3

Evaluation of Current Water Supplies

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3 Evaluation of Current Water Supplies

3.1 Surface Water Supplies

Streamflow in the Brazos River and its tributaries, along with reservoirs in the Brazos River Basin, comprise a vast supply of surface water in the Brazos G Area. Diversions and use of this surface water occur throughout the entire region with over 1,000 water rights currently issued. These water rights provide authorization for an owner to divert, store, and use the water; however, they do not guarantee that a dependable supply will be available from the water source. The availability of water to a water right is dependent on several factors, including hydrologic conditions (i.e., rainfall, runoff, springflow), priority date of the water right, quantity of authorized storage, and any special conditions associated with the water right (i.e., instream flow requirements, maximum diversion rate).

3.1.1 Texas Water Right System

The State of Texas owns the surface water within the state watercourses and is responsible for the appropriation of these waters. Surface water is currently allocated by the Texas Commission on Environmental Quality (TCEQ) for the use and benefit of all people of the state. Historically, Texas water law is based on a combination of the riparian and prior appropriation doctrines. The riparian doctrine extends from the Spanish and Mexican governments that ruled Texas prior to 1836. After 1840, the riparian doctrine provided landowners the rights to make reasonable use of water for irrigation or for other consumptive uses. In 1889, the prior appropriation doctrine was first adopted by Texas, which is based on the concept of “first in time is first in right.” Over the years, the combination of riparian and prior appropriation doctrines resulted in an essentially unmanageable system. Various types of water rights existed simultaneously, and many rights were unrecorded. In 1967, the Texas Legislature passed the Water Rights Adjudication Act to merge the riparian water rights into the prior appropriation system, creating a unified water rights system. The adjudication process has taken many years and is essentially complete. In the end, Certificates of Adjudication have been issued for entities recognized as having legitimate water rights. Today, individuals or groups seeking a new water right must submit an application to the TCEQ. The TCEQ determines if the water right will be issued and under what conditions. The water rights grant a certain quantity of water to be diverted and/or stored, a priority date, and often come with some restrictions on when and how the right may be used. Restrictions may include a maximum diversion rate and/or an instream flow restriction to protect existing water rights and environmental resources.

The priority date of a water right is essential to the operation of the water rights system. Each right is issued a priority date based on the date of first capture, or the appropriation date. The established priority system must be adhered to by all water right holders when diverting or storing water for use. A right holder must pass all water to downstream senior water rights when conditions are such that the senior water rights would not be satisfied otherwise.

3.1.2 Types of Water Rights

There are various types of water rights: Certificates of Adjudication, permits, term permits, and temporary permits. Certificates of Adjudication were issued in perpetuity for approved claims during the adjudication process. This type of water right was issued based on historical use rather than water availability. As a consequence, the amount of water to which rights exist exceeds the amount of water available during a drought for some streams. The TCEQ issues new permits only where drought flows are sufficient to meet the requested amount. Permits, like Certificates of Adjudication, are issued in perpetuity and may be bought and sold like other property interests. Term permits may be issued by the TCEQ in areas where waters are fully appropriated, but not yet being fully used. Term permits are usually issued for 10 years and may be renewed if, after 10 years, other water right holders are still not fully using the water in the basin. Temporary permits are issued for up to 3 years. Temporary permits are issued mainly for road construction projects, where water is used to suppress dust, to compact soils, and to start the growth of new vegetation. As term and temporary permits are not permanent water rights, they are not considered in the process of determining available water supplies.

Water rights can include the right to divert and/or store the appropriated water. A run-of-the-river water right provides for the diversion of streamflow and does not include storage of water for use during dry periods. These rights have no authorization to store water, only the right to take water from the stream. Availability of water to a run-of-the-river right may be limited by streamflow, pumping rate, or diversion location.

Water rights that include provisions for storage of water allow a water right holder to impound streamflows for use at a later time. The storage provides water for use during dry periods, when water may not be available due to hydrologic conditions or because existing flows are required to be passed to downstream senior water rights.

While most water rights are diverted and used within the river basin of origin, water rights that divert from one river basin to another basin require an interbasin transfer authorization. Several types of transfers that receive special consideration include emergency transfers, transfers of water from a river basin for use in an adjoining coastal basin (such as from the Brazos River Basin to the San Jacinto-Brazos Coastal Basin), diversions of less than 3,000 acre-feet per year (acft/yr), and diversions within any city or county that has any portion in the basin of origin.

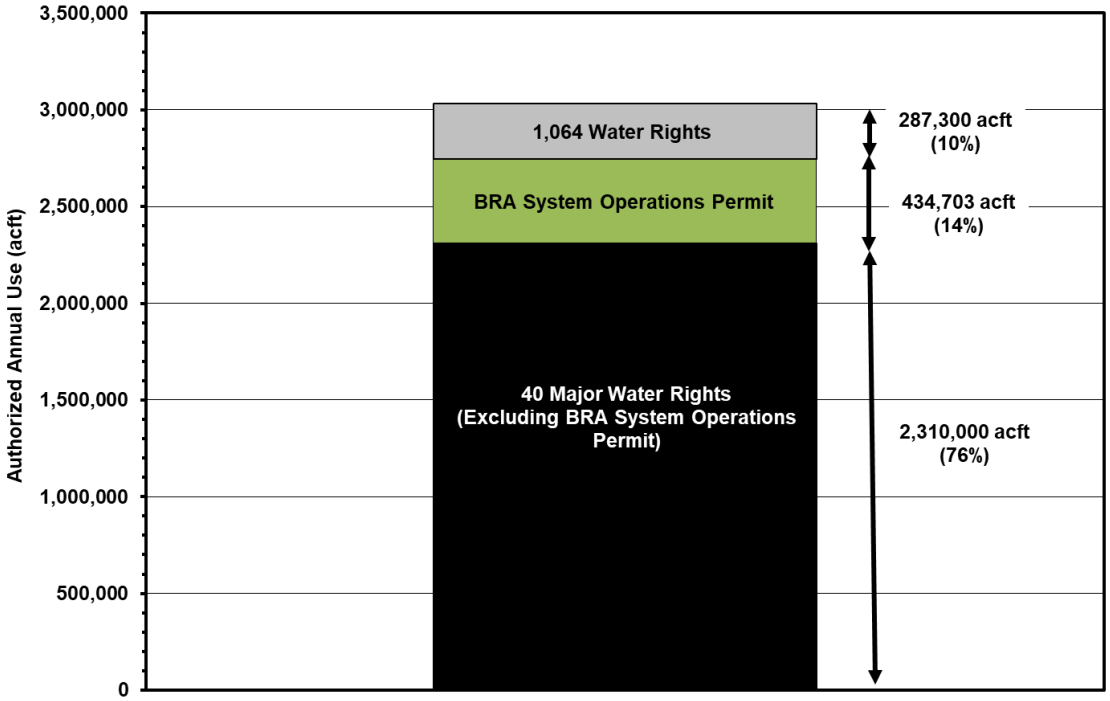
3.1.3 Water Rights in the Brazos River Basin

The TCEQ maintains a database of all active water rights referred to as WRactive, which is available for download from the TCEQ website. The November 2019 version of this database was obtained from the TCEQ and the summary statistics that follow are based on the information contained in that particular version of the database. At the time of the 2016 Brazos G Plan development, a total of 1,090 active water rights existed in the Brazos River Basin, with a total authorized diversion of 2,584,000 acft/yr. Since the 2016 Plan, the TCEQ has issued 15 new water rights or amendments to existing rights, increasing the total authorized diversion amount by 447,500 acft/yr to 3,032,000 acft/yr. The most notable new water right issued in the Brazos River Basin since the 2016 Plan is the Brazos River Authority (BRA) System Operations Permit (Permit 5851), authorizing a combined

diversion amount of up to 434,703 acft/yr at numerous locations within the Brazos G and Region H areas.

It is important to note that a small percentage of the water rights represent a large percentage of the total authorized diversion volume in the Brazos River Basin. The BRA System Operation Permit alone makes up 14 percent of the total authorized diversion volume. Forty other major water rights make up 2,310,000 acft/yr (76 percent) of the authorized diversion volume. The BRA, Gulf Coast Water Authority, and Dow Chemical Company are the three largest water right holders and own approximately 66 percent of the total authorized diversion amount in the basin. The remaining 1,064 water rights primarily consist of small irrigation rights distributed throughout the river basin. Figure 3-1 shows a comparison of significant water rights in the Brazos River Basin by number of rights and diversion volume.

Figure 3-1. Distribution of Water Rights in the Brazos River Basin



The Brazos G Area includes the majority of the water rights in the Brazos River Basin. A total of 963 water rights exist in the Brazos G portion of the Brazos River Basin, with a total authorized diversion of 1,276,000 acft/yr. In the Brazos G portion of the Brazos River Basin, 28 water rights (2.9 percent) make up 1,040,000 acft/yr (81.9 percent) of the authorized diversion volume. The remaining 935 water rights primarily consist of small irrigation rights distributed throughout the area.

Region H, located downstream of the Brazos G Area, has a total of only 39 water rights (3.5 percent) in the Brazos River Basin, but these include some very large rights and make up 1,164,000 acft/yr (38 percent) of the total authorized diversions. Other planning areas

make up a small percentage of the remaining water rights and total authorized diversions in the basin, as shown in Figure 3-2 and Figure 3-3.

Figure 3-2. Comparison of Water Rights in the Brazos River Basin by Planning Area

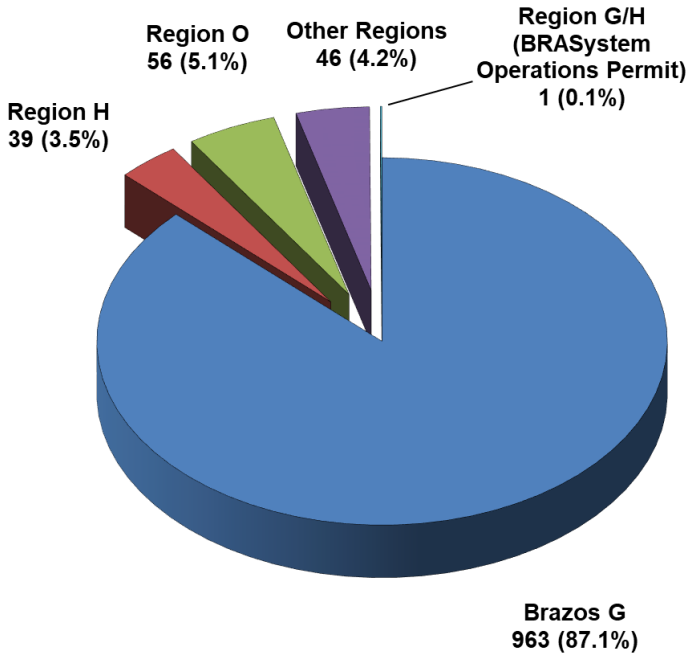
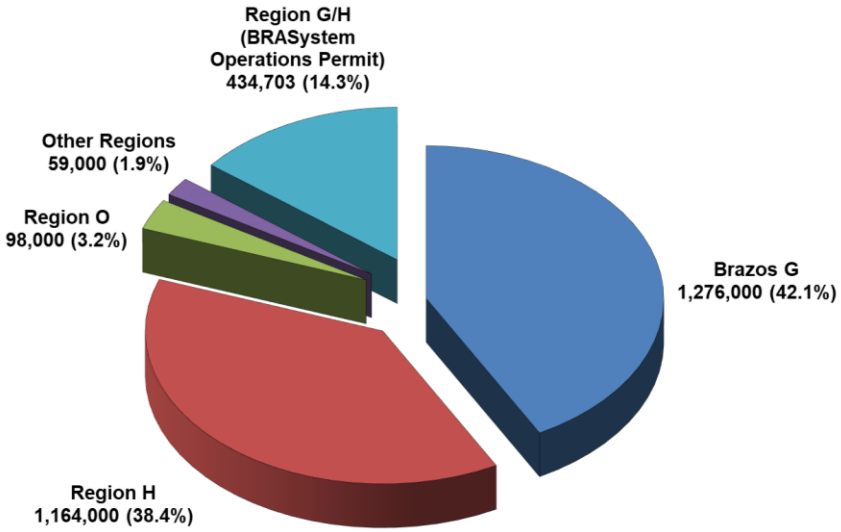
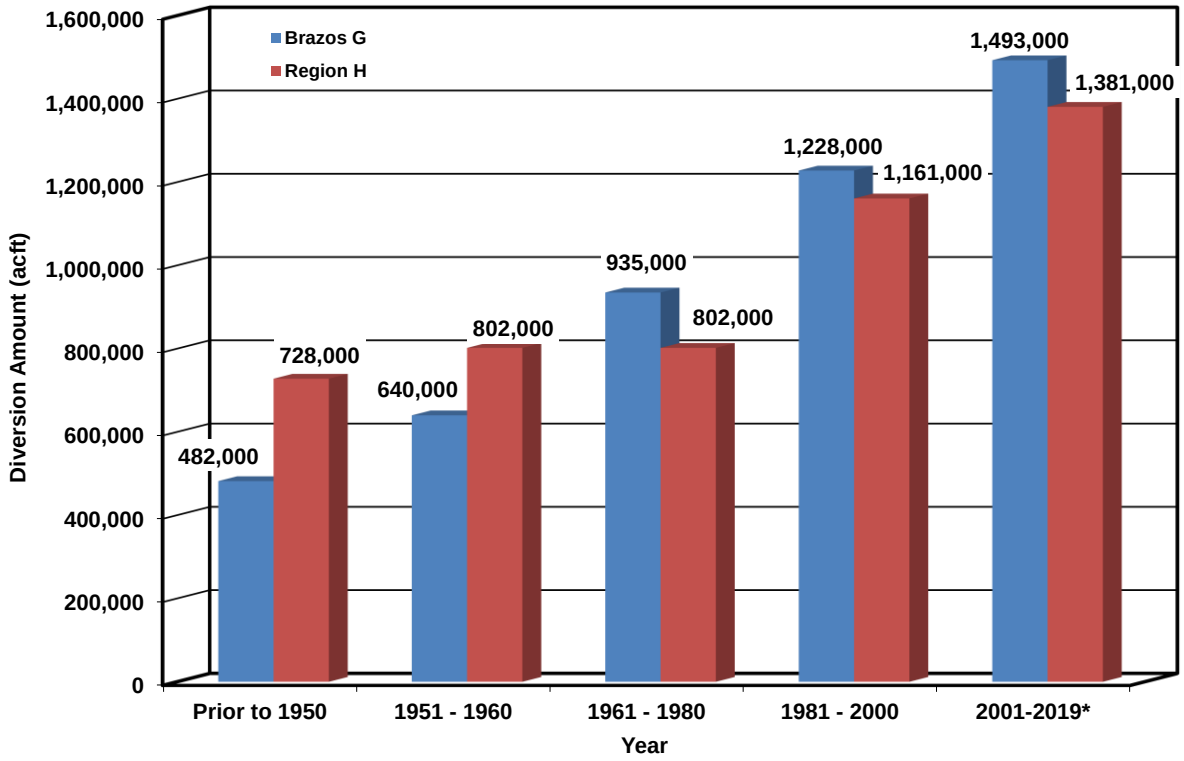


Figure 3-3. Comparison of Authorized Diversion Volume (acre-feet/year) in the Brazos River Basin by Planning Area



The authorized diversions in Region H generally consist of very large, senior priority, run-of-the-river water rights. In comparison, water rights in the Brazos G Area are larger in number and diversion volume; however, the water rights are generally junior in priority to those downstream in Region H. Therefore, in times of drought, when streamflows are low, diversions of water from streams in the Brazos G Area may be restricted for several of the water right holders. A comparison of the quantity of authorized diversions relative to the priority date of the water rights in Brazos G and Region H is presented in Figure 3-4. Major water rights are defined as having an authorized diversion greater than 10,000 acft/yr and/or 5,000 acft of authorized storage. Figure 3-5 shows the location of major water rights in the Brazos River Basin. A list of all water rights, summarized from the TCEQ water right database for all rights in the Brazos G Area, is provided in Appendix F.

Figure 3-4. Comparison of Cumulative Diversion Volume and Priority Date for the Brazos G Area and Region H



*Assumes BRA System Operations Permit authorized diversion volume is split evenly between Region G and Region H.

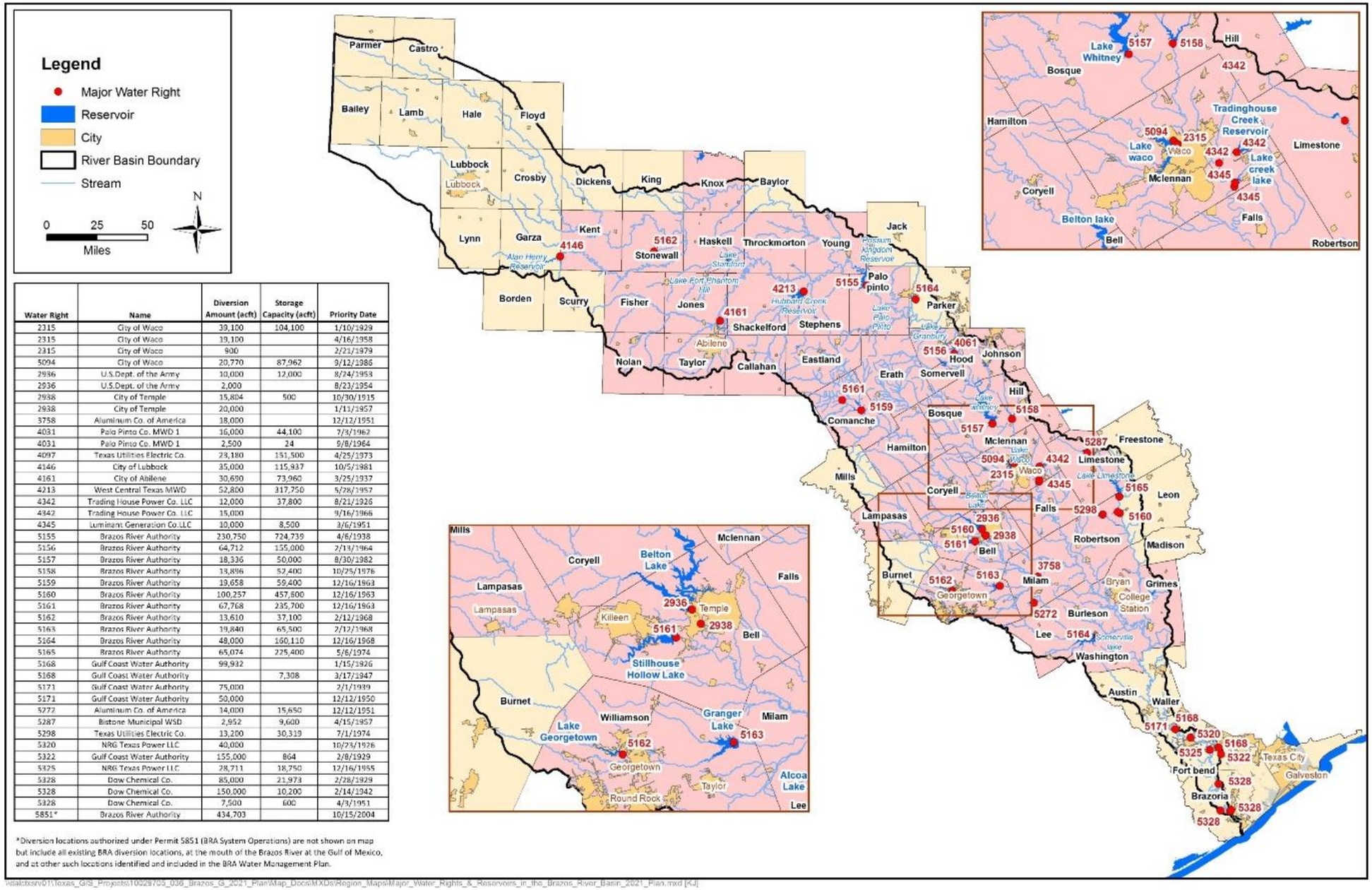
While Region H includes a large quantity of senior priority water rights, most of these water rights have very little storage associated with them and, therefore, may be described primarily as run-of-the-river water rights. The water rights in Brazos G are generally junior to those water rights in Region H; however, there is a substantial volume of reservoir storage associated with the water rights in Brazos G to provide a firm supply. The total authorized storage in the Brazos River Basin is approximately 4,116,000 acre-feet (acft), with 3,609,000 acft (87.7 percent) located in Brazos G. In Region H, the quantity of reservoir storage is 231,000 acft (5.6 percent) of the total authorized storage volume in the

river basin. Since the development of the 2016 Brazos G Plan, less than 600 acft of new storage has been permitted in Brazos G and Region H.

The large quantity of reservoir storage in Brazos G provides for a firm supply of water during drought conditions, when streamflows are low. Figure 3-6 presents a comparison of the total authorized storage and annual diversion volume for the Brazos G Area and Region H.

A total of 48 major reservoirs, defined as authorizes storage capacities greater than 5,000 acft, exist in the Brazos River Basin. The U.S. Army Corps of Engineers (USACE) owns several of these reservoirs, including Lake Georgetown, Lake Aquilla, Lake Granger, Lake Proctor, Lake Somerville, Lake Waco, Lake Belton, Lake Stillhouse Hollow, and Lake Whitney. These reservoirs were built for the primary purpose of flood control; however, they also included other benefits such as water supply and recreation. For purposes of water supply, the USACE has contracted conservation storage in each reservoir to the BRA. The BRA owns the water right for each reservoir and manages the water supply conservation storage in each reservoir, except for Lake Waco, which is controlled by the City of Waco. Other major reservoirs in the basin that provide municipal, industrial, and irrigation water supply are owned by the BRA, City of Abilene, City of Mineral Wells, Palo Pinto County Municipal Water District (MWD) No. 1, West Central Texas MWD, City of Cisco, City of Breckenridge, City of Sweetwater, City of Cleburne, and City of Stamford. A summary of major reservoirs in the Brazos River Basin is presented in Table 3-1 and the locations of the reservoirs are shown in Figure 3-5.

Figure 3-5. Major Water Rights and Reservoirs in the Brazos River Basin



Water Right	Name	Diversion Amount (acft)	Storage Capacity (acft)	Priority Date
2315	City of Waco	39,100	104,100	1/10/1929
2315	City of Waco	19,100		4/16/1958
2315	City of Waco	900		2/23/1979
5094	City of Waco	20,770	87,962	9/12/1986
2936	U.S.Dept. of the Army	10,000	12,000	8/24/1953
2936	U.S.Dept. of the Army	2,000		8/23/1954
2938	City of Temple	15,804	500	10/30/1915
2938	City of Temple	20,000		1/11/1957
3758	Aluminum Co. of America	18,000		12/12/1951
4031	Palo Pinto Co. MWD 1	16,000	44,100	7/3/1962
4031	Palo Pinto Co. MWD 1	2,500	24	9/8/1964
4097	Texas Utilities Electric Co.	23,180	151,500	4/25/1973
4146	City of Lubbock	35,000	115,937	10/5/1981
4161	City of Abilene	30,690	73,960	3/25/1937
4213	West Central Texas MWD	52,800	317,750	5/28/1957
4342	Trading House Power Co. LLC	12,000	37,800	8/21/1926
4342	Trading House Power Co. LLC	15,000		9/16/1966
4345	Luminant Generation Co.LLC	10,000	8,500	3/6/1951
5155	Brazos River Authority	230,750	724,739	4/6/1938
5156	Brazos River Authority	64,712	155,000	7/13/1964
5157	Brazos River Authority	18,336	50,000	8/30/1982
5158	Brazos River Authority	13,896	52,400	10/25/1976
5159	Brazos River Authority	19,658	59,400	12/16/1963
5160	Brazos River Authority	100,257	457,600	12/16/1963
5161	Brazos River Authority	67,768	235,700	12/16/1963
5162	Brazos River Authority	13,610	37,100	2/12/1968
5163	Brazos River Authority	19,840	65,500	2/12/1968
5164	Brazos River Authority	48,000	160,110	12/16/1968
5165	Brazos River Authority	65,074	225,400	5/6/1974
5168	Gulf Coast Water Authority	99,932		1/15/1926
5168	Gulf Coast Water Authority		7,308	3/17/1947
5171	Gulf Coast Water Authority	75,000		7/1/1939
5171	Gulf Coast Water Authority	50,000		12/12/1950
5272	Aluminum Co. of America	14,000	15,650	12/12/1951
5287	Bistone Municipal WSD	2,952	9,600	4/15/1957
5298	Texas Utilities Electric Co.	13,200	30,319	7/1/1974
5320	NRG Texas Power LLC	40,000		10/23/1926
5322	Gulf Coast Water Authority	155,000	864	2/8/1929
5325	NRG Texas Power LLC	28,711	18,750	12/16/1955
5328	Dow Chemical Co.	85,000	21,973	2/28/1929
5328	Dow Chemical Co.	150,000	10,200	2/14/1942
5328	Dow Chemical Co.	7,500	600	4/3/1951
5851*	Brazos River Authority	434,703		10/15/2004

*Diversion locations authorized under Permit 5851 (BRA System Operations) are not shown on map but include all existing BRA diversion locations, at the mouth of the Brazos River at the Gulf of Mexico, and at other such locations identified and included in the BRA Water Management Plan.

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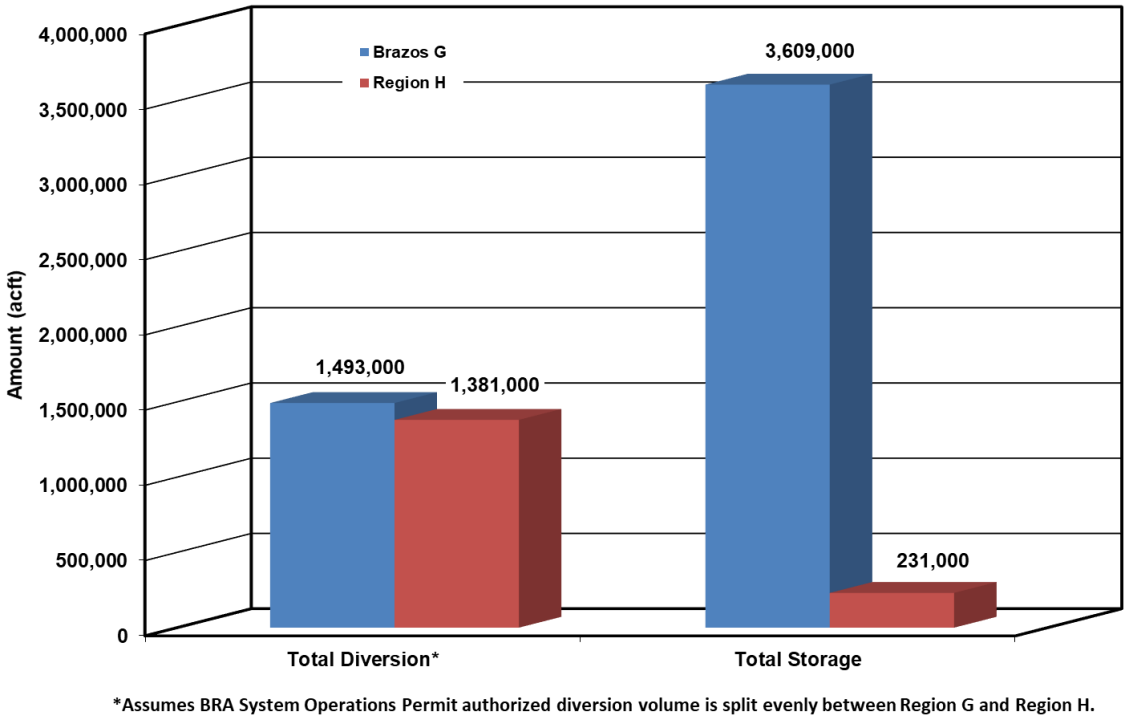
Figure 3-6. Comparison of Storage and Diversion Volumes for Brazos G and Region H



*Assumes BRA System Operations Permit authorized diversion volume is split evenly between Region G and Region H.

Table 3-1. Major Reservoirs[1] of the Brazos River Basin

Reservoir	Water Right Owner	Authorized Storage (acft)	Authorized Diversion (acft)	Priority Date	County	Planning Region
Abilene	City of Abilene	11,868	1,675	1/23/1918	Taylor	G
Alcoa Lake	Aluminum Company of America	15,650	14,000	12/12/1951	Milam	G
Alan Henry	City of Lubbock	115,937	35,200	10/5/1981	Garza	O
Allens Creek	Brazos River Authority/City of Houston	145,553	202,000	9/1/1999	Austin	H
Aquilla	Brazos River Authority	52,400	13,896	10/25/1976	Hill	G
Belton	Brazos River Authority	457,600	100,257	12/16/1963	Bell	G
Belton	U.S. Dept. of the Army[2]	12,000	10,000 2,000	8/24/1953 8/23/1954	Bell	G

Table 3-1. Major Reservoirs[1] of the Brazos River Basin

Reservoir	Water Right Owner	Authorized Storage (acft)	Authorized Diversion (acft)	Priority Date	County	Planning Region
Dow - Brazoria Reservoir	Dow Chemical[3]	21,973	--	4/7/1952	Brazoria	H
Dow - Harris Reservoir	Dow Chemical[3]	10,200	--	2/14/1942	Brazoria	H
Cisco	City of Cisco	45,110	1,971 1,000	4/16/1920 11/8/1954	Eastland	G
Daniel	City of Breckenridge	11,400	2,100	4/26/1946	Stephens	G
Dansby Power Plant	City of Bryan	15,227	850	5/30/1972	Brazos	G
Eagle Nest Lake	U.S. Dept. of the Interior	11,315	1,800	1/15/1948	Brazoria	H
Fort Phantom Hill	City of Abilene	73,960	30,690	3/25/1937	Jones	G
Georgetown	Brazos River Authority	37,100	13,610	2/12/1968	Williamson	G
Gibbons Creek Power	Texas Municipal Power Agency	26,824 5,260	9,740	2/22/1977 3/9/1989	Grimes	G
Graham/Eddleman	City of Graham	4,503 39,000 8,883	5,000 15,000	11/21/1927 11/15/1954 9/16/1957	Young	G
Granbury	Brazos River Authority	155,000	64,712	2/13/1964	Hood	G
Granger	Brazos River Authority	65,500	19,840	2/12/1968	Williamson	G
Hubbard Creek Lake	West Central Texas MWD	317,750	52,800 3,200	5/28/1957 8/14/1972	Stephens	G
Leon	Eastland Co WSD	28,000	1,265 2,438 2,597	5/17/1931 3/21/1952 3/25/1986		
Limestone	Brazos River Authority	225,400	65,074	5/6/1974	Robertson	G
Miller's Creek	North Central Texas MWA	30,696	5,000	10/1/1958	Baylor	B
Palo Pinto	Palo Pinto County MWD No. 1	44,100 24	16,000 2,500	7/3/1962 9/8/1964	Palo Pinto	G
Pat Cleburne Reservoir	City of Cleburne	25,600	5,760 240	8/6/1962 3/29/1976	Johnson	G

Table 3-1. Major Reservoirs[1] of the Brazos River Basin

Reservoir	Water Right Owner	Authorized Storage (acft)	Authorized Diversion (acft)	Priority Date	County	Planning Region
Possum Kingdom	Brazos River Authority	724,739	230,750	4/6/1938	Palo Pinto	G
Proctor	Brazos River Authority	59,400	19,658	12/16/1963	Comanche	G
Smithers Lake	Houston L&P	18,750	28,711	12/16/1955	Fort Bend	H
Somerville	Brazos River Authority	160,110	48,000	12/16/1963	Washington	G
Squaw Creek Reservoir	Luminant	151,500	23,180	4/25/1973	Somervell	G
Stamford	City of Stamford	60,000	10,000	6/8/1949	Haskell	G
Stillhouse Hollow	Brazos River Authority	235,700	67,768	12/16/1963	Bell	G
Sweetwater	City of Sweetwater	10,000	3,740	10/17/1927	Nolan	G
Tradinghouse Steam	Luminant	37,800	12,000 15,000	8/21/1926 9/16/1966	McLennan	G
Twin Oak Steam Electric	Luminant	30,319	13,200	7/1/1974	Robertson	G
Waco	City of Waco	104,100 87,962	39,100 19,100 900 20,770	1/10/1929 4/16/1985 2/21/1979 9/12/1986	McLennan	G
Whitney	Brazos River Authority	50,000	18,336	8/30/1982	Hill	G
White River Reservoir	White River MWD	33,160 5,072 6,665	6,000	9/22/1958 11/21/1960 8/16/1971	Crosby	O

1 – A major reservoir is defined as one with an authorized capacity equal to or greater than 5,000 acft

2 – The Dept. of the Army (Fort Hood) owns water rights in Lake Belton alongside the BRA.

3 – The Dow Chemical Company holds diversion rights from the Brazos River totaling 238,156 acft/yr with priority dates ranging from 1929 to 1976, which are used in conjunction with the two off-channel reservoirs.

acft = acre-feet; MWD = municipal water district; WSD = water supply district

A number of interbasin transfer permits exist in the Brazos River Basin. These permits include both authorizations for diversions from the Brazos River Basin to adjacent river basins and from adjacent river basins to the Brazos River Basin. Most of the interbasin transfer permits are obviously located near the basin divide. Examples of interbasin transfers that authorize diversions from an adjacent river basin to the Brazos River Basin include: Lake Meredith (Canadian River Basin) to the Lubbock and Plainview areas in Lubbock and Hale County; Oak Creek Reservoir (Colorado River Basin) to the City of

Sweetwater in Nolan County; and Lake Travis (Colorado River Basin) to the City of Cedar Park in Williamson County. Interbasin transfers authorized for diversion from the Brazos River Basin to other river basins include: Lake Mexia in Limestone County to part of the City of Mexia that lies in the Trinity River Basin; Teague City Lake in Freestone County to part of the City of Teague that lies in the Trinity River Basin; and Lake Granbury in Hood County to part of Johnson County that lies in the Trinity River Basin. A summary of interbasin transfers (excluding transfers authorized to adjacent coastal basins) associated with the Brazos River Basin is presented in Table 3-2.

Table 3-2. Interbasin Transfers Associated with the Brazos River Basin[1]

River Basin of Origin	Location of Use			Description	Authorized Diversion (acft/yr)	Priority Date
	River Basin	Planning Region	County			
Brazos	Trinity	G	Johnson	Lake Granbury to Johnson County	2,600	11/7/86
Brazos	Trinity	G	Limestone	Lake Mexia to part of Mexia	N/A	N/A
Brazos	Trinity	C	Freestone	Teague City Lake to part of Teague	N/A	N/A
Brazos	Colorado	G	Lampasas	Brazos River to City of Lampasas	180	6/23/14
Brazos	Trinity	C	Multiple	Lake Possum Kingdom to Trinity Basin	5,240	4/6/38
Canadian	Brazos	O	Lubbock	Lake Meredith to Lubbock Co. Area	151,200	1/30/56
Colorado	Brazos	G	Fisher	Lake J B Thomas to Fisher Co.	N/A	N/A
Colorado	Brazos	G	Nolan	Oak Creek Res. to Lake Trammel/Sweetwater	3,000	N/A
Colorado	Brazos	G	Callahan	Lake Clyde to Clyde	200	2/2/65
Colorado	Brazos	G	Taylor	Lake O. H. Ivie to Abilene	15,000	2/2/78
Colorado	Brazos	G	Williamson	Lake Austin to Williamson Co.	N/A	N/A
Colorado	Brazos	G	Williamson	Lake Travis to Cedar Park	16,500	N/A
Colorado	Brazos	G	Williamson	Lake Travis to Leander	6,400	N/A
Colorado	Brazos	F	Fisher	Snyder to City of Rotan	N/A	N/A
Red	Brazos	B	Archer	Small Lakes to Megargel	N/A	N/A
Red	Brazos	B	Archer	Lake Cooper & Olney to Olney	35	8/11/80
Red	Brazos	O	Floyd	Lake MacKenzie to Floydada & Lockney	N/A	N/A
Trinity	Brazos	G	Grimes	Lake Livingston to Grimes County SE	N/A	6/27/98
Trinity	Brazos	C	Parker	Lake Weatherford to part of Weatherford	N/A	N/A

1 – Excludes transfers authorized to adjacent coastal basins.
acft/yr = acre-feet per year

3.1.4 Water Supply Contracts

Many entities within Brazos G obtain surface water through water supply contracts. These supplies are usually obtained from entities that own surface water rights, and the contracts specify the quantity of water each year to a buyer for an established unit price. The BRA is the largest provider of water supply contracts in Brazos G, and has contracted to sell 696,719 acft/yr from its system of reservoirs in the Brazos River Basin. The BRA contracts raw water to various entities for long-term supply as well as short-term supply for municipal, industrial, and irrigation uses. Other water right holders that contract large quantities of raw water supply to other entities include the West Central Texas MWD and the Palo Pinto County MWD No. 1. The West Central Texas MWD contracts raw water from Hubbard Creek Reservoir for municipal use to the cities of Abilene, Albany, Anson, and Breckenridge. The City of Abilene provides water to several other surrounding cities and water supply corporations. The Palo Pinto County MWD No. 1 contracts raw water from Lake Palo Pinto for industrial use to Brazos Electric Co-op as well as for municipal use for the City of Mineral Wells and several smaller water supply corporations.

Table 3-3 summarizes water supply contracts and other current demands held by the identified wholesale water providers (WWPs) and water user groups (WUGs) within Brazos G, and includes other demands that those entities meet currently, such as a portion of county-aggregated manufacturing demands, etc. Note that some of the supplies shown change between decades. These changes reflect either anticipated changes in contracted amounts (through cancellation or amendment) or “meets” contracts where a WWP agrees to meet the water supply needs of the customer without a fixed annual contractual amount. The contracts shown make up the bulk of the water contracts in the planning area; however, there are numerous smaller entities which often contract between each other for emergency supplies or various other reasons which are not summarized here. Certain WUGs and WWPs may be located within multiple planning areas. All WUGs and WWPs listed are identified by their primary planning area. The contract and WUG municipal demands shown are not split by primary and secondary planning areas. Contract demands assigned to municipal WUGS supply to portion of both primary and other region.

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
BRA (LAKE AQUILLA)						
Aquilla WSD	5,953	5,953	5,953	5,953	5,953	5,953
City of Cleburne	5,300	5,300	5,300	5,300	5,300	5,300
Hilco United Services	150	150	150	150	150	150
Total Contracts and WUG Demands	**11,403**	**11,403**	**11,403**	**11,403**	**11,403**	**11,403**
BRA (LITTLE RIVER SYSTEM)						
439 WSC	1,409	1,409	1,409	1,409	1,409	1,409
Milam County, Steam Electric (ALCOA)	5,000	5,000	5,000	5,000	5,000	5,000

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Bell County WCID #1	62,509	62,509	62,509	62,509	62,509	62,509
Bluebonnet WSC	8,301	8,301	8,301	8,301	8,301	8,301
Brushy Creek MUD	4,000	4,000	4,000	4,000	4,000	4,000
Central Texas WSC	12,045	12,045	12,045	12,045	12,045	12,045
City of Belton	2,500	2,500	2,500	2,500	2,500	2,500
City of Gatesville	5,898	5,898	5,898	5,898	5,898	5,898
City of Georgetown	45,707	45,707	45,707	45,707	45,707	45,707
City of Harker Heights	3,535	3,535	3,535	3,535	3,535	3,535
City of Lampasas	3,500	3,500	3,500	3,500	3,500	3,500
City of McGregor	810	810	810	810	810	810
City of Round Rock	24,854	24,854	24,854	24,854	24,854	24,854
City of Temple	30,453	30,453	30,453	30,453	30,453	30,453
Coryell City WSD	300	300	300	300	300	300
Bell County, Irrigation (Country Harvest)	8	8	8	8	8	8
Dog Ridge WSC	1,500	1,500	1,500	1,500	1,500	1,500
East Williamson Co Water (City of Taylor, Jarrell-Schwertner WSC, Sonterra MUD)	13,000	13,000	13,000	13,000	13,000	13,000
Fort Gates WSC	200	200	200	200	200	200
Williamson County-Other (High Gabriel WSC)	310	310	310	310	310	310
Jarrell-Schwertner WSC	1,000	1,000	1,000	1,000	1,000	1,000
Bell County, Irrigation (Jerry Glaze)	100	100	100	100	100	100
Kempner WSC	8,900	8,900	8,900	8,900	8,900	8,900
Comanche County, Irrigation (Lake Proctor Irrigation Authority)	3,743	3,743	3,743	3,743	3,743	3,743
Moffat WSC	500	500	500	500	500	500
Comanche County, Irrigation (North Leon River Irrigation Corporation)	2,909	2,909	2,909	2,909	2,909	2,909
Salado WSC	1,600	1,600	1,600	1,600	1,600	1,600
Williamson County, Irrigation (Sun City Georgetown)	15	15	15	15	15	15
The Grove WSC	400	400	400	400	400	400
Upper Leon River MWD	6,437	6,437	6,437	6,437	6,437	6,437
Bell County, Irrigation (Wildflower County Club)	200	200	200	200	200	200
Total Contracts and WUG Demands	**251,643**	**251,643**	**251,643**	**251,643**	**251,643**	**251,643**

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
BRA (MAIN STEM)						
Acton MUD (WUG + Decordova Bend States Owners)	7,400	7,400	7,400	7,400	7,400	7,400
Stephens County, Mining (Basa Resources)	1,000	1,000	1,000	1,000	1,000	1,000
Bosque County, Steam Electric (Bosque Generating, L.P.)	6,500	6,500	6,500	6,500	6,500	6,500
Palo Pinto County, Steam Electric (Brazos Electric Power Coop.)	11,600	11,600	11,600	11,600	11,600	11,600
Palo Pinto County, Irrigation (Carr-Thomas Ranch)	50	50	50	50	50	50
City of Abilene	11,681	11,681	11,681	11,681	11,681	11,681
City of Brenham	4,200	4,200	4,200	4,200	4,200	4,200
City of Cleburne	9,700	9,700	9,700	9,700	9,700	9,700
City of Graham	1,000	1,000	1,000	1,000	1,000	1,000
City of Granbury	10,800	10,800	10,800	10,800	10,800	10,800
City of Lorena	1,000	1,000	1,000	1,000	1,000	1,000
City of Lubbock[1] (*Region O*)	961	961	961	961	961	961
City of Marlin	1,200	1,200	1,200	1,200	1,200	1,200
City of Richmond (*Region H*)	2,932	2,932	2,932	2,932	2,932	2,932
City of Rosebud	100	100	100	100	100	100
City of Rosenberg (*Region H*)	4,500	4,500	4,500	4,500	4,500	4,500
City of Sugarland (*Region H*)	6,388	6,388	6,388	6,388	6,388	6,388
City of Stamford[1]	1,820	1,820	1,820	1,820	1,820	1,820
City of Whitney	750	750	750	750	750	750
Double Diamond, Inc.	1,000	1,000	1,000	1,000	1,000	1,000
Hood County, Manufacturing (Exelon Generating)	10,000	10,000	10,000	10,000	10,000	10,000
Fort Griffin SUD	353	353	353	353	353	353
Gulf Coast Water Authority (*Region H*)(includes South Texas Water Company contract)	46,780	46,780	46,780	46,780	46,780	46,780
Hood County, Irrigation (Granbury Recreational Association)	50	50	50	50	50	50
Palo Pinto County, Irrigation (Hill Country Harbor Village)	250	250	250	250	250	250
Brazos County, Irrigation (Horizon Turf Grass)	350	350	350	350	350	350
Johnson County SUD	9,210	9,210	9,210	9,210	9,210	9,210

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Hood County, Irrigation (King Ranch Turfgrass)	1,300	1,300	1,300	1,300	1,300	1,300
Hood County, Irrigation (Lenmo Inc.)	2,000	2,000	2,000	2,000	2,000	2,000
Hood County-Other (LSF Development Corp)	90	90	90	90	90	90
Hood County-Other (Monarch Utilities I, L.P.)	600	600	600	600	600	600
Palo Pinto County, Irrigation (MM Terry Ranch, Ltd.)	125	125	125	125	125	125
Hood County, Irrigation (Mt Lakes Ranch)	200	200	200	200	200	200
NRG Texas, LLC (*Region H*)	83,000	83,000	83,000	83,000	83,000	83,000
Limestone County, Steam Electric (NRG Texas, LLC)	21,837	21,837	21,837	21,837	21,837	21,837
Robertson County, Steam-Electric (Oak Grove Management)	3,838	3,838	3,838	3,838	3,838	3,838
Robertson County, Steam Electric (TXU Electric)	26,639	26,639	26,639	26,639	26,639	26,639
Parker County SUD (*Region C)*	1,100	1,100	1,100	1,100	1,100	1,100
Pecan Grove MUD 1 (*Region H)*	3,800	3,800	3,800	3,800	3,800	3,800
Hood County, Irrigation (Pecan Plantation Owners Association)	750	750	750	750	750	750
Possum Kingdom WSC	750	750	750	750	750	750
Palo Pinto County, Irrigation (Ranch Owner's Association)	250	250	250	250	250	250
Hood County, Irrigation (Rex R. Worrell)	240	240	240	240	240	240
SLC Water Supply Company	200	200	200	200	200	200
Sportsmans World MUD	125	125	125	125	125	125
Stephens Regional SUD (Stephens County RWSC)	800	800	800	800	800	800
Somervell County, Steam Electric (TXU Electric)	41,094	41,094	41,094	41,094	41,094	41,094
Parker County, Irrigation (Sugar Tree, Inc.-*Region C*)	500	500	500	500	500	500
Grimes County, Steam Electric (Texas Municipal Power Agency)	3,600	3,600	3,600	3,600	3,600	3,600
Palo Pinto County, Manufacturing (TPWD)	1,200	1,200	1,200	1,200	1,200	1,200
Hood County, Steam Electric (TXU Electric)	10,185	10,185	10,185	10,185	10,185	10,185
Palo Pinto County, Mining (Vulcan Construction Materials)	1,000	1,000	1,000	1,000	1,000	1,000
Wellborn SUD	4,000	4,000	4,000	4,000	4,000	4,000
West Central Texas MWD	235	235	235	235	235	235

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Hill County, Mining (Western Company of Texas)	1,000	1,000	1,000	1,000	1,000	1,000
Hill County, Irrigation (White Bluff Property Owners)	1,000	1,000	1,000	1,000	1,000	1,000
Young County, Steam Electric Power (TXU Electric)	432	432	432	432	432	432
DOW Chemical USA (DOW Pipeline Company- *Region H*)	16,000	16,000	16,000	16,000	16,000	16,000
Waller County, Irrigation (All Seasons Turf Grass- *Region H*)	50	50	50	50	50	50
Total Contracts and WUG Demands	**379,515**	**379,515**	**379,515**	**379,515**	**379,515**	**379,515**
1 – Contract represents a priority calls commitment						
BRA (PURCHASED FROM LOWER COLORADO RIVER AUTHORITY)						
Liberty Hill	1,200	1,200	1,200	1,200	1,200	1,200
Round Rock	20,928	20,928	20,928	20,928	20,928	20,928
Total Contracts and WUG Demands	**22,128**	**22,128**	**22,128**	**22,128**	**22,128**	**22,128**
BRA (SYSTEM OPERATIONS)[1]						
Double Diamond (Retreat)	619	619	619	619	619	619
West Central Texas MWD	774	774	774	774	774	774
LENMO	774	774	774	774	774	774
TPWD Possum Kingdom State Park	15	15	15	15	15	15
Sportsman's World MUD	290	290	290	290	290	290
City of Abilene	7,737	7,737	7,737	7,737	7,737	7,737
Parker County SUD	774	774	774	774	774	774
Possum Kingdom WSC	1,934	1,934	1,934	1,934	1,934	1,934
Corky Underwood	54	54	54	54	54	54
Neuhaus Trust Partnership	309	309	309	309	309	309
FHLM WSC	1,934	1,934	1,934	1,934	1,934	1,934
Horizon Turfgrass	348	348	348	348	348	348
City of Brenham	774	774	774	774	774	774
Vulcan Materials	387	387	387	387	387	387
Total Brazos G	16,723	16,723	16,723	16,723	16,723	16,723
All Seasons Turfgrass, Inc.	90	90	90	90	90	90
City of Sugar Land	10,279	10,279	10,279	10,279	10,279	10,279
City of Richmond	2,773	2,773	2,773	2,773	2,773	2,773
City of Manvel	3,731	3,731	3,731	3,731	3,731	3,731

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Dow	15,473	15,473	15,473	15,473	15,473	15,473
BASF	3,868	3,868	3,868	3,868	3,868	3,868
Marathon-GBR	5,700	5,700	5,700	5,700	5,700	5,700
GCWA	36,362	36,362	36,362	36,362	36,362	36,362
Total Region H	78,276	78,276	78,276	78,276	78,276	78,276
TPWD Water Trust	6,035	6,035	6,035	6,035	6,035	6,035
GM Reserve	4,997	4,997	4,997	4,997	4,997	4,997
Total Other	11,032	11,032	11,032	11,032	11,032	11,032
Total Contract (Region H)	78,276	78,276	78,276	78,276	78,276	78,276
Total Contract (Region G)	16,723	16,723	16,723	16,723	16,723	16,723
Total Other	11,032	11,032	11,032	11,032	11,032	11,032
Total Contracts and Other Demands	**106,031**	**106,031**	**106,031**	**106,031**	**106,031**	**106,031**
1-Contracts for BRA Sys Ops supplies will considered as recommended water management strategies for the 2021 Brazos G Plan, and are not considered to be current supplies.						
AQUILLA WATER SUPPLY DISTRICT						
Brandon-Irene WSC	287	287	287	287	287	287
Chatt WSC	86	86	86	86	86	86
Files Valley WSC	1,709	1,709	1,709	1,709	1,709	1,709
Hill County WSC	230	230	230	230	230	230
Hillsboro	4,200	3,640	3,640	3,640	3,640	3,640
Total Contracts and WUG Demands	**6,512**	**5,952**	**5,952**	**5,952**	**5,952**	**5,952**
BELL COUNTY WCID #1						
439 Water Supply Corp	750	750	750	750	750	750
Bell County WCID 3	1,207	1,601	2,176	2,552	2,840	3,125
City of Belton	5,966	5,966	5,966	5,966	5,966	5,966
City of Copperas Cove	8,824	8,824	8,824	8,824	8,824	8,824
City of Harker Heights	5,265	5,265	5,265	5,265	5,265	5,265
City of Killeen	2,240	2,240	2,240	2,240	2,240	2,240
Bell County-Other	750	750	750	750	750	750
Total Contracts and WUG Demands	**25,002**	**25,396**	**25,971**	**26,347**	**26,635**	**26,920**
BLUEBONNET WSC						
City of Bruceville-Eddy	938	938	938	938	938	938
Elm Creek WSC	654	654	654	654	654	654
City of McGregor	2,139	2,139	2,139	2,139	2,139	2,139
Moffat WSC	869	869	869	869	869	869

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
City of Moody	401	401	401	401	401	401
Pendleton WSC	461	461	461	461	461	461
Spring Valley WSC	301	301	301	301	301	301
City of Woodway	1,362	1,362	1,362	1,362	1,362	1,362
Total Contracts and WUG Demands	**7,125**	**7,125**	**7,125**	**7,125**	**7,125**	**7,125**
CENTRAL TEXAS WSC						
Armstrong WSC	783	783	783	783	783	783
Bell County-Other	702	702	702	702	702	702
Bell-Milam-Falls WSC	2,327	2,327	2,327	2,327	2,327	2,327
City of Belton	100	100	100	100	100	100
Dog Ridge WSC	840	840	840	840	840	840
EAST BELL WSC	847	847	847	847	847	847
City of Holland	331	331	331	331	331	331
Jarrell-Schwertner WSC	1,000	1,000	1,000	1,000	1,000	1,000
Little Elm Valley WSC	547	547	547	547	547	547
City of Rodgers	486	486	486	486	486	486
City of Rosebud	525	525	525	525	525	525
Salem-Elm Ridge WSC	297	297	297	297	297	297
West Bell County WSC	1,660	1,660	1,660	1,660	1,660	1,660
Falls County- Other (Westphalia WSC)	67	67	67	67	67	67
Falls County-Other (Town of Mooreville)	25	25	25	25	25	25
Total Contracts and WUG Demands	**10,537**	**10,537**	**10,537**	**10,537**	**10,537**	**10,537**
EASTLAND COUNTY WSD						
City of Eastland	3,314	3,314	3,314	3,314	3,314	3,314
City of Ranger	2,025	2,025	2,025	2,025	2,025	2,025
Eastland County, Manufacturing	48	56	56	56	56	56
Total Contracts and WUG Demands	**5,387**	**5,395**	**5,395**	**5,395**	**5,395**	**5,395**
NORTH CENTRAL TEXAS MWA						
City of Aspermont	118	118	118	118	118	118
Baylor SUD (*Region B*)	147	147	119	89	60	28
Haskell County-Other	236	236	236	236	236	236
Knox County-Other (City of Benjamin)	13	13	13	13	13	13

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Knox County-Other (City of Goree)	63	63	63	63	63	63
Knox County-Other (Knox County Rural WSC)	55	55	55	55	55	55
City of Haskell	637	637	637	637	637	637
City of Knox City	260	260	260	260	260	260
City of Munday	268	268	268	268	268	268
Total Contracts and WUG Demands	**1,797**	**1,797**	**1,797**	**1,797**	**1,797**	**1,797**
PALO PINTO CO MWD No. 1						
City of Mineral Wells[1]	5,164	5,265	5,320	5,391	5,462	5,521
Lake Palo Pinto Area WSC	250	250	250	250	250	250
Palo Pinto County, Steam-Electric	4,000	4,000	4,000	4,000	4,000	4,000
Total Contracts and WUG Demands	**9,414**	**9,515**	**9,570**	**9,641**	**9,712**	**9,771**
1- Includes municipal supply to portion of Mineral Wells located in Region C.						
UPPER LEON MWD						
City of Comanche	706	706	706	706	706	706
Comanche County-Other	9	9	9	9	9	9
City of De Leon	307	307	307	307	307	307
City of Dublin	598	598	598	598	598	598
City of Gorman	169	169	169	169	169	169
City of Hamilton	921	921	921	921	921	921
City of Stephenville	1,862	1,862	1,862	1,862	1,862	1,862
Total Contracts and WUG Demands	**4,572**	**4,572**	**4,572**	**4,572**	**4,572**	**4,572**
WEST CENTRAL TEXAS MWD						
City of Abilene	13,077	10,720	8,360	6,000	3,640	1,300
City of Albany	1,400	1,400	1,400	1,400	1,400	1,400
City of Anson	1,600	1,600	1,600	1,600	1,600	1,600
City of Breckenridge	1,900	1,900	1,900	1,900	1,900	1,900
Total Contracts and WUG Demands	**17,977**	**15,620**	**13,260**	**10,900**	**8,540**	**6,200**
ABILENE						
City of Abilene (municipal WUG demands)	22,261	22,698	23,050	23,440	23,874	24,238
City of Baird	77	77	77	77	77	77
City of Clyde	8,554	12,144	12,144	12,144	12,144	12,144
Taylor County-Other (Blair WSC)	77	77	77	77	77	77

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Taylor County-Other (S.U.N. WSC)	230	230	230	230	230	230
Eula WSC	61	61	61	61	61	61
Hamby WSC	308	308	308	308	308	308
Hawley WSC	307	307	307	307	307	307
City of Lawn	153	153	153	153	153	153
Taylor County, Manufacturing	1,248	1,395	1,537	1,658	1,831	2,019
City of Merke;	353	353	353	353	353	353
Potosi WSC	307	307	307	307	307	307
Steamboat Mountain WSC	307	307	307	307	307	307
City of Tye	184	184	184	184	184	184
View Caps WSC	199	199	199	199	199	199
Total Contracts and WUG Demands	**34,626**	**38,800**	**39,294**	**39,805**	**40,412**	**40,964**
ACTON MUD						
Acton MUD (municipal WUG demands)	2,845	4,422	5,455	5,993	6,610	7,299
Hood County-Other	782	801	844	888	1,496	2,077
Total Contracts and WUG Demands	**3,627**	**5,223**	**6,299**	**6,881**	**8,106**	**9,376**
ALBANY						
City of Albany (municipal WUG demands)	604	635	624	625	624	624
Fort Griffin SUD	219	219	216	215	215	215
Total Contracts and WUG Demands	**823**	**854**	**840**	**840**	**839**	**839**
ANSON						
City of Anson (municipal WUG demands)	365	373	376	386	394	402
Hawley WSC	221	221	221	221	221	221
City of Hamlin	534	526	523	513	505	497
Total Contracts and WUG Demands	**1,120**	**1,120**	**1,120**	**1,120**	**1,120**	**1,120**
BISTONE MUNICIPAL WATER SUPPLY DISTRICT						
Bistone Municipal Water Supply District (municipal WUG demands)	233	241	247	258	267	273
City of Mexia	2,067	2,047	1,941	1,830	1,721	1,615
Limestone County-Other (Mexia State School)	280	280	280	280	280	280
City of Coolidge	225	225	225	225	225	225

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Whiterock WSC	274	274	274	274	274	274
Total Contracts and WUG Demands	**3,079**	**3,067**	**2,967**	**2,867**	**2,767**	**2,667**
BRANDON IRENE WSC						
Brandon Irene WSC (municipal WUG demands)	265	275	282	295	309	322
Hill County-Other	29	31	32	33	34	35
Total Contracts and WUG Demands	**294**	**306**	**314**	**328**	**343**	**357**
BRECKENRIDGE						
City of Breckenridge (municipal WUG demands)	1,002	1,012	1,006	1,004	1,005	1,015
Stephens County, Manufacturing	7	8	8	8	8	8
Total Contracts and WUG Demands	**1,009**	**1,020**	**1,014**	**1,012**	**1,013**	**1,023**
BRENHAM						
City of Brenham (municipal WUG demands)	4,329	4,627	4,821	5,038	5,225	5,382
Washington County, Manufacturing	208	208	208	208	208	208
Total Contracts and WUG Demands	**4,537**	**4,835**	**5,029**	**5,246**	**5,433**	**5,590**
BRUSHY CREEK MUD						
Brushy Creek MUD (municipal WUG demands)	3,084	3,022	2,985	2,965	2,960	2,959
Williamson County-Other	518	518	518	518	518	518
Total Contracts and WUG Demands	**3,602**	**3,540**	**3,503**	**3,483**	**3,478**	**3,477**
BRYAN						
City of Bryan (municipal WUG demands)	14,944	17,356	20,223	23,804	28,205	35,620
Wellborn SUD	3,360	3,360	3,360	3,360	3,360	3,360
Wickson Creek SUD	1,115	939	771	646	534	446
Brazos County, Manufacturing	95	95	95	95	95	95
Brazos County, Steam Electric	1	1	1	1	1	1
Total Contracts and WUG Demands	**19,515**	**21,751**	**24,450**	**27,906**	**32,195**	**39,522**
BURLESON						
City of Burleson (municipal WUG demands)	6,466	7,484	8,553	9,718	10,980	12,309
Johnson County, Manufacturing	2	2	2	2	2	2
Total Contracts and WUG Demands	**6,468**	**7,486**	**8,555**	**9,720**	**10,982**	**12,311**

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
CAMERON						
City of Cameron (municipal WUG demands)	1,363	1,413	1,446	1,504	1,561	1,617
Milam County, Manufacturing	14	14	14	14	14	14
North Milam WSC	38	38	38	38	38	38
Salem Elm Ridge WSC	125	125	125	125	125	125
Total Contracts and WUG Demands	**1,540**	**1,590**	**1,623**	**1,681**	**1,738**	**1,794**
CEDAR PARK						
City of Cedar Park (municipal WUG demands)	19,108	20,969	21,044	21,007	20,988	20,980
Block House MUD	1,098	1,098	1,098	1,098	1,098	1,098
Williamson County-Other (Indian Springs Subdivision)	13	13	13	13	13	13
Williamson County, Manufacturing	292	347	347	347	347	347
Williamson Travis County MUD 1	989	989	989	989	989	989
Total Contracts and WUG Demands	**21,500**	**23,416**	**23,491**	**23,454**	**23,435**	**23,427**
CHATT WSC						
Chatt WSC (municipal WUG demands)	95	98	100	103	106	108
Hill County, Manufacturing	45	50	55	60	65	70
Total Contracts and WUG Demands	**140**	**148**	**155**	**163**	**171**	**178**
CHILDRESS CREEK WSC						
Childress Creek WSC (municipal WUG demands)	343	365	373	379	384	388
Bosque County, Manufacturing	1	1	1	1	1	1
Total Contracts and WUG Demands	**344**	**366**	**374**	**380**	**385**	**389**
CISCO						
City of Cisco (municipal WUG demands)	729	726	711	703	701	701
Eastland County-Other	147	147	147	147	147	147
Total Contracts and WUG Demands	**876**	**873**	**858**	**850**	**848**	**848**
CLEBURNE						
City of Cleburne (municipal WUG demands)	6,969	7,580	8,977	10,446	12,234	13,678
Johnson County, Steam Electric	1,344	1,344	1,344	1,344	1,344	1,344
Johnson County, Manufacturing	2,329	2,714	3,105	3,455	3,801	4,182
Total Contracts and WUG Demands	**10,642**	**11,638**	**13,426**	**15,245**	**17,379**	**19,204**

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
CLIFTON						
City of Clifton (municipal WUG demands)	704	748	766	779	790	797
Bosque County, Manufacturing	1	1	1	1	1	1
City of Meridian	112	112	105	88	70	53
Total Contracts and WUG Demands	**817**	**861**	**872**	**868**	**861**	**851**
CLYDE						
City of Clyde (municipal WUG demands)	309	312	310	308	311	313
Callahan County WSC	184	187	185	185	187	188
Eula WSC	221	221	221	221	221	221
Total Contracts and WUG Demands	**714**	**720**	**716**	**714**	**719**	**722**
COLLEGE STATION						
City of College Station (municipal WUG demands)	16,451	20,480	25,877	30,439	30,382	30,363
Brazos County, Manufacturing	6	6	6	6	6	6
Total Contracts and WUG Demands	**16,457**	**20,486**	**25,883**	**30,445**	**30,388**	**30,369**
COMANCHE						
City of Comanche (municipal WUG demands)	520	518	513	521	533	546
Comanche County, Manufacturing	20	20	20	20	20	20
Total Contracts and WUG Demands	**540**	**538**	**533**	**541**	**553**	**566**
COOLIDGE						
City of Coolidge (municipal WUG demands)	176	191	202	217	230	239
Limestone County, Manufacturing	19	19	19	19	19	19
Total Contracts and WUG Demands	**195**	**210**	**221**	**236**	**249**	**258**
COPPERAS COVE						
City of Copperas Cove (municipal WUG demands)	4,304	4,722	5,225	5,707	6,267	6,833
Central Texas College District	132	129	126	125	125	125
Total Contracts and WUG Demands	**4,436**	**4,851**	**5,351**	**5,832**	**6,392**	**6,958**
ERATH COUNTY-OTHER						
Erath County-Other (municipal WUG demands)	2,605	2,833	3,022	3,269	3,479	3,678
Erath County, Manufacturing	1	1	1	1	2	2
Total Contracts and WUG Demands	**2,606**	**2,834**	**3,023**	**3,270**	**3,481**	**3,680**

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
LIMESTONE COUNTY-OTHER						
Limestone County-Other (municipal WUG demands)	311	287	275	273	266	282
Limestone County, Irrigation	14	14	14	14	14	14
Limestone County, Mining	7	7	7	7	7	7
Total Contracts and WUG Demands	**332**	**308**	**296**	**294**	**287**	**303**
MCLENNAN COUNTY-OTHER						
Mclennan County-Other (municipal WUG demands)	1,268	1,035	880	708	551	400
Mclennan County, Manufacturing	3	3	3	3	3	3
City of Riesel (from RMS WSC)	125	125	125	125	125	125
Mclennan County, Steam Electric	1	1	1	1	1	1
Total Contracts and WUG Demands	**1,397**	**1,164**	**1,009**	**837**	**680**	**529**
NOLAN COUNTY-OTHER						
Nolan County-Other (municipal WUG demands)	126	127	128	130	134	137
Nolan County, Manufacturing	1	1	1	1	1	1
Total Contracts and WUG Demands	**127**	**128**	**129**	**131**	**135**	**138**
PALO PINTO COUNTY-OTHER						
Palo Pinto County-Other (municipal WUG demands)	281	280	277	277	274	267
Palo Pinto County, Mining	1	1	1	1	1	1
Palo Pinto County, Steam Electric	1	1	1	1	1	1
Total Contracts and WUG Demands	**283**	**282**	**279**	**279**	**276**	**269**
YOUNG COUNTY-OTHER						
Young County-Other (municipal WUG demands)	250	262	273	288	304	320
Young County, Manufacturing	57	62	67	70	77	85
Total Contracts and WUG Demands	**307**	**324**	**340**	**358**	**381**	**405**
CRAWFORD						
City of Crawford (municipal WUG demands)	148	147	146	147	148	150
McLennan County, Mining	3	3	3	3	3	3
Total Contracts and WUG Demands	**151**	**150**	**149**	**150**	**151**	**153**

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
DUBLIN						
City of Dublin (municipal WUG demands)	418	430	445	436	464	490
Erath County-Other	72	72	72	72	72	72
Erath County, Manufacturing	5	7	8	9	10	12
Total Contracts and WUG Demands	**495**	**509**	**525**	**517**	**546**	**574**
EASTLAND						
City of Eastland (municipal WUG demands)	622	617	603	595	594	594
Eastland County-Other	120	120	120	120	120	120
Staff WSC	30	30	30	30	30	30
Total Contracts and WUG Demands	**772**	**767**	**753**	**745**	**744**	**744**
FILES VALLEY WSC						
Files Valley WSC (municipal WUG demands)	505	545	585	646	707	773
Ellis County-Other (*Region C*)	84	84	84	84	84	84
Parker WSC	336	336	336	336	336	336
Total Contracts and WUG Demands	**925**	**965**	**1,005**	**1,066**	**1,127**	**1,193**
FORT GRIFFIN SUD						
Fort Griffin SUD (municipal WUG demands)	219	219	216	215	215	215
Shackelford County, Mining	2	2	2	2	2	2
Total Contracts and WUG Demands	**221**	**221**	**218**	**217**	**217**	**217**
GATESVILLE						
City of Gatesville (municipal WUG demands)	4,301	4,801	5,377	5,897	6,472	7,050
Coryell City Water Supply District	933	1,044	1,171	1,287	1,413	1,542
Fort Gates WSC	120	120	120	120	120	120
Mountain WSC	280	280	280	280	280	280
Flat WSC	102	102	102	102	102	102
Coryell County, Manufacturing	4	4	4	4	4	4
The Grove WSC	203	211	239	269	299	330
Total Contracts and WUG Demands	**5,943**	**6,562**	**7,293**	**7,959**	**8,690**	**9,428**
GEORGETOWN						
City of Georgetown (municipal WUG demands)	26,851	34,979	43,505	53,659	65,054	78,352
Jonah Water SUD	3,312	4,052	5,008	6,062	7,281	8,485

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
City of Liberty Hill	25	72	134	203	283	365
Williamson County, Manufacturing	137	163	163	163	163	163
Total Contracts and WUG Demands	**30,325**	**39,266**	**48,810**	**60,087**	**72,781**	**87,365**
GIDDINGS						
City of Giddings (municipal WUG demands)	1,154	1,268	1,328	1,347	1,364	1,374
Lee County, Manufacturing	13	14	15	16	17	18
Total Contracts and WUG Demands	**1,167**	**1,282**	**1,343**	**1,363**	**1,381**	**1,392**
GORDON						
City of Gordon (municipal WUG demands)	147	155	160	166	171	175
Erath County-Other	50	50	50	50	50	50
Total Contracts and WUG Demands	**197**	**205**	**210**	**216**	**221**	**225**
GRAHAM						
City of Graham (municipal WUG demands)	2,788	2,891	2,959	3,052	3,157	3,262
Jack County-Other (*Region C*)	545	560	566	568	574	580
Young County-Other	134	131	130	130	131	132
Fort Belknap WSC	419	419	419	419	419	419
Young County, Manufacturing	2	2	2	2	2	2
Young County, Steam Electric	248	248	248	248	248	248
Total Contracts and WUG Demands	4,136	4,251	4,324	4,419	4,531	4,643
H & H WSC						
H & H WSC (municipal WUG demands)	188	195	202	212	223	235
McLennan County-Other	81	84	87	92	97	102
Total Contracts and WUG Demands	**269**	**279**	**289**	**304**	**320**	**337**
HAMILTON						
City of Hamilton (municipal WUG demands)	512	508	497	490	489	489
Bosque County, Manufacturing	5	5	5	5	5	5
Hamilton County, Manufacturing	1	1	1	1	1	1
Multi County WSC	245	245	245	245	245	245
Total Contracts and WUG Demands	**763**	**759**	**748**	**741**	**740**	**740**
HAMLIN						
City of Hamlin (municipal WUG demands)	423	435	444	458	468	478

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Fisher County, Manufacturing	2	2	2	2	2	2
Total Contracts and WUG Demands	**425**	**437**	**446**	**460**	**470**	**480**
HEARNE						
City of Hearne (municipal WUG demands)	759	898	1,065	1,062	1,060	1,060
Bethany Hearne WSC	43	45	48	51	54	58
Robertson County, Manufacturing	1	1	1	1	1	1
Total Contracts and WUG Demands	**803**	**944**	**1,114**	**1,114**	**1,115**	**1,119**
HILLSBORO						
City of Hillsboro (municipal WUG demands)	1,987	2,070	2,122	2,189	2,251	2,283
Johnson County, Manufacturing	6	7	9	10	11	12
Total Contracts and WUG Demands	**1,993**	**2,077**	**2,131**	**2,199**	**2,262**	**2,295**
JARRELL-SCHWERTNER						
Jarrell-Schwertner (municipal WUG demands)	958	1,140	1,369	1,623	1,916	2,222
Williamson County-Other	560	560	560	560	560	560
Total Contracts and WUG Demands	**1,518**	**1,700**	**1,929**	**2,183**	**2,476**	**2,782**
JOHNSON COUNTY SUD						
Johnson County SUD (municipal WUG demands)	5,771	6,120	6,696	7,320	7,986	8,665
City of Alvarado	2,241	2,241	2,241	2,241	2,241	2,241
Bethany WSC	1,120	1,120	1,120	1,120	1,120	1,120
Johnson County-Other (City of Joshua)	2,643	1,952	1,619	1,591	1,435	1,169
Johnson County-Other (Monarch Utilities)	282	282	282	282	282	282
Johnson County-Other (Sundance)	56	56	56	56	56	56
Johnson County-Other (Blue Water Oaks)	0	0	0	0	0	0
Johnson County-Other (Walnut Creek MHP)	0	0	0	0	0	0
City of Keene	1,120	1,120	1,120	1,120	1,120	1,120
Johnson County, Mining	20	20	20	20	20	20
Total Contracts and WUG Demands	**13,253**	**12,911**	**13,154**	**13,750**	**14,260**	**14,673**
KEMPNER WSC						
Kempner WSC (municipal WUG demands)	2,751	3,007	3,221	3,447	3,667	3,873
Lampasas County-Other	195	209	225	240	254	267
City of Lampasas	1,281	1,281	1,281	1,281	1,281	1,281

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Lampasas County, Mining	25	25	25	25	25	25
Salado WSC	183	183	183	183	183	183
Total Contracts and WUG Demands	**4,435**	**4,705**	**4,935**	**5,176**	**5,410**	**5,629**
KILLEEN						
City of Killeen (municipal WUG demands)	18,308	20,913	23,716	26,629	29,619	32,599
Bell County, Manufacturing	7	7	7	7	7	7
Total Contracts and WUG Demands	**18,315**	**20,920**	**23,723**	**26,636**	**29,626**	**32,606**
LAMPASAS						
City of Lampasas (municipal WUG demands)	1,265	1,356	1,424	1,506	1,590	1,668
Lampasas County, Manufacturing	137	151	165	178	195	213
Total Contracts and WUG Demands	**1,402**	**1,507**	**1,589**	**1,684**	**1,785**	**1,881**
MCGREGOR						
City of McGregor (municipal WUG demands)	801	813	825	846	874	905
Central Bosque WSC	128	135	140	147	156	164
McLennan County, Manufacturing	4	4	4	4	4	4
Total Contracts and WUG Demands	**933**	**952**	**969**	**997**	**1,034**	**1,073**
MEXIA						
City of Mexia (municipal WUG demands)	568	634	687	745	793	826
City of Wortham (*Region C*)	157	157	157	157	157	157
Bistone Municipal Water Supply District	28	28	28	28	28	28
Limestone County-Other	254	254	254	254	254	254
Limestone County, Manufacturing	43	44	44	44	45	45
Whiterock WSC	487	487	487	487	487	487
Total Contracts and WUG Demands	**1,537**	**1,604**	**1,657**	**1,715**	**1,764**	**1,797**
MINERAL WELLS						
City of Mineral Wells (municipal WUG demands)	2,922	3,022	3,077	3,148	3,219	3,277
Parker County-Other (*Region C*)	663	663	663	663	663	663
Parker County Manufacturing (*Region C*)	25	25	25	25	25	25
Parker County SUD (*Region C*)	448	448	448	448	448	448
Palo Pinto County-Other (City of Graford)	92	92	92	92	92	92
Palo Pinto County, Manufacturing	10	10	10	10	10	10

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
North Rural WSC	324	324	324	324	324	324
Palo Pinto WSC	179	179	179	179	179	179
Santo SUD	331	331	331	331	331	331
Sturdivant Progress WSC	307	307	307	307	307	307
Total Contracts and WUG Demands	**5,301**	**5,401**	**5,456**	**5,527**	**5,598**	**5,656**
NAVASOTA						
City of Navasota (municipal WUG demands)	1,474	1,486	1,493	1,514	1,541	1,567
Grimes County, Manufacturing	114	114	114	114	138	183
Total Contracts and WUG Demands	**1,588**	**1,600**	**1,607**	**1,628**	**1,679**	**1,750**
POST OAK SUD						
Post Oak SUD (municipal WUG demands)	129	131	155	169	187	208
Birome WSC	184	189	195	200	205	211
City of Coolidge	176	191	202	217	230	239
City of Hubbard	156	157	157	162	167	169
Total Contracts and WUG Demands	**645**	**668**	**709**	**748**	**789**	**827**
RANGER						
City of Ranger (municipal WUG demands)	479	476	466	464	463	463
Staff WSC	232	232	232	232	232	232
Total Contracts and WUG Demands	**711**	**708**	**698**	**696**	**695**	**695**
ROBERTSON COUNTY WSC						
Robertson County WSC (municipal WUG demands)	424	500	578	675	776	869
Robertson County, Steam-Electric	6	6	6	6	6	6
Total Contracts and WUG Demands	**430**	**506**	**584**	**681**	**782**	**875**
ROBINSON						
City of Robinson (municipal WUG demands)	2,472	2,896	3,275	3,671	4,078	4,482
City of Lorena	560	560	560	560	560	560
Total Contracts and WUG Demands	**3,032**	**3,456**	**3,835**	**4,231**	**4,638**	**5,042**
ROTAN						
City of Rotan (municipal WUG demands)	194	185	180	179	179	179
Fisher County, Manufacturing	4	4	4	4	4	4
Total Contracts and WUG Demands	**198**	**189**	**184**	**183**	**183**	**183**

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
ROUND ROCK						
City of Round Rock (municipal WUG demands)	20,082	24,612	30,598	37,623	37,608	37,623
Williamson County, Other (Paloma Lake MUD)	0	0	0	0	0	0
Williamson County, Other (Round Rock Ranch PUD)	0	0	0	0	0	0
Williamson County, Other (Williamson County)	110	132	164	221	299	379
Williamson County, Other (Blessing MHP)	96	116	143	194	262	332
Williamson County, Other (Tal Tex)	164	198	244	331	447	567
Fern Bluff MUD	1,187	1,175	1,168	1,163	1,161	1,161
Williamson County, Manufacturing	569	674	674	674	674	674
Williamson County, Mining	6	6	6	6	6	6
Paloma Lake MUD 1	137	166	205	277	374	475
Paloma Lake MUD 2	245	287	282	280	279	279
Walsh Ranch MUD	199	196	195	195	194	194
Williamson County MUD 10	727	722	721	720	719	718
Williamson County MUD 11	820	816	816	817	818	820
Williamson County MUD 9 (Vista oaks MUD)	548	541	538	536	536	536
Total Contracts and WUG Demands	**24,890**	**29,641**	**35,754**	**43,037**	**43,377**	**43,764**
SALADO WSC						
Salado WSC (municipal WUG demands)	1,899	2,081	2,265	2,449	2,636	2,822
Jarrell-Schwertner	55	55	55	55	55	55
Total Contracts and WUG Demands	**1,954**	**2,136**	**2,320**	**2,504**	**2,691**	**2,877**
SOUTHWEST MILAM WSC						
Southwest Milam WSC (municipal WUG demands)	1,466	1,575	1,685	1,824	1,977	2,131
City of Thorndale	202	202	202	202	202	202
Total Contracts and WUG Demands	**1,668**	**1,777**	**1,887**	**2,026**	**2,179**	**2,333**
STAMFORD						
City of Stamford (municipal WUG demands)	849	880	900	925	948	967
Jones County-Other (City of Leuders)	52	52	52	52	52	52
Jones County-Other (Ericksdahl WSC)	37	37	37	37	37	37
Haskell County-Other (Paint Creek WSC)	87	87	87	87	87	87

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Haskell County-Other (Sagerton WSC)	73	73	73	73	73	73
Total Contracts and WUG Demands	**1,098**	**1,129**	**1,149**	**1,174**	**1,197**	**1,216**
STEAMBOAT MOUNTAIN WSC						
Steamboat Mountain WSC (municipal WUG demands)	376	379	383	387	393	399
Taylor County-Other	79	79	79	79	79	79
Total Contracts and WUG Demands	**455**	**458**	**462**	**466**	**472**	**478**
STEPHENS REGIONAL SUD						
Stephens Regional SUD (municipal WUG demands)	296	292	288	283	284	285
Throckmorton County-Other	99	99	99	99	99	99
Total Contracts and WUG Demands	**395**	**391**	**387**	**382**	**383**	**384**
STEPHENVILLE						
City of Stephenville (municipal WUG demands)	2,659	2,867	3,047	3,241	3,448	3,645
Erath County, Manufacturing	29	35	42	48	55	64
Total Contracts and WUG Demands	**2,688**	**2,902**	**3,089**	**3,289**	**3,503**	**3,709**
STRAWN						
City of Strawn (municipal WUG demands)	145	152	156	160	165	169
City of Gordon	50	50	50	50	50	50
Total Contracts and WUG Demands	**195**	**202**	**206**	**210**	**215**	**219**
SWEETWATER						
City of Sweetwater (municipal WUG demands)	1,953	1,996	2,017	2,084	2,140	2,192
City of Bronte (*Region F*)	0	0	0	0	0	0
Taylor County-Other	187	187	187	187	187	187
Nolan County, Manufacturing	361	358	356	354	354	354
City of Roby	1,074	1,074	1,074	1,074	1,074	1,074
Total Contracts and WUG Demands	**3,575**	**3,615**	**3,634**	**3,699**	**3,755**	**3,807**
TAYLOR						
City of Taylor (municipal WUG demands)	2,844	3,010	3,245	3,527	3,873	4,237
Williamson County-Other	95	101	111	122	136	151
City of Hutto	336	336	336	336	336	336
Williamson County, Manufacturing	4	5	5	5	5	5

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
Total Contracts and WUG Demands	**3,279**	**3,452**	**3,697**	**3,990**	**4,350**	**4,729**
TEMPLE						
City of Temple (municipal WUG demands)	20,095	23,231	26,532	29,903	33,301	36,666
Bell County WCID 2	323	323	323	323	323	323
Bell County-Other (Arrowhead Hill)	26	26	26	26	26	26
Bell County, Manufacturing	481	481	481	481	481	481
Morgans Point Resort	1,935	1,935	1,935	1,935	1,935	1,935
City of Troy	968	968	968	968	968	968
Total Contracts and WUG Demands	**23,828**	**26,964**	**30,265**	**33,636**	**37,034**	**40,399**
TROY						
City of Troy (municipal WUG demands)	185	199	215	233	254	275
Bell County, Manufacturing	9	9	9	9	9	9
Total Contracts and WUG Demands	**194**	**208**	**224**	**242**	**263**	**284**
WACO						
City of Waco (municipal WUG demands)	31,279	33,063	34,676	36,494	38,495	40,503
City of Bellmead	1,344	1,344	1,344	1,344	1,344	1,344
Bold Springs WSC	560	560	560	560	560	560
Central Bosqque WSC	359	359	359	359	359	359
City of Hewitt	1,120	1,120	1,120	1,120	1,120	1,120
Hilltop WSC	101	101	101	101	101	101
City of Lacy Lakeview	1,120	1,120	1,120	1,120	1,120	1,120
Leroy Tours Gerard WSC	196	196	196	196	196	196
McLennan County, Manufacturing	2,503	2,888	3,249	3,618	3,948	4,403
City of Robinson	560	560	560	560	560	560
Ross WSC	280	280	280	280	280	280
Mclennan County, Steam Electric	15,000	15,000	15,000	15,000	15,000	15,000
Texas State Technical College	888	954	1,013	1,073	1,132	1,193
City of West	1,120	1,120	1,120	1,120	1,120	1,120
City of Woodway	0	4	219	478	728	989
Total Contracts and WUG Demands	**56,430**	**58,669**	**60,917**	**63,423**	**66,063**	**68,848**

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
WICKSON CREEK SUD						
Wickson Creek SUD (municipal WUG demands)	1,648	1,828	2,022	2,267	2,537	2,832
Brazos County, Manufacturing	5	5	5	5	5	5
Grimes County, Manufacturing	3	3	3	3	4	5
Total Contracts and WUG Demands	**1,656**	**1,836**	**2,030**	**2,275**	**2,546**	**2,842**
WOODWAY						
City of Woodway (municipal WUG demands)	3,465	3,690	3,892	4,114	4,347	4,579
McLennan County, Manufacturing	2	2	2	2	2	2
Total Contracts and WUG Demands	**3,467**	**3,692**	**3,894**	**4,116**	**4,349**	**4,581**
OLNEY (REGION B)[1]						
Young County, Manufacturing	25	25	25	25	25	25
Total Contracts and WUG Demands	**25**	**25**	**25**	**25**	**25**	**25**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
ARLINGTON (REGION C)[1]						
Bethesda WSC	1,234	1,473	1,724	2,003	2,312	2,637
Total Contracts and WUG Demands	**1,234**	**1,473**	**1,724**	**2,003**	**2,312**	**2,637**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
CORSICANA (REGION C)[1]						
Hill County-Other	110	119	116	113	104	101
Post Oak SUD	461	479	514	548	584	616
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
FORTWORTH (REGION C)[1]						
Bethesda WSC	2,469	2,946	3,447	4,006	4,623	5,275
City of Burleson	6,468	7,486	8,555	9,720	10,982	12,311
Total Contracts and WUG Demands	**8,937**	**10,432**	**12,002**	**13,726**	**15,605**	**17,586**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
GRAND PRAIRIE (REGION C)[1]						
Johnson County-Other	673	1,345	1,345	1,345	1,345	1,345
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
MANSFIELD (REGION C)[1]						
Johnson County SUD	4,000	7,215	8,845	8,845	8,845	8,845
Total Contracts and WUG Demands	**4,000**	**7,215**	**8,845**	**8,845**	**8,845**	**8,845**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
MIDLOTHIAN (REGION C)[1]						
City of Venus	535	625	721	830	949	1,079
Total Contracts and WUG Demands	**535**	**625**	**721**	**830**	**949**	**1,079**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
WAXAHACHIE (REGION C)[1]						
Files Valley WSC	0	0	0	0	0	0
Total Contracts and WUG Demands	**0**	**0**	**0**	**0**	**0**	**0**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
COLORADO RIVER MWD (REGION F)[1]						
City of Abilene[2]	5,020	4,850	4,679	4,509	4,338	4,168
Total Contracts and WUG Demands	**5,020**	**4,850**	**4,679**	**4,509**	**4,338**	**4,168**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand. 2- Values represent supplies assigned to Abilene by Region F based on available yield from O.H. Ivie Reservoir, not actual contractual volume.						
SNYDER (REGION F)[1]						
City of Rotan	178	170	165	164	163	163
Total Contracts and WUG Demands	**178**	**170**	**165**	**164**	**163**	**163**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
HUNTSVILLE (REGION H)[1]						
Grimes County, Steam Electric	6,720	6,720	6,720	6,720	6,720	6,720
Total Contracts and WUG Demands	**6,720**	**6,720**	**6,720**	**6,720**	**6,720**	**6,720**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
AUSTIN (REGION K)[1]						
Williamson County-Other	87	87	87	87	87	87
Total Contracts and WUG Demands	**87**	**87**	**87**	**87**	**87**	**87**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
LOWER COLORADO RIVER AUTHORITY (REGION K)[1]						
Brazos River Authority	25,000	25,000	25,000	25,000	25,000	25,000
City of Cedar Park	20,500	20,500	20,500	20,500	20,500	20,500
Corix Utilities Texas Inc	1,140	1,140	1,140	1,140	1,140	1,140

Table 3-3. Water Supply Contracts and Other Current Demands Supplied by Water User Groups (WUGs) and Wholesale Water Providers (WWPs) (acre-feet/year)

Water User Group/Wholesale Water Supplier	Year					
	2020	2030	2040	2050	2060	2070
City of Leander	24,000	24,000	24,000	24,000	24,000	24,000
Total Contracts and WUG Demands	**70,640**	**70,640**	**70,640**	**70,640**	**70,640**	**70,640**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
MANVILLE WSC (REGION K)[1]						
City of Hutto	560	560	560	560	560	560
Williamson County WSID 3	1,189	1,189	1,189	1,189	1,189	1,189
Total Contracts and WUG Demands	**1,749**	**1,749**	**1,749**	**1,749**	**1,749**	**1,749**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						
SAN ANTONIO WATER SYSTEM (REGION L)[1]						
Williamson County-Other	5,700	5,700	5,700	5,700	5,700	5,700
Total Contracts and WUG Demands	**5,700**	**5,700**	**5,700**	**5,700**	**5,700**	**5,700**
1- Only listing Entity's contracts with Region G. Does not list Entity's other contract demands and Entity Demand.						

3.2 Determination of Surface Water Availability

3.2.1 Modified TCEQ Water Availability Model of the Brazos River Basin (Brazos G WAM)

Determination of water availability for existing water rights is based on a rather complex function of location, hydrologic conditions, diversion volume, reservoir storage, and priority date. Computer models that are capable of analyzing these complex inter-relationships are typically employed to determine water availability for water rights. Water availability estimates for the Brazos G Area were developed using a computer model of the Brazos River Basin. The Water Rights Analysis Package (WRAP) computer model was developed at Texas A&M University for use as a water resources management tool. The model can be used to evaluate the reliability of existing water rights and to determine unappropriated streamflow potentially available for new water right permits. WRAP simulates the management and use of streamflow and reservoirs over a historical period of record, adhering to the prior appropriation doctrine governing water rights in Texas.

The TCEQ maintains a Water Availability Model (TCEQ WAM) for the Brazos River Basin that contains information on all water rights in the basin. The TCEQ WAM is the fundamental tool used to determine surface water availability throughout the Brazos River Basin for water rights permitting. Embedded within this model are certain assumptions that the TCEQ specifies when analyzing water right reliabilities. These assumptions are not necessarily the most appropriate to apply to the regional water planning process. For example, the TCEQ WAM uses permitted storage capacities for all reservoirs, whereas,

water supply planning should be based upon current and future sedimentation conditions in the reservoirs.

The Brazos G RWPG has approved (and the TWDB has authorized) several assumptions to be incorporated into the TCEQ WAM for purposes of determining surface water availability. With these modifications, the TCEQ WAM is hereinafter referred to as the "Brazos G WAM." These assumptions include the following items.

- Utilization of naturalized flow and evaporation data developed by the BRA for its adopted management plan, which extends the hydrologic period of record through 2015.
- Inclusion of a certain level of current and future return flows by entities located throughout the basin. These return flows are based on historical return flow information as well as projected future rates assuming an aggressive plan for future reuse. Table 3-4 lists the entities and the annual amount of return flows approved for use in the Brazos G WAM. Multiple entries for the same entity indicate multiple discharge locations. Entities operating wastewater treatment plants in the Brazos Basin not shown in the table are excluded for one of two reasons. One, is the entity requested during the development of the 2016 Plan that zero effluent be made available in the WAM because they plan to reuse all future effluent. These same entities are assumed to fully use all future effluent in the 2021 Plan unless otherwise notified by the entity. Two, return flows are included only for those facilities currently permitted to discharge 0.9 million gallons per day (MGD) or greater.
- Inclusion of BRA current contractual demand amounts and locations as provided by the BRA consistent with the BRA adopted management plan.
- Incorporation of reservoir system operations rules provided by the BRA to more accurately reflect current operations of BRA reservoirs to meet contract demands.
- The Brazos G WAM uses Year 2020, or the most up to date reservoir survey as available, and estimated Year 2070 elevation-area-capacity information for all reservoirs authorized for greater than 5,000 acft storage capacity.
- The Brazos G WAM includes five subordination agreements as agreed to by the Texas Water Development Board (TWDB):
    - Possum Kingdom Reservoir is subordinated to Lake Alan Henry,
    - Possum Kingdom Reservoir is subordinated to the Fort Phantom Hill Reservoir Scalping water right located on the Clear Fork of the Brazos River,
    - Possum Kingdom Reservoir is subordinated to Hubbard Creek Reservoir,
    - Possum Kingdom Reservoir is subordinated to the City of Stamford's California Creek pump-back operation into Lake Stamford, and
    - Lake Waco is subordinated to the City of Clifton's 1996 priority date water right.
- Exclusion of the following permitted but not constructed reservoirs:
    - Allens Creek Reservoir

- Post Reservoir
- Turkey Peak Reservoir (Lake Palo Pinto expansion)

These assumptions were used in the analyses to determine surface water availability for existing surface water supply sources. Different assumptions will be used, per TWDB requirements, for determining surface water availability for new water management strategies.

Table 3-4. Return Flows included in the Brazos G WAM (millions of gallons per day [MGD])

Entity[1]	County	Current Discharge [2]	Estimated 2070 Discharge[3]
Bell County WCID No. 1	Bell	0.52	0.35
Bell County WCID No. 1	Bell	2.17	7.72
Bell County WCID No. 1	Bell	11.44	1.46
BRA SLRSS	Fort Bend	4.17	5.60
BRA/LCRA BCRWSS West	Williamson	15.28	16.74
BRA/LCRA BCRWSS East	Williamson	1.35	1.48
City of Angleton	Brazoria	1.77	1.69
City of Bellville	Austin	0.39	0.34
City of Breckenridge	Stephens	0.32	0.09
City of Brenham	Washington	1.85	0.66
City of Cameron	Milam	0.67	0.25
City of Copperas Cove	Coryell	0.80	0.48
City of Copperas Cove	Coryell	1.51	0.90
City of Copperas Cove	Coryell	0.57	0.34
City of Eastland	Eastland	0.10	0.03
City of Freeport	Brazoria	0.91	0.87
City of Gatesville	Coryell	0.73	0.44
City of Gatesville	Coryell	1.80	1.08
City of Georgetown	Williamson	1.45	1.59
City of Georgetown	Williamson	1.37	1.50
City of Graham	Young	0.67	0.24
City of Granbury	Hood	0.62	0.31
City of Harker Heights	Bell	1.98	1.34
City of Hearne	Robertson	0.51	0.25
City of Hillsboro	Hood	1.07	0.54
City of Hutto	Williamson	0.99	1.09
City of Lampasas	Lampasas	0.60	0.27

Table 3-4. Return Flows included in the Brazos G WAM (millions of gallons per day [MGD])

Entity[1]	County	Current Discharge [2]	Estimated 2070 Discharge[3]
City of Leander	Williamson	0.96	1.05
City of Marlin	Falls	1.01	0.30
City of McGregor	McLennan	0.41	0.18
City of Mineral Wells	Parker	0.10	0.04
City of Mineral Wells	Palo Pinto	1.06	0.39
City of Navasota	Grimes	0.62	0.26
City of Richmond	Fort Bend	0.30	0.40
City of Rosenberg	Fort Bend	1.19	1.60
City of Rosenberg	Fort Bend	1.79	2.40
City of Stephenville	Erath	1.26	0.61
City of Sugarland	Fort Bend	2.16	2.90
City of Sugarland	Fort Bend	2.16	2.90
City of Taylor	Williamson	1.66	1.82
City of West Columbia	Brazoria	0.74	0.71
Fort Bend MUD 106	Fort Bend	1.00	1.34
Fort Bend MUD 112	Fort Bend	1.42	1.90
Pecan Grove MUD	Fort Bend	0.83	1.11
Prairie View A&M University	Waller	0.45	0.48
Texas A&M University	Brazos	0.36	0.27
	Total:	**75.13**	**68.33**
	Total (acft/yr):	**84,143**	**76,530**

1. Entities operating WWTPs but are not shown are assumed to have zero effluent made available because they plan to reuse all future effluent, or are permitted to discharge less than 0.9 MGD.
2. Current return flow estimates are based on the minimum annual discharge during 2015-2017 period.
3. Future estimates assume 25% of Year 2020 discharges will continue and 50% of any growth in wastewater volume will be discharged.

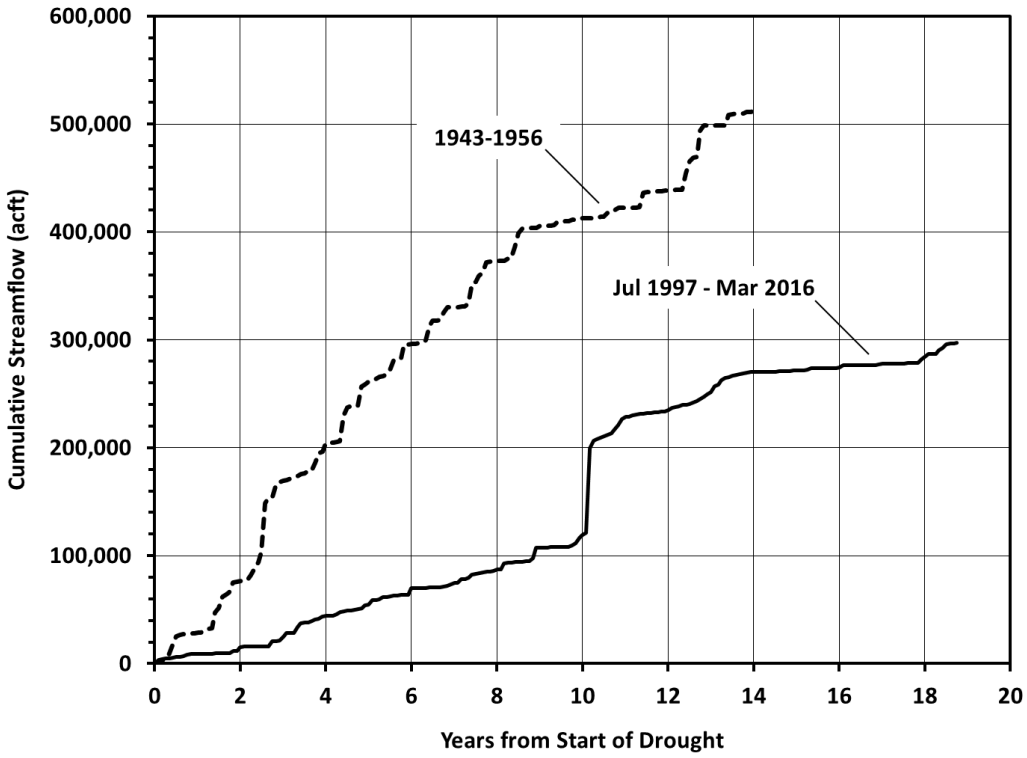
The Brazos G WAM contains 77 primary control points that contain naturalized flow information, and 67 evaporation data sets used to calculate evaporation for the 650 reservoirs included in the model. The period of record for the Brazos G WAM is 1940-2015. Water availability computations are performed at over 3,800 control points located throughout the river basin in the process of analyzing more than 1,700 water right records. The Brazos G WAM contains water right data available from the TCEQ for all water rights in the Brazos Basin as of November 2016. Water right applications submitted or approved after this date are not reflected in the model. A summary of yield data for major reservoirs analyzed in the Brazos G WAM is presented in Section 3.2.3.

3.2.2 Reliability of Surface Water Supplies and New Upper Basin Drought of Record

Hydrologic conditions are a primary factor that affects the reliability of water rights. Severe drought periods have been experienced in all areas of the Brazos River Basin. The drought of record for most areas of Brazos G occurred in the 1950s with other less severe drought periods occurring in the 1960s, 1970s, 1980s, and even recently in the 1990s. In some parts of the upper Brazos Basin, the recent drought of the 1990s has continued past the turn of the century, and in many places streamflow data indicate that its severity is greater than that of the drought that occurred in the 1950s. The region of Texas near Abilene has experienced drought conditions in almost all years from the early 1990s until 2016. Streamflows in the Clear Fork of the Brazos River (Clear Fork) during this period were substantially less compared to the previous drought of record which occurred from 1943 through 1956.

Figure 3-7 illustrates this with a comparison of cumulative gaged flows at the Clear Fork at Nugent gage during the drought of the 1950s and the drought beginning in the summer of 1997 and ending in the spring of 2016. When the recent drought cumulative streamflows are compared to the 1950s droughts at the 14 years mark from the beginning of the drought, total streamflow is 53 percent of the total streamflow for the 1950s. Additionally, the duration of the recent drought is more than 4 years longer than the 1950s drought. The comparison shows that the current drought was much more severe in the Clear Fork watershed. Additional information and comparisons of historic droughts in the Brazos River Basin are included in Chapter 7.

Figure 3-7. Comparison of Cumulative Streamflows for Two Drought Periods for the Clear Fork at Nugent, TX Streamgage (08084000)



3.2.3 Yield Analysis for Large Reservoirs

Water availability estimates for reservoirs were determined using the Brazos G WAM. For each reservoir greater than 5,000 acft yield estimates were determined using the updated 2020 (current) and 2070 (future) elevation-area-capacity information based on projected reservoir sedimentation. For reservoirs with less than 5,000 acft of storage, as-permitted capacities were used to estimate yields. Future reservoir sediment conditions were estimated using available reservoir sedimentation data. Sedimentation conditions used for the 2021 Plan are identical to those used for the 2016 Plan, except for those reservoirs for which updated reservoir sedimentation data exist, as summarized in Table 3-5.

Table 3-5. Summary of Current and Future Sediment Estimates for Reservoirs with Recent Surveys (available as of May 1, 2018)

Reservoir	Year of New Survey	Sedimentation Rate (acft/yr)	2021 Plan Conservation Storage Capacity (acft)		2016 Plan Conservation Storage Capacity (acft)	
			2020	2070	2020	2070
Lake Aquilla[1]	2014	209	42,025	31,575	43,174	37,374
Lake Belton[1]	2015	336	430,951	414,151	430,976	411,325
Lake Georgetown[1]	2016	21	37,984	36,934	36,799	36,449
Lake Granbury[1]	2015	278	132,468	118,568	116,703	80,503
Lake Granger[1]	2013	152	50,758	43,158	47,971	36,271
Lake Limestone[1]	2012	481	199,932	175,882	196,965	166,265
Lake Proctor[1]	2012	161	53,474	45,424	53,639	48,589
Lake Somerville[1]	2012	379	147,261	128,311	141,069	123,319
Lake Stillhouse Hollow[1]	2015	119	229,286	223,336	224,645	214,045
Possum Kingdom Reservoir[1]	2016	298	536,947	522,047	501,520	372,120
Lake Alan Henry (Region O) [2]	2017	118.5	95,883	89,959	79,719	29,418
Lake Leon[3]	2015	12.6	26,458	25,828	26,458	25,828
Lake Mineral Wells[4]	2015	6	5,324	5,024	5,752	4,744

1. Sedimentation rate provided by Brazos River Authority.
2. Sedimentation rate calculated using 2017 Draft TWDB survey.
3. Due to differences in survey methodologies, the 2015 survey was not comparable to previous surveys and cannot be used to determine a new sedimentation rate. Therefore, the 2021 Plan sedimentation rate was maintained at the same level as that used in the 2016 Plan to estimate current and future sediment conditions.
4. Sedimentation rate provided in TWDB survey report.

Yields were limited to authorized diversions. Yields also were determined for smaller reservoirs that serve as the sole water supply for a municipal entity. Yield estimates for BRA reservoirs were estimated as a stand-alone yield without system operations. The stand-alone yields for the BRA reservoirs assume all diversions from BRA reservoirs are made lakeside.

Firm yield estimates were determined for all reservoirs and safe yield estimates were also determined for reservoirs located upstream of Possum Kingdom Reservoir and for Lake Palo Pinto. Utilization of safe yield in lieu of firm yield is a common practice in west Texas where droughts are frequent and severe, and water managers are acutely aware that a drought more severe than recent recorded history could occur. Safe yield provides additional assurance of supply in an area where water resource alternatives are limited. All reservoirs upstream of Possum Kingdom Reservoir (Upper Basin Reservoirs) were evaluated on a 1-year safe yield basis. A 1-year safe yield is defined as the amount of water that can be diverted from a reservoir during a repeat of the worst drought of record while still maintaining a reserve storage equal to a 1-year supply volume. Two-year safe yields were calculated for Hubbard Creek Reservoir as approved by the TWDB. A 2-year safe yield is used to provide a greater assurance to reservoir owners that supplies are not over-estimated when considering droughts worse than the drought of record. A 6-month safe yield is used for Lake Palo Pinto and is the only reservoir located in a watershed downstream of Possum Kingdom Reservoir for which a safe yield is used.

A summary of firm and safe yield estimates for major reservoirs and minor reservoirs used for municipal supply is presented in Table 3-6.

Table 3-6. Yields for Reservoirs in the Brazos G Area (acre-feet/year)

Water Right ID	Reservoir Name	Firm Yield		Safe Yield	
		2020	2070	2020	2070
BRA Reservoirs[1]					
C5155	Possum Kingdom	152,100	147,700		
C5156	Granbury	59,400	54,300		
C5157	Whitney	18,336	18,336		
C5158	Aquilla	13,400	10,900		
C5159	Proctor	13,300	10,100		
C5160	Belton	112,257	112,257		
C5161	Stillhouse Hollow	66,400	65,000		
C5162	Georgetown	11,600	11,500		
C5163	Granger	17,600	15,400		
C5164	Somerville	42,200	38,900		
C5165	Limestone	64,000	56,200		
Large Non-BRA Reservoirs					
C3758, C5272	Alcoa	14,000	14,000		
C5268	Dansbury (Bryan Utilities)	195	195		
C5311, C5307	Gibbons Creek	9,740	9,740		
C4345	Lake Creek	9,900	9,900		
C34403	Davis	0	0		

Table 3-6. Yields for Reservoirs in the Brazos G Area (acre-feet/year)

Water Right ID	Reservoir Name	Firm Yield		Safe Yield	
		2020	2070	2020	2070
C3470	Leon	4,000	3,850		
C40391	Mineral Wells	1,550	1,500		
C4031	Palo Pinto[2]	9,800	8,950	7,800	7,100
C4106	Pat Cleburne	5,040	4,680		
C4097	Squaw Creek	8,050	7,710		
C4342	Tradinghouse	4,970	4,890		
C5298	Twin Oaks	2,900	2,760		
P5551, P5899	Waco	75,800	75,300		
C3693	White River	0	0		
Minor Reservoirs					
P4135	Crawford	0	0		
C3465	Eastland	500	500		
C4024	Gordon	0	0		
C4355	New Marlin City Lake	2,250	2,000		
P5000	Mart	0	0		
P5085	Robinson	0	0		
P5744	Wheeler Branch	1,960	1,960		
C4019	Strawn	160	160		
C3450	Throckmorton	50	0		
C5301	Camp Creek	2,575	2,000		
C5287	Mexia	1,100	600		
C4340	Lake Brazos	5,600	5,600		
P5551	Clifton	400	150		
Upper Basin Reservoirs					
C4142	Abilene[3]	800	750	450	325
C4211	Cisco	1,300	1,300	1,075	1,075
C4214	Daniel	250	225	175	150
C4151, C4161, C4139, C4165	Fort Phantom Hill[5]	7,500	6,900	4,800	4,300
C3458	Graham-Eddleman	1,800	1,125	1,275	675
C4213	Hubbard Creek[6]	26,900	26,300	20,000	19,500
C4150	Kirby[7]	300	300	150	150
C4179	Stamford	4,400	4,050	2,600	2,200

Table 3-6. Yields for Reservoirs in the Brazos G Area (acre-feet/year)

Water Right ID	Reservoir Name	Firm Yield		Safe Yield	
		2020	2070	2020	2070
C4130	Sweetwater[3]	650	650	500	500
C4128	Sweetwater_Trammel_RC4128[3]	300	0	225	0
C4152	Lytle Lake	230	0	230	0
C4180	City of Hamlin Lake	50	0	0	0
C4181	Anson North	25	0	0	0
C4194	Woodson	0	0	0	0
C4202	Baird	25	0	0	0
C4208	McCarty	100	0	75	0
C4207	Moran	125	0	50	0
C3462	Bryson	0	0	0	0
C3444	Millers Creek Reservoir	125	0	75	0

1. BRA reservoir firm yield estimates are considered a stand-alone yield and do not include system operations.
2. Safe yield estimate for Lake Palo Pinto is based on a 6-month safe yield calculation.
3. Reservoir not used for supply by owning entity or is not considered a reliable supply.
4. Lake Belton yield includes 12,000 acft/yr of water rights held by Department of the Army.
5. Safe yield estimate for Fort Phantom Hill Reservoir is based on a 2-year safe yield calculation. The City of Abilene plans to manage current and future supplies from Fort Phantom Hill Reservoir using the minimum of 1) the 2-year safe yield estimates, and 2) the yield estimates included in the purpose and need analysis of the Abilene water system as part of the 404 permitting process for the Cedar Ridge Reservoir project.
6. Safe yield estimate for Hubbard Creek Reservoir is based on a 2-year safe yield calculation.
7. Lake Kirby is used as part of the City of Abilene's reuse system and not for raw water supply. Yield estimates for Lake Kirby do not include effluent inflows.

3.2.4 Reliability of Run-of-the-River and Small Reservoir Water Rights

The results of the Brazos G WAM simulations include water availability estimates for each water right located in the Brazos Basin. Summaries of water available to run-of-the-river water rights (including rights with small reservoirs) are presented in Appendix F. If the supply for a water right was determined by a firm or safe yield analysis then this number is shown in the appendix. Water availability for other rights is expressed in terms of the minimum annual supply, which is defined as the water available during the most severe drought year over the 76-year simulation period of 1940 to 2015. Water right reliabilities were calculated simulating both current and future reservoir sedimentation conditions. The minimum annual supplies for run-of-river water rights (based on minimum monthly diversions) were used to determine the supplies available by type of use and county for comparison with demands.

3.2.5 Reliability of BRA System Operations Permit

The BRA has been granted water right permit No. 12-5851 authorizing the additional appropriation of water made available through system operation of the BRA's existing

water rights and reservoirs. The system operations permit allows the BRA to appropriate available run-of-river streamflow in the middle and lower Brazos Basin (downstream of Possum Kingdom Reservoir) in amounts greater than the diversion amounts authorized in existing certificates and permits held by the BRA, and use these supplies in coordination with water stored in BRA reservoirs to meet future customer needs.

The Brazos G WAM prioritizes meeting the demands of the existing BRA contracts from the BRA system of reservoirs (BRA System) before making any system operations water available to meet future demands. The remaining water available from the BRA System is then determined at the Brazos River near Rosharon control point, at the lower end of the Brazos Basin. Under this hypothetical operation (diverting all additional "system" supply from the lowest reach of the Brazos Basin), unregulated flows originating downstream of the BRA reservoirs are diverted during wet times and firmed up by releases from storage in the upstream BRA reservoirs during dry times. In this fashion, a total "system" yield can be developed in addition to the sum of the individual reservoir firm yields. For this analysis, the system yield was determined to be the sum of the minimum annual volume of water delivered to the existing contracts and remaining available water near the Rosharon control point. The difference between the system yield and the sum of the individual reservoir firm yields is considered to be the additional system operations reliable supply. Table 3-7 summarizes the BRA reservoir firm yields, system yield and system operations reliable supply.

The BRA currently holds multiple contracts to supply water to cities, districts, irrigators and industry throughout the Brazos River Basin. Many of these contracts are supplied proximate to the BRA's reservoirs, or through lakeside diversions. Because the additional System supply is dependent upon unregulated flows below the existing BRA reservoirs, the additional supply from system operations is considered to be available for diversion only at locations along the main stem of the Brazos River.

Table 3-7. Summary of BRA Reservoir Firm Yields and System Operations Reliable Supply

BRA Reservoir	Stand-Alone Firm Yield (acft/yr)	
	2020	2070
Possum Kingdom	152,100	147,700
Granbury	59,400	54,300
Whitney	18,336	18,336
Aquilla	13,400	10,900
Proctor	13,300	10,100
Belton[1]	100,257	100,257
Stillhouse	66,400	65,000
Georgetown	11,600	11,500
Granger	17,600	15,400
Somerville	42,200	38,900
Limestone	64,000	56,200

Table 3-7. Summary of BRA Reservoir Firm Yields and System Operations Reliable Supply

BRA Reservoir	Stand-Alone Firm Yield (acft/yr)	
	2020	2070
Total Reservoir Firm Yields	**558,593**	**528,593**
System Yield	**669,003**	**624,507**
System Operations Reliable Supply[2]	**110,410**	**95,914**

1. BRA portion of Lake Belton stand-alone yield excludes 12,000 acft/yr of water rights held by the Department of the Army.
2. The system operations reliable supply is assumed to be available to meet demands located on the main-stem of the Brazos River as infrastructure does not exist to transport the supply to the demands located in the Little River or Lake Aquilla systems.

acft/yr = acre-feet per year

3.2.6 Unappropriated Flows in the Brazos River Basin

The Brazos G WAM calculates unappropriated flow each month for the 1940 – 2015 period at each modeled location in the basin. Unappropriated flow is the excess flow that is not used by existing water rights and instream flow restrictions in the model simulation. This unappropriated flow is computed assuming SB3 instream flow restrictions and full use of all existing water rights. The quantity of unappropriated flow varies throughout the river basin depending on location. Summaries of unappropriated flows from the Brazos G WAM were developed at the following locations:

- Brazos River at South Bend (BRSB23),
- Brazos River near Glen Rose (BRGR30),
- Brazos River near Aquilla (BRAQ33),
- Bosque River near Waco (BOWA40),
- Little River at Cameron (LRCA58),
- Brazos River near Bryan (BRBR59),
- Brazos River near Hempstead (BRHE68), and
- Brazos River at Richmond (BRRI70).

These locations effectively summarize flow conditions throughout the river basin and are located at current or discontinued U.S. Geological Survey (USGS streamflow gaging stations, which are also primary control points in the Brazos G WAM. Table 3-8 summarizes the monthly and annual unappropriated flows at these selected locations for the current conditions run.

Table 3-8. Summary of Unappropriated Flow at Selected Brazos G WAM Locations

Control Point	Unappropriated Flow Estimates								Max. No. of Consecutive Months with Zero Unappropriated Flow
	Monthly Unappropriated Flows (acft)				Annual Unappropriated Flows (acft)				
	Maximum	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	
BRSB23	1,260,731	0	14,494	0	2,233,716	0	173,928	27,716	53
BRGR30	2,489,576	0	26,817	0	3,141,017	0	321,804	75,131	37
BRAQ33	2,655,348	0	42,304	0	3,477,421	0	507,643	243,907	33
BOWA40	525,202	0	18,831	0	950,067	0	225,968	135,985	35
LRCA58	1,377,318	0	62,131	0	3,870,405	0	745,574	407,749	32
BRBR59	4,090,902	0	162,877	0	9,213,368	0	1,954,521	1,501,324	28
BRHE68	4,759,396	0	213,888	0	11,381,815	0	2,566,662	1,945,257	28
BRRI70	5,119,260	0	227,372	0	11,997,705	0	2,728,458	2,110,123	22

acft = acre-feet

Figure 3-8 provides a comparison of median annual unappropriated flows at the selected location to those calculated in the 2016 Brazos G Plan. The comparison shows that the median unappropriated flow at all of the selected location has decreased since the 2016 Plan. This reduction in unappropriated flow can largely be attributed to the new appropriation of water under the BRA System Operations Permit.

Figure 3-8. Comparison of Simulated Median Annual Unappropriated Flow to 2016 Brazos G Plan

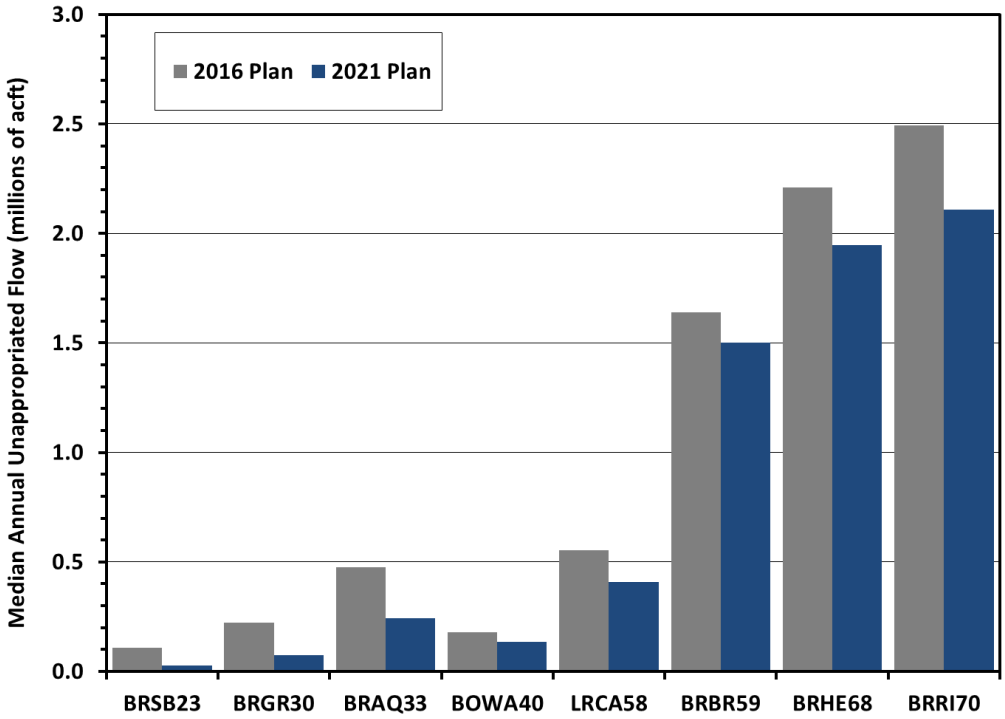


Figure 3-9 through Figure 3-16 illustrate the annual time series of unappropriated flows at each location. As Table 3-8 and Figure 3-9 through Figure 3-16 demonstrate, locations further downstream on major streams tend to have more unappropriated flow than those upstream with less contributing drainage area. As shown in these figures, unappropriated flow is present at the South Bend gage location in 30 out of 76 years of the model simulation. Conversely, unappropriated flow is present in all but 8 years at Richmond in the lower basin, and often in large quantities. Unappropriated flow is not available at Richmond for three years during the severe drought of the 1950s, which is the lowest flow period during the 1940 to 2015 simulation period at this gage.

Figure 3-9. Simulated Annual Unappropriated Flow at Brazos River at South Bend

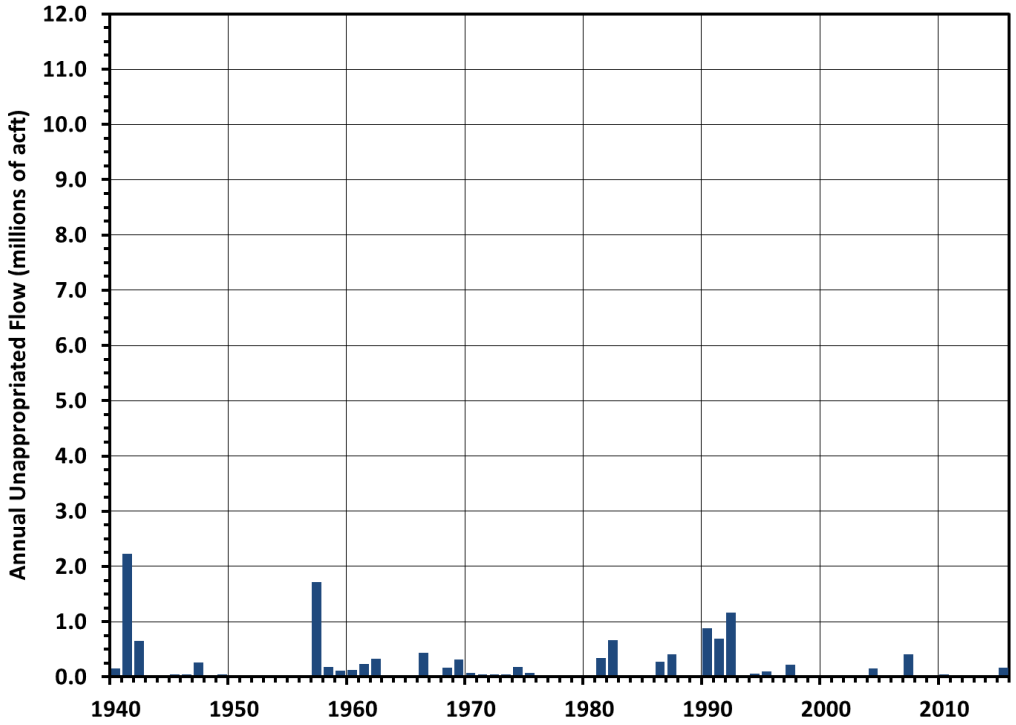


Figure 3-10. Simulated Annual Unappropriated Flow at Brazos River near Glen Rose

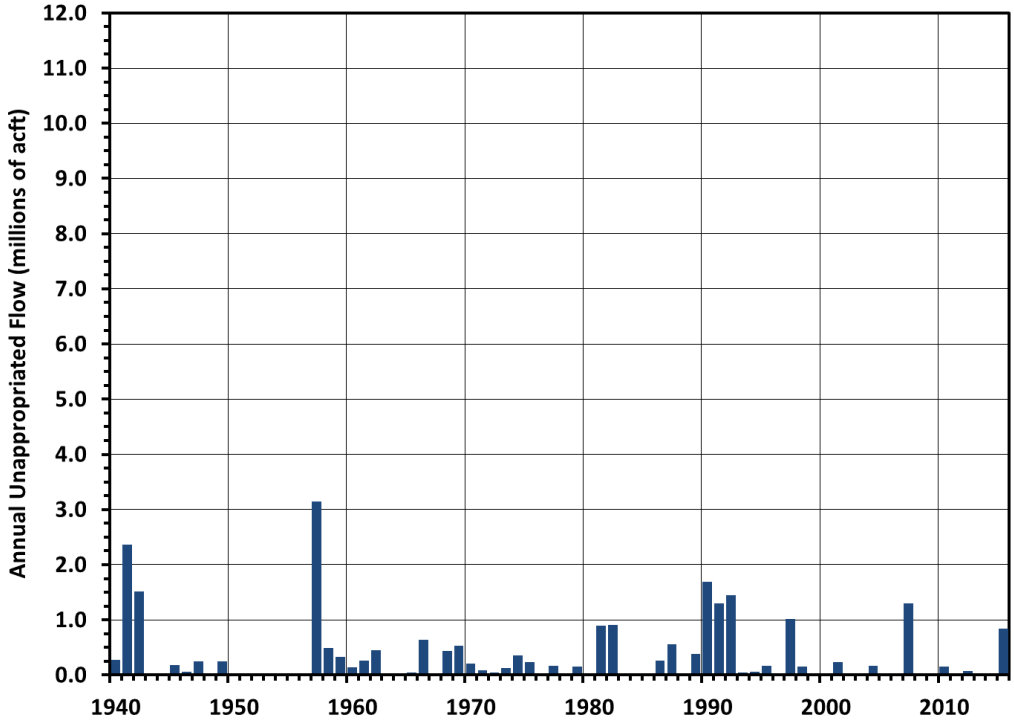


Figure 3-11. Simulated Annual Unappropriated Flow at Brazos River near Aquilla

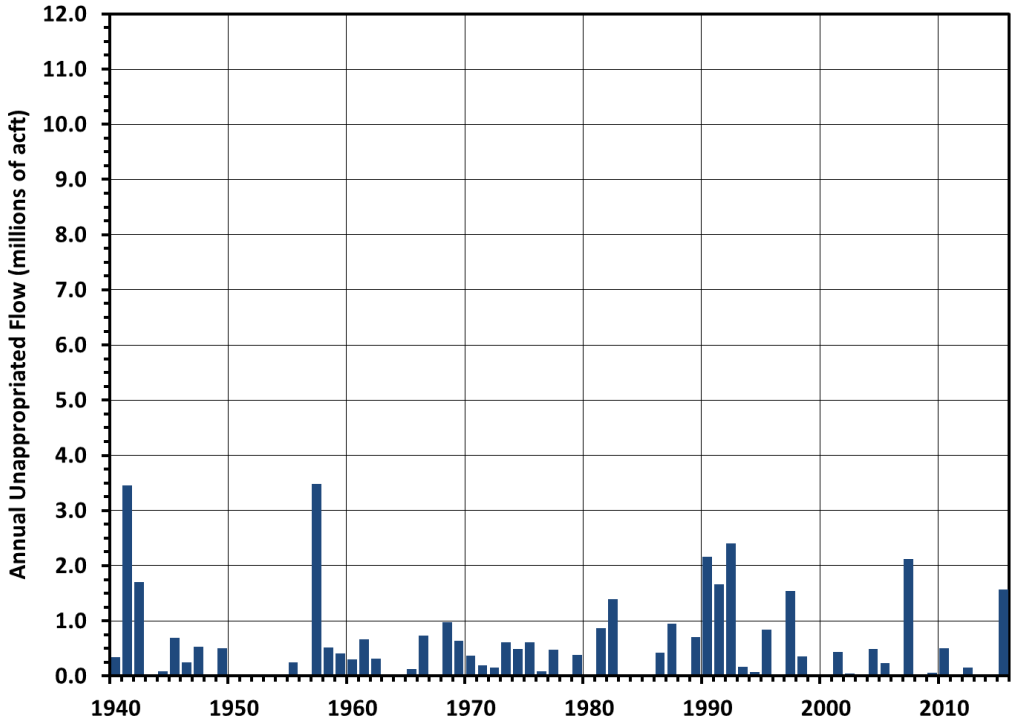


Figure 3-12. Simulated Annual Unappropriated Flow at Brazos River near Waco

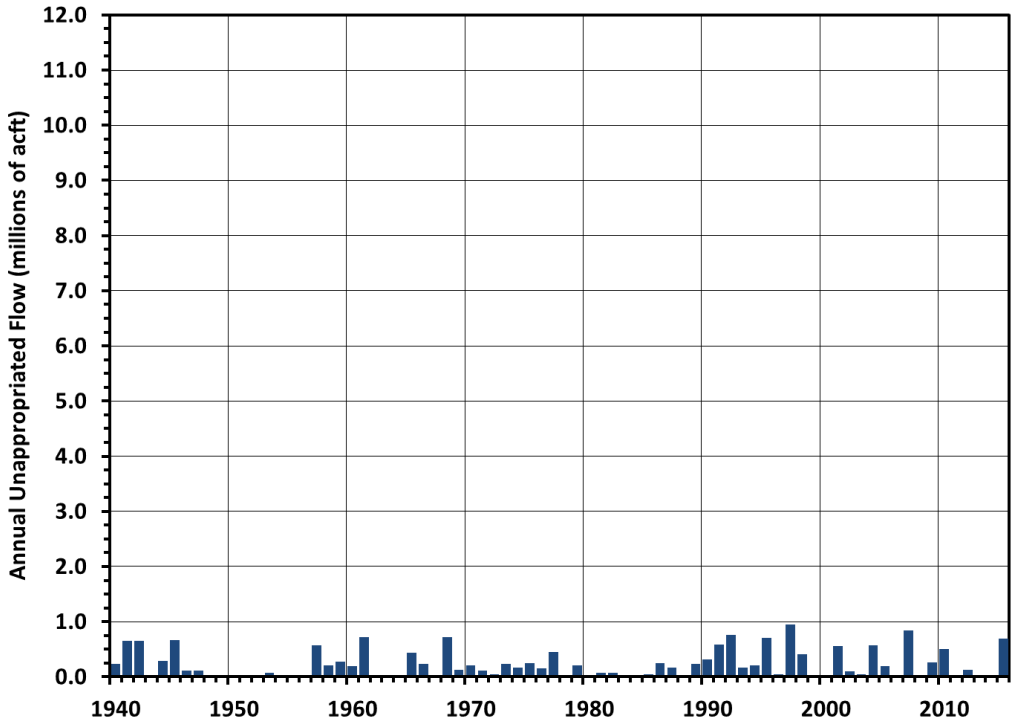


Figure 3-13. Simulated Annual Unappropriated Flow at Little River at Cameron

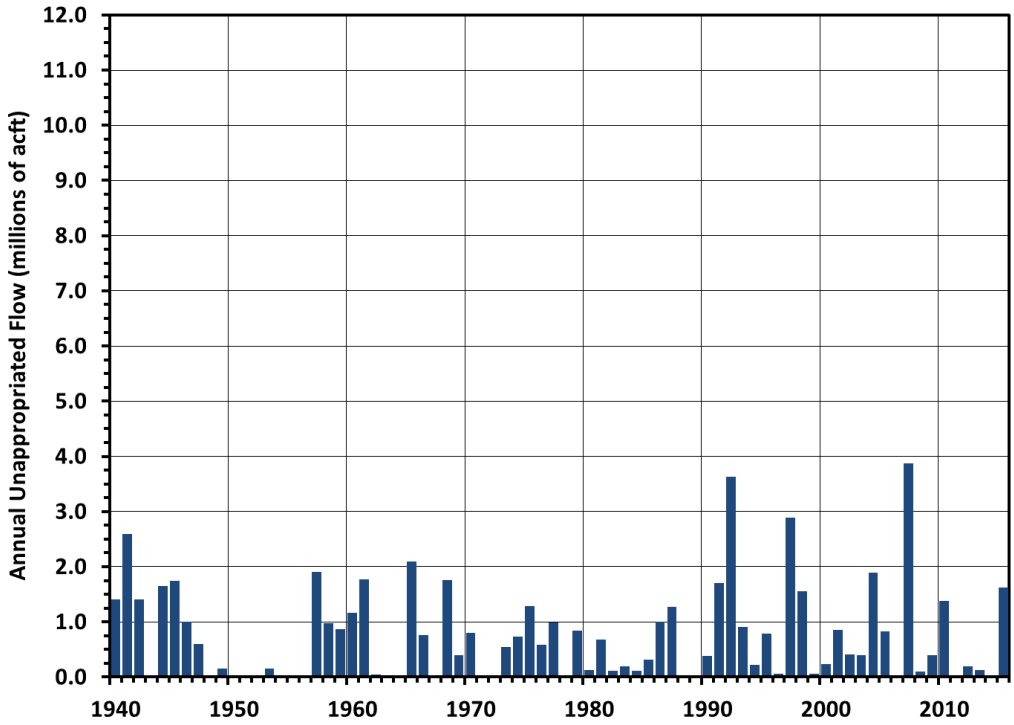


Figure 3-14. Simulated Annual Unappropriated Flow at Brazos River near Bryan

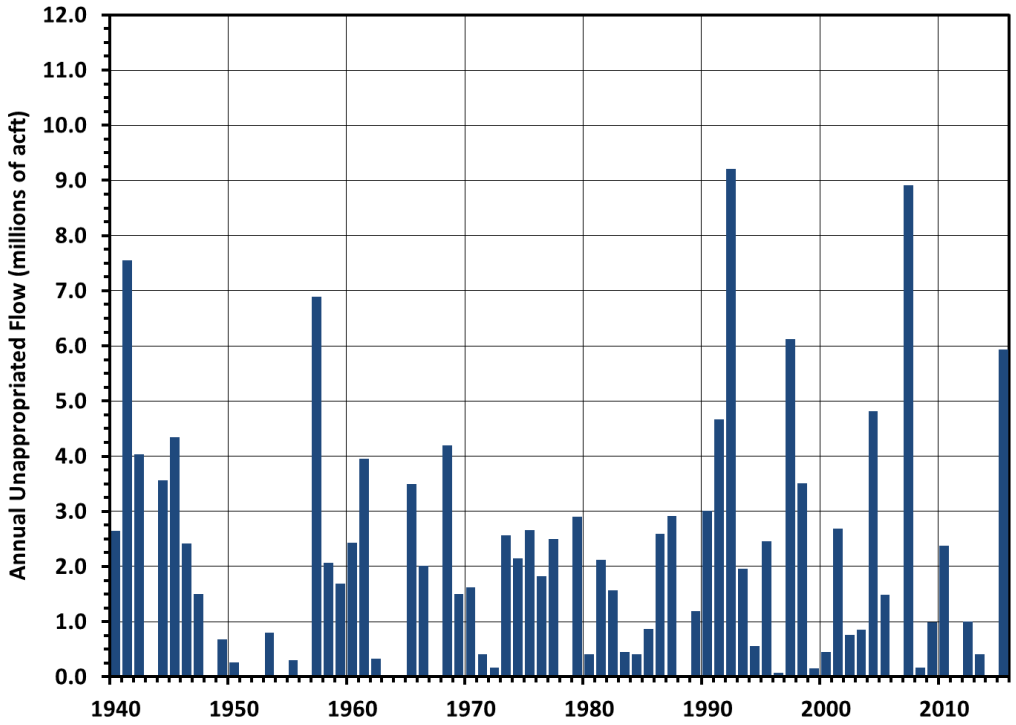


Figure 3-15. Simulated Annual Unappropriated Flow at Brazos River near Hempstead

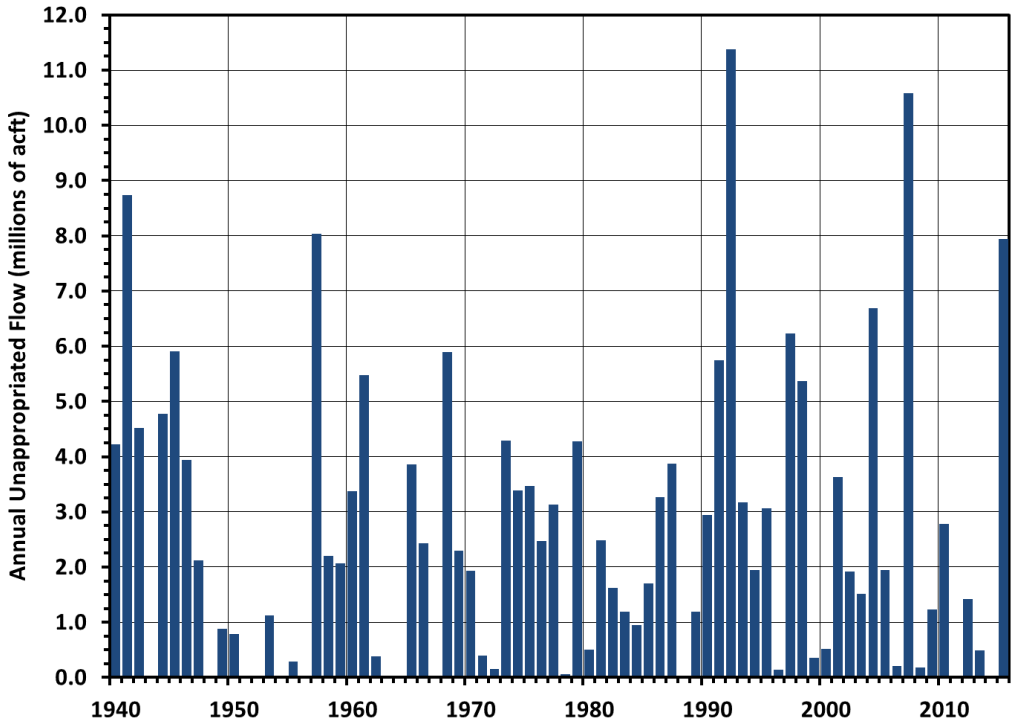
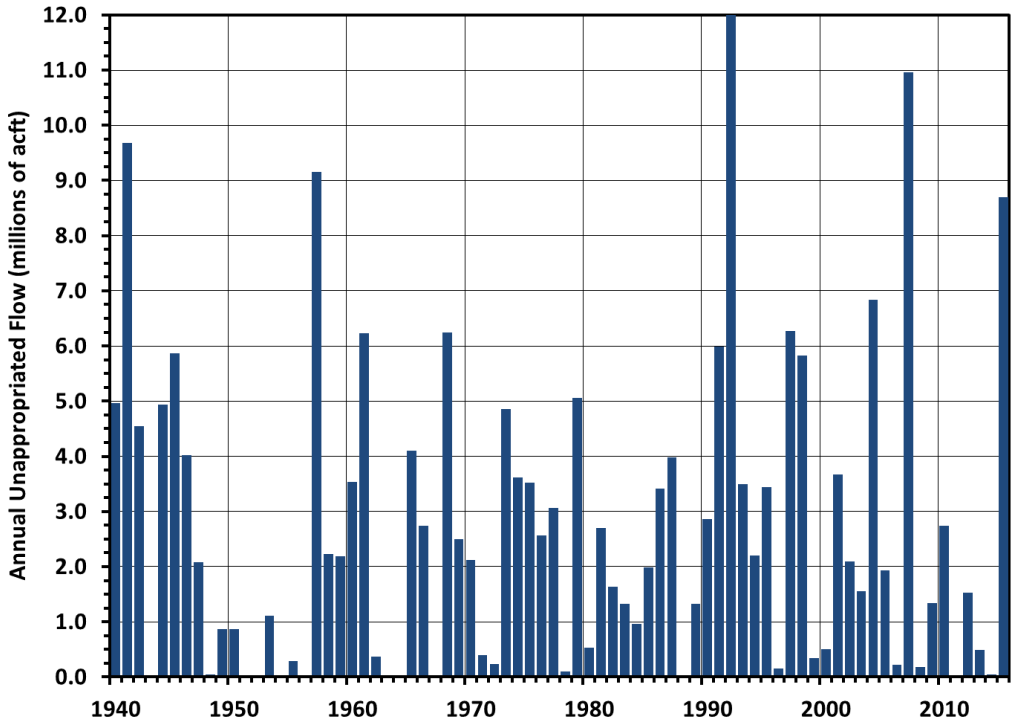


Figure 3-16. Simulated Annual Unappropriated Flow at Brazos River at Richmond



3.2.7 Local Surface Water Supplies

The local surface water supplies are used for livestock supplies in the Brazos G area. These supplies are firm and would be available through a drought of record given that they are reflected in the State's water availability models through the underlying streamflow gage data upon which the naturalized streamflows are based.

3.3 Water Quality Considerations Affecting Supply

The Brazos G WAM addresses the quantity of water available to existing water rights. However, water quality from some sources of water for existing water rights and contracts may limit the availability of water for certain beneficial uses. Water quality that does not meet criteria for designated uses such as public water supply, contact recreation, and aquatic life support is important to water supply considerations.

3.3.1 Point and Non-Point Source Pollution Water Quality

A number of stream segments and lakes in the Brazos G Area do not meet water quality standards due to point and/or nonpoint source pollution. The total maximum daily loads (TMDL) and individual water quality-based effluent limitations defined in 40 CFR 130.7 give TCEQ and U.S. Environmental Protection Agency (USEPA) the responsibility to identify water bodies that do not meet or are not expected to meet applicable water quality standards for designated uses.

As required under Sections 303(d) and 304(a) of the federal Clean Water Act, the 303(d) list identifies the water bodies in or bordering Texas for which effluent limitations are not

stringent enough to implement water quality standards, and for which the associated pollutants are suitable for measurement by maximum daily load. Texas' 303(d) list is included as part of the Texas Integrated Report of Surface Water Quality[1].

One of three subcategories is assigned to each impaired parameter to provide information about water quality status and management activities on that water body. The categories are defined as:

- Category 5: The water body does not meet applicable water quality standards or is threatened for one or more designated uses by one or more pollutants.
- Category 5a - TMDLs are underway, scheduled, or will be scheduled for one or more parameters.
- Category 5b - A review of the standards for one or more parameters will be conducted before a management strategy is selected, including the possible revision to the water quality standards.
- Category 5c - Additional data or information will be collected and/or evaluated for one or more parameters before a management strategy is selected.

The Brazos G Area stream segments and lakes identified in Texas' 303(d) list are summarized in Table 3-9[2].

Table 3-9. 2012 Draft Texas 303(d) List (November 8, 2019) Brazos G Regional Planning Area

Segment Number	Segment Name	County	Category	Parameter of Concern	Year First Listed
1202	Brazos River Below Navasota River	Grimes	5c	Bacteria	2018
1204A	Camp Creek	Johnson	5c	Bacteria	2010
1208	Brazos River Above Possum Kingdom Lake	Young / Stonewall	5c	Bacteria	2008
1209	Navasota River Below Lake Limestone	Grimes/ Robertson	5a	Bacteria	2002
1209A	Country Club Lake	Brazos	5c	Toxicity in sediment	1999
1209B	Fin Feather Lake	Brazos	5c	Toxicity in sediment	2000
1209E	Wickson Creek	Brazos	5b	Bacteria	2006
1209H	Duck Creek	Robertson	5c	Bacteria	2006
			5b	Depressed dissolved oxygen	2012

[1] 2018, TCEQ. 2018 Draft Texas Integrated Report of Surface Water Quality.

[2] Texas Commission on Environmental Quality, 2018 Texas 303(d) List (November 8, 2018).

Table 3-9. 2012 Draft Texas 303(d) List (November 8, 2019) Brazos G Regional Planning Area

Segment Number	Segment Name	County	Category	Parameter of Concern	Year First Listed
1209I	Gibbons Creek	Grimes	5b	Bacteria	2002
			5c	Depressed dissolved oxygen	2016
1209J	Shepherd Creek	Madison	5c	Bacteria	2002
1209K	Steele Creek	Limestone	5b	Bacteria	2002
1210A	Navasota River above Lake Mexia	Hill	5c	Bacteria	2002
1211A	Davidson Creek	Burleson	5c	Bacteria	2002
			5c	Depressed dissolved oxygen	2010
1212	Lake Somerville	Burleson / Washington	5c	pH	2002
1212A	Middle Yegua Creek	Lee / Williamson	5c	Bacteria	2010
1213	Little River	Milam / Bell	5c	Bacteria	2006
1213A	Big Elm Creek	Milam	5c	Bacteria	2010
1217B	Sulphur Creek	Lampasas	5c	Bacteria	2016
1218	Nolan Creek / South Nolan Creek	Bell	5b	Bacteria	1996
1218C	Little Nolan Creek	Bell	5b	Bacteria	2010
1221	Leon River below Proctor Lake	Comanche/ Coryell	5c	Bacteria	1996
1221A	Resley Creek	Comanche	5b	Bacteria	2004
			5b	Depressed dissolved oxygen	2006
1221D	Indian Creek	Comanche	5b	Bacteria	2006
1222A	Duncan Creek	Comanche	5c	Bacteria	1999
1222B	Rush-Copperas Creek	Comanche	5c	Bacteria	2006
1222C	Sabana River	Comanche / Eastland	5b	Bacteria	2006
1222E	Sweetwater Creek	Comanche	5c	Bacteria	2006

Table 3-9. 2012 Draft Texas 303(d) List (November 8, 2019) Brazos G Regional Planning Area

Segment Number	Segment Name	County	Category	Parameter of Concern	Year First Listed
1223	Leon River Below Leon Reservoir	Comanche / Eastland	5c	Bacteria	2006
			5c	Depressed dissolved oxygen	2008
1226B	Green Creek	Erath	5c	Depressed dissolved oxygen	2006
1226G	Spring Creek	Hamilton	5c	Bacteria	2018
1226K	Little Duffau Creek	Erath	5c	Bacteria	2006
1227	Nolan River	Hill / Johnson	5b	Sulfate	2002
			5c	Bacteria	2018
			5b	TDS	2006
1232	Clear Fork Brazos River	Fisher	5c	Bacteria	2018
			5c	pH	2016
1232A	California Creek	Haskell / Jones	5b	Bacteria	2010
			5c	Impaired fish community	2016
1238	Salt Fork Brazos River	Kent/Crosby	5c	Chloride	2016
1241	Double Mountain Fork Brazos River	Stonewall / Kent	5b	Bacteria	2010
1242B	Cottonwood Branch	Brazos	5c	Bacteria	2006
1242C	Still Creek	Brazos	5c	Bacteria	2006
1242D	Thompsons Creek	Brazos	5b	Bacteria	2002
			5b	Depressed dissolved oxygen	2006
1242F	Pond Creek	Falls	5c	Bacteria	2010
1242I	Campbells Creek	Falls	5c	Bacteria	2002
1242J	Deer Creek	Falls	5c	Bacteria	2006
1242K	Mud Creek	Robertson	5b	Bacteria	2002
1242L	Pin Oak Creek	Robertson	5b	Bacteria	2002
1242M	Spring Creek	Robertson	5b	Bacteria	2002
1242O	Walnut Creek	Robertson	5b	Bacteria	2006

Table 3-9. 2012 Draft Texas 303(d) List (November 8, 2019) Brazos G Regional Planning Area

Segment Number	Segment Name	County	Category	Parameter of Concern	Year First Listed
1242P	Big Creek	Falls	5b	Bacteria	2002
1244	Brushy Creek	Milam / Williamson	5c	Bacteria	2006
1246E	Wasp Creek	McLennan / Coryell	5b	Bacteria	2002
1247A	Willis Creek	Williamson	5c	Bacteria	2002
1248C	Mankins Branch	Williamson	5c	Bacteria	2004
1252	Lake Limestone	Limestone/ Robertson	5c	pH	2016
1255	Upper North Bosque River	Erath	5c	Bacteria	1996
			5c	Depressed dissolved oxygen	2008
1255A	Goose Branch	Erath	5c	Bacteria	2002
1255C	Scarborough Creek	Erath	5c	Bacteria	2002
1255D	South Fork North Bosque River	Erath	5b	Bacteria	2010
1255E	Unnamed tributary of Goose Branch	Erath	5c	Bacteria	2002
1255G	Woodhollow Branch	Erath	5c	Bacteria	2002
1259	Leon River above Belton Lake	Coryell	5c	Bacteria	1996

The TCEQ has the responsibility to identify and prioritize water bodies that may require a TMDL allocation to address the cause and source of water quality impairment. Navasota River below Lake Limestone (Segment 1209) for bacteria, are categorized as 5a, meaning TMDLs are underway, scheduled, or will be scheduled for one or more parameters.

These water quality issues are beyond the scope of regional water planning activities. The Brazos G RWPG encourages TCEQ and USEPA to take responsibility and pursue their obligation to restore water quality to meet intended uses.

A substantial part of the salt load in the Brazos River is contributed by Croton Creek and Salt Croton Creek. The natural salt pollution producing area is a semi-arid region of salt and gypsum encrusted hills and canyon-like stream valleys. The area is studded with salt springs and seeps. Wherever there is a joint or fracture in the stream bedrock material, the highly mineralized water seeps to the surface under artesian pressure. Massive salt flats, often 400 to 500 acres in size, are formed by this process. Salt and other minerals

are also leached out of the adjacent floodplain material that surrounds the salt flats and streams. The Brazos River receives a tremendous salt load when local rainfall is sufficient to dissolve the deposited salt and wash it out of the salt flats. Naturally occurring salinity, commonly measured as total dissolved solids (TDS), has long been recognized as an issue in the Brazos Basin.

The TCEQ has issued a secondary standard for TDS of 1,000 milligrams per liter (mg/L). Water sources with TDS concentrations exceeding this standard are generally considered as low quality and may require higher cost advanced treatment methods for use as a municipal or industrial supply. This concentration is routinely exceeded in the upper Brazos Basin, but tributary inflows of relatively low TDS water gradually reduces TDS concentrations in a downstream direction. TDS concentrations at the Seymour gage equal or exceed the TDS limit in 99.7 percent of the period of record, with a mean concentration of 3,356 mg/L. Further downstream, TDS concentrations average 1,512 mg/L at Possum Kingdom Lake and 928 mg/L at Lake Whitney, exceeding the secondary standard in 93.6 percent of the months and in 40.0 percent of the months, respectively. At College Station, concentrations equal or exceed the TDS limit in 2.2 percent of the months, with an average concentration of 438 mg/L. Finally, at the Richmond gage, the downstream-most gage with available data (92 river miles above the Gulf of Mexico), TDS concentrations do not exceed the secondary standard and have an average concentration of 339 mg/L.

3.3.2 Comparison of Supplies with Water Quality Standards

Numerous stream segments within the Brazos G Area are listed on the State's 303(d) list for bacteria levels that exceed the standards for contact recreation; however, bacteria, unlike salts, are easily managed through required conventional water treatment to meet drinking water standards.

3.3.3 Special Water Quality Studies and Activities in the Brazos River Basin

There are several special water quality studies that are on-going in the Brazos River Basin as described in the Brazos River Authority's 2019 Basin Highlights Report. A brief summary of these projects is described below.

Little River, San Gabriel River, and Big Elm Creek Watershed Inventory

The BRA is working on the Little River watershed to lower elevated levels of E. Coli. The watershed inventory was developed with data and information on water quality impairment and issues in the watershed. In April 2017 the Texas Water Resources Institute competed a report to address the water quality issues using a GIS tool that was developed to integrate numerous existing information resources. Big Elm Creek is developing a Watershed Protection Plan, which will hopefully be adopted Fall of 2020.

Watershed Protection Plan for Lake Granger and San Gabriel River

The BRA and the Little River–San Gabriel Soil and Water Conservation District are developing a Watershed Protection Plan for Lake Granger and the San Gabriel River to address water quality issues of stream erosion, sedimentation and bacteria

concentrations. This plan was developed in 2011 by the BRA. The district has received funding to aid participants implementing best management practices on agricultural lands. This plan is currently being implemented.[3]

Watershed Protection Plan for Leon River

TCEQ began developing a TMDL for the river segment between Lake Procter and Hamilton in 2002 for bacteria concentrations. The BRA is working with stakeholders and the Texas State Soil and Water Conservation Board to develop a Watershed Protection Plan to assist TCEQ in selecting implementation strategies for the TMDL. The USEPA approved the plan in early 2015 and the Leon River Watershed Protection Plan (WPP) is currently being implemented[4].

Watershed Protection Plan for Lampasas River

The Lampasas River was flagged by the TCEQ to implement a watershed protection plan due to elevated levels of bacteria in 2002. The Lampasas River Watershed Partnership and local residents worked to create a WWP. They made recommendations for voluntary pollutant load reductions. The WWP was submitted to the USEPA in 2013 and it is now being implemented[5].

Watershed Protection Plan for Nolan Creek and South Nolan Creek

The TCEQ listed Nolan Creek and South Nolan Creek on the 303(d) impaired for elevated bacteria concentrations in 1996. The Nolan Creek Partnership has provided local input for the development of a WWP, which is almost complete. The goal is to provide education programs and practices to improve the water quality. The WWP will hopefully be accepted in spring of 2019 by the USEPA.

Watershed Protection Plan for the Navasota River below Lake Limestone

The Navasota River and several tributaries were listed as imparted by the TCEQ in 2002 for elevated E. coli concentrations, low dissolved oxygen, elevated nutrients, and chlorophyll-a. The watershed stakeholders created a Navasota River below Lake Limestone Watershed Protection Plan. This plan included management strategies to retain landscape, removing feral hogs, livestock, on-site sewage facilities, pets and wastewater. All management recommendation were voluntary. The WWP was approved by the USEPA in 2017 and is currently being implemented[6]. The watershed stakeholders are also pursuing a TMDL that is in review with the TCEQ.

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[3] BRA, 2011. Lake Granger and San Gabriel River Water Protection Plan. https://www.tsswcb.texas.gov/sites/default/files/files/programs/nonpoint-source-managment/Completed%20Projects/Lake_Granger_and_San_Gabriel_River_WPP.pdf

[4] Parsons Water & Infrastructure Inc. and the Brazos River Authority. Watershed Protection Plan for the Leon River Below Proctor Lake and Above Belton Lake. http://leonriver.tamu.edu/media/1110/final-leon-wpp.pdf

[5] Lampasas River Watershed Protection Plan. http://www.lampasasriver.org/.

[6] Navasota River Below Lake Limestone Watershed Protection Plan. http://twri.tamu.edu/media/661581/tr-497.pdf

3.4 Groundwater Availability

Seventeen aquifers underlie parts of the Brazos G Area, including six of the major and eleven of the minor aquifers in Texas[7]. The locations of the major and minor aquifers are shown in Chapter 1 of this report.

3.4.1 Method of Determination

When available, the amount of groundwater available for development is based on the TWDB's determination of modeled available groundwater (MAG), which is based on desired future conditions (DFC), as established by members of Groundwater Conservation Districts within a Groundwater Management Area (GMA). If a groundwater availability model (GAM) is available for an aquifer, it is to be used by the TWDB in making the MAG determination. Otherwise, the TWDB uses analytical methods.

In the Brazos G Area, an official MAG has been determined by the TWDB at the county and river basin level for each of the delineated aquifers. The GMAs are shown in Figure 3-17.

In general terms, the MAG represents the annual volume of groundwater available which may be developed and, according to modeling, will still maintain aquifer parameters within the criteria established in the aquifer DFCs. When evaluating proposed pumping for regulatory approval, the MAG serves as a guideline and may be one of multiple guidelines referenced. However, for planning purposes, the MAGs are considered hard caps of which annual groundwater production cannot exceed.

The MAG determination is based upon drought-of-record conditions which would occur simultaneously with increased, dry-year demands. For groundwater systems sensitive to annual hydrologic variability, this this is a ration approach. However, supplies from some aquifer systems, such as the Carrizo-Wilcox Aquifer, are not sensitive to annual or short-term fluctuations in hydrology. For these systems, simply applying the MAG has been found to be an overly conservative estimate of availability. With the realization that demands in many years will be substantially less than the dry-year demands, the Brazos G Regional Water Planning Group has adopted a MAG Peak Factor to increase planning supplies, which is based on developing an annual pumping pattern that reflects annual variation in pumping from an aquifer over a period while not exceeding the cumulative volume that would be pumped by the MAG in that same period. Any adjustments to the MAG, such as the MAG Peak Factor, must still honor the established DFCs for a given aquifer. A MAG Peak Factor is incorporated for the Carrizo-Wilcox Aquifer in Brazos County for this planning cycle. This peak factor is a composite factor representing the cumulative availability for the Carrizo-Wilcox Aquifer system from both the Carrizo and Simsboro Formations and represents an annual available groundwater supply which is 15 percent to 20 percent greater across the planning horizon than the MAG. The process for developing the MAG Peak Factors is presented in Appendix K.

For aquifers without an adopted MAG, the TWDB provided "total availability" estimates that are based on results from groundwater modeling during the development of the MAGs

[7] Texas Water Development Board, Water for Texas, 2019.

for other aquifers. For other aquifers, Brazos G utilized the groundwater availability estimate carried forward from the 2016 Brazos G Regional Water Plan; these were determined based on a variety of sources, predominately information from historical TWDB groundwater reports and the TWDB groundwater database. The Brazos G technical consultant requested specific groundwater availability estimates based on the above information and coordinated closely with TWDB staff to finalize the non-MAG groundwater availability estimates for aquifers in counties and river basins for which an official MAG has not been adopted.

Table 3-10 summarizes groundwater availability by county and aquifer. The sources of the estimates are described in Appendix B. The distribution of groundwater availability is summarized into western, central and eastern areas. As tabulated in Table 3-11 and shown in Figure 3-18, the groundwater in the Brazos G Area is not uniformly distributed, with about 15 percent occurring in the western area, about 33 percent in the central area, and about 52 percent in the eastern area.

Figure 3-17. Groundwater Management Areas in Brazos G

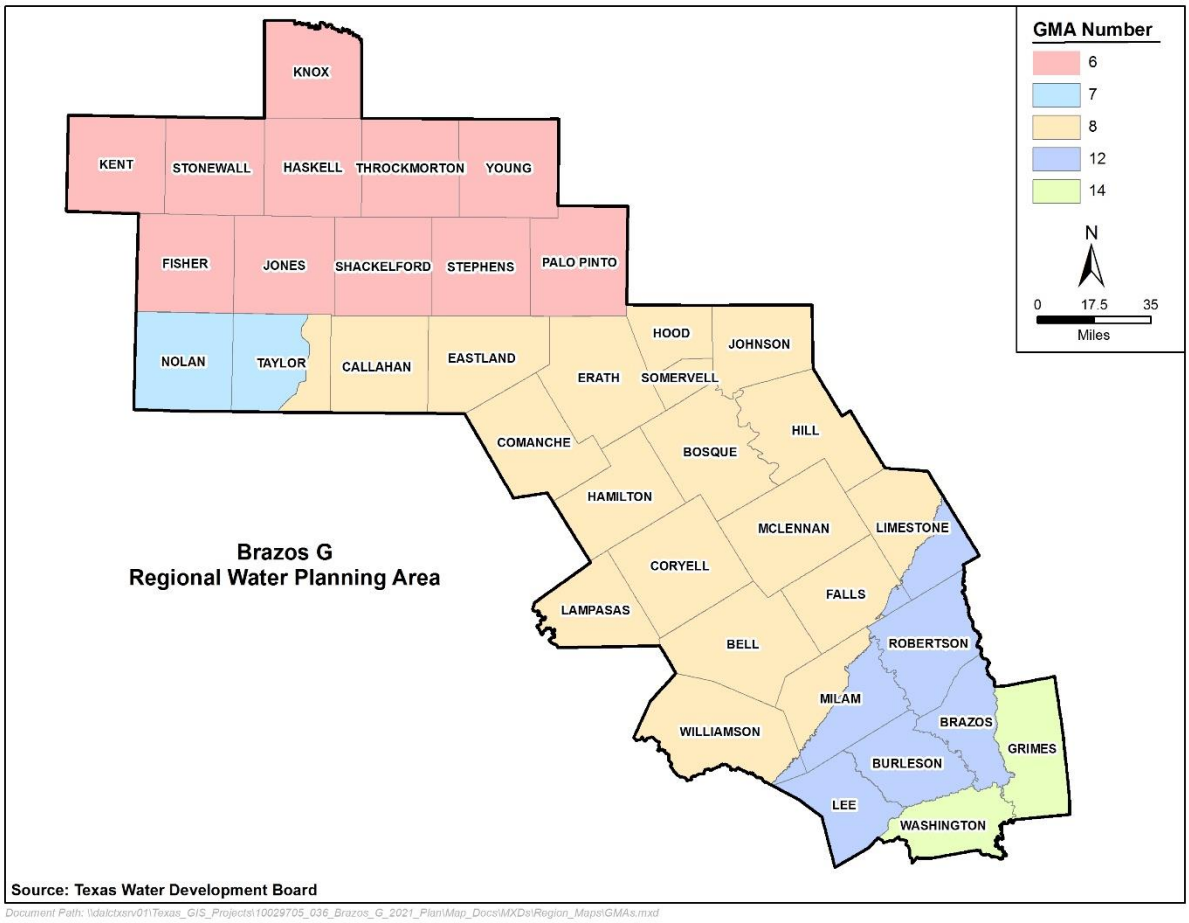


Table 3-10. Groundwater Availability Used in the 2021 Brazos G Regional Water Plan

County	Aquifer	Availability (acre-feet/year)					
		2020	2030	2040	2050	2060	2070
Bell	Edwards-BFZ (N. Segment)	6,469	6,469	6,469	6,469	6,469	6,469
	Trinity	9,267	9,241	9,267	9,241	9,267	9,241
	Subtotal	15,736	15,710	15,736	15,710	15,736	15,710
Bosque	Brazos River Alluvium [A]	830	830	830	830	830	830
	Trinity	8,788	8,762	8,788	8,762	8,788	8,762
	Subtotal	9,618	9,592	9,618	9,592	9,618	9,592
Brazos	Brazos River Alluvium	81,581	80,311	80,081	79,976	79,913	79,872
	Carrizo-Wilcox	44,832	47,844	49,418	53,969	57,167	57,167
	Carrizo-Wilcox (MAG Peak Factor)	53,350	55,977	59,302	63,683	65,742	65,742
	Gulf Coast [A]	1,189	1,189	1,189	1,189	1,189	1,189
	Queen City	836	883	887	891	891	891
	Sparta	5,404	6,505	7,507	8,509	8,509	8,509
	Yegua-Jackson	6,856	6,854	6,854	6,854	6,854	6,854
	Subtotal [B]	149,216	151,719	155,820	161,102	163,098	163,057
Burleson	Brazos River Alluvium	28,472	28,418	28,414	28,414	28,414	28,413
	Carrizo-Wilcox	23,242	28,039	32,511	36,485	38,694	38,694
	Queen City	416	447	447	447	447	447
	Sparta	2,246	4,042	5,613	6,735	6,735	6,735
	Yegua-Jackson	14,544	12,576	12,564	12,478	12,326	12,326
	Subtotal	68,920	73,522	79,549	84,559	86,616	86,615
Callahan	Trinity	1,729	1,725	1,729	1,725	1,729	1,725
	Subtotal	1,729	1,725	1,729	1,725	1,729	1,725
Comanche	Trinity	12,072	12,039	12,072	12,039	12,072	12,039
	Subtotal	12,072	12,039	12,072	12,039	12,072	12,039
Coryell	Trinity	4,503	4,491	4,503	4,491	4,503	4,491
	Subtotal	4,503	4,491	4,503	4,491	4,503	4,491

Table 3-10. Groundwater Availability Used in the 2021 Brazos G Regional Water Plan

County	Aquifer	Availability (acre-feet/year)					
		2020	2030	2040	2050	2060	2070
Eastland	Trinity	5,747	5,732	5,747	5,732	5,747	5,732
	Subtotal	5,747	5,732	5,747	5,732	5,747	5,732
Erath	Trinity	20,658	20,599	20,658	20,599	20,658	20,599
	Subtotal	20,658	20,599	20,658	20,599	20,658	20,599
Falls	Brazos River Alluvium [A]	16,684	16,684	16,684	16,684	16,684	16,684
	Carrizo-Wilcox	867	875	884	895	895	895
	Trinity	1,438	1,434	1,438	1,434	1,438	1,434
	Subtotal	18,989	18,993	19,006	19,013	19,017	19,013
Fisher	Blaine	12,855	12,820	12,855	12,820	12,855	12,820
	Dockum	79	79	79	79	79	79
	Seymour	6,718	6,132	6,149	6,472	6,490	6,131
	Subtotal	19,652	19,031	19,083	19,371	19,424	19,030
Grimes	Brazos River Alluvium [A]	5,112	5,112	5,112	5,112	5,112	5,112
	Carrizo-Wilcox [A]	8,274	8,274	8,274	8,274	8,274	8,274
	Gulf Coast	13,996	13,996	13,996	13,996	13,996	13,996
	Navasota River Alluvium [A]	2,216	2,216	2,216	2,216	2,216	2,216
	Queen City [A]	637	637	637	637	637	637
	Sparta [A]	2,571	2,571	2,571	2,571	2,571	2,571
	Yegua-Jackson [A]	3,278	3,278	3,278	3,278	3,278	3,278
	Subtotal	36,084	36,084	36,084	36,084	36,084	36,084
Hamilton	Trinity	2,431	2,425	2,431	2,425	2,431	2,425
	Subtotal	2,431	2,425	2,431	2,425	2,431	2,425
Haskell	Seymour	41,750	41,636	41,750	41,636	41,750	41,636
	Subtotal	41,750	41,636	41,750	41,636	41,750	41,636
Hill	Brazos River Alluvium [A]	632	632	632	632	632	632
	Trinity	4,029	4,017	4,029	4,017	4,029	4,017
	Woodbine	588	586	588	586	588	586
	Subtotal	5,249	5,235	5,249	5,235	5,249	5,235

Table 3-10. Groundwater Availability Used in the 2021 Brazos G Regional Water Plan

County	Aquifer	Availability (acre-feet/year)					
		2020	2030	2040	2050	2060	2070
Hood	Trinity	12,458	12,424	12,458	12,424	12,458	12,424
	Subtotal	12,458	12,424	12,458	12,424	12,458	12,424
Johnson	Trinity	9,422	9,396	9,422	9,396	9,422	9,396
	Woodbine	1,985	1,980	1,985	1,980	1,985	1,980
	Subtotal	11,407	11,376	11,407	11,376	11,407	11,376
Jones	Seymour [A]	2,918	2,918	2,918	2,918	2,918	2,918
	Subtotal	2,918	2,918	2,918	2,918	2,918	2,918
Kent	Dockum [A]	6,250	6,250	6,250	6,250	6,250	6,250
	Seymour [A]	1,181	1,180	1,180	1,179	1,179	1,179
	Subtotal	7,431	7,430	7,430	7,429	7,429	7,429
Knox	Blaine [A]	700	700	700	700	700	700
	Seymour	29,036	26,640	26,224	26,530	29,166	26,973
	Subtotal	29,736	27,340	26,924	27,230	29,866	27,673
Lampasas	Ellenburger-San Saba	2,601	2,593	2,601	2,593	2,601	2,593
	Hickory	114	113	114	113	114	113
	Marble Falls	2,845	2,837	2,845	2,837	2,845	2,837
	Trinity	1,672	1,666	1,672	1,666	1,672	1,666
	Subtotal	7,232	7,209	7,232	7,209	7,232	7,209
Lee	Carrizo-Wilcox	21,142	20,516	20,558	21,466	19,069	19,069
	Queen City	757	774	791	810	829	829
	Sparta	1,483	1,487	1,490	1,493	1,494	1,494
	Trinity	0	0	0	0	0	0
	Yegua-Jackson [A]	635	635	635	635	635	635
	Subtotal	24,017	23,412	23,474	24,404	22,027	22,027
Limestone	Carrizo-Wilcox	11,353	11,483	11,664	11,966	11,966	11,966
	Trinity	0	0	0	0	0	0
	Subtotal	11,353	11,483	11,664	11,966	11,966	11,966
McLennan	Brazos River Alluvium [A]	15,023	15,023	15,023	15,023	15,023	15,023
	Trinity	20,691	20,635	20,691	20,635	20,691	20,635
	Woodbine	0	0	0	0	0	0

Table 3-10. Groundwater Availability Used in the 2021 Brazos G Regional Water Plan

County	Aquifer	Availability (acre-feet/year)					
		2020	2030	2040	2050	2060	2070
	Subtotal	35,714	35,658	35,714	35,658	35,714	35,658
Milam	Brazos River Alluvium	47,818	47,785	47,779	47,775	47,773	47,771
	Carrizo-Wilcox	23,928	20,211	19,119	21,366	22,327	22,327
	Queen City	53	56	56	56	56	56
	Trinity	0	0	0	0	0	0
	Subtotal	71,799	68,052	66,954	69,197	70,156	70,154
Nolan	Blaine [A]	100	100	100	100	100	100
	Dockum [A]	5,750	5,750	5,750	5,750	5,750	5,750
	Edwards-Trinity (Plateau) [A]	693	693	693	693	693	693
	Subtotal	6,543	6,543	6,543	6,543	6,543	6,543
Palo Pinto	Trinity [A]	12	12	12	12	12	12
	Subtotal	12	12	12	12	12	12
Robertson	Brazos River Alluvium	61,161	57,959	57,633	57,544	57,503	57,480
	Carrizo-Wilcox	46,590	47,400	47,881	48,281	48,282	48,282
	Queen City	368	309	309	309	309	309
	Sparta	510	510	510	510	510	510
	Subtotal	108,629	106,178	106,333	106,644	106,604	106,581
Shackelford	Cross Timbers [A]	712	712	712	712	712	712
	Other (Local) Aquifer [A]	97	97	97	97	97	97
	Subtotal	809	809	809	809	809	809
Somervell	Trinity	3,188	3,181	3,188	3,181	3,188	3,181
	Subtotal	3,188	3,181	3,188	3,181	3,188	3,181
Stephens	Cross Timbers [A]	620	620	620	620	620	620
	Other (Local) Aquifer [A]	85	85	85	85	85	85
	Subtotal	705	705	705	705	705	705
Stonewall	Blaine [A]	8,700	8,700	8,700	8,700	8,700	8,700
	Seymour [A]	233	230	224	215	214	214

Table 3-10. Groundwater Availability Used in the 2021 Brazos G Regional Water Plan

County	Aquifer	Availability (acre-feet/year)					
		2020	2030	2040	2050	2060	2070
	Subtotal	8,933	8,930	8,924	8,915	8,914	8,914
Taylor	Edwards-Trinity (Plateau) [A]	489	489	489	489	489	489
	Trinity	14	14	14	14	14	14
	Subtotal	503	503	503	503	503	503
Throckmorton	Seymour [A]	115	115	115	115	115	115
	Other (Local) Aquifer [A]	364	364	364	364	364	364
	Subtotal	479	479	479	479	479	479
Washington	Brazos River Alluvium [A]	5,770	5,770	5,770	5,770	5,770	5,770
	Gulf Coast	13,031	13,031	13,031	13,031	13,031	13,031
	Yegua-Jackson [A]	291	291	291	291	291	291
	Subtotal	19,092	19,092	19,092	19,092	19,092	19,092
Williamson	Carrizo-Wilcox	9	9	9	10	9	9
	Edwards-BFZ	3,452	3,452	3,452	3,452	3,452	3,452
	Hickory	0	0	0	0	0	0
	Trinity	3,513	3,503	3,513	3,503	3,513	3,503
	Other (Local) Aquifer [A]	665	665	665	665	665	665
	Subtotal	7,639	7,629	7,639	7,630	7,639	7,629
Young	Seymour [A]	309	258	258	258	258	258
	Other (Local) Aquifer [A]	1,018	1,018	1,018	1,018	1,018	1,018
	Subtotal	1,327	1,276	1,276	1,276	1,276	1,276

BFZ – Balcones Fault Zone
[A] – Indicates Non-MAG availability estimate.
[B] – Values calculated using MAG Peak Factor for the Carrizo-Wilcox Aquifer in Brazos County.

Table 3-11. Groundwater Availability from the Brazos G Area Aquifers

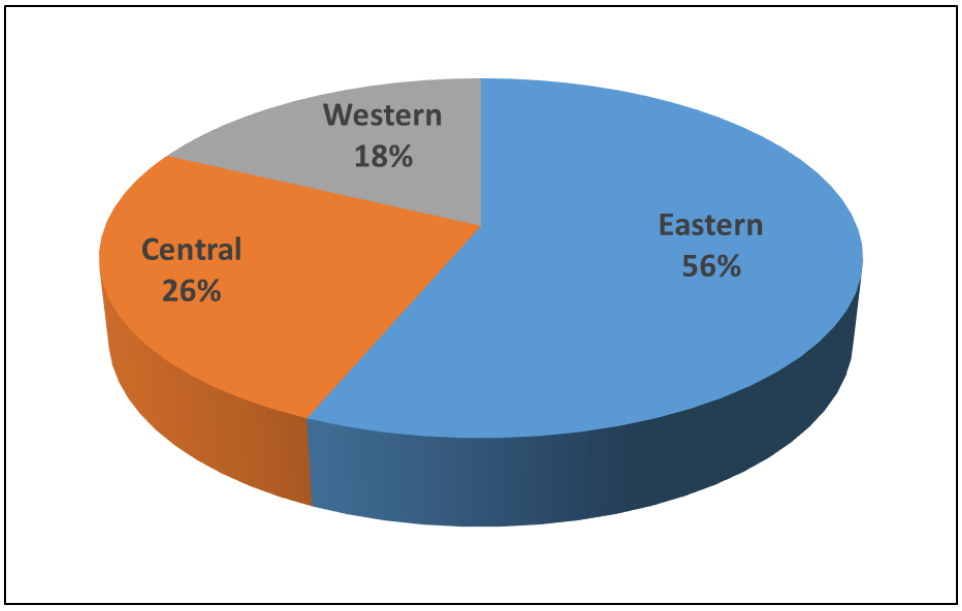
Aquifer	2070 Groundwater Availability (acft/yr)	Typical Range in Well Yields (gpm)
Western Area		
Blaine	4,400	less than 25
Cross Timbers	1,495	5 to 300
Dockum	7,388	100 to 400
Edwards-Trinity (Plateau)	1,029	5 to 300
Ogallala and Edwards Trinity- High Plains	3	
Other (Local) Aquifers	80	5 to 300
Seymour	74,848	100 to 1,000
Trinity	26	50 to 500
Subtotal:	**89,269**	
Central Area		
Brazos River Alluvium	15,333	250 to 500
Carrizo-Wilcox	5,620	100 to 3,000
Edwards-BFZ (Northern Segment)	7,269	200 to 2,000
Ellenburger-San Saba	129	Unknown
Gulf Coast	201	300 to 800
Marble Falls	23	less than 100
Other (Local) Aquifers	524	5 to 300
Trinity	99,163	50 to 500
Woodbine	948	50 to 150
Subtotal:	**129,210**	
Eastern Area		
Brazos River Alluvium	129,906	250 to 500
Carrizo-Wilcox	123,808	100 to 3,000
Gulf Coast	10,097	300 to 800
Queen City	1,689	200 to 500
Sparta	8,810	200 to 600
Navasota River Alluvium	58	Unknown

Table 3-11. Groundwater Availability from the Brazos G Area Aquifers

Aquifer	2070 Groundwater Availability (acft/yr)	Typical Range in Well Yields (gpm)
Yegua-Jackson	6,497	50 to 300
Trinity	758	50 to 500
Subtotal:	**281,623**	
Total:	**500,102**	

BFZ – Balcones Fault Zone.
ND indicates not determined.

Figure 3-18. Distribution of Groundwater by Area within Brazos G



3.4.2 Western Area

Only part of the western area is underlain by a major or minor aquifer, as shown in Figure 3-19. Together, the five aquifers, Blaine, Dockum, Cross Timbers, Edwards-Trinity (Plateau), and Seymour and the other (Local) aquifers, can supply up to 89,269 acft/yr. Of the five aquifers, the Seymour Aquifer has about 84 percent of the supplies and is scattered in six counties; however, about 90 percent of the supply is in Knox and Haskell counties. The Dockum Aquifer exists only on the western fringe and can contribute about 8 percent of the groundwater supply in the area (Figure 3-21).The Cross Timbers minor aquifer contributes 2 percent of the groundwater supply in the area. Undifferentiated aquifers underlie some of the area, including all of Shackelford, Stephens, Throckmorton, and Young counties. At best, the undifferentiated aquifers can provide only meager supplies for livestock and domestic uses.

Figure 3-19. Major Aquifers in the Western Area

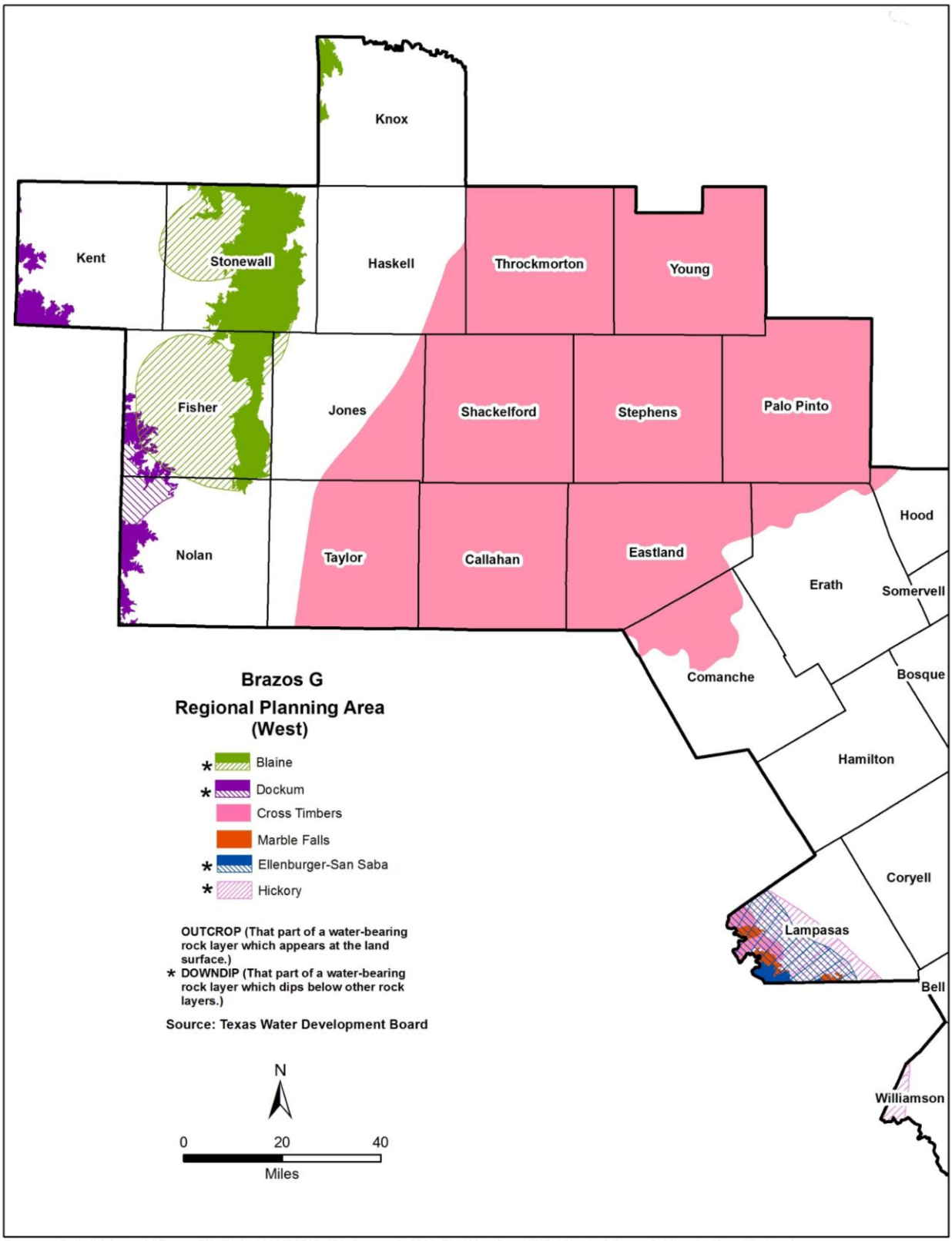


Figure 3-20. Minor Aquifers in the Western Area

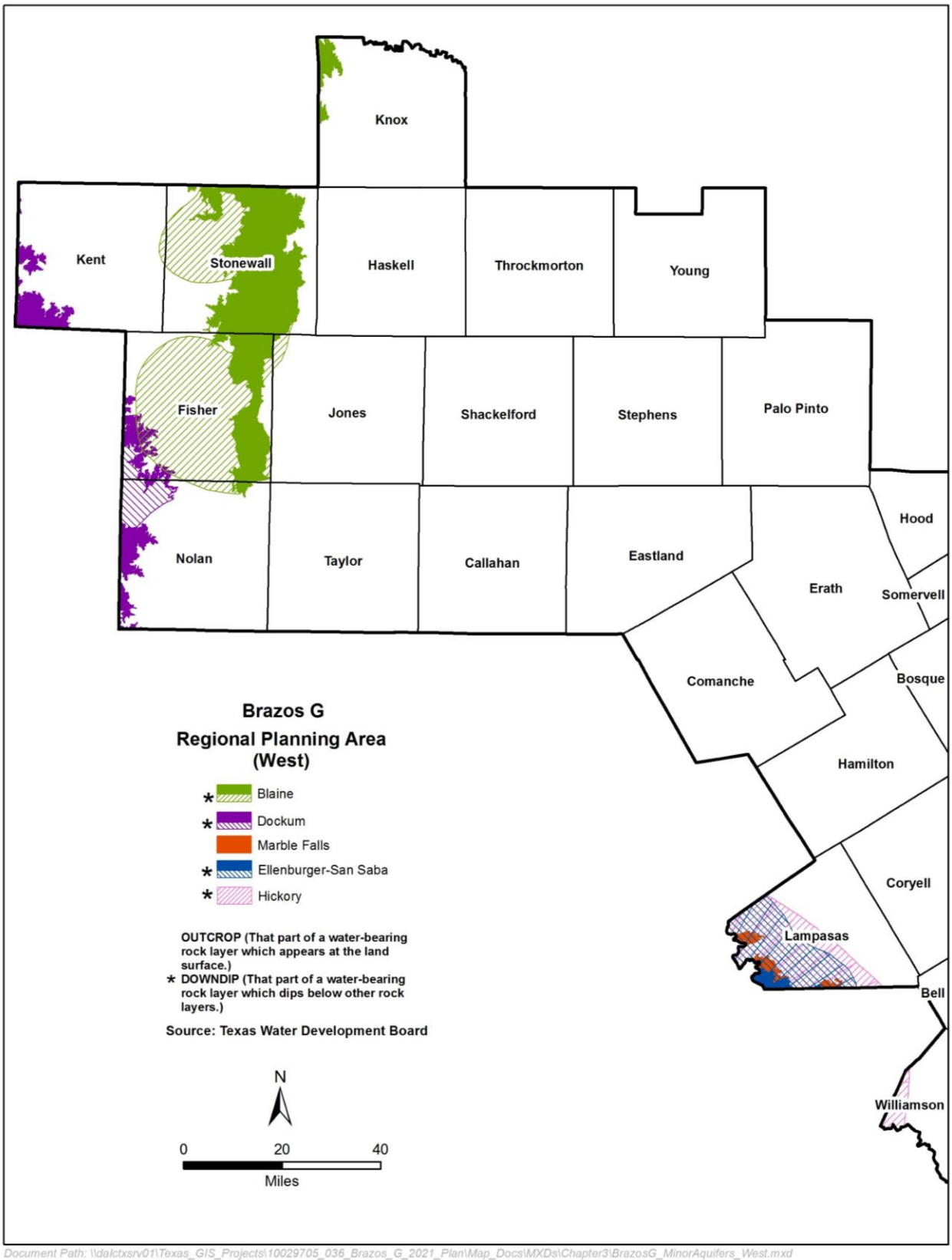


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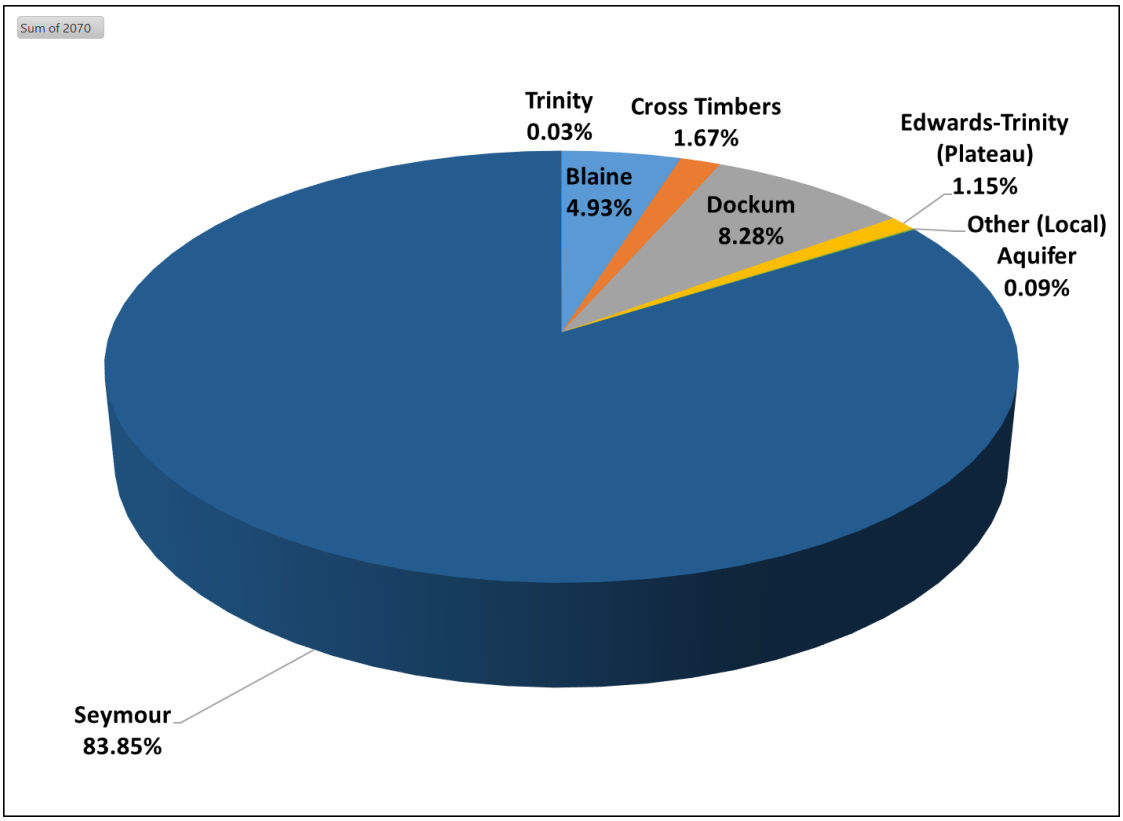
Figure 3-21. Groundwater Availability in the Western Area



3.4.3 Central Area

Major or minor aquifers exist in the southeastern two-thirds of the central area, as shown in Figure 3-22. Together, the nine aquifers (Brazos River Alluvium, Carrizo-Wilcox, Edwards-BFZ (Northern Segment), Ellenburger-San Saba, Gulf Coast, Marble Falls, Trinity, Woodbine, and Other (Local) Aquifers) can provide up to 129,210acft/yr. Of these aquifers, the Trinity Aquifer is most extensive and has about 77 percent of the supplies (Figure 3-24). Although the Trinity Aquifer as a whole can provide 99,163acft/yr, local areas have experienced very substantial drawdowns and probably will require many wells to be replaced with larger and deeper ones. The Edwards-BFZ (Northern Segment) exists only in parts of Bell and Williamson counties and has about five percent of the area's groundwater supply.

Figure 3-22. Major Aquifers in the Central Area

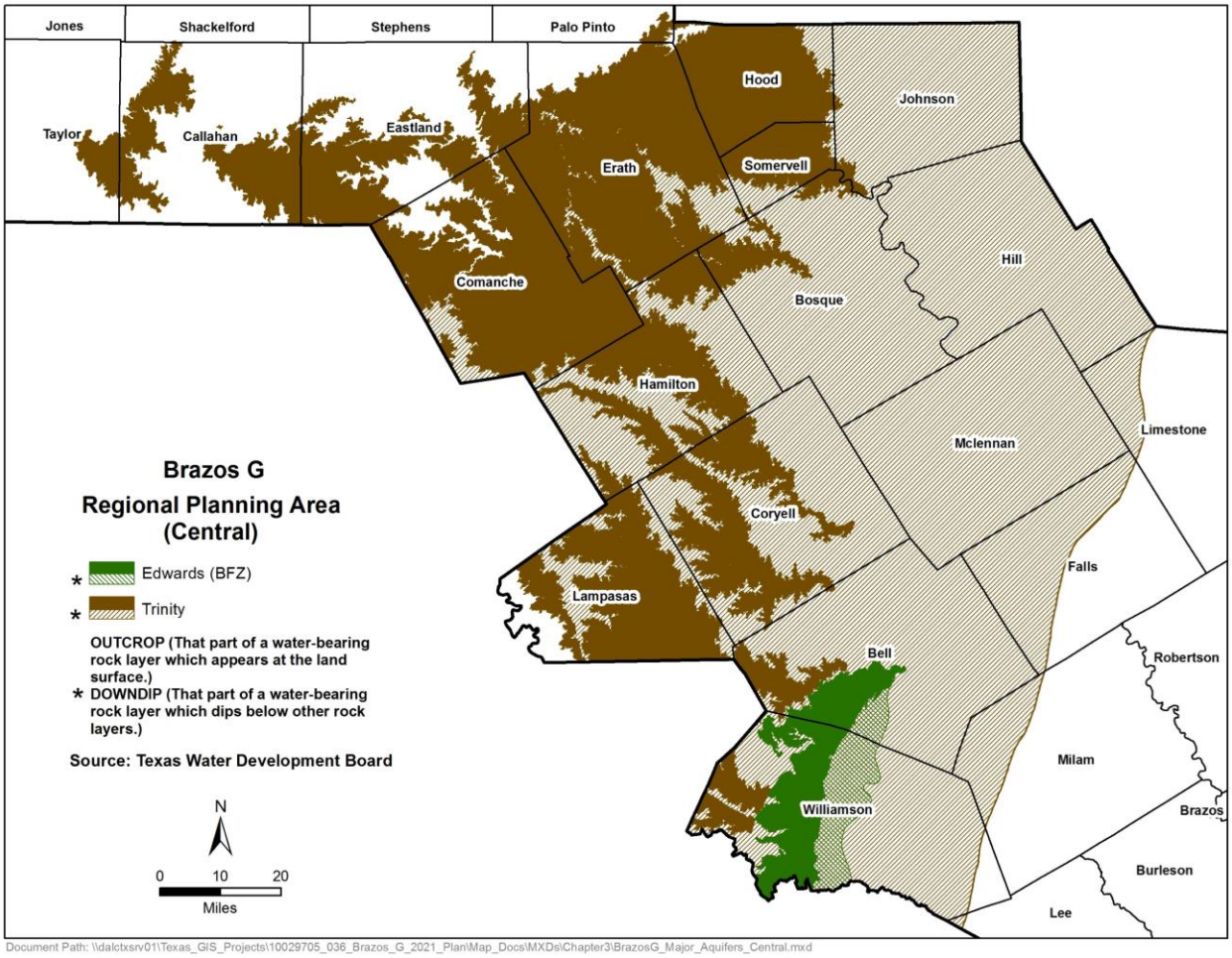


Figure 3-23. Minor Aquifers in the Central Area

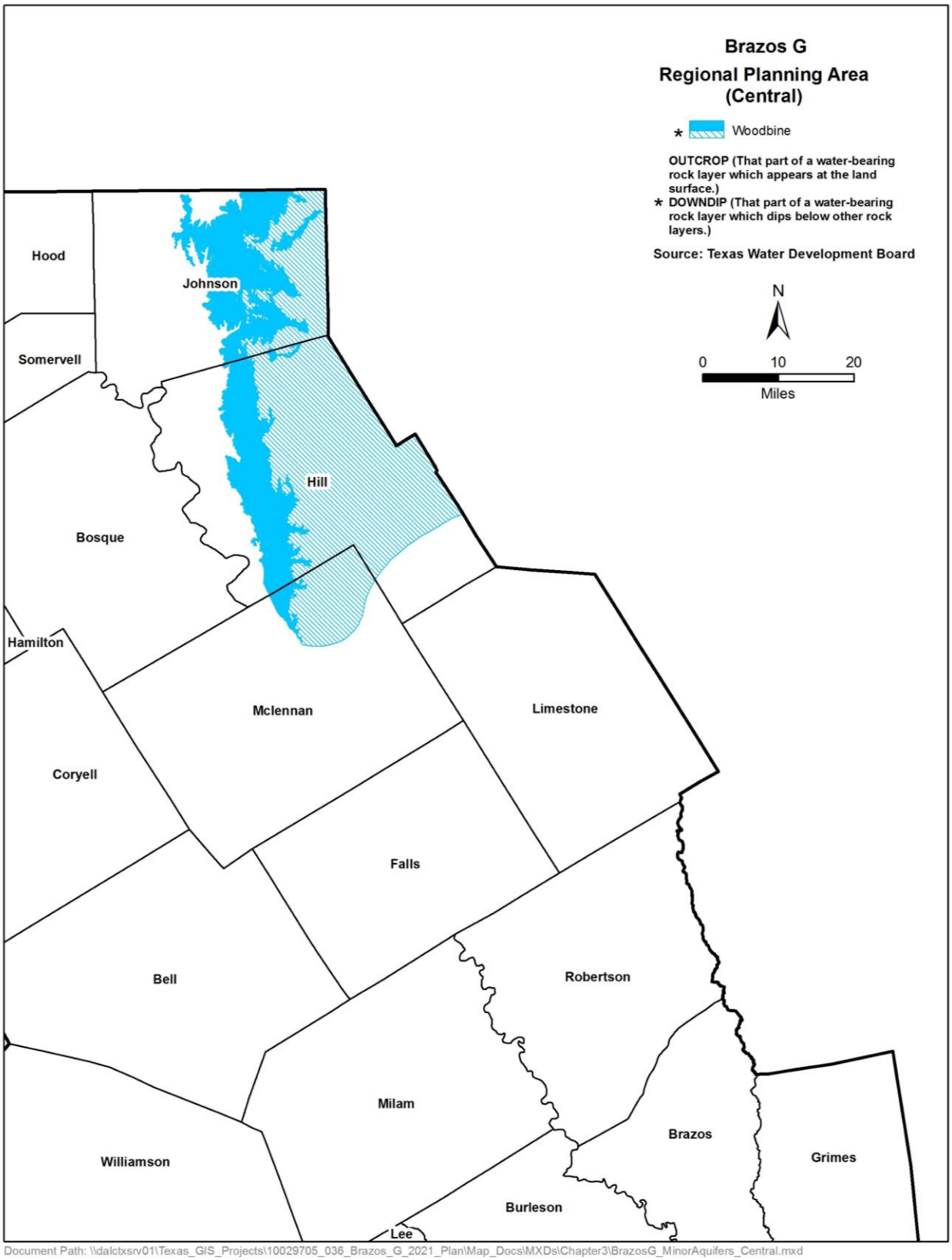
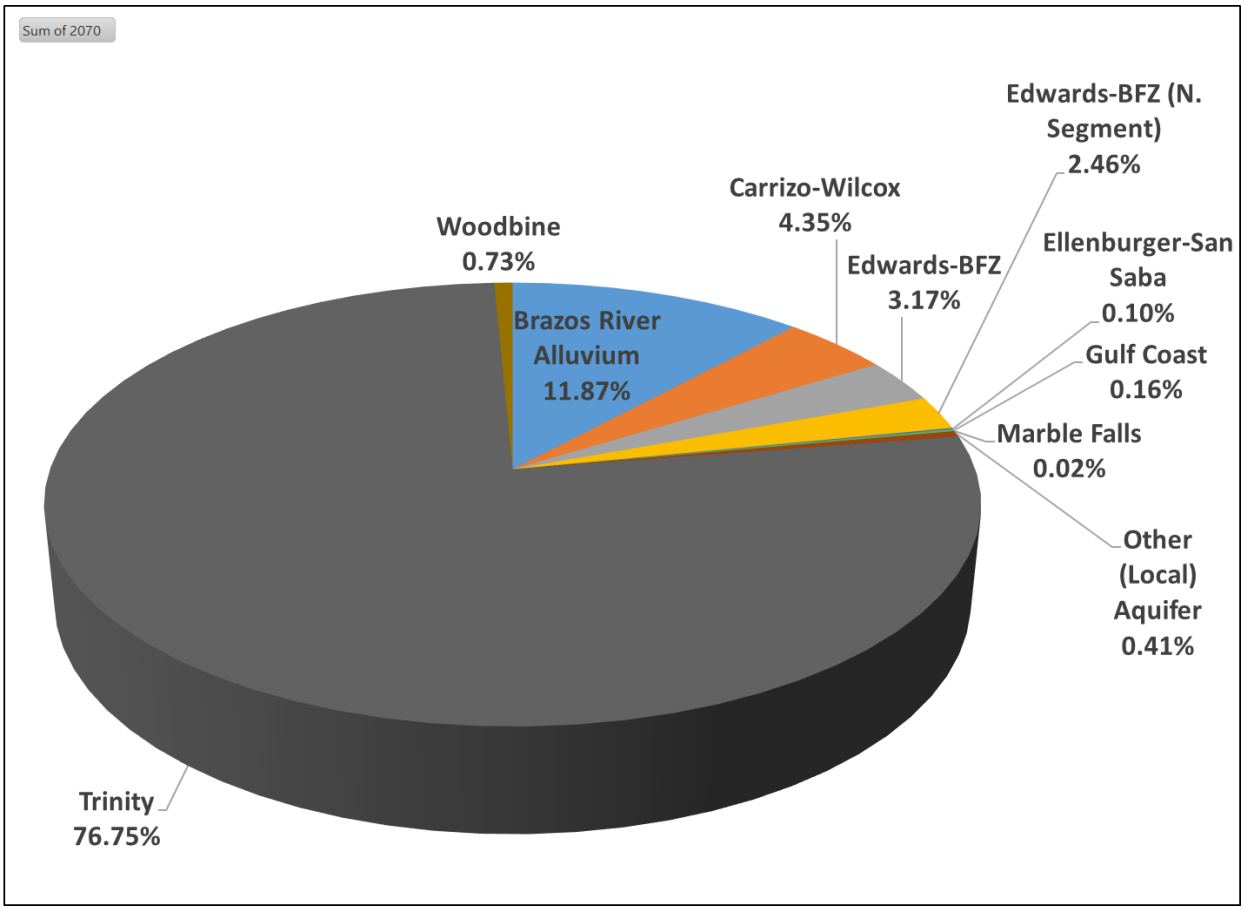


Figure 3-24. Groundwater Availability in the Central Area



3.4.4 Eastern Area

Major or minor aquifers exist throughout the eastern area except in the western fringe, as shown in Figure 3-25. Together, the eight aquifers (Brazos River Alluvium, Carrizo-Wilcox, Gulf Coast, Queen City, Sparta, Trinity, Navasota River Alluvium and Yegua-Jackson) can provide up to 281,623 acft/yr. Of these aquifers, the Carrizo-Wilcox Aquifer and Brazos River Alluvium Aquifers are most extensive and represents about 44 to 46 percent of the supplies, respectively (Figure 3-26 and Figure 3-27).

3.5 Supplies from Other Regions

Multiple entities within the Brazos G Area obtain water from sources owned by entities located outside of the region. These other sources include the Edwards Trinity Plateau Aquifer, Benbrook Reservoir, Navarro Mills Reservoir, the Colorado River MWD System, Lake Livingston (Trinity River Authority), Lake Clyde, Lake Joe Pool (TRA), Richland Chambers and/or Cedar Creek Reservoirs (TRWD), and the Highland Lakes System (LCRA). Table 3-12 summarizes the current supplies from other regions to the Brazos G Area.

Figure 3-25. Major Aquifers in the Eastern Area

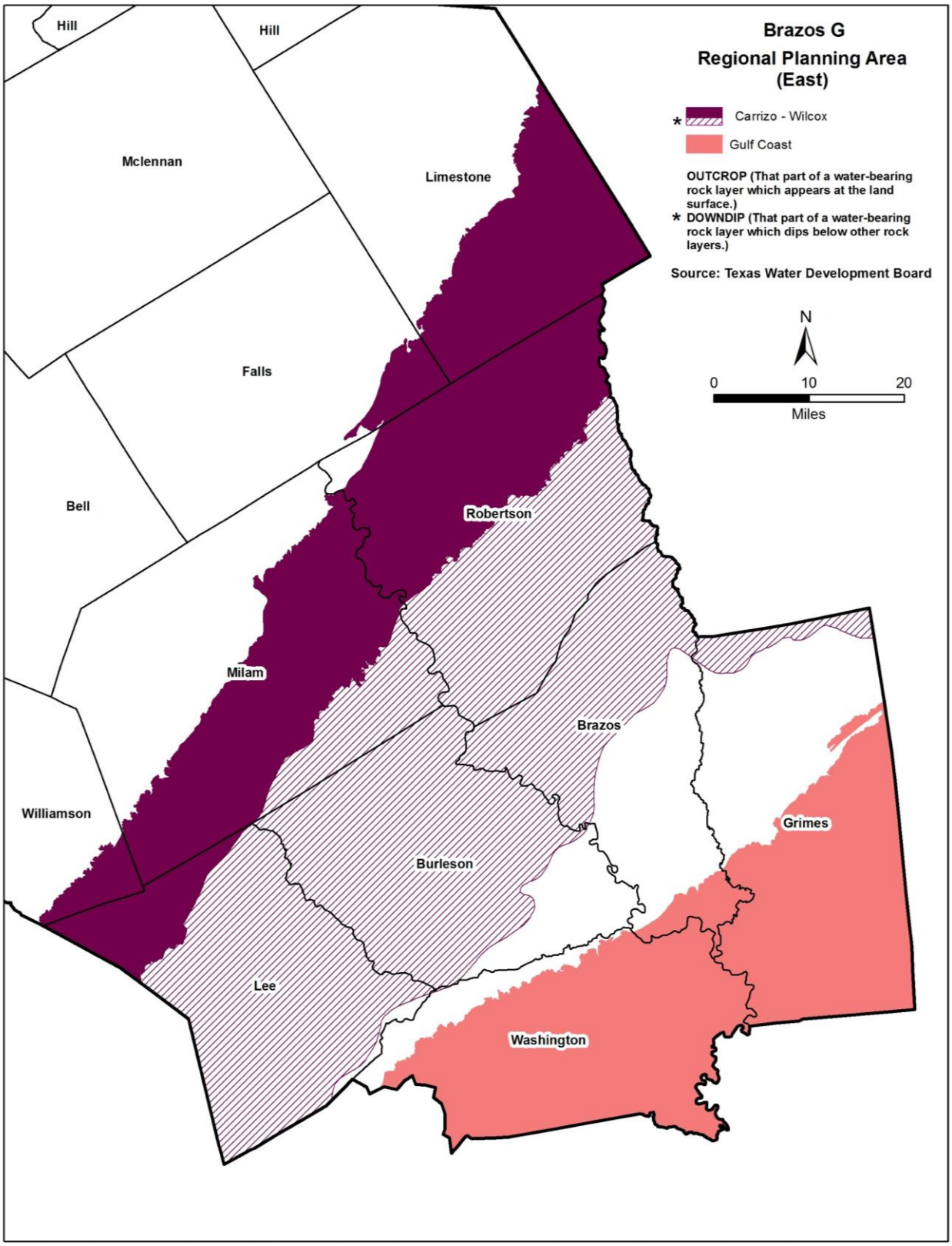


Figure 3-26. Minor Aquifers in the Eastern Area

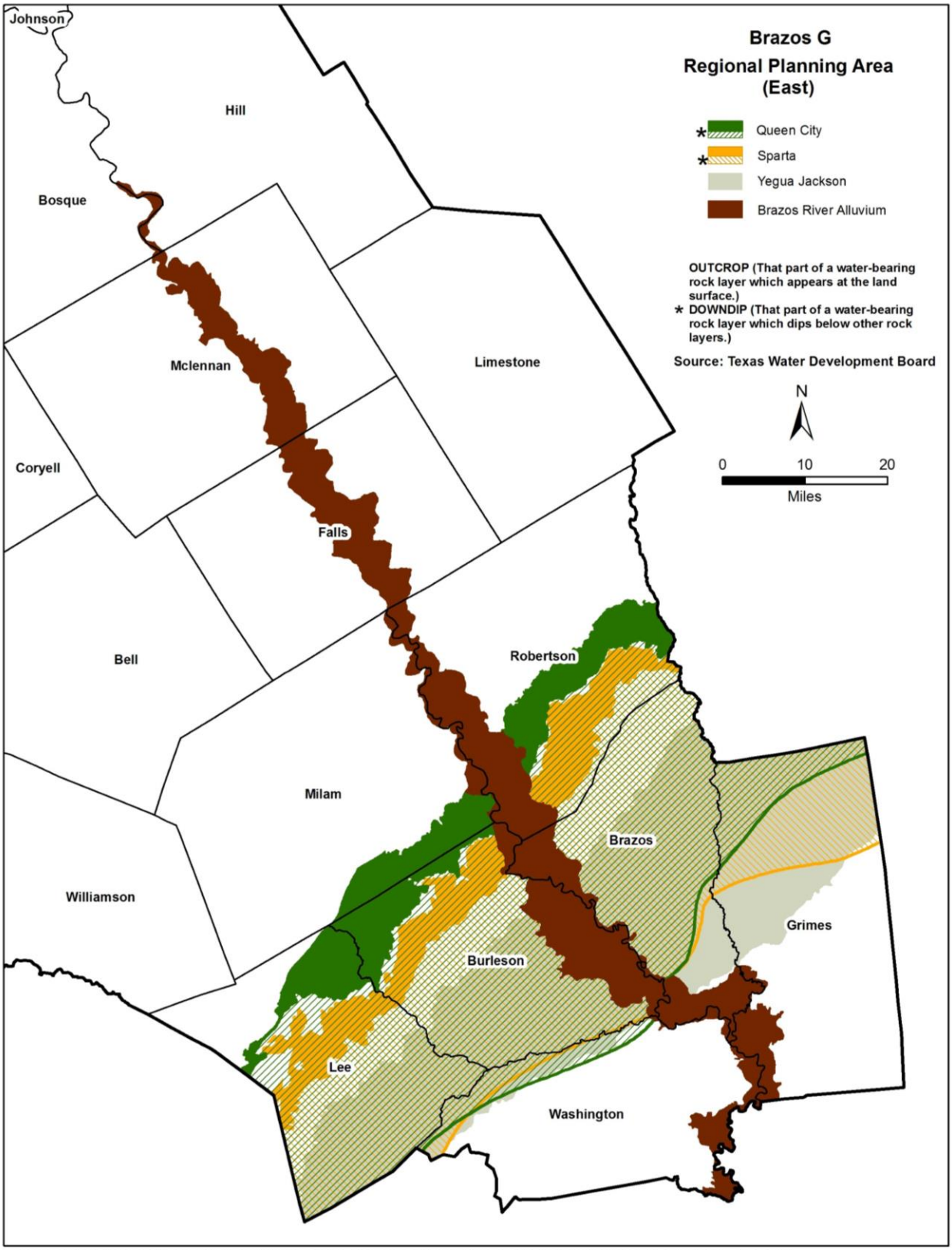


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Figure 3-27. Groundwater Availability in the Eastern Area

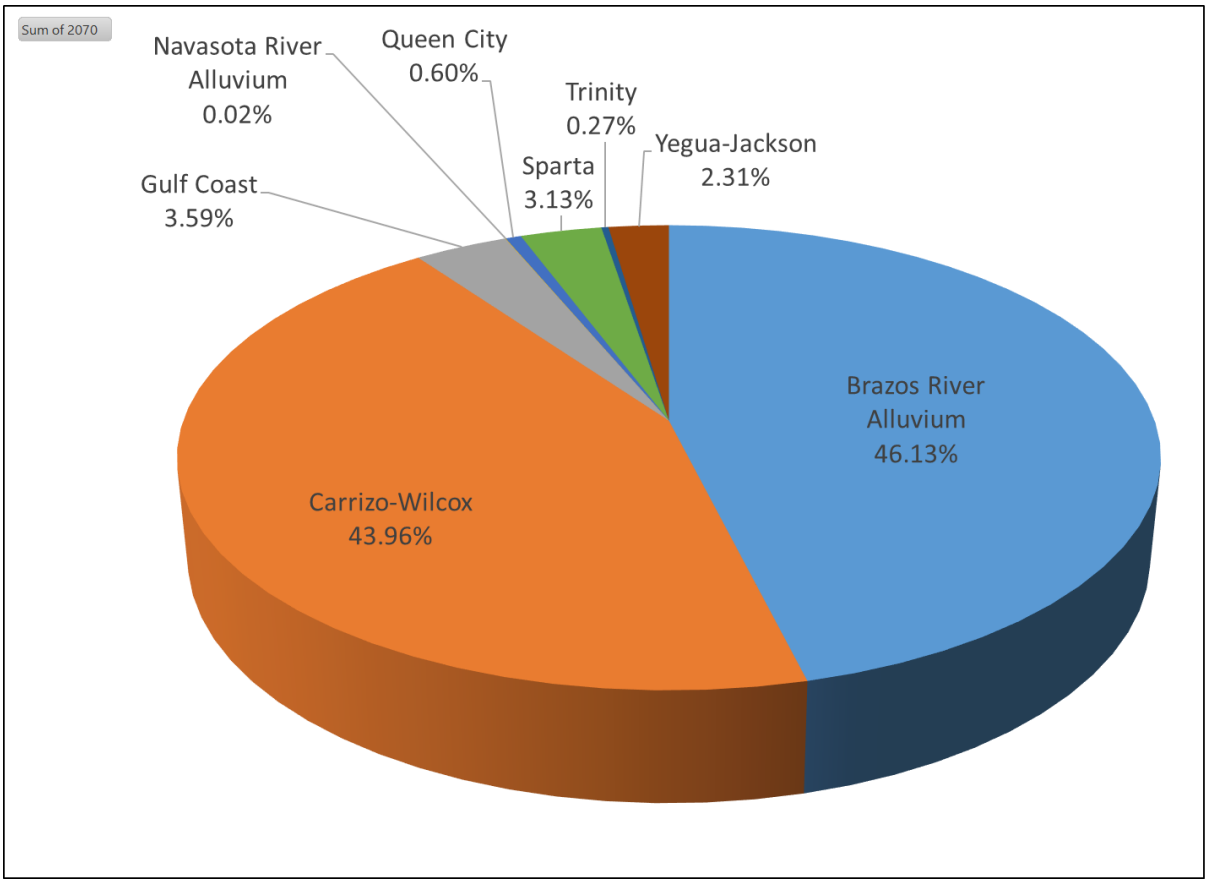

Table 3-12. Water Supplies from Other Regions

Receiving Entity	Supplier	Source[1]	Source Region	Contract Amount or Amount Supplied (acft/yr)
Eula WSC	Abilene (from CRMWD)	OH Ivie Lake/Reservoir Non-System Portion	F	61
Eula WSC	Clyde	Lake Clyde	F	221
Rotan	Snyder (from CRMWD)	Edwards-Trinity-Plateau And Pecos Valley Aquifers | Ward County, and Ogallala And Edwards-Trinity-High Plains Aquifers | Martin County	F	Meets Contract
Fisher-Manufacturing	Rotan (from Snyder)	Edwards-Trinity-Plateau And Pecos Valley Aquifers | Ward County	F	4

Table 3-12. Water Supplies from Other Regions

Receiving Entity	Supplier	Source[1]	Source Region	Contract Amount or Amount Supplied (acft/yr)
Bethesda WSC	Fort Worth	TRWD System	C	Meets Contract
Bethesda WSC	Arlington	TRWD System	C	5,601
Bethesda WSC	Bethesda WSC	Trinity Aquifer | Tarrant County	C	1,753
Crowley	Fort Worth	Trinity Aquifer | Tarrant County	C	Meets Contract
Abilene	CRMWD	OH Ivie Lake/Reservoir Non-System Portion[2]	F	5,320
Hamby WSC	Abilene (from CRMWD)	OH Ivie Lake/Reservoir Non-System Portion	F	308
Baylor SUD		Seymour Aquifer | Baylor County	B	32
Aqua WSC		Carrizo-Wilcox Aquifer | Bastrop County	K	550
Point Enterprise WSC		Carrizo-Wilcox Aquifer | Freestone County	C	94
Merkel	Abilene (from CRMWD)	OH Ivie Lake/Reservoir Non-System Portion	F	350
Taylor-Manufacturing	Abilene (from CRMWD)	OH Ivie Lake/Reservoir Non-System Portion	F	Meets Contract
North Runnels WSC	Abilene (from CRMWD)	OH Ivie Lake/Reservoir Non-System Portion	F	2
Taylor-County-Other	Abilene (from CRMWD)	OH Ivie Lake/Reservoir Non-System Portion	F	8
West End WSC		Gulf Coast Aquifer System | Austin County	H	53-82
Hutto	Manville WSC	Edwards-Bfz Aquifer | Travis County	K	560
Manville WSC		Edwards-Bfz Aquifer | Travis County	K	99-116
Manville WSC		Trinity Aquifer | Travis County	K	150-176

Table 3-12. Water Supplies from Other Regions

Receiving Entity	Supplier	Source[1]	Source Region	Contract Amount or Amount Supplied (acft/yr)
Pflugerville	Pflugerville and LCRA	Edwards-Bfz Aquifer | Travis County and Highland Lakes System	K	15-20
Cedar Park	LCRA	Highland Lakes System	K	20,500
Leander	LCRA	Highland Lakes System	K	24,000
Liberty Hill	LCRA/BRA	Highland Lakes System	K	1,200
Round Rock	LCRA/BRA	Highland Lakes System	K	20,928
Venus	TRWD	TRWD System	C	Meets Contract
Grimes County, Steam Electric	Huntsville (from Trinity River Authority)	Lake Livingston	H	6,720
Williamson County WCID 3	Manville WSC	Trinity Aquifer | Travis County	K	215-221

1 – Supplies available from out-of-region sources are as inputted into DB22 by the source planning area.
2 – Current contract allows 16.54% of the one-year safe yield of O.H. Ivie Reservoir. Supply shown is 2020 supply available.
acft/yr = acre-feet per year

3.6 Methods to Estimate Available Water Supplies in the Brazos G Area

3.6.1 Surface Water Supplies

Surface water in the region available to meet projected demands consists of firm yield of reservoirs, dependable supply of run-of-river water rights through drought of record conditions, and other local sources. Contracts and/or rights to reservoir yields and supplies from run-of-river rights were allocated as supplies to their stated type of use: municipal, industrial (manufacturing, steam-electric, and mining), and irrigation. Additionally, municipal supply was further allocated among cities and other municipal water supply entities. This allocation was done by obtaining water seller information (i.e., which contract/right holders – a wholesaler – are reselling water to other water supply entities) and water purchase contract limits between buyers and sellers. This information was obtained from TWDB files and follow-up queries to water supply entities. All water supply contracts were assumed to be renewed at their existing levels unless otherwise directed by local entities.

It was assumed that all livestock demands would be met from local water sources (e.g., shallow groundwater, stock ponds and riparian use of streams by livestock). These supplies are firm and would be available through a drought of record given that they are supported by local, shallow groundwater sources when groundwate- based, and when surface water-based are reflected in the State's water availability models through the underlying streamflow gage data upon which the naturalized streamflows are based.

In certain instances, the entity's available water supply is constrained by lack of infrastructure. For example, an entity may hold a contract to divert water from a reservoir; however, the required pipeline has not been built. In this instance, the contract amount would not be included in the entity's available water supply or would be identified as a constrained supply.

In some instances, specific operational, contractual, or legal constraints required modifications to the general surface water allocation procedure. For example, provisions in the current contract between the City of Abilene and the West Central Texas Municipal Water District for supplies to the City from Hubbard Creek Reservoir preclude the City from receiving its normal pro-rata share of the reservoir's allocated safe yield during times when the reservoir is significantly drawn down. However, the other member cities of the district (Anson, Albany, and Breckenridge) do not have similar provisions in their contracts with the district.

3.6.2 Groundwater Allocation

For each county, total available groundwater was allocated among the six user groups—municipal, manufacturing, steam-electric, mining, irrigation, and livestock—as described below. In some specific instances, these general procedures were modified to more accurately reflect the interactions between water demands, supplies, and needs.

Municipal Allocation

Municipal supplies were allocated to users from each aquifer as follows:

a. Municipal supply is based upon well capacities. For cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the total modeled available groundwater (MAG), the supply is prorated downward for every entity using that particular source.

b. For county-other municipal supplies, it is assumed that the rural household (municipal type) demand would be met from aquifers underlying that river basin portion of the county. The rural supply is generally calculated as 125 percent of the year 2010 use from each particular aquifer. For cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the MAG, supply is prorated downward for every entity using that particular source.

Industrial (Steam-Electric and Manufacturing) Allocation

Industrial supply from groundwater sources is associated with aquifers underlying the river basin portion of the county. The industrial supply is generally calculated as 125 percent of the year 2010 use from each particular aquifer. For cases in which the total demand on

that portion (i.e., county and river basin) of the aquifer exceeds the MAG, supply is prorated downwards for every entity using that particular source.

Irrigation Allocation

Irrigation supply from groundwater sources is associated with aquifers underlying the river basin portion of the county. The irrigation supply is calculated as being equal to the projected demand in each decade. For cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the MAG, supply is prorated downward for every entity using that particular source.

Mining Allocation

Mining supply from groundwater sources is associated with aquifers underlying the river basin portion of the county. The mining supply is calculated as being equal to the projected demand in each decade. For cases in which the total demand on that portion (i.e., county and river basin) of the aquifer exceeds the MAG, supply is prorated downward for every entity using that particular source.

3.6.3 Constraints on Surface Water Supplies

In determining needs (shortages), an emphasis has been placed not only on a water user group's (WUG's) total raw water supply availability, but also on their infrastructure available to deliver and treat this supply.

Based on Texas Commission on Environmental Quality (TCEQ) records, the normal-rated design (NRD) of each surface water treatment plant of public water suppliers located in the Brazos G Area was used to determine the existing peaking capacities to treat and deliver surface water supplies. The average annual capacity (AAC) for the water treatment plant (WTP) was calculated as 50 percent of the NRD to account for peaking. For each WUG for which these data were available in the TCEQ database, the AAC was used to constrain the supply available from surface water sources and was incorporated into the needs analysis for each WUG by using a term referred to as "constrained supply." Constrained supply is defined as the amount of water available to a WUG considering the limiting effects of existing infrastructure. This methodology allows for water management strategies to be identified and developed that specifically address these constraints caused by limited infrastructure capacity. These strategies could include pipelines to existing reservoirs, treatment plant expansions, or other infrastructure required to deliver and treat water for the end user of the WUG. Generally, the only infrastructure constraint data that will be taken into account for the 2021 Plan is treatment capacity, as data on other types of infrastructure constraints are not readily available. Other constraints may have been added where the planning group was made aware of particular infrastructure capacity or lack of infrastructure. These infrastructure constraints were applied to the supply available for the WUG and to any contractual demands using that supply. Twenty municipal WUGs have their available supply constrained by treatment capacity, resulting in supply shortages.

3.6.4 Constraints on Groundwater Supplies

Similar to surface water availability, the groundwater supplies assume that the wells will be able to continue producing the supply into the foreseeable future. However, some of the MAGs adopted for use would allow substantial drawdown of aquifer levels, which would require that well pumps be lowered or, in some cases, that deeper replacement wells be drilled in order to continue to use the assumed supply available from the aquifer. This has been identified as a potential issue in the Trinity Aquifer but supplies to WUGs were not adjusted to account for this potential limitation.

3.7 Existing Supplies Allocated to Water User Groups

A table summarizing the final allocation of existing supplies to WUGs is shown in the Executive Summary Appendix as “Region G Water User Group (WUG) Existing Water Supply.”

3.8 Existing Supplies for Major Water Providers

Existing supplies summarized for Major Water Providers by decade and category of use are shown in Appendix O.

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