

# GTA Aquifer Assessment 08-05

by David Thorkildsen, P.G. and Sarah Backhouse

Texas Water Development Board  
Groundwater Technical Assistance Section  
(512) 936-0871  
October 22, 2009

## REQUESTOR:

Caroline Runge, of the Menard County Underground Water District acting on behalf of the member groundwater conservation districts of Groundwater Management Area 7.

## DESCRIPTION OF REQUEST:

In a letter dated July 8, 2008, Ms. Caroline Runge provided the Texas Water Development Board (TWDB) with draft desired future conditions for the Edwards-Trinity (Plateau) Aquifer covering two separate areas in Groundwater Management Area 7 and requested that TWDB estimate draft managed available groundwater values for each of those areas. This aquifer assessment presents the draft managed available groundwater for the Edwards-Trinity (Plateau) Aquifer in the Crockett County, Kimble County, Kinney County, Middle Pecos, and Wes-Tex Groundwater Conservation Districts; the Coke County, Hill Country, Sterling County, Sutton County, and Uvalde County Underground Water Conservation Districts; the Hickory Underground Water Conservation District No. 1; the Irion County and Lipan-Kickapoo Water Conservation Districts; the Menard County Underground Water District; the Plateau Underground Water Conservation and Supply District; and the Real-Edwards Conservation and Reclamation District in Groundwater Management Area 7.

## DRAFT DESIRED FUTURE CONDITIONS:

- Edwards-Trinity (Plateau) Aquifer – Four scenarios that allow water-level declines of 5, 10, 15, and 20 feet after 50 years, respectively.

## METHODS:

The requested analysis for the Edwards-Trinity (Plateau) Aquifer was based on maintaining a specified water-level decline from current average static water level elevation after 50 years.

The amount of data available for the Edwards-Trinity (Plateau) Aquifer is considerable; information on effective recharge and specific yield is available from the TWDB Groundwater Availability Model (GAM) (Anaya and Jones, 2004) for the aquifer. Water level data (2000-present) is also sufficient to determine

current average aquifer static water level elevation for estimating draft managed available groundwater (TDLR, 2009; TWDB, 2009).

Analytical estimates for the Edwards-Trinity (Plateau) Aquifer were requested due to possible simulation problems with the GAM in Pecos, Glasscock and Reagan counties (Donnelly, 2007; Tu, 2008).

A transient hydrologic budget for the saturated portion of an aquifer is described by Freeze and Cherry (1979, p.365):

$$Q(t) = R(t) - D(t) + \frac{dS}{dt}$$

where:  $Q(t)$ = total rate of groundwater withdrawal  
 $R(t)$ = total rate of groundwater recharge to the basin  
 $D(t)$ = total rate of groundwater discharge from the basin  
 $\frac{dS}{dt}$  = rate of change of storage in the saturated zone of the basin

For this analysis, it is assumed that:

$$R(t) = R(r) + R(e)$$

where:  $R(r)$  = rejected recharge for the basin  
 $R(e)$  = effective recharge

In addition, it is assumed that:

$$R(r) \cong D(t)$$

Therefore, the total rate of groundwater withdrawal equals effective recharge plus the change in storage of the aquifer, or:

$$Q(t) = R(e) + \frac{dS}{dt}$$

County, regional water planning area, river basin, subcrop/outcrop, and groundwater conservation district boundaries subdivide the aquifer into map areas (Figure 1). The areal extent of each aquifer map area was calculated. These areas were used to calculate estimated annual effective recharge.

These map areas were multiplied by the estimated aquifer specific yield, and then by uniform water level declines of 5, 10, 15, and 20 feet. These volumes were then divided by 50 years to obtain a yearly volume. In cases where unconfined and confined conditions existed, those were calculated separately.

Annual effective recharge to the aquifer was calculated by multiplying each area by the average precipitation (1971 to 2000) and an effective recharge rate developed for the Edwards-Trinity (Plateau) Aquifer GAM.

The calculations were completed in a Microsoft Excel worksheet.

#### **PARAMETERS AND ASSUMPTIONS:**

- The estimated current average static water level elevation of the Edwards-Trinity (Plateau) Aquifer within the analyzed area, ranges from 1,200 to 2,930 feet above mean sea level (TDLR, 2009; TWDB 2009).
- The areas for each subdivision were calculated from the Texas Water Development Board (TWDB) shapefile for the Edwards-Trinity (Plateau) Aquifer, projected into the GAM projection (Anaya, 2001).
- Areas, in acres, were calculated within ArcGIS 9.2.
- Average annual precipitation was used to calculate annual effective recharge volumes.
- The average annual precipitation for each aquifer map area (Table 1) was determined from the Texas Climatic Atlas (Narasimhan and others, 2008) which is for the average for years 1971 to 2000.
- The estimated annual effective recharge for the Edwards-Trinity (Plateau) Aquifer in the analyzed area of GMA 7 is 826,537 acre-feet per year (Table 1).
- Annual effective recharge from precipitation is 2 to 11 percent of annual precipitation (Anaya and Jones, 2004).
- The draft managed available groundwater volume estimates are the sum of the annual effective recharge amount and the volume of water depleted from the aquifer based on the draft desired future condition.
- Annual volumes are calculated by dividing the total volume by 50 years.
- The aquifer is treated as a one layer water-table system with values of specific yield that range from 0.2 to 0.0004 (Anaya and Jones, 2004).
- Conditions were assumed to be physically possible across the groundwater management area.

Table 1. Estimated annual effective recharge volume for the Edwards-Trinity (Plateau) Aquifer by map area subdivisions (See Figure 1).

GMA	Aquifer	County	GCD	Map Area	Areal extent (acres)	Estimated average annual precipitation (inches)	Estimated average annual precipitation (feet)	Effective recharge rate (percent)	Estimated annual effective recharge (acre-feet)	
7	Edwards-Trinity Plateau	Pecos	Middle Pecos GCD	1	2,186,580	15	1.25	4	109,329	
		Upton	None	3	414,079	16	1.33	2	11,015	
				4	303,295	16	1.33	2	8,068	
		Ector	None	5	61,576	14	1.17	2	1,441	
				6	260,853	14	1.17	2	6,104	
		Midland	None	8	259,934	15	1.25	2	6,498	
		Glasscock	Glasscock GCD	10	437,869	18	1.50	2	13,136	
				12	61,827	18	1.50	2	1,855	
		Reagan	Santa Rita UWCD	13	638,880	18	1.50	2	19,166	
				14	51,865	17	1.42	2	1,473	
		Mitchell	Lone Wolf GCD	15	331	24	2.00	**	**	
		Sterling	Sterling County UWCD	16	398,492	20	1.67	2	13,310	
				17	2,252	21	1.75	2	79	
		Tom Green	None	18	61,861	21	1.75	2	2,165	
				19	303,830	22	1.83	2	11,120	
				20	28,187	21	1.75	2	987	
				21	576,365	20	1.67	2	19,251	
		Irion	Irion County WCD	21	576,365	20	1.67	2	19,251	
				22	184,425	23	1.92	2	7,082	
		Coke	Coke County UWCD	22	184,425	23	1.92	2	7,082	
				23	117,714	24	2.00	2	4,709	
		Nolan	Wes-Tex GCD	23	117,714	24	2.00	2	4,709	
				24	201,159	24	2.00	2	8,046	
		Taylor	None	25	79,667	25	2.08	2	3,314	
				26	41,083	25	2.08	2	1,709	
		Concho	Lipan-Kickapoo WCD	27	174,217	24	2.00	2	6,969	
				28	62,843	26	2.17	2	2,727	
		McCulloch	Hickory UWCD No.1	29	165,432	27	2.25	2	7,444	
				30	10,832	26	2.17	2	470	
		Mason	Hickory UWCD No.1	31	97,884	27	2.25	2	4,405	
		Menard	Menard County UWD	32	498,623	25	2.08	2	20,743	
				33	70,938	26	2.17	2	3,079	
		Kimble	Hickory UWCD No.1	34	14,667	26	2.17	2	637	
				35	775,743	25	2.08	2	32,271	
		Schleicher	Plateau UWC and Supply District	36	633,529	22	1.83	2	23,187	
				37	208,443	20	1.67	1	3,481	
		Sutton	None	38	1,739	21	1.75	2	61	
				39	510,918	22	1.83	2	18,700	
				40	414,592	23	1.92	2	15,920	
		Crockett	None	41	953	18	1.50	2	29	
				42	45,703	19	1.58	1	722	
				43	1,742,191	18	1.50	2	52,266	
		Terrell	None	45	1,509,243	15	1.25	2	37,731	
		Val Verde	None	46	1,899,939	19	1.58	4	120,076	
		Kinney	Kinney County GCD	48	102,337	25	2.08	11	23,415	
				50	122,252	23	1.92	11	25,820	
		Uvalde	Uvalde County UWCD	52	200,573	28	2.33	7	32,713	
				53	401,504	30	2.50	3	30,113	
		Real	Real-Edwards C and R District	54	37,906	28	2.33	2	1,766	
				55	422	29	2.42	**	**	
				56	577,311	25	2.08	4	48,032	
		Edwards	Real-Edwards C and R District	57	377,832	23	1.92	4	29,017	
				58	402,036	25	2.08	2	16,725	
		Gillespie	Hill Country UWCD	59	341,139	30	2.50	2	17,057	
				60	21,388	31	2.58	2	1,104	
		Total								826,537

GMA = groundwater management area      GCD = groundwater conservation district      UWCD = underground water conservation district  
WCD = water conservation district      UWD = underground water district      C and R District = conservation and reclamation district  
ac-ft/yr = acre-feet per year      UWC and Supply District = underground water conservation and supply district

\*\* Recharge not calculated due to insignificant area.

The formula for this table is: areal extent (acres) \* estimated average annual precipitation (feet) \* effective recharge rate = estimated annual effective recharge (ac-ft/yr).

## **RESULTS:**

The annual effective recharge estimate for the Edwards-Trinity (Plateau) Aquifer in Groundwater Management Area 7 is 826,537 acre-feet per year.

The results (Tables 2-6) show the draft managed available groundwater estimates for the Edwards-Trinity (Plateau) Aquifer in Groundwater Management Area 7. A 5-foot decline results in an estimated annual total volume of 832,808 acre-feet per year, a 10-foot decline results in an estimated annual total volume of 839,092 acre-feet per year, a 15-foot decline results in an estimated annual total volume of 845,365 acre-feet per year, and a 20-foot decline results in an estimated annual total volume of 851,646 acre-feet per year.

For estimates of draft managed available groundwater based on water level declines of 5, 10, 15, and 20 feet respectively and tabulated for individual groundwater management entities (GCD's, UWCD's, WCD's, UWD's, C and R Districts, and UWC and Supply Districts) see Tables 3-6.

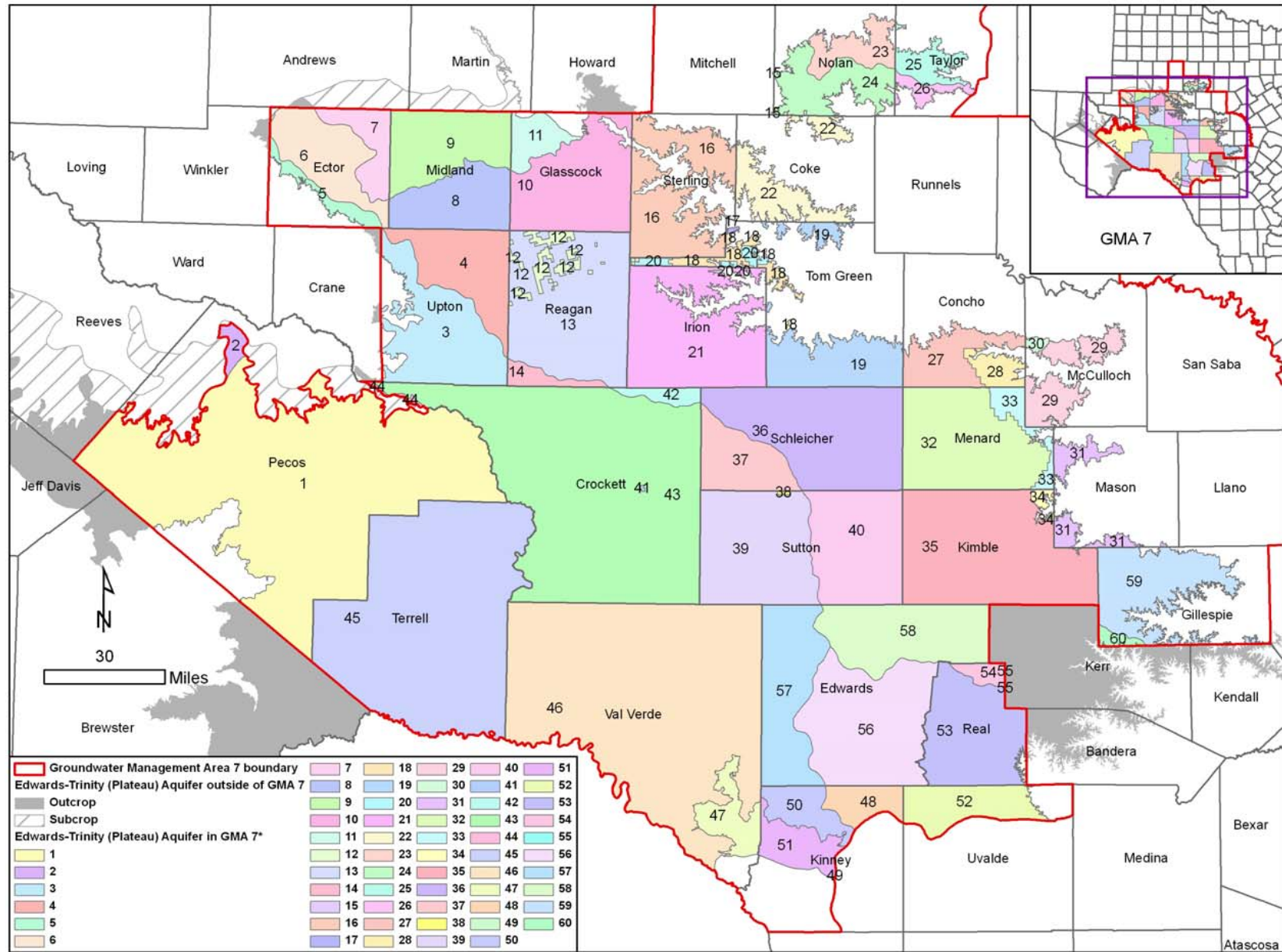


Figure 1. Geographic subdivisions for analyzing draft managed available groundwater for the Edwards-Trinity (Plateau) Aquifer in Groundwater Management Area 7. \* See Tables 3-6 for a description of geographic subdivisions based on county, regional water planning area, river basin, groundwater conservation district, and subcrop/outcrop boundaries.

Table 2. Estimates of draft managed available groundwater for the Edwards-Trinity (Plateau) Aquifer summarized by map areas (see Figure 1).

GMA	Aquifer	County	GCD	Map Area	Estimated specific yield	Areal extent (acres)	Average Current Static Water Level Elevation <sup>1</sup>	Desired total aquifer water level decline (feet)	Estimated total volume from water level decline (acre-feet)	Estimated annual volume from water level decline (acre-feet)	Estimated annual effective recharge <sup>2</sup> (ac-ft/yr)	Estimated annual total volume (ac-ft/yr)		
7	Edwards - Trinity Plateau	Pecos	Middle Pecos GCD	1	0.004	2,186,580	2830	5	43,732	875	109,329	110,204		
					0.004	2,186,580	2830	10	87,463	1,749	109,329	111,078		
					0.004	2,186,580	2830	15	131,195	2,624	109,329	111,953		
					0.004	2,186,580	2830	20	174,926	3,499	109,329	112,828		
				2	0.005	32,847	2450	5	821	16	0	16		
					0.005	32,847	2450	10	1,642	33	0	33		
					0.005	32,847	2450	15	2,464	49	0	49		
					0.005	32,847	2450	20	3,285	66	0	66		
			Upton	None	3	0.002	414,079	2560	5	4,141	83	11,015	11,098	
						0.002	414,079	2560	10	8,282	166	11,015	11,181	
						0.002	414,079	2560	15	12,422	248	11,015	11,263	
						0.002	414,079	2560	20	16,563	331	11,015	11,346	
					4	0.002	303,295	2580	5	3,033	61	8,068	8,129	
						0.002	303,295	2580	10	6,066	121	8,068	8,189	
				Ector	None	5	0.003	61,576	2930	5	924	18	1,441	1,459
							0.003	61,576	2930	10	1,847	37	1,441	1,478
		0.003					61,576	2930	15	2,771	55	1,441	1,496	
		0.003					61,576	2930	20	3,695	74	1,441	1,515	
		6				0.003	260,853	2930	5	3,913	78	6,104	6,182	
						0.003	260,853	2930	10	7,826	157	6,104	6,261	
			0.003			260,853	2930	15	11,738	235	6,104	6,339		
			0.003			260,853	2930	20	15,651	313	6,104	6,417		
		7	0.003		130,007	2930	5	1,950	39	0	39			
			0.003		130,007	2930	10	3,900	78	0	78			
		Midland	None		8	0.008	259,934	2690	5	10,397	208	6,498	6,706	
						0.008	259,934	2690	10	20,795	416	6,498	6,914	
						0.008	259,934	2690	15	31,192	624	6,498	7,122	
						0.008	259,934	2690	20	41,589	832	6,498	7,330	
				9	0.003	317,381	2730	5	4,761	95	0	95		
					0.003	317,381	2730	10	9,521	190	0	190		
					0.003	317,381	2730	15	14,282	286	0	286		
					0.003	317,381	2730	20	19,043	381	0	381		
			Glasscock	Glasscock GCD	10	0.002	437,869	2540	5	4,379	88	13,136	13,224	
						0.002	437,869	2540	10	8,757	175	13,136	13,311	
						0.002	437,869	2540	15	13,136	263	13,136	13,399	
						0.002	437,869	2540	20	17,515	350	13,136	13,486	
		11			0.004	96,386	2660	5	1,928	39	0	39		
					0.004	96,386	2660	10	3,855	77	0	77		
		Reagan			Glasscock GCD	12	0.002	61,827	2490	5	618	12	1,855	1,867
							0.002	61,827	2490	10	1,237	25	1,855	1,880
				0.002			61,827	2490	15	1,855	37	1,855	1,892	
				0.002			61,827	2490	20	2,473	49	1,855	1,904	
			Santa Rita UWCD	13	0.002	638,880	2460	5	6,389	128	19,166	19,294		
					0.002	638,880	2460	10	12,778	256	19,166	19,422		
					0.002	638,880	2460	15	19,166	383	19,166	19,549		
					0.002	638,880	2460	20	25,555	511	19,166	19,677		
				14	0.002	51,865	2390	5	519	10	1,473	1,483		
					0.002	51,865	2390	10	1,037	21	1,473	1,494		
					0.002	51,865	2390	15	1,556	31	1,473	1,504		
					0.002	51,865	2390	20	2,075	42	1,473	1,515		
		Mitchell	Lone Wolf GCD	15	**	331	**	**	**	**	**	**	**	
		Sterling	Sterling County UWCD	16	0.001	398,492	2410	5	1,992	40	13,310	13,350		
					0.001	398,492	2410	10	3,985	80	13,310	13,390		
					0.001	398,492	2410	15	5,977	120	13,310	13,430		
					0.001	398,492	2410	20	7,970	159	13,310	13,469		

Table 2 continued.

7	Edwards-Trinity Plateau u	Tom Green	Sterling County UWCD	17	0.0003	2,252	2260	5	3	0	79	79
					0.0003	2,252	2260	10	7	0	79	79
					0.0003	2,252	2260	15	10	0	79	79
					0.0003	2,252	2260	20	14	0	79	79
			None	18	0.0004	61,861	2280	5	124	2	2,165	2,167
					0.0004	61,861	2280	10	247	5	2,165	2,170
					0.0004	61,861	2280	15	371	7	2,165	2,172
					0.0004	61,861	2280	20	495	10	2,165	2,175
			Lipan-Kickapoo WCD	19	0.004	303,830	2150	5	6,077	122	11,120	11,242
					0.004	303,830	2150	10	12,153	243	11,120	11,363
					0.004	303,830	2150	15	18,230	365	11,120	11,485
					0.004	303,830	2150	20	24,306	486	11,120	11,606
		Irion County WCD	20	0.0004	28,187	2300	5	56	1	987	988	
				0.0004	28,187	2300	10	113	2	987	989	
				0.0004	28,187	2300	15	169	3	987	990	
				0.0004	28,187	2300	20	225	5	987	992	
		Irion	Irion County WCD	21	0.002	576,365	2300	5	5,764	115	19,251	19,366
					0.002	576,365	2300	10	11,527	231	19,251	19,482
					0.002	576,365	2300	15	17,291	346	19,251	19,597
					0.002	576,365	2300	20	23,055	461	19,251	19,712
		Coke	Coke County UWCD	22	0.003	184,425	2360	5	2,766	55	7,082	7,137
					0.003	184,425	2360	10	5,533	111	7,082	7,193
					0.003	184,425	2360	15	8,299	166	7,082	7,248
					0.003	184,425	2360	20	11,066	221	7,082	7,303
		Nolan	Wes-Tex GCD	23	0.003	117,714	2350	5	1,766	35	4,709	4,744
					0.003	117,714	2350	10	3,531	71	4,709	4,780
					0.003	117,714	2350	15	5,297	106	4,709	4,815
					0.003	117,714	2350	20	7,063	141	4,709	4,850
			None	24	0.003	201,159	2360	5	3,017	60	8,046	8,106
					0.003	201,159	2360	10	6,035	121	8,046	8,167
					0.003	201,159	2360	15	9,052	181	8,046	8,227
					0.003	201,159	2360	20	12,070	241	8,046	8,287
		Taylor	None	25	0.003	79,667	2200	5	1,195	24	3,314	3,338
					0.003	79,667	2200	10	2,390	48	3,314	3,362
					0.003	79,667	2200	15	3,585	72	3,314	3,386
					0.003	79,667	2200	20	4,780	96	3,314	3,410
			None	26	0.003	41,083	2200	5	616	12	1,709	1,721
					0.003	41,083	2200	10	1,232	25	1,709	1,734
					0.003	41,083	2200	15	1,849	37	1,709	1,746
					0.003	41,083	2200	20	2,465	49	1,709	1,758
		Concho	Lipan-Kickapoo WCD	27	0.004	174,217	2010	5	3,484	70	6,969	7,039
					0.004	174,217	2010	10	6,969	139	6,969	7,108
					0.004	174,217	2010	15	10,453	209	6,969	7,178
					0.004	174,217	2010	20	13,937	279	6,969	7,248
			Hickory UWCD No.1	28	0.004	62,843	1970	5	1,257	25	2,727	2,752
					0.004	62,843	1970	10	2,514	50	2,727	2,777
					0.004	62,843	1970	15	3,771	75	2,727	2,802
					0.004	62,843	1970	20	5,027	101	2,727	2,828
		McCulloch	Hickory UWCD No.1	29	0.004	165,432	1880	5	3,309	66	7,444	7,510
					0.004	165,432	1880	10	6,617	132	7,444	7,576
					0.004	165,432	1880	15	9,926	199	7,444	7,643
					0.004	165,432	1880	20	13,235	265	7,444	7,709
			None	30	0.003	10,832	1900	5	162	3	470	473
					0.003	10,832	1900	10	325	7	470	477
					0.003	10,832	1900	15	487	10	470	480
					0.003	10,832	1900	20	650	13	470	483
		Mason	Hickory UWCD No.1	31	0.002	97,884	1860	5	979	20	4,405	4,425
					0.002	97,884	1860	10	1,958	39	4,405	4,444
					0.002	97,884	1860	15	2,937	59	4,405	4,464
					0.002	97,884	1860	20	3,915	78	4,405	4,483
		Menard	Menard County UWD	32	0.003	498,623	2010	5	7,479	150	20,743	20,893
					0.003	498,623	2010	10	14,959	299	20,743	21,042
					0.003	498,623	2010	15	22,438	449	20,743	21,192
					0.003	498,623	2010	20	29,917	598	20,743	21,341
			Hickory UWCD No.1	33	0.004	70,938	1900	5	1,419	28	3,079	3,107
					0.004	70,938	1900	10	2,838	57	3,079	3,136
					0.004	70,938	1900	15	4,256	85	3,079	3,164
					0.004	70,938	1900	20	5,675	114	3,079	3,193
		Kimble	Hickory UWCD No.1	34	0.003	14,667	1790	5	220	4	637	641
					0.003	14,667	1790	10	440	9	637	646
					0.003	14,667	1790	15	660	13	637	650
					0.003	14,667	1790	20	880	18	637	655
			Kimble County GCD	35	0.002	775,743	1910	5	7,757	155	32,271	32,426
					0.002	775,743	1910	10	15,515	310	32,271	32,581
					0.002	775,743	1910	15	23,272	465	32,271	32,736
					0.002	775,743	1910	20	31,030	621	32,271	32,892



Table 2 continued.

7	Edwards - Trinity Plateau	Schleicher	Plateau UWC and Supply District	36	0.004	633,529	2160	5	12,671	253	23,187	23,440	
					0.004	633,529	2160	10	25,341	507	23,187	23,694	
					0.004	633,529	2160	15	38,012	760	23,187	23,947	
					0.004	633,529	2160	20	50,682	1,014	23,187	24,201	
				37	0.004	208,443	2210	5	4,169	83	3,481	3,564	
					0.004	208,443	2210	10	8,338	167	3,481	3,648	
					0.004	208,443	2210	15	12,507	250	3,481	3,731	
					0.004	208,443	2210	20	16,675	334	3,481	3,815	
		Sutton	None	38	0.004	1,739	2130	5	35	1	61	62	
					0.004	1,739	2130	10	70	1	61	62	
					0.004	1,739	2130	15	104	2	61	63	
					0.004	1,739	2130	20	139	3	61	64	
			Sutton County UWCD	39	0.004	510,918	1970	5	10,218	204	18,700	18,904	
					0.004	510,918	1970	10	20,437	409	18,700	19,109	
					0.004	510,918	1970	15	30,655	613	18,700	19,313	
					0.004	510,918	1970	20	40,873	817	18,700	19,517	
				40	0.003	414,592	2050	5	6,219	124	15,920	16,044	
					0.003	414,592	2050	10	12,438	249	15,920	16,169	
					0.003	414,592	2050	15	18,657	373	15,920	16,293	
					0.003	414,592	2050	20	24,876	498	15,920	16,418	
			Crockett	None	41	0.004	953	2120	5	19	0	29	29
						0.004	953	2120	10	38	1	29	30
						0.004	953	2120	15	57	1	29	30
						0.004	953	2120	20	76	2	29	31
		Crockett County GCD		42	0.004	45,703	2270	5	914	18	722	740	
					0.004	45,703	2270	10	1,828	37	722	759	
					0.004	45,703	2270	15	2,742	55	722	777	
					0.004	45,703	2270	20	3,656	73	722	795	
				43	0.004	1,742,191	2060	5	34,844	697	52,266	52,963	
					0.004	1,742,191	2060	10	69,688	1,394	52,266	53,660	
					0.004	1,742,191	2060	15	104,531	2,091	52,266	54,357	
					0.004	1,742,191	2060	20	139,375	2,788	52,266	55,054	
		44		0.2	7,835	2340	5	7,835	157	0	157		
				0.2	7,835	2340	10	15,670	313	0	313		
				0.2	7,835	2340	15	23,505	470	0	470		
				0.2	7,835	2340	20	31,340	627	0	627		
		Terrell		None	45	0.004	1,509,243	2050	5	30,185	604	37,731	38,335
						0.004	1,509,243	2050	10	60,370	1,207	37,731	38,938
						0.004	1,509,243	2050	15	90,555	1,811	37,731	39,542
						0.004	1,509,243	2050	20	120,739	2,415	37,731	40,146
		Val Verde	None	46	0.003	1,899,939	1430	5	28,499	570	120,076	120,646	
					0.003	1,899,939	1430	10	56,998	1,140	120,076	121,216	
					0.003	1,899,939	1430	15	85,497	1,710	120,076	121,786	
					0.003	1,899,939	1430	20	113,996	2,280	120,076	122,356	
			47	0.002	127,073	1230	5	1,271	25	0	25		
				0.002	127,073	1230	10	2,541	51	0	51		
				0.002	127,073	1230	15	3,812	76	0	76		
				0.002	127,073	1230	20	5,083	102	0	102		
		Kinney	Kinney County GCD	48	0.002	102,337	1460	5	1,023	20	23,415	23,435	
					0.002	102,337	1460	10	2,047	41	23,415	23,456	
					0.002	102,337	1460	15	3,070	61	23,415	23,476	
					0.002	102,337	1460	20	4,093	82	23,415	23,497	
				49	**	302	**	**	**	**	**		
				50	0.002	122,252	1360	5	1,223	24	25,820	25,844	
					0.002	122,252	1360	10	2,445	49	25,820	25,869	
					0.002	122,252	1360	15	3,668	73	25,820	25,893	
			0.002		122,252	1360	20	4,890	98	25,820	25,918		
			51	0.02	131,359	1200	5	13,136	263	0	263		
				0.02	131,359	1200	10	26,272	525	0	525		
				0.02	131,359	1200	15	39,408	788	0	788		
				0.02	131,359	1200	20	52,544	1,051	0	1,051		
			Uvalde	Uvalde County UWCD	52	0.003	200,573	1300	5	3,009	60	32,713	32,773
		0.003				200,573	1300	10	6,017	120	32,713	32,833	
		0.003				200,573	1300	15	9,026	181	32,713	32,894	
		0.003				200,573	1300	20	12,034	241	32,713	32,954	

Table 2 continued.

7	Edwards-Trinity Plateau	Real	Real-Edwards C and R District	53	0.002	401,504	1590	5	4,015	80	30,113	30,193		
					0.002	401,504	1590	10	8,030	161	30,113	30,274		
					0.002	401,504	1590	15	12,045	241	30,113	30,354		
					0.002	401,504	1590	20	16,060	321	30,113	30,434		
				54	0.002	37,906	1810	5	379	8	1,766	1,774		
					0.002	37,906	1810	10	758	15	1,766	1,781		
					0.002	37,906	1810	15	1,137	23	1,766	1,789		
					0.002	37,906	1810	20	1,516	30	1,766	1,796		
				55	**	422	**	**	**	**	**	**		
				Edwards	Real-Edwards C and R District	56	0.002	577,311	1760	5	5,773	115	48,032	48,147
							0.002	577,311	1760	10	11,546	231	48,032	48,263
							0.002	577,311	1760	15	17,319	346	48,032	48,378
		0.002	577,311				1760	20	23,092	462	48,032	48,494		
		57	0.002			377,832	1650	5	3,778	76	29,017	29,093		
			0.002			377,832	1650	10	7,557	151	29,017	29,168		
			0.002			377,832	1650	15	11,335	227	29,017	29,244		
			0.002			377,832	1650	20	15,113	302	29,017	29,319		
		58	0.002			402,036	1850	5	4,020	80	16,725	16,805		
			0.002			402,036	1850	10	8,041	161	16,725	16,886		
			0.002			402,036	1850	15	12,061	241	16,725	16,966		
			0.002			402,036	1850	20	16,081	322	16,725	17,047		
		Gillespie	Hill Country UWCD			59	0.002	341,139	1870	5	3,411	68	17,057	17,125
							0.002	341,139	1870	10	6,823	136	17,057	17,193
							0.002	341,139	1870	15	10,234	205	17,057	17,262
							0.002	341,139	1870	20	13,646	273	17,057	17,330
				60	0.002	21,388	1720	5	214	4	1,104	1,108		
					0.002	21,388	1720	10	428	9	1,104	1,113		
					0.002	21,388	1720	15	642	13	1,104	1,117		
					0.002	21,388	1720	20	856	17	1,104	1,121		
		<b>Total</b>								5		826,537	832,808	
										10		826,537	839,092	
										15		826,537	845,365	
										20		826,537	851,646	

GMA = groundwater management area

GCD = groundwater conservation district

UWCD = underground water conservation district

WCD = water conservation district

C and R District = conservation and reclamation district UWD = underground water district

ac-ft/yr = acre-feet per year

UWC and Supply District = Underground water conservation and supply district

1 - feet above mean sea level

2 - This is the estimated total annual effective recharge volume for the Edwards-Trinity (Plateau) Aquifer by map areas as shown in Table 1.

\*\* Recharge and availability not calculated due to insignificant area.

The formulas for this table are: specific yield \* areal extent \* desired total aquifer water level decline = estimated total volume from water level decline. Estimated total volume from water level decline/50 = estimated annual volume from water level decline. Then estimated annual volume from water level decline + estimated annual effective recharge = estimated annual total volume.

Table 3. Estimates of draft managed available groundwater for water level declines of 5 feet in the Edwards-Trinity (Plateau) Aquifer (see Figure 1).

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
1	Edwards-Trinity Plateau	Pecos	F	Rio Grande	Middle Pecos GCD	7	n/a	n/a	outcrop	110,204
2	Edwards-Trinity Plateau	Pecos	F	Rio Grande	Middle Pecos GCD	7	n/a	n/a	subcrop	16
3	Edwards-Trinity Plateau	Upton	F	Rio Grande	n/a	7	n/a	n/a	outcrop	11,098
4	Edwards-Trinity Plateau	Upton	F	Colorado	n/a	7	n/a	n/a	outcrop	8,129
5	Edwards-Trinity Plateau	Ector	F	Rio Grande	n/a	7	n/a	n/a	outcrop	1,459
6	Edwards-Trinity Plateau	Ector	F	Colorado	n/a	7	n/a	n/a	outcrop	6,182
7	Edwards-Trinity Plateau	Ector	F	Colorado	n/a	7	n/a	n/a	subcrop	39
8	Edwards-Trinity Plateau	Midland	F	Colorado	n/a	7	n/a	n/a	outcrop	6,706
9	Edwards-Trinity Plateau	Midland	F	Colorado	n/a	7	n/a	n/a	subcrop	95
10	Edwards-Trinity Plateau	Glasscock	F	Colorado	Glasscock GCD	7	n/a	n/a	outcrop	13,224
11	Edwards-Trinity Plateau	Glasscock	F	Colorado	Glasscock GCD	7	n/a	n/a	subcrop	39
12	Edwards-Trinity Plateau	Reagan	F	Colorado	Glasscock GCD	7	n/a	n/a	outcrop	1,867
13	Edwards-Trinity Plateau	Reagan	F	Colorado	Santa Rita UWCD	7	n/a	n/a	outcrop	19,294
14	Edwards-Trinity Plateau	Reagan	F	Rio Grande	Santa Rita UWCD	7	n/a	n/a	outcrop	1,483
15	Edwards-Trinity Plateau	Mitchell	F	Colorado	Lone Wolf GCD	7	n/a	n/a	outcrop	*
16	Edwards-Trinity Plateau	Sterling	F	Colorado	Sterling County UWCD	7	n/a	n/a	outcrop	13,350
17	Edwards-Trinity Plateau	Green Tom	F	Colorado	Sterling County UWCD	7	n/a	n/a	outcrop	79
18	Edwards-Trinity Plateau	Green Tom	F	Colorado	n/a	7	n/a	n/a	outcrop	2,167
19	Edwards-Trinity Plateau	Green Tom	F	Colorado	Lipan-Kickapoo WCD	7	n/a	n/a	outcrop	11,242
20	Edwards-Trinity Plateau	Green	F	Colorado	Irion County WCD	7	n/a	n/a	outcrop	988

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
21	Edwards-Trinity Plateau	Irion	F	Colorado	Irion County WCD	7	n/a	n/a	outcrop	19,366
22	Edwards-Trinity Plateau	Coke	F	Colorado	Coke County UWCD	7	n/a	n/a	outcrop	7,137
23	Edwards-Trinity Plateau	Nolan	G	Brazos	Wes-Tex GCD	7	n/a	n/a	outcrop	4,744
24	Edwards-Trinity Plateau	Nolan	G	Colorado	Wes-Tex GCD	7	n/a	n/a	outcrop	8,106
25	Edwards-Trinity Plateau	Taylor	G	Brazos	n/a	7	n/a	n/a	outcrop	3,338
26	Edwards-Trinity Plateau	Taylor	G	Colorado	n/a	7	n/a	n/a	outcrop	1,721
27	Edwards-Trinity Plateau	Concho	F	Colorado	Lipan-Kickapoo WCD	7	n/a	n/a	outcrop	7,039
28	Edwards-Trinity Plateau	Concho	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	2,752
29	Edwards-Trinity Plateau	McCulloch	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	7,510
30	Edwards-Trinity Plateau	McCulloch	F	Colorado	n/a	7	n/a	n/a	outcrop	473
31	Edwards-Trinity Plateau	Mason	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	4,425
32	Edwards-Trinity Plateau	Menard	F	Colorado	Menard County UWD	7	n/a	n/a	outcrop	20,893
33	Edwards-Trinity Plateau	Menard	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	3,107
34	Edwards-Trinity Plateau	Kimble	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	641
35	Edwards-Trinity Plateau	Kimble	F	Colorado	Kimble County GCD	7	n/a	n/a	outcrop	32,426
36	Edwards-Trinity Plateau	Schleicher	F	Colorado	Supply District Plateau UWC and	7	n/a	n/a	outcrop	23,440
37	Edwards-Trinity Plateau	Schleicher	F	Rio Grande	Supply District	7	n/a	n/a	outcrop	3,564
38	Edwards-Trinity Plateau	Sutton	F	Rio Grande	n/a	7	n/a	n/a	outcrop	62
39	Edwards-Trinity Plateau	Sutton	F	Rio Grande	Sutton County UWCD	7	n/a	n/a	outcrop	18,904
40	Edwards-Trinity Plateau	Sutton	F	Colorado	Sutton County UWCD	7	n/a	n/a	outcrop	16,044
41	Edwards-Trinity Plateau	Crockett	F	Rio Grande	n/a	7	n/a	n/a	outcrop	29
42	Edwards-Trinity Plateau	Crockett	F	Colorado	Crockett County GCD	7	n/a	n/a	outcrop	740
43	Edwards-Trinity Plateau	Crockett	F	Rio Grande	Crockett County GCD	7	n/a	n/a	outcrop	52,963
44	Edwards-Trinity Plateau	Crockett	F	Rio Grande	Crockett County GCD	7	n/a	n/a	subcrop	157
45	Edwards-Trinity Plateau	Terrell	E	Rio Grande	n/a	7	n/a	n/a	outcrop	38,335
46	Edwards-Trinity Plateau	Val Verde	J	Rio Grande	n/a	7	n/a	n/a	outcrop	120,646
47	Edwards-Trinity Plateau	Val Verde	J	Rio Grande	n/a	7	n/a	n/a	subcrop	25
48	Edwards-Trinity Plateau	Kinney	J	Nueces	Kinney County GCD	7	n/a	n/a	outcrop	23,435

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
49	Edwards-Trinity Plateau	Kinney	J	Nueces	Kinney County GCD	7	n/a	n/a	subcrop	*
50	Edwards-Trinity Plateau	Kinney	J	Rio Grande	Kinney County GCD	7	n/a	n/a	outcrop	25,844
51	Edwards-Trinity Plateau	Kinney	J	Rio Grande	Kinney County GCD	7	n/a	n/a	subcrop	263
52	Edwards-Trinity Plateau	Uvalde	L	Nueces	Uvalde County UWCD	7	n/a	n/a	outcrop	32,773
53	Edwards-Trinity Plateau	Real	J	Nueces	Real-Edwards C and R District	7	n/a	n/a	outcrop	30,193
54	Edwards-Trinity Plateau	Real	J	Colorado	Real-Edwards C and R District	7	n/a	n/a	outcrop	1,774
55	Edwards-Trinity Plateau	Real	J	Guadalupe	Real-Edwards C and R District	7	n/a	n/a	outcrop	*
56	Edwards-Trinity Plateau	Edwards	J	Nueces	Real-Edwards C and R District	7	n/a	n/a	outcrop	48,147
57	Edwards-Trinity Plateau	Edwards	J	Rio Grande	Real-Edwards C and R District	7	n/a	n/a	outcrop	29,093
58	Edwards-Trinity Plateau	Edwards	J	Colorado	Real-Edwards C and R District	7	n/a	n/a	outcrop	16,805
59	Edwards-Trinity Plateau	Gillespie	K	Colorado	Hill Country UWCD	7	n/a	n/a	outcrop	17,125
60	Edwards-Trinity Plateau	Gillespie	K	Guadalupe	Hill Country UWCD	7	n/a	n/a	outcrop	1,108

RWPA = regional water planning area

GCD = groundwater conservation district

UWCD = under water conservation district

GMA = groundwater management area

WCD = water conservation district

C and R District = conservation and reclamation district

UWC and Supply District = underground water conservation and supply district

UWD = underground water district

GeoArea = Geographic areas defined by unique desired future conditions as specified by a groundwater management area.

MAG = Managed available groundwater in units of acre-feet per year.

\* Availability not calculated due to insignificant area.

Table 4. Estimates of draft managed available groundwater for water level declines of 10 feet in the Edwards-Trinity (Plateau) Aquifer (see Figure 1).

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
1	Edwards-Trinity Plateau	Pecos	F	Rio Grande	Middle Pecos GCD	7	n/a	n/a	outcrop	111,078
2	Edwards-Trinity Plateau	Pecos	F	Rio Grande	Middle Pecos GCD	7	n/a	n/a	subcrop	33
3	Edwards-Trinity Plateau	Upton	F	Rio Grande	n/a	7	n/a	n/a	outcrop	11,181
4	Edwards-Trinity Plateau	Upton	F	Colorado	n/a	7	n/a	n/a	outcrop	8,189
5	Edwards-Trinity Plateau	Ector	F	Rio Grande	n/a	7	n/a	n/a	outcrop	1,478
6	Edwards-Trinity Plateau	Ector	F	Colorado	n/a	7	n/a	n/a	outcrop	6,261
7	Edwards-Trinity Plateau	Ector	F	Colorado	n/a	7	n/a	n/a	subcrop	78
8	Edwards-Trinity Plateau	Midland	F	Colorado	n/a	7	n/a	n/a	outcrop	6,914
9	Edwards-Trinity Plateau	Midland	F	Colorado	n/a	7	n/a	n/a	subcrop	190
10	Edwards-Trinity Plateau	Glasscock	F	Colorado	Glasscock GCD	7	n/a	n/a	outcrop	13,311
11	Edwards-Trinity Plateau	Glasscock	F	Colorado	Glasscock GCD	7	n/a	n/a	subcrop	77
12	Edwards-Trinity Plateau	Reagan	F	Colorado	Glasscock GCD	7	n/a	n/a	outcrop	1,880
13	Edwards-Trinity Plateau	Reagan	F	Colorado	Santa Rita UWCD	7	n/a	n/a	outcrop	19,422
14	Edwards-Trinity Plateau	Reagan	F	Rio Grande	Santa Rita UWCD	7	n/a	n/a	outcrop	1,494
15	Edwards-Trinity Plateau	Mitchell	F	Colorado	Lone Wolf GCD	7	n/a	n/a	outcrop	*
16	Edwards-Trinity Plateau	Sterling	F	Colorado	Sterling County UWCD	7	n/a	n/a	outcrop	13,390
17	Edwards-Trinity Plateau	Green Tom	F	Colorado	Sterling County UWCD	7	n/a	n/a	outcrop	79
18	Edwards-Trinity Plateau	Green Tom	F	Colorado	n/a	7	n/a	n/a	outcrop	2,170
19	Edwards-Trinity Plateau	Green Tom	F	Colorado	Lipan-Kickapoo WCD	7	n/a	n/a	outcrop	11,363
20	Edwards-Trinity Plateau	Green	F	Colorado	Irion County WCD	7	n/a	n/a	outcrop	989

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
21	Edwards-Trinity Plateau	Irion	F	Colorado	Irion County WCD	7	n/a	n/a	outcrop	19,482
22	Edwards-Trinity Plateau	Coke	F	Colorado	Coke County UWCD	7	n/a	n/a	outcrop	7,193
23	Edwards-Trinity Plateau	Nolan	G	Brazos	Wes-Tex GCD	7	n/a	n/a	outcrop	4,780
24	Edwards-Trinity Plateau	Nolan	G	Colorado	Wes-Tex GCD	7	n/a	n/a	outcrop	8,167
25	Edwards-Trinity Plateau	Taylor	G	Brazos	n/a	7	n/a	n/a	outcrop	3,362
26	Edwards-Trinity Plateau	Taylor	G	Colorado	n/a	7	n/a	n/a	outcrop	1,734
27	Edwards-Trinity Plateau	Concho	F	Colorado	Lipan-Kickapoo WCD	7	n/a	n/a	outcrop	7,108
28	Edwards-Trinity Plateau	Concho	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	2,777
29	Edwards-Trinity Plateau	McCulloch	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	7,576
30	Edwards-Trinity Plateau	McCulloch	F	Colorado	n/a	7	n/a	n/a	outcrop	477
31	Edwards-Trinity Plateau	Mason	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	4,444
32	Edwards-Trinity Plateau	Menard	F	Colorado	Menard County UWD	7	n/a	n/a	outcrop	21,042
33	Edwards-Trinity Plateau	Menard	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	3,136
34	Edwards-Trinity Plateau	Kimble	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	646
35	Edwards-Trinity Plateau	Kimble	F	Colorado	Kimble County GCD	7	n/a	n/a	outcrop	32,581
36	Edwards-Trinity Plateau	Schleicher	F	Colorado	Supply District Plateau UWC and	7	n/a	n/a	outcrop	23,694
37	Edwards-Trinity Plateau	Schleicher	F	Rio Grande	Supply District	7	n/a	n/a	outcrop	3,648
38	Edwards-Trinity Plateau	Sutton	F	Rio Grande	n/a	7	n/a	n/a	outcrop	62
39	Edwards-Trinity Plateau	Sutton	F	Rio Grande	Sutton County UWCD	7	n/a	n/a	outcrop	19,109
40	Edwards-Trinity Plateau	Sutton	F	Colorado	Sutton County UWCD	7	n/a	n/a	outcrop	16,169
41	Edwards-Trinity Plateau	Crockett	F	Rio Grande	n/a	7	n/a	n/a	outcrop	30
42	Edwards-Trinity Plateau	Crockett	F	Colorado	Crockett County GCD	7	n/a	n/a	outcrop	759
43	Edwards-Trinity Plateau	Crockett	F	Rio Grande	Crockett County GCD	7	n/a	n/a	outcrop	53,660
44	Edwards-Trinity Plateau	Crockett	F	Rio Grande	Crockett County GCD	7	n/a	n/a	subcrop	313
45	Edwards-Trinity Plateau	Terrell	E	Rio Grande	n/a	7	n/a	n/a	outcrop	38,938
46	Edwards-Trinity Plateau	Val Verde	J	Rio Grande	n/a	7	n/a	n/a	outcrop	121,216
47	Edwards-Trinity Plateau	Val Verde	J	Rio Grande	n/a	7	n/a	n/a	subcrop	51
48	Edwards-Trinity Plateau	Kinney	J	Nueces	Kinney County GCD	7	n/a	n/a	outcrop	23,456

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
49	Edwards-Trinity Plateau	Kinney	J	Nueces	Kinney County GCD	7	n/a	n/a	subcrop	*
50	Edwards-Trinity Plateau	Kinney	J	Rio Grande	Kinney County GCD	7	n/a	n/a	outcrop	25,869
51	Edwards-Trinity Plateau	Kinney	J	Rio Grande	Kinney County GCD	7	n/a	n/a	subcrop	525
52	Edwards-Trinity Plateau	Uvalde	L	Nueces	Uvalde County UWCD	7	n/a	n/a	outcrop	32,833
53	Edwards-Trinity Plateau	Real	J	Nueces	Real-Edwards C and R District	7	n/a	n/a	outcrop	30,274
54	Edwards-Trinity Plateau	Real	J	Colorado	Real-Edwards C and R District	7	n/a	n/a	outcrop	1,781
55	Edwards-Trinity Plateau	Real	J	Guadalupe	Real-Edwards C and R District	7	n/a	n/a	outcrop	*
56	Edwards-Trinity Plateau	Edwards	J	Nueces	Real-Edwards C and R District	7	n/a	n/a	outcrop	48,263
57	Edwards-Trinity Plateau	Edwards	J	Rio Grande	Real-Edwards C and R District	7	n/a	n/a	outcrop	29,168
58	Edwards-Trinity Plateau	Edwards	J	Colorado	Real-Edwards C and R District	7	n/a	n/a	outcrop	16,886
59	Edwards-Trinity Plateau	Gillespie	K	Colorado	Hill Country UWCD	7	n/a	n/a	outcrop	17,193
60	Edwards-Trinity Plateau	Gillespie	K	Guadalupe	Hill Country UWCD	7	n/a	n/a	outcrop	1,113

RWPA = regional water planning area

GCD = groundwater conservation district

UWCD = under water conservation district

GMA = groundwater management area

WCD = water conservation district

C and R District = conservation and reclamation district

UWC and Supply District = underground water conservation and supply district

UWD = underground water district

GeoArea = Geographic areas defined by unique desired future conditions as specified by a groundwater management area.

MAG = Managed available groundwater in units of acre-feet per year.

\* Availability not calculated due to insignificant area.



Table 5. Estimates of draft managed available groundwater for water level declines of 15 feet in the Edwards-Trinity (Plateau) Aquifer (see Figure 1).

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
1	Edwards-Trinity Plateau	Pecos	F	Rio Grande	Middle Pecos GCD	7	n/a	n/a	outcrop	111,953
2	Edwards-Trinity Plateau	Pecos	F	Rio Grande	Middle Pecos GCD	7	n/a	n/a	subcrop	49
3	Edwards-Trinity Plateau	Upton	F	Rio Grande	n/a	7	n/a	n/a	outcrop	11,263
4	Edwards-Trinity Plateau	Upton	F	Colorado	n/a	7	n/a	n/a	outcrop	8,250
5	Edwards-Trinity Plateau	Ector	F	Rio Grande	n/a	7	n/a	n/a	outcrop	1,496
6	Edwards-Trinity Plateau	Ector	F	Colorado	n/a	7	n/a	n/a	outcrop	6,339
7	Edwards-Trinity Plateau	Ector	F	Colorado	n/a	7	n/a	n/a	subcrop	117
8	Edwards-Trinity Plateau	Midland	F	Colorado	n/a	7	n/a	n/a	outcrop	7,122
9	Edwards-Trinity Plateau	Midland	F	Colorado	n/a	7	n/a	n/a	subcrop	286
10	Edwards-Trinity Plateau	Glasscock	F	Colorado	Glasscock GCD	7	n/a	n/a	outcrop	13,399
11	Edwards-Trinity Plateau	Glasscock	F	Colorado	Glasscock GCD	7	n/a	n/a	subcrop	116
12	Edwards-Trinity Plateau	Reagan	F	Colorado	Glasscock GCD	7	n/a	n/a	outcrop	1,892
13	Edwards-Trinity Plateau	Reagan	F	Colorado	Santa Rita UWCD	7	n/a	n/a	outcrop	19,549
14	Edwards-Trinity Plateau	Reagan	F	Rio Grande	Santa Rita UWCD	7	n/a	n/a	outcrop	1,504
15	Edwards-Trinity Plateau	Mitchell	F	Colorado	Lone Wolf GCD	7	n/a	n/a	outcrop	*
16	Edwards-Trinity Plateau	Sterling	F	Colorado	Sterling County UWCD	7	n/a	n/a	outcrop	13,430
17	Edwards-Trinity Plateau	Green Tom	F	Colorado	Sterling County UWCD	7	n/a	n/a	outcrop	79
18	Edwards-Trinity Plateau	Green Tom	F	Colorado	n/a	7	n/a	n/a	outcrop	2,172
19	Edwards-Trinity Plateau	Green Tom	F	Colorado	Lipan-Kickapoo WCD	7	n/a	n/a	outcrop	11,485
20	Edwards-Trinity Plateau	Green	F	Colorado	Irion County WCD	7	n/a	n/a	outcrop	990

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
21	Edwards-Trinity Plateau	Irion	F	Colorado	Irion County WCD	7	n/a	n/a	outcrop	19,597
22	Edwards-Trinity Plateau	Coke	F	Colorado	Coke County UWCD	7	n/a	n/a	outcrop	7,248
23	Edwards-Trinity Plateau	Nolan	G	Brazos	Wes-Tex GCD	7	n/a	n/a	outcrop	4,815
24	Edwards-Trinity Plateau	Nolan	G	Colorado	Wes-Tex GCD	7	n/a	n/a	outcrop	8,227
25	Edwards-Trinity Plateau	Taylor	G	Brazos	n/a	7	n/a	n/a	outcrop	3,386
26	Edwards-Trinity Plateau	Taylor	G	Colorado	n/a	7	n/a	n/a	outcrop	1,746
27	Edwards-Trinity Plateau	Concho	F	Colorado	Lipan-Kickapoo WCD	7	n/a	n/a	outcrop	7,178
28	Edwards-Trinity Plateau	Concho	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	2,802
29	Edwards-Trinity Plateau	McCulloch	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	7,643
30	Edwards-Trinity Plateau	McCulloch	F	Colorado	n/a	7	n/a	n/a	outcrop	480
31	Edwards-Trinity Plateau	Mason	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	4,464
32	Edwards-Trinity Plateau	Menard	F	Colorado	Menard County UWD	7	n/a	n/a	outcrop	21,192
33	Edwards-Trinity Plateau	Menard	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	3,164
34	Edwards-Trinity Plateau	Kimble	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	650
35	Edwards-Trinity Plateau	Kimble	F	Colorado	Kimble County GCD	7	n/a	n/a	outcrop	32,736
36	Edwards-Trinity Plateau	Schleicher	F	Colorado	Supply District Plateau UWC and	7	n/a	n/a	outcrop	23,947
37	Edwards-Trinity Plateau	Schleicher	F	Rio Grande	Supply District	7	n/a	n/a	outcrop	3,731
38	Edwards-Trinity Plateau	Sutton	F	Rio Grande	n/a	7	n/a	n/a	outcrop	63
39	Edwards-Trinity Plateau	Sutton	F	Rio Grande	Sutton County UWCD	7	n/a	n/a	outcrop	19,313
40	Edwards-Trinity Plateau	Sutton	F	Colorado	Sutton County UWCD	7	n/a	n/a	outcrop	16,293
41	Edwards-Trinity Plateau	Crockett	F	Rio Grande	n/a	7	n/a	n/a	outcrop	30
42	Edwards-Trinity Plateau	Crockett	F	Colorado	Crockett County GCD	7	n/a	n/a	outcrop	777
43	Edwards-Trinity Plateau	Crockett	F	Rio Grande	Crockett County GCD	7	n/a	n/a	outcrop	54,357
44	Edwards-Trinity Plateau	Crockett	F	Rio Grande	Crockett County GCD	7	n/a	n/a	subcrop	470
45	Edwards-Trinity Plateau	Terrell	E	Rio Grande	n/a	7	n/a	n/a	outcrop	39,542
46	Edwards-Trinity Plateau	Val Verde	J	Rio Grande	n/a	7	n/a	n/a	outcrop	121,786
47	Edwards-Trinity Plateau	Val Verde	J	Rio Grande	n/a	7	n/a	n/a	subcrop	76
48	Edwards-Trinity Plateau	Kinney	J	Nueces	Kinney County GCD	7	n/a	n/a	outcrop	23,476

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
49	Edwards-Trinity Plateau	Kinney	J	Nueces	Kinney County GCD	7	n/a	n/a	subcrop	*
50	Edwards-Trinity Plateau	Kinney	J	Rio Grande	Kinney County GCD	7	n/a	n/a	outcrop	25,893
51	Edwards-Trinity Plateau	Kinney	J	Rio Grande	Kinney County GCD	7	n/a	n/a	subcrop	788
52	Edwards-Trinity Plateau	Uvalde	L	Nueces	Uvalde County UWCD	7	n/a	n/a	outcrop	32,894
53	Edwards-Trinity Plateau	Real	J	Nueces	Real-Edwards C and R District	7	n/a	n/a	outcrop	30,354
54	Edwards-Trinity Plateau	Real	J	Colorado	Real-Edwards C and R District	7	n/a	n/a	outcrop	1,789
55	Edwards-Trinity Plateau	Real	J	Guadalupe	Real-Edwards C and R District	7	n/a	n/a	outcrop	*
56	Edwards-Trinity Plateau	Edwards	J	Nueces	Real-Edwards C and R District	7	n/a	n/a	outcrop	48,378
57	Edwards-Trinity Plateau	Edwards	J	Rio Grande	Real-Edwards C and R District	7	n/a	n/a	outcrop	29,244
58	Edwards-Trinity Plateau	Edwards	J	Colorado	Real-Edwards C and R District	7	n/a	n/a	outcrop	16,966
59	Edwards-Trinity Plateau	Gillespie	K	Colorado	Hill Country UWCD	7	n/a	n/a	outcrop	17,262
60	Edwards-Trinity Plateau	Gillespie	K	Guadalupe	Hill Country UWCD	7	n/a	n/a	outcrop	1,117

RWPA = regional water planning area

GCD = groundwater conservation district

UWCD = under water conservation district

GMA = groundwater management area

WCD = water conservation district

C and R District = conservation and reclamation district

UWC and Supply District = underground water conservation and supply district

UWD = underground water district

GeoArea = Geographic areas defined by unique desired future conditions as specified by a groundwater management area.

MAG = Managed available groundwater in units of acre-feet per year.

\* Availability not calculated due to insignificant area.

Table 6. Estimates of draft managed available groundwater for water level declines of 20 feet in the Edwards-Trinity (Plateau) Aquifer (see Figure 1).

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
1	Edwards-Trinity Plateau	Pecos	F	Rio Grande	Middle Pecos GCD	7	n/a	n/a	outcrop	112,828
2	Edwards-Trinity Plateau	Pecos	F	Rio Grande	Middle Pecos GCD	7	n/a	n/a	subcrop	66
3	Edwards-Trinity Plateau	Upton	F	Rio Grande	n/a	7	n/a	n/a	outcrop	11,346
4	Edwards-Trinity Plateau	Upton	F	Colorado	n/a	7	n/a	n/a	outcrop	8,311
5	Edwards-Trinity Plateau	Ector	F	Rio Grande	n/a	7	n/a	n/a	outcrop	1,515
6	Edwards-Trinity Plateau	Ector	F	Colorado	n/a	7	n/a	n/a	outcrop	6,417
7	Edwards-Trinity Plateau	Ector	F	Colorado	n/a	7	n/a	n/a	subcrop	156
8	Edwards-Trinity Plateau	Midland	F	Colorado	n/a	7	n/a	n/a	outcrop	7,330
9	Edwards-Trinity Plateau	Midland	F	Colorado	n/a	7	n/a	n/a	subcrop	381
10	Edwards-Trinity Plateau	Glasscock	F	Colorado	Glasscock GCD	7	n/a	n/a	outcrop	13,486
11	Edwards-Trinity Plateau	Glasscock	F	Colorado	Glasscock GCD	7	n/a	n/a	subcrop	154
12	Edwards-Trinity Plateau	Reagan	F	Colorado	Glasscock GCD	7	n/a	n/a	outcrop	1,904
13	Edwards-Trinity Plateau	Reagan	F	Colorado	Santa Rita UWCD	7	n/a	n/a	outcrop	19,677
14	Edwards-Trinity Plateau	Reagan	F	Rio Grande	Santa Rita UWCD	7	n/a	n/a	outcrop	1,515
15	Edwards-Trinity Plateau	Mitchell	F	Colorado	Lone Wolf GCD	7	n/a	n/a	outcrop	*
16	Edwards-Trinity Plateau	Sterling	F	Colorado	Sterling County UWCD	7	n/a	n/a	outcrop	13,469
17	Edwards-Trinity Plateau	Green Tom	F	Colorado	Sterling County UWCD	7	n/a	n/a	outcrop	79
18	Edwards-Trinity Plateau	Green Tom	F	Colorado	n/a	7	n/a	n/a	outcrop	2,175
19	Edwards-Trinity Plateau	Green Tom	F	Colorado	Lipan-Kickapoo WCD	7	n/a	n/a	outcrop	11,606
20	Edwards-Trinity Plateau	Green	F	Colorado	Irion County WCD	7	n/a	n/a	outcrop	992

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
21	Edwards-Trinity Plateau	Irion	F	Colorado	Irion County WCD	7	n/a	n/a	outcrop	19,712
22	Edwards-Trinity Plateau	Coke	F	Colorado	Coke County UWCD	7	n/a	n/a	outcrop	7,303
23	Edwards-Trinity Plateau	Nolan	G	Brazos	Wes-Tex GCD	7	n/a	n/a	outcrop	4,850
24	Edwards-Trinity Plateau	Nolan	G	Colorado	Wes-Tex GCD	7	n/a	n/a	outcrop	8,287
25	Edwards-Trinity Plateau	Taylor	G	Brazos	n/a	7	n/a	n/a	outcrop	3,410
26	Edwards-Trinity Plateau	Taylor	G	Colorado	n/a	7	n/a	n/a	outcrop	1,758
27	Edwards-Trinity Plateau	Concho	F	Colorado	Lipan-Kickapoo WCD	7	n/a	n/a	outcrop	7,248
28	Edwards-Trinity Plateau	Concho	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	2,828
29	Edwards-Trinity Plateau	McCulloch	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	7,709
30	Edwards-Trinity Plateau	McCulloch	F	Colorado	n/a	7	n/a	n/a	outcrop	483
31	Edwards-Trinity Plateau	Mason	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	4,483
32	Edwards-Trinity Plateau	Menard	F	Colorado	Menard County UWD	7	n/a	n/a	outcrop	21,341
33	Edwards-Trinity Plateau	Menard	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	3,193
34	Edwards-Trinity Plateau	Kimble	F	Colorado	Hickory UWCD No.1	7	n/a	n/a	outcrop	655
35	Edwards-Trinity Plateau	Kimble	F	Colorado	Kimble County GCD	7	n/a	n/a	outcrop	32,892
36	Edwards-Trinity Plateau	Schleicher	F	Colorado	Supply District Plateau UWC and	7	n/a	n/a	outcrop	24,201
37	Edwards-Trinity Plateau	Schleicher	F	Rio Grande	Supply District	7	n/a	n/a	outcrop	3,815
38	Edwards-Trinity Plateau	Sutton	F	Rio Grande	n/a	7	n/a	n/a	outcrop	64
39	Edwards-Trinity Plateau	Sutton	F	Rio Grande	Sutton County UWCD	7	n/a	n/a	outcrop	19,517
40	Edwards-Trinity Plateau	Sutton	F	Colorado	Sutton County UWCD	7	n/a	n/a	outcrop	16,418
41	Edwards-Trinity Plateau	Crockett	F	Rio Grande	n/a	7	n/a	n/a	outcrop	31
42	Edwards-Trinity Plateau	Crockett	F	Colorado	Crockett County GCD	7	n/a	n/a	outcrop	795
43	Edwards-Trinity Plateau	Crockett	F	Rio Grande	Crockett County GCD	7	n/a	n/a	outcrop	55,054
44	Edwards-Trinity Plateau	Crockett	F	Rio Grande	Crockett County GCD	7	n/a	n/a	subcrop	627
45	Edwards-Trinity Plateau	Terrell	E	Rio Grande	n/a	7	n/a	n/a	outcrop	40,146
46	Edwards-Trinity Plateau	Val Verde	J	Rio Grande	n/a	7	n/a	n/a	outcrop	122,356
47	Edwards-Trinity Plateau	Val Verde	J	Rio Grande	n/a	7	n/a	n/a	subcrop	102
48	Edwards-Trinity Plateau	Kinney	J	Nueces	Kinney County GCD	7	n/a	n/a	outcrop	23,497

Map Key	Aquifer	County	RWPA	River Basin	GCD	GMA	Geo Area	Year	Outcrop/ Subcrop	Draft MAG (acre-feet per year)
49	Edwards-Trinity Plateau	Kinney	J	Nueces	Kinney County GCD	7	n/a	n/a	subcrop	*
50	Edwards-Trinity Plateau	Kinney	J	Rio Grande	Kinney County GCD	7	n/a	n/a	outcrop	25,918
51	Edwards-Trinity Plateau	Kinney	J	Rio Grande	Kinney County GCD	7	n/a	n/a	subcrop	1,051
52	Edwards-Trinity Plateau	Uvalde	L	Nueces	Uvalde County UWCD	7	n/a	n/a	outcrop	32,954
53	Edwards-Trinity Plateau	Real	J	Nueces	Real-Edwards C and R District	7	n/a	n/a	outcrop	30,434
54	Edwards-Trinity Plateau	Real	J	Colorado	Real-Edwards C and R District	7	n/a	n/a	outcrop	1,796
55	Edwards-Trinity Plateau	Real	J	Guadalupe	Real-Edwards C and R District	7	n/a	n/a	outcrop	*
56	Edwards-Trinity Plateau	Edwards	J	Nueces	Real-Edwards C and R District	7	n/a	n/a	outcrop	48,494
57	Edwards-Trinity Plateau	Edwards	J	Rio Grande	Real-Edwards C and R District	7	n/a	n/a	outcrop	29,319
58	Edwards-Trinity Plateau	Edwards	J	Colorado	Real-Edwards C and R District	7	n/a	n/a	outcrop	17,047
59	Edwards-Trinity Plateau	Gillespie	K	Colorado	Hill Country UWCD	7	n/a	n/a	outcrop	17,330
60	Edwards-Trinity Plateau	Gillespie	K	Guadalupe	Hill Country UWCD	7	n/a	n/a	outcrop	1,212

RWPA = regional water planning area

GCD = groundwater conservation district

UWCD = under water conservation district

GMA = groundwater management area

WCD = water conservation district

C and R District = conservation and reclamation district

UWC and Supply District = underground water conservation and supply district

UWD = underground water district

GeoArea = Geographic areas defined by unique desired future conditions as specified by a groundwater management area.

MAG = Managed available groundwater in units of acre-feet per year.

\* Availability not calculated due to insignificant area.

## **Limitations:**

Additional data are needed to create improved estimates; these estimates are a fundamental interpretation of the requested conditions. This analysis assumes homogeneous and isotropic aquifers; however, conditions for the Edwards-Trinity (Plateau) Aquifer may not behave in a uniform manner. The analysis further assumes that precipitation is the only source of aquifer recharge, that lateral inflow to the aquifer is equal to lateral outflow from the aquifer, and that future pumping will not alter this balance.

Note that estimates of managed available groundwater are based on the best available scientific tools that can be used to develop managed available groundwater and that these estimates can be a function of assumptions made on the magnitude and distribution of pumping in the aquifer. Therefore, it is important for groundwater conservation districts to monitor whether or not they are achieving their desired future conditions and to work with the TWDB to refine managed available groundwater given the reality of how the aquifer responds to the actual magnitude and distribution of pumping now and in the future.

## **REFERENCES:**

Anaya, R., 2001, GAM technical memo 01-01(rev a): Texas Water Development Board technical memorandum, 2 p.

Anaya, R., and Jones, I., 2004, Groundwater availability model for the Edwards-Trinity (Plateau) and Cenozoic Pecos Alluvium aquifer systems, Texas: Texas Water Development Board, GAM Report, 208 p.

Donnelly, A, 2007, GAM Run 07-32, Texas Water Development Board GAM Run Report, 20 p.

Freeze, R. A., and Cherry, J. A., 1979, Groundwater: Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 604 p.

Narasimhan, B., Srinivasan, R., Quiring, S., and Nielsen-Gammon, J.W., 2008, Digital Climatic Atlas of Texas: Texas A&M University, Texas Water Development Board Contract, Report 2005-483-5591, 108 p.

Texas Department of Licensing and Regulation, 2009, State of Texas Well Report Submission and Retrieval system, Water Well Drillers and Pump Installers Program.

Texas Water Development Board, 2009, Groundwater database: Texas Water Development Board, Water Science and Conservation Division.

Tu, K., 2008, GAM Run 07-37, Texas Water Development Board GAM Run Report, 26 p.



The seal appearing on this document was authorized by David Thorkildsen, P.G., on August 11, 2009