

3. Analysis of Water Supply Currently Available to Region C

This section gives an overall summary of the water supplies available to Region C. Appendix I includes further details on the development of this information. Under the Texas Water Development Board (TWDB) regional water planning guidelines ⁽¹⁾, each region is to identify currently available water supplies to the region by source and user. The supplies available by source are based on the supply available during drought of record conditions. For surface water reservoirs, this is generally the equivalent of firm yield supply or permitted amount (whichever is lower). For run-of-the-river supplies, this is the minimum supply available in a year over the historical record. Available groundwater supplies are defined by county and aquifer. Generally, groundwater supply is the supply available with acceptable long-term impacts to water levels. For some aquifers in Region C, Managed Available Groundwater (MAG) numbers have been developed by the TWDB to define the long-term available groundwater supply. Where applicable, groundwater conservation district rules are also considered.

Currently available water supplies are those water supplies that have been permitted or contracted and that have infrastructure in place to transport and treat the water. Some water supplies that are permitted or contracted for use do not yet have the infrastructure in place. Connecting such supplies is considered a water management strategy for use of this water in the future, and water management strategies are discussed in Section 4 of this report.

3.1 Overall Water Supply Availability

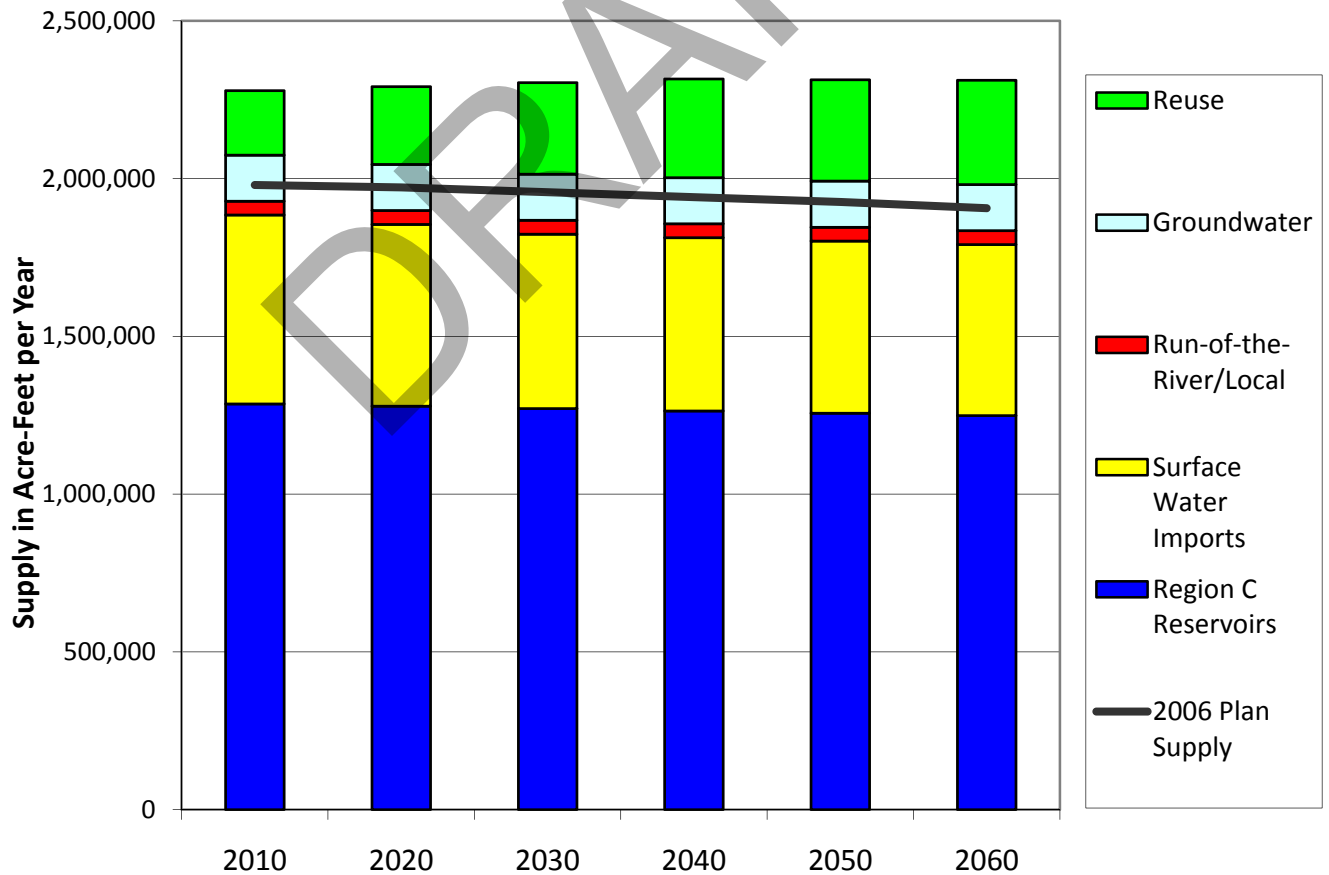
Table 3.1 and Figure 3.1 summarize the overall water supply availability in Region C, including both connected and unconnected water sources. Table 3.1 and Figure 3.1 show that in 2010:

- About 56 percent of the water supply available to Region C is from in-region reservoirs.
- Groundwater is approximately 6 percent of the overall supply available to Region C.
- Local supplies are only 2 percent of the overall supply available to Region C.

Table 3.1
Overall Water Supply Availability in Region C
 - Values in Acre-Feet per Year -

Summary	2010	2020	2030	2040	2050	2060
Reservoirs in Region C	1,285,826	1,278,724	1,271,317	1,263,783	1,256,249	1,248,713
Local Irrigation	20,205	20,205	20,205	20,205	20,205	20,205
Other Local Supply	23,701	23,701	23,701	23,701	23,701	23,701
Surface Water Imports	598,775	576,120	552,672	549,222	545,782	542,352
Groundwater	146,152	146,152	146,152	146,152	146,152	146,152
Reuse	203,974	246,510	289,995	312,972	321,405	330,695
REGION C TOTAL	2,278,633	2,291,412	2,304,042	2,316,035	2,313,494	2,311,818

Figure 3.1
Overall Water Supply Availability in Region C



- Currently authorized reuse is about 9 percent of the overall supply available to Region C. (It is worth noting that the development of reuse strategies has increased the 2060 overall reuse available from 103,000 acre-feet per year in the 2006 Region C Water Plan⁽²⁾ to 331,000 acre-feet per year in this plan.)
- Importation of water from other regions is approximately 26 percent of the water available to Region C.
- If all of the available supplies could be utilized, Region C would have 2,311,818 acre-feet per year available in 2060. The total water availability is more than in the *2006 Region C Water Plan* ⁽²⁾ primarily due to the following changes:
 - Greater availability from reservoirs in Region C because of increased supplies from some reservoirs (based on changes to the WAMs) and on new water rights obtained since 2006.
 - Higher groundwater availability in the Managed Available Groundwater in the Trinity and Woodbine aquifers ^(3,4) when compared to previous availability estimates.
 - Greater availability from reuse due to the development of new reuse projects.
- Currently connected and available supplies are less than overall water supplies and are discussed in Section 3.2. The sources of the information in Table 3.1 are discussed in greater detail below.

Surface Water Availability

Reservoirs. In its guidelines for Regional Water Planning ⁽¹⁾, the TWDB requires that water availability for reservoirs be based on results of the TCEQ-approved Water Availability Models (WAMs) ^(5, 6, 7, 8, 9). In Region C, most of the in-region reservoirs are located in the Trinity River Basin. Region C also uses water supplies originating in the Neches, Red, Sabine, Brazos, and Sulphur River Basins.

The WAM models were developed for the purpose of reviewing and granting new surface water right permits. The assumptions in the WAM models are based on the legal interpretation of water rights, and in some cases do not accurately reflect current operations. For planning purposes, adjustments were made to the WAMs to better reflect current and future surface water conditions in the region. Generally, changes made to the WAM included:

- Assessment of reservoir sedimentation rates and calculation of area-capacity conditions for current (2000) and future (2060) conditions.
- Inclusion of subordination agreements.
- Inclusion of system operations where appropriate.

- Other specific corrections by river basin, as appropriate.

According to the modified WAM results, the total available supply from Region C reservoirs is calculated at 1,285,826 acre-feet per year in 2010 and 1,248,713 acre-feet per year in 2060. The total available supply from imports from reservoirs in other regions is 598,775 acre-feet per year in 2010 and 542,352 acre-feet per year in 2060. Table 3.2 lists the reservoir water supplies available for use in Region C. More detail on the determination of available supplies from reservoirs is included in Appendix I.

Table 3.2
Surface Water Supplies Currently Available to Region C
 - Values in Acre-Feet per Year -

Reservoir	2010	2020	2030	2040	2050	2060
Systems in Region C						
Lost Creek/Jacksboro System	1,597	1,597	1,597	1,597	1,597	1,597
West Fork System (TRWD)	109,833	109,167	108,500	107,833	107,167	106,500
Elm Fork/Lewisville/Ray Roberts (Dallas)	184,801	183,733	182,665	181,597	180,529	179,459
Grapevine (Dallas)	7,583	7,367	7,150	6,933	6,717	6,500
Subtotal of Systems in Region C	303,815	301,863	299,912	297,961	296,009	294,056
Reservoirs in Region C						
Cedar Creek	175,000	175,000	175,000	175,000	175,000	175,000
Richland-Chambers (TRWD)	210,000	210,000	210,000	210,000	210,000	210,000
Richland-Chambers (Corsicana) and Lake Halbert	13,872	13,863	13,855	13,847	13,838	13,830
Moss	7,410	7,410	7,410	7,410	7,410	7,410
Lake Texoma (Texas' Share – NTMWD)	190,300	190,300	190,300	190,300	190,300	190,300
Lake Texoma (Texas' Share – GTUA)	25,000	25,000	25,000	25,000	25,000	25,000
Lake Texoma (Texas' Share – Denison)	24,400	24,400	24,400	24,400	24,400	24,400
Lake Texoma (Texas' Share – TXU)	16,400	16,400	16,400	16,400	16,400	16,400
Lake Texoma (Texas' Share – RRA)	2,250	2,250	2,250	2,250	2,250	2,250
Randell	1,400	1,400	1,400	1,400	1,400	1,400

Table 3.2, Continued

Reservoir	2010	2020	2030	2040	2050	2060
Valley	0	0	0	0	0	0
Bonham	5,340	5,340	5,340	5,340	5,340	5,340
Ray Roberts (Denton)	18,980	18,720	18,460	18,200	17,940	17,680
Lewisville (Denton)	7,918	7,817	7,715	7,613	7,512	7,410
Benbrook	6,833	6,833	6,833	6,833	6,833	6,833
Weatherford	2,967	2,923	2,880	2,837	2,793	2,750
Grapevine (PCMUD)	17,050	16,900	16,750	16,600	16,450	16,300
Grapevine (Grapevine)	2,017	1,983	1,950	1,917	1,883	1,850
Arlington	9,850	9,700	9,550	9,400	9,250	9,100
Joe Pool	15,192	14,883	14,575	14,267	13,958	13,650
Mountain Creek	6,400	6,400	6,400	6,400	6,400	6,400
North	0	0	0	0	0	0
Lake Ray Hubbard (Dallas)	57,427	56,113	54,800	53,487	52,173	50,860
White Rock	3,500	3,200	2,900	2,600	2,300	2,000
Terrell	2,283	2,267	2,250	2,233	2,217	2,200
Clark	210	210	210	210	210	210
Bardwell	9,600	9,600	9,295	8,863	8,432	8,000
Waxahachie	2,905	2,800	2,695	2,590	2,485	2,380
Forest Grove	8,767	8,693	8,620	8,547	8,473	8,400
Trinidad City Lake	450	450	450	450	450	450
Trinidad	3,050	3,050	3,050	3,050	3,050	3,050
Navarro Mills	19,342	18,333	17,325	16,317	15,308	14,300
Fairfield	870	870	870	870	870	870
Bryson	0	0	0	0	0	0
Mineral Wells	2,508	2,495	2,483	2,470	2,458	2,445
Teague City Lake	189	189	189	189	189	189
Lake Lavon	112,033	110,767	109,500	108,233	106,967	105,700
Muenster	300	300	300	300	300	300
Subtotal of Individual Reservoirs in Region C	982,011	976,860	971,405	965,822	960,240	954,657
Subtotal of Reservoirs in Region C	1,285,826	1,278,724	1,271,317	1,263,783	1,256,249	1,248,713
Imports						
Chapman (NTMWD)	47,132	47,132	47,132	47,132	47,132	47,132
Chapman (Irving)	44,484	44,484	44,484	44,484	44,484	44,484
Chapman (UTRWD)	13,268	13,268	13,268	13,268	13,268	13,268
Tawakoni (Dallas)	183,619	182,251	180,882	179,515	178,146	176,777
Fork (Dallas)	120,000	119,943	119,095	118,248	117,400	116,551
Upper Sabine Basin (NTMWD)	49,718	29,646	9,573	9,501	9,428	9,356
Palestine (Dallas)	112,881	111,776	110,670	109,563	108,455	107,347
Lake Livingston (TXU)	20,000	20,000	20,000	20,000	20,000	20,000
Lake Aquilla	264	276	285	295	309	329

Table 3.2, Continued

Imports	2010	2020	2030	2040	2050	2060
Lake Athens (Athens MWA)	3,908	3,856	3,804	3,751	3,699	3,647
Lake Granbury	231	231	231	231	231	231
Vulcan Materials (from BRA-Possum Kingdom)	2,000	2,000	2,000	2,000	2,000	2,000
Parker County (from Lake Palo Pinto)	1,270	1,257	1,248	1,234	1,230	1,230
Subtotal of Imports	598,775	576,120	552,672	549,222	545,782	542,352
TOTAL	1,884,601	1,854,844	1,823,989	1,813,005	1,802,031	1,791,065

**Table 3.3
Run-of-the-River and Other Local Water Supplies**

County	Run-of-the-River Supply (Acre-Feet per Year)				Other Local Supply (Acre-Feet per Year)	
	Irrigation	Manufacturing	Mining	Municipal	Livestock	Mining
Collin	408	0	0	0	1,002	195
Cooke	23	0	0	0	1,187	237
Dallas	791	368	0	0	712	1,525
Denton	0	0	0	0	935	103
Ellis	3	0	0	0	1,688	0
Fannin	14,758	0	72	69	1,583	0
Freestone	87	0	0	41	1,043	120
Grayson	2,394	30	0	0	1,683	0
Henderson	415	0	0	0	341	0
Jack	110	0	0	0	1,665	370
Kaufman	64	0	0	0	1,622	86
Navarro	226	0	0	252	1,603	0
Parker	239	0	0	33	1,922	20
Rockwall	0	0	0	0	168	33
Tarrant	549	959	0	0	442	342
Wise	139	0	133	0	1,117	0
TOTAL	20,205	1,357	205	395	18,713	3,031

Local Irrigation Supply. The local irrigation surface water supply is based on existing run-of-the-river water rights for irrigation not associated with major reservoirs. The total irrigation local supply in Region C is estimated at 20,205 acre-feet per year throughout the planning period. More detail on the determination of available supplies for run-of-the-river supply is shown in Table 3.3 and in Appendix I.

Other Local Supplies. Other local supplies include run-of-the-river supplies associated with water rights and used for municipal, manufacturing, mining, and power generation. It also includes local surface water supplies used for mining and livestock. For livestock and mining supplies that are not associated with water rights (such as stock ponds and privately-owned water for mining), supplies are assumed to be the same as was reported in the *2006 Region C Water Plan* ⁽²⁾. The total other local supply available in Region C is 23,701 acre-feet per year. More detail on the determination of available other local supplies is included in Table 3.3 and Appendix I.

Reuse. The reuse supply considered as available to the region is from existing projects based on current permits, authorizations, and facilities. Categories of reuse include (1) currently permitted and operating indirect reuse projects, in which water is reused after being returned to the stream; (2) existing reuse projects for industrial purposes (including recycled water for mining use); and (3) authorized direct reuse projects for which facilities are already developed. The specific reuse projects included are discussed in Appendix I.

Indirect reuse project sponsors in Region C include the North Texas Municipal Water District (NTMWD), Trinity River Authority (TRA), Tarrant Regional Water District (TRWD), and the Upper Trinity Regional Water District (UTRWD). In addition, there are a number of existing direct reuse projects for landscape irrigation, golf course irrigation, cooling water, park irrigation, and natural gas industry use in Region C. Many of these projects were included in the *2006 Region C Water Plan* ⁽²⁾. Significant new reuse projects since the last plan include:

- The expansion of the City of Fort Worth's Village Creek Reclaimed Water Delivery System to serve the Cities of Arlington and Euless, Dallas-Fort Worth International Airport, and other potential retail customers within the City of Fort Worth is currently under construction and is anticipated to be online by the end of 2010.
- The TRWD Richland-Chambers Reservoir reuse project began operation in 2009 and diverts return flows into off-channel, wetland impoundments for water quality treatment purposes before delivery into the Richland-Chambers Reservoir for storage and diversion.
- The NTMWD is now authorized to divert up to an additional 35,941 acre-feet per year (for a total of 71,882 acre-feet per year) of return flows from the District's Wilson Creek Wastewater Treatment Plant in Lake Lavon.
- The NTMWD East Fork Raw Water Supply Project began operation in 2009 and can currently convey nearly 48,000 acre-feet per year of return flows to Lake Lavon for

subsequent reuse. The NTMWD East Fork Raw Water Supply Project diverts return flows from the East Fork of the Trinity River to a constructed wetland for polishing treatment and ultimately returns this water to Lake Lavon. The water right for the project authorizes diversions up to 157,393 acre-feet per year, as return flows increase and become available.

- Dallas Water Utilities and NTMWD have entered into an agreement which would allow NTMWD to exchange return flows from its WWTPs discharging into Lake Ray Hubbard for Dallas return flows discharged to the main stem of the Trinity River. Under this agreement, Dallas will obtain the right to divert the NTMWD return flows from Lake Ray Hubbard and will pump an equal amount of flow from the main stem of the Trinity River to the NTMWD East Fork Water Supply Project wetland for use by NTMWD. In addition, once water rights for Elm Fork return flows (from NTMWD WWTPs discharging to Lake Lewisville) have been secured by NTMWD, NTMWD will support Dallas efforts to secure bed and banks transport, storage and diversion rights for the Elm Fork return flows. In exchange, Dallas will pump a quantity equal to NTMWD's discharge of its future Elm Fork return flows to the East Fork Water Supply Project wetland for use by NTMWD.

It is anticipated that reuse will increase significantly in Region C over the next 50 years, but proposed and potential direct reuse projects are not included as currently available supplies. There are a number of reuse projects being considered as potentially feasible management strategies as part of this planning process. Recommended water management strategies for reuse are discussed in Chapter 4 of this report.

Table 3.4 summarizes the currently available reuse supplies by county in Region C. The total available supply from reuse in Region C by 2010 is 203,974 acre-feet per year, increasing to 330,695 acre-feet per year in 2060.

Groundwater Availability

Groundwater supplies in Region C are obtained from two major aquifers (Carrizo-Wilcox and Trinity), four minor aquifers (Woodbine, Nacatoch, Sparta, and Queen City), and locally undifferentiated formations, referred to as "other aquifer".

The TWDB guidelines⁽¹⁾ state that Managed Available Groundwater (MAG) estimates provided by the TWDB are to be used to determine available groundwater supplies unless the MAG estimates are not available. MAG estimates are developed by the TWDB using Desired Future Conditions (DFCs) submitted by Groundwater Management Areas (GMAs). The TWDB created sixteen GMAs in Texas. GMA 8 covers all of Region C except for Jack County, Henderson County, and a small portion of Navarro County.

Table 3.4
Currently Permitted and Available Reuse Supplies by County
 - Values in Acre-Feet per Year -

County	2010	2020	2030	2040	2050	2060
Collin	52,227	63,168	74,109	74,109	74,109	74,109
Cooke	9	9	9	9	9	9
Dallas	8,831	8,831	8,831	8,831	8,831	8,831
Denton	41,207	61,480	75,725	85,135	94,842	105,197
Ellis	5,798	5,929	5,929	5,929	5,929	5,929
Fannin	0	0	0	0	0	0
Freestone	0	0	0	0	0	0
Grayson	0	0	0	0	0	0
Henderson	2,904	32	32	32	32	32
Jack	412	412	411	411	410	410
Kaufman	61,345	76,885	96,839	111,737	111,737	111,737
Navarro	10,000	10,000	10,000	10,000	10,000	10,000
Parker	13	13	13	13	13	13
Rockwall	784	784	784	784	784	784
Tarrant	4,514	4,893	5,161	5,339	5,473	5,583
Wise	15,930	14,074	12,152	10,643	9,236	8,061
TOTAL	203,974	246,510	289,995	312,972	321,405	330,695

The GMAs are responsible for developing DFCs for aquifers within their respective areas. The TWDB quantifies MAG estimates based on the DFCs provided by the GMAs. For the 2011 regional water plans, the planning groups were required to use MAG estimates available as of January 1, 2009 as the basis for existing groundwater supplies ⁽¹⁾. MAG estimates were available for the Woodbine aquifer prior to the January 1st deadline. MAG estimates were available for the Trinity aquifer in March of 2009. Both the Woodbine and Trinity MAGs were used to calculate the available supplies in Region C. MAGs for the remaining aquifers were not available in time for inclusion in Region C's planning for this round of planning.

Carrizo-Wilcox Aquifer. Supplies from the Carrizo-Wilcox aquifer are available in Freestone, Henderson, and Navarro counties in Region C. The available supply from the Carrizo-Wilcox aquifer is assumed to be the same as that shown in the *2006 Region C Water Plan* ⁽²⁾.

For the 2006 Region C Water Plan ⁽²⁾ update, Region C requested that the TWDB run both the Northern Carrizo-Wilcox and Central Carrizo-Wilcox Groundwater Availability Models (GAMs) ⁽¹⁰⁾, and the two models resulted in significantly different water availabilities. After discussing the results with the groundwater conservation districts in the region, Region C assumed that the currently available groundwater supply from the Carrizo-Wilcox aquifer was equivalent to twice the current use from the aquifer in Freestone, Henderson, and Navarro counties. Table 3.5 shows the resulting groundwater availability by county to Region C from the Carrizo-Wilcox aquifer. As with reservoirs, this number represents the amount of water available from the aquifer, without considering limitations imposed by or current availability due to the capacity of wells and other facilities. The amount of groundwater currently available in Region C is discussed in Section 3.2.

Trinity and Woodbine Aquifers. The Woodbine aquifer overlies the Trinity aquifer. The Woodbine aquifer is in Collin, Dallas, Denton, Ellis, Fannin, Grayson, Kaufman, Navarro, and Parker counties in Region C. The Trinity aquifer is in Collin, Cooke, Dallas, Denton, Ellis, Fannin, Grayson, Jack, Navarro, Parker, Tarrant, and Wise counties in Region C. Most of the pumping from the Trinity aquifer in Region C is from three layers: Paluxy, Hensel, and Hosston. MAG estimates provided by the TWDB were used to determine groundwater availability from the Trinity and Woodbine aquifers. These availability numbers are shown in Table 3.5.

Groundwater Conservation Districts. There are currently seven Groundwater Conservation Districts (GCDs) that include one or more Region C counties:

- Upper Trinity GCD (Wise and Parker Counties)
- Northern Trinity GCD (Tarrant County)
- Neches and Trinity Valleys GCD (includes Henderson County)
- Mid-East Texas GCD (includes Freestone County)
- Prairielands GCD (includes Ellis County)
- North Texas GCD (Collin, Cooke, and Denton Counties)
- Red River GCD (Grayson and Fannin Counties).

Table 3.5
Groundwater Supplies in Region C
- Values in Acre-Feet per Year -

Aquifer	County	2010	2020	2030	2040	2050	2060
Carrizo-Wilcox	Freestone	6,653	6,653	6,653	6,653	6,653	6,653
Carrizo-Wilcox	Henderson	5,370	5,370	5,370	5,370	5,370	5,370
Carrizo-Wilcox	Navarro	180	180	180	180	180	180
Carrizo-Wilcox Subtotal		12,203	12,203	12,203	12,203	12,203	12,203
Trinity	Collin	2,100	2,100	2,100	2,100	2,100	2,100
Trinity	Cooke	6,850	6,850	6,850	6,850	6,850	6,850
Trinity	Dallas	5,458	5,458	5,458	5,458	5,458	5,458
Trinity	Denton	19,333	19,333	19,333	19,333	19,333	19,333
Trinity	Ellis	3,959	3,959	3,959	3,959	3,959	3,959
Trinity	Fannin	700	700	700	700	700	700
Trinity	Grayson	9,400	9,400	9,400	9,400	9,400	9,400
Trinity	Jack	100	100	100	100	100	100
Trinity	Kaufman	1,181	1,181	1,181	1,181	1,181	1,181
Trinity	Navarro	1,873	1,873	1,873	1,873	1,873	1,873
Trinity	Parker	15,248	15,248	15,248	15,248	15,248	15,248
Trinity	Rockwall	958	958	958	958	958	958
Trinity	Tarrant	18,747	18,747	18,747	18,747	18,747	18,747
Trinity	Wise	9,282	9,282	9,282	9,282	9,282	9,282
Trinity Subtotal		95,189	95,189	95,189	95,189	95,189	95,189
Woodbine	Collin	2,509	2,509	2,509	2,509	2,509	2,509
Woodbine	Cooke	154	154	154	154	154	154
Woodbine	Dallas	2,313	2,313	2,313	2,313	2,313	2,313
Woodbine	Denton	4,126	4,126	4,126	4,126	4,126	4,126
Woodbine	Ellis	5,441	5,441	5,441	5,441	5,441	5,441
Woodbine	Fannin	3,297	3,297	3,297	3,297	3,297	3,297
Woodbine	Grayson	12,087	12,087	12,087	12,087	12,087	12,087
Woodbine	Kaufman	200	200	200	200	200	200
Woodbine	Navarro	300	300	300	300	300	300
Woodbine	Parker	0	0	0	0	0	0
Woodbine	Rockwall	144	144	144	144	144	144
Woodbine	Tarrant	632	632	632	632	632	632
Woodbine Subtotal		31,203	31,203	31,203	31,203	31,203	31,203

Table 3.5, Continued

Aquifer	County	2010	2020	2030	2040	2050	2060
Nacatoch	Henderson, Kaufman, Navarro, & Rockwall	558	558	558	558	558	558
Queen City	Freestone & Henderson	873	873	873	873	873	873
Other	All	6,126	6,126	6,126	6,126	6,126	6,126
Minor Aquifers Subtotal		7,557	7,557	7,557	7,557	7,557	7,557
TOTAL		146,152	146,152	146,152	146,152	146,152	146,152

Summary. In Region C, MAG estimates for the Trinity and Woodbine aquifers were available for this cycle of regional water planning. For the Carrizo-Wilcox, Nacatoch, Sparta, Queen City, and other aquifers, available groundwater supplies were assumed to be the same as was shown in the *2006 Region C Water Plan* ⁽²⁾. The total available supply from groundwater in Region C is 146,152 acre-feet per year throughout the planning period. More detail on the determination of available supplies from groundwater is included in Appendix I.

3.2 Currently Available Water Supplies

Table 3.6 and Figure 3.2 show the currently available water supplies in Region C by different source types. Table 3.7 shows the currently available supplies to water user groups by county. Currently available supplies are supplies that can be used with currently existing water rights, contracts, and facilities. They are less than the overall supplies available to the region because the facilities needed to use some supplies have not yet been developed. (Common constraints limiting currently available supplies include the availability and capacity of transmission systems, treatment plants, and wells.) The comparison of overall water supply availability and currently available water supplies for Region C shows the following:

- The total currently available supply in Region C for 2060 is 1,772,464 acre-feet per year, of which 1,758,494 acre-feet per year is available to users in Region C (a portion is used to supply customers in adjacent regions). This is 539,354 acre-feet per year less than the overall supply. The difference is due primarily to transmission and treatment plant capacity limitations. This includes 196,881 acre-feet per year of unconnected supplies for Dallas Water Utilities (Lake Fork Reservoir and Lake Palestine). It is worth

noting that the currently available supply presented in this plan is significantly greater than what was in the 2006 Region C Plan, demonstrating on-going development by Region C suppliers.

- The currently available supplies from in-region reservoirs, local sources, groundwater and current reuse are nearly fully allocated by 2060. Some of the differences can be attributed to sources that are not currently used for water supplies (White Rock Lake, Lake Mineral Wells and Forest Grove Reservoir).
- Groundwater supplies, which represent only 6 percent of the total available supply to the region, are nearly 86 percent utilized by current water users. The total amount of groundwater supply that is available for future development is only 20,456 acre-feet per year.
- Permitted surface water imports to Region C are shown to be more than 540,000 acre-feet per year in 2060 in Table 3.1. Approximately 16% of these supplies are not currently connected to water supply systems. The connection of these supplies will be considered as water management strategies in Section 4.

Table 3.6
Currently Available Water Supplies to Water Users by Source Type
 - Values in Acre-Feet per Year -

Category	2010	2020	2030	2040	2050	2060
Reservoirs in Region C	969,572	935,146	917,842	909,098	903,473	886,936
Local Irrigation	19,455	19,455	19,455	19,455	19,455	19,455
Other Local Supply	22,862	22,814	22,846	22,884	22,931	22,989
Surface Water Imports	451,504	421,323	399,008	395,081	392,517	385,222
Groundwater	127,167	127,167	127,167	127,167	127,167	127,167
Reuse	203,974	246,510	289,995	312,972	321,405	330,695
REGION C TOTAL	1,794,534	1,772,415	1,776,313	1,786,657	1,786,948	1,772,464

Figure 3.2
Currently Available Supplies to Region C Water Users

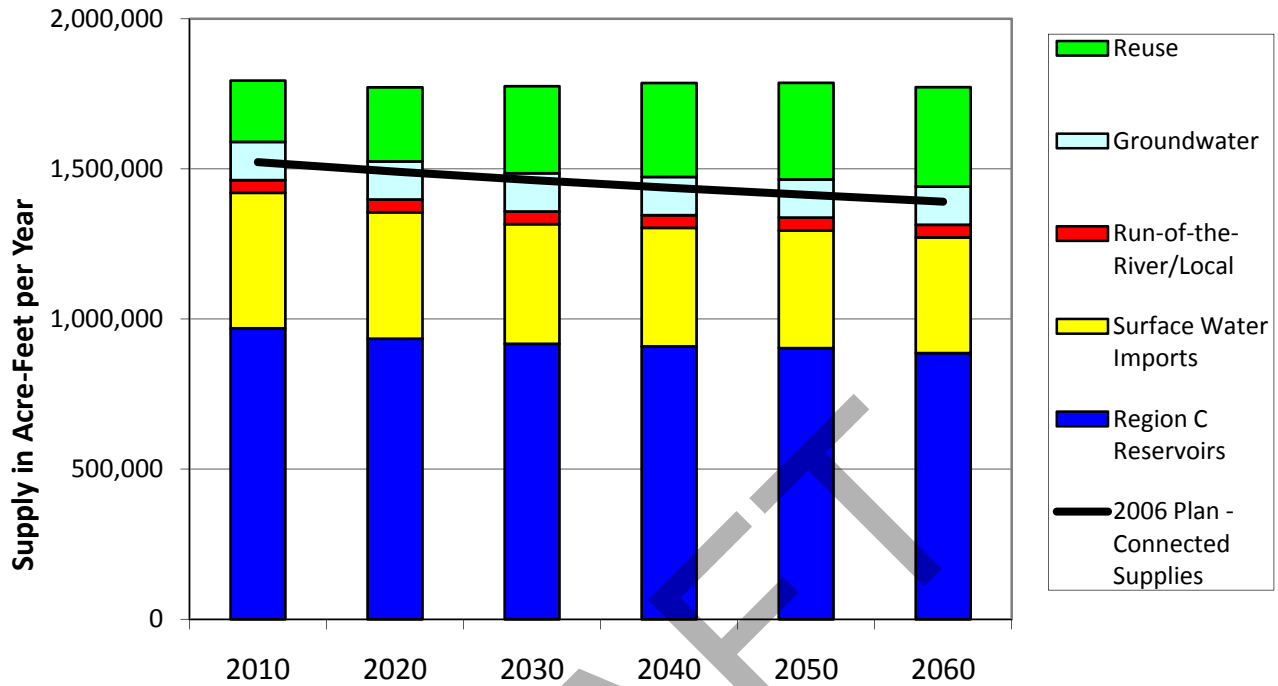


Table 3.7
Currently Available Supplies by County
- Values in Acre-Feet per Year -

County	2010	2020	2030	2040	2050	2060
Collin	218,492	232,137	237,090	246,894	247,757	244,013
Cooke	9,814	9,676	9,599	9,545	9,462	9,410
Dallas	663,340	590,930	576,525	568,195	564,649	557,886
Denton	153,834	150,298	164,771	175,372	183,118	181,228
Ellis	35,262	39,207	44,768	49,265	51,365	51,739
Fannin	42,273	42,124	42,366	42,917	43,412	43,335
Freestone	34,466	34,511	33,685	32,956	32,274	31,659
Grayson	45,167	42,366	41,414	41,151	40,995	40,774
Henderson	19,122	15,751	18,713	18,777	18,857	18,855
Jack	7,463	7,801	8,000	8,200	8,399	8,599
Kaufman	31,251	36,550	38,940	41,131	42,054	43,997
Navarro	13,142	14,118	14,200	14,597	15,069	15,623
Parker	31,533	43,247	47,409	47,500	47,003	45,998
Rockwall	22,235	29,179	30,518	31,866	31,060	30,808
Tarrant	412,872	427,589	411,647	403,558	398,236	396,418
Wise	44,478	45,250	42,922	41,353	39,622	38,153
Subtotal	1,784,744	1,760,734	1,762,567	1,773,277	1,773,332	1,758,495
Other Regions	9,790	11,681	13,746	13,380	13,616	13,969
TOTAL	1,794,534	1,772,415	1,776,313	1,786,657	1,786,948	1,772,464

3.3 Water Availability by Wholesale Water Provider (WWP)

As part of the Senate Bill One planning process, the Texas Water Development Board requires development of water availability for each designated wholesale water provider. A wholesale water provider is defined as “any person or entity, including river authorities and irrigation districts, that has contracts to sell more than 1,000 acre-feet of water wholesale in any one year during the five years immediately preceding the adoption of the last Regional Water Plan.”⁽¹⁾ The planning groups are also required to designate any person or entity expected to contract to sell at least 1,000 acre-feet per year of wholesale water during the planning period as a WWP. There are 41 entities in Region C that qualify as wholesale water providers (20 cities, 2 river authorities, and 19 water districts). Twelve of the wholesale water providers provide a large amount of wholesale water supplies to a number of customers and are discussed below as regional wholesale water providers. The remaining 29 supply less water to fewer customers and are discussed as local wholesale water providers. The 12 regional wholesale water providers are:

- Dallas Water Utilities
- Tarrant Regional Water District
- North Texas Municipal Water District
- City of Fort Worth
- Trinity River Authority
- Upper Trinity Regional Water District
- Greater Texoma Utility Authority
- Dallas County Park Cities Municipal Utility District
- City of Corsicana
- Sabine River Authority
- Sulphur River Water District
- Upper Neches River Municipal Water Authority

The 29 local wholesale water providers include:

- Argyle Water Supply Corporation
- City of Arlington
- Athens Municipal Water Authority

- Bartonville Water Supply Corporation
- Bolivar Water Supply Corporation
- Dallas County WCID #6
- City of Denton
- East Cedar Creek Freshwater Supply District
- City of Ennis
- City of Forney
- City of Gainesville
- City of Garland
- City of Grand Prairie
- Lake Cities Municipal Utility Authority
- City of Mansfield
- City of Midlothian
- Mustang Special Utility District
- City of North Richland Hills
- City of Princeton
- Rockett Special Utility District
- City of Rockwall
- City of Seagoville
- City of Sherman
- City of Terrell
- Walnut Creek Special Utility District
- City of Waxahachie
- City of Weatherford
- West Cedar Creek Municipal Utility District
- Wise County Water Supply District

3.4 Water Supplies Currently Available to Regional Wholesale Water Providers

Table 3.8 gives a summary of the supplies currently available to regional wholesale water providers serving Region C. As discussed in Section 3.2, currently available supplies are limited by existing physical facilities.

**Table 3.8
Currently Available Supplies to Regional Wholesale Water Providers in Region C**

Provider	Source	Water Supply Currently Available (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
Dallas Water Utilities	Lake Ray Roberts/Lake Lewisville System	184,801	183,733	182,665	181,597	180,529	179,456
	Lake Grapevine	7,583	7,367	7,150	6,933	6,717	6,500
	Lake Ray Hubbard	57,427	56,113	54,800	53,487	52,173	50,860
	Lake Ray Hubbard Temporary	49,800	0	0	0	0	0
	Lake Tawakoni	183,619	182,251	180,882	179,515	178,146	176,777
	Lake Fork	40,581	41,949	43,318	44,685	46,054	47,423
	Direct Reuse (Cedar Crest GC)	561	561	561	561	561	561
	Indirect Reuse	29,961	42,046	53,147	60,646	69,861	79,613
	White Rock Lake (Irrigation Only)	3,500	3,200	2,900	2,600	2,300	2,000
	DWU Total	557,833	517,220	525,423	530,024	536,341	543,193
Tarrant Regional Water District	West Fork System	109,833	109,167	108,500	107,833	107,167	106,500
	Lake Benbrook	6,833	6,833	6,833	6,833	6,833	6,833
	Cedar Creek Lake	175,000	175,000	175,000	175,000	175,000	175,000
	Richland-Chambers Res.	210,000	210,000	210,000	210,000	210,000	210,000
	Richland-Chambers Reuse	10,000	10,000	10,000	10,000	10,000	10,000
	TRWD Total	511,666	511,000	510,333	509,666	509,000	508,333
North Texas Municipal Water District	Lake Lavon	112,033	110,767	109,500	108,233	106,967	105,700
	Lake Texoma	77,300	77,300	77,300	77,300	77,300	77,300
	Lake Chapman	47,132	47,132	47,132	47,132	47,132	47,132
	Wilson Creek Reuse	50,000	60,941	71,882	71,882	71,882	71,882
	Lake Bonham	5,340	5,340	5,340	5,340	5,340	5,340
	East Fork Reuse	51,790	67,148	87,102	102,000	102,000	102,000
	Interim GTUA	15,500	0	0	0	0	0
	Upper Sabine Basin	49,718	29,646	9,573	9,501	9,428	9,356
	Direct Reuse	2,695	2,695	2,695	2,695	2,695	2,695
NTMWD Total	411,508	400,969	410,524	424,083	422,744	421,405	

Table 3.8, Continued

Provider	Source	Water Supply Currently Available (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
City of Fort Worth	TRWD Supplies	247,979	277,748	277,748	277,748	277,748	277,748
	Direct Reuse	897	897	897	897	897	897
	Fort Worth Total	248,876	278,645	278,645	278,645	278,645	278,645
Trinity River Authority	Joe Pool Lake (Midlothian)	5,954	7,104	6,951	6,798	6,644	6,491
	Joe Pool Lake (Grand Prairie)	300	300	300	300	300	300
	Navarro Mills Lake	19,342	18,333	17,325	16,317	15,308	14,300
	Bardwell Lake	9,600	9,600	9,295	8,863	8,432	8,000
	Lake Livingston (Region C)	20,000	20,000	20,000	20,000	20,000	20,000
	Reuse (Region C)	13,248	13,379	13,379	13,379	13,379	13,379
	Subtotal	68,444	68,716	67,250	65,657	64,063	62,470
	TRWD	56,456	72,279	70,266	68,519	66,192	63,352
TRA Total in Region C	124,900	140,995	137,516	134,176	130,255	125,822	
Upper Trinity Regional Water District	Lake Chapman	13,268	13,268	13,268	13,268	13,268	13,268
	DWU Contract	8,290	36,549	42,664	41,267	39,087	35,226
	Denton	4,069	0	0	0	0	0
	Chapman Reuse	6,634	6,634	6,634	6,634	6,634	6,634
	Direct Reuse	897	897	897	897	897	897
	UTRWD Total	33,158	57,348	63,463	62,066	59,886	56,025
Greater Texoma Utility Authority	Lake Texoma Raw Water	25,000	25,000	25,000	25,000	25,000	25,000
	Delivery Limited by WTP Capacity	8,000	8,000	8,000	8,000	8,000	8,000
	Usable Lk Texoma Raw Water	5,600	5,600	5,600	5,600	5,600	5,600
	Dennison (for Pottsboro)	560	560	560	560	560	560
	NTMWD (Collin-Grayson MA)	1,928	5,400	5,400	5,400	5,400	5,400
	GTUA Total	16,088	19,560	19,560	19,560	19,560	19,560

Table 3.8, Continued

Provider	Source	Water Supply Currently Available (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
Dallas County Park Cities MUD	Lake Grapevine	17,050	16,900	16,750	16,600	16,450	16,300
	Grapevine Reuse	3,317	3,696	3,964	4,142	4,276	4,386
	DCPCMUD Total	20,367	20,596	20,714	20,742	20,726	20,686
City of Corsicana	Navarro Mills Lake (from TRA)	11,210	11,210	11,210	11,210	11,210	11,210
	Richland Chambers/Halbert	2,242	2,242	2,242	2,242	2,242	2,242
	Total (Limited by WTP Capacity)	13,452	13,452	13,452	13,452	13,452	13,452
Sabine River Authority	Lake Tawakoni (Dallas)	183,619	182,251	180,882	179,515	178,146	176,777
	Lake Tawakoni (NTMWD)	9,718	9,646	9,573	9,501	9,428	9,356
	Lake Tawakoni (Others)	36,469	36,197	35,925	35,651	35,379	35,107
	Upper Sabine Basin Supply (NTMWD)	40,000	20,000	0	0	0	0
	Lake Fork (Dallas) - Trinity Basin	120,000	119,943	119,095	118,248	117,400	116,551
	Lake Fork (Dallas) - Sabine Basin	791	0	0	0	0	0
	Lake Fork (Others)	52,244	51,877	51,510	51,142	50,775	50,409
	Toledo Bend Lake	750,000	750,000	750,000	750,000	750,000	750,000
	Sabine Run-of-River	147,100	147,100	147,100	147,100	147,100	147,100
	SRA Total	1,339,942	1,317,013	1,294,085	1,291,157	1,288,228	1,285,300
	SRA Total Dallas and NTMWD	313,337	311,840	309,550	307,263	304,974	302,684

Table 3.8, Continued

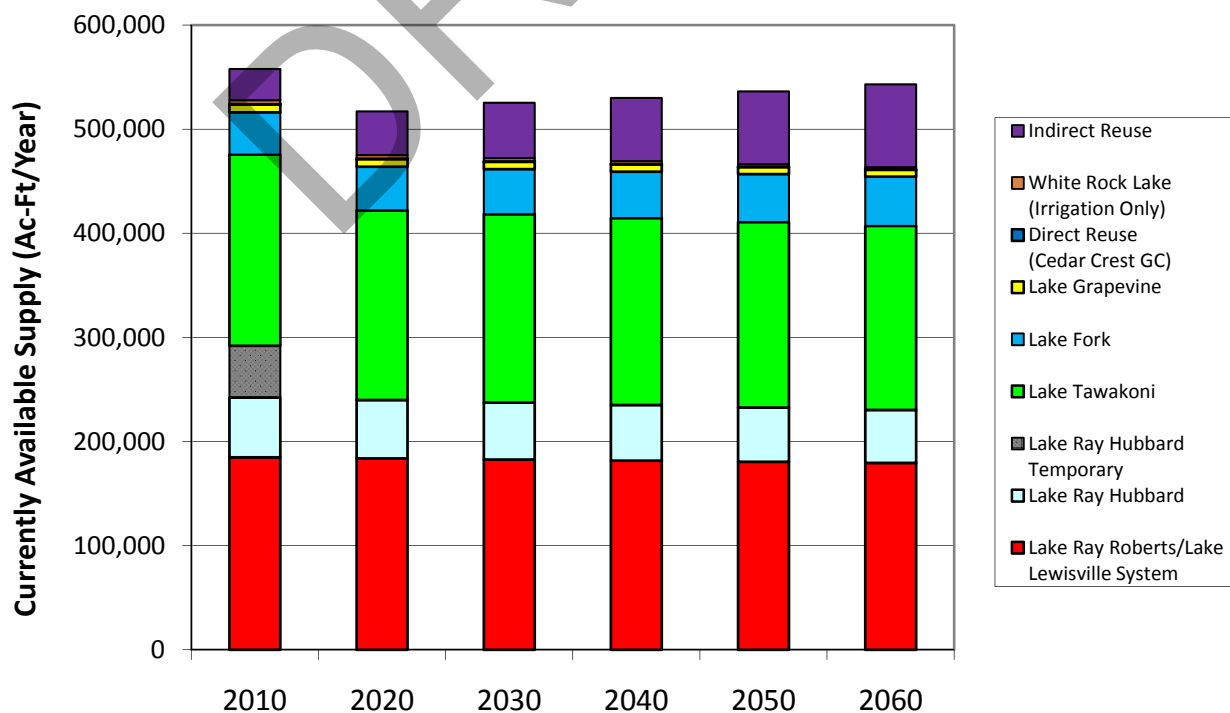
Provider	Source	Water Supply Currently Available (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
Sulphur River Water District	Lake Chapman (UTRWD)	13,268	13,268	13,268	13,268	13,268	13,268
	Lake Chapman (NTMWD through Cooper)	883	883	883	883	883	883
	Lake Chapman (Other)	14,933	14,933	14,933	14,933	14,933	14,933
	SRWD Total	29,084	29,084	29,084	29,084	29,084	29,084
	SRWD to Region C	14,151	14,151	14,151	14,151	14,151	14,151
Upper Neches River Municipal Water Authority	Lake Palestine (Dallas)	112,881	111,776	110,670	109,563	108,455	107,347
	Lake Palestine (Other Committed)	94,577	93,641	92,705	91,770	90,837	89,903
	Lake Palestine (Uncommitted)	0	0	0	0	0	0
	UNRMWA Total	207,458	205,417	203,375	201,333	199,292	197,250

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Dallas Water Utilities

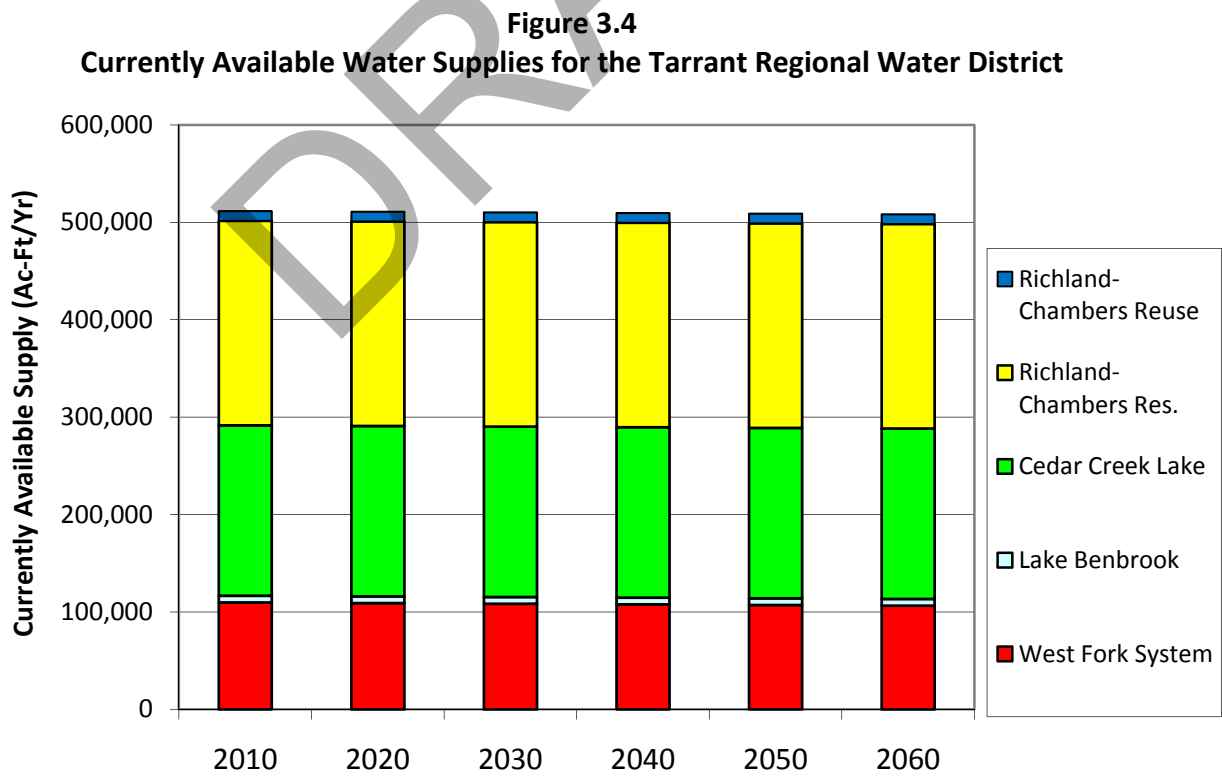
Figure 3.3 shows the currently available supply for Dallas Water Utilities (DWU). DWU's currently available supply sources include Lake Ray Hubbard, Lake Tawakoni (in Region D), the Ray Roberts/Lewisville Lake/Elm Fork System, Dallas' share of Grapevine Lake, White Rock Lake (irrigation only), direct reuse, indirect reuse of specified return flows above its lakes, and a portion of DWU's share of the Lake Fork supply (in Region D). The first phase of DWU's connection to Lake Fork (a pipeline from Lake Fork to Tawakoni) was completed since the last round of planning. The next phase of the connection (a 144" pipeline to replace the existing 84" and 72" pipelines from Tawakoni to Dallas) is scheduled to be completed in the next five years. The first phase allows DWU to utilize approximately 30% of their Lake Fork supply. Lake Palestine (in Region I) is a significant supply source for DWU that is not currently connected to DWU's system. The estimated reliable supply for DWU from currently available sources (which exclude 70% of Lake Fork Reservoir and all of Lake Palestine, since they are not connected) is 557,833 acre-feet per year as of the year 2010 and 543,193 acre-feet per year in 2060.

Figure 3.3
Currently Available Water Supplies for Dallas Water Utilities



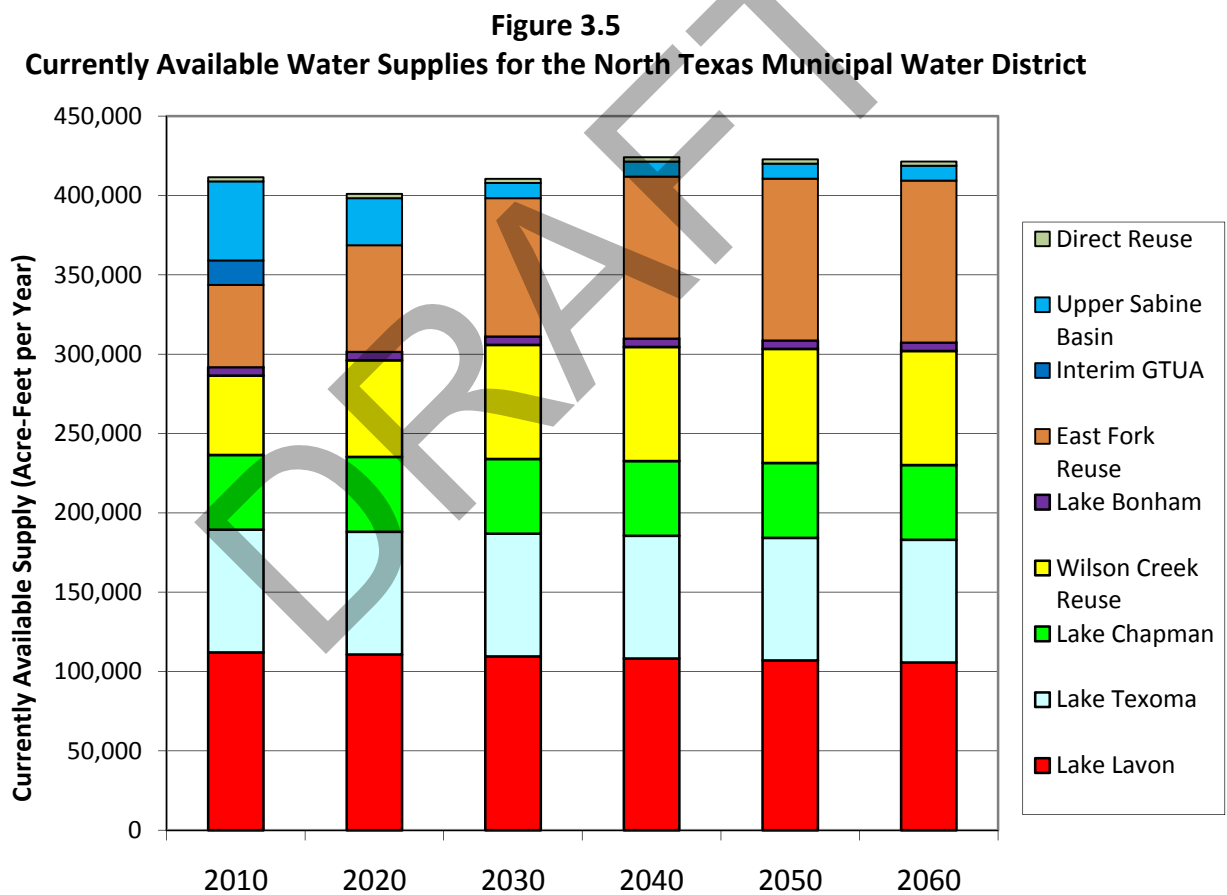
Tarrant Regional Water District

Figure 3.4 shows the currently available water supply for Tarrant Regional Water District (TRWD). TRWD's water supply system includes Cedar Creek Reservoir, Richland-Chambers Reservoir, Richland-Chambers reuse supply, Benbrook Lake, Lake Bridgeport, Eagle Mountain Lake and Lake Worth (owned by Fort Worth). Lakes Bridgeport, Eagle Mountain, and Worth are operated as the West Fork system. The currently available water supply as of 2060 is 508,333 acre-feet per year on a firm yield basis. The Richland-Chambers Reservoir reuse project is an existing water supply source that was a water management strategy for TRWD in the *2006 Region C Water Plan* ⁽²⁾. This project adds 10,000 acre-feet per year of currently available supply to the TRWD system. The water is used for municipal, mining, industrial, and agricultural purposes. Further development of the Richland-Chambers Reservoir reuse project is a water management strategy for TRWD and is discussed in Chapter 4. TRWD also has a water right allowing it to divert return flows from the Trinity River into Cedar Creek Reservoir. This project is a water management strategy for TRWD and is discussed in more detail in Chapter 4.



North Texas Municipal Water District

Figure 3.5 shows the currently available supply for the North Texas Municipal Water District (NTMWD). NTMWD's sources of supply include Lake Lavon, Lake Texoma, Chapman Lake (in Region D), direct reuse from several NTMWD wastewater treatment plants, return flows into the Lake Lavon watershed, Bonham Lake, return flows from the East Fork Raw Water Supply Project, raw water from the Upper Sabine Basin, and an interim raw water supply from GTUA. The East Fork Raw Water Supply Project, Upper Sabine Basin supply, interim GTUA supply, additional yield from Lake Lavon, and additional Wilson Creek Wastewater Treatment Plant reuse were all water management strategies for NTMWD in the *2006 Region C Water Plan* ⁽²⁾.



City of Fort Worth

Fort Worth obtains raw water from the Tarrant Regional Water District and sells treated water to wholesale and retail customers. The City currently provides reuse water

for golf course irrigation and is expanding its system to provide reuse water to the City of Arlington, City of Euless, Dallas-Fort Worth International Airport, and additional retail customers within the Fort Worth city limits. As shown in Table 3.8, Fort Worth's currently available supply is between 248,876 acre-feet per year and 278,645 acre-feet per year throughout the planning period.

Trinity River Authority

The Trinity River Authority (TRA) has water rights in Joe Pool Lake, Navarro Mills Lake, and Bardwell Lake in Region C. TRA also imports water from Lake Livingston in Region H (by an upstream diversion from the Trinity River) and has permits and authorization for three reuse projects, two of which are in operation. TRA purchases water from the Tarrant Regional Water District for its Tarrant County water supply project and has plans to purchase water from TRWD for use in Ellis County. Based on the WAM and reuse permit amounts, TRA's independent supply in Region C from current sources is projected to be 62,470 acre-feet as of 2060. This is in addition to the water it purchases from the Tarrant Regional Water District. The TRA has also received several recent water right amendments that will allow the diversion of up to 251,328 acre-feet per year of return flows for beneficial use.

Upper Trinity Regional Water District

As shown in Table 3.8, the Upper Trinity Regional Water District (UTRWD) has water supply available from Chapman Lake (in Region D, purchased from the Sulphur River Water District), Dallas Water Utilities, City of Denton, and reuse projects. UTRWD provides treated water to customers in Denton County and surrounding counties. UTRWD has recently received a water right amendment which allows the District to divert from Lake Lewisville up to 9,664 acre-feet per year of return flows, originating from UTRWD's Lake Chapman water, for municipal and industrial purposes.

Greater Texoma Utility Authority

The Greater Texoma Utility Authority (GTUA) has water rights for 25,000 acre-feet per year from Lake Texoma and sells raw water to Sherman, which operates a desalination and

treatment plant. Additional information regarding the Sherman Desalination Facility is provided in Appendix I. The yield of Lake Texoma is sufficient to provide 25,000 acre-feet per year through the year 2060. Congress allocated 50,000 acre-feet of storage in Lake Texoma from hydropower to municipal use for the GTUA. GTUA has applied for a water right for this additional 50,000 acre-feet of storage and an additional 56,500 acre-feet per year of supply. This strategy is discussed and recommended in Section 4E.

Dallas County Park Cities MUD

Dallas Cities Park Cities Municipal Utility District (PCMUD) holds water rights in Grapevine Lake and supplies treated water to Highland Park and University Park in Dallas County. PCMUD also has a contract with the City of Grapevine allowing Grapevine to reuse return flows discharged to Grapevine Lake from Grapevine's Peach Street WWTP.

City of Corsicana

The City of Corsicana purchases water from Navarro Mills Lake from the Trinity River Authority. The firm yield of the lake ranges from 19,342 acre-feet per year in 2010 to 14,300 acre-feet per year in 2060. The currently available supply for the City of Corsicana is limited by the capacity of its Navarro Mills water treatment plant to 11,210 acre-feet per year. Corsicana also has water rights in Lake Halbert and Richland-Chambers Reservoir, which was recently connected to the City's system. With the connection to Richland-Chambers Reservoir, the combined firm yield from Corsicana's share of Richland-Chambers Reservoir and from Lake Halbert is 13,830 acre-feet per year as of 2060. The currently available supply to Corsicana from Richland-Chambers Reservoir and Lake Halbert is 2,242 acre-feet per year because it is limited by the water treatment plant capacity at Lake Halbert.

Sabine River Authority

As shown in Table 3.8, the Sabine River Authority (SRA) has water supplies available from Lake Tawakoni and Lake Fork Reservoir in Region D and from Toledo Bend Reservoir and a run-of-the-river water right in Region I. SRA supplies water to Region C from Lake Tawakoni and Lake Fork Reservoir through sales to Dallas Water Utilities and North Texas

Municipal Water District. SRA also supplies water to other water suppliers in the Upper Sabine Basin, mostly located in Region D (but with some service in Region C). SRA's supplies from Lake Tawakoni and Lake Fork Reservoir are fully committed, but SRA has significant uncommitted supplies in Toledo Bend Reservoir.

Sulphur River Water District

The Sulphur River Water District (SRWD) holds water rights in Chapman Lake in Region C. SRWD supplies Chapman Lake raw water to UTRWD in Region C and suppliers in Region D.

Upper Neches River Municipal Water Authority

The Upper Neches River Municipal Water Authority (UNRMWA) holds water rights in Lake Palestine in Region I and has a contract to provide water to Dallas Water Utilities in Region C. UNRMWA also provides water from Lake Palestine to suppliers in Region I. DWU has not yet developed the facilities to deliver Lake Palestine water to DWU and plans to connect this supply in the future.

3.5 Current Water Supplies Available to Local Wholesale Water Providers

The supplies currently available to local wholesale water providers are summarized in Table 3.9. Many of the local wholesale water providers purchase their water from the regional suppliers and sell that water to their customers. Entities buying and selling water in this manner include:

- Argyle Water Supply Corporation purchases some of their supply from Upper Trinity Regional Water District.
- Bartonville Water Supply Corporation purchases some of their supply from Upper Trinity Regional Water District.
- City of Denton plans to purchase some of their supply from Dallas Water Utilities.
- City of Ennis purchases water from the Trinity River Authority (Bardwell Lake) and the Tarrant Regional Water District through the Trinity River Authority.
- City of Forney purchases water from North Texas Municipal Water District and purchases reuse water from Garland for Steam Electric Power.
- City of Garland purchase water from North Texas Municipal Water District and sells reuse water to Forney for Steam Electric Power.

- City of Mansfield purchases water from the Tarrant Regional Water District.
- City of McKinney purchases water from North Texas Municipal Water District.
- City of Midlothian purchases water from Trinity River Authority (Joe Pool Lake, with plans for Tarrant Regional Water District supplies through the Trinity River Authority as well).
- City of North Richland Hills purchases water from Tarrant Regional Water District through Fort Worth and Trinity River Authority.
- City of Rockwall purchases the water from North Texas Municipal Water District.
- City of Seagoville purchases water from Dallas Water Utilities.
- City of Sherman purchases water from Greater Texoma Utility Authority.
- City of Terrell purchases water from North Texas Municipal Water District.
- City of Waxahachie purchases some of its water from the Trinity River Authority (Bardwell Lake) and the Tarrant Regional Water District through the Trinity River Authority.
- City of Weatherford purchases some of its water from Tarrant Regional Water District.
- East Cedar Creek Freshwater Supply District purchases water from Tarrant Regional Water District (Cedar Creek Reservoir).
- Lake Cities Municipal Utility Authority purchases water from Upper Trinity Regional Water District.
- Mustang Special Utility District purchases water from Upper Trinity Regional Water District.
- Rockett Special Utility District purchases water from Midlothian, Waxahachie, and the Tarrant Regional Water District through the Trinity River Authority.
- Walnut Creek Special Utility District purchases water from Tarrant Regional Water District.
- West Cedar Creek Municipal Utility District purchases water from Tarrant Regional Water District.
- Wise County Water Supply District purchases water from Tarrant Regional Water District.

The remaining local wholesale water providers supply water to their customers from their own water supplies.

3.6 Water Availability by Water User Group (WUG)

As part of the regional water planning process, the TWDB requires development of information on currently available water supplies for each water user group (WUG) by

river basin and county. (Water user groups are cities with populations greater than 500, water suppliers who serve an average of at least 0.25 million gallons per day (mgd) annually, “county-other” municipal uses, and countywide manufacturing, irrigation, mining, livestock, and steam electric uses.) The availability figures by water user group are limited by contracts and existing physical facilities, including transmission facilities, groundwater wells, and water treatment. The supplies available to each WUG are shown in Appendix J.

As the information on currently available water supply for WUGs was developed, several important points became apparent:

- Most water user groups in Region C will need additional water supplies over the next 50 years to meet growing demands.
- Current groundwater use in a few areas exceeds the long-term reliable supply.
- There are some significant water supplies that can be made available by the development of additional water transmission facilities. Examples include full development of Dallas Water Utilities’ share of Lake Fork Reservoir in the Sabine Basin and Lake Palestine in the Neches Basin.

3.7 Summary of Current Water Supply in Region C

1. Region C water suppliers are currently using most of the reliable supply available from in-region reservoirs. The current use from some in-region reservoirs exceeds the reliable supplies that would be available in an extended drought. (In all cases where this is being done, the water suppliers have developed or are developing access to other supplies.)
2. The projected overall water supply available to Region C in 2060 from current sources is 2,311,818 acre-feet per year. (This figure does not consider supply limitations due to the capacities of current raw water transmission facilities and wells.) The sources of supply for Region C in 2060 include:
 - 1,248,713 acre-feet per year (54%) from in-region reservoirs
 - 146,152 acre-feet per year (6%) from groundwater
 - 43,906 acre-feet per year (2%) from local supplies
 - 330,695 acre-feet per year (14%) from reuse
 - 542,352 acre-feet per year (23%) from imports from other regions
3. The supply currently available to Region C from existing sources in 2060 (1.77 million acre-feet per year) is significantly less than the projected 2060 water use, which is over 3.27million acre-feet per year.
4. Considering supply limitations due to the capacities of current raw water transmission facilities and wells, the currently available supply for Region C water users in 2060 is

1,758,495 acre- feet per year, with 13,969 acre-feet per year for water users in other regions. The total available supply is 1,772,464 acre-feet per year, which is 539,354 acre-feet per year less than the overall supply from existing sources. Most water user groups will have to make improvements to their facilities to provide for projected needs.

5. The currently available supply for 2060 presented in this plan (1,772,464 acre-feet per year) is significantly greater than what was in the 2006 Region C Plan (1,391,001 acre-feet per year), demonstrating on-going development by Region C suppliers.
6. Several major water suppliers will require additional raw water transmission facilities to make full use of their existing sources.
7. Current groundwater use in a few areas in Region C exceeds the projected long-term water supply availability. Supplies from other sources will be needed in these areas so that groundwater use can be reduced to sustainable levels.
8. Some sources of supply will probably not be utilized fully during the period covered by this plan, but these will generally be the smaller local supplies.
9. The two operating desalination facilities in Region C are capable of treating 8,550 acre-feet per year of brackish water within Region C. The City of Sherman facility treats water from Lake Texoma, and the City of Bardwell facility treats local groundwater. Additional information regarding desalination in Region C is provided in Appendix I.

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**Table 3.9
Currently Available Supplies to Local Wholesale Water Providers in Region C**

Provider	Source	Water Supply Currently Available (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
Argyle WSC	Groundwater	667	667	667	667	667	667
	UTRWD	1,775	1,251	1,179	1,017	911	882
	Total	2,442	1,918	1,846	1,684	1,578	1,549
Arlington	Lake Arlington	9,850	9,700	9,550	9,400	9,250	9,100
	TRWD	68,006	77,114	69,406	62,992	55,473	48,949
	Total	77,856	86,814	78,956	72,392	64,723	58,049
Athens Municipal Water Authority	Lake Athens (firm yield)	6,064	5,983	5,903	5,822	5,741	5,660
	Lake Athens (operational yield)	2,900	2,900	2,900	2,900	2,900	2,900
	Reuse for Fish Hatchery	2,872	0	0	0	0	0
	Total (limited by operation)	5,772	2,900	2,900	2,900	2,900	2,900
Bartonville WSC	UTRWD	1,170	708	540	447	381	355
	Trinity Aquifer	449	449	449	449	449	449
	Total	1,619	1,157	989	896	830	804
Bolivar WSC	UTRWD	773	720	1,120	1,660	2,023	2,327
	Trinity Aquifer	1,548	1,548	1,548	1,548	1,548	1,548
	Total	2,321	2,268	2,668	3,208	3,571	3,875
Dallas County WCID #6	Total (from DWU)	2,516	2,156	2,112	2,014	1,909	1,731
Denton	Lake Lewisville	7,918	7,817	7,715	7,613	7,512	7,410
	Lake Ray Roberts	18,980	18,720	18,460	18,200	17,940	17,680
	Indirect Reuse	1,682	8,861	11,557	12,907	12,726	12,545
	DWU	0	0	5,310	12,883	20,694	33,332
	Subtotal (limited by WTP capacity)	28,580	31,949	31,949	31,949	31,949	31,949
	Reuse (Steam Electric Power and Irrigation)	1,233	2,242	2,690	3,251	3,924	4,708
	Total	29,813	34,191	34,639	35,200	35,873	36,657
East Cedar Creek FWSD	TRWD (limited by contract)	2,330	2,608	2,587	2,446	2,358	2,271

Table 3.9, Continued

Provider	Source	Water Supply Currently Available (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
Ennis	Bardwell Lake (TRA)	4,712	4,484	4,257	4,030	4,802	3,575
	TRA (TRWD Sources)	0	1,042	2,012	2,692	2,358	2,871
	Direct Reuse	800	800	800	800	800	800
	Total	5,512	6,326	7,069	7,522	6,960	7,246
Forney	NTMWD	3,717	6,367	6,692	7,007	7,265	7,729
	Reuse from Garland (Steam Electric only)	8,979	8,979	8,979	8,979	8,979	8,979
	Total	12,696	15,346	15,671	15,986	16,244	16,708
Gainesville	Trinity Aquifer	2,360	2,360	2,360	2,360	2,360	2,360
	Moss Lake (limited by WTP)	1,120	1,120	1,120	1,120	1,120	1,120
	Direct Reuse	9	9	9	9	9	9
	Total	3,489	3,489	3,489	3,489	3,489	3,489
Garland	NTMWD	45,634	37,649	33,741	30,411	27,702	25,973
	Reuse sold to Forney (Steam Electric only)	8,979	8,979	8,979	8,979	8,979	8,979
	Total	54,613	46,628	42,720	39,390	36,681	34,952
Grand Prairie	Groundwater	4,200	4,200	4,200	4,200	4,200	4,200
	Joe Pool Raw Water	300	300	300	300	300	300
	Fort Worth (TRWD)	1,065	1,028	874	756	662	577
	DWU	21,897	12,147	15,303	17,615	19,404	17,062
	Total	27,462	17,676	20,677	22,871	24,566	22,139
Lake Cities MUA	UTRWD	2,099	995	775	651	525	465
	Trinity Aquifer	150	150	150	150	150	150
	Woodbine Aquifer	324	324	324	324	324	324
	Total	2,573	1,469	1,249	1,125	999	939
Mansfield	TRWD (limited by WTP)	14,965	16,815	16,815	16,815	16,815	16,815
Midlothian	Joe Pool Lake	5,954	5,833	5,712	5,591	5,470	5,349
	Joe Pool Lake from Grand Prairie	1,304	1,272	1,239	1,207	1,174	1,141
	Total (limited by WTP)	6,884	6,884	6,884	6,798	6,644	6,490

Table 3.9, Continued

Provider	Source	Water Supply Currently Available (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
Mustang SUD	Trinity Aquifer	1,162	1,162	1,162	1,162	1,162	1,162
	UTRWD Sources	1,096	1,128	1,080	1,239	1,325	1,457
	Total	2,258	2,290	2,242	2,401	2,487	2,619
North Richland Hills	TRWD (through Ft Worth & TRA)	15,906	16,092	14,416	12,832	11,487	10,212
	Trinity Aquifer	233	233	233	233	233	233
	Total	16,139	16,325	14,649	13,065	11,720	10,445
Princeton	NTMWD	2,207	3,261	3,885	5,294	7,431	9,948
Rockett SUD	Midlothian	1,544	1,682	1,682	1,682	1,682	1,682
	Waxahachie	0	0	0	0	0	0
	TRA (TRWD Sources)	4,356	7,256	8,003	7,779	7,235	6,413
	TRA/TRWD (limited by WTP)	4,356	5,600	5,600	5,600	5,600	5,600
	Total	5,900	7,282	7,282	7,282	7,282	7,282
Rockwall	NTMWD	11,444	14,568	15,481	16,174	15,009	13,950
Seagoville	DWU	2,601	2,944	3,491	3,941	4,308	4,414
Sherman	Trinity Aquifer	4,083	4,083	4,083	4,083	4,083	4,083
	Woodbine Aquifer	3,463	3,463	3,463	3,463	3,463	3,463
	GTUA	13,600	13,600	13,600	13,600	13,600	13,600
	Total	21,146	21,146	21,146	21,146	21,146	21,146
Terrell	North Texas Municipal Water District	5,490	10,081	12,050	13,739	14,103	14,910
Walnut Creek SUD	TRWD	3,575	5,124	6,694	7,320	7,233	6,999
	Total (limited by WTP capacity)	3,575	4,204	4,204	4,204	4,204	4,204

Table 3.9, Continued

Provider	Source	Water Supply Currently Available (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
Waxahachie	Lake Waxahachie	2,905	2,800	2,695	2,590	2,485	2,380
	TRA (Bardwell)	4,320	4,320	4,183	3,988	3,794	3,600
	Rockett SUD (for retail connections)	613	613	613	613	613	613
	Reuse	4,998	5,129	5,129	5,129	5,129	5,129
	TRA (TRWD Sources for Sokol WTP)	2,325	2,440	3,765	6,978	9,822	11,487
	Sokol WTP (limited by capacity)	2,325	2,440	3,765	5,605	5,605	5,605
	Total (limited by WTP capacity)	11,346	11,461	12,786	14,626	14,626	14,626
Weatherford	Lake Weatherford	2,967	2,923	2,880	2,837	2,793	2,750
	Benbrook Lake (TRWD)	3,076	4,550	4,998	5,243	5,389	5,486
	Total (limited by WTP capacity)	6,043	7,473	7,840	7,840	7,840	7,840
West Cedar Creek SUD	TRWD (limited by contract)	1,714	1,714	1,714	1,714	1,714	1,714
Wise Co. WSD	TRWD	1,730	1,966	2,258	2,496	2,810	2,873
	Total (limited by WTP capacity)	1,730	1,754	1,754	1,754	1,754	1,754

CHAPTER 3 LIST OF REFERENCES

- (1) Texas Water Development Board, *Exhibit C General Guidelines for Regional Water Plan Development (2007-2011)*, Austin, [Online] Available URL: <http://www.twdb.state.tx.us/wrpi/rwp/docu.htm>, September 8, 2008.
- (2) Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2006 Region C Water Plan*, prepared for the Region C Water Planning Group, Fort Worth, January 2006.
- (3) Texas Water Development Board: "GAM Run 08-84mag," Managed available groundwater estimates for the Trinity Aquifer in Groundwater Management Area 8, Austin, March 2009.
- (4) Texas Water Development Board: "GAM Run 08-14mag," Managed available groundwater estimates for the Woodbine Aquifer in Groundwater Management Area 8, Austin, December 2008.
- (5) Espey Consultants, Inc., Brown and Root, Inc., Freese and Nichols, Inc., GSG Inc., Crespo Consulting Services, Inc.: *Final Water Availability Models for the Trinity, Trinity-San Jacinto, and Neches-Trinity Basins*, prepared for the Texas Natural Resource Conservation Commission, Austin, March 2002.
- (6) Brown and Root Services, Freese and Nichols, Inc., Espey-Padden, and Crespo Consultants: *Final Report Water Availability Modeling for the Neches River Basin*, prepared for the Texas Natural Resource Conservation Commission, Houston, January 2000.
- (7) Espey Consulting, Inc., PBS&J, Halff Associates, Inc., Crespo Consulting Services, Inc., and CivilTech Engineering, Inc.: *Water Availability Models for the Red and Canadian River Basins*, prepared for the Texas Natural Resource Conservation Commission, Austin, March 2002.
- (8) Brown and Root Services, R.J. Brandes Company, and Crespo Consultants: *Final Report Water Availability Modeling for the Sabine River Basin*, prepared for the Texas Natural Resource Conservation Commission, Houston, December 2001.
- (9) R.J. Brandes Company: *Final Report Water Availability Modeling for the Sulphur River Basin*, prepared for the Texas Natural Resource Conservation Commission, Austin, June 1999.
- (10) Intera and Parsons, *Final Report Groundwater Availability Model for the Northern Carrizo-Wilcox Aquifer*, prepared for the Texas Water Development Board, Austin, January 31, 2003.

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