; (b) Groundwater monitoring-water levels and quality; (c) Hydrographic surveys and sediment accumulation in reservoirs; (d) Water surface evaporation rates; (e) Water use data for all water user groups; and (f) Population projections.

8.9.2 Access to State Water Data

There should be adequate funding for the critical roles of TWDB and TCEQ 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 Regional Water Planning Groups in refining water demand projections for use in the 2016 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 has struggled with the lack of flexibility within the methodology to address rapidly growing municipal water demands associated with the transient work forces and long-term operations and maintenance personnel supporting extraction, collection, and transport of oil and gas resources found in the Eagle Ford shale. In circumstances such as this, the SCTRWPG encourages greater TWDB flexibility through relaxation of current methodological assumptions holding 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.

8.10 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.

8.10.2 Planning for System Management Water Supplies

System management water supplies, i.e. supplies over and above those apparently needed to meet projected demands, may be included in the plan for the following reasons: 1) to recognize both the long lead times and the uncertainty associated with risk factors that may prevent implementation of water management strategies and necessitate replacement strategies; 2) to preserve flexibility for water user groups or wholesale water suppliers to select the most feasible projects among several consistent with the Regional Plan and therefore potentially eligible for permitting and funding; 3) to serve as additional supplies in the event rules, regulations, or other restrictions limit use of any planned strategies; and 4) to ensure adequate supplies in the event of a drought more severe than that which occurred historically. The plan should specify those factors affecting reliability of the recommended options and strategies and indicate what alternatives are available as possible replacements.

The amount of the management supply should be limited by consideration of the following factors: 1) potential disruptive impacts of planning for projects that have low probability of implementation; and 2) citing of specific reasons for management supplies that exceed the projected needs of the region.

8.10.3 Public Education on Water

The State should fund a state-wide 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.

SCTRWPG supports legislation for funding to implement the Water Conservation Task Force recommendations, particularly the statewide public education programs, such as Water IQ.

8.10.4 County Authority

Counties should have additional authority for land use planning and for regulating development based on water availability and protection of water resources.

8.10.5 Planning Requirements

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.

8.10.6 Condemnation and Eminent Domain

The SCTRWPG is of the opinion that it is not appropriate for a regional water planning group to tell a governmental entity to abandon its eminent domain powers if it wants its project to be approved as a recommended water management strategy. The SCTRWPG is further of the opinion that it is not within the planning group's jurisdiction to judge the merits of eminent domain. It is, however, the preference of the SCTRWPG that all land needed for implementation of water management strategies be obtained using a process of willing seller and willing buyer and that limited condemnation be used as a last resort.

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9 Water Infrastructure Funding Recommendations

[31 TAC § 357.44]

To be added in summer of 2015 after survey of Water User Groups to obtain information.

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10 Regional Water Plan Adoption
[31 TAC §357.21and §357.50]

To be added prior to adoption of the 2016 South Central Texas Regional Water Plan.

10.1 Public Participation

10.2 Coordination with Water User Groups and Wholesale Water Providers

10.3 Coordination with Other Planning Regions

10.4 Public Hearings and RWPG Responses to Comments on Initially Prepared Plan

10.5 TWDB Comments on Initially Prepared Plan and RWPG Responses

10.6 Final Regional Water Plan Adoption

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11 Comparison to the Previous Regional Water Plan

11.1 Implementation of Previous Regional Water Plan

A survey was sent to Region L WUGs and WWPs regarding the status of recommended strategies presented in the 2011 SCTRWP. Three entities responded by April 22, 2015, representing seven WUGs/WWPs and 24 water management strategies. The survey included information regarding the project description and infrastructure type. The WUGs and WWPs were asked to update the regional planning group on 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 online. If the project was a phased project, the WUGs were asked about the ultimate volume, project cost, and year that the project will reach maximum capacity. If the project was not implemented, the WUGs were asked to comment on why that was the case. The survey also had a column regarding inclusion in the 2016 plan for both phased and non-implemented projects. Results of the survey (as of April 22, 2015) are summarized in Table 11-1. The full list of projects, including responses gathered to date, can be found in Appendix K.

Table 11-1 Summary of Project Implementation

Responding Entity	WUG/WWP	Projects Implemented	Projects Under Construction	Projects in Design	Projects in Study
SAWS	SAWS	4	1	0	1
	Bexar Met	1	0	0	0
Springs Hill WSC	Springs Hill WSC	1	0	0	0
HCPUA	GOFORTH WSC	0	0	1	0
	KYLE	0	0	1	0
	MOUNTAIN CITY	0	0	1	0
	SANTA CLARA	0	0	1	0

11.2 Comparison to Previous Regional Water Plan

With each regional water planning cycle, population and demand projections can potentially change for each Water User Group (WUG). Population changes due to updated information, either from the latest census or better estimates from the Texas State Demographer. Water demands change due to changes in population, variances in GPCD values which are affected by conservation efforts, drought measures, and a shifting water uses. New WUGs are introduced while other WUGs fall below the TWDB threshold to be a WUG and/or combine with other entities. This chapter compares the changes of projections in water demand, source water availability, the drought of record, existing supplies, needs, and water management strategies between this plan and the last regional plan. The 2011 Regional Water Plan covered the period fro 2010 to 2060, while the 2016 Regional Water Plan covers the period from 2020 to 2070.

Water Demand Projections

In general, water demand projections for the region are greater in the 2016 South Central Texas Regional Water Plan (SCTRWP). Municipal water demand projections are slightly higher in the 2016 SCTRWP than in the 2011 Plan for each decade, increasing to 754,306 acft/yr by the 2070 decade (Figure 11.2-1). Non-Municipal demands, however, remain about the same throughout the planning period (Figure 11.2-2). The 2011 SCTRWP has higher projections for 2020 through 2040, and the 2016 SCTRWP projections begin exceeding the 2011 Plan projections slightly in 2050 and 2060. The total water demands for all entities in the region were projected to increase from under 1,000,000 acft/yr in 2010 to 1,291,567 in 2060 for the 2011 Plan (Figure 11.2-3). The total water demand projections for the 2016 Plan increase from 1,070,354 acft/yr in 2020 to 1,433,835 acft/yr in 2070.

Figure 11.2-1 Municipal Water Demand Projections

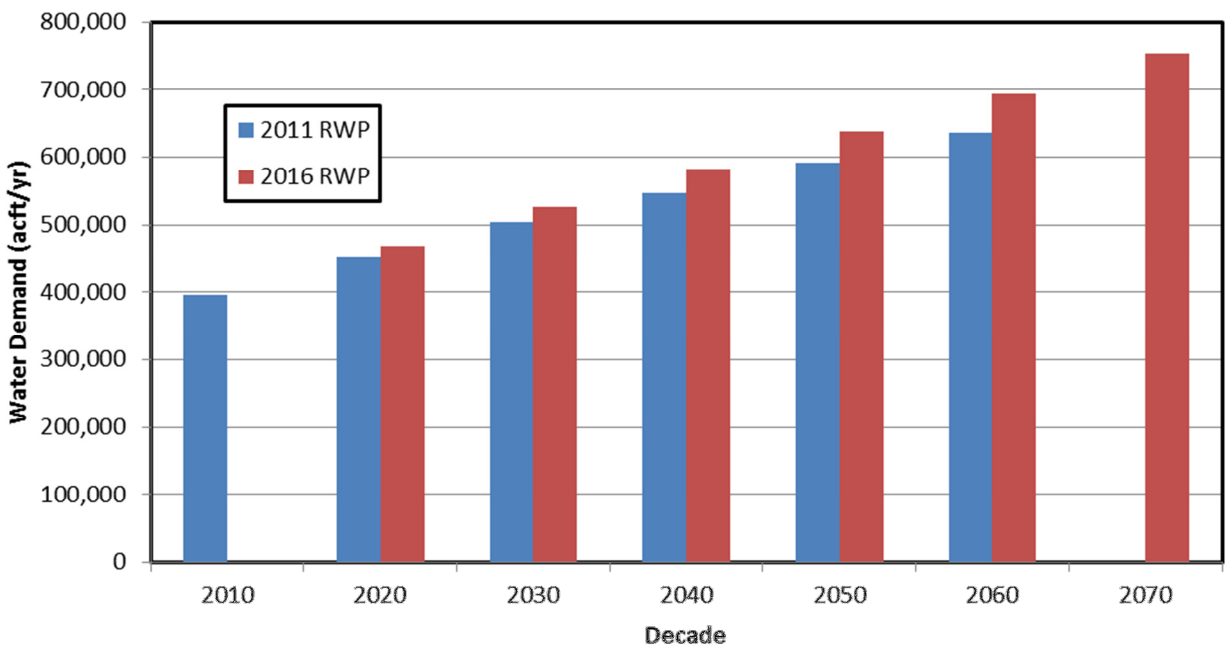


Figure 11.2-2 Non-Municipal Water Demand Projections

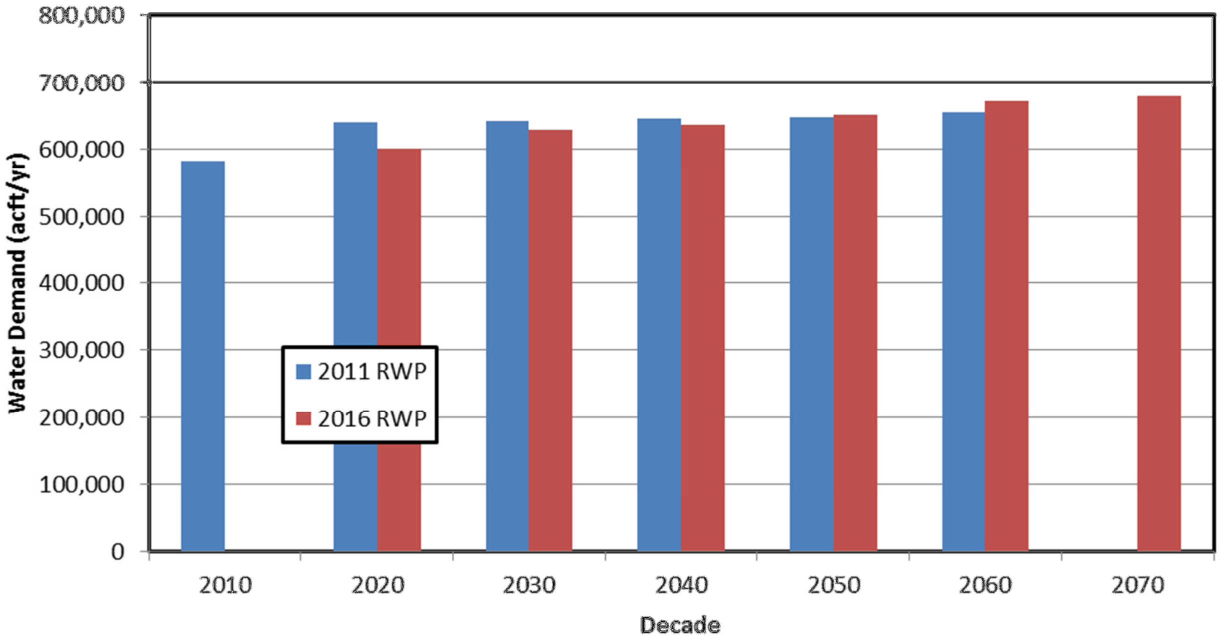
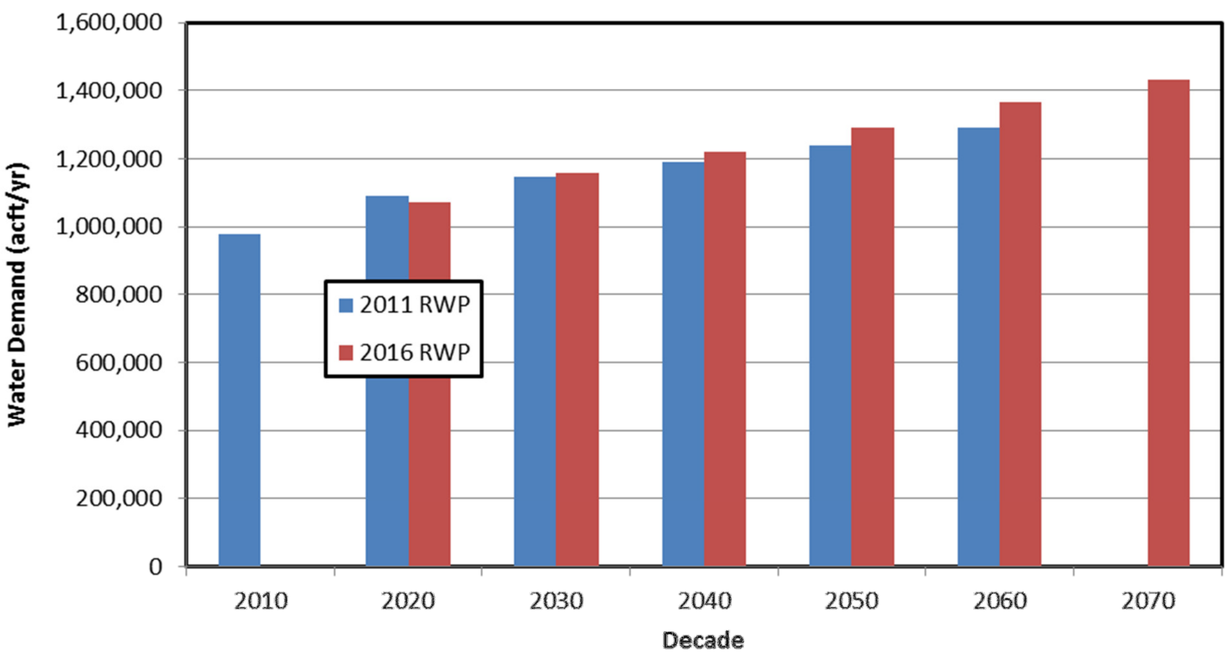


Figure 11.2-3 Total Water Demand Projections



Drought of Record and Assumptions

The drought of record in the Guadalupe-San Antonio River Basin is the drought of the 1950's which was most severe from 1947-1956. The drought of record did not change between the 2011 and 2016 SCTRWPs although more recent droughts may alter the drought of record for the 2021 regional water plan depending on the final severity and duration. Water modeling assumptions associated with both plans are listed in Table 11-2.

Table 11-2 Modeling Assumptions

2011 SCTRWP	2016 SCTRWP
Edwards Aquifer CPM Consistent with **SB3**	Edwards Aquifer CPM Consistent with **EAHCP**
Groundwater Availability based on **Various Model Runs**	Groundwater Availability based on **Modeled Available Groundwater**
Existing Supply based on 2006 Effluent Discharges adjusted for Reuse Commitments	Existing Supply based on 2006 Effluent Discharges adjusted for Reuse Commitments
Surface Water Management Strategies **include** Effluent Discharges adjusted for Reuse Commitments	Surface Water Management Strategies **exclude** Effluent Discharges adjusted for Reuse Commitments
New Surface WMSs conform to **Consensus Criteria for Environmental Flow Needs**	New Surface WMSs conform to TCEQ Environmental Flow Standards

Source Water Availability

Approximately 75 percent of the water available in the South Central Texas region comes from groundwater sources. The total groundwater available has stayed relatively constant throughout planning decades and consistent between the 2011 and 2016 Plans. Figure 11.2-4 shows that the groundwater availability has increased slightly during the 2016 planning cycle. Surface water availability which accounts for about 25 percent of availability in the region has also stayed relatively consistent but is slightly greater for each decade in the 2016 SCTRWP (Figure 11.2-5). The total water availability decrease from 1,224,269 acft/yr in 2070 to 1,244,150 in 2070 in the 2016 plan. The total 2060 water availability projection is 28,006 acft/yr greater in the 2016 plan than in the 2011 plan (Figure 11.2-6).

Figure 11.2-4 Groundwater Availability

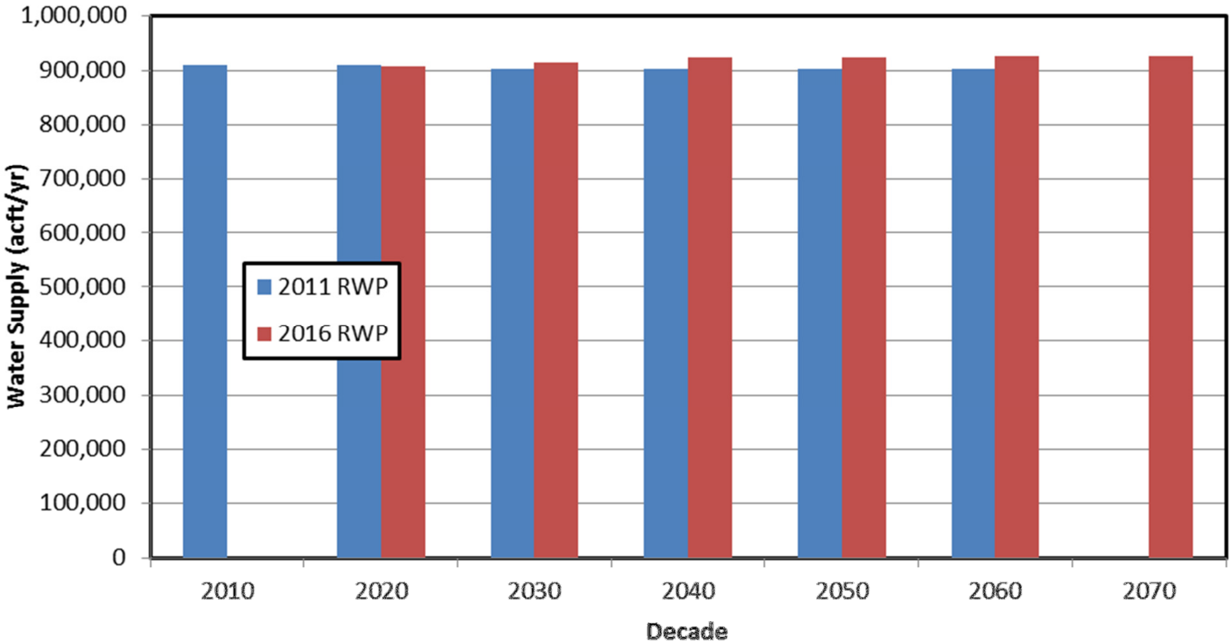


Figure 11.2-5 Surface water Availability

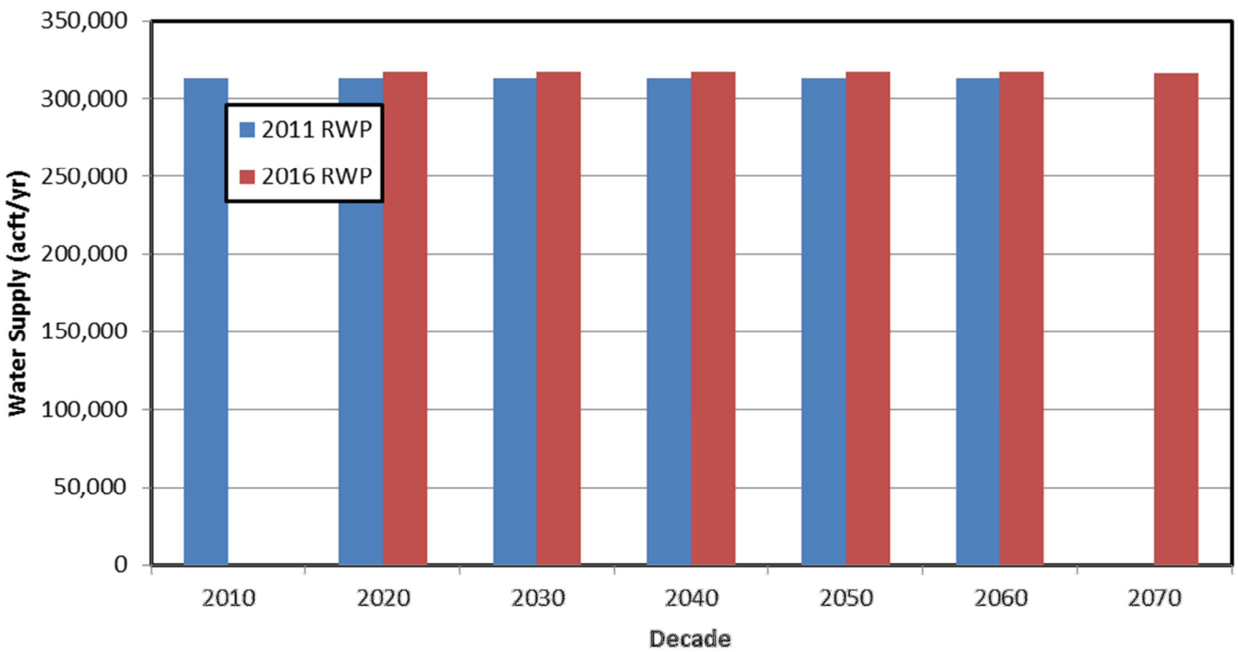
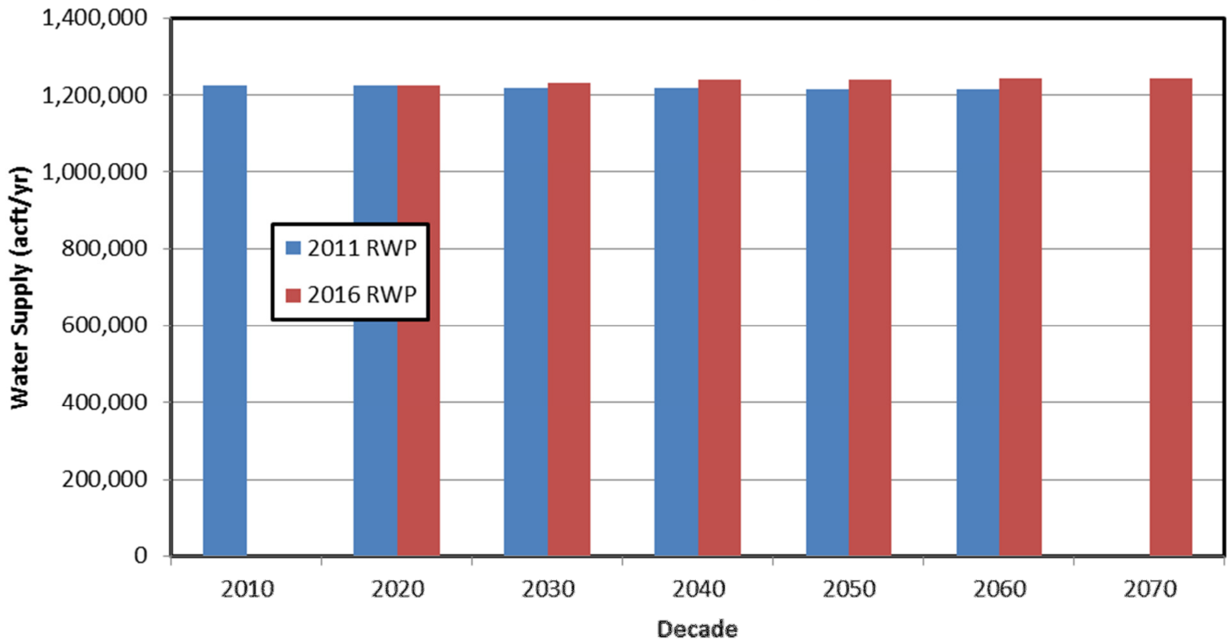


Figure 11.2-6 Total Water Availability



Existing Water Supplies

Existing Water Supplies for entities within Region L have changed significantly since the last planning cycle. Existing municipal supplies have increased on average by approximately 101,000 acft/yr for the comparable planning decades of 2020 through 2060 (Figure 11.2-7). Non-Municipal WUG supplies have decreased by an average of 103,500 acft/yr over the same four planning decades (Figure 11.2-8). Some of this is due to the shift due to acquisition of irrigation water rights by municipalities via Edwards Transfers. Implementation of the Edwards Aquifer Habitat Conservation Plan (EAHCP) may be contributing as well. Finally, new connected supplies have come online since the 2011 SCTRWP. Overall the total difference in existing supplies between planning cycles range from a 1,387 acft drop in 2020 to 9,392 acft drop in 2060 (Figure 11.2-9).

Figure 11.2-7 Existing Water Supplies for Municipal WUGs

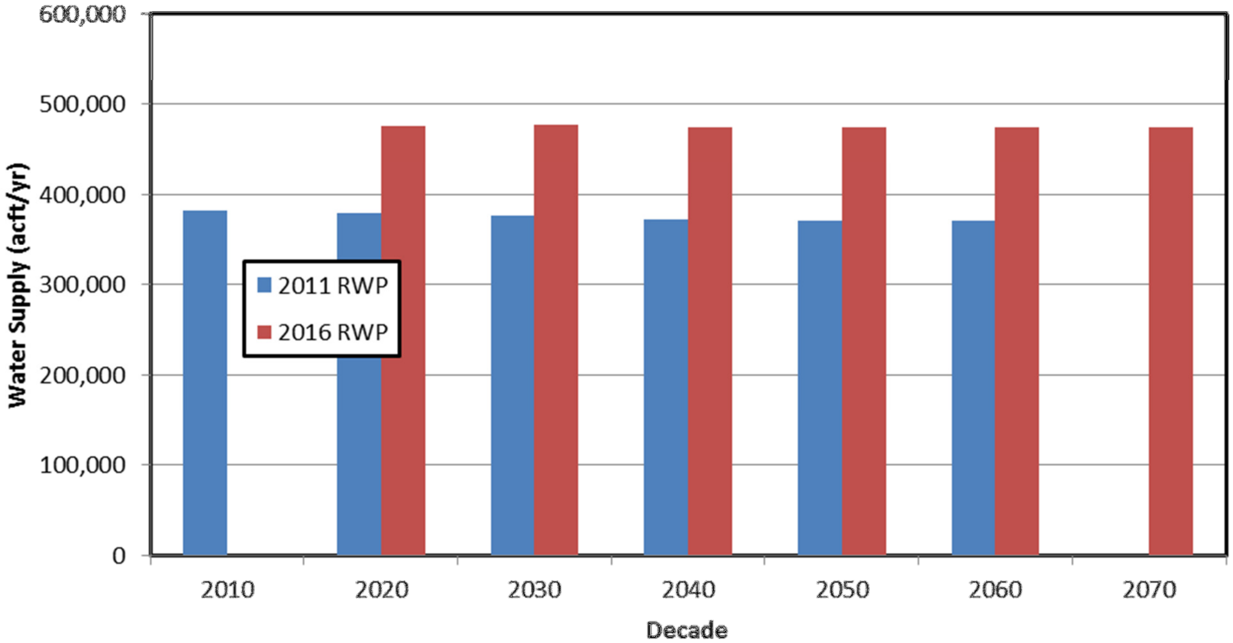


Figure 11.2-8 Existing Water Supplies for Non-Municipal WUGs

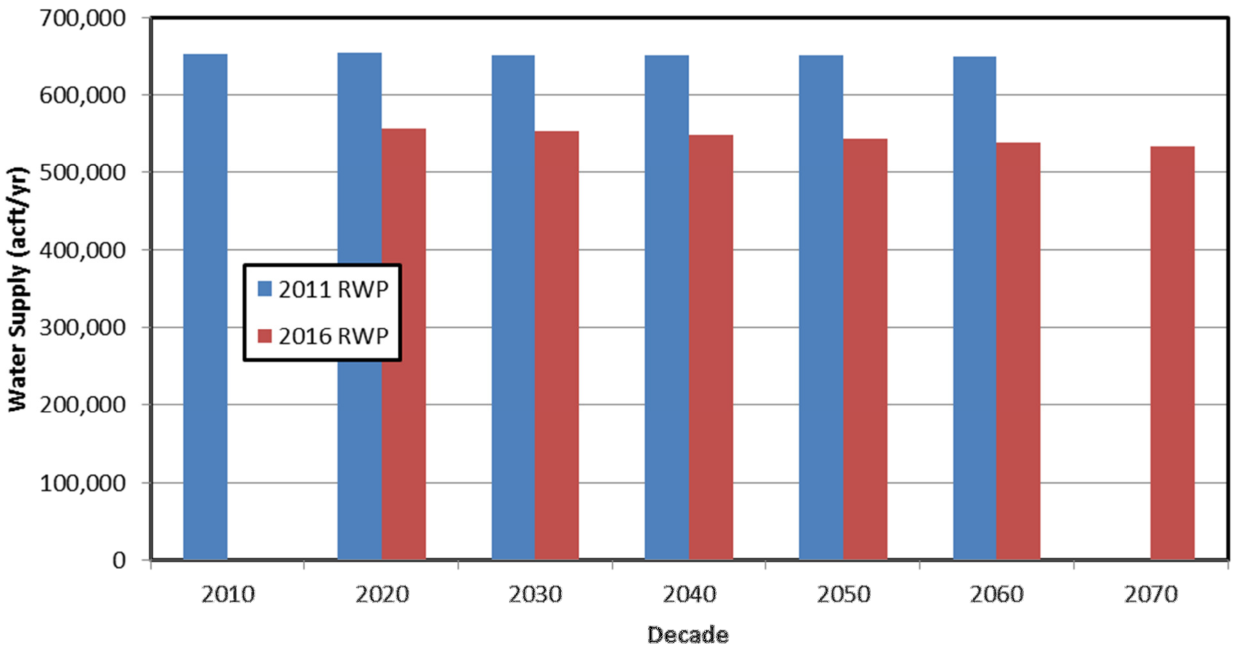
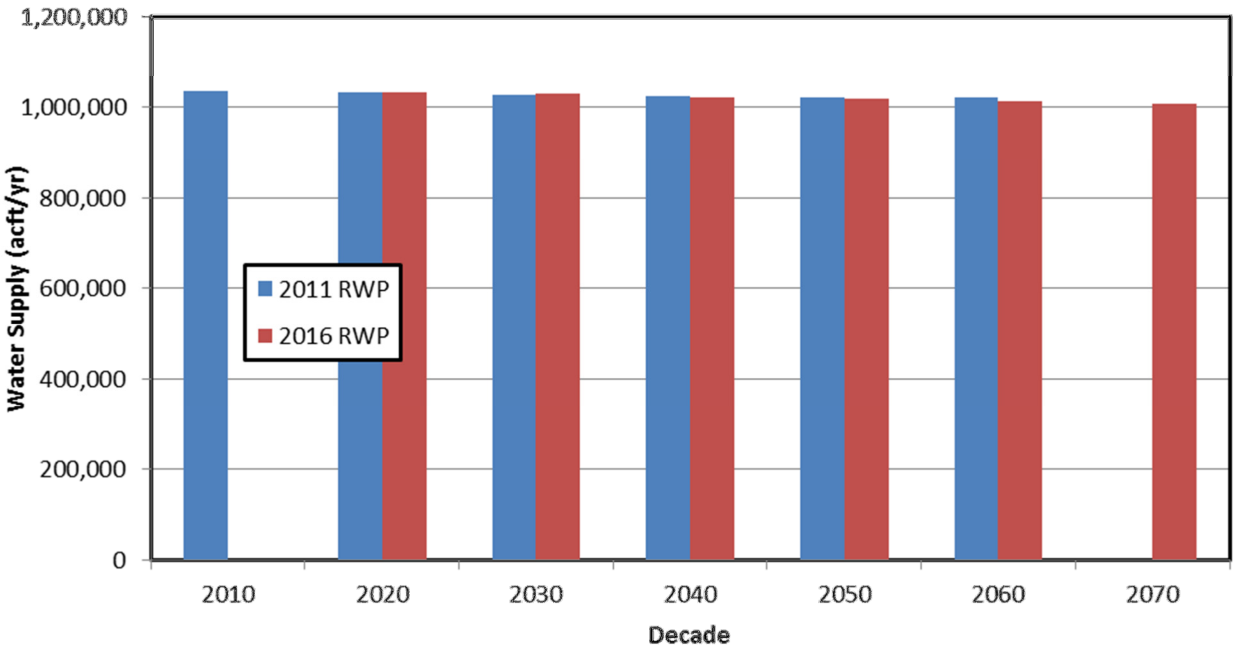


Figure 11.2-9 Existing Water Supplies for All WUGs



Needs

Municipal need projections increased for each decade in both the 2011 and 2016 SCTRWPs, however, the municipal needs are less for each comparable decade in the 2016 plan because there is more existing supply (Figure 11.2-10). On the other hand, non-municipal need projections have increased in the 2016 SCTRWP because there are more Steam-Electric demands, and increases in mining demands due to fracking in the Eagle Ford Shale formation, and decreases in existing supplies (Figure 11.2-11). The total WUG needs for the 2016 Plan increase from 207,214 in 2020 to 497,243 in 2070, and are greater than the needs in the 2011 Plan until 2060 where the 2011 projections are 2,005 acft/yr greater. The 2016 SCTRWP projections for Wholesale Water Provider (WWP) needs are less for every comparable decade than the 2011 SCTRWP projections (Figure 11.2-12). The WWP needs are currently projected to increase from 74,944 acft in 2020 to 403,947 acft in 2070.

Figure 11.2-10 Municipal WUG Needs

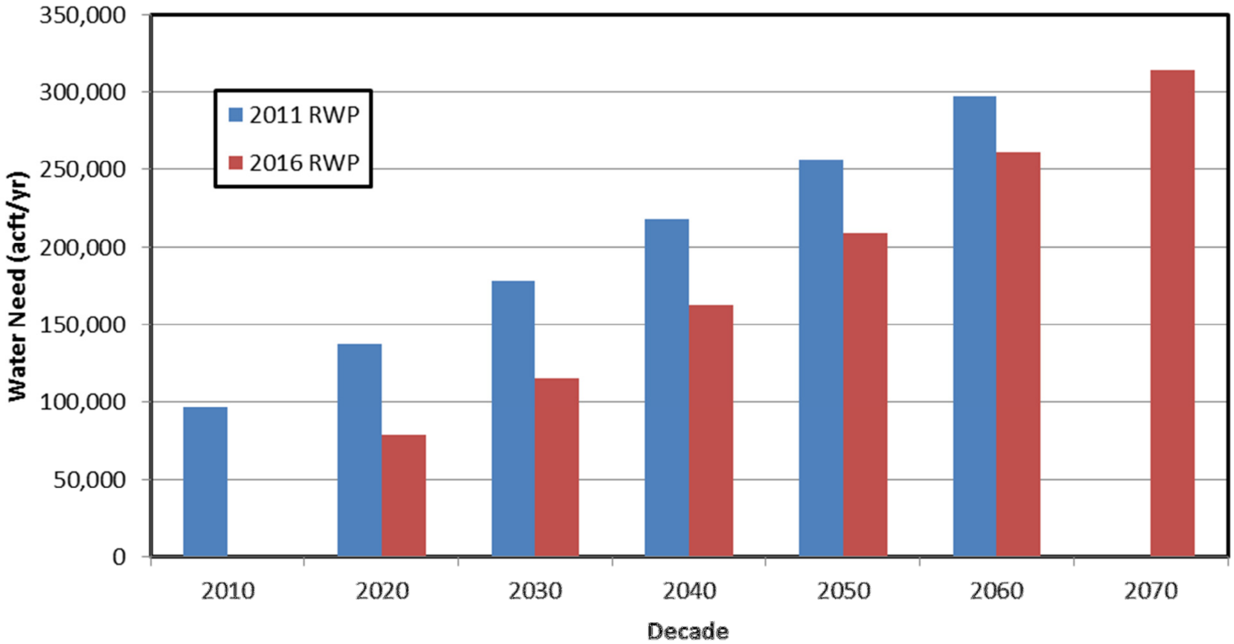


Figure 11.2-11 Non-Municipal WUG Needs

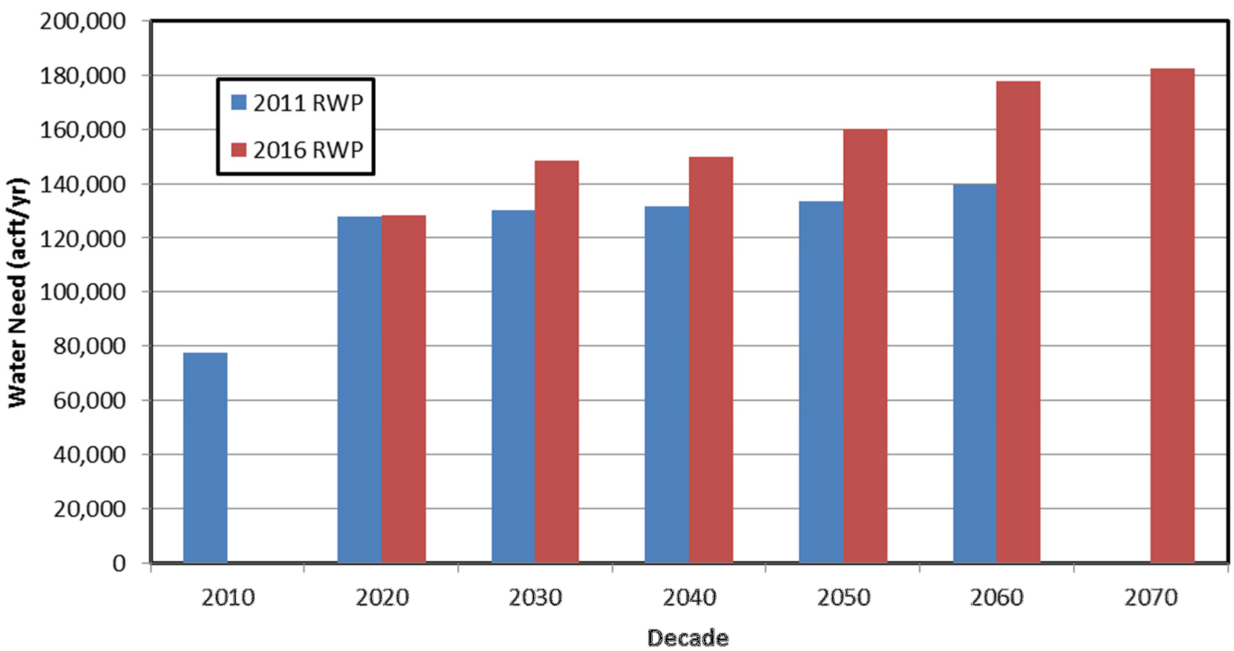


Figure 11.2-12 All WUG Needs

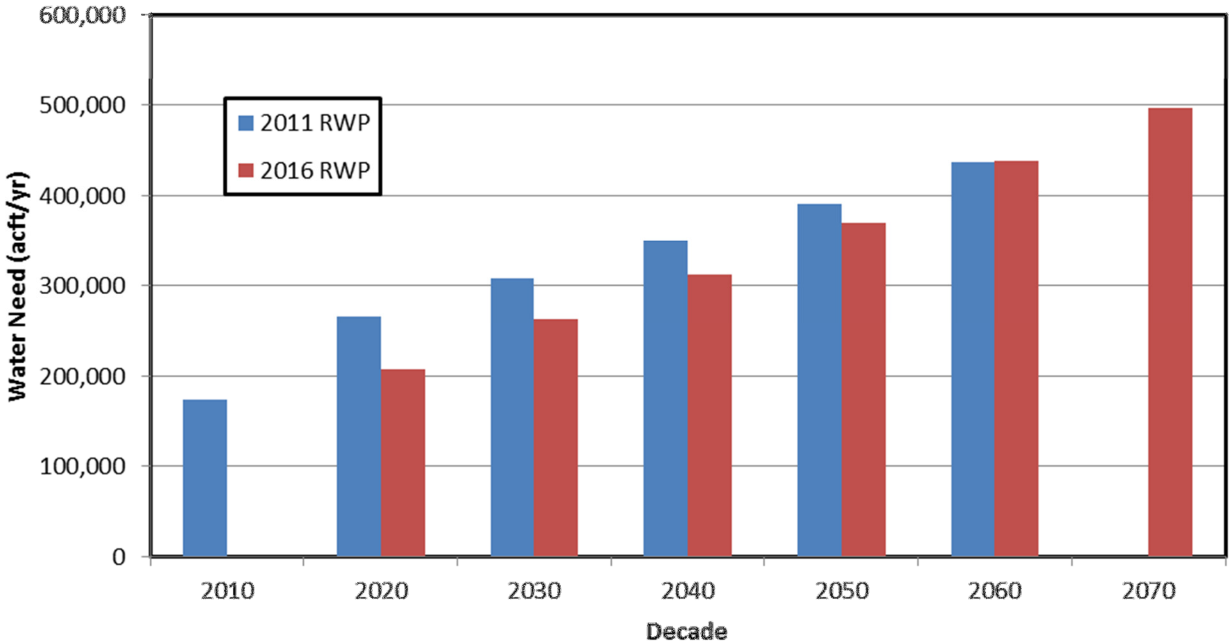
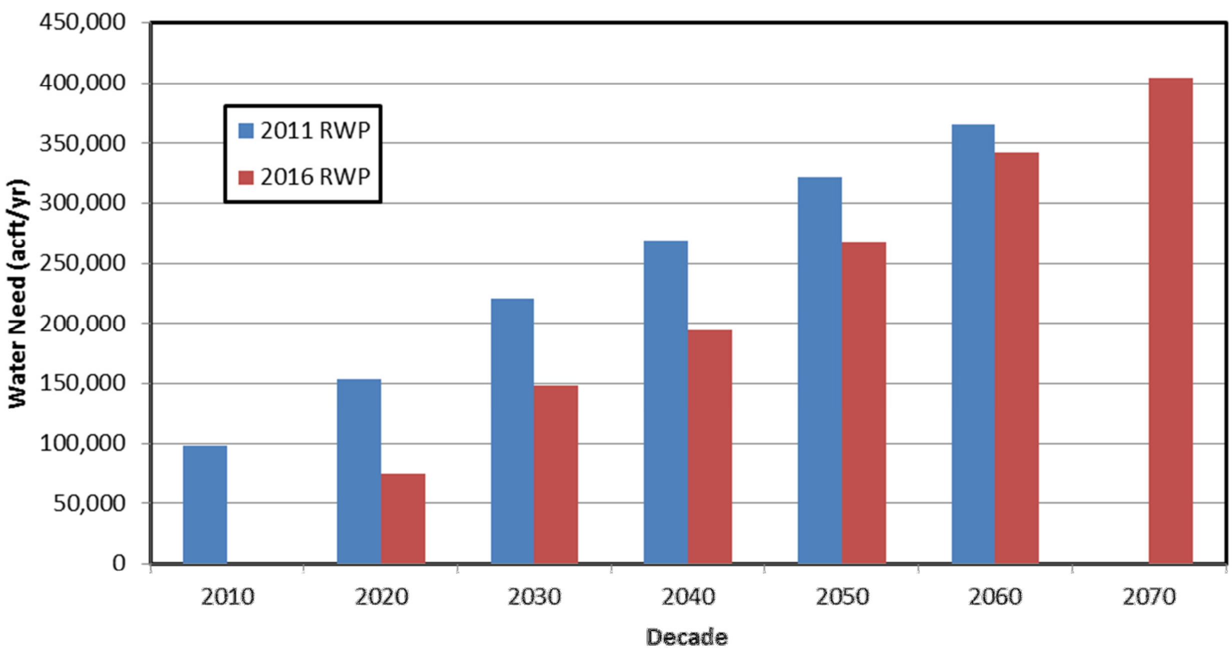


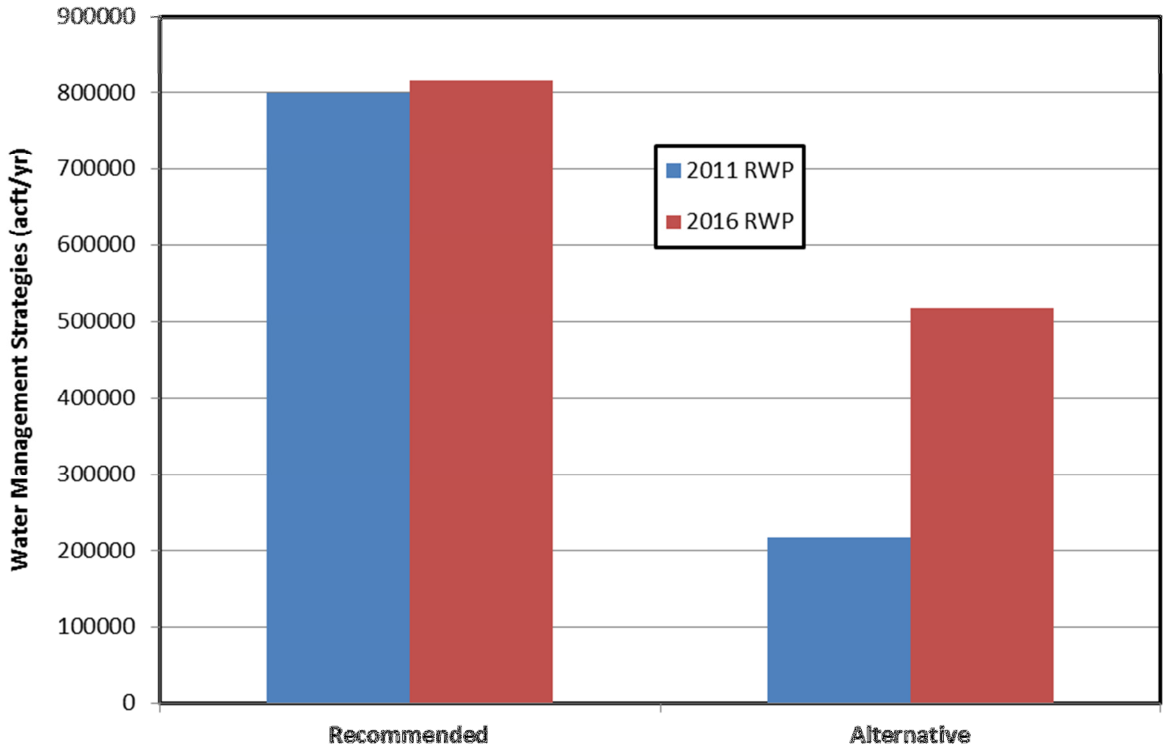
Figure 11.2-13 All Wholesale Water Providers



Recommended & Alternative Water Management Strategies

The completed 2011 SCTRWP included a total of 40 Recommended Water Management Strategies (WMSs) and 12 Alternative WMSs. The 2016 SCTRWP includes 60 recommended WMSs and 19 alternative WMSs. The total volume of recommended strategies increased by about 2.1 percent from 799,382 acft/yr to 816,705 acft/yr. The volume of alternative strategies increased significantly from 217,559 acft/yr to 518,219 acft/yr or an increase of 138 percent.

Figure 11.2-14 Recommended and Alternative Water Management Strategies



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Appendix A

DB17 Reports

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WUG POPULATION

REGION L	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
ATASCOSA COUNTY						
NUECES BASIN						
BENTON CITY WSC	8,157	9,426	10,583	11,712	12,772	13,759
CHARLOTTE	2,008	2,321	2,605	2,883	3,144	3,387
JOURDANTON	4,532	5,237	5,880	6,506	7,096	7,644
LYTLE	2,339	2,703	3,035	3,358	3,663	3,946
MCCOY WSC	7,305	8,442	9,478	10,488	11,439	12,321
PLEASANTON	10,459	12,086	13,569	15,016	16,377	17,641
POTEET	3,817	4,411	4,952	5,480	5,976	6,437
SAN ANTONIO WATER SYSTEM	5,772	6,670	7,488	8,286	9,037	9,735
COUNTY-OTHER	6,592	7,618	8,553	9,464	10,325	11,119
NUECES BASIN TOTAL POPULATION	**50,981**	**58,914**	**66,143**	**73,193**	**79,829**	**85,989**
SAN ANTONIO BASIN						
BENTON CITY WSC	1,008	1,165	1,308	1,447	1,579	1,700
COUNTY-OTHER	585	676	759	841	916	987
SAN ANTONIO BASIN TOTAL POPULATION	**1,593**	**1,841**	**2,067**	**2,288**	**2,495**	**2,687**
ATASCOSA COUNTY TOTAL POPULATION	**52,574**	**60,755**	**68,210**	**75,481**	**82,324**	**88,676**
BEXAR COUNTY						
NUECES BASIN						
ATASCOSA RURAL WSC	687	829	960	1,086	1,201	1,307
LYTLE	56	75	92	109	124	138
COUNTY-OTHER	8,037	9,022	9,926	10,795	11,593	12,320
NUECES BASIN TOTAL POPULATION	**8,780**	**9,926**	**10,978**	**11,990**	**12,918**	**13,765**
SAN ANTONIO BASIN						
ALAMO HEIGHTS	8,095	8,423	8,423	8,423	8,423	8,423
ATASCOSA RURAL WSC	11,898	14,365	16,632	18,810	20,809	22,632
BALCONES HEIGHTS	3,386	3,828	4,234	4,624	4,982	5,308
CASTLE HILLS	4,739	4,739	4,739	4,739	4,739	4,739
CHINA GROVE	1,358	1,535	1,698	1,854	1,997	2,128
CONVERSE	23,289	25,936	28,193	28,193	28,193	28,193
EAST CENTRAL SUD	9,626	10,731	11,747	12,723	13,619	14,437
ELMENDORF	2,131	2,781	3,379	3,953	4,480	4,961
FAIR OAKS RANCH	4,959	5,286	5,446	5,387	5,642	5,874
GREEN VALLEY SUD	3,179	3,594	3,975	4,341	4,677	4,983
HELOTES	9,803	12,249	14,497	16,657	18,639	20,447
HILL COUNTRY VILLAGE	1,028	1,028	1,028	1,028	1,028	1,028
HOLLYWOOD PARK	3,126	3,190	3,249	3,305	3,357	3,404
KIRBY	9,210	10,411	10,494	10,495	10,495	10,495
LACKLAND AFB	9,918	9,918	9,918	9,918	9,918	9,918
LEON VALLEY	10,886	11,616	12,287	12,932	13,524	14,064
LIVE OAK	15,117	15,480	15,480	15,480	15,480	15,480
OLMOS PARK	2,576	2,912	3,220	3,517	3,789	4,038
RANDOLPH AFB	1,429	1,615	1,787	1,951	2,102	2,240

WUG POPULATION

REGION L	WUG POPULATION					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
BEXAR COUNTY						
SAN ANTONIO BASIN						
SAN ANTONIO	1,528,077	1,727,411	1,910,640	2,086,678	2,248,192	2,395,583
SAN ANTONIO WATER SYSTEM	227,729	257,436	284,742	310,977	335,047	357,013
SCHERTZ	1,485	1,866	2,347	2,859	3,473	4,035
SELMA	4,777	5,400	5,973	6,523	7,028	7,488
SHAVANO PARK	3,494	3,950	4,369	4,772	5,141	5,478
SOMERSET	1,878	2,123	2,348	2,564	2,763	2,944
ST. HEDWIG	2,411	2,726	3,015	3,292	3,547	3,780
TERRELL HILLS	5,616	5,616	5,616	5,616	5,616	5,616
THE OAKS WSC	2,114	2,519	2,892	3,250	3,579	3,879
UNIVERSAL CITY	21,332	21,970	21,970	21,970	21,970	21,970
VON ORMY	1,250	1,412	1,562	1,706	1,838	1,959
WATER SERVICES INC	4,102	4,587	5,032	5,460	5,853	6,211
WINDCREST	5,573	5,781	5,972	6,156	6,324	6,478
COUNTY-OTHER	19,670	29,190	40,372	53,525	65,137	75,735
SAN ANTONIO BASIN TOTAL POPULATION	**1,965,261**	**2,221,624**	**2,457,276**	**2,683,678**	**2,891,401**	**3,080,961**
BEXAR COUNTY TOTAL POPULATION	**1,974,041**	**2,231,550**	**2,468,254**	**2,695,668**	**2,904,319**	**3,094,726**
CALDWELL COUNTY						
COLORADO BASIN						
AQUA WSC	260	318	375	432	489	545
CREEDMOOR-MAHA WSC	1,021	1,249	1,476	1,699	1,926	2,144
MUSTANG RIDGE	514	629	743	855	969	1,079
POLONIA WSC	2,269	2,776	3,278	3,774	4,275	4,763
COUNTY-OTHER	426	524	619	713	807	901
COLORADO BASIN TOTAL POPULATION	**4,490**	**5,496**	**6,491**	**7,473**	**8,466**	**9,432**
GUADALUPE BASIN						
AQUA WSC	1,470	1,800	2,126	2,447	2,773	3,089
COUNTY LINE WSC	1,173	1,436	1,695	1,952	2,212	2,464
CREEDMOOR-MAHA WSC	260	320	377	434	491	548
GOFORTH SUD	377	462	546	628	712	793
GONZALES COUNTY WSC	182	223	264	304	344	383
LOCKHART	15,680	19,198	22,668	26,100	29,568	32,942
LULING	6,658	8,152	9,625	11,083	12,555	13,988
MARTINDALE	1,378	1,687	1,992	2,293	2,598	2,895
MAXWELL WSC	4,070	4,983	5,883	6,774	7,674	8,550
MUSTANG RIDGE	13	16	19	22	25	28
NIEDERWALD	160	196	232	267	302	337
POLONIA WSC	4,813	5,894	6,960	8,014	9,079	10,115
SAN MARCOS	9	15	21	27	33	39
UHLAND	614	752	889	1,023	1,159	1,291

WUG POPULATION

REGION L	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
CALDWELL COUNTY						
GUADALUPE BASIN						
COUNTY-OTHER	5,661	6,923	8,167	9,402	10,648	11,860
GUADALUPE BASIN TOTAL POPULATION	**42,518**	**52,057**	**61,464**	**70,770**	**80,173**	**89,322**
CALDWELL COUNTY TOTAL POPULATION	**47,008**	**57,553**	**67,955**	**78,243**	**88,639**	**98,754**
CALHOUN COUNTY						
COLORADO-LAVACA BASIN						
POINT COMFORT	829	927	1,022	1,113	1,204	1,292
COUNTY-OTHER	802	896	988	1,077	1,165	1,249
COLORADO-LAVACA BASIN TOTAL POPULATION	**1,631**	**1,823**	**2,010**	**2,190**	**2,369**	**2,541**
LAVACA-GUADALUPE BASIN						
CALHOUN COUNTY WS	4,401	4,919	5,423	5,909	6,390	6,857
PORT LAVACA	13,770	15,391	16,969	18,490	19,996	21,456
PORT O'CONNOR 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	1,214	1,357	1,498	1,630	1,765	1,893
LAVACA-GUADALUPE BASIN TOTAL POPULATION	**22,328**	**24,956**	**27,516**	**29,981**	**32,424**	**34,791**
SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	78	87	96	105	113	122
SAN ANTONIO-NUECES BASIN TOTAL POPULATION	**78**	**87**	**96**	**105**	**113**	**122**
CALHOUN COUNTY TOTAL POPULATION	**24,037**	**26,866**	**29,622**	**32,276**	**34,906**	**37,454**
COMAL COUNTY						
GUADALUPE BASIN						
BULVERDE	56	66	77	88	99	110
CANYON LAKE WATER SERVICE COMPANY	24,848	35,043	45,401	55,857	66,241	76,210
CRYSTAL CLEAR WSC	2,087	2,404	2,726	3,051	3,373	3,683
GARDEN RIDGE	3,017	4,103	5,205	6,318	7,424	8,485
GREEN VALLEY SUD	355	450	547	644	741	833
NEW BRAUNFELS	60,609	75,734	91,096	106,606	122,011	136,799
SAN ANTONIO WATER SYSTEM	5,328	7,953	10,620	13,313	15,988	18,488
SCHERTZ	1,531	2,490	3,741	5,200	7,011	8,845
COUNTY-OTHER	23,390	23,788	23,846	23,933	23,544	23,254
GUADALUPE BASIN TOTAL POPULATION	**121,221**	**152,031**	**183,259**	**215,010**	**246,432**	**276,707**
SAN ANTONIO BASIN						
BULVERDE	5,497	6,559	7,637	8,725	9,806	10,843
CANYON LAKE WATER SERVICE COMPANY	6,150	8,672	11,231	13,816	16,385	18,850
FAIR OAKS RANCH	399	475	537	576	647	715
GARDEN RIDGE	1,705	2,318	2,941	3,570	4,194	4,794
SAN ANTONIO WATER SYSTEM	4,565	6,816	9,101	11,408	13,699	15,966
SCHERTZ	38	61	92	128	172	218

WUG POPULATION

REGION L	WUG POPULATION					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
COMAL COUNTY						
SAN ANTONIO BASIN						
SELMA	18	23	27	32	37	42
COUNTY-OTHER	1,232	1,444	1,737	1,827	1,990	1,964
SAN ANTONIO BASIN TOTAL POPULATION	**19,604**	**26,368**	**33,303**	**40,082**	**46,930**	**53,392**
COMAL COUNTY TOTAL POPULATION	**140,825**	**178,399**	**216,562**	**255,092**	**293,362**	**330,099**
DEWITT COUNTY						
GUADALUPE BASIN						
CUERO	7,100	7,338	7,455	7,563	7,634	7,684
GONZALES COUNTY WSC	356	368	374	380	383	386
YORKTOWN	2,171	2,244	2,280	2,313	2,335	2,350
COUNTY-OTHER	7,166	7,406	7,525	7,633	7,705	7,755
GUADALUPE BASIN TOTAL POPULATION	**16,793**	**17,356**	**17,634**	**17,889**	**18,057**	**18,175**
LAVACA BASIN						
YOAKUM	2,219	2,294	2,330	2,364	2,386	2,402
COUNTY-OTHER	1,274	1,316	1,338	1,357	1,370	1,379
LAVACA BASIN TOTAL POPULATION	**3,493**	**3,610**	**3,668**	**3,721**	**3,756**	**3,781**
LAVACA-GUADALUPE BASIN						
COUNTY-OTHER	13	13	14	14	14	14
LAVACA-GUADALUPE BASIN TOTAL POPULATION	**13**	**13**	**14**	**14**	**14**	**14**
SAN ANTONIO BASIN						
COUNTY-OTHER	556	576	584	592	598	602
SAN ANTONIO BASIN TOTAL POPULATION	**556**	**576**	**584**	**592**	**598**	**602**
DEWITT COUNTY TOTAL POPULATION	**20,855**	**21,555**	**21,900**	**22,216**	**22,425**	**22,572**
DIMMIT COUNTY						
NUECES BASIN						
ASHERTON	1,180	1,272	1,332	1,391	1,437	1,474
BIG WELLS	759	818	856	895	924	948
CARRIZO SPRINGS	5,841	6,297	6,592	6,888	7,114	7,296
COUNTY-OTHER	3,071	3,313	3,468	3,623	3,742	3,837
NUECES BASIN TOTAL POPULATION	**10,851**	**11,700**	**12,248**	**12,797**	**13,217**	**13,555**
RIO GRANDE BASIN						
COUNTY-OTHER	24	25	27	28	29	30
RIO GRANDE BASIN TOTAL POPULATION	**24**	**25**	**27**	**28**	**29**	**30**
DIMMIT COUNTY TOTAL POPULATION	**10,875**	**11,725**	**12,275**	**12,825**	**13,246**	**13,585**
FRIO COUNTY						
NUECES BASIN						
BENTON CITY WSC	573	632	683	732	776	816
DILLEY	4,340	4,783	5,168	5,539	5,874	6,176
PEARSALL	10,192	11,233	12,137	13,009	13,795	14,505

WUG POPULATION

REGION L	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
FRIO COUNTY						
NUECES BASIN						
COUNTY-OTHER	4,081	4,496	4,858	5,208	5,522	5,807
NUECES BASIN TOTAL POPULATION	**19,186**	**21,144**	**22,846**	**24,488**	**25,967**	**27,304**
FRIO COUNTY TOTAL POPULATION	**19,186**	**21,144**	**22,846**	**24,488**	**25,967**	**27,304**
GOLIAD COUNTY						
GUADALUPE BASIN						
COUNTY-OTHER	3,006	3,395	3,652	3,761	3,837	3,882
GUADALUPE BASIN TOTAL POPULATION	**3,006**	**3,395**	**3,652**	**3,761**	**3,837**	**3,882**
SAN ANTONIO BASIN						
GOLIAD	2,230	2,519	2,709	2,790	2,847	2,880
COUNTY-OTHER	2,515	2,841	3,056	3,147	3,211	3,248
SAN ANTONIO BASIN TOTAL POPULATION	**4,745**	**5,360**	**5,765**	**5,937**	**6,058**	**6,128**
SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	676	764	822	847	864	874
SAN ANTONIO-NUECES BASIN TOTAL POPULATION	**676**	**764**	**822**	**847**	**864**	**874**
GOLIAD COUNTY TOTAL POPULATION	**8,427**	**9,519**	**10,239**	**10,545**	**10,759**	**10,884**
GONZALES COUNTY						
GUADALUPE BASIN						
GONZALES	7,948	8,741	9,487	10,352	11,231	12,151
GONZALES COUNTY WSC	6,264	6,889	7,477	8,159	8,852	9,578
NIXON	2,612	2,872	3,118	3,402	3,691	3,993
SMILEY	603	664	720	786	852	922
WAELDER	1,170	1,287	1,397	1,524	1,653	1,789
COUNTY-OTHER	3,007	3,306	3,588	3,915	4,251	4,598
GUADALUPE BASIN TOTAL POPULATION	**21,604**	**23,759**	**25,787**	**28,138**	**30,530**	**33,031**
LAVACA BASIN						
COUNTY-OTHER	147	162	176	192	208	225
LAVACA BASIN TOTAL POPULATION	**147**	**162**	**176**	**192**	**208**	**225**
GONZALES COUNTY TOTAL POPULATION	**21,751**	**23,921**	**25,963**	**28,330**	**30,738**	**33,256**
GUADALUPE COUNTY						
GUADALUPE BASIN						
CRYSTAL CLEAR WSC	11,211	13,479	15,799	18,068	20,378	22,646
GONZALES COUNTY WSC	100	121	141	162	182	202
GREEN VALLEY SUD	11,342	13,636	15,983	18,279	20,615	22,909
LULING	24	28	33	38	43	47
NEW BRAUNFELS	12,373	14,875	17,436	19,940	22,489	24,991
SANTA CLARA	123	148	173	198	223	248
SCHERTZ	2,962	3,958	4,657	5,342	6,036	6,716
SEGUIN	30,675	36,879	43,227	49,436	55,756	61,960
SPRINGS HILL WSC	14,564	17,510	20,524	23,472	26,472	29,418

WUG POPULATION

REGION L	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
GUADALUPE COUNTY						
GUADALUPE BASIN						
COUNTY-OTHER	5,474	6,084	7,736	9,351	10,996	12,611
GUADALUPE BASIN TOTAL POPULATION	**88,848**	**106,718**	**125,709**	**144,286**	**163,190**	**181,748**
SAN ANTONIO BASIN						
CIBOLO	37,000	54,800	64,234	73,459	82,849	92,069
EAST CENTRAL SUD	685	824	965	1,104	1,245	1,384
GREEN VALLEY SUD	8,280	9,955	11,669	13,345	15,051	16,726
MARION	1,299	1,562	1,831	2,094	2,361	2,624
NEW BERLIN	623	749	878	1,004	1,132	1,258
SANTA CLARA	761	915	1,072	1,226	1,383	1,537
SCHERTZ	37,067	49,524	58,269	66,841	75,534	84,043
SELMA	2,274	5,012	5,012	5,012	5,012	5,012
SPRINGS HILL WSC	1,960	2,356	2,762	3,158	3,562	3,958
WATER SERVICES INC	247	296	347	397	448	498
COUNTY-OTHER	3,649	2,607	3,316	4,008	4,713	5,404
SAN ANTONIO BASIN TOTAL POPULATION	**93,845**	**128,600**	**150,355**	**171,648**	**193,290**	**214,513**
GUADALUPE COUNTY TOTAL POPULATION	**182,693**	**235,318**	**276,064**	**315,934**	**356,480**	**396,261**
HAYS COUNTY						
GUADALUPE BASIN						
BUDA	1,658	2,184	2,826	3,627	4,533	5,564
COUNTY LINE WSC	2,601	3,427	4,433	5,691	7,112	8,730
CREEDMOOR-MAHA WSC	82	108	139	179	223	274
CRYSTAL CLEAR WSC	4,393	5,131	6,029	7,152	8,421	9,865
GOFORTH SUD	12,870	16,829	21,650	27,677	34,487	42,238
KYLE	50,808	77,050	92,000	92,000	92,000	92,000
MAXWELL WSC	1,146	1,248	1,372	1,527	1,702	1,902
MOUNTAIN CITY	199	263	340	436	544	668
NIEDERWALD	601	792	1,025	1,315	1,643	2,017
PLUM CREEK WATER COMPANY	10,934	15,878	15,592	15,350	15,159	15,009
SAN MARCOS	71,108	84,803	101,138	120,621	143,859	171,575
UHLAND	770	1,063	1,420	1,866	2,370	2,943
WIMBERLEY	3,627	4,780	6,183	7,937	9,919	12,175
WIMBERLEY WSC	4,063	6,083	8,542	11,617	15,091	19,045
WOODCREEK	1,641	1,853	2,111	2,434	2,798	3,213
COUNTY-OTHER	16,777	19,057	38,837	53,743	101,516	154,547
GUADALUPE BASIN TOTAL POPULATION	**183,278**	**240,549**	**303,637**	**353,172**	**441,377**	**541,765**
HAYS COUNTY TOTAL POPULATION	**183,278**	**240,549**	**303,637**	**353,172**	**441,377**	**541,765**
KARNES COUNTY						
GUADALUPE BASIN						
EL OSO WSC	32	33	33	33	33	33
COUNTY-OTHER	89	91	92	92	92	92
GUADALUPE BASIN TOTAL POPULATION	**121**	**124**	**125**	**125**	**125**	**125**

WUG POPULATION

REGION L	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
KARNES COUNTY						
NUECES BASIN						
EL OSO WSC	90	93	93	93	93	93
COUNTY-OTHER	76	80	79	79	79	79
NUECES BASIN TOTAL POPULATION	**166**	**173**	**172**	**172**	**172**	**172**
SAN ANTONIO BASIN						
EL OSO WSC	2,623	2,704	2,709	2,709	2,709	2,709
FALLS CITY	638	657	659	659	659	659
KARNES CITY	3,172	3,271	3,277	3,277	3,277	3,277
KENEDY	3,437	3,544	3,551	3,551	3,551	3,551
RUNGE	1,075	1,109	1,111	1,111	1,111	1,111
SUNKO WSC	193	199	200	200	200	200
COUNTY-OTHER	3,967	4,092	4,098	4,098	4,098	4,098
SAN ANTONIO BASIN TOTAL POPULATION	**15,105**	**15,576**	**15,605**	**15,605**	**15,605**	**15,605**
SAN ANTONIO-NUECES BASIN						
EL OSO WSC	23	24	24	24	24	24
COUNTY-OTHER	41	41	42	42	42	42
SAN ANTONIO-NUECES BASIN TOTAL POPULATION	**64**	**65**	**66**	**66**	**66**	**66**
KARNES COUNTY TOTAL POPULATION	**15,456**	**15,938**	**15,968**	**15,968**	**15,968**	**15,968**
KENDALL COUNTY						
COLORADO BASIN						
COUNTY-OTHER	329	406	489	571	655	736
COLORADO BASIN TOTAL POPULATION	**329**	**406**	**489**	**571**	**655**	**736**
GUADALUPE BASIN						
KENDALL COUNTY WCID #1	3,190	3,750	4,341	4,927	5,525	6,112
COUNTY-OTHER	13,000	16,289	19,764	23,208	26,724	30,175
GUADALUPE BASIN TOTAL POPULATION	**16,190**	**20,039**	**24,105**	**28,135**	**32,249**	**36,287**
SAN ANTONIO BASIN						
BOERNE	14,367	18,820	23,524	28,187	32,947	37,619
FAIR OAKS RANCH	2,482	3,431	4,318	4,965	5,898	6,814
WATER SERVICES INC	280	346	417	487	558	628
COUNTY-OTHER	8,537	9,171	9,954	10,963	11,721	12,465
SAN ANTONIO BASIN TOTAL POPULATION	**25,666**	**31,768**	**38,213**	**44,602**	**51,124**	**57,526**
KENDALL COUNTY TOTAL POPULATION	**42,185**	**52,213**	**62,807**	**73,308**	**84,028**	**94,549**
LA SALLE COUNTY						
NUECES BASIN						
COTULLA	4,069	4,457	4,819	5,226	5,577	5,902
ENCINAL	632	692	748	811	866	916
COUNTY-OTHER	3,075	3,368	3,642	3,950	4,214	4,461
NUECES BASIN TOTAL POPULATION	**7,776**	**8,517**	**9,209**	**9,987**	**10,657**	**11,279**
LA SALLE COUNTY TOTAL POPULATION	**7,776**	**8,517**	**9,209**	**9,987**	**10,657**	**11,279**

WUG POPULATION

REGION L	WUG POPULATION					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
MEDINA COUNTY						
NUECES BASIN						
BENTON CITY WSC	5,157	6,193	7,074	7,842	8,535	9,138
DEVINE	4,559	4,780	4,968	5,132	5,280	5,409
EAST MEDINA COUNTY SUD	7,719	8,873	9,854	10,710	11,482	12,153
HONDO	9,702	10,654	11,463	12,169	12,806	13,360
LYTLE	590	731	851	956	1,051	1,133
NATALIA	1,638	1,857	2,043	2,206	2,352	2,480
YANCEY WSC	1,159	1,315	1,446	1,561	1,665	1,755
COUNTY-OTHER	9,511	9,986	10,738	11,330	11,816	12,172
NUECES BASIN TOTAL POPULATION	**40,035**	**44,389**	**48,437**	**51,906**	**54,987**	**57,600**
SAN ANTONIO BASIN						
CASTROVILLE	2,696	2,713	2,728	2,741	2,753	2,763
EAST MEDINA COUNTY SUD	696	800	888	965	1,035	1,096
LACOSTE	1,281	1,452	1,598	1,725	1,839	1,939
SAN ANTONIO	52	80	104	125	144	160
SAN ANTONIO WATER SYSTEM	2,974	4,482	5,763	6,881	7,890	8,767
YANCEY WSC	4,731	5,363	5,901	6,370	6,792	7,160
COUNTY-OTHER	188	415	257	183	165	215
SAN ANTONIO BASIN TOTAL POPULATION	**12,618**	**15,305**	**17,239**	**18,990**	**20,618**	**22,100**
MEDINA COUNTY TOTAL POPULATION	**52,653**	**59,694**	**65,676**	**70,896**	**75,605**	**79,700**
REFUGIO COUNTY						
SAN ANTONIO BASIN						
COUNTY-OTHER	67	69	70	71	71	72
SAN ANTONIO BASIN TOTAL POPULATION	**67**	**69**	**70**	**71**	**71**	**72**
SAN ANTONIO-NUECES BASIN						
REFUGIO	3,009	3,104	3,126	3,179	3,201	3,215
WOODSBORO	1,575	1,624	1,636	1,663	1,675	1,682
COUNTY-OTHER	3,036	3,132	3,153	3,206	3,228	3,244
SAN ANTONIO-NUECES BASIN TOTAL POPULATION	**7,620**	**7,860**	**7,915**	**8,048**	**8,104**	**8,141**
REFUGIO COUNTY TOTAL POPULATION	**7,687**	**7,929**	**7,985**	**8,119**	**8,175**	**8,213**
UVALDE COUNTY						
NUECES BASIN						
SABINAL	1,852	2,026	2,174	2,328	2,475	2,615
UVALDE	17,208	18,819	20,199	21,628	22,992	24,299
COUNTY-OTHER	9,786	10,703	11,488	12,301	13,076	13,820
NUECES BASIN TOTAL POPULATION	**28,846**	**31,548**	**33,861**	**36,257**	**38,543**	**40,734**
UVALDE COUNTY TOTAL POPULATION	**28,846**	**31,548**	**33,861**	**36,257**	**38,543**	**40,734**
VICTORIA COUNTY						
GUADALUPE BASIN						
VICTORIA	45,688	48,862	51,359	53,584	55,410	56,923
COUNTY-OTHER	15,410	16,404	17,187	17,883	18,456	18,929

WUG POPULATION

REGION L	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
VICTORIA COUNTY						
GUADALUPE BASIN TOTAL POPULATION	**61,098**	**65,266**	**68,546**	**71,467**	**73,866**	**75,852**
LAVACA BASIN						
COUNTY-OTHER	43	46	48	50	52	53
LAVACA BASIN TOTAL POPULATION	**43**	**46**	**48**	**50**	**52**	**53**
LAVACA-GUADALUPE BASIN						
VICTORIA	22,099	23,634	24,842	25,917	26,801	27,533
COUNTY-OTHER	10,547	11,239	11,784	12,269	12,666	12,997
LAVACA-GUADALUPE BASIN TOTAL POPULATION	**32,646**	**34,873**	**36,626**	**38,186**	**39,467**	**40,530**
SAN ANTONIO BASIN						
COUNTY-OTHER	70	75	78	82	85	87
SAN ANTONIO BASIN TOTAL POPULATION	**70**	**75**	**78**	**82**	**85**	**87**
VICTORIA COUNTY TOTAL POPULATION	**93,857**	**100,260**	**105,298**	**109,785**	**113,470**	**116,522**
WILSON COUNTY						
GUADALUPE BASIN						
NIXON	8	10	12	14	16	17
SUNKO WSC	27	33	39	44	50	54
COUNTY-OTHER	339	418	494	563	626	686
GUADALUPE BASIN TOTAL POPULATION	**374**	**461**	**545**	**621**	**692**	**757**
NUECES BASIN						
MCCOY WSC	346	426	505	574	641	701
COUNTY-OTHER	414	510	602	686	766	836
NUECES BASIN TOTAL POPULATION	**760**	**936**	**1,107**	**1,260**	**1,407**	**1,537**
SAN ANTONIO BASIN						
EAST CENTRAL SUD	1,111	1,368	1,618	1,843	2,056	2,248
EL OSO WSC	179	221	261	297	332	363
ELMENDORF	15	18	22	25	28	30
FLORESVILLE	8,152	10,041	11,875	13,524	15,085	16,491
LA VERNIA	1,307	1,610	1,904	2,168	2,419	2,644
MCCOY WSC	28	34	40	46	51	56
OAK HILLS WSC	5,405	6,657	7,873	8,966	10,001	10,934
POTH	2,412	2,971	3,514	4,001	4,463	4,880
S S WSC	16,420	20,224	23,918	27,238	30,384	33,216
STOCKDALE	1,823	2,245	2,655	3,024	3,373	3,688
SUNKO WSC	4,441	5,470	6,469	7,368	8,218	8,984
COUNTY-OTHER	11,839	14,581	17,243	19,635	21,902	23,943
SAN ANTONIO BASIN TOTAL POPULATION	**53,132**	**65,440**	**77,392**	**88,135**	**98,312**	**107,477**
WILSON COUNTY TOTAL POPULATION	**54,266**	**66,837**	**79,044**	**90,016**	**100,411**	**109,771**
ZAVALA COUNTY						
NUECES BASIN						
CRYSTAL CITY	8,063	9,022	9,880	10,711	11,484	12,199

WUG POPULATION

REGION L	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
ZAVALA COUNTY						
NUECES BASIN						
ZAVALA COUNTY WCID #1	1,672	1,871	2,049	2,221	2,382	2,530
COUNTY-OTHER	3,454	3,865	4,232	4,589	4,920	5,227
NUECES BASIN TOTAL POPULATION	**13,189**	**14,758**	**16,161**	**17,521**	**18,786**	**19,956**
ZAVALA COUNTY TOTAL POPULATION	**13,189**	**14,758**	**16,161**	**17,521**	**18,786**	**19,956**
REGION L TOTAL POPULATION	**3,001,465**	**3,476,548**	**3,919,536**	**4,336,127**	**4,770,185**	**5,192,028**

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
ATASCOSA COUNTY						
NUECES BASIN						
BENTON CITY WSC	882	993	1,099	1,207	1,313	1,413
CHARLOTTE	344	386	425	467	508	547
JOURDANTON	959	1,083	1,198	1,317	1,434	1,544
LYTLE	452	510	563	618	673	725
MCCOY WSC	905	1,012	1,113	1,219	1,326	1,427
PLEASANTON	2,283	2,582	2,859	3,143	3,423	3,685
POTEET	472	523	571	623	678	730
SAN ANTONIO WATER SYSTEM	716	803	885	970	1,055	1,136
COUNTY-OTHER	847	940	1,028	1,123	1,222	1,315
MANUFACTURING	12	12	12	12	12	12
MINING	4,081	4,043	3,935	3,212	2,478	2,043
STEAM ELECTRIC POWER	4,807	6,101	5,997	7,336	7,672	7,819
LIVESTOCK	1,509	1,509	1,509	1,509	1,509	1,509
IRRIGATION	26,328	25,446	24,597	23,780	22,991	22,273
NUECES BASIN TOTAL DEMAND	**44,597**	**45,943**	**45,791**	**46,536**	**46,294**	**46,178**
SAN ANTONIO BASIN						
BENTON CITY WSC	109	123	136	150	163	175
COUNTY-OTHER	75	84	91	100	109	117
IRRIGATION	266	257	248	240	232	225
SAN ANTONIO BASIN TOTAL DEMAND	**450**	**464**	**475**	**490**	**504**	**517**
ATASCOSA COUNTY TOTAL DEMAND	**45,047**	**46,407**	**46,266**	**47,026**	**46,798**	**46,695**
BEXAR COUNTY						
NUECES BASIN						
ATASCOSA RURAL WSC	88	103	117	131	145	158
LYTLE	11	15	18	21	23	26
COUNTY-OTHER	1,504	1,638	1,774	1,917	2,056	2,184
LIVESTOCK	178	178	178	178	178	178
IRRIGATION	1,301	1,246	1,194	1,143	1,095	1,052
NUECES BASIN TOTAL DEMAND	**3,082**	**3,180**	**3,281**	**3,390**	**3,497**	**3,598**
SAN ANTONIO BASIN						
ALAMO HEIGHTS	2,216	2,268	2,240	2,227	2,225	2,225
ATASCOSA RURAL WSC	1,508	1,772	2,020	2,268	2,502	2,719
BALCONES HEIGHTS	518	566	612	662	711	758
CASTLE HILLS	395	375	359	351	350	349
CHINA GROVE	316	350	381	413	445	474
CONVERSE	2,536	2,744	2,930	2,905	2,898	2,897
EAST CENTRAL SUD	1,357	1,461	1,561	1,671	1,784	1,890
ELMENDORF	308	394	474	552	625	691
FAIR OAKS RANCH	1,311	1,384	1,419	1,400	1,464	1,524
GREEN VALLEY SUD	250	265	281	301	323	343
HELOTES	1,622	1,998	2,349	2,690	3,005	3,295
HILL COUNTRY VILLAGE	234	230	226	224	224	224
HOLLYWOOD PARK	949	953	959	969	983	997
KIRBY	942	1,012	986	977	974	974
LACKLAND AFB	1,054	1,013	981	962	959	959
LEON VALLEY	1,860	1,931	2,001	2,083	2,174	2,260
LIVE OAK	2,677	2,687	2,648	2,626	2,621	2,621

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
BEXAR COUNTY						
SAN ANTONIO BASIN						
OLMOS PARK	564	623	678	736	791	843
RANDOLPH AFB	97	109	121	132	142	151
SAN ANTONIO	235,320	258,645	280,772	303,790	326,624	347,849
SAN ANTONIO WATER SYSTEM	28,224	30,974	33,634	36,391	39,111	41,647
SCHERTZ	240	295	369	447	542	629
SELMA	788	879	969	1,056	1,136	1,211
SHAVANO PARK	1,104	1,234	1,356	1,476	1,588	1,692
SOMERSET	221	240	259	279	300	319
ST. HEDWIG	346	379	410	443	476	507
TERRELL HILLS	1,299	1,276	1,257	1,247	1,245	1,245
THE OAKS WSC	370	433	492	551	605	656
UNIVERSAL CITY	3,195	3,210	3,151	3,118	3,112	3,111
VON ORMY	140	153	165	178	191	204
WATER SERVICES INC	660	715	767	826	884	937
WINDCREST	1,203	1,220	1,238	1,265	1,297	1,328
COUNTY-OTHER	3,681	5,299	7,215	9,503	11,548	13,422
MANUFACTURING	22,737	25,264	27,802	30,035	32,461	35,083
MINING	7,820	8,740	9,533	10,404	11,399	12,502
STEAM ELECTRIC POWER	25,215	29,501	32,275	35,355	38,775	42,526
LIVESTOCK	980	980	980	980	980	980
IRRIGATION	10,325	9,889	9,470	9,070	8,686	8,349
SAN ANTONIO BASIN TOTAL DEMAND	**364,582**	**401,461**	**435,340**	**470,563**	**506,160**	**540,391**
BEXAR COUNTY TOTAL DEMAND	**367,664**	**404,641**	**438,621**	**473,953**	**509,657**	**543,989**
CALDWELL COUNTY						
COLORADO BASIN						
AQUA WSC	43	51	60	68	77	86
CREEDMOOR-MAHA WSC	114	133	152	172	195	216
MUSTANG RIDGE	69	82	95	108	122	136
POLONIA WSC	282	333	386	440	498	554
COUNTY-OTHER	51	60	70	79	90	100
MINING	11	9	6	4	2	1
LIVESTOCK	71	71	71	71	71	71
IRRIGATION	19	17	15	13	12	11
COLORADO BASIN TOTAL DEMAND	**660**	**756**	**855**	**955**	**1,067**	**1,175**
GUADALUPE BASIN						
AQUA WSC	242	289	336	385	435	484
COUNTY LINE WSC	82	97	114	132	149	166
CREEDMOOR-MAHA WSC	29	34	39	45	50	56
GOFORTH SUD	41	49	56	64	73	81
GONZALES COUNTY WSC	58	70	83	95	91	102
LOCKHART	2,251	2,676	3,105	3,547	4,010	4,465
LULING	950	1,125	1,301	1,484	1,678	1,868
MARTINDALE	187	221	256	292	330	367
MAXWELL WSC	414	487	561	638	720	802
MUSTANG RIDGE	2	2	2	3	3	3
NIEDERWALD	16	19	22	25	28	31

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
CALDWELL COUNTY						
GUADALUPE BASIN						
POLONIA WSC	596	707	819	935	1,055	1,175
SAN MARCOS	2	3	4	5	6	7
UHLAND	79	94	110	126	142	158
COUNTY-OTHER	674	796	920	1,050	1,186	1,320
MANUFACTURING	8	9	10	11	12	13
MINING	112	89	66	42	18	8
LIVESTOCK	937	937	937	937	937	937
IRRIGATION	599	532	473	420	372	339
GUADALUPE BASIN TOTAL DEMAND	**7,279**	**8,236**	**9,214**	**10,236**	**11,295**	**12,382**
CALDWELL COUNTY TOTAL DEMAND	**7,939**	**8,992**	**10,069**	**11,191**	**12,362**	**13,557**
CALHOUN COUNTY						
COLORADO-LAVACA BASIN						
POINT COMFORT	87	92	99	107	115	124
COUNTY-OTHER	94	101	110	120	129	138
MANUFACTURING	30,171	32,579	34,966	37,073	39,731	42,030
MINING	26	27	20	15	9	6
LIVESTOCK	66	66	66	66	66	66
IRRIGATION	712	630	575	536	499	461
COLORADO-LAVACA BASIN TOTAL DEMAND	**31,156**	**33,495**	**35,836**	**37,917**	**40,549**	**42,825**
GUADALUPE BASIN						
LIVESTOCK	2	2	2	2	2	2
GUADALUPE BASIN TOTAL DEMAND	**2**	**2**	**2**	**2**	**2**	**2**
LAVACA-GUADALUPE BASIN						
CALHOUN COUNTY WS	356	376	398	425	457	490
PORT LAVACA	1,927	2,080	2,237	2,408	2,598	2,786
PORT O'CONNOR MUD	110	116	123	132	142	152
SEADRIFT	256	278	300	324	349	374
COUNTY-OTHER	141	152	167	180	195	210
MANUFACTURING	24,686	26,656	28,609	30,333	32,507	34,389
MINING	26	28	21	15	10	6
LIVESTOCK	260	260	260	260	260	260
IRRIGATION	12,748	11,294	10,309	9,603	8,945	8,257
LAVACA-GUADALUPE BASIN TOTAL DEMAND	**40,510**	**41,240**	**42,424**	**43,680**	**45,463**	**46,924**
SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	9	9	11	12	13	13
LIVESTOCK	16	16	16	16	16	16
IRRIGATION	12	11	10	9	9	8
SAN ANTONIO-NUECES BASIN TOTAL DEMAND	**37**	**36**	**37**	**37**	**38**	**37**
CALHOUN COUNTY TOTAL DEMAND	**71,705**	**74,773**	**78,299**	**81,636**	**86,052**	**89,788**
COMAL COUNTY						
GUADALUPE BASIN						
BULVERDE	9	10	11	13	14	15
CANYON LAKE WATER SERVICE COMPANY	3,112	4,314	5,554	6,812	8,067	9,275
CRYSTAL CLEAR WSC	301	336	374	415	458	500

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COMAL COUNTY						
GUADALUPE BASIN						
GARDEN RIDGE	1,062	1,430	1,806	2,188	2,570	2,936
GREEN VALLEY SUD	28	34	39	45	52	58
NEW BRAUNFELS	12,380	15,203	18,118	21,108	24,127	27,039
SAN ANTONIO WATER SYSTEM	661	956	1,254	1,558	1,866	2,157
SCHERTZ	247	394	587	813	1,094	1,379
COUNTY-OTHER	3,955	3,917	3,843	3,812	3,741	3,694
MANUFACTURING	8,477	9,221	9,945	10,565	11,437	12,382
MINING	8,256	9,596	10,886	12,012	13,423	15,003
LIVESTOCK	240	240	240	240	240	240
IRRIGATION	386	351	316	281	247	227
GUADALUPE BASIN TOTAL DEMAND	**39,114**	**46,002**	**52,973**	**59,862**	**67,336**	**74,905**
SAN ANTONIO BASIN						
BULVERDE	794	929	1,070	1,215	1,363	1,506
CANYON LAKE WATER SERVICE COMPANY	771	1,068	1,375	1,686	1,996	2,295
FAIR OAKS RANCH	106	125	140	150	168	186
GARDEN RIDGE	600	808	1,021	1,237	1,452	1,660
SAN ANTONIO WATER SYSTEM	566	821	1,076	1,335	1,600	1,863
SCHERTZ	6	10	15	20	27	34
SELMA	3	4	5	6	6	7
COUNTY-OTHER	209	238	280	291	317	313
MANUFACTURING	86	93	100	107	116	125
MINING	344	400	454	501	559	625
LIVESTOCK	18	18	18	18	18	18
IRRIGATION	43	39	35	31	28	25
SAN ANTONIO BASIN TOTAL DEMAND	**3,546**	**4,553**	**5,589**	**6,597**	**7,650**	**8,657**
COMAL COUNTY TOTAL DEMAND	**42,660**	**50,555**	**58,562**	**66,459**	**74,986**	**83,562**
DEWITT COUNTY						
GUADALUPE BASIN						
CUERO	2,195	2,229	2,232	2,248	1,942	1,955
GONZALES COUNTY WSC	113	115	117	118	102	102
YORKTOWN	447	448	446	449	388	390
COUNTY-OTHER	1,139	1,138	1,126	1,125	970	976
MANUFACTURING	330	352	373	391	421	454
MINING	2,405	2,259	1,668	1,081	494	229
LIVESTOCK	1,517	1,517	1,517	1,517	1,517	1,517
IRRIGATION	520	520	520	520	520	520
GUADALUPE BASIN TOTAL DEMAND	**8,666**	**8,578**	**7,999**	**7,449**	**6,354**	**6,143**
LAVACA BASIN						
YOAKUM	455	458	455	456	402	404
COUNTY-OTHER	203	203	200	200	173	174
MANUFACTURING	220	234	249	261	281	302
MINING	506	476	351	228	104	48
LIVESTOCK	309	309	309	309	309	309
IRRIGATION	846	846	846	846	846	846
LAVACA BASIN TOTAL DEMAND	**2,539**	**2,526**	**2,410**	**2,300**	**2,115**	**2,083**
LAVACA-GUADALUPE BASIN						
COUNTY-OTHER	2	2	2	2	2	2

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
DEWITT COUNTY						
LAVACA-GUADALUPE BASIN						
LIVESTOCK	18	18	18	18	18	18
IRRIGATION	15	15	15	15	15	15
LAVACA-GUADALUPE BASIN TOTAL DEMAND	**35**	**35**	**35**	**35**	**35**	**35**
SAN ANTONIO BASIN						
COUNTY-OTHER	88	88	87	87	75	76
MINING	254	238	176	113	52	24
LIVESTOCK	150	150	150	150	150	150
IRRIGATION	104	104	104	104	104	104
SAN ANTONIO BASIN TOTAL DEMAND	**596**	**580**	**517**	**454**	**381**	**354**
DEWITT COUNTY TOTAL DEMAND	**11,836**	**11,719**	**10,961**	**10,238**	**8,885**	**8,615**
DIMMIT COUNTY						
NUECES BASIN						
ASHERTON	341	359	374	390	280	287
BIG WELLS	174	181	185	192	138	141
CARRIZO SPRINGS	2,270	2,402	2,479	2,581	1,856	1,903
COUNTY-OTHER	607	636	649	671	481	494
MINING	4,265	4,336	3,760	2,448	1,140	531
LIVESTOCK	439	439	439	439	439	439
IRRIGATION	5,020	4,968	4,768	4,563	4,366	4,232
NUECES BASIN TOTAL DEMAND	**13,116**	**13,321**	**12,654**	**11,284**	**8,700**	**8,027**
RIO GRANDE BASIN						
COUNTY-OTHER	4	4	5	5	4	4
MINING	654	665	577	376	175	81
LIVESTOCK	49	49	49	49	49	49
IRRIGATION	755	747	717	686	657	637
RIO GRANDE BASIN TOTAL DEMAND	**1,462**	**1,465**	**1,348**	**1,116**	**885**	**771**
DIMMIT COUNTY TOTAL DEMAND	**14,578**	**14,786**	**14,002**	**12,400**	**9,585**	**8,798**
FRIO COUNTY						
NUECES BASIN						
BENTON CITY WSC	62	67	71	76	80	84
DILLEY	1,025	1,110	1,185	1,263	1,337	1,405
PEARSALL	2,021	2,181	2,323	2,472	2,616	2,750
COUNTY-OTHER	528	559	602	643	680	715
MINING	1,217	1,250	1,178	986	620	390
STEAM ELECTRIC POWER	555	417	398	158	189	163
LIVESTOCK	994	994	994	994	994	994
IRRIGATION	70,831	68,327	65,932	63,638	61,423	59,412
NUECES BASIN TOTAL DEMAND	**77,233**	**74,905**	**72,683**	**70,230**	**67,939**	**65,913**
FRIO COUNTY TOTAL DEMAND	**77,233**	**74,905**	**72,683**	**70,230**	**67,939**	**65,913**
GOLIAD COUNTY						
GUADALUPE BASIN						
COUNTY-OTHER	502	547	575	585	436	441
MINING	126	126	126	126	126	126
STEAM ELECTRIC POWER	17,080	17,080	17,080	17,080	17,080	17,080
LIVESTOCK	262	262	262	262	262	262
IRRIGATION	575	575	575	575	575	575

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
GOLIAD COUNTY						
GUADALUPE BASIN TOTAL DEMAND	**18,545**	**18,590**	**18,618**	**18,628**	**18,479**	**18,484**
SAN ANTONIO BASIN						
GOLIAD	611	674	713	729	544	551
COUNTY-OTHER	421	458	482	490	365	370
MANUFACTURING	34	51	68	85	102	122
MINING	275	275	275	275	275	275
LIVESTOCK	448	448	448	448	448	448
IRRIGATION	2,209	2,209	2,209	2,209	2,209	2,209
SAN ANTONIO BASIN TOTAL DEMAND	**3,998**	**4,115**	**4,195**	**4,236**	**3,943**	**3,975**
SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	112	123	129	131	99	99
MINING	49	49	49	49	49	49
LIVESTOCK	418	418	418	418	418	418
IRRIGATION	416	416	416	416	416	416
SAN ANTONIO-NUECES BASIN TOTAL DEMAND	**995**	**1,006**	**1,012**	**1,014**	**982**	**982**
GOLIAD COUNTY TOTAL DEMAND	**23,538**	**23,711**	**23,825**	**23,878**	**23,404**	**23,441**
GONZALES COUNTY						
GUADALUPE BASIN						
GONZALES	2,200	2,375	2,545	2,759	2,677	2,895
GONZALES COUNTY WSC	1,989	2,153	2,340	2,534	2,337	2,528
NIXON	433	462	491	529	538	582
SMILEY	136	146	156	170	164	177
WAELDER	224	241	258	279	270	292
COUNTY-OTHER	402	420	454	494	463	502
MANUFACTURING	1,671	1,794	1,914	2,020	2,163	2,316
MINING	1,600	1,207	813	418	24	1
LIVESTOCK	4,629	4,629	4,629	4,629	4,629	4,629
IRRIGATION	2,413	2,080	1,792	1,545	1,333	1,193
GUADALUPE BASIN TOTAL DEMAND	**15,697**	**15,507**	**15,392**	**15,377**	**14,598**	**15,115**
LAVACA BASIN						
COUNTY-OTHER	20	21	23	24	24	25
LIVESTOCK	107	107	107	107	107	107
LAVACA BASIN TOTAL DEMAND	**127**	**128**	**130**	**131**	**131**	**132**
GONZALES COUNTY TOTAL DEMAND	**15,824**	**15,635**	**15,522**	**15,508**	**14,729**	**15,247**
GUADALUPE COUNTY						
GUADALUPE BASIN						
CRYSTAL CLEAR WSC	1,612	1,883	2,167	2,457	2,766	3,071
GONZALES COUNTY WSC	32	38	45	51	49	54
GREEN VALLEY SUD	892	1,004	1,128	1,265	1,421	1,577
LULING	4	4	5	6	6	7
NEW BRAUNFELS	2,528	2,987	3,468	3,949	4,447	4,940
SANTA CLARA	15	17	20	23	25	28
SCHERTZ	478	626	731	835	942	1,047
SEGUIN	4,707	5,494	6,326	7,175	8,077	8,970
SPRINGS HILL WSC	1,249	1,428	1,626	1,833	2,059	2,286
COUNTY-OTHER	640	693	871	1,048	1,229	1,408
MANUFACTURING	2,994	3,290	3,574	3,819	4,149	4,507
MINING	342	412	479	566	663	782

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
GUADALUPE COUNTY						
GUADALUPE BASIN						
STEAM ELECTRIC POWER	5,984	4,941	5,136	5,585	7,515	8,371
LIVESTOCK	941	941	941	941	941	941
IRRIGATION	339	300	263	252	250	233
GUADALUPE BASIN TOTAL DEMAND	**22,757**	**24,058**	**26,780**	**29,805**	**34,539**	**38,222**
SAN ANTONIO BASIN						
CIBOLO	5,343	7,823	9,148	10,447	11,773	13,075
EAST CENTRAL SUD	97	113	129	145	164	182
GREEN VALLEY SUD	651	733	824	924	1,038	1,152
MARION	164	189	216	245	275	305
NEW BERLIN	102	120	140	159	179	198
SANTA CLARA	90	105	121	136	154	171
SCHERTZ	5,970	7,828	9,136	10,438	11,779	13,099
SELMA	376	816	813	812	811	810
SPRINGS HILL WSC	168	193	219	247	278	308
WATER SERVICES INC	40	47	53	61	68	76
COUNTY-OTHER	427	298	374	450	526	603
MANUFACTURING	9	10	11	11	12	14
MINING	114	138	160	189	221	261
LIVESTOCK	105	105	105	105	105	105
IRRIGATION	74	66	58	55	55	51
SAN ANTONIO BASIN TOTAL DEMAND	**13,730**	**18,584**	**21,507**	**24,424**	**27,438**	**30,410**
GUADALUPE COUNTY TOTAL DEMAND	**36,487**	**42,642**	**48,287**	**54,229**	**61,977**	**68,632**
HAYS COUNTY						
GUADALUPE BASIN						
BUDA	299	388	499	639	798	979
COUNTY LINE WSC	181	231	298	383	478	587
CREEDMOOR-MAHA WSC	10	12	15	19	23	28
CRYSTAL CLEAR WSC	632	717	827	973	1,143	1,338
GOFORTH SUD	1,384	1,753	2,220	2,818	3,504	4,287
KYLE	5,156	7,680	9,133	9,119	9,108	9,104
MAXWELL WSC	117	122	131	144	160	179
MOUNTAIN CITY	24	30	38	48	60	73
NIEDERWALD	59	75	96	122	151	185
PLUM CREEK WATER COMPANY	736	1,068	1,048	1,032	1,019	1,009
SAN MARCOS	11,934	13,941	16,430	19,485	23,205	27,655
UHLAND	99	133	175	229	290	360
WIMBERLEY	626	800	1,018	1,300	1,622	1,990
WIMBERLEY WSC	450	657	919	1,247	1,617	2,039
WOODCREEK	282	311	349	399	458	525
COUNTY-OTHER	2,064	2,284	4,564	6,274	11,819	17,977
MANUFACTURING	107	122	138	152	165	179
STEAM ELECTRIC POWER	730	965	1,982	2,708	3,688	5,023
LIVESTOCK	410	410	410	410	410	410
IRRIGATION	650	644	638	632	626	620
GUADALUPE BASIN TOTAL DEMAND	**25,950**	**32,343**	**40,928**	**48,133**	**60,344**	**74,547**
HAYS COUNTY TOTAL DEMAND	**25,950**	**32,343**	**40,928**	**48,133**	**60,344**	**74,547**

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
KARNES COUNTY						
GUADALUPE BASIN						
EL OSO WSC	7	7	7	7	7	7
COUNTY-OTHER	14	14	14	14	13	13
MINING	152	115	77	40	2	0
LIVESTOCK	41	41	41	41	41	41
IRRIGATION	27	25	22	20	18	17
GUADALUPE BASIN TOTAL DEMAND	**241**	**202**	**161**	**122**	**81**	**78**
NUECES BASIN						
EL OSO WSC	20	20	19	19	18	18
COUNTY-OTHER	11	11	11	11	11	11
MINING	253	192	129	66	4	0
LIVESTOCK	64	64	64	64	64	64
IRRIGATION	42	38	35	31	28	26
NUECES BASIN TOTAL DEMAND	**390**	**325**	**258**	**191**	**125**	**119**
SAN ANTONIO BASIN						
EL OSO WSC	563	568	559	553	524	524
FALLS CITY	147	148	146	145	141	141
KARNES CITY	625	628	617	611	580	580
KENEDY	1,421	1,446	1,435	1,432	1,362	1,362
RUNGE	231	232	228	227	216	216
SUNKO WSC	34	35	35	33	31	31
COUNTY-OTHER	591	598	592	588	557	557
MANUFACTURING	171	175	179	182	192	203
MINING	2,022	1,535	1,030	530	28	2
LIVESTOCK	1,039	1,039	1,039	1,039	1,039	1,039
IRRIGATION	570	516	466	422	381	350
SAN ANTONIO BASIN TOTAL DEMAND	**7,414**	**6,920**	**6,326**	**5,762**	**5,051**	**5,005**
SAN ANTONIO-NUECES BASIN						
EL OSO WSC	5	5	5	5	5	5
COUNTY-OTHER	6	6	6	6	6	6
MINING	101	77	52	26	1	0
LIVESTOCK	24	24	24	24	24	24
IRRIGATION	16	14	13	12	11	10
SAN ANTONIO-NUECES BASIN TOTAL DEMAND	**152**	**126**	**100**	**73**	**47**	**45**
KARNES COUNTY TOTAL DEMAND	**8,197**	**7,573**	**6,845**	**6,148**	**5,304**	**5,247**
KENDALL COUNTY						
COLORADO BASIN						
COUNTY-OTHER	41	48	57	66	75	85
LIVESTOCK	13	13	13	13	13	13
COLORADO BASIN TOTAL DEMAND	**54**	**61**	**70**	**79**	**88**	**98**
GUADALUPE BASIN						
KENDALL COUNTY WCID #1	303	341	384	430	481	531
COUNTY-OTHER	1,587	1,925	2,289	2,662	3,058	3,450
LIVESTOCK	316	316	316	316	316	316
IRRIGATION	305	299	292	287	282	276
GUADALUPE BASIN TOTAL DEMAND	**2,511**	**2,881**	**3,281**	**3,695**	**4,137**	**4,573**
SAN ANTONIO BASIN						
BOERNE	3,091	3,985	4,942	5,900	6,889	7,863

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
KENDALL COUNTY						
SAN ANTONIO BASIN						
FAIR OAKS RANCH	656	898	1,125	1,290	1,531	1,768
WATER SERVICES INC	46	54	64	74	85	95
COUNTY-OTHER	1,042	1,084	1,153	1,257	1,341	1,424
LIVESTOCK	66	66	66	66	66	66
IRRIGATION	70	68	67	65	64	63
SAN ANTONIO BASIN TOTAL DEMAND	**4,971**	**6,155**	**7,417**	**8,652**	**9,976**	**11,279**
KENDALL COUNTY TOTAL DEMAND	**7,536**	**9,097**	**10,768**	**12,426**	**14,201**	**15,950**
LA SALLE COUNTY						
NUECES BASIN						
COTULLA	1,868	2,016	2,155	2,323	1,680	1,777
ENCINAL	213	228	243	263	191	201
COUNTY-OTHER	522	556	590	633	458	484
MINING	4,617	4,772	4,263	2,819	1,380	676
LIVESTOCK	610	610	610	610	610	610
IRRIGATION	4,636	4,493	4,354	4,220	4,090	3,971
NUECES BASIN TOTAL DEMAND	**12,466**	**12,675**	**12,215**	**10,868**	**8,409**	**7,719**
LA SALLE COUNTY TOTAL DEMAND	**12,466**	**12,675**	**12,215**	**10,868**	**8,409**	**7,719**
MEDINA COUNTY						
NUECES BASIN						
BENTON CITY WSC	558	653	735	809	878	939
DEVINE	668	678	687	701	719	736
EAST MEDINA COUNTY SUD	690	758	819	877	936	990
HONDO	2,053	2,210	2,346	2,473	2,598	2,710
LYTLE	114	138	158	176	194	209
NATALIA	281	309	333	356	379	400
YANCEY WSC	130	144	155	166	176	186
COUNTY-OTHER	1,232	1,258	1,327	1,386	1,441	1,484
MANUFACTURING	41	44	48	51	55	60
MINING	1,388	1,543	1,673	1,805	1,972	2,154
LIVESTOCK	1,042	1,042	1,042	1,042	1,042	1,042
IRRIGATION	49,596	47,529	45,550	43,653	41,836	40,232
NUECES BASIN TOTAL DEMAND	**57,793**	**56,306**	**54,873**	**53,495**	**52,226**	**51,142**
SAN ANTONIO BASIN						
CASTROVILLE	794	787	780	778	781	784
EAST MEDINA COUNTY SUD	63	69	74	79	85	90
LACOSTE	127	137	145	154	164	173
SAN ANTONIO	9	12	16	19	21	24
SAN ANTONIO WATER SYSTEM	369	540	681	806	922	1,023
YANCEY WSC	530	583	631	674	717	755
COUNTY-OTHER	25	53	32	23	21	27
MANUFACTURING	7	8	8	9	10	10
MINING	463	514	558	602	657	718
LIVESTOCK	123	123	123	123	123	123
IRRIGATION	7,868	7,541	7,226	6,926	6,637	6,383
SAN ANTONIO BASIN TOTAL DEMAND	**10,378**	**10,367**	**10,274**	**10,193**	**10,138**	**10,110**
MEDINA COUNTY TOTAL DEMAND	**68,171**	**66,673**	**65,147**	**63,688**	**62,364**	**61,252**

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
REFUGIO COUNTY						
SAN ANTONIO BASIN						
COUNTY-OTHER	11	11	10	10	8	8
MINING	3	3	3	2	1	1
LIVESTOCK	32	32	32	32	32	32
SAN ANTONIO BASIN TOTAL DEMAND	**46**	**46**	**45**	**44**	**41**	**41**
SAN ANTONIO-NUECES BASIN						
REFUGIO	803	808	797	805	578	580
WOODSBORO	361	361	354	360	258	259
COUNTY-OTHER	507	501	488	490	351	352
MINING	63	66	48	36	23	14
LIVESTOCK	604	604	604	604	604	604
IRRIGATION	652	652	652	652	652	652
SAN ANTONIO-NUECES BASIN TOTAL DEMAND	**2,990**	**2,992**	**2,943**	**2,947**	**2,466**	**2,461**
REFUGIO COUNTY TOTAL DEMAND	**3,036**	**3,038**	**2,988**	**2,991**	**2,507**	**2,502**
UVALDE COUNTY						
NUECES BASIN						
SABINAL	445	477	505	536	569	601
UVALDE	4,052	4,342	4,593	4,881	5,181	5,474
COUNTY-OTHER	1,395	1,476	1,546	1,635	1,734	1,831
MANUFACTURING	289	300	311	321	342	364
MINING	2,661	2,916	3,037	3,279	3,564	3,874
LIVESTOCK	1,031	1,031	1,031	1,031	1,031	1,031
IRRIGATION	65,722	63,152	60,682	58,310	56,030	54,004
NUECES BASIN TOTAL DEMAND	**75,595**	**73,694**	**71,705**	**69,993**	**68,451**	**67,179**
UVALDE COUNTY TOTAL DEMAND	**75,595**	**73,694**	**71,705**	**69,993**	**68,451**	**67,179**
VICTORIA COUNTY						
GUADALUPE BASIN						
VICTORIA	11,532	12,109	12,555	13,007	13,432	13,797
COUNTY-OTHER	1,802	1,845	1,875	1,921	1,976	2,026
MANUFACTURING	30,977	33,815	36,640	39,165	42,005	45,051
MINING	36	38	28	21	14	9
STEAM ELECTRIC POWER	5,530	30,802	38,202	54,623	71,720	71,720
LIVESTOCK	535	535	535	535	535	535
IRRIGATION	2,546	2,546	2,546	2,546	2,546	2,546
GUADALUPE BASIN TOTAL DEMAND	**52,958**	**81,690**	**92,381**	**111,818**	**132,228**	**135,684**
LAVACA BASIN						
COUNTY-OTHER	5	5	5	5	5	5
LIVESTOCK	5	5	5	5	5	5
LAVACA BASIN TOTAL DEMAND	**10**	**10**	**10**	**10**	**10**	**10**
LAVACA-GUADALUPE BASIN						
VICTORIA	5,578	5,857	6,074	6,292	6,498	6,674
COUNTY-OTHER	1,234	1,264	1,287	1,318	1,357	1,392
MINING	33	34	26	19	12	8
LIVESTOCK	576	576	576	576	576	576
IRRIGATION	18,669	18,669	18,669	18,669	18,669	18,669
LAVACA-GUADALUPE BASIN TOTAL DEMAND	**26,090**	**26,400**	**26,632**	**26,874**	**27,112**	**27,319**

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
VICTORIA COUNTY						
SAN ANTONIO BASIN						
COUNTY-OTHER	9	9	9	9	10	10
MINING	3	3	2	1	1	1
LIVESTOCK	49	49	49	49	49	49
SAN ANTONIO BASIN TOTAL DEMAND	**61**	**61**	**60**	**59**	**60**	**60**
VICTORIA COUNTY TOTAL DEMAND	**79,119**	**108,161**	**119,083**	**138,761**	**159,410**	**163,073**
WILSON COUNTY						
GUADALUPE BASIN						
NIXON	2	2	2	3	3	3
SUNKO WSC	5	6	7	7	8	8
COUNTY-OTHER	40	49	57	64	71	78
MINING	174	139	105	70	36	18
LIVESTOCK	108	108	108	108	108	108
GUADALUPE BASIN TOTAL DEMAND	**329**	**304**	**279**	**252**	**226**	**215**
NUECES BASIN						
MCCOY WSC	43	51	59	67	75	81
COUNTY-OTHER	50	59	69	78	87	95
MINING	174	139	105	70	36	18
LIVESTOCK	108	108	108	108	108	108
IRRIGATION	4,884	4,343	3,865	3,445	3,081	2,810
NUECES BASIN TOTAL DEMAND	**5,259**	**4,700**	**4,206**	**3,768**	**3,387**	**3,112**
SAN ANTONIO BASIN						
EAST CENTRAL SUD	157	187	215	242	270	295
EL OSO WSC	39	47	54	61	65	71
ELMENDORF	3	3	4	4	4	5
FLORESVILLE	1,940	2,344	2,741	3,106	3,460	3,781
LA VERNIA	277	335	391	443	494	539
MCCOY WSC	4	5	5	6	6	7
OAK HILLS WSC	904	1,090	1,275	1,444	1,608	1,757
POTH	387	462	537	607	676	738
S S WSC	1,986	2,384	2,782	3,147	3,503	3,827
STOCKDALE	384	462	539	610	679	742
SUNKO WSC	783	935	1,100	1,216	1,270	1,388
COUNTY-OTHER	1,403	1,685	1,967	2,225	2,477	2,705
MANUFACTURING	10	10	10	10	10	10
MINING	1,581	1,270	955	642	327	168
LIVESTOCK	1,521	1,521	1,521	1,521	1,521	1,521
IRRIGATION	7,298	6,488	5,775	5,147	4,604	4,199
SAN ANTONIO BASIN TOTAL DEMAND	**18,677**	**19,228**	**19,871**	**20,431**	**20,974**	**21,753**
WILSON COUNTY TOTAL DEMAND	**24,265**	**24,232**	**24,356**	**24,451**	**24,587**	**25,080**
ZAVALA COUNTY						
NUECES BASIN						
CRYSTAL CITY	1,702	1,858	2,000	2,160	2,312	2,455
ZAVALA COUNTY WCID #1	477	525	567	613	656	697
COUNTY-OTHER	572	618	672	727	778	826
MANUFACTURING	946	987	1,026	1,058	1,124	1,194
MINING	2,531	2,257	1,977	1,559	932	557

WUG DEMAND

REGION L	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ZAVALA COUNTY						
NUECES BASIN						
LIVESTOCK	1,058	1,058	1,058	1,058	1,058	1,058
IRRIGATION	44,222	42,475	40,797	39,185	37,636	36,262
NUECES BASIN TOTAL DEMAND	**51,508**	**49,778**	**48,097**	**46,360**	**44,496**	**43,049**
ZAVALA COUNTY TOTAL DEMAND	**51,508**	**49,778**	**48,097**	**46,360**	**44,496**	**43,049**
REGION L TOTAL DEMAND	**1,070,354**	**1,156,030**	**1,219,229**	**1,290,567**	**1,366,447**	**1,433,835**

SOURCE AVAILABILITY

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
				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	68,656	70,249	71,827	73,666	75,688	75,688
CARRIZO-WILCOX AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	120	120	120	120	120	120
CARRIZO-WILCOX AQUIFER	BEXAR	NUECES	FRESH	14,198	14,198	14,198	14,198	14,198	14,198
CARRIZO-WILCOX AQUIFER	BEXAR	SAN ANTONIO	FRESH	12,080	12,080	12,080	12,080	11,909	11,909
CARRIZO-WILCOX AQUIFER	CALDWELL	COLORADO	FRESH	593	593	593	593	593	593
CARRIZO-WILCOX AQUIFER	CALDWELL	GUADALUPE	FRESH	43,951	43,543	43,543	42,967	42,967	42,967
CARRIZO-WILCOX AQUIFER	DIMMIT	NUECES	FRESH	3,253	3,253	3,253	3,253	3,253	3,253
CARRIZO-WILCOX AQUIFER	DIMMIT	RIO GRANDE	FRESH	106	106	106	106	106	106
CARRIZO-WILCOX AQUIFER	FRIO	NUECES	FRESH	79,089	76,734	74,439	72,222	70,030	70,030
CARRIZO-WILCOX AQUIFER	GONZALES	GUADALUPE	FRESH	62,101	70,102	75,576	75,755	75,755	75,755
CARRIZO-WILCOX AQUIFER	GONZALES	LAVACA	FRESH	215	215	215	215	215	215
CARRIZO-WILCOX AQUIFER	GUADALUPE	GUADALUPE	FRESH	9,460	9,910	11,648	12,168	12,668	12,668
CARRIZO-WILCOX AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	1,373	1,373	1,373	1,373	1,373	1,373
CARRIZO-WILCOX AQUIFER	KARNES	GUADALUPE	FRESH	195	207	215	220	224	224
CARRIZO-WILCOX AQUIFER	KARNES	NUECES	FRESH	92	97	101	103	105	105
CARRIZO-WILCOX AQUIFER	KARNES	SAN ANTONIO	FRESH	830	878	915	936	951	951
CARRIZO-WILCOX AQUIFER	LA SALLE	NUECES	FRESH	6,454	6,454	6,454	6,454	6,454	6,454
CARRIZO-WILCOX AQUIFER	MEDINA	NUECES	FRESH	2,519	2,507	2,507	2,507	2,507	2,507
CARRIZO-WILCOX AQUIFER	MEDINA	SAN ANTONIO	FRESH	26	26	26	26	26	26
CARRIZO-WILCOX AQUIFER	UVALDE	NUECES	FRESH	1,230	828	828	828	828	828
CARRIZO-WILCOX AQUIFER	WILSON	GUADALUPE	FRESH	672	731	791	861	938	938
CARRIZO-WILCOX AQUIFER	WILSON	NUECES	FRESH	7,311	7,505	7,703	7,932	8,185	8,185
CARRIZO-WILCOX AQUIFER	WILSON	SAN ANTONIO	FRESH	29,003	30,481	31,992	33,738	35,671	35,671
CARRIZO-WILCOX AQUIFER	ZAVALA	NUECES	FRESH	35,859	35,521	35,388	35,288	34,969	34,969
EDWARDS-BFZ AQUIFER	ATASCOSA	NUECES	FRESH	154	154	154	154	154	154
EDWARDS-BFZ AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	72	72	72	72	72	72
EDWARDS-BFZ AQUIFER	BEXAR	SAN ANTONIO	FRESH	213,671	213,671	213,671	213,671	213,671	213,671
EDWARDS-BFZ AQUIFER	CALDWELL	COLORADO	SALINE	64	64	64	64	64	64

SOURCE AVAILABILITY

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
EDWARDS-BFZ AQUIFER	CALDWELL	GUADALUPE	SALINE	134	134	134	134	134	134
EDWARDS-BFZ AQUIFER	COMAL	GUADALUPE	FRESH	13,271	13,271	13,271	13,271	13,271	13,271
EDWARDS-BFZ AQUIFER	COMAL	SAN ANTONIO	FRESH	287	287	287	287	287	287
EDWARDS-BFZ AQUIFER	FRIO	NUECES	FRESH	23,213	23,213	23,213	23,213	23,213	23,213
EDWARDS-BFZ AQUIFER	GUADALUPE	GUADALUPE	FRESH	208	208	208	208	208	208
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	FRESH	7,802	7,802	7,802	7,802	7,802	7,802
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	SALINE	235	235	235	235	235	235
EDWARDS-BFZ AQUIFER	MEDINA	NUECES	FRESH	19,373	19,373	19,373	19,373	19,373	19,373
EDWARDS-BFZ AQUIFER	MEDINA	SAN ANTONIO	FRESH	6,620	6,620	6,620	6,620	6,620	6,620
EDWARDS-BFZ AQUIFER	UVALDE	NUECES	FRESH	31,714	31,714	31,714	31,714	31,714	31,714
EDWARDS-BFZ AQUIFER	BEXAR	NUECES	FRESH	188	188	188	188	188	188
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	COLORADO	FRESH	46	46	46	46	46	46
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	GUADALUPE	FRESH	103	103	103	103	103	103
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	SAN ANTONIO	FRESH	169	169	169	169	169	169
EDWARDS-TRINITY-PLATEAU AQUIFER	UVALDE	NUECES	FRESH	1,635	1,635	1,635	1,635	1,635	1,635
GUADALUPE RIVER ALLUVIUM AQUIFER	CALDWELL	GUADALUPE	FRESH	215	215	215	215	215	215
GULF COAST AQUIFER	CALHOUN	COLORADO-LAVACA	FRESH	361	361	361	361	361	361
GULF COAST AQUIFER	CALHOUN	GUADALUPE	FRESH	17	17	17	17	17	17
GULF COAST AQUIFER	CALHOUN	LAVACA	FRESH	2	2	2	2	2	2
GULF COAST AQUIFER	CALHOUN	LAVACA-GUADALUPE	FRESH	2,574	2,574	2,574	2,574	2,574	2,574
GULF COAST AQUIFER	CALHOUN	SAN ANTONIO-NUECES	FRESH	41	41	41	41	41	41
GULF COAST AQUIFER	DEWITT	GUADALUPE	FRESH	10,548	10,548	10,548	10,548	10,548	10,548
GULF COAST AQUIFER	DEWITT	LAVACA	FRESH	2,932	2,926	2,915	2,912	2,912	2,912
GULF COAST AQUIFER	DEWITT	LAVACA-GUADALUPE	FRESH	417	417	417	417	417	417
GULF COAST AQUIFER	DEWITT	SAN ANTONIO	FRESH	739	739	739	739	739	739
GULF COAST AQUIFER	GOLIAD	GUADALUPE	FRESH	4,417	4,417	4,417	4,417	4,417	4,417
GULF COAST AQUIFER	GOLIAD	SAN ANTONIO	FRESH	6,121	6,121	6,121	6,121	6,121	6,121
GULF COAST AQUIFER	GOLIAD	SAN ANTONIO-NUECES	FRESH	1,161	1,161	1,161	1,161	1,161	1,161
GULF COAST AQUIFER	GONZALES	GUADALUPE	FRESH	1,901	1,901	1,901	1,901	1,901	1,901
GULF COAST AQUIFER	GONZALES	LAVACA	FRESH	182	182	182	182	182	182
GULF COAST AQUIFER	KARNES	GUADALUPE	FRESH	12	12	12	12	12	12
GULF COAST AQUIFER	KARNES	NUECES	FRESH	78	78	78	78	78	78
GULF COAST AQUIFER	KARNES	SAN ANTONIO	FRESH	3,061	3,056	3,052	3,048	2,944	2,944
GULF COAST AQUIFER	KARNES	SAN ANTONIO-NUECES	FRESH	84	84	84	84	82	82
GULF COAST AQUIFER	REFUGIO	SAN ANTONIO	FRESH	1,522	1,522	1,522	1,522	1,522	1,522
GULF COAST AQUIFER	REFUGIO	SAN ANTONIO-NUECES	FRESH	27,806	27,806	27,806	27,806	27,806	27,806
GULF COAST AQUIFER	VICTORIA	GUADALUPE	FRESH	14,617	14,617	14,617	14,617	14,617	14,617

SOURCE AVAILABILITY

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
GULF COAST AQUIFER	VICTORIA	LAVACA	FRESH	217	217	217	217	217	217
GULF COAST AQUIFER	VICTORIA	LAVACA-GUADALUPE	FRESH	19,924	19,924	19,924	19,924	19,924	19,924
GULF COAST AQUIFER	VICTORIA	SAN ANTONIO	FRESH	936	936	936	936	936	936
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	4,546	4,513	4,405	4,300	4,202	4,202
QUEEN CITY AQUIFER	CALDWELL	GUADALUPE	FRESH	306	306	306	306	306	306
QUEEN CITY AQUIFER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	DIMMIT	RIO GRANDE	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	FRIO	NUECES	FRESH	4,582	4,422	4,270	4,124	3,983	3,983
QUEEN CITY AQUIFER	GONZALES	GUADALUPE	FRESH	5,030	5,030	5,030	5,030	5,030	5,030
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	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	KARNES	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	LA SALLE	NUECES	FRESH	1	1	1	1	1	1
QUEEN CITY AQUIFER	WILSON	GUADALUPE	FRESH	114	101	90	80	72	72
QUEEN CITY AQUIFER	WILSON	NUECES	FRESH	132	117	104	93	83	83
QUEEN CITY AQUIFER	WILSON	SAN ANTONIO	FRESH	1,094	973	866	772	690	690
QUEEN CITY AQUIFER	ZAVALA	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	ATASCOSA	NUECES	FRESH	1,130	1,082	1,042	1,013	994	994
SPARTA AQUIFER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	FRIO	NUECES	FRESH	698	674	650	624	601	601
SPARTA AQUIFER	GONZALES	GUADALUPE	FRESH	3,529	3,529	3,529	3,529	3,529	3,529
SPARTA AQUIFER	GONZALES	LAVACA	FRESH	23	23	23	23	23	23
SPARTA AQUIFER	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	KARNES	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	LA SALLE	NUECES	FRESH	987	987	987	987	987	987
SPARTA AQUIFER	WILSON	GUADALUPE	FRESH	20	18	16	14	13	13
SPARTA AQUIFER	WILSON	NUECES	FRESH	49	44	39	34	31	31
SPARTA AQUIFER	WILSON	SAN ANTONIO	FRESH	154	137	121	108	97	97
SPARTA AQUIFER	ZAVALA	NUECES	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	BEXAR	NUECES	FRESH	223	223	223	223	223	223
TRINITY AQUIFER	BEXAR	SAN ANTONIO	FRESH	44,854	44,854	44,854	44,854	44,854	44,854
TRINITY AQUIFER	CALDWELL	GUADALUPE	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	COMAL	GUADALUPE	FRESH	34,082	34,082	34,082	34,082	34,082	34,082
TRINITY AQUIFER	COMAL	SAN ANTONIO	FRESH	5,416	5,416	5,416	5,416	5,416	5,416

SOURCE AVAILABILITY

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
TRINITY AQUIFER	GUADALUPE	GUADALUPE	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	HAYS	GUADALUPE	FRESH	7,270	7,270	7,270	7,270	7,270	7,270
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	5,948	5,948	5,948	5,948	5,948	5,948
TRINITY AQUIFER	MEDINA	SAN ANTONIO	FRESH	1,921	1,921	1,921	1,921	1,921	1,921
TRINITY AQUIFER	UVALDE	NUECES	FRESH	639	639	639	639	639	639
YEGUA-JACKSON AQUIFER	ATASCOSA	NUECES	FRESH	855	855	855	855	855	855
YEGUA-JACKSON AQUIFER	FRIO	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	GONZALES	GUADALUPE	FRESH	980	980	980	980	980	980
YEGUA-JACKSON AQUIFER	GONZALES	LAVACA	FRESH	3	3	3	3	3	3
YEGUA-JACKSON AQUIFER	KARNES	GUADALUPE	FRESH	112	112	112	112	112	112
YEGUA-JACKSON AQUIFER	KARNES	NUECES	FRESH	34	34	34	34	34	34
YEGUA-JACKSON AQUIFER	KARNES	SAN ANTONIO	FRESH	628	628	628	628	628	628
YEGUA-JACKSON AQUIFER	LA SALLE	NUECES	FRESH	91	91	91	91	91	91
YEGUA-JACKSON AQUIFER	WILSON	GUADALUPE	FRESH	48	48	48	48	48	48
YEGUA-JACKSON AQUIFER	WILSON	NUECES	FRESH	184	184	184	184	184	184
YEGUA-JACKSON AQUIFER	WILSON	SAN ANTONIO	FRESH	606	606	606	606	606	606
GROUNDWATER TOTAL SOURCE AVAILABILITY				**970,788**	**978,664**	**986,351**	**987,621**	**989,243**	**989,243**

REGION L

REUSE	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
DIRECT REUSE	BEXAR	SAN ANTONIO	FRESH	11,412	11,412	11,412	11,412	11,412	11,412
DIRECT REUSE	COMAL	GUADALUPE	FRESH	107	107	107	107	107	107
DIRECT REUSE	GUADALUPE	GUADALUPE	FRESH	1,414	1,414	1,414	1,414	1,414	1,414
DIRECT REUSE	HAYS	GUADALUPE	FRESH	4,119	4,119	4,119	4,119	4,119	4,119
DIRECT REUSE	KARNES	SAN ANTONIO	FRESH	30	30	30	30	30	30
DIRECT REUSE	KENDALL	GUADALUPE	FRESH	264	264	264	264	264	264
DIRECT REUSE	KENDALL	SAN ANTONIO	FRESH	7	7	7	7	7	7
REUSE TOTAL SOURCE AVAILABILITY				**17,353**	**17,353**	**17,353**	**17,353**	**17,353**	**17,353**

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
BOERNE LAKE/RESERVOIR	RESERVOIR	SAN ANTONIO	FRESH	645	645	645	645	645	645

SOURCE AVAILABILITY

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
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	89,100	88,960	88,820	88,680	88,540	88,400
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	2,315	2,315	2,315	2,315	2,315	2,315
GUADALUPE LIVESTOCK LOCAL SUPPLY	GUADALUPE	GUADALUPE	FRESH	523	523	523	523	523	523
GUADALUPE LIVESTOCK LOCAL SUPPLY	HAYS	GUADALUPE	FRESH	204	204	204	204	204	204
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	339	339	339	339	339	339
GUADALUPE LIVESTOCK LOCAL SUPPLY	WILSON	GUADALUPE	FRESH	54	54	54	54	54	54
GUADALUPE RUN-OF-RIVER	CALDWELL	GUADALUPE	FRESH	1,296	1,296	1,296	1,296	1,296	1,296
GUADALUPE RUN-OF-RIVER	CALHOUN	GUADALUPE	FRESH	41,543	41,543	41,543	41,543	41,543	41,543
GUADALUPE RUN-OF-RIVER	COMAL	GUADALUPE	FRESH	2,001	2,001	2,001	2,001	2,001	2,001
GUADALUPE RUN-OF-RIVER	GONZALES	GUADALUPE	FRESH	4,040	4,040	4,040	4,040	4,040	4,040
GUADALUPE RUN-OF-RIVER	GUADALUPE	GUADALUPE	FRESH	7,639	7,639	7,639	7,639	7,639	7,639
GUADALUPE RUN-OF-RIVER	HAYS	GUADALUPE	FRESH	130	130	130	130	130	130
GUADALUPE RUN-OF-RIVER	KENDALL	GUADALUPE	FRESH	26	26	26	26	26	26
GUADALUPE RUN-OF-RIVER	VICTORIA	GUADALUPE	FRESH	28,772	28,772	28,772	28,772	28,772	28,772
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

SOURCE AVAILABILITY

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
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	218	218	218	218	218	218
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
NUECES LIVESTOCK LOCAL SUPPLY	FRIO	NUECES	FRESH	497	497	497	497	497	497
NUECES LIVESTOCK LOCAL SUPPLY	LA SALLE	NUECES	FRESH	305	305	305	305	305	305
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	54	54	55	55	56	56
NUECES LIVESTOCK LOCAL SUPPLY	ZAVALA	NUECES	FRESH	594	594	594	594	594	594
NUECES RUN-OF-RIVER	DIMMIT	NUECES	FRESH	2,262	2,262	2,262	2,262	2,262	2,262
NUECES RUN-OF-RIVER	LA SALLE	NUECES	FRESH	705	705	705	705	705	705
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	547	548	548	549	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	16	16	16	16	16	16
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	VICTORIA	SAN ANTONIO	FRESH	24	24	24	24	24	24

SOURCE AVAILABILITY

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE AVAILABILITY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	WILSON	SAN ANTONIO	FRESH	759	759	759	759	759	759
SAN ANTONIO RUN-OF-RIVER	BEXAR	SAN ANTONIO	FRESH	6,118	6,118	6,118	6,118	6,118	6,118
SAN ANTONIO RUN-OF-RIVER	GOLIAD	SAN ANTONIO	FRESH	2,425	2,425	2,425	2,425	2,425	2,425
SAN ANTONIO RUN-OF-RIVER	KARNES	SAN ANTONIO	FRESH	725	725	725	725	725	725
SAN ANTONIO RUN-OF-RIVER	WILSON	SAN ANTONIO	FRESH	1,770	1,770	1,770	1,770	1,770	1,770
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	302	302	302	302	302	302
VICTOR BRAUNIG LAKE/RESERVOIR	RESERVOIR	SAN ANTONIO	FRESH	12,000	12,000	12,000	12,000	12,000	12,000
SURFACE WATER TOTAL SOURCE AVAILABILITY				**275,049**	**274,910**	**274,771**	**274,632**	**274,502**	**274,362**
REGION L TOTAL SOURCE AVAILABILITY				**1,263,190**	**1,270,927**	**1,278,475**	**1,279,606**	**1,281,098**	**1,280,958**

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
ATASCOSA COUNTY							
NUECES BASIN							
BENTON CITY WSC	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	1,415	1,399	1,393	1,392	1,395	1,400
CHARLOTTE	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	690	690	690	690	690	690
JOURDANTON	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	2,094	2,094	2,094	2,094	2,094	2,094
LYTLE	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	318	312	309	308	308	307
MCCOY WSC	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	1,506	1,502	1,499	1,496	1,494	1,493
PLEASANTON	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	3,777	3,777	3,777	3,777	3,777	3,777
POTEET	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	1,418	1,418	1,418	1,418	1,418	1,418
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	60	58	58	58	60	58
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | DIRECT REUSE	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	347	349	350	351	351	352
SAN ANTONIO WATER SYSTEM	L | GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | SAN ANTONIO RUN-OF-RIVER	94	96	96	96	96	96
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | BEXAR COUNTY	121	122	122	122	123	122
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | COMAL COUNTY	7	7	7	7	7	7
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	616	616	616	616	616	616
COUNTY-OTHER	L | QUEEN CITY AQUIFER | ATASCOSA COUNTY	700	700	700	700	700	700
MANUFACTURING	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	12	12	12	12	12	12
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	8,655	8,655	8,655	8,655	8,655	8,655
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	382	382	382	382	382	382
LIVESTOCK	L | NUECES LIVESTOCK LOCAL SUPPLY	754	754	754	754	754	754
LIVESTOCK	L | QUEEN CITY AQUIFER | ATASCOSA COUNTY	239	239	239	239	239	239
LIVESTOCK	L | YEGUA-JACKSON AQUIFER | ATASCOSA COUNTY	134	134	134	134	134	134
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	22,806	21,972	21,163	20,375	19,605	18,887
IRRIGATION	L | EDWARDS-BFZ AQUIFER | ATASCOSA COUNTY	154	154	154	154	154	154
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 EXISTING SUPPLY		**53,748**	**52,805**	**51,837**	**50,293**	**48,774**	**47,622**
SAN ANTONIO BASIN							
BENTON CITY WSC	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	175	173	172	173	173	173

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
ATASCOSA COUNTY							
SAN ANTONIO BASIN							
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	117	117	117	117	117	117
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	194	185	176	168	160	153
IRRIGATION	L | EDWARDS-BFZ AQUIFER | ATASCOSA COUNTY	72	72	72	72	72	72
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**558**	**547**	**537**	**530**	**522**	**515**
ATASCOSA COUNTY TOTAL EXISTING SUPPLY		**54,306**	**53,352**	**52,374**	**50,823**	**49,296**	**48,137**
BEXAR COUNTY							
NUECES BASIN							
ATASCOSA RURAL WSC	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	24	24	24	24	24	24
LYTLE	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	8	9	10	10	10	11
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	314	314	314	314	314	314
LIVESTOCK	L | NUECES LIVESTOCK LOCAL SUPPLY	177	177	177	177	177	177
LIVESTOCK	L | TRINITY AQUIFER | BEXAR COUNTY	1	1	1	1	1	1
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	50	50	50	50	50	50
IRRIGATION	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	188	188	188	188	188	188
NUECES BASIN TOTAL EXISTING SUPPLY		**762**	**763**	**764**	**764**	**764**	**765**
SAN ANTONIO BASIN							
SAN ANTONIO	L | CANYON LAKE/RESERVOIR	6,060	6,060	4,043	4,043	4,043	4,043
SAN ANTONIO	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	7,400	7,400	7,400	7,400	7,400	7,400
SAN ANTONIO	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	13,765	13,764	13,764	13,764	13,764	13,764
SAN ANTONIO	L | DIRECT REUSE	6,776	6,776	6,776	6,776	6,776	6,776
SAN ANTONIO	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	137,241	136,637	136,076	135,490	134,906	134,363
SAN ANTONIO	L | GUADALUPE RUN-OF-RIVER	270	270	270	270	270	270
SAN ANTONIO	L | TRINITY AQUIFER | BEXAR COUNTY	2,000	2,000	2,000	2,000	2,000	2,000
ALAMO HEIGHTS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,420	1,420	1,420	1,420	1,420	1,420
ATASCOSA RURAL WSC	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	405	405	405	405	405	405
BALCONES HEIGHTS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	518	566	612	662	711	758
CASTLE HILLS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	395	375	359	351	350	349
CHINA GROVE	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	316	350	381	413	445	474
CONVERSE	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	500	500	500	500	500	500
CONVERSE	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,133	1,133	1,133	1,133	1,133	1,133
ELMENDORF	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	308	394	474	552	625	691
GREEN VALLEY SUD	L | CANYON LAKE/RESERVOIR	147	138	132	127	123	116
GREEN VALLEY SUD	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	40	39	37	35	34	32
GREEN VALLEY SUD	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	39	36	34	34	32	31
GREEN VALLEY SUD	L | TRINITY AQUIFER | BEXAR COUNTY	13	12	12	12	10	10
HELOTES	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,622	1,998	2,349	2,690	3,005	3,295
HILL COUNTRY VILLAGE	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	234	230	226	224	224	224

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
BEXAR COUNTY							
SAN ANTONIO BASIN							
HOLLYWOOD PARK	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	949	953	959	969	983	997
KIRBY	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	805	805	805	805	805	805
LACKLAND AFB	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	2,000	2,000	2,000	2,000	2,000	2,000
LEON VALLEY	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,763	1,784	1,805	1,829	1,857	1,883
LIVE OAK	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	3,189	3,192	3,180	3,173	3,172	3,172
OLMOS PARK	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	564	623	678	736	791	843
SCHERTZ	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	357	296	301	291	282	263
SCHERTZ	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	33	31	33	33	36	37
SELMA	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	709	544	569	592	611	627
SELMA	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	427	328	343	357	368	378
SHAVANO PARK	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	679	679	679	679	679	679
SOMERSET	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	221	240	259	279	300	319
ST. HEDWIG	L | CANYON LAKE/RESERVOIR	146	179	210	243	276	307
ST. HEDWIG	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	100	100	100	100	100	100
ST. HEDWIG	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	100	100	100	100	100	100
TERRELL HILLS	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,299	1,276	1,257	1,247	1,245	1,245
UNIVERSAL CITY	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	800	800	800	800	800	800
UNIVERSAL CITY	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1,979	1,979	1,979	1,979	1,979	1,979
WATER SERVICES INC	L | TRINITY AQUIFER | BEXAR COUNTY	1,062	1,052	1,041	1,032	1,023	1,015
WINDCREST	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	877	877	877	877	877	877
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	866	788	725	676	634	601
RANDOLPH AFB	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	2,000	2,000	2,000	2,000	2,000	2,000
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	2,310	2,272	2,240	2,216	2,194	2,178
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | DIRECT REUSE	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	13,702	13,467	13,285	13,138	13,013	12,909
SAN ANTONIO WATER SYSTEM	L | GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | SAN ANTONIO RUN-OF-RIVER	3,739	3,675	3,625	3,585	3,551	3,522
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | BEXAR COUNTY	4,789	4,707	4,643	4,592	4,548	4,512
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | COMAL COUNTY	277	273	269	266	263	261
THE OAKS WSC	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	221	221	221	221	221	221
THE OAKS WSC	L | TRINITY AQUIFER | BEXAR COUNTY	270	270	270	270	270	270

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
BEXAR COUNTY							
SAN ANTONIO BASIN							
VON ORMY	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	140	140	140	140	140	140
VON ORMY	L | TRINITY AQUIFER | BEXAR COUNTY	70	70	70	70	70	70
EAST CENTRAL SUD	L | CANYON LAKE/RESERVOIR	691	648	609	571	534	501
EAST CENTRAL SUD	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	645	630	618	606	596	587
EAST CENTRAL SUD	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	264	255	247	239	232	225
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	8,804	8,804	8,804	8,804	8,804	8,804
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	100	100	100	100	100	100
COUNTY-OTHER	L | SAN ANTONIO RUN-OF-RIVER	100	100	100	100	100	100
COUNTY-OTHER	L | TRINITY AQUIFER | BEXAR COUNTY	204	204	204	204	204	204
MANUFACTURING	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	2,699	2,699	2,699	2,699	2,699	2,699
MANUFACTURING	L | DIRECT REUSE	4,076	4,076	4,076	4,076	4,076	4,076
MANUFACTURING	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	18,841	18,841	18,841	18,841	18,841	18,841
MANUFACTURING	L | SAN ANTONIO RUN-OF-RIVER	11	11	11	11	11	11
MANUFACTURING	L | TRINITY AQUIFER | BEXAR COUNTY	5,776	5,776	5,776	5,776	5,776	5,776
MINING	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	400	400	400	400	400	400
MINING	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	4,562	4,562	4,562	4,562	4,562	4,562
MINING	L | TRINITY AQUIFER | BEXAR COUNTY	2,858	3,778	4,571	5,442	6,437	7,540
STEAM ELECTRIC POWER	L | CALAVERAS LAKE/RESERVOIR	36,900	36,900	36,900	36,900	36,900	36,900
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	14	14	14	14	14	14
LIVESTOCK	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	511	511	511	511	511	511
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	402	402	402	402	402	402
LIVESTOCK	L | TRINITY AQUIFER | BEXAR COUNTY	53	53	53	53	53	53
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	542	542	542	542	542	542
IRRIGATION	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	3,768	3,768	3,768	3,768	3,768	3,768
IRRIGATION	L | SAN ANTONIO RUN-OF-RIVER	1,962	1,962	1,962	1,962	1,962	1,962
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**334,752**	**334,646**	**332,911**	**333,367**	**334,004**	**334,798**
BEXAR COUNTY TOTAL EXISTING SUPPLY		**335,514**	**335,409**	**333,675**	**334,131**	**334,768**	**335,563**
CALDWELL COUNTY							
COLORADO BASIN							
AQUA WSC	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	86	86	86	86	86	86
CREEDMOOR-MAHA WSC	K | EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	114	133	152	172	195	216
MUSTANG RIDGE	K | EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	32	43	53	66	78	91
MUSTANG RIDGE	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	21	22	24	24	25	26
MUSTANG RIDGE	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	16	17	18	18	19	19
POLONIA WSC	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	400	398	397	395	394	390
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	229	229	229	229	229	229

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
CALDWELL COUNTY							
COLORADO BASIN							
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	4	4	4	4	4	4
MINING	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	11	9	6	4	2	1
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	41	41	41	41	41	41
LIVESTOCK	L | COLORADO LIVESTOCK LOCAL SUPPLY	30	30	30	30	30	30
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	19	19	19	19	19	19
COLORADO BASIN TOTAL EXISTING SUPPLY		**1,003**	**1,031**	**1,059**	**1,088**	**1,122**	**1,152**
GUADALUPE BASIN							
AQUA WSC	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	484	484	484	484	484	484
COUNTY LINE WSC	L | CANYON LAKE/RESERVOIR	103	83	61	39	18	0
COUNTY LINE WSC	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	35	33	31	29	27	25
CREEDMOOR-MAHA WSC	K | EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	29	34	39	45	50	56
GONZALES COUNTY WSC	L | CANYON LAKE/RESERVOIR	19	21	22	23	25	25
GONZALES COUNTY WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	53	60	65	69	72	74
LOCKHART	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	2,063	2,063	2,063	2,063	2,063	2,063
LULING	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	1,083	1,084	1,084	1,084	1,084	1,084
MARTINDALE	L | CANYON LAKE/RESERVOIR	90	90	90	90	90	90
MARTINDALE	L | GUADALUPE RUN-OF-RIVER	100	100	100	100	100	100
MAXWELL WSC	L | CANYON LAKE/RESERVOIR	359	368	373	375	376	376
MAXWELL WSC	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	136	140	142	143	143	143
MAXWELL WSC	L | GUADALUPE RUN-OF-RIVER	543	557	565	568	569	569
MUSTANG RIDGE	K | EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	1	1	2	1	2	2
MUSTANG RIDGE	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	1	1	0	1	1	1
MUSTANG RIDGE	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	0	0	0	1	0	0
NIEDERWALD	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	3	3	2	2	2	2
POLONIA WSC	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	858	853	845	834	818	798
SAN MARCOS	L | CANYON LAKE/RESERVOIR	2	2	2	3	3	3
SAN MARCOS	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	1	1	1	1	1	1
GOFORTH SUD	K | EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	0	0	0	0	0	0
GOFORTH SUD	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	3	3	3	2	2	2
GOFORTH SUD	L | TRINITY AQUIFER | HAYS COUNTY	38	46	53	62	71	79
UHLAND	L | CANYON LAKE/RESERVOIR	79	94	110	126	142	158
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	1,086	1,086	1,086	1,086	1,086	1,086
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	55	55	55	55	55	55
COUNTY-OTHER	L | GUADALUPE RUN-OF-RIVER	500	500	500	500	500	500
COUNTY-OTHER	L | QUEEN CITY AQUIFER | CALDWELL COUNTY	141	141	141	141	141	141

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
CALDWELL COUNTY							
GUADALUPE BASIN							
MANUFACTURING	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	13	13	13	13	13	13
MINING	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	112	89	66	42	18	8
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	449	449	449	449	449	449
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL 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	556	556	556	556	556	556
IRRIGATION	L | QUEEN CITY AQUIFER | CALDWELL COUNTY	77	77	77	77	77	77
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**9,560**	**9,575**	**9,568**	**9,552**	**9,526**	**9,508**
CALDWELL COUNTY TOTAL EXISTING SUPPLY		**10,563**	**10,606**	**10,627**	**10,640**	**10,648**	**10,660**
CALHOUN COUNTY							
COLORADO-LAVACA BASIN							
POINT COMFORT	P | TEXANA LAKE/RESERVOIR	178	178	178	178	178	178
COUNTY-OTHER	L | GULF COAST AQUIFER | CALHOUN COUNTY	170	170	169	170	170	169
MANUFACTURING	L | GUADALUPE RUN-OF-RIVER	18,865	18,865	18,865	18,865	18,865	18,865
MANUFACTURING	L | GULF COAST AQUIFER | CALHOUN COUNTY	195	195	195	195	195	195
MANUFACTURING	P | TEXANA LAKE/RESERVOIR	16,857	16,857	16,857	16,857	16,858	16,857
MINING	L | GULF COAST AQUIFER | CALHOUN COUNTY	28	27	28	28	28	28
LIVESTOCK	L | COLORADO-LAVACA LIVESTOCK LOCAL SUPPLY	64	64	64	64	64	64
LIVESTOCK	L | GULF COAST AQUIFER | CALHOUN COUNTY	2	2	2	2	2	2
IRRIGATION	L | GULF COAST AQUIFER | CALHOUN COUNTY	148	148	148	148	148	148
COLORADO-LAVACA BASIN TOTAL EXISTING SUPPLY		**36,507**	**36,506**	**36,506**	**36,507**	**36,508**	**36,506**
GUADALUPE BASIN							
LIVESTOCK	L | GULF COAST AQUIFER | CALHOUN COUNTY	2	2	2	2	2	2
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**2**	**2**	**2**	**2**	**2**	**2**
LAVACA-GUADALUPE BASIN							
CALHOUN COUNTY WS	L | GUADALUPE RUN-OF-RIVER	1,500	1,500	1,500	1,500	1,500	1,500
PORT LAVACA	L | GUADALUPE RUN-OF-RIVER	4,480	4,480	4,480	4,480	4,480	4,480
PORT O'CONNOR MUD	L | GUADALUPE RUN-OF-RIVER	1,120	1,120	1,120	1,120	1,120	1,120
PORT O'CONNOR MUD	L | GULF COAST AQUIFER | CALHOUN COUNTY	200	200	200	200	200	200
SEADRIFT	L | GULF COAST AQUIFER | CALHOUN COUNTY	728	728	728	728	728	728
COUNTY-OTHER	L | GULF COAST AQUIFER | CALHOUN COUNTY	231	232	232	231	231	233
MANUFACTURING	L | CANYON LAKE/RESERVOIR	100	100	100	100	100	100
MANUFACTURING	L | GUADALUPE RUN-OF-RIVER	15,435	15,435	15,435	15,435	15,435	15,435
MANUFACTURING	P | TEXANA LAKE/RESERVOIR	13,793	13,793	13,793	13,793	13,792	13,793
MINING	L | GULF COAST AQUIFER | CALHOUN COUNTY	27	28	27	27	27	27
LIVESTOCK	L | GULF COAST AQUIFER | CALHOUN COUNTY	168	168	168	168	168	168
LIVESTOCK	L | LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	92	92	92	92	92	92
IRRIGATION	L | GULF COAST AQUIFER | CALHOUN COUNTY	1,051	1,051	1,051	1,051	1,051	1,051

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
CALHOUN COUNTY							
LAVACA-GUADALUPE BASIN TOTAL EXISTING SUPPLY		**38,925**	**38,927**	**38,926**	**38,925**	**38,924**	**38,927**
SAN ANTONIO-NUECES BASIN							
COUNTY-OTHER	L | GULF COAST AQUIFER | CALHOUN COUNTY	24	23	24	24	24	23
LIVESTOCK	L | SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	16	16	16	16	16	16
IRRIGATION		0	0	0	0	0	0
SAN ANTONIO-NUECES BASIN TOTAL EXISTING SUPPLY		**40**	**39**	**40**	**40**	**40**	**39**
CALHOUN COUNTY TOTAL EXISTING SUPPLY		**75,474**	**75,474**	**75,474**	**75,474**	**75,474**	**75,474**
COMAL COUNTY							
GUADALUPE BASIN							
CRYSTAL CLEAR WSC	L | CANYON LAKE/RESERVOIR	153	149	144	140	136	133
CRYSTAL CLEAR WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	36	35	33	32	31	30
CRYSTAL CLEAR WSC	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	6	6	6	5	5	5
CRYSTAL CLEAR WSC	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	120	117	113	111	107	104
CRYSTAL CLEAR WSC	L | GUADALUPE RIVER ALLUVIUM AQUIFER | CALDWELL COUNTY	26	24	24	24	23	21
GARDEN RIDGE	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	213	213	213	213	213	213
GARDEN RIDGE	L | TRINITY AQUIFER | COMAL COUNTY	196	196	195	195	196	195
GREEN VALLEY SUD	L | CANYON LAKE/RESERVOIR	16	18	18	19	19	20
GREEN VALLEY SUD	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	5	5	5	5	5	5
GREEN VALLEY SUD	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	4	5	5	5	5	5
GREEN VALLEY SUD	L | TRINITY AQUIFER | BEXAR COUNTY	1	2	2	2	2	2
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	4,590	4,620	4,640	4,657	4,668	4,674
NEW BRAUNFELS	L | GUADALUPE RUN-OF-RIVER	1,075	1,082	1,086	1,090	1,093	1,094
NEW BRAUNFELS	L | TRINITY AQUIFER | BEXAR COUNTY	87	88	88	88	89	89
NEW BRAUNFELS	L | TRINITY AQUIFER | COMAL COUNTY	536	539	541	543	545	545
SCHERTZ	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	368	395	478	529	568	578
SCHERTZ	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	35	42	53	63	74	83
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	54	70	84	94	104	112
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | DIRECT REUSE	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	321	416	495	562	621	669
SAN ANTONIO WATER SYSTEM	L | GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | SAN ANTONIO RUN-OF-RIVER	88	113	135	153	169	182
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | BEXAR COUNTY	112	145	173	197	217	234

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
COMAL COUNTY							
GUADALUPE BASIN							
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | COMAL COUNTY	6	8	10	11	13	14
BULVERDE	L | CANYON LAKE/RESERVOIR	9	10	11	13	14	15
CANYON LAKE WATER SERVICE COMPANY	L | CANYON LAKE/RESERVOIR	3,908	3,773	3,641	3,514	3,387	3,266
CANYON LAKE WATER SERVICE COMPANY	L | TRINITY AQUIFER | COMAL COUNTY	0	0	0	0	0	0
COUNTY-OTHER	L | CANYON LAKE/RESERVOIR	1,378	1,378	1,378	1,378	1,378	1,378
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	652	649	646	645	643	643
COUNTY-OTHER	L | TRINITY AQUIFER | BEXAR COUNTY	291	288	285	284	282	282
COUNTY-OTHER	L | TRINITY AQUIFER | COMAL COUNTY	2,356	2,356	2,356	2,356	2,356	2,356
MANUFACTURING	L | CANYON LAKE/RESERVOIR	4	4	4	4	4	4
MANUFACTURING	L | DIRECT REUSE	784	784	784	784	784	784
MANUFACTURING	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	2,031	2,031	2,031	2,031	2,031	2,031
MANUFACTURING	L | GUADALUPE RUN-OF-RIVER	100	100	100	100	100	100
MANUFACTURING	L | TRINITY AQUIFER | COMAL COUNTY	1,227	1,227	1,227	1,227	1,227	1,227
MINING	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	3,809	3,809	3,809	3,809	3,809	3,809
MINING	L | TRINITY AQUIFER | COMAL COUNTY	4,447	5,787	7,077	8,203	9,614	11,194
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	120	120	120	120	120	120
LIVESTOCK	L | TRINITY AQUIFER | COMAL COUNTY	120	120	120	120	120	120
IRRIGATION	L | CANYON LAKE/RESERVOIR	249	249	249	249	249	249
IRRIGATION	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	171	171	171	171	171	171
IRRIGATION	L | GUADALUPE RUN-OF-RIVER	207	207	207	207	207	207
IRRIGATION	L | TRINITY AQUIFER | COMAL COUNTY	252	252	252	252	252	252
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**38,324**	**39,816**	**41,257**	**42,483**	**43,948**	**45,523**
SAN ANTONIO BASIN							
GARDEN RIDGE	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	120	120	120	120	120	120
GARDEN RIDGE	L | TRINITY AQUIFER | COMAL COUNTY	110	110	111	111	110	111
SCHERTZ	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	9	10	12	13	14	14
SCHERTZ	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	1	1	1	2	2	2
SELMA	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	3	2	3	3	3	4
SELMA	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	2	1	2	2	2	2
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
FAIR OAKS RANCH	L | TRINITY AQUIFER | COMAL COUNTY	70	71	71	72	73	73
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	46	60	72	82	90	98
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | DIRECT REUSE	0	0	0	0	0	0

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COMAL COUNTY							
SAN ANTONIO BASIN							
SAN ANTONIO WATER SYSTEM	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	275	357	425	482	532	577
SAN ANTONIO WATER SYSTEM	L | GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | SAN ANTONIO RUN-OF-RIVER	75	97	116	132	145	158
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | BEXAR COUNTY	96	125	149	168	186	202
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | COMAL COUNTY	6	7	9	10	11	12
BULVERDE	L | CANYON LAKE/RESERVOIR	794	929	1,070	1,215	1,363	1,506
CANYON LAKE WATER SERVICE COMPANY	L | CANYON LAKE/RESERVOIR	961	938	915	889	862	836
CANYON LAKE WATER SERVICE COMPANY	L | TRINITY AQUIFER | COMAL COUNTY	0	0	0	0	0	0
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	150	153	156	157	159	159
COUNTY-OTHER	L | TRINITY AQUIFER | BEXAR COUNTY	15	18	21	22	24	24
COUNTY-OTHER	L | TRINITY AQUIFER | COMAL COUNTY	136	136	136	136	136	136
MANUFACTURING	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	283	283	283	283	283	283
MANUFACTURING	L | TRINITY AQUIFER | COMAL COUNTY	4	4	4	4	4	4
MINING	L | TRINITY AQUIFER | COMAL COUNTY	344	400	454	501	559	625
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	9	9	9	9	9	9
LIVESTOCK	L | TRINITY AQUIFER | COMAL COUNTY	9	9	9	9	9	9
IRRIGATION	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	4	4	4	4	4	4
IRRIGATION	L | TRINITY AQUIFER | COMAL COUNTY	42	42	42	42	42	42
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**3,688**	**4,011**	**4,319**	**4,596**	**4,870**	**5,139**
COMAL COUNTY TOTAL EXISTING SUPPLY		**42,012**	**43,827**	**45,576**	**47,079**	**48,818**	**50,662**
DEWITT COUNTY							
GUADALUPE BASIN							
CUERO	L | GULF COAST AQUIFER | DEWITT COUNTY	4,042	4,042	4,042	4,042	4,042	4,042
GONZALES COUNTY WSC	L | CANYON LAKE/RESERVOIR	36	34	32	30	28	26
GONZALES COUNTY WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	104	98	92	85	80	74
YORKTOWN	L | GULF COAST AQUIFER | DEWITT COUNTY	972	972	972	972	972	972
COUNTY-OTHER	L | GULF COAST AQUIFER | DEWITT COUNTY	1,184	1,184	1,184	1,184	1,184	1,184
MANUFACTURING	L | GULF COAST AQUIFER | DEWITT COUNTY	455	455	455	455	455	455
MINING	L | GULF COAST AQUIFER | DEWITT COUNTY	2,405	2,259	1,668	1,081	494	229
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	631	631	631	631	631	631
LIVESTOCK	L | GULF COAST AQUIFER | DEWITT COUNTY	886	886	886	886	886	886
IRRIGATION	L | GULF COAST AQUIFER | DEWITT COUNTY	520	520	520	520	520	520
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**11,235**	**11,081**	**10,482**	**9,886**	**9,292**	**9,019**
LAVACA BASIN							
YOAKUM	L | GULF COAST AQUIFER | DEWITT COUNTY	458	458	458	458	458	458
COUNTY-OTHER	L | GULF COAST AQUIFER | DEWITT COUNTY	206	208	215	224	225	225
MANUFACTURING	L | GULF COAST AQUIFER | DEWITT COUNTY	314	317	329	343	345	345

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
DEWITT COUNTY							
LAVACA BASIN							
MINING	L | GULF COAST AQUIFER | DEWITT COUNTY	462	438	335	226	104	48
LIVESTOCK	L | GULF COAST AQUIFER | DEWITT COUNTY	27	27	27	27	27	27
LIVESTOCK	L | LAVACA LIVESTOCK LOCAL SUPPLY	282	282	282	282	282	282
IRRIGATION	L | GULF COAST AQUIFER | DEWITT COUNTY	772	778	807	840	846	846
LAVACA BASIN TOTAL EXISTING SUPPLY		**2,521**	**2,508**	**2,453**	**2,400**	**2,287**	**2,231**
LAVACA-GUADALUPE BASIN							
COUNTY-OTHER	L | GULF COAST AQUIFER | DEWITT COUNTY	2	2	2	2	2	2
LIVESTOCK	L | GULF COAST AQUIFER | DEWITT COUNTY	9	9	9	9	9	9
LIVESTOCK	L | LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	9	9	9	9	9	9
IRRIGATION	L | GULF COAST AQUIFER | DEWITT COUNTY	15	15	15	15	15	15
LAVACA-GUADALUPE BASIN TOTAL EXISTING SUPPLY		**35**	**35**	**35**	**35**	**35**	**35**
SAN ANTONIO BASIN							
COUNTY-OTHER	L | GULF COAST AQUIFER | DEWITT COUNTY	89	89	89	89	89	89
MINING	L | GULF COAST AQUIFER | DEWITT COUNTY	254	238	176	113	52	24
LIVESTOCK	L | GULF COAST AQUIFER | DEWITT COUNTY	75	75	75	75	75	75
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	75	75	75	75	75	75
IRRIGATION	L | GULF COAST AQUIFER | DEWITT COUNTY	104	104	104	104	104	104
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**597**	**581**	**519**	**456**	**395**	**367**
DEWITT COUNTY TOTAL EXISTING SUPPLY		**14,388**	**14,205**	**13,489**	**12,777**	**12,009**	**11,652**
DIMMIT COUNTY							
NUECES BASIN							
ASHERTON	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	313	313	313	313	313	313
BIG WELLS	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	251	251	251	251	251	251
CARRIZO SPRINGS	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	2,003	2,003	2,003	2,003	2,003	2,003
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	311	311	311	311	311	311
MINING	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	92	92	92	92	92	92
MINING	L | NUECES RUN-OF-RIVER	1	1	1	1	1	1
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	219	219	219	219	219	219
LIVESTOCK	L | NUECES LIVESTOCK LOCAL SUPPLY	220	220	220	220	220	220
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	64	64	64	64	64	64
IRRIGATION	L | NUECES RUN-OF-RIVER	2,261	2,261	2,261	2,261	2,261	2,261
NUECES BASIN TOTAL EXISTING SUPPLY		**5,735**	**5,735**	**5,735**	**5,735**	**5,735**	**5,735**
RIO GRANDE BASIN							
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	3	3	3	3	3	3
MINING		0	0	0	0	0	0
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	25	25	25	25	25	25
LIVESTOCK	L | RIO GRANDE LIVESTOCK LOCAL SUPPLY	24	24	24	24	24	24
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | DIMMIT COUNTY	78	78	78	78	78	78
RIO GRANDE BASIN TOTAL EXISTING SUPPLY		**130**	**130**	**130**	**130**	**130**	**130**
DIMMIT COUNTY TOTAL EXISTING SUPPLY		**5,865**	**5,865**	**5,865**	**5,865**	**5,865**	**5,865**

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
FRIO COUNTY							
NUECES BASIN							
BENTON CITY WSC	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	100	94	90	88	85	83
DILLEY	L | CARRIZO-WILCOX AQUIFER | FRIO COUNTY	2,107	2,107	2,107	2,107	2,107	2,107
PEARSALL	L | CARRIZO-WILCOX AQUIFER | FRIO COUNTY	2,731	2,731	2,731	2,731	2,731	2,731
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | FRIO COUNTY	1,020	1,020	1,020	1,020	1,020	1,020
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	555	555	555	555	555	555
LIVESTOCK	L | NUECES LIVESTOCK LOCAL SUPPLY	497	497	497	497	497	497
LIVESTOCK	L | QUEEN CITY AQUIFER | FRIO COUNTY	497	497	497	497	497	497
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | FRIO COUNTY	68,922	66,442	64,071	61,803	59,611	57,600
IRRIGATION	L | QUEEN CITY AQUIFER | FRIO COUNTY	1,211	1,211	1,211	1,211	1,211	1,211
IRRIGATION	L | SPARTA AQUIFER | FRIO COUNTY	698	674	650	624	601	601
NUECES BASIN TOTAL EXISTING SUPPLY		**79,555**	**77,078**	**74,607**	**72,119**	**69,535**	**67,292**
FRIO COUNTY TOTAL EXISTING SUPPLY		**79,555**	**77,078**	**74,607**	**72,119**	**69,535**	**67,292**
GOLIAD COUNTY							
GUADALUPE BASIN							
COUNTY-OTHER	L | GULF COAST AQUIFER | GOLIAD COUNTY	589	589	589	589	589	589
MINING	L | GULF COAST AQUIFER | 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 | GOLIAD COUNTY	2,800	2,800	2,800	2,800	2,800	2,800
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	140	140	140	140	140	140
LIVESTOCK	L | GULF COAST AQUIFER | GOLIAD COUNTY	122	122	122	122	122	122
IRRIGATION	L | GULF COAST AQUIFER | GOLIAD COUNTY	742	742	742	742	742	742
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**28,679**	**28,679**	**28,679**	**28,679**	**28,679**	**28,679**
SAN ANTONIO BASIN							
GOLIAD	L | GULF COAST AQUIFER | GOLIAD COUNTY	804	804	804	804	804	804
COUNTY-OTHER	L | GULF COAST AQUIFER | GOLIAD COUNTY	491	491	491	491	491	491
MANUFACTURING	L | GULF COAST AQUIFER | GOLIAD COUNTY	122	122	122	122	122	122
MINING	L | GULF COAST AQUIFER | GOLIAD COUNTY	275	275	275	275	275	275
LIVESTOCK	L | GULF COAST AQUIFER | GOLIAD COUNTY	233	233	233	233	233	233
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	215	215	215	215	215	215
IRRIGATION	L | GULF COAST AQUIFER | GOLIAD COUNTY	592	592	592	592	592	592
IRRIGATION	L | SAN ANTONIO RUN-OF-RIVER	2,425	2,425	2,425	2,425	2,425	2,425
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**5,157**	**5,157**	**5,157**	**5,157**	**5,157**	**5,157**
SAN ANTONIO-NUECES BASIN							
COUNTY-OTHER	L | GULF COAST AQUIFER | GOLIAD COUNTY	132	132	132	132	132	132
MINING	L | GULF COAST AQUIFER | GOLIAD COUNTY	49	49	49	49	49	49
LIVESTOCK	L | GULF COAST AQUIFER | GOLIAD COUNTY	209	209	209	209	209	209
LIVESTOCK	L | SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	209	209	209	209	209	209
IRRIGATION	L | GULF COAST AQUIFER | GOLIAD COUNTY	416	416	416	416	416	416

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
GOLIAD COUNTY							
SAN ANTONIO-NUECES BASIN TOTAL EXISTING SUPPLY		**1,015**	**1,015**	**1,015**	**1,015**	**1,015**	**1,015**
GOLIAD COUNTY TOTAL EXISTING SUPPLY		**34,851**	**34,851**	**34,851**	**34,851**	**34,851**	**34,851**
GONZALES COUNTY							
GUADALUPE BASIN							
GONZALES	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	345	345	345	345	345	345
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	635	634	634	634	634	635
GONZALES COUNTY WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	1,836	1,833	1,831	1,832	1,833	1,836
NIXON	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	2,632	2,633	2,633	2,629	2,629	2,630
WAELDER	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	597	597	597	597	597	597
SMILEY	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	225	225	225	225	225	225
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	539	539	539	539	539	539
MANUFACTURING	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	1,247	1,247	1,247	1,247	1,247	1,247
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	2,962	2,962	2,962	2,962	2,962	2,962
LIVESTOCK	L | GULF COAST AQUIFER | GONZALES COUNTY	35	35	35	35	35	35
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	1,027	1,027	1,027	1,027	1,027	1,027
IRRIGATION	L | GUADALUPE RUN-OF-RIVER	1,800	1,800	1,800	1,800	1,800	1,800
IRRIGATION	L | QUEEN CITY AQUIFER | GONZALES COUNTY	629	629	629	629	629	629
IRRIGATION	L | YEGUA-JACKSON AQUIFER | GONZALES COUNTY	140	140	140	140	140	140
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**21,268**	**20,872**	**20,476**	**20,078**	**19,685**	**19,667**
LAVACA BASIN							
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	33	33	33	33	33	33
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	107	107	107	107	107	107
LAVACA BASIN TOTAL EXISTING SUPPLY		**140**	**140**	**140**	**140**	**140**	**140**
GONZALES COUNTY TOTAL EXISTING SUPPLY		**21,408**	**21,012**	**20,616**	**20,218**	**19,825**	**19,807**
GUADALUPE COUNTY							
GUADALUPE BASIN							
SEGUIN	L | CANYON LAKE/RESERVOIR	1,160	1,171	1,200	1,263	1,329	1,397
SEGUIN	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	3,325	4,092	4,866	5,589	6,357	7,116
SEGUIN	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	161	170	199	262	330	396

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
GUADALUPE COUNTY							
GUADALUPE BASIN							
SEGUIN	L | DIRECT REUSE	61	61	61	61	61	61
SPRINGS HILL WSC	L | CANYON LAKE/RESERVOIR	3,011	2,972	2,869	2,645	2,409	2,170
SPRINGS HILL WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	785	766	714	602	484	433
SPRINGS HILL WSC	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	646	628	577	465	346	159
SPRINGS HILL WSC	L | GUADALUPE RUN-OF-RIVER	79	79	79	79	79	79
CRYSTAL CLEAR WSC	L | CANYON LAKE/RESERVOIR	824	834	837	831	824	813
CRYSTAL CLEAR WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	190	192	193	192	190	188
CRYSTAL CLEAR WSC	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	32	32	32	32	32	31
CRYSTAL CLEAR WSC	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	647	655	657	652	647	639
CRYSTAL CLEAR WSC	L | GUADALUPE RIVER ALLUVIUM AQUIFER | CALDWELL COUNTY	136	138	138	137	136	135
GONZALES COUNTY WSC	L | CANYON LAKE/RESERVOIR	10	11	12	13	13	14
GONZALES COUNTY WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	30	32	35	37	38	39
GREEN VALLEY SUD	L | CANYON LAKE/RESERVOIR	521	525	528	531	533	536
GREEN VALLEY SUD	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	145	145	146	147	148	149
GREEN VALLEY SUD	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	139	140	141	141	142	143
GREEN VALLEY SUD	L | TRINITY AQUIFER | BEXAR COUNTY	48	48	48	48	49	49
LULING	L | CARRIZO-WILCOX AQUIFER | CALDWELL COUNTY	5	4	4	4	4	4
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	938	908	888	871	860	854
NEW BRAUNFELS	L | GUADALUPE RUN-OF-RIVER	219	212	208	204	201	200
NEW BRAUNFELS	L | TRINITY AQUIFER | BEXAR COUNTY	18	17	17	17	16	16
NEW BRAUNFELS	L | TRINITY AQUIFER | COMAL COUNTY	109	106	104	102	100	100
SANTA CLARA	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	21	20	20	21	20	20
SCHERTZ	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	712	628	596	544	489	439
SCHERTZ	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	67	66	65	65	64	63
COUNTY-OTHER	L | CANYON LAKE/RESERVOIR	649	762	783	828	877	924
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	218	261	282	327	375	368
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	1,128	1,152	1,172	1,217	1,264	1,367
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	60	70	70	70	70	70
COUNTY-OTHER	L | GUADALUPE RUN-OF-RIVER	61	61	61	61	61	61
COUNTY-OTHER	L | TRINITY AQUIFER | BEXAR COUNTY	30	35	35	35	35	35
MANUFACTURING	L | CANYON LAKE/RESERVOIR	985	985	985	985	985	985

EXISTING WATER SUPPLY

REGION L		EXISTING SUPPLY (ACRE-FEET PER YEAR)					
	SOURCE REGION | SOURCE NAME	2020	2030	2040	2050	2060	2070
GUADALUPE COUNTY							
GUADALUPE BASIN							
MANUFACTURING	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	1,000	1,000	1,000	1,000	1,000	1,000
MANUFACTURING	L | EDWARDS-BFZ AQUIFER | GUADALUPE COUNTY	208	208	208	208	208	208
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	1,352	1,352	1,352	1,352	1,352	1,352
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	418	418	418	418	418	418
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	523	523	523	523	523	523
IRRIGATION	L | CANYON LAKE/RESERVOIR	336	336	336	336	336	336
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	122	122	122	122	122	122
IRRIGATION	L | GUADALUPE RUN-OF-RIVER	429	429	429	429	429	429
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**37,465**	**38,291**	**38,967**	**39,480**	**40,048**	**40,641**
SAN ANTONIO BASIN							
SPRINGS HILL WSC	L | CANYON LAKE/RESERVOIR	405	402	387	357	325	292
SPRINGS HILL WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	105	103	96	81	65	58
SPRINGS HILL WSC	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	87	85	78	63	47	21
SPRINGS HILL WSC	L | GUADALUPE RUN-OF-RIVER	11	11	11	11	11	11
CIBOLO	L | CANYON LAKE/RESERVOIR	2,526	2,526	2,526	2,526	2,526	2,526
CIBOLO	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	1,400	1,400	1,400	1,400	1,400	1,400
GREEN VALLEY SUD	L | CANYON LAKE/RESERVOIR	380	383	386	387	389	392
GREEN VALLEY SUD	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	105	106	107	108	108	109
GREEN VALLEY SUD	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	101	102	103	103	104	104
GREEN VALLEY SUD	L | TRINITY AQUIFER | BEXAR COUNTY	35	35	35	35	36	36
MARION	L | CANYON LAKE/RESERVOIR	208	208	208	208	208	208
MARION	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	5	5	5	5	5	5
MARION	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	114	114	114	114	114	114
MARION	L | TRINITY AQUIFER | BEXAR COUNTY	5	5	5	5	5	5
SANTA CLARA	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	123	124	124	123	124	124
SCHERTZ	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	8,888	7,854	7,446	6,796	6,118	5,486
SCHERTZ	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	834	830	818	807	794	785
SELMA	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	338	504	478	455	436	419
SELMA	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	204	304	288	274	263	253

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
GUADALUPE COUNTY							
SAN ANTONIO BASIN							
WATER SERVICES INC	L | TRINITY AQUIFER | BEXAR COUNTY	64	69	72	76	79	82
NEW BERLIN	L | CANYON LAKE/RESERVOIR	34	40	47	53	60	66
NEW BERLIN	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	34	40	46	53	59	66
NEW BERLIN	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	34	40	47	53	60	66
EAST CENTRAL SUD	L | CANYON LAKE/RESERVOIR	49	50	50	50	49	48
EAST CENTRAL SUD	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	46	49	51	53	55	56
EAST CENTRAL SUD	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	19	20	20	21	21	22
COUNTY-OTHER	L | CANYON LAKE/RESERVOIR	426	323	332	351	370	391
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	145	112	121	140	160	157
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	173	160	169	188	208	252
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | COMAL COUNTY	40	30	30	30	30	30
COUNTY-OTHER	L | TRINITY AQUIFER | BEXAR COUNTY	20	15	15	15	15	15
MANUFACTURING	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	15	15	15	15	15	15
MINING	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	114	138	160	189	221	261
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	105	105	105	105	105	105
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	75	75	75	75	75	75
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**17,267**	**16,382**	**15,970**	**15,325**	**14,660**	**14,055**
GUADALUPE COUNTY TOTAL EXISTING SUPPLY		**54,732**	**54,673**	**54,937**	**54,805**	**54,708**	**54,696**
HAYS COUNTY							
GUADALUPE BASIN							
BUDA	L | CANYON LAKE/RESERVOIR	299	388	499	639	798	979
COUNTY LINE WSC	L | CANYON LAKE/RESERVOIR	226	197	161	113	57	0
COUNTY LINE WSC	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	77	79	81	83	85	87
CREEDMOOR-MAHA WSC	K | EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	10	12	15	19	23	28
CRYSTAL CLEAR WSC	L | CANYON LAKE/RESERVOIR	323	317	319	329	340	354
CRYSTAL CLEAR WSC	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	74	73	74	76	79	82
CRYSTAL CLEAR WSC	L | CARRIZO-WILCOX AQUIFER | GUADALUPE COUNTY	12	12	12	13	13	14
CRYSTAL CLEAR WSC	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	254	249	251	258	267	278
CRYSTAL CLEAR WSC	L | GUADALUPE RIVER ALLUVIUM AQUIFER | CALDWELL COUNTY	53	53	53	54	56	59
KYLE	L | CANYON LAKE/RESERVOIR	5,743	5,743	5,743	5,743	5,743	5,732
KYLE	L | DIRECT REUSE	199	199	199	199	199	199
KYLE	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	390	390	390	390	390	390
MAXWELL WSC	L | CANYON LAKE/RESERVOIR	101	92	87	85	84	84
MAXWELL WSC	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	39	35	33	32	32	32

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
HAYS COUNTY							
GUADALUPE BASIN							
MAXWELL WSC	L | GUADALUPE RUN-OF-RIVER	153	139	131	128	127	127
MOUNTAIN CITY	K | EDWARDS-BFZ AQUIFER | HAYS COUNTY	15	16	18	18	18	18
MOUNTAIN CITY	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	13	13	13	13	13	13
NIEDERWALD	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	10	10	11	11	11	11
PLUM CREEK WATER COMPANY	L | TRINITY AQUIFER | HAYS COUNTY	984	883	864	847	835	825
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	3,803	3,803	3,803	3,803	3,803	3,803
WIMBERLEY WSC	L | TRINITY AQUIFER | HAYS COUNTY	683	683	683	683	683	683
WOODCREEK	L | TRINITY AQUIFER | HAYS COUNTY	998	998	998	998	998	998
GOFORTH SUD	K | EDWARDS-BFZ AQUIFER | TRAVIS COUNTY	7	7	6	6	6	6
GOFORTH SUD	L | CANYON LAKE/RESERVOIR	1,050	1,050	1,050	1,050	1,050	1,050
GOFORTH SUD	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	105	104	103	103	103	103
GOFORTH SUD	L | TRINITY AQUIFER | HAYS COUNTY	2,985	2,932	2,871	2,792	2,703	2,603
UHLAND	L | CANYON LAKE/RESERVOIR	99	133	175	229	290	360
WIMBERLEY	L | TRINITY AQUIFER | HAYS COUNTY	844	844	844	844	844	844
COUNTY-OTHER	L | CANYON LAKE/RESERVOIR	3,877	3,877	3,877	3,877	3,877	3,877
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	947	947	947	947	947	947
COUNTY-OTHER	L | TRINITY AQUIFER | HAYS COUNTY	341	341	341	341	341	341
MANUFACTURING		0	0	0	0	0	0
STEAM ELECTRIC POWER	L | CANYON LAKE/RESERVOIR	2,464	2,464	2,464	2,464	2,464	2,464
STEAM ELECTRIC POWER	L | DIRECT REUSE	2,912	2,912	2,912	2,912	2,912	2,912
LIVESTOCK	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	161	161	161	161	161	161
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	204	204	204	204	204	204
LIVESTOCK	L | TRINITY AQUIFER | HAYS COUNTY	45	45	45	45	45	45
IRRIGATION	L | DIRECT REUSE	224	224	224	224	224	224
IRRIGATION	L | EDWARDS-BFZ AQUIFER | HAYS COUNTY	282	282	282	282	282	282
IRRIGATION	L | GUADALUPE RUN-OF-RIVER	130	130	130	130	130	130
IRRIGATION	L | TRINITY AQUIFER | HAYS COUNTY	102	102	102	102	102	102
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**41,236**	**41,141**	**41,174**	**41,244**	**41,336**	**41,448**
HAYS COUNTY TOTAL EXISTING SUPPLY		**41,236**	**41,141**	**41,174**	**41,244**	**41,336**	**41,448**
KARNES COUNTY							
GUADALUPE BASIN							
EL OSO WSC	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	4	4	4	4	4	4
EL OSO WSC	L | GULF COAST AQUIFER | KARNES COUNTY	5	5	5	5	5	6
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	20	20	20	20	20	20
COUNTY-OTHER	L | GULF COAST AQUIFER | KARNES COUNTY	8	8	8	8	8	8
MINING	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	152	115	77	40	2	0
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	20	20	20	20	20	20
LIVESTOCK	L | GULF COAST AQUIFER | KARNES COUNTY	4	4	4	4	4	4

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
KARNES COUNTY							
GUADALUPE BASIN							
LIVESTOCK	L | YEGUA-JACKSON AQUIFER | KARNES COUNTY	17	17	17	17	17	17
IRRIGATION	L | YEGUA-JACKSON AQUIFER | KARNES COUNTY	30	30	30	30	30	30
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**260**	**223**	**185**	**148**	**110**	**109**
NUECES BASIN							
EL OSO WSC	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	10	10	10	10	10	10
EL OSO WSC	L | GULF COAST AQUIFER | KARNES COUNTY	14	14	13	13	12	12
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	20	20	20	20	20	20
MINING	L | GULF COAST AQUIFER | KARNES COUNTY	36	36	35	31	28	26
LIVESTOCK	L | GULF COAST AQUIFER | KARNES COUNTY	42	42	42	42	42	42
LIVESTOCK	L | YEGUA-JACKSON AQUIFER | KARNES COUNTY	22	22	22	22	22	22
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	42	42	42	42	42	42
NUECES BASIN TOTAL EXISTING SUPPLY		**186**	**186**	**184**	**180**	**176**	**174**
SAN ANTONIO BASIN							
EL OSO WSC	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	279	291	300	304	305	302
EL OSO WSC	L | GULF COAST AQUIFER | KARNES COUNTY	393	389	383	378	361	357
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	331	331
KENEDY	L | GULF COAST AQUIFER | KARNES COUNTY	1,260	1,257	1,256	1,254	1,211	1,211
RUNGE	L | GULF COAST AQUIFER | KARNES COUNTY	274	273	273	273	263	263
SUNKO WSC	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	54	47	40	35	31	29
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	51	52	52	52	52	52
COUNTY-OTHER	L | GULF COAST AQUIFER | KARNES COUNTY	549	548	548	547	528	528
MANUFACTURING	L | GULF COAST AQUIFER | KARNES COUNTY	229	228	228	228	220	220
MINING	L | DIRECT REUSE	30	30	30	30	30	30
MINING	L | YEGUA-JACKSON AQUIFER | KARNES COUNTY	411	411	411	411	15	1
LIVESTOCK	L | GULF COAST AQUIFER | KARNES COUNTY	275	274	274	273	264	264
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	547	548	548	549	558	558
LIVESTOCK	L | YEGUA-JACKSON AQUIFER | KARNES COUNTY	217	217	217	217	217	217
IRRIGATION	L | GULF COAST AQUIFER | KARNES COUNTY	32	32	32	32	31	31
IRRIGATION	L | SAN ANTONIO RUN-OF-RIVER	725	725	725	725	725	725
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**5,835**	**5,861**	**5,879**	**5,882**	**5,394**	**5,371**
SAN ANTONIO-NUECES BASIN							
EL OSO WSC	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	2	3	3	3	3	3
EL OSO WSC	L | GULF COAST AQUIFER | KARNES COUNTY	3	3	3	3	3	3
COUNTY-OTHER	L | GULF COAST AQUIFER | KARNES COUNTY	20	20	20	20	20	20
MINING	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	1	1	1	1	1	1
MINING	L | GULF COAST AQUIFER | KARNES COUNTY	34	34	34	34	9	0
LIVESTOCK	L | GULF COAST AQUIFER | KARNES COUNTY	14	14	14	14	14	14

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
KARNES COUNTY							
SAN ANTONIO-NUECES BASIN							
LIVESTOCK	L | SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	10	10	10	10	10	10
IRRIGATION	L | GULF COAST AQUIFER | KARNES COUNTY	16	16	16	16	16	16
SAN ANTONIO-NUECES BASIN TOTAL EXISTING SUPPLY		**100**	**101**	**101**	**101**	**76**	**67**
KARNES COUNTY TOTAL EXISTING SUPPLY		**6,381**	**6,371**	**6,349**	**6,311**	**5,756**	**5,721**
KENDALL COUNTY							
COLORADO BASIN							
COUNTY-OTHER	L | EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	44	44	44	44	44	44
COUNTY-OTHER	L | TRINITY AQUIFER | KENDALL COUNTY	44	44	44	44	44	44
LIVESTOCK	L | COLORADO LIVESTOCK LOCAL SUPPLY	6	6	6	6	6	6
LIVESTOCK	L | EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	2	2	2	2	2	2
LIVESTOCK	L | TRINITY AQUIFER | KENDALL COUNTY	5	5	5	5	5	5
COLORADO BASIN TOTAL EXISTING SUPPLY		**101**	**101**	**101**	**101**	**101**	**101**
GUADALUPE BASIN							
KENDALL COUNTY WCID #1	L | DIRECT REUSE	230	230	230	230	230	230
KENDALL COUNTY WCID #1	L | TRINITY AQUIFER | KENDALL COUNTY	545	545	545	545	545	545
COUNTY-OTHER	L | CANYON LAKE/RESERVOIR	2,500	2,500	2,500	2,500	2,500	2,500
COUNTY-OTHER	L | EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	94	94	94	94	94	94
COUNTY-OTHER	L | TRINITY AQUIFER | KENDALL COUNTY	1,320	1,320	1,320	1,320	1,320	1,320
LIVESTOCK	L | EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	9	9	9	9	9	9
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	159	159	159	159	159	159
LIVESTOCK	L | TRINITY AQUIFER | KENDALL COUNTY	148	148	148	148	148	148
IRRIGATION	L | DIRECT REUSE	34	34	34	34	34	34
IRRIGATION	L | GUADALUPE RUN-OF-RIVER	26	26	26	26	26	26
IRRIGATION	L | TRINITY AQUIFER | KENDALL COUNTY	300	300	300	300	300	300
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**5,365**	**5,365**	**5,365**	**5,365**	**5,365**	**5,365**
SAN ANTONIO BASIN							
BOERNE	L | BOERNE LAKE/RESERVOIR	645	645	645	645	645	645
BOERNE	L | CANYON LAKE/RESERVOIR	3,611	3,611	3,611	3,611	3,611	3,611
BOERNE	L | DIRECT REUSE	7	7	7	7	7	7
BOERNE	L | TRINITY AQUIFER | KENDALL COUNTY	987	987	987	987	987	987
WATER SERVICES INC	L | TRINITY AQUIFER | BEXAR COUNTY	74	79	87	92	98	103
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	434	511	574	622	663	696
COUNTY-OTHER	L | TRINITY AQUIFER | KENDALL COUNTY	1,425	1,425	1,425	1,425	1,425	1,425
LIVESTOCK	L | EDWARDS-TRINITY-PLATEAU AQUIFER | KENDALL COUNTY	9	9	9	9	9	9
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	33	33	33	33	33	33

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
KENDALL COUNTY							
SAN ANTONIO BASIN							
LIVESTOCK	L | TRINITY AQUIFER | KENDALL COUNTY	24	24	24	24	24	24
IRRIGATION	L | TRINITY AQUIFER | KENDALL COUNTY	100	100	100	100	100	100
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**8,111**	**8,330**	**8,512**	**8,649**	**8,768**	**8,865**
KENDALL COUNTY TOTAL EXISTING SUPPLY		**13,577**	**13,796**	**13,978**	**14,115**	**14,234**	**14,331**
LA SALLE COUNTY							
NUECES BASIN							
COTULLA	L | CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	2,000	2,000	2,000	2,000	2,000	2,000
ENCINAL	L | CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	268	268	268	268	268	268
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	500	500	500	500	500	500
MINING	L | CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	529	529	529	529	529	529
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | LA SALLE COUNTY	139	139	139	139	139	139
LIVESTOCK	L | NUECES LIVESTOCK LOCAL SUPPLY	305	305	305	305	305	305
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	3,018	3,018	3,018	3,018	3,018	3,018
IRRIGATION	L | NUECES RUN-OF-RIVER	705	705	705	705	705	705
IRRIGATION	L | SPARTA AQUIFER | LA SALLE COUNTY	913	913	913	913	913	913
NUECES BASIN TOTAL EXISTING SUPPLY		**8,543**	**8,543**	**8,543**	**8,543**	**8,543**	**8,543**
LA SALLE COUNTY TOTAL EXISTING SUPPLY		**8,543**	**8,543**	**8,543**	**8,543**	**8,543**	**8,543**
MEDINA COUNTY							
NUECES BASIN							
BENTON CITY WSC	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	896	920	931	933	933	930
DEVINE	L | CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	221	220	220	220	220	220
DEVINE	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	535	535	535	535	535	535
HONDO	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	1,530	1,530	1,530	1,530	1,530	1,530
LYTLE	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	80	85	87	88	88	88
NATALIA	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	180	180	180	180	180	180
YANCEY WSC	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	124	125	125	125	125	125
EAST MEDINA COUNTY SUD	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	925	926	926	927	926	926
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	500	498	498	498	498	498
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	1,937	1,937	1,937	1,937	1,937	1,937
MINING	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	305	305	305	305	305	305
MINING	L | LEONA GRAVEL AQUIFER | MEDINA COUNTY	1,083	1,238	1,368	1,500	1,667	1,849
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | MEDINA COUNTY	38	38	38	38	38	38

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
MEDINA COUNTY							
NUECES BASIN							
LIVESTOCK	L | LEONA GRAVEL AQUIFER | MEDINA COUNTY	321	321	321	321	321	321
LIVESTOCK	L | NUECES LIVESTOCK LOCAL 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	1,758	1,749	1,749	1,749	1,749	1,749
IRRIGATION	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	12,238	12,238	12,238	12,238	12,238	12,238
IRRIGATION	L | TRINITY AQUIFER | MEDINA COUNTY	5,784	5,784	5,784	5,784	5,784	5,784
NUECES BASIN TOTAL EXISTING SUPPLY		**30,372**	**30,546**	**30,689**	**30,825**	**30,991**	**31,170**
SAN ANTONIO BASIN							
SAN ANTONIO	L | CANYON LAKE/RESERVOIR	0	0	0	0	0	0
SAN ANTONIO	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	0	0	0	0	0	0
SAN ANTONIO	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	0	1	1	1	1	1
SAN ANTONIO	L | DIRECT REUSE	0	0	0	0	0	0
SAN ANTONIO	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	5	6	8	8	9	9
SAN ANTONIO	L | GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO	L | TRINITY AQUIFER | BEXAR COUNTY	0	0	0	0	0	0
CASTROVILLE	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	570	570	570	570	570	570
LACOSTE	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	117	117	117	117	117	117
YANCEY WSC	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	508	507	507	507	507	507
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | BEXAR COUNTY	30	40	46	50	52	54
SAN ANTONIO WATER SYSTEM	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | DIRECT REUSE	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	179	235	269	291	307	317
SAN ANTONIO WATER SYSTEM	L | GUADALUPE RUN-OF-RIVER	0	0	0	0	0	0
SAN ANTONIO WATER SYSTEM	L | SAN ANTONIO RUN-OF-RIVER	49	64	73	79	84	87
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | BEXAR COUNTY	63	82	94	102	107	111
SAN ANTONIO WATER SYSTEM	L | TRINITY AQUIFER | COMAL COUNTY	4	5	5	6	6	6
EAST MEDINA COUNTY SUD	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	85	84	84	83	84	84
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	489	489	489	489	489	489
COUNTY-OTHER	L | TRINITY AQUIFER | MEDINA COUNTY	300	300	300	300	300	300
MANUFACTURING	L | LEONA GRAVEL AQUIFER | MEDINA COUNTY	15	15	15	15	15	15
MINING	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	277	277	277	277	277	277
MINING	L | LEONA GRAVEL AQUIFER | MEDINA COUNTY	186	237	331	375	430	491
LIVESTOCK	L | LEONA GRAVEL AQUIFER | MEDINA COUNTY	33	33	33	33	33	33
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL 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	26	26	26	26	26	26

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
MEDINA COUNTY							
SAN ANTONIO BASIN							
IRRIGATION	L | EDWARDS-BFZ AQUIFER | MEDINA COUNTY	4,535	4,535	4,535	4,535	4,535	4,535
IRRIGATION	L | TRINITY AQUIFER | MEDINA COUNTY	1,594	1,594	1,594	1,594	1,594	1,594
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**9,155**	**9,307**	**9,464**	**9,548**	**9,633**	**9,713**
MEDINA COUNTY TOTAL EXISTING SUPPLY		**39,527**	**39,853**	**40,153**	**40,373**	**40,624**	**40,883**
REFUGIO COUNTY							
SAN ANTONIO BASIN							
COUNTY-OTHER	L | GULF COAST AQUIFER | REFUGIO COUNTY	12	12	12	12	12	12
MINING	L | GULF COAST AQUIFER | REFUGIO COUNTY	3	3	3	2	1	1
LIVESTOCK	L | GULF COAST AQUIFER | REFUGIO COUNTY	16	16	16	16	16	16
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	16	16	16	16	16	16
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**47**	**47**	**47**	**46**	**45**	**45**
SAN ANTONIO-NUECES BASIN							
REFUGIO	L | GULF COAST AQUIFER | REFUGIO COUNTY	1,234	1,234	1,234	1,234	1,234	1,234
WOODSBORO	L | GULF COAST AQUIFER | REFUGIO COUNTY	606	606	606	606	606	606
COUNTY-OTHER	L | GULF COAST AQUIFER | REFUGIO COUNTY	511	511	511	511	511	511
MINING	L | GULF COAST AQUIFER | REFUGIO COUNTY	63	66	48	36	23	14
LIVESTOCK	L | GULF COAST AQUIFER | REFUGIO COUNTY	302	302	302	302	302	302
LIVESTOCK	L | SAN ANTONIO-NUECES LIVESTOCK LOCAL SUPPLY	302	302	302	302	302	302
IRRIGATION	L | GULF COAST AQUIFER | REFUGIO COUNTY	652	652	652	652	652	652
SAN ANTONIO-NUECES BASIN TOTAL EXISTING SUPPLY		**3,670**	**3,673**	**3,655**	**3,643**	**3,630**	**3,621**
REFUGIO COUNTY TOTAL EXISTING SUPPLY		**3,717**	**3,720**	**3,702**	**3,689**	**3,675**	**3,666**
UVALDE COUNTY							
NUECES BASIN							
SABINAL	L | EDWARDS-BFZ AQUIFER | UVALDE COUNTY	324	324	324	324	324	324
UVALDE	L | EDWARDS-BFZ AQUIFER | UVALDE COUNTY	3,109	3,109	3,109	3,109	3,109	3,109
COUNTY-OTHER	L | BUDA LIMESTONE AQUIFER | UVALDE COUNTY	525	525	525	525	525	525
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | UVALDE COUNTY	1,230	828	828	828	828	828
COUNTY-OTHER	L | EDWARDS-BFZ AQUIFER | UVALDE COUNTY	2,418	2,418	2,418	2,418	2,418	2,418
COUNTY-OTHER	L | LEONA GRAVEL AQUIFER | UVALDE COUNTY	160	158	183	220	250	250
MANUFACTURING	L | EDWARDS-BFZ AQUIFER | UVALDE COUNTY	231	231	231	231	231	231
MANUFACTURING	L | LEONA GRAVEL AQUIFER | UVALDE COUNTY	160	158	183	220	250	250
MINING	L | EDWARDS-BFZ AQUIFER | UVALDE COUNTY	192	192	192	192	192	192
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	180	180	180	180	180	180
LIVESTOCK	L | EDWARDS-TRINITY-PLATEAU AQUIFER | UVALDE COUNTY	161	161	161	161	161	161
LIVESTOCK	L | LEONA GRAVEL AQUIFER | UVALDE COUNTY	135	135	135	135	135	135
LIVESTOCK	L | NUECES LIVESTOCK LOCAL SUPPLY	516	516	516	516	516	516
LIVESTOCK	L | TRINITY AQUIFER | UVALDE COUNTY	39	39	39	39	39	39
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	25,260	25,260	25,260	25,260	25,260	25,260

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
UVALDE COUNTY							
NUECES BASIN							
IRRIGATION	L | EDWARDS-TRINITY-PLATEAU AQUIFER | UVALDE COUNTY	1,474	1,474	1,474	1,474	1,474	1,474
IRRIGATION	L | LEONA GRAVEL AQUIFER | UVALDE COUNTY	6,205	5,948	5,856	5,645	5,378	5,068
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 EXISTING SUPPLY		**47,888**	**47,480**	**47,559**	**47,664**	**47,742**	**47,742**
UVALDE COUNTY TOTAL EXISTING SUPPLY		**47,888**	**47,480**	**47,559**	**47,664**	**47,742**	**47,742**
VICTORIA COUNTY							
GUADALUPE BASIN							
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 | VICTORIA COUNTY	8,660	8,660	8,659	8,660	8,659	8,660
COUNTY-OTHER	L | GULF COAST AQUIFER | VICTORIA COUNTY	2,032	2,032	2,032	2,032	2,032	2,032
MANUFACTURING	L | GUADALUPE RUN-OF-RIVER	28,027	28,027	28,027	28,027	28,027	28,027
MANUFACTURING	L | GULF COAST AQUIFER | VICTORIA COUNTY	772	772	772	772	772	772
MINING	L | GULF COAST AQUIFER | VICTORIA COUNTY	36	38	28	21	14	9
STEAM ELECTRIC POWER	L | GULF COAST AQUIFER | VICTORIA COUNTY	1,024	1,024	1,024	1,024	1,024	1,024
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	339	339	339	339	339	339
LIVESTOCK	L | GULF COAST AQUIFER | VICTORIA COUNTY	196	196	196	196	196	196
IRRIGATION	L | GUADALUPE RUN-OF-RIVER	137	137	137	137	137	137
IRRIGATION	L | GULF COAST AQUIFER | VICTORIA COUNTY	820	820	820	820	820	820
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**43,289**	**43,291**	**43,280**	**43,274**	**43,266**	**43,262**
LAVACA BASIN							
COUNTY-OTHER	L | GULF COAST AQUIFER | VICTORIA COUNTY	7	7	7	7	7	7
LIVESTOCK	L | GULF COAST AQUIFER | VICTORIA COUNTY	3	3	3	3	3	3
LIVESTOCK	L | LAVACA LIVESTOCK LOCAL SUPPLY	2	2	2	2	2	2
LAVACA BASIN TOTAL EXISTING SUPPLY		**12**	**12**	**12**	**12**	**12**	**12**
LAVACA-GUADALUPE BASIN							
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 | VICTORIA COUNTY	4,189	4,189	4,190	4,189	4,190	4,189
COUNTY-OTHER	L | GULF COAST AQUIFER | VICTORIA COUNTY	1,425	1,425	1,425	1,425	1,425	1,425
MINING	L | GULF COAST AQUIFER | VICTORIA COUNTY	33	34	26	19	12	8
LIVESTOCK	L | GULF COAST AQUIFER | VICTORIA COUNTY	358	358	358	358	358	358
LIVESTOCK	L | LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	218	218	218	218	218	218
IRRIGATION	L | GULF COAST AQUIFER | VICTORIA COUNTY	14,993	14,993	14,993	14,993	14,993	14,993
LAVACA-GUADALUPE BASIN TOTAL EXISTING SUPPLY		**21,818**	**21,819**	**21,812**	**21,804**	**21,798**	**21,793**
SAN ANTONIO BASIN							
COUNTY-OTHER	L | GULF COAST AQUIFER | VICTORIA COUNTY	10	10	10	10	10	10
MINING	L | GULF COAST AQUIFER | VICTORIA COUNTY	3	3	2	1	1	1
LIVESTOCK	L | GULF COAST AQUIFER | VICTORIA COUNTY	25	25	25	25	25	25
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	24	24	24	24	24	24

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
VICTORIA COUNTY							
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**62**	**62**	**61**	**60**	**60**	**60**
VICTORIA COUNTY TOTAL EXISTING SUPPLY		**65,181**	**65,184**	**65,165**	**65,150**	**65,136**	**65,127**
WILSON COUNTY							
GUADALUPE BASIN							
NIXON	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	12	11	11	15	15	14
SUNKO WSC	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	8	8	8	7	8	7
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	125	125	125	125	125	125
MINING	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	174	139	105	70	36	18
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	38	38	38	38	38	38
LIVESTOCK	L | GUADALUPE LIVESTOCK LOCAL SUPPLY	54	54	54	54	54	54
LIVESTOCK	L | QUEEN CITY AQUIFER | WILSON COUNTY	7	7	7	7	7	7
LIVESTOCK	L | SPARTA AQUIFER | WILSON COUNTY	4	4	4	4	4	4
LIVESTOCK	L | YEGUA-JACKSON AQUIFER | WILSON COUNTY	5	5	5	5	5	5
GUADALUPE BASIN TOTAL EXISTING SUPPLY		**427**	**391**	**357**	**325**	**292**	**272**
NUECES BASIN							
MCCOY WSC	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	72	76	79	82	84	85
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	95	95	95	95	95	95
MINING	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	174	139	105	70	36	18
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	26	26	26	26	26	26
LIVESTOCK	L | NUECES LIVESTOCK LOCAL SUPPLY	54	54	55	55	56	56
LIVESTOCK	L | QUEEN CITY AQUIFER | WILSON COUNTY	5	5	4	4	3	3
LIVESTOCK	L | SPARTA AQUIFER | WILSON COUNTY	10	10	10	10	10	10
LIVESTOCK	L | YEGUA-JACKSON AQUIFER | WILSON COUNTY	13	13	13	13	13	13
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	4,800	4,300	3,800	3,400	3,000	2,800
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 EXISTING SUPPLY		**5,404**	**4,858**	**4,315**	**3,872**	**3,431**	**3,214**
SAN ANTONIO BASIN							
EL OSO WSC	L | CARRIZO-WILCOX AQUIFER | KARNES COUNTY	19	24	29	34	38	41
EL OSO WSC	L | GULF COAST AQUIFER | KARNES COUNTY	27	32	37	42	45	48
ELMENDORF	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	3	3	4	4	4	5
FLORESVILLE	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	2,336	2,336	2,336	2,336	2,336	2,336
LA VERNIA	L | CANYON LAKE/RESERVOIR	270	270	270	270	270	270
LA VERNIA	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	146	146	146	146	146	146
LA VERNIA	L | GUADALUPE RUN-OF-RIVER	130	130	130	130	130	130
MCCOY WSC	L | CARRIZO-WILCOX AQUIFER | ATASCOSA COUNTY	7	7	7	7	7	7
OAK HILLS WSC	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,863	1,863	1,863	1,863	1,863	1,863

EXISTING WATER SUPPLY

REGION L	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
WILSON COUNTY							
SAN ANTONIO BASIN							
POTH	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,303	1,303	1,303	1,303	1,303	1,303
STOCKDALE	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,762	1,762	1,762	1,762	1,762	1,762
SUNKO WSC	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,248	1,255	1,262	1,268	1,271	1,274
S S WSC	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	3,593	3,593	3,593	3,593	3,593	3,593
EAST CENTRAL SUD	L | CANYON LAKE/RESERVOIR	80	83	84	83	81	78
EAST CENTRAL SUD	L | CARRIZO-WILCOX AQUIFER | GONZALES COUNTY	75	81	85	88	90	91
EAST CENTRAL SUD	L | EDWARDS-BFZ AQUIFER | BEXAR COUNTY	31	33	34	35	35	35
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	2,665	2,665	2,665	2,665	2,665	2,665
COUNTY-OTHER	L | SAN ANTONIO RUN-OF-RIVER	42	42	42	42	42	42
MANUFACTURING	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	10	10	10	10	10	10
MINING	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	1,581	1,270	955	642	327	168
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	422	422	422	422	422	422
LIVESTOCK	L | QUEEN CITY AQUIFER | WILSON COUNTY	198	198	198	198	198	198
LIVESTOCK	L | SAN ANTONIO LIVESTOCK LOCAL SUPPLY	759	759	759	759	759	759
LIVESTOCK	L | YEGUA-JACKSON AQUIFER | WILSON COUNTY	142	142	142	142	142	142
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | WILSON COUNTY	8,500	7,500	6,500	5,500	4,500	3,500
IRRIGATION	L | SAN ANTONIO RUN-OF-RIVER	1,728	1,728	1,728	1,728	1,728	1,728
IRRIGATION	L | YEGUA-JACKSON AQUIFER | WILSON COUNTY	84	84	84	84	84	84
SAN ANTONIO BASIN TOTAL EXISTING SUPPLY		**29,024**	**27,741**	**26,450**	**25,156**	**23,851**	**22,700**
WILSON COUNTY TOTAL EXISTING SUPPLY		**34,855**	**32,990**	**31,122**	**29,353**	**27,574**	**26,186**
ZAVALA COUNTY							
NUECES BASIN							
CRYSTAL CITY	L | CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	3,523	3,523	3,523	3,523	3,523	3,523
ZAVALA COUNTY WCID #1	L | CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	1,272	1,272	1,272	1,272	1,272	1,272
COUNTY-OTHER	L | CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	900	900	900	900	900	900
MANUFACTURING	L | CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	1,434	1,434	1,434	1,434	1,434	1,434
MINING	L | CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	2,531	2,257	1,977	1,559	932	557
LIVESTOCK	L | CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	464	464	464	464	464	464
LIVESTOCK	L | NUECES LIVESTOCK LOCAL SUPPLY	594	594	594	594	594	594
IRRIGATION	L | CARRIZO-WILCOX AQUIFER | ZAVALA COUNTY	25,735	25,670	25,817	26,136	26,443	26,819
NUECES BASIN TOTAL EXISTING SUPPLY		**36,453**	**36,114**	**35,981**	**35,882**	**35,562**	**35,563**
ZAVALA COUNTY TOTAL EXISTING SUPPLY		**36,453**	**36,114**	**35,981**	**35,882**	**35,562**	**35,563**
	REGION L TOTAL EXISTING SUPPLY	**1,026,026**	**1,021,544**	**1,015,817**	**1,011,106**	**1,005,979**	**1,003,869**

EXISTING WATER SUPPLY

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ATASCOSA COUNTY						
NUECES BASIN						
BENTON CITY WSC	533	406	294	185	82	(13)
CHARLOTTE	346	304	265	223	182	143
JOURDANTON	1,135	1,011	896	777	660	550
LYTLE	(134)	(198)	(254)	(310)	(365)	(418)
MCCOY WSC	601	490	386	277	168	66
PLEASANTON	1,494	1,195	918	634	354	92
POTEET	946	895	847	795	740	688
SAN ANTONIO WATER SYSTEM	(87)	(171)	(252)	(336)	(418)	(501)
COUNTY-OTHER	469	376	288	193	94	1
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	3,848	2,554	2,658	1,319	983	836
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
SAN ANTONIO BASIN						
BENTON CITY WSC	66	50	36	23	10	(2)
COUNTY-OTHER	42	33	26	17	8	0
IRRIGATION	0	0	0	0	0	0
BEXAR COUNTY						
NUECES BASIN						
ATASCOSA RURAL WSC	(64)	(79)	(93)	(107)	(121)	(134)
LYTLE	(3)	(6)	(8)	(11)	(13)	(15)
COUNTY-OTHER	(1,190)	(1,324)	(1,460)	(1,603)	(1,742)	(1,870)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1,063)	(1,008)	(956)	(905)	(857)	(814)
SAN ANTONIO BASIN						
ALAMO HEIGHTS	(796)	(848)	(820)	(807)	(805)	(805)
ATASCOSA RURAL WSC	(1,103)	(1,367)	(1,615)	(1,863)	(2,097)	(2,314)
BALCONES HEIGHTS	0	0	0	0	0	0
CASTLE HILLS	0	0	0	0	0	0
CHINA GROVE	0	0	0	0	0	0
CONVERSE	(903)	(1,111)	(1,297)	(1,272)	(1,265)	(1,264)
EAST CENTRAL SUD	243	72	(87)	(255)	(422)	(577)
ELMENDORF	0	0	0	0	0	0
FAIR OAKS RANCH	1,079	790	581	464	286	133
GREEN VALLEY SUD	(11)	(40)	(66)	(93)	(124)	(154)
HELOTES	0	0	0	0	0	0
HILL COUNTRY VILLAGE	0	0	0	0	0	0
HOLLYWOOD PARK	0	0	0	0	0	0
KIRBY	(137)	(207)	(181)	(172)	(169)	(169)
LACKLAND AFB	946	987	1,019	1,038	1,041	1,041
LEON VALLEY	(97)	(147)	(196)	(254)	(317)	(377)
LIVE OAK	512	505	532	547	551	551
OLMOS PARK	0	0	0	0	0	0
RANDOLPH AFB	1,903	1,891	1,879	1,868	1,858	1,849
SAN ANTONIO	(61,808)	(85,738)	(110,443)	(134,047)	(157,465)	(179,233)
SAN ANTONIO WATER SYSTEM	(3,407)	(6,580)	(9,572)	(12,594)	(15,542)	(18,265)

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
BEXAR COUNTY						
SAN ANTONIO BASIN						
SCHERTZ	150	32	(35)	(123)	(224)	(329)
SELMA	348	(7)	(57)	(107)	(157)	(206)
SHAVANO PARK	(425)	(555)	(677)	(797)	(909)	(1,013)
SOMERSET	0	0	0	0	0	0
ST. HEDWIG	0	0	0	0	0	0
TERRELL HILLS	0	0	0	0	0	0
THE OAKS WSC	121	58	(1)	(60)	(114)	(165)
UNIVERSAL CITY	(416)	(431)	(372)	(339)	(333)	(332)
VON ORMY	70	57	45	32	19	6
WATER SERVICES INC	402	337	274	206	139	78
WINDCREST	(326)	(343)	(361)	(388)	(420)	(451)
COUNTY-OTHER	5,527	3,909	1,993	(295)	(2,340)	(4,214)
MANUFACTURING	8,666	6,139	3,601	1,368	(1,058)	(3,680)
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	23,685	19,399	16,625	13,545	10,125	6,374
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(4,053)	(3,617)	(3,198)	(2,798)	(2,414)	(2,077)
CALDWELL COUNTY						
COLORADO BASIN						
AQUA WSC	43	35	26	18	9	0
CREEDMOOR-MAHA WSC	0	0	0	0	0	0
MUSTANG RIDGE	0	0	0	0	0	0
POLONIA WSC	118	65	11	(45)	(104)	(164)
COUNTY-OTHER	182	173	163	154	143	133
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	2	4	6	7	8
GUADALUPE BASIN						
AQUA WSC	242	195	148	99	49	0
COUNTY LINE WSC	56	19	(22)	(64)	(104)	(141)
CREEDMOOR-MAHA WSC	0	0	0	0	0	0
GOFORTH SUD	0	0	0	0	0	0
GONZALES COUNTY WSC	14	11	4	(3)	6	(3)
LOCKHART	(188)	(613)	(1,042)	(1,484)	(1,947)	(2,402)
LULING	133	(41)	(217)	(400)	(594)	(784)
MARTINDALE	3	(31)	(66)	(102)	(140)	(177)
MAXWELL WSC	624	578	519	448	368	286
MUSTANG RIDGE	0	0	0	0	0	0
NIEDERWALD	(13)	(16)	(20)	(23)	(26)	(29)
POLONIA WSC	262	146	26	(101)	(237)	(377)
SAN MARCOS	1	0	(1)	(1)	(2)	(3)
UHLAND	0	0	0	0	0	0
COUNTY-OTHER	1,108	986	862	732	596	462
MANUFACTURING	5	4	3	2	1	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	34	101	160	213	261	294

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
CALHOUN COUNTY						
COLORADO-LAVACA BASIN						
POINT COMFORT	91	86	79	71	63	54
COUNTY-OTHER	76	69	59	50	41	31
MANUFACTURING	5,746	3,338	951	(1,156)	(3,813)	(6,113)
MINING	2	0	8	13	19	22
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(564)	(482)	(427)	(388)	(351)	(313)
GUADALUPE BASIN						
LIVESTOCK	0	0	0	0	0	0
LAVACA-GUADALUPE BASIN						
CALHOUN COUNTY WS	1,144	1,124	1,102	1,075	1,043	1,010
PORT LAVACA	2,553	2,400	2,243	2,072	1,882	1,694
PORT O'CONNOR MUD	1,210	1,204	1,197	1,188	1,178	1,168
SEADRIFT	472	450	428	404	379	354
COUNTY-OTHER	90	80	65	51	36	23
MANUFACTURING	4,642	2,672	719	(1,005)	(3,180)	(5,061)
MINING	1	0	6	12	17	21
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(11,697)	(10,243)	(9,258)	(8,552)	(7,894)	(7,206)
SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	15	14	13	12	11	10
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(12)	(11)	(10)	(9)	(9)	(8)
COMAL COUNTY						
GUADALUPE BASIN						
BULVERDE	0	0	0	0	0	0
CANYON LAKE WATER SERVICE COMPANY	796	(541)	(1,913)	(3,298)	(4,680)	(6,009)
CRYSTAL CLEAR WSC	40	(5)	(54)	(103)	(156)	(207)
GARDEN RIDGE	(653)	(1,021)	(1,398)	(1,780)	(2,161)	(2,528)
GREEN VALLEY SUD	(2)	(4)	(9)	(14)	(21)	(26)
NEW BRAUNFELS	2,069	(661)	(3,515)	(6,452)	(9,435)	(12,329)
SAN ANTONIO WATER SYSTEM	(80)	(204)	(357)	(541)	(742)	(946)
SCHERTZ	156	43	(56)	(221)	(452)	(718)
COUNTY-OTHER	722	754	822	851	918	965
MANUFACTURING	(4,331)	(5,075)	(5,799)	(6,419)	(7,291)	(8,236)
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	493	528	563	598	632	652
SAN ANTONIO BASIN						
BULVERDE	0	0	0	0	0	0
CANYON LAKE WATER SERVICE COMPANY	190	(130)	(460)	(797)	(1,134)	(1,459)
FAIR OAKS RANCH	88	71	56	50	33	16
GARDEN RIDGE	(370)	(578)	(790)	(1,006)	(1,222)	(1,429)
SAN ANTONIO WATER SYSTEM	(68)	(175)	(305)	(461)	(636)	(816)
SCHERTZ	4	1	(2)	(5)	(11)	(18)
SELMA	2	(1)	0	(1)	(1)	(1)
COUNTY-OTHER	92	69	33	24	2	6
MANUFACTURING	201	194	187	180	171	162

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COMAL COUNTY						
SAN ANTONIO BASIN						
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	3	7	11	15	18	21
DEWITT COUNTY						
GUADALUPE BASIN						
CUERO	1,847	1,813	1,810	1,794	2,100	2,087
GONZALES COUNTY WSC	27	17	7	(3)	6	(2)
YORKTOWN	525	524	526	523	584	582
COUNTY-OTHER	45	46	58	59	214	208
MANUFACTURING	125	103	82	64	34	1
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
LAVACA BASIN						
YOAKUM	3	0	3	2	56	54
COUNTY-OTHER	3	5	15	24	52	51
MANUFACTURING	94	83	80	82	64	43
MINING	(44)	(38)	(16)	(2)	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(74)	(68)	(39)	(6)	0	0
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
SAN ANTONIO BASIN						
COUNTY-OTHER	1	1	2	2	14	13
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
DIMMIT COUNTY						
NUECES BASIN						
ASHERTON	(28)	(46)	(61)	(77)	33	26
BIG WELLS	77	70	66	59	113	110
CARRIZO SPRINGS	(267)	(399)	(476)	(578)	147	100
COUNTY-OTHER	(296)	(325)	(338)	(360)	(170)	(183)
MINING	(4,172)	(4,243)	(3,667)	(2,355)	(1,047)	(438)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(2,695)	(2,643)	(2,443)	(2,238)	(2,041)	(1,907)
RIO GRANDE BASIN						
COUNTY-OTHER	(1)	(1)	(2)	(2)	(1)	(1)
MINING	(654)	(665)	(577)	(376)	(175)	(81)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(677)	(669)	(639)	(608)	(579)	(559)
FRIO COUNTY						
NUECES BASIN						
BENTON CITY WSC	38	27	19	12	5	(1)
DILLEY	1,082	997	922	844	770	702

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
FRIO COUNTY						
NUECES BASIN						
PEARSALL	710	550	408	259	115	(19)
COUNTY-OTHER	492	461	418	377	340	305
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	0	138	157	397	366	392
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0
GOLIAD COUNTY						
GUADALUPE BASIN						
COUNTY-OTHER	87	42	14	4	153	148
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	9,880	9,880	9,880	9,880	9,880	9,880
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	167	167	167	167	167	167
SAN ANTONIO BASIN						
GOLIAD	193	130	91	75	260	253
COUNTY-OTHER	70	33	9	1	126	121
MANUFACTURING	88	71	54	37	20	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	808	808	808	808	808	808
SAN ANTONIO-NUECES BASIN						
COUNTY-OTHER	20	9	3	1	33	33
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	385	210	40	(174)	(92)	(310)
GONZALES COUNTY WSC	482	314	125	(68)	130	(57)
NIXON	2,199	2,171	2,142	2,100	2,091	2,048
SMILEY	89	79	69	55	61	48
WAELDER	373	356	339	318	327	305
COUNTY-OTHER	137	119	85	45	76	37
MANUFACTURING	716	593	473	367	224	71
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	1,190	1,523	1,811	2,058	2,270	2,410
LAVACA BASIN						
COUNTY-OTHER	13	12	10	9	9	8
LIVESTOCK	0	0	0	0	0	0
GUADALUPE COUNTY						
GUADALUPE BASIN						
CRYSTAL CLEAR WSC	217	(32)	(310)	(613)	(937)	(1,265)
GONZALES COUNTY WSC	8	5	2	(1)	2	(1)
GREEN VALLEY SUD	(39)	(146)	(265)	(398)	(549)	(700)
LULING	1	0	(1)	(2)	(2)	(3)
NEW BRAUNFELS	422	(130)	(672)	(1,206)	(1,740)	(2,251)

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
GUADALUPE COUNTY						
GUADALUPE BASIN						
SANTA CLARA	6	3	0	(2)	(5)	(8)
SCHERTZ	301	68	(70)	(226)	(389)	(545)
SEGUIN	0	0	0	0	0	0
SPRINGS HILL WSC	3,272	3,017	2,613	1,958	1,259	555
COUNTY-OTHER	1,506	1,648	1,532	1,490	1,453	1,417
MANUFACTURING	658	362	78	(167)	(497)	(855)
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	7,808	8,851	8,656	8,207	6,277	5,421
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	548	587	624	635	637	654
SAN ANTONIO BASIN						
CIBOLO	(1,417)	(3,897)	(5,222)	(6,521)	(7,847)	(9,149)
EAST CENTRAL SUD	17	6	(8)	(21)	(39)	(56)
GREEN VALLEY SUD	(30)	(107)	(193)	(291)	(401)	(511)
MARION	168	143	116	87	57	27
NEW BERLIN	0	0	0	0	0	0
SANTA CLARA	33	19	3	(13)	(30)	(47)
SCHERTZ	3,752	856	(872)	(2,835)	(4,867)	(6,828)
SELMA	166	(8)	(47)	(83)	(112)	(138)
SPRINGS HILL WSC	440	408	353	265	170	74
WATER SERVICES INC	24	22	19	15	11	6
COUNTY-OTHER	377	342	293	274	257	242
MANUFACTURING	6	5	4	4	3	1
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	1	9	17	20	20	24
HAYS COUNTY						
GUADALUPE BASIN						
BUDA	0	0	0	0	0	0
COUNTY LINE WSC	122	45	(56)	(187)	(336)	(500)
CREEDMOOR-MAHA WSC	0	0	0	0	0	0
CRYSTAL CLEAR WSC	84	(13)	(118)	(243)	(388)	(551)
GOFORTH SUD	2,763	2,340	1,810	1,133	358	(525)
KYLE	1,176	(1,348)	(2,801)	(2,787)	(2,776)	(2,783)
MAXWELL WSC	176	144	120	101	83	64
MOUNTAIN CITY	4	(1)	(7)	(17)	(29)	(42)
NIEDERWALD	(49)	(65)	(85)	(111)	(140)	(174)
PLUM CREEK WATER COMPANY	248	(185)	(184)	(185)	(184)	(184)
SAN MARCOS	1,867	(140)	(2,629)	(5,685)	(9,405)	(13,855)
UHLAND	0	0	0	0	0	0
WIMBERLEY	218	44	(174)	(456)	(778)	(1,146)
WIMBERLEY WSC	233	26	(236)	(564)	(934)	(1,356)
WOODCREEK	716	687	649	599	540	473
COUNTY-OTHER	3,101	2,881	601	(1,109)	(6,654)	(12,812)
MANUFACTURING	(107)	(122)	(138)	(152)	(165)	(179)
STEAM ELECTRIC POWER	4,646	4,411	3,394	2,668	1,688	353
LIVESTOCK	0	0	0	0	0	0

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
HAYS COUNTY						
GUADALUPE BASIN						
IRRIGATION	88	94	100	106	112	118
KARNES COUNTY						
GUADALUPE BASIN						
EL OSO WSC	2	2	2	2	2	3
COUNTY-OTHER	14	14	14	14	15	15
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	3	5	8	10	12	13
NUECES BASIN						
EL OSO WSC	4	4	4	4	4	4
COUNTY-OTHER	9	9	9	9	9	9
MINING	(217)	(156)	(94)	(35)	24	26
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	4	7	11	14	16
SAN ANTONIO BASIN						
EL OSO WSC	109	112	124	129	142	135
FALLS CITY	73	85	97	103	111	111
KARNES CITY	(336)	(322)	(298)	(285)	(249)	(249)
KENEDY	(161)	(189)	(179)	(178)	(151)	(151)
RUNGE	43	41	45	46	47	47
SUNKO WSC	20	12	5	2	0	(2)
COUNTY-OTHER	9	2	8	11	23	23
MANUFACTURING	58	53	49	46	28	17
MINING	(1,581)	(1,094)	(589)	(89)	17	29
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	187	241	291	335	375	406
SAN ANTONIO-NUECES BASIN						
EL OSO WSC	0	1	1	1	1	1
COUNTY-OTHER	14	14	14	14	14	14
MINING	(66)	(42)	(17)	9	9	1
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	2	3	4	5	6
KENDALL COUNTY						
COLORADO BASIN						
COUNTY-OTHER	47	40	31	22	13	3
LIVESTOCK	0	0	0	0	0	0
GUADALUPE BASIN						
KENDALL COUNTY WCID #1	472	434	391	345	294	244
COUNTY-OTHER	2,327	1,989	1,625	1,252	856	464
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	55	61	68	73	78	84
SAN ANTONIO BASIN						
BOERNE	2,159	1,265	308	(650)	(1,639)	(2,613)
FAIR OAKS RANCH	540	512	459	426	298	153
WATER SERVICES INC	28	25	23	18	13	8
COUNTY-OTHER	383	341	272	168	84	1
LIVESTOCK	0	0	0	0	0	0

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
KENDALL COUNTY						
SAN ANTONIO BASIN						
IRRIGATION	30	32	33	35	36	37
LA SALLE COUNTY						
NUECES BASIN						
COTULLA	132	(16)	(155)	(323)	320	223
ENCINAL	55	40	25	5	77	67
COUNTY-OTHER	(22)	(56)	(90)	(133)	42	16
MINING	(4,088)	(4,243)	(3,734)	(2,290)	(851)	(147)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	143	282	416	546	665
MEDINA COUNTY						
NUECES BASIN						
BENTON CITY WSC	338	267	196	124	55	(9)
DEVINE	88	77	68	54	36	19
EAST MEDINA COUNTY SUD	235	168	107	50	(10)	(64)
HONDO	(523)	(680)	(816)	(943)	(1,068)	(1,180)
LYTLE	(34)	(53)	(71)	(88)	(106)	(121)
NATALIA	(101)	(129)	(153)	(176)	(199)	(220)
YANCEY WSC	(6)	(19)	(30)	(41)	(51)	(61)
COUNTY-OTHER	500	472	403	344	289	246
MANUFACTURING	1,898	1,895	1,891	1,888	1,884	1,879
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(29,816)	(27,758)	(25,779)	(23,882)	(22,065)	(20,461)
SAN ANTONIO BASIN						
CASTROVILLE	(224)	(217)	(210)	(208)	(211)	(214)
EAST MEDINA COUNTY SUD	22	15	10	4	(1)	(6)
LACOSTE	(10)	(20)	(28)	(37)	(47)	(56)
SAN ANTONIO	(4)	(5)	(7)	(10)	(11)	(14)
SAN ANTONIO WATER SYSTEM	(44)	(114)	(194)	(278)	(366)	(448)
YANCEY WSC	(22)	(76)	(124)	(167)	(210)	(248)
COUNTY-OTHER	764	736	757	766	768	762
MANUFACTURING	8	7	7	6	5	5
MINING	0	0	50	50	50	50
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1,713)	(1,386)	(1,071)	(771)	(482)	(228)
REFUGIO COUNTY						
SAN ANTONIO BASIN						
COUNTY-OTHER	1	1	2	2	4	4
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
SAN ANTONIO-NUECES BASIN						
REFUGIO	431	426	437	429	656	654
WOODSBORO	245	245	252	246	348	347
COUNTY-OTHER	4	10	23	21	160	159
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	0	0	0	0	0	0

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
UVALDE COUNTY						
NUECES BASIN						
SABINAL	(121)	(153)	(181)	(212)	(245)	(277)
UVALDE	(943)	(1,233)	(1,484)	(1,772)	(2,072)	(2,365)
COUNTY-OTHER	2,938	2,453	2,408	2,356	2,287	2,190
MANUFACTURING	102	89	103	130	139	117
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(29,683)	(27,370)	(24,992)	(22,831)	(20,818)	(19,102)
VICTORIA COUNTY						
GUADALUPE BASIN						
VICTORIA	(1,626)	(2,203)	(2,650)	(3,101)	(3,527)	(3,891)
COUNTY-OTHER	230	187	157	111	56	6
MANUFACTURING	(2,178)	(5,016)	(7,841)	(10,366)	(13,206)	(16,252)
MINING	0	0	0	0	0	0
STEAM ELECTRIC POWER	(4,506)	(29,778)	(37,178)	(53,599)	(70,696)	(70,696)
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(1,589)	(1,589)	(1,589)	(1,589)	(1,589)	(1,589)
LAVACA BASIN						
COUNTY-OTHER	2	2	2	2	2	2
LIVESTOCK	0	0	0	0	0	0
LAVACA-GUADALUPE BASIN						
VICTORIA	(787)	(1,066)	(1,282)	(1,501)	(1,706)	(1,883)
COUNTY-OTHER	191	161	138	107	68	33
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(3,676)	(3,676)	(3,676)	(3,676)	(3,676)	(3,676)
SAN ANTONIO BASIN						
COUNTY-OTHER	1	1	1	1	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
WILSON COUNTY						
GUADALUPE BASIN						
NIXON	10	9	9	12	12	11
SUNKO WSC	3	2	1	0	0	(1)
COUNTY-OTHER	85	76	68	61	54	47
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
NUECES BASIN						
MCCOY WSC	29	25	20	15	9	4
COUNTY-OTHER	45	36	26	17	8	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	71	97	63	72	27	98
SAN ANTONIO BASIN						
EAST CENTRAL SUD	29	10	(12)	(36)	(64)	(91)
EL OSO WSC	7	9	12	15	18	18
ELMENDORF	0	0	0	0	0	0
FLORESVILLE	396	(8)	(405)	(770)	(1,124)	(1,445)

WUG (NEEDS)/SURPLUS

REGION L	WUG (NEEDS)/SURPLUS (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
WILSON COUNTY						
SAN ANTONIO BASIN						
LA VERNIA	269	211	155	103	52	7
MCCOY WSC	3	2	2	1	1	0
OAK HILLS WSC	959	773	588	419	255	106
POTH	916	841	766	696	627	565
S S WSC	1,607	1,209	811	446	90	(234)
STOCKDALE	1,378	1,300	1,223	1,152	1,083	1,020
SUNKO WSC	465	320	162	52	1	(114)
COUNTY-OTHER	1,304	1,022	740	482	230	2
MANUFACTURING	0	0	0	0	0	0
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	3,014	2,824	2,537	2,165	1,708	1,113
ZAVALA COUNTY						
NUECES BASIN						
CRYSTAL CITY	1,821	1,665	1,523	1,363	1,211	1,068
ZAVALA COUNTY WCID #1	795	747	705	659	616	575
COUNTY-OTHER	328	282	228	173	122	74
MANUFACTURING	488	447	408	376	310	240
MINING	0	0	0	0	0	0
LIVESTOCK	0	0	0	0	0	0
IRRIGATION	(18,487)	(16,805)	(14,980)	(13,049)	(11,193)	(9,443)

WUG CATEGORY SUMMARY

REGION L	2020	2030	2040	2050	2060	2070
MUNICIPAL						
POPULATION	2,788,524	3,234,681	3,628,444	3,999,545	4,358,152	4,701,382
DEMANDS (acre-feet per year)	438,567	493,023	542,713	593,050	640,769	690,745
EXISTING SUPPLIES (acre-feet per year)	420,057	419,607	417,927	417,704	417,404	417,161
NEEDS (acre-feet per year)*	(77,863)	(114,869)	(159,380)	(204,960)	(250,122)	(296,267)
COUNTY-OTHER						
POPULATION	212,941	241,867	291,092	336,582	412,033	490,646
DEMANDS (acre-feet per year)	30,498	33,783	39,708	45,544	53,787	63,561
EXISTING SUPPLIES (acre-feet per year)	52,360	51,987	52,108	52,345	52,560	52,765
NEEDS (acre-feet per year)*	(1,509)	(1,706)	(1,890)	(3,502)	(10,907)	(19,080)
MANUFACTURING						
DEMANDS (acre-feet per year)	123,983	135,026	145,993	155,671	167,307	178,820
EXISTING SUPPLIES (acre-feet per year)	140,868	140,868	140,905	140,956	140,980	140,980
NEEDS (acre-feet per year)*	(6,616)	(10,213)	(13,778)	(19,265)	(29,210)	(40,376)
MINING						
DEMANDS (acre-feet per year)	48,738	49,976	48,601	44,647	40,831	41,209
EXISTING SUPPLIES (acre-feet per year)	37,919	39,495	39,971	39,584	38,894	40,692
NEEDS (acre-feet per year)*	(10,822)	(10,481)	(8,694)	(5,147)	(2,073)	(666)
STEAM ELECTRIC POWER						
DEMANDS (acre-feet per year)	59,901	89,807	101,070	122,845	146,639	152,702
EXISTING SUPPLIES (acre-feet per year)	105,262	105,262	105,262	105,262	105,262	105,262
NEEDS (acre-feet per year)*	(4,506)	(29,778)	(37,178)	(53,599)	(70,696)	(70,696)
LIVESTOCK						
DEMANDS (acre-feet per year)	24,038	24,038	24,038	24,038	24,038	24,038
EXISTING SUPPLIES (acre-feet per year)	24,038	24,038	24,038	24,038	24,038	24,038
NEEDS (acre-feet per year)*	0	0	0	0	0	0
IRRIGATION						
DEMANDS (acre-feet per year)	344,629	330,377	317,106	304,772	293,076	282,760
EXISTING SUPPLIES (acre-feet per year)	245,522	240,287	235,606	231,217	226,841	222,971
NEEDS (acre-feet per year)*	(105,799)	(97,325)	(89,057)	(81,302)	(73,968)	(67,383)
REGION TOTALS						
POPULATION	3,001,465	3,476,548	3,919,536	4,336,127	4,770,185	5,192,028
DEMANDS (acre-feet per year)	1,070,354	1,156,030	1,219,229	1,290,567	1,366,447	1,433,835
EXISTING SUPPLIES (acre-feet per year)	1,026,026	1,021,544	1,015,817	1,011,106	1,005,979	1,003,869
NEEDS (acre-feet per year)*	(207,115)	(264,372)	(309,977)	(367,775)	(436,976)	(494,468)

*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.

SOURCE WATER BALANCE (AVAILABILITY - WUG SUPPLY)

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
AUSTIN CHALK AQUIFER	UVALDE	NUECES	FRESH	1,155	1,155	1,155	1,155	1,155	1,155
BUDA LIMESTONE AQUIFER	UVALDE	NUECES	FRESH	233	233	233	233	233	233
CARRIZO-WILCOX AQUIFER	ATASCOSA	NUECES	FRESH	19,758	22,232	24,736	28,094	31,628	32,788
CARRIZO-WILCOX AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	5	5	5	5	5	5
CARRIZO-WILCOX AQUIFER	BEXAR	NUECES	FRESH	8,884	8,884	8,884	8,884	8,884	8,884
CARRIZO-WILCOX AQUIFER	BEXAR	SAN ANTONIO	FRESH	3,475	3,475	3,475	3,475	3,304	3,304
CARRIZO-WILCOX AQUIFER	CALDWELL	COLORADO	FRESH	293	295	298	300	302	303
CARRIZO-WILCOX AQUIFER	CALDWELL	GUADALUPE	FRESH	32,297	31,912	31,935	31,383	31,407	31,417
CARRIZO-WILCOX AQUIFER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	DIMMIT	RIO GRANDE	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	FRIO	NUECES	FRESH	3,237	3,329	3,427	3,620	3,786	5,827
CARRIZO-WILCOX AQUIFER	GONZALES	GUADALUPE	FRESH	14,965	23,754	29,227	29,801	30,195	30,218
CARRIZO-WILCOX AQUIFER	GONZALES	LAVACA	FRESH	75	75	75	75	75	75
CARRIZO-WILCOX AQUIFER	GUADALUPE	GUADALUPE	FRESH	5,406	5,786	7,457	7,890	8,293	8,174
CARRIZO-WILCOX AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	847	823	801	772	740	700
CARRIZO-WILCOX AQUIFER	KARNES	GUADALUPE	FRESH	7	56	102	144	186	188
CARRIZO-WILCOX AQUIFER	KARNES	NUECES	FRESH	0	5	9	11	13	13
CARRIZO-WILCOX AQUIFER	KARNES	SAN ANTONIO	FRESH	1	0	0	0	1	1
CARRIZO-WILCOX AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	MEDINA	NUECES	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	MEDINA	SAN ANTONIO	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
CARRIZO-WILCOX AQUIFER	WILSON	GUADALUPE	FRESH	335	429	523	628	739	757
CARRIZO-WILCOX AQUIFER	WILSON	NUECES	FRESH	2,216	2,945	3,677	4,341	5,028	5,246
CARRIZO-WILCOX AQUIFER	WILSON	SAN ANTONIO	FRESH	3,512	6,301	9,127	12,186	15,434	16,593
CARRIZO-WILCOX AQUIFER	ZAVALA	NUECES	FRESH	0	1	1	0	1	0
EDWARDS-BFZ AQUIFER	ATASCOSA	NUECES	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	ATASCOSA	SAN ANTONIO	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	BEXAR	SAN ANTONIO	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	CALDWELL	COLORADO	SALINE	64	64	64	64	64	64

SOURCE WATER BALANCE (AVAILABILITY - WUG SUPPLY)

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
EDWARDS-BFZ AQUIFER	CALDWELL	GUADALUPE	SALINE	134	134	134	134	134	134
EDWARDS-BFZ AQUIFER	COMAL	GUADALUPE	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	COMAL	SAN ANTONIO	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	FRIO	NUECES	FRESH	23,213	23,213	23,213	23,213	23,213	23,213
EDWARDS-BFZ AQUIFER	GUADALUPE	GUADALUPE	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	FRESH	680	680	680	680	680	680
EDWARDS-BFZ AQUIFER	HAYS	GUADALUPE	SALINE	235	235	235	235	235	235
EDWARDS-BFZ AQUIFER	MEDINA	NUECES	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	MEDINA	SAN ANTONIO	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
EDWARDS-BFZ AQUIFER	BEXAR	NUECES	FRESH	0	0	0	0	0	0
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	COLORADO	FRESH	0	0	0	0	0	0
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	GUADALUPE	FRESH	0	0	0	0	0	0
EDWARDS-TRINITY-PLATEAU AQUIFER	KENDALL	SAN ANTONIO	FRESH	160	160	160	160	160	160
EDWARDS-TRINITY-PLATEAU AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
GUADALUPE RIVER ALLUVIUM AQUIFER	CALDWELL	GUADALUPE	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER	CALHOUN	COLORADO-LAVACA	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER	CALHOUN	GUADALUPE	FRESH	15	15	15	15	15	15
GULF COAST AQUIFER	CALHOUN	LAVACA	FRESH	2	2	2	2	2	2
GULF COAST AQUIFER	CALHOUN	LAVACA-GUADALUPE	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER	CALHOUN	SAN ANTONIO-NUECES	FRESH	4	4	4	4	4	4
GULF COAST AQUIFER	DEWITT	GUADALUPE	FRESH	87	233	824	1,411	1,998	2,263
GULF COAST AQUIFER	DEWITT	LAVACA	FRESH	698	705	749	799	912	968
GULF COAST AQUIFER	DEWITT	LAVACA-GUADALUPE	FRESH	393	393	393	393	393	393
GULF COAST AQUIFER	DEWITT	SAN ANTONIO	FRESH	207	223	285	348	409	437
GULF COAST AQUIFER	GOLIAD	GUADALUPE	FRESH	38	38	38	38	38	38
GULF COAST AQUIFER	GOLIAD	SAN ANTONIO	FRESH	3,604	3,604	3,604	3,604	3,604	3,604
GULF COAST AQUIFER	GOLIAD	SAN ANTONIO-NUECES	FRESH	355	355	355	355	355	355
GULF COAST AQUIFER	GONZALES	GUADALUPE	FRESH	1,866	1,866	1,866	1,866	1,866	1,866
GULF COAST AQUIFER	GONZALES	LAVACA	FRESH	182	182	182	182	182	182
GULF COAST AQUIFER	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
GULF COAST AQUIFER	KARNES	NUECES	FRESH	0	0	1	5	8	10
GULF COAST AQUIFER	KARNES	SAN ANTONIO	FRESH	0	1	0	0	1	1
GULF COAST AQUIFER	KARNES	SAN ANTONIO-NUECES	FRESH	0	0	0	0	23	32
GULF COAST AQUIFER	REFUGIO	SAN ANTONIO	FRESH	1,491	1,491	1,491	1,492	1,493	1,493
GULF COAST AQUIFER	REFUGIO	SAN ANTONIO-NUECES	FRESH	24,438	24,435	24,453	24,465	24,478	24,487
GULF COAST AQUIFER	VICTORIA	GUADALUPE	FRESH	2	0	10	17	24	29

SOURCE WATER BALANCE (AVAILABILITY - WUG SUPPLY)

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
GULF COAST AQUIFER	VICTORIA	LAVACA	FRESH	207	207	207	207	207	207
GULF COAST AQUIFER	VICTORIA	LAVACA-GUADALUPE	FRESH	1	0	8	15	22	26
GULF COAST AQUIFER	VICTORIA	SAN ANTONIO	FRESH	898	898	899	900	900	900
LEONA GRAVEL AQUIFER	MEDINA	NUECES	FRESH	16,551	16,396	16,266	16,134	15,967	15,785
LEONA GRAVEL AQUIFER	MEDINA	SAN ANTONIO	FRESH	3,828	3,777	3,683	3,639	3,584	3,523
LEONA GRAVEL AQUIFER	UVALDE	NUECES	FRESH	256	262	183	78	0	0
QUEEN CITY AQUIFER	ATASCOSA	NUECES	FRESH	1,683	1,650	1,542	1,437	1,339	1,339
QUEEN CITY AQUIFER	CALDWELL	GUADALUPE	FRESH	71	71	71	71	71	71
QUEEN CITY AQUIFER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	DIMMIT	RIO GRANDE	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	FRIO	NUECES	FRESH	2,174	2,014	1,912	1,816	1,875	2,075
QUEEN CITY AQUIFER	GONZALES	GUADALUPE	FRESH	3,847	3,847	3,847	3,847	3,847	3,847
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	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	KARNES	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	WILSON	GUADALUPE	FRESH	107	94	83	73	65	65
QUEEN CITY AQUIFER	WILSON	NUECES	FRESH	0	0	0	0	0	0
QUEEN CITY AQUIFER	WILSON	SAN ANTONIO	FRESH	896	775	668	574	492	492
QUEEN CITY AQUIFER	ZAVALA	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	ATASCOSA	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	DIMMIT	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	FRIO	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	GONZALES	GUADALUPE	FRESH	1,940	1,940	1,940	1,940	1,940	1,940
SPARTA AQUIFER	GONZALES	LAVACA	FRESH	23	23	23	23	23	23
SPARTA AQUIFER	KARNES	GUADALUPE	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	KARNES	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
SPARTA AQUIFER	WILSON	GUADALUPE	FRESH	16	14	12	10	9	9
SPARTA AQUIFER	WILSON	NUECES	FRESH	39	34	29	24	21	21
SPARTA AQUIFER	WILSON	SAN ANTONIO	FRESH	154	137	121	108	97	97
SPARTA AQUIFER	ZAVALA	NUECES	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	BEXAR	NUECES	FRESH	222	222	222	222	222	222
TRINITY AQUIFER	BEXAR	SAN ANTONIO	FRESH	26,679	25,759	24,966	24,095	23,100	21,997
TRINITY AQUIFER	CALDWELL	GUADALUPE	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	COMAL	GUADALUPE	FRESH	24,729	23,389	22,099	20,973	19,562	17,982
TRINITY AQUIFER	COMAL	SAN ANTONIO	FRESH	3,211	3,155	3,101	3,054	2,996	2,930

SOURCE WATER BALANCE (AVAILABILITY - WUG SUPPLY)

REGION L

GROUNDWATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
TRINITY AQUIFER	GUADALUPE	GUADALUPE	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	GUADALUPE	SAN ANTONIO	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	HAYS	GUADALUPE	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	KENDALL	COLORADO	FRESH	86	86	86	86	86	86
TRINITY AQUIFER	KENDALL	GUADALUPE	FRESH	3,715	3,715	3,715	3,715	3,715	3,715
TRINITY AQUIFER	KENDALL	SAN ANTONIO	FRESH	2,440	2,440	2,440	2,440	2,440	2,440
TRINITY AQUIFER	MEDINA	NUECES	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	MEDINA	SAN ANTONIO	FRESH	0	0	0	0	0	0
TRINITY AQUIFER	UVALDE	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	ATASCOSA	NUECES	FRESH	407	407	407	407	407	407
YEGUA-JACKSON AQUIFER	FRIO	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	GONZALES	GUADALUPE	FRESH	211	211	211	211	211	211
YEGUA-JACKSON AQUIFER	GONZALES	LAVACA	FRESH	3	3	3	3	3	3
YEGUA-JACKSON AQUIFER	KARNES	GUADALUPE	FRESH	65	65	65	65	65	65
YEGUA-JACKSON AQUIFER	KARNES	NUECES	FRESH	12	12	12	12	12	12
YEGUA-JACKSON AQUIFER	KARNES	SAN ANTONIO	FRESH	0	0	0	0	396	410
YEGUA-JACKSON AQUIFER	LA SALLE	NUECES	FRESH	0	0	0	0	0	0
YEGUA-JACKSON AQUIFER	WILSON	GUADALUPE	FRESH	43	43	43	43	43	43
YEGUA-JACKSON AQUIFER	WILSON	NUECES	FRESH	143	143	143	143	143	143
YEGUA-JACKSON AQUIFER	WILSON	SAN ANTONIO	FRESH	380	380	380	380	380	380
GROUNDWATER TOTAL SOURCE WATER BALANCE				**249,641**	**261,932**	**273,327**	**279,259**	**285,975**	**288,047**

REGION L

REUSE	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
DIRECT REUSE	BEXAR	SAN ANTONIO	FRESH	0	0	0	0	0	0
DIRECT REUSE	COMAL	GUADALUPE	FRESH	0	0	0	0	0	0
DIRECT REUSE	GUADALUPE	GUADALUPE	FRESH	1	1	1	1	1	1
DIRECT REUSE	HAYS	GUADALUPE	FRESH	0	0	0	0	0	0
DIRECT REUSE	KARNES	SAN ANTONIO	FRESH	0	0	0	0	0	0
DIRECT REUSE	KENDALL	GUADALUPE	FRESH	0	0	0	0	0	0
DIRECT REUSE	KENDALL	SAN ANTONIO	FRESH	0	0	0	0	0	0
REUSE TOTAL SOURCE WATER BALANCE				**1**	**1**	**1**	**1**	**1**	**1**

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
BOERNE LAKE/RESERVOIR	RESERVOIR	SAN ANTONIO	FRESH	0	0	0	0	0	0

SOURCE WATER BALANCE (AVAILABILITY - WUG SUPPLY)

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
CALAVERAS LAKE/RESERVOIR	RESERVOIR	SAN ANTONIO	FRESH	0	0	0	0	0	0
CANYON LAKE/RESERVOIR	RESERVOIR	GUADALUPE	FRESH	9,170	9,051	10,987	10,974	10,968	10,964
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	0	0	0	0	0	0
GUADALUPE LIVESTOCK LOCAL SUPPLY	GONZALES	GUADALUPE	FRESH	2,315	2,315	2,315	2,315	2,315	2,315
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	143	143	143	143	143	143
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	0	0	0	0	0	0
GUADALUPE RUN-OF-RIVER	HAYS	GUADALUPE	FRESH	0	0	0	0	0	0
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

SOURCE WATER BALANCE (AVAILABILITY - WUG SUPPLY)

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR)					
				2020	2030	2040	2050	2060	2070
LAVACA-GUADALUPE LIVESTOCK LOCAL SUPPLY	CALHOUN	LAVACA-GUADALUPE	FRESH	0	0	0	0	0	0
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	0	0	0	0	0	0
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	0	0	0	0	0	0
SAN ANTONIO LIVESTOCK LOCAL SUPPLY	KARNES	SAN ANTONIO	FRESH	0	0	0	0	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

SOURCE WATER BALANCE (AVAILABILITY - WUG SUPPLY)

REGION L

SURFACE WATER	COUNTY	BASIN	SALINITY	SOURCE WATER BALANCE (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
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	GOLIAD	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	0	0	0	0	0	0
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
SURFACE WATER TOTAL SOURCE WATER BALANCE				**11,681**	**11,562**	**13,498**	**13,485**	**13,479**	**13,475**
REGION L TOTAL SOURCE WATER BALANCE				**261,323**	**273,495**	**286,826**	**292,745**	**299,455**	**301,523**