FINAL PLAN

CHAPTER 9: IMPLEMENTATION AND COMPARISON TO PREVIOUS REGIONAL WATER PLAN

Rio Grande Regional Water Plan

B&V PROJECT NO. 411250

PREPARED FOR

Rio Grande Regional Water Planning Group

7 OCTOBER 2025

BLACK & VEATCH

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List of Abbreviations

ac-ft/yr	Acre-Feet per Year
BEG	Bureau of Economic Geology
DFC	Desired Future Condition
DOR	Drought of Record
GAM	Groundwater Availability Model
GMA	Groundwater Management Area
ID	Irrigation District
MAG	Modeled Available Groundwater
RWP	Regional Water Plan
RWPG	Regional Water Planning Group
SRWA	Southmost Regional Water Authority
TSDC	Texas State Data Center
TWDB	Texas Water Development Board
WAM	Water Availability Model
WMS	Water Management Strategy
WSC	Water Supply Corporation
WTP	Water Treatment Plant
WUG	Water User Group
WWP	Wholesale Water Provider

9.0 Implementation and Comparison to Previous Regional Water Plan

9.1 Introduction

Each update to the Regional Water Plan (RWP) is an opportunity for the Regional Water Planning Group (RWPG) to evaluate the changes in the region's water use and conservation goals, and to lay out a path toward meeting future water needs. Every 5-year cycle of planning includes re-evaluation of demands, current and future, an update of supplies currently being used, and development of a range of water management strategies (WMSs) that can be used to meet projected needs. This chapter focuses on changes that have occurred since the last plan was adopted, including providing comparison information on the following:

- Population and water demand projections
- Water source availabilities
- Water needs
- WMSs and projects
- Drought response

In addition, this chapter assesses the region's progress towards regionalization as well as provides survey responses on the implementation status of strategies and projects that were recommended in the 2021 Region M Plan.

9.2 Population and Water Demand Projections

For each cycle of regional water planning, the Texas Water Development Board (TWDB) evaluates demographic data and information on agricultural and industrial water usage. This information is used to develop the current demands (base year demands) and to develop an anticipated rate of change to project those demands over the 50-year planning horizon. Population and municipal demand projections are developed for each municipal water user group (WUG), which is defined as any utility or water systems that provide more than 100 acre-feet per year (ac-ft/yr) for municipal use, as well as an aggregated County-Other WUG which combines the remaining county population that does not meet the criteria mentioned above. Non-municipal water use categories for irrigation, livestock, manufacturing, mining, and steam-electric are aggregated into WUGs with developed water demand projections for each county and river basin. Demand projections are developed initially by the TWDB technical staff and are then evaluated by the RWPGs for accuracy and revised if necessary. The demand projection methodology is discussed in detail in Chapter 2.

The Region M planning group approved the draft projections developed by the TWDB for manufacturing, livestock, mining, and steam-electric power generation demands. The TWDB projections for municipal and irrigation demands were revised based on local information and feedback from the municipal WUGs. The total water demand projections for all WUGs over the planning horizon are shown aggregated for the 2021 RWP and the 2026 RWP on Figure 9-1.

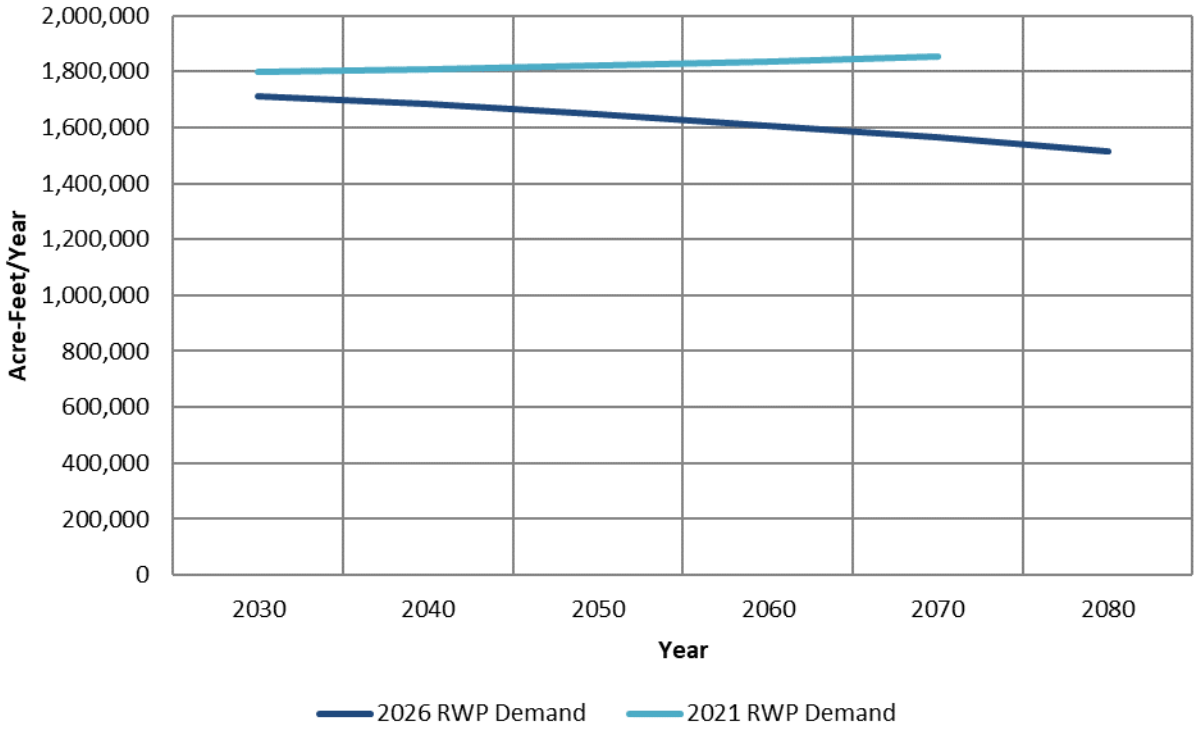

Figure 9-1 Comparison of Regional Demand Projections, 2021 and 2026 RWPs

9.2.1 Population Projections

For the 2021 RWP, the 2010 US Census was used as a basis, and population growth was estimated using demographics and projected birth, death, and migration rates.

Population projections for this cycle were based on the 2020 US Census data. For this reason, the population projections for Region M are lower than in previous cycles. According to demographers at the Pew Research Center, the 2020 Census had a nationwide undercount of 5 percent for Hispanic populations. To address these concerns, the RWPG requested an increase to the county population in Cameron County, Hidalgo County, and Webb County, based on a 5 percent increase to the Hispanic population percent in each county. These are the three counties where municipal WUGs requested revisions to their population projections.

County-level population projections are based on Texas State Data Center (TSDC) Office of the State Demographer county-level population estimates. The base year projections are based on the 2020 census, and projections were developed using demographic trends including birth rates, survival rates, and net migration rates for population cohorts separated by age, gender, and race/ethnicity. TSDC's projections extend to 2050, and the TWDB staff has extended the projection through 2080. Overall, the population for the region increases over the planning horizon, but certain counties do project a decrease

in population due to updates to the birth/death and migration rates for each individual county. Refer to Figure 9-2 for a comparison in population projections for the 2021 RWP and 2026 RWP.

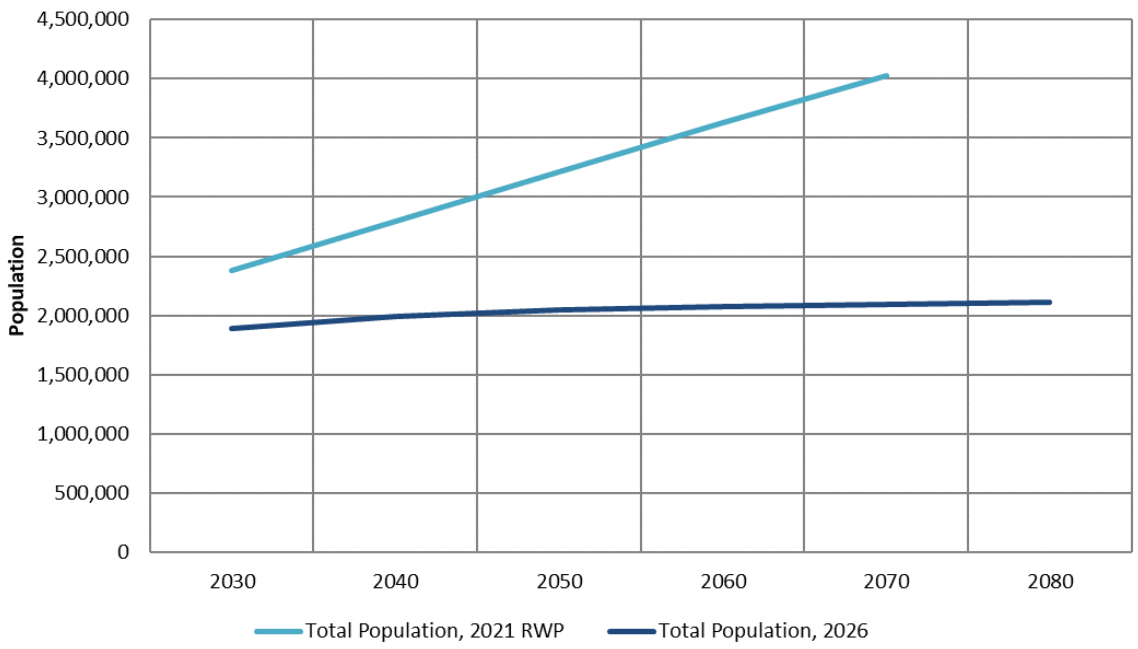

Figure 9-2 Comparison of Population Projections, 2021 and 2026 RWPs

In the updated plan, only a slight change is noted in the distribution of projected population on a county basis, as shown on Figure 9-3.

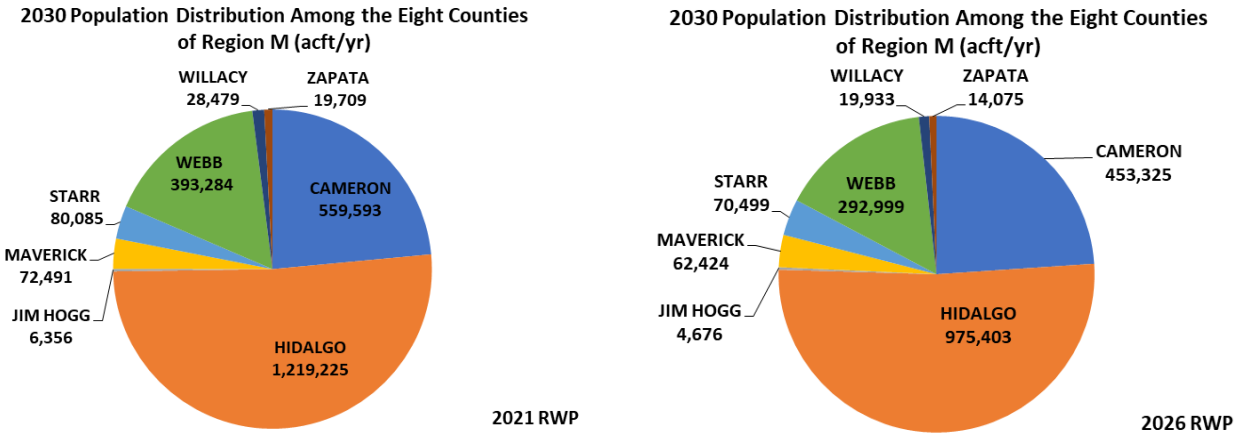

Figure 9-3 Population Projections by County, 2021 and 2026 RWPs

9.2.2 Municipal Water Demand Projections

The municipal demand projections for 2026 are lower and flatter than the 2021 RWP projections (Figure 9-4) because of a lower projected population and lower measured and projected per-capita water use.

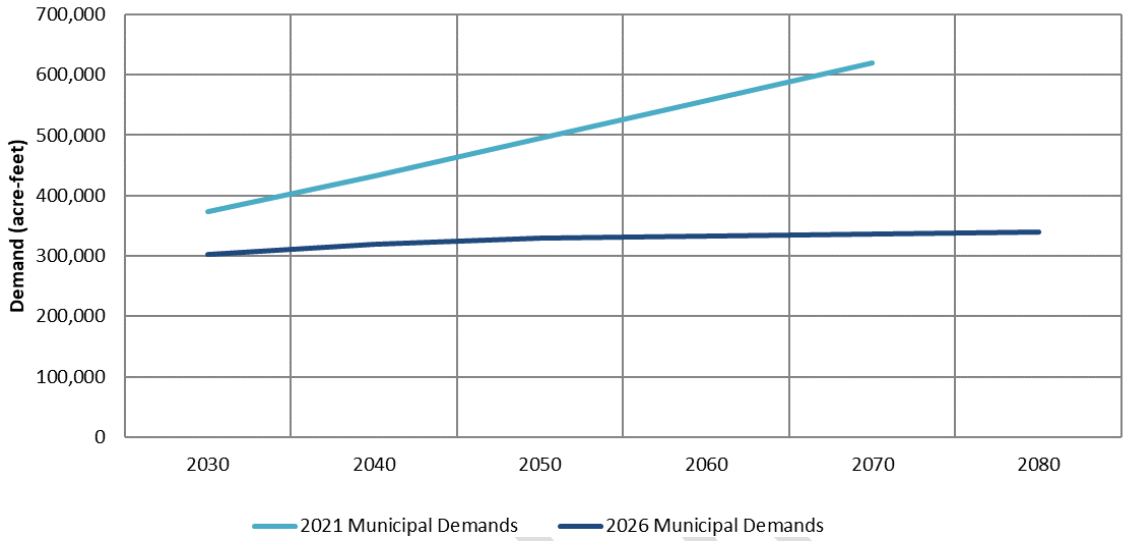

Figure 9-4 Comparison of Municipal Demand Projections, 2021 and 2026 RWPs

9.2.3 Irrigation Demand Projections

Each cycle of planning in Region M has predicted decreasing demand for irrigation water over the planning horizon, based on anticipated urbanization, particularly in Cameron and Hidalgo counties (Figure 9-5).

For the 2026 planning cycle, the Region M RWPG agreed to use the same methodology as in the 2021 Plan. The 2021 irrigation demand projections are based on the TWDB Historical Water Use Estimates[1] for 2011, data provided in May 2017, which was considered representative of a year with high water storage (not supply-limited), and low rainfall (high demand). The rate of change was estimated by the rate of conversion of water rights from irrigation to municipal use across the planning region and was based on Texas Commission on Environmental Quality records of active water rights.[2]

The rate of change that was initially recommended by the TWDB was flat and was determined by the planning group to not be appropriate. The projected increases in municipal demand relate to increasing development and urbanization, which should correlate to decreased irrigated land and it is assumed that water rights will be converted from irrigation use to municipal use. The rate that irrigation water use is projected to decrease can be correlated with the increasing municipal demands, given that there are limited alternative sources for irrigation water. For the purposes of this study, the planning group estimated the rate of decreasing irrigation demand by the inverse of the rate at which municipal water demand increases.

[1] http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/index.asp.
[2] "WRActive" file available https://www.tceq.texas.gov/permitting/water_rights/wr-permitting/wrwud. Previous downloads of the file were dated and a trend analysis performed for the classification of water rights.

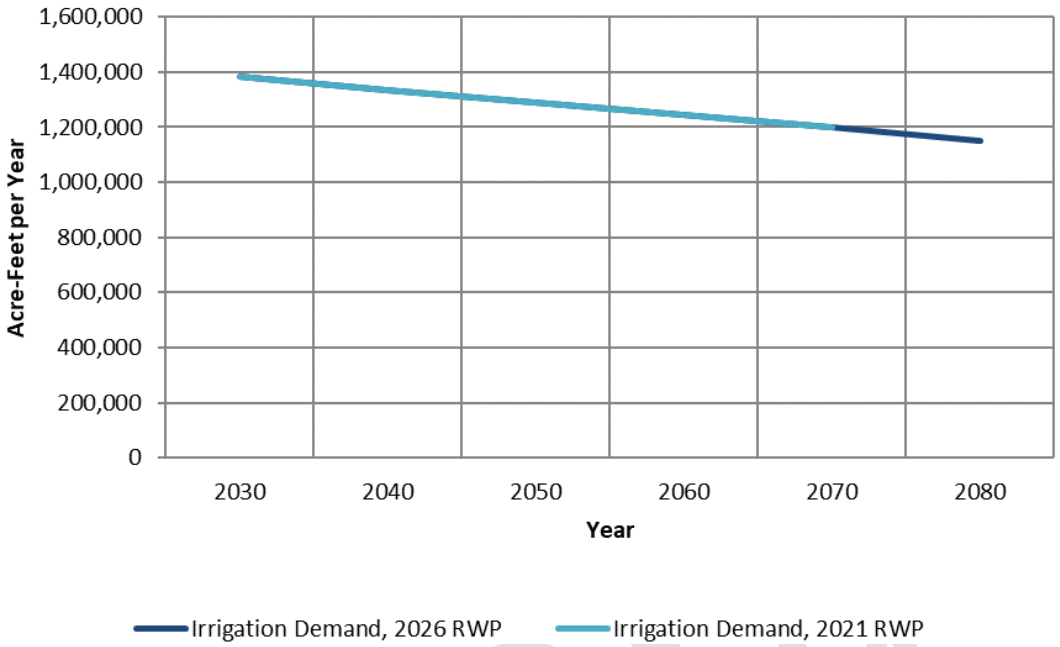

Figure 9-5 Comparison of Irrigation Demand Projections, 2021 and 2026 RWPs

9.2.4 Manufacturing Demand Projections

Manufacturing demands represent a very small portion of the overall regional water demands and are revised upward slightly in this plan (Figure 9-6), with increased in demand occurring primarily in Cameron and Hidalgo counties. The primary manufacturing water users in Region M are related to the agriculture industry and the fishing industry, including vegetable processing.

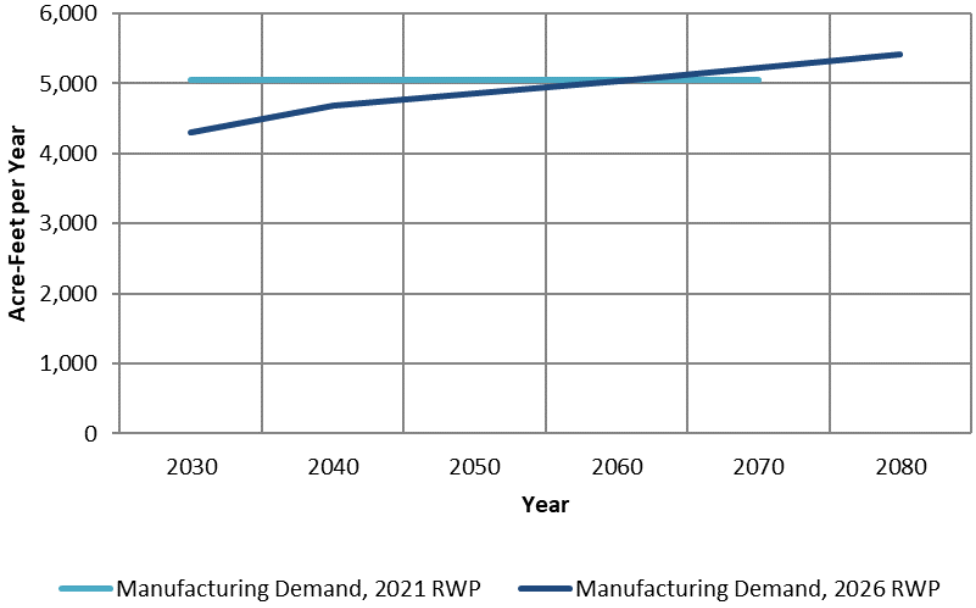

Figure 9-6 Comparison of Manufacturing Demand Projections, 2021 and 2026 RWPs

9.2.5 Mining Demand Projections

The mining demand projections shifted significantly from the 2021 RWP (Figure 9-7). For the 2021 RWP, mining water use estimates were based on the TWDB Annual Water Use Survey and additional oil and gas water use estimates provided by the TWDB using the FracFocus database. Oil and gas water use estimates were then broken down by water source based on a TWDB contracted study, Oil & Gas Water Use in Texas: Update to the 2011 Mining Water Use Report,[3] with the Bureau of Economic Geology (BEG). The BEG estimated recent mining water use and projected the water use across the planning horizon using data collected from trade organizations, government agencies, and other industry representatives. County-level projections were compiled as the sum of individual projections for four sub-sector mining categories: oil and gas, aggregates, coal and lignite, and other.

For the 2026 Plan, mining water use estimates were based on the 2022 TWDB contracted study, Water Use by the Mining Industry in Texas,[4] with the University of Texas BEG. According to TWDB, this study provided a comprehensive and quantitative assessment of mining water use across Texas and identified major mining operations in the state, including oil and gas, aggregates, and coal and lignite. Both historical and current water use were determined, and projections of future water demand were developed for 2030 through 2080 in each major sub-category within the mining sector, highlighting water use for unconventional oil and gas development.

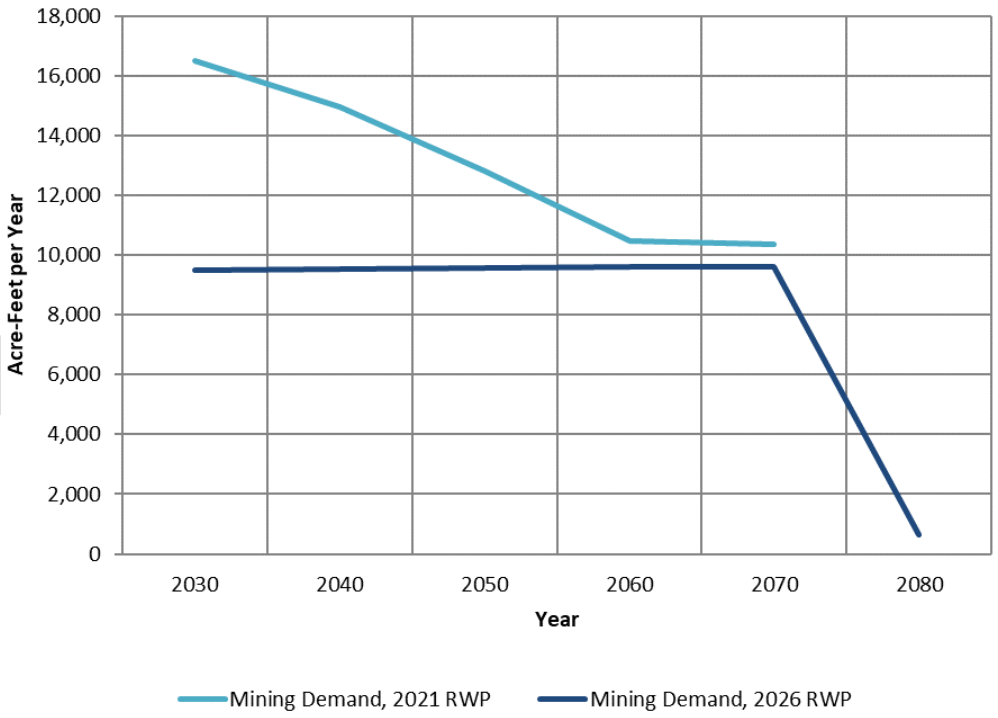

Figure 9-7 Comparison of Mining Demand Projections, 2021 and 2026 RWPs

[3] Bureau of Economic Geology. Oil & Gas Water Use in Texas: Update to the 2011 Mining Water Use Report. http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0904830939_2012Update_MiningWaterUse.pdf.

[4] University of Texas Bureau of Economic Geology. Water Use by the Mining Industry in Texas. August 2022. https://www.twdb.texas.gov/waterplanning/data/projections/MiningStudy/doc/Final%20TWDB%20Mining%20Water%20Use%20Report.pdf

9.2.6 Steam-Electric Power Generation Demand Projections

Steam-electric power generation water demand is projected to remain below 1 percent the overall non-municipal water demands in Region M throughout the planning horizon. The steam-electric water demands are projected to be a constant 10,621 ac-ft/yr from 2030 to 2080. The demand projections are lower than those in the 2021 Region M Water Plan, mainly due to the cancellation of two planned facilities associated with Coronado Power Ventures (La Paloma Energy Center). Refer to Figure 9-8 for comparison to the previous cycle.

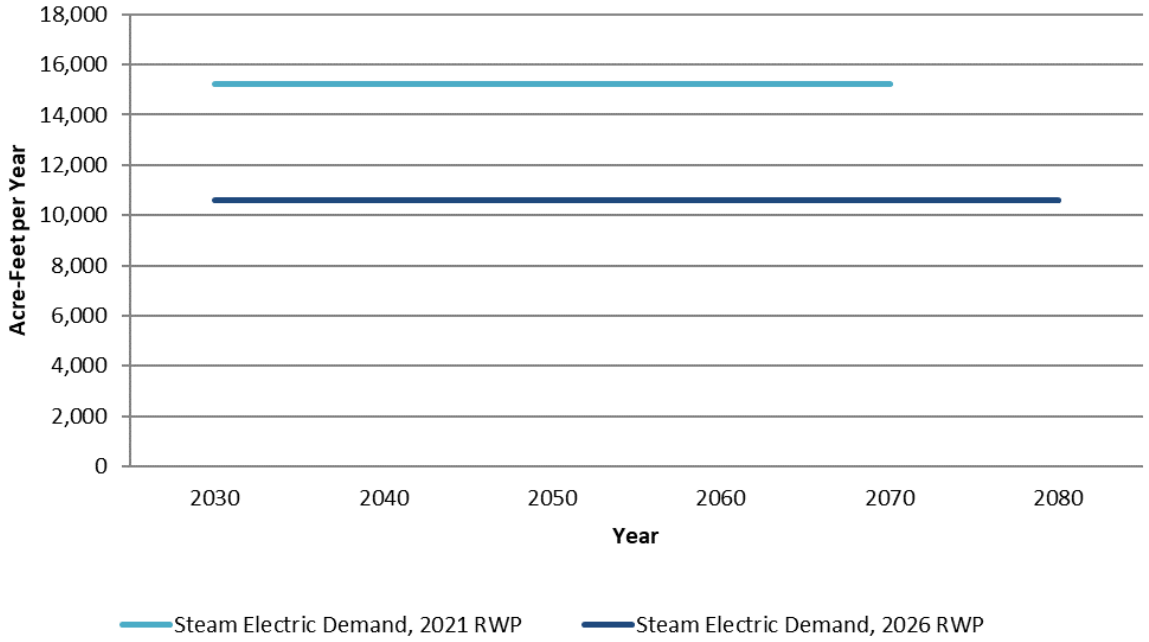

Figure 9-8 Comparison of Steam Electric Demand Projections, 2021 and 2026 RWPs

9.2.7 Livestock Demand Projections

The RWPs since 2001 have estimated livestock demand using the numbers of each type of livestock and estimated water usage for each type. The rate of change has been assumed to be constant in both this plan and the 2021 RWP. The TWDB updated the inventory estimates for broiler chickens for 2015 through 2019, and updated livestock water use estimates for 2015 through 2019 using new per head daily water use for milk cows, chickens, hogs, and goats; these figures were used in developing the livestock water demand projections. The rate of change for projections from the 2021 RWP was then applied to the updated base year. Base year livestock demands in this plan are shown to be slightly lower than the projections from the 2021 RWP, as shown on Figure 9-9.

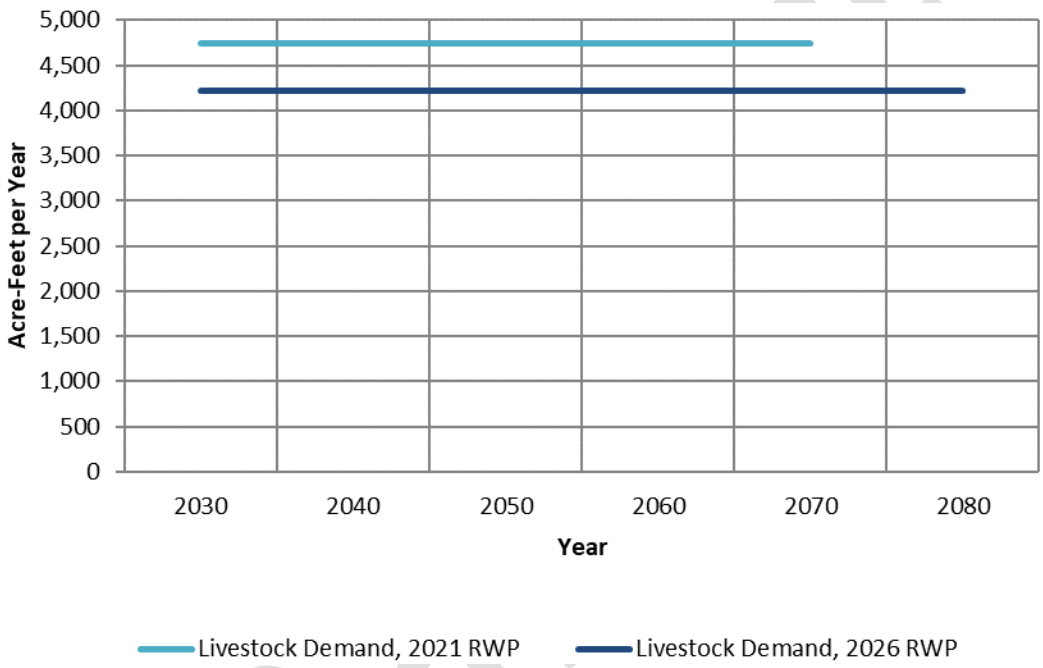

Figure 9-9 Comparison of Livestock Demand Projections, 2021 and 2026 RWPs

9.3 Availability and Supply

The Rio Grande Water Availability Model (WAM) was updated prior to the 2026 planning cycle with the period of record extending out to 2018, which decreased the Amistad-Falcon Reservoir System firm yield values that are used in the planning process. For the 2021 RWP, the Rio Grande WAM had a period of record that only went through the year 2000. While the drought spanning from July of 1992 through the year 2000 (end of the WAM's period of record) included the minimum storage event for both the United States and the combined (United States and Mexico) systems, the extent of the model did not include the end of the drought. As such, the drought of record (DOR) for the 2021 Plan was the longest duration drought modeled for both the combined reservoir system and the US portion spans the 1960s: 12/1959 through 10/1971 for the combined storage belonging to the United States and Mexico, and 6/1961 through 10/1971 for the US portion. For the 2026 RWP, because the WAM's period of record was extended through 2018, a new DOR occurred. The new DOR modeled for both the combined reservoir system and the United States portion spans the late 1990s to early 2000s: 6/1994 to 8/2003 for the United States portion and 1/1994 to 5/2003 for the combined system. Both the 2021 RWP and 2026 RWP require that all current and future groundwater supplies fit within the modeled available groundwater (MAG) as established by groundwater management area (GMA) 13 and GMA 16.

9.3.1 Rio Grande Water Availability Model

The Rio Grande Water Availability Model (WAM) was updated as described in the Technical Memorandum, such that the current distribution of water rights is included, and the revisions made by Region E to the upper basin are included in the Region M modeling for consistency. Supply from the Amistad-Falcon Reservoir System is expected to decrease as a result of sedimentation, which reduces the overall storage capacity. A sediment loading rate was estimated for each reservoir and the reduction in storage is incorporated into the WAM. Figure 9-10 shows the variation in the firm yield from the Rio Grande WAM in the last two planning cycles.

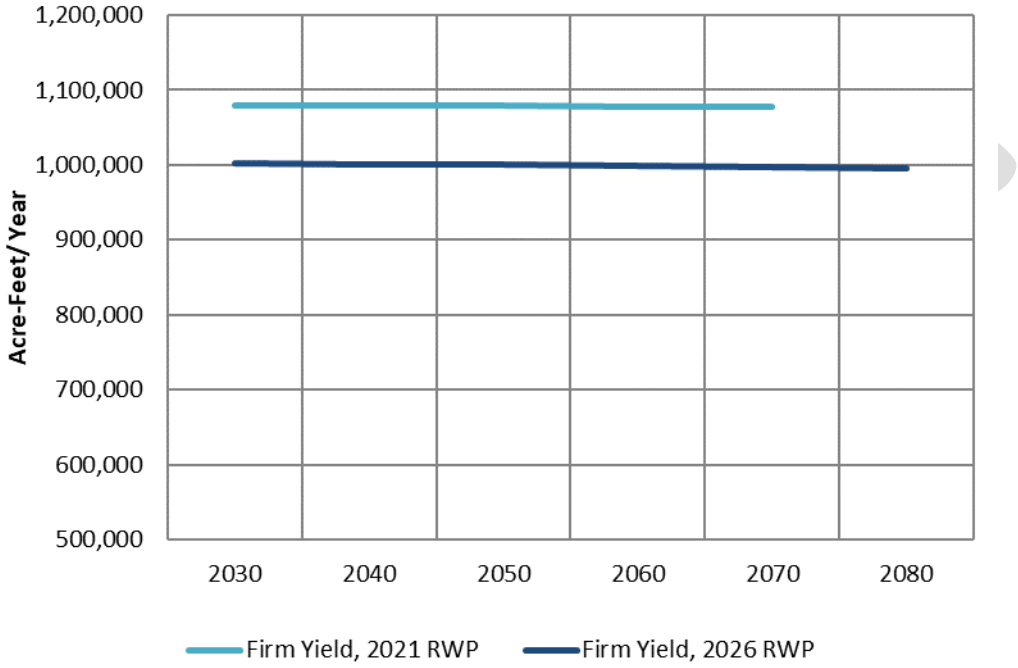

Figure 9-10 Firm Yield Projections for the Amistad-Falcon Reservoir System, 2021 and 2026 RWPs

9.3.2 Groundwater

The 2016 RWP was the first cycle of planning that required that all current and future groundwater usage described in the plan to not exceed the MAG values. GMAs were established across the state to help facilitate local regulation of groundwater. Groundwater can be regulated locally by groundwater conservation districts where they have been formed, but most of Region M is not within a district. The groundwater conservation districts within a single GMA determine the desired future conditions (DFCs) for the aquifers in that area. DFCs are conservation goals associated with a quantifiable measure of aquifer conditions, such as future water levels, water quality, or spring flows that are specified for certain times in the future, i.e., 12 feet of drawdown in 50 years. In the case of Region M, representatives from the existing GCDs in GMA 16 and GMA 13 established the DFCs.

A groundwater availability model (GAM) allows the TWDB to evaluate what amount of groundwater production, on an average annual basis, will achieve the stated DFCs for an aquifer. The current MAGs do not specify water quality, but the supplies are identified as fresh, fresh/brackish, or brackish according to the aquifer and the location within that aquifer (specified by county and river basin).

In some cases, aquifers or parts of aquifers within a GMA are locally important but are not planned for in the same way. Availabilities for these aquifers are developed through the aquifer models but are considered non-MAG availabilities because they are not included in the joint groundwater planning process. The minor and alluvial aquifers in the region, including the Yegua-Jackson aquifer, may produce significant quantities of water that supply relatively small areas.

Region M has two major and one minor aquifer for which groundwater availabilities are provided. Figure 9-11 shows the previous 2030 estimates of groundwater availability for each aquifer that were used in the 2021 RWP (in light blue/on the left), and the current 2030 groundwater availabilities in dark blue on the right. More detailed information about regional groundwater availability is available in Chapter 3.

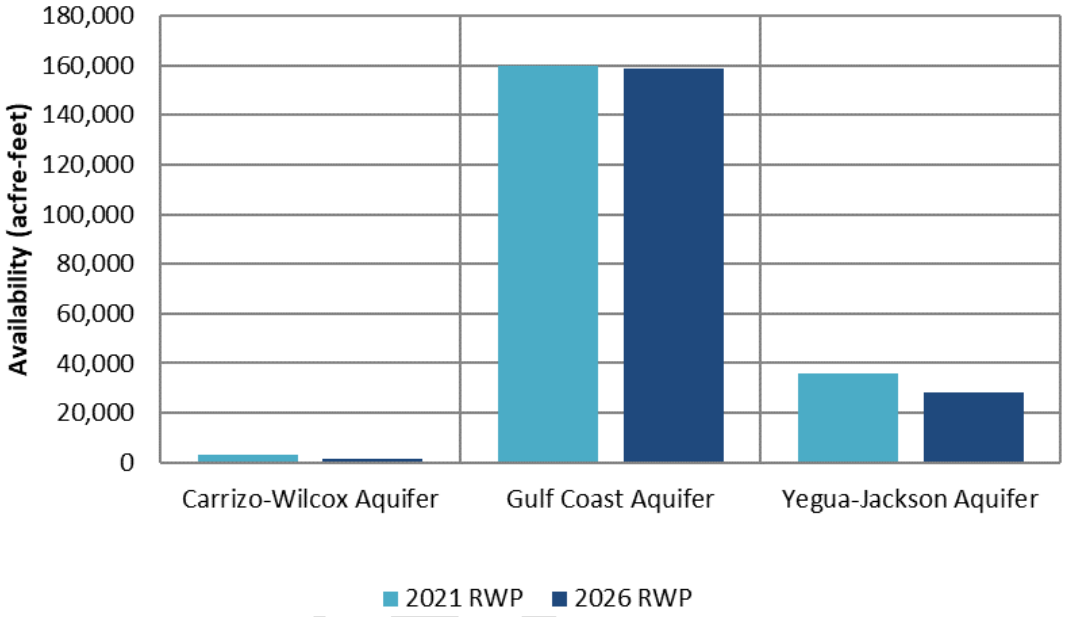

Figure 9-11 2030 Groundwater Availability Estimates, 2021 and 2026 RWPs

9.4 Water Needs

Water needs are determined by comparing the existing supplies to the projected demands in each decade to identify if there is a surplus or a shortage (need). For the 2021 RWP, water needs increased slightly over the planning horizon, due mainly to the municipal demand growth. For the 2026 RWP, because the population growth projections decrease significantly as compared to the 2021 RWP, while the regional water needs are higher in 2030, they decrease over the planning horizon. Figure 9-12 shows the regional water needs comparison for the 2021 RWP and 2026 RWP.

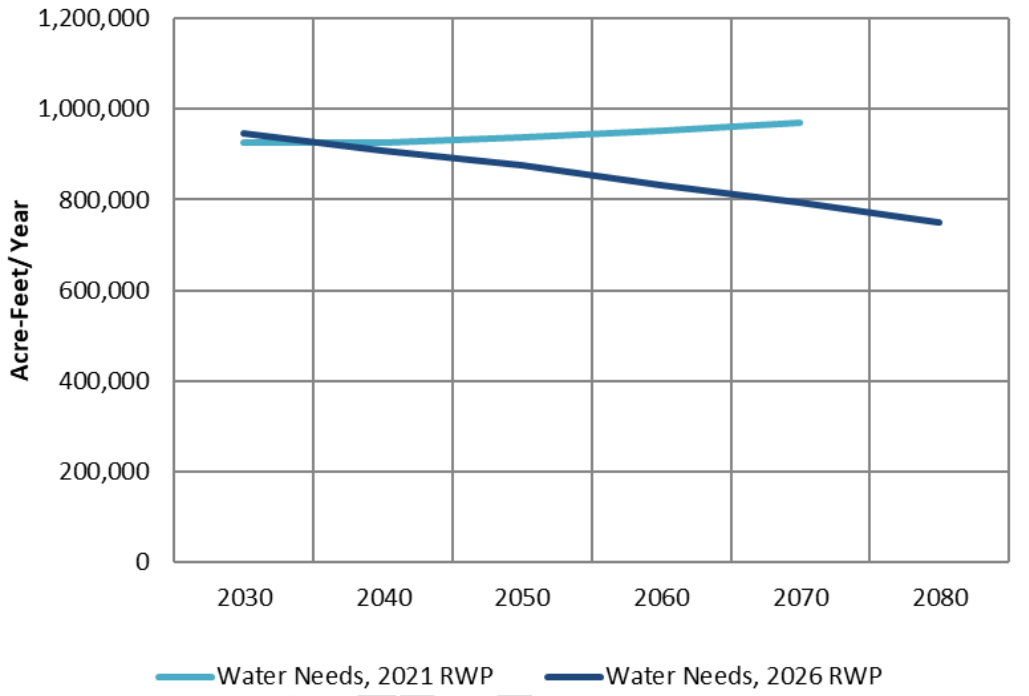

Figure 9-12 Regional Water Needs, 2021 and 2026 RWPs

9.5 Water Management Strategies

Before a RWPG begins the process of identifying potentially feasible WMSs, RWPGs must document the process by which it will list all possible WMSs and identify the strategies that are potentially feasible for meeting a need in the region. On November 1, 2023, the Rio Grande RWPG, after asking for public comments, considered and approved a documented process to identify potentially feasible WMSs for the 2026 Regional Water Planning Cycle.

The Region M potentially feasible WMSs were identified using the following documented process:

1. Current water planning information, including specific WMSs of interest, will be solicited from WUGs and Wholesale Water Providers (WWPs) in Fall 2023.
    a. Solicitation of planning information will include the recommended WMSs in the 2021 Regional Water Plan.
    b. WUGs/WWPs will be encouraged to classify each WMS on their 2021 Plan list as included or rejected for the 2026 Planning Cycle and provide comments, and also to list additional WMSs that will be new for the 2026 Planning Cycle. WUGs/WWPs will be

encouraged to classify each WMS on their draft list as recommended, alternative, or rejected and provide comments.

2. A list of potential WMSs will be prepared based on an initial technical evaluation and needs analysis and the comments received, which will be available for consideration by the RWPG by early 2024.

3. Additional WMSs may be brought forth to the RWPG for consideration until May 2024.

Using the documented process identified above, the Rio Grande RWPG identified Potentially Feasible WMSs for the 2026 RWP, which are listed in Table 9-1. The majority of the WMSs listed in the table are the same as in the 2021 RWP, although in some cases, the WMS from the 2021 RWP has been split into multiple WMS in the 2026 RWP. For example, Municipal Infrastructure Improvements in the 2021 RWP have been split into separate WMSs for Surface Water Treatment, Distribution and Transmission Facilities, and Storage Reservoirs, and Desalination has been split into Brackish Groundwater Desalination and Seawater Desalination.

Table 9-1 2026 Potentially Feasible Water Management Strategies

Potentially Feasible Water Management Strategies
Advanced Municipal Conservation
Irrigation District Conservation
Agricultural (On-Farm) Conservation
Industrial Conservation
Conversion of Water Right Classification
New or Expanded Surface Water Treatment
New or Expanded Distribution and Transmission Facilities Resulting in Increased Supplies
Storage Reservoirs
New or Expanded Fresh Groundwater Supply
New or Expanded Brackish Groundwater Desalination
Seawater Desalination
Reuse
Biological Control of Arundo Donax
Drought Management
Aquifer Storage and Recovery
Regional Water Supply Facilities

Once the list of potentially feasible WMSs was developed, it was used in conjunction with the "Needs Analysis" based on supplies and demands. Advanced municipal conservation, drought management, reuse, irrigation district (ID) improvements, and industrial conservation WMSs were applied to the WUGs and WWPs, and a secondary needs calculation was performed.

These secondary needs were then compared to the submitted, developed, and carried over WMS available to each WUG or WWP. Staying within the bounds of water availability from each source, the WMSs specific to each WUG were selected that could meet the projected need. A detailed description of the "Needs Analysis" is discussed in Chapter 4, and the WMS evaluation process is included in Chapter 5.

Table 9-2 compares the number of each type of WMS that was recommended in the 2021 RWP and the 2026 RWP. The 2021 RWP included 139 recommended WMS projects and 22 alternative WMS projects, whereas the 2026 RWP recommends 238 WMS projects and 19 alternative WMS projects. In many cases, the number of WMS correlates to the number of WMS projects for a particular WMS category. In some cases, the number of WMS may be fewer, particularly if there are multiple phased projects for the WMS. The majority of the increase in projects for the 2026 RWP comes from the inclusion of capital cost conservation measures, such as water line leak detection and repair, and AMI smart meters.

Table 9-2 Comparison of Recommended WMS/WMS Projects from 2021 and 2026 RWPs

Category	Number of Recommended WMS/WMS Projects		Number of Alternative WMS/WMS Projects	
	2026 RWP	2021 RWP	2026 RWP	2021 RWP
Conversion of Water Rights	71	46	-	-
Aquifer Storage and Recovery	-	-	1	1
Brackish Groundwater	24	5	-	-
Fresh Groundwater	10	18	4	5
Irrigation District Conservation	24	24	-	-
On-Farm Conservation	8	8	-	-
Municipal Conservation	73	-	-	-
Municipal Infrastructure Improvements	5	13	-	-
Reuse	14	17	7	5
Seawater Desalination	1	1	2	2
Storage	4	6	1	2
Surface Water Treatment	4	1	4	7

9.5.1 Implementation of Water Management Strategy Projects from the 2021 Regional Water Plan

An implementation survey was conducted as part of the 2026 RWP process, which describes the progress toward implementing projects that were recommended in the 2021 RWP. Appendix 9A includes survey results and project information that were received by sponsors.

9.6 Drought Response

Chapter 7 is dedicated to a discussion of each region's preparations for and response to drought. The previous requirements for the RWPs have been retained, aggregated into this chapter, clarified, and new requirements have been added.

New requirements for the 2026 RWP:

- RWPGs to identify rather than recommend drought response triggers and actions.
- New guidance to optionally address droughts worse than drought of record.
- New subsection required to address how the planning group is addressing uncertainty and droughts worse than drought of record (if applicable), and what additional measures not included in the plan could be available during a drought worse than drought of record.

9.7 Assessment of Progress Toward Regionalization

In accordance with 31 Texas Administrative Code §357.45(b), planning groups must "assess the progress of the RWPA in encouraging cooperation between WUGs for the purpose of achieving economies of scale and otherwise incentivizing WMSs that benefit the entire RWPA."

Several WMSs since the 2021 RWP have focused on cooperative agreements among WUGs and WWPs. The 2021 RWP had 23 WMSs that served multiple WUGs. These included Arundo Donax Biological Control, Edinburg Non-Potable Reuse, the North Cameron Regional Water Treatment Plant (WTP) Wellfield Expansion for East Rio Hondo Water Supply Corporation (WSC) and North Alamo WSC, the Roma Regional WTP, Urbanization, and multiple ID Conservation strategies. The 2026 RWP has 24 WMSs that serve multiple WUGs. These include Arundo Donax Biological Control, Conversion of Surface Water Rights, four Southmost RWA strategies, and multiple ID Conservation strategies. The ID Conservation WMS is the main recommended WMS in the 2021 RWP and the RWP 2026 RWP that serves more than one WUG. This WMS focuses on improving ID distribution systems to reduce losses and remove infrastructure bottlenecks and providing continued improvement to any ID efficiency and enables more water to convey through the complex systems in the Lower Rio Grande Valley. Since the 2021 RWP, three confirmed WMSs have been implemented: Arundo Donax Biological Control and two of the ID Conservation WMSs. The Arundo Donax Biological Control and the ID Conservation measures will continue to be implemented in future years. Another WMS that will likely serve multiple WUGs that have not yet been identified is the Delta Region Water Supply WMS, which proposes to build three reservoirs and water treatment plants that could serve multiple WUGs, although specific WUGs have not been identified yet. This WMS was included in the 2021 RWP as an amendment to the plan and continues to be included in the 2026 RWP as a recommended WMS. Southmost Regional Water Authority (SRWA) has three brackish groundwater desalination WMSs recommended in the 2026 RWP that will also likely serve multiple WUGs. Outside of WMSs, SRWA has conducted successful regional groundwater connection studies.

For many years, the Rio Grande RWPA has encouraged cooperation and collaboration among WUGs for the purposes of achieving economies of scales. For example, the Southmost Regional Water Authority utilizes economy of scale to service various independent systems. These WUGs include Brownsville Public Utilities Board, Valley Municipal Utility District, Brownsville Navigation District (i.e., Manufacturing, Cameron in the RWP), Los Fresnos, and Indian Lake (i.e., County-Other, Cameron in the RWP).

This assessment demonstrates that many entities within the Rio Grande RWPA coordinate and collaborate in order to achieve regionalization. Based on the array of collaborative projects and partnerships, the Rio Grande RWPA has been successful in encouraging cooperation among WUGs for the purpose of achieving economies of scale or otherwise incentivizing WMSs that benefit the entire RWPA. The Rio Grande RWPG is committed to encouraging continued cooperation among WUGs and is always looking for ways to achieve economies of scale for the benefit of the region and the state.

Appendix 9A. Implementation Status of Recommended Projects in the 2021 RWP