FINAL PLAN

CHAPTER 3: WATER SUPPLY ANALYSIS

Rio Grande Regional Water Plan

BV 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	Acre-Feet
ac-ft/yr	Acre-Feet per Year
BRACS	Brackish Resource Aquifer Characterization System
CEAT	Comisión Estatal del Agua en Tamaulipas
CILA	Comisión Internacional de Límites y Aguas
CONAGUA	Comisión Nacional del Agua
DFC	Desired Future Conditions
DMI	Domestic/Municipal/Industrial
DOR	Drought of Record
GAM	Groundwater Availability Model
GCD	Groundwater Conservation District
GMA	Groundwater Management Area
GPCD	Gallons per Capita per Day
gpm	Gallons per Minute
HB1763	House Bill 1763
HCWID	Hidalgo County Water Improvement District
IBWC	International Boundary and Water Commission
JAC	Joint Advisory Committee
KCGCD	Kenedy County Groundwater Conservation District
LRGWQI	Lower Rio Grande/Río Bravo Water Quality Initiative
LRGVDC	Lower Rio Grande Development council
MAG	Modeled Available Groundwater
mg/L	Milligrams per Liter
mgd	Million Gallons per Day
MUD	Municipal Utility District
MWP	Major Water Provider
PUB	Public Utilities Board
RWP	Regional Water Plan
RWPG	Regional Water Planning Group
SEDUMA	Secretaría de Desarrollo Urbano y Medio Ambiente
SUD	Special Utility District
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TWDB	Texas Water Development Board

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WAM	Water Availability Model
WCID	Water Control and Improvement District
WID	Water Improvement District
WMS	Water Management Strategy
WRAP	Water Rights Analysis Package
WSC	Water Supply Corporation
WUG	Water User Group
WWP	Wholesale Water Providers
WWTP	Wastewater Treatment Plant

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3.0 Water Supply Analysis

The planning effort requires a detailed understanding of current and potential water supplies. Region M water users rely mainly on surface water from the Rio Grande, although both fresh and brackish groundwater is used across the region for primary or supplementary water supplies. Increasingly, sources that require additional treatment, such as brackish groundwater, are being considered in the face of increasing demands. Reuse of water for both potable and non-potable uses is expected to increase in the region as demands on existing surface and groundwater increase and the technology, permitting, and public acceptance processes become more commonplace. Figure 3-1 displays the 2030 estimates of available water resources in Region M.

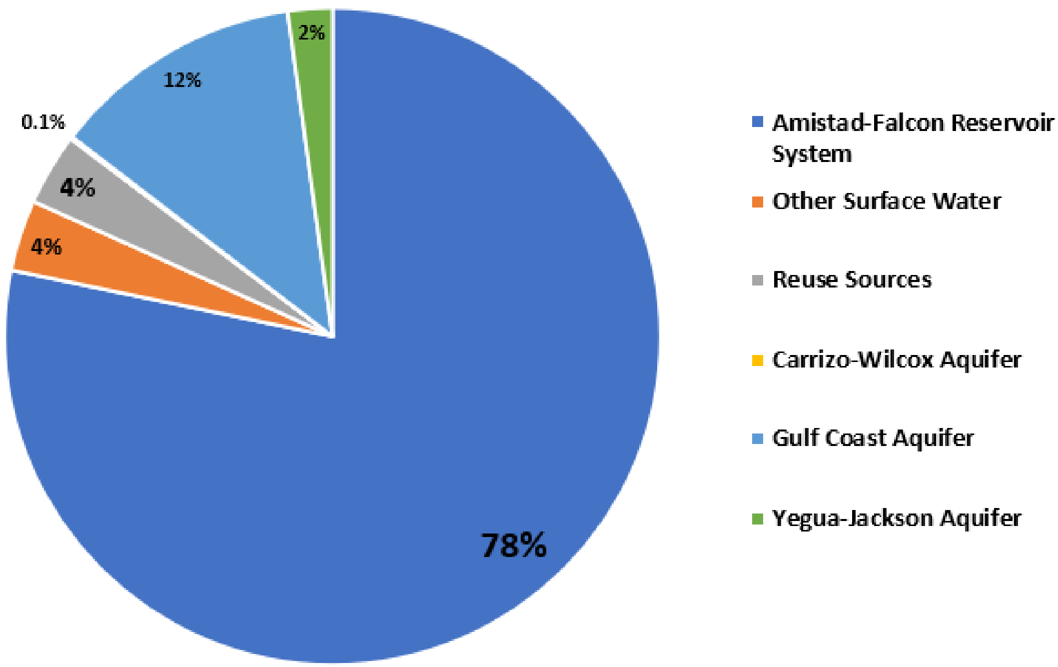

Figure 3-1 Major Groundwater, Surface Water, and Reuse Water Source Projections in Region M

In 2023, surveys were sent to entities in the region, contacted individually and/or through the irrigation district and utility managers associations, asking for information about current supplies. Other resources documenting the allocation of groundwater and surface water resources from the Texas Commission on Environmental Quality (TCEQ) and the Texas Water Development Board (TWDB) have been used to estimate current reliable supplies.

3.1 Surface Water Availability

3.1.1 Rio Grande

The Rio Grande is the fifth longest river in the United States and among the top 20 in the world. It extends from 12,000 feet above sea level in the San Juan Mountains of Colorado to the Gulf of Mexico (1,901 miles) and forms a 1,255-mile segment of the border between the United States and Mexico.

The entire Rio Grande basin (Figure 3-2) covers an area approximately 336,000 square miles, with approximately half the watershed in the United States and the other half in Mexico.[1] Approximately 182,000 square miles of the basin contribute flow; the remainder includes numerous endorheic, or closed, basins. Roughly 54,000 square miles of the total watershed are within Texas, about 8,100 square miles of which are endorheic basins.

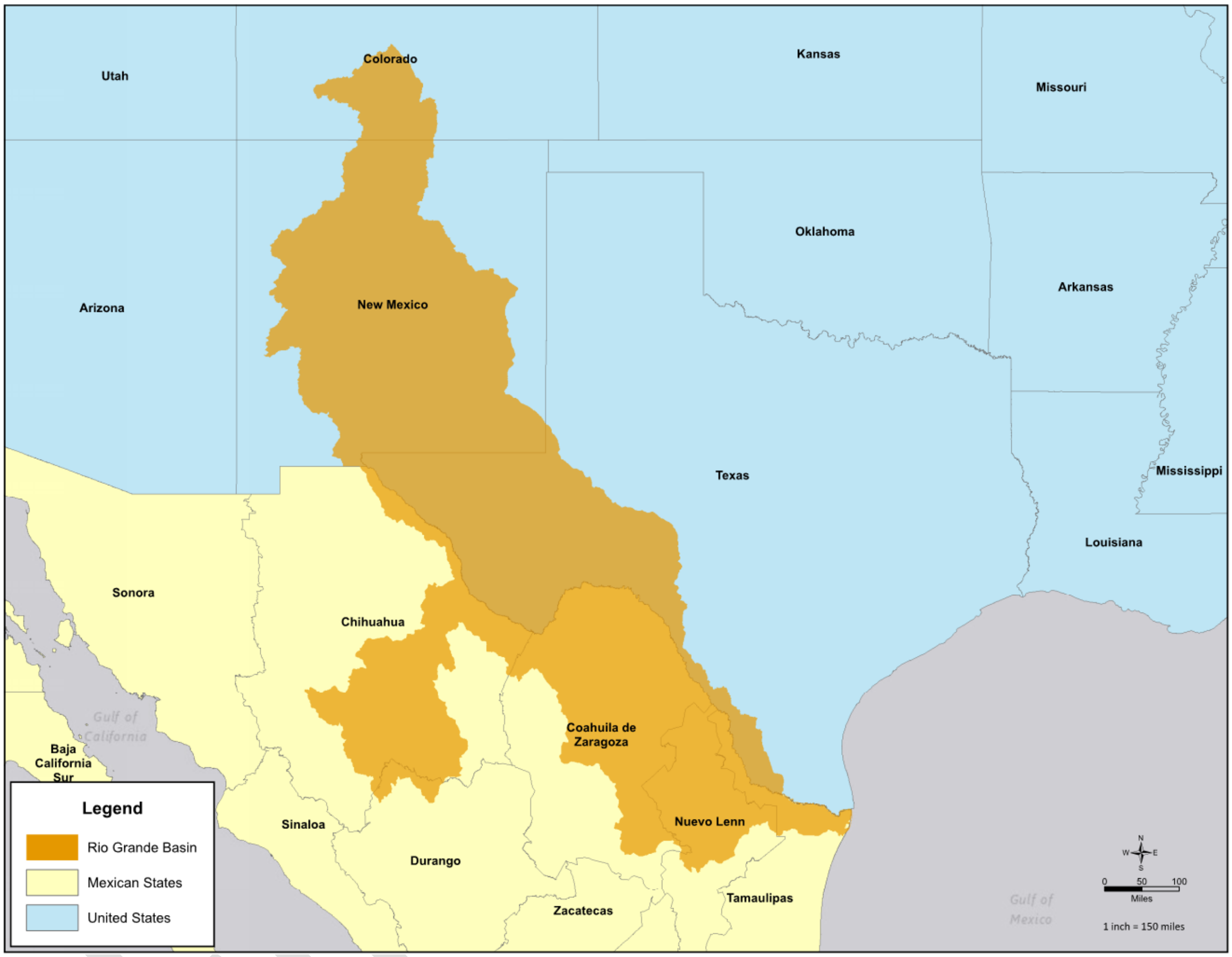

Figure 3-2 Rio Grande Basin

[1] In Mexico, the Rio Grande is referred to as the Rio Bravo.

The two major international reservoirs on the Rio Grande, Falcon, and Amistad, are operated as a system by the International Boundary and Water Commission (IBWC) for flood control and water supply purposes. The Amistad Reservoir is located in Val Verde County (in Region J) at the confluence of the Devils River, 12 miles northwest of Del Rio. Falcon Reservoir is located between the cities of Laredo, Texas, and Rio Grande City, Texas, about 275 river miles upstream from the Gulf of Mexico.

In addition to the two international reservoirs on the Rio Grande (Amistad and Falcon), Mexico has constructed an extensive system of reservoirs on tributaries of the Rio Grande. Figure 3-3 shows the location of these reservoirs noted by text.

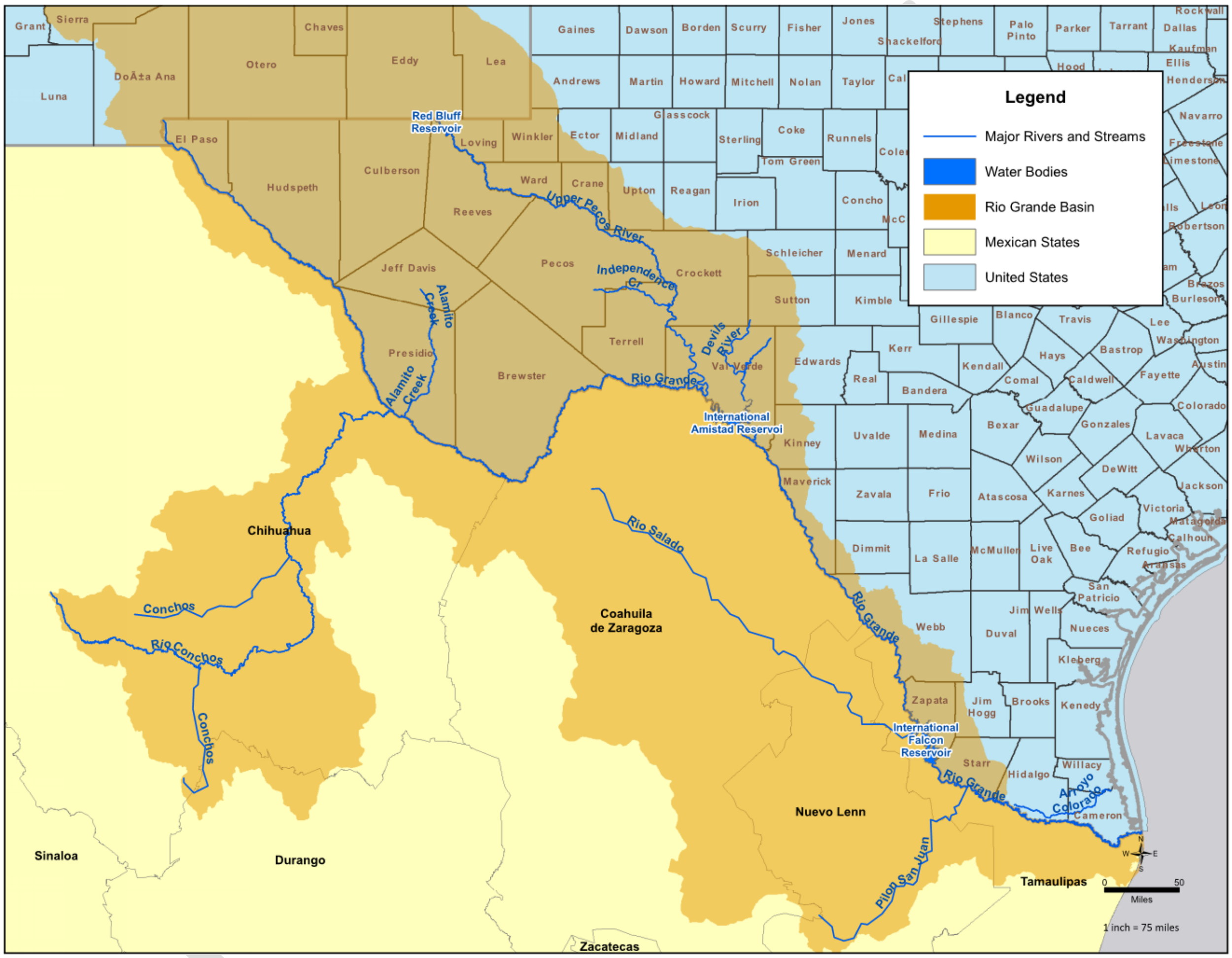

Figure 3-3 Rio Grande Basin Hydrography, Showing Tributaries and Major Reservoirs in Texas and Mexico

3.1.1.1 Drought of Record

The drought of record (DOR) is the basis of the firm yield projection for each river basin. The DOR identifies the worst drought on record, and the firm yield is the supply that can be expected from that river or system in that most severe drought scenario. The firm yield and DOR are determined using the Rio Grande Water Availability Model (WAM), which models the existing system and demands under historical hydrologic flows. The Rio Grande WAM has a period of record from January 1940 to December 2018.

Typically, the DOR is defined as the longest period between full reservoir storage with firm yield demands applied to the system over the period of record. The Amistad-Falcon reservoir system is used to store water for Mexico and the United States using a storage pool accounting system. The total storage capacity and reservoir stages under firm yield demands are shown on Figure 3-4 for the combined storage (United States and Mexico) and the portion belonging to the United States. Critical drought starting and ending dates are shown, as well as the storage minima and the date they occurred.

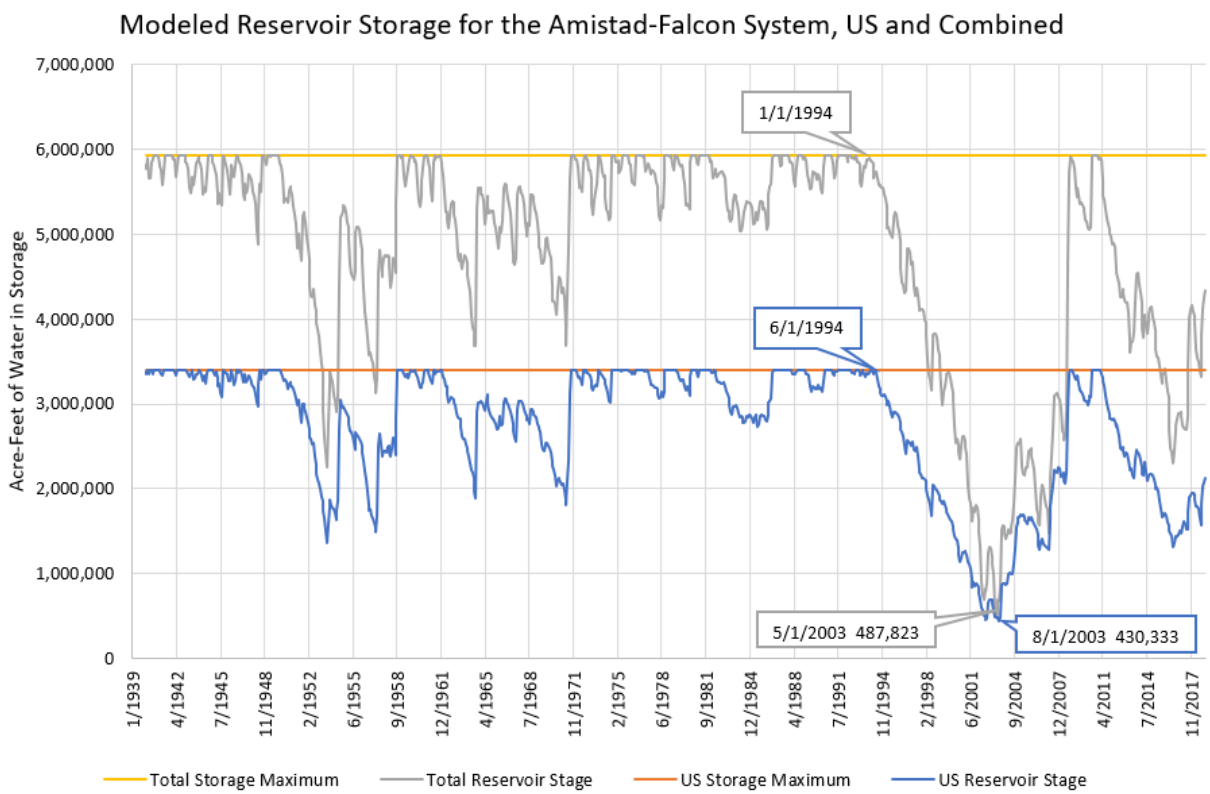

Figure 3-4 Modeled Reservoir Storage for the Amistad-Falcon System, United States and Combined

This cycle, the DOR has changed because of an update to the TCEQ Rio Grande WAM to extend the period of record through 2018. 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. The DOR and drought responses are discussed in detail in Chapter 7.

3.1.1.2 Shared Resources with Mexico

Two treaties between the United States and Mexico contain basic provisions regarding the development and use of Rio Grande waters by the two countries. The 1906 convention provides for delivery to Mexico by the United States of 60,000 acre-feet (ac-ft) of water annually in the El Paso-Juarez Valley upstream from Fort Quitman, Texas. The cycle lasts either 5 years or until the U.S. conservation capacity at both reservoirs is filled with waters belonging to the U.S. If shortages occur in the water supply for United States, deliveries to Mexico are to be reduced in the same proportion as deliveries to the United States. Region M interprets from the 1906 convention and 1944 treaty that the flows in the Rio Grande at Fort Quitman are owned 100 percent by the United States because Mexico waived any and all claims to the waters of the Rio Grande for any purpose whatever between the head of the present Mexican Canal and Fort Quitman, Texas. All other flows occurring in the main channel of the Rio Grande downstream from Fort Quitman are owned 50 percent by the United States and 50 percent by Mexico.

The treaty of February 3, 1944, for "Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande" described how Mexico and the United States would divide the waters of the Rio Grande from Fort Quitman to the Gulf of Mexico and the waters of the Colorado River. Of the waters of the Rio Grande, the treaty allots to Mexico: (1) all of the waters reaching the main channel of the Rio Grande from the San Juan and Alamo rivers, including the return flows from the lands irrigated from those two rivers; (2) two-thirds of the flow in the main channel of the Rio Grande from the measured Conchos, San Diego, San Rodrigo, Escondido, and Salado rivers, and the Las Vacas Arroyo, subject to certain provisions; and (3) one-half of all other flows occurring in the main channel of the Rio Grande downstream from Fort Quitman. The treaty allots to the United States: (1) all of the waters reaching the main channel of the Rio Grande from the Pecos and Devils Rivers, Goodenough Spring, and Alamito, Terlingua, San Felipe, and Pinto Creeks; (2) one-third of the flow reaching the main channel of the river from the six named measured tributaries from Mexico (the treaty provides that this third shall not be less, as an average amount in cycles of 5 consecutive years, than 350,000 ac-ft annually); and (3) one-half of all other flows occurring in the main channel of the Rio Grande downstream from Fort Quitman.[2]

The treaty allows exceptions for years of extraordinary drought or serious accident to the hydraulic systems on the Mexican tributaries; however, extraordinary drought is not defined. As a result, Mexico often runs a deficit for up to 4 consecutive years and repays the debt in years of high precipitation. This significantly impacts the reliability of supplies and is especially difficult for farmers whose water rights are the most vulnerable to reduced system availability.

Although the term "extraordinary drought" is not expressly defined in the treaty, as other terms are defined in Article 1, it is implicitly defined in the second subparagraph of Article 4B(d) as an event that makes it difficult for Mexico "…to make available the runoff of 350,000 ac-ft (431,721,000 cubic meters) annually." In other words, it is a drought condition when there is less than 1,050,000 ac-ft (350,000 United States' share and 700,000 Mexico share) of "run-off waters in the watersheds of the named Mexican tributaries" to allow Mexico to deliver the required amount of 1,050,000 ac-ft to the Rio Grande. This amount is measured at the Rio Grande, without regard to conveyance losses in Mexico, and so Mexico must assume conveyance losses in Mexico and deliver to the Rio Grande the full amount. If there is sufficient runoff water in the watershed of the Mexican tributaries, an extraordinary drought does not exist.

The IBWC tracks the deliveries of water from Mexico to the United States. Figure 3-5 depicts the amount of water that has been delivered from Mexico in each of the previous cycles since 1988. The cycles last either 5 years or until the conservation pools in the two reservoirs are full. Figure 3-5 was the most recent graphic available with data through May 11, 2024. More specific (e.g., reservoir levels) and recent data and reports can be found at ibwc.gov. Figure 3-6 displays the deliveries for this current cycle compared with the target delivery rate as described in the 1944 treaty. The graph shows that deliveries from Mexico in the last few years have been much lower than what is expected. The IBWC began negotiation of a new Minute in 2023 to increase the predictability and reliability of Rio Grande water

[2]The International Boundary and Water Commission. Its Mission, Organization, and Procedures for Solution of Boundary and Water Problems. http://ibwc.gov/.html.

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deliveries to users in both the United States and Mexico. Minute 331 was signed by the United States and Mexico on November 7, 2024.

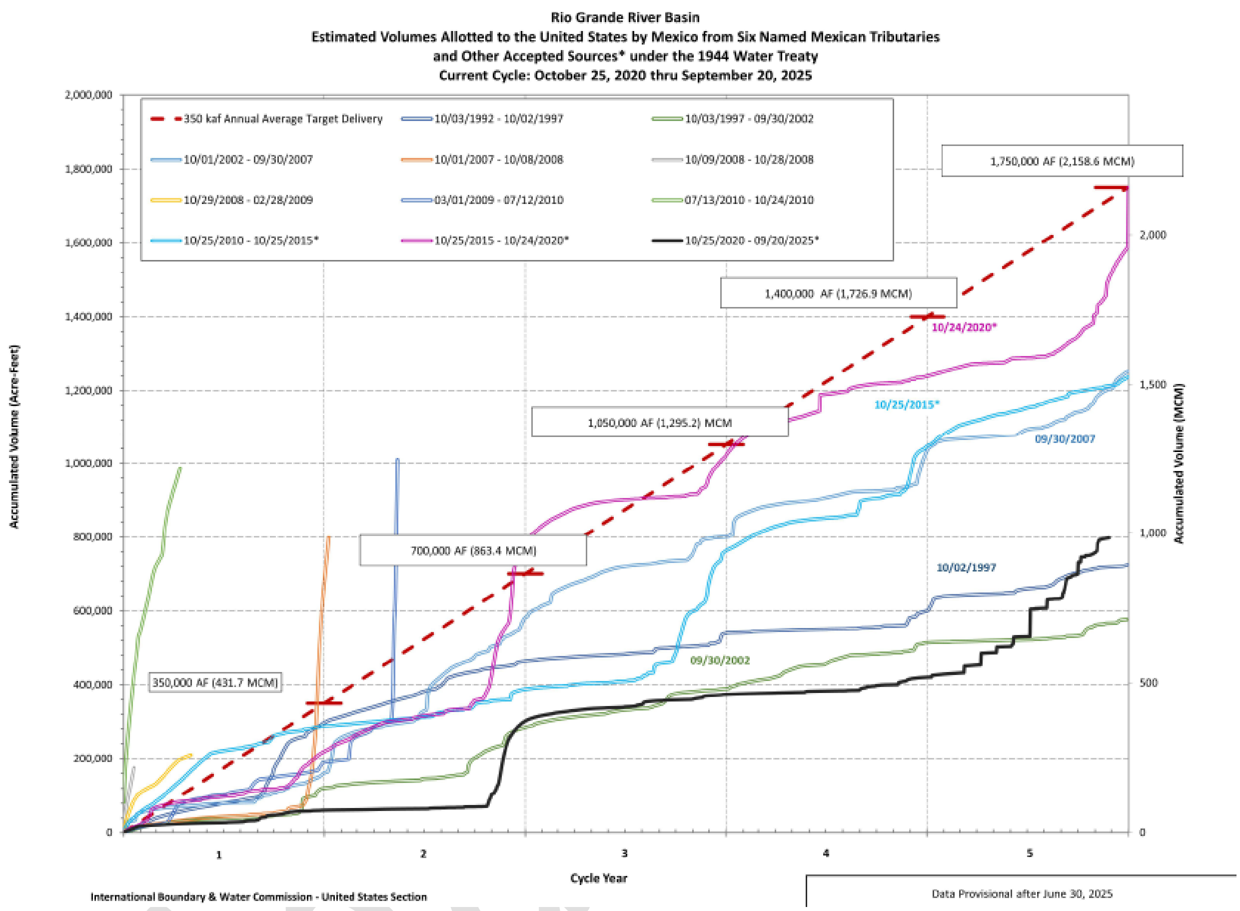

Figure 3-5 **Water Delivered to the United States from Mexico, 1992 to 2025 (IBWC)**[3]

[3] IBWC. Mexico Deliveries During the Current 5-Year Cycle. https://ibwc.gov/Water_Data/mexico_deliveries.html. Accessed 5/16/2024.

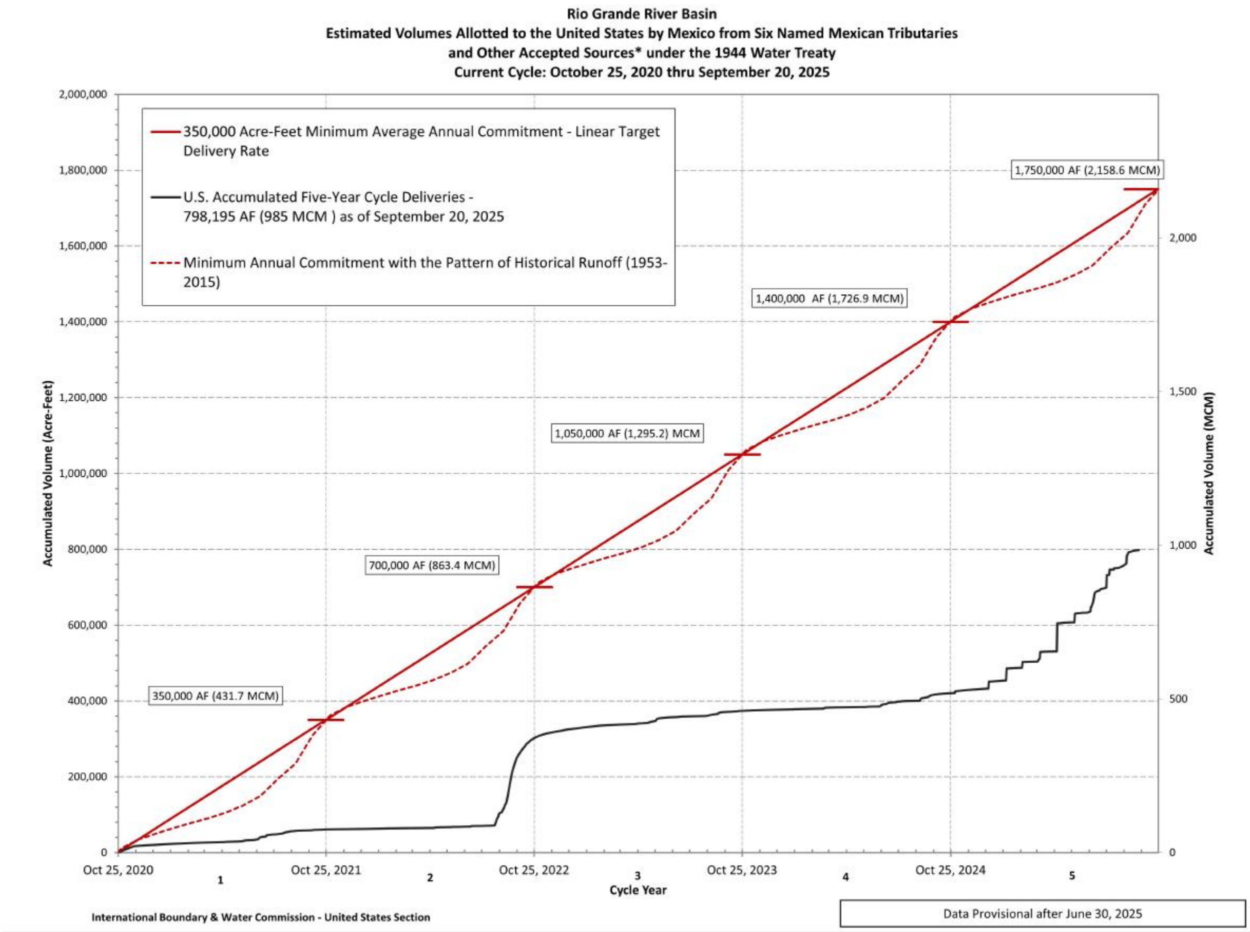

Figure 3-6 Water Delivered to the United States from Mexico, Current Cycle (IBWC)[4]

3.1.1.3 Rio Grande Water Availability Model

Availability in the Rio Grande for the United States use is determined by the Rio Grande WAM, maintained by the TCEQ. Estimated historical streamflow conditions are developed, including typical wet, dry, and normal flow periods, as they would be without the influence of manmade diversions, dams, and other influence on the watershed, called naturalized flows. The current Rio Grande WAM includes data from 1940 to 2018 from control points, or locations where contributing streams have gauging data, in both Texas and Mexico. The Rio Grande WAM extends to the New Mexico state line and includes data from both the Rio Grande and the Pecos Rivers at the state line, according to the provisions of existing compacts between the states.

The 1940 to 2018 historical period includes the droughts of the 1950s and 1990s, both of which represent extreme drought conditions for most of the Rio Grande basin. To estimate the firm yield, the Rio Grande WAM is run with parameters intended to approximate a drought scenario, called Run 3. This model run assumes that all water rights are fully diverted and that there are no return flows into the Rio Grande. The most current version of the Rio Grande WAM Run 3 is dated October 1, 2023. In addition to

[4] IBWC. "Mexico Deliveries." https://ibwc.gov/Water_Data/mexico_deliveries.html; Accessed July 2024.

extending the period of record through 2018, the model is a simplified version of the WAM that uses aggregated totals to represent the approximately 1,500 individual water rights.

Sedimentation was incorporated in the Rio Grande WAM for major reservoirs within the Region M boundary. Sedimentation was not performed for major reservoirs upstream and outside of the Region M boundary because it is more conservative to assume sedimentation will not occur and more water will be captured in those upstream reservoirs.

On February 1, 2024, the International Boundary and Water Commission (IBWC) released new reservoir sedimentation surveys for the Amistad-Falcon Reservoir System. The survey represents the best available data and is based on surveys deemed complete in early 2014. In addition, sedimentation analyses were conducted for Casa Blanca Lake/Reservoir. The following summarizes the methodology used for estimating and incorporating sedimentation into the WAMs.

The sedimentation rate for Amistad Reservoir was estimated by comparing the sedimentation observed between the survey conducted in 2014 and the previous survey conducted in 2005. The resulting sedimentation rate is slightly greater than the rate used in previous Region M Regional Water Plans. Because the most-recent sedimentation rate represents the latest information and is more conservative, this sedimentation rate information was imposed on the 2014 storage volume - surface area (SV/SA) tables for Amistad Reservoir to estimate projected firm yields in future decades.

The 2014 SV/SA tables for Falcon Reservoir demonstrate greater capacity than previous surveys, which indicates that there are data inconsistencies. These inconsistencies are likely an artifact due to the significantly increased resolution of the survey in 2014 when compared to previous surveys. In order to accurately estimate the sedimentation rate, surveys of similar resolution must be used. Therefore, for Falcon Reservoir, the sedimentation rate was estimated by comparing the sedimentation observed between a previous survey conducted in 2005 and a survey conducted in 1992. This sedimentation rate was imposed on the 2014 SV/SA tables for Falcon Reservoir to estimate projected firm yields in future decades.

Sedimentation estimates for Casa Blanca Lake/Reservoir were determined based on a report by Espey and the City of Laredo during the 2007 timeframe. The sedimentation rate was calculated using the 2007 estimate and the sedimentation estimate that was done in the original WAM for the year 2000 condition, and then the resulting annual sedimentation rate was extrapolated out to 2030 through 2080.

Firm yield values for 2030 through 2080 were estimated by the WAM Run 3 and show a reduction in availability over time because of sedimentation. The annual firm yield, averaged for each planning decade, is shown in Table 3-1.

Table 3-1 Firm Yield Projections for the Amistad-Falcon Reservoir System and Casa Blanca Lake/Reservoir 2030-2080 (ac-ft/yr)

Source	2030	2040	2050	2060	2070	2080
Amistad-Falcon Reservoir	1,001,776	1,001,268	1,000,760	999,553	997,821	995,863
Casa Blanca Lake/Reservoir	600	600	600	600	562	412

The Rio Grande WAM then simulates the monthly ability of individual water right holders to make diversions in accordance with the TCEQ's Rio Grande operating rules. The simulations are performed

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using the Water Rights Analysis Package (WRAP) program.[5] The results of this simulation indicate that the Rio Grande basin has no water that is not already appropriated and include an estimated reliability for each of the different types of water rights.[6] These monthly simulations are aggregated into decadal averages for planning purposes.

All of the Rio Grande Basin below the New Mexico state line, including the Mexican portion of the basin, is included in the Rio Grande WAM. The 1944 treaty provision requiring a minimum of 350,000 acre-feet per year (ac-ft/yr) to be delivered to the United States from the six named Mexican tributaries has not been incorporated as a rule into the WAM because shortages are allowed to accumulate over up to a 5-year period in times of drought. The transfer of Mexican water from the six named Mexican tributaries of the Rio Grande to the United States is modeled after Mexico's demands and reservoirs on these tributaries have been simulated. The United States is allotted one-third of the remaining flow at the mouths of each of the six named Mexican tributaries. Demands for water along the Rio Grande by both US and Mexican water users downstream of these Mexican tributaries are then simulated in the model.

Kennedy Resource Company, Inc., was asked to review and modify the 2023 Rio Grande WAM as a part of the 2026 update to the Region M plan. This included incorporating modified irrigation patterns above Fort Quitman and modeling the San Solomon Springs as cutoff from the rest of the basin. These two items made the model consistent with Region E's version of the model. A hydrologic variance was requested by the Region M planning group and approved by the TWDB in a letter dated November 9, 2023 (Appendix 3B). Table 3-2 includes details for hydrologic models used, including the model name, version date, model input/output files used, date model used and any relevant comments.

Table 3-2 Details for Hydrologic Models Used

Model Name	Version Date	Input/Output Files Used	Date Model Used	Comments
TCEQ Rio Grande Run 3	10/1/2023	RG3.dat, RG3.dis, RG3.flo, RG3.his, RG3.fad, RG3.eva RG3.out then numerous Tables *.tou July 2022 version of the SIM and TABLES executables.	11/1/23	TCEQ Authorized Diversion Amounts and Authorized Reservoir Capacities – No sedimentation
			12/10/23	Amistad/Falcon and Casa Blanca set to Firm Yield – No sedimentation
			12/15/23	TCEQ Authorized Diversion Amounts and Authorized Reservoir Capacities – sedimentation for 2030 and 2080

[5] "Water Rights Analysis Package (WRAP) Users and Reference Manual." Texas Water Resources Institute at Texas A&M University. Revised July 2022 by Ralph A. Wurbs (Wurbs, 2022). The version of the WRAP program dated July 2022 was used for the 2023 Rio Grande WAM (Wurbs, 2022).
[6] There are water rights that are not considered in the RWP, including those held by state and federal government agencies that are not used in meeting the needs of any of the WUGs that are planned for in this process.

			2/8/24	Amistad/Falcon and Casa Blanca set to Firm Yield – sedimentation for 2030 and 2080
TCEQ Rio Grande Run 3 Modified	10/1/2023	RG3.dat, RG3.dis, RG3.flo, RG3.his, RG3.fad, RG3.eva RG3.out then numerous Tables *.tou July 2022 version of the SIM and TABLES executables.	12/15/2023-2/10/2024	Altered to incorporate TWDB Region M Planning Variance Evaluated to determine TCEQ authorized diversions for Run of River water rights and firm yields for Amistad/Falcon and Casa Blanca (2030-2080)
TCEQ Nueces-Rio Grande Coastal WAM Run 3	10/1/2023	NRG3.dat, NRG3.dis, NRG3.flo, NRG3.his, NRG3.fad, NRG3.eva NRG3.out then numerous Tables *.tou July 2022 version of the SIM and TABLES executables.	12/2023	Evaluated to determine TCEQ authorized diversions for Run of River water rights – no reservoirs in WAM, so no sedimentation incorporated

Table 3-3 summarizes the results of Run 3 of the Rio Grande WAM, which evaluated the firm yield associated with the aggregated middle- and lower-basin water rights that are used in the simplified WAM. The table shows the maximum authorized diversion associated with each type of water right and the firm yield that can be expected in a drought similar to the worst historical DOR.

The table displays the water rights separated into middle and lower basin, and by user designations for "MUNI" - municipal (most commonly raw water for municipal treatment plants), "IRR" - irrigation, and "MIN" - mining, Classes A and B. A list of relevant Rio Grande active water rights is included in Appendix 3C.

Table 3-3 Rio Grande WAM Modeled Water Rights, Firm Yield Results (ac-ft/yr)

Authorized Diversion						Firm Yield	
Lower Basin		Middle Basin		Total		2030	2080
MUNILWR	253,428	MUNIMID	74,215	MUNI	327,643	327,643	327,643
LOW-A-IRR	1,411,050	MID-A-IRR	156,946	A-IRR	1,567,996	616,056	610,653
LOW-A-MIN	1,077	MID-A-MIN	9,173	A-MIN	10,250	4,027	3,992
LOW-A-MUN	465	MID-A-MUN	2,051	A-MUN	2,515	988	980
LOW-B-IRR	131,682	MID-B-IRR	18,051	B-IRR	149,733	47,063	46,651
LOW-B-MIN	5,020	MID-B-MIN	10,176	B-MIN	15,196	4,776	4,735
LOW-B-MUN	3,823	MID-B-MUN	62	B-MUN	3,885	1,221	1,210

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Various run-of-river water rights on the Rio Grande are exceptions to typical operations, three of which have been evaluated for firm yields (Table 3-4).

Table 3-4 Rio Grande Run-of-River Water Rights

Water Right No.	Water Right Holder	Authorized Diversion	Firm Yield
952-001	City of Eagle Pass Water Works System	4,600	1,180
952-002	City of Laredo	2,818	626
952-003	Maverick County	641	182

3.1.1.4 Rio Grande Operations

Waters of the Rio Grande are treated as a "stock resource" that is accumulated in the Amistad-Falcon reservoir system and released on demand in accordance with water rights set by law. The TCEQ administers the United States' share of water stored in Amistad and Falcon reservoirs in compliance with the decision of the Thirteenth Court of Civil Appeals in the case "State of Texas, et al. vs. Hidalgo County Water Control and Improvement District No. 18, et al.," commonly referred to as the Valley Water Suit, and the Adjudication Decree in the Middle Rio Grande under the Water Rights Adjudication act of 1967. The TCEQ Rio Grande Watermaster program is responsible for allocating, monitoring, and controlling the use of surface water in the Rio Grande basin from Fort Quitman to the Gulf of Mexico.

Since the 1960s, the US portion of the Rio Grande below Amistad has been fully adjudicated so that no "unclaimed" water is regularly available in the system. Water rights on the river are divided into two major types: domestic/municipal/industrial (DMI) rights, and irrigation and mining rights (which are sub-divided into Class A and Class B). These rights represent the annual allowable maximum diverted, but because demand exceeds supply in a drought year, only the highest priority (i.e., DMI) water rights are guaranteed to receive the full amount of their water rights. Classes A and B irrigation and mining accounts are allocated water on a pro-rata basis but are not necessarily able to access their maximum authorized diversion each year.

To determine the amount of water to be allocated to various accounts, the Watermaster makes the following computations at the beginning of each month:

1. From the amount of water in usable storage, 225,000 ac-ft are deducted to re-establish the DMI storage pool. These uses are given the highest priority.
2. From the remaining storage, the total end-of-month account balances for all lower and middle Rio Grande irrigation and mining water right holders are deducted.
3. From the remaining storage, the operating reserve is deducted to account for evaporation, seepage, conveyance losses, and emergencies.
4. Any remaining storage is allocated to the irrigation and mining accounts.

Steps 2 through 4 are iterative and are all based on the reservoir volume.

Water that has been designated for municipal use must be used for municipal purposes, and similarly, irrigation water rights for irrigation, etc., unless it is permanently converted through TCEQ. When irrigation and mining water rights are converted to municipal water rights, the maximum diversions for

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Class A are reduced by 50 percent and Class B by 60 percent. The main mechanism for this conversion is urbanization.

Generally, under the current TCEQ rules and regulations, all US water that is diverted from the lower and middle Rio Grande by authorized diverters is accounted for by the Rio Grande Watermaster, with appropriate charges against annual authorized diversion accounts in accordance with existing individual water rights and against individual storage accounts in Falcon and Amistad reservoirs.

When there are substantial flows in the river from high runoff conditions, the Rio Grande Watermaster may allow water rights holders along the lower and middle Rio Grande to divert water without those diversions being charged to their accounts. These are referred to as "no-charge pumping" periods, and diversions during such periods are authorized by an order issued by the Texas Water Commission on August 4, 1981. When no-charge pumping is declared by the Rio Grande Watermaster, authorized water rights holders can divert to the extent it is available, without their respective annual water use and storage accounts being charged.

DMI water right accounts have no storage, thus cannot roll over any unused water each year; they are limited to diverting no more than their water right in each year. Classes A and B water right accounts can accumulate up to 1.41 times the annual authorized diversion right in storage. If an allottee does not use any water for 2 consecutive years, its account is reduced to zero.

3.1.1.5 Irrigation Districts

Irrigation districts operate under rules and regulations in the Texas Water Code and within the TCEQ operational rules that resulted in part from the Valley Water Suit. Among other things, this judgment allocated specific amounts of water in the Lower Rio Grande Valley to individual DMI water users (typically cities) with documented historical water usage, and it assigned these DMI water rights to specific irrigation districts, which had pumping facilities on the river, for the subsequent diversion and delivery of river water to the DMI users. In effect, the irrigation districts were assigned municipal water rights that were specifically designated for certain individual DMI water users. Most of the DMI water users in the Lower Rio Grande Valley continue to obtain their water supplies from the irrigation districts under the original water rights that are owned by the irrigation districts but that have specific assignments to the DMI users.

Most water in the Lower Rio Grande is diverted and delivered by irrigation districts, although some farmers, entities, and individuals divert their own water directly, including most users in the Middle Rio Grande. Water right holders request diversion certifications from the Watermaster and then divert water from the Rio Grande into their storage and delivery systems. Water is metered as it is pumped out of the river, according to TCEQ Watermaster rules, but most districts do not meter any water provided to irrigators or "domestic" water usage for lawn watering and livestock.

In some cases, there are written contracts between the DMI users and the irrigation districts for water delivery; however, often there are only general agreements between the DMI users and the irrigation districts that water will be delivered pursuant to the requirements of the original water rights that specifically assigned water to the DMI users. When these delivery contracts or agreements expire, they are often extended with revised rates to cover pumping costs. Sometimes when the annual allotment for DMI water, as stipulated in a water right, is exceeded by an individual DMI water user, the irrigation district will continue to supply DMI water to the DMI user under the district's own water right, to the extent that a district has these rights available, and then charge the DMI user for this additional water. If

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the district does not have available municipal water rights, the city or the district can acquire municipal use water from third parties to deliver to the city. This one-time delivery of water is referred to as "contract water," which means that water is being delivered to a DMI user on a short-term contractual basis, governed by the Watermaster rules.

The DMI water users can draw their maximum authorized water right from the DMI Reserve.

Some municipal water users have their own water rights, and some that have specific contracts for DMI water from the irrigation districts under the districts' water rights exclusive of the original allotments from the Rio Grande Valley Water Suit.

Irrigation water rights are also generally held by the irrigation district. Farmers pay an annual flat rate assessment that entitles them to receive irrigation water according to acreage. Each district operates somewhat differently with respect to if and how water can be sold and purchased within and outside of the district. For instance, during a drought period, some districts allow farmers to consolidate their allocation of water on one portion of their land, some allow for sales within the district, and some allow for sales outside of the district. When the district is not on allocation, most water will be delivered to farmers on a "first-come, first-served" basis.

The drought year projections for 2030 water rights, 2030 diverted, and 2030 delivered to end users (drought year diversion impacted by irrigation district delivery losses) are shown in Table 3-5.

- Column 2030 Water Right lists the authorized diversion;
- Column 2030 Diverted lists how much can be reliably diverted in a drought year (Class A and B reliability); and
- Column 2030 Delivered lists how much supply a District could deliver to end users (the 2030 diverted less any conveyance losses from the irrigation district).

Each irrigation district is described in two sections: current water rights with their estimated conveyance efficiency and associated customers. Water rights are listed by 1) priority (i.e., DMI, Class A, and Class B); 2) if owned by the irrigation district; and 3) alphabetical order by users that hold their own water rights and are under contract with each irrigation district.

Table 3-5 Irrigation District Water Rights, Water Diversions, and Water Deliveries (ac-ft/yr)

User	2030 Water Right	2030 Diversion	2030 Delivery
Bayview Irrigation District No. 11 (Bayview ID)			
DMI Municipal	183	183	124
Irrigation Class A, Cameron County	16,978	6,771	4,604
Brownsville Irrigation District (Brownsville ID)			
DMI Municipal	3,834	3,834	2,607
Irrigation Class A, Cameron County	31,949	12,741	8,664
Cameron County Irrigation District No. 2 (CCID #2)			
DMI Municipal	8,914	8,914	7,131
DMI Industrial	192	192	154
DMI East Rio Hondo WSC	3,836	3,836	3,069
DMI San Benito	1,532	1,532	1,226

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User	2030 Water Right	2030 Diversion	2030 Delivery
Irrigation Class A, Cameron County	151,536	60,433	48,346
Irrigation Class B, Cameron County	14	4	3
Cameron County Irrigation District No. 6 (CCID #6) - Los Fresnos			
DMI Industrial	20	20	17
DMI Los Fresnos	1,051	1,051	893
DMI Olmito DMI	1,885	1,885	1,602
Irrigation Class A, Cameron County	48,399	19,301	16,406
Cameron County Water Improvement District No. 10 (CCWID #10)			
Irrigation Class A, Cameron County (From CCID #6)	7,953	3,172	2,157
Mining Class A, Cameron County	35	14	9
Delta Lake ID			
DMI Municipal	8,110	8,110	5,272
Raymondville, Class A	224	89	58
DMI Lyford	980	980	637
DMI North Alamo WSC	8,577	8,577	5,575
DMI Port Mansfield PUD	150	150	98
DMI Willacy County Navigation District	100	100	65
Irrigation Class A, Hidalgo County	99,268	39,588	25,732
Irrigation Class B, Hidalgo County	256	67	43
Irrigation Class A, Willacy County	75,808	30,232	19,651
Irrigation Class B, Willacy County	196	51	33
Donna ID			
DMI Municipal	4,190	4,190	2,975
DMI Domestic & Livestock	2,690	2,690	1,910
Irrigation Class A, Hidalgo County	94,064	37,513	26,634
Irrigation Class A, City of Donna	480	191	136
Engleman ID			
Irrigation Class A, Hidalgo County (From Delta Lake ID)	17,231	6,872	4,879
Harlingen ID			
DMI Municipal	856	856	728
DMI Harlingen Water Works System	22,488	22,488	19,115
DMI Military Highway WSC	632	632	537
DMI Palm Valley	313	313	266
DMI Primera	400	400	340
Irrigation Class A, Cameron County	113,883	45,417	38,604
Irrigation Class A, Harlingen Water Works System	4,454	1,776	1,510
Irrigation Class A, Town of Progreso (delivered to Military Highway WSC)	174	69	59

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User	2030 Water Right	2030 Diversion	2030 Delivery
Hidalgo & Cameron County ID No. 9 (H&CCID #9)			
DMI Municipal	13,454	13,454	9,418
DMI Industrial	3,174	3,174	2,222
DMI Mercedes	1,015	1,015	711
DMI Weslaco	736	736	515
DMI Town of La Blanca	13	13	9
Irrigation Class A, Cameron County	12,395	4,943	3,460
Irrigation Class B, Cameron County	4	1	1
Irrigation Class A, Hidalgo County	159,757	63,711	44,598
Irrigation Class B, Hidalgo County	55	14	10
Irrigation Class A, Edcouch	226	90	63
Irrigation Class A, Elsa	698	278	195
Irrigation Class A, La Villa	63	25	17
Hidalgo County Irrigation District No. 1 (HCID#1)			
DMI Municipal	13,003	13,003	9,232
DMI Edinburg	10,847	10,847	7,701
DMI Hidalgo MUD	631	631	448
DMI Sharyland WSC	4,458	4,458	3,165
Irrigation Class A, Hidalgo County	74,079	29,543	20,975
Irrigation Class B, Edinburg	10	3	2
Irrigation Class B, Hidalgo MUD	700	182	129
Hidalgo County Irrigation District No. 2 (HCID #2)			
DMI Municipal	27,320	27,320	20,490
DMI Alamo	2,175	2,175	1,631
DMI North Alamo WSC	1,457	1,457	1,093
DMI Pharr	6,691	6,691	5,018
DMI San Juan	2,533	2,533	1,900
DMI Mcallen	6,611	6,611	4,958
DMI Edinburg	2,591	2,591	1,943
Irrigation Class A, Hidalgo County	132,500	52,841	39,631
Irrigation Class A, HCWID #3	552	220	165
Irrigation Class B, North Alamo WSC	3,750	976	732
Irrigation Class B, Hidalgo County	375	98	73
Hidalgo County Irrigation District No. 5 (HCID #5)			
Irrigation Class A, Hidalgo County	14,235	5,677	4,030
Irrigation Class B, Hidalgo County	403	105	74

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User	2030 Water Right	2030 Diversion	2030 Delivery
Hidalgo County Irrigation District No. 6 (HCID #6)			
DMI Municipal	6,816	6,816	4,839
DMI Agua SUD	1,513	1,513	1,074
Irrigation Class A, Hidalgo County	32,913	13,126	9,319
Hidalgo County Irrigation District No. 13 (HCID #13) - Baptist Seminary			
Irrigation Class A, Hidalgo County	4,357	1,738	1,234
Hidalgo County Irrigation District No. 16 (HCID #16)			
DMI Municipal	1,500	1,500	1,065
DMI Domestic & Livestock	100	100	71
DMI Agua SUD	3,166	3,166	2,248
DMI La Joya	13	13	9
DMI Los Ebanos (delivered to Agua SUD)	13	13	9
DMI Penitas (delivered to Agua SUD)	13	13	9
DMI Sullivan City (delivered to Agua SUD)	13	13	9
Irrigation Class A, Hidalgo County	30,749	12,263	8,707
Mining Class A, Hidalgo County	200	80	57
Hidalgo County Water Improvement District No. 3 *			
DMI Municipal	13,980	13,980	12,582
DMI McAllen	3,229	3,229	2,906
Irrigation Class A, Hidalgo County	8,553	3,411	3,070
Mining Class A, Hidalgo County	100	40	36
Irrigation Class A, HCID#2	552	165	149
Hidalgo County Water Improvement District No. 18 (HCWCID #18)			
Irrigation Class B, Hidalgo County	99	26	18
Hidalgo County Water Improvement District No. 19 (HCWCID #19)			
Irrigation Class A, Hidalgo County	8,016	3,197	2,270
La Feria ID - Cameron County Irrigation District No. 3 (CCID #3)			
DMI Municipal	5,212	5,212	3,544
DMI Siesta Shores WCID	200	200	136
Irrigation Class A, Cameron County	85,808	34,220	23,270
Irrigation Class B, Siesta Shores WCID	63	16	11
Maverick County Water Improvement District (WID)			
Irrigation Class A, Maverick County	134,900	59,626	39,949
Irrigation Class A, Maverick County - Municipal	2,049	906	607
County of Maverick	641	111	74
Santa Cruz Water Control and Improvement (WCID) No. 15			
DMI Municipal	120	120	72
DMI North Alamo WSC	749	749	449
Irrigation Class A, Hidalgo County	74,873	29,859	17,916

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User	2030 Water Right	2030 Diversion	2030 Delivery
United ID			
DMI Municipal	25,815	25,815	21,943
DMI Mission	2,838	2,838	2,412
DMI Sharyland WSC	8,666	8,666	7,366
DMI United for Mission	5,300	5,300	4,505
Irrigation Class A, Hidalgo County	29,374	11,714	9,957
Irrigation Class A, Mission	5,000	1,994	1,695
Valley Acres ID			
Irrigation Class A, Cameron County	2,177	868	616
Irrigation Class A, Hidalgo County	13,947	5,562	3,949
Manufacturing Class A, Cameron County	200	80	57

*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.

As the basis of the supply analysis, diversions were projected to 2070 to reflect the gradually decreasing yield from the reservoirs caused by sedimentation. The deliveries were projected with the combined impacts of conveyance losses and the reduction in reliability from lower reservoir yields. These supply projections are intended to show what supplies are currently available and project what supplies would continue to be available if no water management strategies (WMSs) are implemented.

In Chapter 5, irrigation district conservation is evaluated, which will reduce the impact of conveyance losses on the delivery projections. Additionally, urbanization is considered, which is expected to reduce irrigation use and make some additional water available to meet growing municipal demands through the conversion of water rights.

3.1.1.6 Drought and Push Water

The Rio Grande allocation system fulfils the DMI Reserve monthly. The impacts of drought on DMI water right holders are not reduced diversions but are likely increased demand because of low rainfall and increased outdoor water use, so the main concern is ownership or long-term contracts for sufficient water rights to meet demands for the entire year. Municipal conservation can help a utility to stay within its annual water budget. To date, there has not been a drought severe enough to impact the DMI reserve. It is considered 100 percent reliable.

Agricultural water users are not guaranteed their full authorized diversion each year and must adapt to the water that is available for Class A and B water rights under the Amistad-Falcon system. In the worst historical drought, Class A water right holders could expect about 40 percent of their authorized diversion, and Class B water right holders could expect about 26 percent. Conservation for irrigators (not the only Class A and B water right users, but the largest by far) is more about maximizing the water that is available for irrigation and the ability to adapt to drought years through changing crops or limiting irrigated acreage.

Severe reductions in irrigation water do impact the operations of irrigation districts, so that "push water" may not be available. Many of the water districts deliver water primarily for irrigation and use

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this water to charge their networks of canals, and municipal water rights are effectively "carried on" the irrigation water. In years of severe drought, there may be periods when little to no irrigation water is delivered, so municipalities may need to purchase additional water to provide a minimum operational amount of water in the system. This is in addition to the regular water losses experienced by districts as a result of seepage, evaporation, and operational losses.

When an irrigation district goes on allocation, agricultural usage slows dramatically. This reduction of usage has historically allowed the reservoirs and irrigators' useable account balances to re-charge, and for the system to go back to normal operations with irrigation deliveries to charge the canals and make municipal water available. Although the system does have a self-righting tendency, push water is still a concern that may be exacerbated by urbanization. The recommendations for addressing this concern include the construction or expansion of storage capacity for cities so that a city has sufficient supply between deliveries and increasing inter-connectedness between both raw and treated water systems for increased flexibility and resilience in times of shortage. Irrigation districts may be able to adapt their systems to meet the needs of a customer base that is shifting from irrigation customers to municipal customers.

3.1.1.7 Water Quality

Water in the Rio Grande is normally of suitable quality for irrigation, livestock, industrial uses, and basic treatment for municipal supplies; however, salinity, nutrients, and fecal coliform bacteria are of concern throughout the basin. Salinity concentrations in the Rio Grande are the result of both human activities and natural conditions. For example, the naturally salty waters of the Pecos River are a major source of the salts that flow into the Amistad Reservoir and continue downstream. One possible source is nonpoint source pollution on both sides of the river, including poorly constructed or malfunctioning septic and sewage collection systems and improperly managed animal wastes. Nutrient levels are a concern in the Rio Grande, but current levels do not represent a severe threat to human health; however, biennial water quality assessments conducted by TCEQ consistently show elevated levels of chlorophyll and depressed dissolved oxygen in portions of the Rio Grande downstream of Falcon Dam, possibly indicating eutrophication occurring in the river as a result of excessive nutrients, such as ammonia and nitrate.

In addition to natural sources of salinity in the Rio Grande watershed, human activities also increase the loading of salts to the river. Several major agricultural drains that contribute flow to the Rio Grande below Falcon Dam contain seasonally high levels of chlorides and sulfates.[7] These drains receive irrigation return flows from an estimated 1,115 square kilometers (km^2) of irrigated land, 4/5 of which are located in Mexico (888 km^2). Trend analyses conducted on historical water quality data collected in the portion of the Rio Grande downstream of Falcon Reservoir showed increasing trends in chlorides, sulfate, and total dissolved solids over time.[8] The same trend analyses also showed increasing trends in nutrients, fecal indicator bacteria, and biochemical oxygen demand.

With active sources of pollution on both sides of the river and separate US and Mexican institutional frameworks in place to control them, coordinated binational efforts to protect water quality in the Rio

[7] International Boundary and Water Commission (IBWC). 2000-2006. Water Bulletins. http://www.ibwc.state.gov/water_data/water_bulletins.html; Accessed October 2016.
[8] Miranda, R.M. and Harper, H.D. (2017). Watershed Characterization Report: Lower Rio Grande/Río Bravo Water Quality initiative. Texas Commission on Environmental Quality Report prepared for the Texas General Land Office and US Fish and Wildlife Service as a deliverable to TGLO Contract No. 13-096-000-7128 – Coastal Impact Assistance Program USFWS Financial Assistance Award Number F12AF01188.

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Grande are necessary to improve water quality. In 2013, the TCEQ partnered with two US Federal agencies (IBWC and EPA) and two Mexican Federal agencies (Comisión Internacional de Límites y Aguas [CILA] and Comisión Nacional del Agua [CONAGUA]) and the Mexican State of Tamaulipas (Secretaría de Desarrollo Urbano y Medio Ambiente [SEDUMA]/Comisión Estatal del Agua en Tamaulipas [CEAT]) to begin a binational initiative to restore and protect water quality in the Lower Rio Grande below Falcon Dam. The Lower Rio Grande/Río Bravo Water Quality Initiative (LRGWQI) began under the auspices of the IBWC and follows the protocols established under the US/Mexico Water Treaty of 1944. An official exchange of letters signed on September 10, 2013, by the Principal Engineers of the two sections of the IBWC includes the official Terms of Reference for the initiative, which established the study area, goals, and objectives of the project, as well as the structure of the binational core group and working groups.

The objectives, as described in the LRGWQI Terms of Reference, are to complete the following:

- Address current and future water quality issues;
- Evaluate management strategies for point sources;
- Evaluate other mechanisms and strategies to improve water quality under steady-state conditions, including salinity management; and
- Suggest implementation strategies.

The most important goal of the initiative is the development of a binational watershed-based plan to restore and protect water quality in the river. The Terms of Reference for the LRGWQI also described the technical approach that was to be used for the initiative, which included the following:

- Binational Data Exchange;
- Historical Data Review;
- Identification of Data Gaps;
- Data Collection; and
- Data Analysis and Modeling.

All technical tasks listed in the Terms of Reference for the LRGWQI were completed in August 2018. As of 2024, the work products of the LRGWQI include a detailed watershed characterization report containing a historical data review and analysis, a point source analysis, and a geospatial analysis of steady state nonpoint sources. Between 2016 and 2018, the LRGWQI also developed binational models of water quality in the Lower Rio Grande, which are incorporated into a decision support system designed to help resource managers and decision makers incorporate water quality planning into their efforts.

Most recently, the work to develop a binational plan has occurred under the United States Environmental Protection Agency's (USEPA's) Border 2025 Program. In 2021, a local binational partnership was created to identify financial resources and to establish sector-based subgroups to draft portions of a binational plan. According to the USEPA's website, under Border 2025, a Water Policy Workgroup has been formed with the goal of improving water quality along the border. The objectives of the Water Policy Workgroup include the following:

- **Objective 1:** Address Border Water Management in the Tijuana River Watershed. The EPA and SEMARNAT are to coordinate with specific federal, state, and local entities to plan and implement high priority infrastructure projects that address transboundary pollution affecting the Tijuana River watershed.

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- **Objective 2:** Improve Drinking Water and Wastewater Treatment Infrastructure. Ten (10) drinking water and/or wastewater projects will be developed and certified by the NADB Board of Directors by 2025 under the Border Water Infrastructure Program.
- **Objective 3:** Improve operations and maintenance (O&M) of Drinking Water and Wastewater Infrastructure.
- **Objective 4:** Promote beneficial reuse of treated wastewater and conservation of water and energy. One hundred (100) percent of Border Water Infrastructure Program projects selected for development will include an assessment of water reuse opportunities, if appropriate, by 2025.
- **Objective 5:** Implement projects to prevent and reduce the levels of trash and sediment from entering high priority binational watersheds. Projects that prevent/reduce marine litter should primarily focus on preventing waste at the source through improvements to solid waste management systems, education campaigns, and monitoring as well as reducing trash from entering the aquatic environment through the capture of litter using river booms in known watershed litter hot spots. Funding sources are intended for at least one project in Tijuana River, New River, Rio Grande, and Santa Cruz River watersheds will be implemented to address trash or sediment by 2025.
- **Objective 6:** Improve access to transboundary water quality data.

3.1.2 Nueces River Basin

The Nueces River basin is bounded by the Rio Grande and Nueces-Rio Grande basins on its southern boundary and by the Colorado, San Antonio, and San Antonio-Nueces basins on its northern boundary. The basin extends from Edwards County in Texas to its discharge point in Nueces Bay, which flows into Corpus Christi Bay and ultimately to the Gulf of Mexico. Only a small portion of the Nueces Basin in Webb and Maverick counties is located within the Rio Grande Region. The Nueces River does not pass through Region M, and the Nueces basin does not contribute significant surface water supply to the region.

3.1.3 Nueces-Rio Grande Basin

The Nueces-Rio Grande basin is bounded on the north by the Nueces River basin and on the west and south by the Rio Grande basin. The drainage area of the Nueces-Rio Grande basin is 10,442 square miles, terminating at the Laguna Madre Estuary. Within the Rio Grande Region the basin encompasses the southeastern portion of Webb County, nearly two-thirds of Jim Hogg County, the majority of Hidalgo and Cameron counties, and all of Willacy County (Figure 3-7).

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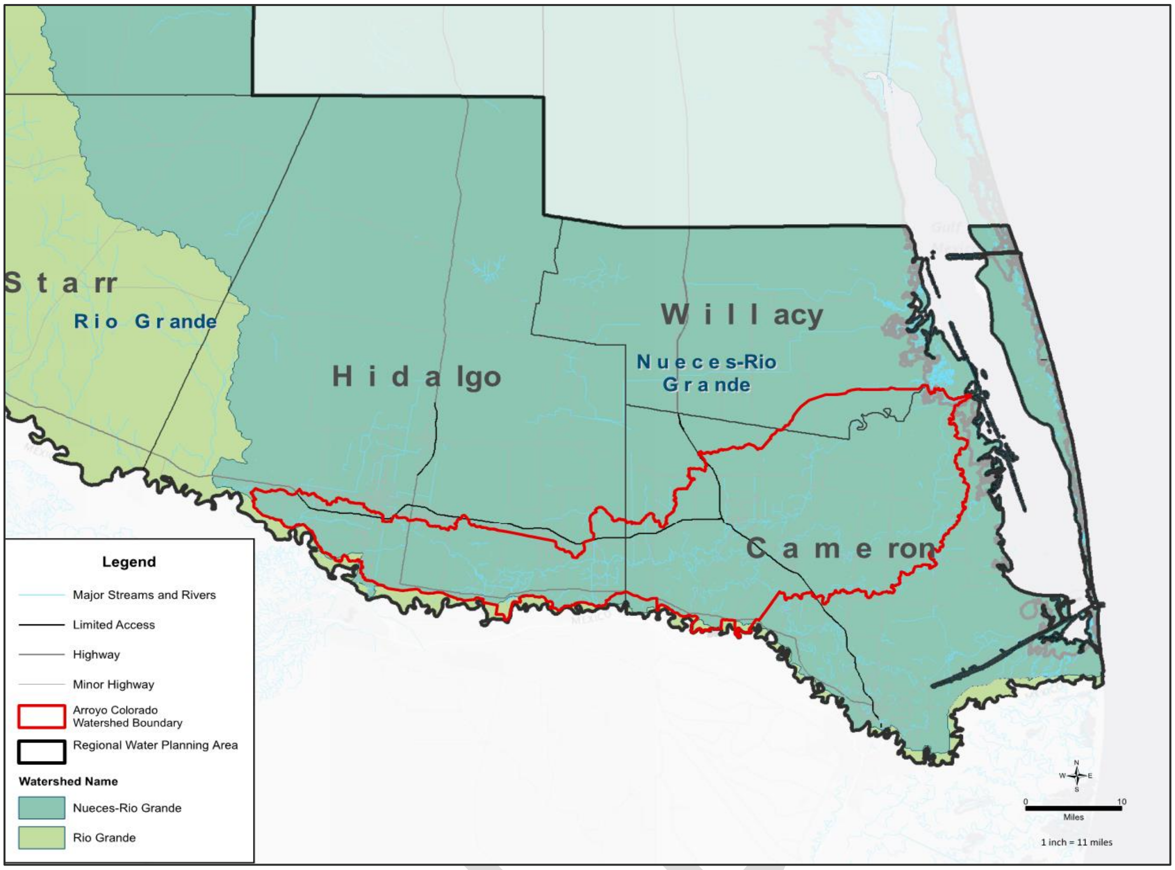

Figure 3-7 Nueces-Rio Grande Basin, Including Major Drainage-Ways

Two major drainage courses are in the basin: the main floodway and the Arroyo Colorado. Inflows from the Arroyo Colorado are critical to the ecological health of the Laguna Madre Estuary. In addition to natural drainage, most of the surface water diverted from the Lower Rio Grande is pumped into this basin and discharges into the Arroyo Colorado. There are no natural perennial streams and no significant water supplies from this basin.

The TWDB evaluated the Lower Laguna Madre Estuary and noted that the combined freshwater inflows to the estuary between 1977 and 2010 averaged 523,602 ac-ft/yr and ranged from a minimum of 234,158 ac-ft in 1990 to 2,726,325 ac-ft in 2010. The two gauging stations are on the North Floodway at the town of Sebastian and the Arroyo Colorado at Harlingen. Gauged inflow to the Lower Laguna Madre accounted for 60 percent of the inflows, ungauged flows (estimated using precipitation data over ungauged watershed areas) accounted for approximately 38 percent of the combined inflow, and the net diversions and return flows accounted for the remaining 2 percent.

The Arroyo Colorado traverses Willacy, Cameron, and Hidalgo counties and is the major drainage-way for approximately two dozen cities in this area, with the notable exception of Brownsville. Almost 500,000 acres in these three counties are irrigated for cotton, citrus, vegetables, grain sorghum, corn, and sugar cane production, and much of the runoff and return flows from these areas are discharged into the Arroyo Colorado. The Arroyo Colorado and the Brownsville Ship Channel both discharge into the Laguna Madre near the northern border of Willacy County.

Use of the water in the Arroyo Colorado for municipal, industrial, and/or irrigation purposes is somewhat limited because of the water quality conditions that exist there. The Arroyo Colorado has two

TCEQ classified stream segments: a freshwater segment (Segment 2202) and a tidally influenced marine segment (Segment 2201). Segments 2201 and 2202 are listed as impaired for high bacteria levels. Segment 2201 is also listed as impaired for low dissolved oxygen. Nutrient concentrations (nitrogen and phosphorus compounds) are high in both segments.

According to available publications and literature, existing springs within the Nueces-Rio Grande Coastal Basin of the Region M planning area (Cameron, Hidalgo, and Willacy counties) are few and small in terms of their discharge. No major springs are extensively relied upon for water supply purposes. Many of the small springs do provide water for livestock and wildlife when they are flowing.

3.1.4 Livestock Local Supplies

Livestock local supplies are dispersed supplies that are available only at the point of use and do not impact firm yield. These supplies are generally runoff collection, such as livestock supply ponds, and are assumed to be freshwater. Livestock is managed in such a way that populations will be maintained at a level that can be supported by a combination of known groundwater supplies and livestock local supplies available during drought conditions. Livestock local supplies are shown in Table 3-6.

Table 3-6 Livestock Local Supplies (ac-ft/yr)

County	Basin	2020	2030	2040	2050	2060	2070
Jim Hogg	Nueces-Rio Grande	257	257	257	257	257	257
Maverick	Nueces	64	64	64	64	64	64
Maverick	Rio Grande	409	409	409	409	409	409
Starr	Rio Grande	75	75	75	75	75	75
Webb	Nueces	384	384	384	384	384	384
Webb	Nueces-Rio Grande	73	73	73	73	73	73
Webb	Rio Grande	344	344	344	344	344	344
Zapata	Rio Grande	249	249	249	249	249	249

3.1.5 Allocation of Surface Water Supplies

Water from the Amistad-Falcon Reservoir system is the primary surface water supply. This subsection discusses the established supplies that can be considered reliable within the context of the Rio Grande operations. TCEQ annual water rights records were used to establish most supplies. Short-term contracts for water were not considered to be reliable supplies, although longer-term contracts and those anticipated to be renewed were considered reliable.

Class A and B water rights were reduced according to the volume reliability anticipated in a drought year, which decreases over the planning horizon because of sedimentation in the reservoirs. DMI water rights were expected to be 100 percent reliable.

In the supply data, irrigation districts are shown as directly accessing the Rio Grande and as delivering the water that they divert to end users. These data show the physical relationships between the districts and the users that they serve. The delivery losses in the districts were estimated and tracked, and irrigation district conservation is recommended as a WMS to access the water that is currently lost in these systems. Delivery losses that were based on estimated conveyance efficiency were applied to all water supplied by each district. Those water rights that are not diverted by irrigation districts were shown to directly supply the end user, in some cases public supply utilities and in other cases individuals. According to the use designation, this water was counted as supplying county-other demand, irrigation, mining, livestock, or industrial demand. Where the TCEQ data were insufficient to understand the supplies associated with the Rio Grande, entities were contacted individually.

Livestock local surface water supplies were assumed for all counties with livestock demand. Because the demands are based on a drought year scenario, it was assumed that ranchers will manage their livestock so that reliable water sources will be sufficient. These supplies were assumed to be used only for livestock and independent of other surface water sources listed.

3.2 Groundwater Availability

The major aquifer that underlies Region M is the Gulf Coast, which underlies Hidalgo, Starr, Jim Hogg, and the western portions of Willacy and Cameron counties. The Carrizo-Wilcox extends through Webb and part of Maverick counties; however, only the outcrop has fresh water, and the subsurface water tends to be slightly to moderately saline. The minor aquifers in the region may produce significant quantities of water that supply relatively small areas, including the Rio Grande Alluvium, Laredo Formation, and Yegua-Jackson Aquifer. The majority of groundwater is slightly or moderately saline.

3.2.1 Groundwater Planning

On September 1, 2005, the Texas Legislature passed House Bill 1763 (HB1763) that presented changes in how groundwater availability is determined in Texas. HB1763 includes the following: (1) regionalizes decisions on groundwater availability; (2) requires regional water planning groups to use groundwater availability numbers from the groundwater conservation districts (GCDs); and (3) defines a permitting target/cap for groundwater production.

The joint groundwater planning process involves various stakeholders to determine how much water can be withdrawn annually and still meet desired future conditions (DFC). This process is undertaken for each of the groundwater management areas (GMAs) by representatives of GCDs and members of the public. The modeled available groundwater (MAG) values are the result of this process, which become the groundwater availabilities for the regional water planning process.

The GMAs work with a model of the aquifers in that region to establish estimates of current and future pumping, recharge, and other aquifer characteristics. The MAG for each part of the aquifer indicates how much groundwater pumping should occur in future decades to maintain the DFC. The most recent reports from GMA 16 (GR21-021 MAG) and GMA 13 (GR21-018 MAG) were used along with the DFC-compatible non-relevant aquifer availabilities provided by TWDB to establish the MAG availabilities for each decade of the planning horizon.

In some cases, there are aquifers or parts of aquifers within a GMA that 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. One such example is the inclusion of the non-MAG Gulf Coast Aquifer in Cameron and Willacy Counties of GMA 16. Pumping in these areas is not included in the MAG but is approved by the TWDB and included as non-MAG sources in the TWDB database. They are identified as areas “outside official TWDB aquifer boundary.” Table 3-7 summarizes the aquifer availabilities in Region M, including MAG and non-MAG.

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Table 3-7 Available Groundwater for Significant Aquifers in Region M (ac-ft/yr)

Aquifer	County	Data	2030	2040	2050	2060	2070	2080
Carrizo-Wilcox	Maverick	MAG	545	547	545	545	276	276
Carrizo-Wilcox	Webb	MAG	910	912	910	910	910	910
Gulf Coast	Cameron	MAG	7,999	9,311	10,620	11,932	11,932	11,932
Gulf Coast	Cameron	Non-MAG[1]	43,167	46,720	50,273	53,824	53,824	53,824
Gulf Coast	Hidalgo	MAG	93,462	99,105	104,721	110,363	110,431	110,431
Gulf Coast	Jim Hogg	MAG	6,167	6,167	6,167	6,167	7,084	7,084
Gulf Coast	Starr	MAG	4,797	5,797	6,794	7,795	7,795	7,795
Gulf Coast	Webb	MAG	789	959	1,129	1,299	1,299	1,299
Gulf Coast	Willacy	MAG	1,150	1,329	1,486	1,665	1,703	1,703
Gulf Coast	Willacy	Non-MAG[1]	1,407	1,622	1,838	2,053	2,053	2,053
Yegua-Jackson	Starr	Non-MAG[2]	33	38	43	48	48	48
Yegua-Jackson	Webb	Non-MAG[3]	20,000	20,000	20,000	20,000	20,000	20,000
Yegua-Jackson	Zapata	Non-MAG[4]	7,987	7,987	7,987	7,987	7,987	7,987
Total			**188,413**	**200,494**	**212,513**	**224,588**	**225,342**	**225,342**

1 TWDB modeling note: non-relevant DFC-compatible modeled pumping values; GMA(s): 16 | GAM Run: GR21-021_MAG; Outside official TWDB aquifer boundary

2 TWDB modeling note: non-relevant DFC-compatible modeled pumping values; GMA(s): 16 | GAM Run: GR21-021_MAG

3 TWDB modeling note: non-relevant DFC-compatible modeled pumping values; GMA(s): 13 | GAM Run: GR21-018_MAG; TWDB modeling note: non-relevant DFC-compatible modeled pumping values for GMA 13 and GMA 16; GMA(s): 13 / 16 | GAM Run: GR21-018_MAG / GR21-021_MAG

4 TWDB modeling note: non-relevant DFC-compatible modeled pumping values; GMA(s): 13 | GAM Run: GR21-018_MAG

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Currently, four GCDs exist in the region: Brush Country, Kenedy County, Red Sands, and Starr County (Figure 3-8).

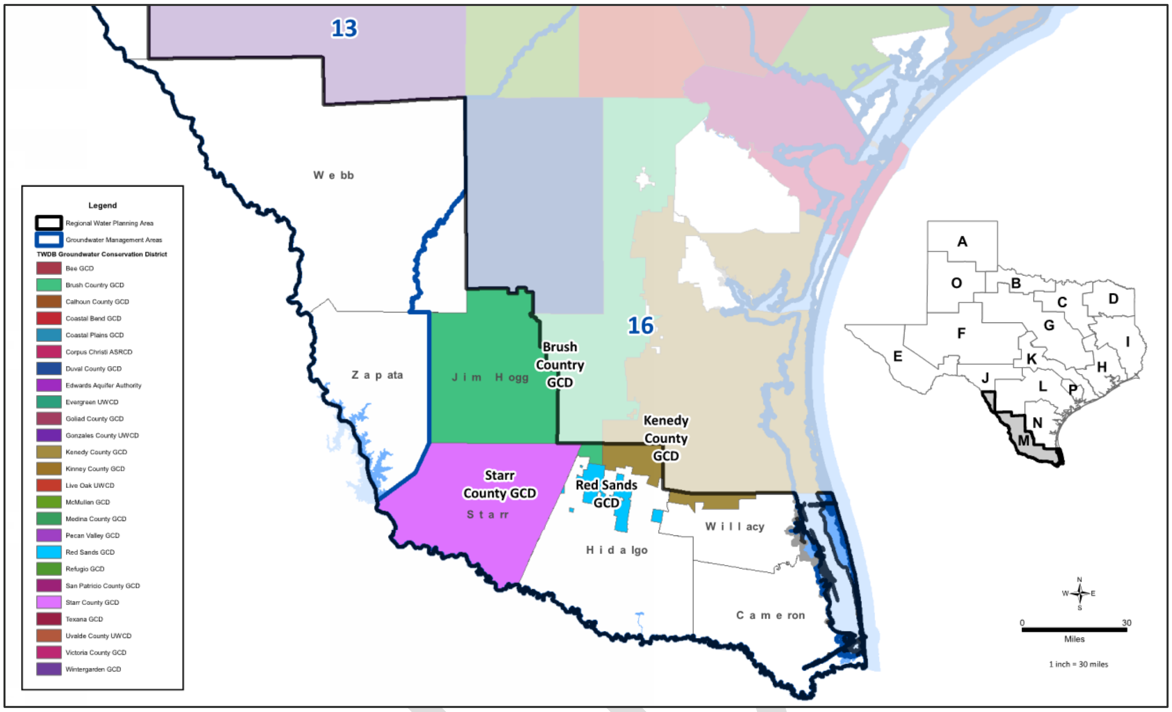

Figure 3-8 Groundwater Conservation Districts and Groundwater Management Areas in Region M

3.2.1.1 Brush Country Groundwater Conservation District

The Brush Country GCD was created by legislative enactment in 2009 and was confirmed by voters at a confirmation election held on November 3, 2009. On August 26, 2013, the Brush Country Board of Directors adopted comprehensive rules to manage, protect, and conserve the groundwater resources within its district boundaries. The Brush Country GCD territory includes all of Jim Hogg County, the area of Jim Wells County outside of the City of Alice and outside the Kenedy County GCD, the area of Brooks County outside of the Kenedy County GCD, and a small area in northern Hidalgo County. The current Brush County GCD Management Plan identifies the Gulf Coast Aquifer as the only major aquifer within the district's boundaries and the Yegua-Jackson Aquifer as the only minor aquifer within the district's boundaries. The most recent established DFC for the Gulf Coast Aquifer was adopted on November 23, 2021, and is a drawdown of 89 feet. The Yegua-Jackson Aquifer was identified as "non-relevant" for the purposes of joint planning and, therefore, no DFC was established.

Brush Country GCD has been actively participating in GMA 16 meetings and is considered fully operational.

3.2.1.2 Kenedy County Groundwater Conservation District

The Kenedy County Groundwater Conservation District (KCGCD) covers 1,686,889 acres, including all land within Kenedy County and parts of Brooks, Hidalgo, Jim Wells, Kleberg, Nueces, and Willacy counties. The district includes 44,311 acres of northern Willacy County and 73,006 acres of northeastern Hidalgo County. The district's mission is to develop and implement an efficient, economical, and environmentally sound groundwater management program to protect and enhance the groundwater resources of the district.

The KCGCD's most current Groundwater Management Plan was approved by the TWDB on January 18, 2023. The only major aquifer within the district is the Gulf Coast Aquifer and there are no minor aquifers.

The DFC established for the Kenedy County GCD for the Gulf Coast Aquifer, as part of the 2021 joint planning process, was an average drawdown of 27 feet from January 1, 2010, to December 31, 2079.

3.2.1.3 Red Sands Groundwater Conservation District

The majority of the Red Sands GCD is located in Hidalgo County and in the southern parts of Willacy County. The district comprises an area of land in the northwestern corner of Hidalgo County, an adjacent area in north central Hidalgo County, and an area along the border between Hidalgo and Willacy counties.

Red Sands GCD adopted its most current Groundwater Management Plan on September 21, 2023. The Red Sands GCD management plan details the historical and current state of its district and its plans to adhere to TWDB and groundwater conservation. Red Sands is in the process of registering all wells in the district and issuing permits for those wells. Many inactive wells are in the district, and Red Sands is in the process of plugging those inactive wells in accordance with the goals in its conservation plan. The major aquifer within the district is the Gulf Coast Aquifer. There is a limited water supply in the Red Sands GCD, the DFC determined in the 2021 joint planning process identifies a target of 60 feet of average drawdown from January 1, 2010, to December 31, 2079. According to the most recent groundwater modeling, this allows for up to 2,863 ac-ft/yr of pumping by 2060. Because of this limited water supply and location restrictions, Red Sands has maintained community engagement goals to remain active in groundwater conservation.

3.2.1.4 Starr County Groundwater Conservation District

Starr County GCD consists entirely of Starr County, bounded by Zapata, Jim Hogg, Brooks, and Hidalgo counties, and the Rio Grande. Starr County GCD is governed by a five-member Board of Directors.

Starr County GCD overlies parts of both the Gulf Coast Aquifer and the Yegua-Jackson Aquifer. The Portion of the Gulf Coast has low water availability and a total dissolved solids (TDS) ranging from 1,000 to more than 10,000 milligrams per liter (mg/L). The Yegua Jackson Aquifer has low yield with water quality between 50 and 10,000 mg/L TDS. Starr county GCD has adopted the average drawdown goal of 94-foot area-wide for the Gulf Coast Aquifer System from January 1, 2010, to December 31, 2079, for GMA 16. The portion of the Yegua-Jackson Aquifer in Starr County is not included in the MAG process.

3.2.2 Gulf Coast Aquifer

The Gulf Coast Aquifer exists in an irregular band along the Texas coast from the Texas-Louisiana border to Mexico. Historically, the Gulf Coast Aquifer has been used to supply varying quantities of water in Cameron, Hidalgo, Jim Hogg, eastern Starr, southeastern Webb, and southern Willacy counties (Figure 3-9).

The Gulf Coast Aquifer consists of interbedded clays, silts, sands, and gravels, which are hydrologically connected to form a leaky aquifer system. In general, there are four components of this system: the deepest zone is the Catahoula; above the Catahoula is the Jasper Aquifer located within the Oakville Sandstone; the Evangeline Aquifer contained within the Fleming and Goliad sands is separated from the Jasper by the Burkeville confining layer; and the uppermost aquifer, the Chicot, consists of the Lissie, Willis, Bentley, Montgomery, Beaumont, and overlying alluvial deposits. In Region M, these overlying

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alluvial deposits include portions of the Rio Grande alluvium. These zones extend into Zapata and Webb counties but produce smaller quantities of water in these areas.

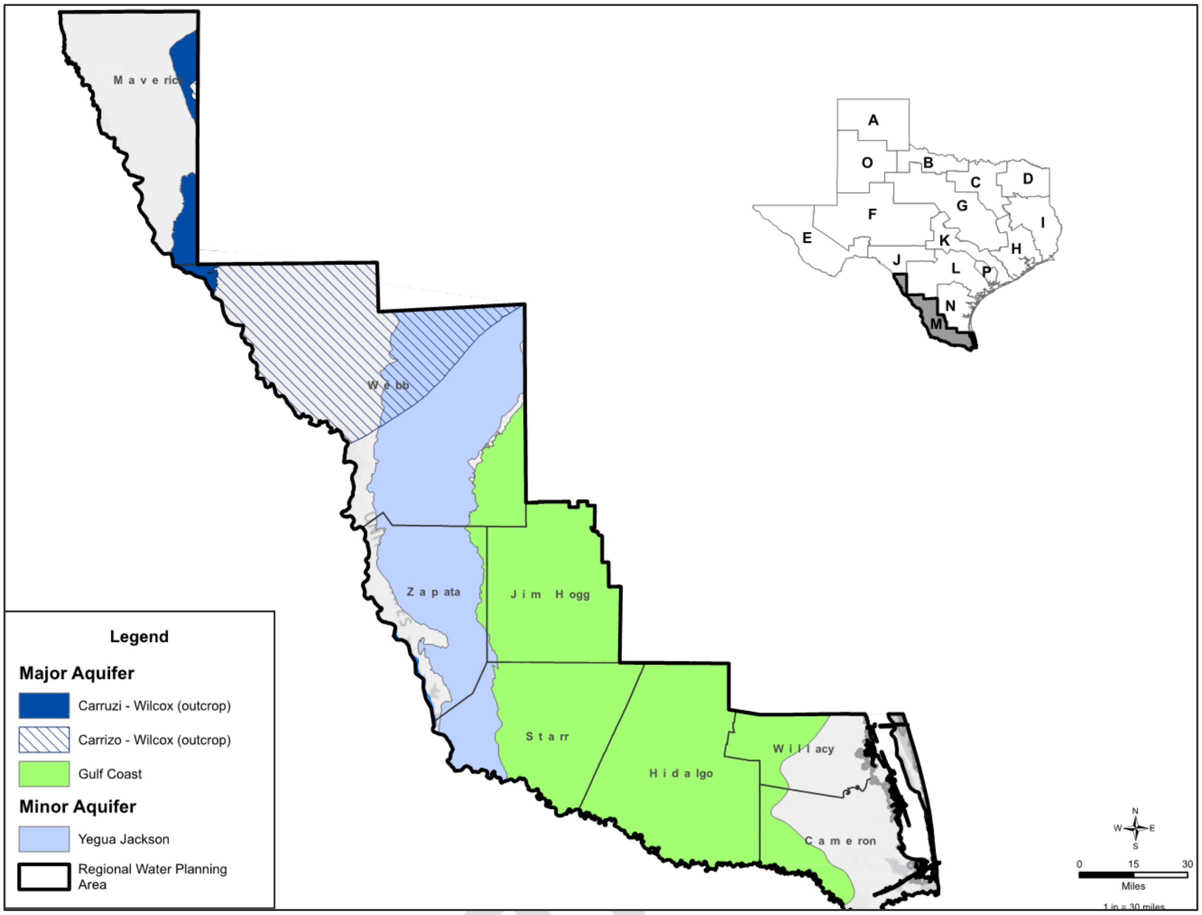

Figure 3-9 Major and Minor Aquifers in Region M

The primary water-producing zone varies from one area of the region to another. The Chicot Aquifer is the primary water-producing zone in western Cameron and eastern Hidalgo counties. The Evangeline Aquifer produces significant quantities of water in Cameron, Hidalgo, and Willacy counties. The Oakville Sandstone produces significant quantities of water in northeastern Starr County, northwestern Hidalgo County, and a portion of Jim Hogg County. The Catahoula formation produces small to moderate quantities of water in Webb County (Table 3-8).

Recharge to the Gulf Coast Aquifer occurs primarily through percolation of precipitation. This may be supplemented in some areas by the addition of irrigation water from the Rio Grande, which may have negative impacts on water quality in localized areas. In some areas, recharge may be limited by shallow subsurface drainage systems designed to control the buildup of salts resulting from continued irrigation operations.

Table 3-8 Gulf Coast Aquifer MAG and Non-MAG Availability Projections by County and River Basin (ac-ft/yr)

Source County	Source Basin	2030	2040	2050	2060	2070	2080
Cameron	Nueces-Rio Grande	7,536	8,771	10,005	11,241	11,241	11,241
Cameron	Rio Grande	463	540	615	691	691	691
Cameron (Non-MAG)	Nueces-Rio Grande	42,395	45,821	49,247	52,673	52,673	52,673
Cameron (Non-MAG)	Rio Grande	772	899	1,026	1,151	1,151	1,151
Hidalgo	Nueces-Rio Grande	91,421	96,658	101,867	107,103	107,171	107,171
Hidalgo	Rio Grande	2,041	2,447	2,854	3,260	3,260	3,260
Jim Hogg	Nueces-Rio Grande	5,230	5,230	5,230	5,230	6,008	6,008
Jim Hogg	Rio Grande	937	937	937	937	1076	1076
Starr	Nueces-Rio Grande	1,958	2,366	2,772	3,180	3,180	3,180
Starr	Rio Grande	2,839	3,431	4,022	4,615	4,615	4,615
Webb	Nueces	22	27	32	37	37	37
Webb	Nueces-Rio Grande	642	780	918	1,056	1,056	1,056
Webb	Rio Grande	125	152	179	206	206	206
Willacy	Nueces-Rio Grande	1,150	1,329	1,486	1,665	1,703	1,703
Willacy (Non-MAG)	Nueces-Rio Grande	1,407	1,622	1,838	2,053	2,053	2,053
Total		**158,938**	**171,010**	**183,028**	**195,098**	**196,121**	**196,121**

Although significant quantities of groundwater are available, recent pumping has resulted in dropping groundwater levels in some areas. Anecdotally, northern Hidalgo and western Willacy counties are experiencing dropping water levels in recent drought years of up to 80 feet.

Well yields can vary significantly. In the Oakville Sandstone, average production is about 120 gallons per minute (gpm), while in the Chicot Aquifer the average well yield is about 10 times this rate, or 1,200 gpm. In the Catahoula Formation, yields range from 30 to 150 gpm. Availability from the Gulf Coast Aquifer is based on GAM Run 21-021 MAG: Modeled Available Groundwater for the Gulf Coast Aquifer System in GMA 16, finalized December 7, 2022. As described in Subsection 3.2.1, non-MAG availability in the Gulf Coast Aquifer is based on GMA 16 Joint Planning Cycle 2019-2022 preliminary modeling data, approved by the TWDB to be included in the RWP last cycle.

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3.2.2.1 Brackish Groundwater in the Gulf Coast Aquifer, Lower Rio Grande Valley, Texas

The TWDB initiated a study of the groundwater resources in the Lower Rio Grande Valley under the Brackish Resources Aquifer Characterization System (BRACS) program. Most of the groundwater in the study area (parts of Cameron, Willacy, Hidalgo, and Starr counties) has concentrations of TDS greater than 1,000 mg/L and does not meet drinking water quality standards (Figure 3-10). The Gulf Coast Aquifer and overlying quaternary geologic units underlie an area of about 3,900 square miles in the study area, and it is the primary source of groundwater in the area.

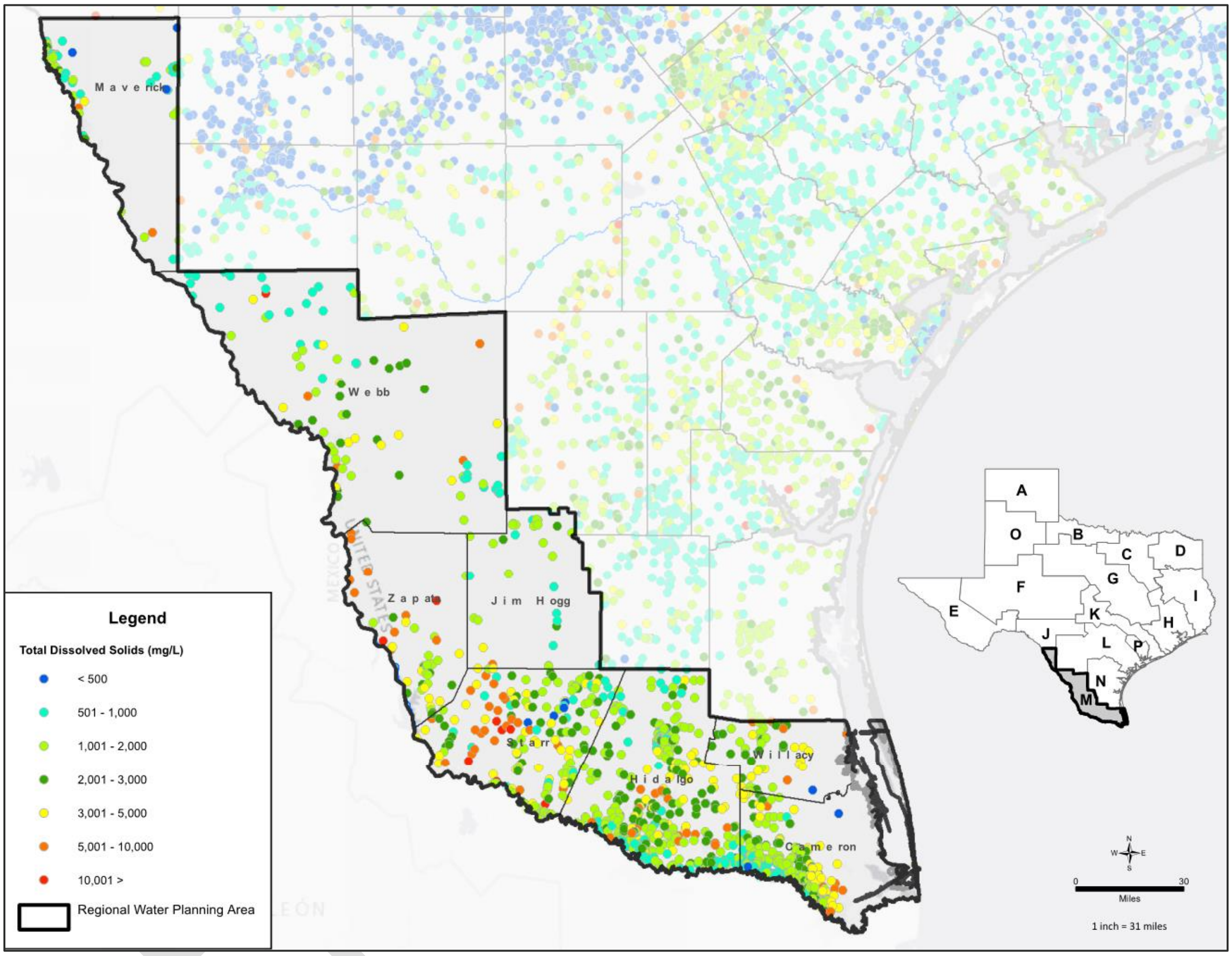

Figure 3-10 Distribution of Wells Sampled for TDS, BRACS Report

The BRACS study used thousands of water well and geophysical logs for geologic, water chemistry, water level, and aquifer test data from a wide variety of sources to characterize the groundwater in the Gulf Coast Aquifer. From this information, three-dimensional salinity zones were mapped within the aquifer containing groundwater of a similar salinity range shown in Table 3-9.

Table 3-9 Salinity Ranges for Groundwater as Defined in BRACS

Salinity	Range of Total Dissolved Solids (mg/L)
Fresh Water	0 – 1,000
Slightly Saline Water	1,000 – 3,000
Moderately Saline Water	3,000 – 10,000
Very Saline Water	10,000 – 35,000
Brine	greater than 35,000

TWDB estimated that the Gulf Coast Aquifer in the study area contains a significant volume of brackish groundwater: more than 40 million ac-ft of slightly saline groundwater; 112 million ac-ft of moderately saline groundwater; and 123 million ac-ft of very saline groundwater. Not all of the brackish groundwater can be produced or economically extracted and treated, but the estimates provide an indication of the potential availability of this important resource.

The study delineated 21 separate geographic areas that each have a unique salinity zone profile from ground surface to the base of the Gulf Coast Aquifer. Some of the salinity zones are quite complex, with intermingled groundwater of different salinity ranges that could not be classified into unique, mapped zones. Placement of these boundaries represents best professional judgment and can undoubtedly be refined with more data from future drilling and testing. The use of these boundaries accordingly requires caution when evaluating future well fields near one of them.

3.2.3 Carrizo-Wilcox Aquifer

The Carrizo Sand, or Carrizo-Wilcox Aquifer, outcrops in a very small area in northwest Webb County, approximately 60 miles to the north-northwest of Laredo (refer to "Carrizo-Wilcox [outcrop]" on Figure 3-9). The formation continues north into Dimmit, Zavala, and Maverick counties, roughly parallel in orientation to those formations occurring to the east and south.

The Carrizo-Wilcox Aquifer is the principal and most prolific aquifer within the northern portion of Region M. The Carrizo-Wilcox Aquifer is a coarse to fine grained, massive, loosely cemented, cross-bedded sandstone with some interbedded thinner sandstones and shales. It yields moderate to large quantities of groundwater, but the yield decreases with distance from the outcrop as the formation dips southeastward. Recharge occurs primarily through exposure of the Carrizo-Wilcox sands to precipitation at the outcrop and where the outcrop is incised by creeks or streams.

The projected quantities of water available from the Carrizo-Wilcox Aquifer are presented in Table 3-10. These estimates were derived by assessing GAM Run 21-018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA 13, finalized July 25, 2022.

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Table 3-10 Carrizo-Wilcox Aquifer MAG Availability Projections by County and River Basin (ac-ft/yr)

Source County	Source Basin	2030	2040	2050	2060	2070	2080
Maverick	Nueces	542	544	542	542	273	273
Maverick	Rio Grande	3	3	3	3	3	3
Webb	Nueces	890	892	890	890	890	890
Webb	Rio Grande	20	20	20	20	20	20
Total		**1,455**	**1,459**	**1,455**	**1,455**	**1,186**	**1,186**

3.2.4 Yegua-Jackson Aquifer

The Yegua-Jackson Aquifer extends in a narrow band from the Rio Grande and Mexico across the state to the Sabine River and Louisiana. In Region M, the Yegua-Jackson Aquifer extends in a narrow band from the Rio Grande through Starr, Zapata, and Webb counties (Figure 3-9). The amount and type of use from the Yegua-Jackson Aquifer vary across the region.

The Yegua-Jackson aquifer consists of complex associations of sand, silt, and clay deposited during the Tertiary Period. Net sand thickness is generally less than 200 feet at any location within the aquifer. Water quality varies greatly within the aquifer, and shallow occurrences of poor-quality water are not uncommon; this is especially true in the Region M planning area. In general, however, small to moderate amounts of usable quality water can be found within shallow sands (less than 300 feet deep) over much of the Yegua-Jackson Aquifer. Although the occurrence, quality, and quantity of water from this aquifer are erratic, domestic and livestock supplies are available from shallow wells over most of its extent. Locally, water for municipal, industrial, and irrigation purposes is available. Yields of most wells are small, less than 50 gpm, but in some areas, yields of adequately constructed wells may be as high as 500 gpm. Availabilities in the Yegua-Jackson Aquifer are based on GAM Run 1721-027 018 MAG: Modeled Available Groundwater for the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers in GMA 13, from finalized July 25, 2022. The Yegua-Jackson aquifer availabilities are DFC compatible non-relevant availability estimates, generated in the GR21-021 MAG model run for the areas in GMA 16 and in the GR21-018 MAG model run for the areas in GMA 13. Table 3-11 summarizes non-MAG availability projections in the Yegua-Jackson Aquifer, separated by basin.

Table 3-11 Yegua-Jackson Aquifer Non-MAG Availability Projections by County and River Basin (ac-ft/yr)

Source County	Source Basin	2030	2040	2050	2060	2070	2080
Starr	Rio Grande	33	38	43	48	48	48
Webb	Nueces	11,969	11,969	11,969	11,969	11,969	11,969
Webb	Rio Grande	8,031	8,031	8,031	8,031	8,031	8,031
Zapata	Rio Grande	7,987	7,987	7,987	7,987	7,987	7,987
Total		**28,020**	**28,025**	**28,030**	**28,035**	**28,035**	**28,035**

3.2.5 Rio Grande Alluvium

The alluvial aquifer of the lower Rio Grande Valley consists of terrace, floodplain, and delta deposits of the Rio Grande. These deposits are made up of unconsolidated gravel, sand, silt, and clay. The aquifer also includes some clay, silt, sand, and gravel of the Goliad, Lissie, and Beaumont Formations, which underlie the alluvium. The aquifer extends along the Rio Grande from below Falcon Dam in Starr County for about 100 miles to Brownsville in Cameron County. In southern Starr County and southwestern Hidalgo County, the aquifer follows a narrow strip along the river 5 to 10 miles wide. From eastern Hidalgo County, the aquifer extends northward into Willacy County, where its maximum width in Texas is about 28 miles. The alluvial aquifer also covers the western half of Cameron County. The productive area of the aquifer convers about 950 square miles, most of which is in or around the Rio Grande basin in Hidalgo, Cameron, and Willacy counties. This additional area adjacent to the Rio Grande basin has been included in this discussion because of its hydrologic connection with the aquifer in the basin. The potential yield of the aquifer in the Rio Grande basin depends on the amount of water recharged by the infiltration of precipitation and by seepage from the Rio Grande and the amount of water withdrawn from the aquifer in the area north of the basin.

Groundwater in the upper part of the aquifer generally is under water-table conditions; however, local artesian conditions exist where the water passes under relatively impermeable clays. The maximum thickness of the aquifer is about 700 feet. Its thickness is irregular and is generally less than 500 feet. The best quality of water in the aquifer occurs near the Rio Grande at depths of less than 75 feet in southeastern Starr County, between 50 and 250 feet in southern Hidalgo County, and between 100 and 300 feet in western Cameron County.

Recharge to the aquifer is from the percolation of water from the land surface. This water is from precipitation, canals and drains, irrigation return water, and the Rio Grande. Water normally flows from the Rio Grande into the aquifer, except when the river is at its lowest level.

Although a number of entities pump Rio Grande Alluvial groundwater, there is no MAG for this aquifer. The Rio Grande alluvium intermingles with the Gulf Coast Aquifer, and in many cases it is difficult to delineate these two aquifers. The wells at Southmost Regional Water Authority and Military Highway WSC have been identified in some cases as drawing from Gulf Coast and in other cases drawing from Rio Grande Alluvium.

3.2.6 Allocation of Groundwater Supplies

Groundwater usage records were gathered from the TWDB groundwater database, from the Water User Group (WUG) Entity detailed gallons per capita per day (GPCD) reports, from the municipal and industrial water uses surveys, and from entities themselves. Municipal groundwater supplies were based on information from the municipalities/utilities and considered to be consistent over the planning horizon.

For county-wide WUGs, such as irrigation, mining, and county-other, the TWDB historical groundwater pumping database was used. These values were compared against the stated demands.

In using these resources, the aquifers identified were checked against availability information, including, but not limited to, the MAG values. The RWP processes relies on MAG as the annual amount of groundwater that can reliably be extracted from an aquifer in a given area while still meeting conservation goals set out by the GMAs.

The RWP is required to present only supplies and recommended projects within the TWDB-approved groundwater availability (MAG + Non-MAG) volume totals. Thus, the total existing supplies plus any recommended groundwater projects must be no greater than the TWDB-approved groundwater availability for that county.

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In some cases, current identified supplies are larger than the TWDB-approved groundwater availability within a particular county. As a result, the RWP may need to cite existing supplies in the plan as less than the water that is actually being supplied. All counties with current supplies that are less than the TWDB-approved groundwater availability will be unaffected, and existing supplies can be shown in full.

3.3 Reuse

The use of wastewater treatment plant (WWTP) effluent as reclaimed water is becoming increasingly common as an alternative water supply. Water reuse is classified as direct or indirect and potable or non-potable. Direct reuse is defined as the use of reclaimed water that is piped directly from the WWTP to the place where it is utilized. Indirect reuse is defined as the use of reclaimed water by discharging to a water supply source, such as surface water or groundwater, where it blends with the water supply and may be further purified before being removed for non-potable or potable uses. Potable water is suitable for direct consumption, and non-potable is used to meet a range of other demands. This gives the following four classes of reuse:

1. Direct potable;
2. Direct non-potable;
3. Indirect potable; and
4. Indirect non-potable.

The most common class is direct non-potable for irrigation or industrial type uses. Irrigation use may include turf irrigation, or in some cases, crop irrigation. Many forms of indirect reuse have been implemented through the years as discharges from one water user contribute to streamflow or groundwater recharge and are then diverted by a downstream water user. In unique cases involving groundwater-based return flows or inter-basin transfers, a discharger may retain a right to its return flows. For planning purposes, indirect reuse is considered water that would require a permit to access after it has been discharged into the environment. This form of indirect reuse is limited by the legal complexity required to demonstrate that a discharge increases water availability.

The Texas Administrative Code (TAC) Chapter 210 authorizes individual producers of reclaimed water to implement water reuse in Texas. Many individual WUGs in Region M have 210 authorizations with water reuse in various stages of implementation. The following two classes of water are authorized:

- Type I Reclaimed Water – suitable for use where contact between humans and the reclaimed water is likely; and
- Type II Reclaimed Water – suitable for use where contact between humans and the reclaimed water is unlikely.

Currently, 6 municipalities in Region M use direct reuse water to satisfy municipal demands. Table 3-12 presents data and information provided by the associated WUGs. Most uses are for non-potable purposes, such as service water at WWTPs and landscape irrigation and ponds.

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Table 3-12 Current Reuse Water Usage in the Lower Rio Grande Valley

Municipality	Current Reuse Supply		Intended Use	Direct or Indirect
	(MGD)	(ac-ft/yr)		
Harlingen	1.0	1,120	Golf Course; Sports Fields; Watering Ponds	Direct
Laredo	0.69	773	Plant Water, Irrigation, Golf Course Irrigation, Belt Press, Process Water	Direct
McAllen	5	5,546	Plant Water; Master Plan Community, Gold Course Irrigation, Steam-Electric	Direct
Pharr	0.96	1,074	Parks; Golf Course Irrigation	Direct
Valley MUD No. 2	0.1	112	Golf Course Pond	Direct
Weslaco	0.94	1,052	Plant Water; Golf Course Irrigation	Direct

Availability of reuse water is limited by the treatment capacity and actual flow of the WWTPs that supply the effluent. It is assumed that half of a WWTP's average effluent is available on a consistent basis to be used for reuse water.

Currently, the area uses reclaimed water for non-potable purposes; however, there is likely to be increased focus on potential potable reuse water. Several utilities have been identified as feasible candidates to implement potable reuse systems, discussed further in Chapter 5.

3.3.1 Allocation of Reuse Water Supplies

Existing reuse water supplies were evaluated and projected to continue through the planning horizon. Non-potable reuse supplies were limited to one-third of a municipal demand because, in many cases, the volume of water that can be reused is significantly larger than the limited demands that can be met with non-potable water.

Future supplies are based on the capacities of existing WWTPs. This methodology is discussed further in Chapter 5 under the reuse WMS.

3.4 Major Water Providers

A Major Water Provider (MWP) is defined as any wholesale water provider (WWP) or municipal WUG that has demands greater than 3,000 ac-ft/yr in 2030.

A summary of existing sales and transfers for MWPs by decade and category of use is included in Appendix 3D. A summary of MWP supplies by decade and category of use is included in Appendix 4B.

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Appendix 3A. Relevant Reports from the 2027 Regional and State Water Planning Database (DB27)

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Appendix 3B. Hydrologic Variance Documentation

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Appendix 3C. Rio Grande Active Water Rights

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Appendix 3D. Major Water Providers Sales and Transfers

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