

FINAL PLAN

CHAPTER 7: DROUGHT RESPONSE INFORMATION, ACTIVITIES, AND RECOMMENDATIONS

Rio Grande Regional Water Plan

BV PROJECT NO. 411250

PREPARED FOR

Rio Grande Regional Water Planning Group

7 OCTOBER 2025



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Final Draft

List of Abbreviations

ac-ft	Acre-Feet
ac-ft/yr	Acre-Feet per Year
DCP	Drought Contingency Plan
DMI	Domestic, Municipal, and Industrial
DOR	Drought of Record
DWDOR	Drought Worse Than the Drought of Record
IBWC	International Boundary Water Commission
MUD	Municipal Utility District
PDSI	Palmer Drought Severity Index
RWP	Regional Water Plan
RWPG	Regional Water Planning Group
SUD	Special Utility District
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board
WAM	Water Availability Model
WCID	Water Control and Improvement District
WCP	Water Conservation Plan
WMS	Water Management Strategy
WSC	Water Supply Corporation
WSOC	Water Supply Option Contracts
WTP	Water Treatment Plant
WUG	Water User Group
WW	Water Works
WWP	Wholesale Water Provider

7.0 Drought Response Information, Activities, and Recommendations

7.1 Droughts of Record in the Regional Water Planning Area

Region M relies heavily on water from the Rio Grande, managed through Amistad and Falcon Reservoirs, although brackish and fresh groundwater provide supplemental and locally critical supplies. Response to drought varies across the region depending on the primary source of water and type of water use.

Since the last planning cycle, the period of record for the Water Availability Model (WAM) was updated to include 2000 through 2018. Severe drought has affected Region M in the period of record of the WAM (1940 through 2018). The drought record helps to understand the firm yield from the Amistad-Falcon Reservoir system. The firm yield has decreased based on the new period of record.

Because of the unique mechanism for fulfillment of water rights of the Rio Grande system, and the heavy reliance on that source, drought impacts Region M somewhat differently than other regions. In addition, a significant portion of the water used in Region M comes from the Mexican side of the Rio Grande watershed.

Drought and other circumstances can contribute to a water shortage, which is any situation when there is less supply of water than there is demand for water. Shortages can be the result of low rainfall, operational decisions, higher than normal temperatures, or growing populations causing increased demand. Drought preparation and response can help to mitigate the impacts of these shortages by finding ways to reduce demands and supplement supplies in response to water shortages.

The Drought Preparedness Council submitted recommendations to all Regional Water Planning Groups (RWPGs) on February 8, 2024. The Council encouraged the RWPGs to (1) consider planning for drought conditions worse than the drought of record (DWDOR) (including scenarios that reflect greater rainfall deficits and/or higher surface temperatures), (2) incorporate projected future reservoir evaporation rates in their assessments of future surface water availability, and (3) identify utilities that reported having less than 180 days of available water supply. These recommendations have been considered in the development of this chapter.

This chapter consolidates the existing information on current drought preparation and response activities for Region M and makes recommendations where needed.

7.1.1 Current Drought of Record

The drought of record (DOR) is the basis of the firm yield projection for each surface water supply. The DOR identifies the worst drought during the period of record, and the firm yield is the supply that can be expected from that river or system in that most severe drought scenario. The Rio Grande WAM includes hydrologic information from 1940 through 2018.

This planning cycle, the DOR has changed due to an update to the Texas Commission on Environmental Quality (TCEQ) Rio Grande Water Availability Model to extend the period of record through 2018. The new drought of record modeled for both the combined reservoir system and the US portion spans the late 1990s to the early 2000s: June 1994 (6/1994) to August 2003 (8/2003) for the US portion (9 years, 2 month); and January 1994 (1/1994) to May 2003 (5/2003) for the combined system (9 years, 4 months). Refer to Figure 7-1.

Modeled Reservoir Storage for the Amistad-Falcon System, US and Combined

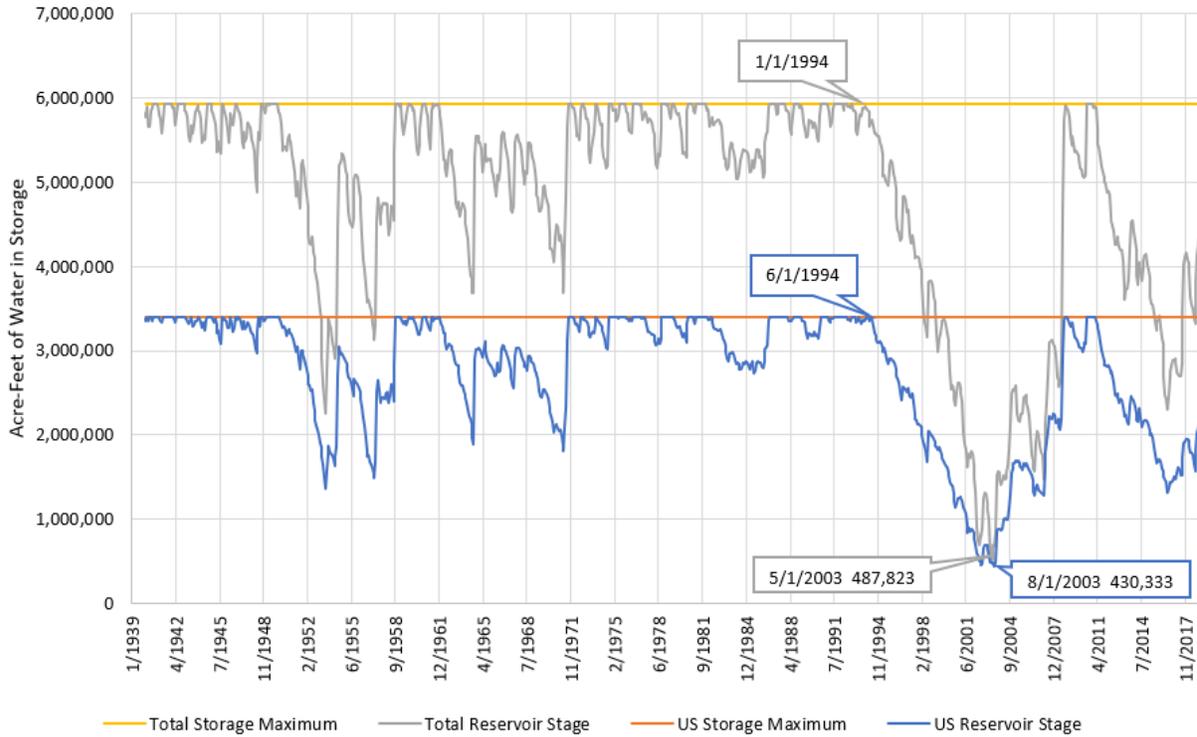


Figure 7-1 Modeled Reservoir Storage for the Amistad-Falcon System, United States and Combined

The WAM takes into account inflows from both Mexican and US tributaries associated with the DOR, volumes and locations of demands along the river, channel losses along the river, and other factors. The deliveries from Mexico are not modeled according to the 1944 treaty, which establishes a minimum 350,000 acre-feet/year (ac-ft/yr) to be delivered to the United States; the deliveries are modeled according to historical supplies and demands rather than assuming that the treaty obligation will be met in full each year. Firm yield decreases slightly each decade from reduced reservoir capacity due to sedimentation.

The hydrologic record in the Rio Grande WAM is used to predict firm yield over the planning horizon, given in Table 7-1.

Table 7-1 Firm Yield Projections, Amistad-Falcon Reservoir System 2030-2080 (Acre-feet/year)

	2030	2040	2050	2060	2070	2080
Amistad-Falcon Reservoir System	1,001,776	1,001,268	1,000,760	999,553	997,821	995,863

7.1.2 Potential Droughts of Record

The naturalized flow record that is used in the WAM is one way to evaluate the scale and duration of drought. Other measures and indicators of drought can be used to compare recent years with the historical record. In the past couple of years, reservoirs levels in the Amistad-Falcon Reservoir have been low. A lack of deliveries from Mexico are leading to drought restriction conditions, but there has been no determination yet to whether this could result in a potential new DOR.

7.1.2.1 Drought Indices

Drought indices have been developed to assess the effects of drought through parameters, including severity, duration, and spatial extent. One of the first comprehensive efforts using precipitation and temperature for estimating a region's moisture was the Palmer Drought Severity Index (PDSI). Index values range from up to 10, indicating wetter-than-normal conditions, and as low as -10 for severe drought. The PDSI includes values across the country through 2023, which makes it a valuable addition to drought analysis. Graphs for yearly PDSI values for Texas Climate Divisions 9 and 10 (Figure 7-2) show more recent and severe droughts in the 21st century than the drought of the 1950s, but over a shorter duration for Region M (Figure 7-3 and Figure 7-4).

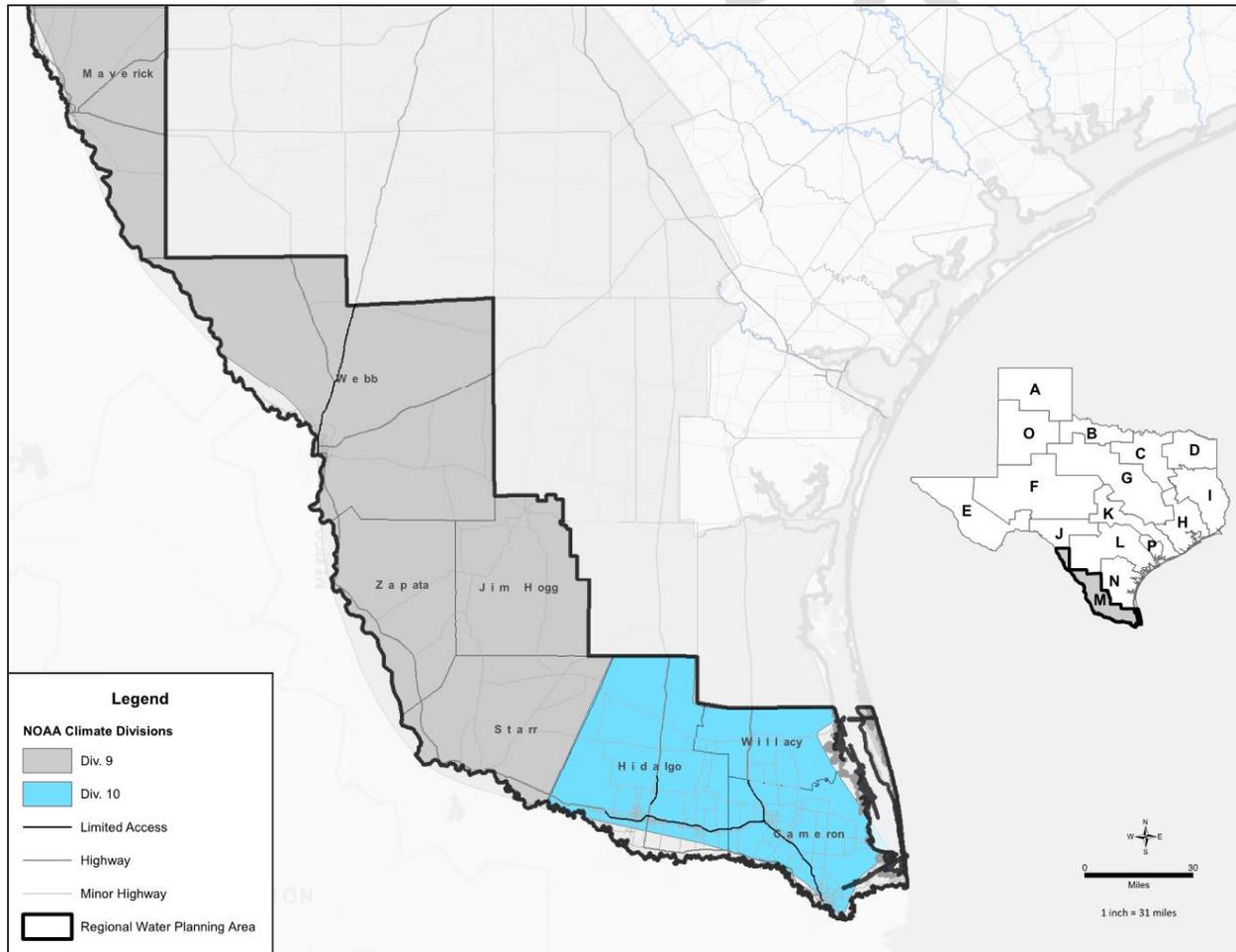


Figure 7-2 National Oceanic and Atmospheric Administration Climate Divisions 9 and 10

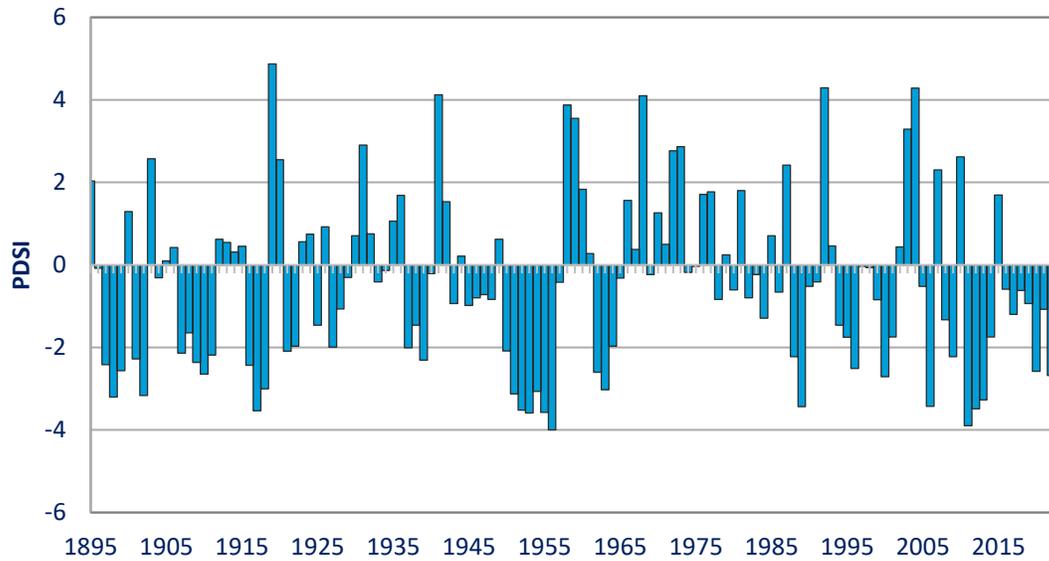


Figure 7-3 Palmer Drought Severity Index for Division 9

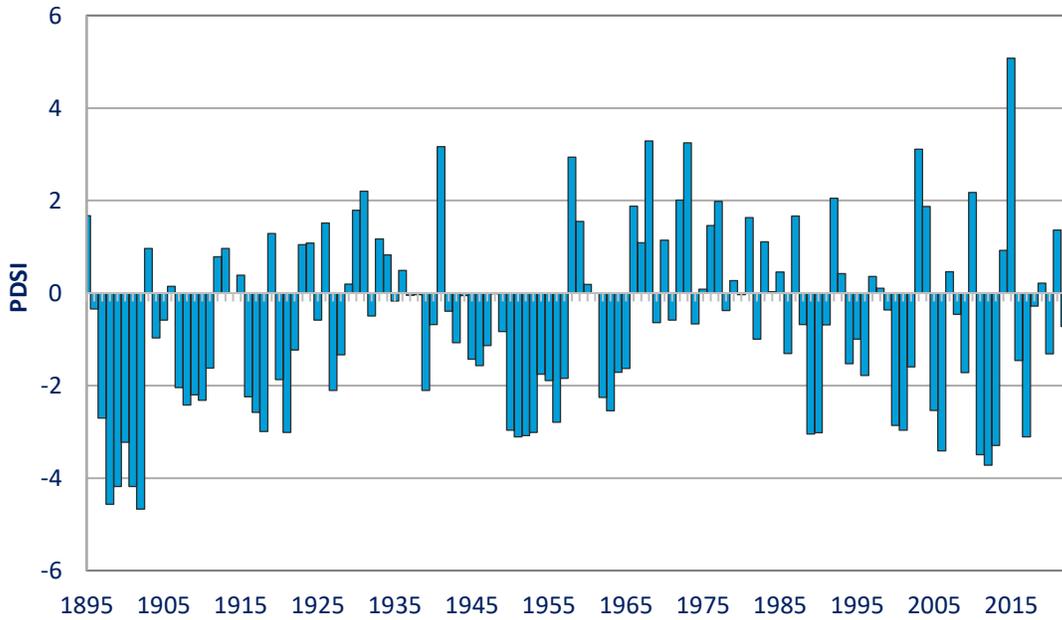


Figure 7-4 Palmer Drought Severity Index for Division 10

7.2 Uncertainty and Droughts Worse Than the Drought of Record

For the 2026 Regional Water Planning cycle, a new Rio Grande WAM was released by TCEQ with a period of record extended out through 2018. This created a new DOR for the region and significantly decreased the firm yield of Amistad-Falcon Reservoir System.

The Rio Grande RWPG recognizes that there is known, unquantified uncertainty associated with estimating population, water demands, hydrologic conditions, and Water Management Strategy (WMS) firm yields, as well as the current trends of the reservoir firm yields and the decreased inflows from tributaries on both the US side and Mexican side. On a regionwide basis, the Rio Grande RWPG considered planning for uncertainty and DWDOR, such as incorporation of forecasting tools and climate models to evaluate supplies or application of a safety factor. However, the Rio Grande RWPG chose not to plan for uncertainty or DWDOR on a regional scale at this time because forecasting tools have not been able to provide the resolution needed for water planning on a regional basis.

Additionally, the Rio Grande RWPG recognizes the uncertainty of the water deliveries from Mexico. On November 7, 2024, the United States and Mexico International Boundary Water Commissions signed Minute 331 which focused on improving reliability and predictability of Rio Grande water deliveries. The Minute, which comes amid growing water scarcity on both sides of the Rio Grande, recognizes the importance to the United States of incorporating Texas water deliveries in the annual allocation plans of Mexico's water managers. During the current cycle, which began on October 25, 2020, Mexico has delivered a total of 425,405 acre-feet (ac-ft). Mexico's obligation under the treaty is to deliver 1.75 million ac-ft by October 24, 2025, absent extraordinary drought or a serious infrastructure accident.

While planning measures to address a DWDOR have not been included on a regionwide basis, several entities have recommended strategies and projects in this plan that will provide them with a secondary source of water, such as potable reuse or groundwater, in order to continue to plan for times when surface water availability may be limited.

In the event of a near-term onset of a DWDOR, water user groups (WUGs) and wholesale water providers (WWPs) without adequate management supplies could potentially implement various measures and responses that would likely be available and capable of providing additional demand reductions or additional water supply capacities to withstand the DWDOR.

The following provides examples of demand management and water supply measures that could be implemented during a DWDOR:

- Demand Management Measures:
 - For WUGs and WWPs that do not already have the Drought Management WMS included as a Recommended strategy in the Regional Water Plan (RWP): Implement Drought Management reductions associated with outdoor watering restrictions, conversion of irrigated crops to dry farming, or temporary suspension of water use.
 - For WUGs and WWPs with the Drought Management WMS included as a Recommended strategy in the RWP: Implement additional drought management measures beyond those in the plan.

- Water Supply Measures:
 - Pursue new direct potable reuse to extend existing supplies.
 - Pursue new groundwater well.
 - Pursue new brackish groundwater well with desalination.
 - Pursue new plan to blend brackish groundwater with existing water supply without additional desalination.
 - Implement new or existing emergency interconnects with other water providers.
 - Purchase hauled water via trucked water systems.

7.3 Current Drought Preparations and Response

7.3.1 Overview

All WUGs in Region M can prepare for drought by participating in the regional planning process, which plans for long-term supplies that are reliable for the DOR. The regional planning process attempts to meet projected water demands during a drought of severity equivalent to the DOR. Statewide, increased efforts in recent years have established both long-term drought management strategies to avoid shortages and Drought Contingency Plans (DCPs) to plan for temporary water supply shortages and other water supply emergencies.

The TCEQ requires that anyone applying for a water right, irrigation districts, wholesale public water suppliers, and all retail public water suppliers serving 3,300 connections or more submit a DCP to the TCEQ. Public water suppliers serving fewer than 3,300 connections are required to have a DCP on file but are not required to submit it to TCEQ. May 1, 2024, was the most recent deadline for DCP submittals.

All the entities that are required to submit a DCP, as well as all users of 1,000 ac-ft or more domestic, municipal, or industrial (DMI) surface water rights and 10,000 ac-ft or more of irrigation surface water rights, are required to submit a Water Conservation Plan (WCP) to TCEQ and Texas Water Development Board (TWDB).

Because of these requirements and recent drought conditions, many communities in the Rio Grande Region have addressed drought preparedness and water conservation planning. A complete list of the DCPs that have been submitted to TCEQ as of October 2024 is shown in Table 7-2.

DCPs for retail or wholesale water suppliers are required to include the following:

- Specific, quantified targets for water use reductions;
- Drought response stages;
- Triggers to begin and end each stage;
- Supply management measures;
- Demand management measures;
- Descriptions of drought indicators;
- Notification procedures;

- Enforcement procedures;
- Procedures for granting exceptions;
- Public input to the plan;
- Ongoing public education;
- Adoption of plan; and
- Coordination with the RWPG.

Utilities within Region M may have implemented drought contingency measures in response to drought conditions during this planning cycle, as the combined storage of the Amistad-Falcon Reservoir System dropped below 20% in 2024. The TCEQ Rio Grande Watermaster now provides reports that list both the combined ownership percentage of capacity and the U.S. usable storage percent of capacity, which may be less than 20% even if the combined ownership is greater than 20%.

Table 7-2 Submitted Drought Contingency Plans

Entity	Drought Contingency Plan Date
Agua Special Utility District (SUD)	4/8/2024
Alamo	4/16/2024
Bayview Irrigation District No. 11	5/6/2019
Brownsville Irrigation District	1/24/2024
Brownsville Public Utilities Board	4/1/2024
Cameron County Irrigation District No. 2	5/1/2024
Cameron County Irrigation District No. 6	3/14/2024
Delta Lake Irrigation District	1/3/2024
Donna	6/7/2022
Donna Irrigation District	5/3/2024
Eagle Pass Water Works (WW) System	2/2/2022
East Rio Hondo WSC	2/1/2024
Edinburg	5/1/2024
El Jardin Water Supply Corporation	5/1/2014
Engelman Irrigation District	7/22/2022
Harlingen Irrigation District	8/1/2024
Harlingen Waterworks System	10/1/2024
Hidalgo	5/1/2024
Hidalgo County Irrigation District No. 1	10/19/2023
Hidalgo County Irrigation District No. 2	9/1/2022
Hidalgo County Irrigation District No. 5	4/30/2019
Hidalgo County Irrigation District No. 6	6/24/2024
Hidalgo County Irrigation District No. 9	9/15/2020

Entity	Drought Contingency Plan Date
Hidalgo County Irrigation District No. 13	4/22/2019
Hidalgo Water Improvement District No. 3*	5/15/2024
La Feria Irrigation District	5/1/2019
Laguna Madre Water District	9/14/2022
Laredo	4/1/2024
Maverick County Water Control and Improvement District (WCID) No. 1	5/1/2019
McAllen, McAllen Public Utility	4/24/2023
Mercedes	5/31/2024
Military Highway WSC	4/25/2024
Mission Public Works Department	8/1/2024
North Alamo WSC	9/17/2019
Pharr	5/20/2024
Rio Grande City	5/28/2019
Roma	4/1/2024
San Benito	5/1/2024
San Juan	4/19/2024
Santa Cruz Irrigation District No. 15*	5/29/2024
Sharyland WSC	10/17/2024
Southmost Regional Water Authority	4/24/2019
United Irrigation District	5/9/2024
Weslaco	5/23/2019
Zapata County WW	8/30/2024

*In January 2025, Hidalgo County Water Improvement District No. 3 and Santa Cruz Water Control and Improvement District No. 15 consolidated into Hidalgo County Consolidated Water Control and Improvement District.

7.3.2 Drought Response Triggers

Drought response varies from entity to entity, primarily between groundwater and surface water sources, and those who serve customers with raw water, and those who deliver treated water. For irrigation districts, which deliver raw surface water, the response to drought is largely determined by the Rio Grande water right system. For treated water suppliers, triggers are specific to their users’ demand in relation to treatment capacity, wellfield capacity, or the account balance on DMI water rights held.

7.3.2.1 Irrigation Districts

The TCEQ Rio Grande operating rules determine how the United States’ share of usable surface water stored in Amistad and Falcon Reservoirs is apportioned among water right holders in the Region M planning area. A 225,000 ac-ft storage pool within the reservoir is replenished at the beginning of each

month for DMI water right accounts, although the TCEQ Rio Grande Watermaster may have some discretion in this because in December 2024, 55,000 ac-ft was added to the storage pool to reach 280,000 ac-ft. After the DMI Reserve is re-established, the end of month account balances for Class A and Class B accounts is reserved, then a 75,000 ac-ft Operating Reserve is met. The Operating Reserve may fluctuate between 75,000 ac-ft and zero but cannot go below zero. In the history of the Watermaster Program, the DMI reserves have always been replenished in full, but the water available annually for Class A and B water rights is often significantly less than the annual maximum authorization of those water rights. Class A and B water rights absorb the impacts of drought on the reservoir system by having less than 100 percent reliability.

Irrigation districts deliver a significant portion of the water used in the Lower Rio Grande Valley (Cameron, Hidalgo, Willacy, and Starr Counties) and Maverick County. The majority of Rio Grande water rights are delivered by irrigation districts. Farmers pay an annual flat rate assessment that entitles them to receive irrigation water on the basis of acreage. When an irrigation district crosses its drought trigger, it goes on water allocation. This means that the district's available water is allocated to their active flat rate acreage.

Each water district has slightly different rules when on allocation; in some cases, water is allowed to be sold between farmers in their district, or farmers may consolidate their allocation on a portion of their land, leaving other areas for dry land farming. These measures allow farmers to adjust to anticipated water shortages.

A summary of the drought triggers and responses as listed by the irrigation districts that submitted DCPs at the time of writing is shown in Appendix 7A.

7.3.2.2 Retail Public Water Suppliers

Although some cities rely on groundwater exclusively or groundwater comprises a part of their supply, most cities in Region M rely on surface water from the Rio Grande. Because the DMI Reserve has priority in the Amistad-Falcon Reservoir system, municipal rights have historically been considered "guaranteed" in their full authorized diversion volume.

Those entities who deliver treated water generally developed triggers that were either based on the remaining municipal water rights available to the city for that year or the capacities of their treatment plants, so that high demands on the plants trigger a conservation stage. The conditions of the reservoirs are occasionally listed among triggers in public water supply DCPs but have little bearing on the availability of municipal water. One issue, though, is that when farmers have water shortages from lower levels in the reservoirs, there is less water in the canal pushing through the municipal water, which can result in additional delivery losses for municipal entities. The conservation stages for cities included limitations on car washing and lawn watering, ranging from voluntary in early stages to some fines or other penalties in later stages.

A summary of the drought triggers and responses as listed in the DCPs for cities and water supply corporations at the time of writing is included as **Error! Reference source not found..**

7.4 Existing and Potential Emergency Interconnects

7.4.1 Information Collection Methodology

In accordance with Texas Administrative Code (TAC) (31 TAC 357.42(d)), the RWPG has collected high-level information on existing interconnects. Most water users in Region M are located along the Rio Grande or along canals that convey Rio Grande water. In a sense, the region is highly interconnected.

The distribution system for raw Rio Grande water includes the reservoir system and the 23 Irrigation districts, many of which are either interconnected or have high potential to be connected. The RWPG has previously reached out through representatives of the Lower Rio Grande Valley Water District Managers Association to the district managers for information about interconnects between raw water systems.

7.4.2 Local Drought Contingency Plans with Emergency Interconnects

Although utilization of emergency interconnects was not included in the DCPs that were reviewed, Table 7-3 shows the known existing interconnections between public water supply systems and whether the connections are used for regular service or only in emergencies. Detailed information about these interconnections was previously submitted securely to the Executive Administrator of the TWDB during the 2016 planning cycle.

Table 7-3 Emergency Interconnections Between Public Water Supply Systems

Public Water Supply System	Interconnects	Type of Connection
Agua SUD	La Joya	One-way emergency interconnect
	Peñitas, Palmview, Sullivan City, Mission	All within Agua SUD service area
East Rio Hondo WSC	Harlingen WW	Connection for regular service with capacity to increase in emergencies
	City of Los Fresnos	Connection for regular service
	Olmito WSC	Connection for regular service with capacity to increase in emergencies
	North Cameron Regional	Connection for regular service
	Combes	Emergency Interconnect
Harlingen WW	La Feria	Emergency Interconnect
	Combes	5 connections for regular service
	Primera	2 connections for regular service
	San Benito	Emergency Interconnect
	Palm Valley	2 connections for regular service
	East Rio Hondo WSC	Connection for regular service
	Military Highway WSC	Connection for regular service

Public Water Supply System	Interconnects	Type of Connection
McAllen	Edinburg	Used only during times of high demand
	Pharr	Used only during times of high demand
	Mission	Used only during times of high demand
	Hidalgo	Used only during times of high demand
	Hidalgo County Irrigation District No. 1, Hidalgo County Irrigation District No. 2, Hidalgo County Water Improvement District No. 3*, United Irrigation District	McAllen receives raw water from these districts
Military Highway WSC	Harlingen WW (see above)	
	Los Indios, Progreso, San Juan	Military Highway serves these entities
North Alamo WSC	Mercedes	Emergency interconnect
	Sebastian Municipal Utility District (MUD)	Emergency interconnect
	Lyford	Emergency interconnect
	Raymondville	Emergency interconnect
	Edcouch	Emergency interconnect
	Elsa	Emergency interconnect
	La Villa	Emergency interconnect
	Donna	Connection for regular service
	Edinburg	2 connections for regular service
	Military Highway WSC	Connection for regular service
	Quiet Village Utilities	Connection for regular service
	Port Mansfield PUD	Connection for regular service
	Delta Lake ID, Donna Irrigation District, Hidalgo County Irrigation District No. 2, Hidalgo County Irrigation District No. 1, East Rio Hondo WSC	North Alamo WSC receives raw water from these districts
	Olmito WSC	Los Fresnos
Valley MUD No. 2		Two-Way emergency interconnect
Zapata County Waterworks	Zapata County Water Control & Improvement District No. 16	Connection for regular service
Brownsville Public Utilities Board	El Jardin WSC	Connection for regular service
Laguna Madre Water District	Laguna Vista, Port Isabel, South Padre Island	Connection for regular service

Public Water Supply System	Interconnects	Type of Connection
Valley MUD No. 2	Military Highway WSC	Emergency interconnect
	Olmito WSC	Emergency interconnect
	Southmost Regional Water Authority	Connection for regular service
	Rancho Viejo	Connection for regular service
Rio Grande City	Rio WSC	Connection for regular service
Roma	Escobares	Connection for regular service
Weslaco	Mercedes	Emergency interconnect

*In January 2025, Hidalgo County Water Improvement District No. 3 and Santa Cruz Water Control and Improvement District No. 15 consolidated into Hidalgo County Consolidated Water Control and Improvement District.

7.5 Emergency Responses to Local Drought Conditions or Loss of Municipal Supply

Municipal WUGs that are of concern for emergency drought response are identified as those that have a population of 7,500 or less and have a sole source of water, even if that water is provided by a wholesale water provider, or in the case of the Rio Grande region, if those entities receive waters from the Amistad-Falcon Reservoir System from multiple irrigation districts. For purposes of this evaluation, entities evaluated for emergency responses to local drought conditions or loss of municipal supply were assumed to have 180 days or less of remaining supply. Additionally, all “county-other” WUGs are considered.

WUGs that meet these criteria are shown in Table 7-4, with population projections for 2030 and current suppliers. Most of these districts rely exclusively on water from the Amistad-Falcon Reservoir System and have no secondary source available to them (the districts that provide surface water are listed as the “Current Supply”). Those that indicate their sole supply is groundwater are generally geographically constrained and limited to local groundwater supplies. Three of the entities listed in Table 7-4, Elsa, Siesta Shores WCID, and Zapata County WCID Hwy 16 East, are municipal public water systems that reported to the TCEQ with less than 180 days of water between January 2016 and November 2023. The fourth additional entity, Zapata County Water Works, is not in Table 7-4 because it does not meet the population criteria but reported to TCEQ with less than 180 days of water during that time period.

Table 7-4 WUGs Identified for Emergency Drought Response Evaluation

County	Entity	2030 Population	Current Supply ⁽¹⁾	Current Supply ⁽²⁾
Cameron	Combes	3,041	Harlingen Irrigation District - Cameron County 1	
Cameron	County-Other	26,712	Surface Water (various)	Groundwater (various)
Cameron	La Feria	6,210	La Feria Irrigation District	
Cameron	Olmito WSC	7,329	Cameron County Irrigation District No. 6	

County	Entity	2030 Population	Current Supply ⁽¹⁾	Current Supply ⁽²⁾
Cameron	Palm Valley	1,308	Harlingen Irrigation District No. 1	
Cameron	Rio Hondo	1,711	Cameron County Irrigation District No. 2	
Cameron	Santa Rosa	2,947	La Feria Irrigation District	
Hidalgo	County-Other	27,570	Donna Irrigation District - Hidalgo County 1	Surface Water (various)
Hidalgo	Edcouch	2,552	Hidalgo County Irrigation District No. 9	North Alamo WSC emergency interconnect
Hidalgo	Elsa	4,659	Hidalgo County Irrigation District No. 9	North Alamo WSC emergency interconnect
Hidalgo	Hidalgo County MUD No. 1	5,256	Hidalgo County Irrigation District No. 1	
Hidalgo	La Joya	4,764	Hidalgo County Irrigation District No. 16	Agua SUD one-way emergency interconnect
Hidalgo	La Villa	2,092	Hidalgo County Irrigation District No. 9	North Alamo WSC emergency interconnect
Jim Hogg	County-Other	1,194	Local groundwater	
Jim Hogg	Jim Hogg County Water Control & Improvement District No. 2	3,482	Gulf Coast groundwater	
Maverick	County - Other	1,328	Surface water (various)	Groundwater (various)
Starr	County - Other	4,359	Surface water (various)	Groundwater (various)
Starr	El Sauz WSC	1,708	Rio Grande City	
Starr	El Tanque WSC	1,385	Rio Grande City	
Starr	Union WSC	7,207	Surface water	
Webb	County - Other	12,504	Surface water (various)	Groundwater (various)
Webb	Mirando City WSC	268	Gulf Coast Groundwater	

County	Entity	2030 Population	Current Supply ⁽¹⁾	Current Supply ⁽²⁾
Willacy	County - Other	4,665	Surface water (various)	Groundwater (various)
Willacy	Lyford	1,992	Delta Lake Irrigation District	North Alamo WSC emergency interconnect
Willacy	Port Mansfield Public Utility District	358	North Alamo WSC	
Willacy	Sebastian MUD	1,410	La Feria Irrigation District	North Alamo WSC emergency interconnect
Zapata	County - Other	1,162	Surface water (various)	Groundwater (various)
Zapata	Falcon Rural WSC	377	Surface water	
Zapata	Zapata County San Ygnacio and Ramireño	388	Self-supplied surface water	
Zapata	Siesta Shores WCID	1,552	Surface water	
Zapata	Zapata County WCID - Hwy 16 East	547	Surface water	

7.5.1.1 Sole Source: Surface Water

Entities that depend entirely on surface water in Region M are very common. If shortages occur as a result of having insufficient water rights to meet demand or to deliver water, water market and provisions allow for entities to purchase water. Special provisions enable purchase of emergency water. It is recommended that all WUGs procure sufficient water rights or long-term contracts to meet projected demands when feasible. Additionally, access to off-channel storage reservoirs, storage tanks, or additional sources of water (groundwater, reuse, etc.) for sole-source utilities may provide increased resilience.

7.5.1.1.1 Interconnections

Interconnections between utilities build greater resilience by providing utilities an alternate source of treated water if either system is damaged or fails. Entities that experience push water requirements when irrigation deliveries are curtailed may also benefit from both raw and treated water interconnects, which could allow districts and utilities to coordinate and consolidate deliveries in a limited number of canals.

7.5.1.1.2 Water Quality

Any emergency that impacts the quality of the water in the Rio Grande has the potential to cause significant harm to the region. Because contamination could be released from either the United States or Mexican side of the river, there is an additional level of uncertainty regarding potential contaminants. In the past, releases into Rio Grande tributaries were identified only by a widespread fish kill. No

emergency response plan is currently in place to handle the release of contaminants into the Rio Grande.

In addition, drought in the region leads to low flows in the rivers and streams. Low flow in the Rio Grande leads to a concentration of pollutants, such as bacteria, nutrients, and TDS. In the tidal section, low flow rates lead to saltwater intrusion which can create high salinity levels.

As mentioned in detail in Chapter 3, a binational effort is underway to improve and protect water quality in the Lower Rio Grande below Falcon Dam to the Gulf of Mexico that currently experiences bacteria levels that have at times been higher than recommended for approved water uses of the river. The effort, the Lower Rio Grande Water Quality Initiative, is intended to serve as a pilot project to develop the binational mechanisms necessary to improve water quality throughout the Rio Grande.

Regular water quality testing and reporting is already in place in some locations to alert farmers of high total dissolved solids in the river. This type of system could be expanded upon to provide regular reports of water quality to utility managers and agencies such as IBWC and TCEQ. This kind of water quality analysis is complicated by the fact that the potential contaminants are not known in many cases. Understanding the timing of contaminant transport through the system could allow entities to pump enough water to fill reservoirs before the contaminant has reached that location. However, the success of this approach is contingent on timely information about releases. At a minimum, information must be communicated to utilities and to the public in an accurate and timely manner so that safe drinking water can be provided immediately.

7.5.1.1.3 Recommendations

Long-term recommendations for entities that rely solely on surface water include expansion of alternate water supplies, including fresh and brackish groundwater where available. Emergency recommendations are listed in Table 7-5.

Table 7-5 Recommended Emergency Water Shortage Responses: Surface Water Dependent WUGs

Emergency Shortage	Responses
Insufficient Surface Water Rights	<ul style="list-style-type: none"> • Purchase surface water. • Highest stage drought restrictions. • Long term: purchase DMI water rights, add storage, add a groundwater source.
Water Treatment Plant Failure	<ul style="list-style-type: none"> • Interconnects with other systems. • Truck in water. • Highest stage drought restrictions. • Long term: facility improvements, system evaluation, and phased improvement plan.

Emergency Shortage	Responses
Rio Grande Contamination	<ul style="list-style-type: none"> • Immediate testing. • Pumping and storage of safe water to any existing storage facilities. • Interconnects with systems that have alternate supplies. • Truck in water. • Emergency communication with boil water or other guidance to customers. • Highest stage drought restrictions. • Long term: emergency response plan including communications, provision of safe water to critical facilities, etc.

7.5.1.2 Sole Source: Groundwater

Utilities that depend exclusively on groundwater tend to be isolated from other sources and other cities. For instance, Hebbronville is over 30 miles from the nearest city, Falfurrias. For entities that are dependent on groundwater, the entities are encouraged to actively monitor water levels in wells, especially in high-demand periods. Water levels can be used to trigger drought responses, and to guide expansion of wellfields or deepening of wells. Additionally, groundwater quality may be an indicator of decreasing availability from a well or wellfield.

Emergency responses for entities that rely solely on groundwater are shown in Table 7-6.

Table 7-6 Recommended Emergency Water Shortage Responses: Groundwater Dependent WUGs

Emergency Shortage	Responses
Insufficient Well Production	<ul style="list-style-type: none"> • Highest stage drought restrictions. • Deepen wells (if possible). • Interconnects with other systems (if possible). • Truck in water. • Long term: facility improvements, system evaluation, and phased improvement plan.
Water Treatment Plant Failure	<ul style="list-style-type: none"> • Highest stage drought restrictions. • Interconnects with other systems (if possible). • Truck in water. • Long term: facility improvements, system evaluation, and phased improvement plan.
Groundwater Quality	<ul style="list-style-type: none"> • Immediate testing. • Highest stage drought restrictions. • Additional emergency treatment (if possible). • Interconnects with other systems (if possible). • Truck in water. • Long term: supply or treatment facility improvements, system evaluation, and phased improvement plan.

7.6 Region-Specific Drought Response Recommendations and Model Drought Contingency Plans

The drought response recommendations made for each water source in the following subsections should be considered in the development of drought response preparations. The TCEQ has prepared model DCPs for wholesale and retail water suppliers to provide guidance and suggestions to entities regarding the preparation of DCPs. Not all items in the model will apply to every system's situation, but the overall model can be used as a starting point for most entities. The Rio Grande RWPG suggests that the TCEQ model DCPs be used for entities wishing to develop a new DCP. The TCEQ model DCPs and WCPs are included for all WUG types in Appendix 7CC. The TCEQ model DCPs can be found on TCEQ's website: (https://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/contingency.html)

7.6.1 Amistad-Falcon Reservoir System Drought Response Recommendations

Water supplies from the Amistad-Falcon reservoir system are managed with a unique operating and water rights system, which reserves a significant portion of the reservoir to effectively guarantee DMI water rights and fills irrigation and mining water right accounts as water is available to that storage pool.

This system ensures that, even in the worst recorded drought, a municipal or industrial WUG may divert its full annual authorized diversion each year. If a municipal or industrial WUG has sufficient water rights to meet its needs, and a reasonable means of delivering the water from the diversion point to the point of need, there should be no issues getting that water in a year similar to the DOR.

Water shortages among municipal WUGs can result from a range of scenarios (discussed in Subsection 0) including insufficient water rights, issues with water rights account budgeting, delivery issues, and water treatment or storage issues. The primary impact of drought on municipal utilities that rely on the Amistad-Falcon reservoir system is an increase in demands, and not a reduction of supplies, although for this planning cycle, as irrigation water diminishes it is challenging to deliver the DMI water when a lack of push water from irrigation occurs.

7.6.1.1 DMI Water Rights Holders

Utilities and industrial users in Region M experience drought under the following scenarios, described in Table 7-7 with recommendations specific to each.

Table 7-7 Municipal Shortage Scenarios and Recommendations

Shortage Scenario and Triggers	Recommended Responses
<p>Insufficient Water Rights to Meet Demand. An entity may have sufficient treatment capacity to meet its demands but have insufficient water rights to meet drought year demands.</p> <p>Triggers should be based on useable balance calculations and monthly/weekly demand projections. When the balance of water available for the remainder of the year does not exceed the demand projections by a reasonable margin, severe drought response should be implemented. When the projected demands exceed the balance of water, critical drought response should be implemented.</p>	<p>Best Practices: Use of water rights should be managed carefully, and cities should track their useable balance over the year compared with seasonal/monthly demand projections. This will allow a city to implement conservation measures early in the year to stay within its water budget. It is recommended that any city that projects a shortage should purchase water rights when feasible.</p> <p>Severe Conditions: Request voluntary municipal and industrial conservation, limit unnecessary municipal usage, consider billing rate incentives for conservation in severe drought periods, and purchase water as it is available.</p> <p>Critical Conditions: Implement mandatory municipal and industrial water use restrictions, restrict nonessential municipal water use, consider billing rate incentives for conservation in critical drought periods, and purchase water as it is available.</p>
<p>Water Treatment Plant Capacity. Municipal utilities with sufficient water rights may experience a shortage if, during their peak demand months, the capacity of the water treatment plant (WTP) is not sufficient to meet permit requirements.</p> <p>Triggers should be based on daily treatment volumes and TCEQ WTP capacity rules. When 85% capacity is reached for 3 consecutive days, severe drought response should be implemented. When 95% capacity is reached, critical drought response should be implemented.</p>	<p>Best Practices: Conservation programs can reduce demands on the WTP. The long-term solution is expansion of WTPs’ capacity and interconnections with other facilities.</p> <p>Severe Conditions: Request voluntary municipal and industrial conservation, limit unnecessary municipal usage, consider billing rate incentives for conservation in severe drought periods, and utilize emergency interconnects.</p> <p>Critical Conditions: Implement mandatory municipal and industrial water use restrictions, restrict nonessential municipal water use, consider billing rate incentives for conservation in critical drought periods, and utilize emergency interconnects.</p>

Shortage Scenario and Triggers	Recommended Responses
<p>Push Water. Even with sufficient water rights to meet demands and to cover normal delivery losses, some municipalities, especially those who receive surface water from irrigation districts that serve mostly irrigation water users, may need additional water to meet minimum operational requirements in the district conveyance system if irrigation water is curtailed.</p> <p>Triggers should be based on (1) the requirement of irrigation water to deliver DMI water in a given district, (2) the useable balance available to irrigators in the district, and whether those irrigators are on allocation, and (3) the storage capacity available to the utility.</p> <p>Severe drought restrictions should be implemented if stored water is at or within a small margin of the projected demands before the next feasible delivery from the district.</p> <p>Critical drought restrictions should be implemented if water in storage is less than the projected demands before the next feasible delivery from the district.</p>	<p>Best Practices: First, utilities should have a clear communication plan in place with the irrigation district that alerts the city when irrigation water users may be put on allocation. This may include a drought trigger associated with Amistad/Falcon reservoir storage levels and the useable balance of irrigation accounts in the district. Second, utilities should evaluate their current conveyance methods to see if there are alternate canals or districts that may be able to serve their systems in the case of a push water shortage. Third, where possible, entities should increase their raw water storage to allow for more time between deliveries that need to be timed to coincide with irrigation deliveries. Last, interconnections and emergency agreements with other utilities and other sources are recommended.</p> <p>Severe Conditions: Request voluntary municipal and industrial conservation, limit unnecessary municipal usage, consider billing rate incentives for conservation in severe drought periods, utilize emergency interconnects, and identify water that may be available for purchase as push water.</p> <p>Critical Conditions: Implement mandatory municipal and industrial water use restrictions, restrict nonessential municipal water use, consider billing rate incentives for conservation in critical drought periods, utilize emergency interconnects, and identify water that may be available for purchase as push water.</p>

7.6.1.2 Irrigation and Mining Water Rights Holders

Farmers can respond to drought through planning, crop selection, highly efficient operations, and on-farm demand reduction strategies (such as narrow border citrus and drip irrigation). Farmers and irrigation districts should maintain useable balance calculations and monitor reservoir levels to facilitate planning. Selection of crops, in conjunction with available demand reduction strategies, can allow farmers to maximize their yield in years of drought. Crop selection tools that take current costs and market values into account have been made available to farmers in the High Plains and could be updated with information specific to the region.

Cooperation with the irrigation districts to increase the operational and conveyance efficiency could yield a significant amount of water to farmers. This is discussed as a water management strategy in Chapter 5.

Mining water use, including oil and gas drilling, can be decreased by close controls of leaks and spills, on-site reuse, and new technology or approaches that require less water. Because mining water rights are subject to the same decrease in reliability in drought years, mining water users are highly encouraged to identify and implement water conservation measures. Both irrigation and mining water demand can be scaled according to available water, and alternate sources, such as reuse or groundwater, may be used when surface water is scarce.

7.6.2 Groundwater Supply Drought Response Recommendations

Many users in Region M rely on groundwater as their main source of supply. The aquifers and subsections of aquifers within Region M exhibit a broad range of drought response characteristics, which require specific drought triggers and responses to be developed for each situation. In general, groundwater wells may be impacted by increased pumping in the area and by decreasing recharge resulting from drought. Insufficient groundwater or groundwater of acceptable quality may result in a shortage.

For general drought preparedness, wells should regularly be monitored for changing water levels and changes in quality. If required, additional temporary treatment may need to be implemented to meet drinking water standards. It is important to understand what temporary treatment options may be used in the case of a shortage. Additional wells and emergency rehabilitation or deepening of existing wells can help to increase supplies in a shortage.

Under severe conditions, established when supplies may be insufficient to meet demands within 60 days or decrease in well productivity or quality, it is recommended that municipal utility managers request voluntary municipal and industrial conservation, limit unnecessary municipal usage, consider billing rate incentives for conservation in severe drought periods, and utilize any available emergency interconnects.

Under critical conditions, established when demands are expected to exceed supplies within 30 days, it is recommended that city utility managers implement mandatory municipal and industrial water use restrictions, restrict nonessential municipal water use, consider billing rate incentives for conservation in critical drought periods, and utilize emergency interconnects. In the most extreme cases, trucking in water may be the best alternative to meet immediate needs.

7.7 Drought Management Water Management Strategies

Drought WMSs, such as voluntary or mandatory drought water restrictions, are those which are intended to be implemented only in times of drought. While conservation as a whole may be implemented as a long-term strategy, the ability of a WUG to reduce demands in times of severe water shortage can enable reliable delivery of water at levels that maintain near-term health and safety.

It has been demonstrated across the state that municipal WUGs that focus on reducing discretionary outdoor water use first in response to drought and avoid water use reductions in the commercial and manufacturing use sectors, may find drought management to be economically viable and cost-competitive with other WMS. Drought WMS may be economically viable as an interim strategy to meet near-term needs through demand reduction until such time as economically viable long-term water supplies can be developed. For planning purposes, it is important that a utility understand the amount of demand reduction that can be expected when drought restrictions are put in place.

All WMS are discussed in more detail in Chapter 5.

7.7.1 Recommended Drought Management WMS

The main drought management WMS that was considered for Region M included strategies intended to reduce demand, which is intended to make the region more resilient to drought. The drought management WMS that was evaluated for all possible municipal WUGs is as follows:

- Municipal Drought Management. Water demand reductions, by voluntary or mandatory restrictions, were considered for all municipal WUGs with a need in any decade, and for entities required to develop and submit a DCP.
- In addition, several municipal WUGs have looked into direct potable reuse or groundwater strategies to add a secondary source of supply that would be available even when surface water availability is reduced. While not officially a drought management strategy, these types of recommended strategies will help increase supplies during conditions of drought.

7.7.1.1 Municipal Drought Management WMS

Water demand reductions, by voluntary or mandatory restrictions, were recommended for all municipal WUGs with needs and/or municipal WUGs that are required to submit a DCP to TCEQ. The RWP is representative of the worst historical drought conditions, and municipal water utilities in Region M and across the state have successfully integrated water demand reduction into their DCPs as a way to respond to drought. Subsection 7.3.2.2 includes examples of drought triggers and responses from municipal water utilities in Region M.

The RWPG has determined that 5 percent demand reduction is an attainable demand reduction for any utility with a municipal need in any decade, and for entities required to develop and submit a DCP. This reduction has been applied to all municipal WUGs with a need in any decade and/or that are required to submit a DCP to TCEQ.

The demand reduction was not applied to WUGs that do not have municipal water demands or to County-Other WUGs. In cases where entities are required to develop and submit a DCP but are not considered a WUG or WWP, or they do not have municipal water demands, the percent reduction was not applied.

7.7.2 Drought Management WMS Not Recommended

An approach to water marketing known as "dry year option contracts" or "water supply option contracts" (WSOC) may reduce the impact on agricultural production while providing drought supplies for other uses. This concept involves temporary transfers of irrigation water to provide secure water supplies to non-agricultural users during droughts. This option would transfer water to other users when needed while preserving the water for agriculture during normal water supply situations. In Texas, WSOC is a practice in the Edwards Aquifer area to provide water for endangered species and San Antonio water users during drought.

The Lower Rio Grande Valley and Region M have some unique institutional, hydrologic, and economic conditions that would need to be addressed to provide seller and buyer incentives to enter into a WSOC. Unlike many other areas of the Western United States, water rights are held by the irrigation districts rather than farmers. Given this and the generally low price of agricultural water, farmers have little incentive to conserve water except in drought and lack the ability to sell water conserved by more efficient irrigation methods or fallowing land such as for WSOC payments. While the potential exists for irrigation districts to enter into a WSOC with another user, irrigation districts would need to work with farmers and pass-through exercise payments to make WSOCs feasible from the farmer's point of view. In addition, with the generally low cost of irrigation district water, the purchase of this water may be the lowest cost to urban providers and other users compared to alternative sources such as desalination or reuse.

Urban demand has the highest priority in drought conditions, and therefore, urban communities may feel little need to have WSOCs unless there is concern about the agricultural community and/or irrigation district welfare. This strategy would require significant legislative changes and is not recommended at this time.

7.8 Other Considerations and Recommendations

7.8.1 Relevant Recommendations from Drought Preparedness Council

In February 2024, the Drought Preparedness Council recommended that regional water planning groups identify utilities within their boundaries that reported to the TCEQ having less than 180 days of available water supply during the current or preceding planning cycle. The following WUGs reported to the TCEQ having less than 180 days of available water supply between 2016 and 2023: Elsa, Siesta Shores WCID, Zapata County Water Works, and Zapata County WCID Hwy 16 East.

The Drought Preparedness Council also encouraged RWPGs to incorporate projected future reservoir evaporation rates in their assessments of future surface water availability. Historical reservoir evaporation rates are incorporated into WAMs that the Rio Grande RWPG uses to determine surface water availability. However, projected future reservoir evaporation rates would require development of climate models with resolution needed for water planning on a regional basis. The Rio Grande RWPG understands that incorporation of down scaled climate models is being considered for inclusion in WAMs, which would incorporate projected future reservoir evaporation rates.

Finally, the Drought Preparedness Council encourages regional water planning groups to consider planning for drought conditions worse than the drought of record, including scenarios that reflect greater rainfall deficits and/or higher surface temperatures. The Rio Grande RWPG's response to this item is discussed in Section 7.2.

7.8.2 Recommendations Regarding Counteractive Variations in Drought Response Strategies

Unnecessary or counterproductive variations in drought response strategies may impede drought response efforts. Counterproductive examples include entities having different stages, triggers, and responses that may have been counterproductive to the efforts of drought response and negatively impact local resources. Furthermore, municipalities have drought triggers that are set on varying reservoir levels, and if they have municipal water rights, these water rights are not affected by reservoir levels. Setting drought response stages or triggers with respect to the budgeting of water rights rather than reservoir levels could prove to be more beneficial for drought response strategies for entities in the region. In addition, if an entity enacts a drought response faster than other entities, the action complicated connections. Entity coordination of drought response triggers could mitigate some counteractive variations in drought response strategies. Lastly, a measure to assist in mitigating the counterproductive measures associated with push water would be for entities to coordinate the timing of the utilization of push water to decrease excess water used in distribution canals.

7.8.3 Other Drought Management Measures

Livestock water supplies are from both groundwater and surface water in Region M. In a drought scenario, it is important that windmill pumps that fill stock ponds and tanks be used only when needed, rather than allowed to run at all times. Agricultural and livestock demands may be significantly increased in severe drought, which can impact groundwater supplies. In addition to careful management of water supplies, drought relief programs may be pursued to assist with livestock demands in a severe drought, including the emergency Haying and Grazing Program.

**Appendix 7A. Summary of Drought Response Triggers –
Irrigation District Drought Contingency Plans**

Final Draft

**Appendix 7B. Summary of Drought Response Triggers -
Retail Public Water Supplier Drought
Contingency Plans**

Final Draft

Appendix 7C. TCEQ Model DCPs and WCPs

Final Draft