

## 7 DROUGHT RESPONSE INFORMATION, ACTIVITIES, AND RECOMMENDATIONS

During the past century, recurring drought has been a natural part of Texas' varying climate, especially in the arid and semi-arid regions of the state. An old saying about droughts in west Texas is that "droughts are continual with short intermittent periods of rainfall." Droughts, due to their complex nature, are difficult to define and understand, especially in a context that is useful for communities that must plan and prepare for drought. Drought directly impacts the availability of ground and surface water supplies for agricultural, industrial, municipal, recreational, and designated aquatic life uses. The location, duration, and severity of drought determine the extent to which the natural environment, human activities, and economic factors are impacted.

Geography, geology, and climate vary significantly from east to west in Region F. Ecoregions within Region F vary from the Edwards Plateau to the east, Central Great and Western High Plains in the central and northern portions of the region, and Chihuahuan Deserts to the west. Annual rainfall in Region F ranges from an average of more than 30 inches in the east to slightly more than 11 inches in the west. Likewise, the annual gross reservoir evaporation rate ranges from 60 inches in the east to approximately 75 inches in the western portion of the region.

Numerous definitions of drought have been developed to describe drought conditions based on various factors and potential consequences. In the simplest of terms, drought can be defined as "a prolonged period of below-normal rainfall." However, the State Drought Preparedness Plan provides more specific and detailed definitions shown in the box at right.

These definitions are not mutually exclusive, and provide valuable insight into the complexity

of droughts and their impacts. They also help to identify factors to be considered in the development of appropriate and effective drought preparation and contingency measures.

### Types of Drought

- **Meteorological Drought.** A period of substantially diminished precipitation duration and/or intensity that persists long enough to produce a significant hydrologic imbalance.
- **Agricultural Drought.** Inadequate precipitation and/or soil moisture to sustain crop or forage production systems. The water deficit results in serious damage and economic loss to plant and animal agriculture. Agricultural drought usually begins after meteorological drought but before hydrological drought and can also affect livestock and other agricultural operations.
- **Hydrological Drought.** Refers to deficiencies in surface and subsurface water supplies. It is measured as streamflow, and as lake, reservoir, and groundwater levels. There is usually a lack of rain or snow and less measurable water in streams, lakes, and reservoirs, making hydrological measurements not the earliest indicators of drought.
- **Socioeconomic Drought.** Occurs when physical water shortages start to affect the health, well being, and quality of life of the people, or when the drought starts to affect the supply and demand of an economic product.

Droughts have often been described as "insidious by nature." This is mainly due to several factors:

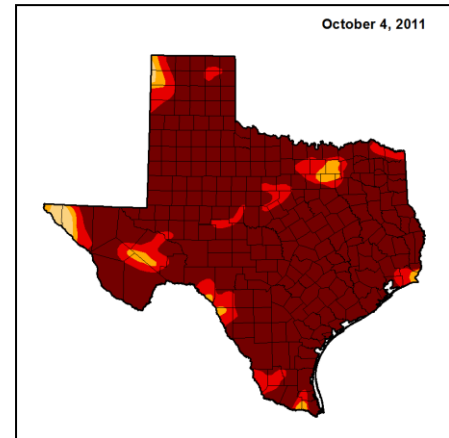
- Droughts cannot be accurately characterized by well-defined beginning or end points.
- Severity of drought-related impacts is dependent on antecedent conditions, as well as ambient conditions such as temperature, wind, and cloud cover.

- Droughts, depending on their severity, may have significant impacts on human activities; and human activities during periods of drought may exacerbate the drought conditions through increased water usage and demand.

Furthermore, the impact of a drought may extend well past the time when normal or above-normal precipitation returns.

## 7.1 Drought of Record in the Regional Water Planning Area (RWPA)

Various indices have been developed in an attempt to quantify drought severity for assessment and comparative purposes. One numerical measure of drought severity that is frequently used by many federal and state government agencies is the Palmer Drought Severity Index (PDSI). It is an estimate of soil moisture that is calculated based on precipitation and temperature. Another measure is the Drought Monitor that incorporates measurement of climate, hydrologic and soils conditions as well as site specific observations and reports. The Drought Monitor is distributed weekly and is often the tool used to convey drought conditions to the public and water users. In 2011, all counties of Region F experienced at least some periods of severe or extreme drought. Conditions have improved since 2011 but the Region is still experiencing ongoing drought conditions



**Drought Monitor, October 2011**

### 7.1.1 Drought of Record in Region F

The drought of record is commonly defined as the worst drought to occur in a region during the entire period of meteorological record keeping. For most of Texas, the drought of record occurred from 1950 to 1957. During the 1950's drought, many wells, springs, streams, and rivers went dry and some cities had to rely on water trucked in from other areas to meet drinking water demands. By the end of 1956, 244 of the 254 Texas counties were classified as disaster areas due to the drought, including all of the counties in Region F.

During the past decade, most regions of Texas have experienced droughts resulting in diminished water supplies for agricultural and municipal use, decreased flows in streams and reservoirs, and significant economic loss. Droughts of severe to extreme conditions occurred in the 1950s, 1990s, 2000s, and 2010s in Region F. The worst year during the recent drought was 2011, when most Region F counties experienced extreme drought. Despite some improvements from the worst part of 2011, drought conditions continue to persist throughout the region today.

For reservoirs, the drought of record is defined as the period of record that includes the minimum content of the reservoir. The period is recorded from the last time the reservoir spills before reaching its minimum content to the next time the reservoir spills. If a reservoir has reached its minimum content but has not yet filled enough to spill, then it is considered to be still in drought of record conditions. Based on the water availability modeling, most of the reservoirs in Region F are currently experiencing a new drought of record. The minimum content of many reservoirs in the Colorado River Basin occurs at or near the end of the modeling simulation for TCEQ WAM Run 3 in December 2013. If the drought continues, the minimum content of the reservoir could continue to decrease, reducing the firm yield of

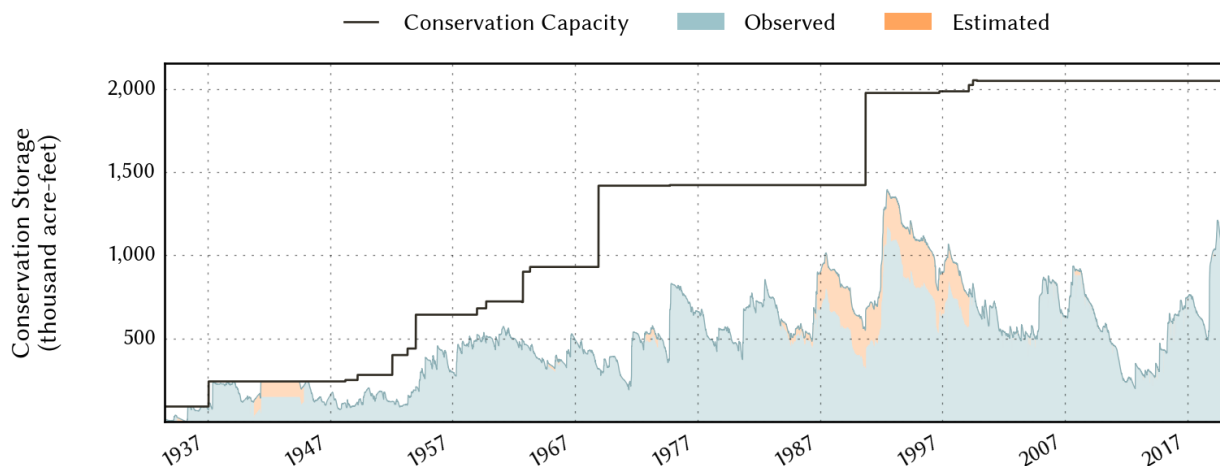
the reservoirs. The modeled drought of records for the reservoirs in Region F are shown below in Table 7-1. Figure 7-1 is another perspective of reservoir storage in the region during the most recent drought which is generated by TWDB<sup>1</sup>.

**Table 7-1**  
**Modeled Droughts of Record in Region F**

Reservoir	Date last full in WAM	Date of minimum content in WAM	Drought of Record based on the WAM
Ballinger/Moonen	March 2008	August 2012	2008 – Current
Balmorhea	February 1997	September 2000	1997 – 2000
Brady Creek	March 1998	June 2013	1998 – Current
Brownwood	July 2007	September 2013	2007 – Current
Champion Creek	May 1987	August 2012	1987 – Current
Coleman	August 2007	December 2013 <sup>b</sup>	2007 – Current
Colorado City	May 1994	May 2003	1994 – Current
Hords Creek	July 2007	December 2013 <sup>b</sup>	2007 – Current
Lake Clyde	August 2007	December 2013 <sup>b</sup>	2007 – Current
Mountain Creek	May 2008	August 2012	2008 – Current
Nasworthy	April 2008	October 2013	2008 – Current
Oak Creek	June 1997	August 2012	1997 – Current
O.C. Fisher	June 1987	September 2013	1987 – Current
O.H. Ivie	June 1997	December 2013 <sup>b</sup>	1997 – Current
Red Bluff	March 1943	September 2000 <sup>b,c</sup>	1943 – 2000
Spence	June 1992 <sup>a</sup>	August 2012	1992 – Current
Thomas	September 1962	December 2013 <sup>b</sup>	1962 – Current
Twin Buttes	March 1993	December 2013 <sup>b</sup>	1993 – Current
Winters	June 1997	August 2012	1997 – Current

- (1) This reservoir has never filled. The Date Last Full is based on the firm yield analyses. (Note: Firm yield analyses assume the reservoir is full at the beginning of the simulation.)
- (2) Date of the end of the simulation.
- (3) Hydrology for WAM simulations for the Rio Grande River Basin end in 2000. It was not extended.

**Figure 7-1**  
**TWDB Region-F Planning Region Reservoirs**



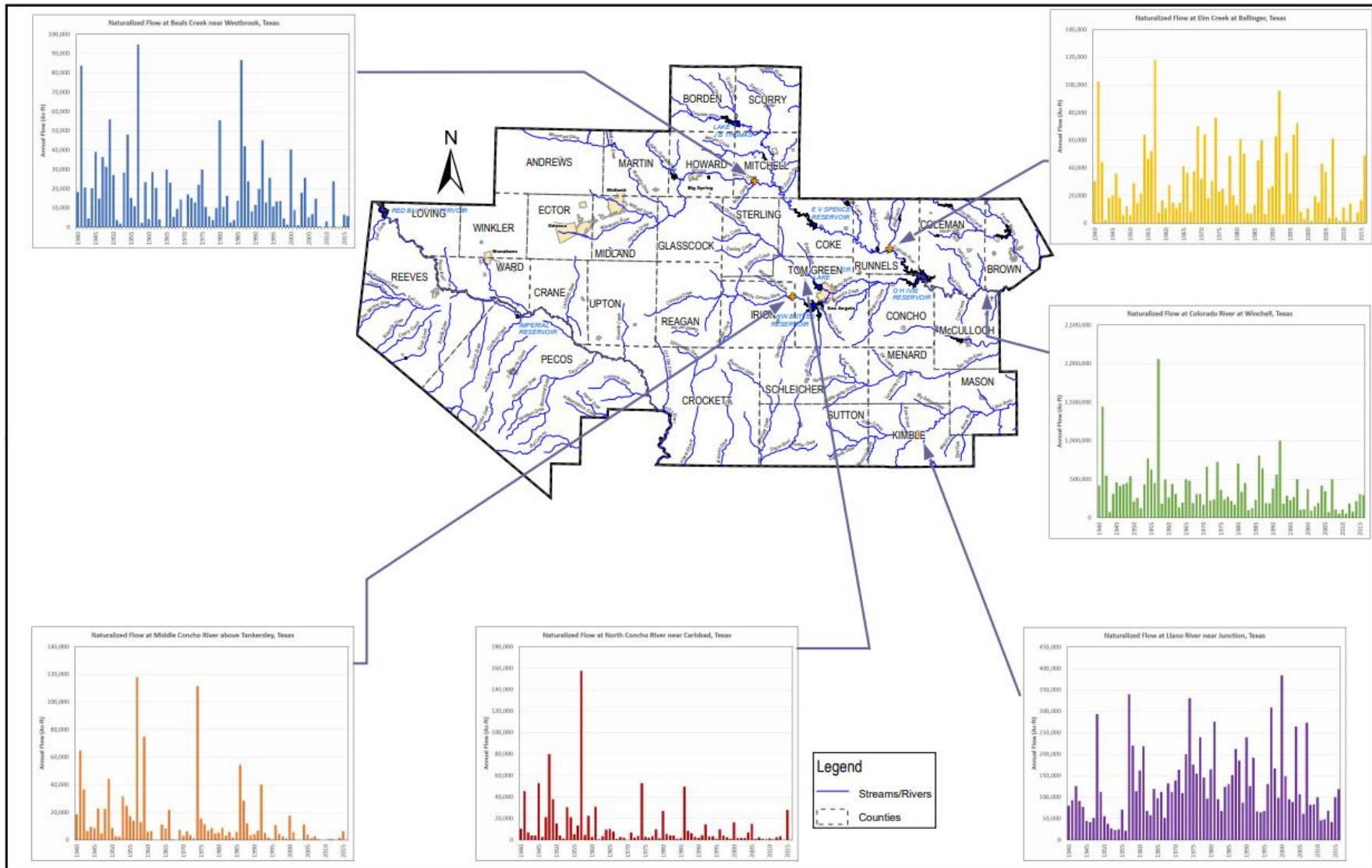
Drought of record conditions for run of the river supplies are typically evaluated based on minimum annual stream flows. Figure 7-2 shows the variations in naturalized flows from the WAM for seven U.S. Geological Survey (USGS) streamflow gages in Region F.<sup>2</sup> The five gages on tributaries have watersheds with limited development and show the natural variation in streamflows in this region. The Colorado gage near Winchell is the most downstream gage on the main stem of the Colorado River in Region F. Flows at the Pecos River gage near Girvin are largely controlled by releases from Red Bluff Reservoir. Based on the naturalized flows at these locations, the 2011 drought is the drought of record for the run-of-river supplies in the Colorado Basin with the exception of the Llano River where the drought of record is still in the 1950s. The drought of 2011 is also the drought of record for the Rio Grande River Basin in Region F.

For groundwater, meteorological and agricultural conditions were considered for defining the drought of record in Region F. The National Atmospheric and Oceanic Administration (NOAA) maintains data on the historical meteorological conditions and drought indices across the country. Figure 7-3 shows the historical precipitation for Midland, Texas. As is typical in Texas, the average annual precipitation in Region F increases from west to east. Midland is further west, and averages about 14.6 inches a year over the period shown. The years with the lowest historical precipitation occurred in 1951, 1998, and 2011. In 1951, 4.60 inches were recorded and 5.16 inches were recorded in 1998. In 2011, 5.47 inches were recorded. For both the 1950's drought and the recent drought, annual rainfall is significantly below average for an extended number of years. The current drought rivals the 1950's drought. Seven of the last fifteen years show rainfall less than the historic average. This is similar to the drought of the 1950s.

## Drought of Record in Region F:

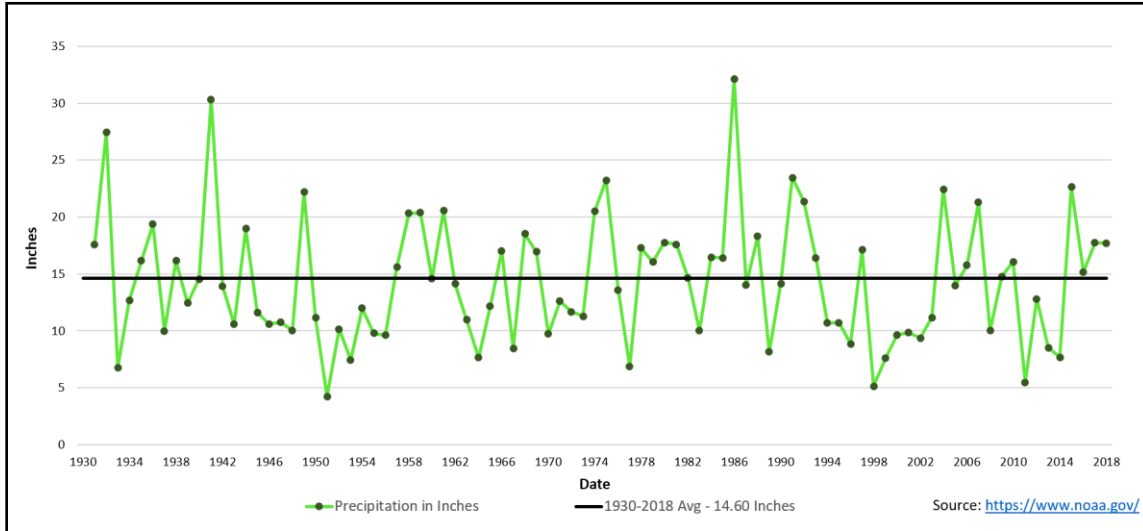
- The drought of record is worst drought in recorded history.
- For reservoirs, the drought of record is measured from the last time the reservoir was full before reaching its minimum content until the next time the reservoir fills and spill.
- For most of the region, the most recent drought in the 1990s, 2000s, and 2010s is the drought of record.
- This is different than most of the state where the drought of the 1950s is still the drought of record.
- In some cases, reservoirs in Region F still have not fully filled, indicating the drought of record is still on going even though conditions have significantly improved over the past few years.
- 2011 was the worst single year of drought in Region F.

**Figure 7-2**  
**Region F Annual Streamflow**



\* Natural Dam Lake, which is above the Beals Creek gage, spilled intermittently during 1986 and 1987. Natural Dam has subsequently been improved so that spills from the lake will not reoccur.

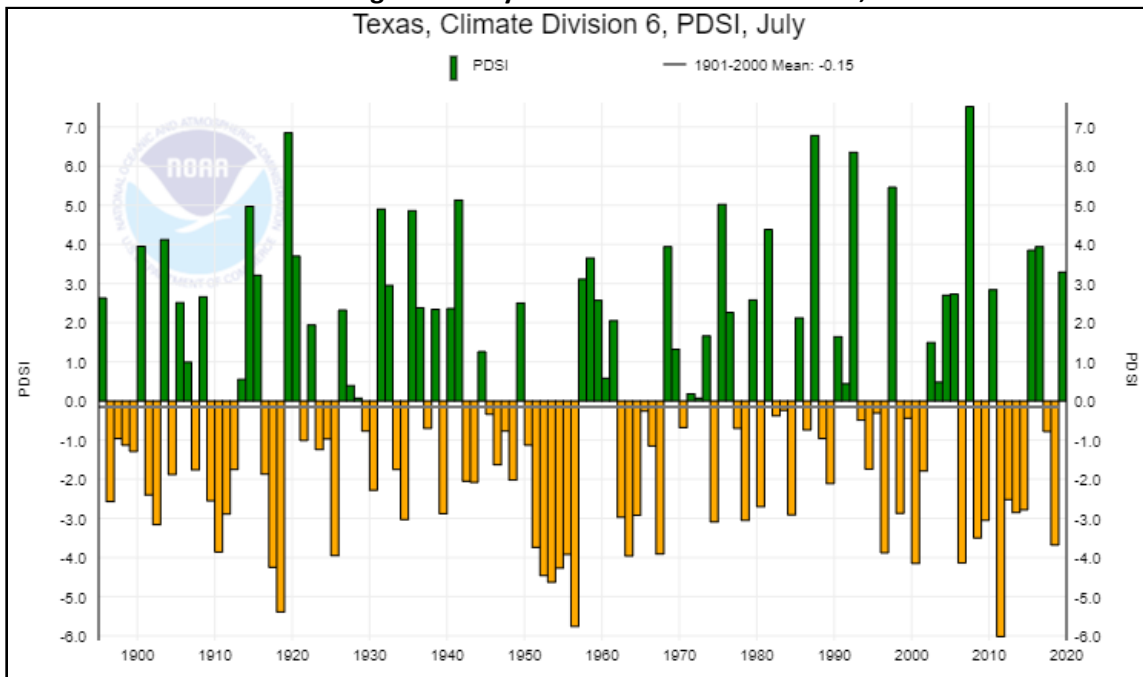
**Figure 7-3**  
**Historical Annual Precipitation in Midland, Texas**



Looking at the Palmer Drought Severity Indices over the same time period for Climate Region 6 (where most of Region F is located), Figure 7-4 clearly shows the drought impacts during the 1950s and again since 2011. The Palmer Drought Severity Indices (PDSI) provide a measurement of long-term drought based on the intensity of drought during the current month plus the cumulative patterns of previous months. It considers antecedent soil moisture and precipitation. For Region F, these considerations are important in assessing the potential impacts to groundwater sources during drought from increases in water demands and agricultural water needs.

Considering both the annual precipitation and PDSI in the region, the drought of record for groundwater and run of the river sources is still the drought of the 1950s, although the current drought that began in 2011 is nearly as severe.

**Figure 7-4**  
**Palmer Drought Severity Indices for Edwards Plateau, Texas**



### **7.1.2 Impacts of Drought on Water Supplies**

Drought is a major threat to surface water supplies in Region F. For surface water, hydrological drought is significant because it impacts the yield of water sources. Typically, multi-year droughts have the greatest impact on a reservoir yield. Impacts of the new drought on reservoir yields in Region F using WAM Run 3 (no subordination) are negligible in most cases where the yields were already at or near zero. Impacts are more readily seen with the subordination strategy, which is discussed in Chapter 5C. With subordination, the analysis showed that most of the Colorado Basin reservoirs in Region F are currently experiencing new ongoing drought-of-record conditions. As a result of this current drought, many reservoirs have shown reductions in yield and may continue to decline if the drought persists.

Drought can also be a major threat to groundwater supplies that rely heavily on recharge. While some aquifers are less impacted by reduced recharge, others may be heavily impacted by the ongoing agricultural drought which can increase the demands on these sources. Furthermore, the reduced reliability of surface water sources in the region from the drought has caused many to shift to groundwater sources to secure a more drought-tolerant source of water supply. Over time the increased demands can impact the amount of storage in the aquifers for future use.

## **7.2 Current Drought Preparations and Response**

In 1997, the Texas Legislature directed the TCEQ to adopt rules establishing common drought plan requirements for water suppliers in response to drought conditions throughout the State. Since 1997, the TCEQ has required all wholesale public water suppliers, retail public water suppliers serving 3,300 connections or more, and irrigation districts to develop, implement, and submit

Drought Contingency Plans (DCPs) every five years. The most recent updates were to be submitted to the TCEQ by May 1, 2019. Retail public water suppliers serving less than 3,300 connections must prepare and adopt a DCP but are not required to submit plans to TCEQ. All DCPs should be made available for inspection by TCEQ. DCPs typically identify different stages of drought (e.g., mild, moderate, severe) and specific triggers and responses for each stage. In addition, DCPs specify quantifiable targets for water use reductions for each stage, and a means and method for enforcement.

Most wholesale water providers and municipalities in Region F have taken steps to prepare for and respond to drought through efforts, including the preparation of individual DCPs and readiness to implement them as necessary. Region F DCPs include specific water savings goals and drought contingency measures associated with multiple drought stages. In addition to these Plans, many water providers have a Management Supply Factor (or safety factor) greater than 1.0 for demands that are essential to public health and safety.

### **7.2.1 Drought Preparedness**

Frequent recurring drought is a fact of life in Region F. Droughts have occurred in almost every decade since the 1940s. Recent experience with critical drought conditions attests to the effectiveness of drought management in the region. These reductions are at least partially due to the implementation of drought response activities included in the municipality's drought plan. However, according to city officials, the most significant factor in reducing water consumption is public awareness of drought conditions and voluntary reductions in water use. Some cities are pursuing aggressive water conservation programs that include using xeriscaping and efficient irrigation practices for public properties such as parks and

buildings, and reuse of treated effluent for municipal and manufacturing supplies.

In general, water suppliers in Region F identify the onset of drought (set drought triggers) based on either their current level of supply or their current level of demand. Often the triggers for surface water reservoirs are based on the current capacity of the reservoir as a percentage of the total reservoir capacity. In Region F, the reservoir operators use a combination of reservoir storage (elevation triggers) and/or demand levels. Triggers for groundwater supplies are commonly determined by demand as a percentage of total supply or total delivery capacity. Suppliers set these triggers as needed based on the individual parameters of their system. Customers of a wholesale

water provider (WWP) are subject to the triggers and measures of the WWPs' Drought Plans.

Fifteen updated Drought Contingency Plans (DCPs) were either submitted to Region F or adopted by an entity during this round of planning. The majority of these DCPs use trigger conditions that are supply-based, while the rest either use triggers that are based on the demands placed on the water system or are a combination of multiple conditions.

Table 7-2 summarizes the basis of the drought triggers by provider. Appendix G, Table G-1 summarizes the triggers and actions by water provider for initiation and response to drought.

**Table 7-2  
Type of Trigger Condition for Entities with Drought Contingency Plans Submitted to the Region F  
Planning Group**

Entity	Type Trigger Conditions	
	Demand	Supply
Brookesmith SUD	X	
Brownwood	X	X
Brown County WID		X
CRMWD		X
Ector County UD		X
Eden		X
Fort Stockton	X	
Grandfalls	X	
Midland	X	
Red Bluff Power Control District		X
San Angelo		X
Snyder	X	X
Sonora	X	X
UCRA		X
Winters		X



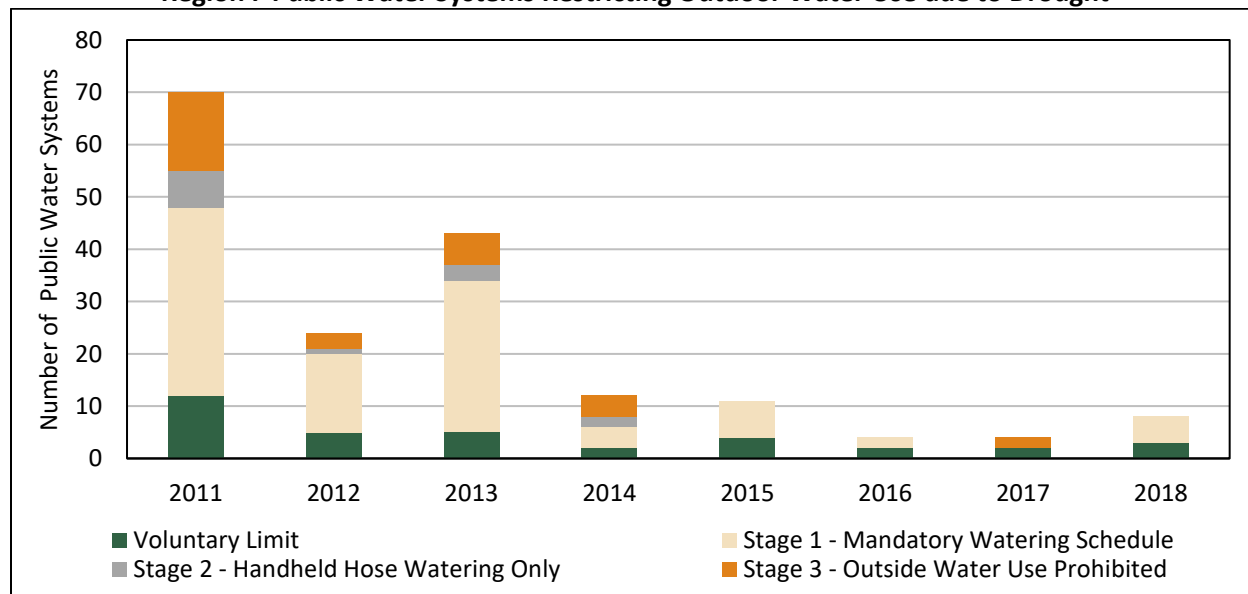
Challenges to the drought preparedness in Region F include the resources available to smaller cities to adequately prepare for drought and respond in a timely manner. Also, for many cities the drought of 2011 truly tested the entity’s drought plan and triggers. Some water providers found that the triggers were not set at the appropriate level to initiate different stages of the drought plan. The 2011 drought came quickly and was very intense. This increased demands on local resources and for many groundwater users increased competition for the water. Some systems had difficulty meeting demands and little time to make adjustments.

Many water providers of surface water sources have proactively developed supplemental groundwater sources, providing additional protections during drought. Many of the groundwater users have expanded groundwater production or are planning to develop additional groundwater in response to the current drought. Groundwater in Region F provides a more drought-resilient water source, but it needs to be managed to assure future supplies.

### 7.2.2 Recent Implementation of Drought Contingency Measures in Region F

TCEQ has collects data on Texas public water systems (PWSs) that reported water use restrictions and priority levels due to drought or emergency conditions. The most recent list of Texas PWSs limiting water use is found here: <https://www.tceq.texas.gov/drinkingwater/trot/droughtw.html>. The Region F RWPG conducted an analysis of TCEQ records between May 2011 and December 2018 to determine which Region F PWSs implemented water restrictions and to what extent the restrictions were implemented. The results of this analysis are shown in Figure 7-5. The impacts of the 2011 drought and continuing dry conditions through 2013 are apparent, as nearly 150 Region F PWSs reported water use restrictions during that time span. Since the publication of the 2016 Region F RWP, reports have decreased significantly, as only 18 PWSs have reported watering restrictions. Similarly, between 2011 and 2015, 17 unique Region F PWSs reported that the remaining water supply available to the system was insufficient to meet at least 180 days of demand. Since 2016, no Region F entities have reported insufficient water supply to meet at least 180 days of demand.

**Figure 7-5  
Region F Public Water Systems Restricting Outdoor Water Use due to Drought**



### 7.3 Existing and Potential Emergency Interconnects

According to Texas Statute §357.42(d),(e) regional water planning groups are to collect information on existing major water infrastructure facilities that may be used in the event of an emergency shortage of water. Pertinent information includes identifying the potential user(s) of the interconnect, the potential supplier(s), the estimated potential volume of supply that could be provided, and a general description of the facility. Texas Water Code §16.053(c) requires information regarding facility locations to remain confidential. This section provides general information regarding existing and potential emergency interconnects among water user groups within Region F.

#### 7.3.1 Existing Emergency Interconnects

Major water infrastructure facilities within Region F were identified through a survey process to better evaluate existing and potentially feasible emergency interconnects. Most interconnections provide water to a specific recipient. Pecos County WCID and the City of Fort Stockton have an interconnection that can move water to or from each entity. In addition, two of the four systems within Concho Rural Water North Concho Lake Estates system are linked. Table 7-3 presents the survey results for the existing emergency interconnects among water users and neighboring systems.

**Table 7-3  
Existing Emergency Interconnects to Major Water Facilities in Region F**

<b>Entity Providing Supply</b>	<b>Entity Receiving Supply</b>
CRMWD	Monahans
Millersview-Doole WSC	City of Paint Rock
City of San Angelo	Millersview-Doole WSC
City of Fort Stockton	Pecos Co. Water District
Pecos Co. WCID #1	City of Fort Stockton
Concho Rural Water N. Concho Lake Estates	CRWC Grape Creek
Zephyr WSC	City of Blanket
City of Odessa	Steam Electric Power, Ector County

#### 7.3.2 Potential Emergency Interconnects

Responses to survey questions helped identify other potential emergency interconnects for various WUGs in Region F. Table 7-4 presents a list of cities for those receiving and those supplying the potential emergency interconnects. Emergency interconnects were found to be not practical for many of the entities that were evaluated for potential

emergency water supplies. The type of infrastructure required between entities to provide or receive water during an emergency shortage was deemed impractical due to long transmission distances. Furthermore, it was deemed impractical during an emergency situation, to complete the required construction in a reasonable timeframe.

**Table 7-4  
Potential Emergency Interconnects to Major Water Facilities in Region F**

<b>Entity Providing Supply</b>	<b>Entity Receiving Supply</b>
CRMWD (O.H. Ivie Lake)	Ballinger
Midland County FWSD#1	Greater Gardendale WSC
City of Ballinger	North Runnels WSC
Texland Great Plains WSC	City of Andrews
Millersview-Doole WSC	City of Miles
CRMWD	Wickett

## 7.4 Emergency Responses to Local Drought Conditions or Loss of Municipal Supply

Texas Statute §357.42(g) requires regional water planning groups to evaluate potential temporary emergency water supplies for all County-Other WUGs and municipalities with 2010 populations less than 7,500 that rely on a sole source of water. The purpose of this evaluation is to identify potential alternative water sources that may be considered for temporary emergency use in the event that the existing water supply sources become temporarily unavailable due to extreme hydrologic conditions. This section provides potential solutions that should act as a guide for municipal water users that are most vulnerable in the event of a loss of supply. This review was limited and did not require technical analyses or evaluations in accordance with 31 TAC §357.34.

### 7.4.1 Emergency Responses to Local Drought Conditions

A survey was conducted to identify and evaluate the municipal water users that are most vulnerable in the event of an emergency water shortage. The analysis included all County-Other WUGs and rural cities with a population less than 7,500 and on a sole source of water. A sole source is defined here as a single well field or single surface water source. If an entity receives water from a single wholesale provider with only one source, they were considered as part of this analysis. If an entity receives water from a single wholesale provider who has multiple sources, they were not considered to have a sole source and were not included in this analysis.

Table 7-5 presents potential temporary responses that may or may not require permanent infrastructure. It was assumed in the analysis that the entities listed would have approximately 180 days or less of remaining water supply.

### *Releases from Upstream Reservoirs and Curtailment of Rights*

Releases from upstream reservoirs and curtailment of water rights was considered as a temporary measure that may help increase water supplies during an emergency water shortage. This response was only considered for those entities who receive surface water and may not be viable for all water right holders. Surface water in Texas is operated on a priority system and the water right holder may have no legal authority on which to request a release from an upstream reservoir or the curtailment of other water rights if their rights are junior. Even if the water user has a senior water right, in some cases, these strategies may result in what is known as a futile call. This occurs if shutting down a junior water right will not actually result in water being delivered to the senior right. In which case, the call will not be enforced.

### *Brackish Groundwater*

Brackish groundwater was evaluated as a temporary source during an emergency water shortage. Some brackish groundwater is found in certain places in the Ogallala, the Dockum, Hickory, Ellenburger-San Saba, Lipan, Capitan Reef, Pecos Valley Alluvium and other formations which underlie shallow aquifers. Required infrastructure would include additional groundwater wells, potential treatment facilities and conveyance facilities. Brackish groundwater at lower TDS concentrations may require only limited treatment. Twelve of the entities listed in Table 7-5 may not be able to potentially use brackish groundwater as a feasible solution to an emergency local drought condition.

### *Drill Additional Local Groundwater Wells and Trucking in Water*

If existing water supply sources become temporarily unavailable, possible solutions include drilling additional groundwater wells or trucking in water. Table 7-5 presents this option as viable for all entities listed.

**Table 7-5  
Emergency Responses to Local Drought Conditions in Region F**

Entity				Implementation Requirements									
Water User Group	County	2020 Population	2020 Demand (AF/YR)	Release from upstream reservoir	Curtailement of water rights	Local groundwater wells	Brackish groundwater limited treatment	Brackish groundwater desalination	Emergency interconnect	Trucked - in water	Type of infrastructure required	Entity providing supply	Emergency agreements already in place
Bangs	Brown	2,506	310			▪	▪		▪	▪			
Barstow	Ward	375	119			▪	▪			▪			
Big Lake	Reagan	3,357	730			▪	▪	▪		▪			
Colorado City	Mitchell	5,149	1,308			▪	▪			▪			
Crockett Co. WCID1	Crockett	3,885	1,153			▪	▪			▪			
DADS Supported Living Center	Tom Green	253	109			▪	▪			▪			
Early	Brown	2,907	292			▪	▪		▪	▪	Pipeline	Brownwood	
Eldorado	Schleicher	2,104	662			▪	▪			▪			
Grandfalls	Ward	427	135			▪	▪			▪			
Greater Gardendale WSC	Ector	2,547	211			▪	▪	▪		▪			
	Midland	1,299	108			▪	▪	▪		▪			
Greenwood Water	Midland	993	310			▪	▪			▪			
Iraan	Pecos	1,347	458			▪	▪	▪	▪	▪	Pipeline; PS; Treatment	Pecos Co. Precinct #3	
Junction	Kimble	2,632	626			▪	▪	▪		▪			
Kermit	Winkler	5,917	1,811			▪	▪	▪	▪	▪	Pipeline; PS; Treatment	Midland Freshwater District/ WRTA	

Entity				Implementation Requirements									
Water User Group	County	2020 Population	2020 Demand (AF/YR)	Release from upstream reservoir	Curtailment of water rights	Local groundwater wells	Brackish groundwater limited treatment	Brackish groundwater desalination	Emergency interconnect	Trucked - in water	Type of infrastructure required	Entity providing supply	Emergency agreements already in place
Loraine	Mitchell	656	76			▪				▪			
Madera Valley WSC	Reeves	1,541	446			▪	▪	▪		▪			
Mason	Mason	2,134	700			▪				▪			
McCamey	Upton	2,215	827			▪	▪	▪		▪			
Menard	Menard	1,492	350			▪	▪			▪			
Mertzson	Irion	823	101			▪	▪			▪			
Mitchell Co. Utility	Mitchell	1,596	210			▪	▪			▪			
Pecos Co. Fresh Water	Pecos	748	201			▪				▪			
Pecos Co. WCID 1	Pecos	3,019	384			▪	▪	▪	▪	▪	Pipeline	Fort Stockton	▪
Rankin	Upton	856	276			▪				▪			
Santa Anna	Coleman	1,121	156			▪	▪			▪			
Sonora	Sutton	2,800	1,045			▪				▪			
Southwest Sandhills WSC	Ward	1,937	185			▪	▪			▪			
Sterling City	Sterling	944	276			▪	▪	▪		▪			
Tom Green Co. FWSD 3	Tom Green	1,132	131			▪				▪			
Wickett	Ward	512	208			▪				▪			
Wink	Winkler	1,059	358			▪	▪	▪		▪			
Winters	Runnels	2,763	226			▪		▪	▪	▪	Pipeline	Abilene (Ivie Pipeline)	
Zephyr WSC	Brown	4,173	343			▪	▪			▪			▪

## **7.5 Region Specific Drought Response Recommendations and Model Drought Contingency Plans**

As required by the TWDB, the RWPG (Regional Water Planning Group) shall develop drought recommendations regarding the management of existing groundwater and surface water sources. These recommendations must include factors specific to each source as to when to initiate drought response and actions to be taken as part of the drought response. These actions should be specified for the manager of a water source and entities relying on the water source. The RWPG has defined the manager of water sources as the entity that controls the water production and distribution of the water supply from the source. For purposes of this assessment, a manager must also meet the TCEQ requirements for development of a Drought Contingency Plan. Entities that rely on the water sources include customers of the water source manager and direct users of the water sources, such as irrigators.

A list of each surface water and groundwater source in Region F and the associated managers and users of the source is included in Table G-2 in Appendix G.

In addition, the RWPG must identify unnecessary or counterproductive variations in specific drought response strategies, including outdoor watering restrictions, among user groups in the regional water

planning area that may confuse the public or otherwise impede drought response efforts. The Region F RWPG recognizes the benefit of additional coordination between drought responses within more urban planning areas where people living in very close proximity to one another may have different outdoor water restrictions. However, this situation does not occur in Region F. Region F maintains that DCPs developed by the local, individual water providers are the best available tool for drought management. Region F fully supports the use and implementation of individual DCPs during times of drought and did not find the differences in local response to be unnecessary or counterproductive.

### **7.5.1 Drought Trigger Conditions for Surface Water Supply**

Drought trigger conditions for surface water supply are customarily related to reservoir levels. Region F acknowledges that the Drought Contingency Plans for the suppliers who have surface water supplies are the best management tool for these water supplies. The RWPG recommends that the drought triggers and associated actions developed by the regional operator of the reservoirs are the Region F regional triggers for these sources. A summary of these triggers and actions for major Region F reservoirs follows as defined by each source manager. Triggers and actions for other reservoirs are included in Table G-3 in Appendix G. The region also recognizes any modification to these drought triggers that are adopted by the regional operator.

**Lake Brownwood (Brown County WCID #1)**

BCWID #1 adopted their current Drought Contingency Plan in March of 2019. The triggers and actions are related to the elevation of Lake Brownwood and are summarized below in Table 7-6.

**Table 7-6  
Lake Brownwood Triggers and Actions**

<b>Drought Stage</b>	<b>Trigger</b>	<b>Action</b>
Mild	Elevation below 1,420 ft. (76% capacity)	Advise customer of early conditions. Initiate Stage I of DCPs. Increase public education. Request voluntary conservation measures.
Moderate	Elevation below 1,417 ft. (64% capacity)	Request decrease in water usage. Implement watering restrictions. Request monitoring of irrigation facilities. District may reduce water delivery in accordance with pro rate curtailment.
Severe	Elevation below 1,414 ft. (53% capacity)	Request to severely reduce water usage. Watering restrictions. May conduct site visits to irrigation facilities. District may reduce water delivery in accordance with pro rata curtailment. May utilize alternate water sources, with TCEQ approval.
Exceptional	Elevation below 1,411 ft. (43% capacity)	District may call an emergency meeting with customers. Completely restrict watering. District may evaluate the need to discontinue delivery of water for second crops and non-essential uses. May reduce water delivery in accordance with pro rata curtailment. May utilize alternate water sources, with TCEQ approval.
Emergency	Elevation below 1408 ft. (34% capacity)	Same as the Exceptional drought stage. Any other necessary actions.

**O.H. Ivie Reservoir (CRMWD)**

The Board of Directors of CRMWD adopted their current Drought Contingency Plan in May 2019. In CRMWD’s DCP, drought contingency triggers and actions are separated into two categories: the non-system portion of the O.H. Ivie Reservoir (Ivie) and the remaining CRMWD System. Triggers for these two categories are associated with their respective storage capacities. The triggers and actions related to the capacities of the O.H. Ivie Reservoir are outlined below in Table 7-7.



**Table 7-7  
O.H. Ivie Reservoir Drought Triggers and Actions**

<b>Drought Stage</b>	<b>Trigger</b>	<b>Action<sup>a</sup></b>
Mild	Capacity below 138,028 ac-ft.	Initiate studies to evaluate alternative actions if conditions worsen. Request any WUG solely dependent on Ivie water to implement Stage 1 of their DCP.
Moderate	Capacity below 107,060 ac-ft.	Continue or initiate actions under Stage 1. Initiate studies to evaluate alternative actions if conditions worsen. Request any WUG solely dependent on this source to implement Stage 2 of their DCP.
Severe	Capacity below 76,092 ac-ft.	Continue or initiate actions under Stage 1 and 2. Initiate studies to evaluate alternative actions if conditions worsen. Request any WUG solely dependent on this source to implement Stage 3 of their DCP.
Critical	Pipeline break, equipment failure, or source contamination that severely limits distribution capacity.	Assess the severity of the problem and identify actions and time need to resolve it. Inform responsible officials for each wholesale water customer and suggest actions to alleviate problems. If appropriate, notify city, county, and/or state emergency response officials. Undertake necessary actions. Prepare a post-event assessment report.

- a. During each stage, the following actions may be implemented by the District:
- (1) Contact wholesale water customers monthly to discuss water supply and/or demand actions.
  - (2) Requesting wholesale water customers to reduce non-essential water use.
  - (3) Discussing the possibility of pro rate curtailment of water diversions and/or deliveries.
  - (4) Preparing a monthly water usage allocation baseline for each wholesale customer.

**CRMWD System (CRMWD)**

The CRMWD System includes supplies from Lake J.B. Thomas, E.V. Spence Reservoir, O.H. Ivie Reservoir, North Ward County Well Field, and the Big Spring Raw Water Production Facility. The triggers and actions related to the capacity of the CRMWD System are outlined below in Table 7-8.

**Table 7-8  
CRMWD System Drought Triggers and Actions**

<b>Drought Stage</b>	<b>Trigger</b>	<b>Action<sup>a</sup></b>
Mild	Capacity below 77,998 ac-ft.	Initiate studies to evaluate alternative actions if conditions worsen. Request any WUG solely dependent on Ivie water to implement Stage 1 of their DCP.
Moderate	Capacity below 58,499 ac-ft.	Continue or initiate actions under Stage 1. Initiate studies to evaluate alternative actions if conditions worsen. Request any WUG solely dependent on this source to implement Stage 2 of their DCP.
Severe	Capacity below 38,999 ac-ft.	Continue or initiate actions under Stage 1 and 2. Initiate studies to evaluate alternative actions if conditions worsen. Request any WUG solely dependent on this source to implement Stage 3 of their DCP.
Critical	Pipeline break, equipment failure, or source contamination that severely limits distribution capacity.	Assess the severity of the problem and identify actions and time need to resolve it. Inform responsible officials for each wholesale water customer and suggest actions to alleviate problems. If appropriate, notify city, county, and/or state emergency response officials. Undertake necessary actions. Prepare a post-event assessment report.

- a. During each stage, the following actions may be implemented by the District:
- (1) Contact wholesale water customers monthly to discuss water supply and/or demand actions.
  - (2) Requesting wholesale water customers to reduce non-essential water use.
  - (3) Discussing the possibility of pro rate curtailment of water diversions and/or deliveries.
  - (4) Preparing a monthly water usage allocation baseline for each wholesale customer.



### **O.C. Fisher, Twin Buttes, Nasworthy (San Angelo)**

O.C. Fisher, Twin Buttes, and Nasworthy are all operated by the City of San Angelo. The City of San Angelo adopted their most recent Drought Contingency Plan in September of 2019. The triggers and actions in the City’s DCP are based on combined storage and supply from all of the City’s sources, which includes these reservoirs, as well as groundwater. These are outlined in Table 7-9 below.

**Table 7-9  
O.C Fisher, Twin Buttes and Nasworthy Drought Triggers and Actions**

<b>Drought Stage</b>	<b>Trigger</b>	<b>Action</b>
Mild	Less than 24 months supply	Outdoor watering restrictions, watering schedule, water usage fees.
Moderate	Less than 18 months supply	Same as Stage 1 (“Mild” drought stage).
Critical/Emergency	Less than 12 months supply	Outdoor watering, filling of fountains or swimming pools, and/or washing of vehicles are all prohibited, water usage fees.

### **7.5.2 Drought Trigger Conditions for Run-of-River and Groundwater Supply**

Both run-of-river and ground water supplies are more regional than reservoirs and typically there are many users of these sources. As noted in Section 7.2, some water providers will have developed Drought Contingency Plans that are specific to their water supplies. Other water users, such as agricultural or industrial users, may not have Drought Contingency Plans. To convey drought conditions to all users of these resources in Region F, the RWPG proposes to use the Drought Monitor. This information is easily accessible and updated regularly. It does not require a specific entity to monitor well water levels or stream gages. It is also geographically specific so that drought triggers can be identified on a sub-county level that is consistent with the location of use. Region F has adopted the same nomenclature as the Drought Monitor for corresponding Region F drought triggers. Table 7-10 shows the categories adopted by the U.S. Drought Monitor and the associated Palmer Drought Index.

**Table 7-10  
Drought Severity Classification**

<b>Category</b>	<b>Description</b>	<b>Possible Impacts</b>	<b>Palmer Drought Severity Index</b>
<b>D0</b>	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9
<b>D1</b>	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9
<b>D2</b>	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9
<b>D3</b>	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	4.0 to 4.9
<b>D4</b>	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	5.0 or less

U.S. Drought Monitor: <https://droughtmonitor.unl.edu/AboutUSDM/AbouttheData/DroughtClassification.aspx>

For groundwater and run-of-river supplies, Region F recognizes that the initiation of drought response is the decision of the manager of the source and/or user of the source. Region F recommends the following actions based on each of the drought classifications listed above:

- *Abnormally Dry* – Entities should begin to review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage is necessary.
- *Moderate Drought* – Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage is necessary.
- *Severe Drought* – Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies may not be sufficient to meet reduced demands the entity should begin considering alternative supplies.
- *Extreme Drought* – Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies may not be sufficient to meet reduced demands the entity should consider alternative supplies.
- *Exceptional Drought* – Entities should review their DCP, status of current supplies and current demands to determine if implementation of a DCP stage or changing to a more stringent stage is necessary. At this point if the review indicates current supplies are not sufficient to meet reduced demands the entity should implement alternative supplies

### 7.5.3 Model Drought Contingency Plans

Model Drought Contingency Plans (DCPs) were developed for Region F and can be accessed online at [www.regionwater.org](http://www.regionwater.org). Each plan identifies four drought stages: mild, moderate, severe and emergency. The recommended responses range from notification of drought conditions and voluntary reductions in the “mild” stage to mandatory restrictions during an “emergency” stage. Entities using the model plan can select the trigger conditions for the different stages and appropriate responses for each stage.

In 2019, the Drought Preparedness Council recommended that a model DCP be in place for any water user group that exceeds ten percent of the Region’s water demands. For Region F, these user groups include irrigation, municipal, and mining. Region F developed Model DCPs for municipal and irrigation users, which can be accessed at

<http://regionwater.org/index.aspx?id=Documents>. The TCEQ does not require a DCP for mining users since mining is a private industry and is not subject to TCEQ enforcement. Thus, no model DCP was developed for mining.

## 7.6 Drought Management Water Management Strategies

Drought management is a temporary strategy to conserve available water supplies during times of drought or emergencies. This strategy is not recommended to meet long-term growth in demands, but rather acts as a means to minimize the potential for adverse impacts or water supply shortages during drought. The TCEQ requires Drought Contingency Plans (DCPs) for wholesale and retail public water suppliers and irrigation districts. A DCP may also be required for entities seeking state funding for water projects. Region F does not recommend specific drought management strategies. Region F recommends the implementation of DCPs by suppliers when appropriate to reduce demand during drought and prolong current supplies.

## 7.7 Other Drought-Related Considerations and Recommendations

### 7.7.1 Texas Drought Preparedness Council and Drought Preparedness Plan

In accordance with TWDB rules, all relevant recommendations from the Drought Preparedness Council were considered in the writing of this Chapter. The Texas Drought Preparedness Council is composed of representatives from multiple State agencies and plays an important role in monitoring drought conditions, advising the governor and other groups on significant drought conditions, and facilitating coordination among local, State, and federal agencies in drought-response planning. The Council meets regularly to discuss drought indicators and conditions across the State and releases Situation Reports summarizing their findings. Additionally, the Council has developed the State Drought Preparedness Plan, which sets forth a framework for approaching drought to minimize impacts to people and resources. Region F supports the efforts of the Texas Drought Preparedness Council and recommends that water providers regularly review the Situation Reports as part of their drought monitoring.

The Council provided two new recommendations in 2019 to all RWPGs which are addressed in this chapter:

- Follow the outline template for Chapter 7 provided to the regions by Texas Water Development Board staff in April of 2019, making an effort to fully address the assessment of current drought preparations and planned responses, as well as planned responses to local drought conditions or loss of municipal supply.
- Develop region-specific model drought contingency plans 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. To meet these recommendations, Region F has developed this Chapter to correspond with the sections of the outline template. Region F also prepared Model DCPs for municipal, irrigation, and industrial users. Region F did not prepare a Model DCP for mining despite its accounting for greater than 10 percent of the Region's water demands in some decades. The primary drivers for mining water use are economic, not drought conditions. Thus, the Region F RWPG did not feel it was appropriate to develop a Model DCP for mining. Further discussion of these Model DCPs are discussed in Section 7.5.3.

### 7.7.2 Other Drought Recommendations

Region F recognizes that while drought preparedness, including DCPs, are an important tool, in some instances drought cannot be prepared for, it must be responded to. Region F recognizes the Drought Preparedness Council's ability to assist with drought response when needed. Region F, however, maintains that DCPs developed by the local, individual water providers are the best available tool for drought management. Region F fully supports the use and implementation of individual DCPs during times of drought.

To better prepare for future droughts, Region F makes the following recommendations:

- That the Regional Water Plans remain a separate process for developing long-term water supply solutions for increased growth. The Regional Water Plans should not be the resource for times of emergency drought.
- The Drought Preparedness Council should increase coordination with local providers regarding drought conditions and potential implementation of drought stages, particularly during times of limited precipitation.

## LIST OF REFERENCES

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<sup>1</sup> Texas Water Development Board "Water Data for Texas"  
<<https://www.waterdatafortexas.org/reservoirs/region/region-f>>

<sup>2</sup> U.S. Geological Survey. "Streamflow Gage Records." <<http://waterdata.usgs.gov/tx/nwis.>>.

# **APPENDIX G DROUGHT TRIGGERS AND ACTIONS**

Table G-1  
Drought Triggers and Actions by Water Provider

Water Provider	Water Sources	Stage 1 - Mild Drought		Stage 2 - Moderate Drought		Stage 3 - Severe Drought		Stage 4 - Critical Drought		Stage 5 - Emergency Drought	
		Stage 1 Trigger	Response	Stage 2 Trigger	Response	Stage 3 Trigger	Response	Stage 4 Trigger	Response	Stage 5 Trigger	Response
Brookesmith SUD (Retail)	Sales from BCWID #1	Daily water demand equals or exceeds 85% (3.4 MG) for 3 consecutive days or 4 MG on a single day.	Achieve a 5% reduction in water use. Reduce or discontinue the flush of water mains. Contact wholesale water customers. Voluntary water use restrictions.	Daily water demand equals or exceeds 90% (3.6 MG) for 3 consecutive days or 4 MG on a single day.	Achieve a 15% reduction in water use. May reduce or discontinue flushing of water mains and irrigation of public landscaped areas. Water use restrictions, including watering schedule and prohibition of non-essential water uses.	When imminent or actual failure of major component which would cause immediate health or safety hazard.	Achieve a 30% reduction in water use. May reduce or discontinue the flushing of water mains. Same mandatory water use restrictions as Stage 2, except more limited water schedule, prohibition of water uses, no applications for additional water connections. Water Allocation Plan may be implemented by GM.	Emergency water shortage when major water line breaks or pump / system fail occurs and causes loss of capability.	Achieve a 50% reduction in water use. BMPs to manage critical water shortage conditions. Same mandatory water use restrictions as Stage 2 and 3, except more limited water schedule, prohibition of further water uses, no applications for additional water connections.	N/A	N/A
Brookesmith SUD (Wholesale)	Sales from BCWID #1	Daily water demand equals or exceeds 85% (3.4 MG) for 3 consecutive days or 4 MG on a single day.	Achieve a 5% reduction in water use. Reduce or discontinue the flush of water mains. Contact wholesale water customers. Request initiation of voluntary measures. Weekly report to news media.	Daily water demand equals or exceeds 90% (3.6 MG) for 3 consecutive days or 4 MG on a single day.	Achieve a 15% reduction in water use. May reduce or discontinue flushing of water mains and irrigation of public landscaped areas. Request wholesale water customers to initiate mandatory measures. GM will prepare for implementation of pro rate curtailment. Weekly report to news media.	When imminent or actual failure of major component which would cause immediate health or safety hazard.	Achieve a 30% reduction in water use. Discontinue the flushing of water mains. Request wholesale water customers to initiate additional mandatory measures. GM will initiate pro rate curtailment. Weekly report to news media.	Emergency water shortage when major water line breaks or pump / system fail occurs and causes loss of capability.	Assess severity of problem and identify actions needed and time required to solve the problem. Notify appropriate city, county, state emergency response officials, if appropriate. Undertake necessary actions, including repairs and/or clean-up as needed. Prepare post-event assessment report.	N/A	N/A
Brown County WID	Lake Brownwood	Lake Brownwood is below elevation 1,420 feet msl. (76% capacity)	Achieve a 5% reduction in water use. Advise customer of early conditions. Require customers to initiate Stage 1 of Drought Contingency Plans. Increase public education. Request voluntary conservation measures.	Lake Brownwood is below elevation 1,417 feet msl. (64% capacity)	Achieve a 15% reduction in water use. Request decrease in water usage. Implement watering restrictions. May reduce water delivery in accordance with pro rate curtailment.	Lake Brownwood is below elevation 1,414 feet msl. (52% capacity)	Achieve a 30% reduction in water use. Request to severely reduce water usage. Watering restrictions. District may reduce water delivery in accordance with pro rata curtailment. May utilize alternative water sources with TCEQ Director approval.	Lake Brownwood is below elevation 1,411 feet msl. (43% capacity)	Achieve a 50% reduction in water use. District may call an emergency meeting with customers. Completely restrict watering. May evaluate the need to discontinue delivery of water for second crops and non-essential uses. May reduce water delivery in accordance with pro rata curtailment. May utilize alternative water sources with TCEQ Director approval.	Lake Brownwood is below elevation 1,408 feet msl. (34% of reservoir capacity). Mechanical or system failures occur. Natural or man-made contamination. Discretion of BCWID General Manager or Board of Directors.	Declaration of an emergency water shortage condition. District will assess severity of the problem and identify actions and time to solve it. May call an emergency meeting with customers. May reduce or eliminate water delivery in accordance with pro rata. May utilize alternative water sources with TCEQ Director approval.
Brookwood	Sales from BCWID #1	Brown County WID #1 declares Stage 1 Drought. High demand on system. Drought monitor indicates drought conditions.	Achieve a 5% reduction in total water use. Voluntary watering schedule. Notify major commercial and industrial water users. Increase leak detection and repair efforts. Daily evaluations of SCADA system and/or operations. May consider water rate increase or water use surcharge.	Brown County WID #1 declares Stage 2 Drought. Inability to maintain 70% storage capacity overnight due to high demand. Demand exceeds 85% capacity for 3 consecutive days. Demand exceeds 90% capacity for 1 day.	Achieve 15% reduction in total water use. Mandatory watering schedule. Initiate 50% reduction in irrigation of parks and landscapes. Reduce commercial and purchased wholesale use by 20%. Increase utility oversight of water waste. May consider water rate increase or water use surcharge.	Brown County WID #1 declares Stage 3 Drought. Inability to maintain 50% storage capacity overnight due to high demand. Demand exceeds 90% capacity for 3 consecutive days. Demand exceeds 95% capacity for 1 day.	Achieve 30% reduction in total water use. Mandatory watering schedule and water use restrictions. Non-essential commercial water reduced by 20%. Require wholesale customers to reduce purchased water use by 30%. Implement utility enforcement of watering schedule and water waste. May consider water rate increase or water use surcharge.	Brown County WID #1 declares Stage 4 Drought. Inability to maintain 35% storage capacity overnight due to high demand. Demand exceeds 95% capacity for 3 consecutive days. Demand exceeds 100% capacity for 1 day.	Achieve 50% reduction in total water use. Mandatory watering schedule. Reduce non-essential commercial water use by 50% to 100%. Require wholesale customers to reduce purchased water use by 50%. Increase utility enforcement of water schedule and waste. May consider water rate increase or water use surcharge.	Same triggers as Stage 4 with addition of one or more secondary triggers. Lake levels less than one year supply. Inability to achieve Stage 4 goals.	Achieve 50% reduction in total water use. Prohibit water use according to a watering schedule. Reduce non-essential commercial use by 75% to 100%. Require wholesale customers to reduce purchased water use by 50%. Increase utility enforcement of water schedule and waste. May consider water rate increase or water use surcharge.
Coleman County SUD	Lake Coleman, Hords Creek Lake	Lake Coleman lake level is equal to or less than 1705.5 ft elevation. USACE curtails the amount of water that the City can obtain from Hords Creek Lake. Daily water demand for City of Coleman equals or exceeds 3.3 MGD for 5 consecutive days.	Achieve a voluntary 10% reduction in daily water demand. GM will monitor limited water supplies and/or reduce water demand. GM will contact City and Brookesmith SUD. Lawn watering schedule restriction. Weekly news report.	Lake Coleman lake level is equal to or less than 1702 ft elevation. USACE significantly curtails the amount of water that the City can obtain from Hords Creek Lake.	Achieve a 20% reduction in daily water demand. Confer with City and Brookesmith SUD. City may modify reservoir operations. Water use restrictions and penalties. Fines for violations.	Lake Coleman lake level is equal to or less than 1700 ft elevation. USACE completely curtails the amount of water that the City can obtain from Hords Creek Lake.	Achieve a 30% reduction in total water use. Meet weekly with City and Brookesmith SUD. Consider tapping reserves in Lake Scarborough. More stringent water use restrictions and penalties.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply source(s).	Assess severity and identify actions needed and time required to solve. Notify city, county, and/or state emergency response officials for assistance if needed. Undertake necessary actions as needed. Prepare post-event assessment report.	N/A	N/A
Colorado River Municipal Water District (CRMWD)	O.H. Ivie Reservoir	O.H. Ivie Reservoir capacity is less than 138,028 ac-ft or System capacity is less than 77,998 ac-ft.	Achieve a 2% reduction in total water use. Begin 'pump back' operation as needed. Initiate studies to evaluate alternative actions if conditions worsen. Request any or all WUGs to implement Stage 1 or their drought contingency plan.	O.H. Ivie Reservoir capacity is less than 107,060 ac-ft or System capacity is less than 58,499 ac-ft.	Achieve a 5% reduction in total water use. Notify TCEQ within 5 business days of any mandatory measures to be implemented. Request any or all WUGs to implement Stage 2 of their drought contingency plan.	O.H. Ivie Reservoir capacity is less than 76,092 ac-ft or System capacity is less than 38,999 ac-ft.	Achieve a 10% reduction in total water use. Initiate Ward County Well Field System pipeline expansion project. Initiate additional studies if conditions worsen. Request any or all WUGs to implement stage 3 of their drought contingency plan.	Emergency water shortage when a pipeline break, equipment failure, or contamination severely limits distribution capacity.	Assess severity and identify actions needed and time required to solve. Inform utility director to alleviate problem. Notify city, county, and/or state emergency response officials for assistance if needed. Undertake necessary actions as needed.	N/A	N/A

Table G-1  
Drought Triggers and Actions by Water Provider

Water Provider	Water Sources	Stage 1 - Mild Drought		Stage 2 - Moderate Drought		Stage 3 - Severe Drought		Stage 4 - Critical Drought		Stage 5 - Emergency Drought	
		Stage 1 Trigger	Response	Stage 2 Trigger	Response	Stage 3 Trigger	Response	Stage 4 Trigger	Response	Stage 5 Trigger	Response
Ector County Utility District (ECUD)	Sales from Odessa	Daily water demands exceed 90% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days.	Achieve a voluntary 1 to 5% reduction in daily water demand. Raise public awareness, request voluntary reductions in nonessential water use.	Daily water demands exceed 95% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days.	Achieve a 5 to 10% reduction in daily water demand. Implement mandatory restriction on nonessential water uses. Irrigation watering schedule, mandatory water restrictions, prohibit non-essential water uses.	Daily water demands exceed 98% of City of Odessa's treatment plant's capacity to produce or pump water for three consecutive days or moderate conditions have remained in effect for an extended period.	Achieve a 10 to 15% reduction in daily water demand. Implement bans on certain types of non-essential water uses. Prohibit watering of landscaped areas and non-essential uses. Other limits on industrial, commercial, or residential customers deemed necessary by the Administrator.	Extended duration of severe conditions. Extreme operational conditions such as major line breaks, pump or system failures which cause loss of capability to provide normal water service. Natural or man-made contamination of water sources.	Contact large water users to require they cease landscape irrigation and reduce all other water uses. Implement Severe Condition restriction as needed. Implement Emergency Response Program. City Council may implement a surcharge system for water use over specified volume.	N/A	N/A
Eden	City Well Field	Distribution system tank storage levels remain below 75 percent for a continuous three day period.	Achieve a voluntary 10% reduction in daily water demand. Reduce flushing of water mains. Voluntary water use restrictions.	Distribution system tank storage levels remain below 60 percent for a continuous three day period.	Achieve a 25% reduction in total daily water use. Reduce flushing of water mains, reduce park water. Irrigation watering schedule, limit hydrant use, prohibit non-essential water uses.	Distribution system tank storage levels remain below 50 percent for a continuous three day period.	Achieve a 35% reduction in total daily water use. Refrain from flushing mains, park watering, filling swimming pools. Irrigation watering schedule and limitations on irrigation watering use. Unmetered water for construction under special permit is discontinued.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply sources occur.	Achieve a 50% reduction in total daily water use. Refrain from flushing mains, park watering, filling swimming pools. Irrigation of landscaped areas is prohibited. Other outdoor uses are prohibited. Administrator authorized to allocate water according to water allocation plan.	N/A	N/A
Fort Stockton	City Well Field	Annually May 1 through September 30. Demand equals or exceeds 5 MG for 3 consecutive days or 6 MG on a single day.	Achieve voluntary 20% reduction in total water uses. Reduce to 4 MG daily demand. Voluntary water use restrictions.	Demand equals or exceeds 5MG for 7 consecutive days or 6 MG on a single day.	Achieve voluntary 20% reduction in total water uses. Reduce to 4 MG daily demand. Irrigation watering schedule, mandatory water use restrictions, prohibit non-essential water uses.	Demand equals or exceeds 6 MG for 7 consecutive days or 7 MG on a single day.	Achieve voluntary 33% reduction in total water use. Lower to 4MG daily demand. Requirements of Stage 2 shall remain in effect except: irrigation watering schedule further limited, watering of golf course tees is prohibited, use of water for construction purposes is discontinued.	Demand equals and exceeds 7 MG for 1 consecutive days or when static water level in the City of Fort Stockton water supply well(s) is equal to or greater than 300 feet.	Achieve voluntary 43% reduction in total water use, and reduce daily water demand to an acceptable daily demand of 4 MG. Requirements of Stage 2 and 3 shall remain in effect. Irrigation watering schedule is further limited. Prohibition of water water outdoor and non-essential water uses.	Major water line breaks, pump or system failures that cause unprecedented loss of water system. Natural or man-made water supply contamination.	Achieve a voluntary 70 percent reduction in total water use, reduce daily water demand to 2 MG. Requirements of Stage 2, 3, and 4 shall remain in effect. Irrigation of landscaped areas is prohibited. Use of water for vehicle washing is prohibited.
Grandfalls	Sales from CRMWD	Annually May 1 through September 30. Pursuant to wholesale contract, CRMWD requests initiation of Stage 1 of the Drought Contingency Plan.	Achieve a reduction in both total water use and daily water demand. Voluntary water use restrictions.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 2 of the Drought Contingency Plan. Total daily water demand equals or exceeds 300,000 gal for 3 consecutive days, demand for 500,000 gal for a single day, continually falling treated water reservoir levels do not refill to 100% overnight.	Achieve a reduction in both total water use and daily water demand. Irrigation watering schedule, mandatory water use restrictions, prohibit non-essential water uses.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 3 of the Drought Contingency Plan. Total daily water demand equals or exceeds 400,000 gal for 3 consecutive days, demand for 600,000 gal for a single day, continually falling treated water reservoir levels do not refill to 75% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2 shall remain in effect except: irrigation watering schedule further limited, watering of golf course tees is prohibited, use of water for construction purposes is discontinued.	Pursuant to wholesale contract, CRMWD requests initiation of Stage 4 of the Drought Contingency Plan. Total daily water demand equals or exceeds 500,000 gal for 3 consecutive days, demand for 700,000 gal for a single day, continually falling treated water reservoir levels do not refill to 50% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2 and 3 shall remain in effect except: irrigation watering schedule is further limited, prohibition of outdoor and non-essential water uses, no applications for new, additional, expanded, or increased water connections.	Major water line breaks, pump or system failures that cause unprecedented loss of water system. Natural or man-made water supply contamination. Continually falling treated water reservoir levels do not refill above 25% overnight.	Achieve a reduction in both total water use and daily water demand. Requirements of Stage 2, 3, and 4 shall remain in effect except: irrigation of landscaped areas is prohibited, use of water to wash vehicles is prohibited.
Millersview-Doole	Sales from CRMWD, Groundwater	Average daily water use reaches 1.56 MGD (currently 60% of system capacity) for three consecutive days. Consideration will be given to weather conditions, time of year, and customer complaints of low water pressure.	Reduce usage by 10%. Inform the public. Implement mandatory lawn watering schedule; water restrictions; pipe insulation; monitoring water pressure in distribution system and water levels in storage tanks.	Average daily water use reaches 1.95 MGD (currently 60% of system capacity) for three consecutive days. Net storage in water usage is continually decreasing on a daily basis and falls below 720,000 gal (60% capacity) for 48 hours. Water pressures reach 35 psi in distribution system.	Reduce usage by 15%. Inform the public. Continue actions from Stage 1. Prohibit outdoor water use. Prohibit non-essential water uses (water line flusing, washing corporation vehicles). Purchase customers for non-compliance to curtailment measures.	Immiment or actual failure of major component of the system which would cause an immediate health or safety hazard. Water demand exceeding 1.95 MGD (currently 75% of system capacity) for three consecutive days. Failure of supplier to deliver contracted water. Availabl ewater supply is so low that pumps cannot pump daily water demand.	Reduce usage by 25%. Inform the public. Prohibit water use certain commercial water users which are not essential to health and safety of the community.	N/A	N/A	N/A	N/A
Midland	Sales from CRMWD, City Well Field, O.H. Ivie Reservoir	CRMWD initiates Stage 1. Request from CRMWD due to limitation in available supplies or transmission. Demand reaches 45 MGD (94% of the treatment plant capacity) plus 50% of well field capacity for 5 consecutive days.	Achieve voluntary 10% reduction in daily water demand. Reduced flushing of water mains and increased use of alternative supply source(s) if available. Voluntary water use restrictions. Request for customers to practice water conservation and minimize or discontinue non-essential water use.	CRMWD initiates Stage 2. Request from CRMWD due to limitation in available supplies or their transmission lines. Demand reaches or exceed 55 MGD (95% of water plant's capacity) for 5 consecutive days or 60 MG in a single day.	Achieve 15% reduction in daily water demand. Implement reduced flushing of water mains, increased use of an alternative supply source(s). Irrigation watering schedule. Mandatory water use restrictions. Prohibit non-essential water uses.	CRMWD initiates Stage 3. Failure or threatening failure of a major system component will result in immediate health or safety hazard. Total daily water demand reaches the system limit.	Achieve 20% reduction in daily water demand. Reduce flushing of water mains, reduced irrigation of public landscaped areas to minimum required to avoid vegetation loss, increased use of an alternative supply source. All requirements of Stage 2 except: a more stringent irrigation watering schedule, prohibit watering of golf course tees.	CRMWD initiates Stage 4. Treated water storage levels do no restore overnight.	Achieve a 25% reduction in daily water demand. Reduced or discontinued flushing of water mains, reduced or discontinued irrigation of public landscaped areas, increased use of an alternative supply source. All requirements of Stage 2 and 3 except: more stringent outdoor watering schedules, prohibit various outdoor water uses, no applications for new, additional, expanded, or increased-in-size water connections.	Major water line breaks, or pump or system failure occurs, which cause unprecedented loss of capability to provide water service. Natural or man-made contamination of water supply sources.	Achieve a 30 day sustainable demand level which well fields can provide 25 MGD. Discontinued flushing of water mains, discontinued irrigation of public landscaped areas, use of an alternative supply source(s). All requirements of Stage 2, 3, and 4 shall remain in effect except: irrigation of landscaped areas is prohibited, use of water to wash vehicles is prohibited.

Table G-1  
Drought Triggers and Actions by Water Provider

Water Provider	Water Sources	Stage 1 - Mild Drought		Stage 2 - Moderate Drought		Stage 3 - Severe Drought		Stage 4 - Critical Drought		Stage 5 - Emergency Drought	
		Stage 1 Trigger	Response	Stage 2 Trigger	Response	Stage 3 Trigger	Response	Stage 4 Trigger	Response	Stage 5 Trigger	Response
Odessa	Sales from CRMWD	Daily demand > 90% of treatment plant's capacity to produce or pump water for three consecutive days.	Achieve voluntary 1-5% reduction in daily water demand. Raise public awareness of need to conserve water supply. Request voluntary reductions in nonessential water use. Notify industrial users and request voluntary water use restrictions.	Daily demand > 95% of treatment plant's capacity to produce or pump water for three consecutive days.	Achieve 5-10% reduction in daily water demand. Implement mandatory restrictions on nonessential water. Reduce fire hydrant flushing except where needed to maintain water quality. Irrigation watering schedule. Mandatory water use restrictions. Prohibit non-essential water uses.	Daily demand > 98% of treatment plant's capacity to produce or pump water for three consecutive days or the moderate conditions have remained in effect for an extended period.	Achieve 10-15% reduction in daily water demand. Implement ban on certain types of non-essential water uses. Consider implementation of a surcharge for excess water usage. Discontinue all fire hydrants flushing except where critical to maintaining water quality. Reduce or discontinue irrigation of public landscaped areas irrigated with the raw or potable water sources. Prohibit non-essential water uses.	Extended duration of severe conditions. Extreme operational conditions such as major line breaks, pump or system failures which cause loss of capability to provide normal water service. Natural or man-made contamination of water sources.	Reduce water usage as deemed necessary by the Administrator to alleviate the emergency conditions, maintain fire flows, and/or state requirements for the maintenance of distribution systems. Implement emergency response appropriate for the type and anticipated duration of the emergency. Contact all water users to require they cease landscape irrigation and reduce water uses. Implement Emergency Response Program.	Extended duration of severe conditions. Extreme operational conditions such as major line breaks, pump or system failures which cause loss of capability to provide normal water service. Natural or man-made contamination of water sources.	N/A
Red Bluff Power Control District	Red Bluff Lake	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
San Angelo	City Well Field, O.H. Ivie Reservoir	Minimum daily groundwater production coupled with the total amount of surface water available is less than a 24-month supply.	Achieve a 10% reduction in water use. Various outdoor watering use restrictions. Water usage fee.	Minimum daily groundwater production coupled with the total amount of surface water available is less than an 18-month supply.	Achieve a 15% reduction in water use. Various outdoor watering use restrictions. Water usage fee.	Minimum daily groundwater production coupled with the total amount of surface water available is less than a 12-month supply.	Achieve a 25% reduction in water use. Various outdoor watering use restrictions. Water usage fee.	N/A	N/A	N/A	N/A
Snyder	Sales from CRMWD	Begin April 1st to Sept 30th.	Voluntarily limit the use of water for nonessential purposes and to practice water conservation.	Average daily water use exceeds the plant capacity for three consecutive days. CRMWD is unable to supply the daily raw water demand.	Achieve 15% reduction in daily water demand. Visually inspect lines and repair leaks on a daily basis. Reduce landscape irrigation to half the normal irrigation schedule. Voluntary outdoor water use reductions and watering schedule.	Imminent or actual failure of a major component of the system, which would cause an immediate health or safety hazard. Water demand is exceeding the firm system capacity of 8 MGD for 3 consecutive days. Average daily water use exceeds the plant capacity for 3 consecutive days. CRMWD is unable to supply the daily water demand.	Achieve 30% reduction in daily water demand. Visually inspect lines and repair leaks on a regular basis. Irrigation watering schedule. Mandatory water use restrictions. Prohibit non-essential water uses.	Major water main break, pump or system failures occur, or any event which cause unprecedented loss of the capability to provide water service, or natural or man-made contamination of the water supply sources occur.	Achieve a maximum reduction as possible to maintain potable water delivery. Irrigation of landscaped areas is absolutely prohibited. Use of water to wash vehicles is prohibited.	N/A	N/A
Sonora	City Well Field	Average daily water consumption reaches 80% of production capacity of water system (2.01 MGD). Consumption (80%) has existed for 3 days. Weather conditions are considered to be in a drought classification determination.	Develop Information Center and designate Information Person. Advise public. Encourage voluntary reduction of water use. Contact wholesale, commercial, and industrial users and explain initiation. Implementation of system oversight and make adjustments needed.	Average daily water consumption reaches 85% of production capacity of water system (2.13 MGD). Weather conditions indicate mild drought for 5 or more days. One GST or well is taken out of service. Storage capacity (water level) is not 100% maintained during period of 85% production. Existence of any listed condition in Stage 1 for 36 hours.	Outdoor residential use (washing vehicles, landscape or recreational sprinklers, etc.) of water will be permitted only on specified days. City Administrator will monitor system function and establish hours for outside use. Information Center will keep public advised. Commercial and industrial users will be notified to insure mandatory conservation initiation.	Average daily water consumption reaches 90% of production capacity of water system (2.26 MGD). Average daily water consumption will not enable storage level to maintained and/or recover fully during low demand periods. System demand meets or exceeds 90% max. daily average. Any two conditions listed in Stage 2 occur at same time during 24-hour period.	The City Administrator will ban the use of water for: (1) vehicle washing, window washing, outdoor watering (lawn, shrub, faucet, dripping garden, etc.); (2) Public water uses not essential for health, safety, and sanitary purposes; (3) Commercial users not listed and industrial users will be controlled to the extent dictated by the City Administrator.	Average daily water consumption reaches 95% of production capacity of water system (2.39 MGD). Average daily water consumption will not enable storage level to maintained above 90% of normal water storage capacity. System demand exceeds max. daily average. Any two conditions listed in Stage 3 occur at same time during 24-hour period.	The City Administrator will ban the use of water for: (1) vehicle washing, window washing, outdoor watering (lawn, shrub, faucet, dripping garden, etc.); (2) Public water uses not essential for health, safety, and sanitary purposes; (3) Commercial users not listed and industrial users will be controlled to the extent dictated by the City Administrator. Wholesale customers shall be notified and initiate curtailment procedures for mandatory DCP measures (if none, follow Sonora's DCP).	Average daily water consumption reaches 100% of production capacity of water system (2.51 MGD). Average daily water consumption will not enable storage level to maintained above 75% of normal water storage capacity. System demand exceeds peak daily average. Any two conditions listed in Stage 4 occur at same time during 24-hour period. Water system is contaminated. Water system fails (act of God, natural disaster, man).	The City Administrator will ban use of water for all water use, except for water needed for health and human consumption.
Upper Colorado River Authority (UCRA)	Sales from City of San Angelo	The amount of water available, to the City of San Angelo and its developed water sources is less than a 24-month supply.	Achieve a voluntary 10% reduction in daily water demand. Outdoor watering schedule and restrictions.	The amount of water available, to the City of San Angelo and its developed water sources is less than a 18-month supply.	Achieve a 15% reduction in daily water demand. Outdoor watering schedule and restrictions. Prepare for implementation of pro rata curtailment.	The amount of water available, to the City of San Angelo and its developed water sources is less than a 12-month supply.	Achieve a 20% reduction in daily water demand. Outdoor watering is prohibited. Other water uses are prohibited. UCRA Director will contact water customers. If City of San Angelo curtails water delivery to UCRA, they will initiate pro rata curtailment.	City of San Angelo's water distribution system reaches a level that exceeds the amount which may be treated or safely delivered through the system. Water system failure or emergency which limits the amount of water that may be treated or safely delivered through the City of San Angelo's system.	Assess the severity of the problem and communicate with City of San Angelo regarding any water use restriction resolutions(s) passed by the San Angelo City Council.	N/A	N/A



**Table G-1  
Drought Triggers and Actions by Water Provider**

Water Provider	Water Sources	Stage 1 - Mild Drought		Stage 2 - Moderate Drought		Stage 3 - Severe Drought		Stage 4 - Critical Drought		Stage 5 - Emergency Drought	
		Stage 1 Trigger	Response	Stage 2 Trigger	Response	Stage 3 Trigger	Response	Stage 4 Trigger	Response	Stage 5 Trigger	Response
Winters	Elm Creek Reservoir	Total storage in Elm Creek Reservoir is at or below 50% of total water storage capacity	Water use reduction goal below 1.7 MGD. City Administrator will provide weekly report to media. Outdoor watering schedule and restrictions. Certain non-essential water uses are prohibited.	Total storage in Elm Creek Reservoir is at or below 40% of total water storage capacity	Water use reduction goal below 1.5 MGD. City Administrator will request wholesale customers to initiate DCP Stage 2; begin weekly contact with wholesale customers to begin pro rate curtailment. Provide weekly report to media. Outdoor watering schedule and restrictions. All non-essential water uses, with the exception of livestock, are prohibited	Total storage in Elm Creek Reservoir is at or below 30% of total water storage capacity; demand on the system exceeds production and storage capacities over a 24-hour period and refilling of facilities is at a critical stage and demand for water is expected to continue to exceed supply capabilities.	Water use reduction goal below 1.25 MGD. City Administrator will request wholesale customers to initiate DCP Stage 3; continue weekly contact with wholesale customers to discuss water supply and/or demand and pro rate curtailment. Provide weekly report to media. All non-essential water uses are prohibited. City Administrator may grant exception for livestock.	Total storage in Elm Creek Reservoir is at or below 20% of total water storage capacity; demand on the system exceeds production and storage capacities over a 24-hour period and refilling of facilities is at a critical stage and demand for water is expected to continue to exceed supply capabilities. Loss of major component of distribution system, source of supply, or natural disaster/emergency.	Water use reduction goal below 1.0 MGD. Continue Stage 3 demand management measures. Continue Stage 2 and 3 water restrictions, except: irrigation of landscaped areas is prohibited; use of water to wash vehicles is prohibited; filling, refilling or adding of water to pools/jacuzzis is prohibited. Violations of restrictions are subject to a fine. Residential water rate structure.	N/A	N/A

**Table G-2  
Source, Manager, and User**

Source	Manager	User
Ballinger/Moonen Lake	Ballinger	Ballinger
		North Runnels WSC
		County-Other (Runnels County)
		Manufacturing (Runnels County)
Lake Balmorhea	Reeves County WCID #1	Irrigation (Reeves County)
Lake Brownwood	Brown County WID #1	Bangs
		Brookesmith SUD
		Brownwood
		Coleman County SUD
		County-Other (Brown County)
		Early
		Santa Anna
		Zephyr WSC
		Irrigation (Brown County)
		Manufacturing (Brown County)
Brady Creek Reservoir	Brady	Brady
		County-Other (McCulloch County)
Lake Coleman	Coleman	Coleman County SUD
		Coleman
		County-Other (Coleman County)
		Manufacturing (Coleman County)
Champion Lake	Texas Electric Service Company	Steam Electric Power (Mitchell County)
Colorado River MWD Reservoir System	CRMWD	Big Spring
		Coahoma
		County-Other (Scurry County)
		Ector County UD
		Midland
		Odessa
		Rotan
		Snyder
		Stanton
		Irrigation (Ector County)
		Irrigation (Midland County)
		Manufacturing (Ector County)
		Manufacturing (Howard County)
		Steam Electric Power (Ector County)
Steam Electric Power (Howard County)		

**Table G-2**  
**Source, Manager, and User**

Source	Manager	User
Colorado River MWD Reservoir (O.H. Ivie) Non-System	CRMWD	Abilene
		Midland
		San Angelo
		Millersview-Doole WSC
		Ballinger
Hords Creek Lake	USACE	Coleman County SUD
		Coleman
		County-Other (Coleman County)
		Irrigation (Coleman County)
		Manufacturing (Coleman County)
Oak Creek	Sweetwater	Bronte
		Robert Lee
		County-Other (Coke County)
		Sweetwater
		Steam Electric Power (Coke County)
O.C. Fisher	San Angelo	San Angelo
		Goodfellow Air Force Base
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green))
		Manufacturing (Tom Green County)
Red Bluff Lake	Red Bluff Water Power Control District	Irrigation (Pecos County)
		Irrigation (Reeves County)
		Irrigation (Ward County)
San Angelo System (Twin Buttes, Nasworthy)	San Angelo	San Angelo
		Goodfellow Air Force Base
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green))
		Manufacturing (Tom Green County)
Lake Winters	Winters	County-Other (Runnels County)
		Manufacturing (Runnels County)
		Winters
Colorado Run-of-River - Brown County		Irrigation (Brown County)
Colorado Run-of-River - Coke County		Irrigation (Coke County)
Colorado Run-of-River - Coleman County		Irrigation (Coleman County)
Colorado Run-of-River - Concho County		County-Other (Concho County)
		Irrigation (Concho County)
Colorado Run-of-River - Ector County		Irrigation (Ector County)
Colorado Run-of-River - Irion County		Irrigation (Irion County)
Colorado Run-of-River - Kimble County		Irrigation (Kimble County)
		Manufacturing (Kimble County)
		Mining (Kimble County)
Colorado Run-of-River - Kimble County	Junction	Junction

**Table G-2  
Source, Manager, and User**

Source	Manager	User
Colorado Run-of-River - McCulloch County		Irrigation (McCulloch County)
Colorado Run-of-River - Menard County		Irrigation (Menard County) Menard
Colorado Run-of-River - Mitchell County		Irrigation (Mitchell County)
Colorado Run-of-River - Runnels County		Irrigation (Runnels County)
Colorado Run-of-River - Sterling County		Irrigation (Sterling County)
Colorado Run-of-River - Sutton County		Irrigation (Sutton County)
Concho Run-of River - Tom Green County	San Angelo	San Angelo
		Goodfellow Air Force Base
		UCRA (Miles, Concho Rural WSC, County-Other (Concho, Tom Green), Mining (Tom Green)
		Manufacturing (Tom Green County)
Rio Grande Run-Of-River - Jeff Davis County (Region E)		County-Other (Reeves County)
		Irrigation (Jeff Davis County Region E)
Rio Grande Run-of-River - Pecos County		Irrigation (Pecos County)
Capitan Reef Complex Aquifer - Pecos County		Irrigation (Pecos County)
		Livestock (Pecos County)
Cross Timbers Aquifer - Brown County		County-Other (Brown County)
		Irrigation (Brown County)
		Livestock (Brown County)
		Mining (Brown County)
Cross Timbers Aquifer - Coleman County		Irrigation (Coleman County)
Cross Timbers Aquifer - Concho County		None reported
Cross Timbers Aquifer - McCulloch County		None reported
Cross Timbers Aquifer - Runnels County		None reported
Dockum Aquifer - Andrews County		Livestock (Andrews County)
		Manufacturing (Andrews County)
Dockum Aquifer - Borden County		Livestock (Borden County)
Dockum Aquifer - Crane County		Manufacturing (Crane County)
Dockum Aquifer - Ector County		Mining (Ector County)
Dockum Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
		Mining (Howard County)
Dockum Aquifer - Irion County		Mining (Irion County)
Dockum Aquifer - Loving County		Livestock (Loving County)
		Mining (Loving County)

**Table G-2  
Source, Manager, and User**

Source	Manager	User
Dockum Aquifer - Mitchell County		Colorado City
		Loraine
		Mitchell County Utility
		County-Other (Mitchell County)
		Irrigation (Mitchell County)
		Livestock (Mitchell County)
		Manufacturing (Mitchell County)
		Mining (Mitchell County)
Dockum Aquifer - Reagan County		Irrigation (Reagan County)
Dockum Aquifer - Reeves County		Livestock (Reeves County)
		Pecos (Reeves County)
Dockum Aquifer - Scurry County		County-Other (Scurry County)
		Irrigation (Scurry County)
		Livestock (Scurry County)
		Manufacturing (Scurry County)
		Mining (Scurry County)
Dockum Aquifer - Upton County		Irrigation (Upton County)
		Manufacturing (Upton County)
Dockum Aquifer - Ward County		County-Other (Ward County)
		Irrigation (Ward County)
		Livestock (Ward County)
Dockum Aquifer - Winkler County		County-Other (Winkler County)
		Kermit
		Livestock (Winkler County)
		Manufacturing (Winkler County)
		Mining (Winkler Other)
Edwards-Trinity (Plateau) Aquifer - Andrews County		Irrigation (Andrews County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Coke County		County-Other (Coke County)
		Irrigation (Coke County)
		Livestock (Coke County)
		Mining (Coke County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Concho County		Eden
		County-Other (Concho County)
		Livestock (Concho County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Crockett County		County-Other (Crockett County)
		Crockett County WCID #1
		Irrigation (Crockett County)
		Livestock (Crockett County)
		Manufacturing (Crockett County)
		Mining (Crockett County)

**Table G-2  
Source, Manager, and User**

Source	Manager	User
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Ector County		County-Other (Ector County)
		Greater Gardendale WSC
		Irrigation (Ector County)
		Livestock (Ector County)
		Mining (Ector County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Glasscock County		County-Other (Glasscock County)
		Irrigation (Glasscock County)
		Livestock (Glasscock County)
		Manufacturing (Glasscock County)
Edwards-Trinity (Plateau) Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
		Manufacturing (Howard County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Irion County		County-Other (Irion County)
		Irrigation (Irion County)
		Livestock (Irion County)
		Manufacturing (Irion County)
		Mertzon
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Kimble County		County-Other (Kimble County)
		Irrigation (Kimble County)
		Livestock (Kimble County)
		Manufacturing (Kimble County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - McCulloch County		Livestock (McCulloch County)
		Manufacturing (McCulloch County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Menard County		County-Other (Menard County)
		Irrigation (Menard County)
		Livestock (Menard County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Midland County		Airline Mobile Home Park LTD
		County-Other (Midland County)
		Irrigation (Midland County)
		Livestock (Midland County)
		Midland
		Manufacturing (Midland County)
		Mining (Midland County)
Odessa		

**Table G-2  
Source, Manager, and User**

Source	Manager	User
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Pecos County		County-Other (Pecos County)
		Fort Stockton
		Iraan
		Irrigation (Pecos County)
		Livestock (Pecos County)
		Manufacturing (Pecos County)
		Mining (Pecos County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Reagan County		Pecos County Fresh Water
		Big Lake
		County-Other (Reagan County)
		Irrigation (Reagan County)
		Livestock (Reagan County)
		Mining (Reagan County)
		Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Schleicher County
El Dorado		
Irrigation (Schleicher County)		
Livestock (Schleicher County)		
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Sterling County		Mining (Schleicher County)
		County-Other (Sterling County)
		Irrigation (Sterling County)
		Livestock (Sterling County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Sutton County		Mining (Sterling County)
		County-Other (Sutton County)
		Irrigation (Sutton County)
		Livestock (Sutton County)
		Manufacturing (Sutton County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Tom Green County		Mining (Sutton County)
		Sonora
		Concho Rural WSC
		County-Other (Tom Green County)
Edwards-Trinity (Plateau), Pecos Valley, and Trinity Aquifer - Upton County		Irrigation (Tom Green County)
		Livestock (Tom Green County)
		County-Other (Upton County)
		Irrigation (Upton County)
Ellenburger-San Saba Aquifer - Mason County		Livestock (Upton County)
		Manufacturing (Upton County)
		Mining (Upton County)
		Rankin
		County-Other (Mason County)
Ellenburger - San Saba Aquifer - McCulloch County		Livestock (Mason County)
		Mining (McCulloch County)
Ellenburger - San Saba Aquifer - Menard County		Livestock (McCulloch County)
		Mining (Menard County)

**Table G-2  
Source, Manager, and User**

Source	Manager	User
Hickory Aquifer - Concho County		Millerview-Doole WSC
Hickory Aquifer - Kimble County		Irrigation (Kimble County)
Hickory Aquifer - Mason County		County-Other (Mason County)
		Irrigation (Mason County)
		Livestock (Mason County)
		Mason
		Mining (Mason County)
Hickory Aquifer - McCulloch County		Brady
		County-Other (McCulloch County)
		Irrigation (McCulloch County)
		Livestock (McCulloch County)
		Manufacturing (McCulloch County)
		Millersview-Doole WSC
Hickory Aquifer - Menard County		Irrigation (Menard County)
Hickory Aquifer - Runnels County		Miles
		Millersview-Doole WSC
Hickory Aquifer - Tom Green County		Concho Rural Water
		County-Other (Tom Green County)
		Goodfellow Air Force Base
		Manufacturing (Tom Green County)
		Millersview-Doole WSC
		Mining (Tom Green County)
Igneous Aquifer - Reeves County		Irrigation (Reeves County)
		Livestock (Reeves County)
Lipan Aquifer - Concho County		Irrigation (Concho County)
Lipan Aquifer - Irion County		Mining (Irion County)
Lipan Aquifer - Runnels County		Livestock (Runnels County)
		Manufacturing (Runnels County)
		Miles
Lipan Aquifer - Sterling County		Sterling City
Lipan Aquifer - Tom Green County		Concho Rural WSC
		County-Other (Tom Green County)
		DADS Supported Living Center
		Irrigation (Tom Green County)
		Livestock (Tom Green County)
		Manufacturing (Tom Green County)
		Mining (Tom Green County)
Tom Green County FWSD 3		
Marble Falls Aquifer - Kimble County		County-Other (Kimble County)
Marble Falls Aquifer - McCulloch County		Irrigation (McCulloch County)
		Richland SUD



**Table G-2  
Source, Manager, and User**

Source	Manager	User
Ogallala and Edwards-Trinity (High Plains) Aquifer - Andrews County		Andrews
	Great Plains Water System Inc.	County-Other (Andrews County)
		Irrigation (Andrews County)
		Livestock (Andrews County)
		Manufacturing (Andrews County)
	Great Plains Water System Inc.	Mining (Andrews County)
	Great Plains Water System Inc.	Steam Electric Power (Ector County)
	Midland	
Ogallala and Edwards-Trinity (High Plains) Aquifer - Borden County		County-Other (Borden County)
		Irrigation (Borden County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Dawson County		County-Other (Borden County)
Ogallala Aquifer - Ector County		County-Other (Ector County)
		Irrigation (Ector County)
		Livestock (Ector County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Gaines County		Steam Electric Power (Ector County)
Ogallala Aquifer - Glasscock County		Livestock (Glasscock County)
		Irrigation (Glasscock County)
Ogallala and Edwards-Trinity (High Plains) Aquifer - Howard County		County-Other (Howard County)
		Irrigation (Howard County)
		Livestock (Howard County)
		Manufacturing (Howard County)
		Mining (Howard County)
	Steam Electric Power (Howard County)	

**Table G-2  
Source, Manager, and User**

Source	Manager	User
Ogallala and Edwards-Trinity (High Plains) Aquifer -Martin County		Ector County Utility District
		Odessa
		Manufacturing (Ector County)
		Irrigation (Ector County)
		Coahoma
		Manufacturing (Howard County)
		Steam Electric Power (Howard County)
		County-Other (Martin County)
	CRMWD	CRMWD system customers
		Irrigation (Martin County)
		Livestock (Martin County)
	University Lands	Midland
		Mining (Martin County)
	Stanton	Stanton
		Odessa
	Irrigation (Midland County)	
	Snyder	
	County - Other (Scurry County)	
Ogallala Aquifer - Midland County		Airline Mobile Home Park LTD
		County-Other (Midland County)
		Greenwood Water
		Irrigation (Midland County)
		Livestock (Midland County)
		Manufacturing (Midland County)
		Mining (Midland County)
Other Aquifer - Borden County		County-Other (Borden County)
		Irrigation (Borden County)
		Mining (Borden County)
Other Aquifer - Coke County		Bronte (Coke County)
		County-Other (Coke County)
		Irrigation (Coke County)
		Livestock (Coke County)
		Robert Lee
Other Aquifer - Coleman County		Mining (Coleman County)
Other Aquifer - Concho County		County-Other (Concho County)
		Eden
		Irrigation (Concho County)
		Mining (Concho County)
Other Aquifer - Mason County		County - Other (Mason County)
Other Aquifer - McCulloch County		Livestock (McCulloch County)
		County-Other (McCulloch County)
Other Aquifer - Mitchell County		Livestock (Mitchell County)
Other Aquifer - Pecos County		Livestock (Pecos County)

**Table G-2**  
**Source, Manager, and User**

Source	Manager	User
Other Aquifer - Runnels County		County-Other (Runnels County)
		Irrigation (Runnels County)
		Livestock (Runnels County)
		Mining (Runnels County)
Other Aquifer - Scurry County		County-Other (Scurry County)
		Livestock (Scurry County)
Pecos Valley Aquifer - Andrews County		County - Other (Andrews County)
		Livestock (Andrews County)
		Irrigation (Andrews County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Crane County		Crane
		County - Other (Crane County)
		Manufacturing (Crane County)
		Mining (Crane County)
		Livestock (Crane County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Jeff Davis County		Balmorhea
		Madera Valley WSC
		County - Other (Reeves County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Loving County		County - Other (Loving County)
		Mining (Loving County)
		Livestock (Loving County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Pecos County		Pecos County WCID #1
		Mining (Pecos County)
		Irrigation (Pecos County)
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Reeves County		Madera Valley WSC
		Conty - Other (Reeves County)
		Manufacturing (Reeves County)
		Mining (Reeves County)
		Livestock (Reeves County)
		Irrigation (Reeves County)

**Table G-2  
Source, Manager, and User**

Source	Manager	User
Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Ward County		Crane
		County - Other (Crane County)
		Ector County Utility District
		Odessa
		Manufacturing (Ector County)
		Irrigation (Ector County)
		Big Spring
		Coahoma
		Manufacturing (Howard County)
		Steam Electric Power (Howard County)
		Stanton
		Midland
		Odessa
		Irrigation (Midland County)
		Pecos
		Snyder
		County - Other (Scurry County)
		Grandfalls
		Monahans
	Pecos Valley, Edwards-Trinity (Plateau) Aquifer - Winkler County	
		Wickett
		County - Other (Ward County)
		Manufacturing (Ward County)
		Mining (Ward County)
		Steam Electric Power (Ward County)
		Livestock (Ward County)
Rustler Aquifer - Loving County		Irrigation (Ward County)
		Midland
		Monahans
		Wink
		County - Other (Winkler County)
		Mining (Winkler County)
Rustler Aquifer - Pecos County		Livestock (Winkler County)
		Irrigation (Winkler County)
Rustler Aquifer - Reeves County		Mining (Loving County)
Trinity Aquifer - Brown County		Irrigation (Pecos County)
		Livestock (Pecos County)
		Irrigation (Reeves County)
		County-Other (Brown County)
	Irrigation (Brown County)	
	Livestock (Brown County)	
	Mining (Brown County)	

**Table G-3  
Drought Triggers and Actions by Source**

Source Name	Type (sw/gw)	Factor considered	TRIGGERS						ACTIONS					
			Source Manager			Users			Source Manager			Users		
			Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency
Ballinger/ Moonen Lake	sw	Water Level	1,666	1,662	1,658	same as manager			outside watering limits; request voluntary reduction of use	outside watering limits; fines for violation	prohibit outdoor use; prohibit non essential use; fines	outside watering limits; voluntary reduction of use	outside watering limits; fines for violation	prohibit outdoor use; prohibit non essential use; fines
Lake Balmorhea	sw	Capacity/ Rainfall	<70% intake pond capacity; or no rainfall for 15 consecutive days	<50% intake pond capacity; or no rainfall for 20 consecutive days	<70% intake pond capacity; or no rainfall for 15 consecutive days	same as manager			Achieve voluntary 60% reduction of use for nonessential purposes; water conservation	Achieve 85% reduction in daily water demand. Implement BMPs for supply management.	Achieve 90% reduction in total water usage. Implement BMPs for supply management.	same as manager		
Lake Brownwood	sw	Water Level	1,420	1,414	1,408	same as manager			Initiate stage 1 of DCP; increase public education; request voluntary reduction of use	Initiate stage 2 of DCP; request decrease in use; implement watering restrictions	Initiate stages 3/4 of DCP; request to severely reduce use; may curtail usage and discontinue nonessential uses	Initiate stage 1 of DCP; voluntary reduction of use	Initiate stage 2 of DCP; decrease in use; implement watering restrictions	Initiate stages 3/4 of DCP; severely reduce use; may have reduced deliveries; discontinue all nonessential uses
Brady Creek Reservoir	sw	Supply as % of Demand	supply <= 80% of consumptive needs	supply <= 70% of consumptive needs	supply <= 60% of consumptive needs	same as manager			voluntary 10% reduction of use	20% reduction of use; outdoor watering limits	30% reduction of use; prohibit outdoor water use	same as manager		
Lake Coleman	sw	Water Level	1705 or demand => 3.3 MGD for 5 consecutive days	1,702	1,700	same as manager			voluntary 10% reduction of use; limit outdoor watering; public education	20% reduction; potential pro rata curtailment of customers; further watering restrictions	30% reduction; pro rata curtailment of customers; further watering restrictions	same as manager		
Champion Creek Reservoir	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies		Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies	
CRMWD System	sw	Reservoir Storage	< 77,998 ac-ft capacity	< 58,499 ac-ft capacity	< 38,999 ac-ft capacity	same as manager			initiate studies to evaluate alternative actions; begin 'pump back' operatoin as needed; request initiation of Stage 1 of DCPs	continue or initiate actions from Stage 1; initiate studies to evaluate alternative actions; request initiation of Stage 2 of DCPs	continue or initiate actions from Stages 1 or 2; initiate Ward County Well Field System pipeline expansion project; initiate studies to evaluate alternative actions; request initiation of Stage 3 of DCPs; implement alternative supplies	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3 of DCP
Hords Creek Lake	sw	Demand/ Curtailment	COE curtails usage or demand => 3.3 MGD for 5 consecutive days	COE significantly curtails usage	COE completely curtails usage	same as manager			voluntary 10% reduction of use; limit outdoor watering; public education	20% reduction; potential pro rata curtailment of customers; further watering restrictions	30% reduction; pro rata curtailment of customers; further watering restrictions	same as manager		

**Table G-3  
Drought Triggers and Actions by Source**

Source Name	Type (sw/gw)	Factor considered	TRIGGERS						ACTIONS					
			Source Manager			Users			Source Manager			Users		
			Mild	Severe	Critical/Emergency	Mild	Severe	Critical/Emergency	Mild	Severe	Critical/Emergency	Mild	Severe	Critical/Emergency
Nasworthy	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	same as manager			watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	same as manager		
Oak Creek	sw	Water Level	10 ft. below the spillway (51.5% of capacity)	18 ft. below the spillway	19.7 ft. below the spillway	same as manager			voluntary reduction of non-essential use	limited outdoor watering; fines for violators	no outside watering; increased rates; pro rata curtailment	same as manager		
O.C. Fisher	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	same as manager			watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	same as manager		
O.H. Ivie	sw	Reservoir Storage	< 138,028 ac-ft capacity	< 107,060 ac-ft capacity	< 76,092 ac-ft capacity	same as manager			initiate studies to evaluate alternative actions; request initiation of Stage 1 of DCPs	continue or initiate actions from Stage 1; initiate studies to evaluate alternative actions; request initiation of Stage 2 of DCPs	continue or initiate actions from Stages 1 or 2; initiate studies to evaluate alternative actions; request initiation of Stage 3 of DCPs	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3 of DCP
Red Bluff Lake	sw	Reservoir Storage	100,000 acre-feet	75,000 acre-feet	50,000 acre-feet	same as manager			reduce amount available to users	reduce amount available to users	reduce amount available to users	reduce irrigated acreage	reduce irrigated acreage	stop irrigation
Twin Buttes	sw	San Angelo System Supply	< 24 months supply	< 18 months supply	< 12 months supply	same as manager			watering restrictions; water usage fees	increased watering restrictions; increased water usage fees	increased watering restrictions; increased water usage fees	same as manager		
Lake Winters	sw	Reservoir Storage	<= 50% storage	<= 40% storage	<= 20% storage	same as manager			Target water use below 1.7 MGD; watering restrictions	Target water use below 1.5 MGD, contact customers, weekly report to media, prohibit all nonessential outdoor water use, except for livestock use	Target water use below 1.0 MGD, contact customers, weekly report to media, prohibit all water uses, including livestock use, water usage fees	Initiate stage 1 of DCP	Initiate stage 2 of DCP	Initiate stage 3/4 of DCP
Colorado Run-of-River	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Rio Grande Run-of-River	sw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Capitan Reef Complex Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		

**Table G-3  
Drought Triggers and Actions by Source**

Source Name	Type (sw/gw)	Factor considered	TRIGGERS						ACTIONS					
			Source Manager			Users			Source Manager			Users		
			Mild	Severe	Critical/Emergency	Mild	Severe	Critical/Emergency	Mild	Severe	Critical/Emergency	Mild	Severe	Critical/Emergency
Cross Timbers Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Dockum Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Edwards- Trinity (Plateau), Pecos Valley, and Trinity Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Ellenburger-San Saba Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Hickory Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Lipan Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Marble Falls Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Ogallala & Edwards-Trinity (High Plains) Aquifers	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		

**Table G-3  
Drought Triggers and Actions by Source**

Source Name	Type (sw/gw)	Factor considered	TRIGGERS						ACTIONS					
			Source Manager			Users			Source Manager			Users		
			Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency	Mild	Severe	Critical/ Emergency
Other Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Rustler Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		
Seymour Aquifer	gw	Drought Monitor	D1 (Moderate)	D2 (Severe)	D4 (Critical)	D1 (Moderate)	D2 (Severe)	D4 (Critical)	Review DCP; Initiate actions if appropriate	Review DCP; Initiate actions; consider additional supplies	Review DCP and implement ,if appropriate; consider voluntary demand reductions	Review DCP; Initiate actions; consider additional supplies		