

FINAL PLAN

CHAPTER 4: IDENTIFICATION OF WATER NEEDS

Rio Grande Regional Water Plan

BV PROJECT NO. 411250

PREPARED FOR

Rio Grande Regional Water Planning Group

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Appendix 4B.	Major Water Providers Summary

List of Abbreviations

ac-ft/yr	Acre-Feet per Year
MAG	Modeled Available Groundwater
MUD	Municipal Utility District
MWP	Major Water Provider
SUD	Special Utility District
TWDB	Texas Water Development Board
WCID	Water Control and Improvement District
WMS	Water Management Strategy
WSC	Water Supply Corporation
WUG	Water User Group
WWP	Wholesale Water Provider

Final Draft

4.0 Identification of Water Needs

4.1 Introduction

The primary emphasis of the regional water supply planning process established by Senate Bill 1 is the identification of current and future water needs and the development of strategies for meeting those needs. This chapter describes the projected needs determined from the demands described in Chapter 2 and supplies discussed in Chapter 3.

The objective is to identify which Water User Groups (WUGs) will have a need, herein defined as a shortage between projected demands and supplies. Drought year needs may be the result of any combination of the following scenarios, among others:

- High drought year demand;
- Long-term demand growth;
- Limited supplies, either:
 - Contractually, as in municipal water rights, or
 - Hydraulically, as with irrigation water rights,
- Limitations of existing infrastructure, as with well-field or treatment plan capacity; or
- Unreliable supplies.

WUG needs are shown herein, and an evaluation of Major Water Provider (MWP) demand, supply, and need is included in Appendix 4B.

Needs were identified for each of the six types of WUG: municipal, irrigation, livestock, manufacturing, steam-electric power generation, and mining. Chapter 2 describes the methodology for demand projections for each WUG type, and Chapter 3 discusses the approach for determining existing supplies. For each WUG (each municipal utility WUG and each countywide aggregate for the other five types of users), the supplies and the demands are compared to estimate the needs. Surpluses, where the currently available supplies exceed demands, are shown as a zero in the needs evaluations. This ensures that a surplus for one location does not automatically cancel out a shortage for another entity. For any surplus that is moved from one entity/geographical area to another, a Water Management Strategy (WMS) will be identified in Chapter 5.

A second-tier needs analysis, which shows needs remaining after the recommended conservation and direct reuse WMS are accounted for, is included in Appendix 4A.

For Wholesale Water Providers (WWPs) that are also WUGs, their needs are shown according to the supplies or portions of supplies that have been identified to meet their WUG needs. WWP supplies to other WUGs are included as a supply for that WUG. WWPs that do not have a demand associated with them independent of the WUG they supply are not shown herein.

4.2 Regional Needs Summary

4.2.1 Regional Needs by Water User Group Category

Figure 4-1 displays the total regional needs for Region M, where most needs are from irrigation. This is to be expected, as the irrigation demand projections are based on estimated use in a year where supplies are not limited from the reservoirs and little rainfall occurs, or the highest demand scenario; whereas the supplies are based on the drought of record. This shortage will be partially addressed with supply increase through improvements to the irrigation district conveyance systems. Growers also manage low water years through on-farm efficiency measures. Both strategies are discussed in detail in Chapter 5. Table 4-1 summarizes the water needs by WUG type.

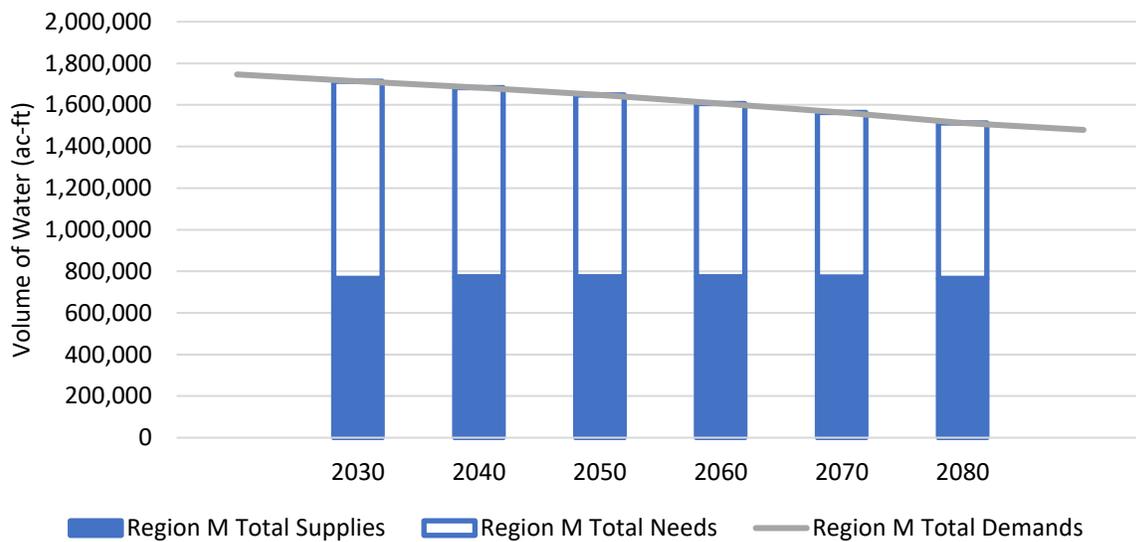


Figure 4-1 Total Regional Needs, Shown as a Portion of Total Demands (ac-ft/yr)¹

Table 4-1 Water Needs by Water User Group Type (ac-ft/yr)

WUG	2030	2040	2050	2060	2070	2080
Irrigation Needs	919,013	873,548	828,086	783,070	738,360	693,854
Municipal Needs	24,355	32,442	42,823	46,375	50,400	54,449
Mining Needs	3,604	3,605	3,606	3,608	3,675	-
Steam-Electric Power Needs	--	--	--	--	--	--
Manufacturing Needs	--	--	--	1	5	9
Livestock Needs	--	--	--	--	--	--
Total Needs	946,972	909,595	874,515	833,054	792,440	748,312

Dash (--) indicates surplus for the associated WUG type decade.

¹ Region M Total Supplies illustrated on figure do not include individual WUG surplus supplies.

Municipal needs are significant and increase as the population increases over the planning horizon. While one-time purchases of water, rather than contractual agreements or purchase of water rights, are often used as a stopgap measure, this is not a reliable drought year supply strategy. Chapter 5 recommends the purchase of water rights, as well as development of new sources, conservation, and other strategies to address current and future needs of municipal WUG and WWP.

Industrial users (mining, steam-electric, and manufacturing) supplies were evaluated using data provided to the Texas Water Development Board (TWDB) and the Texas Commission on Environmental Quality regarding groundwater wells, surface water use, and purchase of water from public water supplies. Needs in these categories will likely also require increased cooperation with municipalities for reuse of wastewater effluent as well as conservation and water efficiency measures. Strategies for meeting future water needs are discussed in Chapter 5.

4.2.2 Regional Needs by County

The needs in Region M follow a similar distribution as the demands, focused heavily in Cameron and Hidalgo Counties, as shown in Table 4-2. Some needs are anticipated in each county in 2030, which will be evaluated individually in following sections. Jim Hogg County exhibits surplus supplies, as noted with the dashes in Table 4-2.

Table 4-2 Needs by County (ac-ft/yr)

County	2030	2040	2050	2060	2070	2080
Cameron	364,901	347,179	329,406	312,357	295,794	279,304
Hidalgo	448,863	435,464	424,071	405,086	386,301	367,632
Jim Hogg	--	--	--	--	--	--
Maverick	25,192	23,241	21,381	19,939	18,589	13,510
Starr	23,449	23,239	22,928	22,519	22,141	21,770
Webb	4,465	3,662	3,169	2,821	2,485	2,149
Willacy	76,389	73,259	70,161	67,085	64,038	61,007
Zapata	3,713	3,551	3,399	3,247	3,092	2,940
Total Needs	946,972	909,595	874,515	833,054	792,440	748,312
Dash (--) indicates surplus for the associated county decade.						

4.3 Municipal Needs

The population of Region M has been growing at a slightly higher rate than the rest of Texas. The demand distribution is heavily concentrated in Cameron and Hidalgo counties and in the Laredo area in Webb County. Current supplies are estimated to be less than the 2030 demands for municipalities. As noted earlier, in some cases, this indicates that drought-year demands exceed normal supplies, and that need is regularly met by short-term contracts for water. Other municipalities may experience persistent shortage, especially those communities that rely solely on groundwater or utilities with infrastructure limitations.

The need for municipal water is depicted in the blue outline box on Figure 4-2 and increases to approximately 85 percent of the total demand by 2080. The population centers are shown on Figure 4-3. Figure 4-4 displays each county’s portion of the total regional municipal needs. Municipal demands for each county are discussed in the following sections. Chapter 5 will discuss WMSs that have been identified to address projected municipal needs.

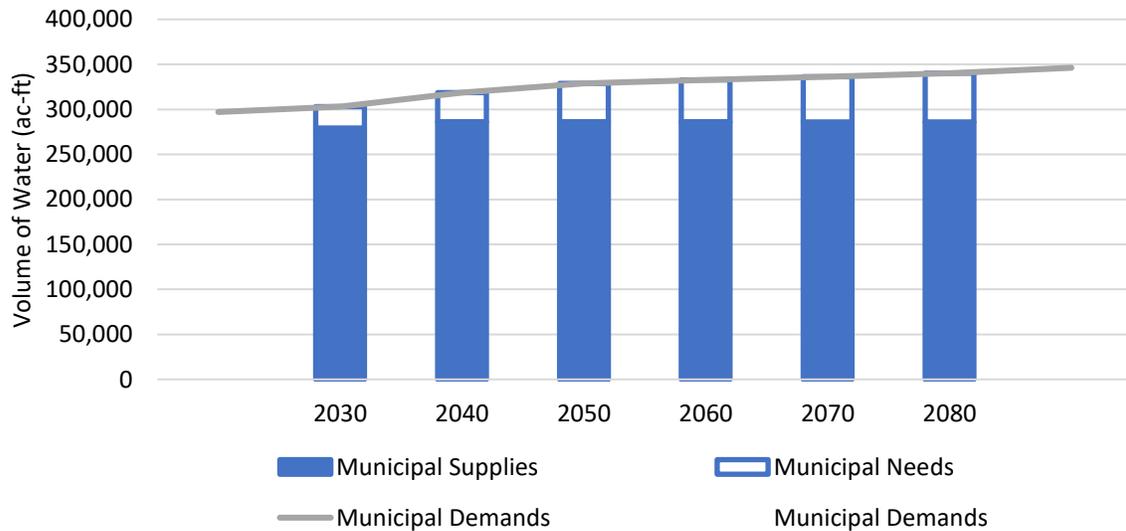


Figure 4-2 Municipal Needs, Shown as a Portion of Municipal Demands (ac-ft/yr)²

² Region M Municipal Supplies illustrated on figure do not include individual WUG surplus supplies.

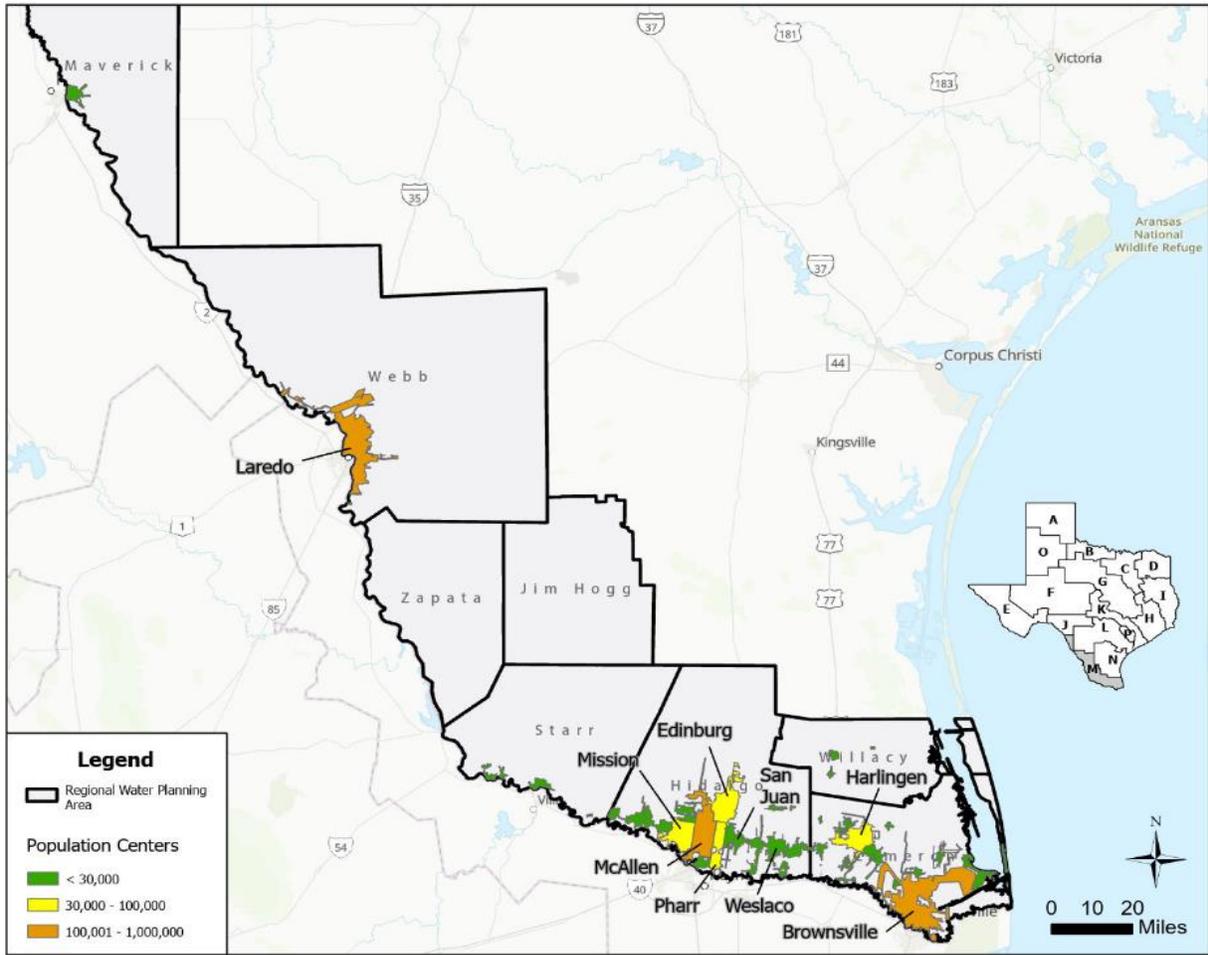


Figure 4-3 Population and Municipal Demand Centers

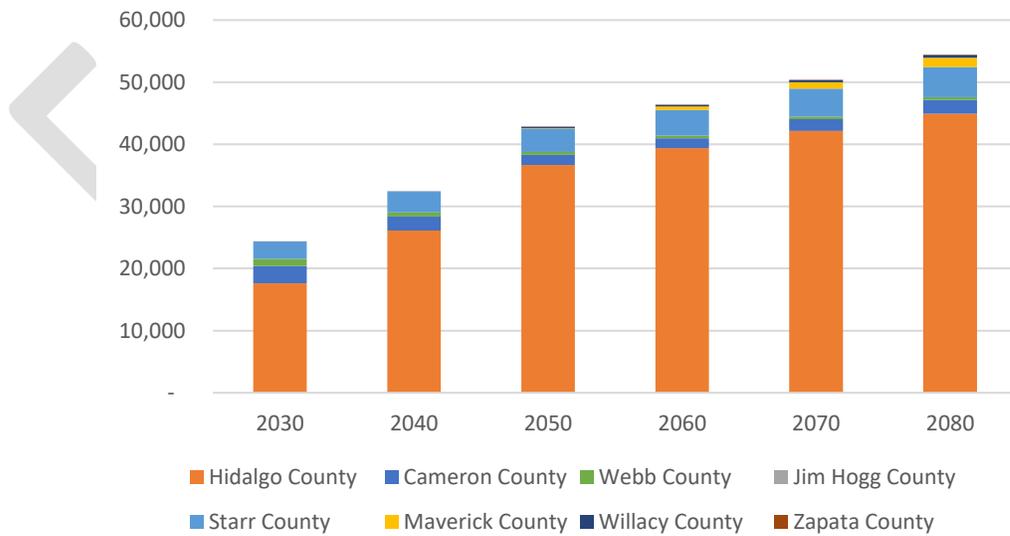


Figure 4-4 Municipal Needs, Shown by County (ac-ft/yr)

4.3.1 Major Water Providers

MWP needs are based on the WUG demands of the MWP, if applicable, and the contract demand of customers, which may not be representative of the customer’s full demand. MWP supplies are based on what is available for use, but in some cases supply surplus may be representative of system losses, as in the case of irrigation districts.

Detailed MWP needs information is included in Appendix 4B.

4.3.2 Cameron County Municipal Needs

Cameron County is projected to have the second-largest share of municipal needs, behind Hidalgo County, shown in Table 4-3.

Table 4-3 Cameron County Municipal Needs Projections (ac-ft/yr)

Entity	2030	2040	2050	2060	2070	2080
Brownsville PUB	--	--	--	--	--	--
Combes	--	--	--	--	--	--
County-Other, Cameron*	2,434	1,561	638	--	--	--
East Rio Hondo Water Supply Corporation (WSC)	--	--	118	639	921	1,216
El Jardin WSC	185	211	224	220	216	212
Harlingen	--	--	--	--	--	--
La Feria	--	--	--	--	--	--
Laguna Madre Water District	--	--	--	--	--	--
Los Fresnos	--	--	--	--	--	--
Military Highway WSC	55	142	180	165	149	132
North Alamo WSC	126	143	150	147	145	143
Olmito WSC	--	--	--	--	--	--
Palm Valley	--	--	--	--	--	--
Primera	25	185	295	379	471	522
Rio Hondo	--	--	--	--	--	--
San Benito	--	--	--	--	--	--
Santa Rosa	--	--	--	--	--	--
Valley Municipal Utility District (MUD) 2	--	--	--	--	--	--
Total	2,825	2,242	1,605	1,550	1,902	2,225

Dash (--) indicates surplus for the associated WUG decade.
 *Cameron "County-Other" includes public water supplies in Indian Lake and La Mirada Country Estates.

Most of the entities within Cameron County are at least in part served by irrigation districts and surface water. For this source, the most common limiting factor is water rights and the efficiency of conveyance infrastructure. Groundwater development has increased in Cameron County, which in many cases requires advanced treatment such as reverse osmosis. In these cases, the cost of extraction and treatment of groundwater can be a limiting factor, which impacts the rate of development of new well fields and treatment facilities.

The adopted modeled available groundwater (MAG) for Cameron County in this planning cycle did not differ significantly from the availability in the previous (2021) Region M water plan. This plan shows reduced supplies for some WUGs because supplies are required to be limited by the MAG in the Regional Water Plan. Reduction in actual supplies for Cameron County groundwater users is not planned or expected, and the joint groundwater planning process has not indicated any known concern about a reduction in groundwater availability in Cameron County.

4.3.3 Hidalgo County Municipal Needs

Hidalgo County has the largest share of municipal needs in the region, shown in Table 4-4. Within the county, almost all the municipalities are served by irrigation districts, with some groundwater. Therefore, the majority of the supplies are limited by the water rights that are held by each entity, as well as the efficiency of the conveyance infrastructure.

Table 4-4 Hidalgo County Municipal Needs Projections (ac-ft/yr)

Entity	2030	2040	2050	2060	2070	2080
Agua SUD	--	--	--	--	--	--
Alamo	--	--	--	--	--	--
County-Other, Hidalgo*	964	--	--	--	--	--
Donna	--	--	--	--	--	--
Edcouch	--	--	--	--	--	--
Edinburg	451	1,356	1,969	2,167	2,366	2,565
Elsa	--	--	--	--	--	--
Hidalgo	--	--	--	--	--	--
Hidalgo County MUD 1	--	--	--	--	--	17
La Joya	232	269	294	308	323	337
La Villa	--	30	56	53	50	47
McAllen	1,361	5,494	11,326	12,558	13,809	15,080
Mercedes	--	--	--	--	--	--
Military Highway WSC	--	--	--	--	--	--
Mission	--	630	1,317	1,792	2,275	2,764
North Alamo WSC	12,797	16,056	18,254	18,625	18,993	19,362
Pharr	1,803	2,310	2,676	2,864	3,053	3,244

Entity	2030	2040	2050	2060	2070	2080
San Juan	--	--	--	--	--	--
Sharyland WSC	--	--	794	1,035	1,276	1,516
Weslaco	--	--	--	--	--	--
Total	17,608	26,145	36,686	39,402	42,145	44,932

Dash (--) indicates surplus for the associated WUG decade.
 *Hidalgo County-Other includes the public water systems in Llano Grande Lake Park East, Llano Grande Lake Park West, Trails End Mobile Home Park, and Quiet Village II.

4.3.4 Jim Hogg County Municipal Needs

Jim Hogg County has little municipal demand and shows no municipal need. WUGs in Jim Hogg County do not have direct access to Rio Grande water with current infrastructure. The current municipal WUG is Jim Hogg County Water Control and Improvement District (WCID) 2. The limiting factor for groundwater supplies can be both the existing well field capacities as well as the characteristics of the aquifer(s).

4.3.5 Maverick County Municipal Needs

The Maverick County WUG does have municipal need from 2030 through 2080, as detailed in Table 4-5. Eagle Pass is the only incorporated city in Maverick County. The total population of Maverick County, according to the 2020 census, was 57,887. Maverick County WCID No. 1 serves some of these unincorporated areas. Maverick County’s population is concentrated along the Rio Grande, so the limiting factor on supplies is typically water rights.

Table 4-5 Maverick County Municipal Needs Projections (ac-ft/yr)

Entity	2030	2040	2050	2060	2070	2080
County-Other, Maverick	--	--	--	--	--	--
Eagle Pass	--	--	92	559	1,023	1,486
Maverick County	--	--	--	--	--	--
Total	0	0	92	559	1,023	1,486

Dash (--) indicates surplus for the associated WUG decade.

4.3.6 Starr County Municipal Needs

Municipal needs in Starr County are shown in Table 4-6. Starr County’s population is concentrated along the Rio Grande, so the limiting factor on supplies is likely to be water rights. The primary need in Starr County is Rio Grande City, which is more than double some of the other entities needs from this county. Some areas in northeastern Starr County are experiencing dropping water levels, which require new or deepened wells.

Table 4-6 Starr County Municipal Needs Projections (ac-ft/yr)

Entity	2030	2040	2050	2060	2070	2080
Agua SUD	--	--	--	--	--	--
County-Other, Starr	215	217	231	282	337	392
El Sauz WSC	62	76	87	91	95	99
El Tanque WSC	24	--	--	--	--	--
La Grulla	867	961	1,035	1,082	1,130	1,178
Rio Grande City	712	980	1,188	1,326	1,466	1,608
Rio WSC	193	337	433	433	431	429
Roma	--	--	--	67	156	247
Union WSC	691	749	799	845	892	939
Total	2,764	3,320	3,773	4,126	4,507	4,892
Dash (--) indicates surplus for the associated WUG decade.						

4.3.7 Webb County Municipal Needs

Webb County is the largest county in Region M but is relatively sparsely populated outside of Laredo and the cities south of Laredo along the Rio Grande. The population of Webb County, according to the 2020 census, is approximately 267,114, of which 96 percent is in Laredo. Limitations on access to water in this county are related to water rights, availability of groundwater, and infrastructure with which to access groundwater. Table 4-7 summarizes municipal needs projections in Webb County.

Table 4-7 Webb County Municipal Needs Projections (ac-ft/yr)

Entity	2030	2040	2050	2060	2070	2080
County-Other, Webb*	1,117	643	154	154	160	161
Laredo	--	--	--	--	--	--
Mirando City WSC	--	--	--	--	--	--
Webb County	--	--	302	276	250	223
Total	1,117	643	456	430	410	384
Dash (--) indicates surplus for the associated WUG decade.						
*Webb County-Other includes public water systems in Bruni Rural, Los Botines, and Oilton Rural WSCs.						

4.3.8 Willacy County Municipal Needs

Willacy County, although not on the Rio Grande, is primarily supplied by water diverted from the river in Cameron and Hidalgo counties and delivered to users in Willacy County via irrigation districts. Needs projections for Willacy County are shown in Table 4-8.

Table 4-8 Willacy County Municipal Needs Projections (ac-ft/yr)

Entity	2030	2040	2050	2060	2070	2080
County-Other, Willacy	--	--	--	--	--	--
Lyford	--	--	--	--	--	--
North Alamo WSC	--	25	74	108	145	183
Port Mansfield Public Utility District	40	67	102	156	219	292
Raymondville	--	--	--	--	--	--
Sebastian MUD	--	--	--	--	--	--
Total	40	92	176	264	364	475

Dash (--) indicates surplus for the associated WUG decade.

4.3.9 Zapata County Municipal Needs

Zapata County accounts for a small portion of the region’s municipal needs, but Zapata County’s need accounts for almost all of its demands projected for 2030, shown in Table 4-9. Little groundwater pumping is documented in Zapata County.

Table 4-9 Zapata County Municipal Needs Projections (ac-ft/yr)

Entity	2030	2040	2050	2060	2070	2080
County-Other, Zapata	--	--	11	20	26	32
Falcon Rural WSC	--	--	--	--	--	--
San Ygnacio & Ramireño	--	--	--	--	--	--
Siesta Shores WCID	--	--	--	--	--	--
Zapata County	--	--	--	--	--	--
Zapata County WCID- Hwy 16 East	--	--	--	--	--	--
Total	0	0	11	20	26	32

Dash (--) indicates surplus for the associated WUG decade.

4.4 Irrigation Needs

Irrigation is the largest water user in Region M and also has the largest need. This is because of how the needs are calculated: using a year with maximum demand and minimum supply because irrigation surface water rights are filled only after all domestic, municipal, and industrial water is set aside. The portion of demands that is met and the resulting needs are shown on Figure 4-5. A detailed discussion on how irrigation demands are estimated is included in Chapter 2, and more information about how water is allocated on the Rio Grande is included in Chapter 3.

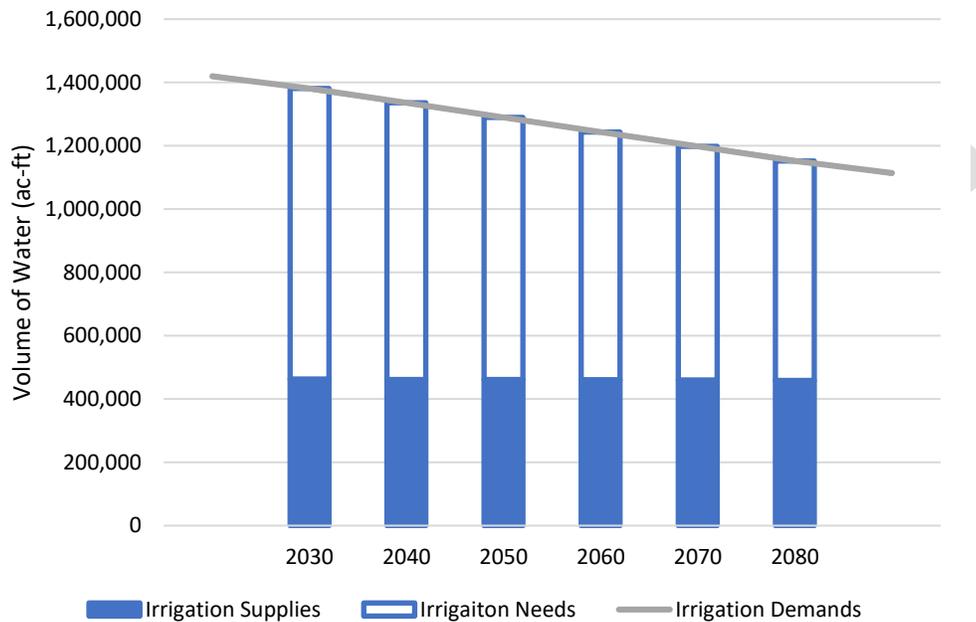


Figure 4-5 Irrigation Needs, Shown as a Portion of Irrigation Demands (ac-ft/yr)³

Irrigation needs, shown in Table 4-10, are the highest in Cameron and Hidalgo counties, where there is the most heavily irrigated farmland. Needs are projected to decrease slightly as a result of decreasing demand. Increased efficiency and conservation on-farm may alleviate some of the impacts of drought on productivity for farmers. These needs represent the extent of shortage anticipated by farmers in years of limited supply.

Table 4-10 Irrigation Needs Projections, by County and River Basin (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
Cameron	Nueces-Rio Grande	340,153	324,043	307,937	291,963	276,061	260,256
Cameron	Rio Grande	21,923	20,894	19,864	18,844	17,831	16,823
Hidalgo	Nueces-Rio Grande	414,119	393,058	371,993	351,157	330,482	309,879
Hidalgo	Rio Grande	17,135	16,261	15,392	14,527	13,674	12,821

³ Region M Irrigation Supplies illustrated on figure do not include individual surplus supplies.

County	Basin	2030	2040	2050	2060	2070	2080
Jim Hogg	Nueces-Rio Grande	-	-	-	-	-	-
Jim Hogg	Rio Grande	-	-	-	-	-	-
Maverick	Rio Grande	21,588	19,636	17,683	15,771	13,886	12,015
Starr	Rio Grande	20,685	19,919	19,155	18,393	17,634	16,878
Webb	Rio Grande	3,348	3,019	2,689	2,367	2,052	1,742
Willacy	Nueces-Rio Grande	76,349	73,167	69,985	66,821	63,674	60,532
Zapata	Rio Grande	3,713	3,551	3,388	3,227	3,066	2,908
Total		919,013	873,548	828,086	783,070	738,360	693,854

Dash (-) indicates surplus for the associated irrigation decade.

4.5 Steam Electric Power Generation Needs

The current supplies for steam electric power generation meet approximately 96 percent of the 2030 demands (Figure 4-6). This stems, in part, from the anticipated near-term growth of power generation demands, the likelihood of some short-term contractual water, and from increasingly efficient power generation in terms of consumptive water use. This will be discussed in Chapter 5 as part of the Industrial Implementation of Best Management Practices Water Management Strategy for addressing the needs of steam electric power generation. Table 4-11 shows that there are no projected steam electric needs.

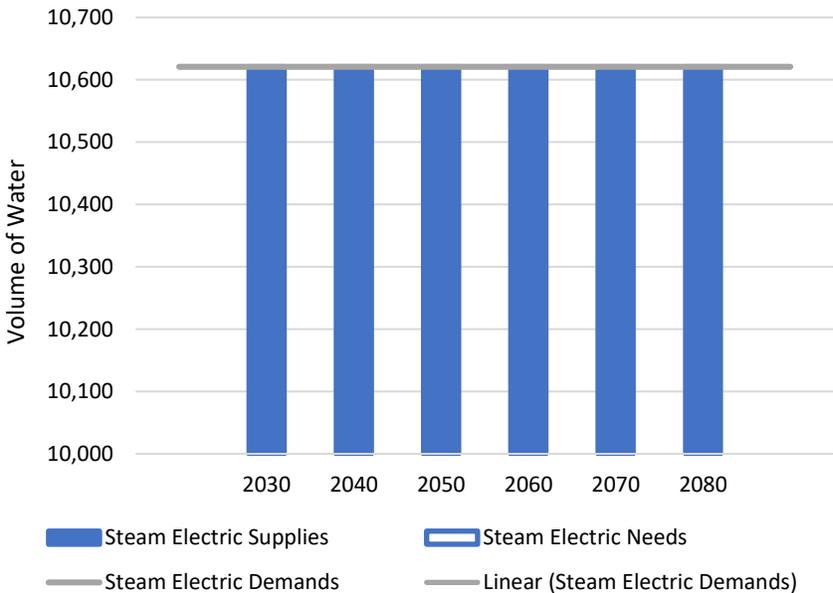


Figure 4-6 Steam Electric Needs, Shown as a Portion of Steam Electric Demands (ac-ft/yr)⁴

⁴ Region M Steam Electric Supplies illustrated on figure do not include individual surplus supplies.

Table 4-11 Steam Electric Needs Projections, by County and River Basin (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
Cameron	Nueces-Rio Grande	--	--	--	--	--	--
Cameron	Rio Grande	--	--	--	--	--	--
Hidalgo	Nueces-Rio Grande	--	--	--	--	--	--
Hidalgo	Rio Grande	--	--	--	--	--	--
Webb	Rio Grande	--	--	--	--	--	--
Total		--	--	--	--	--	--

Dash (--) indicates surplus for the associated Steam Electric Power decade.

4.6 Mining Needs

Current mining supplies appear to meet about 60 percent of the 2030 demands for mining water (Figure 4-7). This is in part because mining water rights to Rio Grande water are subject to decreased reliability in drought years, so the estimates of availability are significantly lower than what is available in a normal year. Because of reporting limitations, additional mining supplies from groundwater might exceed the MAG values for some aquifer/county/river basin areas. Mining needs are shown in Table 4-12.

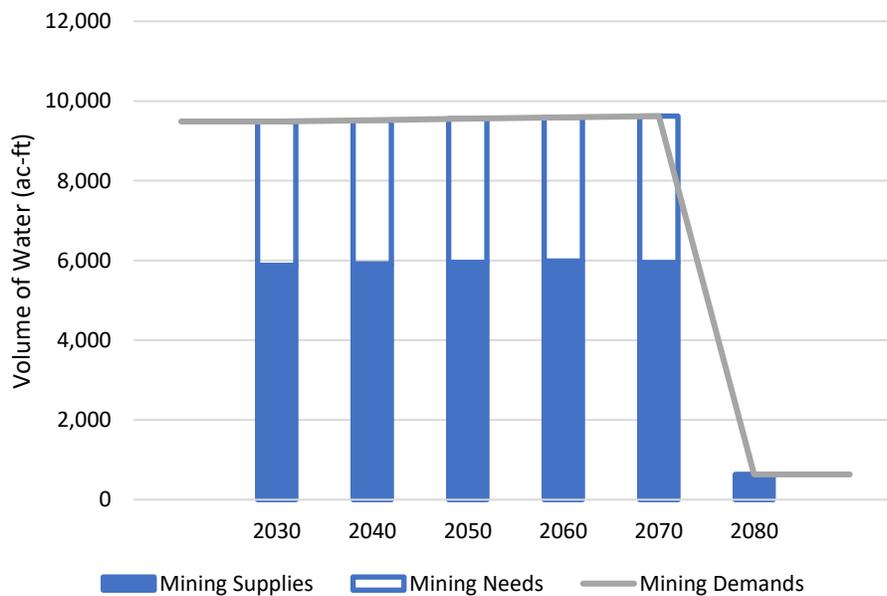


Figure 4-7 Mining Needs, Shown as a Portion of Mining Demands (ac-ft/yr)⁵

⁵ Region M Mining Supplies illustrated on figure do not include individual surplus supplies.

Table 4-12 Mining Needs Projections, by County and River Basin (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
Cameron	Nueces-Rio Grande	--	--	--	--	--	--
Hidalgo	Nueces-Rio Grande	--	--	--	--	--	--
Hidalgo	Rio Grande	--	--	--	--	--	--
Jim Hogg	Nueces-Rio Grande	--	--	--	--	--	--
Jim Hogg	Rio Grande	--	--	--	--	--	--
Maverick	Nueces	17	17	17	17	81	--
Maverick	Rio Grande	3,587	3,588	3,589	3,591	3,594	--
Starr	Nueces-Rio Grande	--	--	--	--	--	--
Starr	Rio Grande	--	--	--	--	--	--
Webb	Nueces	--	--	--	--	--	--
Webb	Nueces-Rio Grande	--	--	--	--	--	--
Webb	Rio Grande	--	--	--	--	--	--
Willacy	Nueces-Rio Grande	--	--	--	--	--	--
Zapata	Rio Grande	--	--	--	--	--	--
Total		3,604	3,605	3,606	3,608	3,675	--
Dash (--) indicates surplus for the associated Mining decade.							

As discussed in Chapter 2, the mining, oil, and gas industry has very few requirements for reporting the volumes of groundwater used. This is an impediment to evaluating current and future availabilities and may result in over-allocation of some aquifers.

4.7 Manufacturing Needs

Manufacturing needs are shown on Figure 4-8 and in Table 4-13. Water demand associated with manufacturing is met by both groundwater and surface water and comprises a relatively small portion of the regional demand and need. Current supplies meet 100 percent of 2030-2050 projected demands.

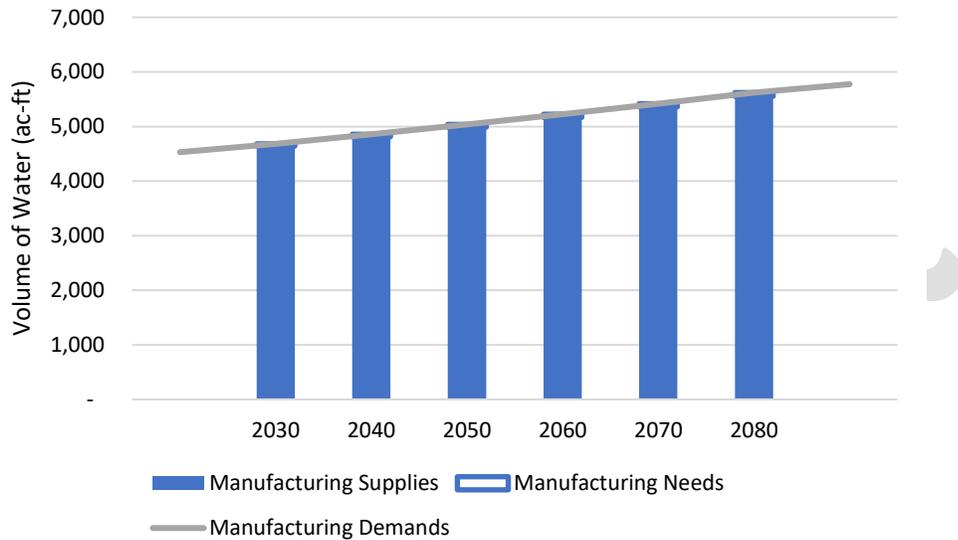


Figure 4-8 Manufacturing Needs, Shown as a Portion of Manufacturing Demands (ac-ft/yr)⁶

Table 4-13 Manufacturing Needs Projections, by County and River Basin (ac-ft/yr)

County	Basin	2030	2040	2050	2060	2070	2080
Cameron	Nueces-Rio Grande	--	--	--	--	--	--
Hidalgo	Nueces-Rio Grande	--	--	--	--	--	--
Hidalgo	Rio Grande	--	--	--	--	--	--
Jim Hogg	Nueces-Rio Grande	--	--	--	--	--	--
Maverick	Rio Grande	--	--	--	1	5	9
Starr	Rio Grande	--	--	--	--	--	--
Webb	Nueces	--	--	--	--	--	--
Webb	Rio Grande	--	--	--	--	--	--
Total		--	--	--	1	5	9

Dash (--) indicates surplus for the associated Manufacturing decade.

⁶ Region M Manufacturing Supplies illustrated on figure do not include individual surplus supplies.

4.8 Livestock Needs

Livestock demands are met by numerous groundwater wells, ephemeral streams, and ponds, as well as surface water diversions, often classified together with lawn watering contracts or referred to herein as livestock local supplies. These supplies are expected to be sufficient to meet the needs of the (stable) livestock demand, and therefore, livestock has no needs (Figure 4-9). In particular areas, providing sufficient water in a drought year may be difficult, but overall, ranchers are expected to manage their livestock within the available supplies.

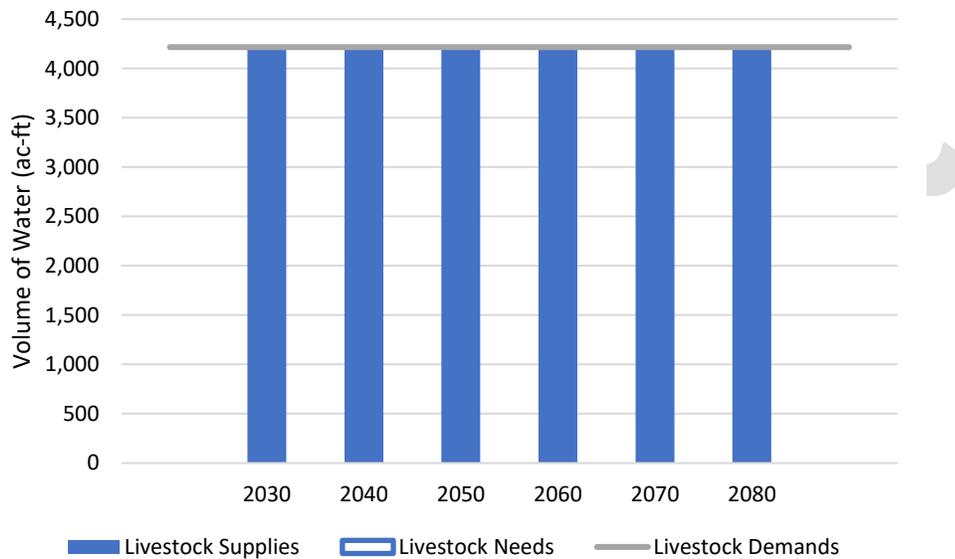


Figure 4-9 Livestock Needs, Shown as a Portion of Livestock Demands (ac-ft/yr)⁷

4.9 Secondary Needs Analysis

Needs that remain after conservation and reuse WMS that have been applied are considered second-tier needs. Detailed secondary needs estimates for WUGs are included in Appendix 4A. An evaluation of Major Water Provider (MWP) second tier needs is included in Appendix 4B.

A TWDB social and economic impacts evaluation of projected water shortages if no WMS are implemented can be found in Chapter 6.

⁷ Region M Livestock Supplies illustrated on figure do not include individual surplus supplies.

Appendix 4A. Relevant Reports from the 2027 Regional and State Water Planning Database (DB27)

Final Draft

Appendix 4B. Major Water Providers Summary

Final Draft