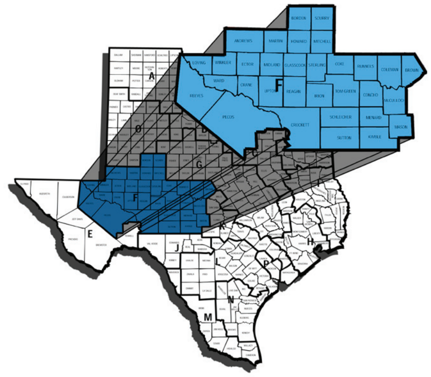
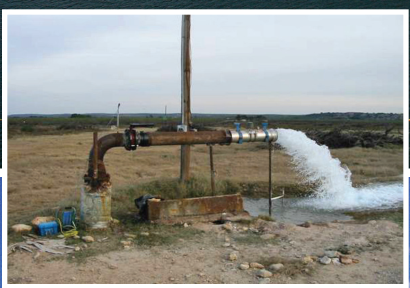
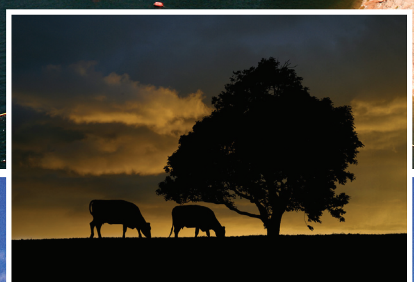
2011 Region F Water Plan

Volume II
Appendices

November 2010







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STATE OF TEXAS
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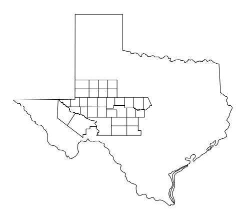
2011 Region F Water Plan

November 2010

Prepared for:

Region F Water Planning Group



Jon S. Albright, Hydrologist

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Volume II

Appendices

The following appendices present data in support of the *2011 Region F Water Plan*. These data were incorporated into the TWDB online planning database as required by contract. Due to rounding associated with regional water plan presentation and online data entry there may be slight differences between the TWDB online planning database and the printed regional water plan. In any and all instances where numbers in the regional water plan and the online planning database do not match, the data in the online planning database (DB12) shall take precedence over the associated number in the regional water plan for the purposes of developing the State Water Plan.

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List of Common Acronyms

Acronym	Name	Meaning
BCWID	Brown County Water Improvement District Number One	Owns and operates Lake Brownwood. Wholesale water provider in Brown and Coleman Counties.
CRMWD	Colorado River Municipal Water District	Water district that owns and operates 3 major reservoirs and several well fields. CRMWD is the largest water supplier in Region F and is the political subdivision for the Region F RWPG.
DFC	Desired Future Condition	Criteria for which is used to define the amount of available groundwater from an aquifer.
GAM	Groundwater Availability Model	Numerical groundwater flow model. GAMs are used to determine the aquifer response to pumping scenarios. These are the preferred models to assess groundwater availability.
GCD	Groundwater Conservation District	Generic term for all or individual state recognized Districts that oversee the groundwater resources within a specified political boundary.
GMA	Groundwater Management Area	Sixteen GMAs in Texas. Tasked by the Legislature to define the desired future conditions for major and minor aquifers within the GMA.
MAG	Managed Available Groundwater	The MAG is the amount of groundwater that can be permitted by a GCD on an annual basis. It is determined by the TWDB based on the DFC approved by the GMA. Once the MAG is established, this value must be used as the available groundwater in regional water planning.
RWPG	Regional Water Planning Group	The generic term for the planning groups that oversee the regional water plan development in each respective region in the State of Texas

Acronym	Name	Meaning
SB1	Senate Bill One	Legislation passed by the 75th Texas Legislature that is the basis for the current regional water planning process.
TCEQ	Texas Commission on Environmental Quality	Agency charged with oversight of Texas surface water rights and WAM program.
TWDB	Texas Water Development Board	Texas Agency charged with oversight of regional water plan development and oversight of GCDs
UCRA	Upper Colorado River Authority	Owner of water rights in O.C. Fisher Reservoir and Mountain Creek Lake. Designated WWP.
WAM	Water Availability Model	Computer model of a river watershed that evaluates surface water availability based on Texas water rights.
WMS	Water Management Strategy	Strategies available to RWPG to meet water needs identified in the regional water plan.
WUG	Water User Group	A group that uses water. Six major types of WUGs: municipal, manufacturing, mining, steam electric power, irrigation and livestock.
WWP	Wholesale Water Provider	Entity that has or is expected to have contracts to sell 1,000 ac-ft/yr or more of wholesale water.

Appendix 1A
Selected Bibliography of Studies in Region F

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Selected Bibliography of Studies in Region F

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Appendix 2A
Population and Water Demand Projections

Table 2A-1
Population Projections for Region F

Water User Group Name	County	Basin	Population						
			Historical	Projected					
			2000	2010	2020	2030	2040	2050	2060
ANDREWS	ANDREWS	COLORADO	9,652	10,519	11,247	11,754	12,232	12,453	12,701
COUNTY-OTHER	ANDREWS	COLORADO	3,308	3,565	3,781	3,931	4,072	4,137	4,211
COUNTY-OTHER	ANDREWS	RIO GRANDE	44	47	50	52	54	55	56
		ANDREWS Total	*13,004*	*14,131*	*15,078*	*15,737*	*16,358*	*16,645*	*16,968*
COUNTY-OTHER	BORDEN	BRAZOS	59	64	66	63	56	52	47
COUNTY-OTHER	BORDEN	COLORADO	670	728	754	719	637	592	535
		BORDEN Total	*729*	*792*	*820*	*782*	*693*	*644*	*582*
BANGS	BROWN	COLORADO	1,620	1,691	1,746	1,761	1,761	1,761	1,761
BROOKSMITH SUD	BROWN	COLORADO	7,579	7,911	8,168	8,240	8,240	8,240	8,240
BROWNWOOD	BROWN	COLORADO	18,813	20,703	21,376	21,563	21,563	21,563	21,563
COLEMAN COUNTY WSC	BROWN	COLORADO	140	146	151	152	152	152	152
COUNTY-OTHER	BROWN	BRAZOS	85	89	92	93	93	93	93
COUNTY-OTHER	BROWN	COLORADO	3,399	2,482	2,562	2,585	2,585	2,585	2,585
EARLY	BROWN	COLORADO	2,588	2,701	2,789	2,814	2,814	2,814	2,814
ZEPHYR WSC	BROWN	COLORADO	3,450	3,601	3,718	3,751	3,751	3,751	3,751
		BROWN Total	*37,674*	*39,324*	*40,602*	*40,959*	*40,959*	*40,959*	*40,959*
BRONTE VILLAGE	COKE	COLORADO	1,076	1,065	1,140	1,140	1,140	1,140	1,140
COUNTY-OTHER	COKE	COLORADO	1,617	1,547	1,474	1,474	1,474	1,474	1,474
ROBERT LEE	COKE	COLORADO	1,171	1,136	1,136	1,136	1,136	1,136	1,136
		COKE Total	*3,864*	*3,748*	*3,750*	*3,750*	*3,750*	*3,750*	*3,750*
BROOKSMITH SUD	COLEMAN	COLORADO	75	74	74	74	74	74	74
COLEMAN	COLEMAN	COLORADO	5,127	5,075	5,079	5,079	5,079	5,079	5,079
COLEMAN COUNTY WSC	COLEMAN	COLORADO	2,800	2,771	2,774	2,774	2,774	2,774	2,774
COUNTY-OTHER	COLEMAN	COLORADO	152	151	151	151	151	151	151
SANTA ANNA	COLEMAN	COLORADO	1,081	1,070	1,071	1,071	1,071	1,071	1,071
		COLEMAN Total	*9,235*	*9,141*	*9,149*	*9,149*	*9,149*	*9,149*	*9,149*
COUNTY-OTHER	CONCHO	COLORADO	538	605	628	628	628	628	628
EDEN	CONCHO	COLORADO	2,561	2,885	2,988	2,988	2,988	2,988	2,988
MILLERSVIEW-DOOLE WSC	CONCHO	COLORADO	867	977	1,012	1,012	1,012	1,012	1,012
		CONCHO Total	*3,966*	*4,467*	*4,628*	*4,628*	*4,628*	*4,628*	*4,628*
COUNTY-OTHER	CRANE	RIO GRANDE	805	1,031	1,280	1,415	1,518	1,629	1,745
CRANE	CRANE	RIO GRANDE	3,191	3,438	3,710	3,857	3,969	4,089	4,216
		CRANE Total	*3,996*	*4,469*	*4,990*	*5,272*	*5,487*	*5,718*	*5,961*
COUNTY-OTHER	CROCKETT	RIO GRANDE	229	225	221	217	213	209	205
CROCKETT COUNTY WCID #1	CROCKETT	RIO GRANDE	3,870	4,257	4,619	4,749	4,809	4,930	5,039
		CROCKETT Total	*4,099*	*4,482*	*4,840*	*4,966*	*5,022*	*5,139*	*5,244*
COUNTY-OTHER	ECTOR	COLORADO	27,214	33,888	40,100	44,733	47,970	49,153	49,641
COUNTY-OTHER	ECTOR	RIO GRANDE	1,008	1,091	1,172	1,244	1,308	1,359	1,407
ECTOR COUNTY UD	ECTOR	COLORADO	3,000	4,116	5,202	6,169	7,031	7,718	8,363
ODESSA	ECTOR	COLORADO	89,901	93,664	97,599	102,014	106,832	112,077	117,615
		ECTOR Total	*121,123*	*132,759*	*144,073*	*154,160*	*163,141*	*170,307*	*177,026*
COUNTY-OTHER	GLASSCOCK	COLORADO	1,406	1,582	1,783	1,891	1,921	1,915	1,954
		GLASSCOCK Total	*1,406*	*1,582*	*1,783*	*1,891*	*1,921*	*1,915*	*1,954*
BIG SPRING	HOWARD	COLORADO	25,233	25,944	26,592	26,803	26,803	26,803	26,803
COAHOMA	HOWARD	COLORADO	932	958	982	990	990	990	990
COUNTY-OTHER	HOWARD	COLORADO	7,462	7,672	7,864	7,926	7,926	7,926	7,926
		HOWARD Total	*33,627*	*34,574*	*35,438*	*35,719*	*35,719*	*35,719*	*35,719*
COUNTY-OTHER	IRION	COLORADO	932	994	1,020	996	934	884	845
MERTZON	IRION	COLORADO	839	894	918	896	840	796	761
		IRION Total	*1,771*	*1,888*	*1,938*	*1,892*	*1,774*	*1,680*	*1,606*
COUNTY-OTHER	KIMBLE	COLORADO	1,850	1,929	1,947	1,947	1,947	1,947	1,947
JUNCTION	KIMBLE	COLORADO	2,618	2,731	2,755	2,755	2,755	2,755	2,755
		KIMBLE Total	*4,468*	*4,660*	*4,702*	*4,702*	*4,702*	*4,702*	*4,702*
COUNTY-OTHER	LOVING	RIO GRANDE	67	67	67	67	67	67	67
		LOVING Total	*67*	*67*	*67*	*67*	*67*	*67*	*67*

Table 2A-1: Population Projections for Region F (Continued)

Water User Group Name	County	Basin	Population						
			Historical	Projected					
			2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER	MARTIN	COLORADO	2,190	2,401	2,628	2,739	2,806	2,738	2,599
STANTON	MARTIN	COLORADO	2,556	2,802	3,068	3,196	3,276	3,196	3,034
		MARTIN Total	*4,746*	*5,203*	*5,696*	*5,935*	*6,082*	*5,934*	*5,633*
COUNTY-OTHER	MASON	COLORADO	1,604	1,660	1,687	1,701	1,708	1,712	1,716
MASON	MASON	COLORADO	2,134	2,157	2,169	2,175	2,178	2,179	2,180
		MASON Total	*3,738*	*3,817*	*3,856*	*3,876*	*3,886*	*3,891*	*3,896*
BRADY	MCCULLOCH	COLORADO	5,523	5,593	5,689	5,689	5,689	5,689	5,689
COUNTY-OTHER	MCCULLOCH	COLORADO	135	86	88	88	88	88	88
MILLERSVIEW-DOOLE WSC	MCCULLOCH	COLORADO	1,916	1,923	1,956	1,956	1,956	1,956	1,956
RICHLAND SUD	MCCULLOCH	COLORADO	631	633	644	644	644	644	644
		MCCULLOCH Total	*8,205*	*8,235*	*8,377*	*8,377*	*8,377*	*8,377*	*8,377*
COUNTY-OTHER	MENARD	COLORADO	707	747	757	757	757	757	757
MENARD	MENARD	COLORADO	1,653	1,746	1,771	1,771	1,771	1,771	1,771
		MENARD Total	*2,360*	*2,493*	*2,528*	*2,528*	*2,528*	*2,528*	*2,528*
COUNTY-OTHER	MIDLAND	COLORADO	19,971	22,747	25,718	27,835	29,409	30,406	31,345
MIDLAND	MIDLAND	COLORADO	94,996	100,137	105,639	109,561	112,478	114,324	116,064
ODESSA	MIDLAND	COLORADO	1,042	1,826	2,665	3,263	3,708	3,990	4,255
		MIDLAND Total	*116,009*	*124,710*	*134,022*	*140,659*	*145,595*	*148,720*	*151,664*
COLORADO CITY	MITCHELL	COLORADO	4,281	4,298	4,288	4,213	4,119	4,003	3,761
COUNTY-OTHER	MITCHELL	COLORADO	4,761	4,779	4,769	4,686	4,582	4,453	4,184
LORAINE	MITCHELL	COLORADO	656	659	657	646	631	613	576
		MITCHELL Total	*9,698*	*9,736*	*9,714*	*9,545*	*9,332*	*9,069*	*8,521*
COUNTY-OTHER	PECOS	RIO GRANDE	4,405	4,677	4,922	5,058	5,132	5,144	5,044
FORT STOCKTON	PECOS	RIO GRANDE	7,846	8,332	8,766	9,009	9,139	9,163	8,984
IRAAN	PECOS	RIO GRANDE	1,238	1,315	1,383	1,421	1,442	1,446	1,417
PECOS COUNTY WCID #1	PECOS	RIO GRANDE	3,320	3,526	3,709	3,812	3,867	3,877	3,801
		PECOS Total	*16,809*	*17,850*	*18,780*	*19,300*	*19,580*	*19,630*	*19,246*
BIG LAKE	REAGAN	COLORADO	2,885	3,288	3,628	3,800	3,788	3,654	3,478
COUNTY-OTHER	REAGAN	COLORADO	441	503	554	581	579	559	532
		REAGAN Total	*3,326*	*3,791*	*4,182*	*4,381*	*4,367*	*4,213*	*4,010*
BALMORHEA	REEVES	RIO GRANDE	527	627	730	815	885	949	1,000
COUNTY-OTHER	REEVES	RIO GRANDE	809	729	646	577	520	469	428
MADERA VALLEY WSC	REEVES	RIO GRANDE	2,300	2,342	2,385	2,421	2,451	2,478	2,499
PECOS	REEVES	RIO GRANDE	9,501	10,583	11,690	12,604	13,363	14,053	14,600
		REEVES Total	*13,137*	*14,281*	*15,451*	*16,417*	*17,219*	*17,949*	*18,527*
BALLINGER	RUNNELS	COLORADO	4,243	4,379	4,871	5,243	5,654	5,974	6,274
COLEMAN COUNTY WSC	RUNNELS	COLORADO	112	140	243	321	407	474	559
COUNTY-OTHER	RUNNELS	COLORADO	2,688	2,534	2,126	1,817	1,476	1,210	1,000
MILES	RUNNELS	COLORADO	850	879	984	1,063	1,151	1,219	1,284
MILLERSVIEW-DOOLE WSC	RUNNELS	COLORADO	722	727	745	759	774	786	801
WINTERS	RUNNELS	COLORADO	2,880	2,951	3,056	3,136	3,224	3,293	3,380
		RUNNELS Total	*11,495*	*11,610*	*12,025*	*12,339*	*12,686*	*12,956*	*13,298*
COUNTY-OTHER	SCHLEICHER	COLORADO	810	766	722	701	693	682	670
COUNTY-OTHER	SCHLEICHER	RIO GRANDE	174	165	155	151	149	146	143
ELDORADO	SCHLEICHER	COLORADO	1,951	2,228	2,510	2,639	2,691	2,766	2,845
		SCHLEICHER Total	*2,935*	*3,159*	*3,387*	*3,491*	*3,533*	*3,594*	*3,658*
COUNTY-OTHER	SCURRY	BRAZOS	2,016	2,103	2,186	2,230	2,253	2,268	2,268
COUNTY-OTHER	SCURRY	COLORADO	3,562	3,716	3,862	3,940	3,981	4,008	4,008
SNYDER	SCURRY	COLORADO	10,783	11,179	11,554	11,753	11,858	11,927	11,927
		SCURRY Total	*16,361*	*16,998*	*17,602*	*17,923*	*18,092*	*18,203*	*18,203*
COUNTY-OTHER	STERLING	COLORADO	312	342	376	391	396	385	389
STERLING CITY	STERLING	COLORADO	1,081	1,187	1,304	1,353	1,370	1,332	1,350
		STERLING Total	*1,393*	*1,529*	*1,680*	*1,744*	*1,766*	*1,717*	*1,739*
COUNTY-OTHER	SUTTON	COLORADO	224	246	261	263	262	262	259
COUNTY-OTHER	SUTTON	RIO GRANDE	929	1,021	1,079	1,089	1,085	1,088	1,077
SONORA	SUTTON	RIO GRANDE	2,924	3,212	3,397	3,428	3,415	3,423	3,389
		SUTTON Total	*4,077*	*4,479*	*4,737*	*4,780*	*4,762*	*4,773*	*4,725*

Table 2A-1: Population Projections for Region F (Continued)

Water User Group Name	County	Basin	Population						
			Historical	Projected					
			2000	2010	2020	2030	2040	2050	2060
CONCHO RURAL WSC	TOM GREEN	COLORADO	3,909	6,082	7,876	9,014	9,644	10,143	10,255
COUNTY-OTHER	TOM GREEN	COLORADO	10,037	9,948	9,806	9,589	9,303	8,964	8,550
MILLERSVIEW-DOOLE WSC	TOM GREEN	COLORADO	1,625	1,847	2,099	2,386	2,711	3,081	3,502
SAN ANGELO	TOM GREEN	COLORADO	88,439	94,261	99,070	102,120	103,808	105,145	105,445
		TOM GREEN Total	*104,010*	*112,138*	*118,851*	*123,109*	*125,466*	*127,333*	*127,752*
COUNTY-OTHER	UPTON	COLORADO	275	292	307	312	317	323	328
COUNTY-OTHER	UPTON	RIO GRANDE	524	556	584	595	603	614	625
MCCAMEY	UPTON	RIO GRANDE	1,805	2,038	2,243	2,320	2,381	2,461	2,539
RANKIN	UPTON	RIO GRANDE	800	871	934	958	977	1,002	1,026
		UPTON Total	*3,404*	*3,757*	*4,068*	*4,185*	*4,278*	*4,400*	*4,518*
COUNTY-OTHER	WARD	RIO GRANDE	4,088	4,278	4,388	4,439	4,439	4,439	4,439
MONAHANS	WARD	RIO GRANDE	6,821	7,138	7,322	7,407	7,407	7,407	7,407
		WARD Total	*10,909*	*11,416*	*11,710*	*11,846*	*11,846*	*11,846*	*11,846*
COUNTY-OTHER	WINKLER	RIO GRANDE	540	572	599	604	606	594	575
KERMIT	WINKLER	RIO GRANDE	5,714	6,057	6,338	6,391	6,405	6,285	6,084
WINK	WINKLER	RIO GRANDE	919	974	1,019	1,028	1,030	1,011	979
		WINKLER Total	*7,173*	*7,603*	*7,956*	*8,023*	*8,041*	*7,890*	*7,638*
		Grand Total	***578,814***	***618,889***	***656,480***	***682,132***	***700,806***	***714,045***	***724,094***

Table 2A-2
Per Capita Water Demand Projections for Region F

Water User Group Name	County Name	Basin Name	Per Capita Water Demand (gallons per person per day)						
			Historical	Projected					
			2000	2010	2020	2030	2040	2050	2060
ANDREWS	ANDREWS	COLORADO	266	262	259	256	253	252	252
COUNTY-OTHER	ANDREWS	COLORADO	138	133	130	127	124	123	123
COUNTY-OTHER	ANDREWS	RIO GRANDE	138	133	130	127	124	123	123
COUNTY-OTHER	BORDEN	BRAZOS	202	198	195	192	190	188	188
COUNTY-OTHER	BORDEN	COLORADO	202	198	195	192	190	188	188
BANGS	BROWN	COLORADO	143	140	136	133	130	129	129
BROOKSMITH SUD	BROWN	COLORADO	158	155	152	150	147	146	146
BROWNWOOD	BROWN	COLORADO	171	168	164	161	158	157	157
COLEMAN COUNTY WSC	BROWN	COLORADO	117	115	112	109	106	105	105
COUNTY-OTHER	BROWN	BRAZOS	127	123	119	116	113	112	112
COUNTY-OTHER	BROWN	COLORADO	127	123	119	116	113	112	112
EARLY	BROWN	COLORADO	267	264	260	257	254	253	253
ZEPHYR WSC	BROWN	COLORADO	102	99	97	95	93	92	92
BRONTE VILLAGE	COKE	COLORADO	192	205	202	199	196	195	195
COUNTY-OTHER	COKE	COLORADO	89	101	98	96	93	92	92
ROBERT LEE	COKE	COLORADO	278	276	272	269	266	264	264
BROOKSMITH SUD	COLEMAN	COLORADO	158	155	152	150	147	146	146
COLEMAN	COLEMAN	COLORADO	177	226	223	220	217	215	215
COLEMAN COUNTY WSC	COLEMAN	COLORADO	117	115	112	109	106	105	105
COUNTY-OTHER	COLEMAN	COLORADO	117	115	112	109	106	105	105
SANTA ANNA	COLEMAN	COLORADO	170	167	164	161	158	156	156
COUNTY-OTHER	CONCHO	COLORADO	282	277	274	271	268	267	267
EDEN	CONCHO	COLORADO	144	173	171	170	168	167	167
MILLERSVIEW-DOOLE WSC	CONCHO	COLORADO	119	115	112	109	105	104	104
COUNTY-OTHER	CRANE	RIO GRANDE	279	274	270	268	266	265	265
CRANE	CRANE	RIO GRANDE	248	244	241	238	235	234	234
COUNTY-OTHER	CROCKETT	COLORADO	172	169	166	163	160	158	158
COUNTY-OTHER	CROCKETT	RIO GRANDE	172	169	166	163	160	158	158
CROCKETT COUNTY WCID #1	CROCKETT	RIO GRANDE	354	349	346	343	340	339	339
COUNTY-OTHER	ECTOR	COLORADO	147	146	145	145	144	144	144
COUNTY-OTHER	ECTOR	RIO GRANDE	147	146	145	145	144	144	144
ECTOR COUNTY UD	ECTOR	COLORADO	327	321	317	315	314	313	313
ODESSA	ECTOR	COLORADO	208	205	202	198	195	194	194
COUNTY-OTHER	GLASSCOCK	COLORADO	106	102	98	96	93	92	92
BIG SPRING	HOWARD	COLORADO	198	207	204	201	198	197	197
COAHOMA	HOWARD	COLORADO	174	171	168	165	162	160	160
COUNTY-OTHER	HOWARD	COLORADO	132	129	126	123	120	118	118
COUNTY-OTHER	IRION	COLORADO	96	98	95	92	90	88	88
MERTZON	IRION	COLORADO	83	129	126	124	121	120	120
COUNTY-OTHER	KIMBLE	COLORADO	97	98	95	93	90	89	89
JUNCTION	KIMBLE	COLORADO	263	306	303	300	297	295	295
COUNTY-OTHER	LOVING	RIO GRANDE	147	143	140	137	134	132	132
COUNTY-OTHER	MARTIN	COLORADO	144	140	137	134	131	130	130
STANTON	MARTIN	COLORADO	102	131	128	125	122	121	121
COUNTY-OTHER	MASON	COLORADO	97	102	99	96	93	92	92
MASON	MASON	COLORADO	299	307	304	301	298	296	296
BRADY	MCCULLOCH	COLORADO	303	300	297	294	291	289	289
COUNTY-OTHER	MCCULLOCH	COLORADO	130	127	124	122	119	118	118
MILLERSVIEW-DOOLE WSC	MCCULLOCH	COLORADO	119	115	112	109	105	104	104
RICHLAND SUD	MCCULLOCH	COLORADO	164	160	157	154	151	150	150
COUNTY-OTHER	MENARD	COLORADO	128	124	120	117	114	113	113
MENARD	MENARD	COLORADO	176	181	178	175	172	171	171
COUNTY-OTHER	MIDLAND	COLORADO	112	126	123	121	119	118	118
MIDLAND	MIDLAND	COLORADO	262	258	254	251	248	247	247
ODESSA	MIDLAND	COLORADO	208	205	202	198	195	194	194

Table 2A-2: Per Capita Water Demand Projections for Region F (Continued)

Water User Group Name	County Name	Basin Name	Per Capita Water Demand (gallons per person per day)						
			Historical	Projected					
			2000	2010	2020	2030	2040	2050	2060
COLORADO CITY	MITCHELL	COLORADO	211	207	204	201	198	196	196
COUNTY-OTHER	MITCHELL	BRAZOS	118	116	114	113	111	110	110
COUNTY-OTHER	MITCHELL	COLORADO	118	116	114	113	111	110	110
LORAINE	MITCHELL	COLORADO	118	115	112	109	106	104	104
COUNTY-OTHER	PECOS	RIO GRANDE	136	134	131	129	127	126	126
FORT STOCKTON	PECOS	RIO GRANDE	353	350	346	343	340	339	339
IRAAN	PECOS	RIO GRANDE	310	307	303	300	297	296	296
PECOS COUNTY WCID #1	PECOS	RIO GRANDE	99	100	97	94	92	91	91
BIG LAKE	REAGAN	COLORADO	251	247	243	241	238	237	237
COUNTY-OTHER	REAGAN	COLORADO	227	222	218	216	213	212	212
COUNTY-OTHER	REAGAN	RIO GRANDE	227	222	218	216	213	212	212
BALMORHEA	REEVES	RIO GRANDE	163	157	154	151	149	148	148
COUNTY-OTHER	REEVES	RIO GRANDE	269	268	266	264	261	259	259
MADERA VALLEY WSC	REEVES	RIO GRANDE	269	265	262	259	256	254	254
PECOS	REEVES	RIO GRANDE	242	237	234	231	228	227	227
BALLINGER	RUNNELS	COLORADO	150	187	183	180	177	176	176
COLEMAN COUNTY WSC	RUNNELS	COLORADO	117	115	112	109	106	105	105
COUNTY-OTHER	RUNNELS	COLORADO	89	127	124	121	117	115	115
MILES	RUNNELS	COLORADO	135	152	148	145	142	141	141
MILLERSVIEW-DOOLE WSC	RUNNELS	COLORADO	119	115	112	109	105	104	104
WINTERS	RUNNELS	COLORADO	102	167	164	161	158	156	156
COUNTY-OTHER	SCHLEICHER	COLORADO	139	136	133	130	126	124	124
COUNTY-OTHER	SCHLEICHER	RIO GRANDE	139	136	133	130	126	124	124
ELDORADO	SCHLEICHER	COLORADO	237	233	229	227	224	223	223
COUNTY-OTHER	SCURRY	BRAZOS	138	134	130	127	124	123	123
COUNTY-OTHER	SCURRY	COLORADO	138	134	130	127	124	123	123
SNYDER	SCURRY	COLORADO	194	223	219	216	213	212	212
COUNTY-OTHER	STERLING	COLORADO	140	136	133	130	127	126	126
STERLING CITY	STERLING	COLORADO	227	223	220	218	215	214	214
COUNTY-OTHER	SUTTON	COLORADO	199	195	192	189	186	185	185
COUNTY-OTHER	SUTTON	RIO GRANDE	199	195	192	189	186	185	185
SONORA	SUTTON	RIO GRANDE	337	332	329	326	323	322	322
CONCHO RURAL WSC	TOM GREEN	COLORADO	108	102	99	98	97	96	96
COUNTY-OTHER	TOM GREEN	COLORADO	109	158	155	152	149	147	147
MILLERSVIEW-DOOLE WSC	TOM GREEN	COLORADO	119	115	112	109	105	104	104
SAN ANGELO	TOM GREEN	COLORADO	162	197	193	190	187	186	186
COUNTY-OTHER	UPTON	COLORADO	163	160	156	153	150	149	149
COUNTY-OTHER	UPTON	RIO GRANDE	163	160	156	153	150	149	149
MCCAMEY	UPTON	RIO GRANDE	249	245	241	239	236	235	235
RANKIN	UPTON	RIO GRANDE	241	237	234	231	228	227	227
COUNTY-OTHER	WARD	RIO GRANDE	197	193	189	186	183	182	182
MONAHANS	WARD	RIO GRANDE	324	320	316	313	310	309	309
COUNTY-OTHER	WINKLER	COLORADO	188	185	181	178	175	174	174
COUNTY-OTHER	WINKLER	RIO GRANDE	188	185	181	178	175	174	174
KERMIT	WINKLER	RIO GRANDE	287	284	280	277	274	273	273
WINK	WINKLER	RIO GRANDE	306	303	299	296	293	292	292

Table 2A-3
Municipal Water Demand Projections for Region F

WUG Name	County	Basin	Water Demand (Acre-Feet per Year)					
			2010	2020	2030	2040	2050	2060
ANDREWS	ANDREWS	COLORADO	3,087	3,263	3,371	3,467	3,515	3,585
COUNTY-OTHER	ANDREWS	COLORADO	531	551	559	566	570	580
COUNTY-OTHER	ANDREWS	RIO GRANDE	7	7	7	8	8	8
		ANDREWS Total	*3,625*	*3,821*	*3,937*	*4,041*	*4,093*	*4,173*
COUNTY-OTHER	BORDEN	BRAZOS	14	14	14	12	11	10
COUNTY-OTHER	BORDEN	COLORADO	161	165	155	136	125	113
		BORDEN Total	*175*	*179*	*169*	*148*	*136*	*123*
BANGS	BROWN	COLORADO	265	266	262	256	254	254
BROOKESMITH SUD	BROWN	COLORADO	1,374	1,391	1,384	1,357	1,348	1,348
BROWNWOOD	BROWN	COLORADO	3,896	3,927	3,889	3,816	3,792	3,792
COLEMAN COUNTY WSC	BROWN	COLORADO	19	19	19	18	18	18
COUNTY-OTHER	BROWN	BRAZOS	12	12	12	12	12	12
COUNTY-OTHER	BROWN	COLORADO	342	342	336	327	324	324
EARLY	BROWN	COLORADO	799	812	810	801	797	797
ZEPHYR WSC	BROWN	COLORADO	399	404	399	391	387	387
		BROWN Total	*7,106*	*7,173*	*7,111*	*6,978*	*6,932*	*6,932*
BRONTE VILLAGE	COKE	COLORADO	245	258	254	250	249	249
COUNTY-OTHER	COKE	COLORADO	175	162	159	154	152	152
ROBERT LEE	COKE	COLORADO	351	346	342	338	336	336
		COKE Total	*771*	*766*	*755*	*742*	*737*	*737*
BROOKESMITH SUD	COLEMAN	COLORADO	13	13	12	12	12	12
COLEMAN	COLEMAN	COLORADO	1,285	1,269	1,252	1,235	1,223	1,223
COLEMAN COUNTY WSC	COLEMAN	COLORADO	357	348	339	329	326	326
COUNTY-OTHER	COLEMAN	COLORADO	19	19	18	18	18	18
SANTA ANNA	COLEMAN	COLORADO	200	197	193	190	187	187
		COLEMAN Total	*1,874*	*1,846*	*1,814*	*1,784*	*1,766*	*1,766*
COUNTY-OTHER	CONCHO	COLORADO	188	193	191	189	188	188
EDEN	CONCHO	COLORADO	559	572	569	562	559	559
MILLERSVIEW-DOOLE WSC	CONCHO	COLORADO	126	127	124	119	118	118
		CONCHO Total	*873*	*892*	*884*	*870*	*865*	*865*
COUNTY-OTHER	CRANE	RIO GRANDE	316	387	425	452	484	518
CRANE	CRANE	RIO GRANDE	940	1,002	1,028	1,045	1,072	1,105
		CRANE Total	*1,256*	*1,389*	*1,453*	*1,497*	*1,556*	*1,623*
COUNTY-OTHER	CROCKETT	RIO GRANDE	43	41	40	38	37	36
CROCKETT COUNTY WCID #1	CROCKETT	RIO GRANDE	1,664	1,790	1,825	1,832	1,872	1,913
		CROCKETT Total	*1,707*	*1,831*	*1,865*	*1,870*	*1,909*	*1,949*
COUNTY-OTHER	ECTOR	COLORADO	5,542	6,513	7,266	7,738	7,928	8,007
COUNTY-OTHER	ECTOR	RIO GRANDE	178	190	202	211	219	227
ECTOR COUNTY UD	ECTOR	COLORADO	1,480	1,847	2,177	2,473	2,706	2,932
ODESSA	ECTOR	COLORADO	21,508	22,084	22,626	23,335	24,355	25,559
		ECTOR Total	*28,708*	*30,634*	*32,271*	*33,757*	*35,208*	*36,725*
COUNTY-OTHER	GLASSCOCK	COLORADO	181	196	203	200	197	201
		GLASSCOCK Total	*181*	*196*	*203*	*200*	*197*	*201*
BIG SPRING	HOWARD	COLORADO	6,016	6,077	6,035	5,945	5,915	5,915
COAHOMA	HOWARD	COLORADO	183	185	183	180	177	177
COUNTY-OTHER	HOWARD	COLORADO	1,109	1,110	1,092	1,065	1,048	1,048
		HOWARD Total	*7,308*	*7,372*	*7,310*	*7,190*	*7,140*	*7,140*
COUNTY-OTHER	IRION	COLORADO	109	109	103	94	87	83
MERTZON	IRION	COLORADO	129	130	124	114	107	102
		IRION Total	*238*	*239*	*227*	*208*	*194*	*185*
COUNTY-OTHER	KIMBLE	COLORADO	212	207	203	196	194	194
JUNCTION	KIMBLE	COLORADO	936	935	926	917	910	910
		KIMBLE Total	*1,148*	*1,142*	*1,129*	*1,113*	*1,104*	*1,104*
COUNTY-OTHER	LOVING	RIO GRANDE	11	11	10	10	10	10
		LOVING Total	*11*	*11*	*10*	*10*	*10*	*10*

Table 2A-3: Municipal Water Demand Projections for Region F (Continued)

WUG Name	County	Basin	Water Demand (Acre-Feet per Year)					
			2010	2020	2030	2040	2050	2060
COUNTY-OTHER	MARTIN	COLORADO	377	403	411	412	399	378
STANTON	MARTIN	COLORADO	411	440	447	448	433	411
		MARTIN Total	*788*	*843*	*858*	*860*	*832*	*789*
COUNTY-OTHER	MASON	COLORADO	190	187	183	178	176	177
MASON	MASON	COLORADO	742	739	733	727	722	723
		MASON Total	*932*	*926*	*916*	*905*	*898*	*900*
BRADY	MCCULLOCH	COLORADO	1,879	1,893	1,874	1,854	1,842	1,842
COUNTY-OTHER	MCCULLOCH	COLORADO	12	12	12	12	12	12
MILLERSVIEW-DOOLE WSC	MCCULLOCH	COLORADO	248	245	239	230	228	228
RICHLAND SUD	MCCULLOCH	COLORADO	113	113	111	109	108	108
		MCCULLOCH Total	*2,252*	*2,263*	*2,236*	*2,205*	*2,190*	*2,190*
COUNTY-OTHER	MENARD	COLORADO	104	102	99	97	96	96
MENARD	MENARD	COLORADO	354	353	347	341	339	339
		MENARD Total	*458*	*455*	*446*	*438*	*435*	*435*
COUNTY-OTHER	MIDLAND	COLORADO	3,210	3,543	3,773	3,920	4,019	4,143
MIDLAND	MIDLAND	COLORADO	28,939	30,056	30,804	31,246	31,631	32,112
ODESSA	MIDLAND	COLORADO	419	603	724	810	867	925
		MIDLAND Total	*32,568*	*34,202*	*35,301*	*35,976*	*36,517*	*37,180*
COLORADO CITY	MITCHELL	COLORADO	997	980	949	914	879	826
COUNTY-OTHER	MITCHELL	COLORADO	621	609	593	570	549	516
LORAINE	MITCHELL	COLORADO	85	82	79	75	71	67
		MITCHELL Total	*1,703*	*1,671*	*1,621*	*1,559*	*1,499*	*1,409*
COUNTY-OTHER	PECOS	RIO GRANDE	702	722	731	730	726	712
FORT STOCKTON	PECOS	RIO GRANDE	3,267	3,397	3,461	3,481	3,479	3,411
IRAAN	PECOS	RIO GRANDE	452	469	478	480	479	470
PECOS COUNTY WCID #1	PECOS	RIO GRANDE	395	403	401	399	395	387
		PECOS Total	*4,816*	*4,991*	*5,071*	*5,090*	*5,079*	*4,980*
BIG LAKE	REAGAN	COLORADO	910	988	1,026	1,010	970	923
COUNTY-OTHER	REAGAN	COLORADO	125	135	141	138	133	126
		REAGAN Total	*1,035*	*1,123*	*1,167*	*1,148*	*1,103*	*1,049*
BALMORHEA	REEVES	RIO GRANDE	110	126	138	148	157	166
COUNTY-OTHER	REEVES	RIO GRANDE	219	192	171	152	136	124
MADERA VALLEY WSC	REEVES	RIO GRANDE	695	700	702	703	705	711
PECOS	REEVES	RIO GRANDE	2,810	3,064	3,261	3,413	3,573	3,712
		REEVES Total	*3,834*	*4,082*	*4,272*	*4,416*	*4,571*	*4,713*
BALLINGER	RUNNELS	COLORADO	917	998	1,057	1,121	1,178	1,237
COLEMAN COUNTY WSC	RUNNELS	COLORADO	18	30	39	48	56	66
COUNTY-OTHER	RUNNELS	COLORADO	360	295	246	193	156	129
MILES	RUNNELS	COLORADO	150	163	173	183	193	203
MILLERSVIEW-DOOLE WSC	RUNNELS	COLORADO	94	93	93	91	92	93
WINTERS	RUNNELS	COLORADO	552	561	566	571	575	591
		RUNNELS Total	*2,091*	*2,140*	*2,174*	*2,207*	*2,250*	*2,319*
COUNTY-OTHER	SCHLEICHER	COLORADO	117	108	102	98	95	93
COUNTY-OTHER	SCHLEICHER	RIO GRANDE	25	23	22	21	20	20
ELDORADO	SCHLEICHER	COLORADO	581	644	671	675	691	711
		SCHLEICHER Total	*723*	*775*	*795*	*794*	*806*	*824*
COUNTY-OTHER	SCURRY	BRAZOS	316	318	317	313	312	312
COUNTY-OTHER	SCURRY	COLORADO	558	562	560	553	552	552
SNYDER	SCURRY	COLORADO	2,792	2,834	2,844	2,829	2,832	2,832
		SCURRY Total	*3,666*	*3,714*	*3,721*	*3,695*	*3,696*	*3,696*
COUNTY-OTHER	STERLING	COLORADO	52	56	57	56	54	55
STERLING CITY	STERLING	COLORADO	297	321	330	330	319	324
		STERLING Total	*349*	*377*	*387*	*386*	*373*	*379*
COUNTY-OTHER	SUTTON	COLORADO	54	56	56	55	54	54
COUNTY-OTHER	SUTTON	RIO GRANDE	223	232	231	226	225	223
SONORA	SUTTON	RIO GRANDE	1,195	1,252	1,252	1,236	1,235	1,222
		SUTTON Total	*1,472*	*1,540*	*1,539*	*1,517*	*1,514*	*1,499*

Table 2A-3: Municipal Water Demand Projections for Region F (Continued)

WUG Name	County	Basin	Water Demand (Acre-Feet per Year)					
			2010	2020	2030	2040	2050	2060
CONCHO RURAL WSC	TOM GREEN	COLORADO	695	873	990	1,048	1,091	1,103
COUNTY-OTHER	TOM GREEN	COLORADO	1,761	1,703	1,633	1,553	1,476	1,408
MILLERSVIEW-DOOLE WSC	TOM GREEN	COLORADO	238	263	291	319	359	408
SAN ANGELO	TOM GREEN	COLORADO	20,800	21,418	21,734	21,744	21,907	21,969
		TOM GREEN Total	*23,494*	*24,257*	*24,648*	*24,664*	*24,833*	*24,888*
COUNTY-OTHER	UPTON	COLORADO	52	54	53	53	54	55
COUNTY-OTHER	UPTON	RIO GRANDE	100	102	102	101	102	104
MCCAMEY	UPTON	RIO GRANDE	559	606	621	629	648	668
RANKIN	UPTON	RIO GRANDE	231	245	248	250	255	261
		UPTON Total	*942*	*1,007*	*1,024*	*1,033*	*1,059*	*1,088*
COUNTY-OTHER	WARD	RIO GRANDE	925	929	925	910	905	905
MONAHANS	WARD	RIO GRANDE	2,559	2,592	2,597	2,572	2,564	2,564
		WARD Total	*3,484*	*3,521*	*3,522*	*3,482*	*3,469*	*3,469*
COUNTY-OTHER	WINKLER	RIO GRANDE	119	121	120	119	116	112
KERMIT	WINKLER	RIO GRANDE	1,927	1,988	1,983	1,966	1,922	1,860
WINK	WINKLER	RIO GRANDE	331	341	341	338	331	320
		WINKLER Total	*2,377*	*2,450*	*2,444*	*2,423*	*2,369*	*2,292*
		Grand Total	***141,965***	***147,828***	***151,280***	***153,206***	***155,340***	***157,632***

Table 2A-4
Manufacturing Water Demand Projections for Region F

County	Basin	Water Demand (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
BROWN	COLORADO	577	636	686	734	775	837
COLEMAN	COLORADO	6	6	6	6	6	6
ECTOR	COLORADO	2,743	2,946	3,107	3,248	3,357	3,471
ECTOR	RIO GRANDE	16	17	18	19	19	20
HOWARD	COLORADO	1,648	1,753	1,832	1,910	1,976	2,099
KIMBLE	COLORADO	702	767	823	880	932	1,002
MCCULLOCH	COLORADO	844	929	1,004	1,075	1,137	1,233
MARTIN	COLORADO	39	41	42	43	44	47
MIDLAND	COLORADO	164	182	198	213	226	245
PECOS	RIO GRANDE	2	2	2	2	2	2
REEVES	RIO GRANDE	720	741	756	770	781	825
RUNNELS	COLORADO	63	70	76	82	87	94
TOM GREEN	COLORADO	2,226	2,498	2,737	2,971	3,175	3,425
WARD	RIO GRANDE	7	7	7	7	7	7
	Grand Total	***9,757***	***10,595***	***11,294***	***11,960***	***12,524***	***13,313***

Table 2A-5
Mining Water Demand Projections for Region F

County	Basin	Water Demand (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
ANDREWS	COLORADO	1,845	1,893	1,911	1,929	1,946	1,969
ANDREWS	RIO GRANDE	63	64	65	65	66	67
BORDEN	COLORADO	690	658	646	635	625	612
BROWN	BRAZOS	41	42	42	42	42	42
BROWN	COLORADO	2,446	2,462	2,468	2,474	2,480	2,488
COKE	COLORADO	488	528	550	572	593	614
COLEMAN	COLORADO	18	19	19	19	19	19
CRANE	RIO GRANDE	2,221	2,216	2,214	2,212	2,210	2,208
CROCKETT	RIO GRANDE	402	421	431	441	450	459
ECTOR	COLORADO	9,702	10,321	10,706	11,080	11,447	11,745
ECTOR	RIO GRANDE	186	198	205	212	219	225
GLASSCOCK	COLORADO	5	5	5	5	5	5
HOWARD	COLORADO	1,783	1,883	1,924	1,963	2,001	2,052
IRION	COLORADO	122	122	122	122	122	122
KIMBLE	COLORADO	71	67	65	63	61	60
LOVING	RIO GRANDE	2	2	2	2	2	2
MARTIN	COLORADO	674	645	634	624	615	603
MASON	COLORADO	6	6	6	6	6	6
MCCULLOCH	COLORADO	154	159	162	165	168	171
MIDLAND	COLORADO	677	778	846	915	986	1,046
MITCHELL	COLORADO	115	110	108	107	106	104
PECOS	RIO GRANDE	159	158	158	158	158	158
REAGAN	COLORADO	2,036	2,165	2,235	2,303	2,370	2,436
REEVES	RIO GRANDE	182	177	175	173	172	170
RUNNELS	COLORADO	44	45	45	45	45	45
SCHLEICHER	COLORADO	125	134	139	144	149	154
SCURRY	BRAZOS	2,244	2,403	2,465	2,525	2,583	2,667
SCURRY	COLORADO	863	924	948	971	994	1,026
STERLING	COLORADO	590	600	605	610	615	620
SUTTON	COLORADO	35	35	36	36	37	37
SUTTON	RIO GRANDE	45	47	47	48	48	49
TOM GREEN	COLORADO	73	80	85	90	95	99
UPTON	COLORADO	2,011	2,025	2,030	2,035	2,040	2,046
UPTON	RIO GRANDE	651	655	657	659	660	662
WARD	RIO GRANDE	153	155	156	157	158	159
WINKLER	RIO GRANDE	928	895	883	872	861	847
	Grand Total	***31,850***	***33,097***	***33,795***	***34,479***	***35,154***	***35,794***

Table 2A-6
Irrigation Water Demand Projections for Region F

County	Basin	Water Demand (Acre-Feet per Year)					
		2010	**2020**	**2030**	**2040**	**2050**	**2060**
ANDREWS	COLORADO	32,608	32,334	32,062	31,788	31,516	31,245
BORDEN	BRAZOS	1,103	1,102	1,100	1,099	1,097	1,096
BORDEN	COLORADO	1,587	1,585	1,582	1,581	1,578	1,577
BROWN	COLORADO	12,313	12,272	12,230	12,189	12,146	12,105
COKE	COLORADO	936	936	934	933	933	933
COLEMAN	COLORADO	1,379	1,379	1,379	1,379	1,379	1,379
CONCHO	COLORADO	4,297	4,280	4,262	4,245	4,229	4,213
CRANE	RIO GRANDE	337	337	337	337	337	337
CROCKETT	RIO GRANDE	525	518	508	498	492	482
ECTOR	COLORADO	5,477	5,412	5,348	5,281	5,219	5,152
ECTOR	RIO GRANDE	56	54	54	54	52	52
GLASSCOCK	COLORADO	52,272	51,854	51,438	51,021	50,603	50,190
HOWARD	COLORADO	4,799	4,744	4,690	4,635	4,581	4,527
IRION	COLORADO	2,803	2,742	2,682	2,621	2,561	2,501
KIMBLE	COLORADO	985	948	913	877	841	807
LOVING	RIO GRANDE	581	580	576	575	573	572
MARTIN	COLORADO	14,324	14,073	13,822	13,571	13,321	13,075
MASON	COLORADO	10,079	9,936	9,792	9,648	9,505	9,363
MCCULLOCH	COLORADO	2,824	2,789	2,754	2,718	2,683	2,649
MENARD	COLORADO	6,061	6,041	6,022	6,003	5,981	5,962
MIDLAND	COLORADO	41,493	41,170	40,848	40,526	40,203	39,884
MITCHELL	COLORADO	5,534	5,507	5,479	5,452	5,425	5,398
PECOS	RIO GRANDE	79,681	78,436	77,191	75,945	74,700	73,475
REAGAN	COLORADO	36,597	35,990	35,385	34,779	34,174	33,579
REEVES	RIO GRANDE	103,069	102,196	101,323	100,448	99,575	98,710
RUNNELS	COLORADO	4,331	4,317	4,298	4,279	4,260	4,241
SCHLEICHER	COLORADO	1,750	1,716	1,680	1,645	1,609	1,575
SCHLEICHER	RIO GRANDE	358	351	344	337	330	322
SCURRY	BRAZOS	788	762	736	710	684	659
SCURRY	COLORADO	2,027	1,961	1,894	1,827	1,760	1,696
STERLING	COLORADO	648	621	595	569	543	518
SUTTON	COLORADO	561	551	540	530	518	507
SUTTON	RIO GRANDE	1,250	1,226	1,202	1,178	1,155	1,132
TOM GREEN	COLORADO	104,621	104,362	104,107	103,852	103,593	103,338
UPTON	COLORADO	16,592	16,355	16,123	15,887	15,651	15,421
UPTON	RIO GRANDE	167	166	162	160	158	155
WARD	RIO GRANDE	13,793	13,624	13,454	13,284	13,115	12,947
WINKLER	RIO GRANDE	10,000	10,000	10,000	10,000	10,000	10,000
	Grand Total	***578,606***	***573,227***	***567,846***	***562,461***	***557,080***	***551,774***

Table 2A-7
Livestock Water Demand Projections for Region F

County	Basin	Water Demand (Acre-Feet per Year)					
		2010	2020	2030	2040	2050	2060
ANDREWS	COLORADO	360	360	360	360	360	360
ANDREWS	RIO GRANDE	78	78	78	78	78	78
BORDEN	BRAZOS	10	10	10	10	10	10
BORDEN	COLORADO	271	271	271	271	271	271
BROWN	BRAZOS	32	32	32	32	32	32
BROWN	COLORADO	1,604	1,604	1,604	1,604	1,604	1,604
COKE	COLORADO	593	593	593	593	593	593
COLEMAN	COLORADO	1,259	1,259	1,259	1,259	1,259	1,259
CONCHO	COLORADO	775	775	775	775	775	775
CRANE	RIO GRANDE	155	155	155	155	155	155
CROCKETT	COLORADO	30	30	30	30	30	30
CROCKETT	RIO GRANDE	967	967	967	967	967	967
ECTOR	COLORADO	198	198	198	198	198	198
ECTOR	RIO GRANDE	95	95	95	95	95	95
GLASSCOCK	COLORADO	232	232	232	232	232	232
HOWARD	COLORADO	366	366	366	366	366	366
IRION	COLORADO	460	460	460	460	460	460
KIMBLE	COLORADO	668	668	668	668	668	668
LOVING	RIO GRANDE	70	70	70	70	70	70
MCCULLOCH	COLORADO	1,027	1,027	1,027	1,027	1,027	1,027
MARTIN	COLORADO	273	273	273	273	273	273
MASON	COLORADO	1,036	1,036	1,036	1,036	1,036	1,036
MENARD	COLORADO	642	642	642	642	642	642
MIDLAND	COLORADO	904	904	904	904	904	904
MITCHELL	COLORADO	449	449	449	449	449	449
PECOS	RIO GRANDE	1,239	1,239	1,239	1,239	1,239	1,239
REAGAN	COLORADO	253	253	253	253	253	253
REAGAN	RIO GRANDE	19	19	19	19	19	19
REEVES	RIO GRANDE	2,283	2,283	2,283	2,283	2,283	2,283
RUNNELS	COLORADO	1,530	1,530	1,530	1,530	1,530	1,530
SCHLEICHER	COLORADO	583	583	583	583	583	583
SCHLEICHER	RIO GRANDE	204	204	204	204	204	204
SCURRY	BRAZOS	233	233	233	233	233	233
SCURRY	COLORADO	396	396	396	396	396	396
STERLING	COLORADO	503	503	503	503	503	503
SUTTON	COLORADO	358	358	358	358	358	358
SUTTON	RIO GRANDE	438	438	438	438	438	438
TOM GREEN	COLORADO	1,978	1,978	1,978	1,978	1,978	1,978
UPTON	COLORADO	78	78	78	78	78	78
UPTON	RIO GRANDE	134	134	134	134	134	134
WARD	RIO GRANDE	126	126	126	126	126	126
WINKLER	COLORADO	2	2	2	2	2	2
WINKLER	RIO GRANDE	149	149	149	149	149	149
	Grand Total	***23,060***	***23,060***	***23,060***	***23,060***	***23,060***	***23,060***

Table 2A-8
Steam-Electric Water Demand Projections for Region F

County	Basin	Water Demand (Acre-Feet per Year)					
		2010	**2020**	**2030**	**2040**	**2050**	**2060**
COKE	COLORADO	310	247	289	339	401	477
CROCKETT	RIO GRANDE	973	776	907	1,067	1,262	1,500
ECTOR	COLORADO	6,375	9,125	10,668	12,549	14,842	17,637
MITCHELL	COLORADO	5,023	4,847	4,670	4,493	4,317	4,140
TOM GREEN	COLORADO	543	777	909	1,069	1,264	1,502
WARD	RIO GRANDE	4,914	4,223	4,937	5,807	6,868	8,162
	Grand Total	***18,138***	***19,995***	***22,380***	***25,324***	***28,954***	***33,418***

Appendix 3A
Currently Available Water Supply by Water User Group

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
ANDREWS	ANDREWS	COLORADO	OGALLALA AQUIFER	ANDREWS	COLORADO	3,087	3,263	3,371	2,717	2,755	2,812
COUNTY-OTHER	ANDREWS	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	ANDREWS	COLORADO	16	16	16	16	16	16
COUNTY-OTHER	ANDREWS	COLORADO	OGALLALA AQUIFER	ANDREWS	COLORADO	515	535	543	550	554	564
COUNTY-OTHER	ANDREWS	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	ANDREWS	RIO GRANDE	7	7	7	8	8	8
IRRIGATION	ANDREWS	COLORADO	DIRECT REUSE	ANDREWS	COLORADO	560	560	560	560	560	560
IRRIGATION	ANDREWS	COLORADO	OGALLALA AQUIFER	ANDREWS	COLORADO	19,173	18,929	18,795	19,911	19,842	19,739
LIVESTOCK	ANDREWS	COLORADO	DOCKUM AQUIFER	ANDREWS	COLORADO	9	9	9	9	9	9
LIVESTOCK	ANDREWS	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	ANDREWS	COLORADO	9	9	9	9	9	9
LIVESTOCK	ANDREWS	COLORADO	LIVESTOCK LOCAL SUPPLY	ANDREWS	COLORADO	63	63	63	63	63	63
LIVESTOCK	ANDREWS	COLORADO	OGALLALA AQUIFER	ANDREWS	COLORADO	279	279	279	279	279	279
LIVESTOCK	ANDREWS	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	ANDREWS	RIO GRANDE	64	64	64	64	64	64
LIVESTOCK	ANDREWS	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	ANDREWS	RIO GRANDE	14	14	14	14	14	14
MINING	ANDREWS	COLORADO	DOCKUM AQUIFER	ANDREWS	COLORADO	13	13	13	13	13	13
MINING	ANDREWS	COLORADO	OGALLALA AQUIFER	ANDREWS	COLORADO	1,832	1,880	1,898	1,916	1,933	1,956
MINING	ANDREWS	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	ANDREWS	RIO GRANDE	120	120	120	120	120	120
COUNTY-OTHER	BORDEN	BRAZOS	OGALLALA AQUIFER	BORDEN	BRAZOS	14	14	14	12	11	10
COUNTY-OTHER	BORDEN	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	BORDEN	COLORADO	OGALLALA AQUIFER	BORDEN	COLORADO	3	3	3	3	3	3
COUNTY-OTHER	BORDEN	COLORADO	OGALLALA AQUIFER	DAWSON	COLORADO	101	101	101	101	101	101
COUNTY-OTHER	BORDEN	COLORADO	OTHER AQUIFER	BORDEN	COLORADO	60	61	60	60	60	60
IRRIGATION	BORDEN	BRAZOS	BRAZOS RIVER RUN-OF-RIVER IRRIGATION	BORDEN	BRAZOS	0	0	0	0	0	0
IRRIGATION	BORDEN	BRAZOS	OGALLALA AQUIFER	BORDEN	BRAZOS	84	84	84	86	87	88
IRRIGATION	BORDEN	COLORADO	OGALLALA AQUIFER	BORDEN	COLORADO	759	759	759	759	759	759
LIVESTOCK	BORDEN	BRAZOS	OGALLALA AQUIFER	BORDEN	BRAZOS	10	10	10	10	10	10
LIVESTOCK	BORDEN	COLORADO	LIVESTOCK LOCAL SUPPLY	BORDEN	COLORADO	251	251	251	251	251	251
LIVESTOCK	BORDEN	COLORADO	OGALLALA AQUIFER	BORDEN	COLORADO	20	20	20	20	20	20
MINING	BORDEN	COLORADO	OTHER AQUIFER	BORDEN	COLORADO	1,014	1,014	1,014	1,014	1,014	1,014
BANGS	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	265	266	262	256	254	254
BROOKESMITH SUD	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	1,413	1,412	1,413	1,413	1,413	1,414
BROWNWOOD	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	3,896	3,927	3,889	3,816	3,792	3,792
COLEMAN COUNTY WSC	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	19	19	19	18	18	18
COLEMAN COUNTY WSC	BROWN	COLORADO	COLEMAN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	BROWN	BRAZOS	TRINITY AQUIFER	BROWN	BRAZOS	12	12	12	12	12	12
COUNTY-OTHER	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	385	385	379	370	367	367
COUNTY-OTHER	BROWN	COLORADO	OTHER AQUIFER	BROWN	COLORADO	9	9	9	9	9	9
COUNTY-OTHER	BROWN	COLORADO	TRINITY AQUIFER	BROWN	COLORADO	0	0	0	0	0	0
EARLY	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	1,228	1,228	1,228	1,228	1,228	1,228
IRRIGATION	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	6,970	6,970	6,970	6,970	6,970	6,970
IRRIGATION	BROWN	COLORADO	PECAN BAYOU COMBINED RUN-OF-RIVER IRRIGATION	BROWN	COLORADO	778	778	778	778	778	778
IRRIGATION	BROWN	COLORADO	TRINITY AQUIFER	BROWN	COLORADO	1,559	1,542	1,536	1,536	1,530	1,516
LIVESTOCK	BROWN	BRAZOS	LIVESTOCK LOCAL SUPPLY	BROWN	BRAZOS	27	27	27	27	27	27
LIVESTOCK	BROWN	BRAZOS	TRINITY AQUIFER	BROWN	BRAZOS	5	5	5	5	5	5
LIVESTOCK	BROWN	COLORADO	LIVESTOCK LOCAL SUPPLY	BROWN	COLORADO	1,296	1,296	1,296	1,296	1,296	1,296
LIVESTOCK	BROWN	COLORADO	OTHER AQUIFER	BROWN	COLORADO	40	40	40	40	40	40
LIVESTOCK	BROWN	COLORADO	TRINITY AQUIFER	BROWN	COLORADO	268	268	268	268	268	268

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
MANUFACTURING	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	577	636	686	734	775	837
MANUFACTURING	BROWN	COLORADO	OTHER AQUIFER	BROWN	COLORADO	0	0	0	0	0	0
MINING	BROWN	BRAZOS	TRINITY AQUIFER	BROWN	BRAZOS	41	42	42	42	42	42
MINING	BROWN	COLORADO	OTHER AQUIFER	BROWN	COLORADO	31	31	31	31	31	31
MINING	BROWN	COLORADO	OTHER LOCAL SUPPLY	BROWN	COLORADO	2,274	2,274	2,274	2,274	2,274	2,274
MINING	BROWN	COLORADO	TRINITY AQUIFER	BROWN	COLORADO	141	157	163	169	175	183
ZEPHYR WSC	BROWN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	516	516	516	516	516	516
BRONTE VILLAGE	COKE	COLORADO	OAK CREEK LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
BRONTE VILLAGE	COKE	COLORADO	OTHER AQUIFER	COKE	COLORADO	250	238	226	215	204	194
COUNTY-OTHER	COKE	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	77	65	95	86	82	76
COUNTY-OTHER	COKE	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	COKE	COLORADO	15	15	15	15	15	15
COUNTY-OTHER	COKE	COLORADO	OTHER AQUIFER	COKE	COLORADO	55	50	49	47	46	46
IRRIGATION	COKE	COLORADO	COLORADO RIVER COMBINED RUN-OF-RIVER IRRIGATION	COKE	COLORADO	41	41	41	41	41	41
IRRIGATION	COKE	COLORADO	OTHER AQUIFER	COKE	COLORADO	532	532	532	532	532	532
LIVESTOCK	COKE	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	COKE	COLORADO	184	184	184	184	184	184
LIVESTOCK	COKE	COLORADO	LIVESTOCK LOCAL SUPPLY	COKE	COLORADO	370	370	370	370	370	370
LIVESTOCK	COKE	COLORADO	OTHER AQUIFER	COKE	COLORADO	39	39	39	39	39	39
MINING	COKE	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	232	239	378	378	380	372
MINING	COKE	COLORADO	OTHER AQUIFER	COKE	COLORADO	170	170	170	170	170	170
ROBERT LEE	COKE	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	256	231	340	317	302	281
ROBERT LEE	COKE	COLORADO	COLORADO RIVER RUN-OF-RIVER CITY OF ROBERT LEE	COKE	COLORADO	7	7	7	7	7	7
ROBERT LEE	COKE	COLORADO	MOUNTAIN CREEK LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
STEAM ELECTRIC POWER	COKE	COLORADO	OAK CREEK LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
BROOKESMITH SUD	COLEMAN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	13	13	12	12	12	12
COLEMAN	COLEMAN	COLORADO	COLEMAN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
COLEMAN	COLEMAN	COLORADO	HORDS CREEK LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
COLEMAN COUNTY WSC	COLEMAN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	1,295	1,280	1,278	1,276	1,275	1,271
COLEMAN COUNTY WSC	COLEMAN	COLORADO	COLEMAN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	COLEMAN	COLORADO	COLEMAN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
IRRIGATION	COLEMAN	COLORADO	COLEMAN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
IRRIGATION	COLEMAN	COLORADO	COLORADO RIVER COMBINED RUN-OF-RIVER IRRIGATION	COLEMAN	COLORADO	31	31	31	31	31	31
LIVESTOCK	COLEMAN	COLORADO	LIVESTOCK LOCAL SUPPLY	COLEMAN	COLORADO	1,081	1,081	1,081	1,081	1,081	1,081
LIVESTOCK	COLEMAN	COLORADO	OTHER AQUIFER	COLEMAN	COLORADO	178	178	178	178	178	178
MANUFACTURING	COLEMAN	COLORADO	COLEMAN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
MINING	COLEMAN	COLORADO	COLEMAN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
MINING	COLEMAN	COLORADO	COLORADO RIVER COMBINED RUN-OF-RIVER CENTRAL COLORADO RIVER AUTHORITY	COLEMAN	COLORADO	0	0	0	0	0	0
MINING	COLEMAN	COLORADO	OTHER AQUIFER	COLEMAN	COLORADO	1	1	1	1	1	1
SANTA ANNA	COLEMAN	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	207	207	207	207	207	207

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
SANTA ANNA	COLEMAN	COLORADO	COLORADO RIVER COMBINED RUN-OF-RIVER CENTRAL COLORADO RIVER AUTHORITY	COLEMAN	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	CONCHO	COLORADO	CONCHO RIVER RUN-OF-RIVER CITY OF PAINT ROCK	CONCHO	COLORADO	35	35	35	35	35	35
COUNTY-OTHER	CONCHO	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	CONCHO	COLORADO	40	40	40	40	40	40
COUNTY-OTHER	CONCHO	COLORADO	HICKORY AQUIFER	CONCHO	COLORADO	17	19	19	19	19	19
COUNTY-OTHER	CONCHO	COLORADO	OTHER AQUIFER	CONCHO	COLORADO	127	127	127	127	127	127
EDEN	CONCHO	COLORADO	DIRECT REUSE	CONCHO	COLORADO	80	220	220	220	220	220
EDEN	CONCHO	COLORADO	HICKORY AQUIFER	CONCHO	COLORADO	574	572	572	572	572	572
EDEN	CONCHO	COLORADO	OTHER AQUIFER	CONCHO	COLORADO	0	0	0	0	0	0
IRRIGATION	CONCHO	COLORADO	CONCHO RIVER COMBINED RUN-OF-RIVER IRRIGATION	CONCHO	COLORADO	228	228	228	228	228	228
IRRIGATION	CONCHO	COLORADO	LIPAN AQUIFER	CONCHO	COLORADO	5,037	5,037	5,037	5,037	5,037	5,037
LIVESTOCK	CONCHO	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	CONCHO	COLORADO	289	289	289	289	289	289
LIVESTOCK	CONCHO	COLORADO	LIVESTOCK LOCAL SUPPLY	CONCHO	COLORADO	123	123	123	123	123	123
LIVESTOCK	CONCHO	COLORADO	OTHER AQUIFER	CONCHO	COLORADO	363	363	363	363	363	363
MILLERSVIEW-DOOLE WSC	CONCHO	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	46	43	62	56	0	0
MILLERSVIEW-DOOLE WSC	CONCHO	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	76	76	76	76	76	76
COUNTY-OTHER	CRANE	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	CRANE	RIO GRANDE	254	311	341	363	389	416
COUNTY-OTHER	CRANE	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	62	76	84	89	95	102
CRANE	CRANE	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	CRANE	RIO GRANDE	755	804	826	839	861	887
CRANE	CRANE	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	185	198	202	206	211	218
CRANE	CRANE	RIO GRANDE	DIRECT REUSE	CRANE	RIO GRANDE	0	0	0	0	0	0
IRRIGATION	CRANE	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	CRANE	RIO GRANDE	337	337	337	337	337	337
LIVESTOCK	CRANE	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	CRANE	RIO GRANDE	148	148	148	148	148	148
LIVESTOCK	CRANE	RIO GRANDE	DOCKUM AQUIFER	CRANE	RIO GRANDE	0	0	0	0	0	0
LIVESTOCK	CRANE	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	CRANE	RIO GRANDE	7	7	7	7	7	7
MINING	CRANE	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	CRANE	RIO GRANDE	710	705	703	701	699	697
MINING	CRANE	RIO GRANDE	OTHER AQUIFER	CRANE	RIO GRANDE	81	81	81	81	81	81
MINING	CRANE	RIO GRANDE	OTHER LOCAL SUPPLY	CRANE	RIO GRANDE	1,430	1,430	1,430	1,430	1,430	1,430
COUNTY-OTHER	CROCKETT	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	CROCKETT	RIO GRANDE	43	41	40	38	37	36
CROCKETT COUNTY WCID #1	CROCKETT	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	CROCKETT	RIO GRANDE	2,503	2,503	2,503	2,503	2,503	2,503
IRRIGATION	CROCKETT	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	CROCKETT	RIO GRANDE	535	535	535	535	535	535
LIVESTOCK	CROCKETT	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	CROCKETT	COLORADO	26	26	26	26	26	26
LIVESTOCK	CROCKETT	COLORADO	LIVESTOCK LOCAL SUPPLY	CROCKETT	COLORADO	4	4	4	4	4	4
LIVESTOCK	CROCKETT	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	CROCKETT	RIO GRANDE	840	840	840	840	840	840
LIVESTOCK	CROCKETT	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	CROCKETT	RIO GRANDE	127	127	127	127	127	127
MINING	CROCKETT	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	CROCKETT	RIO GRANDE	402	421	431	441	450	459
STEAM ELECTRIC POWER	CROCKETT	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	PECOS	RIO GRANDE	1,500	1,500	1,500	1,500	1,500	1,500
COUNTY-OTHER	ECTOR	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	3,325	3,908	4,360	4,643	4,757	4,804
COUNTY-OTHER	ECTOR	COLORADO	OGALLALA AQUIFER	ECTOR	COLORADO	2,153	2,541	2,842	3,031	3,107	3,139
COUNTY-OTHER	ECTOR	COLORADO	OGALLALA AQUIFER	GAINES	COLORADO	64	64	64	64	64	64
COUNTY-OTHER	ECTOR	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	ECTOR	RIO GRANDE	52	55	59	61	64	66
COUNTY-OTHER	ECTOR	RIO GRANDE	DOCKUM AQUIFER	ECTOR	RIO GRANDE	30	32	34	36	37	38
COUNTY-OTHER	ECTOR	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	RIO GRANDE	96	103	109	114	118	123

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
ECTOR COUNTY UD	ECTOR	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	1,080	1,234	2,166	2,322	2,434	2,454
IRRIGATION	ECTOR	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	1,768	2,091	2,328	2,450	2,464	2,429
IRRIGATION	ECTOR	COLORADO	MONAHANS DRAW COMBINED RUN-OF-RIVER IRRIGATION	ECTOR	COLORADO	23	23	23	23	23	23
IRRIGATION	ECTOR	COLORADO	OGALLALA AQUIFER	ECTOR	COLORADO	3,686	3,298	2,997	2,808	2,732	2,700
IRRIGATION	ECTOR	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	ECTOR	RIO GRANDE	56	54	54	54	52	52
LIVESTOCK	ECTOR	COLORADO	DOCKUM AQUIFER	ECTOR	COLORADO	6	6	6	6	6	6
LIVESTOCK	ECTOR	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	171	171	171	171	171	171
LIVESTOCK	ECTOR	COLORADO	LIVESTOCK LOCAL SUPPLY	ECTOR	COLORADO	11	11	11	11	11	11
LIVESTOCK	ECTOR	COLORADO	OGALLALA AQUIFER	ECTOR	COLORADO	10	10	10	10	10	10
LIVESTOCK	ECTOR	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	ECTOR	RIO GRANDE	29	29	29	29	29	29
LIVESTOCK	ECTOR	RIO GRANDE	DOCKUM AQUIFER	ECTOR	RIO GRANDE	16	16	16	16	16	16
LIVESTOCK	ECTOR	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	RIO GRANDE	50	50	50	50	50	50
MANUFACTURING	ECTOR	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	877	797	1,199	902	871	813
MANUFACTURING	ECTOR	COLORADO	DIRECT REUSE	ECTOR	COLORADO	1,500	1,650	1,800	1,950	2,100	2,250
MANUFACTURING	ECTOR	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	ECTOR	RIO GRANDE	16	17	18	19	19	20
MINING	ECTOR	COLORADO	CAPITAN REEF AQUIFER	WINKLER	RIO GRANDE	5,259	6,784	7,858	8,637	9,132	9,442
MINING	ECTOR	COLORADO	DOCKUM AQUIFER	ECTOR	COLORADO	0	0	0	0	0	0
MINING	ECTOR	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	4,443	3,537	2,848	2,443	2,315	2,303
MINING	ECTOR	COLORADO	OGALLALA AQUIFER	ECTOR	COLORADO	0	0	0	0	0	0
MINING	ECTOR	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	ECTOR	RIO GRANDE	1	1	1	1	1	1
MINING	ECTOR	RIO GRANDE	DOCKUM AQUIFER	ECTOR	RIO GRANDE	348	348	348	348	348	348
MINING	ECTOR	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	RIO GRANDE	23	23	23	23	23	23
ODESSA	ECTOR	COLORADO	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	4,708	0	0	0	0	0
ODESSA	ECTOR	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	11,176	10,757	16,708	16,793	17,092	17,006
ODESSA	ECTOR	COLORADO	DIRECT REUSE	ECTOR	COLORADO	1,500	1,500	1,500	1,500	1,500	1,500
ODESSA	ECTOR	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	432	428	426	425	425	425
STEAM ELECTRIC POWER	ECTOR	COLORADO	OGALLALA AQUIFER	ANDREWS	COLORADO	5,156	5,156	5,156	5,156	5,156	5,156
COUNTY-OTHER	GLASSCOCK	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	GLASSCOCK	COLORADO	179	194	201	198	195	199
COUNTY-OTHER	GLASSCOCK	COLORADO	OGALLALA AQUIFER	GLASSCOCK	COLORADO	2	2	2	2	2	2
IRRIGATION	GLASSCOCK	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	GLASSCOCK	COLORADO	20,586	20,571	20,564	20,567	20,570	20,566
IRRIGATION	GLASSCOCK	COLORADO	OGALLALA AQUIFER	GLASSCOCK	COLORADO	3,902	3,902	3,902	3,902	3,902	3,902
LIVESTOCK	GLASSCOCK	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	GLASSCOCK	COLORADO	168	168	168	168	168	168
LIVESTOCK	GLASSCOCK	COLORADO	LIVESTOCK LOCAL SUPPLY	GLASSCOCK	COLORADO	40	40	40	40	40	40
LIVESTOCK	GLASSCOCK	COLORADO	OGALLALA AQUIFER	GLASSCOCK	COLORADO	24	24	24	24	24	24
MINING	GLASSCOCK	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	GLASSCOCK	COLORADO	5	5	5	5	5	5
BIG SPRING	HOWARD	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	3,636	3,370	4,976	4,611	4,389	4,084
BIG SPRING	HOWARD	COLORADO	OGALLALA AQUIFER	MARTIN	COLORADO	1,035	1,035	1,035	1,035	1,035	1,035
COAHOMA	HOWARD	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	134	124	182	169	159	148
COUNTY-OTHER	HOWARD	COLORADO	DOCKUM AQUIFER	HOWARD	COLORADO	12	12	12	12	12	12
COUNTY-OTHER	HOWARD	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	HOWARD	COLORADO	572	572	572	572	572	572
COUNTY-OTHER	HOWARD	COLORADO	OGALLALA AQUIFER	HOWARD	COLORADO	569	569	569	569	569	569

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
IRRIGATION	HOWARD	COLORADO	BEALS CREEK COMBINED RUN-OF-RIVER IRRIGATION	HOWARD	COLORADO	0	0	0	0	0	0
IRRIGATION	HOWARD	COLORADO	DOCKUM AQUIFER	HOWARD	COLORADO	41	41	41	41	41	41
IRRIGATION	HOWARD	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	HOWARD	COLORADO	183	183	183	183	183	183
IRRIGATION	HOWARD	COLORADO	OGALLALA AQUIFER	HOWARD	COLORADO	4,638	4,638	4,638	4,638	4,638	4,638
LIVESTOCK	HOWARD	COLORADO	DOCKUM AQUIFER	HOWARD	COLORADO	9	9	9	9	9	9
LIVESTOCK	HOWARD	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	HOWARD	COLORADO	70	70	70	70	70	70
LIVESTOCK	HOWARD	COLORADO	LIVESTOCK LOCAL SUPPLY	HOWARD	COLORADO	62	62	62	62	62	62
LIVESTOCK	HOWARD	COLORADO	OGALLALA AQUIFER	HOWARD	COLORADO	225	225	225	225	225	225
MANUFACTURING	HOWARD	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	722	703	1,094	1,090	1,103	1,130
MANUFACTURING	HOWARD	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	HOWARD	COLORADO	288	288	288	288	288	288
MANUFACTURING	HOWARD	COLORADO	OGALLALA AQUIFER	HOWARD	COLORADO	461	461	461	461	461	461
MINING	HOWARD	COLORADO	BEALS CREEK RUN-OF-RIVER CRMWD DIVERTED WATER	HOWARD	COLORADO	0	0	0	0	0	0
MINING	HOWARD	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	1,076	1,053	1,608	1,555	1,523	1,460
MINING	HOWARD	COLORADO	DOCKUM AQUIFER	HOWARD	COLORADO	106	106	106	106	106	106
MINING	HOWARD	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	HOWARD	COLORADO	82	82	82	82	82	82
MINING	HOWARD	COLORADO	OGALLALA AQUIFER	HOWARD	COLORADO	119	119	119	119	119	119
COUNTY-OTHER	IRION	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	IRION	COLORADO	109	109	103	94	87	83
IRRIGATION	IRION	COLORADO	OTHER AQUIFER	IRION	COLORADO	921	921	921	921	921	921
IRRIGATION	IRION	COLORADO	SPRING CREEK COMBINED RUN-OF-RIVER IRRIGATION	IRION	COLORADO	580	580	580	580	580	580
LIVESTOCK	IRION	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	IRION	COLORADO	386	386	386	386	386	386
LIVESTOCK	IRION	COLORADO	LIVESTOCK LOCAL SUPPLY	IRION	COLORADO	67	67	67	67	67	67
LIVESTOCK	IRION	COLORADO	OTHER AQUIFER	IRION	COLORADO	7	7	7	7	7	7
MERTZON	IRION	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	IRION	COLORADO	139	139	139	139	139	139
MINING	IRION	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	IRION	COLORADO	122	122	122	122	122	122
COUNTY-OTHER	KIMBLE	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	KIMBLE	COLORADO	203	200	200	200	200	200
COUNTY-OTHER	KIMBLE	COLORADO	LLANO RIVER RUN-OF-RIVER CITY OF JUNCTION	KIMBLE	COLORADO	0	0	0	0	0	0
IRRIGATION	KIMBLE	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	KIMBLE	COLORADO	296	296	296	296	296	296
IRRIGATION	KIMBLE	COLORADO	LLANO RIVER COMBINED RUN-OF-RIVER IRRIGATION	KIMBLE	COLORADO	1,475	1,475	1,475	1,475	1,475	1,475
JUNCTION	KIMBLE	COLORADO	LLANO RIVER RUN-OF-RIVER CITY OF JUNCTION	KIMBLE	COLORADO	0	0	0	0	0	0
LIVESTOCK	KIMBLE	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	KIMBLE	COLORADO	579	579	579	579	579	579
LIVESTOCK	KIMBLE	COLORADO	LIVESTOCK LOCAL SUPPLY	KIMBLE	COLORADO	89	89	89	89	89	89
MANUFACTURING	KIMBLE	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	KIMBLE	COLORADO	3	3	3	3	3	3
MANUFACTURING	KIMBLE	COLORADO	LLANO RIVER COMBINED RUN-OF-RIVER MANUFACTURING	KIMBLE	COLORADO	0	0	0	0	0	0
MINING	KIMBLE	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	KIMBLE	COLORADO	91	91	91	91	91	91
MINING	KIMBLE	COLORADO	LLANO RIVER COMBINED RUN-OF-RIVER MINING	KIMBLE	COLORADO	13	13	13	13	13	13
COUNTY-OTHER	LOVING	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	LOVING	RIO GRANDE	11	11	10	10	10	10
IRRIGATION	LOVING	RIO GRANDE	RED BLUFF LAKE/RESERVOIR	RESERVOIR	RIO GRANDE	583	583	583	583	583	583
LIVESTOCK	LOVING	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	LOVING	RIO GRANDE	54	54	54	54	54	54

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
LIVESTOCK	LOVING	RIO GRANDE	DOCKUM AQUIFER	LOVING	RIO GRANDE	6	6	6	6	6	6
LIVESTOCK	LOVING	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	LOVING	RIO GRANDE	10	10	10	10	10	10
MINING	LOVING	RIO GRANDE	DOCKUM AQUIFER	LOVING	RIO GRANDE	3	3	3	3	3	3
COUNTY-OTHER	MARTIN	COLORADO	OGALLALA AQUIFER	MARTIN	COLORADO	377	403	411	412	399	378
IRRIGATION	MARTIN	COLORADO	OGALLALA AQUIFER	MARTIN	COLORADO	13,536	13,509	13,500	13,571	13,321	13,075
LIVESTOCK	MARTIN	COLORADO	LIVESTOCK LOCAL SUPPLY	MARTIN	COLORADO	67	67	67	67	67	67
LIVESTOCK	MARTIN	COLORADO	OGALLALA AQUIFER	MARTIN	COLORADO	206	206	206	206	206	206
MANUFACTURING	MARTIN	COLORADO	OGALLALA AQUIFER	MARTIN	COLORADO	39	41	42	43	44	47
MINING	MARTIN	COLORADO	OGALLALA AQUIFER	MARTIN	COLORADO	705	705	705	705	705	705
STANTON	MARTIN	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
STANTON	MARTIN	COLORADO	OGALLALA AQUIFER	MARTIN	COLORADO	19	18	18	18	18	18
COUNTY-OTHER	MASON	COLORADO	ELLENBURGER-SAN SABA AQUIFER	MASON	COLORADO	38	38	38	38	38	38
COUNTY-OTHER	MASON	COLORADO	HICKORY AQUIFER	MASON	COLORADO	115	115	115	115	115	115
COUNTY-OTHER	MASON	COLORADO	MARBLE FALLS AQUIFER	MASON	COLORADO	37	37	37	37	37	37
IRRIGATION	MASON	COLORADO	HICKORY AQUIFER	MASON	COLORADO	16,099	16,099	16,099	16,099	16,099	16,099
LIVESTOCK	MASON	COLORADO	ELLENBURGER-SAN SABA AQUIFER	MASON	COLORADO	102	102	102	102	102	102
LIVESTOCK	MASON	COLORADO	HICKORY AQUIFER	MASON	COLORADO	386	386	386	386	386	386
LIVESTOCK	MASON	COLORADO	LIVESTOCK LOCAL SUPPLY	MASON	COLORADO	451	451	451	451	451	451
LIVESTOCK	MASON	COLORADO	MARBLE FALLS AQUIFER	MASON	COLORADO	97	97	97	97	97	97
MASON	MASON	COLORADO	HICKORY AQUIFER	MASON	COLORADO	766	765	766	766	766	766
MINING	MASON	COLORADO	HICKORY AQUIFER	MASON	COLORADO	6	6	6	6	6	6
BRADY	MCCULLOCH	COLORADO	BRADY CREEK LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
BRADY	MCCULLOCH	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	884	884	884	884	884	884
COUNTY-OTHER	MCCULLOCH	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	12	12	12	12	12	12
IRRIGATION	MCCULLOCH	COLORADO	COLORADO RIVER COMBINED RUN-OF-RIVER IRRIGATION	MCCULLOCH	COLORADO	128	128	128	128	128	128
IRRIGATION	MCCULLOCH	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	5,975	5,975	5,975	5,975	5,975	5,975
LIVESTOCK	MCCULLOCH	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	MCCULLOCH	COLORADO	16	16	16	16	16	16
LIVESTOCK	MCCULLOCH	COLORADO	ELLENBURGER-SAN SABA AQUIFER	MCCULLOCH	COLORADO	355	355	355	355	355	355
LIVESTOCK	MCCULLOCH	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	373	373	373	373	373	373
LIVESTOCK	MCCULLOCH	COLORADO	LIVESTOCK LOCAL SUPPLY	MCCULLOCH	COLORADO	164	164	164	164	164	164
LIVESTOCK	MCCULLOCH	COLORADO	MARBLE FALLS AQUIFER	MCCULLOCH	COLORADO	15	15	15	15	15	15
LIVESTOCK	MCCULLOCH	COLORADO	OTHER AQUIFER	MCCULLOCH	COLORADO	104	104	104	104	104	104
MANUFACTURING	MCCULLOCH	COLORADO	BRADY CREEK LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
MANUFACTURING	MCCULLOCH	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	844	929	1,004	1,075	1,137	1,233
MILLERSVIEW-DOOLE WSC	MCCULLOCH	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	91	82	119	108	0	0
MILLERSVIEW-DOOLE WSC	MCCULLOCH	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	148	148	148	148	148	148
MINING	MCCULLOCH	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	154	159	162	165	168	171
RICHLAND SUD	MCCULLOCH	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	186	186	186	186	186	186
COUNTY-OTHER	MENARD	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	MENARD	COLORADO	69	67	66	66	66	66
COUNTY-OTHER	MENARD	COLORADO	ELLENBURGER-SAN SABA AQUIFER	MENARD	COLORADO	1	1	1	1	1	1
COUNTY-OTHER	MENARD	COLORADO	OTHER AQUIFER	MENARD	COLORADO	14	13	13	13	13	13
COUNTY-OTHER	MENARD	COLORADO	SAN SABA RIVER RUN-OF-RIVER CITY OF MENARD	MENARD	COLORADO	0	0	0	0	0	0
IRRIGATION	MENARD	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	MENARD	COLORADO	627	627	627	627	627	627
IRRIGATION	MENARD	COLORADO	HICKORY AQUIFER	MENARD	COLORADO	59	59	59	59	59	59

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
IRRIGATION	MENARD	COLORADO	OTHER AQUIFER	MENARD	COLORADO	0	0	0	0	0	0
IRRIGATION	MENARD	COLORADO	SAN SABA RIVER COMBINED RUN-OF-RIVER IRRIGATION	MENARD	COLORADO	2,934	2,934	2,934	2,934	2,934	2,934
LIVESTOCK	MENARD	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	MENARD	COLORADO	516	516	516	516	516	516
LIVESTOCK	MENARD	COLORADO	ELLENBURGER-SAN SABA AQUIFER	MENARD	COLORADO	6	6	6	6	6	6
LIVESTOCK	MENARD	COLORADO	LIVESTOCK LOCAL SUPPLY	MENARD	COLORADO	86	86	86	86	86	86
LIVESTOCK	MENARD	COLORADO	OTHER AQUIFER	MENARD	COLORADO	34	34	34	34	34	34
MENARD	MENARD	COLORADO	SAN SABA RIVER RUN-OF-RIVER CITY OF MENARD	MENARD	COLORADO	304	304	304	304	304	304
COUNTY-OTHER	MIDLAND	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	MIDLAND	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	MIDLAND	COLORADO	2,296	2,536	2,701	2,807	2,879	2,968
COUNTY-OTHER	MIDLAND	COLORADO	OGALLALA AQUIFER	MIDLAND	COLORADO	893	986	1,051	1,092	1,119	1,154
COUNTY-OTHER	MIDLAND	COLORADO	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	21	21	21	21	21	21
IRRIGATION	MIDLAND	COLORADO	DIRECT REUSE	MIDLAND	COLORADO	5,987	5,987	5,987	5,987	5,987	5,987
IRRIGATION	MIDLAND	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	MIDLAND	COLORADO	15,843	15,502	15,269	15,094	14,951	14,802
IRRIGATION	MIDLAND	COLORADO	OGALLALA AQUIFER	MIDLAND	COLORADO	3,430	3,322	3,244	3,191	3,153	3,102
LIVESTOCK	MIDLAND	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	MIDLAND	COLORADO	579	579	579	579	579	579
LIVESTOCK	MIDLAND	COLORADO	LIVESTOCK LOCAL SUPPLY	MIDLAND	COLORADO	117	117	117	117	117	117
LIVESTOCK	MIDLAND	COLORADO	OGALLALA AQUIFER	MIDLAND	COLORADO	208	208	208	208	208	208
MANUFACTURING	MIDLAND	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
MANUFACTURING	MIDLAND	COLORADO	OGALLALA AQUIFER	MIDLAND	COLORADO	136	151	164	176	187	203
MANUFACTURING	MIDLAND	COLORADO	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	28	31	34	37	39	42
MIDLAND	MIDLAND	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	12,136	12,202	0	0	0	0
MIDLAND	MIDLAND	COLORADO	OGALLALA AQUIFER	ANDREWS	COLORADO	1,237	1,237	1,237	0	0	0
MIDLAND	MIDLAND	COLORADO	OGALLALA AQUIFER	MARTIN	COLORADO	3,485	3,485	3,485	0	0	0
MIDLAND	MIDLAND	COLORADO	OGALLALA AQUIFER	MIDLAND	COLORADO	0	0	0	0	0	0
MIDLAND	MIDLAND	COLORADO	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	10,925	10,669	10,473	10,246	10,021	9,795
MINING	MIDLAND	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	MIDLAND	COLORADO	677	778	846	915	986	1,046
ODESSA	MIDLAND	COLORADO	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	92	0	0	0	0	0
ODESSA	MIDLAND	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	233	310	559	596	618	621
ODESSA	MIDLAND	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	8	12	14	15	15	15
COLORADO CITY	MITCHELL	COLORADO	COLORADO CITY-CHAMPION LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
COLORADO CITY	MITCHELL	COLORADO	DIRECT REUSE	MITCHELL	COLORADO	0	0	0	0	0	0
COLORADO CITY	MITCHELL	COLORADO	DOCKUM AQUIFER	MITCHELL	COLORADO	997	999	1,001	1,004	1,008	1,013
COUNTY-OTHER	MITCHELL	COLORADO	DOCKUM AQUIFER	MITCHELL	COLORADO	621	609	593	570	549	516
IRRIGATION	MITCHELL	COLORADO	COLORADO RIVER COMBINED RUN-OF-RIVER IRRIGATION	MITCHELL	COLORADO	15	15	15	15	15	15
IRRIGATION	MITCHELL	COLORADO	DOCKUM AQUIFER	MITCHELL	COLORADO	5,549	5,549	5,549	5,549	5,549	5,549
LIVESTOCK	MITCHELL	COLORADO	DOCKUM AQUIFER	MITCHELL	COLORADO	66	66	66	66	66	66
LIVESTOCK	MITCHELL	COLORADO	LIVESTOCK LOCAL SUPPLY	MITCHELL	COLORADO	381	381	381	381	381	381

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
LIVESTOCK	MITCHELL	COLORADO	OTHER AQUIFER	MITCHELL	COLORADO	2	2	2	2	2	2
LORAINE	MITCHELL	COLORADO	DOCKUM AQUIFER	MITCHELL	COLORADO	110	110	110	110	110	110
MINING	MITCHELL	COLORADO	COLORADO RIVER RUN-OF-RIVER CRMWD DIVERTED WATER	COKE	COLORADO	0	0	0	0	0	0
MINING	MITCHELL	COLORADO	DOCKUM AQUIFER	MITCHELL	COLORADO	141	141	141	141	141	141
STEAM ELECTRIC POWER	MITCHELL	COLORADO	COLORADO CITY-CHAMPION LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	PECOS	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	PECOS	RIO GRANDE	27	27	27	27	27	27
COUNTY-OTHER	PECOS	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	PECOS	RIO GRANDE	674	694	703	702	698	684
COUNTY-OTHER	PECOS	RIO GRANDE	OTHER AQUIFER	PECOS	RIO GRANDE	1	1	1	1	1	1
FORT STOCKTON	PECOS	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	PECOS	RIO GRANDE	5,913	5,913	5,913	5,913	5,913	5,913
IRAAN	PECOS	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	PECOS	RIO GRANDE	567	567	567	567	567	567
IRRIGATION	PECOS	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	PECOS	RIO GRANDE	27,456	27,456	27,456	27,456	27,456	27,456
IRRIGATION	PECOS	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	PECOS	RIO GRANDE	47,740	47,740	47,740	47,740	47,740	47,740
IRRIGATION	PECOS	RIO GRANDE	PECOS RIVER COMBINED RUN-OF-RIVER IRRIGATION	PECOS	RIO GRANDE	4,444	4,444	4,444	4,444	4,444	4,444
IRRIGATION	PECOS	RIO GRANDE	RED BLUFF LAKE/RESERVOIR	RESERVOIR	RIO GRANDE	1,558	1,558	1,558	1,558	1,558	1,558
IRRIGATION	PECOS	RIO GRANDE	RUSTLER AQUIFER	PECOS	RIO GRANDE	1,385	1,385	1,385	1,385	1,385	1,385
LIVESTOCK	PECOS	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	PECOS	RIO GRANDE	269	269	269	269	269	269
LIVESTOCK	PECOS	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	PECOS	RIO GRANDE	911	911	911	911	911	911
LIVESTOCK	PECOS	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	PECOS	RIO GRANDE	52	52	52	52	52	52
LIVESTOCK	PECOS	RIO GRANDE	OTHER AQUIFER	PECOS	RIO GRANDE	4	4	4	4	4	4
LIVESTOCK	PECOS	RIO GRANDE	RUSTLER AQUIFER	PECOS	RIO GRANDE	4	4	4	4	4	4
MANUFACTURING	PECOS	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	PECOS	RIO GRANDE	3	3	3	3	3	3
MINING	PECOS	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	PECOS	RIO GRANDE	37	37	37	37	37	37
MINING	PECOS	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	PECOS	RIO GRANDE	249	249	249	249	249	249
PECOS COUNTY WCID #1	PECOS	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	PECOS	RIO GRANDE	478	478	478	478	478	478
BIG LAKE	REAGAN	COLORADO	DIRECT REUSE	REAGAN	COLORADO	0	0	0	0	0	0
BIG LAKE	REAGAN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	REAGAN	COLORADO	910	988	1,026	1,010	970	923
COUNTY-OTHER	REAGAN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	REAGAN	COLORADO	125	135	141	138	133	126
IRRIGATION	REAGAN	COLORADO	DOCKUM AQUIFER	REAGAN	RIO GRANDE	0	0	0	0	0	0
IRRIGATION	REAGAN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	REAGAN	COLORADO	25,600	25,383	25,269	25,220	25,198	25,186
LIVESTOCK	REAGAN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	REAGAN	COLORADO	215	215	215	215	215	215
LIVESTOCK	REAGAN	COLORADO	LIVESTOCK LOCAL SUPPLY	REAGAN	COLORADO	38	38	38	38	38	38
LIVESTOCK	REAGAN	RIO GRANDE	DOCKUM AQUIFER	REAGAN	RIO GRANDE	10	10	10	10	10	10
LIVESTOCK	REAGAN	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	REAGAN	RIO GRANDE	13	13	13	13	13	13
LIVESTOCK	REAGAN	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	REAGAN	RIO GRANDE	3	3	3	3	3	3
MINING	REAGAN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	REAGAN	COLORADO	2,036	2,165	2,235	2,303	2,370	2,436
BALMORHEA	REEVES	RIO GRANDE	BALMORHEA LAKE/RESERVOIR	RESERVOIR	RIO GRANDE	0	0	0	0	0	0
BALMORHEA	REEVES	RIO GRANDE	OTHER AQUIFER	JEFF DAVIS	RIO GRANDE	122	132	139	148	157	166
COUNTY-OTHER	REEVES	RIO GRANDE	OTHER AQUIFER	JEFF DAVIS	RIO GRANDE	76	66	59	50	41	32
COUNTY-OTHER	REEVES	RIO GRANDE	BALMORHEA LAKE/RESERVOIR	RESERVOIR	RIO GRANDE	0	0	0	0	0	0
COUNTY-OTHER	REEVES	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	49	43	39	34	29	28
COUNTY-OTHER	REEVES	RIO GRANDE	DOCKUM AQUIFER	REEVES	RIO GRANDE	26	23	20	18	16	14
COUNTY-OTHER	REEVES	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	REEVES	RIO GRANDE	68	68	68	68	68	68
IRRIGATION	REEVES	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	REEVES	RIO GRANDE	57,862	57,841	57,826	57,813	57,801	57,753
IRRIGATION	REEVES	RIO GRANDE	BALMORHEA LAKE/RESERVOIR	RESERVOIR	RIO GRANDE	21,844	21,844	21,844	21,844	21,844	21,844

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
IRRIGATION	REEVES	RIO GRANDE	PECOS RIVER COMBINED RUN-OF-RIVER IRRIGATION	REEVES	RIO GRANDE	0	0	0	0	0	0
IRRIGATION	REEVES	RIO GRANDE	RED BLUFF LAKE/RESERVOIR	RESERVOIR	RIO GRANDE	9,110	9,110	9,110	9,110	9,110	9,110
LIVESTOCK	REEVES	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	REEVES	RIO GRANDE	1,211	1,211	1,211	1,211	1,211	1,211
LIVESTOCK	REEVES	RIO GRANDE	DOCKUM AQUIFER	REEVES	RIO GRANDE	130	130	130	130	130	130
LIVESTOCK	REEVES	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	REEVES	RIO GRANDE	773	773	773	773	773	773
LIVESTOCK	REEVES	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	REEVES	RIO GRANDE	66	66	66	66	66	66
LIVESTOCK	REEVES	RIO GRANDE	RUSTLER AQUIFER	REEVES	RIO GRANDE	103	103	103	103	103	103
MADERA VALLEY WSC	REEVES	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	REEVES	RIO GRANDE	695	700	702	703	705	711
MANUFACTURING	REEVES	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	REEVES	RIO GRANDE	570	591	606	620	631	675
MANUFACTURING	REEVES	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	98	98	98	98	98	98
MANUFACTURING	REEVES	RIO GRANDE	DOCKUM AQUIFER	REEVES	RIO GRANDE	52	52	52	52	52	52
MINING	REEVES	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	REEVES	RIO GRANDE	182	177	175	173	172	170
PECOS	REEVES	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	1,541	1,792	1,986	2,136	2,294	2,431
PECOS	REEVES	RIO GRANDE	DOCKUM AQUIFER	REEVES	RIO GRANDE	1,269	1,272	1,275	1,277	1,279	1,281
BALLINGER	RUNNELS	COLORADO	BALLINGER/MOONEN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
BALLINGER	RUNNELS	COLORADO	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	257	244	373	357	0	0
BALLINGER	RUNNELS	COLORADO	OTHER AQUIFER	RUNNELS	COLORADO	0	0	0	0	0	0
COLEMAN COUNTY WSC	RUNNELS	COLORADO	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	18	30	39	48	56	66
COLEMAN COUNTY WSC	RUNNELS	COLORADO	COLEMAN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	RUNNELS	COLORADO	BALLINGER/MOONEN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	RUNNELS	COLORADO	OTHER AQUIFER	RUNNELS	COLORADO	30	29	29	28	31	52
COUNTY-OTHER	RUNNELS	COLORADO	WINTERS LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
IRRIGATION	RUNNELS	COLORADO	COLORADO RIVER COMBINED RUN-OF-RIVER IRRIGATION	RUNNELS	COLORADO	771	771	771	771	771	771
IRRIGATION	RUNNELS	COLORADO	DIRECT REUSE	RUNNELS	COLORADO	218	218	218	218	218	218
IRRIGATION	RUNNELS	COLORADO	OTHER AQUIFER	RUNNELS	COLORADO	1,984	1,984	1,984	1,984	1,984	1,984
LIVESTOCK	RUNNELS	COLORADO	LIVESTOCK LOCAL SUPPLY	RUNNELS	COLORADO	1,148	1,148	1,148	1,148	1,148	1,148
LIVESTOCK	RUNNELS	COLORADO	OTHER AQUIFER	RUNNELS	COLORADO	382	382	382	382	382	382
MANUFACTURING	RUNNELS	COLORADO	BALLINGER/MOONEN LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
MANUFACTURING	RUNNELS	COLORADO	WINTERS LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
MILES	RUNNELS	COLORADO	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
MILES	RUNNELS	COLORADO	OTHER AQUIFER	RUNNELS	COLORADO	10	10	10	10	10	10
MILLERSVIEW-DOOLE WSC	RUNNELS	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	35	31	47	43	0	0
MILLERSVIEW-DOOLE WSC	RUNNELS	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	56	56	56	56	56	56
MINING	RUNNELS	COLORADO	OTHER AQUIFER	RUNNELS	COLORADO	44	45	45	45	45	45
WINTERS	RUNNELS	COLORADO	WINTERS LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	SCHLEICHER	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SCHLEICHER	COLORADO	117	108	102	98	95	93
COUNTY-OTHER	SCHLEICHER	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	SCHLEICHER	RIO GRANDE	25	23	22	21	20	20
ELDORADO	SCHLEICHER	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SCHLEICHER	COLORADO	710	710	710	710	710	711
IRRIGATION	SCHLEICHER	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SCHLEICHER	COLORADO	2,286	2,286	2,286	2,286	2,286	2,286

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
IRRIGATION	SCHLEICHER	COLORADO	SAN SABA RIVER RUN-OF-RIVER IRRIGATION	SCHLEICHER	COLORADO	0	0	0	0	0	0
IRRIGATION	SCHLEICHER	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	SCHLEICHER	RIO GRANDE	846	846	846	846	846	846
LIVESTOCK	SCHLEICHER	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SCHLEICHER	COLORADO	500	500	500	500	500	500
LIVESTOCK	SCHLEICHER	COLORADO	LIVESTOCK LOCAL SUPPLY	SCHLEICHER	COLORADO	83	83	83	83	83	83
LIVESTOCK	SCHLEICHER	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	SCHLEICHER	RIO GRANDE	175	175	175	175	175	175
LIVESTOCK	SCHLEICHER	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	SCHLEICHER	RIO GRANDE	29	29	29	29	29	29
MINING	SCHLEICHER	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SCHLEICHER	COLORADO	150	150	150	150	150	154
MINING	SCHLEICHER	COLORADO	SAN SABA RIVER RUN-OF-RIVER MINING	SCHLEICHER	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	SCURRY	BRAZOS	DOCKUM AQUIFER	SCURRY	BRAZOS	273	275	274	270	269	269
COUNTY-OTHER	SCURRY	BRAZOS	OTHER AQUIFER	SCURRY	BRAZOS	43	43	43	43	43	43
COUNTY-OTHER	SCURRY	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	146	134	199	188	180	167
COUNTY-OTHER	SCURRY	COLORADO	DOCKUM AQUIFER	SCURRY	COLORADO	120	124	122	115	114	114
COUNTY-OTHER	SCURRY	COLORADO	OTHER AQUIFER	SCURRY	COLORADO	238	238	238	238	238	238
IRRIGATION	SCURRY	BRAZOS	DOCKUM AQUIFER	SCURRY	BRAZOS	788	762	736	710	684	659
IRRIGATION	SCURRY	COLORADO	DEEP CREEK COMBINED RUN-OF-RIVER IRRIGATION	SCURRY	COLORADO	69	69	69	69	69	69
IRRIGATION	SCURRY	COLORADO	DIRECT REUSE	SCURRY	COLORADO	0	0	0	0	0	0
IRRIGATION	SCURRY	COLORADO	DOCKUM AQUIFER	SCURRY	COLORADO	2,672	2,672	2,672	2,672	2,672	2,672
LIVESTOCK	SCURRY	BRAZOS	DOCKUM AQUIFER	SCURRY	BRAZOS	27	27	27	27	27	27
LIVESTOCK	SCURRY	BRAZOS	LIVESTOCK LOCAL SUPPLY	SCURRY	BRAZOS	198	198	198	198	198	198
LIVESTOCK	SCURRY	BRAZOS	OTHER AQUIFER	SCURRY	BRAZOS	8	8	8	8	8	8
LIVESTOCK	SCURRY	COLORADO	DOCKUM AQUIFER	SCURRY	COLORADO	40	40	40	40	40	40
LIVESTOCK	SCURRY	COLORADO	LIVESTOCK LOCAL SUPPLY	SCURRY	COLORADO	336	336	336	336	336	336
LIVESTOCK	SCURRY	COLORADO	OTHER AQUIFER	SCURRY	COLORADO	20	20	20	20	20	20
MINING	SCURRY	BRAZOS	DOCKUM AQUIFER	SCURRY	BRAZOS	2,921	2,921	2,921	2,921	2,921	2,921
MINING	SCURRY	COLORADO	COLORADO RIVER RUN-OF-RIVER CRMWD DIVERTED WATER	COKE	COLORADO	0	0	0	0	0	0
MINING	SCURRY	COLORADO	DOCKUM AQUIFER	SCURRY	COLORADO	954	954	954	966	989	1,021
MINING	SCURRY	COLORADO	OTHER AQUIFER	SCURRY	COLORADO	5	5	5	5	5	5
SNYDER	SCURRY	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	1,381	1,293	1,935	1,812	1,738	1,617
SNYDER	SCURRY	COLORADO	DOCKUM AQUIFER	SCURRY	COLORADO	900	900	900	900	900	900
COUNTY-OTHER	STERLING	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	STERLING	COLORADO	46	50	51	50	48	49
COUNTY-OTHER	STERLING	COLORADO	OTHER AQUIFER	STERLING	COLORADO	6	6	6	6	6	6
IRRIGATION	STERLING	COLORADO	DIRECT REUSE	STERLING	COLORADO	0	0	0	0	0	0
IRRIGATION	STERLING	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	STERLING	COLORADO	102	102	102	102	102	102
IRRIGATION	STERLING	COLORADO	NORTH CONCHO RIVER COMBINED RUN-OF-RIVER IRRIGATION	STERLING	COLORADO	48	48	48	48	48	48
IRRIGATION	STERLING	COLORADO	OTHER AQUIFER	STERLING	COLORADO	595	595	595	595	595	595
LIVESTOCK	STERLING	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	STERLING	COLORADO	352	352	352	352	352	352
LIVESTOCK	STERLING	COLORADO	LIVESTOCK LOCAL SUPPLY	STERLING	COLORADO	74	74	74	74	74	74
LIVESTOCK	STERLING	COLORADO	OTHER AQUIFER	STERLING	COLORADO	77	77	77	77	77	77
MINING	STERLING	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	STERLING	COLORADO	590	600	605	610	615	620
STERLING CITY	STERLING	COLORADO	OTHER AQUIFER	STERLING	COLORADO	297	321	330	330	319	324
COUNTY-OTHER	SUTTON	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	COLORADO	54	56	56	55	54	54

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
COUNTY-OTHER	SUTTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	RIO GRANDE	223	232	231	226	225	223
IRRIGATION	SUTTON	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	COLORADO	554	554	554	554	554	554
IRRIGATION	SUTTON	COLORADO	N LLANO RIVER COMBINED RUN-OF-RIVER IRRIGATION	SUTTON	COLORADO	8	8	8	8	8	8
IRRIGATION	SUTTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	RIO GRANDE	1,250	1,232	1,232	1,232	1,232	1,232
LIVESTOCK	SUTTON	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	COLORADO	312	312	312	312	312	312
LIVESTOCK	SUTTON	COLORADO	LIVESTOCK LOCAL SUPPLY	SUTTON	COLORADO	46	46	46	46	46	46
LIVESTOCK	SUTTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	RIO GRANDE	381	381	381	381	381	381
LIVESTOCK	SUTTON	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	SUTTON	RIO GRANDE	57	57	57	57	57	57
MINING	SUTTON	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	COLORADO	35	35	36	36	37	37
MINING	SUTTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	RIO GRANDE	45	47	47	48	48	49
SONORA	SUTTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	SUTTON	RIO GRANDE	1,919	1,919	1,919	1,919	1,919	1,919
CONCHO RURAL WSC	TOM GREEN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	TOM GREEN	COLORADO	41	41	41	41	41	41
CONCHO RURAL WSC	TOM GREEN	COLORADO	LIPAN AQUIFER	TOM GREEN	COLORADO	1,062	1,062	1,062	1,062	1,062	1,062
COUNTY-OTHER	TOM GREEN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	TOM GREEN	COLORADO	536	536	536	536	536	536
COUNTY-OTHER	TOM GREEN	COLORADO	LIPAN AQUIFER	TOM GREEN	COLORADO	502	502	502	502	502	502
COUNTY-OTHER	TOM GREEN	COLORADO	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	TOM GREEN	COLORADO	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	TOM GREEN	COLORADO	OTHER AQUIFER	TOM GREEN	COLORADO	682	682	682	682	682	682
COUNTY-OTHER	TOM GREEN	COLORADO	TWIN BUTTES LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
IRRIGATION	TOM GREEN	COLORADO	CONCHO RIVER COMBINED RUN-OF-RIVER IRRIGATION	TOM GREEN	COLORADO	2,812	2,812	2,812	2,812	2,812	2,812
IRRIGATION	TOM GREEN	COLORADO	DIRECT REUSE	TOM GREEN	COLORADO	8,500	8,500	8,500	8,500	8,500	8,500
IRRIGATION	TOM GREEN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	TOM GREEN	COLORADO	520	520	520	520	520	520
IRRIGATION	TOM GREEN	COLORADO	LIPAN AQUIFER	TOM GREEN	COLORADO	35,846	35,846	35,846	35,846	35,846	35,846
IRRIGATION	TOM GREEN	COLORADO	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
IRRIGATION	TOM GREEN	COLORADO	OTHER AQUIFER	TOM GREEN	COLORADO	9,853	9,853	9,853	9,853	9,853	9,853
IRRIGATION	TOM GREEN	COLORADO	TWIN BUTTES LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
LIVESTOCK	TOM GREEN	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	TOM GREEN	COLORADO	273	273	273	273	273	273
LIVESTOCK	TOM GREEN	COLORADO	LIPAN AQUIFER	TOM GREEN	COLORADO	31	31	31	31	31	31
LIVESTOCK	TOM GREEN	COLORADO	LIVESTOCK LOCAL SUPPLY	TOM GREEN	COLORADO	1,644	1,644	1,644	1,644	1,644	1,644
LIVESTOCK	TOM GREEN	COLORADO	OTHER AQUIFER	TOM GREEN	COLORADO	30	30	30	30	30	30
MANUFACTURING	TOM GREEN	COLORADO	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
MANUFACTURING	TOM GREEN	COLORADO	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
MANUFACTURING	TOM GREEN	COLORADO	TWIN BUTTES LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
MILLERSVIEW-DOOLE WSC	TOM GREEN	COLORADO	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	87	88	145	150	0	0
MILLERSVIEW-DOOLE WSC	TOM GREEN	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	244	244	244	244	244	244
MINING	TOM GREEN	COLORADO	LIPAN AQUIFER	TOM GREEN	COLORADO	45	45	45	45	45	45
MINING	TOM GREEN	COLORADO	OTHER AQUIFER	TOM GREEN	COLORADO	105	105	105	105	105	105

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
SAN ANGELO	TOM GREEN	COLORADO	CONCHO RIVER COMBINED RUN-OF-RIVER CITY OF SAN ANGELO	TOM GREEN	COLORADO	642	642	642	642	642	642
SAN ANGELO	TOM GREEN	COLORADO	EV SPENCE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO	TOM GREEN	COLORADO	HICKORY AQUIFER	MCCULLOCH	COLORADO	0	0	0	0	0	0
SAN ANGELO	TOM GREEN	COLORADO	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO	TOM GREEN	COLORADO	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO	TOM GREEN	COLORADO	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	10,974	10,751	10,528	10,304	10,081	9,858
SAN ANGELO	TOM GREEN	COLORADO	TWIN BUTTES LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
STEAM ELECTRIC POWER	TOM GREEN	COLORADO	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
COUNTY-OTHER	UPTON	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	COLORADO	52	54	53	53	54	55
COUNTY-OTHER	UPTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	RIO GRANDE	100	102	102	101	102	104
IRRIGATION	UPTON	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	COLORADO	5,920	5,904	5,900	5,895	5,889	5,882
IRRIGATION	UPTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	RIO GRANDE	199	199	199	199	199	199
LIVESTOCK	UPTON	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	COLORADO	65	65	65	65	65	65
LIVESTOCK	UPTON	COLORADO	LIVESTOCK LOCAL SUPPLY	UPTON	COLORADO	13	13	13	13	13	13
LIVESTOCK	UPTON	RIO GRANDE	DOCKUM AQUIFER	UPTON	RIO GRANDE	20	20	20	20	20	20
LIVESTOCK	UPTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	RIO GRANDE	91	91	91	91	91	91
LIVESTOCK	UPTON	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	UPTON	RIO GRANDE	23	23	23	23	23	23
MCCAMEY	UPTON	RIO GRANDE	DIRECT REUSE	UPTON	RIO GRANDE	0	0	0	0	0	0
MCCAMEY	UPTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	RIO GRANDE	1,071	1,070	1,070	1,071	1,070	1,069
MINING	UPTON	COLORADO	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	COLORADO	2,011	2,025	2,030	2,035	2,040	2,046
MINING	UPTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	RIO GRANDE	651	655	657	659	660	662
RANKIN	UPTON	RIO GRANDE	DIRECT REUSE	UPTON	RIO GRANDE	0	0	0	0	0	0
RANKIN	UPTON	RIO GRANDE	EDWARDS-TRINITY-PLATEAU AQUIFER	UPTON	RIO GRANDE	327	326	326	326	326	325
COUNTY-OTHER	WARD	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	910	514	510	495	490	490
COUNTY-OTHER	WARD	RIO GRANDE	DOCKUM AQUIFER	WARD	RIO GRANDE	15	15	15	15	15	15
IRRIGATION	WARD	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	2,271	2,656	1,738	750	215	64
IRRIGATION	WARD	RIO GRANDE	DIRECT REUSE	WARD	RIO GRANDE	670	670	670	670	670	670
IRRIGATION	WARD	RIO GRANDE	DOCKUM AQUIFER	WARD	RIO GRANDE	316	316	316	316	316	316
IRRIGATION	WARD	RIO GRANDE	RED BLUFF LAKE/RESERVOIR	RESERVOIR	RIO GRANDE	5,009	5,009	5,009	5,009	5,009	5,009
LIVESTOCK	WARD	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	116	116	116	116	116	116
LIVESTOCK	WARD	RIO GRANDE	DOCKUM AQUIFER	WARD	RIO GRANDE	5	5	5	5	5	5
LIVESTOCK	WARD	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	WARD	RIO GRANDE	5	5	5	5	5	5
MANUFACTURING	WARD	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	7	7	7	7	7	7
MINING	WARD	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	153	155	156	157	158	159
MONAHANS	WARD	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	2,182	2,210	2,215	2,193	2,186	2,186
MONAHANS	WARD	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WINKLER	RIO GRANDE	377	382	382	379	378	378
MONAHANS	WARD	RIO GRANDE	DIRECT REUSE	WARD	RIO GRANDE	0	0	0	0	0	0
STEAM ELECTRIC POWER	WARD	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	4,914	4,223	4,937	5,807	6,189	6,189
COUNTY-OTHER	WINKLER	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WINKLER	RIO GRANDE	57	57	57	57	57	57
COUNTY-OTHER	WINKLER	RIO GRANDE	DOCKUM AQUIFER	WINKLER	RIO GRANDE	64	64	64	64	64	64
IRRIGATION	WINKLER	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WINKLER	RIO GRANDE	10,000	10,000	10,000	10,000	10,000	10,000

Region F Water User Group Supply
(Ac-ft per Year)

WUG Name	WUG County	WUG Basin	Source Name	Source County	Source Basin	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060
KERMIT	WINKLER	RIO GRANDE	DOCKUM AQUIFER	WINKLER	RIO GRANDE	3,943	3,943	3,943	3,943	3,943	3,943
LIVESTOCK	WINKLER	COLORADO	DOCKUM AQUIFER	WINKLER	COLORADO	2	2	2	2	2	2
LIVESTOCK	WINKLER	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WINKLER	RIO GRANDE	140	140	140	140	140	140
LIVESTOCK	WINKLER	RIO GRANDE	DOCKUM AQUIFER	WINKLER	RIO GRANDE	20	20	20	20	20	20
LIVESTOCK	WINKLER	RIO GRANDE	LIVESTOCK LOCAL SUPPLY	WINKLER	RIO GRANDE	7	7	7	7	7	7
MINING	WINKLER	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WINKLER	RIO GRANDE	109	109	109	109	109	109
MINING	WINKLER	RIO GRANDE	DOCKUM AQUIFER	WINKLER	RIO GRANDE	1,769	1,769	1,769	1,769	1,769	1,769
WINK	WINKLER	RIO GRANDE	CENOZOIC PECOS ALLUVIUM AQUIFER	WINKLER	RIO GRANDE	657	657	657	657	657	657

Appendix 3B
Currently Available Water Supply by Wholesale Water Provider

Region F Wholesale Water Provider Supplies
(Ac-ft per Year)

WWP Name	WUG ID	WUG Name	WUG County	WUG Basin	DBSOID	Source Name	Source County	Source Basin	WPS2010	WPS2020	WPS2030	WPS2040	WPS2050	WPS2060
BROWN COUNTY WID #1	872	BANGS	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	265	266	262	256	254	254
BROWN COUNTY WID #1	923	COUNTY-OTHER	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	12,703	12,615	12,606	12,640	12,621	12,553
BROWN COUNTY WID #1	3624	BROOKESMITH SUD	MILLS	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	7	8	8	8	8	7
BROWN COUNTY WID #1	3222	BROOKESMITH SUD	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	1,413	1,412	1,413	1,413	1,413	1,414
BROWN COUNTY WID #1	3223	BROOKESMITH SUD	COLEMAN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	13	13	12	12	12	12
BROWN COUNTY WID #1	964	MANUFACTURING	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	577	636	686	734	775	837
BROWN COUNTY WID #1	923	COUNTY-OTHER	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	385	385	379	370	367	367
BROWN COUNTY WID #1	878	BROWNWOOD	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	3,896	3,927	3,889	3,816	3,792	3,792
BROWN COUNTY WID #1	909	SANTA ANNA	COLEMAN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	307	307	307	307	307	307
BROWN COUNTY WID #1	3226	COLEMAN COUNTY WSC	RUNNELS	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	18	30	39	48	56	66
BROWN COUNTY WID #1	3224	COLEMAN COUNTY WSC	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	19	19	19	18	18	18
BROWN COUNTY WID #1	3225	COLEMAN COUNTY WSC	COLEMAN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	1,295	1,280	1,278	1,276	1,275	1,271
BROWN COUNTY WID #1	883	EARLY	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	1,228	1,228	1,228	1,228	1,228	1,228
BROWN COUNTY WID #1	1028	IRRIGATION	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	6,970	6,970	6,970	6,970	6,970	6,970
BROWN COUNTY WID #1	3237	ZEPHYR WSC	BROWN	COLORADO	332	BROWNWOOD LAKE/RESERVOIR	RESERVOIR	COLORADO	616	616	616	616	616	616
COLORADO RIVER MWD	1106	ABILENE	JONES	BRAZOS	3760	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	547	535	523	512	501	490
COLORADO RIVER MWD	1107	ABILENE	TAYLOR	BRAZOS	3760	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	10,427	10,216	10,005	9,792	9,580	9,368
COLORADO RIVER MWD	875	BIG SPRING	HOWARD	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	3,636	3,370	4,976	4,611	4,389	4,084
COLORADO RIVER MWD	875	BIG SPRING	HOWARD	COLORADO	1233	OGALLALA AQUIFER	MARTIN	COLORADO	1,035	1,035	1,035	1,035	1,035	1,035
COLORADO RIVER MWD	870	BALLINGER	RUNNELS	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	257	244	373	357	0	0
COLORADO RIVER MWD	879	COAHOMA	HOWARD	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	134	124	182	169	159	148
COLORADO RIVER MWD	924	COUNTY-OTHER	COKE	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	77	65	95	86	82	76
COLORADO RIVER MWD	941	COUNTY-OTHER	MIDLAND	COLORADO	3760	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	21	21	21	21	21	21
COLORADO RIVER MWD	959	COUNTY-OTHER	WARD	RIO GRANDE	1288	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	400	0	0	0	0	0
COLORADO RIVER MWD	952	COUNTY-OTHER	SCURRY	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	146	134	199	188	180	167
COLORADO RIVER MWD	933	COUNTY-OTHER	HOWARD	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	0	2	158	150	140	120
COLORADO RIVER MWD	3229	ECTOR COUNTY UD	ECTOR	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	1,080	1,234	2,166	2,322	2,434	2,454
COLORADO RIVER MWD	969	MANUFACTURING	HOWARD	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	722	703	1,094	1,090	1,103	1,130
COLORADO RIVER MWD	973	MANUFACTURING	MIDLAND	COLORADO	3760	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	28	31	34	37	39	42
COLORADO RIVER MWD	967	MANUFACTURING	ECTOR	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	877	797	1,199	902	871	813
COLORADO RIVER MWD	899	MIDLAND	MIDLAND	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	12,136	12,202	0	0	0	0

Region F Wholesale Water Provider Supplies
(Ac-ft per Year)

WWP Name	WUG ID	WUG Name	WUG County	WUG Basin	DBSOID	Source Name	Source County	Source Basin	WPS2010	WPS2020	WPS2030	WPS2040	WPS2050	WPS2060
COLORADO RIVER MWD	899	MIDLAND	MIDLAND	COLORADO	3760	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	10,925	10,699	10,473	10,246	10,021	9,795
COLORADO RIVER MWD	3231	MILLERSVIEW-DOOLE WSC	CONCHO	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	46	43	62	56	0	0
COLORADO RIVER MWD	3232	MILLERSVIEW-DOOLE WSC	MCCULLOCH	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	91	82	119	108	0	0
COLORADO RIVER MWD	3233	MILLERSVIEW-DOOLE WSC	RUNNELS	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	35	31	47	43	0	0
COLORADO RIVER MWD	3234	MILLERSVIEW-DOOLE WSC	TOM GREEN	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	87	88	145	150	0	0
COLORADO RIVER MWD	994	MINING	COKE	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	232	239	378	378	380	372
COLORADO RIVER MWD	1001	MINING	HOWARD	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	1,076	1,053	1,608	1,555	1,523	1,460
COLORADO RIVER MWD	902	ODESSA	ECTOR	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	11,176	10,757	16,708	16,793	17,092	17,006
COLORADO RIVER MWD	903	ODESSA	MIDLAND	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	233	310	559	596	618	621
COLORADO RIVER MWD	902	ODESSA	ECTOR	COLORADO	1215	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	440	440	440	440	440	440
COLORADO RIVER MWD	902	ODESSA	ECTOR	COLORADO	1288	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	4,800	0	0	0	0	0
COLORADO RIVER MWD	907	ROBERT LEE	COKE	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	256	231	340	317	302	281
COLORADO RIVER MWD	1221	ROTAN	FISHER	BRAZOS	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	278	271	249	231	222	203
COLORADO RIVER MWD	908	SAN ANGELO	TOM GREEN	COLORADO	3760	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	10,974	10,751	10,528	10,304	10,081	9,858
COLORADO RIVER MWD	908	SAN ANGELO	TOM GREEN	COLORADO	3761	EV SPENCE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	34	34	34	34	34	34
COLORADO RIVER MWD	910	SNYDER	SCURRY	COLORADO	1250	DOCKUM AQUIFER	SCURRY	COLORADO	900	900	900	900	900	900
COLORADO RIVER MWD	910	SNYDER	SCURRY	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	1,379	1,293	1,935	1,812	1,738	1,617
COLORADO RIVER MWD	912	STANTON	MARTIN	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
GREAT PLAINS WATER SYSTEM INC	930	COUNTY-OTHER	ECTOR	COLORADO	1812	OGALLALA AQUIFER	GAINES	COLORADO	64	64	64	64	64	64
GREAT PLAINS WATER SYSTEM INC	983	STEAM ELECTRIC POWER	ECTOR	COLORADO	1199	OGALLALA AQUIFER	ANDREWS	COLORADO	5,156	5,156	5,156	5,156	5,156	5,156
ODESSA CITY OF	902	ODESSA	ECTOR	COLORADO	1288	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	4,708	0	0	0	0	0
ODESSA CITY OF	902	ODESSA	ECTOR	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	11,176	10,757	16,708	16,793	17,092	17,006
ODESSA CITY OF	902	ODESSA	ECTOR	COLORADO	1861	DIRECT REUSE	ECTOR	COLORADO	1,500	1,500	1,500	1,500	1,500	1,500
ODESSA CITY OF	902	ODESSA	ECTOR	COLORADO	1215	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	432	428	426	425	425	425
ODESSA CITY OF	903	ODESSA	MIDLAND	COLORADO	1288	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	92	0	0	0	0	0
ODESSA CITY OF	903	ODESSA	MIDLAND	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	233	310	559	596	618	621
ODESSA CITY OF	903	ODESSA	MIDLAND	COLORADO	1215	EDWARDS-TRINITY-PLATEAU AQUIFER	ECTOR	COLORADO	8	12	14	15	15	15
ODESSA CITY OF	3229	ECTOR COUNTY UD	ECTOR	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	1,080	1,234	2,166	2,322	2,434	2,454
ODESSA CITY OF	967	MANUFACTURING	ECTOR	COLORADO	326	COLORADO RIVER MWD LAKE/RESERVOIR SYSTEM	RESERVOIR	COLORADO	877	797	1,199	902	871	813
ODESSA CITY OF	967	MANUFACTURING	ECTOR	COLORADO	1861	DIRECT REUSE	ECTOR	COLORADO	1,500	1,650	1,800	1,950	2,100	2,250
SAN ANGELO CITY OF	987	STEAM ELECTRIC POWER	TOM GREEN	COLORADO	339	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	908	SAN ANGELO	TOM GREEN	COLORADO	1904	CONCHO RIVER COMBINED RUN-OF-RIVER CITY OF SAN ANGELO	TOM GREEN	COLORADO	642	642	642	642	642	642

Region F Wholesale Water Provider Supplies
(Ac-ft per Year)

WWP Name	WUG ID	WUG Name	WUG County	WUG Basin	DBSOID	Source Name	Source County	Source Basin	WPS2010	WPS2020	WPS2030	WPS2040	WPS2050	WPS2060
SAN ANGELO CITY OF	908	SAN ANGELO	TOM GREEN	COLORADO	3761	EV SPENCE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	908	SAN ANGELO	TOM GREEN	COLORADO	1231	HICKORY AQUIFER	MCCULLOCH	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	908	SAN ANGELO	TOM GREEN	COLORADO	339	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	908	SAN ANGELO	TOM GREEN	COLORADO	336	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	908	SAN ANGELO	TOM GREEN	COLORADO	3760	OH IVIE LAKE/RESERVOIR NON-SYSTEM PORTION	RESERVOIR	COLORADO	10,974	10,751	10,528	10,304	10,081	9,858
SAN ANGELO CITY OF	978	MANUFACTURING	TOM GREEN	COLORADO	339	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	900	MILES	RUNNELS	COLORADO	336	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	956	COUNTY-OTHER	TOM GREEN	COLORADO	339	NASWORTHY LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	956	COUNTY-OTHER	TOM GREEN	COLORADO	336	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	956	COUNTY-OTHER	TOM GREEN	COLORADO	333	TWIN BUTTES LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
SAN ANGELO CITY OF	1058	IRRIGATION	TOM GREEN	COLORADO	1871	DIRECT REUSE	TOM GREEN	COLORADO	8,500	8,500	8,500	8,500	8,500	8,500
SAN ANGELO CITY OF	1058	IRRIGATION	TOM GREEN	COLORADO	333	TWIN BUTTES LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
UNIVERSITY LANDS	869	ANDREWS	ANDREWS	COLORADO	1199	OGALLALA AQUIFER	ANDREWS	COLORADO	671	708	730	0	0	0
UNIVERSITY LANDS	959	COUNTY-OTHER	WARD	RIO GRANDE	1288	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	400	0	0	0	0	0
UNIVERSITY LANDS	902	ODESSA	ECTOR	COLORADO	1288	CENOZOIC PECOS ALLUVIUM AQUIFER	WARD	RIO GRANDE	4,800	0	0	0	0	0
UNIVERSITY LANDS	899	MIDLAND	MIDLAND	COLORADO	1199	OGALLALA AQUIFER	ANDREWS	COLORADO	1,237	1,237	1,237	0	0	0
UNIVERSITY LANDS	899	MIDLAND	MIDLAND	COLORADO	1233	OGALLALA AQUIFER	MARTIN	COLORADO	3,485	3,485	3,485	0	0	0
UPPER COLORADO RIVER AUTHORITY	900	MILES	RUNNELS	COLORADO	336	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0
UPPER COLORADO RIVER AUTHORITY	907	ROBERT LEE	COKE	COLORADO	331	MOUNTAIN CREEK LAKE/RESERVOIR	RESERVOIR	COLORADO	0	0	0	0	0	0
UPPER COLORADO RIVER AUTHORITY	908	SAN ANGELO	TOM GREEN	COLORADO	336	OC FISHER LAKE/RESERVOIR SAN ANGELO SYSTEM	RESERVOIR	COLORADO	0	0	0	0	0	0

Appendix 4A
Comparison of Supply and Demand

				WUG Demand						WUG Supply						Surplus/Shortage					
WUG Name	**WUG County**	**WUG Basin**	**Type**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
ANDREWS	ANDREWS	COLORADO	MUN	3,087	3,263	3,371	3,467	3,515	3,585	3,087	3,263	3,371	2,717	2,755	2,812	0	0	0	-750	-760	-773
COUNTY-OTHER	ANDREWS	COLORADO	MUN	531	551	559	566	570	580	531	551	559	566	570	580	0	0	0	0	0	0
COUNTY-OTHER	ANDREWS	RIO GRANDE	MUN	7	7	7	8	8	8	7	7	7	8	8	8	0	0	0	0	0	0
IRRIGATION	ANDREWS	COLORADO	IRR	32,608	32,334	32,062	31,788	31,516	31,245	19,733	19,489	19,355	20,471	20,402	20,299	-12,875	-12,845	-12,707	-11,317	-11,114	-10,946
LIVESTOCK	ANDREWS	COLORADO	STK	360	360	360	360	360	360	360	360	360	360	360	360	0	0	0	0	0	0
LIVESTOCK	ANDREWS	RIO GRANDE	STK	78	78	78	78	78	78	78	78	78	78	78	78	0	0	0	0	0	0
MINING	ANDREWS	COLORADO	MIN	1,845	1,893	1,911	1,929	1,946	1,969	1,845	1,893	1,911	1,929	1,946	1,969	0	0	0	0	0	0
MINING	ANDREWS	RIO GRANDE	MIN	63	64	65	65	66	67	120	120	120	120	120	120	57	56	55	55	54	53
COUNTY-OTHER	BORDEN	BRAZOS	MUN	14	14	14	12	11	10	14	14	14	12	11	10	0	0	0	0	0	0
COUNTY-OTHER	BORDEN	COLORADO	MUN	161	165	155	136	125	113	164	165	164	164	164	164	3	0	9	28	39	51
IRRIGATION	BORDEN	BRAZOS	IRR	1,103	1,102	1,100	1,099	1,097	1,096	84	84	84	86	87	88	-1,019	-1,018	-1,016	-1,013	-1,010	-1,008
IRRIGATION	BORDEN	COLORADO	IRR	1,587	1,585	1,582	1,581	1,578	1,577	759	759	759	759	759	759	-828	-826	-823	-822	-819	-818
LIVESTOCK	BORDEN	BRAZOS	STK	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0	0
LIVESTOCK	BORDEN	COLORADO	STK	271	271	271	271	271	271	271	271	271	271	271	271	0	0	0	0	0	0
MINING	BORDEN	COLORADO	MIN	690	658	646	635	625	612	1,014	1,014	1,014	1,014	1,014	1,014	324	356	368	379	389	402
BANGS	BROWN	COLORADO	MUN	265	266	262	256	254	254	265	266	262	256	254	254	0	0	0	0	0	0
BROOKESMITH SUD	BROWN	COLORADO	MUN	1,374	1,391	1,384	1,357	1,348	1,348	1,413	1,412	1,413	1,413	1,413	1,414	39	21	29	56	65	66
BROWNWOOD	BROWN	COLORADO	MUN	3,896	3,927	3,889	3,816	3,792	3,792	3,896	3,927	3,889	3,816	3,792	3,792	0	0	0	0	0	0
COLEMAN COUNTY WSC	BROWN	COLORADO	MUN	19	19	19	18	18	18	19	19	19	18	18	18	0	0	0	0	0	0
COUNTY-OTHER	BROWN	BRAZOS	MUN	12	12	12	12	12	12	12	12	12	12	12	12	0	0	0	0	0	0
COUNTY-OTHER	BROWN	COLORADO	MUN	342	342	336	327	324	324	394	394	388	379	376	376	52	52	52	52	52	52
EARLY	BROWN	COLORADO	MUN	799	812	810	801	797	797	1,228	1,228	1,228	1,228	1,228	1,228	429	416	418	427	431	431
IRRIGATION	BROWN	COLORADO	IRR	12,313	12,272	12,230	12,189	12,146	12,105	9,307	9,290	9,284	9,284	9,278	9,264	-3,006	-2,982	-2,946	-2,905	-2,868	-2,841
LIVESTOCK	BROWN	BRAZOS	STK	32	32	32	32	32	32	32	32	32	32	32	32	0	0	0	0	0	0
LIVESTOCK	BROWN	COLORADO	STK	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604	0	0	0	0	0	0
MANUFACTURING	BROWN	COLORADO	MFG	577	636	686	734	775	837	577	636	686	734	775	837	0	0	0	0	0	0
MINING	BROWN	BRAZOS	MIN	41	42	42	42	42	42	41	42	42	42	42	42	0	0	0	0	0	0
MINING	BROWN	COLORADO	MIN	2,446	2,462	2,468	2,474	2,480	2,488	2,446	2,462	2,468	2,474	2,480	2,488	0	0	0	0	0	0
ZEPHYR WSC	BROWN	COLORADO	MUN	399	404	399	391	387	387	516	516	516	516	516	516	117	112	117	125	129	129
BRONTE VILLAGE	COKE	COLORADO	MUN	245	258	254	250	249	249	250	238	226	215	204	194	5	-20	-28	-35	-45	-55
COUNTY-OTHER	COKE	COLORADO	MUN	175	162	159	154	152	152	147	130	159	148	143	137	-28	-32	0	-6	-9	-15
IRRIGATION	COKE	COLORADO	IRR	936	936	934	933	933	933	573	573	573	573	573	573	-363	-363	-361	-360	-360	-360
LIVESTOCK	COKE	COLORADO	STK	593	593	593	593	593	593	593	593	593	593	593	593	0	0	0	0	0	0
MINING	COKE	COLORADO	MIN	488	528	550	572	593	614	402	409	548	548	550	542	-86	-119	-2	-24	-43	-72
ROBERT LEE	COKE	COLORADO	MUN	351	346	342	338	336	336	263	238	347	324	309	288	-88	-108	5	-14	-27	-48
STEAM ELECTRIC POWER	COKE	COLORADO	SEP	310	247	289	339	401	477	0	0	0	0	0	0	-310	-247	-289	-339	-401	-477
BROOKESMITH SUD	COLEMAN	COLORADO	MUN	13	13	12	12	12	12	13	13	12	12	12	12	0	0	0	0	0	0
COLEMAN	COLEMAN	COLORADO	MUN	1,285	1,269	1,252	1,235	1,223	1,223	0	0	0	0	0	0	-1,285	-1,269	-1,252	-1,235	-1,223	-1,223
COLEMAN COUNTY WSC	COLEMAN	COLORADO	MUN	357	348	339	329	326	326	1,295	1,280	1,278	1,276	1,275	1,271	938	932	939	947	949	945
COUNTY-OTHER	COLEMAN	COLORADO	MUN	19	19	18	18	18	18	0	0	0	0	0	0	-19	-19	-18	-18	-18	-18
IRRIGATION	COLEMAN	COLORADO	IRR	1,379	1,379	1,379	1,379	1,379	1,379	31	31	31	31	31	31	-1,348	-1,348	-1,348	-1,348	-1,348	-1,348
LIVESTOCK	COLEMAN	COLORADO	STK	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259	1,259	0	0	0	0	0	0
MANUFACTURING	COLEMAN	COLORADO	MFG	6	6	6	6	6	6	0	0	0	0	0	0	-6	-6	-6	-6	-6	-6
MINING	COLEMAN	COLORADO	MIN	18	19	19	19	19	19	1	1	1	1	1	1	-17	-18	-18	-18	-18	-18
SANTA ANNA	COLEMAN	COLORADO	MUN	200	197	193	190	187	187	207	207	207	207	207	207	7	10	14	17	20	20
COUNTY-OTHER	CONCHO	COLORADO	MUN	188	193	191	189	188	188	219	221	221	221	221	221	31	28	30	32	33	33
EDEN	CONCHO	COLORADO	MUN	559	572	569	562	559	559	654	792	792	792	792	792	95	220	223	230	233	233
IRRIGATION	CONCHO	COLORADO	IRR	4,297	4,280	4,262	4,245	4,229	4,213	5,265	5,265	5,265	5,265	5,265	5,265	968	985	1,003	1,020	1,036	1,052
LIVESTOCK	CONCHO	COLORADO	STK	775	775	775	775	775	775	775	775	775	775	775	775	0	0	0	0	0	0
MILLERSVIEW-DOOLE WSC	CONCHO	COLORADO	MUN	126	127	124	119	118	118	122	119	138	132	76	76	-4	-8	14	13	-42	-42
COUNTY-OTHER	CRANE	RIO GRANDE	MUN	316	387	425	452	484	518	316	387	425	452	484	518	0	0	0	0	0	0
CRANE	CRANE	RIO GRANDE	MUN	940	1,002	1,028	1,045	1,072	1,105	940	1,002	1,028	1,045	1,072	1,105	0	0	0	0	0	0
IRRIGATION	CRANE	RIO GRANDE	IRR	337	337	337	337	337	337	337	337	337	337	337	337	0	0	0	0	0	0
LIVESTOCK	CRANE	RIO GRANDE	STK	155	155	155	155	155	155	155	155	155	155	155	155	0	0	0	0	0	0
MINING	CRANE	RIO GRANDE	MIN	2,221	2,216	2,214	2,212	2,210	2,208	2,221	2,216	2,214	2,212	2,210	2,208	0	0	0	0	0	0
COUNTY-OTHER	CROCKETT	RIO GRANDE	MUN	43	41	40	38	37	36	43	41	40	38	37	36	0	0	0	0	0	0
CROCKETT COUNTY WCID #1	CROCKETT	RIO GRANDE	MUN	1,664	1,790	1,825	1,832	1,872	1,913	2,503	2,503	2,503	2,503	2,503	2,503	839	713	678	671	631	590
IRRIGATION	CROCKETT	RIO GRANDE	IRR	525	518	508	498	492	482	535	535	535	535	535	535	10	17	27	37	43	53
LIVESTOCK	CROCKETT	COLORADO	STK	30	30	30	30	30	30	30	30	30	30	30	30	0	0	0	0	0	0
LIVESTOCK	CROCKETT	RIO GRANDE	STK	967	967	967	967	967	967	967	967	967	967	967	967	0	0	0	0	0	0
MINING	CROCKETT	RIO GRANDE	MIN	402	421	431	441	450	459	402	421	431	441	450	459	0	0	0	0	0	0
STEAM ELECTRIC POWER	CROCKETT	RIO GRANDE	SEP	973	776	907	1,067	1,262	1,500	1,500	1,500	1,500	1,500	1,500	1,500	527	724	593	433	238	0

				WUG Demand						WUG Supply						Surplus/Shortage					
WUG Name	WUG County	WUG Basin	Type	2010	2020	2030	2040	2050	2060	2010	2020	2030	2040	2050	2060	2010	2020	2030	2040	2050	2060
COUNTY-OTHER	ECTOR	COLORADO	MUN	5,542	6,513	7,266	7,738	7,928	8,007	5,542	6,513	7,266	7,738	7,928	8,007	0	0	0	0	0	0
COUNTY-OTHER	ECTOR	RIO GRANDE	MUN	178	190	202	211	219	227	178	190	202	211	219	227	0	0	0	0	0	0
ECTOR COUNTY UD	ECTOR	COLORADO	MUN	1,480	1,847	2,177	2,473	2,706	2,932	1,080	1,234	2,166	2,322	2,434	2,454	-400	-613	-11	-151	-272	-478
IRRIGATION	ECTOR	COLORADO	IRR	5,477	5,412	5,348	5,281	5,219	5,152	5,477	5,412	5,348	5,281	5,219	5,152	0	0	0	0	0	0
IRRIGATION	ECTOR	RIO GRANDE	IRR	56	54	54	54	52	52	56	54	54	54	52	52	0	0	0	0	0	0
LIVESTOCK	ECTOR	COLORADO	STK	198	198	198	198	198	198	198	198	198	198	198	198	0	0	0	0	0	0
LIVESTOCK	ECTOR	RIO GRANDE	STK	95	95	95	95	95	95	95	95	95	95	95	95	0	0	0	0	0	0
MANUFACTURING	ECTOR	COLORADO	MFG	2,743	2,946	3,107	3,248	3,357	3,471	2,377	2,447	2,999	2,852	2,971	3,063	-366	-499	-108	-396	-386	-408
MANUFACTURING	ECTOR	RIO GRANDE	MFG	16	17	18	19	19	20	16	17	18	19	19	20	0	0	0	0	0	0
MINING	ECTOR	COLORADO	MIN	9,702	10,321	10,706	11,080	11,447	11,745	9,702	10,321	10,706	11,080	11,447	11,745	0	0	0	0	0	0
MINING	ECTOR	RIO GRANDE	MIN	186	198	205	212	219	225	372	372	372	372	372	372	186	174	167	160	153	147
ODESSA	ECTOR	COLORADO	MUN	21,508	22,084	22,626	23,335	24,355	25,559	17,816	12,685	18,634	18,718	19,017	18,931	-3,692	-9,399	-3,992	-4,617	-5,338	-6,628
STEAM ELECTRIC POWER	ECTOR	COLORADO	SEP	6,375	9,125	10,668	12,549	14,842	17,637	5,156	5,156	5,156	5,156	5,156	5,156	-1,219	-3,969	-5,512	-7,393	-9,686	-12,481
COUNTY-OTHER	GLASSCOCK	COLORADO	MUN	181	196	203	200	197	201	181	196	203	200	197	201	0	0	0	0	0	0
IRRIGATION	GLASSCOCK	COLORADO	IRR	52,272	51,854	51,438	51,021	50,603	50,190	24,488	24,473	24,466	24,469	24,472	24,468	-27,784	-27,381	-26,972	-26,552	-26,131	-25,722
LIVESTOCK	GLASSCOCK	COLORADO	STK	232	232	232	232	232	232	232	232	232	232	232	232	0	0	0	0	0	0
MINING	GLASSCOCK	COLORADO	MIN	5	5	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0
BIG SPRING	HOWARD	COLORADO	MUN	6,016	6,077	6,035	5,945	5,915	5,915	4,671	4,405	6,011	5,646	5,424	5,119	-1,345	-1,672	-24	-299	-491	-796
COAHOMA	HOWARD	COLORADO	MUN	183	185	183	180	177	177	134	124	182	169	159	148	-49	-61	-1	-11	-18	-29
COUNTY-OTHER	HOWARD	COLORADO	MUN	1,109	1,110	1,092	1,065	1,048	1,048	1,153	1,153	1,153	1,153	1,153	1,153	44	43	61	88	105	105
IRRIGATION	HOWARD	COLORADO	IRR	4,799	4,744	4,690	4,635	4,581	4,527	4,862	4,862	4,862	4,862	4,862	4,862	63	118	172	227	281	335
LIVESTOCK	HOWARD	COLORADO	STK	366	366	366	366	366	366	366	366	366	366	366	366	0	0	0	0	0	0
MANUFACTURING	HOWARD	COLORADO	MFG	1,648	1,753	1,832	1,910	1,976	2,099	1,471	1,452	1,843	1,839	1,852	1,879	-177	-301	11	-71	-124	-220
MINING	HOWARD	COLORADO	MIN	1,783	1,883	1,924	1,963	2,001	2,052	1,383	1,360	1,915	1,862	1,830	1,767	-400	-523	-9	-101	-171	-285
COUNTY-OTHER	IRION	COLORADO	MUN	109	109	103	94	87	83	109	109	103	94	87	83	0	0	0	0	0	0
IRRIGATION	IRION	COLORADO	IRR	2,803	2,742	2,682	2,621	2,561	2,501	1,501	1,501	1,501	1,501	1,501	1,501	-1,302	-1,241	-1,181	-1,120	-1,060	-1,000
LIVESTOCK	IRION	COLORADO	STK	460	460	460	460	460	460	460	460	460	460	460	460	0	0	0	0	0	0
MERTZON	IRION	COLORADO	MUN	129	130	124	114	107	102	139	139	139	139	139	139	10	9	15	25	32	37
MINING	IRION	COLORADO	MIN	122	122	122	122	122	122	122	122	122	122	122	122	0	0	0	0	0	0
COUNTY-OTHER	KIMBLE	COLORADO	MUN	212	207	203	196	194	194	203	200	200	200	200	200	-9	-7	-3	4	6	6
IRRIGATION	KIMBLE	COLORADO	IRR	985	948	913	877	841	807	1,771	1,771	1,771	1,771	1,771	1,771	786	823	858	894	930	964
JUNCTION	KIMBLE	COLORADO	MUN	936	935	926	917	910	910	0	0	0	0	0	0	-936	-935	-926	-917	-910	-910
LIVESTOCK	KIMBLE	COLORADO	STK	668	668	668	668	668	668	668	668	668	668	668	668	0	0	0	0	0	0
MANUFACTURING	KIMBLE	COLORADO	MFG	702	767	823	880	932	1,002	3	3	3	3	3	3	-699	-764	-820	-877	-929	-999
MINING	KIMBLE	COLORADO	MIN	71	67	65	63	61	60	104	104	104	104	104	104	33	37	39	41	43	44
COUNTY-OTHER	LOVING	RIO GRANDE	MUN	11	11	10	10	10	10	11	11	10	10	10	10	0	0	0	0	0	0
IRRIGATION	LOVING	RIO GRANDE	IRR	581	580	576	575	573	572	583	583	583	583	583	583	2	3	7	8	10	11
LIVESTOCK	LOVING	RIO GRANDE	STK	70	70	70	70	70	70	70	70	70	70	70	70	0	0	0	0	0	0
MINING	LOVING	RIO GRANDE	MIN	2	2	2	2	2	2	3	3	3	3	3	3	1	1	1	1	1	1
COUNTY-OTHER	MARTIN	COLORADO	MUN	377	403	411	412	399	378	377	403	411	412	399	378	0	0	0	0	0	0
IRRIGATION	MARTIN	COLORADO	IRR	14,324	14,073	13,822	13,571	13,321	13,075	13,536	13,509	13,500	13,571	13,321	13,075	-788	-564	-322	0	0	0
LIVESTOCK	MARTIN	COLORADO	STK	273	273	273	273	273	273	273	273	273	273	273	273	0	0	0	0	0	0
MANUFACTURING	MARTIN	COLORADO	MFG	39	41	42	43	44	47	39	41	42	43	44	47	0	0	0	0	0	0
MINING	MARTIN	COLORADO	MIN	674	645	634	624	615	603	705	705	705	705	705	705	31	60	71	81	90	102
STANTON	MARTIN	COLORADO	MUN	411	440	447	448	433	411	19	18	18	18	18	18	-392	-422	-429	-430	-415	-393
COUNTY-OTHER	MASON	COLORADO	MUN	190	187	183	178	176	177	190	190	190	190	190	190	0	3	7	12	14	13
IRRIGATION	MASON	COLORADO	IRR	10,079	9,936	9,792	9,648	9,505	9,363	16,099	16,099	16,099	16,099	16,099	16,099	6,020	6,163	6,307	6,451	6,594	6,736
LIVESTOCK	MASON	COLORADO	STK	1,036	1,036	1,036	1,036	1,036	1,036	1,036	1,036	1,036	1,036	1,036	1,036	0	0	0	0	0	0
MASON	MASON	COLORADO	MUN	742	739	733	727	722	723	766	765	766	766	766	766	24	26	33	39	44	43
MINING	MASON	COLORADO	MIN	6	6	6	6	6	6	6	6	6	6	6	6	0	0	0	0	0	0
BRADY	MCCULLOCH	COLORADO	MUN	1,879	1,893	1,874	1,854	1,842	1,842	884	884	884	884	884	884	-995	-1,009	-990	-970	-958	-958
COUNTY-OTHER	MCCULLOCH	COLORADO	MUN	12	12	12	12	12	12	12	12	12	12	12	12	0	0	0	0	0	0
IRRIGATION	MCCULLOCH	COLORADO	IRR	2,824	2,789	2,754	2,718	2,683	2,649	6,103	6,103	6,103	6,103	6,103	6,103	3,279	3,314	3,349	3,385	3,420	3,454
LIVESTOCK	MCCULLOCH	COLORADO	STK	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	0	0	0	0	0	0
MANUFACTURING	MCCULLOCH	COLORADO	MFG	844	929	1,004	1,075	1,137	1,233	844	929	1,004	1,075	1,137	1,233	0	0	0	0	0	0
MILLERSVIEW-DOOLE WSC	MCCULLOCH	COLORADO	MUN	248	245	239	230	228	228	239	230	267	256	148	148	-9	-15	28	26	-80	-80
MINING	MCCULLOCH	COLORADO	MIN	154	159	162	165	168	171	154	159	162	165	168	171	0	0	0	0	0	0
RICHLAND SUD	MCCULLOCH	COLORADO	MUN	113	113	111	109	108	108	186	186	186	186	186	186	73	73	75	77	78	78
COUNTY-OTHER	MENARD	COLORADO	MUN	104	102	99	97	96	96	84	81	80	80	80	80	-20	-21	-19	-17	-16	-16
IRRIGATION	MENARD	COLORADO	IRR	6,061	6,041	6,022	6,003	5,981	5,962	3,620	3,620	3,620	3,620	3,620	3,620	-2,441	-2,421	-2,402	-2,383	-2,361	-2,342
LIVESTOCK	MENARD	COLORADO	STK	642	642	642	642	642	642	642	642	642	642	642	642	0	0	0	0	0	0
MENARD	MENARD	COLORADO	MUN	354	353	347	341	339	339	304	304	304	304	304	304	-50	-49	-43	-37	-35	-35

				WUG Demand						WUG Supply						Surplus/Shortage					
WUG Name	**WUG County**	**WUG Basin**	**Type**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
COUNTY-OTHER	MIDLAND	COLORADO	MUN	3,210	3,543	3,773	3,920	4,019	4,143	3,210	3,543	3,773	3,920	4,019	4,143	0	0	0	0	0	0
IRRIGATION	MIDLAND	COLORADO	IRR	41,493	41,170	40,848	40,526	40,203	39,884	25,260	24,811	24,500	24,272	24,091	23,891	-16,233	-16,359	-16,348	-16,254	-16,112	-15,993
LIVESTOCK	MIDLAND	COLORADO	STK	904	904	904	904	904	904	904	904	904	904	904	904	0	0	0	0	0	0
MANUFACTURING	MIDLAND	COLORADO	MFG	164	182	198	213	226	245	164	182	198	213	226	245	0	0	0	0	0	0
MIDLAND	MIDLAND	COLORADO	MUN	28,939	30,056	30,804	31,246	31,631	32,112	27,783	27,593	15,195	10,246	10,021	9,795	-1,156	-2,463	-15,609	-21,000	-21,610	-22,317
MINING	MIDLAND	COLORADO	MIN	677	778	846	915	986	1,046	677	778	846	915	986	1,046	0	0	0	0	0	0
ODESSA	MIDLAND	COLORADO	MUN	419	603	724	810	867	925	333	322	573	611	633	636	-86	-281	-151	-199	-234	-289
COLORADO CITY	MITCHELL	COLORADO	MUN	997	980	949	914	879	826	997	999	1,001	1,004	1,008	1,013	0	19	52	90	129	187
COUNTY-OTHER	MITCHELL	COLORADO	MUN	621	609	593	570	549	516	621	609	593	570	549	516	0	0	0	0	0	0
IRRIGATION	MITCHELL	COLORADO	IRR	5,534	5,507	5,479	5,452	5,425	5,398	5,564	5,564	5,564	5,564	5,564	5,564	30	57	85	112	139	166
LIVESTOCK	MITCHELL	COLORADO	STK	449	449	449	449	449	449	449	449	449	449	449	449	0	0	0	0	0	0
LORAINE	MITCHELL	COLORADO	MUN	85	82	79	75	71	67	110	110	110	110	110	110	25	28	31	35	39	43
MINING	MITCHELL	COLORADO	MIN	115	110	108	107	106	104	141	141	141	141	141	141	26	31	33	34	35	37
STEAM ELECTRIC POWER	MITCHELL	COLORADO	SEP	5,023	4,847	4,670	4,493	4,317	4,140	0	0	0	0	0	0	-5,023	-4,847	-4,670	-4,493	-4,317	-4,140
COUNTY-OTHER	PECOS	RIO GRANDE	MUN	702	722	731	730	726	712	702	722	731	730	726	712	0	0	0	0	0	0
FORT STOCKTON	PECOS	RIO GRANDE	MUN	3,267	3,397	3,461	3,481	3,479	3,411	5,913	5,913	5,913	5,913	5,913	5,913	2,646	2,516	2,452	2,432	2,434	2,502
IRAAN	PECOS	RIO GRANDE	MUN	452	469	478	480	479	470	567	567	567	567	567	567	115	98	89	87	88	97
IRRIGATION	PECOS	RIO GRANDE	IRR	79,681	78,436	77,191	75,945	74,700	73,475	82,583	82,583	82,583	82,583	82,583	82,583	2,902	4,147	5,392	6,638	7,883	9,108
LIVESTOCK	PECOS	RIO GRANDE	STK	1,239	1,239	1,239	1,239	1,239	1,239	1,240	1,240	1,240	1,240	1,240	1,240	1	1	1	1	1	1
MANUFACTURING	PECOS	RIO GRANDE	MFG	2	2	2	2	2	2	3	3	3	3	3	3	1	1	1	1	1	1
MINING	PECOS	RIO GRANDE	MIN	159	158	158	158	158	158	286	286	286	286	286	286	127	128	128	128	128	128
PECOS COUNTY WCID #1	PECOS	RIO GRANDE	MUN	395	403	401	399	395	387	478	478	478	478	478	478	83	75	77	79	83	91
BIG LAKE	REAGAN	COLORADO	MUN	910	988	1,026	1,010	970	923	910	988	1,026	1,010	970	923	0	0	0	0	0	0
COUNTY-OTHER	REAGAN	COLORADO	MUN	125	135	141	138	133	126	125	135	141	138	133	126	0	0	0	0	0	0
IRRIGATION	REAGAN	COLORADO	IRR	36,597	35,990	35,385	34,779	34,174	33,579	25,600	25,383	25,269	25,220	25,198	25,186	-10,997	-10,607	-10,116	-9,559	-8,976	-8,393
LIVESTOCK	REAGAN	COLORADO	STK	253	253	253	253	253	253	253	253	253	253	253	253	0	0	0	0	0	0
LIVESTOCK	REAGAN	RIO GRANDE	STK	19	19	19	19	19	19	26	26	26	26	26	26	7	7	7	7	7	7
MINING	REAGAN	COLORADO	MIN	2,036	2,165	2,235	2,303	2,370	2,436	2,036	2,165	2,235	2,303	2,370	2,436	0	0	0	0	0	0
BALMORHEA	REEVES	RIO GRANDE	MUN	110	126	138	148	157	166	122	132	139	148	157	166	12	6	1	0	0	0
COUNTY-OTHER	REEVES	RIO GRANDE	MUN	219	192	171	152	136	124	219	200	186	170	154	142	0	8	15	18	18	18
IRRIGATION	REEVES	RIO GRANDE	IRR	103,069	102,196	101,323	100,448	99,575	98,710	88,816	88,795	88,780	88,767	88,755	88,707	-14,253	-13,401	-12,543	-11,681	-10,820	-10,003
LIVESTOCK	REEVES	RIO GRANDE	STK	2,283	2,283	2,283	2,283	2,283	2,283	2,283	2,283	2,283	2,283	2,283	2,283	0	0	0	0	0	0
MADERA VALLEY WSC	REEVES	RIO GRANDE	MUN	695	700	702	703	705	711	695	700	702	703	705	711	0	0	0	0	0	0
MANUFACTURING	REEVES	RIO GRANDE	MFG	720	741	756	770	781	825	720	741	756	770	781	825	0	0	0	0	0	0
MINING	REEVES	RIO GRANDE	MIN	182	177	175	173	172	170	182	177	175	173	172	170	0	0	0	0	0	0
PECOS	REEVES	RIO GRANDE	MUN	2,810	3,064	3,261	3,413	3,573	3,712	2,810	3,064	3,261	3,413	3,573	3,712	0	0	0	0	0	0
BALLINGER	RUNNELS	COLORADO	MUN	917	998	1,057	1,121	1,178	1,237	257	244	373	357	0	0	-660	-754	-684	-764	-1,178	-1,237
COLEMAN COUNTY WSC	RUNNELS	COLORADO	MUN	18	30	39	48	56	66	18	30	39	48	56	66	0	0	0	0	0	0
COUNTY-OTHER	RUNNELS	COLORADO	MUN	360	295	246	193	156	129	30	29	29	28	31	52	-330	-266	-217	-165	-125	-77
IRRIGATION	RUNNELS	COLORADO	IRR	4,331	4,317	4,298	4,279	4,260	4,241	2,973	2,973	2,973	2,973	2,973	2,973	-1,358	-1,344	-1,325	-1,306	-1,287	-1,268
LIVESTOCK	RUNNELS	COLORADO	STK	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530	0	0	0	0	0	0
MANUFACTURING	RUNNELS	COLORADO	MFG	63	70	76	82	87	94	0	0	0	0	0	0	-63	-70	-76	-82	-87	-94
MILES	RUNNELS	COLORADO	MUN	150	163	173	183	193	203	10	10	10	10	10	10	-140	-153	-163	-173	-183	-193
MILLERSVIEW-DOOLE WSC	RUNNELS	COLORADO	MUN	94	93	93	91	92	93	91	87	103	99	56	56	-3	-6	10	8	-36	-37
MINING	RUNNELS	COLORADO	MIN	44	45	45	45	45	45	44	45	45	45	45	45	0	0	0	0	0	0
WINTERS	RUNNELS	COLORADO	MUN	552	561	566	571	575	591	0	0	0	0	0	0	-552	-561	-566	-571	-575	-591
COUNTY-OTHER	SCHLEICHER	COLORADO	MUN	117	108	102	98	95	93	117	108	102	98	95	93	0	0	0	0	0	0
COUNTY-OTHER	SCHLEICHER	RIO GRANDE	MUN	25	23	22	21	20	20	25	23	22	21	20	20	0	0	0	0	0	0
ELDORADO	SCHLEICHER	COLORADO	MUN	581	644	671	675	691	711	710	710	710	710	710	711	129	66	39	35	19	0
IRRIGATION	SCHLEICHER	COLORADO	IRR	1,750	1,716	1,680	1,645	1,609	1,575	2,286	2,286	2,286	2,286	2,286	2,286	536	570	606	641	677	711
IRRIGATION	SCHLEICHER	RIO GRANDE	IRR	358	351	344	337	330	322	846	846	846	846	846	846	488	495	502	509	516	524
LIVESTOCK	SCHLEICHER	COLORADO	STK	583	583	583	583	583	583	583	583	583	583	583	583	0	0	0	0	0	0
LIVESTOCK	SCHLEICHER	RIO GRANDE	STK	204	204	204	204	204	204	204	204	204	204	204	204	0	0	0	0	0	0
MINING	SCHLEICHER	COLORADO	MIN	125	134	139	144	149	154	150	150	150	150	150	154	25	16	11	6	1	0
COUNTY-OTHER	SCURRY	BRAZOS	MUN	316	318	317	313	312	312	316	318	317	313	312	312	0	0	0	0	0	0
COUNTY-OTHER	SCURRY	COLORADO	MUN	558	562	560	553	552	552	504	496	559	541	532	519	-54	-66	-1	-12	-20	-33
IRRIGATION	SCURRY	BRAZOS	IRR	788	762	736	710	684	659	788	762	736	710	684	659	0	0	0	0	0	0
IRRIGATION	SCURRY	COLORADO	IRR	2,027	1,961	1,894	1,827	1,760	1,696	2,741	2,741	2,741	2,741	2,741	2,741	714	780	847	914	981	1,045
LIVESTOCK	SCURRY	BRAZOS	STK	233	233	233	233	233	233	233	233	233	233	233	233	0	0	0	0	0	0
LIVESTOCK	SCURRY	COLORADO	STK	396	396	396	396	396	396	396	396	396	396	396	396	0	0	0	0	0	0
MINING	SCURRY	BRAZOS	MIN	2,244	2,403	2,465	2,525	2,583	2,667	2,921	2,921	2,921	2,921	2,921	2,921	677	518	456	396	338	254
MINING	SCURRY	COLORADO	MIN	863	924	948	971	994	1,026	959	959	959	971	994	1,026	96	35	11	0	0	0

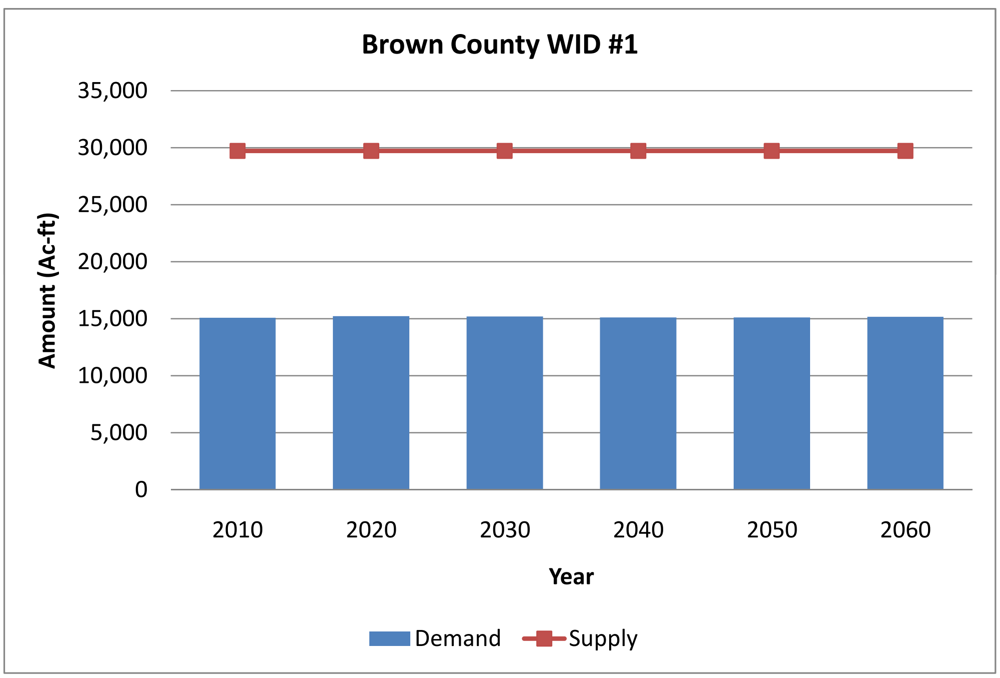
				WUG Demand						WUG Supply						Surplus/Shortage					
WUG Name	**WUG County**	**WUG Basin**	**Type**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
SNYDER	SCURRY	COLORADO	MUN	2,792	2,834	2,844	2,829	2,832	2,832	2,281	2,193	2,835	2,712	2,638	2,517	-511	-641	-9	-117	-194	-315
COUNTY-OTHER	STERLING	COLORADO	MUN	52	56	57	56	54	55	52	56	57	56	54	55	0	0	0	0	0	0
IRRIGATION	STERLING	COLORADO	IRR	648	621	595	569	543	518	745	745	745	745	745	745	97	124	150	176	202	227
LIVESTOCK	STERLING	COLORADO	STK	503	503	503	503	503	503	503	503	503	503	503	503	0	0	0	0	0	0
MINING	STERLING	COLORADO	MIN	590	600	605	610	615	620	590	600	605	610	615	620	0	0	0	0	0	0
STERLING CITY	STERLING	COLORADO	MUN	297	321	330	330	319	324	297	321	330	330	319	324	0	0	0	0	0	0
COUNTY-OTHER	SUTTON	COLORADO	MUN	54	56	56	55	54	54	54	56	56	55	54	54	0	0	0	0	0	0
COUNTY-OTHER	SUTTON	RIO GRANDE	MUN	223	232	231	226	225	223	223	232	231	226	225	223	0	0	0	0	0	0
IRRIGATION	SUTTON	COLORADO	IRR	561	551	540	530	518	507	562	562	562	562	562	562	1	11	22	32	44	55
IRRIGATION	SUTTON	RIO GRANDE	IRR	1,250	1,226	1,202	1,178	1,155	1,132	1,250	1,232	1,232	1,232	1,232	1,232	0	6	30	54	77	100
LIVESTOCK	SUTTON	COLORADO	STK	358	358	358	358	358	358	358	358	358	358	358	358	0	0	0	0	0	0
LIVESTOCK	SUTTON	RIO GRANDE	STK	438	438	438	438	438	438	438	438	438	438	438	438	0	0	0	0	0	0
MINING	SUTTON	COLORADO	MIN	35	35	36	36	37	37	35	35	36	36	37	37	0	0	0	0	0	0
MINING	SUTTON	RIO GRANDE	MIN	45	47	47	48	48	49	45	47	47	48	48	49	0	0	0	0	0	0
SONORA	SUTTON	RIO GRANDE	MUN	1,195	1,252	1,252	1,236	1,235	1,222	1,919	1,919	1,919	1,919	1,919	1,919	724	667	667	683	684	697
CONCHO RURAL WSC	TOM GREEN	COLORADO	MUN	695	873	990	1,048	1,091	1,103	1,103	1,103	1,103	1,103	1,103	1,103	408	230	113	55	12	0
COUNTY-OTHER	TOM GREEN	COLORADO	MUN	1,761	1,703	1,633	1,553	1,476	1,408	1,720	1,720	1,720	1,720	1,720	1,720	-41	17	87	167	244	312
IRRIGATION	TOM GREEN	COLORADO	IRR	104,621	104,362	104,107	103,852	103,593	103,338	57,531	57,531	57,531	57,531	57,531	57,531	-47,090	-46,831	-46,576	-46,321	-46,062	-45,807
LIVESTOCK	TOM GREEN	COLORADO	STK	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	1,978	0	0	0	0	0	0
MANUFACTURING	TOM GREEN	COLORADO	MFG	2,226	2,498	2,737	2,971	3,175	3,425	0	0	0	0	0	0	-2,226	-2,498	-2,737	-2,971	-3,175	-3,425
MILLERSVIEW-DOOLE WSC	TOM GREEN	COLORADO	MUN	238	263	291	319	359	408	331	332	389	394	244	244	93	69	98	75	-115	-164
MINING	TOM GREEN	COLORADO	MIN	73	80	85	90	95	99	150	150	150	150	150	150	77	70	65	60	55	51
SAN ANGELO	TOM GREEN	COLORADO	MUN	20,800	21,418	21,734	21,744	21,907	21,969	11,616	11,393	11,170	10,946	10,723	10,500	-9,184	-10,025	-10,564	-10,798	-11,184	-11,469
STEAM ELECTRIC POWER	TOM GREEN	COLORADO	SEP	543	777	909	1,069	1,264	1,502	0	0	0	0	0	0	-543	-777	-909	-1,069	-1,264	-1,502
COUNTY-OTHER	UPTON	COLORADO	MUN	52	54	53	53	54	55	52	54	53	53	54	55	0	0	0	0	0	0
COUNTY-OTHER	UPTON	RIO GRANDE	MUN	100	102	102	101	102	104	100	102	102	101	102	104	0	0	0	0	0	0
IRRIGATION	UPTON	COLORADO	IRR	16,592	16,355	16,123	15,887	15,651	15,421	5,920	5,904	5,900	5,895	5,889	5,882	-10,672	-10,451	-10,223	-9,992	-9,762	-9,539
IRRIGATION	UPTON	RIO GRANDE	IRR	167	166	162	160	158	155	199	199	199	199	199	199	32	33	37	39	41	44
LIVESTOCK	UPTON	COLORADO	STK	78	78	78	78	78	78	78	78	78	78	78	78	0	0	0	0	0	0
LIVESTOCK	UPTON	RIO GRANDE	STK	134	134	134	134	134	134	134	134	134	134	134	134	0	0	0	0	0	0
MCCAMEY	UPTON	RIO GRANDE	MUN	559	606	621	629	648	668	1,071	1,070	1,070	1,071	1,070	1,069	512	464	449	442	422	401
MINING	UPTON	COLORADO	MIN	2,011	2,025	2,030	2,035	2,040	2,046	2,011	2,025	2,030	2,035	2,040	2,046	0	0	0	0	0	0
MINING	UPTON	RIO GRANDE	MIN	651	655	657	659	660	662	651	655	657	659	660	662	0	0	0	0	0	0
RANKIN	UPTON	RIO GRANDE	MUN	231	245	248	250	255	261	327	326	326	326	326	325	96	81	78	76	71	64
COUNTY-OTHER	WARD	RIO GRANDE	MUN	925	929	925	910	905	905	925	529	525	510	505	505	0	-400	-400	-400	-400	-400
IRRIGATION	WARD	RIO GRANDE	IRR	13,793	13,624	13,454	13,284	13,115	12,947	8,266	8,651	7,733	6,745	6,210	6,059	-5,527	-4,973	-5,721	-6,539	-6,905	-6,888
LIVESTOCK	WARD	RIO GRANDE	STK	126	126	126	126	126	126	126	126	126	126	126	126	0	0	0	0	0	0
MANUFACTURING	WARD	RIO GRANDE	MFG	7	7	7	7	7	7	7	7	7	7	7	7	0	0	0	0	0	0
MINING	WARD	RIO GRANDE	MIN	153	155	156	157	158	159	153	155	156	157	158	159	0	0	0	0	0	0
MONAHANS	WARD	RIO GRANDE	MUN	2,559	2,592	2,597	2,572	2,564	2,564	2,559	2,592	2,597	2,572	2,564	2,564	0	0	0	0	0	0
STEAM ELECTRIC POWER	WARD	RIO GRANDE	SEP	4,914	4,223	4,937	5,807	6,868	8,162	4,914	4,223	4,937	5,807	6,189	6,189	0	0	0	0	-679	-1,973
COUNTY-OTHER	WINKLER	RIO GRANDE	MUN	119	121	120	119	116	112	121	121	121	121	121	121	2	0	1	2	5	9
IRRIGATION	WINKLER	RIO GRANDE	IRR	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	0	0	0	0	0	0
KERMIT	WINKLER	RIO GRANDE	MUN	1,927	1,988	1,983	1,966	1,922	1,860	3,943	3,943	3,943	3,943	3,943	3,943	2,016	1,955	1,960	1,977	2,021	2,083
LIVESTOCK	WINKLER	COLORADO	STK	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
LIVESTOCK	WINKLER	RIO GRANDE	STK	149	149	149	149	149	149	167	167	167	167	167	167	18	18	18	18	18	18
MINING	WINKLER	RIO GRANDE	MIN	928	895	883	872	861	847	1,878	1,878	1,878	1,878	1,878	1,878	950	983	995	1,006	1,017	1,031
WINK	WINKLER	RIO GRANDE	MUN	331	341	341	338	331	320	657	657	657	657	657	657	326	316	316	319	326	337

Brown County WID

Customers	2010	2020	2030	2040	2050	2060
			Demands (AF/Y)			
Customers	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Bangs	265	266	262	256	254	254
Brookesmith SUD	1,394	1,412	1,404	1,377	1,368	1,367
Manufacturing	577	636	686	734	775	837
Brown County Other[1]	385	385	379	370	367	367
City of Brownwood	3,896	3,927	3,889	3,816	3,792	3,792
City of Santa Anna	200	197	193	190	187	187
Coleman County WSC [2]	200	200	200	200	200	205
Early	799	812	810	801	797	797
Irrigation	6,970	6,970	6,970	6,970	6,970	6,970
Zephryr WSC	399	404	399	391	387	387
Total Demand	**15,085**	**15,209**	**15,192**	**15,105**	**15,097**	**15,163**
			Current Water Supply (AF/Y)			
Sources	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Brownwood Lake/Reservoir	29,712	29,712	29,712	29,712	29,712	29,712
Total Current Supply	**29,712**	**29,712**	**29,712**	**29,712**	**29,712**	**29,712**
			Comparison of Supply and Demands (AF/Y)			
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Surplus or (Shortage)	14,627	14,503	14,520	14,607	14,615	14,549

[1] Includes sales from Brownwood and northern Brown County that is now served through Brookesmith and Zephyr

[2] Coleman Co. WSC supplied via Brookesmith SUD



Colorado River Municipal Water District

	Demands (AF/Y)					
Member City	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Odessa	23,150	24,330	25,334	26,416	27,685	29,137
Big Spring	6,016	6,077	6,035	5,945	5,915	5,915
Snyder[1]	3,270	3,305	3,293	3,260	3,254	3,235
Member Cities Total	**32,436**	**33,712**	**34,662**	**35,621**	**36,854**	**38,287**
Other Entities						
Robert Lee	456	443	437	430	427	427
Coahoma	183	185	183	180	177	177
Manufacturing - Howard County	989	1,052	1,099	1,161	1,227	1,350
Stanton[2]	0	0	0	0	0	0
Midland 1966 Contract[3]	16,624	18,257	0	0	0	0
Midland Ivie Contract[4]	10,925	10,699	10,473	10,246	10,021	9,795
Midland - Future Contracts						
County Other - Midland County	21	21	21	21	21	21
Manufacturing - Midland County	28	31	34	37	39	42
Abilene	10,974	10,751	10,528	10,304	10,081	9,858
San Angelo	13,282	13,046	12,809	12,571	12,335	12,098
Millersview-Doole WSC[5]	500	500	500	500	0	0
Ballinger	600	600	600	600		
County Other - Ward County	400	400	400	400	400	400
Mining - Howard County	1,476	1,576	1,617	1,656	1,694	1,745
Mining - Coke County	318	358	380	402	423	444
Other Entities Total	**56,776**	**57,919**	**39,081**	**38,508**	**36,845**	**36,357**
CRMWD Total Demand	**89,212**	**91,631**	**73,743**	**74,129**	**73,699**	**74,644**

[1] Snyder provides water to Rotan and Scurry County-Other.

[2] Stanton contract expires in 2010. Renewal is considered a water management strategy.

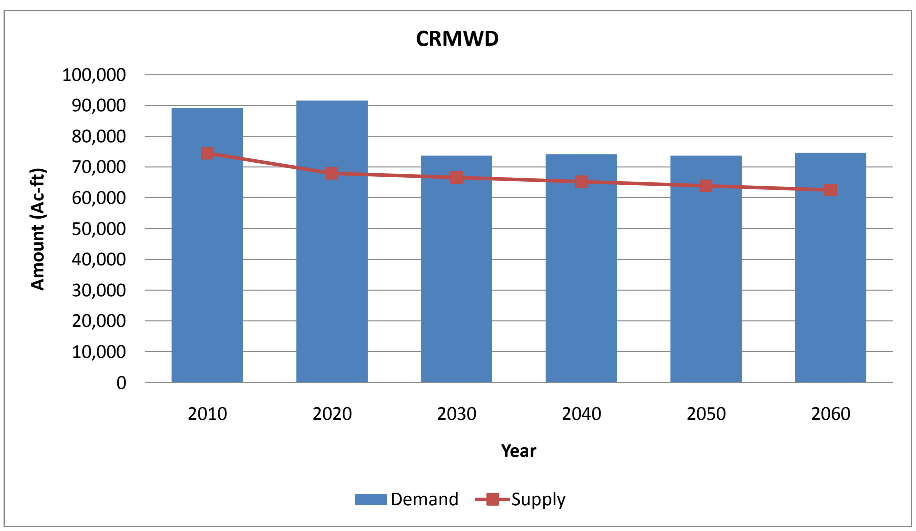
[3] Midland 1966 contract expires in 2026. Renewal is considered a water management strategy.

[4] Contract is limited to 16.54 percent of the safe yield of O.H. Ivie minus sales to Midland County Other and Midland County Manufacturing

[5] Millersville Doole Contract expires in 2041.

	Current Water Supply (AF/Y)					
Sources	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Lake Ivie[1]	66,350	65,000	63,650	62,300	60,950	59,600
Spence Reservoir[1]	560	560	560	560	560	560
Thomas Reservoir[1]	0	0	0	0	0	0
Ward County Well Field	5,200	0	0	0	0	0
Martin County Well Field	1,035	1,035	1,035	1,035	1,035	1,035
Ector County Well Field	440	440	440	440	440	440
Scurry County Well Field	900	900	900	900	900	900
Total Current Supply	**74,485**	**67,935**	**66,585**	**65,235**	**63,885**	**62,535**

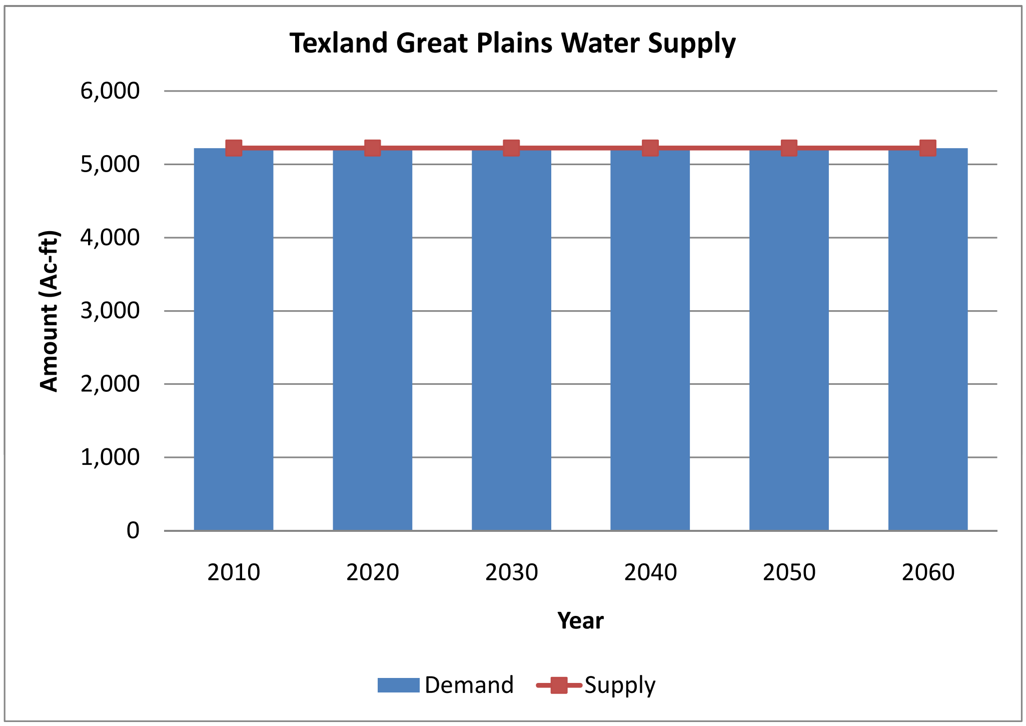
	Comparison of Supply and Demands (AF/Y)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Surplus or (Shortage)	(14,727)	(23,696)	(7,158)	(8,894)	(9,814)	(12,109)



Texland Great Plains Water System, Ltd.

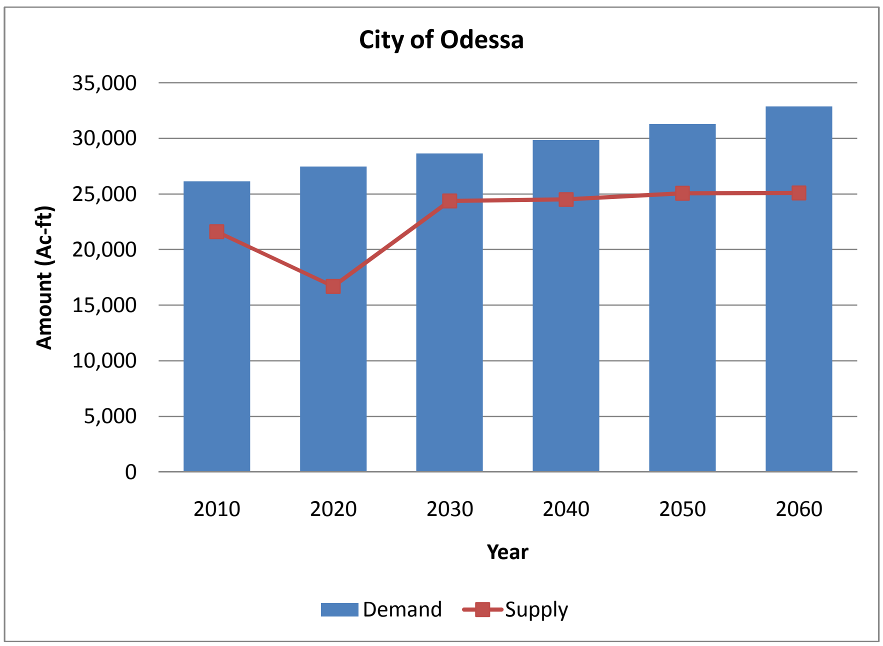
			Demands (AF/Y)			
Customers	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Ector County Municipal	64	64	64	64	64	64
Odessa Power Generation Facility*	5,156	5,156	5,156	5,156	5,156	5,156
Total Demand	**5,220**	**5,220**	**5,220**	**5,220**	**5,220**	**5,220**
			Current Water Supply (AF/Y)			
Sources	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Ogallala Aquifer - Andrews County	5,156	5,156	5,156	5,156	5,156	5,156
Ogallala Aquifer - Gaines County	64	64	64	64	64	64
Total Current Supply	**5,220**	**5,220**	**5,220**	**5,220**	**5,220**	**5,220**
			Comparison of Supply and Demands (AF/Y)			
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Surplus or (Shortage)	0	0	0	0	0	0

* Odessa Power Genration Facility and Navasota Odessa Energy Combined



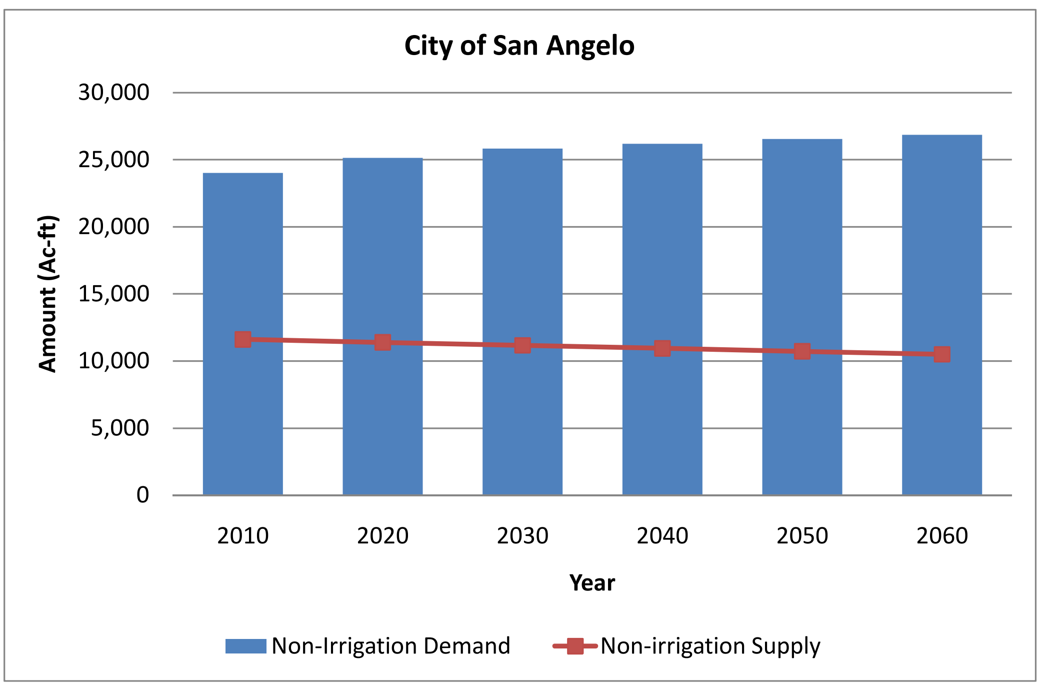
City of Odessa

	Demands (AF/Y)					
Customers	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
City of Odessa	21,927	22,687	23,350	24,145	25,222	26,484
Ector County UD - Odessa Sales	1,480	1,847	2,177	2,473	2,706	2,932
Manufacturing - Odessa Sales	1,243	1,296	1,307	1,298	1,257	1,221
Manufacturing - Reuse	1,500	1,650	1,800	1,950	2,100	2,250
Total Demand	**26,150**	**27,480**	**28,634**	**29,866**	**31,285**	**32,887**
	Current Water Supply (AF/Y)					
Sources	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Colorado River MWD Lake/Reservoir System	13,366	13,098	20,632	20,613	21,015	20,894
Direct Reuse - Ector County	3,000	3,150	3,300	3,450	3,600	3,750
Ector Well Field (CRMWD)	440	440	440	440	440	440
Ward County Well Field	4,800	0	0	0	0	0
Total Current Supply	**21,606**	**16,688**	**24,372**	**24,503**	**25,055**	**25,084**
	Comparison of Supply and Demands (AF/Y)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Surplus or (Shortage)	(4,544)	(10,792)	(4,262)	(5,363)	(6,230)	(7,803)



City of San Angelo

	Demands (AF/Y)					
Customers	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
City of San Angelo	20,800	21,418	21,734	21,744	21,907	21,969
Manufacturing	2,226	2,498	2,737	2,971	3,175	3,425
Miles	200	200	200	200	200	200
San Angelo Municipal Sales	250	250	250	250	250	250
Tom Green County WCID #1 - Reuse[1]	8,500	8,500	8,500	8,500	8,500	8,500
Tom Green County WCID #1 - Twin Buttes	18,000	18,000	18,000	18,000	18,000	18,000
Steam Electric Power - San Angelo	543	777	909	1,021	1,021	1,021
Total Demand	**50,519**	**51,643**	**52,330**	**52,686**	**53,053**	**53,365**
	Current Water Supply (AF/Y)					
Sources	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Concho River combined Run-of-River City of San Angelo	642	642	642	642	642	642
Direct Reuse - Tom Green County[1]	8,500	8,500	8,500	8,500	8,500	8,500
San Angelo System - Twin Buttes, Lake Nasworthy, and O.C. Fisher	0	0	0	0	0	0
Ivie Reservoir	10,974	10,751	10,528	10,304	10,081	9,858
Total Current Supply	**20,116**	**19,893**	**19,670**	**19,446**	**19,223**	**19,000**
[1] Supply for irrigation						
	Comparison of Supply and Demands (AF/Y)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Surplus or (Shortage) - Non-irrigation	(12,403)	(13,750)	(14,660)	(15,240)	(15,830)	(16,365)
Surplus or (Shortage) - Irrigation	(18,000)	(18,000)	(18,000)	(18,000)	(18,000)	(18,000)



University Lands

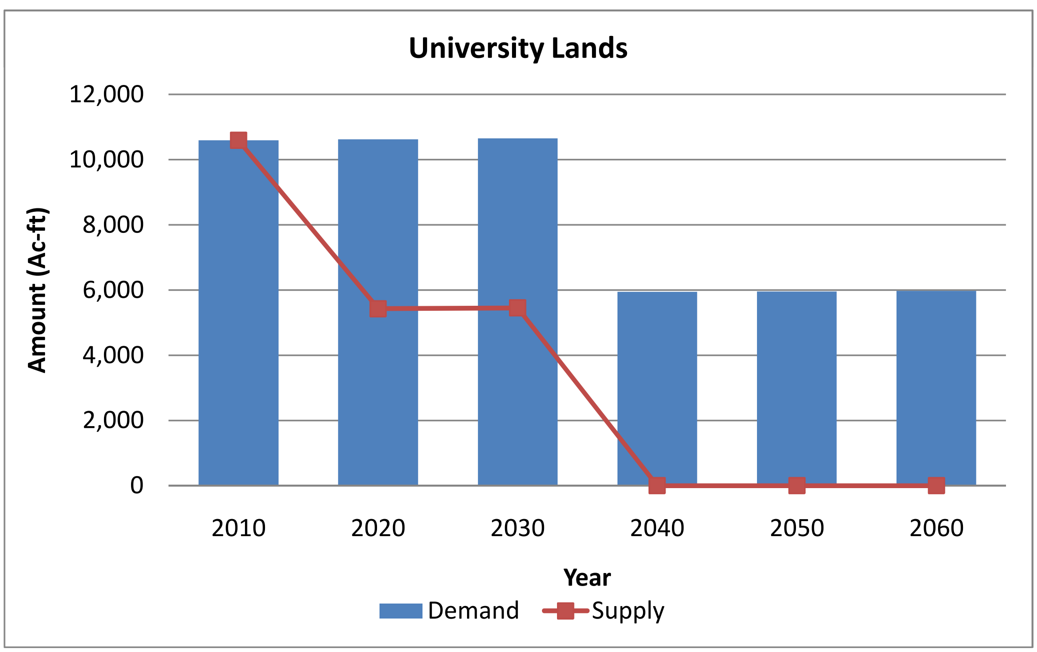
	Demands (AF/Y)					
Customers	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
City of Andrews[1]	671	708	730	750	760	773
CRMWD	5,200	5,200	5,200	5,200	5,200	5,200
City of Midland - Midland Paul Davis Well Field[2]	4,722	4,722	4,722	0	0	0
Total Demand[3]	**10,593**	**10,630**	**10,652**	**5,950**	**5,960**	**5,973**

[1] Andrews obtains 20 percent of supply from University Lands.
[2] The City of Midland expects its well field on University Lands will be depleted by 2035.
[3] Demand assumes that contracts with University lands will be renewed for the duration of the planning period.

	Current Water Supply (AF/Y)					
Sources	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Cenozoic Pecos Alluvium, Aquifer - Ward County - CRMWD[1]	5,200	0	0	0	0	0
Ogallala Aquifer - Martin and Andrews County - Midland[2]	4,722	4,722	4,722	0	0	0
Ogallala Aquifer - Andrews County - City of Andrews	671	708	730	0	0	0
Total Current Supply	**10,593**	**5,430**	**5,452**	**0**	**0**	**0**

[1] CRMWD contracts expires in 2019. Renewal of contract is considered to be a strategy for University Lands
[2] Midland contract expired in 2035. Midland expects supply depleted by 2035.
[3] Andrews contract expires in 2033. Renewal of contract is considered to be a strategy for University Lands

	Comparison of Supply and Demands (AF/Y)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Surplus or (Shortage)	0	(5,200)	(5,200)	(5,950)	(5,960)	(5,973)

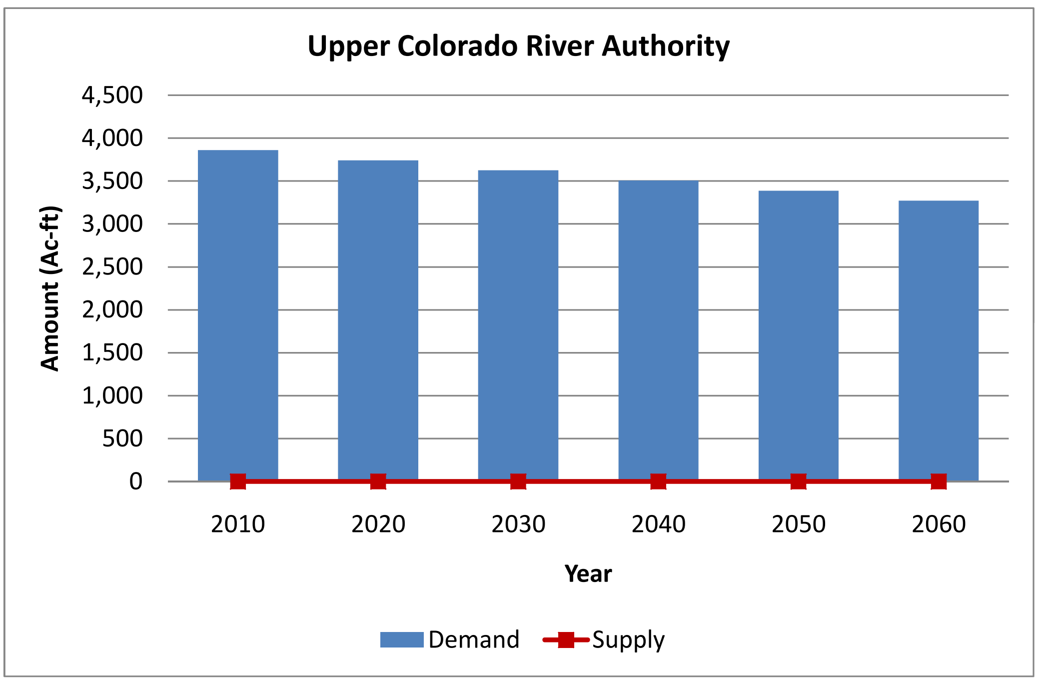


Upper Colorado River Authority

	Demands (AF/Y)					
Customers	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Robert Lee	0	0	0	0	0	0
Miles	200	200	200	200	200	200
Paint Rock	25	25	25	25	25	25
San Angelo	3,637	3,518	3,400	3,282	3,163	3,045
Total Demand	**3,862**	**3,743**	**3,625**	**3,507**	**3,388**	**3,270**
	Current Water Supply (AF/Y)					
Sources	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Mountain Creek Lake[1]	0	0	0	0	0	0
O C Fisher Reservoir[1]	0	0	0	0	0	0
Total Current Supply	**0**	**0**	**0**	**0**	**0**	**0**

[1] Robert Lee has a contract for water from Mountain Creek. This reservoir has no reliable supply.
[1] According to the Colorado WAM this reservoir does not have a reliable supply.

	Comparison of Supply and Demands (AF/Y)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Surplus or (Shortage)	(3,862)	(3,743)	(3,625)	(3,507)	(3,388)	(3,270)



Appendix 4B
Socioeconomic Impacts of Projected Water Shortages
for the Region F Regional Water Planning Area

Economic Impacts of Projected Water Shortages for the Region F Regional Water Planning Area

Prepared in Support of the 2011 Region F Regional Water Plan

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Introduction

Water shortages during drought would likely curtail or eliminate economic activity in business and industries reliant on water. For example, without water farmers cannot irrigate; refineries cannot produce gasoline, and paper mills cannot make paper. Unreliable water supplies would not only have an immediate and real impact on existing businesses and industry, but they could also adversely affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages would disrupt activity in homes, schools and government and could adversely affect public health and safety. For all of the above reasons, it is important to analyze and understand how restricted water supplies during drought could affect communities throughout the state.

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance: "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs*" [(§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted this report in support of the Region F Regional Water Planning Group.

This document summarizes the results of our analysis and discusses the methodology used to generate the results. Section 1 outlines the overall methodology and discusses approaches and assumptions specific to each water use category (i.e., irrigation, livestock, mining, steam-electric, municipal and manufacturing). Section 2 presents the results for each category where shortages are reported at the regional planning area level and river basin level. Results for individual water user groups are not presented, but are available upon request.

1. Methodology

Section 1 provides a general overview of how economic and social impacts were measured. In addition, it summarizes important clarifications, assumptions and limitations of the study.

1.1 Economic Impacts of Water Shortages

1.1.1 General Approach

Economic analysis as it relates to water resources planning generally falls into two broad areas. Supply side analysis focuses on costs and alternatives of developing new water supplies or implementing programs that provide additional water from current supplies. Demand side analysis concentrates on impacts or benefits of providing water to people, businesses and the environment. Analysis in this report focuses strictly on demand side impacts. When analyzing the economic impacts of water shortages as defined in Texas water planning, three potential scenarios are possible:

1) Scenario 1 involves situations where there are physical shortages of raw surface or groundwater due to drought of record conditions. For example, City A relies on a reservoir with average conservation storage of 500 acre-feet per year and a firm yield of 100 acre feet. In 2010, the city uses about 50 acre-feet per year, but by 2030 their demands are expected to increase to 200 acre-feet. Thus, in 2030 the reservoir would not have enough water to meet the city's demands,

and people would experience a shortage of 100 acre-feet assuming drought of record conditions. Under normal or average climatic conditions, the reservoir would likely be able to provide reliable water supplies well beyond 2030.

2) Scenario 2 is a situation where despite drought of record conditions, water supply sources can meet existing use requirements; however, limitations in water infrastructure would preclude future water user groups from accessing these water supplies. For example, City B relies on a river that can provide 500 acre-feet per year during drought of record conditions and other constraints as dictated by planning assumptions. In 2010, the city is expected to use an estimated 100 acre-feet per year and by 2060 it would require no more than 400 acre-feet. But the intake and pipeline that currently transfers water from the river to the city's treatment plant has a capacity of only 200 acre-feet of water per year. Thus, the city's water supplies are adequate even under the most restrictive planning assumptions, but their conveyance system is too small. This implies that at some point – perhaps around 2030 - infrastructure limitations would constrain future population growth and any associated economic activity or impacts.

3) Scenario 3 involves water user groups that rely primarily on aquifers that are being depleted. In this scenario, projected and in some cases existing demands may be unsustainable as groundwater levels decline. Areas that rely on the Ogallala aquifer are a good example. In some communities in the region, irrigated agriculture forms a major base of the regional economy. With less irrigation water from the Ogallala, population and economic activity in the region could decline significantly assuming there are no offsetting developments.

Assessing the social and economic effects of each of the above scenarios requires various levels and methods of analysis and would generate substantially different results for a number of reasons; the most important of which has to do with the time frame of each scenario. Scenario 1 falls into the general category of static analysis. This means that models would measure impacts for a small interval of time such as a drought. Scenarios 2 and 3, on the other hand imply a dynamic analysis meaning that models are concerned with changes over a much longer time period.

Since administrative rules specify that planning analysis be evaluated under drought of record conditions (a static and random event), socioeconomic impact analysis developed by the TWDB for the state water plan is based on assumptions of Scenario 1. Estimated impacts under scenario 1 are point estimates for years in which needs are reported (2010, 2020, 2030, 2040, 2050 and 2060). They are independent and distinct "what if" scenarios for a particular year and shortages are assumed to be temporary events resulting from drought of record conditions. Estimated impacts measure what would happen if water user groups experience water shortages for a period of one year.

The TWDB recognize that dynamic models may be more appropriate for some water user groups; however, combining approaches on a statewide basis poses several problems. For one, it would require a complex array of analyses and models, and might require developing supply and demand forecasts under "normal" climatic conditions as opposed to drought of record conditions. Equally important is the notion that combining the approaches would produce inconsistent results across regions resulting in a so-called "apples to oranges" comparison.

A variety tools are available to estimate economic impacts, but by far, the most widely used today are input-output models (IO models) combined with social accounting matrices (SAMs). Referred to as IO/SAM models, these tools formed the basis for estimating economic impacts for agriculture (irrigation and livestock water uses) and industry (manufacturing, mining, steam-electric and commercial business activity for municipal water uses).

Since the planning horizon extends through 2060, economic variables in the baseline are adjusted in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Future values for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category.

The following steps outline the overall process.

Step 1*: Generate IO/SAM Models and Develop Economic Baseline*

IO/SAM models were estimated using propriety software known as IMPLAN PRO™ (Impact for Planning Analysis). IMPLAN is a modeling system originally developed by the U.S. Forestry Service in the late 1970s. Today, the Minnesota IMPLAN Group (MIG Inc.) owns the copyright and distributes data and software. It is probably the most widely used economic impact model in existence. IMPLAN comes with databases containing the most recently available economic data from a variety of sources.[1] Using IMPLAN software and data, transaction tables conceptually similar to the one discussed previously were estimated for each county in the region and for the region as a whole. Each transaction table contains 528 economic sectors and allows one to estimate a variety of economic statistics including:

- **total sales -** total production measured by sales revenues;
- **intermediate sales -** sales to other businesses and industries within a given region;
- **final sales –** sales to end users in a region and exports out of a region**;**
- **employment -** number of full and part-time jobs (annual average) required by a given industry including self-employment;
- **regional income -** total payroll costs (wages and salaries plus benefits) paid by industries, corporate income, rental income and interest payments; and
- **business taxes -** sales, excise, fees, licenses and other taxes paid during normal operation of an industry (does not include income taxes).

TWDB analysts developed an economic baseline containing each of the above variables using year 2000 data. Since the planning horizon extends through 2060, economic variables in the baseline were allowed to change in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Projections for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category. Monetary impacts in future years are reported in constant year 2006 dollars.

It is important to stress that employment, income and business taxes are the most useful variables when comparing the relative contribution of an economic sector to a regional economy. Total sales as reported in IO/SAM models are less desirable and can be misleading because they include sales to other industries in the region for use in the production of other goods. For example, if a mill buys grain from local farmers and uses it to produce feed, sales of both the processed feed and raw corn are counted as "output" in an IO model. Thus, total sales double-count or overstate the true economic value of goods

[1]The IMPLAN database consists of national level technology matrices based on benchmark input-output accounts generated by the U.S. Bureau of Economic Analysis and estimates of final demand, final payments, industry output and employment for various economic sectors. IMPLAN regional data (i.e. states, a counties or groups of counties within a state) are divided into two basic categories: 1) data on an industry basis including value-added, output and employment, and 2) data on a commodity basis including final demands and institutional sales. State-level data are balanced to national totals using a matrix ratio allocation system and county data are balanced to state totals.

and services produced in an economy. They are not consistent with commonly used measures of output such as Gross National Product (GNP), which counts only final sales.

Another important distinction relates to terminology. Throughout this report, the term *sector* refers to economic subdivisions used in the IMPLAN database and resultant input-output models (528 individual sectors based on Standard Industrial Classification Codes). In contrast, the phrase *water use category* refers to water user groups employed in state and regional water planning including irrigation, livestock, mining, municipal, manufacturing and steam electric. Each IMPLAN sector was assigned to a specific water use category.

Step 2: *Estimate Direct and Indirect Economic Impacts of Water Needs*

Direct impacts are reductions in output by sectors experiencing water shortages. For example, without adequate cooling and process water a refinery would have to curtail or cease operation, car washes may close, or farmers may not be able to irrigate and sales revenues fall. Indirect impacts involve changes in inter-industry transactions as supplying industries respond to decreased demands for their services, and how seemingly non-related businesses are affected by decreased incomes and spending due to direct impacts. For example, if a farmer ceases operations due to a lack of irrigation water, they would likely reduce expenditures on supplies such as fertilizer, labor and equipment, and businesses that provide these goods would suffer as well.

Direct impacts accrue to immediate businesses and industries that rely on water and without water industrial processes could suffer. However, output responses may vary depending upon the severity of shortages. A small shortage relative to total water use would likely have a minimal impact, but large shortages could be critical. For example, farmers facing small shortages might fallow marginally productive acreage to save water for more valuable crops. Livestock producers might employ emergency culling strategies, or they may consider hauling water by truck to fill stock tanks. In the case of manufacturing, a good example occurred in the summer of 1999 when Toyota Motor Manufacturing experienced water shortages at a facility near Georgetown, Kentucky.[2] As water levels in the Kentucky River fell to historic lows due to drought, plant managers sought ways to curtail water use such as reducing rinse operations to a bare minimum and recycling water by funneling it from paint shops to boilers. They even considered trucking in water at a cost of 10 times what they were paying. Fortunately, rains at the end of the summer restored river levels, and Toyota managed to implement cutbacks without affecting production, but it was a close call. If rains had not replenished the river, shortages could have severely reduced output.[3]

To account for uncertainty regarding the relative magnitude of impacts to farm and business operations, the following analysis employs the concept of elasticity. Elasticity is a number that shows how a change in one variable will affect another. In this case, it measures the relationship between a percentage reduction in water availability and a percentage reduction in output. For example, an elasticity of 1.0 indicates that a 1.0 percent reduction in water availability would result in a 1.0 percent reduction in economic output. An elasticity of 0.50 would indicate that for every 1.0 percent of unavailable water, output is reduced by 0.50 percent and so on. Output elasticities used in this study are:[4]

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[2] Royal, W. "*High And Dry - Industrial Centers Face Water Shortages*." in Industry Week, Sept, 2000.

[3] The efforts described above are not planned programmatic or long-term operational changes. They are emergency measures that individuals might pursue to alleviate what they consider a temporary condition. Thus, they are not characteristic of long-term management strategies designed to ensure more dependable water supplies such as capital investments in conservation technology or development of new water supplies.

[4] Elasticities are based on one of the few empirical studies that analyze potential relationships between economic output and water shortages in the United States. The study, conducted in California, showed that a significant number of industries would suffer reduced output during water shortages. Using a survey based approach researchers posed two scenarios to different industries. In

- if water needs are 0 to 5 percent of total water demand, no corresponding reduction in output is assumed;

- if water needs are 5 to 30 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.50 percent reduction in output;

- if water needs are 30 to 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.75 percent reduction in output; and

- if water needs are greater than 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 1.0 percent (i.e., a proportional reduction).

In some cases, elasticities are adjusted depending upon conditions specific to a given water user group.

Once output responses to water shortages were estimated, direct impacts to total sales, employment, regional income and business taxes were derived using regional level economic multipliers estimating using IO/SAM models. The formula for a given IMPLAN sector is:

$D_{i,t} = Q_{i,t} *_{,} S_{i,t} * E_Q * RFD_i * DM_{i(Q, L, I, T)}$

where:

$D_{i,t}$ = direct economic impact to sector *i* in period *t*

$Q_{i,t}$ = total sales for sector *i* in period *t* in an affected county

$RFD_{i,}$ = ratio of final demand to total sales for sector *i* for a given region

$S_{i,t}$ = water shortage as percentage of total water use in period *t*

E_Q = elasticity of output and water use

$DM_{i(L, I, T)}$ = direct output multiplier coefficients for labor (L), income (I) and taxes (T) for sector *i*.

Secondary impacts were derived using the same formula used to estimate direct impacts; however, indirect multiplier coefficients are used. Methods and assumptions specific to each water use sector are discussed in Sections 1.1.2 through 1.1.4.

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the first scenario, they asked how a 15 percent cutback in water supply lasting one year would affect operations. In the second scenario, they asked how a 30 percent reduction lasting one year would affect plant operations. In the case of a 15 percent shortage, reported output elasticities ranged from 0.00 to 0.76 with an average value of 0.25. For a 30 percent shortage, elasticities ranged from 0.00 to 1.39 with average of 0.47. For further information, see, California Urban Water Agencies, "*Cost of Industrial Water Shortages,*" Spectrum Economics, Inc. November, 1991.

General Assumptions and Clarification of the Methodology

As with any attempt to measure and quantify human activities at a societal level, assumptions are necessary and every model has limitations. Assumptions are needed to maintain a level of generality and simplicity such that models can be applied on several geographic levels and across different economic sectors. In terms of the general approach used here several clarifications and cautions are warranted:

1. Shortages as reported by regional planning groups are the starting point for socioeconomic analyses.

2. Estimated impacts are point estimates for years in which needs are reported (i.e., 2010, 2020, 2030, 2040, 2050 and 2060).They are independent and distinct "what if" scenarios for each particular year and water shortages are assumed to be temporary events resulting from severe drought conditions combined with infrastructure limitations. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals and resultant impacts are measured. Given, that reported figures are not cumulative in nature, it is inappropriate to sum impacts over the entire planning horizon. Doing so, would imply that the analysis predicts that drought of record conditions will occur every ten years in the future, which is not the case. Similarly, authors of this report recognize that in many communities needs are driven by population growth, and in the future total population will exceed the amount of water available due to infrastructure limitations, regardless of whether or not there is a drought. This implies that infrastructure limitations would constrain economic growth. However, since needs as defined by planning rules are based upon water supply and demand under the assumption of drought of record conditions, it improper to conduct economic analysis that focuses on growth related impacts over the planning horizon. Figures generated from such an analysis would presume a 50-year drought of record, which is unrealistic. Estimating lost economic activity related to constraints on population and commercial growth due to lack of water would require developing water supply and demand forecasts under "normal" or "most likely" future climatic conditions.

3. While useful for planning purposes, this study is not a benefit-cost analysis. Benefit cost analysis is a tool widely used to evaluate the economic feasibility of specific policies or projects as opposed to estimating economic impacts of unmet water needs. Nevertheless, one could include some impacts measured in this study as part of a benefit cost study if done so properly. Since this is not a benefit cost analysis, future impacts are not weighted differently. In other words, estimates are not discounted. If used as a measure of economic benefits, one should incorporate a measure of uncertainty into the analysis. In this type of analysis, a typical method of discounting future values is to assign probabilities of the drought of record recurring again in a given year, and weight monetary impacts accordingly. This analysis assumes a probability of one.

4. IO multipliers measure the strength of backward linkages to supporting industries (i.e., those who sell inputs to an affected sector). However, multipliers say nothing about forward linkages consisting of businesses that purchase goods from an affected sector for further processing. For example, ranchers in many areas sell most of their animals to local meat packers who process animals into a form that consumers ultimately see in grocery stores and restaurants. Multipliers do not capture forward linkages to meat packers, and since meat packers sell livestock purchased from ranchers as "final sales," multipliers for the ranching sector do fully account for all losses to a region's economy. Thus, as mentioned previously, in some cases closely linked sectors were moved from one water use category to another.

5. Cautions regarding interpretations of direct and secondary impacts are warranted. IO/SAM multipliers are based on "fixed-proportion production functions," which basically means that input use - including labor - moves in lockstep fashion with changes in levels of output. In a

scenario where output (i.e., sales) declines, losses in the immediate sector or supporting sectors could be much less than predicted by an IO/SAM model for several reasons. For one, businesses will likely expect to continue operating so they might maintain spending on inputs for future use; or they may be under contractual obligations to purchase inputs for an extended period regardless of external conditions. Also, employers may not lay-off workers given that experienced labor is sometimes scarce and skilled personnel may not be readily available when water shortages subside. Lastly people who lose jobs might find other employment in the region. As a result, direct losses for employment and secondary losses in sales and employment should be considered an upper bound. Similarly, since projected population losses are based on reduced employment in the region, they should be considered an upper bound as well.

6. IO models are static. Models and resultant multipliers are based upon the structure of the U.S. and regional economies in 2006. In contrast, water shortages are projected to occur well into the future. Thus, the analysis assumes that the general structure of the economy remains the same over the planning horizon, and the farther out into the future we go, this assumption becomes less reliable.

7. Impacts are annual estimates. If one were to assume that conditions persisted for more than one year, figures should be adjusted to reflect the extended duration. The drought of record in most regions of Texas lasted several years.

8. Monetary figures are reported in constant year 2006 dollars.

1.1.2 Impacts to Agriculture

Irrigated Crop Production

The first step in estimating impacts to irrigation required calculating gross sales for IMPLAN crop sectors. Default IMPLAN data do not distinguish irrigated production from dry-land production. Once gross sales were known other statistics such as employment and income were derived using IMPLAN direct multiplier coefficients. Gross sales for a given crop are based on two data sources:

1) county-level statistics collected and maintained by the TWDB and the USDA Farm Services Agency (FSA) including the number of irrigated acres by crop type and water application per acre, and

2) regional-level data published by the Texas Agricultural Statistics Service (TASS) including prices received for crops (marketing year averages), crop yields and crop acreages.

Crop categories used by the TWDB differ from those used in IMPLAN datasets. To maintain consistency, sales and other statistics are reported using IMPLAN crop classifications. Table 1 shows the TWDB crops included in corresponding IMPLAN sectors, and Table 2 summarizes acreage and estimated annual water use for each crop classification (five-year average from 2003-2007). Table 3 displays average (2003-2007) gross revenues per acre for IMPLAN crop categories.

Table 1: Crop Classifications Used in TWDB Water Use Survey and Corresponding IMPLAN Crop Sectors	
IMPLAN Category	**TWDB Category**
Oilseeds	Soybeans and “other oil crops”
Grains	Grain sorghum, corn, wheat and “other grain crops”
Vegetable and melons	“Vegetables” and potatoes
Tree nuts	Pecans
Fruits	Citrus, vineyard and other orchard
Cotton	Cotton
Sugarcane and sugar beets	Sugarcane and sugar beets
All “other” crops	“Forage crops”, peanuts, alfalfa, hay and pasture, rice and “all other crops”

Table 2: Summary of Irrigated Crop Acreage and Water Demand for the Region F Water Planning Area (average 2003-2007)

Sector	Acres (1000s)	Distribution of acres	Water use (1000s of AF)	Distribution of water use
Oilseeds	<1	<1%	<1	<1%
Grains	45	20%	62	17%
Vegetable and melons	5	2%	9	<1%
Tree nuts	6	3%	13	<1%
Fruits	<1	<1%	1	<1%
Cotton	104	47%	154	42%
All “other” crops	61	28%	123	34%
Total	221	100%	363	100%

Source: Water demand figures are a 5- year average (2003-2007) of the TWDB’s annual Irrigation Water Use Estimates. Statistics for irrigated crop acreage are based upon annual survey data collected by the TWDB and the Farm Service Agency. Values do not include acreage or water use for the TWDB categories classified by the Farm Services Agency as “failed acres,” “golf course” or “waste water.”

Table 3: Average Gross Sales Revenues per Acre for Irrigated Crops for the Region F Water Planning Area (2003-2007)		
IMPLAN Sector	**Gross revenues per acre**	**Crops included in estimates**
Oilseeds	$177	Irrigated figure is based on five-year (2003-2007) average weighted by acreage for “irrigated soybeans” and “irrigated ‘other’ oil crops.”
Grains	$199	Based on five-year (2003-2007) average weighted by acreage for “irrigated grain sorghum,” “irrigated corn”, “irrigated wheat” and “irrigated ‘other’ grain crops.”
Vegetable and melons	$6,053	Based on five-year (2003-2007) average weighted by acreage for “irrigated shallow and deep root vegetables”, “irrigated Irish potatoes” and “irrigated melons.”
Tree nuts	$3,451	Based on five-year (2003-2007) average weighted by acreage for “irrigated pecans.”
Fruits	$5,902	Based on five-year (2003-2007) average weighted by acreage for “irrigated citrus”, “irrigated vineyards” and “irrigated ‘other’ orchard.”
Cotton	$488	Based on five-year (2003-2007) average weighted by acreage for “irrigated cotton.”
All other crops	$335	Irrigated figure is based on five-year (2003-2007) average weighted by acreage for “irrigated ‘forage’ crops”, “irrigated peanuts”, “irrigated alfalfa”, “irrigated ‘hay’ and pasture” and “irrigated ‘all other’ crops.”
*Figures are rounded. Source: Based on data from the Texas Agricultural Statistics Service, Texas Water Development Board, and Texas A&M University.		

An important consideration when estimating impacts to irrigation was determining which crops are affected by water shortages. One approach is the so-called rationing model, which assumes that farmers respond to water supply cutbacks by fallowing the lowest value crops in the region first and the highest valued crops last until the amount of water saved equals the shortage.[5] For example, if farmer A grows vegetables (higher value) and farmer B grows wheat (lower value) and they both face a proportionate cutback in irrigation water, then farmer B will sell water to farmer A. Farmer B will fallow her irrigated acreage before farmer A fallows anything. Of course, this assumes that farmers can and do transfer enough water to allow this to happen. A different approach involves constructing farm-level profit maximization models that conform to widely-accepted economic theory that farmers make decisions based on marginal net returns. Such models have good predictive capability, but data requirements and complexity are high. Given that a detailed analysis for each region would require a substantial amount of farm-level data and analysis, the following investigation assumes that projected shortages are distributed equally across predominant crops in the region. Predominant in this case are crops that comprise at least one percent of total acreage in the region.

The following steps outline the overall process used to estimate direct impacts to irrigated agriculture:

1. *Distribute shortages across predominant crop types in the region*. Again, unmet water needs were distributed equally across crop sectors that constitute one percent or more of irrigated acreage.

2. *Estimate associated reductions in output for affected crop sectors*. Output reductions are based on elasticities discussed previously and on estimated values per acre for different crops. Values per acre stem from the same data used to estimate output for the year 2006 baseline. Using multipliers, we then generate estimates of forgone income, jobs, and tax revenues based on reductions in gross sales and final demand.

Livestock

The approach used for the livestock sector is basically the same as that used for crop production. As is the case with crops, livestock categorizations used by the TWDB differ from those used in IMPLAN datasets, and TWDB groupings were assigned to a given IMPLAN sector (Table 4). Then we:

1) *Distribute projected water needs equally among predominant livestock sectors and estimate lost output*: As is the case with irrigation, shortages are assumed to affect all livestock sectors equally; however, the category of “other” is not included given its small size. If water needs were small relative to total demands, we assume that producers would haul in water by truck to fill stock tanks. The cost per acre-foot ($24,000) is based on 2008 rates charged by various water haulers in Texas, and assumes that the average truck load is 6,500 gallons at a hauling distance of 60 miles.

3) *Estimate reduced output in forward processors for livestock sectors*. Reductions in output for livestock sectors are assumed to have a proportional impact on forward processors in the region such as meat packers. In other words, if the cows were gone, meat-packing plants or fluid milk manufacturers) would likely have little to process. This is not an unreasonable premise. Since the

[5] The rationing model was initially proposed by researchers at the University of California at Berkeley, and was then modified for use in a study conducted by the U.S. Environmental Protection Agency that evaluated how proposed water supply cutbacks recommended to protect water quality in the Bay/Delta complex in California would affect farmers in the Central Valley. See, Zilberman, D., Howitt, R. and Sunding, D. “*Economic Impacts of Water Quality Regulations in the San Francisco Bay and Delt*a.” Western Consortium for Public Health. May 1993.

1950s, there has been a major trend towards specialized cattle feedlots, which in turn has decentralized cattle purchasing from livestock terminal markets to direct sales between producers and slaughterhouses. Today, the meat packing industry often operates large processing facilities near high concentrations of feedlots to increase capacity utilization.[6] As a result, packers are heavily dependent upon nearby feedlots. For example, a recent study by the USDA shows that on average meat packers obtain 64 percent of cattle from within 75 miles of their plant, 82 percent from within 150 miles and 92 percent from within 250 miles.[7]

Table 4: Description of Livestock Sectors

IMPLAN Category	TWDB Category
Cattle ranching and farming	Cattle, cow calf, feedlots and dairies
Poultry and egg production	Poultry production.
Other livestock	Livestock other than cattle and poultry (i.e., horses, goats, sheep, hogs)
Milk manufacturing	Fluid milk manufacturing, cheese manufacturing, ice cream manufacturing etc.
Meat packing	Meat processing present in the region from slaughter to final processing

1.1.3 Impacts to Municipal Water User Groups

Disaggregation of Municipal Water Demands

Estimating the economic impacts for the municipal water user groups is complicated for a number of reasons. For one, municipal use comprises a range of consumers including commercial businesses, institutions such as schools and government and households. However, reported water needs are not distributed among different municipal water users. In other words, how much of a municipal need is commercial and how much is residential (domestic)?

The amount of commercial water use as a percentage of total municipal demand was estimated based on “GED” coefficients (gallons per employee per day) published in secondary sources.[8] For example, if year 2006 baseline data for a given economic sector (e.g., amusement and recreation services) shows employment at 30 jobs and the GED coefficient is 200, then average daily water use by that sector is (30 x 200 = 6,000 gallons) or 6.7 acre-feet per year. Water not attributed to commercial use is considered

[6] Ferreira, W.N. “*Analysis of the Meat Processing Industry in the United States*.” Clemson University Extension Economics Report ER211, January 2003.

[7] Ward, C.E. “*Summary of Results from USDA’s Meatpacking Concentration Study*.” Oklahoma Cooperative Extension Service, OSU Extension Facts WF-562.

[8] Sources for GED coefficients include: Gleick, P.H., Haasz, D., Henges-Jeck, C., Srinivasan, V., Wolff, G. Cushing, K.K., and Mann, A. "*Waste Not, Want Not*: *The Potential for Urban Water Conservation in California*." Pacific Institute. November 2003. U.S. Bureau of the Census. 1982 Census of Manufacturers: Water Use in Manufacturing. USGPO, Washington D.C. See also: “*U.S. Army Engineer Institute for Water Resources, IWR Report 88-R-6.*,” Fort Belvoir, VA. See also, Joseph, E. S., 1982, "*Municipal and Industrial Water Demands of the Western United States*." Journal of the Water Resources Planning and Management Division, Proceedings of the American Society of Civil Engineers, v. 108, no. WR2, p. 204-216. See also, Baumann, D. D., Boland, J. J., and Sims, J. H., 1981, “*Evaluation of Water Conservation for Municipal and Industrial Water Supply*.” U.S. Army Corps of Engineers, Institute for Water Resources, Contract no. 82-C1.

domestic, which includes single and multi-family residential consumption, institutional uses and all use designated as “county-other.” Based on our analysis, commercial water use is about 5 to 35 percent of municipal demand. Less populated rural counties occupy the lower end of the spectrum, while larger metropolitan counties are at the higher end.

After determining the distribution of domestic versus commercial water use, we developed methods for estimating impacts to the two groups.

Domestic Water Uses

Input output models are not well suited for measuring impacts of shortages for domestic water uses, which make up the majority of the municipal water use category. To estimate impacts associated with domestic water uses, municipal water demand and needs are subdivided into residential, and commercial and institutional use. Shortages associated with residential water uses are valued by estimating proxy demand functions for different water user groups allowing us to estimate the marginal value of water, which would vary depending upon the level of water shortages. The more severe the water shortage, the more costly it becomes. For instance, a 2 acre-foot shortage for a group of households that use 10 acre-feet per year would not be as severe as a shortage that amounted to 8 acre-feet. In the case of a 2 acre-foot shortage, households would probably have to eliminate some or all outdoor water use, which could have implicit and explicit economic costs including losses to the horticultural and landscaping industry. In the case of an 8 acre-foot shortage, people would have to forgo all outdoor water use and most indoor water consumption. Economic impacts would be much higher in the latter case because people, and would be forced to find emergency alternatives assuming alternatives were available.

To estimate the value of domestic water uses, TWDB staff developed marginal loss functions based on constant elasticity demand curves. This is a standard and well-established method used by economists to value resources such as water that have an explicit monetary cost.

A constant price elasticity of demand is estimated using a standard equation:

$$w = kc^{(-\varepsilon)}$$

where:

- w is equal to average monthly residential water use for a given water user group measured in thousands of gallons;
- k is a constant intercept;
- c is the average cost of water per 1,000 gallons; and
- ε is the price elasticity of demand.

Price elasticities (-0.30 for indoor water use and -0.50 for outdoor use) are based on a study by Bell et al.[9] that surveyed 1,400 water utilities in Texas that serve at least 1,000 people to estimate demand elasticity for several variables including price, income, weather etc. Costs of water and average use per month per household are based on data from the Texas Municipal League's annual water and wastewater rate surveys - specifically average monthly household expenditures on water and wastewater

[9] Bell, D.R. and Griffin, R.C. “*Community Water Demand in Texas as a Century is Turned*.” Research contract report prepared for the Texas Water Development Board. May 2006.

in different communities across the state. After examining variance in costs and usage, three different categories of water user groups based on population (population less than 5,000, cities with populations ranging from 5,000 to 99,999 and cities with populations exceeding 100,000) were selected to serve as proxy values for municipal water groups that meet the criteria (Table 5).[10]

Table 5: Water Use and Costs Parameters Used to Estimated Water Demand Functions
(average monthly costs per acre-foot for delivered water and average monthly use per household)

Community Population	Water	Wastewater	Total monthly cost	Avg. monthly use (gallons)
Less than or equal to 5,000	$1,335	$1,228	$2,563	6,204
5,000 to 100,000	$1,047	$1,162	$2,209	7,950
Great than or equal to 100,000	$718	$457	$1,190	8,409

Source: Based on annual water and wastewater rate surveys published by the Texas Municipal League.

As an example, Table 6 shows the economic impact per acre-foot of domestic water needs for municipal water user groups with population exceeding 100,000 people. There are several important assumptions incorporated in the calculations:

1) Reported values are net of the variable costs of treatment and distribution such as expenses for chemicals and electricity since using less water involves some savings to consumers and utilities alike; and for outdoor uses we do not include any value for wastewater.

2) Outdoor and "non-essential" water uses would be eliminated before indoor water consumption was affected, which is logical because most water utilities in Texas have drought contingency plans that generally specify curtailment or elimination of outdoor water use during droughts.[11] Determining how much water is used for outdoor purposes is based on several secondary sources. The first is a major study sponsored by the American Water Works Association, which surveyed cities in states including Colorado, Oregon, Washington, California, Florida and Arizona. On average across all cities surveyed 58 percent of single family residential water use was for outdoor activities. In cities with climates comparable to large metropolitan areas of Texas, the average was 40 percent.[12] Earlier findings of the U.S. Water Resources Council showed a national

[10] Ideally, one would want to estimate demand functions for each individual utility in the state. However, this would require an enormous amount of time and resources. For planning purposes, we believe the values generated from aggregate data are more than sufficient.

[11] In Texas, state law requires retail and wholesale water providers to prepare and submit plans to the Texas Commission on Environmental Quality (TCEQ). Plans must specify demand management measures for use during drought including curtailment of "non-essential water uses." Non-essential uses include, but are not limited to, landscape irrigation and water for swimming pools or fountains. For further information see the Texas Environmental Quality Code §288.20.

[12] See, Mayer, P.W., DeOreo, W.B., Opitz, E.M., Kiefer, J.C., Davis, W., Dziegielewski, D., Nelson, J.O. "*Residential End Uses of Water*." Research sponsored by the American Water Works Association and completed by Aquacraft, Inc. and Planning and Management Consultants, Ltd. (PMCL@CDM).

average of 33 percent. Similarly, the United States Environmental Protection Agency (USEPA) estimated that landscape watering accounts for 32 percent of total residential and commercial water use on annual basis.[13] A study conducted for the California Urban Water Agencies (CUWA) calculated average annual values ranging from 25 to 35 percent.[14] Unfortunately, there does not appear to be any comprehensive research that has estimated non-agricultural outdoor water use in Texas. As an approximation, an average annual value of 30 percent based on the above references was selected to serve as a rough estimate in this study.

3) As shortages approach 100 percent values become immense and theoretically infinite at 100 percent because at that point death would result, and willingness to pay for water is immeasurable. Thus, as shortages approach 80 percent of monthly consumption, we assume that households and non-water intensive commercial businesses (those that use water only for drinking and sanitation would have water delivered by tanker truck or commercial water delivery companies. Based on reports from water companies throughout the state, we estimate that the cost of trucking in water is around $21,000 to $27,000 per acre-feet assuming a hauling distance of between 20 to 60 miles. This is not an unreasonable assumption. The practice was widespread during the 1950s drought and recently during droughts in this decade. For example, in 2000 at the heels of three consecutive drought years Electra - a small town in North Texas - was down to its last 45 days worth of reservoir water when rain replenished the lake, and the city was able to refurbish old wells to provide supplemental groundwater. At the time, residents were forced to limit water use to 1,000 gallons per person per month - less than half of what most people use - and many were having water delivered to their homes by private contractors.[15] In 2003 citizens of Ballinger, Texas, were also faced with a dwindling water supply due to prolonged drought. After three years of drought, Lake Ballinger, which supplies water to more than 4,300 residents in Ballinger and to 600 residents in nearby Rowena, was almost dry. Each day, people lined up to get water from a well in nearby City Park. Trucks hauling trailers outfitted with large plastic and metal tanks hauled water to and from City Park to Ballinger.[16]

[13] U.S. Environmental Protection Agency. *"Cleaner Water through Conservation*." USEPA Report no. 841-B-95-002. April, 1995.

[14] Planning and Management Consultants, Ltd. "*Evaluating Urban Water Conservation Programs: A Procedures Manual*." Prepared for the California Urban Water Agencies. February 1992.

[15] Zewe, C. "*Tap Threatens to Run Dry in Texas Town*." July 11, 2000. CNN Cable News Network.

[16] Associated Press, "*Ballinger Scrambles to Finish Pipeline before Lake Dries Up*." May 19, 2003.

Table 6: Economic Losses Associated with Domestic Water Shortages in Communities with Populations Exceeding 100,000 people

Water shortages as a percentage of total monthly household demands	No. of gallons remaining per household per day	No of gallons remaining per person per day	Economic loss (per acre-foot)	Economic loss (per gallon)
1%	278	93	$748	$0.00005
5%	266	89	$812	$0.0002
10%	252	84	$900	$0.0005
15%	238	79	$999	$0.0008
20%	224	75	$1,110	$0.0012
25%	210	70	$1,235	$0.0015
30%[a]	196	65	$1,699	$0.0020
35%	182	61	$3,825	$0.0085
40%	168	56	$4,181	$0.0096
45%	154	51	$4,603	$0.011
50%	140	47	$5,109	$0.012
55%	126	42	$5,727	$0.014
60%	112	37	$6,500	$0.017
65%	98	33	$7,493	$0.02
70%	84	28	$8,818	$0.02
75%	70	23	$10,672	$0.03
80%	56	19	$13,454	$0.04
85%	42	14	$18,091 ($24,000)[b]	$0.05 ($0.07)[b]
90%	28	9	$27,363 ($24,000)	$0.08 ($0.07)
95%	14	5	$55,182 ($24,000)	$0.17 ($0.07)
99%	3	0.9	$277,728 ($24,000)	$0.85 ($0.07)
99.9%	1	0.5	$2,781,377 ($24,000)	$8.53 ($0.07)
100%	0	0	Infinite ($24,000)	Infinite ($0.07)

[a] The first 30 percent of needs are assumed to be restrictions of outdoor water use; when needs reach 30 percent of total demands all outdoor water uses would be restricted. Needs greater than 30 percent include indoor use

[b] As shortages approach 100 percent the value approaches infinity assuming there are not alternatives available; however, we assume that communities would begin to have water delivered by tanker truck at an estimated cost of $24,000 per acre-foot when shortages breached 85 percent.

Commercial Businesses

Effects of water shortages on commercial sectors were estimated in a fashion similar to other business sectors meaning that water shortages would affect the ability of these businesses to operate. This is particularly true for "water intensive" commercial sectors that are need large amounts of water (in addition to potable and sanitary water) to provide their services. These include:

- car-washes,
- laundry and cleaning facilities,
- sports and recreation clubs and facilities including race tracks,
- amusement and recreation services,
- hospitals and medical facilities,
- hotels and lodging places, and
- eating and drinking establishments.

A key assumption is that commercial operations would not be affected until water shortages were at least 50 percent of total municipal demand. In other words, we assume that residential water consumers would reduce water use including all non-essential uses before businesses were affected.

An example will illustrate the breakdown of municipal water needs and the overall approach to estimating impacts of municipal needs. Assume City A experiences an unexpected shortage of 50 acre-feet per year when their demands are 200 acre-feet per year. Thus, shortages are only 25 percent of total municipal use and residents of City A could eliminate needs by restricting landscape irrigation. City B, on the other hand, has a deficit of 150 acre-feet in 2020 and a projected demand of 200 acre-feet. Thus, total shortages are 75 percent of total demand. Emergency outdoor and some indoor conservation measures could eliminate 50 acre-feet of projected needs, yet 50 acre-feet would still remain. To eliminate" the remaining 50 acre-feet water intensive commercial businesses would have to curtail operations or shut down completely.

Three other areas were considered when analyzing municipal water shortages: 1) lost revenues to water utilities, 2) losses to the horticultural and landscaping industries stemming for reduction in water available for landscape irrigation, and 3) lost revenues and related economic impacts associated with reduced water related recreation.

Water Utility Revenues

Estimating lost water utility revenues was straightforward. We relied on annual data from the "*Water and Wastewater Rate Survey*" published annually by the Texas Municipal League to calculate an average value per acre-foot for water and sewer. For water revenues, average retail water and sewer rates multiplied by total water needs served as a proxy. For lost wastewater, total unmet needs were adjusted for return flow factor of 0.60 and multiplied by average sewer rates for the region. Needs reported as "county-other" were excluded under the presumption that these consist primarily of self-supplied water uses. In addition, 15 percent of water demand and needs are considered non-billed or "unaccountable" water that comprises things such as leakages and water for municipal government functions (e.g., fire departments). Lost tax receipts are based on current rates for the "miscellaneous gross receipts tax, "which the state collects from utilities located in most incorporated cities or towns in Texas. We do not include lost water utility revenues when aggregating impacts of municipal water shortages to regional and state levels to prevent double counting.

Horticultural and Landscaping Industry

The horticultural and landscaping industry, also referred to as the "green Industry," consists of businesses that produce, distribute and provide services associated with ornamental plants, landscape and garden supplies and equipment. Horticultural industries often face big losses during drought. For example, the recent drought in the Southeast affecting the Carolinas and Georgia horticultural and landscaping businesses had a harsh year. Plant sales were down, plant mortality increased, and watering costs increased. Many businesses were forced to close locations, lay off employees, and even file for bankruptcy. University of Georgia economists put statewide losses for the industry at around $3.2 billion during the 3-year drought that ended in 2008.[17] Municipal restrictions on outdoor watering play a significant role. During drought, water restrictions coupled with persistent heat has a psychological effect on homeowners that reduces demands for landscaping products and services. Simply put, people were afraid to spend any money on new plants and landscaping.

In Texas, there do not appear to be readily available studies that analyze the economic effects of water shortages on the industry. However, authors of this report believe negative impacts do and would result in restricting landscape irrigation to municipal water consumers. The difficulty in measuring them is two-fold. First, as noted above, data and research for these types of impacts that focus on Texas are limited; and second, economic data provided by IMPLAN do not disaggregate different sectors of the green industry to a level that would allow for meaningful and defensible analysis.[18]

Recreational Impacts

Recreational businesses often suffer when water levels and flows in rivers, springs and reservoirs fall significantly during drought. During droughts, many boat docks and lake beaches are forced to close, leading to big losses for lakeside business owners and local communities. Communities adjacent to popular river and stream destinations such as Comal Springs and the Guadalupe River also see their business plummet when springs and rivers dry up. Although there are many examples of businesses that have suffered due to drought, dollar figures for drought-related losses to the recreation and tourism industry are not readily available, and very difficult to measure without extensive local surveys. Thus, while they are important, economic impacts are not measured in this study.

Table 7 summarizes impacts of municipal water shortages at differing levels of magnitude, and shows the ranges of economic costs or losses per acre-foot of shortage for each level.

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[17] Williams, D. *"Georgia landscapers eye rebound from Southeast drought."* Atlanta Business Chronicle, Friday, June 19, 2009

[18] Economic impact analyses prepared by the TWDB for 2006 regional water plans did include estimates for the horticultural industry. However, year 2000 and prior IMPLAN data were disaggregated to a finer level. In the current dataset (2006), the sector previously listed as "Landscaping and Horticultural Services" (IMPLAN Sector 27) is aggregated into "Services to Buildings and Dwellings" (IMPLAN Sector 458).

Table 7: Impacts of Municipal Water Shortages at Different Magnitudes of Shortages		
Water shortages as percent of total municipal demands	Impacts	Economic costs per acre-foot*
0-30%	✓ Lost water utility revenues ✓ Restricted landscape irrigation and non-essential water uses	$730 - $2,040
30-50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use	$2,040 - $10,970
>50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use ✓ Restriction or elimination of commercial water use ✓ Importing water by tanker truck	$10,970 - varies
*Figures are rounded		

1.1.4 Industrial Water User Groups

Manufacturing

Impacts to manufacturing were estimated by distributing water shortages among industrial sectors at the county level. For example, if a planning group estimates that during a drought of record water supplies in County A would only meet 50 percent of total annual demands for manufactures in the county, we reduced output for each sector by 50 percent. Since projected manufacturing demands are based on TWDB Water Uses Survey data for each county, we only include IMPLAN sectors represented in the TWBD survey database. Some sectors in IMPLAN databases are not part of the TWDB database given that they use relatively small amounts of water - primarily for on-site sanitation and potable purposes. To maintain consistency between IMPLAN and TWDB databases, Standard Industrial Classification (SIC) codes both databases were cross referenced in county with shortages. Non-matches were excluded when calculating direct impacts.

Mining

The process of mining is very similar to that of manufacturing. We assume that within a given county, shortages would apply equally to relevant mining sectors, and IMPLAN sectors are cross referenced with TWDB data to ensure consistency.

In Texas, oil and gas extraction and sand and gravel (aggregates) operations are the primary mining industries that rely on large volumes of water. For sand and gravel, estimated output reductions are straightforward; however, oil and gas is more complicated for a number of reasons. IMPLAN does not necessarily report the physical extraction of minerals by geographic local, but rather the sales revenues reported by a particular corporation.

For example, at the state level revenues for IMPLAN sector 19 (oil and gas extraction) and sector 27 (drilling oil and gas wells) totals $257 billion. Of this, nearly $85 billion is attributed to Harris County. However, only a very small fraction (less than one percent) of actual production takes place in the county. To measure actual potential losses in well head capacity due to water shortages, we relied on county level production data from the Texas Railroad Commission (TRC) and average well-head market prices for crude and gas to estimate lost revenues in a given county. After which, we used to IMPLAN ratios to estimate resultant losses in income and employment.

Other considerations with respect to mining include:

> 1) Petroleum and gas extraction industry only uses water in significant amounts for secondary recovery. Known in the industry as enhanced or water flood extraction, secondary recovery involves pumping water down injection wells to increase underground pressure thereby pushing oil or gas into other wells. IMPLAN output numbers do not distinguish between secondary and non-secondary recovery. To account for the discrepancy, county-level TRC data that show the proportion of barrels produced using secondary methods were used to adjust IMPLAN data to reflect only the portion of sales attributed to secondary recovery.
>
> 2) A substantial portion of output from mining operations goes directly to businesses that are classified as manufacturing in our schema. Thus, multipliers measuring backward linkages for a given manufacturer might include impacts to a supplying mining operation. Care was taken not to double count in such situations if both a mining operation and a manufacturer were reported as having water shortages.

Steam-electric

At minimum without adequate cooling water, power plants cannot safely operate. As water availability falls below projected demands, water levels in lakes and rivers that provide cooling water would also decline. Low water levels could affect raw water intakes and outfalls at electrical generating units in several ways. For one, power plants are regulated by thermal emission guidelines that specify the maximum amount of heat that can go back into a river or lake via discharged cooling water. Low water levels could result in permit compliance issues due to reduced dilution and dispersion of heat and subsequent impacts on aquatic biota near outfalls.[19] However, the primary concern would be a loss of head (i.e., pressure) over intake structures that would decrease flows through intake tunnels. This would affect safety related pumps, increase operating costs and/or result in sustained shut-downs. Assuming plants did shutdown, they would not be able to generate electricity.

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[19] Section 316 (b) of the Clean Water Act requires that thermal wastewater discharges do not harm fish and other wildlife.

Among all water use categories steam-electric is unique and cautions are needed when applying methods used in this study. Measured changes to an economy using input-output models stem directly from changes in sales revenues. In the case of water shortages, one assumes that businesses will suffer lost output if process water is in short supply. For power generation facilities this is true as well. However, the electric services sector in IMPLAN represents a corporate entity that may own and operate several electrical generating units in a given region. If one unit became inoperable due to water shortages, plants in other areas or generation facilities that do not rely heavily on water such as gas powered turbines might be able to compensate for lost generating capacity. Utilities could also offset lost production via purchases on the spot market.[20] Thus, depending upon the severity of the shortages and conditions at a given electrical generating unit, energy supplies for local and regional communities could be maintained. But in general, without enough cooling water, utilities would have to throttle back plant operations, forcing them to buy or generate more costly power to meet customer demands.

Measuring impacts end users of electricity is not part of this study as it would require extensive local and regional level analysis of energy production and demand. To maintain consistency with other water user groups, impacts of steam-electric water shortages are measured in terms of lost revenues (and hence income) and jobs associated with shutting down electrical generating units.

1.2 Social Impacts of Water Shortages

As the name implies, the effects of water shortages can be social or economic. Distinctions between the two are both semantic and analytical in nature – more so analytic in the sense that social impacts are harder to quantify. Nevertheless, social effects associated with drought and water shortages are closely tied to economic impacts. For example, they might include:

- demographic effects such as changes in population,
- disruptions in institutional settings including activity in schools and government,
- conflicts between water users such as farmers and urban consumers,
- health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations),
- mental and physical stress (e.g., anxiety, depression, domestic violence),
- public safety issues from forest and range fires and reduced fire fighting capability,
- increased disease caused by wildlife concentrations,
- loss of aesthetic and property values, and
- reduced recreational opportunities.[21]

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[20] Today, most utilities participate in large interstate "power pools" and can buy or sell electricity "on the grid" from other utilities or power marketers. Thus, assuming power was available to buy, and assuming that no contractual or physical limitations were in place such as transmission constraints; utilities could offset lost power that resulted from waters shortages with purchases via the power grid.

[21] Based on information from the website of the National Drought Mitigation Center at the University of Nebraska Lincoln. Available online at: http://www.drought.unl.edu/risk/impacts.htm. See also, Vanclay, F. "*Social Impact Assessment*." in Petts, J. (ed) International Handbook of Environmental Impact Assessment. 1999.

Social impacts measured in this study focus strictly on demographic effects including changes in population and school enrollment. Methods are based on demographic projection models developed by the Texas State Data Center and used by the TWDB for state and regional water planning. Basically, the social impact model uses results from the economic component of the study and assesses how changes in labor demand would affect migration patterns in a region. Declines in labor demand as measured using adjusted IMPLAN data are assumed to affect net economic migration in a given regional water planning area. Employment losses are adjusted to reflect the notion that some people would not relocate but would seek employment in the region and/or public assistance and wait for conditions to improve. Changes in school enrollment are simply the proportion of lost population between the ages of 5 and 17.

2. Results

Section 2 presents the results of the analysis at the regional level. Included are baseline economic data for each water use category, and estimated economics impacts of water shortages for water user groups with reported deficits. According to the 2011 *Region F Regional Water Plan*, during severe drought irrigation, livestock municipal, manufacturing, mining and steam-electric water user groups would experience water shortages in the absence of new water management strategies.

2.1 Overview of Regional Economy

On an annual basis, the Region F economy generates $20.8 billion worth of gross state product for Texas ($19.1 billion in income and $1.7 billion in business taxes) and supports nearly 227,000 jobs (Table 8). Generating about $9.8 billion in gross state product, agriculture, manufacturing, and mining are the region's primary base economic sectors.[22] Municipal sectors also generate substantial amounts of income and are major employers in the region; however, many businesses that make up the municipal category such as restaurants and retail stores are non-basic industries meaning they exist to provide services to people who work would in base industries. In other words, without base industries, many jobs categorized as municipal would not exist.

[22] Base industries are those that supply markets outside of the region. These industries are crucial to the local economy and are called the economic base of a region. Appendix A shows how IMPLAN's 529 sectors were allocated to water use category, and shows economic data for each sector.

Table 8: The Region F Economy by Water User Group ($millions)*						
Water Use Category	**Total sales**	**Intermediate sales**	**Final sales**	**Jobs**	**Income**	**Business taxes**
Irrigation	$131.11	$21.48	$109.67	2,267	$68.24	$1.79
Livestock	$801.61	$432.80	$368.82	11,083	$78.45	$11.11
Manufacturing	$8,793.15	$1,386.66	$7,406.49	36,089	$2,613.94	$51.57
Mining	$11,507.80	$5,279.12	$6,228.68	27,668	$6,415.53	$563.76
Steam-electric	$376.64	$105.96	$270.68	932	$261.54	$44.63
Municipal	$15,709.07	$3,801.30	$11,907.77	148,786	$9,682.07	$981.89
Regional total	$37,319.38	$11,027.32	$26,292.11	226,825	$19,119.77	$1,654.75

[a] Appendix 1 displays data for individual IMPLAN sectors that make up each water use category. Based on data from the Texas Water Development Board, and year 2006 data from the Minnesota IMPLAN Group, Inc.

2.2 Impacts of Agricultural Water Shortages

According to the 2011 *Region F Regional Water Plan*, during severe drought most counties in the region would experiences shortages of irrigation water ranging anywhere from about 5 to 90 percent of total annual irrigation demands. Shortages of these magnitudes would reduce gross state product (income plus state and local business taxes) by about $30 to 35 million depending upon the decade Table 9).

Table 9: Economic Impacts of Water Shortages for Irrigation Water User Groups ($millions)			
Decade	**Lost income from reduced crop production ***	**Lost state and local tax revenues from reduced crop production**	**Lost jobs from reduced crop production**
2010	$34.97	$1.70	454
2020	$34.45	$1.68	448
2030	$33.89	$1.65	442
2040	$33.02	$1.61	432
2050	$32.48	$1.58	426
2060	$31.97	$1.56	419

*Changes to income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.3 Impacts of Municipal Water Shortages

Water shortages are projected to occur in a significant number of communities throughout the region, and deficits range anywhere from 1 to 100 percent of total annual water demands. At the regional level, the estimated economic value of domestic water shortages totals $164 million in 2010 and $446 million in 2060 (Table 10). Due to curtailment of commercial business activity, municipal shortages would also reduce gross state product (income plus taxes) by $40 million in 2010 and $433 million in 2060.

Table 10: Economic Impacts of Water Shortages for Municipal Water User Groups ($millions)

Decade	Monetary value of domestic water shortages	Lost income from reduced commercial business activity*	Lost state and local taxes from reduced commercial business activity	Lost jobs from reduced commercial business activity	Lost water utility revenues
2010	$164.31	$35.84	$3.58	1,165	$22.60
2020	$244.46	$36.34	$3.64	1,180	$38.89
2030	$275.39	$119.12	$9.52	3,208	$48.62
2040	$363.08	$366.53	$27.34	9,367	$62.99
2050	$432.97	$386.74	$29.00	9,940	$67.58
2060	$446.11	$403.41	$30.22	10,360	$72.94

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.4 Impacts of Manufacturing Water Shortages

Manufacturing water shortages are projected to occur in the counties of Coleman, Ector, Howard, Kimble, Runnels, and Tom Green. Projected shortages would reduce gross state product (income plus taxes) by an estimated $891 million in 2020 and $1,356 million in 2060 (Table 11).

Table 11: Economic Impacts of Water Shortages for Manufacturing Water User Groups ($millions)			
Decade	Lost income due to reduced manufacturing output*	Lost state and local business tax revenues due to reduced manufacturing output	Lost jobs due to reduced manufacturing output
2010	$829.61	$62.12	15,723
2020	$936.77	$69.97	17,705
2030	$994.28	$75.07	19,076
2040	$1,092.03	$82.10	20,836
2050	$1,166.59	$87.70	22,261
2060	$1,261.31	$94.74	24,041

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.5 Impacts of Mining Water Shortages

Mining water shortages are projected to occur in Coleman, Coke, and Howard counties, and would primarily affect oil extraction. Combined shortages for each county would result in estimated losses of gross state product totaling $13.5 million dollars in 2010 and $11.0 million 2060 (Table 12).

Table 12: Economic Impacts of Water Shortages for Mining Water User Groups ($millions)			
Decade	Lost income due to reduced mining output*	Lost state and local business tax revenues due to reduced mining output	Lost jobs due to reduced mining output
2010	$12.50	$0.94	78
2020	$16.04	$1.21	101
2030	$2.26	$0.14	13
2040	$4.75	$0.33	29
2050	$6.70	$0.49	41
2060	$9.83	$0.73	61

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.6 Impacts of Steam-electric Water Shortages

Water shortages for electrical generating units are projected in Coke, Ector, Mitchell, Tom Green and Ward counties resulting in estimated losses of gross state product totaling $607 million dollars in 2010, and $2,017 billion in 2060 (Table 13).

Table 13: Economic Impacts of Water Shortages for Steam-electric Water User Groups ($millions)

Decade	Lost income due to reduced electrical generation*	Lost state and local business tax revenues due to reduced electrical generation	Lost jobs due to reduced electrical generation
2010	$530.83	$76.19	1,805
2020	$691.34	$99.23	2,350
2030	$1,045.50	$150.07	3,554
2040	$1,232.24	$176.87	4,189
2050	$1,468.65	$210.80	4,993
2060	$1,763.75	$253.16	5,996

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.7 Social Impacts of Water Shortages

As discussed previously, social impacts focus on changes in population and school enrollment in the region. In 2010, estimated population losses total 25,050 with corresponding reductions in school enrollment of 7,065 students (Table 15). In 2060, population would decline by 49,236 and school enrollment would fall by 9,106.

Table 15: Social Impacts of Water Shortages (2010-2060)

Year	Population Losses	Declines in School Enrollment
2010	25,050	7,065
2020	26,239	7,444
2030	31,670	8,389
2040	41,980	7,759
2050	45,362	8,378
2060	49,236	9,106

2.8 Distribution of Impacts by Major River Basin

Administrative rules require that impacts are presented by both planning region and major river basin. To meet rule requirements, impacts were allocated among basins based on the distribution of water shortages in relevant basins. For example, if 50 percent of water shortages in River Basin A and 50 percent occur in River Basin B, then impacts were split equally among the two basins. Table 16 displays the results.

Table 16: Distribution of Impacts by Major River Basin (2010-2060)

River Basin	2010	2020	2030	2040	2050	2060
Brazos	1%	1%	1%	1%	1%	1%
Colorado	80%	82%	82%	83%	83%	83%
Rio Grande	19%	17%	17%	16%	16%	16%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Appendix 1: Economic Data for Individual IMPLAN Sectors

Economic Data for Agricultural Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Irrigation	Cotton Farming	8	$53.73	$0.73	$53.04	919	$19.78	$0.48
Irrigation	Vegetable and Melon Farming	3	$27.14	$0.97	$26.17	233	$19.84	$0.24
Irrigation	Tree Nut Farming	4	$19.17	$1.01	$18.16	376	$13.34	$0.46
Irrigation	All “Other” Crop Farming	10	$18.30	$16.92	$1.38	206	$8.98	$0.35
Irrigation	Grain Farming	2	$8.96	$1.29	$7.67	446	$4.14	$0.16
Irrigation	Fruit Farming	5	$3.75	$0.57	$3.18	85	$2.13	$0.08
Irrigation	Oilseed Farming	1	$0.07	$0.00	$0.07	2	$0.03	$0.00
Livestock	Cattle ranching and farming	11	$401.54	$278.43	$123.11	7,838	$31.72	$8.44
Livestock	Animal- except poultry- slaughtering	67	$315.06	$84.24	$230.82	832	$31.15	$1.73
Livestock	Animal production- except cattle and poultry	13	$54.48	$46.20	$8.29	2,237	$5.30	$0.84
Livestock	Poultry and egg production	12	$30.53	$23.93	$6.60	176	$10.28	$0.10
	Total Agriculture		$932.73	$454.27	$478.50	13,350	$146.68	$12.90

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Mining and Steam-electric Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Mining	Oil and gas extraction	19	$5,205.54	$4,834.32	$371.22	8,214	$3,001.63	$308.29
Mining	Drilling oil and gas wells	27	$3,371.52	$16.83	$3,354.69	5,299	$997.63	$131.53
Mining	Support activities for oil and gas operations	28	$2,408.86	$334.58	$2,074.28	11,698	$2,184.47	$98.47
Mining	Stone mining and quarrying	24	$348.51	$35.86	$312.65	2,055	$178.44	$13.95
Mining	Natural gas distribution	31	$134.21	$53.79	$80.42	261	$31.27	$10.24
Mining	Sand- gravel- clay- and refractory mining	25	$22.60	$2.39	$20.21	85	$13.55	$0.67
Mining	Other nonmetallic mineral mining	26	$13.05	$1.30	$11.74	30	$7.39	$0.49
Mining	Support activities for other mining	29	$3.52	$0.05	$3.47	26	$1.16	$0.14
Total Mining	NA		$11,507.80	$5,279.12	$6,228.68	27,668	$6,415.53	$563.76
Steam-electric	Power generation and supply		$376.64	$105.96	$270.68	932	$261.54	$44.63

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Manufacturing Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	Petroleum refineries	142	$1,416.82	$526.63	$890.19	156	$154.70	$5.98
Manufacturing	New residential one-unit structures- all	33	$851.38	$0.00	$851.38	5,727	$282.36	$4.44
Manufacturing	Oil and gas field machinery and equipment	261	$523.73	$19.50	$504.22	1,465	$124.96	$2.54
Manufacturing	Other aluminum rolling and drawing	213	$482.71	$13.42	$469.30	642	$68.79	$2.74
Manufacturing	Commercial and institutional buildings	38	$479.41	$0.00	$479.41	4,993	$242.23	$2.98
Manufacturing	Air and gas compressor manufacturing	289	$392.54	$4.04	$388.51	911	$128.34	$2.41
Manufacturing	Vitreous china plumbing fixture manufacturing	182	$370.11	$19.16	$350.94	1,581	$194.11	$3.58
Manufacturing	Prefabricated metal buildings and components	232	$244.97	$12.30	$232.68	1,032	$50.43	$1.18
Manufacturing	Other new construction	41	$209.12	$0.00	$209.12	2,290	$112.29	$0.88
Manufacturing	Other miscellaneous chemical products	171	$149.55	$78.24	$71.31	333	$26.61	$0.65
Manufacturing	Synthetic rubber manufacturing	153	$148.58	$3.64	$144.94	199	$34.04	$0.82
Manufacturing	Asphalt paving mixture and blocks	143	$140.29	$125.83	$14.46	211	$27.81	$0.15
Manufacturing	Machine shops	243	$134.79	$32.53	$102.26	860	$70.03	$1.12
Manufacturing	Fabricated structural metal manufacturing	233	$121.00	$6.27	$114.74	482	$41.45	$0.67
Manufacturing	New residential additions and alterations-all	35	$120.95	$0.00	$120.95	682	$44.73	$0.63
Manufacturing	Cement manufacturing	191	$120.37	$0.32	$120.05	202	$53.57	$1.09
Manufacturing	Plastics pipe- fittings- and profile shapes	173	$116.14	$71.44	$44.70	310	$35.38	$0.80
Manufacturing	Plate work manufacturing	234	$110.15	$6.93	$103.21	446	$43.92	$0.57
Manufacturing	Iron- steel pipe and tubes	205	$107.02	$7.47	$99.55	209	$37.69	$0.96
Manufacturing	Motor vehicle parts manufacturing	350	$104.97	$8.44	$96.53	279	$26.82	$0.49
Manufacturing	Highway- street- bridge- and tunnel construct	39	$103.00	$0.00	$103.00	967	$51.86	$0.66
Manufacturing	Soft drink and ice manufacturing	85	$93.76	$5.24	$88.52	161	$7.92	$0.35
Manufacturing	New multifamily housing structures	34	$92.77	$0.00	$92.77	832	$43.47	$0.25
Manufacturing	Cut and sew apparel manufacturing	107	$76.34	$2.07	$74.27	541	$26.77	$0.43
Manufacturing	Water- sewer- and pipeline construction	40	$74.90	$0.00	$74.90	630	$33.22	$0.48
Manufacturing	Paperboard container manufacturing	126	$74.18	$0.79	$73.39	241	$18.19	$0.71
Manufacturing	Household vacuum cleaner manufacturing	328	$73.63	$2.78	$70.84	263	$24.46	$0.55
Manufacturing	All other manufacturing	various	$1,859.96	$439.61	$1,420.35	9,444	$607.80	$13.47
	Total manufacturing		**$8,793.15**	**$1,386.66**	**$7,406.49**	**36,089**	**$2,613.94**	**$51.57**

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Municipal Water User Groups ($millions)									
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Municipal	Wholesale trade	390	$2,098.95	$1,004.90	$1,094.05	12,934	$1,105.37	$310.12
Municipal	Owner-occupied dwellings	509	$1,892.34	$0.00	$1,892.34	0	$1,465.93	$223.76
Municipal	State & Local Education	503	$1,254.80	$0.00	$1,254.79	31,837	$1,254.80	$0.00
Municipal	Telecommunications	422	$965.38	$331.59	$633.79	3,360	$362.46	$60.38
Municipal	Food services and drinking places	481	$928.45	$118.56	$809.89	19,811	$373.53	$43.64
Municipal	Monetary authorities and depository credit in	430	$736.91	$242.70	$494.21	4,003	$517.47	$9.43
Municipal	State & Local Non-Education	504	$729.16	$0.00	$729.16	13,857	$729.16	$0.00
Municipal	Offices of physicians- dentists- and other he	465	$692.35	$0.00	$692.35	6,505	$486.53	$4.26
Municipal	Pipeline transportation	396	$617.24	$269.94	$347.30	801	$204.11	$43.20
Municipal	Truck transportation	394	$524.82	$284.17	$240.64	4,007	$240.77	$5.45
Municipal	Hospitals	467	$508.85	$0.00	$508.85	4,933	$252.98	$3.23
Municipal	Motor vehicle and parts dealers	401	$498.77	$54.24	$444.54	4,626	$257.34	$72.89
Municipal	Machinery and equipment rental and leasing	434	$433.59	$235.80	$197.78	1,401	$175.66	$6.14
Municipal	Real estate	431	$414.65	$164.14	$250.51	2,447	$240.10	$50.89
Municipal	Commercial machinery repair and maintenance	485	$413.71	$217.81	$195.90	2,466	$216.38	$15.81
Municipal	Architectural and engineering services	439	$402.20	$253.54	$148.67	3,640	$201.97	$1.68
Municipal	General merchandise stores	410	$375.62	$39.59	$336.03	7,016	$167.88	$53.50
Municipal	Other State and local government enterprises	499	$356.82	$116.19	$240.62	1,797	$121.61	$0.04
Municipal	Federal Military	505	$312.73	$0.00	$312.73	4,027	$312.73	$0.00
Municipal	Food and beverage stores	405	$283.68	$37.93	$245.75	5,296	$142.16	$31.15
Municipal	Federal Non-Military	506	$261.85	$0.00	$261.84	1,655	$261.84	$0.00
Municipal	Nursing and residential care facilities	468	$260.81	$0.00	$260.81	5,608	$161.88	$3.82
Municipal	Legal services	437	$258.66	$164.16	$94.50	2,162	$161.43	$5.06
Municipal	Management of companies and enterprises	451	$243.64	$229.12	$14.52	1,331	$136.89	$2.19
Municipal	Gasoline stations	407	$243.12	$36.92	$206.19	3,266	$131.09	$35.27
Municipal	All other municipal	various	$5,964.80	$2,337.40	$3,627.40	95,011	$2,952.30	$228.33
Municipal	Total municipal		$15,709.07	$3,801.30	$11,907.77	148,786	$9,682.07	$981.89
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Appendix 2: Impacts by Water User Group

Irrigation cont. ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Andrews County						
Reduced income from curtailed crop production	$2.6873	$2.6810	$2.6522	$2.3621	$2.3197	$2.2847
Reduced business taxes from curtailed crop production	$0.1093	$0.1090	$0.1079	$0.0961	$0.0943	$0.0929
Reduced jobs from curtailed crop production	33	33	33	29	29	28
Borden County						
Reduced income from curtailed crop production	$0.49	$0.49	$0.49	$0.49	$0.49	$0.49
Reduced business taxes from curtailed crop production	$0.02	$0.02	$0.02	$0.02	$0.02	$0.02
Reduced jobs from curtailed crop production	6	6	6	6	6	6
Brown County						
Reduced income from curtailed crop production	$1.31	$1.31	$1.31	$1.30	$1.30	$1.30
Reduced business taxes from curtailed crop production	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06
Reduced jobs from curtailed crop production	31	31	31	31	31	31
Coke County						
Reduced income from curtailed crop production	$0.03	$0.03	$0.03	$0.03	$0.03	$0.03
Reduced business taxes from curtailed crop production	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Reduced jobs from curtailed crop production	1	1	1	1	1	1
Coleman County						
Reduced income from curtailed crop production	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23
Reduced business taxes from curtailed crop production	$0.01	$0.01	$0.01	$0.01	$0.01	$0.01
Reduced jobs from curtailed crop production	6	6	6	6	6	6
Glasscock County						
Reduced income from curtailed crop production	$12.24	$12.06	$11.88	$11.69	$11.51	$11.33
Reduced business taxes from curtailed crop production	$0.60	$0.59	$0.58	$0.57	$0.56	$0.55
Reduced jobs from curtailed crop production	142	140	138	136	134	132

Irrigation cont. ($millions)						
	2010	2020	2030	2040	2050	2060
Irion County						
Reduced income from curtailed crop production	$0.13	$0.12	$0.12	$0.11	$0.11	$0.10
Reduced business taxes from curtailed crop production	$0.003	$0.003	$0.003	$0.003	$0.003	$0.003
Reduced jobs from curtailed crop production	2	2	2	1	1	1
Martin County						
Reduced income from curtailed crop production	$0.26	$0.19	$0.11	$0.00	$0.00	$0.00
Reduced business taxes from curtailed crop production	$0.01	$0.01	$0.00	$0.00	$0.00	$0.00
Reduced jobs from curtailed crop production	5	5	5	5	4	4
Menard County						
Reduced income from curtailed crop production	$0.46	$0.46	$0.45	$0.45	$0.44	$0.44
Reduced business taxes from curtailed crop production	$0.03	$0.03	$0.03	$0.02	$0.02	$0.02
Reduced jobs from curtailed crop production	10	10	10	10	10	10
Midland County						
Reduced income from curtailed crop production	$1.72	$1.73	$1.73	$1.72	$1.71	$1.69
Reduced business taxes from curtailed crop production	$0.09	$0.09	$0.09	$0.09	$0.08	$0.08
Reduced jobs from curtailed crop production	22	22	22	22	22	22
Reagan County						
Reduced income from curtailed crop production	$1.36	$1.31	$1.25	$1.18	$1.11	$1.04
Reduced business taxes from curtailed crop production	$0.07	$0.07	$0.06	$0.06	$0.06	$0.05
Reduced jobs from curtailed crop production	15	14	14	13	12	11
Runnels County						
Reduced income from curtailed crop production	$3.17	$3.09	$3.02	$2.94	$2.87	$2.79
Reduced business taxes from curtailed crop production	$0.16	$0.15	$0.15	$0.15	$0.14	$0.14
Reduced jobs from curtailed crop production	45	44	43	42	41	40
Tom Green County						
Reduced income from curtailed crop production	$0.20	$0.20	$0.20	$0.20	$0.19	$0.19
Reduced business taxes from curtailed crop production	$0.01	$0.01	$0.01	$0.01	$0.01	$0.01
Reduced jobs from curtailed crop production	3	3	3	3	3	3
Upton County						
Reduced income from curtailed crop production	$5.99	$5.96	$5.93	$5.90	$5.86	$5.83
Reduced business taxes from curtailed crop production	$0.30	$0.30	$0.30	$0.29	$0.29	$0.29
Reduced jobs from curtailed crop production	79	78	78	77	77	77

Irrigation cont. ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Ward County						
Reduced income from curtailed crop production	$0.09	$0.08	$0.10	$0.11	$0.11	$0.11
Reduced business taxes from curtailed crop production	$0.004	$0.004	$0.005	$0.01	$0.01	$0.01
Reduced jobs from curtailed crop production	2	1	2	2	2	2

Manufacturing ($millions)						
	2010	2020	2030	2040	2050	2060
Coleman County						
Reduced income from reduced manufacturing output	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78
Reduced business taxes from reduced manufacturing output	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11
Reduced jobs from reduced manufacturing output	55	55	55	55	55	55
Ector County						
Reduced income from reduced manufacturing output	$14.56	$19.85	$4.30	$15.75	$15.36	$16.23
Reduced business taxes from reduced manufacturing output	$0.71	$0.97	$0.21	$0.77	$0.75	$0.80
Reduced jobs from reduced manufacturing output	147	201	43	159	155	164
Howard County						
Reduced income from reduced manufacturing output	$7.04	$11.97	$0.00	$2.82	$4.93	$8.75
Reduced business taxes from reduced manufacturing output	$0.35	$0.59	$0.00	$0.14	$0.24	$0.43
Reduced jobs from reduced manufacturing output	71	121	0	29	50	89
Kimble County						
Reduced income from reduced manufacturing output	$50.42	$55.11	$59.15	$63.27	$67.02	$72.07
Reduced business taxes from reduced manufacturing output	$2.69	$2.94	$3.16	$3.38	$3.58	$3.84
Reduced jobs from reduced manufacturing output	163	179	192	205	217	234
Runnels County						
Reduced income from reduced manufacturing output	$20.83	$23.14	$25.13	$27.11	$28.76	$31.08
Reduced business taxes from reduced manufacturing output	$1.60	$1.78	$1.93	$2.09	$2.21	$2.39
Reduced jobs from reduced manufacturing output	421	467	508	548	581	628
Tom Green County						
Reduced income from reduced manufacturing output	$735.98	$825.91	$904.93	$982.30	$1,049.74	$1,132.40
Reduced business taxes from reduced manufacturing output	$56.65	$63.58	$69.66	$75.61	$80.81	$87.17
Reduced jobs from reduced manufacturing output	14,865	16,682	18,278	19,840	21,203	22,872

Mining ($millions)						
	2010	2020	2030	2040	2050	2060
Coke County						
Reduced income from reduced mining activity	$2.12	$2.93	$0.05	$0.59	$1.06	$1.77
Reduced business taxes from reduced mining activity	$0.15	$0.20	$0.00	$0.04	$0.07	$0.12
Reduced jobs from reduced mining activity	13	18	0	4	6	11
Coleman County						
Reduced income from reduced mining activity	$1.91	$2.02	$2.02	$2.02	$2.02	$2.02
Reduced business taxes from reduced mining activity	$0.11	$0.12	$0.12	$0.12	$0.12	$0.12
Reduced jobs from reduced mining activity	11	12	12	12	12	12
Howard County						
Reduced income from reduced mining activity	$8.48	$11.09	$0.19	$2.14	$3.63	$6.04
Reduced business taxes from reduced mining activity	$0.68	$0.89	$0.02	$0.17	$0.29	$0.49
Reduced jobs from reduced mining activity	54	71	1	14	23	39

Steam-electric ($millions)						
	2010	2020	2030	2040	2050	2060
Coke County						
Reduced income from reduced electrical generation	$23.08	$18.39	$21.52	$25.24	$29.86	$35.52
Reduced business taxes from reduced electrical generation	$3.31	$2.64	$3.09	$3.62	$4.29	$5.10
Reduced jobs from reduced electrical generation	78	63	73	86	102	121
Ector County						
Reduced income from reduced electrical generation	$31.29	$203.76	$565.96	$759.10	$994.54	$1,281.52
Reduced business taxes from reduced electrical generation	$4.49	$29.25	$81.23	$108.96	$142.75	$183.94
Reduced jobs from reduced electrical generation	106	693	1,924	2,580	3,381	4,356
Mitchell County						
Reduced income from reduced electrical generation	$456.24	$440.25	$424.18	$408.10	$392.11	$376.04
Reduced business taxes from reduced electrical generation	$65.49	$63.19	$60.88	$58.58	$56.28	$53.97
Reduced jobs from reduced electrical generation	1,551	1,497	1,442	1,387	1,333	1,278
Tom Green County						
Reduced income from reduced electrical generation	$20.22	$28.93	$33.85	$39.80	$47.06	$55.92
Reduced business taxes from reduced electrical generation	$2.90	$4.15	$4.86	$5.71	$6.76	$8.03
Reduced jobs from reduced electrical generation	69	98	115	135	160	190
Ward County						
Reduced income from reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$5.07	$14.74
Reduced business taxes from reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$0.73	$2.12
Reduced jobs from reduced electrical generation	0	0	0	0	17	50

Municipal ($millions)						
	2010	2020	2030	2040	2050	2060
Andrews						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.96	$0.98	$0.99
Lost utility revenues	$0.00	$0.00	$0.00	$1.49	$1.51	$1.53
Ballinger						
Monetary value of domestic water shortages	$7.38	$10.75	$7.67	$8.54	$23.75	$24.94
Lost income from reduced commercial business activity	$3.51	$4.15	$1.67	$1.95	$7.52	$7.90
Lost jobs due to reduced commercial business activity	132	156	63	74	284	298
Lost state and local taxes from reduced commercial business activity	$0.38	$0.45	$0.18	$0.21	$0.82	$0.86
Lost utility revenues	$1.31	$1.49	$1.35	$1.51	$2.33	$2.45
Brady						
Monetary value of domestic water shortages	$8.03	$8.13	$7.99	$7.84	$7.75	$7.75
Lost income from reduced commercial business activity	$1.06	$1.09	$1.05	$1.02	$1.00	$1.00
Lost jobs due to reduced commercial business activity	41	42	40	39	38	38
Lost state and local taxes from reduced commercial business activity	$0.12	$0.13	$0.12	$0.12	$0.12	$0.12
Lost utility revenues	$1.97	$2.00	$1.96	$1.92	$1.90	$1.90
Bronte Village						
Monetary value of domestic water shortages	$0.00	$0.02	$0.03	$0.05	$0.07	$0.09
Lost utility revenues	$0.00	$0.04	$0.06	$0.07	$0.09	$0.11
Coahoma						
Monetary value of domestic water shortages	$0.10	$0.12	$0.001	$0.01	$0.02	$0.04
Lost utility revenues	$0.10	$0.12	$0.002	$0.02	$0.04	$0.06
Coleman						
Monetary value of domestic water shortages	$25.91	$25.58	$25.24	$24.90	$24.66	$24.66
Lost income from reduced commercial business activity	$12.43	$12.28	$12.11	$11.95	$11.83	$11.83
Lost jobs due to reduced commercial business activity	348	344	339	335	332	332
Lost state and local taxes from reduced commercial business activity	$0.96	$0.95	$0.94	$0.92	$0.91	$0.91
Lost utility revenues	$2.54	$2.51	$2.48	$2.45	$2.42	$2.42

Municipal ($millions)						
	2010	2020	2030	2040	2050	2060
County-other (Coke)						
Monetary value of domestic water shortages	$0.04	$0.05	$0.00	$0.01	$0.01	$0.02
County-other (Coleman)						
Monetary value of domestic water shortages	$0.46	$0.43	$0.43	$0.43	$0.43	$0.46
County-other (Kimble)						
Monetary value of domestic water shortages	$0.01	$0.01	$0.003	$0.00	$0.00	$0.00
County-other (Menard)						
Monetary value of domestic water shortages	$0.03	$0.03	$0.03	$0.02	$0.02	$0.03
County-other (Runnels)						
Monetary value of domestic water shortages	$7.92	$6.38	$5.21	$3.96	$3.00	$1.85
County-other (Scurry)						
Monetary value of domestic water shortages	$0.07	$0.08	$0.00	$0.01	$0.03	$0.04
County-other (Tom Green)						
Monetary value of domestic water shortages	$0.04	$0.00	$0.00	$0.00	$0.00	$0.00
County-other (Ward)						
Monetary value of domestic water shortages	$0.00	$3.60	$3.60	$3.60	$3.60	$3.60
Junction						
Monetary value of domestic water shortages	$18.87	$18.85	$18.67	$18.49	$18.35	$18.35
Lost income from reduced commercial business activity	$9.58	$9.57	$9.48	$9.38	$9.31	$9.31
Lost jobs due to reduced commercial business activity	373	373	369	365	363	363
Lost state and local taxes from reduced commercial business activity	$1.22	$1.22	$1.21	$1.19	$1.19	$1.19
Lost utility revenues	$1.85	$1.85	$1.83	$1.82	$1.80	$1.80
Menard						
Monetary value of domestic water shortages	$0.07	$0.07	$0.05	$0.05	$0.04	$0.04
Lost utility revenues	$0.10	$0.10	$0.09	$0.07	$0.07	$0.07

Municipal ($millions)						
	2010	2020	2030	2040	2050	2060
Midland						
Monetary value of domestic water shortages	$1.06	$3.01	$95.81	$201.95	$244.36	$251.36
Lost income from reduced commercial business activity	$0.00	$0.00	$85.32	$311.55	$324.80	$339.87
Lost jobs due to reduced commercial business activity	0	0	2,125	7,760	8,090	8,466
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$6.16	$22.49	$23.45	$24.54
Lost utility revenues	$2.29	$4.88	$30.91	$41.59	$42.80	$44.20
Miles						
Monetary value of domestic water shortages	$5.12	$5.60	$5.97	$3.50	$3.71	$3.91
Lost income from reduced commercial business activity	$1.54	$1.69	$1.80	$1.91	$2.03	$2.14
Lost jobs due to reduced commercial business activity	41	45	48	51	54	57
Lost state and local taxes from reduced commercial business activity	$0.19	$0.21	$0.23	$0.24	$0.26	$0.27
Lost utility revenues	$0.28	$0.30	$0.32	$0.34	$0.36	$0.38
Millersview-Doole WSC						
Monetary value of domestic water shortages	$0.02	$0.03	$0.00	$0.00	$1.66	$2.91
Lost utility revenues	$0.03	$0.05	$0.00	$0.00	$0.47	$0.57
Odessa						
Monetary value of domestic water shortages	$4.36	$61.75	$5.35	$6.24	$7.22	$10.05
Lost utility revenues	$7.35	$18.65	$7.94	$9.18	$10.61	$13.16
Robert Lee						
Monetary value of domestic water shortages	$0.16	$0.22	$0.00	$0.01	$0.03	$0.07
Lost utility revenues	$0.17	$0.21	$0.00	$0.03	$0.05	$0.10
San Angelo						
Monetary value of domestic water shortages	$64.65	$79.05	$83.30	$65.88	$76.44	$77.63
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$21.05	$22.71	$24.02
Lost jobs due to reduced commercial business activity	0	0	0	519	559	592
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$1.46	$1.58	$1.67
Lost utility revenues	$0.17	$0.56	$0.30	$0.39	$0.46	$0.57

Municipal ($millions)						
	2010	2020	2030	2040	2050	2060
Snyder						
Monetary value of domestic water shortages	$0.66	$0.92	$0.01	$0.11	$0.20	$0.32
Lost utility revenues	$0.31	$0.39	$0.01	$0.07	$0.12	$0.19
Stanton						
Monetary value of domestic water shortages	$7.93	$8.54	$8.68	$8.70	$8.40	$7.95
Lost income from reduced commercial business activity	$4.90	$5.29	$5.38	$5.39	$5.20	$4.92
Lost jobs due to reduced commercial business activity	127	137	139	140	135	127
Lost state and local taxes from reduced commercial business activity	$0.40	$0.43	$0.44	$0.44	$0.42	$0.40
Lost utility revenues	$0.78	$0.84	$0.85	$0.85	$0.82	$0.78
Winters						
Monetary value of domestic water shortages	$8.90	$7.24	$7.30	$7.37	$7.42	$7.63
Lost income from reduced commercial business activity	$2.82	$2.29	$2.31	$2.33	$2.35	$2.41
Lost jobs due to reduced commercial business activity	102	83	84	85	85	88
Lost state and local taxes from reduced commercial business activity	$0.30	$0.24	$0.25	$0.25	$0.25	$0.26
Lost utility revenues	$1.09	$1.11	$1.12	$1.13	$1.14	$1.17

Appendix 4C
Methodology for Selecting Feasible Water Management Strategies

Appendix 4C – Feasible Water Management Strategies

One of the requirements adopted by the TWDB for regional water planning is an open meeting presentation of the methodology that will be used to identify, screen and select water management strategies for a region. Specifically, 31 TAC Chapter 357(e)(4) states:

> *Before a regional water planning group begins the process of identifying potentially feasible water management strategies, it shall document the process by which it will list all possible water management strategies and identify the water management strategies that are potentially feasible for meeting a need in the region. Once this process is identified, the regional water planning group shall present it to the public for comment at the public meeting required by §357.12(a)(1) of this title (relating to Notice and Public Participation);*

This memorandum presents the methodology for screening and selecting feasible water management strategies adopted by the Region F Water Planning Group on June 22, 2009.

Methodology for Selecting Feasible Water Management Strategies

1. The consultants will identify needs for individual water user groups and regional water providers. "Need" can include, but is not limited to:
    a. Shortage identified from supply/demand comparison using firm yields
    b. Shortage due to established operation policies of water supplies (e.g., safe yield vs. firm yield)
    c. Water quality issues
2. The consultants will review the need and recommended strategy from the *2006 Region F Water Plan* and determine if new or changed strategies are needed.
3. Each need and potential strategy will be presented to the RWPG at an open meeting for review and public input. The RWPG will consider the types of strategies considered to be feasible to meet each need. Potential strategies include:
    a. Water conservation and drought management
    b. Wastewater reuse
    c. Expanded use of existing supplies
        i. System operation,
        ii. Conjunctive use of groundwater and surface water,
        iii. Reallocation of reservoir storage
        iv. Voluntary redistribution of water resources
        v. Voluntary subordination of water rights
        vi. Yield enhancement
        vii. Water quality improvements

d. New supply development
    i. Surface water resources
    ii. Groundwater resources
    iii. Brush control
    iv. Precipitation enhancement
    v. Desalination
    vi. Water right cancellation
    vii. Aquifer storage and recovery
e. Interbasin transfers

4. The RWPG will select strategies considered to be potentially feasible for further evaluation by the consultants.
5. The RWPG and respective WUG will select the recommended and alternative strategy for inclusion in the *2011 Region F Water Plan*.

Screening Criteria

The following offers screening criteria that will be used to assess the feasibility of potential strategies. These criteria are suggested guidelines. A strategy may be retained or dismissed at the discretion of the RWPG.

General

1. Feasible strategy must have an identified sponsor or authority.
2. Feasible strategy must consider the end use. This includes water quality, distance to end use, etc. For example, long transmission systems with pumping are not economically feasible for irrigation use.
3. Strategy should provide a reasonable percentage of the projected need (except conservation, which will be evaluated for all needs).
4. Strategy must meet existing federal and state regulations.
5. Strategies must be based on proven technology.
6. Strategy must be politically and culturally acceptable.
7. Strategy must be appropriate for regional water planning.

By Water Strategy Type (as required in TWDB Guidelines):

WATER CONSERVATION - Water conservation must be considered as a strategy for every identified need. If water conservation is not adopted, the reason must be documented.

DROUGHT MANAGEMENT MEASURES - RWPG may choose to implement emergency water management strategies where appropriate to help meet the projected water needs. Drought management is typically not considered for long-range water supply planning.

WASTEWATER REUSE - Reuse projects will be considered on a case-by-case basis. Both direct and indirect reuse will be considered as appropriate.

EXPANDED USE OF EXISTING SUPPLIES

System Operation - New or additional system operations may be considered pending owner consent. The RWPG will include existing operating policies.

Conjunctive Use of Groundwater and Surface Water - The conjunctive use of groundwater and surface water supplies may be considered when groundwater supplies are available. Applicable groundwater conservation district rules will be considered for such conjunctive systems.

Reallocation of Reservoir Storage - The RWPG will consider reallocation of reservoir storage if the owner is amenable to reallocation.

Voluntary Redistribution of Water Resources - The RWPG will discuss the possible redistribution with the involved parties and come to a consensus on an approach. If the involved parties are not interested, the RWPG will not pursue this option.

Voluntary Subordination of Existing Water Rights - The RWPG will consider voluntary subordination of existing water rights if the TCEQ water availability model shows significantly less supply than assumed in previous planning efforts. Alternatively, the RWPG may recommend that the water right holder consider selling water under their water right to the willing buyer.

Yield Enhancement - The RWPG will consider yield enhancement projects as appropriate for the water source and identified need.

Water Quality Improvement - The RWPG will consider water quality improvement projects for municipal supplies that bring the existing water supply into compliance with state and federal regulations. General water quality projects may be considered if it improves the usability of the water source to help meet demands.

NEW SUPPLY DEVELOPMENT

Surface Water Resources - The RWPG will consider new surface water resources that can be permitted, provide a reasonable amount of supply to meet the identified need, and is located within a reasonable distance to the end users.

Groundwater Resources - The RWPG will consider groundwater supplies in areas where additional groundwater is available.

Brush Control - The RWPG will consider brush control as a general regional strategy. Specific impacts and quantity of supply will not be evaluated unless there is available data from existing studies. Note: Studies sponsored by the TSSWCB provide information on average stream flow. Reservoir yields were not evaluated.

Precipitation Enhancement - The RWPG will consider precipitation enhancement as a general regional strategy. Specific impacts and quantity of supply will not be evaluated unless there is available data from existing studies.

Desalination - The RWPG will consider desalination on a case-by-case basis.

Water Right Cancellation - The RWPG will generally not pursue water right cancellation as a means of obtaining additional water supplies. Instead, the RWPG will recommend that the water right holder consider selling water under their water right to the willing buyer.

Aquifer Storage and Recovery (ASR) - The RWPG will consider aquifer storage and recovery where the structure of the aquifer is such that this method is applicable. An ASR study must have already been performed to consider an area feasible for an ASR project.

INTERBASIN TRANSFERS - The RWPG will recommend interbasin transfers when necessary to transport water from the source to its destination. Interbasin transfers will be evaluated in accordance with current regulations.

Attachment 4C-1
Feasible Strategy Screening Matrices for Water User Groups

Table 4C-1
Potentially Feasible Strategies for the City of Bronte

Strategy	Identified Sponsor	Compatible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Technology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Conservation	City of Bronte	Yes	*	Yes	Yes	Yes	Yes	Yes	Based on criteria developed by the RWPG
Drought Management	City of Bronte	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	No data on specific practices
Reuse	City of Bronte	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Golf course irrigation
System Optimization	City of Bronte	Yes	**No**	Yes	Yes	Yes	Yes	**No**	
Reservoir Reallocation	**No**		**No**		does not apply			**No**	No storage in area reservoirs available for reallocation
Voluntary Redistribution	**No**		**No**		does not apply			**No**	No sources identified.
Subordination	City of Sweetwater	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	See subordination analysis
Yield Enhancement			**No**					**No**	No strategy identified.
Quality Improvement	City of Bronte								Water quality not a limiting factor
New Surface Water	City of Bronte	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No unappropriated water available in Region F
New Groundwater	City of Bronte	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	
Brush Control	City of Sweetwater	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Amount of water uncertain. See section 4.9
Precipitation Enhancement	CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes	CRMWD	Amount of water uncertain. See section 4.9
Regional Interconnect	Cities of Bronte, Robert Lee and Coke County Rural	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Regional project that is currently under study. Not evaluated in full.

Table 4C-1: Potentially Feasible Strategies for the City of Bronte (Continued)

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Right Cancellation	TCEQ, City of Bronte	Yes	**No**	Yes	does not apply	**No**	**No**	**No**	Politically unacceptable for pursuit by City
ASR	City of Bronte	Yes	**No**	Yes	Yes	Yes	Yes	**No**	No suitable aquifer in area
Interbasin Transfers			**No**					**No**	No reasonable out-of-basin supplies identified
Other Strategies	City of Bronte	Yes	NA	Yes	Yes	Yes	Yes	Yes	Rehabilitate Oak Creek pipeline

* Water conservation is evaluated for all municipal needs regardless of the quantity of water saved.

Table 4C-2
Potentially Feasible Strategies for the City of Robert Lee

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Conservation	City of Robert Lee	Yes	*	Yes	Yes	Yes	Yes	Yes	Based on criteria developed by the RWPG
Drought Management	City of Robert Lee	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	No data on specific practices
Reuse	City of Robert Lee	Yes	**No**	Yes	Yes	Yes	Yes	Yes	City already uses discharge for irrigation
System Optimization	City of Robert Lee, CRMWD	Yes	**No**	Yes	Yes	Yes	Yes	**No**	
Reservoir Reallocation	**No**		**No**		does not apply			**No**	No storage in area reservoirs available for reallocation
Voluntary Redistribution	San Angelo	Yes	Yes		Yes	Yes	Yes	Yes	Uses Spence pipeline to transport treated water
Subordination	CRMWD, UCRA	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	See subordination analysis
Yield Enhancement			**No**					**No**	No strategy identified.
Quality Improvement	City of Robert Lee								See desalination
New Surface Water	City of Robert Lee	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No unappropriated water available in Region F
New Groundwater	City of Robert Lee	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	Groundwater study identified potential areas for supply
Brush Control	CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes	CRMWD	Amount of water uncertain. See section 4.9
Precipitation Enhancement	CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes	CRMWD	Amount of water uncertain. See section 4.9
Desalination	City of Robert Lee	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Advanced treatment of Spence water

Table 4C-2: Potentially Feasible Strategies for the City of Robert Lee (continued)

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Right Cancellation	TCEQ, City of Robert Lee	Yes	**No**	Yes	does not apply	**No**	**No**	**No**	Politically unacceptable for pursuit by City
ASR	City of Robert Lee	Yes	**No**	Yes	Yes	Yes	Yes	**No**	No suitable aquifer in area
Interbasin Transfers			**No**					**No**	No reasonable out-of-basin supplies identified
Other Strategies	City of Robert Lee	Yes	Yes	Yes	Yes	Yes	Yes	Yes	New storage facilities, expand WTP, new intakes

* Water conservation is evaluated for all municipal needs regardless of the quantity of water saved.

Table 4C-3
Potentially Feasible Strategies for the Colorado River Municipal Water District

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Conservation	CRMWD Customers	Yes	*	Yes	Yes	Yes	Yes	Yes	Water conservation will be evaluated for individual customers, not CRMWD as a whole
Drought Management	CRMWD, customers	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	CRMWD drought plan
Reuse	CRMWD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Regional Water Reclamation Project
System Optimization	CRMWD	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Insufficient unappropriated water
Reservoir Reallocation	None	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No supplies for reallocation
Voluntary Redistribution	BRA, Mesa, University Lands, others	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	Various sources.
Subordination	CRMWD, LCRA, others	Yes	Yes	Yes	does not apply	Yes	See Comments column	Yes	Specific form of agreement will not be evaluated
Yield Enhancement			**No**					**No**	No strategy identified. Brush control and precipitation enhancement are a separate strategy
Quality Improvement	CRMWD	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Quality improvement will not increase available supplies
New Surface Water	CRMWD	Yes	**No**		does not apply	No	Yes	**No**	No new surface sources identified. Existing sources covered under voluntary redistribution
New Groundwater	CRMWD	Yes	Yes	Yes	does not apply	Political barriers for some sources	Yes	Yes	Winkler well field

Table 4C-3: Potentially Feasible Strategies for the Colorado River Municipal Water District (continued)

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Brush Control	CRMWD, others	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Amount of water uncertain
Precipitation Enhancement	Others	Yes	Unknown	Yes	Yes	Mixed	Yes	**No**	CRMWD has discontinued program; Amount of water uncertain
Desalination	CRMWD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Trans-Pecos desalination facility
Water Right Cancellation	TCEQ, CRMWD	Yes	Yes	Yes	does not apply	**No**	**No**	**No**	Politically unacceptable for pursuit by District
ASR	CRMWD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	In conjunction with Regional Water Reclamation Project
Interbasin Transfers	CRMWD	Yes	**No**	Yes	Yes	Yes	Yes	**No**	No reasonable source of water identified
Other Strategies									Supplemental wells and maintain groundwater capacities of existing sources.

* Water conservation is evaluated for all municipal needs regardless of the quantity of water saved.

Table 4C-4
Potentially Feasible Strategies for the City of Menard

Strategy	Identified Sponsor	Compatible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Technology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Conservation	City of Menard	Yes	*	Yes	Yes	Yes	Yes	Yes	Based on criteria developed by the RWPG
Drought Management	City of Menard	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	No data on specific practices
Reuse	City of Menard	Yes	**No**	Yes	Yes	Yes	Yes	**No**	City does not have a wastewater collection system
System Optimization	City of Menard	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Single source of water
Reservoir Reallocation	**No**	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No reasonable reservoir source available in area
Voluntary Redistribution	City of Menard, LCRA	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	Off-channel reservoir on the San Saba River. Limited partnering options.
Subordination	City of Menard	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	City water right has a senior priority date
Yield Enhancement			**No**					**No**	No strategy identified.
Quality Improvement	City of Menard	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Current supplies not limited by water quality
New Surface Water	City of Menard	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No unappropriated water available in Region F
New Groundwater	City of Menard	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	Hickory aquifer or Edwards-Trinity Plateau aquifer. Hickory may have water quality issues
Brush Control	**No**	Yes	Unknown	Yes	Yes	Yes	Yes	**No**	Amount of water uncertain. No sponsor in area
Precipitation Enhancement	**No**	Yes	Unknown	Yes	Yes	Yes	Yes	**No**	Amount of water uncertain. No sponsor in area.

Table 4C-4: Potentially Feasible Strategies for the City of Menard (continued)

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Desalination			**No**					**No**	No source or sponsor identified
Water Right Cancellation	TCEQ, City of Menard	Yes	Yes	Yes	does not apply	**No**	**No**	**No**	Politically unacceptable for pursuit by City
ASR	City of Menard	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Potential strategy for future evaluations
Interbasin Transfers			**No**					**No**	No reasonable out-of-basin supplies identified
Other Strategies									None identified

* Water conservation is evaluated for all municipal needs regardless of the quantity of water saved.

Table 4C-5
Potentially Feasible Strategies for the City of Midland

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Conservation	City of Midland	Yes	*	Yes	Yes	Yes	Yes	Yes	City of Midland is implementing an aggressive water conservation program
Drought Management	City of Midland, CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Apply drought management identified in Midland and CRMWD drought contingency plans
Reuse	CRMWD	Yes	Yes	Yes	Yes	Unknown	Yes	Yes	See CRMWD strategies
System Optimization	CRMWD	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Previous studies did not identify significant yield gains due to system optimization
Reservoir Reallocation	CRMWD	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No storage available for reallocation
Voluntary Redistribution	CRMWD	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	Renew contract with CRMWD
Subordination	CRMWD, LCRA, others	Yes	Yes	Yes	does not apply	Yes	See Comments column	Yes	Implemented by CRMWD
Yield Enhancement			**No**					**No**	No strategy identified. Brush control and precipitation enhancement are a separate strategy
Quality Improvement	City of Midland, CRMWD	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Will not make more water available for use
New Surface Water	City of Midland, CRMWD	Yes	**No**		does not apply	**No**	Yes	**No**	No new surface sources identified. Existing sources covered under voluntary redistribution
New Groundwater	City of Midland	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	T-Bar Well Field

Table 4C-5 (Continued) Potentially Feasible Strategies for the City of Midland

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Brush Control	CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	CRMWD is participating in salt cedar removal programs. Amount of water uncertain
Precipitation Enhancement	CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	CRMWD sponsors a precipitation enhancement program. Amount of water uncertain
Desalination	CRMWD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Pecos County Regional Desalination Facility. Implemented by CRMWD.
Water Right Cancellation	TCEQ, CRMWD	Yes	Yes	Yes	does not apply	**No**	**No**	**No**	Considered to be politically and culturally unacceptable by Region F
ASR	CRMWD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Assumed to be implemented by CRMWD
Interbasin Transfers	CRMWD	Yes	**No**	Yes	Yes	Yes	Yes	**No**	No reasonable source of water available
Other Strategies									None identified

* Water conservation is evaluated for all municipal needs regardless of the quantity of water saved.

Table 4C-6
Potentially Feasible Strategies for the City of Ballinger

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Conservation	City of Ballinger	Yes	*	Yes	Yes	Yes	Yes	Yes	Based on criteria developed by the RWPG
Drought Management	City of Ballinger	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	No data on specific practices
Reuse	City of Ballinger	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
System Optimization	City of Ballinger	Yes	**No**	Yes	Yes	Yes	Yes	**No**	May be a future strategy if other sources become available
Reservoir Reallocation	**No**		**No**		does not apply			**No**	No storage in area reservoirs available for reallocation
Voluntary Redistribution	City of Ballinger, City of Coleman, CRMWD	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	Hords Creek Reservoir, CRMWD sources
Subordination	City of Ballinger	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	See subordination analysis
Yield Enhancement			**No**					**No**	No strategy identified.
Quality Improvement	City of Ballinger								Water quality not a limiting factor
New Surface Water	City of Ballinger	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No unappropriated water available in Region F
New Groundwater	City of Ballinger	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No source identified
Brush Control	CRMWD, others	Yes	Unknown	Yes	Yes	Yes	Yes		Amount of water uncertain. See section 4.9.2
Precipitation Enhancement	CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes		Amount of water uncertain. See section 4.9.1

Table 4C-7 Potentially Feasible Strategies for the City of Ballinger (continued)

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Desalination	**No**	Yes	Yes	Yes	Yes	Yes	Yes	**No**	No sponsor and no local source.
Water Right Cancellation	TCEQ, City of Ballinger	Yes	**No**	Yes	does not apply	**No**	**No**	**No**	Politically unacceptable for pursuit by City
ASR	City of Ballinger	Yes	**No**	Yes	Yes	Yes	Yes	**No**	No suitable aquifer identified
Interbasin Transfers			**No**					**No**	No reasonable out-of-basin supplies identified
Other Strategies									None identified

* Water conservation is evaluated for all municipal needs regardless of the quantity of water saved.

Table 4C-7
Potentially Feasible Strategies for the City of Winters

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Conservation	City of Winters	Yes	*	Yes	Yes	Yes	Yes	Yes	Based on criteria developed by the RWPG
Drought Management	City of Winters	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	No data on specific practices
Reuse	City of Winters	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
System Optimization	City of Winters	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Single source
Reservoir Reallocation	**No**		**No**		does not apply			**No**	No storage in area reservoirs available for reallocation
Voluntary Redistribution	BCWID	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	Brown/Coleman/Runnels Regional System
Subordination	City of Winters	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	See subordination analysis
Yield Enhancement			**No**					**No**	No strategy identified.
Quality Improvement	City of Winters								Water quality not a limiting factor
New Surface Water	City of Winters	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No unappropriated water available in Region F
New Groundwater	City of Winters	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	No source identified
Brush Control	City of Winters, CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Amount of water uncertain. See section 4.x
Precipitation Enhancement	CRMWD	Yes	Unknown	Yes	Yes	Yes	Yes	CRMWD	Amount of water uncertain. See section 4.x
Desalination	**No**	Yes	Yes	Yes	Yes	Yes	Yes	**No**	No sponsor and no available source.

Table 4C-7: Potentially Feasible Strategies for the City of Winters (Continued)

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Right Cancellation	TCEQ, City of Winters	Yes	**No**	Yes	does not apply	**No**	**No**	**No**	Politically unacceptable for pursuit by City
ASR	City of Winters	Yes	**No**	Yes	Yes	Yes	Yes	**No**	No suitable aquifer in area
Interbasin Transfers			**No**					**No**	No reasonable out-of-basin supplies identified
Other Strategies									

* Water conservation is evaluated for all municipal needs regardless of the quantity of water saved.

Table 4C-8
Potentially Feasible Strategies for the City of San Angelo

Strategy	Identified Sponsor	Com-patible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Tech-nology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Water Conservation	City of San Angelo	Yes	*	Yes	Yes	Yes	Yes	Yes	Based on current practices by the City of San Angelo plus criteria developed by the RWPG
Drought Management	City of San Angelo	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Based on the City's experience during recent drought
Reuse	City of San Angelo	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
System Optimization	City of San Angelo, CRMWD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Reservoir Reallocation	BurRec, COE	Yes	**No**	Yes	does not apply	Yes	Yes	**No**	Insufficient extra supplies for reallocation
Voluntary Redistribution	CRMWD, others	Yes	Yes	Yes	does not apply	Yes	Yes	Yes	Additional water from CRMWD, purchase water rights,
Subordination	CRMWD, LCRA, others	Yes	Yes	Yes	does not apply	Yes	See Comments column	Yes	Specific form of agreement will not be evaluated
Yield Enhancement			**No**					**No**	No strategy identified. Brush control and precipitation enhancement are a separate strategy
Quality Improvement	City of San Angelo	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Quality improvement will not increase available supplies
New Surface Water	City of San Angelo	Yes	**No**		does not apply	No	Yes	**No**	No new surface sources identified. Existing sources covered under voluntary redistribution
New Groundwater	City of San Angelo	Yes	Yes	Yes	does not apply	Political barriers for some sources	Yes	Yes	Hickory aquifer, Edwards-Trinity Plateau aquifer. Other sources covered under desalination.

Table 4C-8: Potentially Feasible Strategies for the City of San Angelo (Continued)

Strategy	Identified Sponsor	Compatible with End Use	Reasonable Percentage of Need	Consistent with State and Federal Regulations	Based on Proven Technology	Politically & Culturally Acceptable	Appropriate for Regional Water Planning	Feasible?	Comments
Brush Control	City of San Angelo, UCRA, others	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Amount of water uncertain
Precipitation Enhancement	City of San Angelo, UCRA, others	Yes	Unknown	Yes	Yes	Yes	Yes	Yes	Amount of water uncertain
Desalination	City of San Angelo	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Clear Fork Formation, possibly in conjunction with Spence water.
Water Right Cancellation	TCEQ, City of San Angelo	Yes	Yes	Yes	does not apply	**No**	**No**	**No**	Politically unacceptable for pursuit by City
ASR	City of San Angelo	Yes	**No**	Yes	Yes	Yes	Yes	**No**	Does not provide significant additional supplies
Interbasin Transfers		Yes	**No**	Yes	Yes	Yes	Yes	**No**	No reasonable source of water identified
Other Strategies	City of San Angelo	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Rehab Spence pipeline,

* Water conservation is evaluated for all municipal needs regardless of the quantity of water saved.

Appendix 4D
Cost Estimates

Appendix 4D: Region F Cost Estimates

As part of the 2006 Region F Plan, cost estimates were developed for each of the recommended water management strategies in Region F. As appropriate, these cost estimates have been updated for the 2011 Region F Plan. In accordance with the Texas Water Development Board guidance the costs for water management strategies are to be updated from second quarter 2002 dollars to September 2008 dollars. The methodology used to develop the 2011 costs is described in the following sections. Where updated unit costs were not available, the Engineering News Record (ENR) Index was used to increase the costs from second quarter 2002 (March) costs to September 2008 costs. An increase of **134%** from March 2002 to September 2008 was determined using the ENR Index method.

Introduction

1. The evaluation of water management strategies requires developing cost estimates. Guidance for cost estimates may be found in the TWDB's "General Guidelines for Regional Water Plan Development (2007-2012)", Section 4.1.2. Costs are to be reported in September 2008 dollars.
2. Standard unit costs for installed pipe, pump stations and standard treatment facilities were developed from actual bid data from similar projects throughout the State of Texas. These estimates were used for all SB1 projects, unless more detailed costing is available. All unit costs include the contractors' mobilization, overhead and profit. The unit costs **do not** include engineering, contingency, financial and legal services, costs for land and rights-of-way, permits, environmental and archeological studies, or mitigation. The costs for these items are determined separately in the cost tables.
3. The information presented in this section is intended to be 'rule-of-thumb' guidance. Specific situations may call for alteration of the procedures and costs. Note that the costs in this memorandum provide a planning level estimate for comparison purposes.
4. It is important that when comparing alternatives that the cost estimates be similar and include similar items. If an existing reliable cost estimate is available for a project it should be used where appropriate. All cost estimates must meet the requirements set forth in the TWDB's "General Guidelines for Regional Water Plan Development (2007-2012)".
5. The cost estimates have two components:

   - Initial capital costs, including engineering and construction costs, and
   - Average annual costs, including annual operation and maintenance costs and debt service.

   TWDB does not require the consultant to determine life cycle or present value analysis. For most situations annual costs are sufficient for comparison purposes and a life-cycle analysis is not required.

ASSUMPTIONS FOR CAPITAL COSTS:

Conveyance Systems

Standard pipeline costs used for these cost estimates are shown in Table 1. Pump station costs are based on required Horsepower capacity and are listed in Table 2. The power capacity is to be determined from the hydraulic analyses conducted from a planning level hydraulic grade line evaluation (or detailed analysis if available). Pipelines and pump stations are to be sized for peak pumping capacity.

- Pump efficiency is assumed to be 75 percent.
- Peaking factor of 2 times the average demand is to be used for strategies when the water is pumped directly to a water treatment plant. (or historical peaking factor, if available)
- Peaking factor of 1.2 to 1.5 is to be used if there are additional water sources and/or the water is transported to a terminal storage facility.
- Ground storage is to be provided at each booster pump station along the transmission line unless there is a more detailed design.
- Ground storage tanks should provide sufficient storage for 2.5 to 4 hours of pumping at peak capacity. Costs for ground storage are shown in Table 3. Covered storage tanks are used for all strategies transporting treated water.

Water Treatment Plants

Water treatment plants are to be sized for peak day capacity (assume peaking factor of 2 if no specific data is available). Costs estimated for new conventional surface water treatment facilities and expansions of existing facilities are listed in Table 4. Conventional treatment does not include advanced technologies, such as ozone or UV treatment. **All treatment plants are to be sized for finished water capacity**.

- For reverse osmosis plants for surface water, increase construction costs shown on Table 4 by the amount shown on Table 5 for the appropriate size plant that will be used for RO. If groundwater is the raw water source, use only the costs in Table 5. These costs were based on actual cost estimates of similar facilities.
- The amount of reject water generated by reverse osmosis treatment is dependent upon the incoming quality of the raw water. Final treatment goals should be between 600 and 800 mg/l of TDS. (This provides a safety margin in meeting secondary treatment standards.) For reverse osmosis treatment of brackish water (1,000 – 3,000 mg/l of TDS), assume that 20 percent of the raw water treated with membranes is discharged as reject water, unless project-specific data is available. For brackish water with TDS concentrations between 3,000 and 10,000 mg/l, assume 30% reject water. Desalination of seawater or very high TDS water will

have a higher percent of reject water (50 to 60%). Minimal losses are assumed for conventional treatment facilities.

- Costs for ion exchange facilities are shown on Table 6. For these facilities it is assumed that 2 to 3 percent of the raw water would be discharged as reject water.

New Groundwater Wells

For the Groundwater Study for Region F, LBG-Guyton Associates prepared a project-specific table of well field costs. Where project-specific information is not available, refer to Table 7. The pumping capacity should be for peak pumpage. Well depth will be estimated by county and aquifer.

For expansion of existing well fields for municipal water providers, an additional $150,000 per expansion for connection to the existing distribution system is assumed. Connection costs and conveyance systems for new well fields will be determined on a case-by-case basis.

New Reservoirs

Site-specific cost estimates will be made for reservoir sites. The elements required for reservoir sites are included in Table 8. Lake intake structures for new reservoirs will be determined on a case-by-case basis. Generally, costs for construction of such facilities prior to filling of the reservoir will be less than shown on Table 2.

Other Costs

- Engineering, contingency, construction management, financial and legal costs are to be estimated at 30 percent of construction cost for pipelines and 35 percent of construction costs for pump stations, treatment facilities and reservoir projects. (This is in accordance with TWDB guidance.)
- Permitting and mitigation for transmission and treatment projects are to be estimated at 1 percent of the total construction costs. For reservoirs, mitigation and permitting costs are assumed equal to twice the land purchase cost, unless site specific data is available.
- Right-of-way (ROW) costs for transmission lines are estimated at $2,000 per acre of rural ROW. Urban ROW will be higher. If no data is available, assume $15,000 per acre. If a small pipeline follows existing right-of-ways (such as

highways), no additional right-of-way cost may be assumed. Large pipelines will require ROW costs regardless of routing.

Interest during construction is the total of interest accrued at the end of the construction period using a 6 percent annual interest rate on total borrowed funds, less a 4 percent rate of return on investment of unspent funds. This is calculated assuming that the total estimated project cost (excluding interest during construction) would be drawn down at a constant rate per month during the construction period. Factors were determined for different lengths of time for project construction. These factors were used in cost estimating and are presented in Table 9.

ASSUMPTIONS FOR ANNUAL COSTS:

Annual costs are to be estimated using the following assumptions:

- Debt service for all transmission and treatment facilities is to be annualized over 20 years, but not longer than the life of the project. [Note: uniform amortization periods should be used when evaluating similar projects for an entity.]
- Annual interest rate for debt service is 6 percent.
- Water purchase costs are to be based on wholesale rates reported by the selling entity when possible. In lieu of known rates, a typical regional cost for treated water and raw water will be developed.
- Operation and Maintenance costs are to be calculated based on the construction cost of the capital improvement. Engineering, permitting, etc. should not be included as a basis for this calculation. However, a 20% allowance for construction contingencies should be included for all O&M calculations. Per the "General Guidelines for Regional Water Plan Development (2007-2012)", O&M should be calculated at:
    - 1 percent of the construction costs for pipelines
    - 1.5 percent for dams
    - 2.5 percent of the construction costs for pump stations, storage tanks, meters and SCADA systems
    - Assume O&M costs for treatment facilities are included in the treatment cost
- Surface water treatment costs are estimated at $0.70 per 1,000 gallons for conventional plants and $1.24 per 1,000 gallons of finished water for surface water plants with reverse osmosis. Assume cost for treatment of groundwater by reverse osmosis is $0.75 per 1,000 gallons. If only a portion of the water will be treated with RO, apply costs proportionately. Treatment for nitrates is estimated at $0.40 per 1,000 gallons. Treatment for groundwater (assuming disinfection and labor only) is estimated at $0.30 per 1,000 gallons. These costs include chemicals, labor and electricity for treatment and should be applied to amount of finished water receiving the treatment. Electricity associated with moving raw

water to the treatment facility is calculated separately (this includes electricity associated with groundwater well fields).

- Reject water disposal for treatment of brackish water is to be estimated on a case-by-case basis depending on disposal method. If no method is defined, assume a cost of $0.35 per 1,000 gallons of reject water. [This value represents a moderate cost estimate. If the water were returned to a brackish surface water source, the costs would be negligible. If evaporation beds or deep well injection were used, the costs could be much higher.]
- Pumping costs are to be estimated using an electricity rate of $0.09 per Kilowatt Hour. If local data is available, this can be used.

Table 1

Pipeline Costs (does not include ROW)

Diameter	**Base Installed Cost**	**Rural Cost with Appurtenances**	**Urban Cost with Appurtenances**	**Assumed ROW Width**	**Assumed Temporary Easement Width**
(Inches)	($/Foot)	($/Foot)	($/Foot)	(Feet)	(Feet)
6	24	26	39	15	50
8	31	34	52	15	50
10	39	43	65	20	60
12	47	52	77	20	60
14	55	60	90	20	60
16	62	69	103	20	60
18	70	77	116	20	60
20	82	90	135	20	60
24	105	116	174	20	60
30	132	145	215	20	60
36	167	184	276	20	60
42	196	215	323	30	70
48	244	269	374	30	70
54	288	317	435	30	70
60	332	366	495	30	70
66	401	441	591	30	70
72	469	516	697	30	70
78	538	591	799	40	80
84	616	677	914	40	80
90	704	774	1,045	40	80
96	782	860	1,161	40	80
102	870	957	1,290	40	80
108	977	1,075	1,451	40	80
114	1,075	1,183	1,596	50	100
120	1,212	1,333	1,801	50	100
132	1,466	1,613	2,177	50	100
144	1,730	1,903	2,569	50	100

Notes:
- a Costs are based on PVC class 150 pipe for the smaller long, rural pipelines.
- b Appurtenances assumed to be 10% of installed pipe costs.
- c For urban pipelines, costs were increased by 35% for cost with appurtenances. For pipes 42"and smaller, additional costs were added.
- d Adjust costs for obstacles (rock, forested areas) and easy conditions (soft soil in flat country).

Table 2
Pump Station Costs for Transmission Systems

Horsepower	Booster PS Costs	Lake PS with Intake Costs
5	$516,000	
10	$538,000	
20	$564,000	
25	$591,000	
50	$645,000	
100	$742,000	
200	$1,118,000	$1,484,000
300	$1,441,000	$1,914,000
400	$1,795,000	$2,387,000
500	$2,032,000	$2,698,000
600	$2,150,000	$2,860,000
700	$2,268,000	$3,021,000
800	$2,516,000	$3,343,000
900	$2,634,000	$3,505,000
1,000	$2,870,000	$3,817,000
2,000	$4,182,000	$5,562,000
3,000	$5,020,000	$6,677,000
4,000	$6,095,000	$8,107,000
5,000	$6,988,000	$9,293,000
6,000	$8,063,000	$10,723,000
7,000	$8,923,000	$11,867,000
8,000	$9,890,000	$13,154,000
9,000	$10,965,000	$14,583,000
10,000	$12,255,000	$16,299,000
20,000	$20,425,000	$27,165,000
30,000	$26,875,000	$35,744,000
40,000	$33,325,000	$44,322,000
50,000	$38,700,000	$51,471,000
60,000	$44,075,000	$58,620,000
70,000	$49,450,000	$65,769,000

Note:
1. Lake PS with intake costs include intake and pump station.
2. Adjust pump station costs upward if the pump station is designed to move large quantities of water at a low head (i.e. low horsepower). See Rusty Gibson for appropriate factor.
3. Assumed multiple pump setup for all pump stations.

Table 3
Ground Storage Tanks

Size (MG)	With Roof	Without Roof
0.05	$125,000	$106,000
0.1	$183,000	$156,000
0.5	$438,000	$333,000
1	$634,000	$469,000
1.5	$796,000	$591,000
2	$957,000	$714,000
2.5	$1,086,000	$821,000
3	$1,215,000	$928,000
3.5	$1,355,000	$1,023,000
4	$1,505,000	$1,118,000
5	$1,720,000	$1,303,000
6	$2,075,000	$1,505,000
7	$2,446,000	$1,740,000
8	$2,822,000	$2,069,000
10	$3,746,000	$2,752,000
12	$4,671,000	$3,419,000
14	$5,595,000	$4,085,000

Note: Costs assume steel tanks smaller than 1 MG, concrete tanks 1 MG and larger.

Table 4
Conventional Water Treatment Plant Costs

Plant Capacity (MGD)	New Conventional Plants	Conventional Plant Expansions
1	$5,800,000	$2,900,000
3	$10,600,000	$7,400,000
7	$17,500,000	$12,900,000
10	$22,400,000	$16,000,000
15	$29,100,000	$20,900,000
20	$35,400,000	$26,100,000
30	$47,600,000	$35,700,000
40	$60,000,000	$45,500,000
50	$72,600,000	$54,400,000
60	$84,900,000	$63,500,000
70	$96,600,000	$72,200,000
80	$107,900,000	$81,400,000
90	$118,500,000	$90,500,000
100	$130,200,000	$100,200,000

Note: Plant is sized for finished peak day capacity.

Table 5

Additional Cost for Reverse Osmosis Treatment

Plant Capacity (MGD)	Reverse Osmosis Facilities Cost
0.5	$1,300,000
1	$1,600,000
3	$3,200,000
7	$7,200,000
10	$9,800,000
15	$14,200,000
20	$18,300,000
30	$25,500,000
40	$31,400,000
50	$36,600,000
60	$40,700,000

Note: Plant is sized for finished water capacity.

Table 6
Groundwater Nitrate Treatment

Treatment Capacity (MGD)	Ion Exchange Plant Cost
0.25	$800,000
1.0	$1,700,000
3.0	$3,900,000

Note: Plant is sized for finished water capacity.

Table 7
Cost Elements for Water Wells

Cost per municipal well = 1.55*(25,500 + (70*a) + (350*b))

Cost per agricultural well = 10,000 + 70*a + 350*b, where:

a = pump rate (gpm), b = well depth (feet)

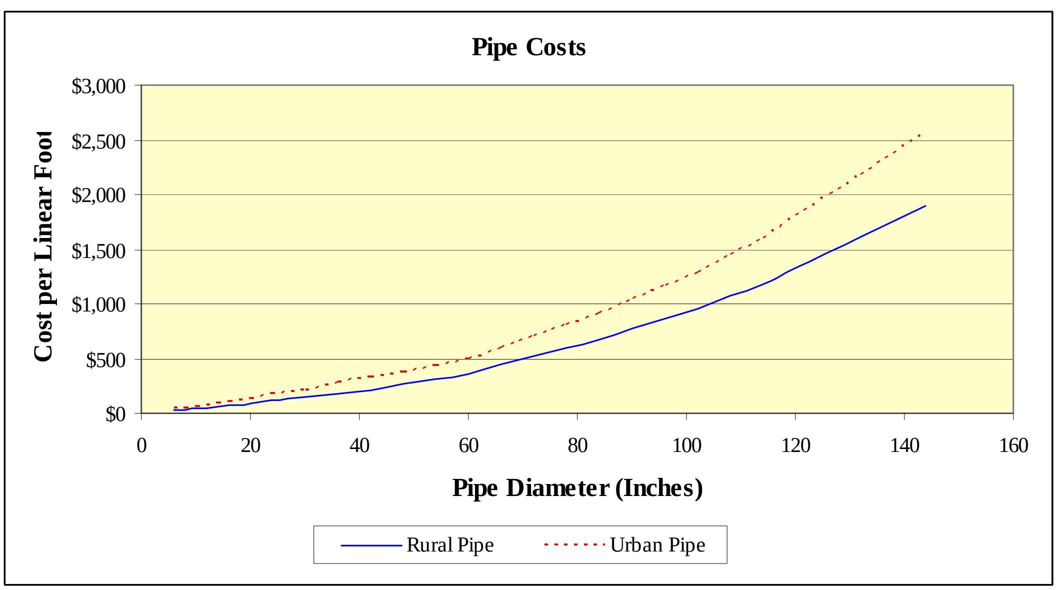
Table 8
Cost Elements for Reservoir Sites

Capital Costs	Studies and Permitting
Embankment	Environmental and archeological studies
Spillway	Permitting
Outlet works	Terrestrial mitigation tracts
Site work	Engineering and contingencies
Land	Construction management
Administrative facilities	
Supplemental pumping facilities	
Flood protection	

Table 9
Factors for Interest During Construction

Construction Period	Factor
6 months	0.02167
12 months	0.04167
18 months	0.06167
24 months	0.08167
36 month construction	0.12167

Figure 1



WUGNAME:	Andrews
STRATEGY:	Dockum Desalination Facility
STRATEGY NUMBER:	F27ADVTR
AMOUNT (ac-ft/yr):	950

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Land acquisition		3	AC	$	2,000	$	6,000
Well pumps	500 gpm	3	EA	$	19,741	$	59,000
Well construction		3	EA	$	197,411	$	592,000
Well field piping	8-inch	15,840	LF	$	34	$	539,000
Ground storage tank	0.25 MG		LS	$	222,375	$	222,000
Engineering and Contingencies (35%)						$	496,000
Subtotal Pump Station and Intake						$	1,914,000

Disposal Facilities	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Pipeline	8-inch	26,400	LF	$	34	$	898,000
Right-of-way		12.1	AC	$	2,000	$	24,000
High pressure well disposal pumps	1300 gpm	1	EA	$	26,322	$	26,000
Brine Lagoon		1	LS	$	394,823	$	395,000
Engineering and Contingencies (30%)						$	403,000
Subtotal Transmission to Treatment Plant						$	1,746,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
RO Treatment Facility	1.0 MGD	1	LS	$	1,895,150	$	1,895,000
Ground storage tank	0.25 MG	1	LS	$	222,375	$	222,000
Engineering and Contingencies (35%)						$	741,000
Subtotal of Treatment						$	2,858,000

CONSTRUCTION TOTAL		$	6,518,000
Permitting and Mitigation		$	58,000
Interest During Construction	(6 months)	$	141,000
TOTAL COST		**$**	**6,717,000**

ANNUAL COSTS*

Debt Service (6% for 20 years)*	$	586,000
Electricity ($0.09 kWh)	$	179,000
Operation & Maintenance	$	108,000
Water Treatment	$	232,000
Total Annual Costs	**$**	**1,105,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$	1,163
Per 1,000 Gallons	$	3.57

UNIT COSTS (After Amortization)

Per Acre-Foot	$	546
Per 1,000 Gallons	$	1.68

WUGNAME: Ballinger
STRATEGY: Generic 0.2 MGD Reuse
STRATEGY NUMBER: F04Reuse
AMOUNT (ac-ft/yr): 220

CONSTRUCTION COSTS

Land Acquisition		**Quantity**	**Unit**	**Unit Price**	**Cost**
Reclaimed Treatment Plant Land Acquisition		3	AC	$ 5,000	$ 15,000
Engineering and Contingencies (30%)					$ 5,000
Subtotal Land Acquisition					$ 20,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline 75gpm	4 in	10,560	LF	$ 24	$ 253,000
Right-of-way easements		7	AC	$ 2,000	$ 15,000
Engineering and Contingencies (30%)					$ 80,000
Subtotal Pipeline					$ 348,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station	150 gpm	1	EA	$ 31,586	$ 32,000
Storage tank	0.05 MG	1	EA	$ 106,000	$ 106,000
Engineering and Contingencies (35%)					$ 48,000
Subtotal of Pump Station(s)					$ 186,000
Treatment Equipment		**Quantity**	**Unit**	**Unit Price**	**Cost**
Microfiltration/Ultrafiltration (MF/UF) and Reverse Osmosis (RO) Equipment and Installation		1	EA	$ 743,583	$ 744,000
UV/Oxidation		1	EA	$ 131,608	$ 132,000
Engineering and Contingencies (35%)					$ 307,000
Subtotal of Treatment Equipment					$ 1,183,000
Building		**Quantity**	**Unit**	**Unit Price**	**Cost**
Metal Building		3,500	SF	$ 118	$ 415,000
Engineering and Contingencies (35%)					$ 145,000
Subtotal of Building					$ 560,000
Electrical					**Cost**
20% of Equipment Cost					$ 80,000
Engineering and Contingencies (35%)					$ 28,000
Subtotal of Electrical					$ 108,000
Instrumentation					**Cost**
20% of Equipment Cost					$ 80,000
Engineering and Contingencies (35%)					$ 28,000
Subtotal of Instrumentation					$ 108,000
CONSTRUCTION TOTAL					$ 2,513,000
Interest During Construction					$ 54,000

WUGNAME:	Ballinger		
STRATEGY:	Generic 0.2 MGD Reuse		
TOTAL COST		**$**	**2,567,000**
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	224,000
Operation & Maintenance		$	100,000
Total Annual Costs		**$**	**324,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	1,473
Per 1,000 Gallons		$	4.52
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	455
Per 1,000 Gallons		$	1.39

WUGNAME: City of Ballinger
STRATEGY: Pipeline to Hords Creek Reservoir
STRATEGY NUMBER: F06AVolRed
AMOUNT (ac-ft/yr): 220

CONSTRUCTION COSTS

Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
12" DR-11 HDPE water line	12 in.	16,000	LF	$ 31	$ 504,000
10" DR-13.5 HPDE water line	10 in.	8,000	LF	$ 26	$ 209,000
10" DR-17 HPDE water line	10 in.	86,000	LF	$ 26	$ 2,247,000
Class "C" bedding material		110,000	LF	$ 2	$ 174,000
HPDE heat fusion fittings		1	LS	$ 88,177	$ 88,000
10" gate valve with valve box	10 in.	25	EA	$ 2,632	$ 66,000
12" gate valve with valve box	12 in.	3	EA	$ 3,290	$ 10,000
Tie-in existing raw water line	10 in.	1	EA	$ 2,632	$ 3,000
Master meter and valve vault		1	LS	$ 12,898	$ 13,000
Air relief valve assembly		10	EA	$ 4,500	$ 45,000
Flush valve assembly		5	EA	$ 3,750	$ 19,000
Stream crossing		4	EA	$ 19,741	$ 79,000
18" bore & steel casement		1,500	LF	$ 132	$ 197,000
Gravel roadway repair		3,900	LF	$ 11	$ 41,000
Asphalt roadway repair		1,000	LF	$ 26	$ 26,000
Pipeline markers		200	EA	$ 66	$ 13,000
Right-of-way easements		1	LS	$ 65,673	$ 66,000
Engineering and Contingencies (30%)					$ 1,140,000
Subtotal pipeline					$ 4,940,000

Pump Station	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station	35 HP	1	EA	$ 612,600	$ 613,000
Fencing		500	LF	$ 26	$ 13,000
Pipe insulation		1	LS	$ 6,580	$ 7,000
Site piping		1	LS	$ 32,902	$ 33,000
Electrical service		1	LS	$ 65,804	$ 66,000
Controls and telemetry		1	LS	$ 19,741	$ 20,000
Engineering and Contingencies (35%)					$ 263,000
Subtotal of Pump Station(s)					$ 1,015,000

Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Ground Storage Tank	0.5 MG	1	EA	$ 333,000	$ 333,000
Engineering and Contingencies (35%)					$ 117,000
Subtotal of Ground Storage					$ 450,000

Mobilization, bonding & insurance	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
		1	LS	$ 189,383	$ 189,000

WUGNAME:	City of Ballinger		
STRATEGY:	Pipeline to Hords Creek Reservoir		
CONSTRUCTION TOTAL		$	6,594,000
Permitting and Mitigation		$	58,000
Interest During Construction	(6 months)	$	143,000
TOTAL COST		**$**	**6,795,000**
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	592,000
Electricity ($0.09 kWh)		$	7,500
Operation & Maintenance		$	90,000
Raw Water Purchase		$	50,000
Total Annual Costs		**$**	**739,500**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	3,361
Per 1,000 Gallons		$	10.32
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	670
Per 1,000 Gallons		$	2.06

WUGNAME:	Big Spring
STRATEGY:	Big Spring Reuse
STRATEGY NUMBER:	F04Reuse
AMOUNT (ac-ft/yr):	1,855

CONSTRUCTION COSTS

	Size	Quantity	Unit	Unit Price	Cost
Land Acquisition		**Quantity**	**Unit**	**Unit Price**	**Cost**
Reclaimed Treatment Plant Land Acquisition		2	AC	$ 2,000	$ 4,000
Engineering and Contingencies (35%)					$ 1,000
Subtotal Land Acquisition					$ 5,000
Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	10 in	5,500	LF	$ 65	$ 358,000
Transmission pipeline	6 in	500	LF	$ 39	$ 20,000
Right-of-way easements		4	AC	$ 1,000	$ 4,000
Engineering and Contingencies (30%)					$ 115,000
Subtotal Pipeline					$ 497,000
Diversion Structure & Pump Station	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station	1715 gpm	1	EA	$ 65,804	$ 66,000
Engineering and Contingencies (35%)					$ 23,000
Subtotal of Diversion and Pump Station					$ 89,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station	1400 gpm	1	EA	$ 65,804	$ 66,000
Storage tank	0.50 MG	1	EA	$ 333,000	$ 333,000
Engineering and Contingencies (35%)					$ 140,000
Subtotal of Pump Station(s)					$ 539,000
Treatment Equipment		**Quantity**	**Unit**	**Unit Price**	**Cost**
Microfiltration/Ultrafiltration (MF/UF)		1	EA	$ 2,043,866	$ 2,044,000
Reverse Osmosis (RO)		1	EA	$ 1,816,185	$ 1,816,000
UV/Oxidation		1	EA	$ 572,493	$ 572,000
Engineering and Contingencies (35%)					$ 1,551,000
Subtotal of Treatment Equipment					$ 5,983,000
Reject Facilities		**Quantity**	**Unit**	**Unit Price**	**Cost**
High Pressure Membrane Reject (Piping to Creek)		1	EA	$ 138,188	$ 138,000
Low Pressure Membrane Reject		1	EA	$ 98,706	$ 99,000
Engineering and Contingencies (35%)					$ 83,000
Subtotal of Reject Facilities					$ 320,000
Building		**Quantity**	**Unit**		**Cost**
Metal Building		5,000	SF	$ 118	$ 592,000
Engineering and Contingencies (35%)					$ 207,000
Subtotal of Building					$ 799,000

WUGNAME: Big Spring
STRATEGY: Big Spring Reuse

Electrical			**Cost**
20% of Equipment Cost		$	445,000
Engineering and Contingencies (35%)		$	156,000
Subtotal of Electrical		$	601,000
Instrumentation			**Cost**
20% of Equipment Cost		$	445,000
Engineering and Contingencies (35%)		$	156,000
Subtotal of Instrumentation		$	601,000
CONSTRUCTION TOTAL		$	9,434,000
Permitting and Mitigation		$	84,000
Interest During Construction	(12 Months)	$	393,000
TOTAL COST		**$**	**9,911,000**
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	864,000
Operation & Maintenance		$	665,000
Total Annual Costs		**$**	**1,529,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	824
Per 1,000 Gallons		$	2.53
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	358
Per 1,000 Gallons		$	1.10

WUGNAME:	Bronte
STRATEGY:	Rehabilitation of Oak Creek Pipeline
STRATEGY NUMBER:	F19REHPIP
AMOUNT (ac-ft/yr):	129

CONSTRUCTION COSTS

Pipeline Rehabilitation	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**	
New pipe	10"	29,100	LF	$	39	$	1,134,900
New pipe	8"	0	LF	$	31	$	-
Replace storage tank	0.05 MG	1	LS	$	106,000	$	106,000
Engineering and Contingencies (10%)						$	124,000
						$	1,364,900

CONSTRUCTION TOTAL	**$**	**1,364,900**
Annual Capital Costs for 5-year Replacement Period	$	272,980
ANNUAL COSTS		
Debt Service (6% for 20 years)	$	23,800

WUGNAME:	Bronte
STRATEGY:	New Groundwater Southeast of Bronte
STRATEGY NUMBER:	F13OthGW
AMOUNT (ac-ft/yr):	350 treated

CONSTRUCTION COSTS

	Size	Quantity	Unit	Unit Price	Cost
Well Field					
Groundwater rights		450	AC	$ 300	$ 135,000
Water wells	250 gpm	3	EA	$ 175,150	$ 525,000
Piping and other appurtenances		1	LS	$ 26,300	$ 26,000
Engineering and contingencies (30%)					$ 551,000
Transmission					
Pipeline	10 in.	26,400	LF	$ 43	$ 1,135,000
Right of Way Easements		12	AC	$ 2,000	$ 24,000
Pump Station	19.0 HP	1	EA	$ 561,400	$ 561,000
Engineering and contingencies					$ 537,000
RO Treatment	.75 mgd	1	EA	$ 1,450,000	$ 1,450,000
Engineering and contingencies					$ 508,000
CONSTRUCTION TOTAL					$ 5,452,000
Permitting and Mitigation					$ 44,000
Interest During Construction	(12 months)				$ 227,000
TOTAL COST					**$ 5,723,000**
ANNUAL COSTS					
Debt Service (6% for 20 years)					$ 499,000
Electricity ($0.09 kWh)					$ 13,000
Operation & Maintenance					$ 37,000
Water Treatment					$ 60,000
Total Annual Costs					**$ 609,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,740
Per 1,000 Gallons					$ 5.34
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 314
Per 1,000 Gallons					$ 0.96

WUGNAME:	Bronte
STRATEGY:	New Groundwater at Oak Creek Reservoir
STRATEGY NUMBER:	F13OthGW
AMOUNT (ac-ft/yr):	150 treated

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Groundwater rights		150	AC	$ 300	$ 45,000
Water wells	100 gpm	3	EA	$ 213,125	$ 639,000
Piping and other appurtenances		1	LS	$ 32,000	$ 32,000
Engineering and contingencies (30%)					$ 671,000
Transmission around lake					
Pipeline	6 in.	15,840	LF	$ 26	$ 412,000
Right of Way Easements		5	AC	$ 2,000	$ 10,000
Pump Station	7.0 HP	1	EA	$ 524,800	$ 525,000
Ground storage	0.10 MG	1	EA	$ 183,000	$ 183,000
Engineering and contingencies					$ 371,000
CONSTRUCTION TOTAL					$ 2,888,000
Permitting and Mitigation					$ 19,000
Interest During Construction	(6 months)				$ 63,000
TOTAL COST					**$ 2,970,000**
ANNUAL COSTS					
Debt Service (6% for 20 years)					$ 259,000
Electricity ($0.09 kWh)					$ 6,000
Operation & Maintenance					$ 29,000
Water Treatment					$ 15,000
Total Annual Costs					**$ 309,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 2,060
Per 1,000 Gallons					$ 6.32
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 333
Per 1,000 Gallons					$ 1.02

WUGNAME: Bronte, Robert Lee, Winters
STRATEGY: Generic 0.1 MGD Reuse
STRATEGY NUMBER: F04Reuse
AMOUNT (ac-ft/yr): 110

CONSTRUCTION COSTS

Land Acquisition		Quantity	Unit	Unit Price	Cost
Reclaimed Treatment Plant Land Acquisition		3	AC	$ 5,000	$ 15,000
Engineering and Contingencies (30%)					$ 5,000
Subtotal Land Acquisition					$ 20,000

Pipeline	Size	Quantity	Unit	Unit Price	Cost
Transmission pipeline 75gpm	4 in	10,560	LF	$ 26	$ 278,000
Right-of-way easements		7	AC	$ 2,000	$ 15,000
Engineering and Contingencies (30%)					$ 88,000
Subtotal Pipeline					$ 381,000

Pump Station(s) & Ground Storage	Size	Quantity	Unit	Unit Price	Cost
Pump Station	75 gpm	1	EA	$ 31,586	$ 32,000
Storage tank	0.025 MG	1	EA	$ 105,286	$ 105,000
Engineering and Contingencies (35%)					$ 48,000
Subtotal of Pump Station(s)					$ 185,000

Treatment Equipment	Quantity	Unit	Unit Price	Cost
Microfiltration/Ultrafiltration (MF/UF) and Reverse Osmosis (RO) Equipment and Installation	1	EA	$ 486,948	$ 487,000
UV/Oxidation	1	EA	$ 85,545	$ 86,000
Engineering and Contingencies (35%)				$ 201,000
Subtotal of Treatment Equipment				$ 774,000

Building	Quantity	Unit	Unit Price	Cost
Metal Building	3,500	SF	$ 118	$ 415,000
Engineering and Contingencies (35%)				$ 145,000
Subtotal of Building				$ 560,000

Electrical	Cost
20% of Equipment Cost	$ 71,000
Engineering and Contingencies (35%)	$ 25,000
Subtotal of Electrical	$ 96,000

Instrumentation	Cost
20% of Equipment Cost	$ 71,000
Engineering and Contingencies (35%)	$ 25,000
Subtotal of Instrumentation	$ 96,000

CONSTRUCTION TOTAL $ 2,112,000

WUGNAME:	Bronte, Robert Lee, Winters		
STRATEGY:	Generic 0.1 MGD Reuse		
Interest During Construction		$	46,000
TOTAL COST		**$**	**2,158,000**
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	188,000
Operation & Maintenance		$	70,000
Total Annual Costs		**$**	**258,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	2,345
Per 1,000 Gallons		$	7.20
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	636
Per 1,000 Gallons		$	1.95

WUGNAME:	Colorado City
STRATEGY:	Dockum Desalination Facility
STRATEGY NUMBER:	
AMOUNT (ac-ft/yr):	2,200

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Land acquisition - well sites		6	AC	$	2,000	$	12,000
Land acquisition - pipeline r.o.w.		15	AC	$	2,000	$	30,000
Well pumps	250 gpm	6	EA	$	100,000	$	600,000
Well construction		6	EA	$	250,000	$	1,500,000
Well field piping (based on assumed avg dist of 3 mi/well to Pump Station. 70% 4"))	4-inch	66,528	LF	$	30	$	1,996,000
Well field piping (based on assumed avg dist of 3 mi/well to Pump Station. 30% 6"))	6-inch	28,512	LF	$	38	$	1,083,000
Ground storage tank	0.25 MG		LS	$	320,000	$	320,000
Engineering and Contingencies (35%)						$	1,939,000
Subtotal Pump Station and Intake						$	7,480,000

Disposal Facilities	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
Pipeline	8-inch	26,400	LF	$	34	$	898,000
Right-of-way		12.1	AC	$	2,000	$	24,000
High pressure well disposal pumps	1300 gpm	1	EA	$	26,322	$	26,000
Brine Lagoon		1	LS	$	394,823	$	395,000
Engineering and Contingencies (30%)						$	403,000
Subtotal Transmission to Treatment Plant						$	1,746,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Unit Price**		**Cost**
RO Treatment Facility	2.0 MGD	1	LS	$	6,000,000	$	6,000,000
Engineering and Contingencies (35%)						$	2,100,000
Subtotal of Treatment						$	8,100,000

CONSTRUCTION TOTAL		$	17,326,000
Permitting and Mitigation		$	154,000
Interest During Construction	(6 months)	$	375,000
TOTAL COST		**$**	**17,855,000**
ANNUAL COSTS*			
Debt Service (6% for 20 years)*		$	1,557,000
Electricity ($0.09 kWh)		$	179,000
Operation & Maintenance		$	262,000
Water Treatment		$	538,000
Total Annual Costs		**$**	**2,536,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	1,153
Per 1,000 Gallons		$	3.54
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	445
Per 1,000 Gallons		$	1.37

WUGNAME:	CRMWD
STRATEGY:	Southwest Pecos County to Odessa
STRATEGY NUMBER:	F13OthGW
AMOUNT (ac-ft/yr):	15,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water Wells	12-inch	10	EA	$ 365,869	$ 3,659,000
Well field piping		20	MGD	$ 329,019	$ 6,580,000
Other well field appurtanances		1	LS	$ 1,316,076	$ 1,316,000
Engineering and Contingencies (35%)					$ 4,044,000
Subtotal of Well Field					$ 15,599,000
Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	42 in.	554,400	LF	$ 215	$ 119,196,000
Right-of-way easements		255	AC	$ 2,000	$ 510,000
Engineering and Contingencies (30%)					$ 35,912,000
Subtotal Pipeline					$ 155,618,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	250 HP	1	EA	$ 1,279,500	$ 1,280,000
Storage tank	4 MG	1	EA	$ 1,118,000	$ 1,118,000
Engineering and Contingencies (35%)					$ 839,000
Subtotal of Pump Station(s)					$ 3,237,000
CONSTRUCTION TOTAL					$ 174,454,000
Permitting and Mitigation					$ 1,598,000
Interest During Construction	(12 months)				$ 7,269,000
TOTAL COST					**$ 183,321,000**
ANNUAL COSTS					
Debt Service (6% for 20 years)					$ 15,983,000
Electricity ($0.09 kWh)					$ 1,611,000
Operation & Maintenance					$ 1,508,000
Water Purchase					$ 1,466,000
Water Treatment					$ 1,711,000
Total Annual Costs					**$ 22,279,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,485
Per 1,000 Gallons					$ 4.56
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 420
Per 1,000 Gallons					$ 1.29

WUGNAME:	CRMWD						
STRATEGY:	Well field development and transmission pipeline from Roberts County to CRMWD						
STRATEGY NUMBER:	F08Market						
AMOUNT (ac-ft/yr):	25,000						

GROUNDWATER COSTS		**Quantity**	**Unit**		**Unit Price**		**Cost**
Groundwater Rights		10,000	Acre	$	658	$	6,580,000
Subtotal						$	6,580,000
CONSTRUCTION COSTS	**Size**	**Quantity**	**Unit**				**Cost**
Well Facilities							
Wells (1,000 gpm per well)	1000 gpm	23	LS	$	592,234	$	13,621,000
Well field pipeline ($329,000 / mgd)	33.5 mgd	33.50	MGD	$	329,000	$	11,022,000
Engineering and Contingencies (30%)						$	7,393,000
Subtotal of Well Field							$32,036,000
Pipeline							
Pipeline	48 in.	1,625,000	LF	$	269	$	437,125,000
Right of Way Easements (ROW)	30 ft.	1,119	Acre	$	4,000	$	4,477,000
Engineering and Contingencies (30%)						$	132,481,000
Subtotal of Pipeline							$574,083,000
Pump Station(s)							
Booster Pump Station	4500 HP	1	LS	$	6,541,500	$	6,542,000
Booster Pump Station	4000 HP	2	LS	$	6,095,000	$	12,190,000
Booster Pump Station	750 HP	1	LS	$	2,392,000	$	2,392,000
Ground Storage Tank	4.2 MG	3	LS	$	1,155,000	$	3,465,000
Engineering and Contingencies (35%)						$	8,606,000
Subtotal of Pump Station(s)							$33,195,000
CONSTRUCTION TOTAL						$	639,314,000
Permitting and Mitigation						$	5,915,000
Interest During Construction (18 months)						$	39,832,000
TOTAL COST Before Development Costs							**$645,894,000**
Development Costs							
Preliminary Expenses		1	LS	$	32,901,907	$	32,902,000
Development Fee	15%	1	LS	$	96,605,263	$	96,605,000
Subtotal							$129,507,000
TOTAL COST							**$775,401,000**
ANNUAL COSTS							
Debt Service (6% for 30 years)						$	67,603,000
Electricity transmission($0.09 kWh)						$	4,884,000
Electricity well field (330 HP each well $0.06 kWh)						$	4,458,000
Operation & Maintenance						$	6,037,000
Total Annual Costs							**$82,982,000**
UNIT COSTS (Until Amortized)							
Per Acre-Foot						$	3,319
Per 1,000 Gallons						$	10.19
UNIT COSTS (After Amortization)							
Per Acre-Foot						$	615
Per 1,000 Gallons						$	1.89

WUGNAME:	CRMWD
STRATEGY:	Winkler County Well Field
STRATEGY NUMBER:	F12CenGW
AMOUNT (ac-ft/yr):	6,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		7	EA	$ 419,000	$ 2,933,000
Well field pipeline	10"	2,800	LF	$ 43	$ 120,000
Well field pipeline	12"	6,050	LF	$ 52	$ 315,000
Well field pipeline	14"	600	LF	$ 60	$ 36,000
Well field pipeline	16"	1,000	LF	$ 69	$ 69,000
Well field pipeline	18"	800	LF	$ 77	$ 62,000
Well field pipeline	24"	2,000	LF	$ 116	$ 232,000
Well field pipeline	27"	2,000	LF	$ 131	$ 261,000
Well field pipeline	30"	7,650	LF	$ 145	$ 1,109,000
Other well field appurtenances			LS	$ 1,316,076	$ 1,316,076
Engineering and contingencies (35%)					$ 2,259,000
Subtotal Well field					$ 8,712,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	36 in	228,934	LF	$ 184	$ 42,124,000
Right-of-way easements		105	AC	$ 2,000	$ 210,000
Engineering and Contingencies (30%)					$ 12,700,000
Subtotal Pipeline					$ 55,034,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	1800 HP	1	EA	$ 3,919,600	$ 3,920,000
Storage tank	5 MG	2	EA	$ 1,303,000	$ 2,606,000
Engineering and Contingencies (35%)					$ 2,284,000
Subtotal of Pump Station(s)					$ 8,810,000

CONSTRUCTION TOTAL		$ 72,556,000
Permitting and Mitigation		$ 689,000
Interest During Construction	(12 months)	$ 3,023,000
TOTAL COST		**$ 76,268,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 6,649,000
Electricity ($0.09 kWh)	$ 726,000
Operation & Maintenance	$ 704,000
Water Purchase	$ 587,000
Total Annual Costs	**$ 8,666,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 1,444
Per 1,000 Gallons	$ 4.43

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 336
Per 1,000 Gallons	$ 1.03

WUGNAME:	CRMWD
STRATEGY:	Ward County Well Field Replacement Wells
STRATEGY NUMBER:	
AMOUNT (ac-ft/yr):	0

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		14	EA	$ 338,000	$ 4,732,000
Well field pipeline	12"	2,000	LF	$ 52	$ 104,000
Well field pipeline	14"	2,000	LF	$ 60	$ 120,000
Well field pipeline	18"	2,000	LF	$ 77	$ 154,000
Well field pipeline	24"	2,000	LF	$ 116	$ 232,000
Well field pipeline	27"	2,000	LF	$ 131	$ 261,000
Well field pipeline	30"	4,000	LF	$ 145	$ 580,000
Other well field appurtenances (20%)			LS		$ 290,200
Engineering and contingencies (35%)					$ 2,266,000
Subtotal Well field					$ 8,739,000
CONSTRUCTION TOTAL					$ 8,739,000
Permitting and Mitigation					$ 78,000
Interest During Construction	(6 months)				$ 189,000
TOTAL COST					**$ 9,006,000**
ANNUAL COSTS					
Debt Service (6% for 20 years)					$ 785,000
Operation & Maintenance					$ 65,000
Total Annual Costs					**$ 850,000**

WUGNAME:	CRMWD
STRATEGY:	Capitan Reef Complex Desalination Facility
STRATEGY NUMBER:	F16DESAL
AMOUNT (ac-ft/yr):	9,500

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Land acquisition		14	AC	$ 2,632	$ 38,000
Well Pumps	500 gpm	20	EA	$ 19,741	$ 395,000
Well Collection Piping	8-inch	20,000	L.F.	$ 53	$ 1,053,000
Well Construction		20	EA	$ 429,041	$ 8,581,000
Ground Storage Tank (6 hrs)	3.3 MG	1	L.S.	$ 985,000	$ 985,000
Engineering and Contingencies (35%)					$ 3,868,000
Subtotal Well Field					$ 14,920,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	30 in.	289,000	L.F.	$ 145	$ 41,905,000
Transmission pipeline - treatment plant to dispo	16 in.	2,000	L.F.	$ 69	$ 138,000
Right-of-way easements		140	AC	$ 2,000	$ 280,000
Engineering and Contingencies (30%)					$ 12,697,000
Subtotal Pipeline					$ 55,020,000

Pumps	**Size**	**Quantity**	**Unit**		**Cost**
Well field to treatment plant	7500 gpm	3	EA	$ 92,125	$ 276,000
Booster Station	1600 HP	1	EA	$ 3,657,200	$ 3,657,000
Ground storage tank	5 MG	1	EA	$ 1,303,000	$ 1,303,000
High service pump station	2000 gpm	1	LS	$ 236,894	$ 237,000
Ground storage tank	2.5 MG	1	LS	$ 821,000	$ 821,000
High pressure well disposal pumps	1300 gpm	3	EA	$ 26,322	$ 79,000
Engineering and Contingencies (35%)					$ 2,231,000
Subtotal of Pumps					$ 8,604,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Cost**
RO Unit	10.0 MGD	1	LS	$ 9,800,000	$ 9,800,000
Disinfection facility		1	LS	$ 223,733	$ 224,000
Metal Building		5,000	SF	$ 118	$ 592,000
Engineering and Contingencies (35%)					$ 3,716,000
Subtotal of Treatment					$ 14,332,000

Reject Facilities	**Size**	**Quantity**	**Unit**		**Cost**
Brine lagoon	37.5 MG	1	LS	$ 3,158,583	$ 3,159,000
Disposal wells		10	LS	$ 1,579,292	$ 15,793,000
Engineering and Contingencies (35%)					$ 6,633,000
Subtotal of Reject Facilities					$ 25,585,000

WUGNAME: CRMWD
STRATEGY: Capitan Reef Complex Desalination Facility

	Size	Quantity	Unit				Cost
Electrical and Instrumentation							
Electrical		1	LS	$	2,594,677	$	2,595,000
Instrumentation		1	LS	$	1,729,785	$	1,730,000
Power Service		25,000	LF	$	39	$	987,000
Engineering and Contingencies (35%)						$	1,859,000
Subtotal of Electrical & Instrumentation						$	7,171,000
CONSTRUCTION TOTAL						$	125,632,000
Permitting and Mitigation						$	736,990
Interest During Construction	(12 months)					$	5,235,000
TOTAL COST						**$**	**131,603,990**
ANNUAL COSTS							
Debt Service (6% for 20 years)						$	11,474,000
Electricity ($0.09 kWh)						$	2,171,378
Operation & Maintenance						$	3,240,000
Water Purchase						$	929,000
Total Annual Costs						**$**	**17,814,378**
UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	1,875
Per 1,000 Gallons						$	5.75
UNIT COSTS (After Amortization)							
Per Acre-Foot						$	667
Per 1,000 Gallons						$	2.05

WUGNAME:	City of Eden
STRATEGY:	0.7 MGD RO Plant
STRATEGY NUMBER:	F27ADVTR
AMOUNT (ac-ft/yr):	392

CONSTRUCTION COSTS

Treatment Facility	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
RO Plant	0.7 MGD	1	LS	$ 1,420,000	$ 1,420,000
Storage Tank	0.75 MG	1	LS	$ 401,000	$ 401,000
Engineering and Contingencies (35%)					$ 637,000
CONSTRUCTION TOTAL					$ 2,458,000
Permitting and Mitigation					$ 22,000
Interest During Construction	(12 months)				$ 102,000
TOTAL COST					**$ 2,582,000**
ANNUAL COSTS					
Debt Service (6% for 20 years)					$ 225,000
O&M					$ 96,000
Total Annual Cost					**$ 321,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 819
Per 1,000 gallons					$ 2.51
UNIT COSTS (After Amortization)					
Per Acre-Foot of treated water					$ 245
Per 1,000 gallons					$ 0.75

WUGNAME:	City of Eden
STRATEGY:	Replacement Well
STRATEGY NUMBER:	F30REPWELL
AMOUNT (ac-ft/yr):	323

CAPITAL COSTS					
	Quantity	**Units**	**Unit Price**		**Cost**
Water Well Construction	1	EA		$	1,211,000
Connection to Water System	1	EA		$	132,000
Engineering and Contingencies (30%)				$	403,000
Subtotal				**$**	**1,746,000**
Permitting and Mitigation				$	16,000
Interest During Construction				$	38,000
TOTAL CAPITAL COST				**$**	**1,800,000**
ANNUAL COSTS	**Quantity**	**Units**	**Unit Price**		
Debt Service (6% for 20 years)				$	157,000
O&M				$	13,000
Chemicals		1000 gal	$ 0.10	$	11,000
Electricity				$	178,000
Total Annual Cost				**$**	**359,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water				$	1,113
Per 1,000 gallons				$	3.42
UNIT COSTS (After Amortization)					
Per Acre-Foot of treated water				$	626
Per 1,000 gallons				$	1.92

WUGNAME:	City of Eden
STRATEGY:	Eden Bottled Water System
STRATEGY NUMBER:	F26BOTTLE
AMOUNT (ac-ft/yr):	1.34

CAPITAL COSTS		2002 **Cost**		2008 **Cost**
Equipment	$	40,000	$	53,000
Installation	$	10,000	$	13,000
Metal Buildings	$	60,000	$	79,000
Engineering and Contingences (20%)	$	22,000	$	29,000
TOTAL CAPITAL COST FOR TWO SYSTEMS	$	132,000	$	174,000
Permitting	$	1,320	$	2,000
TOTAL CAPITAL COST	$	133,320	$	176,000
ANNUAL COSTS				
Debt Service (6% for 10 yrs)	$	18,114	$	24,000
O&M at $2 per 1000 gallon	$	8,760	$	9,000
Total Annual Cost	$	26,874	$	33,000
UNIT COSTS				
Per Acre-Foot of Bottled Water	$	19,994	$	24,552
Per 1,000 gallons	$	61.36	$	75.34

WUGNAME:	Kimble County Manufacturing
STRATEGY:	New Groundwater from Edwards-Trinity Plateau Aquifer
STRATEGY NUMBER:	F10ETRGW
AMOUNT (ac-ft/yr):	1,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	8-in.	5	EA	$ 142,136	$ 711,000
Connection to Existing System		5	LF	$ 65,804	$ 329,000
Engineering and contingencies (35%)					$ 364,000
Subtotal Well field					$ 1,404,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	12 in.	79,200	LF	$ 52	$ 4,118,000
Right-of-way easements		36	AC	$ 2,000	$ 72,000
Engineering and Contingencies (30%)					$ 1,257,000
Subtotal Pipeline					$ 5,447,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	200 HP	1	EA	$ 1,118,000	$ 1,118,000
Storage tank	0.5 MG	1	EA	$ 333,000	$ 333,000
Engineering and Contingencies (35%)					$ 508,000
Subtotal of Pump Station(s)					$ 1,959,000

CONSTRUCTION TOTAL		$ 8,810,000
Permitting and Mitigation		$ 79,000
Interest During Construction	(6 months)	$ 191,000
TOTAL COST		**$ 9,080,000**
ANNUAL COSTS		
Debt Service (6% for 20 years)		$ 792,000
Electricity ($0.09kWh)		$ 84,000
Operation & Maintenance		$ 106,000
Water Purchase		$ 98,000
Total Annual Costs		**$ 1,080,000**
UNIT COSTS (Until Amortized)		
Per Acre-Foot of treated water		$ 1,080
Per 1,000 Gallons		$ 3.31
UNIT COSTS (After Amortization)		
Per Acre-Foot		$ 288
Per 1,000 Gallons		$ 0.88

WUGNAME:	Menard
STRATEGY:	New Hickory Well
STRATEGY NUMBER:	F11HICGW
AMOUNT (ac-ft/yr):	160

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	10-in	1	EA	$ 1,144,460	$ 1,144,000
Connection to existing system		1	LS	$ 65,804	$ 66,000
Engineering and contingencies (35%)					$ 424,000
Subtotal Well field					$ 1,634,000
CONSTRUCTION TOTAL					$ 1,634,000
Permitting and Mitigation					$ 15,000
Interest During Construction	(6 months)				$ 35,000
TOTAL COST					**$ 1,684,000**
ANNUAL COSTS					
Debt Service (6% for 20 years)					$ 147,000
Electricity ($0.09 kWh)					$ 75,000
Operation & Maintenance					$ 11,000
Total Annual Costs					**$ 233,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,456
Per 1,000 Gallons					$ 4.47
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 538
Per 1,000 Gallons					$ 1.65

WUGNAME:	Menard
STRATEGY:	New Hickory Well with ASR
STRATEGY NUMBER:	F17ASR
AMOUNT (ac-ft/yr):	240

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	10-in	1	EA	$ 1,144,460	$ 1,144,000
Connection to existing system		1	LS	$ 65,804	$ 66,000
Injection pump		1	EA	$ 19,741	$ 20,000
Engineering and contingencies (35%)					$ 431,000
Subtotal Well field					$ 1,661,000

CONSTRUCTION TOTAL		$ 1,661,000
Permitting and Mitigation		$ 55,000
Interest During Construction	(6 months)	$ 36,000
TOTAL COST		**$ 1,752,000**
ANNUAL COSTS		
Debt Service (6% for 20 years)		$ 153,000
Electricity ($0.09 kWh)		$ 137,000
Operation & Maintenance		$ 15,000
Total Annual Costs		**$ 305,000**
UNIT COSTS (Until Amortized)		
Per Acre-Foot of treated water		$ 1,271
Per 1,000 Gallons		$ 3.90
UNIT COSTS (After Amortization)		
Per Acre-Foot		$ 633
Per 1,000 Gallons		$ 1.94

WUGNAME:	Menard
STRATEGY:	San Saba Off-Channel Reservoir
STRATEGY NUMBER:	F22OCR
AMOUNT (ac-ft/yr):	500

CONSTRUCTION COSTS

Reservoir	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Mobilization		1	LS	$ 278,613	$ 279,000
Care of Water During Construction		1	LS	$ 61,724	$ 62,000
Clearing and Grubbing		5	Ac	$ 2,632	$ 14,000
Foundation Preparation		1	LS	$ 65,804	$ 66,000
Required Excavation		10,000	CY	$ 5	$ 46,000
Borrow Excavation		188,000	CY	$ 5	$ 866,000
Random Compacted Fill		198,000	CY	$ 6	$ 1,173,000
Core Wall		4,000	CY	$ 428	$ 1,711,000
Soil Cement		8,000	CY	$ 105	$ 842,000
Flex Base Roadway		1,000	CY	$ 53	$ 53,000
Spillway Structure Reinforced Concrete		1,800	CY	$ 494	$ 888,000
Rock Riprap		550	CY	$ 132	$ 72,000
Misc. Internal Drainage		1	LS	$ 658,038	$ 658,000
Instrumentation-Piezometers		1	LS	$ 65,804	$ 66,000
Instrumentation-Monuments		1	LS	$ 32,902	$ 33,000
Reservoir site		75	AC	$ 2,300	$ 173,000
Engineering and contingencies (35%)					$ 2,451,000
Subtotal Reservoir					$ 9,453,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Pipeline from River to OCR	24 in	1,500	LF	$ 116	$ 174,000
Pipeline from OCR to WTP	8 in	5,400	LF	$ 34	$ 184,000
Pipeline from WTP to Menard	8 in	2,300	LF	$ 34	$ 78,000
Right-of-way easements		1	AC	$ 2,000	$ 2,000
Engineering and Contingencies (30%)					$ 131,000
Subtotal Pipeline					$ 569,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Channel Weir		1	LS	$ 361,921	$ 362,000
River Pump Station	400 HP	1	LS	$ 1,795,000	$ 1,795,000
Reservoir Pump Station w intake	50 HP	1	LS	$ 645,000	$ 645,000
Pump Station (WTP to Menard)	50 HP	1	EA	$ 645,000	$ 645,000
Engineering and Contingencies (35%)					$ 1,206,000
Subtotal of Pump Station(s)					$ 4,653,000

New Water Treatment Plant	**Size**	**Quantity**	**Unit**		**Cost**
Conventional WTP	1.1 mgd	1	LS	$ 6,040,000	$ 6,040,000
Engineering and Contingencies (35%)					$ 2,114,000
Subtotal WTP					$ 8,154,000

CONSTRUCTION TOTAL	$ 22,829,000

WUGNAME:	Menard		
STRATEGY:	San Saba Off-Channel Reservoir		
Permitting and Mitigation		$	580,000
Interest During Construction	(24 months)	$	1,864,000
TOTAL COST		**$**	**25,273,000**
ANNUAL COSTS			
Debt Service (6% for 30 years)		$	1,836,000
Electricity ($0.09 kWh)		$	30,000
Operation & Maintenance		$	235,000
Water Treatment		$	57,000
Water Purchase		$	57,000
Total Annual Costs		**$**	**2,215,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	4,430
Per 1,000 Gallons		$	13.60
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	758
Per 1,000 Gallons		$	2.33

WUGNAME:	Midland
STRATEGY:	T-Bar Well Field
STRATEGY NUMBER:	F12CenGW
AMOUNT (ac-ft/yr):	13,600

Based on draft cost estimate by PSC. Provided by City of Midland on 5/16/05

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Wells		43	EA	$ 430,000	$ 18,490,000
Well field piping		20	MGD	$ 329,019	$ 6,580,000
Well field site improvements		1	LS	$ 4,794,466	$ 4,794,000
Engineering and Contingencies (35%)					$ 10,452,000
					$ 40,316,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Pipe	36 in.	368,860	LF	$ 184	$ 67,870,000
Right-of-way easements		169	AC	$ 2,632	$ 445,000
Engineering and Contingencies (30%)					$ 20,495,000
Subtotal Pipeline					$ 88,810,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station at Well Field	1900 HP	1	LS	$ 4,050,800	$ 4,051,000
Storage Tank at Well Field	6 MG	1	LS	$ 1,505,000	$ 1,505,000
Booster Station	1900 HP	1	LS	$ 4,050,800	$ 4,051,000
Storage Tank at Booster Station	6 MG	1	LS	$ 1,505,000	$ 1,505,000
Storage Tank at High Point	6 MG	1	LS	$ 1,505,000	$ 1,505,000
Chlorination and other improvements		1	LS	$ 10,528,610	$ 10,529,000
Engineering and Contingencies (35%)					$ 8,101,000
Subtotal of Pump Station(s)					$ 31,247,000

CONSTRUCTION TOTAL		$ 160,373,000
Permitting and Mitigation		$ 1,451,000
Interest During Construction	(12 months)	$ 6,683,000
TOTAL COST		**$ 168,507,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 14,691,000
Electricity ($0.09 kWh)	$ 1,885,500
Operation & Maintenance	$ 2,763,000
Total Annual Costs	**$ 19,339,500**

UNIT COSTS (Before Amortization)

Per Acre-Foot of treated water	$ 1,422
Per 1,000 Gallons	$ 4.36

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 342
Per 1,000 Gallons	$ 1.05

WUGNAME:	Odessa and Midland
STRATEGY:	Odessa and Midland Reuse Project
STRATEGY NUMBER:	F04Reuse
AMOUNT (ac-ft/yr):	9,799

CONSTRUCTION COSTS

Land Acquisition		**Quantity**	**Unit**	**Unit Price**	**Cost**
Reclaimed Treatment Plant Land Acquisition		5	AC	$ 5,000	$ 25,000
Disposal Facilities Land Acquisition		25	AC	$ 1,000	$ 25,000
Engineering and Contingencies (35%)					$ 18,000
Subtotal Land Acquisition					$ 68,000
Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	30 in	84,000	LF	$ 215	$ 18,060,000
Transmission pipeline	24 in	3,000	LF	$ 174	$ 522,000
Transmission pipeline	12 in	5,280	LF	$ 77	$ 407,000
Right-of-way easements		122	AC	$ 2,000	$ 244,000
Engineering and Contingencies (30%)					$ 5,770,000
Subtotal Pipeline					$ 25,003,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station Reclaimed water to terminal	2-7500 gpm	1	EA	$ 160,561	$ 161,000
Pump Station Midland Reclaimed Water	2-7640 gpm	1	EA	$ 221,101	$ 221,000
Storage tank Reclaimed water to terminal	2.7 MG	1	EA	$ 863,800	$ 864,000
Storage tank Midland Reclaimed Water	3.75 MG	1	EA`	$ 1,070,500	$ 1,071,000
Engineering and Contingencies (35%)					$ 811,000
Subtotal of Pump Station(s)					$ 3,128,000
Treatment Equipment	**Size**	**Quantity**	**Unit**		**Cost**
Microfiltration/Ultrafiltration (MF/UF)		1	EA	$ 7,959,629	$ 7,960,000
Reverse Osmosis (RO)		1	EA	$ 7,675,357	$ 7,675,000
UV/Oxidation		1	EA	$ 2,105,722	$ 2,106,000
Secondary Treatment @ Midland's WWTP	3.75 MG	1	EA	$ 8,225,477	$ 8,225,000
Engineering and Contingencies (35%)					$ 9,088,000
Subtotal of Treatment Equipment					$ 35,054,000
Reject Facilities		**Quantity**	**Unit**		**Cost**
High Pressure Membrane Reject					
Pumps	1875 gpm	1	EA	$ 144,768	$ 145,000
RO reject lagoon	2.7 MG	1	EA	$ 592,234	$ 592,000
Brine Lagoon	40.5 MG	1	EA	$ 2,937,482	$ 2,937,000
Disposal Well		4	EA	$ 1,974,114	$ 7,896,000
Pipeline	18 in	85,000	LF	$ 116	$ 9,860,000
Low Pressure Membrane Reject					
Lagoon	1.5 MG	1	LS	$ 723,842	$ 724,000
Engineering and Contingencies (35%)					$ 7,754,000
Subtotal of Reject Facilities					$ 29,908,000

WUGNAME:	Odessa and Midland					
STRATEGY:	Odessa and Midland Reuse Project					
Aquifer Storage and Recovery		**Quantity**	**Unit**			**Cost**
Pipeline	14 in	27,000	LF	$	90	$ 2,430,000
Pumps	1875 gpm	1	EA	$	44,747	$ 45,000
Well Field Modification		1	LS	$	65,804	$ 66,000
Engineering and Contingencies (35%)						$ 889,000
Subtotal of Aquifer Storage and Recovery						$ 3,430,000
Building		**Quantity**	**Unit**			**Cost**
Metal Building		15,000	SF	$	118	$ 1,777,000
Engineering and Contingencies (35%)						$ 622,000
Subtotal of Building						$ 2,399,000
Electrical						**Cost**
10% of Equipment Cost						$ 1,831,000
Engineering and Contingencies (35%)						$ 641,000
Subtotal of Electrical						$ 2,472,000
Instrumentation						**Cost**
10% of Equipment Cost						$ 1,831,000
Engineering and Contingencies (35%)						$ 641,000
Subtotal of Instrumentation						$ 2,472,000
CONSTRUCTION TOTAL						$ 103,934,000
Permitting and Mitigation						$ 929,000
Interest During Construction	(12 months)					$ 4,331,000
TOTAL COST						**$ 109,194,000**
ANNUAL COSTS						
Debt Service (6% for 20 years)						$ 9,520,000
Operation & Maintenance						$ 3,752,000
Total Annual Costs						**$ 13,272,000**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water						$ 1,354
Per 1,000 Gallons						$ 4.16
UNIT COSTS (After Amortization)						
Per Acre-Foot						$ 383
Per 1,000 Gallons						$ 1.18

WUGNAME:	Richland SUD & McCulloch County Other (City of Melvin, Live
STRATEGY:	Central Bottled Water Point in Brady
STRATEGY NUMBER:	F26BOTTLE
AMOUNT (ac-ft/yr):	0.5

		Cost
Capital Costs for Set-up	$	3,000
ANNUAL COSTS		
Total Administrative Costs	$	13,000
Water Cost	$	1,200
Total Annual Cost	$	14,200
PRO-RATED ANNUAL COSTS		
Richland SUD	$	10,200
Melvin	$	2,000
Live Oak Hills Subdivision	$	2,000
UNIT COSTS		
Per Acre-Foot Bottled	$	28,780
Per 1,000 Gallons	$	88.32

WUGNAME:	Richland SUD
STRATEGY:	Richland SUD Specialized Media System
STRATEGY NUMBER:	F27ADVTR
AMOUNT (ac-ft/yr):	113

CAPITAL COSTS		
		Cost
Building	$	39,000
Connection to System	$	26,000
Engineering and Permitting	$	13,000
TOTAL CAPITAL COST	**$**	**78,000**
ANNUAL COSTS		
Debt Service (6% over 10 years)	$	11,000
Payments to WRT	$	46,000
Power Supply	$	11,000
Personnel	$	7,000
Total Annual Cost	**$**	**75,000**
UNIT COSTS		
Per Acre-Foot Delivered	$	664
Per 1,000 Gallons	$	2.04

WUGNAME:	Richland SUD
STRATEGY:	Replacement Well
STRATEGY NUMBER:	F30REPWELL
AMOUNT (ac-ft/yr):	113

CAPITAL COSTS

	Quantity	Units	Unit Price		Cost
Water Well Construction	1	EA		$	1,137,000
Connection to Water System	1	EA		$	132,000
Engineering and Contingencies (30%)				$	381,000
Subtotal				**$**	**1,650,000**
Permitting and Mitigation				$	15,228
Interest During Construction				$	35,751
TOTAL CAPITAL COST				**$**	**1,700,979**

ANNUAL COSTS	**Quantity**	**Units**	**Unit Price**		
Debt Service (6% for 20 years)				$	148,000
O&M				$	13,000
Chemicals		1000 gal	$ 0.10	$	4,000
Electricity				$	59,000
Total Annual Cost				**$**	**224,000**

UNIT COSTS (Until Amortized)		
Per Acre-Foot of treated water	$	1,982
Per 1,000 gallons	$	6.08

UNIT COSTS (After Amortization)		
Per Acre-Foot of treated water	$	673
Per 1,000 gallons	$	2.06

WUGNAME:	Richland SUD
STRATEGY:	New Groundwater from Ellenberger Aquifer in San Saba County
STRATEGY NUMBER:	F14ELLGW
AMOUNT (ac-ft/yr):	200

CONSTRUCTION COSTS

Pipeline	**Size**	**Quantity**	**Unit**				**Cost**
Transmission pipeline	10 in.	52,800	LF	$	43	$	2,270,000
Right-of-way easements		24	AC	$	2,000	$	48,000
Engineering and Contingencies (30%)						$	695,000
Subtotal Pipeline						$	3,013,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**				**Cost**
Pump Station	10.0 HP	1	EA	$	538,000	$	538,000
Ground Storage	1.00 MG	2	EA	$	469,000	$	938,000
Engineering and Contingencies (35%)						$	517,000
Subtotal of Pump Station(s)						$	1,993,000
CONSTRUCTION TOTAL						$	5,006,000
Permitting and Mitigation						$	34,000
Interest During Construction	(6 months)					$	108,000
TOTAL COST						**$**	**5,148,000**
ANNUAL COSTS							
Debt Service (6% for 20 years)						$	449,000
Electricity ($0.09kWh)						$	2,000
Operation & Maintenance						$	72,000
Total Annual Costs						**$**	**523,000**
UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	2,615
Per 1,000 Gallons						$	8.03
UNIT COSTS (After Amortization)							
Per Acre-Foot						$	370
Per 1,000 Gallons						$	1.14

WUGNAME:	Robert Lee
STRATEGY:	Mountain Creek Intake Structure
STRATEGY NUMBER:	F20Intake
AMOUNT (ac-ft/yr):	50

CONSTRUCTION COSTS

Floating Pump with Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Floating Pump	10 HP	1	LS	$ 329,019	$ 329,000
Pipeline	12 in.	1,000	LF	$ 52	$ 52,000
Engineering and Contingencies (35%)					$ 133,000
Subtotal Pump Station and Intake					$ 514,000
CONSTRUCTION TOTAL					$ 514,000
Permitting and Mitigation					$ 3,000
Interest During Construction	(6 months)				$ 11,000
TOTAL COST					**$ 528,000**
ANNUAL COSTS*					
Debt Service (6% for 20 years)*					$ 46,000
Electricity ($0.09 kWh)					$ 600
Operation & Maintenance					$ 10,000
Total Annual Costs					**$ 56,600**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,132
Per 1,000 Gallons					$ 3.47
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 212
Per 1,000 Gallons					$ 0.65

WUGNAME:	Robert Lee
STRATEGY:	Infrastructure expansion
STRATEGY NUMBER:	
AMOUNT (ac-ft/yr):	200

CONSTRUCTION COSTS

Infrastructure Improvemens	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water Treatment Plant Expansion	.5 mgd	1	LS	$ 1,500,000	$ 1,500,000
Additional Storage	0.1 MG	1	LS	$ 156,000	$ 156,000
Other Improvements		1	LS	$ 100,000	$ 100,000
Engineering and Contingencies (35%)					$ 615,000
Subtotal Infrastructure Improvements					$ 2,371,000
CONSTRUCTION TOTAL					$ 2,371,000
Permitting and Mitigation					$ 14,000
Interest During Construction	(6 months)				$ 51,000
TOTAL COST					**$ 2,436,000**
ANNUAL COSTS*					
Debt Service (6% for 20 years)*					$ 212,000
Water Treatment					$ 45,600
Operation & Maintenance					$ 8,000
Total Annual Costs					**$ 265,600**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,328
Per 1,000 Gallons					$ 4.08
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 268
Per 1,000 Gallons					$ 0.82

WUGNAME:	Robert Lee
STRATEGY:	Lake Spence Desalination Facility
STRATEGY NUMBER:	F16Desal
AMOUNT (ac-ft/yr):	500

CONSTRUCTION COSTS

	Size	Quantity	Unit	Unit Price		Cost
Pump Station with Intake	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Pump Station with Intake	50 HP	1	LS	$ 857,850	$	858,000
Engineering and Contingencies (35%)					$	300,000
Subtotal Pump Station and Intake					$	1,158,000
Transmission to Treatment Plant	**Size**	**Quantity**	**Unit**			**Cost**
Pipeline	10-inch	15,840	LF	$ 43	$	681,000
Right-of-way		7.3	AC	$ 2,000	$	15,000
Engineering and Contingencies (30%)					$	209,000
Subtotal Transmission to Treatment Plant					$	905,000
Treatment Facilities	**Size**	**Quantity**	**Unit**			**Cost**
RO Treatment Facility	1.0 MGD	1	LS	$ 4,500,000	$	4,500,000
Ground storage tank	0.1 MG	1	LS	$ 156,000	$	156,000
Engineering and Contingencies (35%)					$	1,630,000
Subtotal of Treatment					$	6,286,000
CONSTRUCTION TOTAL					$	8,349,000
Permitting and Mitigation					$	74,000
Interest During Construction	(12 months)				$	348,000
TOTAL COST					**$**	**8,771,000**
ANNUAL COSTS*						
Debt Service (6% for 20 years)*					$	765,000
Electricity ($0.09 kWh)					$	13,500
Operation & Maintenance					$	39,000
Water Treatment					$	122,000
Total Annual Costs					**$**	**939,500**
UNIT COSTS (Until Amortized)						
Per Acre-Foot of treated water					$	1,879
Per 1,000 Gallons					$	5.77
UNIT COSTS (After Amortization)						
Per Acre-Foot					$	349
Per 1,000 Gallons					$	1.07

WUGNAME:	Robert Lee
STRATEGY:	New Groundwater from Alluvium in Coke County
STRATEGY NUMBER:	F10RLGW
AMOUNT (ac-ft/yr):	150

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells	6-in.	2	EA	$ 120,900	$ 242,000
Engineering and contingencies (35%)					$ 85,000
Subtotal Well field					$ 327,000
Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	6 in.	7,920	LF	$ 26	$ 206,000
Right-of-way easements		36	AC	$ 2,000	$ 72,000
Engineering and Contingencies (30%)					$ 83,000
Subtotal Pipeline					$ 361,000
Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	10.0 HP	1	EA	$ 538,000	$ 538,000
Engineering and Contingencies (35%)					$ 188,000
Subtotal of Pump Station(s)					$ 726,000
CONSTRUCTION TOTAL					$ 1,414,000
Permitting and Mitigation					$ 12,000
Groundwater Rights					$ 45,000
Interest During Construction	(6 months)				$ 31,000
TOTAL COST					**$ 1,502,000**
ANNUAL COSTS					
Debt Service (6% for 20 years)					$ 131,000
Electricity ($0.09kWh)					$ 4,000
Operation & Maintenance					$ 22,000
Total Annual Costs					**$ 157,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,047
Per 1,000 Gallons					$ 3.21
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 173
Per 1,000 Gallons					$ 0.53

WUGNAME:	Robert Lee
STRATEGY:	Treated water from San Angelo using Spence Pipeline
STRATEGY NUMBER:	F06AVOLRED
AMOUNT (ac-ft/yr):	400

CONSTRUCTION COSTS

Pump Station	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station	14.0 HP	1	LS	$ 548,400	$ 548,000
Engineering and Contingencies (35%)					$ 192,000
Subtotal Pump Station					$ 740,000
Rehabilitation of Spence pipeline					
See Cost Table for San Angelo					
CONSTRUCTION TOTAL					$ 740,000
Permitting and Mitigation					$ 7,000
Interest During Construction	(12 months)				$ 31,000
TOTAL COST					**$ 778,000**
ANNUAL COSTS*					
Debt Service (6% for 20 years)*					$ 68,000
Electricity ($0.09 kWh)					$ 5,000
Operation & Maintenance					$ 3,000
Water Purchase ($3.00/ kgal)					$ 391,000
Total Annual Costs					**$ 467,000**
UNIT COSTS (Until Amortized)					
Per Acre-Foot of treated water					$ 1,168
Per 1,000 Gallons					$ 3.58
UNIT COSTS (After Amortization)					
Per Acre-Foot					$ 998
Per 1,000 Gallons					$ 3.06

WUGNAME: San Angelo
STRATEGY: Phase I - 5.0 MGD Regional Brackish Water Desalination Facility
STRATEGY NUMBER: F16DESAL
AMOUNT (ac-ft/yr): 5,600

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**		**Cost**
Land acquisition		800	AC	$ 2,632	$	2,106,000
Well pumps	500 gpm	16	EA	$ 19,741	$	316,000
Well construction		16	EA	$ 197,411	$	3,159,000
Well field piping		5	LS	$ 329,019	$	1,645,000
Ground storage tank	1.5 MG	1	LS	$ 591,000	$	591,000
Engineering and Contingencies (35%)					$	2,736,000
Subtotal Well Field					$	10,553,000

Pipeline	**Size**	**Quantity**	**Unit**			**Cost**
Transmission pipeline - well field to treatment p	30 in.	158,400	LF	$ 145	$	22,968,000
Transmission pipeline - treatment plant to dispo	16 in.	2,000	LF	$ 69	$	138,000
Right-of-way easements		56.47	AC	$ 1,000	$	56,000
Engineering and Contingencies (30%)					$	6,949,000
Subtotal Pipeline					$	30,111,000

Pumps	**Size**	**Quantity**	**Unit**			**Cost**
Well field to treatment plant	4000 gpm	2	EA	$ 92,125	$	184,000
High pressure well disposal pumps	1300 gpm	2	EA	$ 26,322	$	53,000
Engineering and Contingencies (35%)					$	83,000
Subtotal of Pumps					$	320,000

Treatment Facilities	**Size**	**Quantity**	**Unit**			**Cost**
Land acquisition		30	AC	$ 2,632	$	79,000
RO Unit	5.0 MGD	1	LS	$ 5,200,000	$	5,200,000
Ground storage tank	2.5 MG	1	LS	$ 821,000	$	821,000
Disinfection facility		1	LS	$ 157,929	$	158,000
Metal Building		5,000	SF	$ 118	$	592,000
Engineering and Contingencies (35%)					$	2,398,000
Subtotal of Treatment					$	9,248,000

Reject Facilities	**Size**	**Quantity**	**Unit**			**Cost**
Brine lagoon	19 MG	1	LS	$ 1,776,703	$	1,777,000
Disposal wells		7	LS	$ 1,579,292	$	11,055,000
Engineering and Contingencies (35%)					$	4,491,000
Subtotal of Reject Facilities					$	17,323,000

WUGNAME:	San Angelo							
STRATEGY:	Phase I - 5.0 MGD Regional Brackish Water Desalination Facility							
Electrical and Instrumentation	**Size**	**Quantity**	**Unit**					**Cost**
Electrical		1	LS	$	467,273	$		467,000
Instrumentation		1	LS	$	311,515	$		312,000
Power Service		10,000	LF	$	39	$		395,000
Engineering and Contingencies (35%)						$		411,000
Subtotal of Electrical & Instrumentation						$		1,585,000
CONSTRUCTION TOTAL						$		69,140,000
Permitting and Mitigation						$		653,000
Interest During Construction	(24 months)					$		5,647,000
TOTAL COST						**$**		**75,440,000**
ANNUAL COSTS								
Debt Service (6% for 20 years)						$		6,577,000
Electricity ($0.09 kWh)						$		643,500
Operation & Maintenance						$		1,456,000
Water Purchase						$		547,430
Total Annual Costs						**$**		**9,223,930**
UNIT COSTS (Until Amortized)								
Per Acre-Foot of treated water						$		1,647
Per 1,000 Gallons						$		5.05
UNIT COSTS (After Amortization)								
Per Acre-Foot						$		473
Per 1,000 Gallons						$		1.45

WUGNAME:	San Angelo
STRATEGY:	Phase II - Upgrade Desal Facility to 10 MGD
STRATEGY NUMBER:	F16DESAL
AMOUNT (ac-ft/yr):	11,200

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Land acquisition		800	AC	$ 2,632	$ 2,106,000
Well pumps	500 gpm	16	EA	$ 19,741	$ 316,000
Well construction		16	EA	$ 197,411	$ 3,159,000
Well field piping		5	LS	$ 329,019	$ 1,645,000
Ground storage tank	1.5 MG	1	LS	$ 591,000	$ 591,000
Engineering and Contingencies (35%)					$ 2,736,000
Subtotal Well Field					$ 10,553,000

Pumps	**Size**	**Quantity**	**Unit**		**Cost**
Well field to treatment plant	4000 gpm	3	EA	$ 92,125	$ 276,000
High pressure well disposal pumps	1300 gpm	1	EA	$ 26,322	$ 26,000
Engineering and Contingencies (35%)					$ 106,000
Subtotal of Pumps					$ 408,000

Treatment Facilities	**Size**	**Quantity**	**Unit**		**Cost**
RO Unit	5.0 MGD	1	LS	$ 5,200,000	$ 5,200,000
Disinfection facility		1	LS	$ 65,804	$ 66,000
Engineering and Contingencies (35%)					$ 1,843,000
Subtotal of Treatment					$ 7,109,000

Reject Facilities	**Size**	**Quantity**	**Unit**		**Cost**
Brine lagoon	19 MG	1	LS	$ 1,776,703	$ 1,777,000
Disposal wells		7	LS	$ 1,579,292	$ 11,055,000
Engineering and Contingencies (35%)					$ 4,491,000
Subtotal of Reject Facilities					$ 17,323,000

Electrical and Instrumentation	**Size**	**Quantity**	**Unit**		**Cost**
Electrical		1	LS	$ 467,273	$ 467,000
Instrumentation		1	LS	$ 311,515	$ 312,000
Power Service		10,000	LF	$ 39	$ 395,000
Engineering and Contingencies (35%)					$ 411,000
Subtotal of Electrical & Instrumentation					$ 1,585,000

CONSTRUCTION TOTAL $ 36,978,000

WUGNAME:	San Angelo		
STRATEGY:	Phase II - Upgrade Desal Facility to 10 MGD		
Permitting and Mitigation		$	329,000
Interest During Construction	(24 months)	$	3,020,000
TOTAL COST		**$**	**40,327,000**
ANNUAL COSTS*			
Debt Service (6% for 20 years)*		$	7,055,000
Electricity ($0.09 kWh)		$	1,375,500
Operation & Maintenance		$	2,514,000
Water Purchase		$	1,095,000
Total Annual Costs		**$**	**12,039,500**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	1,075
Per 1,000 Gallons		$	3.30
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	445
Per 1,000 Gallons		$	1.37

* Includes debt service and other annual costs for 5 MGD facility

WUGNAME:	San Angelo
STRATEGY:	Groundwater from Edwards-Trinity (Plateau) aquifer
STRATEGY NUMBER:	F10ETRGW
AMOUNT (ac-ft/yr):	12,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		10	EA	$ 263,215	$ 2,632,000
Well field piping		15	MGD	$ 329,019	$ 4,935,000
Other well field appurtenances		1	LS	$ 658,038	$ 658,000
Engineering and contingencies (30%)					$ 2,468,000
Subtotal Well Field					$ 10,693,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	30 in.	160,000	LF	$ 145	$ 23,200,000
Right-of-way easements		73	AC	$ 2,000	$ 146,000
Engineering and Contingencies (30%)					$ 7,004,000
Subtotal Pipeline					$ 30,350,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	450 HP	1	EA	$ 1,913,500	$ 1,914,000
Storage tank	6 MG	1	EA	$ 1,505,000	$ 1,505,000
Engineering and Contingencies (35%)					$ 1,197,000
Subtotal of Pump Station(s)					$ 4,616,000

CONSTRUCTION TOTAL		$ 45,659,000
Permitting and Mitigation		$ 420,000
Interest During Construction	(12 months)	$ 1,903,000
TOTAL COST		**$ 47,982,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 4,183,000
Electricity ($0.09 kWh)	$ 2,083,500
Operation & Maintenance	$ 480,000
Water Purchase	$ 1,173,000
Total Annual Costs	**$ 7,919,500**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 660
Per 1,000 Gallons	$ 2.03

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 311
Per 1,000 Gallons	$ 0.96

WUGNAME:	San Angelo
STRATEGY:	Groundwater from Southwest Pecos County
STRATEGY NUMBER:	F13OTHGW
AMOUNT (ac-ft/yr):	12,000

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		20	EA	$ 921,253	$ 18,425,000
Well field piping		15	MGD	$ 329,019	$ 4,935,000
Other well field appurtenances		1	LS	$ 2,632,153	$ 2,632,000
Engineering and contingencies (30%)					$ 7,798,000
Subtotal Well Field					$ 33,790,000

Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline	36 in.	401,719	LF	$ 184	$ 73,916,000
Transmission pipeline - high pressure	36 in.	341,582	LF	$ 184	$ 62,851,000
Transmission pipeline	30 in.	189,072	LF	$ 145	$ 27,415,000
Right-of-way easements		428	AC	$ 1,000	$ 428,000
Engineering and Contingencies (30%)					$ 49,383,000
Subtotal Pipeline					$ 213,993,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station	500 HP	1	EA	$ 2,032,000	$ 2,032,000
Storage tank	6 MG	2	EA	$ 1,505,000	$ 3,010,000
Engineering and Contingencies (35%)					$ 1,765,000
Subtotal of Pump Station(s)					$ 6,807,000

CONSTRUCTION TOTAL		$ 254,590,000
Permitting and Mitigation		$ 2,348,000
Interest During Construction	(24 months)	$ 20,792,000
TOTAL COST		**$ 277,730,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 24,214,000
Electricity ($0.09 kWh)	$ 3,900,000
Operation & Maintenance	$ 2,433,000
Water Purchase	$ 1,173,000
Total Annual Costs	**$ 31,720,000**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 2,643
Per 1,000 Gallons	$ 8.11

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 626
Per 1,000 Gallons	$ 1.92

WUGNAME:	San Angelo
STRATEGY:	McCulloch County Well Field Phase 1
STRATEGY NUMBER:	F11HICGW
AMOUNT (ac-ft/yr):	6,700
Implementation Date	2014

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		8	EA	$ 921,253	$ 7,370,000
Well field piping		1	LS	$ 8,618,984	$ 8,619,000
Rehabilitation of existing wells		3	EA	$ 460,627	$ 1,382,000
Engineering and contingencies (30%)					$ 5,211,000
Subtotal Well Field					$ 22,582,000

Pipeline	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Transmission pipeline	36 in.	304,000	LF	$ 184	$ 55,936,000
Right-of-way easements		140	AC	$ 2,000	$ 280,000
Engineering and Contingencies (30%)					$ 16,865,000
Subtotal Pipeline					$ 73,081,000

Pump Station(s) & Ground Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pump Station	2600 HP	1	EA	$ 4,684,800	$ 4,685,000
Storage tank	6 MG	2	EA	$ 1,505,000	$ 3,010,000
Engineering and Contingencies (35%)					$ 2,693,000
Subtotal of Pump Station(s)					$ 10,388,000

Treatment	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Single Use Ion Exchange	6 MGD	1	EA	$ 6,800,000	$ 6,800,000
Engineering and Contingencies (35%)					$ 2,380,000
Subtotal of Treatment					$ 9,180,000

CONSTRUCTION TOTAL		$ 115,231,000
Permitting and Mitigation		$ 1,054,000
Interest During Construction	(24 months)	$ 9,411,000
TOTAL COST		**$ 125,696,000**

ANNUAL COSTS

Debt Service (6% for 20 years)	$ 10,959,000
Electricity ($0.09 kWh)	$ 6,145,500
Operation & Maintenance	$ 1,110,534
Water Purchase	$ -
Total Annual Costs	**$ 18,215,034**

UNIT COSTS (Until Amortized)

Per Acre-Foot of treated water	$ 2,719
Per 1,000 Gallons	$ 8.34

UNIT COSTS (After Amortization)

Per Acre-Foot	$ 1,083
Per 1,000 Gallons	$ 3.32

WUGNAME:	San Angelo
STRATEGY:	McCulloch County Well Field Phase 2
STRATEGY NUMBER:	F11HICGW
AMOUNT (ac-ft/yr):	3,300
Implementation Date	2026

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		8	EA	$ 921,253	$ 7,370,000
Well field piping		1	LS	$ 8,618,984	$ 8,619,000
Rehabilitation of existing wells		3	EA	$ 460,627	$ 1,382,000
Engineering and contingencies (30%)					$ 5,211,000
Subtotal Well Field					$ 22,582,000

Treatment	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Single Use Ion Exchange	3.5 MGD	1	EA	$ 2,100,000	$ 2,100,000
Engineering and Contingencies (35%)					$ 735,000
Subtotal of Treatment					$ 2,835,000

CONSTRUCTION TOTAL		$ 25,417,000
Permitting and Mitigation		$ 242,000
Interest During Construction	(24 months)	$ 2,076,000
TOTAL COST		**$ 27,735,000**
ANNUAL COSTS		
Debt Service (6% for 20 years)		$ 2,418,000
Electricity ($0.09 kWh)		$ 6,145,500
Operation & Maintenance		$ 293,502
Water Purchase		$ -
Total Annual Costs		**$ 8,857,002**
UNIT COSTS (Until Amortized)		
Per Acre-Foot of treated water		$ 2,684
Per 1,000 Gallons		$ 8.24
UNIT COSTS (After Amortization)		
Per Acre-Foot		$ 1,951
Per 1,000 Gallons		$ 5.99

WUGNAME:	San Angelo
STRATEGY:	McCulloch County Well Field Phase 3
STRATEGY NUMBER:	F11HICGW
AMOUNT (ac-ft/yr):	2,000
Implementation Date	2034

CONSTRUCTION COSTS

Well Field	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Water wells		3	EA	$ 921,253	$ 2,764,000
Well field piping		1	LS	$ 8,618,984	$ 8,619,000
Rehabilitation of existing wells		3	EA	$ 460,627	$ 1,382,000
Engineering and contingencies (30%)					$ 3,830,000
Subtotal Well Field					$ 16,595,000

Treatment	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Single Use Ion Exchange	1.75 MGD	1	EA	$ 1,200,000	$ 1,200,000
Engineering and Contingencies (35%)					$ 420,000
Subtotal of Treatment					$ 1,620,000

CONSTRUCTION TOTAL		$ 18,215,000
Permitting and Mitigation		$ 173,000
Interest During Construction	(24 months)	$ 1,488,000
TOTAL COST		**$ 19,876,000**
ANNUAL COSTS		
Debt Service (6% for 20 years)		$ 1,733,000
Electricity ($0.09 kWh)		$ 6,145,500
Operation & Maintenance		$ 201,780
Water Purchase		$ -
Total Annual Costs		**$ 8,080,280**
UNIT COSTS (Until Amortized)		
Per Acre-Foot of treated water		$ 4,040
Per 1,000 Gallons		$ 12.40
UNIT COSTS (After Amortization)		
Per Acre-Foot		$ 3,174
Per 1,000 Gallons		$ 9.74

WUGNAME:	San Angelo
STRATEGY:	Spence Pipeline Rehabilitation
STRATEGY NUMBER:	F19REHPIP
AMOUNT (ac-ft/yr):	2,300

CONSTRUCTION COSTS

Pump Station(s) & Storage	**Size**	**Quantity**	**Unit**	**Unit Price**	**Cost**
Pumping Unit	450 HP	2	EA	$ 197,411	$395,000
Pump Station Control Valve	16 in	2	EA	$ 26,322	$53,000
Isolation Valve	16 in	2	EA	$ 6,580	$13,000
Bridge Pipe		220	LF	$ 197	$43,000
Piping and Appuranturances		1	LS	$ 26,322	$26,000
2400 Switchgear		1	LS	$ 98,706	$99,000
Electrical		1	LS	$ 72,384	$72,000
SCADA System		1	LS	$ 197,411	$197,000
Engineering and Contingencies (30%)					$269,000
Subtotal of Pump Stations					$1,167,000
Pipeline					
Transmission Pipeline	12 in	36,000	LF	$ 77	$2,772,000
Combination Air Valve	6 in	3	EA	$ 11,845	$36,000
Combination Air Valve	3 in	9	EA	$ 9,213	$83,000
Blowoff Valve	6 in	4	EA	$ 6,580	$26,000
Mainline Valves	24 in	3	EA	$ 13,161	$39,000
Cathodic Protection		36,000	LF	$ 7	$237,000
Roadway Bore	42 in	80	LF	$ 592	$47,000
Road Repair		40	LF	$ 395	$16,000
Erosion Control		300	LF	$ 99	$30,000
Permanent Gates		10	EA	$ 1,974	$20,000
Air Valve Rehabilitation	3 in	20	EA	$ 3,290	$66,000
Engineering and Contingencies (30%)					$1,012,000
Subtotal of Pipelines					$4,384,000
Storage Tank					
Rehabilitation of Mountain Top Tank		1	LS	$ 131,608	$132,000
Demolish Pump Station No 1		1	LS	$ 52,643	$53,000
Demolish Pump Station No 2		1	LS	$ 52,643	$53,000
Engineering and Contingencies (30%)					$71,000
Subtotal of Storage Tanks					$309,000
CONSTRUCTION TOTAL					$5,860,000
Permitting and Mitigation					$ 53,000
Interest During Construction	(12 month)				$ 244,000
TOTAL COST					**$ 6,157,000**

WUGNAME:	San Angelo		
STRATEGY:	Spence Pipeline Rehabilitation		
ANNUAL COSTS			
Debt Service (6% for 20 years)		$	537,000
Electricity ($0.09 kWh)		$	179,000
Total Annual Costs		**$**	**716,000**
UNIT COSTS (Until Amortized)			
Per Acre-Foot of treated water		$	311
Per 1,000 Gallons		$	0.96
UNIT COSTS (After Amortization)			
Per Acre-Foot		$	78
Per 1,000 Gallons		$	0.24

WUGNAME: Snyder
STRATEGY: Snyder Reuse Project
STRATEGY NUMBER: F04Reuse
AMOUNT (ac-ft/yr): 726

CONSTRUCTION COSTS

Land Acquisition		**Quantity**	**Unit**	**Unit Price**	**Cost**
Reclaimed Treatment Plant Land Acquisition		2	AC	$ 2,632	$ 5,000
Engineering and Contingencies (35%)					$ 2,000
Subtotal Land Acquisition					$ 7,000
Pipeline	**Size**	**Quantity**	**Unit**		**Cost**
Transmission pipeline to CRMWD GST	8 in	6,800	LF	$ 52	$ 354,000
Transmission pipeline to Reclaimed WTP	8 in	1,500	LF	$ 52	$ 78,000
Transmission pipeline to Disposal	4 in	1,500	LF	$ 26	$ 39,000
Right-of-way easements		7	AC	$ 1,000	$ 7,000
Engineering and Contingencies (30%)					$ 143,000
Subtotal Pipeline					$ 621,000
Pump Station(s) & Storage	**Size**	**Quantity**	**Unit**		**Cost**
Pump Station finished water to CRMWD GST	500	1	EA	$ 52,643	$ 53,000
Pump Station WWTP efluent to Reclaim WTP	700	1	EA	$ 52,643	$ 53,000
Storage reservoir in snyder	15 MG	1	EA	$ 1,302,916	$ 1,303,000
Storage tank	0.18 MG	1	EA	$ 191,400	$ 191,000
Lagoon (1day storage)	1 MG	1	EA`	$ 230,313	$ 230,000
Engineering and Contingencies (35%)					$ 641,000
Subtotal of Pump Station(s)					$ 2,471,000
Treatment Equipment	**Size**	**Quantity**	**Unit**		**Cost**
Microfiltration/Ultrafiltration (MF/UF)		1	EA	$ 798,858	$ 799,000
Reverse Osmosis (RO)		1	EA	$ 568,545	$ 569,000
UV/Oxidation		1	EA	$ 250,054	$ 250,000
Engineering and Contingencies (35%)					$ 566,000
Subtotal of Treatment Equipment					$ 2,184,000
Reject Facilities		**Quantity**	**Unit**		**Cost**
High Pressure Membrane Reject					
Pumps	125 gpm	1	EA	$ 32,902	$ 33,000
RO reject lagoon (1 day storage)	0.18 MG	1	EA	$ 82,913	$ 83,000
Low Pressure Membrane Reject					
Pumps	70 gpm	1	EA	$ 32,902	$ 33,000
Lagoon (1 day storage)	0.2 MG	1	LS	$ 230,313	$ 230,000
Engineering and Contingencies (35%)					$ 133,000
Subtotal of Reject Facilities					$ 512,000

WUGNAME: Snyder
STRATEGY: Snyder Reuse Project

Aquifer Storage and Recovery		**Quantity**	**Unit**				**Cost**
Pipeline	8 in	27,000	LF	$	52	$	1,404,000
Pumps	2-347	1	EA	$	46,063	$	46,000
ASR Well Facilities		1	LS	$	186,883	$	187,000
Engineering and Contingencies (35%)						$	573,000
Subtotal of Aquifer Storage and Recovery						$	2,210,000
Building		**Quantity**	**Unit**				**Cost**
Metal Building		4,500	SF	$	118	$	533,000
Engineering and Contingencies (35%)						$	187,000
Subtotal of Building						$	720,000
Electrical							**Cost**
10% of Equipment Cost						$	168,000
Engineering and Contingencies (35%)						$	59,000
Subtotal of Electrical						$	227,000
Instrumentation							**Cost**
10% of Equipment Cost						$	168,000
Engineering and Contingencies (35%)						$	59,000
Subtotal of Instrumentation						$	227,000
CONSTRUCTION TOTAL						$	9,179,000
Permitting and Mitigation						$	82,000
Interest During Construction	(12 month)					$	382,000
TOTAL COST						**$**	**9,643,000**
ANNUAL COSTS							
Debt Service (6% for 20 years)						$	841,000
Operation & Maintenance						$	263,000
Total Annual Costs						**$**	**1,104,000**
UNIT COSTS (Until Amortized)							
Per Acre-Foot of treated water						$	1,521
Per 1,000 Gallons						$	4.67
UNIT COSTS (After Amortization)							
Per Acre-Foot						$	362
Per 1,000 Gallons						$	1.11

WUGNAME:
STRATEGY: Replacement Well
STRATEGY NUMBER: F30REPWELL
AMOUNT (ac-ft/yr): 0

CAPITAL COSTS

	Quantity	Units	Unit Price		Cost
Water Well Construction	1	EA		$	257,000
Connection to Water System	1	EA		$	132,000
Engineering and Contingencies (30%)				$	117,000
Subtotal				**$**	**506,000**
Permitting and Mitigation				$	5,000
Interest During Construction				$	11,000
TOTAL CAPITAL COST				**$**	**522,000**

ANNUAL COSTS	**Quantity**	**Units**	**Unit Price**		
Debt Service (6% for 20 years)				$	46,000
O&M				$	4,000
Total Annual Cost				**$**	**50,000**

APPENDIX 4E

COSTS FOR ADVANCED IRRIGATION TECHNOLOGIES

County	Water saved (ac-ft)	Acres upgraded	Capital costs	Annual Costs
Andrews	**5455**	**14131**	**$ 4,822,904**	**$ 350,379**
Furrow to LEPA	3377	6281	$2,386,780	$173,397
Furrow to drip	1628	2845	$2,275,840	$165,337
Surge to LEPA	72	177	$63,720	$4,629
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	378	4828	$96,564	$7,015
Borden	**460**	**2050**	**$ 478,200**	**$ 34,741**
Furrow to LEPA	97	450	$171,000	$12,423
Furrow to drip	183	320	$256,000	$18,598
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	132	640	$38,400	$2,790
LESA to LEPA	48	640	$12,800	$930
Brown	**185**	**1467**	**$ 54,917**	**$ 3,990**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	127	640	$38,374	$2,788
LESA to LEPA	58	827	$16,543	$1,202
Coke	**0**	**0**	**$ -**	**$ -**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Coleman	**0**	**0**	**$ -**	**$ -**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Concho	**1496**	**3965**	**$ 1,895,367**	**$ 137,696**
Furrow to LEPA	904	2445	$928,967	$67,488
Furrow to drip	572	1200	$960,000	$69,743
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	20	320	$6,400	$465

County	Water saved (ac-ft)	Acres upgraded	Capital costs	Annual Costs
Crane	**0**	**0**	**$ -**	**$ -**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Crockett	**0**	**0**	**$ -**	**$ -**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Ector	**490**	**951**	**$ 304,680**	**$ 22,135**
Furrow to LEPA	474	794	$301,530	$21,906
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	16	158	$3,150	$229
Glasscock	**7262**	**14278**	**$ 11,422,560**	**$ 829,837**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	7262	14278	$11,422,560	$829,837
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Howard	**653**	**1080**	**$ 647,652**	**$ 47,051**
Furrow to LEPA	330	515	$195,852	$14,228
Furrow to drip	323	565	$451,800	$32,823
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Irion	**73**	**352**	**$ 21,137**	**$ 1,536**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	73	352	$21,137	$1,536
LESA to LEPA	0	0	$0	$0

County	Water saved (ac-ft)	Acres upgraded	Capital costs	Annual Costs
Kimble	**147**	**676**	**$ 141,658**	**$ 10,291**
Furrow to LEPA	131	356	$135,262	$9,827
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	16	320	$6,396	$465
Loving	**0**	**0**	**$ -**	**$ -**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
McCulloch	**394**	**1826**	**$ 166,844**	**$ 12,121**
Furrow to LEPA	66	179	$68,020	$4,942
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	328	1647	$98,824	$7,179
LESA to LEPA	0	0	$0	$0
Martin	**3502**	**8859**	**$ 4,001,621**	**$ 290,713**
Furrow to LEPA	513	1013	$385,013	$27,971
Furrow to drip	2495	4360	$3,488,040	$253,402
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	324	1471	$88,284	$6,414
LESA to LEPA	170	2014	$40,284	$2,927
Mason	**1491**	**5503**	**$ 713,460**	**$ 51,832**
Furrow to LEPA	602	1249	$474,759	$34,491
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	864	3841	$230,438	$16,741
LESA to LEPA	26	413	$8,262	$600
Menard	**46**	**267**	**$ 16,029**	**$ 1,165**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	46	267	$16,029	$1,165
LESA to LEPA	0	0	$0	$0

County	Water saved (ac-ft)	Acres upgraded	Capital costs	Annual Costs
Midland	**3600**	**12771**	**$ 3,169,471**	**$ 230,259**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	2051	3584	$2,867,040	$208,287
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	959	2967	$178,035	$12,934
LESA to LEPA	590	6220	$124,396	$9,037
Mitchell	**1729**	**4171**	**$ 2,548,056**	**$ 185,113**
Furrow to LEPA	248	1321	$502,056	$36,474
Furrow to drip	1459	2550	$2,040,000	$148,204
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	23	300	$6,000	$436
Pecos	**12600**	**18284**	**$ 8,329,226**	**$ 605,109**
Furrow to LEPA	7910	5507	$2,092,801	$152,040
Furrow to drip	486	456	$364,864	$26,507
Surge to LEPA	1507	4472	$1,609,915	$116,959
Surge to Drip	2488	5401	$4,212,702	$306,048
MESA to LEPA	0	0	$0	$0
LESA to LEPA	210	2447	$48,944	$3,556
Reagan	**3936**	**7845**	**$ 6,275,976**	**$ 455,943**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	3936	7845	$6,275,976	$455,943
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Reeves	**11648**	**18880**	**$ 8,253,318**	**$ 599,595**
Furrow to LEPA	6540	4536	$1,723,696	$125,225
Furrow to drip	447	451	$360,862	$26,216
Surge to LEPA	2541	7471	$2,689,545	$195,392
Surge to Drip	1939	4409	$3,438,959	$249,837
MESA to LEPA	0	0	$0	$0
LESA to LEPA	181	2013	$40,257	$2,925
Runnels	**0**	**0**	**$ -**	**$ -**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0

County	Water saved (ac-ft)	Acres upgraded	Capital costs	Annual Costs
Schleicher	**214**	**466**	**$ 176,982**	**$ 12,858**
Furrow to LEPA	214	466	$176,982	$12,858
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Scurry	**1143**	**2868**	**$ 1,290,509**	**$ 93,754**
Furrow to LEPA	808	1968	$747,723	$54,321
Furrow to drip	321	673	$538,240	$39,103
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	14	227	$4,546	$330
Sterling	**89**	**431**	**$ 25,860**	**$ 1,879**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	89	431	$25,860	$1,879
LESA to LEPA	0	0	$0	$0
Sutton	**284**	**513**	**$ 194,940**	**$ 14,162**
Furrow to LEPA	284	513	$194,940	$14,162
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Tom Green	**11548**	**20435**	**$ 10,120,488**	**$ 735,242**
Furrow to LEPA	5128	8721	$3,313,896	$240,751
Furrow to drip	5779	7576	$6,060,552	$440,293
Surge to LEPA	0	0	$0	$0
Surge to Drip	314	864	$674,154	$48,977
MESA to LEPA	27	160	$9,588	$697
LESA to LEPA	299	3115	$62,298	$4,526
Upton	**1840**	**3680**	**$ 2,944,152**	**$ 213,889**
Furrow to LEPA	0	0	$0	$0
Furrow to drip	1840	3680	$2,944,152	$213,889
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0

County	Water saved (ac-ft)	Acres upgraded	Capital costs	Annual Costs
Ward	**1570**	**1152**	**$ 437,760**	**$ 31,803**
Furrow to LEPA	1570	1152	$437,760	$31,803
Furrow to drip	0	0	$0	$0
Surge to LEPA	0	0	$0	$0
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0
Winkler	**389**	**538**	**$ 196,902**	**$ 14,305**
Furrow to LEPA	110	163	$61,902	$4,497
Furrow to drip	0	0	$0	$0
Surge to LEPA	279	375	$135,000	$9,808
Surge to Drip	0	0	$0	$0
MESA to LEPA	0	0	$0	$0
LESA to LEPA	0	0	$0	$0

Appendix 4F
Strategy Evaluation Matrix and Quantified Environmental Impact Matrix

Region F
Strategy Evaluation Matrix

Entity	County Used	Basin Used	Strategy	Quantity (Ac-Ft/Yr)	Reliability	Cost ($/Ac-Ft)	Impacts of Strategy on: Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters	Interbasin Transfer	Third Party Social & Economic Impacts	Implementation Issues	Comments
Andrews	Andrews	Colorado	Water Conservation	310	Medium	$185	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Andrews	Andrews	Colorado	Dockum Desalination	950	Medium	$1,163	Low	Positive	None identified	Low	n/a	None identified	Co-disposal with oil field brine	
Bronte	Coke	Colorado	Reuse	110	High	$2,345	Medium	Positive	None identified	Medium	n/a	None identified	Public perception, disposal, TCEQ rules	
Bronte	Coke	Colorado	New groundwater at Oak Creek	150	Unknown	$2,060	Low to Medium	Positive	Low	Low	n/a	Provides service to local residents	High costs	Interconnection between Oak Creek reservoir and alluvium is unknown.
Bronte	Coke	Colorado	New groundwater and advanced treatment	350	Medium	$1,740	Medium	Low	None identified	Low	n/a	None identified	Disposal of treatment discharge.	
Bronte	Coke	Colorado	Rehabilitation of Oak Creek pipeline	0	Medium	n/a	Low	Positive	None identified	Low	n/a	None identified	Funding	
Bronte	Coke	Colorado	Water Conservation	51	Medium	$188	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Robert Lee	Coke	Colorado	Infrastructure Improvements	200	High	$1,328	Low	Positive	None identified	TBD	n/a	Improved quality and reliability for the city	Financing	0.5 mgd treatment expansion and new storage tank
Robert Lee	Coke	Colorado	New groundwater	150	Medium to Low	$1,047	Medium	Low	None identified	Low	n/a	None identified	Unknown quantity and quality	
Robert Lee	Coke	Colorado	Purchase from San Angelo	400	Medium to High	$1,168	Low	Low	None identified	Low	n/a	None identified	Further study is needed on water quality issues associated with transporting water both directions and small quanties to Robert Lee.	May preclude San Angelo from using water from Spence reservoir
Robert Lee	Coke	Colorado	Reuse	110	High	$2,345	Medium	Positive	None identified	Medium	n/a	None identified	Public perception, disposal, TCEQ rules	
Robert Lee	Coke	Colorado	Desalination of Spence Reservoir Water	500	High	$1,879	Medium	Positive	None identified	Medium	n/a	Increased reliability and better water for city	Financing, disposal of brine reject	Strategy assumes that reject can be discharged. Costs may be significantly higher if other methods used.
Robert Lee	Coke	Colorado	Floating pump in Mountain Creek Resevoir	50	Low	$1,132	Low	Positive	None identified	Low	n/a	None identified	Financing	Allows city to take more water when reservoir is low
Robert Lee	Coke	Colorado	Water Conservation	48	Medium	$199	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Coleman	Coleman	Colorado	Water Conservation	107	Medium	$101	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Eden	Concho	Colorado	RO treatment	392	High	$819	Low to Medium	Positive	None identified	Medium	n/a	High cost takes away resources	Disposal of waste products	
Eden	Concho	Colorado	Replacement well	323	High	$1,113	Low	Positive	None identified	Low	n/a			
CRMWD	Ector/Midland	Colorado	Odessa/Midland Reuse	9,799	High	$1,354	Low	Low	None	Low to Medium	n/a	None identified	Public perception, disposal, TCEQ rules	
CRMWD	Howard	Colorado	Big Spring Reuse	1,855	High	$824	Low	Low	None	Low to Medium	n/a	None identified	Public perception, disposal, TCEQ rules	
Manufacturing	Kimble	Colorado	Edwards-Trinity aquifer	1,000	Medium	$1,080	Medium	None	None identified	None	n/a	None identified	Locating areas with sufficient production and acceptable water quality	Manufacturing demands appear to include recirculated water
Brady	McCulloch	Colorado	Water Conservation	239	Medium	$132	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Richland SUD	McCulloch	Colorado	Specialty Media Treatment System	113	High	$664	Low	Positive	None identified	Low	n/a	Security and worker safety, loss of revenue due to increased costs	Depends on ability to locate injection well. Will require long-term contract and minimum guaranteed payment.	
Richland SUD	McCulloch	Colorado	Bottled water program	1	High	$28,780	Low	Positive	None identified	Low	n/a	Users need to travel to obtain water	Regulatory acceptance	Lowest overall cost
Richland SUD	McCulloch	Colorado	Replacement well	113	High	$1,982	Low	Positive	None identified	Low	n/a	None identified	Assumes that an area with low radionuclide concentration can be identified	
Richland SUD	McCulloch	Colorado	System connection	200	High	$2,615	Low	Positive	None identified	Low	n/a	None identified		
Menard	Menard	Colorado	Aquifer Storage and Recovery	240	High	$1,271	Low	Positive	None identified	Low	n/a	None identified	Suitability of Hickory not established, financing	
Menard	Menard	Colorado	Water Conservation	33	Medium	$211	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.

Entity	County Used	Basin Used	Strategy	Quantity (Ac-Ft/Yr)	Reliability	Cost ($/Ac-Ft)	Impacts of Strategy on:				Interbasin Transfer	Third Party Social & Economic Impacts	Implementation Issues	Comments
							Environmental Factors	Agricultural Resources/ Rural Areas	Other Natural Resources	Key Water Quality Parameters				
Menard	Menard	Colorado	New Hickory well	160	Medium to High	$1,456	Low	Positive	None identified	Low	n/a	None identified	Water quality unknown.	May be higher impacts if advanced treatment needed.
Menard	Menard	Colorado	San Saba Off-Channel Reservoir	500	High	$4,430	Medium	Positive	None identified	Low	n/a	Property owners at reservoir site	Specific site not selected. Priority date of water significantly affects feasibility.	Assuming that diversion is under existing Menard or LCRA water right.
Midland	Midland	Colorado	T-Bar Well Field	13,600	High	$1,422	Low	Low	Low	Low	Not required for groundwater		Pipeline route and well field layout not determined	Additional studies underway. Not available for this plan.
Midland	Midland	Colorado	Water Conservation	3,663	Medium	$132	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Colorado City	Mitchell	Colorado	New wells in Dockum aquifer	2,200	Medium	$1,153	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Finished water amount may be less pending treatability analyses.
CRMWD	Multiple	Colorado	Winkler Well Field	6,000	High	$1,444	Low	Low	Low	Low	Not required for groundwater		Pipeline route and well field layout not determined	
CRMWD	Multiple	Colorado	Water from SW Pecos County	15,000	Medium	$1,485	Low to Medium	May impact Belding Farms	None identified	Low	Not required for groundwater	May impact other groundwater users in Pecos County	Needs additional studies regarding supplies and impacts	
CRMWD	Multiple	Colorado	Water from Roberts County	25,000	High	$3,319	Low	Low	Low	Low	Not required for groundwater	Other users of Roberts County water	Would be more cost-effective with other participants	
Multiple	Multiple	Multiple	Subordination of senior water rights	80,130	Medium	TDB	Medium	Positive	None identified	Low	n/a	None identified	Needs further analysis before implementation	Done in conjunction with Region K
Ballinger	Runnels	Colorado	Voluntary redistribution - Hords Creek Resevoir	220	Low	$3,361	Low	Positive	None identified	Low	n/a	None identified	Subordination to downstream water rights	May require modifications to contracts with Corps of Engineers
Ballinger	Runnels	Colorado	Volunary Redistribution - purchase water from CRMWD	600	High	$658	Low	Positive	None identified	Low	n/a	None identified	Must have agreement with CRMWD and WCTMWD	Uses existing WCTMWD and Ballinger pipelines
Ballinger	Runnels	Colorado	Reuse	220	High	$1,473	Medium	Positive	None identified	Medium	n/a	None identified	Public perception, disposal, TCEQ rules	
Ballinger	Runnels	Colorado	Water Conservation	144	Medium	$208	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
Winters	Runnels	Colorado	Reuse	110	High	$2,345	Medium	Positive	None identified	Medium	n/a	None identified	Public perception, disposal, TCEQ rules	
Winters	Runnels	Colorado	Water Conservation	76	Medium	$248	Low	Positive	None identified	Low	n/a	None identified	Site specific data needed. May require financial and technical assistance.	Conservation based on generic assessment. Site-specific data not available.
CRMWD	Scurry	Colorado	Snyder Reuse	726	High	$1,521	Low	Low	None	Low to Medium	n/a	None identified	Public perception, disposal, TCEQ rules	
CRMWD	Multiple	Colorado	Capitan Reef Desalination	9,500	Medium	$1,875	Low	Low	None	Low	n/a	None identified	Reliability of large-scale development not established.	
San Angelo	Tom Green	Colorado	Water Conservation	2,371	Medium	$110	Low	Low	None identified	Low	n/a	None identified	City developing a water conservation program	Actual conservation savings may be greater.
San Angelo	Tom Green	Colorado	Edwards-Trinity aquifer - Schleicher Co.	12,000	Medium	$660	Medium	Potential impact to local users	None identified	Low	n/a	Potential impact to local users	Locating areas with sufficient production. Groundwater conservation district rules that discourage large-scale development	
San Angelo	Tom Green	Colorado	Water from SW Pecos County	12,000	Medium	$2,643	Low to Medium	May impact Belding Farms	None identified	Low	Not required for groundwater	May impact other groundwater users in Pecos County	Needs additional studies regarding supplies and impacts	
San Angelo	Tom Green	Colorado	McCulloch Well Field	12,000	High	$1,936	Low	Potential impact to other Hickory users	None identified	Low	n/a	Potential impact to other Hickory users	Pipeline route and well field layout currently being studied	Water may not meet standards for Radium & require advanced treatment, which may increase costs
San Angelo	Tom Green	Colorado	Desalination Facility	11,200	High	$1,075	Low	Low	None identified	Low	n/a		Lack of data on target aquifer	
San Angelo	Tom Green	Colorado	Rehabilitation of Spence Pipeline	2,300	High	$311	Low	Low	None identified	Low	n/a			
Steam Electric	Not determined	Not determined	CCGT and ACC Generation	15,000	Medium to High	$1,127	Low	None	None identified	Low	n/a		Implementation based on economic decisions by power industry	Technology requires very little water

Region F
Environmental Quantification Matrix

Entity	County	Basin	Strategy	Environmental Factors										Comments
				Acres Impacted	Wetland Acres	Envir Water Needs	Habitat	Threat and Endanger Species	Cultural Resources	Bays & Estuaries	Envir Water Quality	Other	Overall Environmental Impacts	
Andrews	Andrews	Colorado	Dockum Desalination	15		Low	Low	6	Low	None	Low		Low	Disposal through existing deep well injection
County Other	Brown	Colorado	Voluntary redistribution	53		Low	Low	10	Low	None	Low		Low	Not a significant draw on reservoir
Bronte	Coke	Colorado	Reuse	10		Medium	Medium	8	Low	None	Medium		Medium	Assuming that waste stream from treatment process would be discharged or use land application.
Bronte	Coke	Colorado	New groundwater at Oak Creek	5		Low to Medium	Low	8	Low	None	Low		Low to Medium	The connection between the alluvium and surface water is unknown.
Bronte	Coke	Colorado	New groundwater and advanced treatment	12		Low to Medium	Low	8	Low	None	Medium		Medium	Unknown how discharge from advanced treatment will be handled.
Bronte	Coke	Colorado	Rehabilitation of Oak Creek pipeline	32		Low	Low	8	Low	None	Low		Low	
Bronte	Coke	Colorado	Water Conservation	0		Low	Low	8	Low	None	Low		Low	
Robert Lee	Coke	Colorado	Infrastructure Improvements	4		Low	Low	8	Low	None	Low		Low	0.5 mgd treatment plant and new storage tank
Robert Lee	Coke	Colorado	New groundwater	36		Low to Medium	Low	8	Low	None	Low		Low	The connection between the alluvium and surface water is unknown.
Robert Lee	Coke	Colorado	Purchase frm San Angelo	<1		Low	Low	8	Low	None	Low		Low	
Robert Lee	Coke	Colorado	Reuse	10		Medium	Medium	8	Low	None	Medium		Medium	Assuming that waste stream from treatment process would be discharged or use land application.
Robert Lee	Coke	Colorado	Desalination of Spence Reservoir Water	5		Medium	Medium	8	Low	None	Medium		Medium	
Robert Lee	Coke	Colorado	Floating pump in Mountain Creek Resevoir	1		Low	Low	8	Low	None	Low		Low	Allows city to take more water when reservoir is low
Robert Lee	Coke	Colorado	Water Conservation	0		Low	Low	8	Low	None	Low		Low	
Eden	Concho	Colorado	RO treatment	<1		Low to Medium	Low to Medium	8	Low	None	Medium		Low to Medium	Long-term impacts of land application of naturally occuring radionuclides unknown
Eden	Concho	Colorado	Replacement well	<1		Low	Low	8	Low	None	Low		Low	Small amount of water treated
CRMWD	Ector/Midlan	Colorado	Odessa/Midland Reuse	152		Low	Medium	6	Low	None	Low		Low	Impacts due to decreased flow in Monahans Draw.
CRMWD	Howard	Colorado	Big Spring Reuse	6		Low	Low	6	Low	None	Medium		Low	No impact below Beals Creek diversion
Manufacturing	Kimble	Colorado	Edwards-Trinity aquifer	<1		Medium	Medium	9	Low	None	Medium		Medium	Potential impact on surface water flows
Richland SUD	McCulloch	Colorado	Specialty Media Treatment System	<1		Low	Low	5	Low	None	Low		Low	Spent media disposed using deep-well injection.
Richland SUD	McCulloch	Colorado	Bottled water program	<1		Low	Low	NA	Low	None	Low		Low	Small amount of water treated
Richland SUD	McCulloch	Colorado	System Connection	25		Low to Medium	Low	11	Low	None	Low		Low	
Richland SUD	McCulloch	Colorado	Replacement well	1		Low	Low	11	Low	None	Low		Low	Replaces existing well
Menard	Menard	Colorado	Aquifer Storage and Recovery	2		Low to Medium	Low	12	Low	None	Low		Low	In conjunction with Hickory well
Menard	Menard	Colorado	Water Conservation	0		Low	Low	12	Low	None	Low		Low	
Menard	Menard	Colorado	New Hickory well	2		Low	Low	12	Low	None	Low		Low	Impacts may be higher if advanced treatment required because of brine disposal
Menard	Menard	Colorado	San Saba Off-Channel Reservoir	80		Medium	Medium	12	Low to Medium	None	Low		Medium	Specific site not selected
Midland	Midland	Colorado	T-Bar Well Field	212		Low	Low	7	Low	None	Low		Low	Estimated impacts. Precise route unknown pending routing study.
Midland	Midland	Colorado	Water Conservation	0		Low	Low	6	Low	None	Low		Low	
Colorado City	Mitchell	Colorado	New wells in Dockum aquifer	35		Low	Low	9	Low	None	Low to Medium		Low	Evaporation ponds have been known ot accumulate selenium and other contituents. This should be considered during design.
CRMWD	Multiple	Colorado	Winkler Well Field	112		Low	Low	7	Low	None	Low		Low	Estimated impacts. Precise route unknown pending routing study.
CRMWD	Multiple	Colorado	Water from SW Pecos County	265		Low to Medium	Low	23	Low	None	Low to Medium		Low to Medium	
CRMWD	Multiple	Colorado	Water from Roberts County	1125		Low to Medium	Low		Low	None	Low		Low	Possible impact on Canadian River flows
Multiple	Multiple	Multiple	Subordination of senior water rights	0		Medium	Low	varies	Low	Medium to Low	Medium to Low		Medium	
Ballinger	Runnels	Colorado	Voluntary redistribution - Hords Creek Resevoir	51		Low	Low	10	Low	None	Low		Low	

Region F
Environmental Quantification Matrix

Entity	County	Basin	Strategy	Environmental Factors										Comments
				Acres Impacted	Wetland Acres	Envir Water Needs	Habitat	Threat and Endanger Species	Cultural Resources	Bays & Estuaries	Envir Water Quality	Other	Overall Environmental Impacts	
Ballinger	Runnels	Colorado	Volunary Redistribution - purchase water from CRMWD	0		Low	Low	10	Low	None	Low		Low	Pipeline already in place
Ballinger	Runnels	Colorado	Reuse	10		Medium	Medium	10	Low	None	Medium		Medium	Assuming that waste stream from treatment process would be discharged or use land application.
Ballinger	Runnels	Colorado	Water Conservation	0		Low	Low	10	Low	None	Low		Low	
Winters	Runnels	Colorado	Reuse	10		Medium	Medium	10	Low	None	Medium		Medium	Assuming that waste stream from treatment process would be discharged or use land application.
Winters	Runnels	Colorado	Water Conservation	0		Low	Low	10	Low	None	Low		Low	
CRMWD	Scurry	Colorado	Snyder Reuse	9		Low	Low	6	Low	None	Medium		Low	No impact below Colorado City
CRMWD	Multiple	Colorado	Capitan Reef Desalination	164		Low	Low	7	Low	None	Low		Low	Estimated impacts. Precise route unknown pending routing study.
San Angelo	Tom Green	Colorado	Water Conservation	0		Low	Low	10	Low	None	Low		Low	Conserved water expected to remain in reservoirs for later use, use by others, or lost due to evaporation. Not expected to have a significant positive impact on environmental flows.
San Angelo	Tom Green	Colorado	Edwards-Trinity aquifer - Schleicher Co.	83		Medium to high	Medium	10	Low	None	Medium to Low		Medium	
San Angelo	Tom Green	Colorado	Water from SW Pecos County	448		Low to Medium	Low	23	Low	None	Low to Medium		Low to Medium	
San Angelo	Tom Green	Colorado	McCulloch Well Field	476		Low	Low	12	Low	None	Low		Low	Estimated impacts. Precise route unknown pending routing study.
San Angelo	Tom Green	Colorado	Desalination Facility	100		Low	Low	10	Low	None	Low		Low	Using deep well injection for brine disposal
San Angelo	Tom Green	Colorado	Rehabilitation of Spence Pipeline	0		Low	Low	10	Low	None	Low		Low	Existing pipeline
Steam Electric	Not determir	Not determ	CCGT and ACC Generation	0		Low	Low	unknown	Low	None	Low		Low	Location of new generation not determined

Appendix 4G
Municipal Water Conservation

Appendix 4G: Municipal Water Conservation

As part of our planning efforts for Region F, water conservation must be considered when developing water management strategies for water user groups with needs. An expected level of conservation is included in the demand projections due to the natural replacement of inefficient plumbing fixtures with low flow fixtures, as mandated under the State Plumbing Code. For Region F, the total municipal water savings associated with plumbing fixtures is approximately 7 percent of the projected demand if no conservation occurred.

Additional conservation savings can potentially be achieved in the region through the implementation of conservation best management practices. The potential savings from water conservation were evaluated for twelve municipal water user groups with potential supply shortages.

To assess appropriate strategies for Region F, we reviewed the conservation strategies identified through the Water Conservation Implementation Task Force. The Task Force identified 21 municipal conservation strategies and 15 strategies for industrial water users. In addition the State has adopted new regulations that require all new clothes washers to be more water efficient by 2007. After review and consideration of these strategies, it is recommended that four conservation strategies be evaluated for municipal water users with needs. These include:

- Public and School Education
- Reduction of Unaccounted for Water through Water Audits
- Water Conservation Pricing
- Federal Clothes Washer Rules

Best Management Practices (BMPs) not selected include rebate programs, accelerated plumbing fixtures replacements, and specific outdoor watering measures. The benefits of outdoor watering strategies were assumed to be accounted under the public and school education BMP. Also, many of the entities in Region F already use restrictions on outdoor watering as a drought management measure. Accelerated fixture replacements do not reduce the ultimate water need, but could delay when the need begins. This is also true for rebate programs that simply accelerate the already assumed conservation savings.

However, the likelihood of implementing rebate programs in rural communities is low and previous studies have shown these programs to be relatively costly per acre-foot of water saved.

Region F recognizes that it has no authority to implement, enforce or regulate water conservation practices. These water conservation practices are intended to be guidelines. Water conservation strategies determined and implemented by the individual water user groups in Region F supersede the recommendations in this plan and the Region F Water Planning Group considers these strategies to meet regulatory requirements for consistency with this plan.

A summary of the assumptions in costs and savings for the selected municipal conservation strategies is presented below. Summaries of water conservation savings and costs of each BMP for each water user group may be found in the attached tables.

Public and School Education

Potential water savings associated with education programs are difficult to assess because the results often overlap with other measures. Literature reviews indicate the savings can range from 1 to 5 percent of the projected demand. For cities that have already implemented an aggressive education program, the additional savings may be on the lower side of this range. In Region F, it is assumed that conservation savings associated with education will be 2.0% the first decade increasing to 4.5% by 2060.

Annual costs were estimated at just over $1,000 for small rural communities to over $100,000 for Midland, Odessa and San Angelo. These costs include personnel to develop and oversee the program, public outreach through the news media, public meetings, school education materials, giveaways, and other miscellaneous program specific costs.

Water Conservation Pricing

This BMP can apply to two different conditions: 1) use of rate structures to discourage inefficient and/or excessive water use (e.g., inverted block rates), and 2) natural reduction of use in response to overall rate increases. For this plan, we are assuming that there will be some reduction in water use as new more expensive water is developed. For calculation of potential water savings, a potential water savings of 1.5%

of the projected demand. The costs for this strategy are based on estimated costs of conducting a rate study by the city and implementation of a rate change.

Water System Audit

Under House Bill 3338, all retail public utilities serving 3,300 people or more will be required to conduct water system audits to identify the system water loss. These audits will be required beginning in 2005 and performed every 5 years. The audit itself does not reduce water loss, but can identify potential infrastructure problems contributing to water loss. The TWDB recommends that water system losses should be less than 15 percent of the total water used. The American Water Works Association leak Detection Committee recommends a goal of 10 percent. For the purposes of this plan it was assumed that a water audit would reduce losses to 12 percent of the total water used. If water losses were already less than 12 percent, it was assumed that no additional savings will be realized. Region F recognizes the benefits of water audits as good stewardship for all water systems and recommends that all system conduct water audits.

Costs for this strategy are only those costs associated with the audit itself. Costs range from about $3,000 for a small system to over $300,000 for the larger cities. These costs are amortized over 5 years, which is the schedule for water audits.

Federal Clothes Washer Rules

New regulations governing the manufacturing of clothes washers to be energy efficient were passed in 2007. One option to achieve the efficiency mandate is to reduce water volume (less energy would be needed to heat the water). The water savings per washer is estimated at 5.6 gallons per person per day. It was assumed that 90 percent of the single family homes had washing machines and 3 percent of these homes would have water efficient machines as of year 2000. The average life of a washing machine is 13 years, and the natural replacement rate was assumed at 7.7 percent per year.

This strategy was evaluated for each municipal water user group with a need. It was assumed that these new regulations will occur without any cost to the water user group. Estimates of the number of clothes washers was made for each municipal water user group and savings calculated accordingly.

Appendix 4H
Water User Group Summary Tables

Summaries by Municipal Water User Group

WUG	Description	2010	2020	2030	2040	2050	2060
Andrews	**Projected Population**	10,519	11,247	11,754	12,232	12,453	12,701
	Projected Water Demand	3,087	3,263	3,371	3,467	3,515	3,585
	Available Supplies						
	Ogallala Aquifer	3,087	3,263	3,371	2,717	2,755	2,812
	Total Available Supplies	3,087	3,263	3,371	2,717	2,755	2,812
	Shortage/Surplus	0	0	0	-750	-760	-773
	Recommended Water Management Strategies						
	Desalination	0	950	950	950	950	950
	New/Renew Water Supply - University Lands	0	0	0	750	760	773
	Well Replacement	0	0	0	0	0	0
	Municipal Conservation	84	191	240	265	287	310
	Total Recommended Water Management Strategies	84	1,141	1,190	1,965	1,997	2,033
	Alternative Strategies	0	0	0	0	0	0
	Total Alternative Strategies	0	0	0	0	0	0
	Total Supply Less Projected Demand	84	1,141	1,190	1,215	1,237	1,260
Ballinger	**Projected Population**	4,379	4,871	5,243	5,654	5,974	6,274
	Projected Water Demand	917	998	1,057	1,121	1,178	1,237
	Available Supplies						
	Ballinger/Moonen Lake/Reservoir	0	0	0	0	0	0
	OH Ivie Lake/Reservoir Non-System Portion	257	244	373	357	0	0
	Other Aquifer	0	0	0	0	0	0
	Total Available Supplies	257	244	373	357	0	0
	Shortage/Surplus	-660	-754	-684	-764	-1,178	-1,237
	Recommended Water Management Strategies						
	Municipal Conservation	33	88	107	119	131	144
	New Contract - CRMWD contract	0	0	0	0	491	508
	Subordination - Lake Ballinger	917	930	920	910	900	890
	Subordination - CRMWD System	141	169	68	115	0	0
	Total Recommended Water Management Strategies	1,091	1,187	1,095	1,144	1,522	1,542
	Total Supply Less Projected Demand	431	433	411	380	344	305
	Alternative Strategies						
	Direct Reuse	0	220	220	220	220	220
	Hord's Creek	220	220	220	220	220	220
	Total Alternative Strategies	220	440	440	440	440	440

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Balmorhea	**Projected Population**	627	730	815	885	949	1,000
	Projected Water Demand	110	126	138	148	157	166
	Available Supplies						
	Balmorhea Lake/Reservoir	0	0	0	0	0	0
	Big Aguja Creek Run-Of-River City Of Balmorhea	0	0	0	0	0	0
	Other Aquifer	122	132	139	148	157	166
	Total Available Supplies	122	132	139	148	157	166
	Shortage/Surplus	12	6	1	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	12	6	1	0	0	0
Bangs	**Projected Population**	1,691	1,746	1,761	1,761	1,761	1,761
	Projected Water Demand	265	266	262	256	254	254
	Available Supplies						
	Brownwood Lake/Reservoir	265	266	262	256	254	254
	Total Available Supplies	265	266	262	256	254	254
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Big Lake	**Projected Population**	3,288	3,628	3,800	3,788	3,654	3,478
	Projected Water Demand	910	988	1,026	1,010	970	923
	Available Supplies						
	Direct Reuse	0	0	0	0	0	0
	Edwards-Trinity-Plateau Aquifer	910	988	1,026	1,010	970	923
	Total Available Supplies	910	988	1,026	1,010	970	923
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Big Spring	**Projected Population**	25,944	26,592	26,803	26,803	26,803	26,803
	Projected Water Demand	6,016	6,077	6,035	5,945	5,915	5,915
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	3,636	3,370	4,976	4,611	4,389	4,084
	Ogallala Aquifer	1,035	1,035	1,035	1,035	1,035	1,035
	Total Available Supplies	4,671	4,405	6,011	5,646	5,424	5,119
	Shortage/Surplus	-1,345	-1,672	-24	-299	-491	-796
	Recommended Water Management Strategies						
	Municipal Conservation	241	603	676	698	725	754
	Reuse	0	1,855	1,855	1,855	1,855	1,855
	Subordination - CRMWD System	1,345	1,672	24	299	491	796
	Total Recommended Water Management Strategies	1,586	4,130	2,555	2,852	3,071	3,405
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	241	2,458	2,531	2,553	2,580	2,609

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Brady	**Projected Population**	5,593	5,689	5,689	5,689	5,689	5,689
	Projected Water Demand	1,879	1,893	1,874	1,854	1,842	1,842
	Available Supplies						
	Brady Creek Lake/Reservoir	0	0	0	0	0	0
	Hickory Aquifer	884	884	884	884	884	884
	Total Available Supplies	884	884	884	884	884	884
	Shortage/Surplus	-995	-1,009	-990	-970	-958	-958
	Recommended Water Management Strategies						
	Municipal Conservation	77	192	214	222	230	239
	Subordination - Brady Creek Lake	2,170	2,170	2,170	2,170	2,170	2,170
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	2,247	2,362	2,384	2,392	2,400	2,409
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	1,252	1,353	1,394	1,422	1,442	1,451
Bronte Village	**Projected Population**	1,065	1,140	1,140	1,140	1,140	1,140
	Projected Water Demand	245	258	254	250	249	249
	Available Supplies						
	Oak Creek Lake/Reservoir	0	0	0	0	0	0
	Other Aquifer	250	238	226	215	204	194
	Total Available Supplies	250	238	226	215	204	194
	Shortage/Surplus	5	-20	-28	-35	-45	-55
	Recommended Water Management Strategies						
	Municipal Conservation	16	45	48	48	50	51
	Well Replacement	0	0	0	0	0	0
	Subordination - Oak Creek Lake/Reservoir	129	129	129	129	129	129
	Rehabilitation of Oak Creek Pipeline	0	0	0	0	0	0
	Total Recommended Water Management Strategies	145	174	177	177	179	180
	Total Supply Less Projected Demand	150	154	149	142	134	125
	Alternative Strategies						
	New Groundwater southeast of Bronte		350	350	350	350	350
	New Groundwater to serve resident around Oak Creek Reservoir		150	150	150	150	150
	Total Alternative Strategies	0	500	500	500	500	500

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Brookesmith SUD	**Projected Population**	7,985	8,242	8,314	8,314	8,314	8,314
	Projected Water Demand	1,387	1,404	1,396	1,369	1,360	1,360
	Available Supplies						
	Brownwood Lake/Reservoir	1,426	1,425	1,425	1,425	1,425	1,426
	Total Available Supplies	1,426	1,425	1,425	1,425	1,425	1,426
	Shortage/Surplus	39	21	29	56	65	66
	Recommended Water Management Strategies						
	None						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	39	21	29	56	65	66
Brownwood	**Projected Population**	20,703	21,376	21,563	21,563	21,563	21,563
	Projected Water Demand	3,896	3,927	3,889	3,816	3,792	3,792
	Available Supplies						
	Brownwood Lake/Reservoir	3,896	3,927	3,889	3,816	3,792	3,792
	Total Available Supplies	3,896	3,927	3,889	3,816	3,792	3,792
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	None						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Coahoma	**Projected Population**	958	982	990	990	990	990
	Projected Water Demand	183	185	183	180	177	177
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	134	124	182	169	159	148
	Total Available Supplies	134	124	182	169	159	148
	Shortage/Surplus	-49	-61	-1	-11	-18	-29
	Recommended Water Management Strategies						
	Subordination - CRMWD System	49	61	1	11	18	29
	Total Recommended Water Management Strategies	49	61	1	11	18	29
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Coleman	**Projected Population**	5,075	5,079	5,079	5,079	5,079	5,079
	Projected Water Demand	1,285	1,269	1,252	1,235	1,223	1,223
	Available Supplies						
	Hords Creek Lake/Reservoir	0	0	0	0	0	0
	Coleman Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-1,285	-1,269	-1,252	-1,235	-1,223	-1,223
	Recommended Water Management Strategies						
	Conservation	33	75	90	95	101	107
	Subordination - Coleman Lake/Reservoir	1,650	1,651	1,647	1,645	1,639	1,631
	Subordination - Hords Creek Lake/Reservoir	380	380	380	380	380	380
	Total Recommended Water Management Strategies	2,063	2,106	2,117	2,120	2,120	2,118
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	778	837	865	885	897	895

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Coleman County WSC	**Projected Population**	3,057	3,168	3,247	3,333	3,400	3,485
	Projected Water Demand	394	397	397	395	400	410
	Available Supplies						
	Brownwood Lake/Reservoir	1,332	1,329	1,336	1,342	1,349	1,355
	Coleman Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	1,332	1,329	1,336	1,342	1,349	1,355
	Shortage/Surplus	938	932	939	947	949	945
	Recommended Water Management Strategies						
	Subordination - Coleman Lake/Reservoir	144	144	148	151	157	165
	Total Recommended Water Management Strategies	144	144	148	151	157	165
	Alternative Strategies						
	Total Alternative Strategies	0	0	0	0	0	0
	Total Supply Less Projected Demand	1,082	1,076	1,087	1,098	1,106	1,110
Colorado City	**Projected Population**	4,298	4,288	4,213	4,119	4,003	3,761
	Projected Water Demand	997	980	949	914	879	826
	Available Supplies						
	Direct Reuse	0	0	0	0	0	0
	Dockum Aquifer	997	999	1,001	1,004	1,008	1,013
	Total Available Supplies	997	999	1,001	1,004	1,008	1,013
	Shortage/Surplus	0	19	52	90	129	187
	Recommended Water Management Strategies						
	Devlop Dockum Aquifer Supplies	0	2,200	2,200	2,200	2,200	2,200
	Total Recommended Water Management Strategies	0	2,200	2,200	2,200	2,200	2,200
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	2,219	2,252	2,290	2,329	2,387

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Concho Rural WSC	**Projected Population**	6,082	7,876	9,014	9,644	10,143	10,255
	Projected Water Demand	695	873	990	1,048	1,091	1,103
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	41	41	41	41	41	41
	Lipan Aquifer	1,062	1,062	1,062	1,062	1,062	1,062
	Total Available Supplies	1,103	1,103	1,103	1,103	1,103	1,103
	Shortage/Surplus	408	230	113	55	12	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	408	230	113	55	12	0
County-Other (Andrews)	**Projected Population**	3,612	3,831	3,983	4,126	4,192	4,267
	Projected Water Demand	538	558	566	574	578	588
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	16	16	16	16	16	16
	Ogallala Aquifer	515	535	543	550	554	564
	Pecos Valley Aquifer	7	7	7	8	8	8
	Total Available Supplies	538	558	566	574	578	588
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Borden)	**Projected Population**	792	820	782	693	644	582
	Projected Water Demand	175	179	169	148	136	123
	Available Supplies						
	Ogallala Aquifer	118	118	118	116	115	114
	Other Aquifer	60	61	60	60	60	60
	Total Available Supplies	178	179	178	176	175	174
	Shortage/Surplus	3	0	9	28	39	51
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	3	0	9	28	39	51
County-Other (Brown)	**Projected Population**	2,571	2,654	2,678	2,678	2,678	2,678
	Projected Water Demand	354	354	348	339	336	336
	Available Supplies						
	Trinity Aquifer	12	12	12	12	12	12
	Brownwood Lake/Reservoir	385	385	379	370	367	367
	Other Aquifer	9	9	9	9	9	9
	Total Available Supplies	406	406	400	391	388	388
	Shortage/Surplus	52	52	52	52	52	52
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	52	52	52	52	52	52

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Coke)	**Projected Population**	1,547	1,474	1,474	1,474	1,474	1,474
	Projected Water Demand	175	162	159	154	152	152
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	77	65	95	86	82	76
	Edwards-Trinity-Plateau Aquifer	15	15	15	15	15	15
	Other Aquifer	55	50	49	47	46	46
	Total Available Supplies	147	130	159	148	143	137
	Shortage/Surplus	-28	-32	0	-6	-9	-15
	Recommended Water Management Strategies						
	Subordination - Colorado River MWD Lake/Reservoir System	28	32	0	6	9	15
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	28	32	0	6	9	15
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Coleman)	**Projected Population**	151	151	151	151	151	151
	Projected Water Demand	19	19	18	18	18	18
	Available Supplies						
	Coleman Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-19	-19	-18	-18	-18	-18
	Recommended Water Management Strategies						
	Subordination - Coleman Lake/Reservoir	20	19	19	18	18	18
	Total Recommended Water Management Strategies	20	19	19	18	18	18
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	1	0	1	0	0	0

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Concho)	**Projected Population**	605	628	628	628	628	628
	Projected Water Demand	188	193	191	189	188	188
	Available Supplies						
	Concho River Run-Of-River City Of Paint Rock	35	35	35	35	35	35
	Edwards-Trinity-Plateau Aquifer	40	40	40	40	40	40
	Hickory Aquifer	17	19	19	19	19	19
	Other Aquifer	127	127	127	127	127	127
	Total Available Supplies	219	221	221	221	221	221
	Shortage/Surplus	31	28	30	32	33	33
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Subordination - OC Fisher Lake/Reservoir San Angelo System	25	25	25	25	25	25
	Total Recommended Water Management Strategies	25	25	25	25	25	25
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	56	53	55	57	58	58
County-Other (Crane)	**Projected Population**	1,031	1,280	1,415	1,518	1,629	1,745
	Projected Water Demand	316	387	425	452	484	518
	Available Supplies						
	Pecos Valley Aquifer	316	387	425	452	484	518
	Total Available Supplies	316	387	425	452	484	518
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Crockett)	**Projected Population**	225	221	217	213	209	205
	Projected Water Demand	43	41	40	38	37	36
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	43	41	40	38	37	36
	Total Available Supplies	43	41	40	38	37	36
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Ector)	**Projected Population**	34,979	41,272	45,977	49,278	50,512	51,048
	Projected Water Demand	5,720	6,703	7,468	7,949	8,147	8,234
	Available Supplies						
	Pecos Valley Aquifer	52	55	59	61	64	66
	Dockum Aquifer	30	32	34	36	37	38
	Edwards-Trinity-Plateau Aquifer	3,421	4,011	4,469	4,757	4,875	4,927
	Trinity Aquifer	2,217	2,605	2,906	3,095	3,171	3,203
	Total Available Supplies	5,720	6,703	7,468	7,949	8,147	8,234
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Glasscock)	**Projected Population**	1,582	1,783	1,891	1,921	1,915	1,954
	Projected Water Demand	181	196	203	200	197	201
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	179	194	201	198	195	199
	Ogallala Aquifer	2	2	2	2	2	2
	Total Available Supplies	181	196	203	200	197	201
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Howard)	**Projected Population**	7,672	7,864	7,926	7,926	7,926	7,926
	Projected Water Demand	1,109	1,110	1,092	1,065	1,048	1,048
	Available Supplies						
	Dockum Aquifer	12	12	12	12	12	12
	Edwards-Trinity-Plateau Aquifer	572	572	572	572	572	572
	Ogallala Aquifer	569	569	569	569	569	569
	Total Available Supplies	1,153	1,153	1,153	1,153	1,153	1,153
	Shortage/Surplus	44	43	61	88	105	105
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	44	43	61	88	105	105

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Irion)	**Projected Population**	994	1,020	996	934	884	845
	Projected Water Demand	109	109	103	94	87	83
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	109	109	103	94	87	83
	Total Available Supplies	109	109	103	94	87	83
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Kimble)	**Projected Population**	1,929	1,947	1,947	1,947	1,947	1,947
	Projected Water Demand	212	207	203	196	194	194
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	203	200	200	200	200	200
	Llano River Run-Of-River City Of Junction	0	0	0	0	0	0
	Total Available Supplies	203	200	200	200	200	200
	Shortage/Surplus	-9	-7	-3	4	6	6
	Recommended Water Management Strategies						
	Subordination - Lllano River	9	9	9	9	9	9
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	9	9	9	9	9	9
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	2	6	13	15	15

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Loving)	**Projected Population**	67	67	67	67	67	67
	Projected Water Demand	11	11	10	10	10	10
	Available Supplies						
	Pecos Valley Aquifer	11	11	10	10	10	10
	Total Available Supplies	11	11	10	10	10	10
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (McCulloch)	**Projected Population**	86	88	88	88	88	88
	Projected Water Demand	12	12	12	12	12	12
	Available Supplies						
	Hickory Aquifer	12	12	12	12	12	12
	Total Available Supplies	12	12	12	12	12	12
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Bottled Water Program	0	0	0	0	0	0
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Martin)	**Projected Population**	2,401	2,628	2,739	2,806	2,738	2,599
	Projected Water Demand	377	403	411	412	399	378
	Available Supplies						
	Ogallala Aquifer	377	403	411	412	399	378
	Total Available Supplies	377	403	411	412	399	378
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Mason)	**Projected Population**	1,660	1,687	1,701	1,708	1,712	1,716
	Projected Water Demand	190	187	183	178	176	177
	Available Supplies						
	Ellenburger-San Saba Aquifer	38	38	38	38	38	38
	Hickory Aquifer	115	115	115	115	115	115
	Marble Falls Aquifer	37	37	37	37	37	37
	Total Available Supplies	190	190	190	190	190	190
	Shortage/Surplus	0	3	7	12	14	13
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	3	7	12	14	13

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Menard)	**Projected Population**	747	757	757	757	757	757
	Projected Water Demand	104	102	99	97	96	96
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	69	67	66	66	66	66
	Ellenburger-San Saba Aquifer	1	1	1	1	1	1
	Other Aquifer	14	13	13	13	13	13
	San Saba River Run-Of-River City Of Menard	0	0	0	0	0	0
	Total Available Supplies	84	81	80	80	80	80
	Shortage/Surplus	-20	-21	-19	-17	-16	-16
	Recommended Water Management Strategies						
	Develop Hickory Aquifer Supplies - (Sales from Menard)	20	21	20	20	19	19
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	20	21	20	20	19	19
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	1	3	3	3
County-Other (Midland)	**Projected Population**	22,747	25,718	27,835	29,409	30,406	31,345
	Projected Water Demand	3,210	3,543	3,773	3,920	4,019	4,143
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	2,296	2,536	2,701	2,807	2,879	2,968
	Ogallala Aquifer	893	986	1,051	1,092	1,119	1,154
	OH Ivie Lake/Reservoir Non-System Portion	21	21	21	21	21	21
	Total Available Supplies	3,210	3,543	3,773	3,920	4,019	4,143
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Mitchell)	**Projected Population**	4,779	4,769	4,686	4,582	4,453	4,184
	Projected Water Demand	621	609	593	570	549	516
	Available Supplies						
	Dockum Aquifer	621	609	593	570	549	516
	Total Available Supplies	621	609	593	570	549	516
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Pecos)	**Projected Population**	4,677	4,922	5,058	5,132	5,144	5,044
	Projected Water Demand	702	722	731	730	726	712
	Available Supplies						
	Pecos Valley Aquifer	27	27	27	27	27	27
	Edwards-Trinity-Plateau Aquifer	674	694	703	702	698	684
	Other Aquifer	1	1	1	1	1	1
	Total Available Supplies	702	722	731	730	726	712
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Reagan)	**Projected Population**	503	554	581	579	559	532
	Projected Water Demand	125	135	141	138	133	126
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	125	135	141	138	133	126
	Total Available Supplies	125	135	141	138	133	126
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Reeves)	**Projected Population**	729	646	577	520	469	428
	Projected Water Demand	219	192	171	152	136	124
	Available Supplies						
	Balmorhea Lake/Reservoir	0	0	0	0	0	0
	Pecos Valley Aquifer	49	43	39	34	29	28
	Dockum Aquifer	26	23	20	18	16	14
	Edwards-Trinity-Plateau Aquifer	68	68	68	68	68	68
	Other Aquifer	76	66	59	50	41	32
	Total Available Supplies	219	200	186	170	154	142
	Shortage/Surplus	0	8	15	18	18	18
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	8	15	18	18	18

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Runnels)	**Projected Population**	2,534	2,126	1,817	1,476	1,210	1,000
	Projected Water Demand	360	295	246	193	156	129
	Available Supplies						
	Ballinger/Moonen Lake/Reservoir	0	0	0	0	0	0
	Other Aquifer	30	29	29	28	31	52
	Winters Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	30	29	29	28	31	52
	Shortage/Surplus	-330	-266	-217	-165	-125	-77
	Recommended Water Management Strategies						
	CRMWD System (Sales from Ballinger)	193	177	148	116	94	77
	Subordination - Winters Lake	23	0	0	0	0	0
	Subordination Ballinger/Moonen Lake	114	89	69	49	31	0
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	330	266	217	165	125	77
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Schleicher)	**Projected Population**	931	877	852	842	828	813
	Projected Water Demand	142	131	124	119	115	113
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	142	131	124	119	115	113
	Total Available Supplies	142	131	124	119	115	113
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Scurry)	**Projected Population**	5,819	6,048	6,170	6,234	6,276	6,276
	Projected Water Demand	874	880	877	866	864	864
	Available Supplies						
	Dockum Aquifer	393	275	274	270	269	269
	Other Aquifer	281	43	43	43	43	43
	Colorado River MWD Lake/Reservoir System	146	134	199	188	180	167
	Total Available Supplies	820	814	876	854	844	831
	Shortage/Surplus	-54	-66	-1	-12	-20	-33
	Recommended Water Management Strategies						
	Subordination - Colorado River MWD Lake/Reservoir System	54	66	1	12	20	33
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	54	66	1	12	20	33
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Sterling)	**Projected Population**	342	376	391	396	385	389
	Projected Water Demand	52	56	57	56	54	55
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	46	50	51	50	48	49
	Other Aquifer	6	6	6	6	6	6
	Total Available Supplies	52	56	57	56	54	55
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Sutton)	**Projected Population**	1,267	1,340	1,352	1,347	1,350	1,336
	Projected Water Demand	277	288	287	281	279	277
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	277	288	287	281	279	277
	Total Available Supplies	277	288	287	281	279	277
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Tom Green)	**Projected Population**	9,948	9,806	9,589	9,303	8,964	8,550
	Projected Water Demand	1,761	1,703	1,633	1,553	1,476	1,408
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	536	536	536	536	536	536
	Lipan Aquifer	502	502	502	502	502	502
	Nasworthy Lake/Reservoir San Angelo System	0	0	0	0	0	0
	Other Aquifer	682	682	682	682	682	682
	Total Available Supplies	1,720	1,720	1,720	1,720	1,720	1,720
	Shortage/Surplus	-41	17	87	167	244	312
	Recommended Water Management Strategies	0	0	0	0	0	0
	Subordination - Lake Nasworthy	250	250	250	250	250	250
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	250	250	250	250	250	250
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	209	267	337	417	494	562

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Upton)	**Projected Population**	848	891	907	920	937	953
	Projected Water Demand	152	156	155	154	156	159
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	152	156	155	154	156	159
	Total Available Supplies	152	156	155	154	156	159
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
County-Other (Ward)	**Projected Population**	4,278	4,388	4,439	4,439	4,439	4,439
	Projected Water Demand	925	929	925	910	905	905
	Available Supplies						
	Pecos Valley Aquifer	910	514	510	495	490	490
	Dockum Aquifer	15	15	15	15	15	15
	Total Available Supplies	925	529	525	510	505	505
	Shortage/Surplus	0	-400	-400	-400	-400	-400
	Recommended Water Management Strategies						
	New/Renew Water Supply - University Lands	0	400	400	400	400	400
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	400	400	400	400	400
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
County-Other (Winkler)	**Projected Population**	572	599	604	606	594	575
	Projected Water Demand	119	121	120	119	116	112
	Available Supplies						
	Pecos Valley Aquifer	57	57	57	57	57	57
	Dockum Aquifer	64	64	64	64	64	64
	Total Available Supplies	121	121	121	121	121	121
	Shortage/Surplus	2	0	1	2	5	9
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	2	0	1	2	5	9
Crane	**Projected Population**	3,438	3,710	3,857	3,969	4,089	4,216
	Projected Water Demand	940	1,002	1,028	1,045	1,072	1,105
	Available Supplies						
	Pecos Valley Aquifer	940	1,002	1,028	1,045	1,072	1,105
	Direct Reuse	0	0	0	0	0	0
	Total Available Supplies	940	1,002	1,028	1,045	1,072	1,105
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Crockett County WCID #1	**Projected Population**	4,257	4,619	4,749	4,809	4,930	5,039
	Projected Water Demand	1,664	1,790	1,825	1,832	1,872	1,913
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	2,503	2,503	2,503	2,503	2,503	2,503
	Total Available Supplies	2,503	2,503	2,503	2,503	2,503	2,503
	Shortage/Surplus	839	713	678	671	631	590
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	839	713	678	671	631	590
Early	**Projected Population**	2,701	2,789	2,814	2,814	2,814	2,814
	Projected Water Demand	799	812	810	801	797	797
	Available Supplies						
	Brownwood Lake/Reservoir	1,228	1,228	1,228	1,228	1,228	1,228
	Total Available Supplies	1,228	1,228	1,228	1,228	1,228	1,228
	Shortage/Surplus	429	416	418	427	431	431
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	429	416	418	427	431	431

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Ector County UD	**Projected Population**	4,116	5,202	6,169	7,031	7,718	8,363
	Projected Water Demand	1,480	1,847	2,177	2,473	2,706	2,932
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	1,080	1,234	2,166	2,322	2,434	2,454
	Total Available Supplies	1,080	1,234	2,166	2,322	2,434	2,454
	Shortage/Surplus	-400	-613	-11	-151	-272	-478
	Recommended Water Management Strategies						
	Subordination- Colorado River MWD Lake/Reservoir System	400	613	11	151	272	478
	Total Recommended Water Management Strategies	400	613	11	151	272	478
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Eden	**Projected Population**	2,885	2,988	2,988	2,988	2,988	2,988
	Projected Water Demand	559	572	569	562	559	559
	Available Supplies						
	Hickory Aquifer	574	572	572	572	572	572
	Other Aquifer	0	0	0	0	0	0
	Direct Reuse	80	220	220	220	220	220
	Total Available Supplies	654	792	792	792	792	792
	Shortage/Surplus	95	220	223	230	233	233
	Recommended Water Management Strategies						
	Reverse Osmosis	0	0	0	0	0	0
	New Hickory Well	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	95	220	223	230	233	233

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
El Dorado	**Projected Population**	2,228	2,510	2,639	2,691	2,766	2,845
	Projected Water Demand	581	644	671	675	691	711
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	710	710	710	710	710	711
	Total Available Supplies	710	710	710	710	710	711
	Shortage/Surplus	129	66	39	35	19	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	129	66	39	35	19	0
Fort Stockton	**Projected Population**	8,332	8,766	9,009	9,139	9,163	8,984
	Projected Water Demand	3,267	3,397	3,461	3,481	3,479	3,411
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	5,913	5,913	5,913	5,913	5,913	5,913
	Total Available Supplies	5,913	5,913	5,913	5,913	5,913	5,913
	Shortage/Surplus	2,646	2,516	2,452	2,432	2,434	2,502
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	2,646	2,516	2,452	2,432	2,434	2,502

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Iraan	**Projected Population**	1,315	1,383	1,421	1,442	1,446	1,417
	Projected Water Demand	452	469	478	480	479	470
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	567	567	567	567	567	567
	Total Available Supplies	567	567	567	567	567	567
	Shortage/Surplus	115	98	89	87	88	97
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	115	98	89	87	88	97
Junction	**Projected Population**	2,731	2,755	2,755	2,755	2,755	2,755
	Projected Water Demand	936	935	926	917	910	910
	Available Supplies						
	Llano River Run-Of-River City Of Junction	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-936	-935	-926	-917	-910	-910
	Recommended Water Management Strategies						
	Subordination - Llano Run-of-River	991	991	991	991	991	991
	Total Recommended Water Management Strategies	991	991	991	991	991	991
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	55	56	65	74	81	81

WUG	Description	2010	2020	2030	2040	2050	2060
Kermit	**Projected Population**	6,057	6,338	6,391	6,405	6,285	6,084
	Projected Water Demand	1,927	1,988	1,983	1,966	1,922	1,860
	Available Supplies						
	Dockum Aquifer	3,943	3,943	3,943	3,943	3,943	3,943
	Total Available Supplies	3,943	3,943	3,943	3,943	3,943	3,943
	Shortage/Surplus	2,016	1,955	1,960	1,977	2,021	2,083
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	2,016	1,955	1,960	1,977	2,021	2,083
Loraine	**Projected Population**	659	657	646	631	613	576
	Projected Water Demand	85	82	79	75	71	67
	Available Supplies						
	Dockum Aquifer	110	110	110	110	110	110
	Total Available Supplies	110	110	110	110	110	110
	Shortage/Surplus	25	28	31	35	39	43
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	25	28	31	35	39	43

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Madera Valley WSC	**Projected Population**	2,342	2,385	2,421	2,451	2,478	2,499
	Projected Water Demand	695	700	702	703	705	711
	Available Supplies						
	Pecos Valley Aquifer	695	700	702	703	705	711
	Total Available Supplies	695	700	702	703	705	711
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mason	**Projected Population**	2,157	2,169	2,175	2,178	2,179	2,180
	Projected Water Demand	742	739	733	727	722	723
	Available Supplies						
	Hickory Aquifer	766	765	766	766	766	766
	Total Available Supplies	766	765	766	766	766	766
	Shortage/Surplus	24	26	33	39	44	43
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	24	26	33	39	44	43

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
McCamey	**Projected Population**	2,038	2,243	2,320	2,381	2,461	2,539
	Projected Water Demand	559	606	621	629	648	668
	Available Supplies						
	Direct Reuse	0	0	0	0	0	0
	Edwards-Trinity-Plateau Aquifer	1,071	1,070	1,070	1,071	1,070	1,069
	Total Available Supplies	1,071	1,070	1,070	1,071	1,070	1,069
	Shortage/Surplus	512	464	449	442	422	401
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	512	464	449	442	422	401
Menard	**Projected Population**	1,746	1,771	1,771	1,771	1,771	1,771
	Projected Water Demand	354	353	347	341	339	339
	Available Supplies						
	San Saba River Run-Of-River City Of Menard	304	304	304	304	304	304
	Total Available Supplies	304	304	304	304	304	304
	Shortage/Surplus	-50	-49	-43	-37	-35	-35
	Recommended Water Management Strategies						
	Develop Hickory Aquifer Supplies	140	139	140	140	141	141
	Municipal Conservation	10	24	28	30	32	33
	Total Recommended Water Management Strategies	150	163	168	170	173	174
	Total Supply Less Projected Demand	100	114	125	133	138	139
	Alternative Strategies						
	Hickory Aquifer ASR			240	240	240	240
	Total Alternative Strategies	0	0	240	240	240	240

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mertzon	**Projected Population**	894	918	896	840	796	761
	Projected Water Demand	129	130	124	114	107	102
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	139	139	139	139	139	139
	Total Available Supplies	139	139	139	139	139	139
	Shortage/Surplus	10	9	15	25	32	37
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	10	9	15	25	32	37
Midland	**Projected Population**	100,137	105,639	109,561	112,478	114,324	116,064
	Projected Water Demand	28,939	30,056	30,804	31,246	31,631	32,112
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	12,136	12,202	0	0	0	0
	Ogallala Aquifer	4,722	4,722	4,722	0	0	0
	OH Ivie Lake/Reservoir Non-System Portion	10,925	10,669	10,473	10,246	10,021	9,795
	Total Available Supplies	27,783	27,593	15,195	10,246	10,021	9,795
	Shortage/Surplus	-1,156	-2,463	-15,609	-21,000	-21,610	-22,317
	Recommended Water Management Strategies						
	Develop Pecos Valley (T-Bar Ranch)	0	0	13,600	13,600	13,600	13,600
	Municipal Conservation	1,344	2,616	3,061	3,261	3,457	3,663
	New/Renew Water Supply - CRMWD contract	0	0	10,000	9,800	9,600	9,400
	Reuse	0	5,389	5,389	5,389	5,389	5,389
	Subordination - Colorado River MWD Lake/Reservoir System	4,488	6,152	211	324	438	553
	Subordination - OH Ivie Lake/Reservoir Non-System Portion	17	-97	-211	-324	-438	-553
	Total Recommended Water Management Strategies	5,849	14,060	32,050	32,050	32,046	32,052
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	4,693	11,597	16,441	11,050	10,436	9,735

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Miles	**Projected Population**	879	984	1,063	1,151	1,219	1,284
	Projected Water Demand	150	163	173	183	193	203
	Available Supplies						
	OC Fisher Lake/Reservoir San Angelo System	0	0	0	0	0	0
	Other Aquifer	10	10	10	10	10	10
	Total Available Supplies	10	10	10	10	10	10
	Shortage/Surplus	-140	-153	-163	-173	-183	-193
	Recommended Water Management Strategies						
	Subordination - OC Fisher Lake/Reservoir San Angelo System	200	200	200	200	200	200
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	200	200	200	200	200	200
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	60	47	37	27	17	7
Millersview-Doole WSC	**Projected Population**	5,474	5,812	6,113	6,453	6,835	7,271
	Projected Water Demand	706	728	747	759	797	847
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	259	244	373	357	0	0
	Hickory Aquifer	524	524	524	524	524	524
	Total Available Supplies	783	768	897	881	524	524
	Shortage/Surplus	77	40	150	122	-273	-323
	Recommended Water Management Strategies						
	New/Renew Water Supply - CRMWD contract	0	0	0	0	500	500
	Subordination - Colorado River MWD Lake/Reservoir System	190	241	3	46	0	0
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	190	241	3	46	500	500
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	267	281	153	168	227	177

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Monahans	**Projected Population**	7,138	7,322	7,407	7,407	7,407	7,407
	Projected Water Demand	2,559	2,592	2,597	2,572	2,564	2,564
	Available Supplies						
	Pecos Valley Aquifer	2,559	2,592	2,597	2,572	2,564	2,564
	Direct Reuse	0	0	0	0	0	0
	Total Available Supplies	2,559	2,592	2,597	2,572	2,564	2,564
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Odessa	**Projected Population**	95,490	100,264	105,277	110,540	116,067	121,870
	Projected Water Demand	21,927	22,687	23,350	24,145	25,222	26,484
	Available Supplies						
	Pecos Valley Aquifer	4,800	0	0	0	0	0
	Colorado River MWD Lake/Reservoir System	11,409	11,067	17,267	17,389	17,710	17,627
	Edwards-Trinity-Plateau Aquifer	440	440	440	440	440	440
	Reuse	1,500	1,500	1,500	1,500	1,500	1,500
	Total Available Supplies	18,149	13,007	19,207	19,329	19,650	19,567
	Shortage/Surplus	-3,778	-9,680	-4,143	-4,816	-5,572	-6,917
	Recommended Water Management Strategies						
	CRMWD Pecos Valley supply	0	0	6,000	6,000	6,000	6,000
	Municipal Conservation	551	1,200	1,536	1,715	1,920	2,149
	New/Renew Water Supply - University Lands	0	4,800	4,800	4,800	4,800	4,800
	Reuse		4,060	4,305	4,060	4,110	4,160
	Subordination - Colorado River MWD Lake/Reservoir System	4,205	5,787	87	1,151	2,010	3,464
	Total Recommended Water Management Strategies	4,756	15,847	16,728	17,726	18,840	20,573
	Total Supply Less Projected Demand	978	6,167	12,585	12,910	13,268	13,656
	Alternative Strategies						
	Reuse	0	4,410	4,410	4,410	4,410	4,410
	Total Alternative Strategies	0	4,410	4,410	4,410	4,410	4,410

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Pecos	**Projected Population**	10,583	11,690	12,604	13,363	14,053	14,600
	Projected Water Demand	2,810	3,064	3,261	3,413	3,573	3,712
	Available Supplies						
	Pecos Valley Aquifer	1,541	1,792	1,986	2,136	2,294	2,431
	Dockum Aquifer	1,269	1,272	1,275	1,277	1,279	1,281
	Total Available Supplies	2,810	3,064	3,261	3,413	3,573	3,712
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Pecos County WCID #1	**Projected Population**	3,526	3,709	3,812	3,867	3,877	3,801
	Projected Water Demand	395	403	401	399	395	387
	Available Supplies						
	Pecos Valley Aquifer	478	478	478	478	478	478
	Total Available Supplies	478	478	478	478	478	478
	Shortage/Surplus	83	75	77	79	83	91
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	83	75	77	79	83	91

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Rankin	**Projected Population**	871	934	958	977	1,002	1,026
	Projected Water Demand	231	245	248	250	255	261
	Available Supplies						
	Direct Reuse	0	0	0	0	0	0
	Edwards-Trinity-Plateau Aquifer	327	326	326	326	326	325
	Total Available Supplies	327	326	326	326	326	325
	Shortage/Surplus	96	81	78	76	71	64
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	96	81	78	76	71	64
Richland SUD	**Projected Population**	633	644	644	644	644	644
	Projected Water Demand	113	113	111	109	108	108
	Available Supplies						
	Hickory Aquifer	186	186	186	186	186	186
	Total Available Supplies	186	186	186	186	186	186
	Shortage/Surplus	73	73	75	77	78	78
	Recommended Water Management Strategies						
	Replacment Well - Hickory Aquifer	0	0	0	0	0	0
	Bottled Water Program	1	1	1	1	1	1
	Develop Ellenburger Aquifer Supplies	0	200	200	200	200	200
	Total Recommended Water Management Strategies	1	201	201	201	201	201
	Total Supply Less Projected Demand	74	274	276	278	279	279
	Alternative Strategies						
	Specialized Media Treatment System	113	113	113	113	113	113
	Total Alternative Strategies	113	113	113	113	113	113

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Robert Lee	**Projected Population**	1,136	1,136	1,136	1,136	1,136	1,136
	Projected Water Demand	351	346	342	338	336	336
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	256	231	340	317	302	281
	Colorado River Run-Of-River City Of Robert Lee	7	7	7	7	7	7
	Mountain Creek Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	263	238	347	324	309	288
	Shortage/Surplus	-88	-108	5	-14	-27	-48
	Recommended Water Management Strategies						
	Municipal Conservation	16	40	44	45	46	48
	Subordination - Colorado River MWD Lake/Reservoir System	95	115	2	21	34	55
	Infrastructure Improvements	0	0	0	0	0	0
	Total Recommended Water Management Strategies	111	155	46	66	80	103
	Total Supply Less Projected Demand	23	47	51	52	53	55
	Alternative Strategies						
	Desalination of Spence Reservoir Water		500	500	500	500	500
	Total Alternative Strategies						

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
San Angelo	**Projected Population**	94,261	99,070	102,120	103,808	105,145	105,445
	Projected Water Demand	20,800	21,418	21,734	21,744	21,907	21,969
	Available Supplies						
	Concho River Combined Run-Of-River City Of San Angelo	642	642	642	642	642	642
	EV Spence Lake/Reservoir Non-System Portion	0	0	0	0	0	0
	Hickory Aquifer	0	0	0	0	0	0
	Nasworthy Lake/Reservoir San Angelo System	0	0	0	0	0	0
	OC Fisher Lake/Reservoir San Angelo System	0	0	0	0	0	0
	OH Ivie Lake/Reservoir Non-System Portion	10,974	10,751	10,528	10,304	10,081	9,858
	Twin Buttes Lake/Reservoir San Angelo System	0	0	0	0	0	0
	Total Available Supplies	11,616	11,393	11,170	10,946	10,723	10,500
	Shortage/Surplus	-9,184	-10,025	-10,564	-10,798	-11,184	-11,469
	Recommended Water Management Strategies						
	Brush Control	8,362	8,362	8,362	8,362	8,362	8,362
	Desalination	0	0	0	5,600	5,600	5,600
	Develop Hickory Aquifer Supplies	0	6,700	10,000	12,000	12,000	12,000
	Municipal Conservation	701	1,705	2,009	2,127	2,255	2,371
	Rehabilitation Of Spence Pipeline	0	0	2,281	2,267	2,254	2,240
	Subordination - Nasworthy/Twin Buttes	5,436	5,078	4,752	4,431	4,141	3,804
	Subordination - OC Fisher Reservoir	3,637	3,518	3,400	3,282	3,163	3,045
	Subordination - OH Ivie Reservoir	17	-97	-211	-324	-438	-553
	Total Recommended Water Management Strategies	18,153	25,266	30,593	37,745	37,337	36,869
	Total Supply Less Projected Demand	8,969	15,241	20,029	26,947	26,153	25,400
	Alternative Strategies						
	Develop Pecos County Well Field			12,000	12,000	12,000	12,000
	New Edwards-Trinity Plateau Aquifer			12,000	12,000	12,000	12,000
	Total Alternative Strategies	0	0	24,000	24,000	24,000	24,000

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Santa Anna	**Projected Population**	1,070	1,071	1,071	1,071	1,071	1,071
	Projected Water Demand	200	197	193	190	187	187
	Available Supplies						
	Brownwood Lake/Reservoir	207	207	207	207	207	207
	Colorado River Combined Run-Of-River Central Colorado River Authority (Lake Santana)	0	0	0	0	0	0
	Total Available Supplies	207	207	207	207	207	207
	Shortage/Surplus	7	10	14	17	20	20
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	7	10	14	17	20	20
Snyder	**Projected Population**	11,179	11,554	11,753	11,858	11,927	11,927
	Projected Water Demand	2,792	2,834	2,844	2,829	2,832	2,832
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	1,381	1,293	1,935	1,812	1,738	1,617
	Dockum Aquifer	900	900	900	900	900	900
	Total Available Supplies	2,281	2,193	2,835	2,712	2,638	2,517
	Shortage/Surplus	-511	-641	-9	-117	-194	-315
	Recommended Water Management Strategies						
	Municipal Conservation	70	154	191	205	220	234
	Reuse	0	726	726	726	726	726
	Subordination - Colorado River MWD Lake/Reservoir System	511	641	9	117	194	315
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	581	1,521	926	1,048	1,140	1,275
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	70	880	917	931	946	960

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Sonora	**Projected Population**	3,212	3,397	3,428	3,415	3,423	3,389
	Projected Water Demand	1,195	1,252	1,252	1,236	1,235	1,222
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	1,919	1,919	1,919	1,919	1,919	1,919
	Total Available Supplies	1,919	1,919	1,919	1,919	1,919	1,919
	Shortage/Surplus	724	667	667	683	684	697
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	724	667	667	683	684	697
Stanton	**Projected Population**	2,802	3,068	3,196	3,276	3,196	3,034
	Projected Water Demand	411	440	447	448	433	411
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	0	0	0	0	0	0
	Ogallala Aquifer	19	18	18	18	18	18
	Total Available Supplies	19	18	18	18	18	18
	Shortage/Surplus	-392	-422	-429	-430	-415	-393
	Recommended Water Management Strategies						
	New/Renew Water Supply - CRMWD contract	392	422	429	430	415	393
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	392	422	429	430	415	393
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Sterling City	**Projected Population**	1,187	1,304	1,353	1,370	1,332	1,350
	Projected Water Demand	297	321	330	330	319	324
	Available Supplies						
	Other Aquifer	297	321	330	330	319	324
	Total Available Supplies	297	321	330	330	319	324
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Wink	**Projected Population**	974	1,019	1,028	1,030	1,011	979
	Projected Water Demand	331	341	341	338	331	320
	Available Supplies						
	Pecos Valley Aquifer	657	657	657	657	657	657
	Total Available Supplies	657	657	657	657	657	657
	Shortage/Surplus	326	316	316	319	326	337
	Recommended Water Management Strategies						
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	326	316	316	319	326	337

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Winters	**Projected Population**	2,951	3,056	3,136	3,224	3,293	3,380
	Projected Water Demand	552	561	566	571	575	591
	Available Supplies						
	Winters Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-552	-561	-566	-571	-575	-591
	Recommended Water Management Strategies						
	Municipal Conservation	21	55	63	67	71	76
	Reuse	0	0	0	110	110	110
	Subordination - Winters Lake/Reservoir	552	561	566	571	575	591
	Well Replacement	0	0	0	0	0	0
	Total Recommended Water Management Strategies	573	616	629	748	756	777
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	21	55	63	177	181	186
Zephyr WSC	**Projected Population**	3,601	3,718	3,751	3,751	3,751	3,751
	Projected Water Demand	399	404	399	391	387	387
	Available Supplies						
	BROWNWOOD LAKE/RESERVOIR	516	516	516	516	516	516
	Total Available Supplies	516	516	516	516	516	516
	Shortage/Surplus	117	112	117	125	129	129
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	117	112	117	125	129	129

* All Demand and Supply values are in Acre-Feet

Summaries by Non_Municipal Water User Group

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Andrews)	**Projected Water Demand**	32,608	32,334	32,062	31,788	31,516	31,245
	Available Supplies						
	Direct Reuse	560	560	560	560	560	560
	Ogallala Aquifer	19,173	18,929	18,795	19,911	19,842	19,739
	Total Available Supplies	19,733	19,489	19,355	20,471	20,402	20,299
	Shortage/Surplus	-12,875	-12,845	-12,707	-11,317	-11,114	-10,946
	Recommended Water Management Strategies						
	Irrigation Conservation	0	2,727	5,455	5,455	5,455	5,455
	Total Recommended Water Management Strategies	0	2,727	5,455	5,455	5,455	5,455
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-12,875	-10,118	-7,252	-5,862	-5,659	-5,491
Irrigation (Borden)	**Projected Water Demand**	2,690	2,687	2,682	2,680	2,675	2,673
	Available Supplies						
	Brazos River Run-Of-River Irrigation	0	0	0	0	0	0
	Ogallala Aquifer	843	843	843	845	846	847
	Total Available Supplies	843	843	843	845	846	847
	Shortage/Surplus	-1,847	-1,844	-1,839	-1,835	-1,829	-1,826
	Recommended Water Management Strategies						
	Irrigation Conservation	0	230	460	460	460	460
	Total Recommended Water Management Strategies	0	230	460	460	460	460
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-1,847	-1,614	-1,379	-1,375	-1,369	-1,366

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Brown)	**Projected Water Demand**	12,313	12,272	12,230	12,189	12,146	12,105
	Available Supplies						
	Brownwood Lake/Reservoir	6,970	6,970	6,970	6,970	6,970	6,970
	Pecan Bayou Combined Run-Of-River Irrigation	778	778	778	778	778	778
	Trinity Aquifer	1,559	1,542	1,536	1,536	1,530	1,516
	Total Available Supplies	9,307	9,290	9,284	9,284	9,278	9,264
	Shortage/Surplus	-3,006	-2,982	-2,946	-2,905	-2,868	-2,841
	Recommended Water Management Strategies						
	Irrigation Conservation	0	93	185	185	185	185
	Total Recommended Water Management Strategies	0	93	185	185	185	185
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-3,006	-2,889	-2,761	-2,720	-2,683	-2,656
Irrigation (Coke)	**Projected Water Demand**	936	936	934	933	933	933
	Available Supplies						
	Colorado River Combined Run-Of-River Irrigation	41	41	41	41	41	41
	Other Aquifer	532	532	532	532	532	532
	Total Available Supplies	573	573	573	573	573	573
	Shortage/Surplus	-363	-363	-361	-360	-360	-360
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-363	-363	-361	-360	-360	-360

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Coleman)	**Projected Water Demand**	1,379	1,379	1,379	1,379	1,379	1,379
	Available Supplies						
	Coleman Lake/Reservoir	0	0	0	0	0	0
	Colorado River Combined Run-Of-River Irrigation	31	31	31	31	31	31
	Total Available Supplies	31	31	31	31	31	31
	Shortage/Surplus	-1,348	-1,348	-1,348	-1,348	-1,348	-1,348
	Recommended Water Management Strategies						
	Subordination - Coleman Lake/Reservoir	1,348	1,348	1,348	1,348	1,348	1,348
	Total Recommended Water Management Strategies	1,348	1,348	1,348	1,348	1,348	1,348
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Irrigation (Concho)	**Projected Water Demand**	4,297	4,280	4,262	4,245	4,229	4,213
	Available Supplies						
	Concho River Combined Run-Of-River Irrigation	228	228	228	228	228	228
	Lipan Aquifer	5,037	5,037	5,037	5,037	5,037	5,037
	Total Available Supplies	5,265	5,265	5,265	5,265	5,265	5,265
	Shortage/Surplus	968	985	1,003	1,020	1,036	1,052
	Recommended Water Management Strategies						
	Irrigation Conservation	0	748	1496	1496	1496	1496
	Total Recommended Water Management Strategies	0	748	1,496	1,496	1,496	1,496
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	968	1,733	2,499	2,516	2,532	2,548

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Crane)	**Projected Water Demand**	337	337	337	337	337	337
	Available Supplies						
	Pecos Valley Aquifer	337	337	337	337	337	337
	Total Available Supplies	337	337	337	337	337	337
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Irrigation (Crockett)	**Projected Water Demand**	525	518	508	498	492	482
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	535	535	535	535	535	535
	Total Available Supplies	535	535	535	535	535	535
	Shortage/Surplus	10	17	27	37	43	53
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	10	17	27	37	43	53

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Ector)	**Projected Water Demand**	5,533	5,466	5,402	5,335	5,271	5,204
	Available Supplies						
	Pecos Valley Aquifer	56	54	54	54	52	52
	Edwards-Trinity-Plateau Aquifer	1,768	2,091	2,328	2,450	2,464	2,429
	Monahans Draw Combined Run-Of-River Irrigation	23	23	23	23	23	23
	Ogallala Aquifer	3,686	3,298	2,997	2,808	2,732	2,700
	Total Available Supplies	5,533	5,466	5,402	5,335	5,271	5,204
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Irrigation Conservation	0	245	490	490	490	490
	Total Recommended Water Management Strategies	0	245	490	490	490	490
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	245	490	490	490	490
Irrigation (Glasscock)	**Projected Water Demand**	52,272	51,854	51,438	51,021	50,603	50,190
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	20,586	20,571	20,564	20,567	20,570	20,566
	Ogallala Aquifer	3,902	3,902	3,902	3,902	3,902	3,902
	Total Available Supplies	24,488	24,473	24,466	24,469	24,472	24,468
	Shortage/Surplus	-27,784	-27,381	-26,972	-26,552	-26,131	-25,722
	Recommended Water Management Strategies						
	Irrigation Conservation	0	3,631	7,262	7,262	7,262	7,262
	Total Recommended Water Management Strategies	0	3,631	7,262	7,262	7,262	7,262
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-27,784	-23,750	-19,710	-19,290	-18,869	-18,460

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Howard)	**Projected Water Demand**	4,799	4,744	4,690	4,635	4,581	4,527
	Available Supplies						
	Beals Creek Combined Run-Of-River Irrigation	0	0	0	0	0	0
	Dockum Aquifer	41	41	41	41	41	41
	Edwards-Trinity-Plateau Aquifer	183	183	183	183	183	183
	Ogallala Aquifer	4,638	4,638	4,638	4,638	4,638	4,638
	Total Available Supplies	4,862	4,862	4,862	4,862	4,862	4,862
	Shortage/Surplus	63	118	172	227	281	335
	Recommended Water Management Strategies						
	Irrigation Conservation	0	327	653	653	653	653
	Total Recommended Water Management Strategies	0	327	653	653	653	653
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	63	445	825	880	934	988
Irrigation (Irion)	**Projected Water Demand**	2,803	2,742	2,682	2,621	2,561	2,501
	Available Supplies						
	Other Aquifer	921	921	921	921	921	921
	Spring Creek Combined Run-Of-River Irrigation	580	580	580	580	580	580
	Total Available Supplies	1,501	1,501	1,501	1,501	1,501	1,501
	Shortage/Surplus	-1,302	-1,241	-1,181	-1,120	-1,060	-1,000
	Recommended Water Management Strategies						
	Irrigation Conservation	0	37	73	73	73	73
	Total Recommended Water Management Strategies	0	37	73	73	73	73
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-1,302	-1,204	-1,108	-1,047	-987	-927

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Kimble)	**Projected Water Demand**	985	948	913	877	841	807
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	296	296	296	296	296	296
	Llano River Combined Run-Of-River Irrigation	1,475	1,475	1,475	1,475	1,475	1,475
	Total Available Supplies	1,771	1,771	1,771	1,771	1,771	1,771
	Shortage/Surplus	786	823	858	894	930	964
	Recommended Water Management Strategies						
	Irrigation Conservation	0	74	147	147	147	147
	Total Recommended Water Management Strategies	0	74	147	147	147	147
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	786	897	1,005	1,041	1,077	1,111
Irrigation (Loving)	**Projected Water Demand**	581	580	576	575	573	572
	Available Supplies						
	Red Bluff Lake/Reservoir	583	583	583	583	583	583
	Total Available Supplies	583	583	583	583	583	583
	Shortage/Surplus	2	3	7	8	10	11
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	2	3	7	8	10	11

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (McCulloch)	**Projected Water Demand**	2,824	2,789	2,754	2,718	2,683	2,649
	Available Supplies						
	Colorado River Combined Run-Of-River Irrigation	128	128	128	128	128	128
	Hickory Aquifer	5,975	5,975	5,975	5,975	5,975	5,975
	Total Available Supplies	6,103	6,103	6,103	6,103	6,103	6,103
	Shortage/Surplus	3,279	3,314	3,349	3,385	3,420	3,454
	Recommended Water Management Strategies						
	Irrigation Conservation	0	197	394	394	394	394
	Total Recommended Water Management Strategies	0	197	394	394	394	394
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	3,279	3,511	3,743	3,779	3,814	3,848
Irrigation (Martin)	**Projected Water Demand**	14,324	14,073	13,822	13,571	13,321	13,075
	Available Supplies						
	Ogallala Aquifer	13,536	13,509	13,500	13,571	13,321	13,075
	Total Available Supplies	13,536	13,509	13,500	13,571	13,321	13,075
	Shortage/Surplus	-788	-564	-322	0	0	0
	Recommended Water Management Strategies						
	Irrigation Conservation	0	1,751	3,502	3,502	3,502	3,502
	Total Recommended Water Management Strategies	0	1,751	3,502	3,502	3,502	3,502
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-788	1,187	3,180	3,502	3,502	3,502

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Mason)	**Projected Water Demand**	10,079	9,936	9,792	9,648	9,505	9,363
	Available Supplies						
	Hickory Aquifer	16,099	16,099	16,099	16,099	16,099	16,099
	Total Available Supplies	16,099	16,099	16,099	16,099	16,099	16,099
	Shortage/Surplus	6,020	6,163	6,307	6,451	6,594	6,736
	Recommended Water Management Strategies						
	Irrigation Conservation	0	746	1491	1491	1491	1491
	Total Recommended Water Management Strategies	0	746	1,491	1,491	1,491	1,491
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	6,020	6,909	7,798	7,942	8,085	8,227
Irrigation (Menard)	**Projected Water Demand**	6,061	6,041	6,022	6,003	5,981	5,962
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	627	627	627	627	627	627
	Hickory Aquifer	59	59	59	59	59	59
	Other Aquifer	0	0	0	0	0	0
	San Saba River Combined Run-Of-River Irrigation	2,934	2,934	2,934	2,934	2,934	2,934
	Total Available Supplies	3,620	3,620	3,620	3,620	3,620	3,620
	Shortage/Surplus	-2,441	-2,421	-2,402	-2,383	-2,361	-2,342
	Recommended Water Management Strategies						
	Irrigation Conservation	0	23	46	46	46	46
	Total Recommended Water Management Strategies	0	23	46	46	46	46
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-2,441	-2,398	-2,356	-2,337	-2,315	-2,296

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Midland)	**Projected Water Demand**	41,493	41,170	40,848	40,526	40,203	39,884
	Available Supplies						
	Direct Reuse	5,987	5,987	5,987	5,987	5,987	5,987
	Edwards-Trinity-Plateau Aquifer	15,843	15,502	15,269	15,094	14,951	14,802
	Ogallala Aquifer	3,430	3,322	3,244	3,191	3,153	3,102
	Total Available Supplies	25,260	24,811	24,500	24,272	24,091	23,891
	Shortage/Surplus	-16,233	-16,359	-16,348	-16,254	-16,112	-15,993
	Recommended Water Management Strategies						
	Irrigation Conservation	0	1,800	3,600	3,600	3,600	3,600
	Total Recommended Water Management Strategies	0	1,800	3,600	3,600	3,600	3,600
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-16,233	-14,559	-12,748	-12,654	-12,512	-12,393
Irrigation (Mitchell)	**Projected Water Demand**	5,534	5,507	5,479	5,452	5,425	5,398
	Available Supplies						
	Colorado River Combined Run-Of-River Irrigation	15	15	15	15	15	15
	Dockum Aquifer	5,549	5,549	5,549	5,549	5,549	5,549
	Total Available Supplies	5,564	5,564	5,564	5,564	5,564	5,564
	Shortage/Surplus	30	57	85	112	139	166
	Recommended Water Management Strategies						
	Irrigation Conservation	0	865	1729	1729	1729	1729
	Weather Modification	0	0	0	0	0	0
	Total Recommended Water Management Strategies	0	865	1,729	1,729	1,729	1,729
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	30	922	1,814	1,841	1,868	1,895

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Pecos)	**Projected Water Demand**	79,681	78,436	77,191	75,945	74,700	73,475
	Available Supplies						
	Pecos Valley Aquifer	27,456	27,456	27,456	27,456	27,456	27,456
	Edwards-Trinity-Plateau Aquifer	47,740	47,740	47,740	47,740	47,740	47,740
	Pecos River Combined Run-Of-River Irrigation	4,444	4,444	4,444	4,444	4,444	4,444
	Red Bluff Lake/Reservoir	1,558	1,558	1,558	1,558	1,558	1,558
	Rustler Aquifer	1385	1385	1385	1385	1385	1385
	Total Available Supplies	82,583	82,583	82,583	82,583	82,583	82,583
	Shortage/Surplus	2,902	4,147	5,392	6,638	7,883	9,108
	Recommended Water Management Strategies						
	Irrigation Conservation	0	6,300	12,600	12,600	12,600	12,600
	Total Recommended Water Management Strategies	0	6,300	12,600	12,600	12,600	12,600
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	2,902	10,447	17,992	19,238	20,483	21,708
Irrigation (Reagan)	**Projected Water Demand**	36,597	35,990	35,385	34,779	34,174	33,579
	Available Supplies						
	Dockum Aquifer	0	0	0	0	0	0
	Edwards-Trinity-Plateau Aquifer	25,600	25,383	25,269	25,220	25,198	25,186
	Total Available Supplies	25,600	25,383	25,269	25,220	25,198	25,186
	Shortage/Surplus	-10,997	-10,607	-10,116	-9,559	-8,976	-8,393
	Recommended Water Management Strategies						
	Irrigation Conservation	0	1,968	3,936	3,936	3,936	3,936
	Total Recommended Water Management Strategies	0	1,968	3,936	3,936	3,936	3,936
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-10,997	-8,639	-6,180	-5,623	-5,040	-4,457

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Reeves)	**Projected Water Demand**	103,069	102,196	101,323	100,448	99,575	98,710
	Available Supplies						
	Pecos Valley Aquifer	57,862	57,841	57,826	57,813	57,801	57,753
	Lake Balmorhea	21,844	21,844	21,844	21,844	21,844	21,844
	Pecos River Combined Run-Of-River Irrigation	0	0	0	0	0	0
	Red Bluff Lake/Reservoir	9,110	9,110	9,110	9,110	9,110	9,110
	Total Available Supplies	88,816	88,795	88,780	88,767	88,755	88,707
	Shortage/Surplus	-14,253	-13,401	-12,543	-11,681	-10,820	-10,003
	Recommended Water Management Strategies						
	Irrigation Conservation	0	5,824	11,648	11,648	11,648	11,648
	Total Recommended Water Management Strategies	0	5,824	11,648	11,648	11,648	11,648
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-14,253	-7,577	-895	-33	828	1,645
Irrigation (Runnels)	**Projected Water Demand**	4,331	4,317	4,298	4,279	4,260	4,241
	Available Supplies						
	Colorado River Combined Run-Of-River Irrigation	771	771	771	771	771	771
	Direct Reuse	218	218	218	218	218	218
	Other Aquifer	1,984	1,984	1,984	1,984	1,984	1,984
	Total Available Supplies	2,973	2,973	2,973	2,973	2,973	2,973
	Shortage/Surplus	-1,358	-1,344	-1,325	-1,306	-1,287	-1,268
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-1,358	-1,344	-1,325	-1,306	-1,287	-1,268

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Schleicher)	**Projected Water Demand**	2,108	2,067	2,024	1,982	1,939	1,897
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	3,132	3,132	3,132	3,132	3,132	3,132
	San Saba River Combined Run-Of-River Irrigation	0	0	0	0	0	0
	Total Available Supplies	3,132	3,132	3,132	3,132	3,132	3,132
	Shortage/Surplus	1,024	1,065	1,108	1,150	1,193	1,235
	Recommended Water Management Strategies						
	Irrigation Conservation	0	107	214	214	214	214
	Total Recommended Water Management Strategies	0	107	214	214	214	214
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	1,024	1,172	1,322	1,364	1,407	1,449
Irrigation (Scurry)	**Projected Water Demand**	2,815	2,723	2,630	2,537	2,444	2,355
	Available Supplies						
	Deep Creek Combined Run-Of-River Irrigation	69	69	69	69	69	69
	Direct Reuse	0	0	0	0	0	0
	Dockum Aquifer	3,460	3,434	3,408	3,382	3,356	3,331
	Total Available Supplies	3,529	3,503	3,477	3,451	3,425	3,400
	Shortage/Surplus	714	780	847	914	981	1,045
	Recommended Water Management Strategies						
	Irrigation Conservation	0	571	1,143	1,143	1,143	1,143
	Total Recommended Water Management Strategies	0	571	1,143	1,143	1,143	1,143
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	714	1,351	1,990	2,057	2,124	2,188

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Sterling)	**Projected Water Demand**	648	621	595	569	543	518
	Available Supplies						
	Direct Reuse	0	0	0	0	0	0
	Edwards-Trinity-Plateau Aquifer	102	102	102	102	102	102
	North Concho River Combined Run-Of-River Irrigation	48	48	48	48	48	48
	Other Aquifer	595	595	595	595	595	595
	Total Available Supplies	745	745	745	745	745	745
	Shortage/Surplus	97	124	150	176	202	227
	Recommended Water Management Strategies						
	Irrigation Conservation	0	45	89	89	89	89
	Total Recommended Water Management Strategies	0	45	89	89	89	89
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	97	169	239	265	291	316
Irrigation (Sutton)	**Projected Water Demand**	1,811	1,777	1,742	1,708	1,673	1,639
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	1,804	1,786	1,786	1,786	1,786	1,786
	N Llano River Combined Run-Of-River Irrigation	8	8	8	8	8	8
	Total Available Supplies	1,812	1,794	1,794	1,794	1,794	1,794
	Shortage/Surplus	1	17	52	86	121	155
	Recommended Water Management Strategies						
	Irrigation Conservation	0	142	284	284	284	284
	Total Recommended Water Management Strategies	0	142	284	284	284	284
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	1	159	336	370	405	439

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Tom Green)	**Projected Water Demand**	104,621	104,362	104,107	103,852	103,593	103,338
	Available Supplies						
	Concho River Combined Run-Of-River Irrigation	2,812	2,812	2,812	2,812	2,812	2,812
	Direct Reuse	8,500	8,500	8,500	8,500	8,500	8,500
	Edwards-Trinity-Plateau Aquifer	520	520	520	520	520	520
	Lipan Aquifer	35,846	35,846	35,846	35,846	35,846	35,846
	Nasworthy Lake/Reservoir San Angelo System	0	0	0	0	0	0
	Other Aquifer	9,853	9,853	9,853	9,853	9,853	9,853
	Twin Buttes Lake/Reservoir San Angelo System	0	0	0	0	0	0
	Total Available Supplies	57,531	57,531	57,531	57,531	57,531	57,531
	Shortage/Surplus	-47,090	-46,831	-46,576	-46,321	-46,062	-45,807
	Recommended Water Management Strategies						
	Irrigation Conservation	0	5,774	11,548	11,548	11,548	11,548
	Subordination - Twin Buttes Lake	3,377	3,273	3,170	3,066	2,693	2,860
	Total Recommended Water Management Strategies	3,377	9,047	14,718	14,614	14,241	14,408
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-43,713	-37,784	-31,858	-31,707	-31,821	-31,399
Irrigation (Upton)	**Projected Water Demand**	16,759	16,521	16,285	16,047	15,809	15,576
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	6,119	6,103	6,099	6,094	6,088	6,081
	Total Available Supplies	6,119	6,103	6,099	6,094	6,088	6,081
	Shortage/Surplus	-10,640	-10,418	-10,186	-9,953	-9,721	-9,495
	Recommended Water Management Strategies						
	Irrigation Conservation	0	920	1,840	1,840	1,840	1,840
	Total Recommended Water Management Strategies	0	920	1,840	1,840	1,840	1,840
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-10,640	-9,498	-8,346	-8,113	-7,881	-7,655

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Irrigation (Ward)	**Projected Water Demand**	13,793	13,624	13,454	13,284	13,115	12,947
	Available Supplies						
	Pecos Valley Aquifer	2,271	2,656	1,738	750	215	64
	Direct Reuse	670	670	670	670	670	670
	Dockum Aquifer	316	316	316	316	316	316
	Red Bluff Lake/Reservoir	5,009	5,009	5,009	5,009	5,009	5,009
	Total Available Supplies	8,266	8,651	7,733	6,745	6,210	6,059
	Shortage/Surplus	-5,527	-4,973	-5,721	-6,539	-6,905	-6,888
	Recommended Water Management Strategies						
	Irrigation Conservation	0	785	1,570	1,570	1,570	1,570
	Total Recommended Water Management Strategies	0	785	1,570	1,570	1,570	1,570
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	-5,527	-4,188	-4,151	-4,969	-5,335	-5,318
Irrigation (Winkler)	**Projected Water Demand**	10,000	10,000	10,000	10,000	10,000	10,000
	Available Supplies						
	Pecos Valley Aquifer	10,000	10,000	10,000	10,000	10,000	10,000
	Total Available Supplies	10,000	10,000	10,000	10,000	10,000	10,000
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Irrigation Conservation	0	195	389	389	389	389
	Total Recommended Water Management Strategies	0	195	389	389	389	389
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	195	389	389	389	389

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Andrews)	**Projected Water Demand**	438	438	438	438	438	438
	Available Supplies						
	Pecos Valley Aquifer	64	64	64	64	64	64
	Dockum Aquifer	9	9	9	9	9	9
	Edwards-Trinity-Plateau Aquifer	9	9	9	9	9	9
	Livestock Local Supply	77	77	77	77	77	77
	Ogallala Aquifer	279	279	279	279	279	279
	Total Available Supplies	438	438	438	438	438	438
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Borden)	**Projected Water Demand**	281	281	281	281	281	281
	Available Supplies						
	Livestock Local Supply	251	251	251	251	251	251
	Ogallala Aquifer	30	30	30	30	30	30
	Total Available Supplies	281	281	281	281	281	281
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Brown)	**Projected Water Demand**	1,636	1,636	1,636	1,636	1,636	1,636
	Available Supplies						
	Livestock Local Supply	1,323	1,323	1,323	1,323	1,323	1,323
	Other Aquifer	40	40	40	40	40	40
	Trinity Aquifer	273	273	273	273	273	273
	Total Available Supplies	1,636	1,636	1,636	1,636	1,636	1,636
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Coke)	**Projected Water Demand**	593	593	593	593	593	593
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	184	184	184	184	184	184
	Livestock Local Supply	370	370	370	370	370	370
	Other Aquifer	39	39	39	39	39	39
	Total Available Supplies	593	593	593	593	593	593
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Coleman)	**Projected Water Demand**	1,259	1,259	1,259	1,259	1,259	1,259
	Available Supplies						
	Livestock Local Supply	1,081	1,081	1,081	1,081	1,081	1,081
	Other Aquifer	178	178	178	178	178	178
	Total Available Supplies	1,259	1,259	1,259	1,259	1,259	1,259
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Concho)	**Projected Water Demand**	775	775	775	775	775	775
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	289	289	289	289	289	289
	Livestock Local Supply	123	123	123	123	123	123
	Other Aquifer	363	363	363	363	363	363
	Total Available Supplies	775	775	775	775	775	775
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Crane)	**Projected Water Demand**	155	155	155	155	155	155
	Available Supplies						
	Pecos Valley Aquifer	148	148	148	148	148	148
	Dockum Aquifer	0	0	0	0	0	0
	Livestock Local Supply	7	7	7	7	7	7
	Total Available Supplies	155	155	155	155	155	155
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Crockett)	**Projected Water Demand**	997	997	997	997	997	997
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	866	866	866	866	866	866
	Livestock Local Supply	131	131	131	131	131	131
	Total Available Supplies	997	997	997	997	997	997
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Ector)	**Projected Water Demand**	293	293	293	293	293	293
	Available Supplies						
	Pecos Valley Aquifer	29	29	29	29	29	29
	Dockum Aquifer	22	22	22	22	22	22
	Edwards-Trinity-Plateau Aquifer	221	221	221	221	221	221
	Livestock Local Supply	11	11	11	11	11	11
	Ogallala Aquifer	10	10	10	10	10	10
	Total Available Supplies	293	293	293	293	293	293
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Glasscock)	**Projected Water Demand**	232	232	232	232	232	232
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	168	168	168	168	168	168
	Livestock Local Supply	40	40	40	40	40	40
	Ogallala Aquifer	24	24	24	24	24	24
	Total Available Supplies	232	232	232	232	232	232
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Howard)	**Projected Water Demand**	366	366	366	366	366	366
	Available Supplies						
	Dockum Aquifer	9	9	9	9	9	9
	Edwards-Trinity-Plateau Aquifer	70	70	70	70	70	70
	Livestock Local Supply	62	62	62	62	62	62
	Ogallala Aquifer	225	225	225	225	225	225
	Total Available Supplies	366	366	366	366	366	366
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Irion)	**Projected Water Demand**	460	460	460	460	460	460
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	386	386	386	386	386	386
	Livestock Local Supply	67	67	67	67	67	67
	Other Aquifer	7	7	7	7	7	7
	Total Available Supplies	460	460	460	460	460	460
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Kimble)	**Projected Water Demand**	668	668	668	668	668	668
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	579	579	579	579	579	579
	Livestock Local Supply	89	89	89	89	89	89
	Total Available Supplies	668	668	668	668	668	668
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Loving)	**Projected Water Demand**	70	70	70	70	70	70
	Available Supplies						
	Pecos Valley Aquifer	54	54	54	54	54	54
	Dockum Aquifer	6	6	6	6	6	6
	Livestock Local Supply	10	10	10	10	10	10
	Total Available Supplies	70	70	70	70	70	70
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (McCulloch)	**Projected Water Demand**	1,027	1,027	1,027	1,027	1,027	1,027
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	16	16	16	16	16	16
	Ellenburger-San Saba Aquifer	355	355	355	355	355	355
	Hickory Aquifer	373	373	373	373	373	373
	Livestock Local Supply	164	164	164	164	164	164
	Marble Falls Aquifer	15	15	15	15	15	15
	Other Aquifer	104	104	104	104	104	104
	Total Available Supplies	1,027	1,027	1,027	1,027	1,027	1,027
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Martin)	**Projected Water Demand**	273	273	273	273	273	273
	Available Supplies						
	Livestock Local Supply	67	67	67	67	67	67
	Ogallala Aquifer	206	206	206	206	206	206
	Total Available Supplies	273	273	273	273	273	273
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Mason)	**Projected Water Demand**	1,036	1,036	1,036	1,036	1,036	1,036
	Available Supplies						
	Ellenburger-San Saba Aquifer	102	102	102	102	102	102
	Hickory Aquifer	386	386	386	386	386	386
	Livestock Local Supply	451	451	451	451	451	451
	Marble Falls Aquifer	97	97	97	97	97	97
	Total Available Supplies	1,036	1,036	1,036	1,036	1,036	1,036
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Menard)	**Projected Water Demand**	642	642	642	642	642	642
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	516	516	516	516	516	516
	Ellenburger-San Saba Aquifer	6	6	6	6	6	6
	Livestock Local Supply	86	86	86	86	86	86
	Other Aquifer	34	34	34	34	34	34
	Total Available Supplies	642	642	642	642	642	642
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Midland)	**Projected Water Demand**	904	904	904	904	904	904
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	579	579	579	579	579	579
	Livestock Local Supply	117	117	117	117	117	117
	Ogallala Aquifer	208	208	208	208	208	208
	Total Available Supplies	904	904	904	904	904	904
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Mitchell)	**Projected Water Demand**	449	449	449	449	449	449
	Available Supplies						
	Dockum Aquifer	66	66	66	66	66	66
	Livestock Local Supply	381	381	381	381	381	381
	Other Aquifer	2	2	2	2	2	2
	Total Available Supplies	449	449	449	449	449	449
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Pecos)	**Projected Water Demand**	1,239	1,239	1,239	1,239	1,239	1,239
	Available Supplies						
	Pecos Valley Aquifer	269	269	269	269	269	269
	Edwards-Trinity-Plateau Aquifer	911	911	911	911	911	911
	Livestock Local Supply	52	52	52	52	52	52
	Other Aquifer	4	4	4	4	4	4
	Rustler Aquifer	4	4	4	4	4	4
	Total Available Supplies	1,240	1,240	1,240	1,240	1,240	1,240
	Shortage/Surplus	1	1	1	1	1	1
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	1	1	1	1	1	1
Livestock (Reagan)	**Projected Water Demand**	272	272	272	272	272	272
	Available Supplies						
	Dockum Aquifer	10	10	10	10	10	10
	Edwards-Trinity-Plateau Aquifer	228	228	228	228	228	228
	Livestock Local Supply	41	41	41	41	41	41
	Total Available Supplies	279	279	279	279	279	279
	Shortage/Surplus	7	7	7	7	7	7
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	7	7	7	7	7	7

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Reeves)	**Projected Water Demand**	2,283	2,283	2,283	2,283	2,283	2,283
	Available Supplies						
	Pecos Valley Aquifer	1,211	1,211	1,211	1,211	1,211	1,211
	Dockum Aquifer	130	130	130	130	130	130
	Edwards-Trinity-Plateau Aquifer	773	773	773	773	773	773
	Livestock Local Supply	66	66	66	66	66	66
	Rustler Aquifer	103	103	103	103	103	103
	Total Available Supplies	2,283	2,283	2,283	2,283	2,283	2,283
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Runnels)	**Projected Water Demand**	1,530	1,530	1,530	1,530	1,530	1,530
	Available Supplies						
	Livestock Local Supply	1,148	1,148	1,148	1,148	1,148	1,148
	Other Aquifer	382	382	382	382	382	382
	Total Available Supplies	1,530	1,530	1,530	1,530	1,530	1,530
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Schleicher)	**Projected Water Demand**	787	787	787	787	787	787
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	675	675	675	675	675	675
	Livestock Local Supply	112	112	112	112	112	112
	Total Available Supplies	787	787	787	787	787	787
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Scurry)	**Projected Water Demand**	629	629	629	629	629	629
	Available Supplies						
	Dockum Aquifer	67	67	67	67	67	67
	Livestock Local Supply	534	534	534	534	534	534
	Other Aquifer	28	28	28	28	28	28
	Total Available Supplies	629	629	629	629	629	629
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Sterling)	**Projected Water Demand**	503	503	503	503	503	503
	Available Supplies						
	EDWARDS-TRINITY-PLATEAU AQUIFER	352	352	352	352	352	352
	LIVESTOCK LOCAL SUPPLY	74	74	74	74	74	74
	OTHER AQUIFER	77	77	77	77	77	77
	Total Available Supplies	503	503	503	503	503	503
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Sutton)	**Projected Water Demand**	796	796	796	796	796	796
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	693	693	693	693	693	693
	Livestock Local Supply	103	103	103	103	103	103
	Total Available Supplies	796	796	796	796	796	796
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Tom Green)	**Projected Water Demand**	1,978	1,978	1,978	1,978	1,978	1,978
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	273	273	273	273	273	273
	Lipan Aquifer	31	31	31	31	31	31
	Livestock Local Supply	1,644	1,644	1,644	1,644	1,644	1,644
	Other Aquifer	30	30	30	30	30	30
	Total Available Supplies	1,978	1,978	1,978	1,978	1,978	1,978
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Upton)	**Projected Water Demand**	212	212	212	212	212	212
	Available Supplies						
	Dockum Aquifer	20	20	20	20	20	20
	Edwards-Trinity-Plateau Aquifer	156	156	156	156	156	156
	Livestock Local Supply	36	36	36	36	36	36
	Total Available Supplies	212	212	212	212	212	212
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Livestock (Ward)	**Projected Water Demand**	126	126	126	126	126	126
	Available Supplies						
	Pecos Valley Aquifer	116	116	116	116	116	116
	Dockum Aquifer	5	5	5	5	5	5
	Livestock Local Supply	5	5	5	5	5	5
	Total Available Supplies	126	126	126	126	126	126
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Livestock (Winkler)	**Projected Water Demand**	151	151	151	151	151	151
	Available Supplies						
	Pecos Valley Aquifer	140	140	140	140	140	140
	Dockum Aquifer	22	22	22	22	22	22
	Livestock Local Supply	7	7	7	7	7	7
	Total Available Supplies	169	169	169	169	169	169
	Shortage/Surplus	18	18	18	18	18	18
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	18	18	18	18	18	18

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Manufacturing (Brown)	**Projected Water Demand**	577	636	686	734	775	837
	Available Supplies						
	Brownwood Lake/Reservoir	577	636	686	734	775	837
	Other Aquifer	0	0	0	0	0	0
	Total Available Supplies	577	636	686	734	775	837
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Manufacturing (Coleman)	**Projected Water Demand**	6	6	6	6	6	6
	Available Supplies						
	Coleman Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-6	-6	-6	-6	-6	-6
	Recommended Water Management Strategies						
	Subordination - Coleman Lake/Reservoir	6	6	6	6	6	6
	Total Recommended Water Management Strategies	6	6	6	6	6	6
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Manufacturing (Ector)	**Projected Water Demand**	2,759	2,963	3,125	3,267	3,376	3,491
	Available Supplies						
	Colorado River MWDLake/Reservoir System	877	797	1,199	902	871	813
	Direct Reuse	1,500	1,650	1,800	1,950	2,100	2,250
	Pecos Valley Aquifer	16	17	18	19	19	20
	Total Available Supplies	2,393	2,464	3,017	2,871	2,990	3,083
	Shortage/Surplus	-366	-499	-108	-396	-386	-408
	Recommended Water Management Strategies						
	Reuse	0	350	105	350	300	250
	Subordination - Colorado River MWDLake/Reservoir System	366	149	3	46	86	158
	Total Recommended Water Management Strategies	366	499	108	396	386	408
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Manufacturing (Howard)	**Projected Water Demand**	1,648	1,753	1,832	1,910	1,976	2,099
	Available Supplies						
	Colorado River MWDLake/Reservoir System	722	703	1,094	1,090	1,103	1,130
	Edwards-Trinity-Plateau Aquifer	288	288	288	288	288	288
	Ogallala Aquifer	461	461	461	461	461	461
	Total Available Supplies	1,471	1,452	1,843	1,839	1,852	1,879
	Shortage/Surplus	-177	-301	11	-71	-124	-220
	Recommended Water Management Strategies						
	Subordination - Colorado River MWDLake/Reservoir System	267	349	5	71	124	220
	Total Recommended Water Management Strategies	267	349	5	71	124	220
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	90	48	16	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Manufacturing (Kimble)	**Projected Water Demand**	702	767	823	880	932	1,002
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	3	3	3	3	3	3
	Llano River Combined Run-Of-River Manufacturing	0	0	0	0	0	0
	Total Available Supplies	3	3	3	3	3	3
	Shortage/Surplus	-699	-764	-820	-877	-929	-999
	Recommended Water Management Strategies						
	Subordination - Llano River	1,000	1,000	1,000	1,000	1,000	1,000
	Total Recommended Water Management Strategies	1,000	1,000	1,000	1,000	1,000	1,000
	Total Supply Less Projected Demand	301	236	180	123	71	1
	Alternative Strategies						
	New Wells - Edwards-Triniry Plateau Aquifer	1,000	1,000	1,000	1,000	1,000	1,000
	Total Alternative Strategies	1,000	1,000	1,000	1,000	1,000	1,000
Manufacturing (McCulloch)	**Projected Water Demand**	844	929	1,004	1,075	1,137	1,233
	Available Supplies						
	Brady Creek Lake/Reservoir	0	0	0	0	0	0
	Hickory Aquifer	844	929	1,004	1,075	1,137	1,233
	Total Available Supplies	844	929	1,004	1,075	1,137	1,233
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Manufacturing (Martin)	**Projected Water Demand**	39	41	42	43	44	47
	Available Supplies						
	Ogallala Aquifer	39	41	42	43	44	47
	Total Available Supplies	39	41	42	43	44	47
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Manufacturing (Midland)	**Projected Water Demand**	164	182	198	213	226	245
	Available Supplies						
	Colorado River MWDLake/Reservoir System	0	0	0	0	0	0
	Ogallala Aquifer	136	151	164	176	187	203
	OH Ivie Lake/Reservoir Non-System Portion	28	31	34	37	39	42
	Total Available Supplies	164	182	198	213	226	245
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Manufacturing (Pecos)	**Projected Water Demand**	2	2	2	2	2	2
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	3	3	3	3	3	3
	Total Available Supplies	3	3	3	3	3	3
	Shortage/Surplus	1	1	1	1	1	1
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	1	1	1	1	1	1
Manufacturing (Reeves)	**Projected Water Demand**	720	741	756	770	781	825
	Available Supplies						
	Pecos Valley Aquifer	668	689	704	718	729	773
	Dockum Aquifer	52	52	52	52	52	52
	Total Available Supplies	720	741	756	770	781	825
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Manufacturing (Runnels)	**Projected Water Demand**	63	70	76	82	87	94
	Available Supplies						
	Ballinger/Moonen Lake/Reservoir	0	0	0	0	0	0
	Winters Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-63	-70	-76	-82	-87	-94
	Recommended Water Management Strategies						
	New/Renew Water Supply - Sales from Ballinger	9	10	11	12	13	15
	Subordination - CRMWD Lake/Reservoir System	54	60	65	70	74	79
	Total Recommended Water Management Strategies	63	70	76	82	87	94
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Manufacturing (Tom Green)	**Projected Water Demand**	2,226	2,498	2,737	2,971	3,175	3,425
	Available Supplies						
	Nasworthy Lake/Reservoir San Angelo System	0	0	0	0	0	0
	OC Fisher Lake/Reservoir San Angelo System	0	0	0	0	0	0
	Twin Buttes Lake/Reservoir San Angelo System	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-2,226	-2,498	-2,737	-2,971	-3,175	-3,425
	Recommended Water Management Strategies						
	Subordination - Nasworthy Lake/Reservoir San Angelo System	2,226	2,498	2,737	2,971	3,175	3,425
	Total Recommended Water Management Strategies	2,226	2,498	2,737	2,971	3,175	3,425
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Manufacturing (Ward)	**Projected Water Demand**	7	7	7	7	7	7
	Available Supplies						
	Pecos Valley Aquifer	7	7	7	7	7	7
	Total Available Supplies	7	7	7	7	7	7
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Andrews)	**Projected Water Demand**	1,908	1,957	1,976	1,994	2,012	2,036
	Available Supplies						
	Dockum Aquifer	13	13	13	13	13	13
	Ogallala Aquifer	1,832	1,880	1,898	1,916	1,933	1,956
	Pecos Valley Aquifer	120	120	120	120	120	120
	Total Available Supplies	1,965	2,013	2,031	2,049	2,066	2,089
	Shortage/Surplus	57	56	55	55	54	53
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	57	56	55	55	54	53

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Borden)	**Projected Water Demand**	690	658	646	635	625	612
	Available Supplies						
	Other Aquifer	1,014	1,014	1,014	1,014	1,014	1,014
	Total Available Supplies	1,014	1,014	1,014	1,014	1,014	1,014
	Shortage/Surplus	324	356	368	379	389	402
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	324	356	368	379	389	402
Mining (Brown)	**Projected Water Demand**	2,487	2,504	2,510	2,516	2,522	2,530
	Available Supplies						
	Other Aquifer	31	31	31	31	31	31
	Other Local Supply	2,274	2,274	2,274	2,274	2,274	2,274
	Trinity Aquifer	182	199	205	211	217	225
	Total Available Supplies	2,487	2,504	2,510	2,516	2,522	2,530
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Coke)	**Projected Water Demand**	488	528	550	572	593	614
	Available Supplies						
	Colorado River MWD Lake/Reservoir System	232	239	378	378	380	372
	Other Aquifer	170	170	170	170	170	170
	Total Available Supplies	402	409	548	548	550	542
	Shortage/Surplus	-86	-119	-2	-24	-43	-72
	Recommended Water Management Strategies						
	Subordination - CRMWD Lake/Reservoir System	86	119	2	24	43	72
	Total Recommended Water Management Strategies	86	119	2	24	43	72
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Coleman)	**Projected Water Demand**	18	19	19	19	19	19
	Available Supplies						
	Coleman Lake/Reservoir	0	0	0	0	0	0
	Colorado River Combined Run-Of-River Central Colorado River Authority	0	0	0	0	0	0
	Other Aquifer	1	1	1	1	1	1
	Total Available Supplies	1	1	1	1	1	1
	Shortage/Surplus	-17	-18	-18	-18	-18	-18
	Recommended Water Management Strategies						
	Subordination - Coleman Lake/Reservoir	17	18	18	18	18	18
	Total Recommended Water Management Strategies	17	18	18	18	18	18
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Crane)	**Projected Water Demand**	2,221	2,216	2,214	2,212	2,210	2,208
	Available Supplies						
	Pecos Valley Aquifer	710	705	703	701	699	697
	Other Aquifer	81	81	81	81	81	81
	Other Local Supply	1,430	1,430	1,430	1,430	1,430	1,430
	Total Available Supplies	2,221	2,216	2,214	2,212	2,210	2,208
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Crockett)	**Projected Water Demand**	402	421	431	441	450	459
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	402	421	431	441	450	459
	Total Available Supplies	402	421	431	441	450	459
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Ector)	**Projected Water Demand**	9,888	10,519	10,911	11,292	11,666	11,970
	Available Supplies						
	Capitan Reef Aquifer	5,259	6,784	7,858	8,637	9,132	9,442
	Dockum Aquifer	348	348	348	348	348	348
	Edwards-Trinity-Plateau Aquifer	4,466	3,560	2,871	2,466	2,338	2,326
	Ogallala Aquifer	0	0	0	0	0	0
	Pecos Valley Aquifer	1	1	1	1	1	1
	Total Available Supplies	10,074	10,693	11,078	11,452	11,819	12,117
	Shortage/Surplus	186	174	167	160	153	147
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	186	174	167	160	153	147
Mining (Glasscock)	**Projected Water Demand**	5	5	5	5	5	5
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	5	5	5	5	5	5
	Total Available Supplies	5	5	5	5	5	5
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Howard)	**Projected Water Demand**	1,783	1,883	1,924	1,963	2,001	2,052
	Available Supplies						
	Beals Creek Run-Of-River Crmwd Diverted Water	0	0	0	0	0	0
	Colorado River Mwd Lake/Reservoir System	1,076	1,053	1,608	1,555	1,523	1,460
	Dockum Aquifer	106	106	106	106	106	106
	Edwards-Trinity-Plateau Aquifer	82	82	82	82	82	82
	Ogallala Aquifer	119	119	119	119	119	119
	Total Available Supplies	1,383	1,360	1,915	1,862	1,830	1,767
	Shortage/Surplus	-400	-523	-9	-101	-171	-285
	Recommended Water Management Strategies						
	Subordination - CRMWD Lake/Reservoir System	400	523	9	101	171	285
	Total Recommended Water Management Strategies	400	523	9	101	171	285
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Irion)	**Projected Water Demand**	122	122	122	122	122	122
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	122	122	122	122	122	122
	Total Available Supplies	122	122	122	122	122	122
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Kimble)	**Projected Water Demand**	71	67	65	63	61	60
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	91	91	91	91	91	91
	Llano River Combined Run-Of-River Mining	13	13	13	13	13	13
	Total Available Supplies	104	104	104	104	104	104
	Shortage/Surplus	33	37	39	41	43	44
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	33	37	39	41	43	44
Mining (Loving)	**Projected Water Demand**	2	2	2	2	2	2
	Available Supplies						
	Dockum Aquifer	3	3	3	3	3	3
	Total Available Supplies	3	3	3	3	3	3
	Shortage/Surplus	1	1	1	1	1	1
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	1	1	1	1	1	1

* All Demand and Supply values are in
Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (McCulloch)	**Projected Water Demand**	154	159	162	165	168	171
	Available Supplies						
	Hickory Aquifer	154	159	162	165	168	171
	Total Available Supplies	154	159	162	165	168	171
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Martin)	**Projected Water Demand**	674	645	634	624	615	603
	Available Supplies						
	Ogallala Aquifer	705	705	705	705	705	705
	Total Available Supplies	705	705	705	705	705	705
	Shortage/Surplus	31	60	71	81	90	102
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	31	60	71	81	90	102

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Mason)	**Projected Water Demand**	6	6	6	6	6	6
	Available Supplies						
	Hickory Aquifer	6	6	6	6	6	6
	Total Available Supplies	6	6	6	6	6	6
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Midland)	**Projected Water Demand**	677	778	846	915	986	1,046
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	677	778	846	915	986	1,046
	Total Available Supplies	677	778	846	915	986	1,046
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Mitchell)	**Projected Water Demand**	115	110	108	107	106	104
	Available Supplies						
	Colorado River Run-Of-River Crmwd Diverted Water	0	0	0	0	0	0
	Dockum Aquifer	141	141	141	141	141	141
	Total Available Supplies	141	141	141	141	141	141
	Shortage/Surplus	26	31	33	34	35	37
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	26	31	33	34	35	37
Mining (Pecos)	**Projected Water Demand**	159	158	158	158	158	158
	Available Supplies						
	Pecos Valley Aquifer	37	37	37	37	37	37
	Edwards-Trinity-Plateau Aquifer	249	249	249	249	249	249
	Total Available Supplies	286	286	286	286	286	286
	Shortage/Surplus	127	128	128	128	128	128
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	127	128	128	128	128	128

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Reagan)	**Projected Water Demand**	2,036	2,165	2,235	2,303	2,370	2,436
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	2,036	2,165	2,235	2,303	2,370	2,436
	Total Available Supplies	2,036	2,165	2,235	2,303	2,370	2,436
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Reeves)	**Projected Water Demand**	182	177	175	173	172	170
	Available Supplies						
	Pecos Valley Aquifer	182	177	175	173	172	170
	Total Available Supplies	182	177	175	173	172	170
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Runnels)	**Projected Water Demand**	44	45	45	45	45	45
	Available Supplies						
	Other Aquifer	44	45	45	45	45	45
	Total Available Supplies	44	45	45	45	45	45
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Schleicher)	**Projected Water Demand**	125	134	139	144	149	154
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	150	150	150	150	150	154
	San Saba River Run-Of-River Mining	0	0	0	0	0	0
	Total Available Supplies	150	150	150	150	150	154
	Shortage/Surplus	25	16	11	6	1	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	25	16	11	6	1	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Scurry)	**Projected Water Demand**	3,107	3,327	3,413	3,496	3,577	3,693
	Available Supplies						
	Colorado River Run-Of-River Crmwd Diverted Water	0	0	0	0	0	0
	Dockum Aquifer	3,875	3,875	3,875	3,887	3,910	3,942
	Other Aquifer	5	5	5	5	5	5
	Total Available Supplies	3,880	3,880	3,880	3,892	3,915	3,947
	Shortage/Surplus	773	553	467	396	338	254
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	773	553	467	396	338	254
Mining (Sterling)	**Projected Water Demand**	590	600	605	610	615	620
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	590	600	605	610	615	620
	Total Available Supplies	590	600	605	610	615	620
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Sutton)	**Projected Water Demand**	80	82	83	84	85	86
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	80	82	83	84	85	86
	Total Available Supplies	80	82	83	84	85	86
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Tom Green)	**Projected Water Demand**	73	80	85	90	95	99
	Available Supplies						
	Lipan Aquifer	45	45	45	45	45	45
	Other Aquifer	105	105	105	105	105	105
	Total Available Supplies	150	150	150	150	150	150
	Shortage/Surplus	77	70	65	60	55	51
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	77	70	65	60	55	51

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Upton)	**Projected Water Demand**	2,662	2,680	2,687	2,694	2,700	2,708
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	2,662	2,680	2,687	2,694	2,700	2,708
	Total Available Supplies	2,662	2,680	2,687	2,694	2,700	2,708
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Mining (Ward)	**Projected Water Demand**	153	155	156	157	158	159
	Available Supplies						
	Pecos Valley Aquifer	153	155	156	157	158	159
	Total Available Supplies	153	155	156	157	158	159
	Shortage/Surplus	0	0	0	0	0	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Mining (Winkler)	**Projected Water Demand**	928	895	883	872	861	847
	Available Supplies						
	Pecos Valley Aquifer	109	109	109	109	109	109
	Dockum Aquifer	1,769	1,769	1,769	1,769	1,769	1,769
	Total Available Supplies	1,878	1,878	1,878	1,878	1,878	1,878
	Shortage/Surplus	950	983	995	1,006	1,017	1,031
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	950	983	995	1,006	1,017	1,031
Steam Electric Power (Coke)	**Projected Water Demand**	310	247	289	339	401	477
	Available Supplies						
	Oak Creek Lake/Reservoir	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-310	-247	-289	-339	-401	-477
	Recommended Water Management Strategies						
	Subordination - Oak Creek Lake/Reservoir	310	247	289	339	401	477
	Total Recommended Water Management Strategies	310	247	289	339	401	477
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Steam Electric Power (Crockett)	**Projected Water Demand**	973	776	907	1,067	1,262	1,500
	Available Supplies						
	Edwards-Trinity-Plateau Aquifer	1,500	1,500	1,500	1,500	1,500	1,500
	Total Available Supplies	1,500	1,500	1,500	1,500	1,500	1,500
	Shortage/Surplus	527	724	593	433	238	0
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	527	724	593	433	238	0
Steam Electric Power (Ector)	**Projected Water Demand**	6,375	9,125	10,668	12,549	14,842	17,637
	Available Supplies						
	Ogallala Aquifer	5,156	5,156	5,156	5,156	5,156	5,156
	Total Available Supplies	5,156	5,156	5,156	5,156	5,156	5,156
	Shortage/Surplus	-1,219	-3,969	-5,512	-7,393	-9,686	-12,481
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Total Supply Less Projected Demand	-1,219	-3,969	-5,512	-7,393	-9,686	-12,481
	Alternative Strategies						
	Alternative Generation Technology	0	2,750	4,293	6,174	8,467	11,262
	Total Alternative Strategies	0	2,750	4,293	6,174	8,467	11,262

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Steam Electric Power (Mitchell)	**Projected Water Demand**	5,023	4,847	4,670	4,493	4,317	4,140
	Available Supplies						
	Colorado City-Champion Lake/Reservoir System	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-5,023	-4,847	-4,670	-4,493	-4,317	-4,140
	Recommended Water Management Strategies						
	Subordination - Colorado City-Champion Lake/Reservoir System	5,023	4,847	4,670	4,493	4,317	4,140
	Total Recommended Water Management Strategies	5,023	4,847	4,670	4,493	4,317	4,140
	Alternative Strategies						
	Total Alternative Strategies						
	Total Supply Less Projected Demand	0	0	0	0	0	0
Steam Electric Power (Tom Green)	**Projected Water Demand**	543	777	909	1,069	1,264	1,502
	Available Supplies						
	Nasworthy Lake/Reservoir San Angelo System	0	0	0	0	0	0
	Total Available Supplies	0	0	0	0	0	0
	Shortage/Surplus	-543	-777	-909	-1,069	-1,264	-1,502
	Recommended Water Management Strategies						
	Subordination Nasworthy Lake	1,021	1,021	1,021	1,021	1,021	1,021
	Total Recommended Water Management Strategies	1,021	1,021	1,021	1,021	1,021	1,021
	Total Supply Less Projected Demand	478	244	112	-48	-243	-481
	Alternative Strategies						
	Alternative Generation Technology	0	0	0	48	243	481
	Total Alternative Strategies	0	0	0	48	243	481

* All Demand and Supply values are in Acre-Feet

WUG	Description	2010	2020	2030	2040	2050	2060
Steam Electric Power (Ward)	**Projected Water Demand**	4,914	4,223	4,937	5,807	6,868	8,162
	Available Supplies						
	Pecos Valley Aquifer	4,914	4,223	4,937	5,807	6,189	6,189
	Total Available Supplies	4,914	4,223	4,937	5,807	6,189	6,189
	Shortage/Surplus	0	0	0	0	-679	-1,973
	Recommended Water Management Strategies						
	Total Recommended Water Management Strategies	0	0	0	0	0	0
	Total Supply Less Projected Demand	0	0	0	0	-679	-1,973
	Alternative Strategies						
	Alternative Generation Technology	0	0	0	0	679	1,973
	Total Alternative Strategies						

* All Demand and Supply values are in Acre-Feet

Appendix 4I
Lists of Recommended and Alternative Strategies

List of Potentially Feasible Strategies

Advanced Treatment
Alternative Generation Technology
Aquifer Storage and Recovery
Bottled Water Program
Brush Control
Desalination
Develop Pecos Valley Aquifer Supplies
Develop Edwards Trinity Aquifer Supplies
Develop Ellenburger Aquifer Supplies
Develop Hickory Aquifer Supplies
Develop Other Aquifer Supplies
Irrigation Conservation
Municipal Conservation
New Reservoir Intake
New WTP and Storage Facilities
New Renew Water Supply
New Renew Water Supply - New Infrastructure
Off Channel Reservoir
Rehabilitation of Pipeline
Replacement Well
Reuse
Subordination
Water Marketing (Mesa)
Weather Modification

Summary of Recommended Strategies

Entity	County Used	Basin Used	Total Capital Cost	1st Decade Unit Cost	Supply (Ac-ft/yr) 2010	2020	2030	2040	2050	2060	2060 Unit Cost
Bottle Water Program											
County-Other	McCulloch	Colorado	$0	$28,780	0.00	0.14	0.14	0.14	0.14	0.14	$28,780
Richland SUD	McCulloch	Colorado	$3,000	$28,780	0.00	0.35	0.35	0.35	0.35	0.35	$28,780
Total			**$3,000**	**$28,780**	**0.00**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**$28,780**
Brush Control											
City of San Angelo	Tom Green	Colorado	$23,020,000	$0	8,362	8,362	8,362	8,362	8,362	8,362	$0
Total			**$23,020,000**	**$0**	**8,362**	**8,362**	**8,362**	**8,362**	**8,362**	**8,362**	**$0**
Municipal Conservation											
City of Andrews	Andrews	Colorado	$0	$628	84	191	240	265	287	310	$185
City of Bronte	Coke	Colorado	$0	$334	16	45	48	48	50	51	$188
City of Robert Lee	Coke	Colorado	$0	$356	16	40	44	45	46	48	$199
City of Coleman	Coleman	Colorado	$0	$192	33	75	90	95	101	107	$101
City of Odessa	Ector	Colorado	$0	$869	540	1,168	1,488	1,657	1,854	2,074	$238
City of Big Spring	Howard	Colorado	$0	$540	241	603	676	698	725	754	$153
City of Brady	McCulloch	Colorado	$0	$351	77	192	214	222	230	239	$132
City of Menard	Menard	Colorado	$0	$218	10	24	28	30	32	33	$211
City of Midland	Midland	Colorado	$0	$448	1,344	2,616	3,061	3,261	3,457	3,663	$132
City of Odessa	Midland	Colorado	$0	$869	11	32	48	58	66	75	$238
City of Ballinger	Runnels	Colorado	$0	$665	33	88	107	119	131	144	$208
City of Winters	Runnels	Colorado	$0	$705	21	55	63	67	71	76	$248
City of Snyder	Scurry	Colorado	$0	$200	70	154	191	205	220	234	$81
City of San Angelo	Tom Green	Colorado	$0	$328	701	1,705	2,009	2,127	2,255	2,371	$110
Total			**$0**	**$498**	**3,197**	**6,988**	**8,307**	**8,897**	**9,525**	**10,179**	**$154**
Irrigation Conservation											
Irrigation	Andrews	Colorado	$4,822,904	$64	0	2,727	5,455	5,455	5,455	5,455	$64
Irrigation	Borden	Brazos	$196,062	$76	0	94	189	189	189	189	$75
Irrigation	Borden	Colorado	$282,138	$75	0	136	271	271	271	271	$76
Irrigation	Brown	Colorado	$54,917	$21	0	93	185	185	185	185	$22
Irrigation	Concho	Colorado	$1,895,367	$92	0	748	1,496	1,496	1,496	1,496	$92
Irrigation	Ector	Colorado	$301,633	$45	0	243	485	485	485	485	$45
Irrigation	Ector	Rio Grande	$3,047	$55	0	2	5	5	5	5	$44
Irrigation	Glasscock	Colorado	$11,422,560	$114	0	3,631	7,262	7,262	7,262	7,262	$114
Irrigation	Howard	Colorado	$647,652	$72	0	327	653	653	653	653	$72
Irrigation	Irion	Colorado	$21,137	$21	0	37	73	73	73	73	$21
Irrigation	Kimble	Colorado	$141,658	$70	0	74	147	147	147	147	$70
Irrigation	Martin	Colorado	$4,001,621	$83	0	1,751	3,502	3,502	3,502	3,502	$83
Irrigation	Mason	Colorado	$713,460	$35	0	746	1,491	1,491	1,491	1,491	$35
Irrigation	McCulloch	Colorado	$166,844	$31	0	197	394	394	394	394	$31
Irrigation	Menard	Colorado	$16,029	$25	0	23	46	46	46	46	$25

Summary of Recommended Strategies

Entity	County Used	Basin Used	Total Capital Cost	1st Decade Unit Cost	Supply (Ac-ft/yr) 2010	2020	2030	2040	2050	2060	2060 Unit Cost
Irrigation	Midland	Colorado	$3,169,471	$64	0	1,800	3,600	3,600	3,600	3,600	$64
Irrigation	Mitchell	Colorado	$2,548,056	$107	0	865	1,729	1,729	1,729	1,729	$107
Irrigation	Pecos	Rio Grande	$8,329,226	$48	0	6,300	12,600	12,600	12,600	12,600	$48
Irrigation	Reagan	Colorado	$6,275,976	$116	0	1,968	3,936	3,936	3,936	3,936	$116
Irrigation	Reeves	Rio Grande	$8,253,318	$51	0	5,824	11,648	11,648	11,648	11,648	$51
Irrigation	Schleicher	Colorado	$146,895	$60	0	89	178	178	178	178	$60
Irrigation	Schleicher	Rio Grande	$30,087	$61	0	18	36	36	36	36	$61
Irrigation	Scurry	Brazos	$361,342	$82	0	160	320	320	320	320	$82
Irrigation	Scurry	Colorado	$929,166	$82	0	411	823	823	823	823	$82
Irrigation	Sterling	Colorado	$25,860	$21	0	45	89	89	89	89	$21
Irrigation	Sutton	Colorado	$60,431	$50	0	44	88	88	88	88	$50
Irrigation	Sutton	Rio Grande	$134,509	$50	0	98	196	196	196	196	$50
Irrigation	Tom Green	Colorado	$10,120,488	$64	0	5,774	11,548	11,548	11,548	11,548	$64
Irrigation	Upton	Colorado	$2,885,269	$115	0	911	1,822	1,822	1,822	1,822	$115
Irrigation	Upton	Rio Grande	$58,883	$238	0	9	18	18	18	18	$238
Irrigation	Ward	Rio Grande	$437,760	$20	0	785	1,570	1,570	1,570	1,570	$20
Irrigation	Winkler	Rio Grande	$196,902	$37	0	195	389	389	389	389	$37
Total			**$68,650,668**	**$69**	**0**	**36,125**	**72,244**	**72,244**	**72,244**	**72,244**	**$69**
Desalination											
City of Andrews	Andrews	Colorado	$6,717,000	$1,163	0	950	950	950	950	950	$546
CRMWD			$131,603,990	$0	0	0	0	9,500	9,500	9,500	$251
San Angelo			$75,440,000	$0	0	0	0	5,600	5,600	5,600	$473
Total			**$213,760,990**	**$1,163**	**0**	**950**	**950**	**16,050**	**16,050**	**16,050**	**$346**
Infrastructure Improvements											
City of Bronte	Coke	Colorado	$1,364,900	$0	0	0	0	0	0	0	$0
City of Robert Lee	Coke	Colorado	$2,436,000	$0	0	0	0	0	0	0	$0
Richland SUD	McCulloch	Colorado	$5,148,000	$0	0	200	200	200	200	200	$370
San Angelo	Tom Green	Colorado	$6,157,000	$315	2,274	2,261	2,247	2,233	2,220	2,206	$78
Total			**$15,105,900**	**$315**	**2,274**	**2,461**	**2,447**	**2,433**	**2,420**	**2,406**	**$448**
New Groundwater											
Colorado City	Mitchell	Colorado	$17,855,000	$0	0	2,200	2,200	2,200	2,200	2,200	$445
City of Menard	Menard	Colorado	$1,684,000	$1,664	140	139	140	140	141	141	$610
County-Other	Menard	Colorado	$0	$0	20	21	20	20	19	19	$0
City of Midland	Midland	Colorado	$168,507,000	$0	0	0	13,600	13,600	13,600	13,600	$342
CRMWD	Multiple	Colorado	$76,268,000	$0	0	0	6,000	6,000	6,000	6,000	$251
San Angelo	Tom Green	Colorado	$173,307,000	$0	0	6,700	10,000	12,000	12,000	12,000	$1,670
Total			**$437,621,000**	**$1,456**	**160**	**6,860**	**29,760**	**31,760**	**31,760**	**31,760**	**$858**
Advanced treatment											
City of Eden	Concho	Colorado	$2,582,000	NA	0	0	0	0	0	0	NA

Summary of Recommended Strategies

Entity	County Used	Basin Used	Total Capital Cost	1st Decade Unit Cost	Supply (Ac-ft/yr) 2010	2020	2030	2040	2050	2060	2060 Unit Cost
Reuse											
City of Odessa	Ector	Colorado	$0	$0	0	3,943	4,168	3,912	3,958	4,006	$0
Manufacturing	Ector	Colorado	$0	$0	0	350	105	350	300	250	$0
City of Big Spring	Howard	Colorado	$0	$0	0	1,855	1,855	1,855	1,855	1,855	$0
City of Midland	Midland	Colorado	$0	$0	0	5,389	5,389	5,389	5,389	5,389	$0
City of Odessa	Midland	Colorado	$0	$0	0	117	137	148	152	154	$0
City of Winters	Runnels	Colorado	$2,158,000	$0	0	0	0	110	110	110	$636
City of Snyder	Scurry	Colorado	$0	$0	0	726	726	726	726	726	$0
CRMWD	Multiple	Colorado	$128,748,000	$1,072	0	see customers for supply amounts.					$383
Total			**$130,906,000**	**$1,072**	**0**	**12,380**	**12,380**	**12,490**	**12,490**	**12,490**	**$383**
Subordination											
City of Bronte	Coke	Colorado	$0	$0	129	129	129	129	129	129	$0
City of Robert Lee	Coke	Colorado	$0	$0	95	115	2	21	34	55	$0
County-Other	Coke	Colorado	$0	$0	28	32	0	6	9	15	$0
Mining	Coke	Colorado	$0	$0	86	119	2	24	43	72	$0
Steam Electric Power	Coke	Colorado	$0	$0	310	247	289	339	401	477	$0
City of Coleman	Coleman	Colorado	$0	$0	1,650	1,651	1,647	1,645	1,639	1,631	$0
City of Coleman	Coleman	Colorado	$0	$0	380	380	380	380	380	380	$0
Coleman County WSC	Coleman	Colorado	$0	$0	126	114	109	103	101	99	$0
County-Other	Coleman	Colorado	$0	$0	20	19	19	18	18	18	$0
Irrigation	Coleman	Colorado	$0	$0	1,348	1,348	1,348	1,348	1,348	1,348	$0
Manufacturing	Coleman	Colorado	$0	$0	6	6	6	6	6	6	$0
Mining	Coleman	Colorado	$0	$0	17	18	18	18	18	18	$0
County-Other	Concho	Colorado	$0	$0	25	25	25	25	25	25	$0
Millersview-Doole WSC	Concho	Colorado	$0	$0	34	42	1	7	0	0	$0
Ector County UD	Ector	Colorado	$0	$0	400	613	11	151	272	478	$0
Manufacturing	Ector	Colorado	$0	$0	366	149	3	46	86	158	$0
City of Odessa	Ector	Colorado	$0	$0	4,019	5,611	59	1,085	1,913	3,314	$0
City of Big Spring	Howard	Colorado	$0	$0	1,345	1,672	24	299	491	796	$0
City of Coahoma	Howard	Colorado	$0	$0	49	61	1	11	18	29	$0
Manufacturing	Howard	Colorado	$0	$0	267	349	5	71	124	220	$0
Mining	Howard	Colorado	$0	$0	400	523	9	101	171	285	$0
City of Junction	Kimble	Colorado	$0	$0	991	991	991	991	991	991	$0
County-Other	Kimble	Colorado	$0	$0	9	9	9	9	9	9	$0
Manufacturing	Kimble	Colorado	$0	$0	1,000	1,000	1,000	1,000	1,000	1,000	$0
City of Brady	McCulloch	Colorado	$0	$0	2,170	2,170	2,170	2,170	2,170	2,170	$0
Millersview-Doole WSC	McCulloch	Colorado	$0	$0	67	81	1	14	0	0	$0
City of Midland	Midland	Colorado	$0	$0	4,488	6,152	211	324	438	553	$0
City of Midland	Midland	Colorado	$0	$0	17	(97)	(211)	(324)	(438)	(553)	$0
City of Odessa	Midland	Colorado	$0	$0	186	176	28	66	97	150	$0
Steam Electric Power	Mitchell	Colorado	$0	$0	5,023	4,847	4,670	4,493	4,317	4,140	$0
City of Ballinger	Runnels	Colorado	$0	$0	917	930	920	910	900	890	$0
City of Ballinger	Runnels	Colorado	$0	$0	141	169	68	115	0	0	$0
Coleman County WSC	Runnels	Colorado	$0	$0	18	30	39	48	56	66	$0
County-Other	Runnels	Colorado	$0	$0	23	0	0	0	0	0	$0

Summary of Recommended Strategies

Entity	County Used	Basin Used	Total Capital Cost	1st Decade Unit Cost	Supply (Ac-ft/yr) 2010	2020	2030	2040	2050	2060	2060 Unit Cost
County-Other	Runnels	Colorado	$0	$0	114	89	69	49	31	0	$0
County-Other	Runnels	Colorado	$0	$0	193	177	148	116	0	0	$0
Manufacturing	Runnels	Colorado	$0	$0	54	60	65	70	74	79	$0
Manufacturing	Runnels	Colorado	$0	$0	9	10	11	12	0	0	$0
City of Miles	Runnels	Colorado	$0	$0	200	200	200	200	200	200	$0
Millersview-Doole WSC	Runnels	Colorado	$0	$0	25	31	0	6	0	0	$0
City of Winters	Runnels	Colorado	$0	$0	552	561	566	571	575	591	$0
County-Other	Scurry	Colorado	$0	$0	54	66	1	12	20	33	$0
City of Snyder	Scurry	Colorado	$0	$0	511	641	9	117	194	315	$0
County-Other	Tom Green	Colorado	$0	$0	250	250	250	250	250	250	$0
Irrigation	Tom Green	Colorado	$0	$0	3,377	3,273	3,170	3,066	2,693	2,860	$0
Manufacturing	Tom Green	Colorado	$0	$0	2,226	2,498	2,737	2,971	3,175	3,425	$0
Millersview-Doole WSC	Tom Green	Colorado	$0	$0	64	87	1	19	0	0	$0
City of San Angelo	Tom Green	Colorado	$0	$0	5,436	5,078	4,752	4,431	4,141	3,804	$0
City of San Angelo	Tom Green	Colorado	$0	$0	3,637	3,518	3,400	3,282	3,163	3,045	$0
City of San Angelo	Tom Green	Colorado	$0	$0	17	(97)	(211)	(324)	(438)	(553)	$0
Steam Electric Power	Tom Green	Colorado	$0	$0	1,021	1,021	1,021	1,021	1,021	1,021	$0
CRMWD (not assigned) [1]	Multiple	Colorado	$0	$0	32,447	27,657	33,056	30,488	27,842	24,702	$0
San Angelo	Multiple	Colorado	$0	$0	See customers for supply amounts						$0
UCRA	Multiple	Colorado	$0	$0	See customers for supply amounts						$0
Total			**$0**	**$0**	**76,337**	**74,801**	**63,228**	**62,006**	**59,707**	**58,741**	**$0**
Replacement Wells											
City of Eden	Concho	Colorado	$1,800,000	NA	0	0	0	0	0	0	NA
Richland SUD	McCulloch	Colorado	$1,701,000	NA	0	0	0	0	0	0	NA
CRMWD	Multiple	Colorado	$10,440,000	NA	0	0	0	0	0	0	NA
Total			**$13,941,000**	**NA**	**0**	**0**	**0**	**0**	**0**	**0**	**NA**
Voluntary Redistribution[2]											
City of Andrews	Andrews	Colorado	$0	$0	0	0	0	750	760	773	$477
Millersview-Doole WSC	Concho	Colorado	$0	$0	0	0	0	0	74	74	$477
City of Odessa	Ector	Colorado	$0	$0	0	0	0	5,799	5,794	5,790	$477
City of Odessa	Midland	Colorado	$0	$0	0	0	0	201	206	210	$477
City of Stanton	Martin	Colorado	$0	$477	392	422	429	430	415	393	$477
Millersview-Doole WSC	McCulloch	Colorado	$0	$0	0	0	0	0	143	143	$477
City of Midland	Midland	Colorado	$0	$0	0	0	10,000	9,800	9,600	9,400	$477
City of Ballinger	Runnels	Colorado	$0	$0	0	0	0	0	493	508	$477
County-Other	Runnels	Colorado	$0	$477	0	0	0	0	94	77	$477
Manufacturing	Runnels	Colorado	$0	$477	0	0	0	0	13	15	$477
Millersview-Doole WSC	Runnels	Colorado	$0	$0	0	0	0	0	58	58	$477
Millersview-Doole WSC	Tom Green	Colorado	$0	$0	0	0	0	0	225	225	$477
CRMWD	Multiple	Colorado	$8,964,000	$0	0	5,200	5,200	5,200	5,200	5,200	$477
Total			**$8,964,000**	**$477**	**392**	**5,622**	**15,629**	**22,180**	**23,075**	**22,866**	$477
Weather Modification											
Irrigation	Irion	Colorado	$0	0	0	0	0	0	0	0	0
Irrigation	Mitchell	Colorado	$0	0	0	0	0	0	0	0	0
Irrigation	Ward	Rio Grande	$0	0	0	0	0	0	0	0	0
Total			**$0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**$0**

1. Some of the water developed from Subordination is provided to customers through Voluntary Redistribution. To avoid duplication of water this supply is not listed here under subordination.

2. Voluntary Redistribution uses water developed from other strategies.

Summary of Alternative Strategies

Entity	County Used	Basin Used	Total Capital Cost	1st Decade Unit Cost	2010	2020	2030	2040	2050	2060	2060 Unit Cost
Advanced Treatment											
Richland SUD	McCulloch	Colorado	$78,000	$664	113	113	113	113	113	113	$566
Alternative Generation Technology											
Steam Electric Power	Ector	Colorado	$297,786,650	$1,523	0	2,750	4,293	6,174	8,467	11,262	$1,962
Steam Electric Power	Mitchell	Colorado	$297,786,650	$1,032	4,077	2,774	4,240	5,988	8,079	10,590	$1,962
Steam Electric Power	Tom Green	Colorado	$6,834,117	$1,532	0	0	0	48	243	481	$1,962
Steam Electric Power	Ward	Rio Grande	$24,094,671	$1,660	0	0	0	0	679	1,973	$1,962
Aquifer Storage and Recovery											
Menard	Menard	Colorado	$1,752,000	$1,271	240	240	240	240	240	240	$633
Bottle Water Program											
City of Eden	Concho	Colorado	$176,000	$24,552	0.00	1.34	1.34	1.34	1.34	1.34	$24,522
Desalination											
City of Bronte	Coke	Colorado	$5,723,000	$1,740	0	350	350	350	350	350	$314
Robert Lee	Coke	Colorado	$8,771,000	$1,879	500	500	500	500	500	500	$349
Develop Edwards Trinity Aquifer Supplies											
Manufacturing	Kimble	Colorado	$9,080,000	$1,080	1,000	1,000	1,000	1,000	1,000	1,000	$288
City of San Angelo	Schleicher	Colorado	$47,982,000	$660	0	0	0	12,000	12,000	12,000	$311
Develop Other Aquifer Supplies											
City of Bronte	Coke	Colorado	$2,970,000	$2,060	0	150	150	150	150	150	$333
City of Robert Lee	Coke	Coloorado	$1,502,000	$2,643	150	150	150	150	150	150	$173
City of San Angelo	Tom Green	Colorado	$277,730,000	$2,643	0	0	0	12,000	12,000	12,000	$626
New Reservoir Intake											
Robert Lee	Coke	Colorado	$528,000	$1,132	50	50	50	50	50	50	$212
New/Renew Water Supply - New Infrastructure											
Ballinger	Runnels	Colorado	$6,795,000	$3,361	220	220	220	220	220	220	$670
Off Channel Reservior											
City of Menard	Menard	Colorado	$25,273,000	$4,430	500	500	500	500	500	500	$758
Reuse											
City of Ballinger	Runnels	Colorado	$2,567,000	$1,473	0	220	220	220	220	220	$455

Appendix 6A
Sample Water Conservation Plans

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Appendix 6A1
Sample Water Conservation Plan for Municipal Users

Water Conservation Plan for [Entity]

Date

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APPENDICES

Water Conservation Plan for [Entity]

1. OBJECTIVES

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality (TCEQ) has developed guidelines and requirements governing the development of water conservation plans for public water suppliers.

The objectives of this water conservation plan are as follows:

- To reduce water consumption from the levels that would prevail without conservation efforts.
- To reduce the loss and waste of water.
- To improve efficiency in the use of water.
- To document the level of recycling and reuse in the water supply.
- To extend the life of current water supplies by reducing the rate of growth in demand.

The water conservation plan presented in this document is a model water conservation plan intended for adoption by wholesale or retail public water suppliers in Region F. This model plan includes all of the elements required by TCEQ. In order to adopt this plan, each water supplier will need to do the following:

- Complete the water utility profile.
- Set five- and ten-year goals for per capita water use.
- Adopt ordinance(s) or regulation(s) approving the model plan.

2 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY RULES

2.1 Conservation Plans

The TCEQ rules governing development of water conservation plans for public water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code, which is included in Appendix B. For the purpose of these rules, a water conservation plan is defined as "A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water[1]." The

[1] Title 30 of the Texas Administrative Code, Part 1, Chapter 288, Subchapter A, Rules 288.1 and 288.2, and Subchapter B, Rule 288.20, downloaded from

elements in the TCEQ water conservation rules covered in this conservation plan are listed below.

Minimum Conservation Plan Requirements

The minimum requirements in the Texas Administrative Code for Water Conservation Plans for Public Water Suppliers are covered in this report as follows:

- 288.2(a)(1)(A) – Utility Profile – Section 3 and Appendix C
- 288.2(a)(1)(B) – Specification of Goals – Section 4
- 288.2(a)(1)(C) – Specific, Quantified Goals – Section 4
- 288.2(a)(1)(D) – Accurate Metering – Section 5.1
- 288.2(a)(1)(E) – Universal Metering – Section 5.1
- 288.2(a)(1)(F) – Determination and Control of Unaccounted Water – Section 5.3
- 288.2(a)(1)(G) – Public Education and Information Program – Section 6
- 288.2(a)(1)(H) – Non-Promotional Water Rate Structure – Section 7
- 288.2(a)(1)(I) – Reservoir System Operation Plan – Section 8.2
- 288.2(a)(1)(J) – Means of Implementation and Enforcement – Section 9
- 288.2(a)(1)(K) – Coordination with Regional Water Planning Group – Section 8.5

Conservation Additional Requirements (Population over 5,000)

The Texas Administrative Code includes additional requirements for water conservation plans for cities with a population over 5,000:

- 288.2(a)(2)(A) – Leak Detection, Repair, and Water Loss Accounting – Sections 5.3, 5.4, and 5.5
- 288.2(a)(2)(B) – Record Management System – Section 5.2
- 288.2(a)(2)(C) – Requirement for Water Conservation Plans by Wholesale Customers – Section 8.4

Additional Conservation Strategies

TCEQ rules also list additional optional but not required conservation strategies, which may be adopted by suppliers. The following optional strategies are included in this plan:

- 288.2(a)(3)(A) – Conservation Oriented Water Rates – Section 7
- 288.2(a)(3)(B) – Ordinances, Plumbing Codes or Rules on Water-Conserving Fixtures – Section 8.1

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http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=288, October 2009.

- 288.2(a)(3)(F) – Considerations for Landscape Water Management Regulations – Section 8.3
- 288.2(a)(3)(G) – Monitoring Method – Section 5.5

3. WATER UTILITY PROFILE

Appendix C to this water conservation plan is a sample water utility profile based on the format recommended by the TCEQ.

[Water supplier is to complete the utility profile and provide information on the public water supply system and customers if appropriate for this section.]

4. SPECIFICATION OF WATER CONSERVATION GOALS

[Current TCEQ rules require the adoption of specific water conservation goals for a water conservation plan. As part of plan adoption, each water supplier will develop 5-year and 10-year goals for per capita municipal use, following TCEQ procedures described in the water utility profile (Appendix C).]

The goals for this water conservation plan include the following:

- Strive to attain the per capita municipal water use below the specified amount in gallons per capita per day shown on the completed Table C-1 using a 5-year rolling average calculation. (See 5-year and 10-year goals in Appendix C)
- Conduct water audits as required by the TCEQ and maintain unaccounted for water to *[insert amount]* percent of the total water used through existing and new maintenance programs.
- Raise public awareness of water conservation and encourage responsible public behavior by a public education and information program, as discussed in Section 6.

5. METERING, WATER USE RECORDS, CONTROL OF UNACCOUNTED WATER, AND LEAK DETECTION AND REPAIR

One of the key elements in water conservation is careful tracking of water use and control of losses through illegal diversions and leaks. Careful metering of water deliveries and water use, detection and repair of leaks in the distribution system and regular monitoring of unaccounted water are important in controlling losses. *[Water suppliers serving a population of 5,000 people or more or a having a projected population of greater than 5,000 people or more within the next ten years must include the following elements in their water conservation plans:]*

5.1 Metering of Customer and Public Uses and Meter Testing, Repair, and Replacement

All customers of wholesale or retail public water suppliers, including public and governmental users, should be metered. In many cases, water suppliers already meter all of their water users. For those water suppliers who do not currently meter all of their water uses, these entities will implement a program to meter all water uses within the next five years.

Most water suppliers test and replace their customer meters on a regular basis. All customer meters should be replaced on a 15-year cycle. Those who do not currently have a meter testing and replacement program will implement such a program over the next five years.

5.2 Record Management System

As required by TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2(a)(2)(B), the record management system allows for the separation of water sales and uses into residential, commercial, public/institutional, and industrial categories. This information will be included in an annual water conservation report, as described in Section 5.5 below.

For those entities whose record management systems do not currently allow for the separation of water sales as described above, they will move to implement such a system within the next five years.

5.3 Determination and Control of Unaccounted Water

Unaccounted water is the difference between water delivered to customers and metered deliveries to customers plus authorized but unmetered uses. (Authorized but unmetered uses would include use for fire fighting, releases for flushing of lines, and uses associated with new construction.) Unaccounted water can include several categories:

- Inaccuracies in customer meters. (Customer meters tend to run more slowly as they age and under-report actual use.)
- Accounts which are being used but have not yet been added to the billing system.
- Losses due to water main breaks and leaks in the water distribution system.
- Losses due to illegal connections and theft. (Included in Appendix H.)
- Other.

Measures to control unaccounted water are part of the routine operations of water suppliers. Water audits are useful methods of accounting for water usage within a system. Water audits will be conducted by water suppliers in order to decrease water loss. Maintenance crews and personnel will look for and report evidence of leaks in the water distribution system. The leak detection and repair program is described in Section 5.5 below. Meter readers are asked to watch for and report signs of illegal connections, so they can be addressed quickly. Unaccounted water calculated as part of the utility profile and is included in Appendix C.

5.4 Leak Detection and Repair

City crews and personnel will look for and report evidence of leaks in the water distribution system. Areas of the water distribution system in which numerous leaks and line breaks occur are targeted for replacement as funds are available.

5.5 Monitoring of Effectiveness and Efficiency - Annual Water Conservation Report

[Appendix D is a sample form that can be used in the development of an annual water conservation report for water suppliers.]

An annual conservation report will be completed by *[insert date]* of the following year and will be used to monitor the effectiveness and efficiency of the water conservation program and to plan conservation-related activities for the next year. This report records the water use by category, per capita municipal use, and unaccounted water for the current year and compares them to historical values.

6. CONTINUING PUBLIC EDUCATION AND INFORMATION CAMPAIGN

The continuing public education and information campaign on water conservation includes the following elements: *[Water provider is to select the appropriate measures for its system.]*

- Insert water conservation information with water bills. Inserts will include material developed by the [water supplier] staff and material obtained from the TWDB, the TCEQ, and other sources.
- Encourage local media coverage of water conservation issues and the importance of water conservation.
- Make the *Texas Smartscape CD*, water conservation brochures, and other water conservation materials available to the public.
- Make information on water conservation available on its website (if any) and include links to the *Texas Smartscape* website and to information on water conservation on the TWDB and TCEQ web sites.
- Provide water conservation materials to schools and utilize existing age-appropriate education programs available through the TCEQ and TWDB.
- Support the State-initiated Water Conservation Awareness and Education Campaign.

7. WATER RATE STRUCTURE

[If a water supplier has a decreasing block rate structure, it is recommended that a flat rate or increasing rate structure be adopted.]

An increasing block rate water structure that is intended to encourage water conservation and discourage excessive use and waste of water will be adopted upon completion of the next rate study or within five years. An example water rate structure is as follows:

<u>Residential Rates</u>

1. Monthly minimum charge. This can (but does not have to) include up to 2,000 gallons water use with no additional charge.
2. Base charge per 1,000 gallons up to the approximate average residential use.
3. 2^{nd} tier (from the average to 2 times the approximate average) at 1.25 to 2.0 times the base charge.
4. 3^{rd} tier (above 2 times the approximate average) at 1.25 to 2.0 times the 2^{nd} tier.
5. The residential rate can also include a lower tier for basic household use up to 4,000 gallons per month or so.

<u>Commercial/Industrial Rates</u>

Commercial/industrial rates should include at least 2 tiers, with rates for the 2^{nd} tier at 1.25 to 2.0 times the first tier.

[If a water supplier has an increasing rate structure, state the current rate structure as follows.]

The [water supplier] has adopted an increasing block rate water structure that is intended to encourage water conservation and discourage excessive use and waste of water. The water rate structure adopted on *[insert date]* is as follows:

<u>Residential Rates</u>

[To be completed by the supplier]

<u>Commercial/Industrial Rates</u>

[To be completed by the supplier]

8. OTHER WATER CONSERVATION MEASURES

8.1 Ordinances, Plumbing Codes, or Rules on Water-Conserving Fixtures

The State of Texas has required water-conserving fixtures in new construction and renovations since 1992. The state standards call for flows of no more than 2.5 gallons per minute (gpm) for faucets, 3.0 gpm for showerheads, and 1.6 gallons per flush for toilets. Similar standards are now required nationally under federal law. These state and federal standards assure that all new construction and renovations will use water-conserving fixtures. In addition, federal standards governing clothes washing machines will require all washers produced by 2007 to meet higher efficiency standards, which may include lower water use machines. The potential savings from these fixtures can be significant, but historically have been difficult to measure independently from other factors.

8.2 Reservoir System Operation Plan

[Insert description of reservoir system operation plan if public supplier has such a plan.]

or

The [water supplier] purchases water from [name] and does not have surface water supplies for which to implement a reservoir system operation plan.

8.3 Considerations for Landscape Water Management Regulations (Optional)

[The water supplier may choose to adopt landscape water management regulations as part of the development of this water conservation plan. These regulations are intended to minimize waste in landscape irrigation. The proposed regulations might include the following elements:

- *Require that all new irrigation systems be in compliance with state design and installation regulations (TAC Title 30, Part 1, Chapter 344).*
- *Prohibit irrigation systems that spray directly onto impervious surfaces or onto other non-irrigated areas. (Wind driven water drift will be taken into consideration.)*
- *Prohibit use of poorly maintained sprinkler systems that waste water.*
- *Prohibit outdoor watering during any form of precipitation.*
- *Enforce the regulations by a system of warnings followed by fines for continued or repeat violations.*
- *Implement other measures to encourage off-peak water use.]*

8.4 Requirement for Water Conservation Plans by Wholesale Customers

[Required for cities with populations over 5,000.]

Every contract for the wholesale sale of water by customers that is entered into, renewed, or extended after the adoption of this water conservation and drought contingency plan will include a requirement that the wholesale customer and any wholesale customers of that wholesale customer develop and implement a water conservation plan meeting the requirements of Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2 of the Texas Administrative Code. The requirement will also extend to each successive wholesale customer in the resale of the water.

8.5 Coordination with Regional Water Planning Group

In accordance with TCEQ regulations, a copy of this adopted water conservation plan will be sent to the Region F Water Planning Group.

9. IMPLEMENTATION AND ENFORCEMENT OF THE WATER CONSERVATION PLAN

A copy of [an ordinance, order, or resolution] adopted by the [City Council or governing board] regarding this water conservation plan is attached to and made part of this plan. The [ordinance, order, or resolution] designates responsible officials to implement and enforce the water conservation plan.

Appendix A
List of References

Appendix A
List of References

(1) Title 30 of the Texas Administrative Code, Part 1, Chapter 288, Subchapter A, Rules 288.1 and 288.2, and Subchapter B, Rule 288.20, downloaded from http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=2, October 2009.

The following conservation plans and related documents were reviewed in the development of this plan.

(2) Freese and Nichols, Inc.: *Model Water Conservation Plan for North Texas Municipal Water District Member Cities and Customers*, prepared for the North Texas Municipal Water District, Fort Worth, August 2004.

(3) Texas Commission on Environmental Quality Water Utility Profile, downloaded from http://www.tnrcc.state.tx.us/permitting/forms/10218.pdf, April 29, 2004.

(4) City of Austin Water Conservation Division: "City of Austin Water Conservation Plan, Developed to Meet Senate Bill 1 Regulatory Requirements," Austin, August 1999.

(5) City of Dallas Water Utilities Department: "City of Dallas Water Conservation Plan," adopted by the City Council, Dallas, September 1999.

(6) Freese and Nichols, Inc.: "Water Conservation and Drought Contingency Plan," prepared for the Sabine River Authority of Texas, Fort Worth, September 1994.

(7) GDS Associates, Inc.: "Water Conservation Study," prepared for the Texas Water Development Board, Fort Worth, 2002.

(8) Texas Water Development Board: Report 362, "Water Conservation Best Management Practices Guide", Austin, November 2004.

(9) City of Dallas: "City of Dallas Ordinances, Chapter 49, Section 21.1," Dallas, October 1, 2001.

Appendix B
Texas Commission on Environmental Quality Rules on Municipal Water Conservation Plans

Appendix C
Form for Water Utility Profile

Appendix D
Sample Water Conservation Report

Appendix 6A2
Sample Water Conservation Plan for Irrigation Districts

Water Conservation Plan for [Irrigation District]

Date

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APPENDICES

Water Conservation Plan for [Irrigation District]

1. Objectives

The Texas Commission on Environmental Quality has developed guidelines and requirements governing the development of water conservation plans for irrigation use. The purpose of this water conservation plan is to:

- To reduce water consumption from the levels that would exist without conservation efforts.
- To reduce the loss and waste of water.
- To encourage improvement of processes that inefficiently consume water.
- To extend the life of current supplies by reducing the rate of growth in demand.

This water conservation plan is intended to serve as a guide to [irrigation district]. The following plan includes all conservation measures required by TCEQ.

2. Description of Water Use

[The TCEQ requires that each irrigation user must document how water is used in the irrigation production process.

- *Irrigation users will provide information including:*
  - *Type of crops.*
  - *Acreage of each crop to be irrigated.*
  - *Monthly irrigation diversions.*
  - *Details of seasonal or annual crop rotation.*
  - *Soil types of the land to be irrigated.*
  - *Description of the irrigation method including flow rates, plans, and sketches of the system layout.*
  - *Details of equipment used in the process within an accuracy of +/- 5 %.]*

3. Specification of Water Conservation Goals

[The Irrigation District must specify a five-year and ten-year target for water savings and detail the basis for the development of these goals. These goals will include targets for water use efficiency and a pollution abatement and prevention plan.]

The TCEQ regulations require that each irrigation user adopt quantifiable water conservation goals in their water conservation plan. The *[Irrigation District]* has adopted goals related to improving water efficiency of its delivery system. The *[Irrigation District]* will strive to increase water efficiency per irrigated acre by *[insert amount]* percent within 5 years and *[insert amount]* percent within 10 years.

[Alternate goal] The *[Irrigation District]* will maintain the water efficiency per irrigated acre of *[insert amount]* percent within 5 years and *[insert amount]* percent within 10 years.

The goals for this water conservation plan will be achieved through the following: *[select applicable measures and/or include additional measures.]*

- Regular inspections of systems for controllable operation losses or leaks
- Coordination of irrigation deliveries with customers
- Schedule the timing or measure the amount of water applied.
- Improve or modify irrigation processes in order to increase efficient water use.
- Employ water-conserving irrigation equipment or improve existing equipment.
- Implement methods of land improvement that reduce runoff and increase rain infiltration to the soil.
- Establish a tailwater recovery and reuse program.

4. Control of Unaccounted Water and Leak Detection and Repair

Detection and repair of leaks in an irrigation system is important in controlling losses. Unaccounted water is the difference between water delivered to a system and water delivered to a system plus authorized but unmetered uses. Unaccounted water in the irrigation system can be attributed to several things including:

- Inaccuracies in meters.
- Loss due to leaks in the conveyance system.
- Operational losses
- Illegal connections to a system.
- Other.

To help control unaccounted water, *[irrigation district]* will monitor supply deliveries, conduct water audits and adjust operations to minimize losses if applicable. Broken water lines will be replaced or repaired in a timely manner.

5. Irrigation Scheduling and Volumetric Measuring of Irrigation Water Use

Volumetric Measuring

Measuring the volume of water being used to irrigate a crop is useful because it provides [irrigation district] with information needed to evaluate the efficiency of an irrigation system. With this information, [irrigation district] and customers can better manage their crops. Irrigation water users will employ a method of measuring how much irrigation water is used in their system.

The following methods may be used to directly measure amounts of irrigation water being used *[select appropriate methods]*:

- Propeller meters
- Orifice, venture or differential pressure meters
- Ultrasonic
- Stage Discharge Rating Tables
- Area/Point Velocity Measurements

Indirect methods that may be used to measure irrigation water quantities include:

- Measurement of time of irrigation and size of irrigation delivery system
- Measurement of end-pressure in a sprinkler irrigation system
- Measurement of energy used by a pump supplying water to an irrigation system
- Change in the elevation of water stored in an irrigation water supply reservoir

Irrigation Scheduling

Coordination of irrigation schedules of customers can reduce losses associated with conveying irrigation water. The *[irrigation district]* will implement an irrigation schedule for deliveries to customers to best meet the customers' water needs and minimize conveyance losses.

6. Methods of Land Improvement

To reduce the amount of water required for irrigation, the following land improvement practices are encouraged for customers of the *[irrigation district]*:

- Creation of furrow dikes
- Crop residue management and conservation tillage
- Land leveling
- Contour farming

7. Improvements to Irrigation Equipment

The *[irrigation district]* encourages customers to utilize efficient irrigation equipment, including:

- Installation of a drip/micro-irrigation system
- Installation of gated and flexible pipe for field water distribution systems
- Replacement of on-farm irrigation ditches with pipelines
- Lining of on-farm irrigation ditches
- Installation of low pressure center pivot sprinkler irrigation systems

8. Implementation of Water Conservation Plan

Upon implementation of this water conservation plan, *[irrigation district]* is required by the TCEQ to update the plan at least every five years. Goals for irrigation use will be re-evaluated based on previous five-year and ten-year goals and any new information.

An implementation report will be prepared by the [date] of each year following the adoption of this plan. A sample report is included in Appendix C. This report includes:

- The list of dates and descriptions of conservation measures implemented
- Amount of water saved
- Data about whether or not targets in the plan are met
- If targets are not met, an explanation as to why the target was not met and a discussion of the progress to meet the target.

Appendix A
List of References

Appendix A
List of References

Title 30 of the Texas Administrative Code, Part 1, Chapter 3, Subchapter A, Rules 3.2 and Chapter 288, Subchapter A, Rule 288.4, downloaded from http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=288, October, 2009.

Water Conservation Implementation Task Force, *Draft Best Management Practices*, April 19,2004.

Appendix B
Texas Commission on Environmental Quality Rules on Water Conservation Plans for Irrigation Use

Texas Administrative Code

TITLE 30 ENVIRONMENTAL QUALITY
PART 1 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 288 WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER A WATER CONSERVATION PLANS
RULE §288.4 Water Conservation Plans for Agricultural Use

(a) A water conservation plan for agricultural use of water shall provide information, where applicable, in response to the following subsections.

(1) For an individual agricultural user other than irrigation:

(A) a description of the use of the water in the production process, including how the water is diverted and transported from the source(s) of supply, how the water is utilized in the production process, and the estimated quantity of water consumed in the production process and therefore unavailable for reuse, discharge, or other means of disposal;

(B) specification of conservation goals, the basis for the development of such goals, and a time frame for achieving the specified goals;

(C) a description of the device(s) and/or method(s) within an accuracy of plus or minus 5.0% to be used in order to measure and account for the amount of water diverted from the source of supply;

(D) leak-detection, repair, and accounting for water loss in the water distribution system;

(E) application of state-of-the-art equipment and/or process modifications to improve water use efficiency; and

(F) any other water conservation practice, method, or technique which the user shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

(2) For an individual irrigation user:

(A) a description of the irrigation production process which shall include, but is not limited to, the type of crops and acreage of each crop to be irrigated, monthly irrigation diversions, any seasonal or annual crop rotation, and soil types of the land to be irrigated;

(B) a description of the irrigation method or system and equipment including pumps, flow rates, plans, and/or sketches of the system layout;

(C) a description of the device(s) and/or methods within an accuracy of plus or minus 5.0%, to be used in order to measure and account for the amount of water diverted from the source of supply;

(D) until May 1, 2005, specification of conservation goals including, where appropriate, quantitative goals for irrigation water use efficiency and a pollution abatement and prevention plan;

(E) beginning May 1, 2005, specific, quantified five-year and ten-year targets for water savings including, where appropriate, quantitative goals for irrigation water use efficiency and a pollution abatement and prevention plan. The goals established by an individual irrigation water user under this subparagraph are not enforceable;

(F) water-conserving irrigation equipment and application system or method including, but not limited to, surge irrigation, low pressure sprinkler, drip irrigation, and nonleaking pipe;

(G) leak-detection, repair, and water-loss control;

(H) scheduling the timing and/or measuring the amount of water applied (for example, soil moisture monitoring);

(I) land improvements for retaining or reducing runoff, and increasing the infiltration of rain and irrigation water including, but not limited to, land leveling, furrow diking, terracing, and weed control;

(J) tailwater recovery and reuse; and

(K) any other water conservation practice, method, or technique which the user shows to be appropriate for preventing waste and achieving conservation.

(3) For a system providing agricultural water to more than one user:

(A) a system inventory for the supplier's:

(i) structural facilities including the supplier's water storage, conveyance, and delivery structures;

(ii) management practices, including the supplier's operating rules and regulations, water pricing policy, and a description of practices and/or devices used to account for water deliveries; and

(iii) a user profile including square miles of the service area, the number of customers taking delivery of water by the system, the types of crops, the types of irrigation systems, the types of drainage systems, and total acreage under irrigation, both historical and projected;

(B) until May 1, 2005, specification of water conservation goals, including maximum allowable losses for the storage and distribution system;

(C) beginning May 1, 2005, specific, quantified five-year and ten-year targets for water savings including maximum allowable losses for the storage and distribution system. The goals established by a system providing agricultural water to more than one user under this subparagraph are not enforceable;

(D) a description of the practice(s) and/or device(s) which will be utilized to measure and account for the amount of water diverted from the source(s) of supply;

(E) a monitoring and record management program of water deliveries, sales, and losses;

(F) a leak-detection, repair, and water loss control program;

(G) a program to assist customers in the development of on-farm water conservation and pollution prevention plans and/or measures;

(H) a requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter; if the customer intends to resell the water, then the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of this chapter;

(I) official adoption of the water conservation plan and goals, by ordinance, rule, resolution, or tariff, indicating that the plan reflects official policy of the supplier;

(J) any other water conservation practice, method, or technique which the supplier shows to be appropriate for achieving conservation; and

(K) documentation of coordination with the Regional Water Planning Groups in order to insure consistency with the appropriate approved regional water plans.

(b) A water conservation plan prepared in accordance with the rules of the United States Department of Agriculture Natural Resource Conservation Service, the State Soil and

Water Conservation Board, or other federal or state agency and substantially meeting the requirements of this section and other applicable commission rules may be submitted to meet application requirements pursuant to a memorandum of understanding between the commission and that agency.

Source Note: The provisions of this §288.4 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective August 15, 2002, 27 TexReg 7146; amended to be effective October 7, 2004, 29 TexReg 9384

Appendix C
Sample Implementation Report

Appendix 6A3
Sample Water Conservation Plan for Industries

Water Conservation Plan for [Industrial Entity]

Date

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APPENDICES

Water Conservation Plan for [Industrial Entity]

1. Objectives

The Texas Commission on Environmental Quality has developed guidelines and requirements governing the development of water conservation plans for industrial or mining use. The purpose of this water conservation plan is to:

- To reduce water consumption from the levels that would exist without conservation efforts.
- To reduce the loss and waste of water.
- To encourage improvement of processes that inefficiently consume water.
- To extend the life of current supplies by reducing the rate of growth in demand.
- To document the level of recycling and reuse in the water supply.

This water conservation plan is intended to serve as a guide to [entity]. The following plan includes all conservation measures required by TCEQ.

2. Description of Water Use

The TCEQ requires that each mining or industrial water user must document how water is used in the production process.

- *[Entity provides information including:]*
  - *How water flows to and through their systems*
  - *What purpose water serves in the production process*
  - *How much water is consumed in the production process and not available for reuse*
  - *Means of discharging water used in industrial processes]*

3. Specification of Water Conservation Goals

The TCEQ regulations require that each industrial and mining user adopt quantifiable water conservation goals in their water conservation plan. *[Entity]* has specified a five-year and ten-year target for water savings. *[Include quantifiable water savings targets and the details of the basis for the development of these goals.]*

The goals for this water conservation plan include the following:

- *[Name goals.] Potential goals are:*
  - *Meter water use to decrease water loss through leaks*
  - *Regularly inspect systems for leaks and promptly repair in order to control unaccounted water*

- o *Improve, modify, or audit processes in order to increase efficient water use*

4. Metering of Industrial and Mining Water Users

[Entity]'s water use is metered at [description of location]. Submetering is a good strategy for some industrial water users. Processes or equipment that consume large quantities of water could be usefully submetered. Submetering is an effective way to account for all water use by process, subprocess, or piece of equipment in a facility. *[Identify processes and/or equipment that are currently submetered.]*

5. Control of Unaccounted Water and Leak Detection and Repair

Careful metering of water use, detection, and repair of leaks in the distribution system and regular monitoring of unaccounted water are important in controlling losses.

Unaccounted water is the difference between water delivered to a system and water delivered to a system plus authorized but unmetered uses. Authorized but unmetered uses includes water for fire fighting, releases for flushing of lines, and water used during new construction. Unaccounted water can be attributed to several things including:

- Inaccuracies in meters. Older meters tend to run slowly and therefore under-report actual use.
- Loss due to leaks and main breaks in the system.
- Illegal connections to a system.
- [Other].

In order to control unaccounted water, persons in industry are asked to watch for and report water main breaks and leaks. Broken and leaking lines should be replaced or repaired in a timely manner. Meter readers are asked to report signs of illegal connections so they can be quickly assessed.

[Entity] will implement and maintain a water loss program. This program will serve to reduce losses due to leakage. The measures of the water loss program include *[select applicable measure]*:

- Conducting regular inspections of water main fittings and connections.
- Installing leak noise detectors and loggers.
- Using a leakage modeling program.
- Metering individual pressure zones
- Controlling pressure just above the minimum standard-of-service level
- Limiting surges in pressure.
- [Other]

6. Improving, Modifying, and Auditing Processes and Equipment

[Entity] can increase water efficiency by improving, modifying, and auditing facility processes and equipment. Water can be conserved through the following measures *[select appropriate measure]*:

- Implementing a Water Waste Reduction Program
- Optimizing the water-use efficiency of cooling systems (other than cooling towers)
- Reducing water loss in cooling towers

Water Waste Reduction Programs cause [Entity] personnel to be more aware of wasteful activities. Measures resulting from a Water Waste Reduction Program include:

- Install water saving devices on equipment.
- Replace current equipment with more water-efficient equipment.
- Recycle water within a process.
- Change to waterless equipment or process.

7. Implementation and Modifications to Water Conservation Plan

Upon implementation of this water conservation plan, [Entity] is required by the TCEQ to update the plan at least every five years. New goals will be based on previous five-year and ten-year goals and any new information.

An implementation report will be prepared by the [date] of each year following the adoption of this plan. A sample report is included in Appendix C. This report includes:

- The list of dates and descriptions of conservation measures implemented
- Amount of water saved
- Data about whether or not targets in the plan are met
- If targets are not met, an explanation as to why the target was not met and a discussion of the progress to meet the target.

Appendix A
List of References

APPENDIX A

List of References

Title 30 of the Texas Administrative Code, Part 1, Chapter 288, Subchapter B, Rule 288.3, downloaded from http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=288, October 2009.

Appendix B
Texas Commission on Environmental Quality Rules on Water Conservation Plans for Industrial or Mining Use

Appendix B
Texas Commission on Environmental Quality Rules

Texas Administrative Code

TITLE 30 ENVIRONMENTAL QUALITY
PART 1 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 288 WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER A WATER CONSERVATION PLANS
RULE §288.3 Water Conservation Plans for Industrial or Mining Use

(a) A water conservation plan for industrial or mining uses of water shall provide information, where applicable, in response to each of the following elements:

(1) a description of the use of the water in the production process, including how the water is diverted and transported from the source(s) of supply, how the water is utilized in the production process, and the estimated quantity of water consumed in the production process and therefore unavailable for reuse, discharge, or other means of disposal;

(2) until May 1, 2005, specification of conservation goals, the basis for the development of such goals, and a time frame for achieving the specified goals;

(3) beginning May 1, 2005, specific, quantified five-year and ten-year targets for water savings and the basis for the development of such goals. The goals established by industrial or mining water users under this paragraph are not enforceable;

(4) a description of the device(s) and/or method(s) within an accuracy of plus or minus 5.0% to be used in order to measure and account for the amount of water diverted from the source of supply;

(5) leak-detection, repair, and accounting for water loss in the water distribution system;

(6) application of state-of-the-art equipment and/or process modifications to improve water use efficiency; and

(7) any other water conservation practice, method, or technique which the user shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

Source Note: The provisions of this §288.3 adopted to be effective May 3, 1993, 18 TexReg 2558; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective October 7, 2004, 29 TexReg 9384

Appendix C
Sample Implementation Report

Appendix 6B
Sample Drought Contingency Plans

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Drought Contingency Plan for [Public Water Supplier]

Date

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APPENDICES

Drought Contingency Plan for [Public Water Supplier]

1. Objectives

This drought contingency plan (the Plan) is intended for use by [municipal water supplier]. The plan includes all current TCEQ requirements for a drought contingency plan.

This drought contingency plan serves to:

- Conserve available water supplies during times of drought and emergency.
- Minimize adverse impacts of water supply shortages.
- Minimize the adverse impacts of emergency water supply conditions.
- Preserve public health, welfare, and safety.

2. Texas Commission on Environmental Quality Rules

The TCEQ rules governing development of drought contingency plans for public water suppliers are contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.20 of the Texas Administrative Code.

3. Provisions to Inform the Public and Opportunity for Public Input

[Public water supplier] will give customers the opportunity to provide public input into the preparation of the plan by one of the following methods:

- Holding a public meeting.
- Providing written notice of the proposed plan and the opportunity to comment on the plan by newspaper or posted notice.

4. Public Education

[Public water supplier] will notify the public about the drought contingency plan, including changes in Stage and drought measures to be implemented, by one or more of the following methods:

- Prepare a description of the Plan and make it available to customers at appropriate locations.
- Include utility bill inserts that detail the Plan
- Provide radio announcements that inform customers of stages to be initiated or terminated and drought measures to be taken
- Include an ad in a newspaper of general circulation to inform customers of stages to be initiated or terminated and drought measures to be taken

5. Coordination with the Regional F Water Planning Group

This drought contingency plan will be sent to the Chair of the Region F Water Planning Group in order to ensure consistency with the Region F Water Plan. If any changes are made to the drought contingency plan, a copy of the newly adopted plan will be sent to the Regional Water Planning Group.

6. Initiation and Termination of Drought Response Stages

The designated official will order the implementation of a drought response stage when one or more of the trigger conditions for that stage exist. Official designees may also order the termination of a drought response stage when the termination criteria are met or at their own discretion.

If any mandatory provisions have been implemented or terminated, the water supplier is required to notify the Executive Director of the TCEQ within 5 business days.

7. Goals for Reduction in Water Use

TCEQ requires that each public water supplier develop quantifiable goals for water use reduction for each stage of the drought contingency plan. These goals are outlined below.

[To be developed by each supplier. An example is provided.]

- Stage 1, Mild
  - 0 to 2 percent reduction in use that would have occurred in the absence of drought contingency measures.
- Stage 2, Moderate
  - 2 to 6 percent reduction in use that would have occurred in the absence of drought contingency measures
- Stage 3, Severe
  - 6 to 10 percent reduction in use that would have occurred in the absence of drought contingency measures
- Stage 4, Emergency
  - 10 to 14 percent reduction in use that would have occurred in the absence of drought contingency measures

8. Drought and Emergency Response Stages

Stage 1, Mild

Trigger Conditions for Stage 1, Mild

- A wholesale water supplier that provides all or part of [public water supplier]'s supply has initiated Stage 1, Mild

- [To be otherwise completed by public water supplier]
    - Potential triggers are:
        - When [public water supplier]'s available water supply is equal or less than [amount in ac-ft, percent of storage, etc.].
        - When total daily demand equals [number] million gallons for [number] consecutive days or [number] million gallons on a single day.
        - When the water level in [public water supplier]'s well(s) is equal or less than [number] feet above/below mean sea level.
        - When flows in the [name of river or stream segment] are equal to or less than [number] cubic feet per second.

Stage 1 will end when the circumstances that caused the initiation of Stage 1 no longer exist.

Goals for Use Reduction and Actions Available Under Stage 1, Mild
[Public water supplier] will reduce water use by [goal]. [Public water supplier] may order the implementation of any of the strategies listed below in order to decrease water use:

- Request voluntary reductions in water use.
- Review the problems that caused the initiation of Stage 1.
- Intensify leak detection and repair efforts

Stage 2, Moderate

Trigger Conditions for Stage 2, Moderate

- A wholesale water supplier that provides all or part of [public water supplier]'s supply has initiated Stage 2, Moderate
- [To be otherwise completed by public water supplier]
    - Potential triggers are:
        - When [public water supplier]'s available water supply is equal or less than [amount in ac-ft, percent of storage, etc.].
        - When total daily demand equals [number] million gallons for [number] consecutive days or [number] million gallons on a single day.
        - When the water level in [public water supplier]'s well(s) is equal or less than [number] feet above/below mean sea level.
        - When flows in the [name of river or stream segment] are equal to or less than [number] cubic feet per second.

Stage 2 will end when the circumstances that caused the initiation of Stage 2 no longer exist.

Goals for Use Reduction and Actions Available Under Stage 2, Moderate
[Public water supplier] will reduce water use by [goal]. [Public water supplier] may order the implementation of any of the strategies listed below in order to decrease water use:

- Request voluntary reductions in water use.
- Halt non-essential city government use
- Review the problems that caused the initiation of Stage 2.
- Intensify leak detection and repair efforts
- Implement mandatory restrictions on time of day outdoor water use in the summer.

Stage 3, Severe

Trigger Conditions for Stage 3, Severe

- A wholesale water supplier that provides all or part of [public water supplier]'s supply has initiated Stage 3, Severe
- [To be otherwise completed by public water supplier]
    - Potential triggers are:
        - When [public water supplier]'s available water supply is equal or less than [amount in ac-ft, percent of storage, etc.].
        - When total daily demand equals [number] million gallons for [number] consecutive days or [number] million gallons on a single day.
        - When the water level in [public water supplier]'s well(s) is equal or less than [number] feet above/below mean sea level.
        - When flows in the [name of river or stream segment] are equal to or less than [number] cubic feet per second.

Stage 3 will end when the circumstances that caused the initiation of Stage 3 no longer exist.

Goals for Use Reduction and Actions Available Under Stage 3, Severe
[Public water supplier] will reduce water use by [goal]. [Public water supplier] may order the implementation of any of the strategies listed below in order to decrease water use:

- Request voluntary reductions in water use.
- Require mandatory reductions in water use
- Halt non-essential city government use
- Review the problems that caused the initiation of Stage 3.
- Intensify leak detection and repair efforts
- Implement mandatory restrictions on time of day outdoor water use in the summer.
- Limit outdoor watering to specific weekdays.

- Create and implement a landscape ordinance.

Stage 4, Emergency

Trigger Conditions for Stage 4, Emergency

- A wholesale water supplier that provides all or part of [public water supplier]'s supply has initiated Stage 4, Emergency
- [To be otherwise completed by public water supplier]
  - Potential triggers are:
    - When [public water supplier]'s demand exceeds the amount that can be delivered to customers.
    - When [public water supplier]'s source becomes contaminated
    - [Public water supplier]'s system is unable to deliver water due to the failure or damage of major water system components.

Stage 4 will end when the circumstances that caused the initiation of Stage 4 no longer exist.

Goals for Use Reduction and Actions Available Under Stage 4, Emergency
[Public water supplier] will reduce water use by [goal]. [Public water supplier] may order the implementation of any of the strategies listed below in order to decrease water use:

- Require mandatory reductions in water use
- Halt non-essential city government use
- Review the problems that caused the initiation of Stage 4.
- Intensify leak detection and repair efforts
- Implement mandatory restrictions on time of day outdoor water use in the summer.
- Limit outdoor watering to specific weekdays.
- Create and implement a landscape ordinance.
- Prohibit washing of vehicles except as necessary for health, sanitation, or safety reasons.
- Prohibit commercial and residential landscape watering
- Prohibit golf course watering except for greens and tee boxes
- Prohibit filling of private pools.
- Initiate a rate surcharge for all water use over [amount in gallons per month].

9. Penalty for Violation of Water Use Restriction
Mandatory restrictions are required by TCEQ regulation to have a penalty. These restrictions will be strictly enforced with the following penalties:

- Potential penalties
  - Written warning that they have violated the mandatory water use restriction.

- Issue a citation. Minimum and maximum fines are established by ordinance.
- Discontinue water service to the user.

10. Review and Update of Drought Contingency Plan

This drought contingency plan will be updated at least every 5 years as required by TCEQ regulations.

Appendix A
List of References

APPENDIX A

List of References

Title 30 of the Texas Administrative Code, Part 1, Chapter 288, Subchapter B, Rule 288.20, downloaded from http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=288, October 2009.

Appendix B
Texas Commission on Environmental Quality Rules on Drought Contingency Plans

APPENDIX B
Texas Commission on Environmental Quality Rules on Drought Contingency Plans

Texas Administrative Code

TITLE 30 ENVIRONMENTAL QUALITY
PART 1 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 288 WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER B DROUGHT CONTINGENCY PLANS
RULE §288.20 Drought Contingency Plans for Municipal Uses by Public Water Suppliers

(a) A drought contingency plan for a retail public water supplier, where applicable, shall provide information in response to each of the following.

(1) Minimum requirements. Drought contingency plans shall include the following minimum elements.

(A) Preparation of the plan shall include provisions to actively inform the public and affirmatively provide opportunity for public input. Such acts may include, but are not limited to, having a public meeting at a time and location convenient to the public and providing written notice to the public concerning the proposed plan and meeting.

(B) Provisions shall be made for a program of continuing public education and information regarding the drought contingency plan.

(C) The drought contingency plan must document coordination with the Regional Water Planning Groups for the service area of the retail public water supplier to insure consistency with the appropriate approved regional water plans.

(D) The drought contingency plan shall include a description of the information to be monitored by the water supplier, and specific criteria for the initiation and termination of drought response stages, accompanied by an explanation of the rationale or basis for such triggering criteria.

(E) The drought contingency plan must include drought or emergency response stages providing for the implementation of measures in response to at least the following situations:

(i) reduction in available water supply up to a repeat of the drought of record;

(ii) water production or distribution system limitations;

(iii) supply source contamination; or

(iv) system outage due to the failure or damage of major water system components (e.g., pumps).

(F) The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this subparagraph are not enforceable.:

(G) The drought contingency plan must include the specific water supply or water demand management measures to be implemented during each stage of the plan including, but not limited to, the following:

(i) curtailment of non-essential water uses; and

(ii) utilization of alternative water sources and/or alternative delivery mechanisms with the prior approval of the executive director as appropriate (e.g., interconnection with another water system, temporary use of a non-municipal water supply, use of reclaimed water for non-potable purposes, etc.).

(H) The drought contingency plan must include the procedures to be followed for the initiation or termination of each drought response stage, including procedures for notification of the public.

(I) The drought contingency plan must include procedures for granting variances to the plan.

(J) The drought contingency plan must include procedures for the enforcement of any mandatory water use restrictions, including specification of penalties (e.g., fines, water rate surcharges, discontinuation of service) for violations of such restrictions.

(2) Privately-owned water utilities. Privately-owned water utilities shall prepare a drought contingency plan in accordance with this section and shall incorporate such plan into their tariff.

(3) Wholesale water customers. Any water supplier that receives all or a portion of its water supply from another water supplier shall consult with that supplier and shall include in the drought contingency plan appropriate provisions for responding to reductions in that water supply.

(b) A wholesale or retail water supplier shall notify the executive director within five business days of the implementation of any mandatory provisions of the drought contingency plan.

(c) The retail public water supplier shall review and update, as appropriate, the drought contingency plan, at least every five years, based on new or updated information, such as the adoption or revision of the regional water plan.

Model Drought Contingency Plan for [Irrigation District]

Date

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Drought Contingency Plan for [Irrigation District]

1. Objectives

This drought contingency plan is intended for use by [irrigation district]. The plan includes all current TCEQ requirements for a drought contingency plan.

This drought contingency plan serves to:
- Conserve available water supplies during times of drought and emergency.
- Minimize adverse impacts of water supply shortages.
- Minimize the adverse impacts of emergency water supply conditions.

2. Texas Commission on Environmental Quality Rules

The TCEQ rules governing development of drought contingency plans for irrigation districts are contained in Title 30, Part 1, Chapter 288, Subchapter B, Rule 288.21 of the Texas Administrative Code.

3. Provisions to Inform the Public and Opportunity for Public Input

[Irrigation district] will give customers the opportunity to provide public input into the preparation of the plan by one of the following methods:
- Holding a public meeting.
- Providing written notice of the proposed plan and the opportunity to comment on the plan by newspaper or posted notice.

4. Coordination with the Region F Water Planning Group

This drought contingency plan will be sent to the Chair of the Region F Water Planning Group in order to ensure consistency with the Region F Water Plan.

5. Initiation and Termination of Drought Response Stages

Official designees order the implementation of a drought response stage when one or more of the trigger conditions for that stage are met. Official designees may also order the termination of a drought response stage when the termination criteria are met or at their own discretion. The official designee for the [irrigation district] is:

Name
Title
Contact Information

If any mandatory provisions have been implemented or terminated, [irrigation district] is required to notify the Executive Director of the TCEQ within 5 business days.

6. Goals for Reduction in Water Use

TCEQ requires that each irrigation water user develop specific, quantifiable goals for water use reduction for each stage of the drought contingency plan. [Entity]'s goals are independently developed and given below.

7. Drought and Emergency Response Stages

Stage 1, Mild

Trigger Conditions for Stage 1, Mild

- A wholesale water supplier that provides all or part of an irrigation user's supply has initiated Stage 1, Mild
- *[Select appropriate other triggers]*
    - When [irrigation district]'s available water supply is equal or less than [amount in ac-ft, percent of storage, etc.].
    - When total daily demand equals [number] million gallons for [number] consecutive days or [number] million gallons on a single day.
    - When the water level in [irrigation district]'s well(s) is equal or less than [number] feet above/below mean sea level.
    - When flows in the [name of river or stream segment] are equal to or less than [number] cubic feet per second.

Goals for Use Reduction and Actions Available Under Stage 1, Mild
[Entity]'s will reduce water use by [goal]. Irrigation water suppliers may order the implementation of any of the strategies listed below in order to reduce water use:

- Request voluntary reductions in water use.
- Review the problems that caused the initiation of Stage 1.

Stage 1 is intended to raise awareness of potential drought problems. Stage 1 will end when the circumstances that caused the initiation of Stage 1 no longer exist.

Stage 2, Moderate

Trigger Conditions for Stage 2, Moderate

- A wholesale water supplier that provides all or part of an irrigation user's supply has initiated Stage 2, Moderate
- *[Select appropriate other triggers]*
    - When [irrigation district]'s available water supply is equal or less than [amount in ac-ft, percent of storage, etc.].
    - When total daily demand equals [number] million gallons for [number] consecutive days or [number] million gallons on a single day.

  - When the water level in [irrigation district]'s well(s) is equal or less than [number] feet above/below mean sea level.
  - When flows in the [name of river or stream segment] are equal to or less than [number] cubic feet per second.

Goals for Use Reduction and Actions Available Under Stage 2, Moderate
[Entity]'s will reduce water use by [goal]. Irrigation water suppliers may order the implementation of any of the strategies listed below in order to reduce water use:

- Request voluntary reductions in water use.
- Review the problems that caused the initiation of Stage 2.
- Intensify leak detection and repair efforts.
- Other.

Stage 2 will end when the circumstances that caused the initiation of Stage 2 no longer exist.

Stage 3, Severe

Trigger Conditions for Stage 3, Severe

- A wholesale water supplier that provides all or part of an irrigation user's supply has initiated Stage 3, Severe
- *[Select appropriate other triggers]*
  - When [irrigation district]'s available water supply is equal or less than [amount in ac-ft, percent of storage, etc.].
  - When total daily demand equals [number] million gallons for [number] consecutive days or [number] million gallons on a single day.
  - When the water level in [irrigation district]'s well(s) is equal or less than [number] feet above/below mean sea level.
  - When flows in the [name of river or stream segment] are equal to or less than [number] cubic feet per second.

Goals for Use Reduction and Actions Available Under Stage 3, Severe
[Entity]'s will reduce water use by [goal]. Irrigation water suppliers may order the implementation of any of the strategies listed below in order to reduce water use:

- Request voluntary reductions in water use.
- Review the problems that caused the initiation of Stage 3.
- Intensify leak detection and repair efforts.
- Implement mandatory watering days and/or times.
- Other.

Stage 3 will end when the circumstances that caused the initiation of Stage 3 no longer exist.

Stage 4, Emergency

Trigger Conditions for Stage 4, Emergency

- A wholesale water supplier that provides all or part of an irrigation user's supply has initiated Stage 4, Emergency
- *[Select appropriate other triggers]*
    - When [irrigation district]'s available water supply is equal or less than [amount in ac-ft, percent of storage, etc.].
    - When total daily demand equals [number] million gallons for [number] consecutive days or [number] million gallons on a single day.
    - When the water level in [irrigation district]'s well(s) is equal or less than [number] feet above/below mean sea level.
    - When flows in the [name of river or stream segment] are equal to or less than [number] cubic feet per second.

Goals for Use Reduction and Actions Available Under Stage 4, Emergency
[Entity]'s will reduce water use by [goal]. Irrigation water suppliers may order the implementation of any of the strategies listed below in order to reduce water use:

- Review the problems that caused the initiation of Stage 4.
- Intensify leak detection and repair efforts.
- Implement mandatory watering days and/or times.
- Implement mandatory reductions in water deliveries.
- Other.

Stage 4 will end when the circumstances that caused the initiation of Stage 4 no longer exist.

8. Penalty for Violation of Water Use Restriction

Mandatory water use restrictions are implemented in Stages [1, 2, 3, or 4]. These restrictions will be strictly enforced with the following penalties:

- Potential penalties include:
    - Written warning that they have violated the mandatory water use restriction.
    - Issue a citation. Minimum and maximum fines are established by ordinance or other order.
    - Discontinue water service to the user.

9. Review and Update of Drought Contingency Plan

This drought contingency plan will be updated at least every 5 years as required by TCEQ regulations.

Appendix 6C
Drought Triggers

Drought Triggers for Surface Water Sources

For surface water sources, a single drought trigger was identified based on reservoir content or stream flow. These trigger levels and associated management actions are for reservoirs outlined in Table 6C-1. Table 6C-2 presents the same data for run-of-the-river sources.

Table 6C-1
Drought Triggers for Region F Reservoirs

Reservoirs	Trigger	Action
Lake J.B. Thomas	Elevation is below 2,216.32 ft	Notify City of Snyder of drought conditions. End pumping operations at the Big Spring/Odessa intake. Coordinate with CRMWD and Snyder Drought Contingency Plans.
E.V. Spence Reservoir	Elevation is below 1,846.67 ft	Notify Cities of Robert Lee and San Angelo. Limit releases for water quality purposes. Coordinate with Drought Contingency Plans for CRMWD, Robert Lee and San Angelo.
O.H. Ivie Reservoir	Elevation is below 1,517.73 ft	Notify customers of drought conditions. Limit large releases for water quality purposes. Coordinate with Drought Contingency Plans for CRMWD and San Angelo.
Lake Colorado City	Content is below 16,301 ac-ft	Notify customers of drought conditions. Request voluntary reduction in water use. Coordinate with customers' Drought Contingency Plans.
Champion Creek Reservoir	Content is below 9,918 ac-ft	Notify customers of drought conditions. Request voluntary reduction in water use. Coordinate with customers' Drought Contingency Plans.
Mountain Creek Lake	Content is below 465 ac-ft	Notify customers of drought conditions. Request voluntary reduction in water use. Coordinate with customers' Drought Contingency Plans.
Oak Creek Reservoir	Content is below 13,030 ac-ft	Notify customers of drought conditions. Request voluntary reduction in water use. Coordinate with customers' Drought Contingency Plans.
Lake Ballinger/Moonen	Content is below 1,908 ac-ft	Notify customers of drought conditions. Request voluntary reduction in water use. Coordinate with customers' Drought Contingency Plans.
Lake Winters	Content is below 4,400 ac-ft	Notify customers of drought conditions. Request voluntary reduction in water use. Coordinate with customers' Drought Contingency Plans.

Table 6C-1 Drought Triggers for Region F Reservoirs (continued)

Reservoirs	Trigger	Action
O.C. Fisher Reservoir	Content is below 9,000 ac-ft	See San Angelo System
Twin Buttes Reservoir	Content is below 12,000 ac-ft	See San Angelo System
Lake Nasworthy	Content is below 9,000 ac-ft	See San Angelo System
San Angelo System	Content is below 30,000 ac-ft	Notify customers of drought conditions. Initiate Drought Contingency Plan for San Angelo.
Lake Coleman	Content is below 18,000 ac-ft (Lake level < 1705.5 msl)	Notify customers of drought conditions. Request voluntary reduction in water use. Coordinate with City of Coleman's Drought Contingency Plan.
Hords Creek Reservoir	Content is below 2,268 ac-ft	Notify public of drought conditions. Request voluntary reduction in water use.
Lake Brownwood	Content is below 94,600 ac-ft (Lake Level 1,418 msl)	Notify customers via local media. Coordinate with Drought Contingency Plans for BCWID and Cities of Early, Brownwood.
Brady Creek Lake	Content is below 9,860 ac-ft	When Brady Reservoir begins to be used for water supply, notify customers of drought conditions. Request voluntary reduction in water use. Coordinate with City of Brady's Drought Contingency Plan.
Red Bluff Reservoir	Content is below 52,146 ac-ft at the end of January	Notify customers of drought conditions.

Table 6C-2
Drought Triggers for Region F Run-of-the-River Supplies

Source	Trigger	Action
Colorado River	Using USGS gage at Winchell, Tx, flows are less than 25 cfs for more than 30 consectutive days between September and June.	Notify public and irrigators of drought conditions. Request voluntary reduction in water use.
Concho River	Using USGS gage at Paint Rock, Tx, flows are less than 10 cfs for more than 30 consectutive days between October and February or less than 5 cfs between March and June.	Notify public and irrigators of drought conditions. Request voluntary reduction in water use. Coordinate with the City of Paint Rock's Drought Contingency Plan (if available)
Llano River	Using USGS gage at Junction, Tx, flows are less than 100 cfs for more than 30 consectutive days.	Notify public and irrigators of drought conditions. Request voluntary reduction in water use. Coordinate with the City of Junction's Drought Contingency Plan.
San Saba River	Using USGS gage at Menard, Tx, flows are less than 10 cfs for more than 30 consectutive days between November and May or less than 3 cfs between June and October.	Notify public and irrigators of drought conditions. Request voluntary reduction in water use. Coordinate with the City of Menard's Drought Contingency plan.

Groundwater Drought Triggers

Drought contingency plans provide a structured response that is intended to minimize the damaging effects caused by the water shortage conditions. A common feature of drought contingency plans is a structure that allows increasingly stringent drought response measures to be implemented in successive stages as water supply diminishes or water demand increases. This measured or gradual approach allows for timely and appropriate action as a water shortage develops. The onset and termination of each implementation stage should be defined by specific “triggering” criteria. Triggering criteria are intended to ensure that timely action is taken in response to a developing situation and that the response is appropriate to the level of severity of the situation.

Drought response triggers should be specific to each water supplier and should be based on an assessment of the water user’s vulnerability. Groundwater drought triggers may be based on levels of user demand, water treatment plant or delivery system capabilities, water levels within designated monitor wells that have a record of historical measurements or in some cases using short or long term weather patterns. Whichever method is employed, trigger criteria should be defined on well-established relationships between the benchmark and historical experience. If historical observations have not been made then common sense must prevail until such time that more specific data can be presented.

Ground-water triggers are not as easily identified as factors related to surface-water systems. This is attributable to (1) the rapid response of stream discharge and reservoir storage to short-term changes in climatic conditions and (2) the typically slower response of ground-water systems to recharge processes. Wet climatic conditions over a period of one or two years might have a significant impact on the availability of surface water. However, aquifers in the same area might not show comparable levels of response for much longer periods of time, depending on infiltration rates, size and location of the recharge areas, the distribution of precipitation, and the extent to which aquifers are developed and exploited by major users of groundwater.

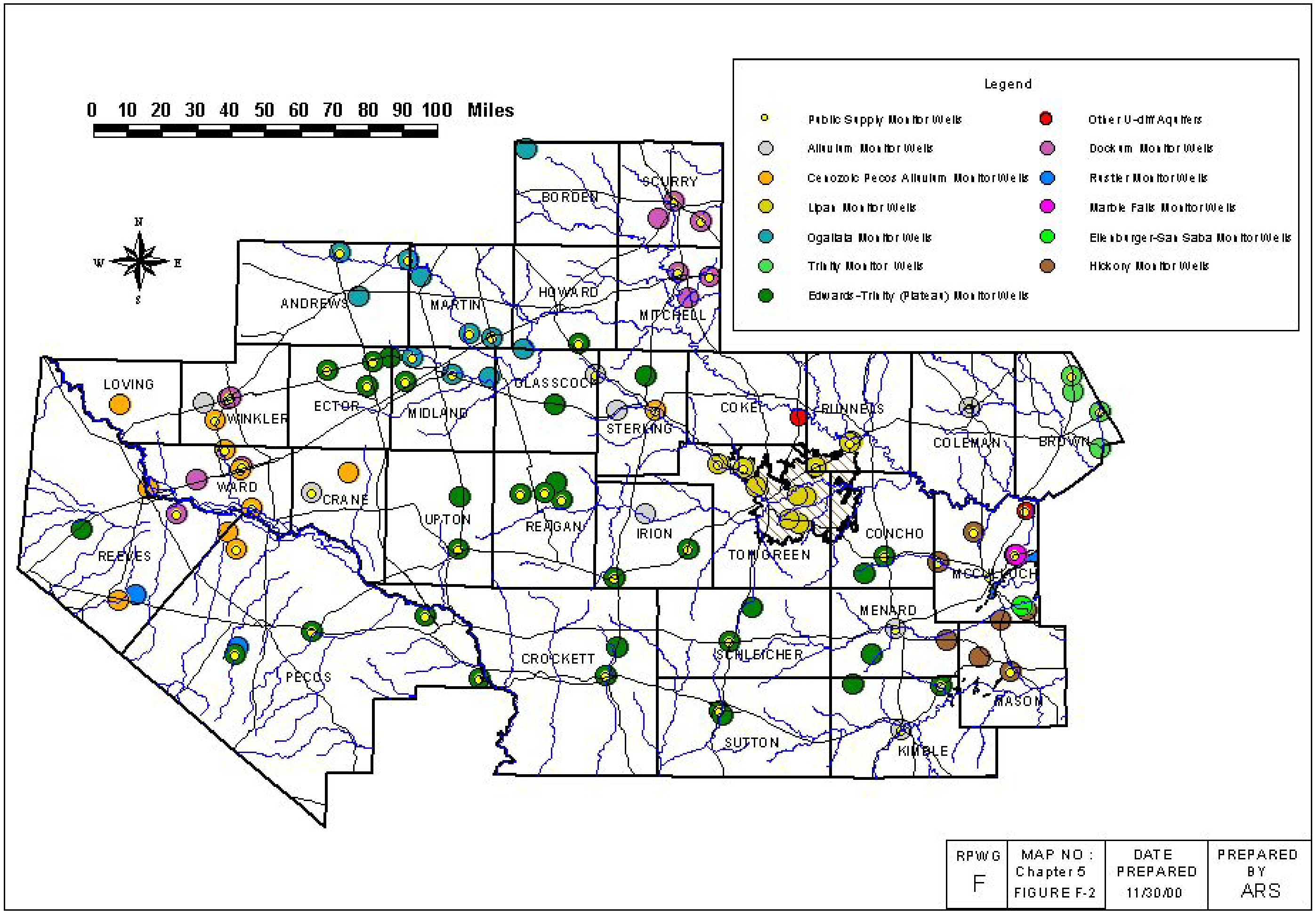
Aquifers that do not receive sufficient recharge to offset natural discharge and pumpage may be depleted of groundwater (e.g., mined) over time. The rate and extent of ground-water mining are related to the timeframe and the extent to which withdrawals exceed recharge. In such aquifers, water levels may fall over long periods of time, eventually reaching a point at which the cost of lifting water to the surface becomes uneconomic. Thus, water levels alone in such areas may not be a satisfactory drought trigger. Instead, communities might consider the average annual rate of water level decline relative to the remaining saturated thickness of the aquifer, and increased well pumping costs as water levels decline as a drought trigger indicators.

Water levels in observation wells in and adjacent to municipal well fields, especially wells completed in aquifers that respond relatively quickly to recharge events, may be established as drought triggers for municipalities if historical water level measurements are available. Water levels below specified elevations for a pre-determined period of time might be interpreted to be reasonable ground-water indicators of drought conditions. Until such historical water-level trends are established, municipalities will likely continue to depend on demand as a percentage of production capacity as their primary drought trigger.

As discussed earlier in this section, ground-water levels in this part of the State have only limited use as drought triggers. Although numerous water-level measurements are available on a number of wells in the Region F, most of this data represents only one measurement a year. This does not allow for observation of seasonal fluctuation or response to recharge events. However, wells have been selected that could monitor water levels in each aquifer, county and for each user group and the locations of these wells are illustrated in Figure 6C-1.

Table 6C-3 lists the individual available well information obtained from TWDB and TNRCC databases including well location, owner, elevation, depth, use and historical water levels. Historical water level trends, aquifer type, well-saturated thickness, drought trigger levels and present drought status were determined from this data. Wells selected in this list had a combination of the most complete record of historical water levels and/or

Figure 6C-1
Location of Water Level Monitoring Wells in Region F



Locations of Water Level Monitor Wells
in Region F

Table 6C-3

Table 6C-3 cont

the most recent water levels (1994 -2000). If water level information was unavailable, the most recent well drilled and/or the deepest well was selected.

When historical water level data was available, a benchmark water level from each well was determined by calculating the average of the historical water levels. Drought trigger levels were set at 50% mark between the benchmark level and the historical low. If the difference in the historical low and benchmark level for a well was less than 10% of the water column in the well, it was assumed that there is not sufficient water level variation to establish drought trigger levels. Also, if the historical water level data indicated the well was being mined, an average mining rate was determined and the trigger level was set at a 25% increase in the average mining rate.

Wells assigned the "Insufficient data" status should not be used for groundwater management decisions until additional data is collected. Drought related decisions of groundwater management in these areas should be based a combination of weather, user demand and or water system delivery capacity to determine drought triggers.

Water-use categories in the Region F other than municipal that are dependent on groundwater as their primary or only source of supply must rely on a number of factors to identify drought conditions. In most cases, atmospheric condition (days without measurable rainfall) is the most obvious factor. Various drought indices (Palmer, Standard Precipitation, and Keetch-Byram) are available from State and local sources. Groundwater conservation districts, agricultural agencies, as well as individuals can access these indices for use in determining local drought conditions and appropriate responses.

The TWDB staff measures water levels of approximately a third of the monitor wells listed in Table 6C-3. Groundwater conservation districts are generally responsible for monitoring conditions within their boundaries and making appropriate public notification. Outside of existing districts, the TWDB should assume responsibility of public notification of drought conditions based on their water-level monitoring network. Appropriate drought responses are the responsibility of and at the discretion of private well owners. Wells selected for drought contingency triggers should be re-evaluated for appropriateness during each planning cycle.

Appendix 7A
Checklist for Comparison of the Regional Water Plan to Applicable Water Planning Regulations

APPENDIX 7A

CHECKLIST FOR COMPARISON OF THE REGIONAL WATER PLAN TO APPLICABLE WATER PLANNING REGULATIONS

The purpose of this attachment is to facilitate the determination of how the Regional Water Plan is consistent with the long-term protection of the water, agricultural, and natural resources of the State of Texas, particularly within this region. The following checklist includes a regulatory citation (Column 1) for all subsections and paragraphs contained in the following applicable portions of the water planning regulations:

- 31 TAC Chapter 358.3
- 31 TAC Chapter 357.5
- 31 TAC Chapter 357.7
- 31 TAC Chapter 357.8
- 31 TAC Chapter 357.9

According to 31 TAC Chapter 357.14(c), the Regional Water Plan is considered to be consistent with the long-term protection of the State's resources if complies with the above listed requirements. Therefore, the Regional Water Plan has been compared to each applicable section of the regulations as a means of determining consistency.

The checklist also includes a summary description of each cited regulation (Column 2). It should be understood that this summary is intended only to provide a general description of the particular section of the regulation and should not be assumed to contain all specifics of the actual regulation. The evaluation of the Regional Water Plan should be performed against the complete regulation, as contained in the actual 31 TAC 358 and 31 TAC 357 regulations.

Column 3 of the checklist provides the evaluation response as affirmative, negative, or not applicable. A "Yes" in this column indicates that the Regional Water Plan has been evaluated to comply with the stated section of the regulation. A "No" response indicates that the Regional Water Plan does not comply with the stated regulation. A response of "NA" (or not applicable) indicates that the stated section of the regulation does not apply to this Regional Water Plan.

The evidence of where, in the Regional Water Plan, the stated regulation is addressed is provided in Column 4. Where the regulation is addressed in multiple locations within the Regional Water Plan, this column may cite only the primary locations. In addition to identifying where the regulation is addressed, this column may include commentary about the application of the regulation in the Regional Water Plan.

The above-listed regulations are repetitive, in some instances. One section of the regulations may be restated or paraphrased elsewhere within the regulations. In some cases, multiple sections of the regulations may be combined into one separate regulation section. Therefore, Column 5 provides cross-referencing.

Checklist For Comparison of the Regional Water Plan to Applicable Water Planning Regulations

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
31 TAC §358.3				
358.3(a)	TWDB shall develop a State Water Plan (SWP) with 50-year planning cycle, and based on the Regional Water Plan (RWP)	NA	Applies to the State Water Plan. The Regional Water Plan is based on a 50-year planning cycle, however.	
358.3(b)	RWP is guided by the following principles			
(b)(1)	Identified policies and actions so that water will be available at reasonable cost, to satisfy reasonable projected use and protect resources	Yes	Chapters 4 and 8	§358.3(b)(4), §357.5 (a); §357.7 (a)(9)
(b)(2)	Open and accountable decision-making based on accurate, objective information	Yes	Regular public meetings of the RWPG;	§357.5 (e)(6)
(b)(3)	Consideration of effects of plan on the public interest, and on entities providing water supply	Yes	Chapters 4 and 7	
(b)(4)	Consideration and approval of cost-effective strategies that meet needs and respond to drought, and are consistent with long-term protection of resources	Yes	Chapters 4, 6, and 7	§358.3(b)(1), §357.5 (e)(4) and §357.5 (e)(6); §357.7(a)(9)
(b)(5)	Consideration of opportunities that encourage the voluntary transfer of water resources	Yes	Chapter 4	
(b) (6)	Consideration of a balance of economic, social, aesthetic, and ecological viability	Yes	Chapters 4 and 7	
(b) (7)	The use of information from the adopted SWP for regions without a RWP	NA		
(b) (8)	The orderly development, management, and conservation of water resources	Yes	Chapters 4, 6, and 7	§357.5(a)
(b) (9)	Surface waters are held in trust by the State, and governed by doctrine of prior appropriation	Yes	Chapters 3 and 4	
(b) (10)	Existing water rights, contracts, and option agreements are protected	Yes	Chapter 4	§357.5(e)(3)
(b) (11)	Groundwater is governed by the right of capture unless under local control of a groundwater management district	Yes	Chapter 3	
(b) (12)	Consideration of recommendation of stream segments of unique ecological value	Yes	Chapter 8. RWPG did not recommend designation of any of the Region's Stream segments as an ecologically unique segment.	§357.8
(b) (13)	Consideration of recommendation of sites of unique value for the construction of reservoirs	Yes	Chapter 8. The RWPG did not recommend any site in the region as a unique reservoir site.	§357.9

Checklist for Comparison of the Regional Water Plan to Applicable Water Planning Regulations - continued

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
(b) (14)	Local, regional, state, and federal agency water planning coordination	Yes	Local, State and Federal levels of coordination	
(b) (15)	Improvement or maintenance of water quality and related uses as designated by the State Water Quality Plan	Yes	Chapters 4 and 5	
(b)(16)	Cooperation between neighboring water planning regions to identify common needs and issues	Yes	Coordination with neighboring planning regions as needed	
(b)(17)	WMS described sufficiently to allow a state agency making financial or regulatory decisions to determine consistency of the WMS with the RWP	NA	To be determined by the State after completion of the RWP	§357.7(a)(9)
(b) (18)	Environmental evaluations are based on site-specific information or state environmental planning criteria	Yes	To the extent that such information and criteria exist; Chapter 4	§357.5(e)(1); §357.5 (e)(6); §357.5(k)(1)(H)
(b) (19)	Consideration of environmental water needs, including instream flows and bay and estuary inflows	Yes	Chapter 4	§357.5(e)(1); §357.5(l); §357.7 (a)(8)(A)(ii)
(b) (20)	Planning is consistent with all laws applicable to water use for state and regional water planning	Yes	Applicable water planning laws have been considered in preparing this plan	§357.5(f)
(b) (21)	Ongoing permitted water development projects are included	Yes	Chapter 4	
31 TAC §357.5				
(a)	The RWP: provides for the orderly development, management, and conservation of water resources; prepares for drought conditions; and protects agricultural, natural, and water resources	Yes	Chapters 4, 6, and 7	§358.3(b)(1). §358.3(b)(8)
(b)	The RWP submitted by January 5, 2011	NA	To be submitted	
(c)	The RWP is consistent with 31 TAC §358 and 31 TAC §357, and guided by State and local water plans	Yes	Throughout RWP	
(d)(1) & (2)	The RWP uses State population and water demand projections from the SWP; or revised population or water demand projections that are adopted by the State	Yes	Chapter 2; Population and water demand projections adopted by TWDB	
(e)(1)	The RWP provides WMS adjusted for appropriate environmental water needs; environmental evaluations are based on site-specific information or state environmental planning criteria	Yes	Chapter 4	§358.3(b)(1); §358.3(b)(18); §357.7 (a)(8)(A)(ii)
(e)(2)	The RWP provides WMS that may be used during a drought of record	Yes	Chapter 4	
(e)(3)	The RWP protects existing water rights, contracts, and option agreements	Yes	Chapter 4	§358.3(b)(10)

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
(e)(4)	The RWP provides cost-effective and environmentally sensitive WMS based on comparisons of all potentially feasible WMS; The process is documented and presented to the public for comment.	Yes	Chapter 4; public process utilized to adopt the RWP	§358.3(b)(4)
(e)(5)	The RWP incorporates water conservation planning and drought contingency planning	Yes	Chapters 4 and 6	§357.5(k)(1)(A)&(B); §357.7(a)(7)(B)
(e)(6)	The RWP achieves efficient use of existing supplies and promotes regional water supplies or regional management of existing supplies; Public involvement is included in the decision-making process	Yes	Chapter 4; public process utilized in consideration WMS	§358.3(b)(2)
(e)(7)(A)&(B)	The RWP identifies (A) drought triggers, and (B) drought responses for designated water supplies	Yes	Chapter 6	§357.5(e)(5); §357.5(k)(1)(A)&(B)
(e)(8)	The RWP considers the effect of the plan on navigation	Yes	Navigation impacts considered to the extent necessary	
(f)	Planning is consistent with all laws applicable to water use in the Region	Yes	Applicable water planning laws considered in adopting the plan	§358.3(b)(20)
(g)	The following characteristics of a candidate special water resource are considered:			
(g)(1)	The surface water rights are owned by an entity headquartered in another region.	NA	No Special Water Resources (as defined in §357) exist in the Region at this time	
(g)(2)	A water supply contract commits water to an entity headquartered in another region.	NA		
(g)(3)	An option agreement may result in water being supplied to an entity headquartered in another region.	NA		
(h)	Water rights, contracts, and option agreements of special water resources are protected in the RWP	NA		
(i)	The RWP considers emergency transfers of surface water rights	NA	Emergency transfers of water not considered in the RWP	
(j)(1)-(3)	Simplified planning is used in the RWP in accordance with TWDB rules	NA	Normal water planning process utilized	
(k)(1)&(2)	The RWP shall consider existing plans and information, and existing programs and goals related to local or regional water planning	Yes	Chapters 1, 4, and 6	§357.5(e)(7)
(l)	The RWP considers environmental water needs including instream flows and bays and estuary flows	Yes	Chapter 4	§358.3(b)(19); §357.7 (a)(8)(A)(ii)

Checklist for Comparison of the Regional Water Plan to Applicable Water Planning Regulations - continued

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
31 TAC §357.7				
(a)(1)(A)-(M)	The RWP shall describe the region, including specific requirements of paragraphs A through M of this section of the regulations	Yes	Chapters 1 and 6	§357.7(a)(8)(A)(iii); §357.7(a)(8)(D); §357.5(k)(1)(C); §357.7(a)(7)(A)(iv) § 358.6 (a)-(b)
(a)(2)(A)-(C)	The RWP includes a presentation of current and projected population and water demands, reported in accordance with paragraphs A through C of this section of the regulations	Yes	Chapter 2	
(a)(3)(A)-(G)	The RWP includes the evaluation of current water supplies available (including a presentation of reservoir firm yields) to the Region for use during drought of record conditions, reported by the type of entity and wholesale providers	Yes	Chapter 3	
(a)(4) (A)&(B)	The RWP includes water supply and demand analysis, comparing the type of entity and wholesale providers	Yes	Chapter 4	
(a)(5)(A)-(C)	The RWP provides sufficient water supply to meet the identified needs, in accordance with requirements of paragraphs A through C of this section of the regulations	Yes	Chapter 4	
(a)(6)	The RWP presents data required in paragraphs (2) - (5) of this subsection in subdivisions of the reporting units required, if desired by the RWPG	Yes	Chapters 2, 3, and 4	
(a)(7)(A)-(H)	The RWP evaluates all WMS determined to be potentially feasible, in accordance with paragraphs A through H of this section of the regulations	Yes	Chapters 1 and 6	§357.5(k)(1)(C); §357.7(a)(1)(M); §357.5(e)(5); §357.5(k)(1)(B) § 358.6 (a)-(b)

Checklist for Comparison of the Regional Water Plan to Applicable Water Planning Regulations - continued

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
(a)(8)(A)-(H)	The RWP evaluates all WMS determined to be potentially feasible, by considering the requirements of paragraphs A through H of this section of the regulations	Yes	Chapter 4	§358.3(b)(19); §357.5(e)(1); §357.5(l); §357.7(a)(1)(L); §357.7(a)(8)(D); §357.7(a)(8)(A)(iii)
(a)(9)	The RWP makes specific recommendations of WMS in sufficient detail to allow state agencies to make financial or regulatory decisions to determine the consistency of the proposed action with an approved RWP	NA	To be determined by the State after completion of the RWP	§358.3(b)(1); §358.3(b)(4); §358.3(b)(17)
(a)(10)	The RWP includes regulatory, administrative, or legislative recommendations to facilitate the orderly development, management, and conservation of water resources; prepares for drought conditions; and protects agricultural, natural, and water resources	Yes	Chapter 8	§358.3(b)(1) §357.5(a)
(a)(11)	The RWP includes a chapter consolidating the water conservation and drought management recommendations	Yes	Chapter 6	
(a)(12)	The RWP includes a chapter describing the major impacts of recommended WMS on key parameters of water quality	Yes	Chapter 5	
(a)(13)	The RWP includes a chapter describing how it is consistent with long-term protection of the state's water, agricultural, and natural resources	Yes	Chapter 7	
(a)(14)	The RWP includes a chapter describing the financing needed to implement the water management strategies recommended	Yes	Chapter 9; due later	
(b)	The RWP excludes WMS for political subdivisions that object to inclusion and provide reasons for objection	NA		
(c)	The RWP includes model water conservation plan(s)	Yes	Chapter 6	
(d)	The RWP includes model drought contingency plan(s)	Yes	Chapter 6	
(e)	The RWP includes provisions for assistance of the TWDB in performing regional water planning activities and/or resolving conflicts within the Region	Yes	Inter-regional cooperation between Regions F and K	

Checklist for Comparison of the Regional Water Plan to Applicable Water Planning Regulations - continued

Regulatory Citation (Col 1)	Summary of Requirement (Col 2)	Response (Yes/No/ NA) (Col 3)	Location(s) in Regional Plan and/or Commentary (Col 4)	Regulatory Cross References (Col 5)
31 TAC §357.8				
(a)	The RWP considers the inclusion of recommendations for the designation of river and stream segments of unique ecological value within the Region	Yes	Chapter 8. The RWPG did not recommend designation of any of the Region's stream segments as ecologically unique	§358.3(b)(12)
(b)	If river or stream segments of unique ecological value are recommended, such recommendations are made in the plan on the basis of the criteria established in this section of the regulations	NA		
(c)	If the RWP recommends designation of river or stream segments of unique ecological value, the impact of the regional water plan on these segments is assessed	NA		
31 TAC §357.9				
(1)	The RWP considers the inclusion of recommendations for the designation of sites of unique value for construction of reservoirs	Yes	The RWPG did not recommend any locations in the Region as a site of unique value for construction of reservoirs	§358.3(b)(13)
(2)	If sites of unique value for construction of reservoirs are recommended, such recommendations are made in the plan on the basis of criteria established in this section of the regulations	NA		

Appendix 10A
Public Comments

From: City of Bronte [mailto:brontetx@wcc.net]
Sent: Tuesday, May 18, 2010 1:39 PM
To: John Grant
Subject: Reg F water plan projects

List are proposed projects for the City of Bronte.

Let me know if cost estimates need to be provided.

Gerald Sandusky
Mayor
City of Bronte

CITY OF BRONTE
PROPOSED WATER PROJECTS
2010 – 2020

The City of Bronte proposes the following water projects to be included in the Region F Initially Prepared Plan (IPP) Water Plan:

1. Complete the raw water transmission line from Oak Creek Lake. (Five miles of ten inch line.)
2. Develop four additional water wells adjacent to Oak Creek Lake and add residential water service around the lake.
3. Develop water wells in the proven water field southeast of Bronte and lay a pipeline to the City's water system.
4. Regain 600 acre feet of water rights that were given to the City of Sweetwater around 1996-1990.
5. Loop the water mains around the City.
6. Install a twelve inch line between Bronte and Robert Lee.
7. Enlarge the treatment plant to supply both Bronte and Robert Lee.
8. Lay a raw water line to Lake Brownwood.
9. Limit Oak Creek Lake to domestic use only. (No commercial use.)
10. Supply water to the Coke County Rule Water System.

You consideration of these projects is greatly appreciated.

From:	Will Wilde, City of San Angelo
To:	John Grant, CRMWD, Region F Chairman
Via:	Email on June 4, 2010

John-The City of San Angelo request consideration for inclusion in the Region F Plan a water supply strategy where by the City of San Angelo could supply water to the City of Robert Lee and any other entities in that area that may have a water supply need. The water would be delivered to them by way of San Angelo's existing pipeline which extends from San Angelo to EV Spence Reservoir.

Thank you for consideration of inclusion of this strategy in the plan.

Will Wilde
Director Water Utilities
City of San Angelo

RESPONSE TO PUBLIC COMMENTS

City of Bronte, Received May 18, 2010

1. The City of Bronte requested the inclusion of 10 water projects in the regional water plan.

Response: The Region F consultants contacted the City of Bronte and discussed the list of water management strategies. The City explained that they have initiated a regional study with the City of Robert Lee and Coke County Rural Water Supply. This study will evaluate several alternatives, including several on the requested list. The study will not be completed prior to the completion of the regional water plan. Based on available information provided by Bronte, the following is a synopsis of the status of the strategies requested for inclusion in the regional water plan:

- Complete the raw water transmission line from Oak Creek Lake. (Five miles of ten inch line.) *Status: This strategy is included in the Region F Water Plan. The costs were changed to reflect 5 miles of 10-inch pipeline. This is a recommended strategy.*

- Develop four additional water wells adjacent to Oak Creek Lake and add residential water service around the lake. *Status: This strategy was added as new groundwater. Three new wells were assumed to be needed to provide 150 acre-feet per year. Three miles of 6-inch pipeline were included in the strategy. Additional distribution infrastructure may be needed to provide service. This is an alternate strategy.*

- Develop water wells in the proven water field southeast of Bronte and lay a pipeline to the City's water system. *Status: This strategy was added as new groundwater. Three new wells were assumed to be needed to provide 350 acre-feet per year. Five miles of 10-inch pipeline were included in the strategy. Advanced treatment is included due to the water quality of the groundwater from this area. This is an alternate strategy.*

- Regain 600 acre feet of water rights that were given to the City of Sweetwater around 1996-1990. *Status: This strategy was not considered in the Region F Water Plan. This is a contracting issue between Sweetwater and Bronte and is not appropriate for regional water planning unless proposed jointly by the two cities.*

- Loop the water mains around the City. *Status: This strategy will be considered as part of Bronte's regional study. Internal distribution improvements are generally not considered in regional water planning.*

- Install a twelve inch line between Bronte and Robert Lee. *Status: This strategy will be considered as part of Bronte's regional study and has not been developed sufficiently for inclusion in the Region F Water Plan at this time.*

- Enlarge the treatment plant to supply both Bronte and Robert Lee. *Status: This strategy will be considered as part of Bronte's regional study and has not been sufficiently developed for inclusion in Region F Water Plan at this time.*

- Lay a raw water line to Lake Brownwood. *Status: This strategy may be considered as part of Bronte's regional study and has not been sufficiently developed for inclusion in the Region F Water Plan at this time. A similar strategy was evaluated as part of a regional strategy in previous Region F plans and was dropped from consideration in the current plan because of the high implementation cost.*

- Limit Oak Creek Lake to domestic use only. (No commercial use.) *Status: This strategy was not considered in the Region F Water Plan. This is a contracting issue for the City of Sweetwater and not appropriate for regional water planning unless approved by the City of Sweetwater.*

- Supply water to the Coke County Rule Water System. *Status: This strategy will be considered as part of Bronte's regional study and has not been sufficiently developed for inclusion in the Region F Water Plan at this time.*

City of San Angelo, Received June 4, 2010

1. San Angelo requested the addition of a strategy to move treated water from San Angelo to Robert Lee and environs through the existing Spence pipeline.

Response: This strategy was added to the Region F Water Plan. It is a considered strategy.

Appendix 10B
Agency Comments

August 11, 2010

Mr. John Grant
Chairman, Region F Regional
Water Planning Group
c/o Colorado River Municipal Water District
Big Spring, Texas 79721-0869

Re: Texas Water Development Board Comments for the Region F Regional Water Planning Group Initially Prepared Plan, Contract No. 0904830865

Dear ~~Mr. Grant~~: John

Texas Water Development Board (TWDB) staff completed a review of the Initially Prepared Plan (IPP) submitted by June 1, 2010 on behalf of the Region F Regional Water Planning Group. The attached comments (Attachments A and B) follow this format:

- Level 1: Comments, questions, and online planning database revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements; and
- Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional plan.

The TWDB's statutory requirement for review of potential interregional conflicts under Title 31, Texas Administrative Code (TAC) §357.14 will not be completed until submittal and review of adopted regional water plans.

Title 31, TAC, §357.11(b) requires the regional water planning group to consider timely agency and public comments. Section 357.10(a)(3) of the TAC requires the final adopted plan include summaries of all timely written and oral comments received, along with a response explaining any resulting revision or why changes are not warranted.

Copies of TWDB's Level 1 and 2 written comments and the region's responses must be included in the final, adopted regional water plan.

If you have any questions, please do not hesitate to contact David Meesey of my staff at (512) 936-0852.

Sincerely,

Carolyn L. Brittin
Deputy Executive Administrator
Water Resources Planning and Information

CLB/DH/MN/TM/ao

Attachments(s)

c w/att: Ms. Simone Kiel, Freese and Nichols, Inc.

ATTACHMENT A

TWDB Comments on Initially Prepared 2011 Region F Regional Water Plan

LEVEL 1. Comments and questions must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.

Executive Summary

1. Page ES-8, Section ES.3.2, line 2: "…to develop approximately 243,000 acre-feet per year of additional supplies by 2060…" does not reconcile with total water management strategy supply volume of 254,754 acft/yr presented on page ES-9, Table ES-1 or total water management strategy volume of 194,710 acft/yr presented in Table 4.10-1. Please revise as appropriate.

2. Page ES-8, Section ES.3.2, line 11; page ES-9, paragraph 1; and page ES-10 Figure ES-5: the total Region F water supply (current supplies with all water management strategies in year 2060) shown as 806,000 acft/yr does not reconcile with the sum of current water user group supply (610,000 acft/yr) and recommended water management strategy supply total (either 194,710 acft/yr, from Table 4.10-1; or 254,754 acft/yr, from Table ES-1), which would total either 804,710 acft/yr or 864,754 acft/yr, respectively. Please revise to reconcile these totals throughout the plan as appropriate.

3. Page ES-9, Table ES-1: "Desalination" year 2060 water management strategy volume of 16,050 acft/yr and capital cost of $424,148,000 do not reconcile with Table 4.10-1 summary of recommended water management strategies volume of 6,550 acft/yr and cost of $6,717,000. Please revise as appropriate.

4. Page ES-9, Table ES-1: "New Groundwater" 2060 water management strategy volume of 32,152 acft/yr and capital cost of $126,333,990 does not reconcile with Table 4.10-1 summary of recommended water management strategy volume of 26,152 acft/yr and cost of $174,573,000. Please revise as appropriate.

5. Page ES-9, Table ES-1: "Infrastructure Improvements" capital cost of $24,776,979 does not reconcile with Table 4.10-1 summary of recommended water management strategy cost of $6,091,979. Please revise as appropriate.

6. Page ES-9, Table ES-1: "Reuse" capital cost of $150,460,000 does not reconcile with Table 4.10-1 summary of recommended water management strategy cost of $2,158,000. Please revise as appropriate, throughout plan (e.g. Figure ES-5).

7. Page ES-9, Table ES-1 & Figure ES-4: "Subordination" 2060 water management strategy volume of 72,830 acft/yr does not reconcile with Table 4.10-1 summary of

recommended water management strategy volume of 33,486 acft/yr . Please revise as appropriate, throughout plan (e.g. Figure ES-5).

8. Page ES-9, Table ES-1: "Voluntary Redistribution" 2060 water management strategy volume of 28,158 acft/yr and capital cost of $8,964,000 does not reconcile with Table 4.10-1 summary of recommended water management strategy volume of 22,958 acft/yr and cost of $0. Please revise as appropriate, throughout plan (e.g. Figure ES-5).

9. Page ES-9, Table ES-1: "Total" for All Recommended Water Management Strategies 2060 volume of 254,754 acft/yr and capital cost of $827,377,639 do not reconcile with Table 4.10-1 summary of recommended water management strategy volume of 194,710 acft/yr and cost of $282,234,649. Please revise as appropriate, throughout plan (e.g. Figure ES-5).

<u>Chapter 1</u>

10. Please describe how the planning group explored opportunities and benefits of regional water supply facilities or providing regional management of regional facilities. *[Title 31 Texas Administrative Code (TAC) §357.5(e)(6)]*

<u>Chapter 3</u>

11. Please indicate whether any publicly available plans of major agricultural, municipal, manufacturing and commercial water users and any water management plans were considered. *[31 TAC §357.5(k)(1)(E) §357.5(k)(1)(F)]*

12. Page 3-4: Two of the groundwater sources listed in Table 3.1-1 and Appendix 3A appear to be the same, but are reference by different names, specifically Table 3.1-1 source "Pecos Valley" and Appendix 3A source "Cenozoic Pecos Alluvium". Please revise as appropriate.

13. Page 3-39: Hords Creek Lake "...diversion of 2,260 acre-feet per year" does not reconcile with page 3-35, Table 3.2-1 diversion volume of 2,240 acft/yr . Please revise as appropriate throughout plan.

14. Page 3-42, Table 3.2-2: Table does not indicate to which information the footnote (c) applies. Please revise as appropriate.

15. Page 3-43, Table 3.2-3: Table header does not specify whether the "WAM Supplies" listed are 'firm yield' or 'safe yield'. Please clarify in table.

16. Page 3-53, Table 3.5-1: CRMWD Ector County Well Field volume of 423 acft/yr for all decades does not reconcile with Appendix 3B volume of 440 acft/yr for all decades. Please revise as appropriate.

Chapter 4

17. It appears that total county 'balance' surpluses/shortages were calculated incorrectly throughout Chapter 4 tables by subtracting 'Total Demand' from 'Total Supply'. Please clarify that these are not water 'needs' (e.g. with a footnote) or revise to reflect total subcategory and county-wide water needs as the sum of the individual needs of each water user group in the county; needs that are calculated based on each water user group's own demands and supplies. *[31 TAC §357.7(a)(4)(B)]*

18. Page 4-2, last sentence: Indication that "On a water user group basis, the sum of the shortages is *over* 213,000 acre-feet per year in 2010…" does not reconcile with Table 4.1-1 year 2010 summation of shortages of 212,918acft/yr. Please revise as appropriate throughout plan.

19. Page 4-6, Table 4.1-1: Table incorrectly sums water 'needs' both horizontally (e.g. the Andrews County irrigation need of 12,875 acft/yr is apparently reduced to 12,818 acft/yr by incorrectly associating surplus water supplies from other water user groups that are not available to this water user group) and vertically (e.g. total needs for the region are presented as 183,933 acft/yr in 2010 whereas the correct net region total water needs in 2010 are 212,918 acft/yr). Please revise table to summarize and compile identified water needs appropriately.

20. Page 4-19, Table 4.2-3: Subordination water management strategy supply volume totals, by decade, in acft/yr of 43,303; 46,471; 29,394; 30,636; 30,877; 32,946) do not reconcile with Table 4.10-1 Subordination supply volume totals, by decade, in acft/yr of 43,890; 47,047; 29,961; 31,194; 31,427; 33,486. Please revise as appropriate.

21. Page 4-20, paragraph 1, line 6: All recommended water management strategies must indicate associated capital and annual costs. Please indicate whether the cost for the 'Subordination' water management strategy is zero or present any associated costs with the strategy.

22. Page 4-26, first sentence, last paragraph: Please reword text to clarify that implementation of Region F water municipal conservation provides water savings of 310 acft/yr rather than 509 acft/yr. This reconciles the strategy supply with the Appendix 4G, page 4G-1 value of 310 acft/yr for 2060 and reflects the fact that the remaining conservation savings appear to be associated with plumbing fixture savings that were embedded in the demand projections.

23. Page 4-28, Section 4.3.2, paragraph 1: 2010 and 2060 City of Ballinger water demands of 1,068 acft/yr and 1,337 acft/yr do not reconcile with Table 4.3.2 (page 4-29) values of 1,142 acft/yr and 1,329 acft/yr respectively. Please revise as appropriate.

24. Page 4-28, Section 4.3.2, paragraph 2: 2010 City of Ballinger water management strategy supply of 950 acft/yr does not reconcile with Table 4.3.2, page 4-29 value of 940 acft/yr and neither number reconciles with Appendix 4H, page 4H-3 tabular value of 917 acft/yr.

25. Page 4-29, Table 4.3-3: Table 'Comments' does not specify whether the "WAM yield" values listed are 'firm yield' or 'safe yield'. Please clarify.

26. Page 4-31: Section 'Voluntary Redistribution – Hords Creek Reservoir to Ballinger (220 acft/yr for 2040 through 2060) and MDWSC to Ballinger (600 acft/yr for 2010 through 2040)' water management strategies do not appear to be included in the Summary of Recommended water management strategies (supply and cost data) in Appendix 4H under the category 'Voluntary Redistribution' located on the fourth (unnumbered) page of Appendix 4H. Please revise as appropriate.

Appendices

27. Appendix 4D, page 48: It appears that the final water management strategy in Appendix D is not assigned to any particular water user group or wholesale water provider. Please clarify.

28. Appendices 4H/4I: Appendix 4H is labeled "Water User Group Summary Tables" but appears to include four tables including a Summary of Recommended Strategies, Summary of Alternative Strategies, List of Potentially Feasible Strategies, and Water User Group Summary Tables. Table of Contents refers to appendix 4I which is not labeled in the appendices section the contents of which appear to be included at the beginning of Appendix 4H. Please revise Table of Contents and appendices labels regarding 4H and 4I to clarify locations of contents.

29. *(Attachment B)* Comments on the online planning database (i.e. DB12) are herein being provided in spreadsheet format. These Level 1 comments are based on a direct comparison of the online planning database against the Initially Prepared Regional Water Plan document as submitted. The table only includes numbers that do not reconcile between the plan (left side of spreadsheet) and online database (right side of spreadsheet). An electronic version of this spreadsheet will be provided upon request.

LEVEL 2. Comments and suggestions that might be considered to clarify or enhance the plan.

General Comment

1. Header on each page indicating "IPP Volume I" suggests that there may be another volume associated with plan. Please consider clarifying in header and/or Table of Contents and throughout plan (e.g. pages 1-64, 3-44, 4-24), if appropriate in the final adopted plan.

Chapter 4

2. Chapter 4: There is no reference in the Chapter 4 text to the associated Appendix 4F – Strategy Evaluation Matrix and Quantified Environmental Impact Matrix. Please consider including a reference in Chapter 4 directing readers to this data.

ATTACHMENT B

REGION F

Non-matching numbers

		IPP document reference:		IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
F	Colorado River Municipal Water District Total Demands	2-28	2.4-1		90,712	93,131	75,243	75,629	75,199	76,144		89,212	91,631	73,743	74,129	73,699	74,644
F	Brown County Water Improvement District #1 Total Demands	2-29	2.4-2		14,929	15,053	15,036	14,949	14,941	15,007		15,085	15,210	15,192	15,105	15,097	15,163
F	City of San Angelo Total Demands	2-31	2.4-6					52,634	53,196	53,746					52,586	52,953	53,265
F	Andrews Co. Pecos Valley Rio Grande	3-4	3.1-1	1,189								191	191	191	192	192	192
F	Andrews Co. Dockum Colorado	3-4	3.1-1	905								22	22	22	22	22	22
F	Andrews Co. Dockum Rio Grande	3-4	3.1-1	5,792								NA	NA	NA	NA	NA	NA
F	Andrews Co. Ogallala Colorado	3-4	3.1-1	31,279								24,886	24,886	24,886	25,373	25,363	25,350
F	Andrews Co. Ogallala Rio Grande	3-4	3.1-1	4,333								NA	NA	NA	NA	NA	NA
F	Andrews Co. Eds-Trinity Colorado	3-4	3.1-1	4,640								25	25	25	25	25	25
F	Groundwater Supply -Brown-Trinity Aquifer	3-4	3.1-1	2,045							2,085						
F	Groundwater Supply -Coleman-Ellenberger-San Saba	3-4	3.1-1	-							179						
F	Groundwater Supply -Crane-Other Aquifer	3-4	3.1-1	NA							81						
F	Ector-Pecos Valley	3-4	3.1-1	2,904							3,143						
F	Irion - Dockum	3-4	3.1-1	-							928						
F	Mitchell-Other Aquifer	3-4	3.1-1	NA							2						
F	Pecos-Capitan Reef	3-4	3.1-1	34,000							NA						
F	Pecos-Rustler Aquifer (db12)	3-4	3.1-1	NA							1,389						
F	Pecos Other Aquifer (db12)	3-4	3.1-1	NA							5						
F	Reeves-Rustler Aquifer (db12)	3-4	3.1-1	NA							103						
F	Runnels- db12 Other Aquifer	3-4	3.1-1	NA							2,656						
F	Scurry-db12 -Other Aquifer	3-4	3.1-1	NA							314						
F	Sterling-Other Aquifer (db12)	3-4	3.1-1	NA							997						
F	Winkler- Dockum Aquifer	3-4	3.1-1	10,746							10,748						
F	Groundwater Supplies in Region F	3-6	3.1-1		NA	NA	NA	NA	NA	1,170,823		1,157,501	1,157,508	1,157,504	1,157,491	1,157,468	1,157,453
F	Currently Available Supplies to WUGs/Co- Brown	3-51	3.4-1		21,694	21,784	21,787	21,752	21,764	21,821		21,750	21,840	21,843	21,808	21,820	21,877
F	Coke	3-51	3.4-1		2,094	2,072	2,345	2,307	2,288	2,253		2,228	2,181	2,4[illegible]	2,401	2,372	2,327
F	Coleman	3-51	3.4-1		2,906	2,891	2,888	2,886	2,885	2,881		2,806	2,791	2,7[illegible]	2,786	2,785	2,781
F	Concho	3-51	3.4-1		7,001	6,994	7,032	7,021	6,909	6,909		7,035	7,172	7,191	7,185	7,129	7.129
F	Ector	3-51	3.4-1		48,121	44,770	53,358	54,244	55,272	55,908		48,048	44,677	53,197	54,079	55,110	55,455
F	McCulloch	3-51	3.4-1		9,644	9,737	9,889	9,941	9,790	9,889		9,449	9,530	9,645	9,708	9,665	9,764
F	Runnels	3-51	3.4-1		4,854	4,859	4,899	4,899	4,825	4,556		4,953	4,948	5,102	5,090	4,701	4,732
F	Tom Green	3-51	3.4-1		74,516	74,295	74,186	73,972				74,429	74,207	74,041	73,822		
F	Total Supply to Water Users	3-51	3.4-1		619,575	615,264	615,446	611,147	610,509	609,822		619,443	615,208	615,315	611,004	610,358	609,670
F	Andrews Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		560	560	560	560	560	560
F	Concho Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		80	220	220	220	220	220
F	Ector Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		3,000	3,150	3,300	3,450	3,600	3,750
F	Midland Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		5,987	5,987	5,987	5,987	5,987	5,987
F	Runnels Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		218	218	218	218	218	218
F	Tom Green Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		8,500	8,500	8,500	8,500	8,500	8,500
F	Ward Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		670	670	670	670	670	670
F	Total Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		19,015	19,305	19,455	19,605	19,755	19,905
F	Currently Available Supply - WWP- Brown Co WID #1	3-53	3.5-1		29,712	29,712	29,712	29,712	29,712	29,712		29,868	29,868	29,868	29,868	29,868	29,868
F	""-CRMWD-Ector Co Well Field	3-53	3.5-1		423	423	423	423	423	423		440	440	440	440	440	440
F	""CRMWD-Lake Ivie	3-53	3.5-1		66,350	65,000	636,520	63,000	60,950	59,600		66,874	65,524	64,018	62,676	61,336	60,006
F	""EV Spense	3-53	3.5-1		560	560	560	560	560	560		34	34	34	34	34	34
F	""City of Odessa - Ward Co Field	3-53	3.5-1		4,800	NA	NA	NA	NA	NA		4,800	-	-	-	-	-
F	"" City of Odessa-CRMWD System	3-53	3.5-1		13,439	13,191	20,793	20,778	21,177	21,047		14,139	13,691	21,388	20,978	21,277	21,047
F	""-University Lands- Midland Paul Davis Well Field	3-53	3.5-1		4,722	4,722	4,722	-	-	-		NA	NA	NA	NA	NA	NA
F	"" University Lands- City of Andrews Well Field	3-53	3.5-1		671	708	730	-	-	-		1,908	1,945	1,967	0	0	0
F	Andrews County Total Needs	4-6	4.1-1		(12,818)							(12,875)					
F	Borden County Total Needs	4-6	4.1-1		(1,520)							(1,847)					
F	Brown County Total Needs	4-6	4.1-1		(2,369)							(3,006)					
F	Coke County Municipal Needs	4-6	4.1-1		(111)							(116)					
F	Coke County Total Needs	4-6	4.1-1		(870)							(875)					
F	Coleman County Municipal Needs	4-6	4.1-1		(359)							(1,304)					
F	Coleman County Total Needs	4-6	4.1-1		(1,730)							(2,675)					
F	Concho County Municipal Needs	4-6	4.1-1		122							(4)					
F	Concho County Total Needs	4-6	4.1-1		1,090							(4)					
F	Ector County Total Needs	4-6	4.1-1		(5,508)							(5,694)					
F	Howard County Municipal Needs	4-6	4.1-1		(1,350)							(1,394)					
F	Howard County Total Needs	4-6	4.1-1		(1,864)							(1,971)					

REGION F

		IPP document reference:		Non-matching numbers: IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
F	Irion County Total Needs	4-6	4.1-1		(1,292)							(1,302)					
F	Kimble County Total Needs	4-6	4.1-1		(825)							(1,644)					
F	Martin County Total Needs	4-6	4.1-1		(1,149)							(1,180)					
F	McCulloch County Municipal Needs	4-6	4.1-1		(931)							(1,004)					
F	McCulloch County Total Needs	4-6	4.1-1		2,348							(1,004)					
F	Mitchell County Total Needs	4-6	4.1-1		(4,942)							(5,023)					
F	Reagan County Total Needs	4-6	4.1-1		(10,990)							(10,997)					
F	Reeves County Total Needs	4-6	4.1-1		(36,085)							(36,097)					
F	Scurry County Total Needs	4-6	4.1-1		922							(565)					
F	Tom Green County Municipal Needs	4-6	4.1-1		(8,724)							(9,225)					
F	Tom Green County Total Needs	4-6	4.1-1		(58,506)							(59,084)					
F	Upton County Irrigation Needs	4-6	4.1-1		(10,640)							(10,672)					
F	Upton County Total Needs	4-6	4.1-1		(10,032)							(10,672)					
F	Region F Total Irrigation Needs	4-6	4.1-1		(163,800)							(179,728)					
F	Region F Total Mining Needs	4-6	4.1-1		2,107							(503)					
F	Region F Total Municipal Needs	4-6	4.1-1		(12,162)							(22,055)					
F	Region F Total Steam Electric Needs	4-6	4.1-1		(6,568)							(7,095)					
F	Region F Total Needs	4-6	4.1-1		(183,933)							(212,918)					
F	Andrews County Total Needs	4-7	4.1-2				(12,652)							(12,707)			
F	Borden County Total Needs	4-7	4.1-2				(1,462)							(1,839)			
F	Brown County Total Needs	4-7	4.1-2				(2,330)							(2,946)			
F	Coke County Municipal Needs	4-7	4.1-2				(23)							(28)			
F	Coke County Total Needs	4-7	4.1-2				(675)							(680)			
F	Coleman County Municipal Needs	4-7	4.1-2				(317)							(1,270)			
F	Coleman County Total Needs	4-7	4.1-2				(1,689)							(2,642)			
F	Ector County Total Needs	4-7	4.1-2				(9,473)							(9,640)			
F	Howard County Municipal Needs	4-7	4.1-2				36							(25)			
F	Howard County Total Needs	4-7	4.1-2				210							(34)			
F	Irion County Total Needs	4-7	4.1-2				(1,166)							(1,181)			
F	Kimble County Total Needs	4-7	4.1-2				(852)							(1,749)			
F	Martin County Total Needs	4-7	4.1-2				(680)							(751)			
F	McCulloch County Municipal Needs	4-7	4.1-2				(887)							(990)			
F	McCulloch County Total Needs	4-7	4.1-2				2,462							(990)			
F	Mitchell County Total Needs	4-7	4.1-2				(4,469)							(4,670)			
F	Reagan County Total Needs	4-7	4.1-2				(10,109)							(10,116)			
F	Reeves County Total Needs	4-7	4.1-2				(34,371)							(34,387)			
F	Runnels County Municipal Needs	4-7	4.1-2				(1,620)							(1,630)			
F	Runnels County Total Needs	4-7	4.1-2				(3,021)							(3,031)			
F	Scurry County Total Needs	4-7	4.1-2				1,304							(10)			
F	Tom Green County Municipal Needs	4-7	4.1-2				(10,266)							(10,564)			
F	Tom Green County Total Needs	4-7	4.1-2				(60,423)							(60,786)			
F	Upton County Irrigation Needs	4-7	4.1-2				(10,186)							(10,223)			
F	Upton County Total Needs	4-7	4.1-2				(9,659)							(10,223)			
F	Region F Total Irrigation Needs	4-7	4.1-2				(155,380)							(174,774)			
F	Region F Total Manufacturing Needs	4-7	4.1-2				(3,735)							(3,747)			
F	Region F Total Mining Needs	4-7	4.1-2				2,371							(29)			
F	Region F Total Municipal Needs	4-7	4.1-2				(26,835)							(36,117)			
F	Region F Total Steam Electric Needs	4-7	4.1-2				(10,787)							(11,380)			
F	Region F Total Needs	4-7	4.1-2				(194,340)							(226,047)			
F	Andrews County Total Needs	4-8	4.1-3							(11,666)							(11,719)
F	Borden County Total Needs	4-8	4.1-3							(1,373)							(1,826)
F	Brown County Total Needs	4-8	4.1-3							(2,163)							(2,841)
F	Coleman County Municipal Needs	4-8	4.1-3							(276)							(1,241)
F	Coleman County Total Needs	4-8	4.1-3							(1,648)							(2,613)
F	Ector County Total Needs	4-8	4.1-3							(19,865)							(20,012)
F	Howard County Municipal Needs	4-8	4.1-3							(720)							(825)
F	Howard County Total Needs	4-8	4.1-3							(890)							(1,330)
F	Irion County Total Needs	4-8	4.1-3							(963)							(1,000)
F	Kimble County Municipal Needs	4-8	4.1-3							(904)							(910)
F	Kimble County Total Needs	4-8	4.1-3							(895)							(1,909)
F	Martin County Total Needs	4-8	4.1-3							(291)							(393)

REGION F

Region IPP	Item	IPP document reference: Page number	IPP document reference: Table number	Non-matching numbers — IPP document number: non-decadal number	IPP 2010	IPP 2020	IPP 2030	IPP 2040	IPP 2050	IPP 2060	Online Planning Database (DB12) number: non-decadal number	DB12 2010	DB12 2020	DB12 2030	DB12 2040	DB12 2050	DB12 2060
F	McCulloch County Municipal Needs	4-8	4.1-3							(960)							(1,038)
F	McCulloch County Total Needs	4-8	4.1-3							2,494							(1,038)
F	Mitchell County Total Needs	4-8	4.1-3							(3,707)							(4,140)
F	Reagan County Total Needs	4-8	4.1-3							(8,386)							(8,393)
F	Reeves County Total Needs	4-8	4.1-3							(31,829)							(31,847)
F	Scurry County Total Needs	4-8	4.1-3							951							(348)
F	Tom Green County Municipal Needs	4-8	4.1-3							(11,321)							(11,633)
F	Tom Green County Total Needs	4-8	4.1-3							(62,004)							(62,367)
F	Upton County Irrigation Needs	4-8	4.1-3							(9,495)							(9,539)
F	Upton County Total Needs	4-8	4.1-3							(9,030)							(9,539)
F	Region F Total Irrigation Needs	4-8	4.1-3							(141,535)							(166,120)
F	Region F Total Mining Needs	4-8	4.1-3							1,875							(375)
F	Region F Total Municipal Needs	4-8	4.1-3							(39,963)							(49,636)
F	Region F Total Needs	4-8	4.1-3							(205,321)							(241,856)
F	Colorado River Municipal Water District Needs	4-9	4.1-4		(16,227)	(25,196)	(8,658)	(10,394)	(11,314)	(13,609)		(14,729)	(23,698)	(8,138)	(9,242)	(9,954)	(12,229)
F	City of Odessa Needs	4-9	4.1-4		(4,488)	(10,176)	(4,118)	(5,215)	(6,085)			(3,788)	(10,216)	(3,523)	(5,015)	(5,985)	
F	City of San Angelo Needs	4-9	4.1-4					(33,188)	(33,973)	(34,746)					(33,140)	(33,730)	(34,265)
F	Colorado River Municipal Water District Needs	NA	Appendix 3B		(16,227)	(25,196)	(8,658)	(10,394)	(11,314)	(13,609)		(14,729)	(23,698)	(8,138)	(9,242)	(9,954)	(12,229)
F	City of Odessa Needs	NA	Appendix 3B		(4,488)	(10,176)	(4,118)	(5,215)	(6,085)			(3,788)	(10,216)	(3,523)	(5,015)	(5,985)	
F	Subordination -Coleman - Coleman Co - Lake Coleman	4-18	4.2-3		2,063	2,075	2,080	2,087	2,089	2,091		1,650	1,651	1,647	1,645	1,639	1,631
F	Subordination -Manufacturing-Ector Co - CRMWD	4-18	4.2-3		66	149	3	46	86	158		366	449	108	396	386	408
F	Subordination -Manufacturing-Kimble Co - Llano River not listed in	4-18	4.2-3		NA	NA	NA	NA	NA	NA		1,000	1,000	1,000	1,000	1,000	1,000
F	Subordination -Miles - Runnels Co - OC Fisher Reservoir	4-19	4.2-3		100	100	100	100	100	100		140	153	163	173	183	193
F	Subordination -Snyder - Scurry Co - CRMWD	4-19	4.2-3		511							513					
F	Subordination -Total	4-19	4.2-3		43,303	46,471	29,394	30,636	30,877	32,946		43,889	47,044	29,902	31,374	31,810	33,829
F	Ballinger - Subordination-Ballinger	4-29 , 4-30 & 4-41	4..3-3 , 4.3-4 & 4.3-8		940							917					
F	Ballinger - Subordination of downstream rights to CRMWD is not lis	4-41	4.3-8		343	356	227	243	0	0		NA	NA	NA	NA	NA	NA
F	Ballinger - CRMWD System not listed in DB12	4-41	4.3-8		257	244	373	357	0	0		NA	NA	NA	NA	NA	NA
F	Winters - Subordination	4-43	4.3-11		720					670		552					591
F	Reuse Cost	4-48	4.3-14							258,000							69,960
F	Subordination to Lake Winters	4-48	4.3-14		720	710	700	690	680	670		552	561	566	571	575	591
F	Winters WMS Totals	4-48	4.3-14		720	710	700	800	790	780		552	561	566	681	685	701
F	City of Winters Cost for Reuse	4-48	4.3-15							258,000							69,960
F	Bronte - Rehabilitation of Pipeline	4-52	4.3-18		0	0	0	0	0	0		129	129	129	129	129	129
F	City of Bronte Cost for Rehab of Oak Creek pipeline	4-56	4.3-21	1,238,600	21,600	21,600					1,955,000	-	-				
F	Robert Lee -Direct Reuse WMS	4-60	4.3-23	2,158,000							na						
F	Robert Lee - Brush Control Cost - not listed in IPP	4-68	4 3-30		NA	NA	NA	NA	NA	NA	114,070	19,000	19,000	19,000	19,000	19,000	19,000
F	City of Menard Conservation Cost	4-71	4.3-32		8,755	13,526	13,146	12,776	12,414	12,190		2,183	7,018	6,993	6,982	6,961	6,951
F	City of Menard Off Channel Reservoir	4-77	4.3-35	24,520,000							25,273,000						
F	City of Menard Conservation Cost	4-79	4.3-36		8,755	13,526	13,146	12,776	12,414	12,190		2,183	7,018	6,993	6,982	6,961	6,951
F	City of Midland Develop Aquifer Supplies	4-82	4.3-39	468,507,000							168,507,000						
F	City of Midland Develop Aquifer Supplies	4-82	4.3-39						4,648,500	4,648,500						4,651,200	4,651,200
F	Midland-Subordination-WMS Supply	4-87	4.3-41		4,656	6,113	-156	-266	-378	-490		4,505	6,055	0	0	0	0
F	Midland-Voluntary Redistribution-Annual Cost	4-88	4.3-42				4,790,000	4,694,200	4,598,400	4,502,600				4,772,088	4,676,646	4,581,204	4,485,763
F	Midland-Annual Cost Totals	4-88	4.3-42				24,646,531	24,570,877	9,738,961	9,635,997				24,628,619	24,523,323	9,724,465	9,621,750
F	City of Midland Redistribution	4-88	4.3-42				4,790,000	4,694,200	4,598,400	4,502,600				-	-	-	-
F	Coleman-Subordination WMS Supply	4-93	4 3-46		2,200	2,200	2,200	2,200	2,200	2,200		2,030	2,031	2,027	2,025	2,019	2,011
F	Brady-Subordination WMS Supply	4-98	4.3-52		1,350	1,350	1,350	1,350	1,350	1,350		2,170	2,170	2,170	2,170	2,170	2,170
F	City of Eden Cost for replacent wells	4-106	4.3-55	1,800,000							1,367,372						
F	City of Eden Cost for Advanced Treatment	4-109	4.3-57	2,582,000							4,382,000						
F	City of Eden- Cost of Recommended Strategies for Hickory Aquifer -	4-121	4.3-65	1,367,372							na						
F	Richland SUD-Cost of Recommended Strategies for Hickory Aquifer-	4-121	4.3-65	977,829	308,311	308,311	384,361	384,361	384,361	384,361	1,703,979.00	234,154.37	234,154.37	86,154.37	86,154.37	86,154.37	86,154.37
F	City of Melvin -Cost of Recommended Strategies for Hickory Aquifer	4-121	4.3-65	325,139	102,392	102,392	102,392	102,392	102,392	102,392	na	na	na	na	na	na	na
F	Live Oak Hills Subdivision -Cost of Recommended Strategies for Hi	4-121	4.3-65	88,804	288,819	288,819	288,819	288,819	288,819	288,819	na	na	na	na	na	na	na
F	Kimble Co Manufacturing Cost not listed in IPP	4-129			NA	NA	NA	NA	NA	NA	0	0	0	0	0	0	0
F	Iron Co Irrigation Conservation WMS Supply	4-144	4.6-5			36							37				
F	Scurry Co Irrigation Conservation WMS Supply	4-144	4.6-5			572							571				
F	Sterling Co Irrigation Conservation WMS Supply	4-144	4.6-5			44							45				
F	Tom Green Co Irrigation Conservation WMS Supply	4-144	4.6-5			5,690							5,774				
F	Winkler Co Irrigation Conservation WMS Supply	4-144	4.6-5			195							194				

REGION F		IPP document reference:		Non-matching numbers													
				IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
F	Costs for Roberts Co Area	4-163	4.8-8	768,821,000						$25,000.00	na						na
F	City of Snyder-Potiential Water Conservation Summary	4-165	4.8-9		$56,052.00	$61,357	$59,809.00	$57,823.00	$55,694.00	$54,185.00		13,976.00	18,898.00	18,973.00	19,026.00	18,969.00	18,901.00
F	CRMWD-Cost for Supplemental Well	4-171	4.8-14	522,000							na						
F	Colorado River Municipal Water District Cost for Desalination	4-170	4.8-13	119,617,000							131,603,990						
F	Colorado River Municipal Water District Cost for new well field	4-173	4.8-16	73,994,000			8,460,000	8,460,000	8,460,000	2,009,000	76,268,000	-	-	8,666,000	8,666,000	2,017,000	2,017,000
F	University Lands Contract	4-173	4.8-16			847,000	847,000	65,000	65,000	65,000		-	-	-	-	-	-
F	Colorado River Municipal Water District Cost for Desalination	4-173	4.8-16	119,617,000				6,340,378	6,340,378	6,340,378	131,603,990				13,721,167	2,384,500	2,384,500
F	Supplemental Wells	4-173	4.8-16	12,528,000		200,000	400,000	416,000	432,000	448,000	-	-	-	-	-	-	-
F	City of San Angelo Cost for Ultimate Capacity Desalination	4-182	4.8-20	40,424,000							-						
F	City of San Angelo McCulloch Co Well Field Cost	4-184	4.8-21	157,126,000							173,307,000						
F	Irrigation Sutton Co. Cost (summed incorrectly)	NA	4.10-1	164,160							194,940						
F	CRMWD Reuse cost	NA	4.10-2	148,302,000							128,748,000						
F	CRMWD Supplemental Wells cost	NA	4.10-2	12,528,000							-						
F	CRMWD Desalination cost	NA	4.10-2	119,616,990							131,603,990						
F	CRMWD Total cost	NA	4.10-2	365,678,990							345,583,990						
F	San Angelo-Subordination WMS Supply	4-191	4.8-25		11,791	11,472	11,153	10,835	10,516	10,196		16,189	15,766	15,344	14,922	14,230	14,077
F	Bronte - Rehabilitation of Pipeline Supply	4.206	4.10-1		0	0	0	0	0	0		129	129	129	129	129	129
F	Robert Lee-New WTP and Storage Facilities WMS Supply not listed	4.206	4.10-1		0	0	0	0	0	0		200	200	200	200	200	200
F	Coke County Total	4.206	4.10-1		680	727	514	612	712	847		1,009	1,056	843	941	1,041	1,176
F	Coleman - Coleman Co - Conservation WMS	4.206	4.10-1		50	109	141	163	181	187		33	75	90	95	101	107
F	Coleman Co WMS Total	4.206	4.10-1		3,597	3,645	3,668	3,681	3,691	3,687		3,580	3,611	3,617	3,613	3,611	3,607
F	Eden-Concho Co-Replacement Well not listed in IPP	4.206	4.10-1		NA	NA	NA	NA	NA	NA		322	322	322	322	322	322
F	Concho County Total	4.206	4.10-1		34	1,182	1,889	1,895	1,962	1,962		356	1,504	2,211	2,217	2,284	2,284
F	Ector Co Manufacturing-Reuse WMS is not listed in IPP	4.207	4.10-1		NA	NA	NA	NA	NA	NA		0	350	105	350	300	250
F	Ector Co Manufacturing-Subordination WMS	4.207	4.10-1		66	149	3	46	86	158		366	449	108	396	386	408
F	Odessa-Ector Co-Reuse	4.207	4.10-1		0	4,293	4,273	7,262	4,258	4,256		0	3,943	4,168	3,912	3,958	4,006
F	Odessa-Ector Co-Conservation	4.207	4.10-1		540	1,168	1,488	1,657	1,854	2,074		551	1,200	1,536	1,715	1,920	2,149
F	Odessa-Ector Co-Voluntary Redistribution	4.207	4.10-1					10,507	10,502	10,498					4,708	4,708	4,708
F	Odessa-Ector Co-Voluntary Redistribution (Develop Aquifer + New/	4.207	4.10-1			4,708	4,708	10,507	10,502	10,498			4,800	10,800	10,800	10,800	10,800
F	Ector County Total	4.207	4.10-1		5,425	16,809	11,057	18,225	19,403	21,297		5,725	17,109	16,962	18,575	19,703	21,547
F	Richland SUE-Bottled Water Program WMS Supply	4-208	4.10-1		0	0	0	0	0	0		1	1	1	1	1	1
F	Richland SUE-Infrastructure Improvement WMS Supply	4-208	4.10-1		0	0	0	0	0	0		113	113	113	113	113	113
F	McCulloch County Total	4-208	4.10-1		2,314	2,640	2,779	2,880	2,937	2,946		2,428	2,754	2,893	2,914	3,051	3,060
F	Midland-Subordination-WMS Supply (CRMWD)	4-208	4.10-1		4,488	6,055	0	0	0	0		4,488	6,152	211	324	438	553
F	Midland County Total	4-208	4.10-1			16,158	35,719	35,864	35,793	35,751			16,255	36,130	36,188	36,231	36,304
F	Ballinger-Runnels Co-Subordination-CRMWD-not listed in DB12	4-209	4.10-1		343	356	227	243	0	0			NA	NA	NA	NA	NA
F	Miles-Runnels Co-Subordination	4-209	4.10-1		100	100	100	100	100	100		140	153	163	173	183	193
F	Runnels Co Total	4-209	4.10-1		2,402	2,487	2,315	2,421	2,813	2,806		2,099	2,184	2,151	2,251	2,896	2,899
F	Snyder-Scurry Co-Subordination	4-209	4.10-1		511							513					
F	Scurry County Total	4-209	4.10-1		635							637					
F	Sterling Co Irrigation Conservation WMS Supply	4-209	4.10-1					90	91	92					89	89	89
F	San Angelo-Tom Green Co-Infrastructure Improvement WMS	4-209	4.10-1		2,274	2,261	2,247	2,233	2,220	2,206		2,308	2,295	2,281	2,267	2,254	2,240
F	Tom Green Co Total	4-209	4.10-1		27,490	40,555	49,411	56,711	56,340	56,289		27,524	40,589	49,445	56,745	56,374	56,323
F	Conservation WMS Total	4-209	4.10-1		3,214	43,147	80,602	81,210	81,851	82,506		3,197	43,113	80,551	81,141	81,769	82,423
F	Subordination WMS Total	4-209	4.10-1		43,890	47,047	29,961	31,194	31,427	33,486		43,889	47,141	30,113	31,698	32,248	34,382
F	Bottled Water Program WMS Total	4-209	4.10-1		0	0	0	0	0	0		1	1	1	1	1	1
F	Infrastructure Improvement WMS Total	4-209	4.10-1		2,274	2,261	2,247	2,233	2,220	2,206		2,437	2,424	2,410	2,396	2,383	2,369
F	Total for All Strategies	4-209	4.10-1		58,494	127,208	174,442	190,499	192,234	194,710		59,275	128,067	181,342	191,733	193,772	196,322
F	CRMWD-Renew Contract WMS	4-210	4.10-1		0	5,200	5,200	5,200	5,200	5,200		392	5,622	15,629	15,430	16,119	15,932
F	CRMWD -Subordination WMS Supply	4-210	4.10-1		48,027	47,133	46,240	45,347	44,453	43,560		47,618	46,809	36,022	35,443	33,975	33,381
F	CRMWD Total	4-210	4.10-1		48,027	64,713	69,820	78,427	77,533	76,640		48,010	64,811	70,031	78,753	77,974	77,193
F	University Lands - New/Renew Water Supply Contract	4-210	4.10-1		NA	NA	NA	NA	NA	NA		0	5,200	5,200	5,950	5,960	5,973
F	WWP WMS Totals	4-210	4.10-1		66,473	89,537	97,622	113,506	112,021	111,076		84,954	125,541	133,699	151,761	151,521	152,545
F	San Angelo -WWP	4-211	4.10-2	254,904,000							na						
F	Brown C-O Brownwood Lake	App. 3A-3	App 3A		229	229	223	214	211	211		385	385	379	370	367	367
F	Brown Co. Zephyr WSC Brownwood Lake	App. 3A-4	App 3A		616	616	616	616	616	616		516	516	516	516	516	516
F	Coke Co. Bronte Village Other Aquifer	App. 3A-4	App 3A		116	129	125	121	120	120		250	238	226	215	204	194
F	Coleman Co. Santa Anna Brownwood Lake	App. 3A-7	App 3A		307	307	307	307	307	307		207	207	207	207	207	207
F	Concho Co. Eden Direct Reuse	App. 3A-8	App 3A		-	-	-	-	-	-		80	220	220	220	220	220
F	Concho Co. Millersville-Doole WSC CRMWD	App. 3A-8	App 3A		92	85	123	112				46	43	62	56		
F	Ector Co. Mfg Colorado Basin CRMWD	App. 3A-12	App 3A		177	297	604	702	771	813		877	797	1,199	902	871	813

REGION F

Non-matching numbers

		IPP document reference:		IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
F	Ector Co. Odessa CRMWD	App. 3A-12	App 3A		11,949	11,350	17,464	17,158	17,354	17,159		11,176	10,757	16,708	16,793	17,092	17,006
F	McCulloch Co. Brady Hickory Aquifer	App. 3A-19	App 3A		1,009	1,009	1,009	1,009	1,009	1,009		884	884	884	884	884	884
F	McCulloch Co. Millersville-Doole WSC CRMWD	App. 3A-19	App 3A		161	164	238	216				91	82	119	108		
F	Runnels Co. Ballinger O.H. Ivie Lake	App. 3A-28	App 3A		-	-	-	-				257	244	373	357		
F	Runnels Co. Miles Other Aquifer	App. 3A-29	App 3A		134	134	134	134	134	134		10	10	10	10	10	10
F	Runnels Co. Millersville-Doole WSC CRMWD	App. 3A-29	App 3A		69	62	93	85				35	31	47	43		
F	Tom Green Co. Millersville-Doole WSC CRMWD	App. 3A-36	App 3A		174	176	290	300	-	-		87	88	145	150	-	-
F	Brown County WID Brownwood Lake	NA	App 3B		29,712	29,712	29,712	29,712	29,712	29,712		29,644	29,641	29,648	29,505	29,016	28,525
F	CRMWD Total Current Supply	NA	App 3B		74,485	67,935	66,585	65,235	63,885	62,535		74,468	67,918	66,568	65,218	63,868	62,518
F	Ballinger cost for reuse	2 of 48	appendix 4D	2,567,000	324,000						-	-					
F	Big Spring cost for reuse	6 of 48	appendix 4D	9,911,000	1,529,000						-	-					
F	Bronte cost for rehab of Oak Creek Pipeline	8 of 48	appendix 4D		34,100							-					
F	CRMWD cost for Southwest Pecos Co to Odessa	11 of 48	appendix 4D	183,321,000	22,279,000						-	-					
F	City of Eden Cost for Advanced Treatment	18 of 48	appendix 4D	2,582,000							4,382,000						
F	City of Eden Cost for replacent wells	19 of 48	appendix 4D	1,800,000							1,367,372						
F	City of Eden Cost for Bottled Water program	20 of 48	appendix 4D		24,000							38,566	38,566	38,566	38,566	38,566	38,566
F	Cost of Odessa-Midland Reuse	28 of 48	appendix 4D	109,194,000	13,272,000						-	-					
F	Robert Lee cost of new groundwater from Alluvium	35 of 48	appendix 4D		157,000							396,500	396,500	25,950	25,950	25,950	25,950
F	San Angelo cost of Desal	37 of 48	appendix 4D		9,223,930										2,648,800	2,648,800	13,721,167
F	San Angelo cost of Desal phase II	38 of 48	appendix 4D	40,327,000	12,039,500						-	-					
F	Snyder Cost for reuse	47 of 48	appendix 4D	9,643,000	1,104,000						-	-					
F	Irrigation Costs for Irion Co.	2 of 6	appendix 4E			1,536						-	91,536				
F	Irrigation Costs for Mitchell Co.	4 of 6	appendix 4E			185,113							285,113				
F	Irrigation Costs for Ward Co.	6 of 6	appendix 4E				31,803							121,803			
F	CRMWD cost for reuse	appendix 4H	WMS Summary of Rec. Strategies	148,302,000							128,748,000						
F	CRMWD Supplemental Wells cost	appendix 4H	Summary of Rec. Strategies	12,528,000							-						
F	Bottle Water Program (McCulloch C-O) WMS Supply	Appendix4H	Summary		0	0	0	0	0	0		0	0	0	0	0	0
F	Bottle Water Program Richland SUD) WMS Supply	Appendix4H	Summary		0	0	0	0	0	0		1	1	1	1	1	1
F	New Infrastructure Improvement - Bronte WMS Supply	Appendix4H	Summary		0	0	0	0	0	0		129	129	129	129	129	129
F	New Infrastructure Improvement - San Angelo WMS Supply	Appendix4H	Summary		2,274	2,261	2,247	2,233	2,220	2,206		2,308	2,295	2,281	2,267	2,254	2,240
F	Reuse-Odessa (Ector Co.) - WMS Supply	Appendix4H	Summary			4,293	4,273	4,262	4,258	4,256			3,943	4,168	3,912	3,958	4,006
F	Reuse-Manufacturing(Ector Co.) WMS Supply	Appendix4H	Summary			NA	NA	NA	NA	NA			350	105	350	300	250
F	Subordination-Coleman(Coleman Co.) WMS Supply	Appendix4H	Summary		1,650	1,651	1,647	1,645	1,639	1,631		2,030	2,031	2,027	2,025	2,019	2,011
F	Subordination-Manufacturing (Ector Co.) WMS Supply	Appendix4H	Summary		66	149	3	46	86	158		366	449	108	396	386	408
F	Subordination-Midland (Midland Co) WMS Supply	Appendix4H	Summary		4,488	6,055	0	0	0	0		4,505	6,055	0	0	0	0
F	Subordination-Midland (Midland Co) WMS Supply	Appendix4H	Summary		17	-97	-211	-324	-438	-553		NA	NA	NA	NA	NA	NA
F	Subordination-Miles-Runnels Co-WMS Supply	Appendix4H	Summary		100	100	100	100	100	100		140	153	163	173	183	193
F	Subordination-Snyder-Scurry Co-WMS Supply	Appendix4H	Summary		511							513					
F	Subordination-CRMWD WMS Supply	Appendix4H	Summary		35,166	30,548	46,240	43,696	41,857	38,746		47,618	46,809	36,022	35,443	33,975	33,381
F	Voluntary Redistribution - CRMWD WMS Supply	Appendix4H	Summary		0	5,200	5,200	5,200	5,200	5,200		392	5,622	15,629	15,430	16,119	15,932
F	Ballinger-Subordination-CRMWD-not listed in DB12	Appendix4H	1 of 99		141	169	68	115	0	0		NA	NA	NA	NA	NA	NA
F	Ballinger WMS Total	Appendix4H	1 of 99		1,091	1,187	1,095	1,144	1,524	1,542		950	1,018	1,027	1,029	1,631	1,634
F	Ballinger Alternative WMS Supply - Direct Reuse not listed in DB12	Appendix4H	1 of 99		220	220	220	220	220	220		NA	NA	NA	NA	NA	NA
F	Bronte - Rehabilitation of Pipeline WMS Supply	Appendix4H	5 of 99		0	0	0	0	0	0		129	129	129	129	129	129
F	Bronte WMS Total	Appendix4H	5 of 99		145	174	177	177	179	180		274	303	306	306	308	309
F	Coleman-Conservation WMS Supply	Appendix4H	6 of 99		50	109	141	163	181	187		33	75	90	95	101	107
F	Coleman-Subordination-Coleman Lake WMS Supply	Appendix4H	6 of 99		6,415	4,084	4,017	3,952	3,883	3,811		1,650	1,651	1,647	1,645	1,639	1,631
F	Coleman-Subordination-Hords Creek Lake WMS Supply	Appendix4H	6 of 99		647	643	640	637	633	630		380	380	380	380	380	380
F	Coleman-Total WMS Supply	Appendix4H	6 of 99		4,854	4,836	4,798	4,752	4,697	4,628		2,063	2,106	2,117	2,120	2,120	2,118
F	Runnels C-O Subordination (Winters Lake) WMS Supply	Appendix4H	20 of 99		114	89	69	49	31	0		23	0	0	0	0	0
F	Runnels C-O Subordination Ballinger Lake) WMS Supply	Appendix4H	20 of 99		23	0	0	0	0	0		114	89	69	49	31	0
F	Eden - New Hickory Well (Replacement Well in DB12) WMS Supply	Appendix4H	26 of 99		392	392	392	392	392	392		322	322	322	322	322	322
F	Eden - New Reverse Osmosis (Advanced Treatment in DB12) WMS S	Appendix4H	26 of 99		0	0	0	0	0	0		0	392	392	392	392	392
F	Eden - WMS Total	Appendix4H	26 of 99		392	392	392	392	392	392		322	714	714	714	714	714
F	Meneard-Alternative WMS-Aquifer Storage Recovery WMS Supply	Appendix4H	31 of 99		0	0						240	240				
F	Menard-Alternative WMS-Off Channel Reservoir not listed in IPP	Appendix4H	31 of 99		NA	NA	NA	NA	NA	NA		500	500	500	500	500	500

REGION F

		IPP document reference:		*Non-matching numbers* IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
F	Menard-Alternative WMS Total	Appendix4H	31 of 99		0	0	240	240	240	240		740	740	740	740	740	740
F	Midland - Subordination-CMWD System WMS Supply	Appendix4H	32 of 99		4,488	6,055	0	0	0	0		4,505	6,055	0	0	0	0
F	Midland - Subordination-OH Ivie LakeWMS Supply	Appendix4H	32 of 99		17	-97	-211	-324	-438	-553		17	-97	-211	-324	-438	-553
F	Midland - WMS Totals	Appendix4H	32 of 99		5,849	13,963	31,839	31,726	31,608	31,499		5,849	14,060	32,050	32,050	32,046	32,052
F	Millersview-Doole WSC-Subordination WMS Supply	Appendix4H	33 of 99		242	257	128	144				190	241	3	46	0	0
F	Millersview-Doole WSC- WMS Supply Total	Appendix4H	33 of 99		242	257	128	144				190	241	3	46		
F	Odessa-New/Renew Water Supply WMS	Appendix4H	34 of 99			4,450	4,695	4,450	4,500	4,550			4,800	4,800	4,800	4,800	4,800
F	Odessa-Subordination WMS Supply	Appendix4H	34 of 99		4,205							4,505					
F	Odessa - Reuse WMS - listed as alternative WMS in IPP.	Appendix4H	34 of 99		4,410	4,410	4,410	4,410	4,410	4,410		4,060	4,305	4,060	4,110	4,160	
F	Odessa-WMS Supply Total	Appendix4H	34 of 99		4,756	11,437	6,318	13,316	14,430	16,163		5,056	15,847	16,728	17,726	18,840	20,573
F	Richland SUD - Replacement Well WMS Supply	Appendix4H	36 of 99		0	0	0	0	0	0		113	113	113	113	113	113
F	Richland SUD Total WMS Supply	Appendix4H	36 of 99		1	1	1	1	1	1		114	114	114	114	114	114
F	Robert Lee-New WTP and Storage Facilities WMS Supply not listed i	Appendix4H	37 of 99		NA	NA	NA	NA	NA	NA		200	200	200	200	200	200
F	Robert Lee Total WMS Supply	Appendix4H	37 of 99		111	155	46	66	80	103		311	355	246	266	280	303
F	Robert Lee-Alternative WMS-Develop Other Aquifer Supply not liste	Appendix4H	37 of 99		NA	NA	NA	NA	NA	NA		150	150	150	150	150	150
F	Robert Lee-Alternative WMS-New Reservoir Intake not listed in IPP	Appendix4H	37 of 99		NA	NA	NA	NA	NA	NA		50	50	50	50	50	50
F	Robert Lee Total Alternative WMS Supply	Appendix4H	37 of 99			500	500	500	500	500		700	700	700	700	700	700
F	San Angelo-Rehabilitation of Pipe WMS Supply	Appendix4H	38 of 99		0	0	2,247	2,233	2,220	2,206		2,308	2,295	2,281	2,267	2,254	2,240
F	San Angelo-Subordination-OC Fisher Lake WMS Supply	Appendix4H	38 of 99		3,762	3,643	3,525	3,407	3,288	3,170		3,762	3,643	3,525	3,407	3,288	3,170
F	San Angelo-Brush Control WMS Supply	Appendix4H	38 of 99		0	0	0	0	0	0		8,362	8,362	8,362	8,362	8,362	8,362
F	San Angelo WMS Supply Total	Appendix4H	38 of 99									20,586	27,686	30,718	37,870	37,462	36,994
F	Snyder-Subordination WMS Supply	Appendix4H	39 of 99		511							513					
F	Snyder WMS total Supply	Appendix4H	39 of 99		581							583					
F	Irrigation-Andrews Co WMS Supply	Appendix4H	43 of 99		2,728							2,727					
F	Manufacturing-Ector Co. Subordination WMS Supply	Appendix4H	76 of 99			149	3	46	86	158			449	108	396	386	408
F	Manufacturing-Ector Co. WMS Supply total	Appendix4H	76 of 99			499	108	396	386	408			799	213	746	686	658
F	Steam Electric-Mitchell Co-Alternative Generation Technology (Alte	Appendix4H	98 of 99		NA	NA	NA	NA	NA	NA		4,077	2,774	4,240	5,988	8,079	10,590

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August 28, 2010

Mr. John W. Grant, Chairman
Region F Regional Water Planning Group
c/o CRMWD
P.O. Box 869
400 E. 24th St.
Big Spring, Texas 79721

Re: 2010 Region F Initially Prepared Regional Water Plan

Dear Mr. Grant:

Thank you for seeking review and comment from the Texas Parks and Wildlife Department ("TPWD") on the 2010 Initially Prepared Regional Water Plan for Region F (IPP).

As you may know, the Texas Parks and Wildlife Commission recently issued a new and updated Land and Water Resources Conservation and Recreation Plan. One of the cornerstones of the Land and Water Plan calls for TPWD to promote and protect healthy aquatic ecosystems, including the establishment of cooperative strategies to incorporate long-term plant, fish and wildlife needs in all statewide, regional and local watershed planning, management and permitting processes.

TPWD understands that regional water planning groups are required by TAC §357.7(a)(8)(A) to perform quantitative reporting of environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effects of upstream development on bays, estuaries and arms of the Gulf of Mexico when evaluating water management strategies. TPWD believes this quantification is a critical step in the process of attempting to plan for future water needs while at the same time, providing adequate protection of environmental resources, including fresh water inflows to current reservoirs and to the Gulf of Mexico. Accordingly, TPWD staff reviewed the IPP with a focus on the following questions:

- Does the IPP include a quantitative reporting of environmental factors including the effects on environmental water needs and habitat?
- Does the IPP include a description of natural resources and threats to natural resources due to water quantity or quality problems?
- Does the IPP discuss how these threats will be addressed?
- Does the IPP describe how it is consistent with long-term protection of natural resources?
- Does the IPP include water conservation as a water management strategy? Reuse?
- Does the IPP recommend any stream segments be nominated as ecologically unique?
- If the IPP includes strategies identified in the 2006 regional water plan, does it address concerns raised by TPWD in connection with the 2006 Water Plan.

Relative to the 2006 Regional Water Plan, the 2010 IPP proposes no changes to the population projections and includes only one change in water demands: a reduction for

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steam electric power in Mitchell County. With regard to existing supplies, groundwater supplies have changed only for the Trinity Aquifer in Brown County, for which a Desired Future Condition (DFC) and associated Managed Available Groundwater (MAG) value have been adopted by Groundwater Management Area 8 (GMA 8). Similarly, supplies from the Colorado River and associated reservoirs are unchanged from the 2006 Regional Water Plan. This includes subordination of certain water rights in the lower Colorado River basin to multiple reservoirs in Region F. As noted on page 4-20, the subordination of downstream water rights has the effect, on paper, of reducing intervening streamflows that may have environmental benefits.

Chapter 1 includes a description of natural resources in the region. Please update Table 1.4-1 Endangered and Threatened Species in Region F and Section 7.4 (Consistency with the Protection of Natural Resources) to include mussel species recently listed as threatened species by the TPWD Commission. These species include smooth pimpleback (*Quadrula houstonensis)*, Texas fatmucket (*Lampsilis bracteata*), Texas pimpleback (*Quadrula petrina)*, Texas fawnsfoot (*Truncilla cognate*), Texas hornshell (*Popenaias popeii*) and false spike (*Quadrula mitchelli*). More information can be found at http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/.

Section 5 describes the potential impact of water management strategies on water quality. Section 7.2 (Consistency with the Protection of Water Resources) reiterates information previously provided in Sections 1 and 4. Section 7.4 (Consistency with the Protection of Natural Resources) notes threatened and endangered species as well as public lands within Region F. Appendix 4F has low/medium/high descriptors of various environmental factors associated with water management strategies.

Each of the water management strategies discussed in Chapter 4 has a short description of associated environmental issues. Water conservation is recommended for many of the municipal water user groups with supply shortages as well as for irrigation shortages. Wastewater reuse is also recommended for some municipalities. TPWD supports the Region's consideration of brush control/management as an additional means to conserve water if done in a manner that can also benefit wildlife habitat. TPWD stands ready to assist with coordination of a land management program for Region F, as stated in the Region F IPP on page 4-202.

TPWD acknowledges Region F's environmental policy recommendations as discussed in Section 8.3.3. We concur with the Region's belief that good stewardship of land resources will also protect water resources and that water development must be balanced with protection of environmental values. While the IPP does not recommend nomination of any stream segments as ecologically unique until TPWD completes comprehensive studies, the IPP does acknowledge the importance of these resources. TPWD looks forward to future discussions with you regarding coordination of stakeholder-based efforts to identify and quantify priority environmental values to be protected.

Section 8.3.4 states that "Some cities and municipalities are concerned that a significant portion of their water supply could be reallocated to meet instream flow demands." TPWD is unaware of any federal or state legislation that forcibly reallocates existing water rights or water supplies to instream uses. Senate Bill 3, passed by the Texas legislature in 2007, created a new regulatory process for determining the environmental flow needs of the state's river basin and bay systems, but the law does not provide the state the authority to reallocate existing water rights to meet environmental flow needs. Texas Water Code Section 11.0237 does provide that water right holders may *voluntarily* amend an existing water right to change the use to or add a use for environmental flows. Additionally, Texas Water Code Section 11.122 provides that certain water right amendments, namely those that request an increased appropriation of water or an increased diversion rate, may be subject to environmental flow permit conditions.

We appreciate the opportunity to provide these comments. While TPWD values and appreciates the need to meet future water supply demands, we must do so in a thoughtful and sound manner that ensures the ecological health of our state's aquatic and natural resources. If you have any questions, or if we can be of any assistance, please feel to contact Cindy Loeffler at 512-389-8715. Thank you.

Sincerely,

Ross Melinchuk
Deputy Executive Director, Natural Resources

RM:CL:ch

RESPONSE TO AGENCY COMMENTS

TWDB Comments on Initially Prepared 2011 Region F Regional Water Plan

Executive Summary

1. Page ES-8, Section ES.3.2, line 2: "…to develop approximately 243,000 acre-feet per year of additional supplies by 2060…" does not reconcile with total water management strategy supply volume of 254,754 acft/yr presented on page ES-9, Table ES-1 or total water management strategy volume of 194,710 acft/yr presented in Table 4.10-1. Please revise as appropriate.

   Response: Table ES-1 and the corresponding text have been updated. Table ES-1 includes strategies developed for water user groups and strategies developed for wholesale water providers. Table 4.10-1 lists only the strategies for water user groups.

2. Page ES-8, Section ES.3.2, line 11; page ES-9, paragraph 1; and page ES-10 Figure ES-5: the total Region F water supply (current supplies with all water management strategies in year 2060) shown as 806,000 acft/yr does not reconcile with the sum of current water user group supply (610,000 acft/yr) and recommended water management strategy supply total (either 194,710 acft/yr, from Table 4.10-1; or 254,754 acft/yr, from Table ES-1), which would total either 804,710 acft/yr or 864,754 acft/yr, respectively. Please revise to reconcile these totals throughout the plan as appropriate.

   Response: Page ES-8 has been updated to show 805,000 acre-feet. This corresponds to the supplies recommended for water user groups.

3. Page ES-9, Table ES-1: "Desalination" year 2060 water management strategy volume of 16,050 acft/yr and capital cost of $424,148,000 do not reconcile with Table 4.10-1 summary of recommended water management strategies volume of 6,550 acft/yr and cost of $6,717,000. Please revise as appropriate.

   Response: Table ES-1 and the corresponding text have been updated. Table ES-1 includes strategies developed for water user groups and strategies developed for wholesale water providers. Table 4.10-1 lists only the strategies for water user groups.

4. Page ES-9, Table ES-1: "New Groundwater" 2060 water management strategy volume of 32,152 acft/yr and capital cost of $126,333,990 does not reconcile with Table 4.10-1 summary of recommended water management strategy volume of 26,152 acft/yr and cost of $174,573,000. Please revise as appropriate.

   Response: Table ES-1 and the corresponding text have been updated. Table ES-1 includes strategies developed for water user groups and strategies developed for wholesale water providers. Table 4.10-1 lists only the strategies for water user groups.

5. Page ES-9, Table ES-1: “Infrastructure Improvements” capital cost of $24,776,979 does not reconcile with Table 4.10-1 summary of recommended water management strategy cost of $6,091,979. Please revise as appropriate.

   Response: Table ES-1 and the corresponding text have been updated. Table ES-1 includes strategies developed for water user groups and strategies developed for wholesale water providers. Table 4.10-1 lists only the strategies for water user groups.

6. Page ES-9, Table ES-1: “Reuse” capital cost of $150,460,000 does not reconcile with Table 4.10-1 summary of recommended water management strategy cost of $2,158,000. Please revise as appropriate, throughout plan (e.g. Figure ES-5).

   Response: Table ES-1 has been updated. Table ES-1 includes strategies developed for water user groups and strategies developed for wholesale water providers. Table 4.10-1 lists only the strategies for water user groups. Figure ES-5 shows the distribution of supplies to water user groups, not costs.

7. Page ES-9, Table ES-1 & Figure ES-4: “Subordination” 2060 water management strategy volume of 72,830 acft/yr does not reconcile with Table 4.10-1 summary of recommended water management strategy volume of 33,486 acft/yr . Please revise as appropriate, throughout plan (e.g. Figure ES-5).

   Response: Table ES-1 has been updated. Table ES-1 includes strategies developed for water user groups and strategies developed for wholesale water providers. Table 4.10-1 lists only the strategies for water user groups. Figure ES-4 shows the total supply available to Region F with and without subordination. The difference in the bar graphs (green bar and red bar) is the amount of supply made available through subordination. No changes made to the graph. Figure ES-5 is correct.

8. Page ES-9, Table ES-1: “Voluntary Redistribution” 2060 water management strategy volume of 28,158 acft/yr and capital cost of $8,964,000 does not reconcile with Table 4.10-1 summary of recommended water management strategy volume of 22,958 acft/yr and cost of $0. Please revise as appropriate, throughout plan (e.g. Figure ES-5).

   Response: Table ES-1 and the corresponding text have been updated. Table ES-1 includes strategies developed for water user groups and strategies developed for wholesale water providers. Table 4.10-1 lists only the strategies for water user groups.

9. Page ES-9, Table ES-1: “Total” for All Recommended Water Management Strategies 2060 volume of 254,754 acft/yr and capital cost of $827,377,639 do not reconcile with Table 4.10-1 summary of recommended water management strategy volume of 194,710 acft/yr and cost of $282,234,649. Please revise as appropriate, throughout plan (e.g. Figure ES-5).

Response: Table ES-1 and the corresponding text have been updated. Table ES-1 includes strategies developed for water user groups and strategies developed for wholesale water providers. Table 4.10-1 lists only the strategies for water user groups. Figure ES-5 shows only supplies to water user groups. This figure is correct.

<u>Chapter 1</u>

10. Please describe how the planning group explored opportunities and benefits of regional water supply facilities or providing regional management of regional facilities. *[Title 31 Texas Administrative Code (TAC) §357.5(e)(6)]*

    Response: The region evaluated regional opportunities through the special studies that were conducted in Phase 1 of this planning cycle. These studies evaluated regional opportunities for groundwater supplies and rural systems. Both of these special studies are discussed in Section 1.7 of the plan. The findings of the special studies were considered in the development of water management strategies.

<u>Chapter 3</u>

11. Please indicate whether any publicly available plans of major agricultural, municipal, manufacturing and commercial water users and any water management plans were considered. *[31 TAC §357.5(k)(1)(E) §357.5(k)(1)(F)]*

    Response: Available water supply plans are discussed in Section 1.6.

12. Page 3-4: Two of the groundwater sources listed in Table 3.1-1 and Appendix 3A appear to be the same, but are reference by different names, specifically Table 3.1-1 source "Pecos Valley" and Appendix 3A source "Cenozoic Pecos Alluvium". Please revise as appropriate.

    Response: Appendix 3A was corrected to show the aquifer name as Pecos Valley.

13. Page 3-39: Hords Creek Lake "…diversion of 2,260 acre-feet per year" does not reconcile with page 3-35, Table 3.2-1 diversion volume of 2,240 acft/yr . Please revise as appropriate throughout plan.

    Response: The diversion amount was corrected to 2,240 acre-feet per year.

14. Page 3-42, Table 3.2-2: Table does not indicate to which information the footnote (c) applies. Please revise as appropriate.

    Response: The footnote was removed.

15. Page 3-43, Table 3.2-3: Table header does not specify whether the "WAM Supplies" listed are 'firm yield' or 'safe yield'. Please clarify in table.

Response: All run-of-the-river supplies are based on firm supply. The header was changed to say "WAM Firm Supplies".

16. Page 3-53, Table 3.5-1: CRMWD Ector County Well Field volume of 423 acft/yr for all decades does not reconcile with Appendix 3B volume of 440 acft/yr for all decades. Please revise as appropriate.

    Response: The supply volume has been changed to 440 acre-feet per year for all decades.

<u>Chapter 4</u>

17. It appears that total county 'balance' surpluses/shortages were calculated incorrectly throughout Chapter 4 tables by subtracting 'Total Demand' from 'Total Supply'. Please clarify that these are not water 'needs' (e.g. with a footnote) or revise to reflect total subcategory and county-wide water needs as the sum of the individual needs of each water user group in the county; needs that are calculated based on each water user group's own demands and supplies. *[31 TAC §357.7(a)(4)(B)]*

    Response: The calculations presented in Tables 4.1-1 through 4.1-3 are correct. A footnote will be added that states the sum of the individual water user group needs will differ. A comparison of supply and demand by water user group is included in Appendix 4A.

18. Page 4-2, last sentence: Indication that "On a water user group basis, the sum of the shortages is *over* 213,000 acre-feet per year in 2010…" does not reconcile with Table 4.1-1 year 2010 summation of shortages of 212,918acft/yr. Please revise as appropriate throughout plan.

    Response: The text on page 4-2 was changed to say "about 213,000".

19. Page 4-6, Table 4.1-1: Table incorrectly sums water 'needs' both horizontally (e.g. the Andrews County irrigation need of 12,875 acft/yr is apparently reduced to 12,818 acft/yr by incorrectly associating surplus water supplies from other water user groups that are not available to this water user group) and vertically (e.g. total needs for the region are presented as 183,933 acft/yr in 2010 whereas the correct net region total water needs in 2010 are 212,918 acft/yr). Please revise table to summarize and compile identified water needs appropriately.

    Response: The calculations presented in Tables 4.1-1 through 4.1-3 are correct. A footnote will be added that states the sum of the individual water user group needs will differ. A comparison of supply and demand by water user group is included in Appendix 4A.

20. Page 4-19, Table 4.2-3: Subordination water management strategy supply volume totals, by decade, in acft/yr of 43,303; 46,471; 29,394; 30,636; 30,877; 32,946) do not reconcile with

Table 4.10-1 Subordination supply volume totals, by decade, in acft/yr of 43,890; 47,047; 29,961; 31,194; 31,427; 33,486. Please revise as appropriate.

Response: Tables 4.2-3 and 4.10-1 were updated for the final plan. The total amount for subordination shown in Table 4.2-3 will not be the same as in Table 4.10-1 because the amount of water attributed to subordination of Spence Reservoir is shown as an infrastructure improvement strategy for San Angelo in Table 4.10-1. This strategy includes the subordination amount plus the existing available supply of 34 acre-feet per year from Spence Reservoir.

21. Page 4-20, paragraph 1, line 6: All recommended water management strategies must indicate associated capital and annual costs. Please indicate whether the cost for the 'Subordination' water management strategy is zero or present any associated costs with the strategy.

    Response: The text on page 4-20 of the IPP states, "For planning purposes, capital and annual costs for the subordination strategy are assumed to be $0." This statement is now on page 4-21 of the final plan.

22. Page 4-26, first sentence, last paragraph: Please reword text to clarify that implementation of Region F water municipal conservation provides water savings of 310 acft/yr rather than 509 acft/yr. This reconciles the strategy supply with the Appendix 4G, page 4G-1 value of 310 acft/yr for 2060 and reflects the fact that the remaining conservation savings appear to be associated with plumbing fixture savings that were embedded in the demand projections.

    Response: The text was reworded to reflect the savings associated only with Region F strategies.

23. Page 4-28, Section 4.3.2, paragraph 1: 2010 and 2060 City of Ballinger water demands of 1,068 acft/yr and 1,337 acft/yr do not reconcile with Table 4.3.2 (page 4-29) values of 1,142 acft/yr and 1,329 acft/yr respectively. Please revise as appropriate.

    Response: The text was corrected to reflect the amounts shown in Table 4.3-2.

24. Page 4-28, Section 4.3.2, paragraph 2: 2010 City of Ballinger water management strategy supply of 950 acft/yr does not reconcile with Table 4.3.2, page 4-29 value of 940 acft/yr and neither number reconciles with Appendix 4H, page 4H-3 tabular value of 917 acft/yr.

    Response: Lake Ballinger yield of 950 ac-ft is for 2000 sediment conditions. The yield of 940 acre-feet per year is in 2010. The text on page 4-29 of the final plan was modified to clarify this. The supply difference in Appendix 4H is due to sales to county-other.

25. Page 4-29, Table 4.3-3: Table 'Comments' does not specify whether the "WAM yield" values listed are 'firm yield' or 'safe yield'. Please clarify.

    Response: The comments were clarified to reflect safe yield.

26. Page 4-31: Section 'Voluntary Redistribution – Hords Creek Reservoir to Ballinger (220 acft/yr for 2040 through 2060) and MDWSC to Ballinger (600 acft/yr for 2010 through 2040)' water management strategies do not appear to be included in the Summary of Recommended water management strategies (supply and cost data) in Appendix 4H under the category 'Voluntary Redistribution' located on the fourth (unnumbered) page of Appendix 4H. Please revise as appropriate.

    Response: Neither of these strategies is recommended for the City of Ballinger. Ballinger has an existing contract for 600 acre-feet per year of water from CRMWD through MDWSC. Only a portion of the water is available without subordination. The recommended strategies for Ballinger are conservation, subordination of Lake Ballinger, subordination of CRMWD sources (for the remainder of the MDWSC contract) and enter into a new contract with CRMWD when the contract with MDWSC expires.

Appendices

27. Appendix 4D, page 48: It appears that the final water management strategy in Appendix D is not assigned to any particular water user group or wholesale water provider. Please clarify.

    Response: this is a generic cost estimate that is used for planning purposes only.

28. Appendices 4H/4I: Appendix 4H is labeled "Water User Group Summary Tables" but appears to include four tables including a Summary of Recommended Strategies, Summary of Alternative Strategies, List of Potentially Feasible Strategies, and Water User Group Summary Tables. Table of Contents refers to appendix 4I which is not labeled in the appendices section the contents of which appear to be included at the beginning of Appendix 4H. Please revise Table of Contents and appendices labels regarding 4H and 4I to clarify locations of contents.

    Response: This was corrected for the final plan.

29. *(Attachment B)* Comments on the online planning database (i.e. DB12) are herein being provided in spreadsheet format. These Level 1 comments are based on a direct comparison of the online planning database against the Initially Prepared Regional Water Plan document as submitted. The table only includes numbers that do not reconcile between the plan (left side of spreadsheet) and online database (right side of spreadsheet). An electronic version of this spreadsheet will be provided upon request.

    Response: The database (DB12) and the Region F Water Plan have been reviewed for consistency and data entries have been reconciled. In some cases, both the plan and DB12 were modified to clarify water strategies and/or supply distributions. A summary of the responses to these comments is included in the Table 10B-1.

LEVEL 2. Comments and suggestions that might be considered to clarify or enhance the plan.

General Comment

1. Header on each page indicating "IPP Volume I" suggests that there may be another volume associated with plan. Please consider clarifying in header and/or Table of Contents and throughout plan (e.g. pages 1-64, 3-44, 4-24), if appropriate in the final adopted plan.

   Response: Volume I was removed from the header. Region F will provide a complete set of the Phase I studies to the Regional Planning Group Members. This will be printed as a separate document.

Chapter 4

2. Chapter 4: There is no reference in the Chapter 4 text to the associated Appendix 4F – Strategy Evaluation Matrix and Quantified Environmental Impact Matrix. Please consider including a reference in Chapter 4 directing readers to this data.

   Response: A reference was added to page 4-12 of the final plan.

Texas Parks and Wildlife Comments, Received August 28, 2010

1. Please update Table 1.4-1 Endangered and Threatened Species in Region F and Section 7.4 with the recently designated threatened mussel species. (Note: these were designated in November 2009.)

   Response: Table 1.4-1 was updated with the recently threatened mussel species. In Chapter 7, the six listed mussel species were added to the text on page 7-5.

2. Texas Parks and Wildlife supports brush control/land management to conserve water if done in a manner that can also benefit wildlife habitat.

   Response: Region F acknowledges your support for brush control and land management.

3. Texas Parks and Wildlife looks forward to working with the region to identify priority environmental values to be protected, including designation of unique stream segments.

   Response: Region F appreciates the TPWD's offer of assistance.

4. Texas Parks and Wildlife discussed clarifications of instream flows as outlined by SB3.

   Response: Region F acknowledges your comments. No changes were made to the plan.

REGION F

		IPP document reference:		Non-matching numbers														
				IPP document number							Online Planning Database (DB12) number							
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060	Response
F	Colorado River Municipal Water District Total Demands	2-28	2.4-1		90,712	93,131	75,243	75,629	75,199	76,144		89,212	91,631	73,743	74,129	73,699	74,644	Table 2.4-1 was corrected.
F	Brown County Water Improvement District #1 Total Dema	2-29	2.4-2		14,929	15,053	15,036	14,949	14,941	15,007		15,085	15,210	15,192	15,105	15,097	15,163	Table 2.4-2 was corrected.
F	City of San Angelo Total Demands	2-31	2.4-6					52,634	53,196	53,746					52,586	52,953	53,265	Table 2.4-6 was corrected.
F	Andrews Co. Pecos Valley Rio Grande	3-4	3.1-1	1,189								191	191	191	192	192	192	Plan and DB12 are correct; Value stated in comment is allocated supply to WUGs.
F	Andrews Co. Dockum Colorado	3-4	3.1-1	905								22	22	22	22	22	22	Plan and DB12 are correct; Value stated in comment is allocated supply to WUGs.
F	Andrews Co. Dockum Rio Grande	3-4	3.1-1	5,792								NA	NA	NA	NA	NA	NA	Plan and DB12 are correct; Value stated in comment is allocated supply to WUGs.
F	Andrews Co. Ogallala Colorado	3-4	3.1-1	31,279								24,886	24,886	24,886	25,373	25,363	25,350	DB12 value is 31279; Value stated in comment is allocated supply to WUGs.
F	Andrews Co. Ogallala Rio Grande	3-4	3.1-1	4,333								NA	NA	NA	NA	NA	NA	DB12 value is 4333; Value stated in comment is allocated supply to WUGs.
F	Andrews Co. Eds-Trinity Colorado	3-4	3.1-1	4,640								25	25	25	25	25	25	DB12 value is 4640; Value stated in comment is allocated supply to WUGs.
F	Groundwater Supply -Brown-Trinity Aquifer	3-4	3.1-1	2,045							2,085							Changed db12 and table 3.1-1
F	Groundwater Supply -Coleman-Ellenberger-San Saba	3-4	3.1-1	-							179							deleted in DB12
F	Groundwater Supply -Crane-Other Aquifer	3-4	3.1-1	NA							81							Add table of Other aquifer
F	Ector-Pecos Valley	3-4	3.1-1	2,904							3,143							Changed DB12
F	Irion - Dockum	3-4	3.1-1	-							928							This is other aquifer in DB12, not Dockum
F	Mitchell-Other Aquifer	3-4	3.1-1	NA							2							Add table of Other aquifer
F	Pecos-Capitan Reef	3-4	3.1-1	34,000							NA							Added to DB12
F	Pecos-Rustler Aquifer (db12)	3-4	3.1-1	NA							1,389							Add table of Other aquifer
F	Pecos Other Aquifer (db12)	3-4	3.1-1	NA							5							Add table of Other aquifer
F	Reeves-Rustler Aquifer (db12)	3-4	3.1-1	NA							103							Add table of Other aquifer
F	Runnels- db12 Other Aquifer	3-4	3.1-1	NA							2,656							Add table of Other aquifer
F	Scurry-db12 -Other Aquifer	3-4	3.1-1	NA							314							Add table of Other aquifer
F	Sterling-Other Aquifer (db12)	3-4	3.1-1	NA							997							Add table of Other aquifer
F	Winkler- Dockum Aquifer	3-4	3.1-1	10,746							10,748							Added supply from Colorado Basin to Table
F	Groundwater Supplies in Region F	3-6	3.1-1		NA	NA	NA	NA	NA	1,170,823		1,157,501	1,157,508	1,157,504	1,157,491	1,157,468	1,157,453	Total groundwater supplies include other aquifer. Plan and DB12 are now correct.
F	Currently Available Supplies to WUGs/Co- Brown	3-51	3.4-1		21,694	21,784	21,787	21,752	21,764	21,821		21,750	21,840	21,843	21,808	21,820	21,877	changed in plan
F	Coke	3-51	3.4-1		2,094	2,072	2,345	2,307	2,288	2,253		2,228	2,181	2,446	2,401	2,372	2,327	changed in plan
F	Coleman	3-51	3.4-1		2,906	2,891	2,888	2,886	2,885	2,881		2,806	2,791	2,788	2,786	2,785	2,781	changed in plan
F	Concho	3-51	3.4-1		7,001	6,994	7,032	7,021	6,909	6,909		7,035	7,172	7,191	7,185	7,129	7,129	changed in plan
F	Ector	3-51	3.4-1		48,121	44,770	53,358	54,244	55,272	55,908		48,048	44,677	53,197	54,079	55,110	55,455	changed in plan
F	McCulloch	3-51	3.4-1		9,644	9,737	9,889	9,941	9,790	9,889		9,449	9,530	9,645	9,708	9,665	9,764	changed in plan
F	Runnels	3-51	3.4-1		4,854	4,859	4,899	4,899	4,825	4,556		4,953	4,948	5,102	5,090	4,701	4,732	changed in plan
F	Tom Green	3-51	3.4-1		74,516	74,295	74,186	73,972				74,429	74,207	74,041	73,822			changed in plan
F	Total Supply to Water Users	3-51	3.4-1		619,575	615,264	615,446	611,147	610,509	609,822		619,443	615,208	615,315	611,004	610,358	609,670	changed in plan
F	Andrews Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		560	560	560	560	560	560	add table 3.3-3 to plan
F	Concho Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		80	220	220	220	220	220	add table 3.3-3 to plan
F	Ector Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		3,000	3,150	3,300	3,450	3,600	3,750	add table 3.3-3 to plan
F	Midland Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		5,987	5,987	5,987	5,987	5,987	5,987	add table 3.3-3 to plan
F	Runnels Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		218	218	218	218	218	218	add table 3.3-3 to plan
F	Tom Green Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		8,500	8,500	8,500	8,500	8,500	8,500	add table 3.3-3 to plan
F	Ward Co. Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		670	670	670	670	670	670	add table 3.3-3 to plan
F	Total Direct Reuse	NA	NA		NA	NA	NA	NA	NA	NA		19,015	19,305	19,455	19,605	19,755	19,905	add table 3.3-3 to plan
F	Currently Available Supply - WWP- Brown Co WID #1	3-53	3.5-1		29,712	29,712	29,712	29,712	29,712	29,712		29,868	29,868	29,868	29,868	29,868	29,868	DB12 reports total supply as 29712. No changes made.
F	""-CRMWD-Ector Co Well Field	3-53	3.5-1		423	423	423	423	423	423		440	440	440	440	440	440	DB12 is correct. Corrected table 3.5-1
F	""CRMWD-Lake Ivie	3-53	3.5-1		66,350	65,000	636,520	63,000	60,950	59,600		66,874	65,524	64,018	62,676	61,336	60,006	DB12 reports source as CRMWD system (includes Ivie, Thomas and Spence less non-system portion)
F	""EV Spense	3-53	3.5-1		560	560	560	560	560	560		34	34	34	34	34	34	Spence non-system portion is reported in DB12
F	""City of Odessa- Ward Co Field	3-53	3.5-1		4,800	NA	NA	NA	NA	NA		4,800	-	-	-	-	-	Correct
F	"" City of Odessa-CRMWD System	3-53	3.5-1		13,439	13,191	20,793	20,778	21,177	21,047		14,139	13,691	21,388	20,978	21,277	21,047	DB12 matches table. No changes made.
F	""-University Lands- Midland Paul Davis Well Field	3-53	3.5-1		4,722	4,722	4,722	-	-	-		NA	NA	NA	NA	NA	NA	DB12 is correct. Data are presented differently in Table 3-5.2.
F	"" University Lands- City of Andrews Well Field	3-53	3.5-1		671	708	730	-	-	-		1,908	1,945	1,967	0	0	0	DB12 is correct. Data are presented differently in Table 3-5.2.
F	Andrews County Total Needs	4-6	4.1-1		(12,818)							(12,875)						Not a valid comparison. Table 4.1-1 compares total supplies versus demands. It does not report only the needs.
F	Borden County Total Needs	4-6	4.1-1		(1,520)							(1,847)						
F	Brown County Total Needs	4-6	4.1-1		(2,369)							(3,006)						
F	Coke County Municipal Needs	4-6	4.1-1		(111)							(116)						
F	Coke County Total Needs	4-6	4.1-1		(870)							(875)						
F	Coleman County Municipal Needs	4-6	4.1-1		(359)							(1,304)						

REGION F

Region IPP	Item	IPP document reference: Page number	Table number	Non-matching numbers — IPP document number: non-decadal number	2010	2020	2030	2040	2050	2060	Online Planning Database (DB12) number: non-decadal number	2010	2020	2030	2040	2050	2060	Response
F	Coleman County Total Needs	4-6	4.1-1		(1,730)							(2,675)						Not a valid comparison. Table 4.1-1 compares total supplies versus demands. It does not report only the needs.
F	Concho County Municipal Needs	4-6	4.1-1		122							(4)						
F	Concho County Total Needs	4-6	4.1-1		1,090							(4)						
F	Ector County Total Needs	4-6	4.1-1		(5,508)							(5,694)						
F	Howard County Municipal Needs	4-6	4.1-1		(1,350)							(1,394)						
F	Howard County Total Needs	4-6	4.1-1		(1,864)							(1,971)						
F	Irion County Total Needs	4-6	4.1-1		(1,292)							(1,302)						
F	Kimble County Total Needs	4-6	4.1-1		(825)							(1,644)						
F	Martin County Total Needs	4-6	4.1-1		(1,149)							(1,180)						
F	McCulloch County Municipal Needs	4-6	4.1-1		(931)							(1,004)						
F	McCulloch County Total Needs	4-6	4.1-1		2,348							(1,004)						
F	Mitchell County Total Needs	4-6	4.1-1		(4,942)							(5,023)						
F	Reagan County Total Needs	4-6	4.1-1		(10,990)							(10,997)						
F	Reeves County Total Needs	4-6	4.1-1		(36,085)							(36,097)						
F	Scurry County Total Needs	4-6	4.1-1		922							(565)						
F	Tom Green County Municipal Needs	4-6	4.1-1		(8,724)							(9,225)						
F	Tom Green County Total Needs	4-6	4.1-1		(58,506)							(59,084)						
F	Upton County Irrigation Needs	4-6	4.1-1		(10,640)							(10,672)						
F	Upton County Total Needs	4-6	4.1-1		(10,032)							(10,672)						
F	Region F Total Irrigation Needs	4-6	4.1-1		(163,800)							(179,728)						
F	Region F Total Mining Needs	4-6	4.1-1		2,107							(503)						
F	Region F Total Municipal Needs	4-6	4.1-1		(12,162)							(22,055)						
F	Region F Total Steam Electric Needs	4-6	4.1-1		(6,568)							(7,095)						
F	Region F Total Needs	4-6	4.1-1		(183,933)							(212,918)						
F	Andrews County Total Needs	4-7	4.1-2				(12,652)							(12,707)				Not a valid comparison. Table 4.1-2 compares total supplies versus demands. It does not report only the needs.
F	Borden County Total Needs	4-7	4.1-2				(1,462)							(1,839)				
F	Brown County Total Needs	4-7	4.1-2				(2,330)							(2,946)				
F	Coke County Municipal Needs	4-7	4.1-2				(23)							(28)				
F	Coke County Total Needs	4-7	4.1-2				(675)							(680)				
F	Coleman County Municipal Needs	4-7	4.1-2				(317)							(1,270)				
F	Coleman County Total Needs	4-7	4.1-2				(1,689)							(2,642)				
F	Ector County Total Needs	4-7	4.1-2				(9,473)							(9,640)				
F	Howard County Municipal Needs	4-7	4.1-2				36							(25)				
F	Howard County Total Needs	4-7	4.1-2				210							(34)				
F	Irion County Total Needs	4-7	4.1-2				(1,166)							(1,181)				
F	Kimble County Total Needs	4-7	4.1-2				(852)							(1,749)				
F	Martin County Total Needs	4-7	4.1-2				(680)							(751)				
F	McCulloch County Municipal Needs	4-7	4.1-2				(887)							(990)				
F	McCulloch County Total Needs	4-7	4.1-2				2,462							(990)				
F	Mitchell County Total Needs	4-7	4.1-2				(4,469)							(4,670)				
F	Reagan County Total Needs	4-7	4.1-2				(10,109)							(10,116)				
F	Reeves County Total Needs	4-7	4.1-2				(34,371)							(34,387)				
F	Runnels County Municipal Needs	4-7	4.1-2				(1,620)							(1,630)				
F	Runnels County Total Needs	4-7	4.1-2				(3,021)							(3,031)				
F	Scurry County Total Needs	4-7	4.1-2				1,304							(10)				
F	Tom Green County Municipal Needs	4-7	4.1-2				(10,266)							(10,564)				
F	Tom Green County Total Needs	4-7	4.1-2				(60,423)							(60,786)				
F	Upton County Irrigation Needs	4-7	4.1-2				(10,186)							(10,223)				
F	Upton County Total Needs	4-7	4.1-2				(9,659)							(10,223)				
F	Region F Total Irrigation Needs	4-7	4.1-2				(155,380)							(174,774)				
F	Region F Total Manufacturing Needs	4-7	4.1-2				(3,735)							(3,747)				
F	Region F Total Mining Needs	4-7	4.1-2				2,371							(29)				
F	Region F Total Municipal Needs	4-7	4.1-2				(26,835)							(36,117)				
F	Region F Total Steam Electric Needs	4-7	4.1-2				(10,787)							(11,380)				
F	Region F Total Needs	4-7	4.1-2				(194,340)							(226,047)				
F	Andrews County Total Needs	4-8	4.1-3							(11,666)							(11,719)	Not a valid comparison. Table 4.1-3 compares total supplies versus demands. It does not report only the needs.
F	Borden County Total Needs	4-8	4.1-3							(1,373)							(1,826)	
F	Brown County Total Needs	4-8	4.1-3							(2,163)							(2,841)	
F	Coleman County Municipal Needs	4-8	4.1-3							(276)							(1,241)	
F	Coleman County Total Needs	4-8	4.1-3							(1,648)							(2,613)	
F	Ector County Total Needs	4-8	4.1-3							(19,865)							(20,012)	
F	Howard County Municipal Needs	4-8	4.1-3							(720)							(825)	

REGION F

Non-matching numbers

Region IPP	Item	IPP document reference: Page number	IPP document reference: Table number	IPP document number: non-decadal number	IPP 2010	IPP 2020	IPP 2030	IPP 2040	IPP 2050	IPP 2060	Online Planning Database (DB12) number: non-decadal number	DB12 2010	DB12 2020	DB12 2030	DB12 2040	DB12 2050	DB12 2060	Response
F	Howard County Total Needs	4-8	4.1-3							(890)							(1,330)	
F	Irion County Total Needs	4-8	4.1-3							(963)							(1,000)	
F	Kimble County Municipal Needs	4-8	4.1-3							(904)							(910)	
F	Kimble County Total Needs	4-8	4.1-3							(895)							(1,909)	
F	Martin County Total Needs	4-8	4.1-3							(291)							(393)	
F	McCulloch County Municipal Needs	4-8	4.1-3							(960)							(1,038)	
F	McCulloch County Total Needs	4-8	4.1-3							2,494							(1,038)	
F	Mitchell County Total Needs	4-8	4.1-3							(3,707)							(4,140)	
F	Reagan County Total Needs	4-8	4.1-3							(8,386)							(8,393)	Not a valid comparison. Table 4.1-3 compares total supplies versus demands. It does not report only the needs.
F	Reeves County Total Needs	4-8	4.1-3							(31,829)							(31,847)	
F	Scurry County Total Needs	4-8	4.1-3							951							(348)	
F	Tom Green County Municipal Needs	4-8	4.1-3							(11,321)							(11,633)	
F	Tom Green County Total Needs	4-8	4.1-3							(62,004)							(62,367)	
F	Upton County Irrigation Needs	4-8	4.1-3							(9,495)							(9,539)	
F	Upton County Total Needs	4-8	4.1-3							(9,030)							(9,539)	
F	Region F Total Irrigation Needs	4-8	4.1-3							(141,535)							(166,120)	
F	Region F Total Mining Needs	4-8	4.1-3							1,875							(375)	
F	Region F Total Municipal Needs	4-8	4.1-3							(39,963)							(49,636)	
F	Region F Total Needs	4-8	4.1-3							(205,321)							(241,856)	
F	Colorado River Municipal Water District Needs	4-9	4.1-4		(16,227)	(25,196)	(8,658)	(10,394)	(11,314)	(13,609)		(14,729)	(23,698)	(8,138)	(9,242)	(9,954)	(12,229)	Corrected Table 4.1-4
F	City of Odessa Needs	4-9	4.1-4		(4,488)	(10,176)	(4,118)	(5,215)	(6,085)			(3,788)	(10,216)	(3,523)	(5,015)	(5,985)		Corrected Table 4.1-4
F	City of San Angelo Needs	4-9	4.1-4					(33,188)	(33,973)	(34,746)					(33,140)	(33,730)	(34,265)	Corrected Table 4.1-4
F	Colorado River Municipal Water District Needs	NA	Appendix 3B		(16,227)	(25,196)	(8,658)	(10,394)	(11,314)	(13,609)		(14,729)	(23,698)	(8,138)	(9,242)	(9,954)	(12,229)	Corrected Appendix 3B
F	City of Odessa Needs	NA	Appendix 3B		(4,488)	(10,176)	(4,118)	(5,215)	(6,085)			(3,788)	(10,216)	(3,523)	(5,015)	(5,985)		Corrected Appendix 3B
F	Subordination -Coleman - Coleman Co - Lake Coleman	4-18	4.2-3		2,063	2,075	2,080	2,087	2,089	2,091		1,650	1,651	1,647	1,645	1,639	1,631	Corrected table 4.2-3
F	Subordination -Manufacturing-Ector Co - CRMWD	4-18	4.2-3		66	149	3	46	86	158		366	449	108	396	386	408	Corrected table 4.2-3
F	Subordination -Manufacturing-Kimble Co - Llano River no	4-18	4.2-3		NA	NA	NA	NA	NA	NA		1,000	1,000	1,000	1,000	1,000	1,000	Corrected table 4.2-3
F	Subordination -Miles - Runnels Co - OC Fisher Reservoir	4-19	4.2-3		100	100	100	100	100	100		140	153	163	173	183	193	Corrected table 4.2-3
F	Subordination -Snyder - Scurry Co - CRMWD	4-19	4.2-3		511							513						Corrected table 4.2-3
F	Subordination -Total	4-19	4.2-3		43,303	46,471	29,394	30,636	30,877	32,946		43,889	47,044	29,902	31,374	31,810	33,829	Corrected table 4.2-3
F	Ballinger - Subordination-Ballinger	4-29 , 4-30 & 4-41	4..3-3 , 4.3-4 & 4.3-8		940							917						DB12 and tables are correct. Subordination values in DB12 also include supply to Runnels County-other.
F	Ballinger - Subordination of downstream rights to CRMWI	4-41	4.3-8		343	356	227	243	0	0		NA	NA	NA	NA	NA	NA	Corrected DB12 to show subordination to Ballinger and customers
F	Ballinger - CRMWD System not listed in DB12	4-41	4.3-8		257	244	373	357	0	0		NA	NA	NA	NA	NA	NA	Included in DB12 as O.H. Ivie non-system portion. Changed table 4.3-8 to clarify.
F	Winters - Subordination	4-43	4.3-11		720					670		552					591	Includes subordination supplies to customers. Customers supplies are shown spearately in DB12.
F	Reuse Cost	4-48	4.3-14							258,000							69,960	Corrected Table 4.3-15.
F	Subordination to Lake Winters	4-48	4.3-14		720	710	700	690	680	670		552	561	566	571	575	591	DB12 breaks out sales to county other and manufacturing. The sum of subordination supplies from Lake Winters is correct. No changes made.
F	Winters WMS Totals	4-48	4.3-14		720	710	700	800	790	780		552	561	566	681	685	701	DB12 breaks out sales to county other and manufacturing. The sum is correct. No changes made.
F	City of Winters Cost for Reuse	4-48	4.3-15							258,000							69,960	Corrected Table 4.3-15.
F	Bronte - Rehabilitation of Pipeline	4-52	4.3-18		0	0	0	0	0	0		129	129	129	129	129	129	DB12 includes subordination supplies in quantity.
F	City of Bronte Cost for Rehab of Oak Creek pipeline	4-56	4.3-21	1,238,600	21,600	21,600					1,955,000	-	-					Revised per comment form Bronte.
F	Robert Lee -Direct Reuse WMS	4-60	4.3-23	2,158,000							na							Not a recommneded or alternate strategy. Not included in DB12.
F	Robert Lee - Brush Control Cost - not listed in IPP	4-68	4.3-30		NA	NA	NA	NA	NA	NA	114,070	19,000	19,000	19,000	19,000	19,000	19,000	deleted in DB12
F	City of Menard Conservation Cost	4-71	4.3-32		8,755	13,526	13,146	12,776	12,414	12,190		2,183	7,018	6,993	6,982	6,961	6,951	Corrected DB12.
F	City of Menard Off Channel Reservoir	4-77	4.3-35	24,520,000							25,273,000							Corrected table in plan.
F	City of Menard Conservation Cost	4-79	4.3-36		8,755	13,526	13,146	12,776	12,414	12,190		2,183	7,018	6,993	6,982	6,961	6,951	Corrected DB12.
F	City of Midland Develop Aquifer Supplies	4-82	4.3-39	468,507,000							168,507,000							Corrected table in plan.
F	City of Midland Develop Aquifer Supplies	4-82	4.3-39						4,648,500	4,648,500						4,651,200	4,651,200	Corrected DB12.
F	Midland-Subordination-WMS Supply	4-87	4.3-41		4,656	6,113	-156	-266	-378	-490		4,505	6,055	0	0	0	0	Reconciled
F	Midland-Voluntary Redistribution-Annual Cost	4-88	4.3-42				4,790,000	4,694,200	4,598,400	4,502,600				4,772,088	4,676,646	4,581,204	4,485,763	Reconciled
F	Midland-Annual Cost Totals	4-88	4.3-42				24,646,531	24,570,877	9,738,961	9,635,997				24,628,619	24,523,323	9,724,465	9,621,750	Reconciled
F	City of Midland Redistribution	4-88	4.3-42				4,790,000	4,694,200	4,598,400	4,502,600				-	-	-	-	corrected DB12
F	Coleman-Subordination WMS Supply	4-93	4.3-46		2,200	2,200	2,200	2,200	2,200	2,200		2,030	2,031	2,027	2,025	2,019	2,011	Includes sales to County-other. Corrected Appendix H
F	Brady-Subordination WMS Supply	4-98	4.3-52		1,350	1,350	1,350	1,350	1,350	1,350		2,170	2,170	2,170	2,170	2,170	2,170	The number in the plan is limited by water treatment and delivery capacity. The number in DB12 is not.
F	City of Eden Cost for replacent wells	4-106	4.3-55	1,800,000							1,367,372							corrected DB12
F	City of Eden Cost for Advanced Treatment	4-109	4.3-57	2,582,000							4,382,000							corrected DB12

REGION F

		IPP document reference:		Non-matching numbers: IPP document number							Online Planning Database (DB12) number							
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060	Response
F	City of Eden- Cost of Recommended Strategies for Hickory	4-121	4.3-65	1,367,372							na							Don't understand comment.
F	Richland SUD-Cost of Recommended Strategies for Hickor	4-121	4.3-65	977,829	308,311	308,311	384,361	384,361	384,361	384,361	1,703,979.00	234,154.37	234,154.37	86,154.37	86,154.37	86,154.37	86,154.37	Corrected table in plan.
F	City of Melvin -Cost of Recommended Strategies for Hickc	4-121	4.3-65	325,139	102,392	102,392	102,392	102,392	102,392	102,392	na	na	na	na	na	na	na	Corrected table in plan.
F	Live Oak Hills Subdivision -Cost of Recommended Strategi	4-121	4.3-65	88,804	288,819	288,819	288,819	288,819	288,819	288,819	na	na	na	na	na	na	na	Corrected table in plan.
F	Kimble Co Manufacturing Cost not listed in IPP	4-129			NA	NA	NA	NA	NA	NA	0	0	0	0	0	0	0	There are no costs associated with subordination.
F	Iron Co Irrigation Conservation WMS Supply	4-144	4.6-5			36							37					Corrected table in plan.
F	Scurry Co Irrigation Conservation WMS Supply	4-144	4.6-5			572							571					Corrected table in plan.
F	Sterling Co Irrigation Conservation WMS Supply	4-144	4.6-5			44							45					Corrected table in plan.
F	Tom Green Co Irrigation Conservation WMS Supply	4-144	4.6-5			5,690							5,774					Corrected table in plan.
F	Winkler Co Irrigation Conservation WMS Supply	4-144	4.6-5			195							194					Corrected table in plan.
F	Costs for Roberts Co Area	4-163	4.8-8	**768,821,000**						$25,000.00	na						na	Not a recommended or alternate strategy. Not included in DB12.
F	City of Snyder-Potiential Water Conservation Summary	4-165	4.8-9		$56,052.00	$61,357	$59,809.00	$57,823.00	$55,694.00	$54,185.00		13,976.00	18,898.00	18,973.00	19,026.00	18,969.00	18,901.00	Corrected DB12
F	CRMWD-Cost for Supplemental Well	4-171	4.8-14	**522,000**							na							Added to DB12.
F	Colorado River Municipal Water District Cost for Desalina	4-170	4.8-13	119,617,000							131,603,990							Corrected text in plan
F	Colorado River Municipal Water District Cost for new well	4-173	4.8-16	73,994,000			8,460,000	8,460,000	8,460,000	2,009,000	76,268,000	-	-	8,666,000	8,666,000	2,017,000	2,017,000	Corrected text in plan
F	University Lands Contract	4-173	4.8-16			847,000	847,000	65,000	65,000	65,000		-	-	-	-	-	-	Added to DB12.
F	Colorado River Municipal Water District Cost for Desalina	4-173	4.8-16	119,617,000				6,340,378	6,340,378	6,340,378	131,603,990				13,721,167	2,384,500	2,384,500	Corrected text in plan
F	Supplemental Wells	4-173	4.8-16	12,528,000		200,000	400,000	416,000	432,000	448,000	-	-	-	-	-	-	-	Corrected capital cost in plan and costs in DB12
F	City of San Angelo Cost for Ultimate Capacity Desalination	4-182	4.8-20	40,424,000							-							Not recommended during this plannigng period.
F	City of San Angelo McCulloch Co Well Field Cost	4-184	4.8-21	157,126,000							173,307,000							Corrected text in plan
F	Irrigation Sutton Co. Cost (summed incorrectly)	NA	4.10-1	164,160							194,940							Corrected text in plan
F	CRMWD Reuse cost	NA	4.10-2	148,302,000							128,748,000							Corrected text in plan
F	CRMWD Supplemental Wells cost	NA	4.10-2	12,528,000							-							Corrected DB12 and text in plan
F	CRMWD Desalination cost	NA	4.10-2	119,616,990							131,603,990							Corrected text in plan
F	CRMWD Total cost	NA	4.10-2	365,678,990							345,583,990							Corrected DB12 and text in plan
F	San Angelo-Subordination WMS Supply	4-191	4.8-25		11,791	11,472	11,153	10,835	10,516	10,196		16,189	15,766	15,344	14,922	14,230	14,077	Corrected DB12 and text in plan
F	Bronte - Rehabilitation of Pipeline Supply	4.206	4.10-1		0	0	0	0	0	0		129	129	129	129	129	129	Includes subordination with this strategy. Broke this out in DB12.
F	Robert Lee-New WTP and Storage Facilities WMS Supply r	4.206	4.10-1		0	0	0	0	0	0		200	200	200	200	200	200	Corrected DB12
F	Coke County Total	4.206	4.10-1		680	727	514	612	712	847		1,009	1,056	843	941	1,041	1,176	Corrected DB12 and text in plan
F	Coleman - Coleman Co - Conservation WMS	4.206	4.10-1		50	109	141	163	181	187		33	75	90	95	101	107	Corrected text in plan
F	Coleman Co WMS Total	4.206	4.10-1		3,597	3,645	3,668	3,681	3,691	3,687		3,580	3,611	3,617	3,613	3,611	3,607	Corrected text in plan
F	Eden-Concho Co-Replacement Well not listed in IPP	4.206	4.10-1		NA	NA	NA	NA	NA	NA		322	322	322	322	322	322	Corrected DB12 and text in plan
F	Concho County Total	4.206	4.10-1		34	1,182	1,889	1,895	1,962	1,962		356	1,504	2,211	2,217	2,284	2,284	Corrected DB12 and text in plan
F	Ector Co Manufacturing-Reuse WMS is not listed in IPP	4.207	4.10-1		NA	NA	NA	NA	NA	NA		0	350	105	350	300	250	This is sales from Odessa. Added to table 4.10-1
F	Ector Co Manufacturing-Subordination WMS	4.207	4.10-1		66	149	3	46	86	158		366	449	108	396	386	408	Corrected DB12
F	Odessa-Ector Co-Reuse	4.207	4.10-1		0	4,293	4,273	7,262	4,258	4,256		0	3,943	4,168	3,912	3,958	4,006	Corrected Odessa reuse amount to show sales to manufacturing.
F	Odessa-Ector Co-Conservation	4.207	4.10-1		540	1,168	1,488	1,657	1,854	2,074		551	1,200	1,536	1,715	1,920	2,149	Corrected db12
F	Odessa-Ector Co-Voluntary Redistribution	4.207	4.10-1					10,507	10,502	10,498					4,708	4,708	4,708	Table 4.10-1 includes all sales from CRMWD
F	Odessa-Ector Co-Voluntary Redistribution (Develop Aquif	4.207	4.10-1			4,708	4,708	10,507	10,502	10,498			4,800	10,800	10,800	10,800	10,800	DB12 and text match.
F	Ector County Total	4.207	4.10-1		5,425	16,809	11,057	18,225	19,403	21,297		5,725	17,109	16,962	18,575	19,703	21,547	Corrected.
F	Richland SUE-Bottled Water Program WMS Supply	4-208	4.10-1		0	0	0	0	0	0		1	1	1	1	1	1	Corrected text in plan. Quantity is less than 1 but DB12 requires entries in whole numbers.
F	Richland SUE-Infrastructure Improvement WMS Supply	4-208	4.10-1		0	0	0	0	0	0		113	113	113	113	113	113	Corrected DB12
F	McCulloch County Total	4-208	4.10-1		2,314	2,640	2,779	2,880	2,937	2,946		2,428	2,754	2,893	2,914	3,051	3,060	Corrected DB12
F	Midland-Subordination-WMS Supply (CRMWD)	4-208	4.10-1		4,488	6,055	0	0	0	0		4,488	6,152	211	324	438	553	Corrected text in plan
F	Midland County Total	4-208	4.10-1			16,158	35,719	35,864	35,793	35,751			16,255	36,130	36,188	36,231	36,304	Corrected text in plan
F	Ballinger-Runnels Co-Subordination-CRMWD-not listed in	4-209	4.10-1		343	356	227	243	0	0			NA	NA	NA	NA	NA	Corrected text in plan
F	Miles-Runnels Co-Subordination	4-209	4.10-1		100	100	100	100	100	100		140	153	163	173	183	193	Corrected text in plan and DB12. Changed Miles to 200 af/y.
F	Runnels Co Total	4-209	4.10-1		2,402	2,487	2,315	2,421	2,813	2,806		2,099	2,184	2,151	2,251	2,896	2,899	Corrected text in plan
F	Snyder-Scurry Co-Subordination	4-209	4.10-1		511							513						Corrected DB12
F	Scurry County Total	4-209	4.10-1		635							637						Corrected DB13
F	Sterling Co Irrigation Conservation WMS Supply	4-209	4.10-1					90	91	92					89	89	89	Corrected text in plan
F	San Angelo-Tom Green Co-Infrastructure Improvement W	4-209	4.10-1		2,274	2,261	2,247	2,233	2,220	2,206		2,308	2,295	2,281	2,267	2,254	2,240	Corrected text in plan
F	Tom Green Co Total	4-209	4.10-1		27,490	40,555	49,411	56,711	56,340	56,289		27,524	40,589	49,445	56,745	56,374	56,323	Corrected text in plan
F	Conservation WMS Total	4-209	4.10-1		3,214	43,147	80,602	81,210	81,851	82,506		3,197	43,113	80,551	81,141	81,769	82,423	Corrected text in plan
F	Subordination WMS Total	4-209	4.10-1		43,890	47,047	29,961	31,194	31,427	33,486		43,889	47,141	30,113	31,698	32,248	34,382	Changes to both DB12 and text.
F	Bottled Water Program WMS Total	4-209	4.10-1		0	0	0	0	0	0		1	1	1	1	1	1	Corrected text in plan. Quantity is less than 1 but DB12 requires entries in whole numbers.
F	Infrastructure Improvement WMS Total	4-209	4.10-1		2,274	2,261	2,247	2,233	2,220	2,206		2,437	2,424	2,410	2,396	2,383	2,369	Changes to both DB12 and text.
F	Total for All Strategies	4-209	4.10-1		58,494	127,208	174,442	190,499	192,234	194,710		59,275	128,067	181,342	191,733	193,772	196,322	Changes to both DB12 and text.
F	CRMWD-Renew Contract WMS	4-210	4.10-1		0	5,200	5,200	5,200	5,200	5,200		392	5,622	15,629	15,430	16,119	15,932	Incorrect comparison. DB12 contract renewal includes CRMWD sales to others and contract renewal with University Lands. Sales to others may come from subordination supplies.

REGION F

Region IPP	Item	IPP document reference: Page number	IPP document reference: Table number	Non-matching numbers — IPP document number: non-decadal number	2010	2020	2030	2040	2050	2060	Online Planning Database (DB12) number: non-decadal number	2010	2020	2030	2040	2050	2060	Response
F	CRMWD -Subordination WMS Supply	4-210	4.10-1		48,027	47,133	46,240	45,347	44,453	43,560		47,618	46,809	36,022	35,443	33,975	33,381	Changes to both DB12 and text. Note: sales to others inlcudes subordination supplies.
F	CRMWD Total	4-210	4.10-1		48,027	64,713	69,820	78,427	77,533	76,640		48,010	64,811	70,031	78,753	77,974	77,193	Changes to both DB12 and text.
F	University Lands - New/Renew Water Supply Contract	4-210	4.10-1		NA	NA	NA	NA	NA	NA		0	5,200	5,200	5,950	5,960	5,973	Added to table 4.10-2.
F	WWP WMS Totals	4-210	4.10-1		66,473	89,537	97,622	113,506	112,021	111,076		84,954	125,541	133,699	151,761	151,521	152,545	Corrected table.
F	San Angelo -WWP	4-211	4.10-2	**254,904,000**							na							Costs are shown on WUG in DB12.
F	Brown C-O Brownwood Lake	App. 3A-3	App 3A		229	229	223	214	211	211		385	385	379	370	367	367	
F	Brown Co. Zephyr WSC Brownwood Lake	App. 3A-4	App 3A		616	616	616	616	616	616		516	516	516	516	516	516	
F	Coke Co. Bronte Village Other Aquifer	App. 3A-4	App 3A		116	129	125	121	120	120		250	238	226	215	204	194	
F	Coleman Co. Santa Anna Brownwood Lake	App. 3A-7	App 3A		307	307	307	307	307	307		207	207	207	207	207	207	
F	Concho Co. Eden Direct Reuse	App. 3A-8	App 3A		-	-	-	-	-	-		80	220	220	220	220	220	
F	Concho Co. Millersville-Doole WSC CRMWD	App. 3A-8	App 3A		92	85	123	112				46	43	62	56			
F	Ector Co. Mfg Colorado Basin CRMWD	App. 3A-12	App 3A		177	297	604	702	771	813		877	797	1,199	902	871	813	Appendix 3A was updated with the latest DB12 download. All numbers should match.
F	Ector Co. Odessa CRMWD	App. 3A-12	App 3A		11,949	11,350	17,464	17,158	17,354	17,159		11,176	10,757	16,708	16,793	17,092	17,006	
F	McCulloch Co. Brady Hickory Aquifer	App. 3A-19	App 3A		1,009	1,009	1,009	1,009	1,009	1,009		884	884	884	884	884	884	
F	McCulloch Co. Millersville-Doole WSC CRMWD	App. 3A-19	App 3A		161	164	238	216				91	82	119	108			
F	Runnels Co. Ballinger O.H. Ivie Lake	App. 3A-28	App 3A		-	-	-	-				257	244	373	357			
F	Runnels Co. Miles Other Aquifer	App. 3A-29	App 3A		134	134	134	134	134	134		10	10	10	10	10	10	
F	Runnels Co. Millersville-Doole WSC CRMWD	App. 3A-29	App 3A		69	62	93	85				35	31	47	43			
F	Tom Green Co. Millersville-Doole WSC CRMWD	App. 3A-36	App 3A		174	176	290	300	-	-		87	88	145	150	-	-	
F	Brown County WID Brownwood Lake	NA	App 3B		29,712	29,712	29,712	29,712	29,712	29,712		29,644	29,641	29,648	29,505	29,016	28,525	DB12 corrected.
F	CRMWD Total Current Supply	NA	App 3B		74,485	67,935	66,585	65,235	63,885	62,535		74,468	67,918	66,568	65,218	63,868	62,518	DB12 corrected.
F	Ballinger cost for reuse	2 of 48	appendix 4D	2,567,000	324,000						-	-						Added to DB12.
F	Big Spring cost for reuse	6 of 48	appendix 4D	9,911,000	1,529,000						-	-						Included with CRMWD costs.
F	Bronte cost for rehab of Oak Creek Pipeline	8 of 48	appendix 4D		34,100							-						Bronte cost was revised based on comments received frm Bronte.
F	CRMWD cost for Southwest Pecos Co to Odessa	11 of 48	appendix 4D	183,321,000	22,279,000						-	-						Not a recommended strategy
F	City of Eden Cost for Advanced Treatment	18 of 48	appendix 4D	2,582,000							4,382,000							Corrected DB12 to show as separate strategies
F	City of Eden Cost for replacent wells	19 of 48	appendix 4D	1,800,000							1,367,372							Corrected DB12 to show as separate strategies
F	City of Eden Cost for Bottled Water program	20 of 48	appendix 4D		24,000							38,566	38,566	38,566	38,566	38,566	38,566	Corrected DB12. Annual costs are $33,000.
F	Cost of Odessa-Midland Reuse	28 of 48	appendix 4D	109,194,000	13,272,000						-	-						Included with CRMWD costs.
F	Robert Lee cost of new groundwater from Alluvium	35 of 48	appendix 4D		157,000							396,500	396,500	25,950	25,950	25,950	25,950	Corrected DB12.
F	San Angelo cost of Desal	37 of 48	appendix 4D		9,223,930										2,648,800	2,648,800	13,721,167	Corrected DB12.
F	San Angelo cost of Desal phase II	38 of 48	appendix 4D	40,327,000	12,039,500						-	-						Not included in this planning cycle.
F	Snyder Cost for reuse	47 of 48	appendix 4D	9,643,000	1,104,000						-	-						Included with CRMWD costs.
F	Irrigation Costs for Irion Co.	2 of 6	appendix 4E			1,536							91,536					Corrected DB12.
F	Irrigation Costs for Mitchell Co.	4 of 6	appendix 4E			185,113							285,113					Corrected DB12.
F	Irrigation Costs for Ward Co.	6 of 6	appendix 4E				31,803							121,803				Corrected DB12.
F	CRMWD cost for reuse	appendix 4H	WMS Summary of Rec. Strategies	148,302,000							128,748,000							Appendix 4I in final plan. Correct table.
F	CRMWD Supplemental Wells cost	appendix 4H	Summary of Rec. Strategies	12,528,000							-							Appendix 4I in final plan. Correct table and DB12.
F	Bottle Water Program (McCulloch C-O) WMS Supply	Appendix4H	Summary		0	0	0	0	0	0		0	0	0	0	0	0	
F	Bottle Water Program Richland SUD) WMS Supply	Appendix4H	Summary		0	0	0	0	0	0		1	1	1	1	1	1	
F	New Infrastructure Improvement - Bronte WMS Supply	Appendix4H	Summary		0	0	0	0	0	0		129	129	129	129	129	129	
F	New Infrastructure Improvement - San Angelo WMS Supp	Appendix4H	Summary		2,274	2,261	2,247	2,233	2,220	2,206		2,308	2,295	2,281	2,267	2,254	2,240	
F	Reuse-Odessa (Ector Co.) - WMS Supply	Appendix4H	Summary			4,293	4,273	4,262	4,258	4,256			3,943	4,168	3,912	3,958	4,006	
F	Reuse-Manufacturing(Ector Co.) WMS Supply	Appendix4H	Summary			NA	NA	NA	NA	NA			350	105	350	300	250	
F	Subordination-Coleman(Coleman Co.) WMS Supply	Appendix4H	Summary		1,650	1,651	1,647	1,645	1,639	1,631		2,030	2,031	2,027	2,025	2,019	2,011	
F	Subordination-Manufacturing (Ector Co.) WMS Supply	Appendix4H	Summary		66	149	3	46	86	158		366	449	108	396	386	408	Appendix 4H was updated with the latest DB12 download. All numbers should match.
F	Subordination-Midland (Midland Co) WMS Supply	Appendix4H	Summary		4,488	6,055	0	0	0	0		4,505	6,055	0	0	0	0	
F	Subordination-Midland (Midland Co) WMS Supply	Appendix4H	Summary		17	-97	-211	-324	-438	-553		NA	NA	NA	NA	NA	NA	
F	Subordination-Miles-Runnels Co-WMS Supply	Appendix4H	Summary		100	100	100	100	100	100		140	153	163	173	183	193	
F	Subordination-Snyder-Scurry Co-WMS Supply	Appendix4H	Summary		511							513						
F	Subordination-CRMWD WMS Supply	Appendix4H	Summary		35,166	30,548	46,240	43,696	41,857	38,746		47,618	46,809	36,022	35,443	33,975	33,381	
F	Voluntary Redistribution - CRMWD WMS Supply	Appendix4H	Summary		0	5,200	5,200	5,200	5,200	5,200		392	5,622	15,629	15,430	16,119	15,932	
F	Ballinger-Subordination-CRMWD-not listed in DB12	Appendix4H	1 of 99		141	169	68	115	0	0		NA	NA	NA	NA	NA	NA	
F	Ballinger WMS Total	Appendix4H	1 of 99		1,091	1,187	1,095	1,144	1,524	1,542		950	1,018	1,027	1,029	1,631	1,634	
F	Ballinger Alternative WMS Supply - Direct Reuse not listed	Appendix4H	1 of 99		220	220	220	220	220	220		NA	NA	NA	NA	NA	NA	
F	Bronte - Rehabilitation of Pipeline WMS Supply	Appendix4H	5 of 99		0	0	0	0	0	0		129	129	129	129	129	129	

REGION F

		IPP document reference:		*Non-matching numbers* IPP document number							Online Planning Database (DB12) number							
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060	Response
F	Bronte WMS Total	Appendix4H	5 of 99		145	174	177	177	179	180		274	303	306	306	308	309	
F	Coleman-Conservation WMS Supply	Appendix4H	6 of 99		50	109	141	163	181	187		33	75	90	95	101	107	
F	Coleman-Subordination-Coleman Lake WMS Supply	Appendix4H	6 of 99		6,415	4,084	4,017	3,952	3,883	3,811		1,650	1,651	1,647	1,645	1,639	1,631	
F	Coleman-Subordination-Hords Creek Lake WMS Supply	Appendix4H	6 of 99		647	643	640	637	633	630		380	380	380	380	380	380	
F	Coleman-Total WMS Supply	Appendix4H	6 of 99		4,854	4,836	4,798	4,752	4,697	4,628		2,063	2,106	2,117	2,120	2,120	2,118	
F	Runnels C-O Subordination (Winters Lake) WMS Supply	Appendix4H	20 of 99		114	89	69	49	31	0		23	0	0	0	0	0	
F	Runnels C-O Subordination Ballinger Lake) WMS Supply	Appendix4H	20 of 99		23	0	0	0	0	0		114	89	69	49	31	0	
F	Eden - New Hickory Well (Replacement Well in DB12) WM	Appendix4H	26 of 99		392	392	392	392	392	392		322	322	322	322	322	322	
F	Eden - New Reverse Osmosis (Advanced Treatment in DB1	Appendix4H	26 of 99		0	0	0	0	0	0		0	392	392	392	392	392	
F	Eden - WMS Total	Appendix4H	26 of 99		392	392	392	392	392	392		322	714	714	714	714	714	
F	Meneard-Alternative WMS-Aquifer Storage Recovery WM	Appendix4H	31 of 99		0	0						240	240					
F	Menard-Alternative WMS-Off Channel Reservoir not listed	Appendix4H	31 of 99		NA	NA	NA	NA	NA	NA		500	500	500	500	500	500	
F	Menard-Alternative WMS Total	Appendix4H	31 of 99		0	0	240	240	240	240		740	740	740	740	740	740	
F	Midland - Subordination-CMWD System WMS Supply	Appendix4H	32 of 99		4,488	6,055	0	0	0	0		4,505	6,055	0	0	0	0	
F	Midland - Subordination-OH Ivie LakeWMS Supply	Appendix4H	32 of 99		17	-97	-211	-324	-438	-553		17	-97	-211	-324	-438	-553	
F	Midland - WMS Totals	Appendix4H	32 of 99		5,849	13,963	31,839	31,726	31,608	31,499		5,849	14,060	32,050	32,050	32,046	32,052	
F	Millersview-Doole WSC-Subordination WMS Supply	Appendix4H	33 of 99		242	257	128	144				190	241	3	46	0	0	
F	Millersview-Doole WSC- WMS Supply Total	Appendix4H	33 of 99		242	257	128	144				190	241	3	46			Appendix 4H was updated with the latest DB12 download. All numbers should match.
F	Odessa-New/Renew Water Supply WMS	Appendix4H	34 of 99			4,450	4,695	4,450	4,500	4,550			4,800	4,800	4,800	4,800	4,800	
F	Odessa-Subordination WMS Supply	Appendix4H	34 of 99		4,205							4,505						
F	Odessa - Reuse WMS - listed as alternative WMS in IPP.	Appendix4H	34 of 99		4,410	4,410	4,410	4,410	4,410	4,410		4,060	4,305	4,060	4,110	4,160		
F	Odessa-WMS Supply Total	Appendix4H	34 of 99		4,756	11,437	6,318	13,316	14,430	16,163		5,056	15,847	16,728	17,726	18,840	20,573	
F	Richland SUD - Replacement Well WMS Supply	Appendix4H	36 of 99		0	0	0	0	0	0		113	113	113	113	113	113	
F	Richland SUD Total WMS Supply	Appendix4H	36 of 99		1	1	1	1	1	1		114	114	114	114	114	114	
F	Robert Lee-New WTP and Storage Facilities WMS Supply r	Appendix4H	37 of 99		NA	NA	NA	NA	NA	NA		200	200	200	200	200	200	
F	Robert Lee Total WMS Supply	Appendix4H	37 of 99		111	155	46	66	80	103		311	355	246	266	280	303	
F	Robert Lee-Alternative WMS-Develop Other Aquifer Supp	Appendix4H	37 of 99		NA	NA	NA	NA	NA	NA		150	150	150	150	150	150	
F	Robert Lee-Alternative WMS-New Reservoir Intake not lis	Appendix4H	37 of 99		NA	NA	NA	NA	NA	NA		50	50	50	50	50	50	
F	Robert Lee Total Alternative WMS Supply	Appendix4H	37 of 99			500	500	500	500	500		700	700	700	700	700	700	
F	San Angelo-Rehabilitation of Pipe WMS Supply	Appendix4H	38 of 99		0	0	2,247	2,233	2,220	2,206		2,308	2,295	2,281	2,267	2,254	2,240	
F	San Angelo-Subordination-OC Fisher Lake WMS Supply	Appendix4H	38 of 99		3,762	3,643	3,525	3,407	3,288	3,170		3,762	3,643	3,525	3,407	3,288	3,170	
F	San Angelo-Brush Control WMS Supply	Appendix4H	38 of 99		0	0	0	0	0	0		8,362	8,362	8,362	8,362	8,362	8,362	
F	San Angelo WMS Supply Total	Appendix4H	38 of 99									20,586	27,686	30,718	37,870	37,462	36,994	
F	Snyder-Subordination WMS Supply	Appendix4H	39 of 99		511							513						
F	Snyder WMS total Supply	Appendix4H	39 of 99		581							583						
F	Irrigation-Andrews Co WMS Supply	Appendix4H	43 of 99		2,728							2,727						
F	Manufacturing-Ector Co. Subordination WMS Supply	Appendix4H	76 of 99			149	3	46	86	158			449	108	396	386	408	
F	Manufacturing-Ector Co. WMS Supply total	Appendix4H	76 of 99			499	108	396	386	408			799	213	746	686	658	
F	Steam Electric-Mitchell Co-Alternative Generation Techno	Appendix4H	98 of 99		NA	NA	NA	NA	NA	NA		4,077	2,774	4,240	5,988	8,079	10,590	