FINAL PLAN

CHAPTER 7: DROUGHT RESPONSE INFORMATION, ACTIVITIES, AND RECOMMENDATIONS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

[This page intentionally left blank]

Table of Contents

LIST OF TABLES

LIST OF FIGURES

List of Abbreviations

BFZ	Balcones Fault Zone
cfs	Cubic Feet per Second
DCP	Drought Contingency Plan
EAA	Edwards Aquifer Authority
El	Elevation
ft-msl	Feet Mean Sea Level
GBRA	Guadalupe-Blanco River Authority
GSA	Guadalupe-San Antonio
EAHCP	Edwards Aquifer Habitat Conservation Plan
MAG	Modeled Available Groundwater
NCDC	National Climatic Data Center
PDSI	Palmer Drought Severity Index
RWA	Regional Water Alliance
SAWS	San Antonio Water System
SCTRWP	South Central Texas Regional Water Plan
SCTRWPG	South Central Texas Regional Water Planning Group
SUD	Special Utility District
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board
USGS	United States Geological Survey
VISPO	Voluntary Irrigation Suspension Program Option
WAM	Water Availability Model
WCID	Water Control and Improvement District
WMS	Water Management Strategy
WSC	Water Supply Corporation
WTP	Water Treatment Plant
WUG	Water User Group
WWP	Wholesale Water Provider

[This page intentionally left blank]

CHAPTER 7: DROUGHT RESPONSE INFORMATION, ACTIVITIES, AND RECOMMENDATIONS

Droughts are of great importance to the planning and management of water resources in Texas. Although droughts can occur in all climatic zones, they have the greatest potential to become environmental disasters in dry or arid regions such as Texas. It is not uncommon for mild droughts to occur over short periods of time in Texas; however, there is no concrete way to predict how long or severe a drought will be while it is occurring. The only defense available to drought-prone water user groups (WUGs), such as those in the South Central Texas Region (Region L), is proper planning and preparation for worst-case scenarios. This requires understanding of drought patterns and the historical droughts in the region.

Because of significant population growth throughout Texas, which is expected to continue in the Region L area according to Texas Water Development Board (TWDB) projections, the demand for water has increased. With growing demand and the threat of climate change contributing to water scarcity, planning is even more important to prevent shortages, deterioration of water quality, and lifestyle/financial impacts on water suppliers and users. This chapter presents information on drought preparedness in the South Central Texas Region, including regional droughts of record, current drought preparations and response, existing and potential emergency interconnects, emergency responses to local drought conditions, region-specific drought response recommendations, drought water management strategies (WMSs), and other drought-related considerations and recommendations.

7.1 DROUGHTS OF RECORD IN THE REGIONAL WATER PLANNING AREA

One of the best tools in drought preparedness is a thorough understanding of the drought of record, or the worst drought to occur for an area during the available period of record. However, there are many ways that the "worst drought" can be defined (degree of dryness, agricultural impacts, socioeconomic impacts, effects of precipitation, etc.). Regional water planning focuses on hydrological drought, which is typically the type of drought associated with the largest shortfalls in surface and/or subsurface water supply. The frequency and severity of hydrological drought is often defined on a watershed or river basin scale, although it could be different from one area to the next, even within a planning region.

7.1.1 Current Drought of Record

In terms of severity and duration, the devastating drought of the 1950s is considered the drought of record for most of the state, including the South Central Texas Region. By 1956, 244 of the 254 counties were considered disaster areas. This drought lasted almost a decade in many places and affected not only Texas but other states throughout the nation as well. The 1950s drought has been used by water resource engineers and managers as a benchmark drought for water supply planning since the regional water planning process was implemented.

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

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

7.1.2 Potential Droughts of Record

Although the 1950s and 1990s droughts are considered the drought of record for the GSA River Basin and the Nueces River Basin, respectively, there have been several droughts that have been considered as potential droughts of records. Two recent droughts, in 2008 and 2011, have been discussed, but not widely accepted, as potential new droughts of record for parts of the state.

In 2011, decreased precipitation led to substantial declines in streamflow throughout the state, resulting in severe drought. Record high temperatures also occurred June through August, leading to increased evaporation rates. The net evaporation was so high that by August 4, 2011, state climatologist John Nielson-Gammon declared 2011 to be the worst one-year drought on record in Texas.[1] The 2011 water year statewide annual precipitation was 11.27 inches, more than 2 inches below the previous record in 1956 of 13.91 inches. While the 2011 water year drought was severe and can provide helpful information to water planners and managers throughout the state, the duration of the 1950s and 1990s droughts combined with the overall severity in the South Central Texas Region suggests that these are still the best choices as the drought of record for regional planning purposes for the GSA River Basin and the Nueces River Basin, respectively.

7.1.3 Drought Indicators

7.1.3.1 Water Availability Modeling

Engineers and planners often use surface water models to demonstrate the effects of historical droughts on water supply. Surface water effects are more readily observed than groundwater effects, and reservoir supplies that were not built before historic droughts can be assessed using historic hydrology. The primary tool used to observe the performance of reservoirs and surface water supplies under historic drought conditions in the South Central Texas Region is the Texas Commission on Environmental Quality (TCEQ) water availability model (WAM). The TCEQ has developed WAMs for individual river and coastal basins. For the South Central Texas Region, the relevant WAMs include the GSA River Basin WAM, Nueces River Basin WAM, Lavaca-Guadalupe Coastal Basin WAM, San Antonio-Nueces Coastal Basin WAM, and Nueces-Rio Grande Coastal Basin WAM.

The GSA WAM is used for the South Central Texas Regional Water Plan (SCTRWP) to determine the available flow and firm yields for surface water projects and to observe the cumulative effects on the SCTRWP. The GSA WAM includes hydrologic information from 1934 through 1989 and supports the use of the 1950s drought as the drought of record for all Region L reservoirs. The Nueces WAM includes hydrologic information from 1934 through 1996 and supports the use of the 1990s drought as the drought of record for all Region L reservoirs. However, the GSA WAM and Nueces WAM have not been

[1] Winters, K.E. A historical perspective on precipitation, drought severity, and streamflow in Texas during 1951–56 and 2011. U.S. Geological Survey Scientific Investigations Report 2013–5113, p.1 http://pubs.usgs.gov/sir/2013/5113. 2013.

updated to include hydrology and precipitation information to assess periods of drought after 1989 and 1996, respectively.

7.1.3.2 Drought Indices

Several drought indices have been developed to assess drought severity using climatic and other quantitative inputs, such as precipitation, temperature, streamflow, soil moisture, and groundwater and reservoir levels. The Palmer Drought Severity Index (PDSI) was one of the first comprehensive efforts using precipitation and temperature for estimating the moisture of a region.[2] PDSI values range from -10 to +10. Index values greater than 0.5 correspond to wetter than normal conditions, and values lower than -3 indicate severe to extreme drought. PDSI information is available for climate regions across the country through 2019, which makes the PDSI a helpful tool for analyzing droughts that is not included in the WAMs.

Most of the South Central Texas Region lies in Texas Climate Divisions 7 and 9, with small portions contained within Climate Divisions 6 and 8 (Figure 7-1). A graph of yearly PDSI values for Texas Climate Divisions 6, 7, 8, and 9 shows that while the 1908 drought and more recent drought in the early 21st century were severe, the drought of the 1950s was the most intense over a longer period of time, supporting the continued use of this drought as the drought of record for Region L (Figure 7-2 through Figure 7-5).

[2] Data from NOAA, National Climatic Data Center (NCDC). U.S. Department of Commerce. https://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp#.

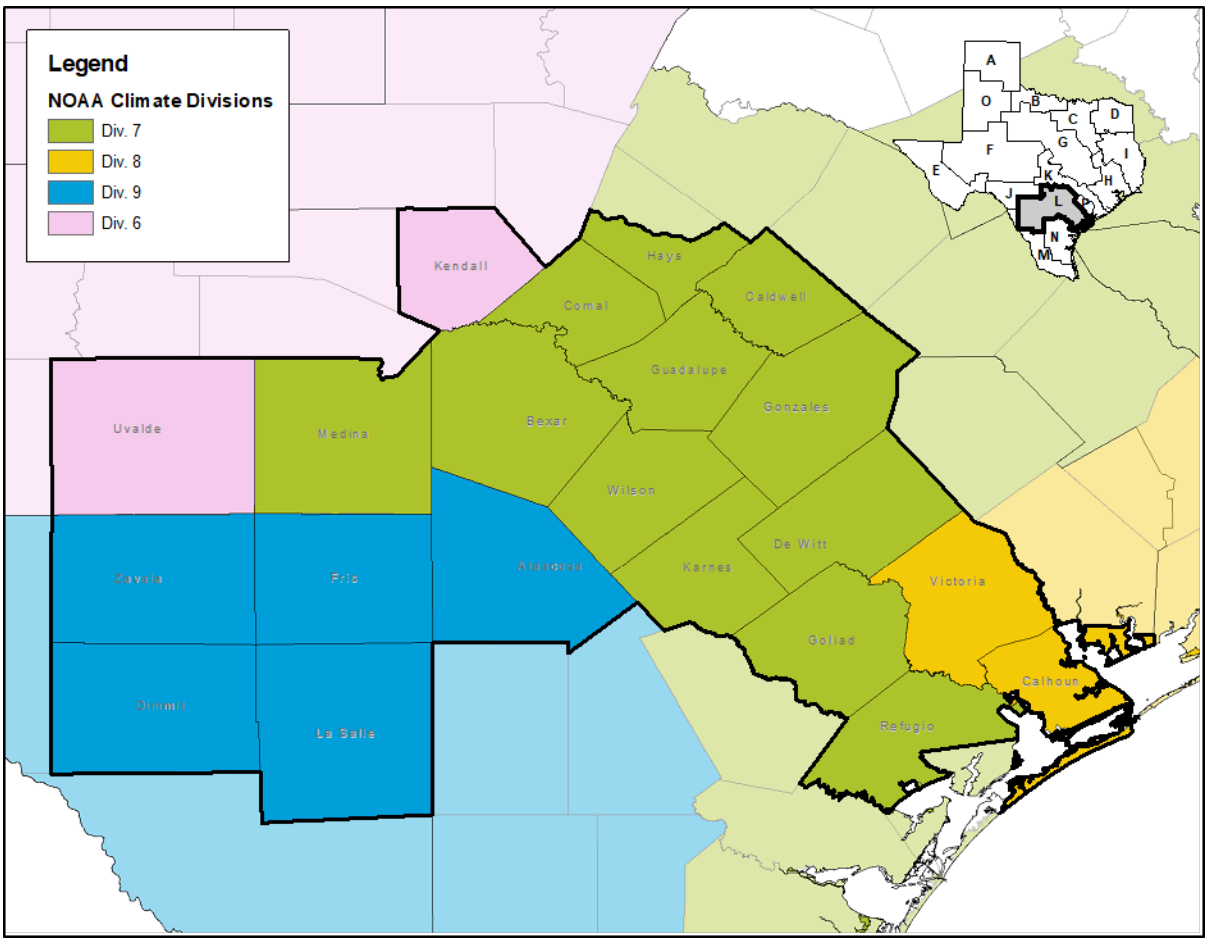


Figure 7-1 NOAA Climate Divisions in the South Central Texas Region

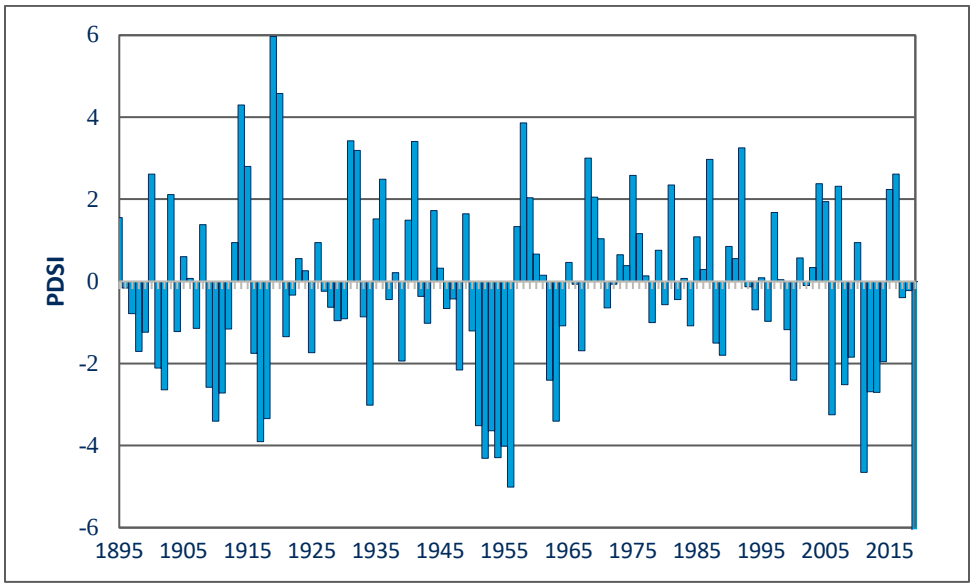


Figure 7-2 Palmer Drought Severity Index: Division 6

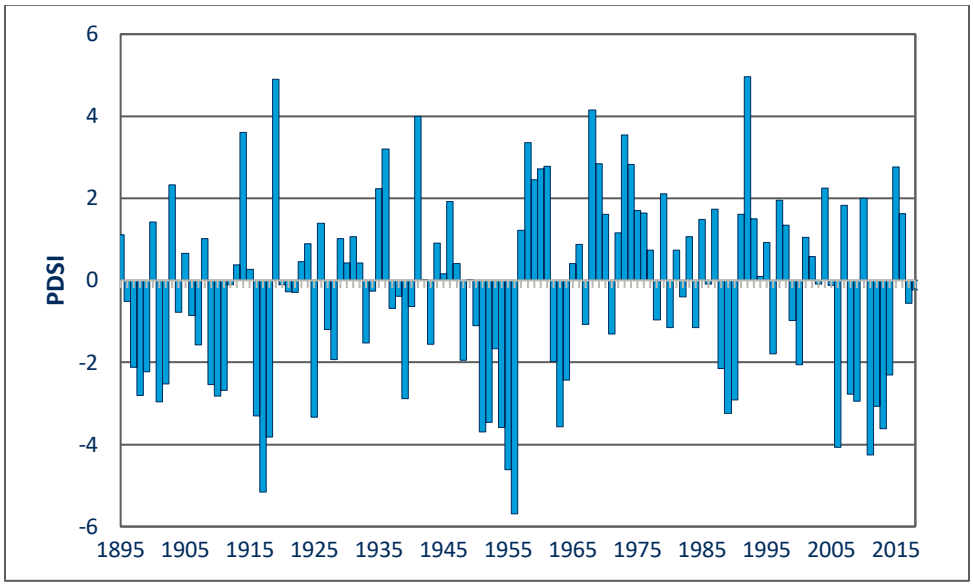


Figure 7-3 Palmer Drought Severity Index: Division 7

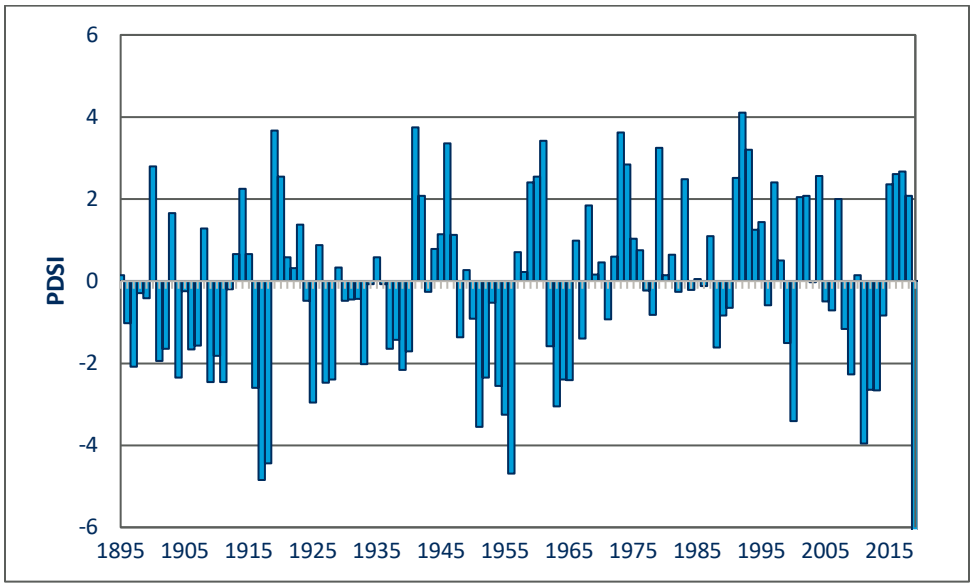


Figure 7-4 Palmer Drought Severity Index: Division 8

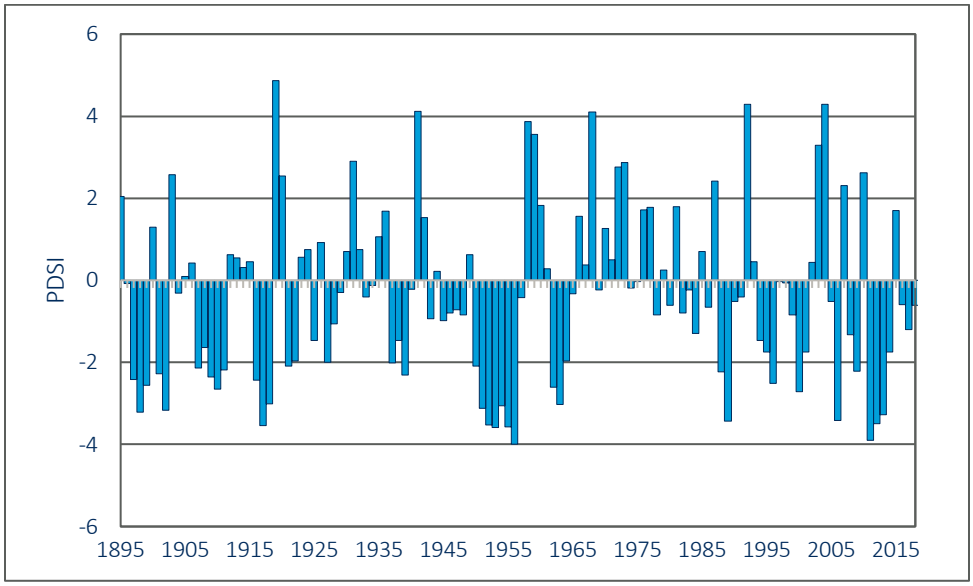


Figure 7-5 Palmer Drought Severity Index: Division 9

7.2 CURRENT DROUGHT PREPARATIONS AND RESPONSE

7.2.1 Overall Current Drought Preparations in South Central Texas Region

All WUGs in the South Central Texas Region prepare for drought by participating in the regional water planning process, which attempts to meet projected water demands during a drought of severity equivalent to the drought of record. WUGs that provide accurate information to TWDB and consider recommendations accepted by the regional water planning group should be able to supply water to customers throughout drought periods. In addition, all wholesale water providers (WWPs) and most municipalities develop individual drought contingency plans (DCPs) or emergency action plans to be implemented at various stages of a drought. Common responses include restriction of irrigation practices to certain days and times, the limitation of vehicle washing to those times or to commercial providers, and prohibiting washing of impervious surfaces. Several DCPs include restrictions on irrigation for golf courses specifically, as well as other athletic fields. Less-common responses include surcharges for usage above a certain allotment.

Throughout Texas including the GSA River Basin, water rights are issued under the prior appropriation system. Curtailment of water rights has become necessary in recent droughts. The South Texas Watermaster Program is responsible for managing surface water rights in an area in South Central Texas according to "run-of-the-river" rights. The program has jurisdiction over the GSA and Nueces river basins, as well as the Lavaca River Basin. Six watermaster deputies patrol the 50 counties in the jurisdictional area and enforce compliance with water rights.

7.2.2 Drought Response Triggers

Through timely implementation of drought response measures, it is possible to meet the goals of the DCP by avoiding, minimizing, or mitigating risks and impacts of water shortages and drought. To accomplish this, DCPs are built around a collection of drought responses and triggers that are based on

various drought stages. Stages are generally similar for all DCPs but can vary from entity to entity. Stage I will normally represent mild water shortage conditions, and the severity of the situation will increase through the stages until emergency water conditions are reached and, in some cases, a water allocation stage is determined.

The South Central Texas Regional Water Planning Group (SCTRWPG) compiled stage, trigger, and response information for 26 DCPs in the region including those from WWPs, WUGs, and County-Other suppliers. The majority of the DCPs in the South Central Texas Region have a voluntary Stage I and mandatory Stage II and III categories. Most entities included a Stage IV, and a few entities specified a Stage V and/or Stage VI scenario. Target reductions, triggers, and responses are included for most stages. A summary of DCP triggers and responses for Region L entities can be found in Appendix 7-A.

In accordance with Title 31 of the Texas Administrative Code (31 TAC) §357.42(b)(2), the SCTRWPG considered whether there exists any unnecessary or counterproductive variations in drought response strategies. The SCTRWPG recognizes that each entity develops drought response measures and tailors them to their own unique circumstances and goals. In an effort to ensure that local water managers can continue to manage their local water supplies, the SCTRWPG chose to deem no variations in drought response strategies as unnecessary or counterproductive.

7.2.3 Regional Water Supplier Roles in Droughts

The Texas Commission on Environmental Quality (TCEQ) requires all wholesale public water suppliers, retail public water suppliers serving 3,300 connections or more, and irrigation districts to submit DCPs. In accordance with the requirements of Title 30 of the Texas Administrative Code (TAC) Section 288(b), DCPs must be updated every 5 years and adopted by retail public water providers. The TCEQ defines a DCP as "a strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other water supply emergencies." According to a TCEQ handbook, the underlying philosophy of drought contingency planning is the following:

- While often unpreventable, short-term water shortages and other water supply emergencies can be anticipated;
- The potential risks and impacts of drought or other emergency conditions can be considered and evaluated in advance of an actual event; and, most importantly,
- Response measures and best management practices can be determined with implementation procedures defined, again in advance, to avoid, minimize, or mitigate the risks and impacts of drought-related shortages and other emergencies.

Model DCPs are available on TCEQ's website; however, it is not possible to create a model DCP that will adequately address local concerns throughout the State of Texas. The conditions that define a water shortage can be location-specific because most communities in the South Central Texas Region rely primarily on local water supplies. For example, some communities rely on reservoirs that are regularly operated at full conditions. In this case, a shortage could exist when the supplies are at 75 percent. Other reservoirs may rarely refill and be considered a concern at 25 percent capacity. Similarly, unique

aquifer systems are considered at risk under location-specific conditions. While the approach to planning may be different between entities, all DCPs should include the following:

- Specific, quantified targets for water use reductions;
- Drought response stages;
- Triggers to begin and end each stage;
- Supply management measures;
- Demand management measures;
- Descriptions of drought indicators;
- Notification procedures;
- Enforcement procedures;
- Procedures for granting exceptions;
- Public input to the plan;
- Ongoing public education;
- Adoption of plan; and
- Coordination with regional water planning group.

For water suppliers such as those in Region L, the primary goal of DCP development is to have a plan that can ensure an uninterrupted supply of water in an amount that can satisfy essential human needs. A secondary but also important goal is to minimize negative impacts on quality of life, the economy, and the local environment. To meet these goals, action needs to be taken quickly, which is why an approved DCP needs to be in place before drought conditions occur.

In accordance with 30 TAC Section 288, most Region L entities have submitted DCPs to TCEQ for implementation when local shortages occur. The SCTRWPG obtained or referenced previously-existing DCPs for 26 WUGs and WWPs. These plans identify multiple triggers for initiation and termination of drought stages, responses to be implemented, and reduction targets for each stage. The plans also include information regarding public notification procedures and enforcement measures. Some WUGs or WWPs have included a method of granting a variance should the need arise. The most recent DCPs for each entity in the South Central Texas Region range in date from 2014 to 2020.

7.3 EXISTING AND POTENTIAL EMERGENCY INTERCONNECTS

A goal of the regional planning process is to ensure a connected supply that meets or exceeds drought of record demands for the next 50 years. However, it is also important for regions to plan for emergency supplies in the event of a prolonged drought or an interruption/impairment of supply from an existing source. An emergency interconnection between two collaborating municipal water user groups (WUGs) can serve as an alternative means of providing emergency drinking water in lieu of trucking in supply or other expensive options. In accordance with 30 TAC Section 357 regional water planning guidelines, information was collected regarding existing emergency interconnections and potential future emergency interconnections that could be used in event of an emergency shortage of water.

In 2009, an interconnection study was prepared for the Regional Water Alliance[3] (RWA) that compiled information regarding existing interconnections and proposed several potential interconnections across

[3] HDR. "Regional Water Alliance Water System Interconnection Study." 2009.

the region. In 2013 and 2015, the SCTRWPG conducted surveys of municipal WUGs, WWPs, and major municipal centers regarding the existing and potential emergency interconnects. In these previous studies and surveys, information was collected and maintained in a confidential manner. The 2016 SCTRWP included a confidential report submitted to the TWDB.

For the 2021 SCTRWP, high level information was collected regarding existing and potential emergency interconnections. Non-confidential information from the previous reports and surveys was compiled and used as the basis for information requests for the 2021 SCTRWP efforts. In January 2020, a survey was emailed to WUGs in the South Central Texas Region to request information regarding existing and future potential emergency interconnections. As part of the survey, individual municipalities were asked to confirm or update interconnect information including the emergency water user and provider. In the South Central Texas Region, 50 existing emergency interconnections were identified among 38 WUGs, and eight potential emergency interconnects were identified. Of the 38 WUGs with existing interconnections, 29 WUGs had one interconnection, six WUGs had two interconnections, and three WUGs had three interconnections. Existing and potential emergency interconnection information for the South Central Texas Region is summarized in Appendix 7-B.

7.4 EMERGENCY RESPONSES TO LOCAL DROUGHT CONDITIONS OR LOSS OF MUNICIPAL SUPPLY

The regional and state water plans aim to prepare entities for worst case drought scenarios using the drought of record described in Section 7.1. However, entities may find themselves in a local drought or facing a loss of municipal supply. While rare, it is important to have a backup plan in case of infrastructure failure or water supply contamination. This is especially important for smaller entities that rely on a sole source of supply. While many entities and WWPs have DCPs as described in Section 7.2, it is less common for small municipalities or County-Other WUGs to have these emergency plans. An analysis of a broad range of emergency response options was performed for all County-Other WUGs and for small WUGs with a 2010 historical population estimate less than 7,500 and a sole supply source. For purposes of this evaluation, entities evaluated for emergency responses to local drought conditions or loss of municipal supply were assumed to have 180 days or less of remaining supply.

A WUG relying on groundwater is considered sole source if all its supplies come from the same aquifer, regardless of varying groundwater districts or combination of contractual and local development supplies. A WUG relying on surface water is considered sole source if its supply comes from one river intake or one reservoir, regardless of the number of contracts in place. A WUG with a contract to purchase water from a WWP was not considered sole-source if various supplies were held by the WWP. WUGs with both groundwater and surface water supplies were not included, except for County-Other entities.

A broad range of emergency situations could result in the loss of reliable municipal supply, and it is not possible to plan one solution to meet any possible emergency; for that reason, a range of possible responses was selected for each entity according to source type and location. WUGs were analyzed for potential additional fresh water and brackish water wells according to the existence of appropriate aquifers in the area. Modeled available groundwater (MAG) availability was not considered since the wells were assumed to be temporary over the course of an emergency. WUGs with nearby surface

water were analyzed for curtailment of junior water rights and for releases from upstream reservoirs. Additional yield availability was not analyzed for reservoir releases as in the case of a temporary, localized emergency, special arrangements can be made.

A nearby entity that could provide supply in case of an isolated incident was identified for applicable WUGs, and existing interconnects were noted if information was available. In addition, trucking in water was considered as a supply option under severe circumstances. Any infrastructure required for implementation of the options is also reported. A total of 96 entities were analyzed, including 21 County-Other WUGs. The results of this analysis are included in Table 7-1.

Table 7-1 Summary of Emergency Supply Options

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Atascosa	Charlotte	1,695	Carrizo-Wilcox	GW	1,985	339			•		•	•
Atascosa	County-Other, Atascosa	-	Various GW	GW	6,766	868			•	•	•	•
Atascosa	Jourdanton	4,125	Carrizo-Wilcox	GW	4,829	1021			•		•	•
Atascosa	McCoy Water Supply Corporation (WSC)	6,500	Various GW	GW	7,239	942			•		•	•
Atascosa	Poteet	3,306	Carrizo-Wilcox	GW	3,871	478			•		•	•
Bexar	Air Force Village II Inc.	685	Edwards-BFZ	GW	742	188					•	•
Bexar	Alamo Heights	7,012	Edwards-BFZ	GW	8,073	2210					•	•
Bexar	Bexar County Water Control and Improvement District (WCID) 10	5,257	Edwards-BFZ	GW	5,462	1174					•	•
Bexar	County-Other, Bexar	-	Various GW	GW	15,689	2,075			•	•	•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Bexar	Fort Sam Houston	1,063	Edwards-BFZ	GW	1,224	2596					•	•
Bexar	Leon Valley	6,920	Edwards-BFZ	GW	8,200	1401					•	•
Bexar	Randolph Air Force Base	1,557	Edwards-BFZ	GW	1,793	121					•	•
Bexar	Selma	5,804	Various GW	GW	5,005	1221			•		•	•
Bexar	Shavano Park	1,906	Edwards-BFZ	GW	2,194	693					•	•
Bexar	The Oaks WSC	1,376	Various GW	GW	1,704	298			•		•	•
Bexar	Water Services	3,987	Trinity	GW	3,613	1134			•		•	•
Caldwell	Aqua WSC	1,360	Carrizo-Wilcox	GW	260	284			•		•	•
Caldwell	County-Other, Caldwell	-	Various GW	GW	1,194	142			•	•	•	•
Caldwell	Creedmoor-Maha WSC	1,415	Various GW	GW	1,508	189			•		•	•
Caldwell	Luling	5,445	Carrizo-Wilcox	GW	6,699	959			•		•	•
Caldwell	Polonia WSC	5,734	Carrizo-Wilcox	GW	2,303	890			•		•	•
Caldwell	Tri Community WSC	1,133	Guadalupe Run-Of-River	SW	1,377	177	•	•			•	•
Calhoun	County-Other, Calhoun	-	Gulf Coast	GW	3,121	363			•	•	•	•
Calhoun	Point Comfort	737	Texana Lake	SW	829	87	•	•			•	•
Calhoun	Seadrift	1,364	Gulf Coast	GW	1,534	256			•	•	•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Comal	Clear Water Estates Water System	430	Trinity	GW	559	677			•		•	•
Comal	County-Other, Comal	-	Blend	Blend	7,041	1,191	•	•	•	•	•	•
Comal	Garden Ridge	3,259	Various GW	GW	3,243	1785			•		•	•
Comal	KT Water Development	915	Trinity	GW	1,271	432			•		•	•
DeWitt	County-Other, DeWitt	-	Gulf Coast	GW	9,136	1,245			•	•	•	•
DeWitt	Cuero	6,640	Gulf Coast	GW	6,892	1826			•	•	•	•
DeWitt	Yoakum	2,165	Gulf Coast	GW	2,195	390			•	•	•	•
DeWitt	Yorktown	2,165	Gulf Coast	GW	2,247	396			•	•	•	•
Dimmit	Asherton	1,084	Carrizo-Wilcox	GW	1,180	238			•		•	•
Dimmit	Big Wells	697	Carrizo-Wilcox	GW	759	121			•		•	•
Dimmit	Carrizo Hill WSC	631	Carrizo-Wilcox	GW	686	119			•		•	•
Dimmit	Carrizo Springs	5,509	Carrizo-Wilcox	GW	5,994	1623			•		•	•
Dimmit	County-Other, Dimmit	-	Carrizo-Wilcox	GW	2,256	310			•		•	•
Frio	County-Other, Frio	-	Carrizo-Wilcox	GW	3,177	411			•		•	•
Frio	Dilley	4,148	Carrizo-Wilcox	GW	4,623	1091			•		•	•
Frio	Moore WSC	505	Carrizo-Wilcox	GW	577	112			•		•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Goliad	County-Other, Goliad	-	Gulf Coast	GW	6,138	751			•	•	•	•
Goliad	Goliad	1,959	Gulf Coast	GW	2,289	460			•	•	•	•
Gonzales	County-Other, Gonzales	-	Carrizo-Wilcox	GW	2,277	272			•		•	•
Gonzales	Nixon	7	Carrizo-Wilcox	GW	2,542	396			•		•	•
Gonzales	Smiley	550	Carrizo-Wilcox	GW	604	122			•		•	•
Gonzales	Waelder	1,132	Queen City	GW	1,244	213			•		•	•
Guadalupe	County-Other, Guadalupe	-	Blend	Blend	1,432	167	•	•	•	•	•	•
Hays	Buda	915	Canyon Lake	SW	1,658	298					•	•
Hays	South Buda WCID 1	682	Trinity	GW	1,350	214			•		•	•
Hays	Texas State University	4,861	Edwards-Balcones Fault Zone (BFZ)	GW	4,861	928					•	•
Hays	Wimberley WSC	3,619	Trinity	GW	9,178	1015			•		•	•
Karnes	County-Other, Karnes	-	Various GW	GW	3,062	434			•	•	•	•
Karnes	El Oso WSC	3,522	Various GW	GW	224	754			•	•	•	•
Karnes	Falls City	603	Carrizo-Wilcox	GW	630	141			•		•	•
Karnes	Karnes City	3,109	Carrizo-Wilcox	GW	3,242	608			•		•	•
Karnes	Kenedy	3,440	Gulf Coast	GW	3,587	1411			•	•	•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Karnes	Runge	1,235	Gulf Coast	GW	1,288	263			•	•	•	•
Karnes	Sunko WSC	3,530	Carrizo-Wilcox	GW	183	719			•		•	•
Kendall	County-Other, Kendall	-	Blend	Blend	18,938	2,312	•	•	•	•	•	•
Kendall	Kendall County WCID 1	2,520	Trinity	GW	2,977	283			•		•	•
Kendall	Kendall West Utility	2,031	Trinity	GW	2,505	311			•		•	•
La Salle	Cotulla	3,664	Carrizo-Wilcox	GW	4,138	1291			•		•	•
La Salle	County-Other, La Salle	-	Carrizo-Wilcox	GW	2,617	302			•		•	•
La Salle	Encinal WSC	903	Carrizo-Wilcox	GW	1,021	214			•		•	•
Medina	Castroville	2,829	Edwards-BFZ	GW	2,846	838					•	•
Medina	County-Other, Medina	-	Various GW	GW	7,317	948			•	•	•	•
Medina	Devine	4,222	Various GW	GW	4,425	648			•		•	•
Medina	East Medina County Special Utility District (SUD)	6,945	Edwards-BFZ	GW	7,419	723					•	•
Medina	La Coste	1,341	Edwards-BFZ	GW	1,535	152					•	•
Medina	Medina County WCID 2	633	Various GW	GW	698	139			•		•	•
Medina	Medina River West WSC	996	Various GW	GW	755	116			•		•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Medina	Natalia	1,492	Edwards-BFZ	GW	1,708	292					•	•
Medina	West Medina WSC	960	Edwards-BFZ	GW	1,147	237					•	•
Medina	Yancey WSC	5,543	Edwards-BFZ	GW	1,110	711					•	•
Refugio	County-Other, Refugio	-	Gulf Coast	GW	3,061	364			•	•	•	•
Refugio	Refugio	2,861	Gulf Coast	GW	2,979	568			•	•	•	•
Refugio	Woodsboro	1,581	Gulf Coast	GW	1,647	269			•	•	•	•
Uvalde	County-Other, Uvalde	-	Various GW	GW	6,019	858			•	•	•	•
Uvalde	Knippa WSC	687	Various GW	GW	740	154			•		•	•
Uvalde	Sabinal	1,688	Edwards-BFZ	GW	1,844	443					•	•
Uvalde	Windmill WSC	1,443	Austin Chalk	GW	1,620	356			•		•	•
Victoria	County-Other, Victoria	-	Gulf Coast	GW	22,094	2,584			•	•	•	•
Victoria	Quail Creek MUD	1,505	Gulf Coast	GW	1,645	192			•	•	•	•
Victoria	Victoria County WCID 1	2,156	Gulf Coast	GW	2,331	253			•	•	•	•
Wilson	County-Other, Wilson	-	Carrizo-Wilcox	GW	7,395	876			•		•	•
Wilson	Floresville	6,425	Carrizo-Wilcox	GW	8,123	1933			•		•	•
Wilson	Oak Hills WSC	4,359	Carrizo-Wilcox	GW	5,511	921			•		•	•

COUNTY	ENTITY	POPULATION (2010)	SOURCE	TYPE	POPULATION (2020)	DEMAND (2020)	RELEASE FROM UPSTREAM RESERVOIR	CURTAILMENT OF JUNIOR WATER RIGHTS	LOCAL GROUNDWATER WELL	BRACKISH GROUNDWATER WELL	TRUCK IN WATER	SUPPLY FROM NEARBY ENTITY
Wilson	Picosa WSC	2,000	Carrizo-Wilcox	GW	32	240			•		•	•
Wilson	Poth	1,879	Carrizo-Wilcox	GW	2,375	381			•		•	•
Wilson	Stockdale	1,470	Carrizo-Wilcox	GW	1,858	391			•		•	•
Zavala	Batesville WSC	1,191	Carrizo-Wilcox	GW	1,242	211			•		•	•
Zavala	County-Other, Zavala	-	Carrizo-Wilcox	GW	1,466	243			•		•	•
Zavala	Crystal City	7,138	Carrizo-Wilcox	GW	8,063	1702			•		•	•
Zavala	Loma Alta Chula Vista Water System	618	Carrizo-Wilcox	GW	735	235			•		•	•
Zavala	Zavala County WCID 1	1,490	Carrizo-Wilcox	GW	1,683	480			•		•	•

GW - groundwater; SW - surface water.

7.5 REGION-SPECIFIC DROUGHT RESPONSE RECOMMENDATIONS AND MODEL DROUGHT CONTINGENCY PLANS

The SCTRWPG acknowledges that DCPs are a useful drought management tool for entities with both surface and groundwater sources and recommends that all entities consider adopting a DCP in preparation for drought conditions. The SCTRWPG also recommends that, in accordance with TCEQ guidelines, entities update their DCPs every 5 years because triggers can change as wholesale and retail water providers reassess their contracts and supplies.

The SCTRWPG obtained 26 DCPs from across the region. Of the 26 DCPs, one of these participating WUGs relies solely on surface water, 13 entities rely solely on groundwater and 12 of them utilize both sources to meet needs.

Water utilities within Region L have recently implemented drought contingency measures in response to drought conditions. Since adoption of the 2016 Regional Water Plan (at the end of 2016), SAWS and

Edwards Aquifer Authority (EAA) both activated stage I contingency measures during the summer of 2017 and stage I and II contingency measures during the summer of 2018. At the time of writing this chapter, Stage 1 drought restrictions were implemented by both SAWS and EAA as recently as July 2020. GBRA indicated that they have no records of activating drought contingency measures since adoption of the 2016 Regional Water Plan.

7.5.1 Recommended Surface Water Triggers and Responses

Surface water accounts for approximately 26 percent of 2020 existing municipal supplies in South Central Texas Region. With such a variety of supply sources, it is difficult to create a set of triggers and responses that will fit the needs of all WUGs in the regional planning area. The SCTRWPG recognizes that supplies are understood best by the operators and suggests that WUGs without DCPs look to the DCPs of their water providers for these surface supplies.

For entities without DCPs supplying themselves with local surface water, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region. An example of triggers and responses from the DCP for Guadalupe-Blanco River Authority (GBRA) is presented in Table 7-2. GBRA was selected as a representative example because it provides water to several entities throughout South Central Texas Region and relies on various types of surface water triggers that can be applied throughout the region. The DCP includes five water stages ranging from "Mild Water Shortage" to "Emergency Water Shortage." The triggers depend on parameters such as storage levels, reservoir elevations, and system failures. The responses include categories ranging from home irrigation limits to pool and fountain restrictions.

Table 7-2 Model Drought Contingency Plan for Surface Water Based on GBRA

DROUGHT STAGE	WATER TYPE	TRIGGER	RESPONSE
Stage 1 – Mild Water Shortage	Canyon Reservoir	Reservoir less than or equal to Elevation (El) 895 feet mean sea level (ft-msl)	• Achieve voluntary 5% reduction in comparison to the average monthly usage of contracted water from shortage for that time period of the calendar year
	Hydroelectric Lakes	Comal Springs 24 hour flow rate is at or below 250 cubic feet per second (cfs)	• No water waste • No washing impervious outdoor ground covering • No landscape watering between 10 a.m. and 8 p.m. unless by handheld device or recycled water • Swimming pools must be at least 25% covered by an evaporative shield when not in use • Vehicles may only be washed at commercial locations or Monday and Friday before 10 a.m. or after 8 p.m.
	Luling Water Right	Production at Luling Water Treatment Plant (WTP) is 2.5 mgd or greater for 7 days or flow at United States Geological Survey (USGS) 08172000 drops below 130 cfs	• Achieve a voluntary 5% reduction in daily water demand for each retail utility utilizing the GBRA Luling WTP

DROUGHT STAGE	WATER TYPE	TRIGGER	RESPONSE
	Lower Basin Water Right	When flow over top of the saltwater barrier is 6 inches or less for 5 consecutive days	• Achieve voluntary reduction of 5% in total domestic water usage during each month of this stage
Stage 2 – Moderate Water Shortage	Canyon Reservoir	Reservoir less than or equal to El 890 ft-msl	• Achieve voluntary 10% reduction in comparison to the average monthly usage of contracted water from shortage for that time period of the calendar year
	Hydroelectric Lakes	Comal Springs 24 hour flow rate is at or below 200 cfs	• All Stage 1 responses • Irrigation limited to three designated days per week during restricted hours unless handheld device used • Vehicle washing is permissible only by using bucket and/or handheld hose equipped with a quick shutoff nozzle on designated watering days or at a commercial location • Water may not be used for ornamental fountains unless recycled
	Luling Water Right	Flow at USGS 08172000 drops below 80 cfs	• Achieve a 10% reduction in daily water demand for each retail utility utilizing the GBRA Luling WTP
	Lower Basin Water Right	Sustained flow over the saltwater barrier is not occurring	• Achieve voluntary reduction of 10% in total domestic water usage during each month of this stage
Stage 3 – Severe Water Shortage	Canyon Reservoir	Reservoir less than or equal to El 885 ft-msl	• Achieve voluntary 15% reduction in comparison to the average monthly usage of contracted water from shortage for that time period of the calendar year • Initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code 11.039
	Hydroelectric Lakes	Comal Springs 24 hour flow rate is at or below 150 cfs	• All Stage 1 and 2 responses • Irrigation limited to two designated days per week during restricted hours unless handheld device used • Water may not be used for ornamental fountains • Vehicle washing is permissible only by using a bucket and/or a handheld hose equipped with a quick shutoff nozzle on designated watering days or at a commercial location
	Luling Water Right	Flow at USGS 08172000 drops below 40 cfs	• Achieve a 15% reduction in daily water demand for each retail utility utilizing the GBRA Luling WTP • Initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code 11.039

DROUGHT STAGE	WATER TYPE	TRIGGER	RESPONSE
	Lower Basin Water Right	The release of stored water from Canyon Dam to supplement run-of-river permitted supply When voluntary Stage 2 measures are ineffective in reducing water usage	• Achieve voluntary reduction of 15% in total domestic water usage during each month of this stage • Initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code 11.039
Stage 4 – Critical/ Emergency Water Shortage	Canyon Reservoir	Loss of capability to provide water service Contamination of supply source Drought of greater severity than the drought of record	• General Manager shall assess severity of the problem and identify the actions needed and time required to resolve the problem
	Hydroelectric Lakes	Comal Springs average 24 hour flow rate is at or below 100 cfs	• All Stage 1, 2 and 3 responses • Irrigation limited to one designated day per week during restricted hours unless handheld device used • Filling of new and existing pools is prohibited • Vehicle washing is permissible only at a commercial location
	Luling Water Right	Loss of capability to provide water service Contamination of supply source Water ceases to flow past Zedler Dam	• General Manager shall assess severity of the problem and identify the actions needed and time required to resolve the problem
	Lower Basin Water Right	When municipal demands of GBRA customers in Calhoun County is being met by the permitted release of stored water in Canyon Dam	• Achieve voluntary reduction of 20% in total domestic water usage during each month of this stage • Initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code 11.039
Stage 5 – Emergency	Hydroelectric Lakes	Comal Springs average 24 hour flow rate is at or below 50 cfs	• General Manager convenes emergency session to consider emergency rules or responses
	Lower Basin Water Right	Loss of capability to provide water service Contamination of supply source May occur at any time and is not dependent on being preceded by Stages 1 through 4	• Achieve voluntary reduction of 50% in total domestic water usage during each month of this stage • General Manager convenes emergency session to consider emergency rules or responses

7.5.2 Recommended Groundwater Triggers and Responses

Groundwater accounts for approximately 71 percent of 2020 existing municipal supplies. Entities in South Central Texas Region utilize both brackish and non-brackish wells in four major formations. With such a variety of supply sources, it is difficult to create a set of triggers and responses that will fit the needs of each WUG in the regional planning area. The SCTRWPG recognizes that supplies are

understood best by the operators and suggests that WUGs without DCPs look to the DCPs of their water providers for these surface supplies.

For entities without DCPs supplying themselves with local groundwater, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region. An example of triggers and responses from the DCP for the San Antonio Water System (SAWS) is presented in Table 7-3. SAWS was selected as a representative example because it is the largest provider of groundwater in the South Central Texas Region. The DCP includes four water stages. The triggers depend on parameters such as supply and well levels. The responses include categories ranging from residential irrigation limits to commercial and irrigation use reductions.

Table 7-3 Model Drought Contingency Plan for Groundwater Based on SAWS

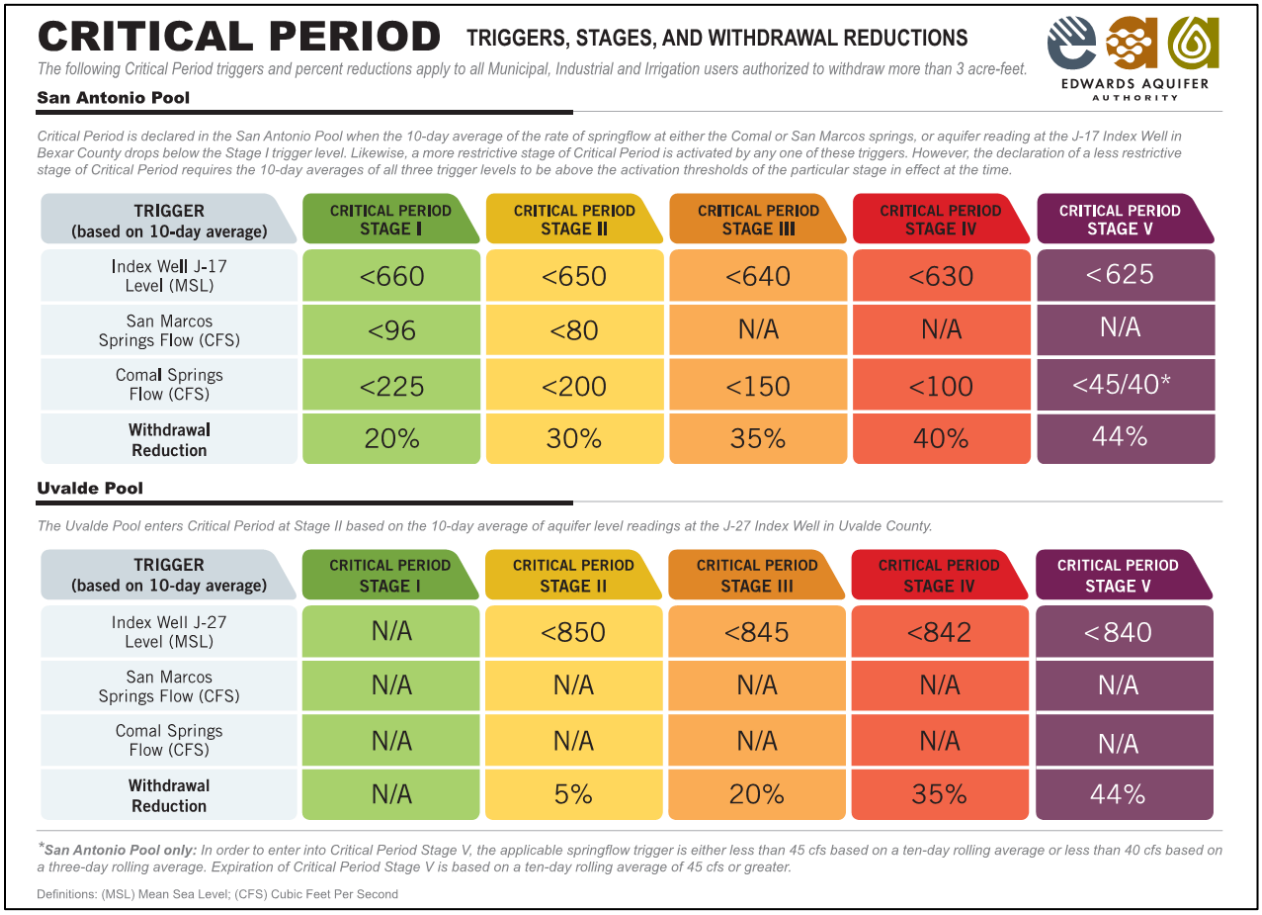
DROUGHT STAGE	TRIGGER	RESPONSE
Stage 1	Edwards Aquifer (Well J-17) 10 day rolling average level falls to 660 ft-msl	• Cites encouraged to reduce water main flushing and to implement leak detection and survey repairs • Voluntary reduction on power production water • No water waste • Lawn watering is limited to 1 day per week at restricted times unless by handheld device • Pools must be covered by at least 25% evaporation block when not in active use • Aesthetic water features prohibited • No person may wash an impervious outdoor ground covering • Golf courses, parks, and fields must submit conservation plans • Customers are requested to minimize or discontinue nonessential water use. Outdoor commercial fountains must have variance to operate • Vehicles may only be washed at commercial locations or once per week on Saturday or Sunday with no water waste • Golf courses, parks, and fields must submit conservation plans and follow irrigation schedule
Stage 2	Edwards Aquifer (Well J-17) 10 day rolling average level falls to 650 ft-msl	• All Stage 1 responses • Irrigation system, sprinkler, or soaker hose watering limited to 1 day per week at further restricted times unless by handheld device • Drip irrigation and handheld device watering allowed any day at restricted times • Hotels must offer "no linen exchange program"
Stage 3	Stage 3 water use reduction measures may be implemented when Edwards Aquifer (Well J-17) 10 day rolling average level falls to 640 ft-msl	• All Stages 1 and 2 responses • Irrigation system, sprinkler, and soaker hose watering limited to 1 day every other week at restricted times. • Drip irrigation limited to restricted times and 3 days a week

DROUGHT STAGE	TRIGGER	RESPONSE
Stage 4	After a 30 day monitoring period once Stage 3 is declared, the city manager, or designee, in consultation with SAWS president/CEO or designee, may declare or delay Stage 4	• All Stages 1, 2, and 3 responses • A surcharge is assessed on all accounts used or assumed to be used for landscape irrigation

7.5.3 Recommended Triggers and Responses for Irrigation and Steam-electric Uses

As mentioned previously, it is difficult to create a set of drought triggers and responses that will fit the needs of all WUGs in the regional planning area. Irrigation and Steam-electric water use categories each represent 10 percent or more of water demands in any decade. For entities supplying significant amounts of water to customers for irrigation and steam-electric uses, the SCTRWPG suggests reviewing the drought responses and recommendations used by similar entities in the region.

An example of triggers and responses from the EAA Critical Period/Drought Management Plan is presented in Figure 7-6. EAA was selected as a representative example because their Critical Period Management Plan applies to municipal, industrial, and irrigation users that are authorized to withdraw more than 3 acre-feet. The Critical Period Management Plan includes five critical period water stages. The triggers depend on 10-day average spring and index well levels and the responses are stepwise, mandatory withdrawal reductions.



CRITICAL PERIOD TRIGGERS, STAGES, AND WITHDRAWAL REDUCTIONS

EDWARDS AQUIFER AUTHORITY

The following Critical Period triggers and percent reductions apply to all Municipal, Industrial and Irrigation users authorized to withdraw more than 3 acre-feet.

San Antonio Pool

Critical Period is declared in the San Antonio Pool when the 10-day average of the rate of springflow at either the Comal or San Marcos springs, or aquifer reading at the J-17 Index Well in Bexar County drops below the Stage I trigger level. Likewise, a more restrictive stage of Critical Period is activated by any one of these triggers. However, the declaration of a less restrictive stage of Critical Period requires the 10-day averages of all three trigger levels to be above the activation thresholds of the particular stage in effect at the time.

TRIGGER (based on 10-day average)	CRITICAL PERIOD STAGE I	CRITICAL PERIOD STAGE II	CRITICAL PERIOD STAGE III	CRITICAL PERIOD STAGE IV	CRITICAL PERIOD STAGE V
Index Well J-17 Level (MSL)	<660	<650	<640	<630	<625
San Marcos Springs Flow (CFS)	<96	<80	N/A	N/A	N/A
Comal Springs Flow (CFS)	<225	<200	<150	<100	<45/40*
Withdrawal Reduction	20%	30%	35%	40%	44%

Uvalde Pool

The Uvalde Pool enters Critical Period at Stage II based on the 10-day average of aquifer level readings at the J-27 Index Well in Uvalde County.

TRIGGER (based on 10-day average)	CRITICAL PERIOD STAGE I	CRITICAL PERIOD STAGE II	CRITICAL PERIOD STAGE III	CRITICAL PERIOD STAGE IV	CRITICAL PERIOD STAGE V
Index Well J-27 Level (MSL)	N/A	<850	<845	<842	<840
San Marcos Springs Flow (CFS)	N/A	N/A	N/A	N/A	N/A
Comal Springs Flow (CFS)	N/A	N/A	N/A	N/A	N/A
Withdrawal Reduction	N/A	5%	20%	35%	44%

**San Antonio Pool only:* *In order to enter into Critical Period Stage V, the applicable springflow trigger is either less than 45 cfs based on a ten-day rolling average or less than 40 cfs based on a three-day rolling average. Expiration of Critical Period Stage V is based on a ten-day rolling average of 45 cfs or greater.*

Definitions: (MSL) Mean Sea Level; (CFS) Cubic Feet Per Second

Figure 7-6 EAA Critical Period Management Summary

For irrigation uses, the SCTRWPG also suggests review of the Voluntary Irrigation Suspension Program Option (VISPO) of the Edwards Aquifer Habitat Conservation Plan (EAHCP). VISPO is available for irrigation users who wish to help protect springflow for federally listed threatened and endangered species that rely heavily on the Comal and San Marcos Springs. The enrollment term is for a period of five years. VISPO compensates enrolled irrigation permit holders for enrollment and also pays an additional suspension rate in years when irrigation suspension is required due to index well levels. VISPO is triggered when the J-17 index well in Bexar County is at or below 635 feet on October 1; the response is for enrolled permit holders to suspend irrigation for the following calendar year. If VISPO is not triggered, then the permit holder may use or lease enrolled water permits during the non-suspension years. More information regarding the EAHCP VISPO can be found on the Edwards Aquifer Authority website (https://www.edwardsaquifer.org/).

7.5.4 Model Drought Contingency Plans

The TCEQ has prepared model DCPs for wholesale and retail water suppliers to provide guidance and suggestions to entities regarding the preparation of DCPs. Not all items in the model will apply to every system's situation, but the overall model can be used as a starting point for most entities. The SCTRWPG suggests that the TCEQ model DCPs be used in conjunction with drought contingency measures such as

those described in Sections 7.5.1, 7.5.2, and 7.5.3 for entities wishing to develop a new DCP. The TCEQ model DCPs can be found on TCEQ's website: (https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/contingency.html)

7.6 DROUGHT WATER MANAGEMENT STRATEGIES

Regional water planning guidelines in 30 TAC Section 357 state that "Regional water plan development shall include an evaluation of all water management strategies the regional water planning group determines to be potentially feasible, including drought management measures including water demand management [30 TAC Section 357.7(a)(7)(B)]." As defined here, drought management means the periodic activation of approved DCPs resulting in short-term demand reduction and/or rationing. This reduction in demand is then considered a "supply" source. Using this approach, an entity may make the conscious decision not to develop firm water supplies greater than or equal to projected water demands with the understanding that demands will have to be reduced or go unmet during times of drought. Using this rationale, an economic impact of not meeting projected water demands can be estimated and compared with the costs of other potentially feasible WMSs in terms of annual unit costs.

A drought management analysis was performed to calculate the potential supply and cost of reducing the 2020 demand by 5, 10, 15, and 20 percent for all entities with needs in 2020. The methodology and results of this analysis can be found in more detail in Subsection 5.2.2. For WUGs with needs in 2020, the SCTRWPG recommends a 5 percent reduction in demands for the drought management strategy. Table 7-4 shows the yield for 38 entities with needs in 2020.

Table 7-4 Drought Management WMS Yield

ENTITY	COUNTY	2020 YIELD USING 5 PERCENT DEMAND REDUCTION (ACFT/YR)
Air Force Village II, Inc.	Bexar	3
Alamo Heights	Bexar	50
Atascosa Rural WSC	Bexar	59
Bexar County WCID 10	Bexar	33
Castroville	Medina	17
Clear Water Estates Water System	Comal	4
Converse	Bexar	101
Crystal Clear WSC	Hays	92
East Medina County SUD	Medina	43
El Oso WSC [1]	Karnes	19
Elmendorf	Bexar	8
Fort Sam Houston	Bexar	5

ENTITY	COUNTY	2020 YIELD USING 5 PERCENT DEMAND REDUCTION (ACFT/YR)
Garden Ridge	Comal	47
Goforth SUD [1]	Caldwell	109
Hondo	Medina	51
Karnes City	Karnes	23
Kirby	Bexar	32
KT Water Development	Comal	7
La Coste	Medina	8
Lackland Air Force Base	Bexar	67
Leon Valley	Bexar	65
Live Oak	Bexar	48
Lytle	Atascosa	18
Martindale WSC	Caldwell	21
Natalia	Medina	6
Oak Hills WSC	Wilson	28
Pearsall	Frio	26
SS WSC	Wilson	95
Sabinal	Uvalde	14
Seguin	Guadalupe	228
Shavano Park	Bexar	47
The Oaks WSC	Bexar	9
Universal City	Bexar	192
Uvalde	Uvalde	103
Victoria	Victoria	490
West Medina WSC	Medina	7
Wingert Water Systems	Comal	10
Yancey WSC	Medina	40
	Total	**2,225**

[1] WUGs are split between Region L and other regions (Regions K or N). Split region specific Region L volumes are detailed in Section 5.3.

Beginning in 2020, SAWS has requested utility-specific drought management and supply reduction goals. SAWS prefers to utilize a multi-decadal approach to drought management. SAWS is considering a 5 percent demand reduction for 2020, a 12 percent demand reduction for 2030, and 16 percent demand reductions for 2040 to 2070. Table 7-5 shows the demand reductions and projected yields for SAWS throughout the planning period.

Table 7-5 SAWS Drought Management Analysis

	2020	2030	2040	2050	2060	2070
% Reduction	5%	12%	16%	16%	16%	16%
Yield (acft/yr)	11,951	31,476	45,677	49,377	53,109	56,588

7.7 OTHER DROUGHT-RELATED CONSIDERATIONS AND RECOMMENDATIONS

7.7.1 Monitoring and Assessment

The SCTRWPG recommends that all entities monitor state and local drought conditions to prepare and facilitate decisions. Several state and local agencies monitor and report on conditions with up-to-date information. A few informative sources are listed below:

San Antonio Water System Drought Restrictions:
http://www.saws.org/conservation/droughtrestrictions/

Guadalupe-Blanco River Authority Drought/Conservation:
http://www.gbra.org/drought/default.aspx

TWDB Drought Information:
http://waterdatafortexas.org/drought/

TCEQ Drought Information:
https://www.tceq.texas.gov/response/drought

Palmer Drought Severity Index:
http://www.ncdc.noaa.gov/temp-and-precip/drought/historical-palmers/

Regional Planning Group Information:
http://www.regionltexas.org/

7.7.2 Drought Preparedness Council and Recommendations

The SCTRWPG supports the efforts of the Texas Drought Preparedness Council, as outlined in its 2019 letter to planning groups, and recommends that entities review information developed by the council. The council was established by the legislature in 1999 and is composed of representatives from 16 state agencies as well as appointees of the governor. The council is responsible for assessment and public reporting of drought monitoring and water supply conditions, advising the governor on significant drought conditions, recommending response plans for drought-related disasters, advising regional water planning groups on drought-related issues in the regional water plans, coordinating local, state, and federal drought-response planning, and submitting a report to the legislature every odd numbered year.

The Drought Preparedness Council recommended planning groups to follow the outline template for Chapter 7, of which this 2021 SCTRWP chapter is based. The council also recommended development of region-specific model DCPs for all water use categories in the region that account for more than 10 percent of water demands in any decade over the 50-year planning horizon. For Region L, the applicable use categories are municipal, irrigation, and steam-electric use categories. As described in Section 7.5.4, the SCTRWPG suggests that the TCEQ model DCPs be used in conjunction with recommended drought contingency measures described in Sections 7.5.1, 7.5.2, and 7.5.3 for entities wishing to develop a new DCP. The SCTRWPG developed and included region-specific recommendations in this chapter for municipal (See Section 7.5.1 and Section 7.5.2), as well as irrigation and steam-electric (See Section 7.5.3 uses. The TCEQ model DCPs can be found on TCEQ's website: (https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/contingency.html).

FINAL PLAN

APPENDIX 7-A: SUMMARY OF DROUGHT CONTINGENCY MEASURES

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

[This page intentionally left blank]

Appendix 7-A: Summary of Drought Contingency Plan Measures

Table 1: Drought Contingency Plan Measures

Entity Name	DCP Date	Stage Number	Triggers										Responses										Water Supply	
			WWP	Demand/Capacity Based	Failure/Contamination	Groundwater Level	Season	Reservoir Level	Supply-Based	Well Pumping Time/Flow	Storage Tank Recovery Time	Other	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Mandatory Reduction	Notification of Public Agencies or Specific Users	Prohibited Use	Discontinue Water Diversions	Potential Suspend Service	Water Allocation	Others	Surface Water	Ground Water
Aqua WSC	2020	1		•						•	•				•			•		•		•		
		2		•						•	•				•			•		•				
		3		•						•	•				•			•		•				•
		4		•						•	•							•		•				
Canyon Lake WSC	2019	1		•				•	•			•			•								•		
		2		•				•							•			•							
		3		•				•			•		•		•			•					•	•	•
		4										•	•	•	•	•	•	•					•		
		Emergency			•			•			•	•	•	•	•	•	•	•					•		
Canyon Regional Water Authority	2019	1						•					•				•						•		
		2						•					•			•	•								
		3						•					•			•	•		•		•			•	•
		4			•							•	•				•								
City of Buda	2019	1		•	•							•			•			•							
		2		•	•							•			•			•						•	•
		3		•	•							•			•			•							
		4		•	•							•			•			•							
City of Converse	2015	1	•			•								•		•		•				•			
		2	•			•								•	•	•		•				•			
		3	•			•	•							•	•	•		•				•			•
		4	•			•	•							•	•	•		•				•			
		5	•			•	•							•	•	•		•				•			
Crystal Clear SUD	2019	1			•						•				•										
		2			•						•				•			•							
		3			•						•				•			•						•	•
		4			•						•				•			•							
		5			•						•							•							
County Line Special Utility District	2019	1	•							•	•	•			•										
		2	•							•	•	•			•			•							
		3	•							•	•	•			•			•						•	•
		4	•							•	•	•			•			•				•			
		5			•										•	•		•				•			

Entity Name	DCP Date	Stage Number	Triggers										Responses										Water Supply	
			WWP	Demand/Capacity Based	Failure/Contamination	Groundwater Level	Season	Reservoir Level	Supply-Based	Well Pumping Time/Flow	Storage Tank Recovery Time	Other	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Mandatory Reduction	Notification of Public Agencies or Specific Users	Prohibited Use	Discontinue Water Diversions	Potential Suspend Service	Water Allocation	Others	Surface Water	Ground Water
Goforth Special Utility District	2019	Conservation Period					•															•		
		1	•	•					•				•				•	•				•		
		2	•	•					•		•		•		•		•	•				•	•	•
		3	•	•					•		•		•		•		•	•				•		
		4	•	•	•				•				•		•		•	•			•	•		
Guadalupe Blanco River Authority	2019	1		•				•	•			•			•		•	•		•		•		
		2		•				•	•			•			•	•	•	•	•			•		
		3		•				•	•			•			•	•	•	•	•		•		•	•
		4		•	•				•			•	•		•		•	•	•		•			
		5		•	•				•			•	•		•		•	•	•		•			
City of Kyle	2014	1					•								•									
		2										•			•			•					•	•
		3										•			•			•						
City of Marion	2014	1						•		•					•									
		2						•		•					•		•	•					•	•
		3						•		•					•		•							
		4		•	•			•		•					•		•	•			•			
McCoy WSC	2019	1		•					•			•			•							•		
		2		•					•		•				•			•				•		•
		3	•	•	•				•			•			•		•	•						
City of New Braunfels	2019	1				•			•						•								•	•
		2				•			•						•			•						
		3				•			•						•			•						
		4					•					•										•		
City of Port Lavaca	2019	1							•						•		•							
		2							•						•	•	•	•						
		3						•	•						•	•	•	•					•	
		4						•	•						•	•	•	•		•				
		5			•			•	•							•		•						
City of San Marcos	2019	1			•	•			•						•			•						
		2			•	•			•						•			•						
		3			•	•			•						•			•					•	•
		4			•	•			•						•			•						
		5		•	•	•			•			•			•			•				•		

Entity Name	DCP Date	Stage Number	Triggers										Responses										Water Supply	
			WWP	Demand/Capacity Based	Failure/Contamination	Groundwater Level	Season	Reservoir Level	Supply-Based	Well Pumping Time/Flow	Storage Tank Recovery Time	Other	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Mandatory Reduction	Notification of Public Agencies or Specific Users	Prohibited Use	Discontinue Water Diversions	Potential Suspend Service	Water Allocation	Others	Surface Water	Ground Water
Jourdanton	2019	1		•		•				•	•				•			•						
		2				•				•	•				•			•						
		3								•	•				•			•						•
		4								•	•				•			•				•		
		5			•										•			•						
SAWS	2019	1				•									•			•				•		
		2				•									•			•				•	•	•
		3				•									•			•				•		
		4		•		•			•			•		•	•			•				•		
City of Schertz	2019	1		•		•						•			•			•						
		2		•		•						•			•			•						
		3		•	•	•						•			•			•						•
		4		•	•	•						•						•						
S.S. Local Government Corporation	2019	1		•	•	•						•					•							
		2		•	•	•						•					•							
		3		•	•	•						•					•							•
		4		•	•	•						•	•	•			•			•	•			
S.S. WSC	2014	1		•											•									
		2		•											•			•						
		3		•											•			•						•
		4		•											•			•						
		5			•													•		•		•		
Sunko Water Supply Corporation	2019	1			•					•	•				•									
		2			•					•	•				•			•						
		3			•					•	•				•			•						•
		4			•					•	•				•			•				•		
		5			•													•				•		
TBM Resident WSC	2017	1										•			•			•						
		2		•									•		•									•
		3		•											•			•				•		
		4		•									•		•			•				•		
Three Oaks WSC	2019	1								•	•	•			•									
		2								•	•	•			•			•						
		3								•	•	•			•			•						•
		4								•	•	•		•	•			•						
		Emergency			•													•						

Entity Name	DCP Date	Stage Number	Triggers										Responses										Water Supply	
			WWP	Demand/Capacity Based	Failure/Contamination	Groundwater Level	Season	Reservoir Level	Supply-Based	Well Pumping Time/Flow	Storage Tank Recovery Time	Other	Assessment and Identification	Water Rate Change or Surcharge	Irrigation Schedule	Mandatory Reduction	Notification of Public Agencies or Specific Users	Prohibited Use	Discontinue Water Diversions	Potential Suspend Service	Water Allocation	Others	Surface Water	Ground Water
Universal City	2019	1				•									•		•	•		•				
		2				•									•		•	•		•				•
		3				•						•			•		•	•		•				
		4			•	•						•		•	•		•	•		•				
City of Victoria	2019	1							•			•										•		
		2							•			•			•									
		3						•				•			•			•					•	•
		4						•							•			•				•		
		5		•	•							•						•			•			
Victoria County WCID No. 1	2019	1																						
		2		•											•			•						•
		3		•											•			•						
		4		•	•										•			•						

FINAL PLAN

APPENDIX 7-B: EXISTING AND POTENTIAL EMERGENCY INTERCONNECTIONS

South Central Texas Regional Water Plan

B&V PROJECT NO. 192335

PREPARED FOR

South Central Texas Regional Water Planning Group

5 NOVEMBER 2020

BLACK & VEATCH

[This page intentionally left blank]

Appendix 7-B: Summary of Existing and Potential Emergency Interconnects

Table 1: Existing Emergency Interconnects

No.	Existing or Potential Emergency Interconnect	Emergency User	Emergency Provider
1	Existing	90 Ranch WSC	East Medina County SUD
2	Existing	Alamo Heights	SAWS
3	Existing	Benton City WSC	Lytle
4	Existing	Cadillac Water	SAWS
5	Existing	Cibolo	Green Valley SUD
6	Existing	City of Seguin	Springs Hill WSC
7	Existing	Creedmoore-Maha WSC	Aqua WSC
8	Existing	Creedmoore-Maha WSC	City of Austin
9	Existing	Crystal Clear	Springs Hill WSC
10	Existing	East Central SUD	La Vernia
11	Existing	East Central SUD	Springs Hill WSC
12	Existing	East Medina County SUD Unit 1	Natalia
13	Existing	El Oso WSC	Karnes City
14	Existing	Fair Oaks Ranch	SAWS
15	Existing	Gonzales County WSC	City of Smiley
16	Existing	Gonzales County WSC	City of Gonzales
17	Existing	Green Valley SUD	City of Cibolo
18	Existing	Green Valley SUD	Schertz
19	Existing	Green Valley SUD	Springs Hill WSC
20	Existing	Kyle	City of San Marcos
21	Existing	Leon Valley	SAWS
22	Existing	Live Oak	SAWS
23	Existing	Live Oak	Selma
24	Existing	Live Oak	Universal City
25	Existing	Lytle	Benton City WSC
26	Existing	Marion	CRWA
27	Existing	Marion	Green Valley SUD
28	Existing	Martindale WSC	Maxwell WSC
29	Existing	Medina County WCID 2	West Medina WSC
30	Existing	Natalia	East Medina County WSC
31	Existing	Oak Village North	Rim Rock Ranch
32	Existing	Polonia WSC	Polonia WSC North
33	Existing	Polonia WSC North	Lockhart
34	Existing	Polonia WSC South	Lockhart
35	Existing	Rim Rock Ranch	Oak Village North
36	Existing	Schertz	SAWS
37	Existing	Selma	Live Oak
38	Existing	Selma	Universal City
39	Existing	Shavano Park	SAWS
40	Existing	Smiley	Gonzales WSC
41	Existing	South Buda WCID 1	Southwest Water Co.
42	Existing	Southwest Water Co.	SAWS
43	Existing	Springs Hill WSC	Canyon Regional WA
44	Existing	Springs Hill WSC	City of Sequin
45	Existing	Springs Hill WSC	Green Valley SUD
46	Existing	Stockdale	Sunko WSC
47	Existing	Sunko WSC	Stockdale

No.	Existing or Potential Emergency Interconnect	Emergency User	Emergency Provider
48	Existing	West Medina WSC	D'Hanis
49	Existing	West Medina WSC	Hondo
50	Existing	Yancey WSC	SAWS

Table 2: Potential Emergency Interconnects

No.	Existing or Potential Emergency Interconnect	Emergency User	Emergency Provider
1	Potential	Atascosa Rural WSC	East Medina SUD
2	Potential	Cibolo	Schertz
3	Potential	County Line SUD	City of Kyle
4	Potential	Crystal Clear WSC	San Marcos
5	Potential	Crystal Clear WSC	NBU
6	Potential	East Medina County SUD	Atascosa Rural WSC
7	Potential	Texas State University	San Marcos
8	Potential	Wimberley WSC	Aqua WSC