

INITIALLY PREPARED PLAN

# CHAPTER 4: IDENTIFICATION OF WATER NEEDS

Rio Grande Regional Water Plan

B&V PROJECT NO. 192863

PREPARED FOR

Rio Grande Regional Water Planning Group

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## List of Abbreviations

acft/yr	Acre-Feet per Year
MAG	Modeled Available Groundwater
MUD	Municipal Utility District
PUD	Public Utility District
RWP	Regional Water Plan
SB1	Senate Bill 1
SUD	Special Utility District
TCEQ	Texas Commission on Environmental Quality
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



## CHAPTER 4: IDENTIFICATION OF WATER NEEDS

### 4.1 INTRODUCTION

The primary emphasis of the regional water supply planning process established by Senate Bill 1 (SB1) 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, here 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 here, and an evaluation of Major Water Provider (MWP) supply, demand, and contract demands is included in Appendix B.

#### 4.1.1 Approach

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 county-wide 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 WMS will be identified in Chapter 5.

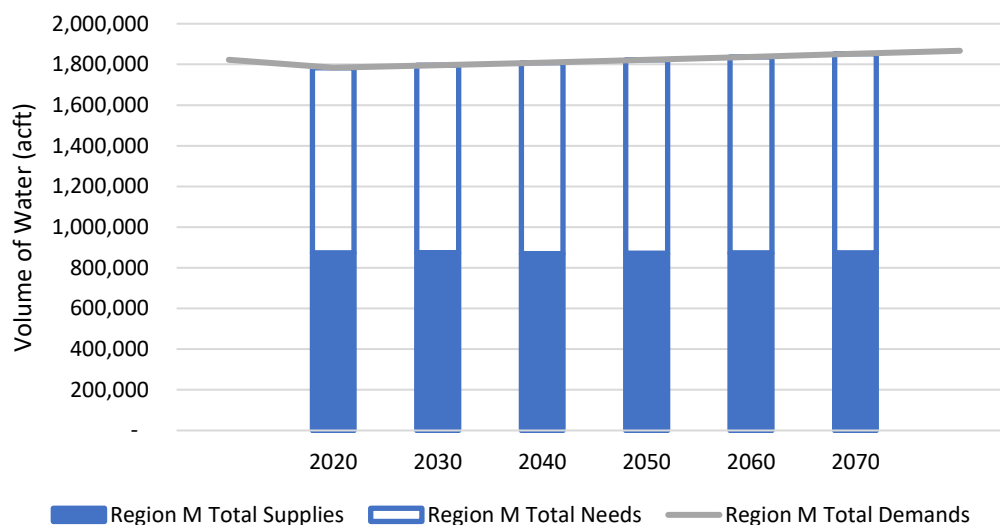
A second-tier need analysis, which shows needs remaining after the recommended conservation and direct reuse WMS are accounted for, is included in Appendix A.7 and a summary of the results in A.8.

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 here.

## 4.2 REGIONAL NEEDS SUMMARY

The following subsections summarize the regional needs by WUG and by county in acre-feet per year (acft/yr).

### 4.2.1 Regional Needs by WUG Category



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

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 there is little rainfall, 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.

**Table 4-1 Water Needs by WUG Type (acft/yr)**

WUG	2020	2030	2040	2050	2060	2070
Irrigation Needs	896,254	850,911	805,465	760,485	714,814	669,488
Municipal Needs	38,630	78,628	134,060	191,416	251,879	313,037
Mining Needs	6,662	6,007	4,834	4,386	4,566	5,318
Steam-Electric Power Needs	5,217	5,028	4,928	4,928	4,928	4,928
Manufacturing Needs	1,023	1,243	1,243	1,243	1,243	1,243
Livestock Needs	--	--	--	--	--	--
<b>Total Needs</b>	<b>947,786</b>	<b>941,817</b>	<b>950,530</b>	<b>962,458</b>	<b>977,430</b>	<b>994,014</b>

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



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 (TCEQ) 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 2020, which will be evaluated individually in following sections. Jim Hogg and Webb County exhibit surplus supplies, as noted with the dashes in Table 4-2.

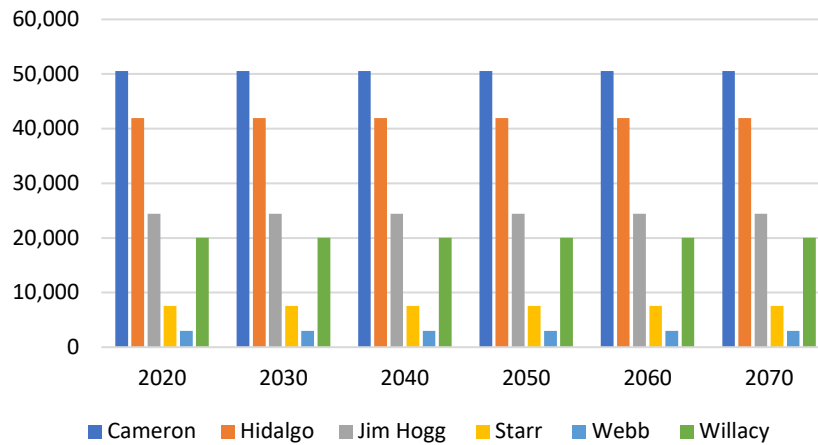
**Table 4-2 Needs by County (acft/yr)**

COUNTY	2020	2030	2040	2050	2060	2070
Cameron	381,796	377,071	376,365	377,277	379,475	383,622
Hidalgo	436,163	440,839	455,626	464,159	472,779	481,247
Jim Hogg	--	--	38	--	--	--
Maverick	18,683	17,627	17,038	15,746	14,473	13,510
Starr	23,849	24,206	24,437	24,723	24,975	25,380
Webb	4,872	2,629	666	7,067	15,020	22,248
Willacy	79,174	76,011	72,693	69,520	66,368	63,220
Zapata	3,249	3,434	3,667	3,966	4,340	4,787
<b>Total Needs</b>	<b>947,786</b>	<b>941,817</b>	<b>950,530</b>	<b>962,458</b>	<b>977,430</b>	<b>994,014</b>

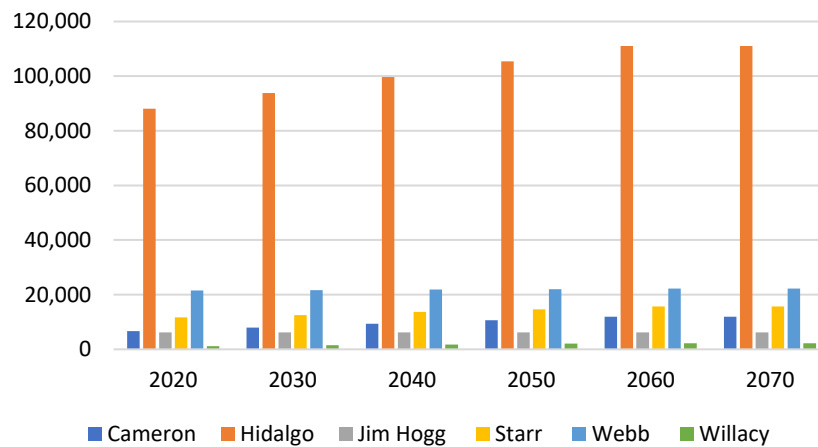
Dash (--) indicates surplus for the associated county decade

### 4.2.3 Modeled Available Groundwater Analysis

As discussed in Chapter 3.2, the Regional Water Plan (RWP) process relies on Modeled Available Groundwater, or MAG, as the annual amount of groundwater that can be reliably extracted from an aquifer in a given area while still meeting conservation goals set out by the Groundwater Management Areas (GMAs). For this planning cycle, there has been a significant change in MAG projections for the counties in Region M between the last two cycles of groundwater management planning. Figure 4-2 and Figure 4-3 compare the 2016 and 2021 availability projections for the Gulf Coast Aquifer MAGs.



**Figure 4-2 2016 Regional Water Plan Gulf Coast Aquifer MAG**



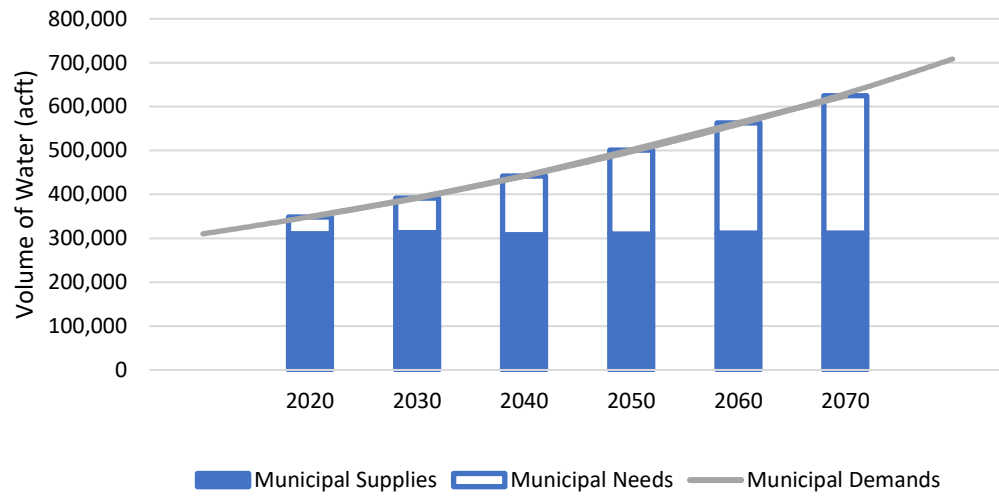
**Figure 4-3 2021 Regional Water Plan Gulf Coast Aquifer MAG**

The RWP is required to show only supplies and recommended projects within the MAG volume totals. Therefore, the total existing supplies plus any recommended projects must be no greater than the MAG for that county.

Because current supplies are larger than the MAG in some counties, the RWP will need to show existing supplies in the RWP as less than the water that is actually being supplied. All counties with current supplies that are less than the MAG will be unaffected, and existing supplies will be shown in full.

### 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 2020 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.



**Figure 4-4** Municipal Needs, Shown as a Portion of Municipal Demands (acft/yr)

The need for municipal water is depicted in the blue outline box on Figure 4-4 and increases to 50 percent of the total demand by 2070. The population centers are shown on Figure 4-5. Figure 4-6 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.

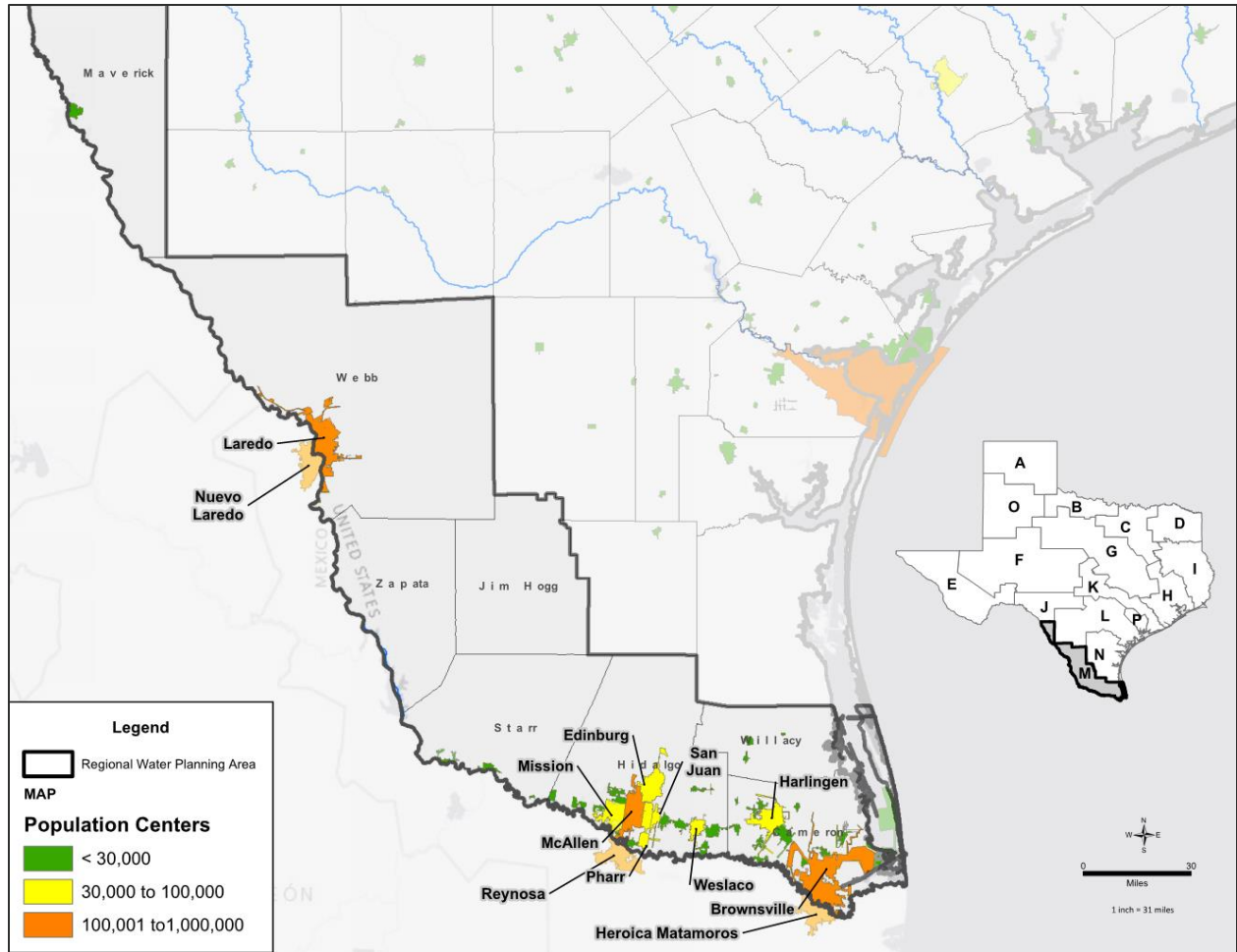


Figure 4-5 Population and Municipal Demand Centers

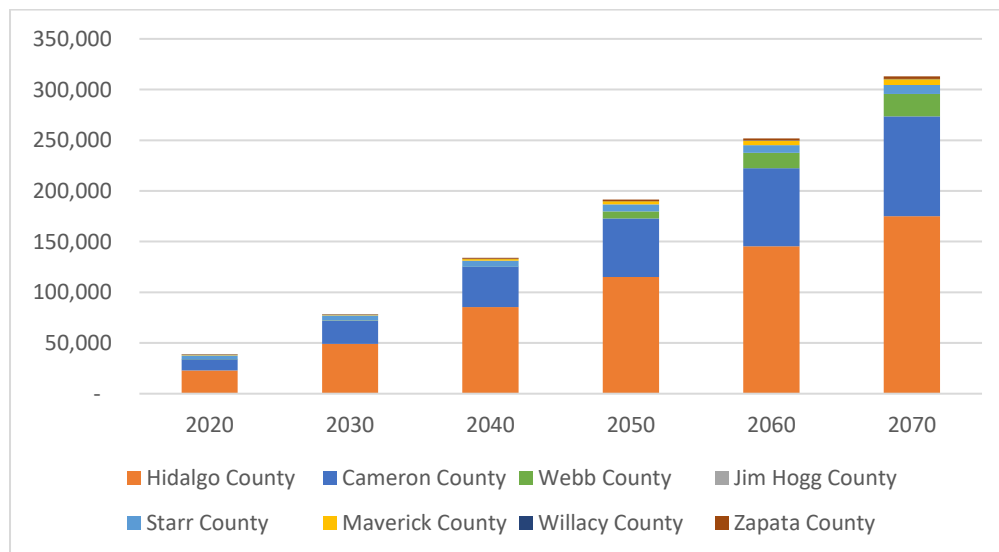


Figure 4-6 Municipal Needs, Shown by County (acft/yr)

### 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.

WWP NEED/SURPLUS	2020	2030	2040	2050	2060	2070
Agua SUD	991	-524	-2,097	-3,720	-5,387	-7,026
Alamo	-1,014	-1,692	-2,391	-3,110	-3,848	-4,570
Bayview Irrigation District No. 11	6,601	6,867	6,930	6,994	7,059	7,061
Brownsville PUB	2,067	-2,850	-8,016	-13,930	-20,227	-27,581
Brownsville Irrigation District	13,892	12,641	11,129	9,568	7,964	6,325
Cameron County Irrigation District No. 2	-1,202	-1,162	-1,202	-1,202	-1,202	-1,202
Cameron County Irrigation District No. 3 - La Feria	112	112	111	112	112	111
Cameron County ID No. 6	18,715	18,712	18,709	18,706	18,703	18,701
Cameron County ID No. 10	15,186	15,184	15,182	15,180	15,178	15,176
Delta Lake ID	17,036	17,033	17,124	17,120	17,115	17,111
Donna Irrigation District-Hidalgo County #1	-14,113	-14,111	-14,108	-14,104	-14,101	-14,098
Eagle Pass	1,068	-226	-1,461	-2,816	-4,182	-5,509
East Rio Hondo WSC	2	-525	-524	-974	-1,431	-2,045
Edinburg	-6,835	-9,591	-14,351	-17,262	-20,237	-23,152
Harlingen	4,942	2,777	682	-1,459	-3,680	-6,485
Harlingen ID No. 1	262	262	262	262	262	262
Hidalgo County Irrigation District No. 1	36,791	36,782	36,772	36,764	36,755	36,745
Hidalgo County Irrigation District No. 2	8,957	8,957	8,956	8,956	8,956	8,955
Hidalgo County Irrigation District No. 6	-6,631	-6,630	-4,652	-4,651	-4,649	-4,648
Hidalgo County Irrigation District No. 16	-5,363	-5,362	-5,362	-5,360	-5,359	-5,358
Hidalgo County Water Improvement District (WID) No. 3	-2,164	-2,164	-2,163	-2,163	-2,163	-2,163
Laguna Madre Water District	-2,821	-4,070	-5,352	-6,756	-8,221	-9,726
Laredo	17,976	9,474	1,192	-6,587	-14,186	-21,092

WWP NEED/SURPLUS	2020	2030	2040	2050	2060	2070
McAllen	-2,872	-11,595	-22,288	-31,377	-40,650	-49,705
Military Highway WSC	-79	-951	-1,866	-2,862	-3,912	-5,234
Mission	-8,514	-12,976	-17,530	-22,161	-26,858	-31,446
North Alamo WSC	-6,396	-12,014	-17,979	-24,091	-30,302	-36,449
Pharr	449	-1,360	-3,238	-5,184	-7,193	-9,165
Rio Grande City	-2,419	-2,955	-3,458	-3,982	-4,474	-4,924
San Benito	113	151	638	159	-280	-944
San Juan	1	-1,042	-2,115	-3,218	-4,350	-5,459
Sharyland WSC	-717	-3,444	-6,237	-9,118	-12,079	-14,976
SRWA	-6,447	-5,602	-4,758	-3,914	-3,069	-3,069
Weslaco	-1,519	-3,533	-5,372	-7,265	-9,213	-11,040

Detailed MWP needs information is included in Appendix B, and detailed WUG needs information is included in Appendix A.6.

### 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.

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. There has been increased groundwater development 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 MAG for Cameron County in this planning cycle was decreased significantly from the availability in the previous (2016) Region M water plan. This plan shows reduced supplies for some WUGs because supplies are required to be limited by the MAG in the RWP. There is not any planned or expected reduction in actual supplies for Cameron County groundwater users, and the joint groundwater planning process has not indicated any known concern about a reduction in groundwater availability in Cameron County.

**Table 4-3 Cameron County Municipal Needs Projections (acft/yr)**

ENTITY	2020	2030	2040	2050	2060	2070
Brownsville PUB	--	2,850	8,016	13,930	20,227	27,581
Combes	--	--	--	--	--	--
County-Other	1,271	958	1,516	1,930	2,566	2,683
East Rio Hondo WSC	--	235	234	684	1,141	1,755
El Jardin WSC	26	229	445	691	956	1,232
Harlingen	--	1,399	3,526	5,738	8,061	10,939
La Feria	--	--	--	--	--	--
Laguna Madre Water District	2,971	4,220	5,502	6,906	8,371	9,876
Los Fresnos	--	--	--	--	--	--
Military Highway WSC	79	951	1,866	2,862	3,912	5,234
North Alamo WSC	6,396	12,014	17,980	24,092	30,303	36,450
Olmito WSC	33	195	364	556	762	974
Palm Valley	--	--	--	--	--	--
Primera	--	--	--	40	110	183
Rio Hondo	--	--	--	--	--	--
San Benito	--	--	--	--	280	944
Santa Rosa	--	--	--	--	--	--
Valley Municipal Utility District (MUD) 2	--	--	98	230	370	555
<b>Total (MAG Limited)</b>	<b>10,776</b>	<b>23,051</b>	<b>39,547</b>	<b>57,659</b>	<b>77,059</b>	<b>98,406</b>
Dash (--) indicates surplus for the associated WUG decade						

Cameron "county-other" includes public water supplies in Brownsville Navigation District, Indian Lake, and La Mirada Country Estates.

### 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 (acft/yr)**

ENTITY	2020	2030	2040	2050	2060	2070
Agua SUD	--	1,181	6,801	8,424	10,091	11,730
Alamo	1,014	1,692	2,391	3,110	3,848	4,570
County-Other	604	1,293	2,170	3,005	3,845	4,713
Donna	--	1	534	1,093	1,677	2,249
Edcouch	81	139	201	269	341	413
Edinburg	6,835	9,591	14,351	17,262	20,237	23,152
Elsa	264	419	582	755	937	1,116
Hidalgo	104	334	742	1,160	1,586	2,004
Hidalgo County MUD 1	212	292	375	459	543	624
La Joya	287	419	555	696	843	986
La Villa	41	96	152	212	273	334
McAllen	2,872	11,595	22,288	31,377	40,650	49,705
Mercedes	--	--	197	665	1,155	1,637
Mission	8,514	12,976	17,530	22,161	26,858	31,446
Pharr	--	1,360	3,238	5,184	7,193	9,165
San Juan	--	1,042	2,115	3,218	4,350	5,459
Sharyland WSC	717	3,444	6,237	9,118	12,079	14,976
Weslaco	1,519	3,332	5,090	6,983	8,931	10,758
<b>Total</b>	<b>23,064</b>	<b>49,206</b>	<b>85,549</b>	<b>115,151</b>	<b>145,437</b>	<b>175,037</b>

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 very 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 WUGs are Jim Hogg County Water Control and Improvement District (WCID) 2 and the aggregated Jim Hogg County-Other. Small towns and villages that comprise Jim Hogg County-Other include Guerra, Agua Nueva, Las Lomitas, Randado, South Fork Estates, and Thompsonville. 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 2020 through 2070, as detailed in Table 4-5. Eagle Pass is the only incorporated city in Maverick County, but there are eight census-designated places that are included in the county-other projections (Edison Road, Elm Creek, El Indio, Las Quintas Fronterizas, Rosita North, and Rosita South). The total population of Maverick County according to the 2010 census, was 54,258 persons. 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 (acft/yr)**

ENTITY	2020	2030	2040	2050	2060	2070
County-Other	395	333	282	235	193	153
Eagle Pass	--	226	1,461	2,816	4,182	5,509
Maverick County	--	--	--	--	--	--
<b>Total</b>	<b>395</b>	<b>559</b>	<b>1,743</b>	<b>3,051</b>	<b>4,375</b>	<b>5,662</b>

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 (acft/yr)**

ENTITY	2020	2030	2040	2050	2060	2070
County-Other	545	600	651	712	772	827
El Sauz WSC	58	72	86	102	117	132
El Tanque WSC	99	128	155	183	211	236
La Grulla	708	845	975	1,112	1,242	1,362
Rio Grande City	1,732	2,268	2,771	3,295	3,787	4,237
Rio WSC	27	90	151	216	278	336
Roma	--	--	--	--	--	200
Union WSC	807	948	1,081	1,218	1,346	1,463
<b>Total</b>	<b>3,976</b>	<b>4,951</b>	<b>5,870</b>	<b>6,838</b>	<b>7,753</b>	<b>8,793</b>

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 2010 census is approximately 250,304, of which 94 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 need projections in Webb County.

**Table 4-7 Webb County Municipal Needs Projections (acft/yr)**

ENTITY	2020	2030	2040	2050	2060	2070
County-Other	59	111	167	216	270	318
Laredo	--	--	--	6,592	14,191	21,097
Mirando City WSC	--	13	26	38	51	62
Webb County	--	--	--	221	508	771
<b>Total</b>	<b>59</b>	<b>124</b>	<b>193</b>	<b>7,067</b>	<b>15,020</b>	<b>22,248</b>

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

Webb county-other includes public water systems in Bruni Rural WSC and Oilton Rural WSC.

### 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. Need projections for Willacy County are shown in Table 4-8.

**Table 4-8 Willacy County Municipal Needs Projections (acft/yr)**

ENTITY	2020	2030	2040	2050	2060	2070
County-Other	--	--	--	--	--	--
Lyford	--	--	--	--	--	--
Port Mansfield Public Utility District (PUD)	141	169	195	223	252	279
Raymondville	--	--	--	--	--	--
Sebastian MUD	--	--	--	1	20	38
<b>Total</b>	<b>141</b>	<b>169</b>	<b>195</b>	<b>224</b>	<b>272</b>	<b>317</b>

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 2020, shown in Table 4-9. There is very little groundwater pumping documented in Zapata County.

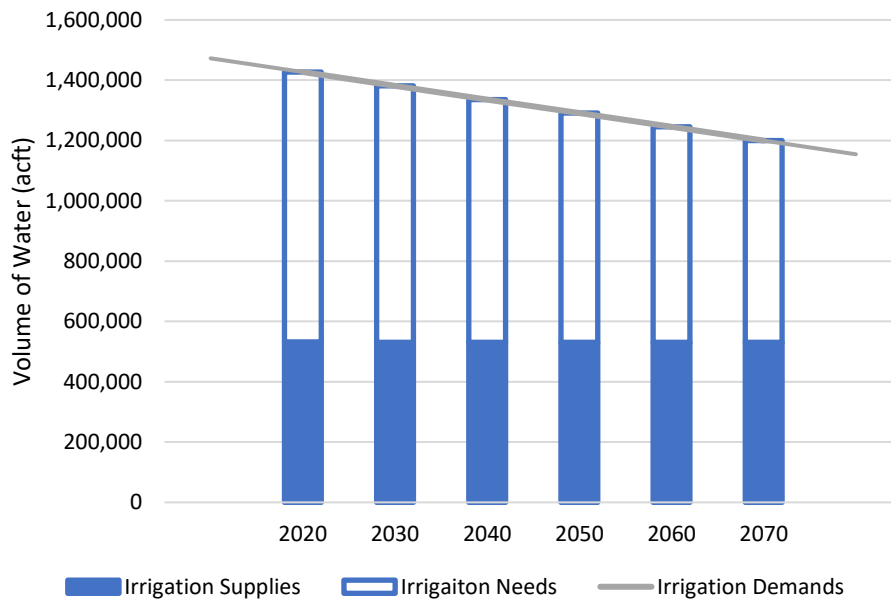
**Table 4-9 Zapata County Municipal Needs Projections (Acre-feet/year)**

ENTITY	2020	2030	2040	2050	2060	2070
County-Other	56	70	91	114	145	167
Falcon Rural WSC	--	--	--	--	--	--
San Ygnacio MUD	--	--	--	--	37	77
Siesta Shores WCID	--	--	--	--	8	55
Zapata County	163	498	872	1,312	1,773	2,275
Zapata County WCID-Hwy 16 East	--	--	--	--	--	--
<b>Total</b>	<b>219</b>	<b>568</b>	<b>963</b>	<b>1,426</b>	<b>1,963</b>	<b>2,574</b>

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

### 4.5 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 4-7. 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 4-7** Irrigation Needs, shown as a Portion of Irrigation Demands (Acre-feet/year)

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 (acft/yr)

COUNTY	BASIN	2020	2030	2040	2050	2060	2070
Cameron	Nueces-Rio Grande	344,814	328,644	312,471	296,301	280,127	263,957
Cameron	Rio Grande	21,783	20,754	19,725	18,695	17,667	16,637
Hidalgo	Nueces-Rio Grande	394,005	372,832	351,678	330,853	309,369	288,215
Hidalgo	Rio Grande	16,391	15,511	14,630	13,765	12,870	11,989
Jim Hogg	Nueces-Rio Grande	8	--	--	--	--	--
Jim Hogg	Rio Grande	--	--	--	--	--	--

COUNTY	BASIN	2020	2030	2040	2050	2060	2070
Maverick	Rio Grande	17,694	15,725	13,755	11,786	9,817	7,848
Starr	Rio Grande	19,557	18,792	18,026	17,261	16,495	15,730
Webb	Rio Grande	--	--	--	--	--	--
Willacy	Nueces-Rio Grande	--	--	--	--	--	--
Zapata	Rio Grande	3,026	2,862	2,700	2,536	2,373	2,209
<b>Total</b>		<b>885,781</b>	<b>817,278</b>	<b>775,120</b>	<b>732,985</b>	<b>691,197</b>	<b>648,718</b>

Dash (--) indicates surplus for the associated Irrigation decade

### 4.6 STEAM-ELECTRIC POWER GENERATION NEEDS

The current supplies for steam-electric power generation meet approximately 67 percent of the 2020 demands (Figure 4-8). 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 steam-electric needs projections.

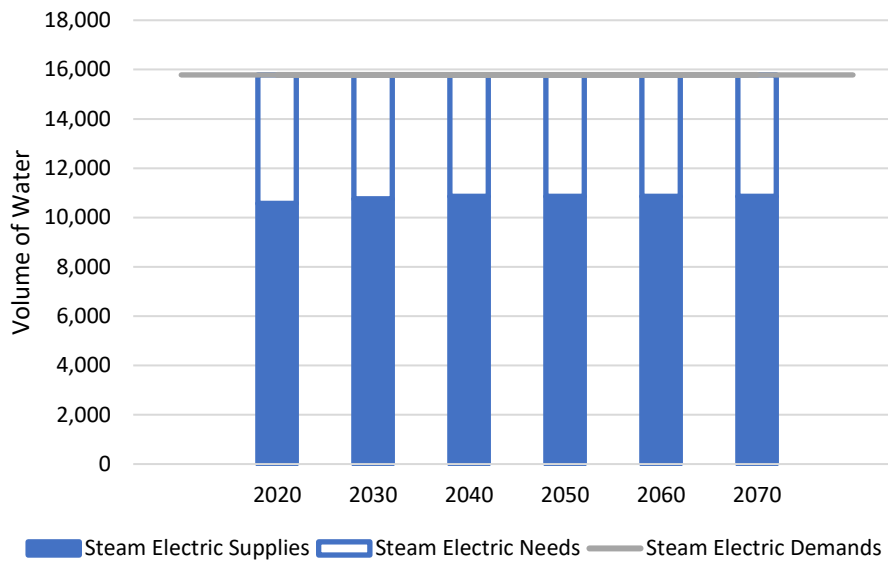


Figure 4-8 Steam-Electric Needs, Shown as a Portion of Steam Electric Demands (acft/yr)

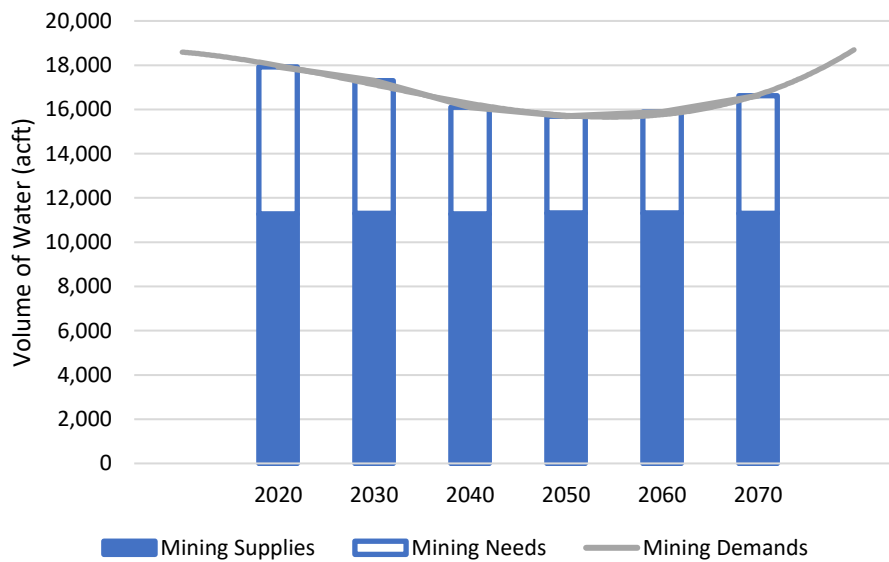
**Table 4-11 Steam-Electric Needs Projections, by County and River Basin (acft/yr)**

COUNTY	BASIN	2020	2030	2040	2050	2060	2070
Cameron	Nueces-Rio Grande	3,302	3,302	3,302	3,302	3,302	3,302
Cameron	Rio Grande	123	123	123	123	123	123
Hidalgo	Nueces-Rio Grande	1,137	1,014	948	948	948	948
Hidalgo	Rio Grande	655	589	555	555	555	555
Webb	Rio Grande	--	--	--	--	--	--
<b>Total</b>		<b>5,217</b>	<b>5,217</b>	<b>5,028</b>	<b>4,928</b>	<b>4,928</b>	<b>4,928</b>

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

### 4.7 MINING NEEDS

Current mining supplies appear to meet about 68 percent of the 2020 demands for mining water (Figure 4-9). 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, there may be additional mining supplies from groundwater that would exceed the MAG values for some aquifer/county/river basin areas. Mining needs are shown in Table 4-12.



**Figure 4-9 Mining Needs, Shown as a Portion of Mining Demands (acft/yr)**

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

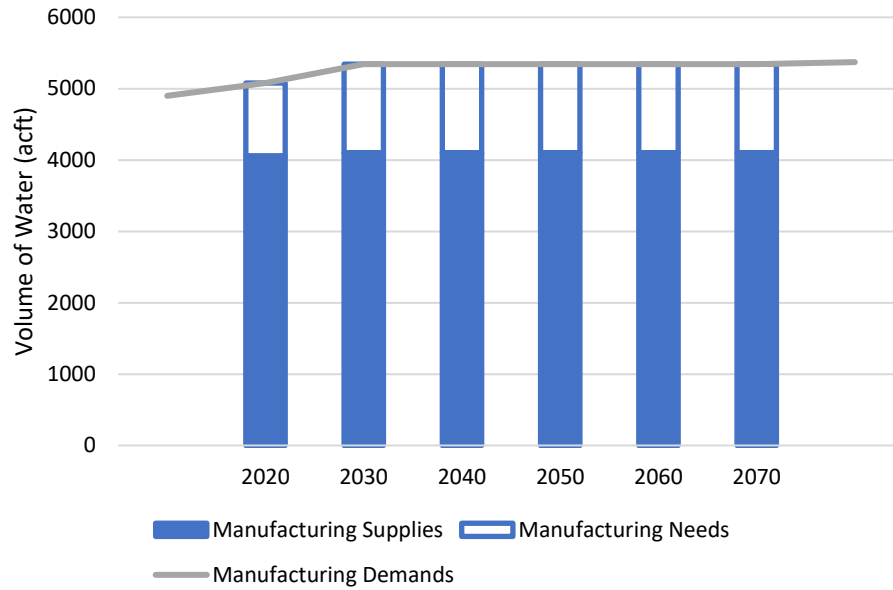
COUNTY	BASIN	2020	2030	2040	2050	2060	2070
Cameron	Nueces-Rio Grande	--	--	--	--	--	--
Hidalgo	Nueces-Rio Grande	798	1,517	2,054	2,630	3,290	4,127
Hidalgo	Rio Grande	113	170	212	257	310	376
Jim Hogg	Nueces-Rio Grande	--	--	34	--	--	--
Jim Hogg	Rio Grande	--	--	4	--	--	--
Maverick	Nueces	119	269	308	182	56	--
Maverick	Rio Grande	475	1,074	1,232	727	225	--
Starr	Nueces-Rio Grande	85	114	132	151	174	204
Starr	Rio Grande	210	307	367	431	511	611
Webb	Nueces	1,463	770	161	--	--	--
Webb	Nueces-Rio Grande	243	128	26	--	--	--
Webb	Rio Grande	3,107	1,607	286	--	--	--
Willacy	Nueces-Rio Grande	49	51	18	8	--	--
Zapata	Rio Grande	--	--	--	--	--	--
<b>Total</b>		<b>6,718</b>	<b>6,662</b>	<b>6,007</b>	<b>4,834</b>	<b>4,386</b>	<b>4,566</b>

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.

## 4.8 MANUFACTURING NEEDS

Manufacturing needs are shown on Figure 4-10 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 80 percent of 2020 projected demands. The need likely results, in part, because the date of most recent supply data (2015) is 5 years from the first date of demand data (2020) and because some portion of supplies are from short-term contracts for water.



**Figure 4-10** Manufacturing Needs, Shown as a Portion of Manufacturing Demands (acft/yr)

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

COUNTY	BASIN	2020	2030	2040	2050	2060	2070
Cameron	Nueces-Rio Grande	433	519	519	519	519	519
Cameron	Rio Grande	565	678	678	678	678	678
Hidalgo	Nueces-Rio Grande	--	--	--	--	--	--
Jim Hogg	Nueces-Rio Grande	--	--	--	--	--	--
Maverick	Rio Grande	--	--	--	--	--	--
Starr	Rio Grande	21	42	42	42	42	42
Webb	Nueces	--	--	--	--	--	--
Webb	Rio Grande	--	--	--	--	--	--
Zapata	Rio Grande	4	4	4	4	4	4
<b>Total</b>		<b>1,220</b>	<b>1,023</b>	<b>1,243</b>	<b>1,243</b>	<b>1,243</b>	<b>1,243</b>

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

## 4.9 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 here as livestock local supplies. These supplies are expected to be sufficient to meet the needs of the (stable) livestock demand, and therefore, there is not a need for livestock (Table 4-10). In particular areas, there



may be some difficulty providing sufficient water in a drought year, but overall, ranchers are expected to manage their livestock within the available supplies.

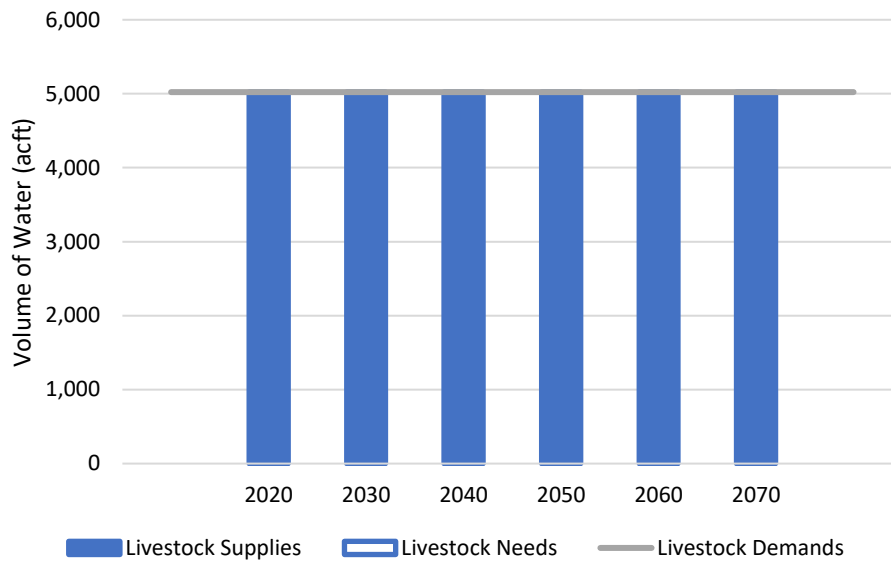


Figure 4-11 Livestock Needs, shown as a Portion of Livestock Demands (acft/yr)

### 4.10 SECONDARY NEEDS ANALYSIS

Needs that remain after conservation, drought management, and reuse WMS have been applied are considered second tier needs. Detailed secondary needs estimates are included in Appendices A.7 and A.8. The second-tier needs are addressed for all municipal WUGs, and some unmet needs are discussed in Chapter 6.

Table 4-14 WUG Unmet Needs (acre-feet/year)

WUG CATEGORY	2020	2030	2040	2050	2060	2070
MUNICIPAL	273	954	411	379	17,940	2,077
COUNTY-OTHER	162	246	333	424	507	597
MANUFACTURING	835	1,031	1,031	1,031	1,030	1,030
MINING	5,084	4,491	3,559	3,585	3,750	4,566
STEAM ELECTRIC POWER	538	349	249	249	249	249
LIVESTOCK	122	106	106	106	106	106
IRRIGATION	844,038	802,890	770,563	733,965	694,486	656,578

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