



DANGER
KEEP AWAY



Appendices

APPENDIX A.1. ACRONYMS

Region	Acronym	Key
A	CRMWA	Canadian River Municipal Water Authority
B	None	None
C	DWU	Dallas Water Utilities
C	GTUA	Greater Texoma Utility Authority
C	NTMWD	North Texas Municipal Water District
C	TRA	Trinity River Authority
C	TRWD	Tarrant Regional Water District
C	UTRWD	Upper Trinity Regional Water District
D	None	None
E	EPWU	El Paso Water Utility
E	LVWD	Lower Valley Water District
F	None	None
G	BRA	Brazos River Authority
H	BRA	Brazos River Authority
H	CHCRWA	Central Harris County Regional Water Authority
H	CLCND	Chambers-Liberty Counties Navigation District
H	GCWA	Gulf Coast Water Authority
H	LNVA	Lower Neches Valley Authority
H	MUD	Municipal Utility District
H	NCWA	North Channel Water Authority
H	NFBWA	North Fort Bend Water Authority
H	NHCRWA	North Harris County Regional Water Authority
H	SJRA	San Jacinto River Authority
H	TRA	Trinity River Authority
H	WCID	Water Control and Improvement District
H	WHCRWA	West Harris County Regional Water Authority
I	None	None
J	UGRA	Upper Guadalupe River Authority
K	LCRA	Lower Colorado River Authority
K	SAWS	San Antonio Water System
L	CRWA	Canyon Regional Water Authority
L	GBRA	Guadalupe-Blanco River Authority
L	LCRA	Lower Colorado River Authority
L	LNRA	Lavaca Navidad River Authority
L	LGWSP	Lower Guadalupe Water Supply Project
L	SAWS	San Antonio Water System
L	SSLGC	Schertz-Seguin Local Government Corporation
L	TWA	Texas Water Alliance
M	None	None
N	None	None
O	CRMWA	Canadian River Municipal Water Authority
O	WRMWD	White River Municipal Water District
P	None	None

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		2010	2020	2030	2040	2050	2060	2060		
Direct reuse	\$264,783,000	\$691	1,552	14,327	29,283	38,649	43,184	46,250	\$139	
Direct reuse - Frisco	\$31,449,606	\$1,359	-	2,240	3,359	5,650	5,649	5,650	\$134	
Ennis reuse	\$31,779,000	\$14,739	-	-	333	2,199	3,696	\$1,328	na	
Facility improvements	\$2,314,558,600	na	-	-	-	-	-	-	na	
Facility improvements - reuse sources	\$590,686,000	na	-	-	-	-	-	-	na	
Fannin County project	\$38,471,000	\$3,838	-	1,254	2,400	3,862	4,439	5,113	\$395	
Fastrill replacement (Region C component) ²	\$1,980,278,000	\$1,724	-	-	-	-	-	112,100	\$1,724	
Golf course conservation	\$0	\$279	56	942	1,808	2,261	2,690	3,121	\$278	
Grayson County project	\$136,016,000	na	200	7,560	10,920	13,440	19,040	24,640	\$141	
Indirect reuse	\$0	na	-	4,368	4,368	4,368	4,368	4,368	na	
Indirect reuse - Jacksboro for Jack County mining	\$200,000	na	385	385	385	385	385	385	na	
Lake Palestine connection (integrated pipeline with TRWD)	\$887,954,000	\$773	-	111,776	110,670	109,563	108,455	107,347	\$204	
Lake Ralph Hall	\$286,401,000	\$727	-	34,050	34,050	34,050	34,050	34,050	\$116	
Lake Ralph Hall - indirect reuse	\$0	na	0	6,129	12,258	18,387	18,387	18,387	na	
Lake Texoma - authorized (blend)	\$336,356,000	\$496	-	-	69,200	68,500	113,000	113,000	\$87	
Lake Texoma - interim purchase from GTUA	\$0	na	-	21,900	21,900	21,899	-	-	na	
Lake Wright Patman - reallocation of flood pool	\$896,478,000	\$762	-	-	-	112,100	112,100	112,100	\$762	
Lower Bois d'Arc Creek Reservoir	\$615,498,000	\$972	-	54,796	117,800	114,138	111,361	108,487	\$79	
Main stem pump station (additional East Fork) NTMWD	\$0	na	-	34,900	15,100	-	-	-	na	
Main stem Trinity pump station (Lake Ray Hubbard indirect reuse - DWU)	\$142,567,000	\$730	-	17,168	15,004	20,010	13,700	11,105	\$196	
Manufacturing conservation	\$0	na	1	131	1,530	2,259	2,457	2,618	\$211	
Marvin Nichols Reservoir	\$3,345,052,000	\$364	-	-	227,400	227,400	472,300	472,300	\$83	
Municipal conservation - basic	\$1,151,575	\$200	41,967	97,040	137,705	175,858	216,941	264,429	\$85	
Municipal conservation - expanded	\$480,774	\$169	4,756	9,862	13,907	16,910	18,824	20,541	\$396	
New wells - Carrizo Wilcox Aquifer	\$1,853,000	\$345	154	181	183	465	466	467	\$446	
New wells - Trinity Aquifer	\$7,778,150	\$410	1,882	2,042	2,306	2,306	2,306	2,306	\$229	
New wells - Woodbine Aquifer	\$14,543,000	\$663	763	1,932	1,932	1,932	1,932	1,932	\$339	
Oklahoma water to Irving	\$194,825,000	\$810	-	-	25,000	25,000	25,000	25,000	\$244	
Oklahoma water to NTMWD, TRWD, UTRWD	\$756,044,500	\$290	-	-	-	-	-	115,000	\$290	
Overdraft Trinity Aquifer - existing wells	\$0	\$105	2,168	-	-	-	-	-	na	
Overdraft Trinity Aquifer - new wells	\$269,000	\$493	75	-	-	-	-	-	na	
Purchase from water provider (1)	\$0	na	46	-	-	-	-	-	na	
Redistribution of supplies	\$0	na	530	13,979	18,526	24,028	33,981	56,031	na	
Subordination agreement - future-only sources	\$6,217,000	\$2,561	-	280	220	219	217	215	\$558	
Supplemental wells	\$495,381,934	na	-	-	-	-	-	-	na	

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Water Supply Volume (acre-feet/year)						Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
	2010	2020	2030	2040	2050	2060	
Region C							
Recommended Water Management Strategy							
First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)							
Total Capital Costs							
Toledo Bend project (Region I entities responsible for 20 percent of cost)	na	363	329	272	232	400,229	400,217
	\$2,406,236,000						\$1,072
TRA 10-Mile Creek reuse project	\$259	-	-	6,760	6,760	6,760	6,760
	\$14,895,000						\$99
TRA Denton Creek wastewater treatment plant reuse	na	-	3,750	3,750	3,750	3,750	3,750
	\$9,506,000						\$229
TRA Ellis County reuse	\$505	-	-	-	-	-	2,200
	\$10,384,000						\$505
TRA Freestone County reuse	\$323	-	-	-	-	6,760	6,760
	\$17,266,000						\$323
TRA Kaufman County reuse	\$901	-	1,000	1,000	1,000	1,000	1,000
	\$9,761,000						\$192
TRA Las Colinas reuse	\$284	-	7,000	7,000	7,000	7,000	7,000
	\$14,530,000						\$134
TRA Tarrant County project	na	-	-	-	-	-	-
	\$59,009,000						na
TRWD third pipeline and reuse	\$1,016	-	105,500	105,500	105,500	105,500	105,500
	\$914,424,000						\$324
Water treatment plant - expansion	na	-	1,260	1,081	3,180	2,786	2,268
	\$19,970,000						\$1,090
Water treatment plant - new	na	-	192	523	587	613	807
	\$308,309,400						\$19,346
Conveyance project (1)¹	\$11,561	194	10,417	17,255	19,490	23,046	25,178
	\$413,884,000						\$679
Conveyance project (2)¹	na	-	1,672	1,299	1,234	1,226	1,237
	\$69,299,100						\$3,154
Conveyance project (3)¹	\$6,531	-	213	1,009	1,717	1,957	2,016
	\$6,465,400						\$1,027
Grayson County project¹	\$3,693	-	5,600	8,400	8,400	14,000	19,600
	\$146,071,000						\$514
Purchase from water provider (1)¹	na	402	27,039	32,425	31,243	30,709	30,103
	\$164,114,900						\$1,067
Purchase from water provider (2)¹	\$5,950	-	52	50	50	50	86
	\$3,538,000						\$609
Purchase from water provider (3)¹	\$2,384	-	4,004	4,493	6,083	5,626	6,417
	\$65,481,250						\$1,706
Water treatment plant - expansion - reuse sources¹	na	-	-	-	-	-	-
	\$32,750,000						na
Water treatment plant - expansion¹	na	-	484	828	2,279	2,545	2,618
	\$2,708,430,000						\$106,249
Region C Subtotal	\$21,481,952,189	79,898	674,664	1,131,057	1,303,003	2,045,260	2,360,302
Region D							
Drill new well	\$2,342	1,094	1,636	1,969	3,100	4,888	6,757
	\$32,260,219						\$336
Increase existing contract	\$0	1,576	2,001	3,345	13,199	34,692	59,478
	\$0						\$476
New surface water contract	\$311	8,660	12,523	14,866	17,678	22,512	32,231
	\$6,247,886						\$144
Increase existing contract³	\$0	-	340	558	711	1,280	1,471
	\$0						na
Region D Subtotal	\$38,508,104	11,330	16,160	20,180	33,977	62,092	98,466
Region E							
Additional one well	\$10	-	500	500	500	500	500
	\$702,770						\$10
Additional wells	\$29	-	175	175	350	350	350
	\$1,006,762						\$29
Additional wells and desalination plant expansions	\$1,114	-	1,607	3,304	4,764	6,245	7,726
	\$34,344,000						\$564
Arsenic treatment facility	\$34	-	276	276	276	276	276
	\$1,996,232						\$34
Integrated water management strategy - conjunctive use with additional surface water	\$0	-	-	-	3,600	3,600	3,600
	\$0						\$525

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Water Supply Volume (acre-feet/year)							Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
	Total Capital Costs	2010	2020	2030	2040	2050	2060	
Integrated water management strategy - conservation	\$0	\$333	3,000	7,000	11,000	16,000	22,000	\$45
Integrated water management strategy - desalination of agricultural drain water	\$16,675,000	\$930	2,700	2,700	2,700	2,700	2,700	\$476
Integrated water management strategy - direct reuse	\$25,257,000	\$538	2,000	4,000	6,000	6,000	6,000	\$334
Integrated water management strategy - import from Dell Valley	\$214,113,000	\$1,529	-	-	-	10,000	20,000	\$1,309
Integrated water management strategy - import from Diablo Farms	\$245,506,000	\$2,353	-	-	10,000	10,000	10,000	\$2,353
Integrated water management strategy - recharge of groundwater with treated surface water	\$14,625,000	\$542	5,000	5,000	5,000	5,000	5,000	\$330
Irrigation scheduling	\$0	\$70	5,275	5,275	5,275	5,275	5,275	\$70
Purchase water from EPWU	\$0	varies	16,939	21,512	18,156	14,074	13,569	varies
Purchase water from LVWD	\$0	\$451	1,441	2,812	3,883	5,050	6,218	\$1,470
Tailwater reuse	\$0	\$478	2,312	2,312	2,312	2,312	2,312	\$478
Water district delivery systems	\$147,635,869	\$8	25,000	25,000	25,000	25,000	25,000	\$8
Integrated water management strategy - conjunctive use with additional surface water ¹	\$140,238,000	\$1,671	5,000	15,000	16,400	16,400	16,400	\$525
Purchase water from EPWU ¹	\$0	varies	605	1,161	9,193	18,231	24,706	varies
Region E Subtotal	\$842,099,633	3,376	66,225	79,866	98,816	112,382	130,526	
Region F								
Advanced treatment	\$2,582,000	na	-	-	-	-	-	na
Bottled water program	\$3,000	\$1,400 - \$28,400	1	1	1	1	1	\$1,400 - \$28,400
Brush control	\$23,020,000	na	8,362	8,362	8,362	8,362	8,362	na
Desalination	\$213,760,990	\$1,163	950	950	16,050	16,050	16,050	\$346
Develop Cenozoic Aquifer supplies	\$244,775,000	\$251 - \$342	-	19,600	19,600	19,600	19,600	\$251 - \$342
Develop Dockum Aquifer supplies	\$17,855,000	\$445	2,200	2,200	2,200	2,200	2,200	\$445
Develop Ellenburger Aquifer supplies	\$5,148,000	\$370	200	200	200	200	200	\$370
Develop Hickory Aquifer supplies	\$174,991,000	\$610 - \$1,670	160	6,860	10,160	12,160	12,160	\$610 - \$1,670
Irrigation conservation	\$68,650,668	\$69	36,125	72,244	72,244	72,244	72,244	\$69
Municipal conservation	\$0	\$498	3,197	6,988	8,307	8,897	9,525	\$154
New water treatment plant and storage facilities	\$2,436,000	na	-	-	-	-	-	na
New/renew water supply	\$8,964,000	\$477	392	5,622	16,180	17,073	16,866	\$477
Rehabilitation of pipeline	\$7,521,900	\$315	-	2,281	2,267	2,254	2,240	\$448
Replacement well	\$13,941,000	na	-	-	-	-	-	na
Reuse	\$130,906,000	\$1,072	12,380	12,380	12,490	12,490	12,490	\$383
Subordination	\$0	na	78,832	77,555	66,391	63,241	62,606	na
Region F Subtotal	\$914,554,558	90,944	157,243	218,705	236,087	235,400	235,198	

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy Region G	Total Capital Costs	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Water Supply Volume (acre-feet/year)							Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
			2010	2020	2030	2040	2050	2060		
Additional Carrizo Aquifer development (includes overdrifting)	\$23,676,071	\$585	1,481	1,884	2,184	5,084	6,963	6,963	\$182	
Additional Edwards-Trinity (Plateau) Aquifer development (includes overdrifting)	\$679,000	\$588	114	114	114	114	114	114	\$70	
Additional Gulf Coast Aquifer development	\$31,630,000	\$638	-	-	-	5,600	5,600	5,600	\$146	
Additional Trinity Aquifer development (includes overdrifting)	\$19,278,000	\$264	723	322	522	1,357	1,708	2,025	\$553	
Aquifer storage and recovery (Brazos River to Seymour Aquifer)	\$38,625,000	\$701	6,208	6,208	6,208	6,208	6,208	6,208	\$159	
Belton to Stillhouse pipeline	\$36,038,000	\$133	-	30,000	30,000	30,000	30,000	30,000	\$45	
Bosque County regional project	\$5,150,000	\$2,895	-	-	190	190	190	190	\$532	
BRA supply through the East Williamson County Regional Water Treatment System	\$44,706,000	\$1,680	4,601	6,260	6,260	6,958	6,958	6,958	\$430	
BRA surface water and treatment system expansion	\$39,971,000	\$2,933	375	3,545	3,545	3,545	3,545	3,545	\$573	
BRA system operations permit	\$204,281,000	\$2,808	750	77,020	82,242	84,742	84,742	84,899	\$314	
Brushy Creek Reservoir	\$18,553,000	\$484	2,090	2,090	2,090	2,090	2,090	2,090	\$67	
Cedar Ridge Reservoir	\$285,214,000	\$1,168	-	23,380	23,380	23,380	23,380	23,380	\$241	
City of Groesbeck off-channel reservoir	\$10,412,000	\$565	-	-	-	-	1,755	1,755	\$565	
Conjunctive management of Champion well field and Oak Creek Reservoir with subordination agreement	\$0	na	688	755	878	948	953	963	na	
Coryell County Reservoir (BRA System)	\$37,489,000	\$1,007	-	3,365	3,365	3,365	3,365	3,365	\$193	
Expansion of Champion well field	\$15,015,000	\$1,643	1,000	1,000	1,000	1,000	1,000	1,000	\$334	
Future phases of Lake Whitney water supply project	\$110,943,000	\$926	-	7,572	7,572	7,572	7,572	7,572	\$926	
Groundwater/ surface water conjunctive use (Lake Granger Augmentation)	\$643,928,000	\$838	26,505	26,001	25,496	47,435	70,751	70,246	\$1,154	
Increase treatment capacity	\$195,654,000	\$546	15,176	28,176	36,016	40,047	51,330	58,435	\$294	
Interconnection of City of Waco system with neighboring communities	\$14,652,000	\$3,387	837	837	837	1,564	1,664	1,814	\$1,136	
Irrigation water conservation	\$0	\$235	3,390	5,519	7,550	7,376	7,206	7,041	\$228	
Limestone County Carrizo-Wilcox Aquifer development	\$18,458,000	\$562	2,500	3,000	3,000	3,600	3,600	3,600	\$115	
Manufacturing water conservation	\$0	na	140	275	440	494	545	594	na	
Midway pipeline project (West Central Brazos distribution system)	\$13,524,731	\$2,046	843	843	843	843	843	843	\$648	
Millers Creek augmentation	\$46,948,000	\$217	17,582	17,582	17,582	17,582	17,582	17,582	\$217	
Mining water conservation	\$0	na	340	611	885	913	941	973	na	
Municipal water conservation	\$0	\$475	4,873	13,572	14,379	15,865	18,497	21,347	\$475	
New water treatment plant	\$3,522,000	\$2,179	224	224	224	224	224	224	\$808	

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Water Supply Volume (acre-feet/year)							Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
			2010	2020	2030	2040	2050	2060		
New West Loop reuse line	\$5,495,500	\$591	680	680	680	680	680	680	680	\$120
Oak Creek Reservoir with subordination agreement	\$0	na	1,679	1,671	1,557	1,435	1,301	1,154	na	na
Phase I Lake Whitney water supply project	\$41,453,000	\$2,862	2,128	2,128	2,128	2,128	2,128	2,128	2,128	\$1,153
Purchase water from City of Bryan	\$1,201,000	\$262	1,500	1,500	1,500	1,500	1,500	1,500	1,500	\$192
Raise level of Gibbons Creek Reservoir	\$12,140,600	\$237	-	3,870	3,870	3,870	3,870	3,870	3,870	\$29
Reallocation of source	\$0	na	9,081	35,928	35,928	40,028	45,728	52,628	na	na
Regional surface water supply to Williamson County from										
Lake Travis	\$391,533,000	\$1,308	600	34,148	41,187	41,187	41,187	44,459	44,459	\$938
Rehabilitate existing wells	\$350,000	\$30	-	1,100	1,100	1,100	1,100	1,100	1,100	\$30
Restructure contract	\$0	na	502	470	437	406	373	341	na	na
Somervell County water supply project (phases 1-4)	\$29,923,000	\$2,841	840	840	840	840	840	840	840	\$508
Somervell County water supply project (phases 5-13)	\$74,228,000	\$1,147	-	-	960	960	960	960	960	\$174
Steam-electric conservation	\$0	na	2,114	4,896	8,219	9,109	10,822	11,803	na	na
Stonewall, Kent, and Garza chloride control project	\$163,226,000	na	-	-	-	-	-	-	-	na
Storage reallocation of federal reservoirs - Lake Aquilla	\$11,447,000	\$406	-	-	-	2,050	2,050	2,050	2,050	\$406
Turkey Peak Reservoir	\$50,227,000	\$924	-	7,600	7,600	7,600	7,600	7,600	7,600	\$441
Voluntary redistribution	\$6,391,000	\$312	11,251	11,942	13,564	14,425	15,236	16,558	16,558	\$469
Wastewater reuse	\$115,432,500	\$340	17,043	38,653	40,523	51,114	64,830	70,087	70,087	\$317
Coryell County Reservoir (BRA system) ¹	\$14,399,000	\$2,867	-	-	3,365	3,365	3,365	3,365	3,365	\$1,522
Groundwater/surface water conjunctive use (Lake										
Granger augmentation) ¹	\$229,822,000	\$865	-	-	-	33,814	37,839	39,710	39,710	\$864
Increase current capacity ¹	\$0	\$401	43	43	543	1,043	1,543	2,143	2,143	\$831
Increase treatment capacity ¹	\$13,951,000	\$648	-	2,800	2,800	2,800	2,800	2,800	2,800	\$213
Limestone County Carrizo-Wilcox Aquifer development ¹	\$0	\$562	148	146	144	142	141	141	141	\$115
New water treatment plant ¹	\$35,822,000	\$627	-	8,400	8,400	8,400	8,400	8,400	8,400	\$255
Storage reallocation of federal reservoirs - Lake Aquilla ¹	\$0	na	-	-	-	375	745	999	na	na
Turkey Peak Reservoir ¹	\$0	\$924	-	7,600	7,600	7,600	7,600	7,600	7,600	\$441
Voluntary redistribution ¹	\$91,940,000	\$860	3,529	19,162	28,296	29,099	29,903	30,757	30,757	\$472
Wastewater reuse ¹	\$39,128,901	\$436	9,232	10,831	11,760	11,760	11,760	11,760	11,760	\$107
<i>Region G Subtotal</i>	<i>\$3,186,357,303</i>	<i>137,858</i>	<i>405,581</i>	<i>436,895</i>	<i>496,528</i>	<i>562,803</i>	<i>587,084</i>	<i>587,084</i>	<i>587,084</i>	<i>\$107</i>
Region H										
Allens Creek reservoir	\$222,752,400	\$326	-	57,393	55,096	87,781	99,650	99,650	99,650	\$39
BRA system operations permit	\$0	na	-	6,621	18,870	25,350	25,350	25,350	25,350	na
Brazoria County interruptible supplies for irrigation	\$0	na	104,977	86,759	64,000	64,000	64,000	64,000	64,000	na
Brazoria off-channel reservoir	\$173,898,602	\$1,206	-	-	-	-	-	24,000	24,000	\$1,206
Brazos saltwater barrier	\$44,470,739	na	-	-	-	-	-	-	-	na

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES

Recommended Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		2010	2020	2030	2040	2050	2060	2060		
Cities of Richmond-Rosenberg Groundwater Reduction Plan - West Fort Bend surface water treatment plant	\$117,220,150	\$887	7,500	7,500	7,500	7,500	7,500	7,500	7,500	\$2,325
City of Houston bayous permit	\$20,956,000	na	-	-	-	-	-	-	-	na
City of Houston Groundwater Reduction Plan participation	\$58,235,873	\$378	11,417	16,809	19,870	22,399	24,990	24,990	24,990	\$214
City of Houston indirect reuse	\$721,822,850	\$725	-	-	66,420	114,679	128,801	128,801	128,801	\$799
City of Missouri City Groundwater Reduction Plan - aquifer storage and recovery	\$58,967,437	na	4,147	4,147	4,147	4,147	4,147	4,147	4,147	na
City of Missouri City Groundwater Reduction Plan - reuse participation	\$9,100,352	na	640	640	640	640	640	640	640	na
City of Missouri City Groundwater Reduction Plan participation	\$6,618,706	\$378	1,004	1,860	1,896	1,896	1,896	1,896	1,896	\$248
City of Sugar Land Groundwater Reduction Plan - reuse participation	\$78,783,825	na	560	5,040	5,040	5,040	5,040	5,040	5,040	na
City of Sugar Land Groundwater Reduction Plan participation	\$6,360,101	\$379	480	1,763	2,380	2,381	2,381	2,381	2,155	\$223
GLCND West Chambers System	\$20,380,000	\$1,171	1,691	1,978	2,235	2,511	2,804	2,804	2,804	\$73
Contract with Brazosport Water Authority	\$22,363,694	\$193	7,750	7,750	7,750	7,750	7,750	7,750	7,750	\$94
Contract with CHCRWA	\$2,048,820	\$196	977	862	720	631	546	546	546	\$50
Contract with City of Galveston	\$10,542,328	\$172	7,262	7,262	7,262	7,262	7,262	7,262	7,262	\$46
Contract with City of Houston	\$63,420,357	\$596	6,128	4,816	4,742	5,400	6,027	6,027	6,027	\$428
Contract with Fort Bend County WCID #1	\$1,815,739	\$259	148	824	940	1,016	1,016	1,016	1,016	\$60
Contract with Galveston County WCID #1	\$1,807,960	\$207	766	909	940	975	1,014	1,014	1,014	\$60
Contract with GCWA	\$132,634,164	\$406	29,718	30,708	31,618	32,719	34,057	34,057	34,057	\$223
Contract with LNVA	\$405,835	\$1,392	16	23	29	33	37	37	37	\$642
Contract with NHCORWA	\$42,207,965	\$68	56,453	83,041	64,491	34,726	27,478	27,478	27,478	\$50
Contract with SJRA	\$264,926,229	\$829	23,008	27,754	37,090	54,777	54,805	54,849	54,849	\$206
Contract with TRA	\$249,479,472	\$1,044	13,823	19,972	22,888	25,732	28,672	28,672	28,672	\$620
Dow off-channel reservoir	\$124,468,000	\$481	21,800	21,800	21,800	21,800	21,800	21,800	21,800	\$389
Expanded use of groundwater	\$165,928,999	\$238	40,159	62,297	68,916	80,337	90,617	90,617	90,617	\$175
Fort Bend County MUD #25 Groundwater Reduction Plan - reuse	\$776,145	\$568	589	589	589	589	589	589	589	\$453
Fort Bend off-channel reservoir	\$202,514,788	\$484,074	-	-	-	90	45,943	45,943	45,943	\$948
Freeport desalination plant	\$255,699,000	\$854	-	-	-	33,600	33,600	33,600	33,600	\$854
Fulshear reuse	\$566,625	\$568	287	430	430	430	430	430	430	\$453
GCWA off-channel reservoir	\$197,448,012	\$827	-	39,500	39,500	39,500	39,500	39,500	39,500	\$827
Industrial conservation	\$0	na	558	558	558	558	558	558	558	na
Interim strategies	\$1,155,965	\$369	503	-	-	-	-	-	-	na
Interim strategies - temporary overdraft	\$85,545,970	\$303	45,009	-	-	-	-	-	-	na
Irrigation conservation	\$757,436	\$100	71,275	71,275	71,275	71,275	71,275	71,275	71,275	\$100

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	2010	2020	2030	2040	2050	2060		
Montgomery MUD #8/9 indirect reuse	\$12,245,687	\$1,387	-	657	816	1,120	1,120	1,120	1,120	\$436
Municipal conservation	\$0	\$213	1,680	3,635	3,954	4,269	4,716	5,232	\$213	
Municipal conservation - large water user group	\$0	\$213	31,612	38,940	42,664	46,276	50,073	54,484	\$213	
Municipal conservation - medium water user group	\$0	\$311	2,668	4,377	5,062	5,684	6,384	7,189	\$311	
Municipal conservation - small water user group	\$0	\$202	9,665	18,366	24,016	28,274	33,219	38,589	\$202	
New groundwater wells for livestock	\$18,635	\$61	-	41	41	41	41	41	\$21	
NFBWA Groundwater Reduction Plan participation	\$1,638,063	\$380	-	106	258	295	466	687	\$241	
NHCRWA Groundwater Reduction Plan participation	\$17,814,585	\$377	761	2,933	4,243	5,573	6,664	8,088	\$206	
NHCRWA indirect reuse	\$66,778,694	\$822	-	-	-	7,300	16,300	16,300	\$589	
Relocation of existing supplies	\$275,269,912	\$351	59,614	56,931	54,011	66,006	76,391	152,895	\$148	
River Plantation Groundwater Reduction Plan - reuse	\$484,926	\$568	168	368	368	368	368	368	\$453	
SJRA Water Resources Assessment Plan participation	\$89,604,231	\$235	-	21,441	27,020	30,247	28,720	26,896	\$282	
TRA to City of Houston contract	\$0	na	-	-	116,738	123,524	123,524	123,524	na	
TRA to SJRA contract	\$302,781,597	\$4,676	-	-	-	7,935	39,096	76,476	\$140	
Wastewater reclamation for municipal irrigation	\$48,043,249	\$568	-	-	7,272	15,425	25,561	36,388	\$520	
Wastewater reuse for industry	\$32,051,761	\$893	-	-	-	-	-	67,200	\$893	
WHCRWA Groundwater Reduction Plan participation	\$35,268,970	\$378	2,488	7,689	10,105	11,683	13,340	15,104	\$219	
BRA to Brazosport Water Authority contract ¹	\$0	na	-	232	248	3,114	6,366	10,870	na	
BRA to Cities of Richmond-Rosenberg contract ¹	\$0	na	-	-	-	2,182	6,120	11,290	na	
BRA to City of Sugar Land contract ¹	\$0	na	-	2,054	5,894	7,232	7,750	9,512	na	
BRA to GCWA contract ¹	\$0	na	-	35,558	80,016	100,410	112,400	131,128	na	
BRA to NRG Energy contract ¹	\$0	na	-	-	-	-	-	17,000	na	
CHCRWA Groundwater Reduction Plan ¹	\$0	na	2,375	4,146	4,789	4,806	4,806	4,806	na	
CHCRWA internal distribution ¹	\$0	na	2,375	4,146	4,789	4,806	4,806	4,806	na	
CHCRWA transmission line ¹	\$0	na	2,375	4,146	4,789	4,806	4,806	4,806	na	
City of Houston distribution expansion ¹	\$261,040,000	\$80	-	280,000	128,000	64,000	48,000	48,000	\$54	
City of Houston to Baytown Area Water Authority contract ¹	\$0	na	-	26	262	398	535	692	na	
City of Houston to BRA contract ¹	\$0	na	-	54,996	50,402	115,772	139,510	139,510	na	
City of Houston to CHCRWA contract ¹	\$0	na	-	1,771	2,414	2,431	2,431	2,431	na	
City of Houston to City of Pasadena contract ¹	\$0	na	1,865	2,278	2,665	3,153	3,579	4,068	na	
City of Houston to NCWA contract ¹	\$0	na	1,954	2,392	2,969	3,511	4,157	4,912	na	
City of Houston to NFBWA contract ¹	\$0	na	-	888	35,942	62,322	82,344	100,884	na	
City of Houston to NHCRWA contract ¹	\$0	na	-	56,453	83,041	83,041	78,041	83,041	na	
City of Houston to SJRA contract ¹	\$0	na	-	36,377	55,538	54,582	53,581	52,534	na	
City of Houston to WHCRWA contract ¹	\$0	na	1,241	31,837	46,324	52,759	55,549	58,402	na	

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
			2010	2020	2030	2040	2050	2060			
City of Houston treatment expansion ¹	\$2,045,672,161	\$479	16,000	280,000	128,000	64,000	48,000	48,000	48,000	\$1,867	
City of Huntsville water treatment plant ¹	\$61,023,906	\$904	11,200	11,200	11,200	11,200	11,200	11,200	11,200	\$429	
City of Missouri City Groundwater Reduction Plan ¹	\$24,003,201	\$1,110	-	395	4,644	8,362	8,362	8,362	12,775	\$131	
City of Pearland surface water treatment plant ¹	\$265,000,000	\$1,656	6,720	6,720	6,720	13,420	13,420	13,420	13,420	\$544	
City of Sealy groundwater treatment expansion ¹	\$6,450,000	\$2,176	-	360	360	360	360	360	888	\$269	
City of Sugar Land Groundwater Reduction Plan ¹	\$82,576,224	\$11,066	-	1,027	2,947	3,616	3,616	3,875	4,756	\$357	
Contract with Baytown Area Water Authority	\$900,444	\$180	-	-	191	349	496	496	496	\$122	
Contract with BRA ¹	\$652,480,634	\$704	-	49,416	35,211	62,308	100,156	145,264	145,264	\$514	
Contract with Brazosport Water Authority	\$2,102,169	na	-	116	124	1,557	3,183	5,435	na	na	
Contract with CHRWA ¹	\$1,867,449	\$196	-	794	1,129	1,500	1,668	1,668	1,668	na	
Contract with Cities of Richmond-Roseberg ¹	\$0	na	-	-	-	1,091	3,060	5,645	na	na	
Contract with City of Houston ¹	\$183,896,349	na	-	14,981	31,413	30,449	34,995	34,995	34,995	\$361	
Contract with City of Missouri City ¹	\$4,807,747	\$100	-	713	6,330	10,661	10,911	15,435	15,435	\$12	
Contract with City of Pasadena ¹	\$2,919,547	\$65	-	967	1,941	2,765	3,317	3,317	3,317	\$72	
Contract with City of Sugar Land ¹	\$4,982,927	na	-	1,027	2,947	3,616	3,875	4,756	na	na	
Contract with CLCND ¹	\$30,827,919	\$1,383	-	1,691	1,978	2,235	2,511	2,804	2,804	\$635	
Contract with Dow ¹	\$155,206,615	\$745	-	21,800	21,800	21,800	21,800	21,800	21,800	\$646	
Contract with Fort Bend County WCID #2 ¹	\$2,049,847	\$233	-	491	1,092	1,092	1,092	1,092	1,092	\$49	
Contract with GCWA ¹	\$144,117,128	na	-	135	54,513	58,116	60,587	65,213	na	na	
Contract with NCWA ¹	\$5,632,614	\$55	-	-	2,088	3,078	3,852	3,852	3,852	\$84	
Contract with NFBWA ¹	\$44,964,481	\$176	-	444	13,085	27,315	38,155	38,155	38,155	\$85	
Contract with NRG Energy ¹	\$0	na	-	-	-	-	-	-	8,500	na	
Contract with S.J.RA ¹	\$43,842,177	na	-	-	-	7,935	39,096	76,476	na	na	
Contract with WHCRWA ¹	\$44,753,636	\$90	-	31,837	46,324	40,241	43,031	36,961	36,961	\$55	
Fort Bend County WCID #2 Groundwater Reduction Plan ¹	\$24,828,857	\$571	-	2,296	5,753	5,753	5,753	5,753	5,753	\$200	
GCWA to City of Galveston contract ¹	\$0	na	-	7,262	7,262	7,262	7,262	7,262	7,262	na	
GCWA to City of Missouri City contract ¹	\$0	na	-	713	6,330	10,661	10,911	15,435	na	na	
GCWA to Fort Bend County WCID #2 contract ¹	\$0	na	-	491	1,092	1,092	1,092	1,092	1,092	na	
GCWA to Galveston County WCID #1 contract ¹	\$0	na	-	766	909	940	975	1,014	na	na	
Harris County MUD #50 water treatment plant ¹	\$6,131,600	\$1,382	560	560	560	560	588	632	632	\$427	
Lake Livingston Water Supply and Sewer Service Corporation surface water project ¹	\$3,087,974	\$561	954	954	954	954	954	954	954	\$279	
Luce Bayou transfer ¹	\$253,916,914	\$248	-	128,259	206,276	207,629	205,171	270,742	270,742	\$36	
NFBWA Groundwater Reduction Plan ¹	\$0	na	35,009	61,021	70,363	84,943	96,103	106,402	106,402	na	

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Water Supply Volume (acre-feet/year)										Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
	Total Capital Costs	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	2010	2020	2030	2040	2050	2060	2060		
NFBWA internal distribution ¹	\$225,000,000	\$184	35,009	61,021	70,363	84,943	96,103	106,402	106,402	\$16	
NFBWA shared transmission line ¹	\$213,000,000	\$56	-	21,878	39,405	52,595	62,606	71,876	71,876	na	
NHCRWA Groundwater Reduction Plan ¹	\$0	na	34,714	91,167	117,755	99,625	81,126	117,755	117,755	na	
NHCRWA internal 2010 distribution ¹	\$153,149,640	\$429	34,714	34,714	34,714	34,714	34,714	34,714	34,714	\$44	
NHCRWA internal 2020 distribution ¹	\$345,292,192	\$368	-	91,167	91,167	91,167	91,167	91,167	91,167	\$38	
NHCRWA internal 2030 distribution ¹	\$37,439,584	\$31	-	-	117,755	117,755	117,755	117,755	117,755	\$3	
NHCRWA transmission 2010 ¹	\$80,690,624	\$226	34,714	34,714	34,714	34,714	34,714	34,714	34,714	\$23	
NHCRWA transmission 2020 ¹	\$172,558,512	\$184	-	91,167	91,167	91,167	91,167	91,167	91,167	\$19	
NHCRWA transmission 2030 ¹	\$0	na	-	-	117,755	117,755	117,755	117,755	117,755	na	
Pecan Grove Groundwater Reduction Plan ¹	\$15,960,000	\$2,150	866	866	1,731	1,731	1,731	1,731	1,731	\$544	
S.JRA to City of Houston contract ¹	\$0	na	-	-	1,356	5,300	3,875	2,428	2,428	na	
S.JRA Water Resources Assessment Plan participation ¹	\$128,252,622	\$136	-	36,377	55,538	54,582	53,581	52,534	52,534	\$125	
S.JRA Water Resources Assessment Plan ¹	\$900,000,000	\$1,172	-	36,377	55,538	62,517	92,677	129,010	129,010	\$269	
WHCRWA Groundwater Reduction Plan ¹	\$0	na	21,678	52,274	66,761	73,196	75,985	78,839	78,839	na	
WHCRWA internal distribution ¹	\$552,472,000	\$607	21,678	52,274	66,761	73,196	75,985	78,839	78,839	\$70	
WHCRWA transmission line ¹	\$290,084,193	\$202	21,678	52,274	66,761	73,196	75,985	78,839	78,839	\$37	
Region H Subtotal	\$12,019,061,335	\$378,759	622,426	863,980	1,040,504	1,202,010	1,501,180	1,501,180	1,501,180		
Region I											
Angelina County Regional Project	\$53,164,000	\$1,577	-	-	-	11,210	11,210	11,210	11,210	\$1,164	
Expand local surface water supplies	\$1,983,800	\$164	50	150	707	990	1,000	1,190	1,190	\$78	
Fastrill replacement (Region I component) ²	\$0	na	-	-	-	-	-	22,400	22,400	na	
Forest Grove Reservoir project	\$26,619,000	\$1,173	-	-	-	2,240	2,240	2,240	2,240	\$310	
Indirect reuse*	\$0	\$33	-	2,872	2,872	2,872	2,872	2,872	2,872	\$33	
Infrastructure improvements	\$1,000,000	\$97	1,000	1,000	1,000	1,000	1,000	1,000	1,000	\$97	
Lake Kurth Regional System	\$56,488,600	\$1,233	6,800	18,400	18,400	18,400	18,400	18,400	18,400	\$314	
Lake Noconiche Regional Supply System	\$24,890,050	\$1,686	-	800	1,200	1,200	1,700	1,700	1,700	\$796	
Lake Palestine infrastructure	\$79,389,250	\$830	-	-	16,815	16,815	16,815	16,815	16,815	\$418	
Municipal conservation	\$0	\$579	111	480	811	1,085	1,381	1,701	1,701	\$81	
New source - Lake Columbia	\$231,865,000	\$215	-	75,700	75,700	75,700	75,700	75,700	75,700	\$12	
New wells - Carrizo Wilcox Aquifer	\$39,623,385	\$332	11,787	13,493	15,656	17,006	20,433	21,403	21,403	\$175	
New wells - Gulf Coast Aquifer	\$6,818,213	\$515	804	1,982	2,199	3,033	3,038	3,043	3,043	\$159	
New wells - Queen City Aquifer	\$5,646,042	\$761	137	231	318	455	650	1,097	1,097	\$3,313	
New wells - Yegua Jackson Aquifer	\$2,581,793	\$253	710	730	971	1,110	1,302	1,376	1,376	\$216	
Overdraft Carrizo Wilcox Aquifer	\$4,209,789	\$49	100	1,400	1,400	1,500	1,500	1,540	1,540	\$176	
Overdraft Gulf Coast Aquifer	\$2,359,067	\$426	844	996	996	996	1,149	1,149	1,149	\$236	

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		2010	2020	2030	2040	2050	2060	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)		
Permit amendment - Houston County Lake	\$0	na	3,500	3,500	3,500	3,500	3,500	3,500	3,500	na
Permit amendment for Sam Rayburn Reservoir	\$0	\$154	-	28,000	28,000	28,000	28,000	28,000	28,000	\$154
Purchase water from provider (1)	\$17,495,246	\$186	5,396	42,367	46,133	51,148	51,148	51,167	54,200	\$90
Purchase water from provider (2)	\$109,419,358	\$769	2,152	29,995	38,839	42,939	42,939	86,040	89,365	\$188
Purchase water from provider (3)	\$0	\$978	27	-	-	-	-	5,175	5,175	na
Reallocation of flood storage (Rayburn)	\$0	\$25	-	-	-	-	-	122,000	122,000	\$25
Saltwater barrier conjunctive operation with Rayburn/Steinhagen	\$2,000,000	\$5	-	111,000	111,000	111,000	111,000	111,000	111,000	\$5
Wholesale customer conservation	\$1,400,000	\$2	20,000	30,000	33,000	35,000	35,000	40,000	40,000	\$1
Angelina-Neches River Authority Treatment and Distribution System ¹	\$35,127,250	na	-	-	-	-	-	-	-	na
Indirect reuse ¹	\$0	\$35	-	1,377	1,589	1,784	1,993	2,198	2,198	\$41
New water treatment plant ¹	\$12,387,000	\$560	-	-	-	-	-	-	2,240	\$560
Purchase water from provider (1) ¹	\$0	\$651	1,080	2,508	2,633	2,908	3,308	3,708	3,708	\$642
Purchase water from provider (2) ¹	\$113,947,150	\$586	13,350	45,201	33,051	34,351	46,751	56,251	56,251	\$371
Purchase water from provider (3) ¹	\$56,415,750	\$955	-	10,251	10,251	10,251	10,251	10,251	10,251	\$475
Region I Subtotal	\$884,825,743		53,418	363,106	399,517	427,199	607,272	638,076		
Region J										
Additional groundwater wells	\$240,350	\$7	222	222	222	222	222	222	222	\$7
Conservation: brush management ⁴	\$3,937,790	\$14	10,500	10,500	10,500	10,500	10,500	10,500	10,500	\$14
Conservation: public information	\$0	\$234	65	69	71	71	71	76	77	\$251
Conservation: system water audit and water loss audit	\$0	\$43	514	553	570	572	593	604	604	\$36
Groundwater wells	\$247,250	\$7	172	172	172	172	172	172	172	\$7
Increased water treatment and aquifer storage and recovery capacity	\$6,650,000	\$364	2,240	2,240	2,240	2,240	2,240	2,240	2,240	\$150
Purchase water from UGRA	\$0	\$1,000	-	-	3,840	3,840	3,840	3,840	5,450	\$1,000
Replace pressure tank	\$7,000	na	-	-	-	-	-	-	-	na
Surface water acquisition, treatment and aquifer storage and recovery	\$36,660,000	\$1,620	-	1,624	1,624	2,124	2,124	2,124	2,624	\$518
Surface water storage	\$7,050,000	\$581	-	1,121	1,121	1,121	1,121	1,121	1,121	\$581
Region J Subtotal	\$54,792,390		13,713	16,501	20,360	20,862	20,888	23,010		
Region K										
Additional municipal conservation	\$0	\$548	-	-	-	522	1,027	1,844	1,844	\$243
Amend LCRA contract	\$0	\$98	3,708	5,265	6,165	8,503	10,955	12,911	12,911	\$125
Aquifer storage and recovery	\$168,711,000	\$3,802	-	-	-	10,000	10,000	10,000	10,000	\$3,802

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Water Supply Volume (acre-feet/year)						Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
	Total Capital Costs	2010	2020	2030	2040	2050	
Blend brackish surface water in South Texas Project Nuclear Operating Company Reservoir	\$0	na	17,505	17,505	17,505	17,505	na
City of Austin conservation	\$0	\$215	18,795	24,036	25,385	30,401	\$47
City of Austin direct reuse (municipal and manufacturing)	\$302,250,510	\$851	13,620	22,077	30,268	36,218	\$851
City of Austin direct reuse (steam-electric)	\$302,250,510	\$851	3,315	7,315	8,315	12,315	\$851
City of Austin return flows	\$0	na	46,853	49,862	62,330	64,645	na
Conjunctive use of groundwater - includes overdraft	\$0	na	62,000	62,000	62,000	62,000	na
Development of Carrizo-Wilcox Aquifer	\$12,242,071	\$771	1,687	1,687	1,687	2,662	\$748
Development of Ellenburger-San Saba Aquifer	\$5,601,523	\$1,542	478	478	478	519	\$1,869
Development of Gulf Coast Aquifer	\$164,000	\$376	-	-	-	82	\$376
Development of Hickory Aquifer	\$4,697,200	\$1,711	512	488	331	261	\$3,815
Development of new rice varieties	\$0	na	40,800	40,800	40,800	40,800	na
Development of other aquifer	\$3,104,788	\$23	4,291	4,370	4,582	4,839	\$104
Development of Queen City Aquifer	\$4,190,135	\$1,082	-	-	-	-	\$1,082
Development of saline zone of Edwards-Balcones Fault Zone Aquifer	\$19,753,964	\$979	250	2,750	2,850	5,500	\$979
Development of Trinity Aquifer	\$4,084,198	\$6,140	-	75	200	301	\$1,657
Downstream return flows	\$0	na	-	460	1,836	3,443	na
Drought management	\$0	na	461	461	461	461	\$38
Enhanced municipal and industrial conservation	\$0	\$400	-	2,000	10,000	20,000	\$400
Expand supply from South Texas Project Nuclear Operating Company Reservoir	\$0	na	193	-	-	-	na
Expansion of Carrizo-Wilcox Aquifer	\$16,872,960	\$357	4,350	8,476	9,779	12,950	\$484
Expansion of Ellenburger-San Saba Aquifer	\$14,482,800	\$1,989	681	786	1,229	1,633	\$1,827
Expansion of Gulf Coast Aquifer	\$1,475,140	\$85	4,486	3,659	2,573	1,185	\$350
Expansion of Hickory Aquifer	\$611,320	\$4,943	62	62	62	62	\$4,943
Expansion of other aquifer	\$1,721,920	\$626	-	416	777	1,366	\$118
Expansion of Queen City Aquifer	\$0	\$20	98	40	31	24	\$20
Expansion of Sparta Aquifer	\$0	\$37	188	129	129	129	\$37
Expansion of Trinity Aquifer	\$3,609,180	\$789	428	988	937	1,147	\$745
Expansion of Yegua-Jackson Aquifer	\$0	\$37	-	-	-	9	\$37
Firm-up run-of-river with off-channel reservoir - LCRA/SAWS project (Region K Component)	\$0	na	-	-	-	47,000	na
Goldthwaite Channel Dam	\$1,841,800	\$1,383	300	300	300	300	\$1,383
House Bill 1437 on-farm conservation	\$3,817,897	\$13	4,000	4,000	4,000	14,800	\$13
Irrigation district conveyance improvements	\$0	na	65,000	65,000	65,000	65,000	na
LCRA Water Management Plan interruptible water supply	\$0	na	255,493	196,568	137,643	78,718	na

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
			2010	2020	2030	2040	2050	2060			
Municipal conservation	\$0	\$567	3,468	6,462	9,644	12,684	15,444	18,380		\$90	
New LCRA contracts	\$17,556,000	\$138	-	35,564	36,782	59,422	60,177	69,910		\$181	
On-farm conservation	\$0	na	-	34,150	34,150	34,150	34,150	34,150		na	
Purchase water from City of Austin	\$2,280,200	\$963	1,100	1,100	1,100	1,100	1,100	1,100		\$963	
Purchase water from West Travis County Regional Water Supply	\$0	\$138	846	925	989	1,015	990	958		\$138	
Reuse by Highland Lakes communities	\$15,920,000	\$550	-	500	2,000	5,000	5,000	5,000		\$550	
Temporary drought period use of Gulf Coast Aquifer	\$0	\$37	-	-	-	-	-	47		\$37	
Temporary drought period use of Queen City Aquifer	\$0	\$20	21	10	-	-	-	-		na	
Water allocation	\$0	na	67	110	-	-	-	-		na	
Water right permit amendment	\$0	na	-	5,500	5,500	5,500	5,500	5,500		na	
Water transfer	\$0	na	11	21	30	37	43	48		na	
House Bill 1437 for Williamson County ¹	\$0	\$173	126	246	349	426	536	645		\$173	
New LCRA contracts ¹	\$0	\$138	300	300	300	300	300	300		\$138	
Region K Subtotal	\$907,239,116		350,583	576,795	554,504	571,085	565,296	646,167			
Region L											
Aquifer storage and recovery project and phased expansion	\$0	na	3,800	16,000	16,000	16,000	16,000	16,000		na	
Brackish groundwater desalination (Wilcox Aquifer)	\$378,330,000	\$1,245 - \$1,823	-	12,000	28,600	35,120	40,720	42,220		\$465 - \$766	
Construction of Lavaca River off-channel reservoir diversion project (Region L component)	\$85,429,083	\$701	-	10,000	10,000	10,000	10,000	10,000		\$100	
CRWA Siesta project	\$53,481,000	\$1,421	-	-	1,000	5,042	5,042	5,042		\$497	
CRWA Wells Ranch project Phase I	\$0	na	5,200	5,200	5,200	5,200	5,200	5,200		na	
CRWA Wells Ranch project Phase II (including Gonzales County)	\$34,910,000	\$725	5,800	5,800	5,800	5,800	5,800	5,800		\$200	
Drought management	\$0	na	41,240	-	-	-	-	-		na	
Edwards Aquifer recharge - Type 2 projects	\$527,643,000	\$2,005	-	13,451	13,451	13,451	13,451	21,577		\$340	
Edwards transfers	\$0	\$454	45,896	47,479	48,931	49,870	50,855	51,875		na	
Facilities expansion	\$142,282,000	na	-	-	-	-	-	-		na	
Firm-up- run-of-river with off-channel reservoir - LCRA/SAWS project (Region L component)	\$1,986,684,000	\$2,394	-	-	90,000	90,000	90,000	90,000		\$829	
GBRA Exelon project	\$280,598,000	\$646	-	49,126	49,126	49,126	49,126	49,126		\$224	
GBRA lower basin storage	\$33,800,000	\$104	-	28,369	28,369	28,369	28,369	28,369		\$60	
GBRA mid basin (surface water)	\$546,941,000	\$1,879	-	25,000	25,000	25,000	25,000	25,000		\$370	
GBRA new appropriation (lower basin)	\$246,849,000	\$1,910	-	-	11,300	11,300	11,300	11,300		\$223	
GBRA Simsboro project (overdraft)	\$330,782,000	\$982	-	30,000	30,000	30,000	49,777	49,777		\$386	

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Water Supply Volume (acre-feet/year)							Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
			2010	2020	2030	2040	2050	2060		
Hays/Caldwell Public Utility Authority Project (including Gonzales County)	\$307,717,752	\$1,245	-	7,289	14,597	19,418	25,868	33,314	\$439	
Industrial, steam-electric power generation, and mining water conservation	\$0	na	521	726	1,771	1,992	2,293	2,493	na	
Irrigation water conservation	\$0	\$143	20,087	17,561	14,429	11,421	8,543	7,238	\$136	
Livestock water conservation	\$0	na	3	1	-	-	-	-	na	
Local groundwater (Gulf Coast Aquifer)	\$2,194,000	\$1,823	-	-	-	161	161	161	\$637	
Local groundwater (Trinity Aquifer)	\$30,224,000	\$644	2,016	3,145	3,468	3,629	3,952	4,436	\$440	
Local groundwater Carrizo-Wilcox Aquifer (includes overdrafts)	\$166,718,000	\$577	6,773	11,610	15,441	17,256	23,946	33,874	\$464	
Medina Lake firm-up (aquifer storage and recovery)	\$146,237,000	\$1,696	9,933	9,933	9,933	9,933	9,933	9,933	\$450	
Municipal water conservation	\$0	\$648	13,232	22,744	31,618	40,531	53,925	72,566	\$572	
Purchase from New Braunfels Utilities/redistribution of supplies	\$0	varies	1,443	552	552	552	552	552	varies	
Purchase from wholesale water provider (GBRA)	\$0	varies	8,940	4,805	-	-	-	-	na	
Purchase from wholesale water provider (LNR)/redistribution of supplies	\$0	varies	46	145	322	499	489	489	varies	
Purchase from wholesale water provider (SSLGC)/redistribution of supplies	\$0	varies	581	719	876	1,034	1,197	1,376	varies	
Recycled water programs	\$465,339,000	varies	21,666	26,046	30,151	34,178	37,706	41,737	varies	
Regional Carrizo for SAWS (including Gonzales County)	\$136,550,000	\$1,343	-	11,687	11,687	11,687	11,687	11,687	\$324	
Regional Carrizo for SSLGC project expansion (including Gonzales County)	\$28,189,000	\$568	-	10,364	10,364	10,364	10,364	10,364	\$331	
Seawater desalination	\$1,293,827,000	\$2,284	-	-	-	-	-	84,012	\$2,284	
Storage above Canyon Reservoir (aquifer storage and recovery)	\$37,326,000	\$1,772	-	3,140	3,140	3,140	3,140	3,140	\$587	
TWA Regional Carrizo (including Gonzales County)	\$313,060,000	\$1,523	-	27,000	27,000	27,000	27,000	27,000	\$512	
Western Canyon water treatment plant expansion	\$11,727,436	\$315	-	-	-	-	5,600	5,600	\$315	
Wimberley and Woodcreek water supply project	\$33,771,000	\$2,429	1,120	4,480	4,480	4,480	4,480	4,480	\$4,480	
Brackish groundwater desalination (Wilcox Aquifer) ¹	\$0	na	-	-	3,596	3,596	9,196	9,196	na	
CRWA Siesta Project ¹	\$0	na	-	-	1,000	5,042	3,711	4,211	na	
CRWA Wells Ranch Project Phase I ¹	\$0	\$725	5,200	5,200	5,200	5,200	5,200	5,200	\$200	
CRWA Wells Ranch Project Phase II (including Gonzales County) ¹	\$0	\$725	1,296	4,626	5,800	5,800	5,800	5,800	\$200	
Edwards transfers ¹	\$0	na	5,259	6,220	8,297	12,483	20,823	21,138	na	
Facilities expansion ¹	\$2,277,000	na	-	-	-	-	-	-	na	
GBRA lower basin storage ¹	\$0	na	-	-	7,786	10,755	13,416	16,391	na	

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Water Supply Volume (acre-feet/year)						Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
	2010	2020	2030	2040	2050	2060	
	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)						
	Total Capital Costs						
GBRA mid-basin (surface water) ¹	na	12,855	13,554	13,988	14,424	14,794	na
GBRA new appropriation (lower basin) ¹	na	-	-	81	193	310	na
GBRA Simsboro project (overdraft) ¹	na	9,268	14,174	20,954	28,024	35,786	na
Hays/Caldwell Public Utility Authority project (including Gonzales County) ¹	na	1,370	7,521	5,344	5,986	7,502	na
Local groundwater (Trinity Aquifer) ¹	na	296	283	705	963	1,216	na
Local groundwater Carrizo-Wilcox Aquifer (includes overdrafts) ¹	na	120	120	120	120	120	na
Medina Lake firm-up (aquifer storage and recovery) ¹	na	500	500	500	500	500	na
Recycled water programs ¹	na	4,240	7,367	15,127	15,127	15,127	na
Regional Carrizo for SSLGC project expansion (including Gonzales County) ¹	\$568	-	616	4,082	5,764	7,573	na
Storage above Canyon Reservoir (aquifer storage and recovery) ¹	\$0	-	3,140	3,140	3,140	3,140	na
TWA Regional Carrizo (including Gonzales County) ¹	\$0	-	6,828	13,717	17,591	21,556	na
Western Canyon water treatment plant expansion ¹	\$0	\$315	-	-	-	650	\$315
Wimberley and Woodcreek water supply project ¹	\$0	1,120	4,480	4,480	4,480	4,480	\$1,772
Region L Subtotal	\$7,622,886,271	188,297	376,003	542,606	571,553	631,476	765,738
Region M							
Acquisition of water rights through contract	\$724	312	738	1,665	2,352	3,198	4,671
Acquisition of water rights through purchase	\$631,081,709	9,611	19,461	41,602	70,944	110,913	151,237
Acquisition of water rights through urbanization	\$56,167,089	299	3,433	6,467	9,496	12,868	16,406
Advanced water conservation	\$22,583,710	2,917	6,339	11,986	16,512	24,867	32,793
Banco Morales Reservoir	\$25,790,900	\$9,370	-	238	238	238	238
Brackish water desalination	\$267,290,631	\$775	56,553	63,239	67,221	73,984	86,708
Brownsville weir and reservoir	\$98,411,077	\$585	-	20,643	20,643	20,643	23,643
Expand existing groundwater wells	\$27,474,302	\$433	3,772	8,572	17,139	20,492	24,520
Irrigation conveyance system conservation	\$131,899,803	\$12	11,204	37,711	63,762	89,347	114,465
Laredo low water weir	\$294,400,000	na	-	-	-	-	-
Non-potable reuse	\$174,944,916	\$466	2,417	9,891	16,425	28,087	42,938
On-farm water conservation	\$194,569,720	\$315	1,622	10,419	26,299	49,073	78,550
Potable reuse	\$7,519,850	\$717	1,120	1,120	1,120	1,150	1,290
Proposed elevated storage tank and infrastructure improvements for City of Elsa	\$8,325,386	\$7,241	105	105	105	105	105
Resaca restoration	\$52,000,000	\$5,583	877	877	877	877	877
							\$2,542

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)							Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		2010	2020	2030	2040	2050	2060		
Seawater Desalination	\$185,940,937	\$1,611	125	143	6,049	6,421	7,902	\$1,051	
Region M Subtotal	\$2,194,663,908	90,934	182,911	275,692	389,319	526,225	673,846		
Region N									
Construction of Lavaca River off-channel reservoir diversion project (Region N component)	\$138,753,917	\$1,027	-	-	-	-	16,242	\$1,027	
Garwood Pipeline	\$112,798,000	\$685	-	35,000	35,000	35,000	35,000	\$402	
Gulf Coast Aquifer Supplies	\$13,413,000	\$100 - \$144	1,975	2,535	11,535	11,535	13,551	\$24 - \$100	
Gulf Coast Aquifer Supplies (regional)	\$59,245,000	\$853	-	11,000	11,000	11,000	18,000	\$566	
Irrigation water conservation	\$0	\$228	17	52	103	169	248	\$228	
Manufacturing water conservation	\$0	na	1,260	1,418	1,576	1,734	1,892	2,050	
Mining water conservation	\$0	na	281	626	998	1,410	1,863	2,343	
Municipal water conservation	\$0	\$423 - \$448	106	353	721	1,153	1,763	\$423 - \$448	
O.N. Stevens Water Treatment Plant improvements	\$31,324,000	\$178	42,329	40,048	36,366	34,817	32,996	\$146	
Off-channel reservoir near Lake Corpus Christi	\$300,577,000	\$715	-	30,340	30,340	30,340	30,340	\$578	
Reclaimed wastewater supplies	\$0	\$826	250	250	250	250	250	\$826	
Voluntary redistribution	\$0	\$685 - \$798	736	738	914	1,060	2,706	\$685 - \$798	
Region N Subtotal	\$656,110,917	46,954	81,020	130,539	130,017	133,430	156,326		
Region O									
CRMWA Region O local groundwater development	\$56,574,000	\$358	-	15,500	14,130	12,717	11,445	\$412	
Irrigation water conservation	\$45,824,000	\$63	479,466	431,517	388,366	349,528	314,577	\$106	
Lake Alan Henry Pipeline for the City of Lubbock	\$294,329,000	\$1,310	21,880	21,880	21,880	21,880	21,880	\$1,310	
Lake Alan Henry Supply for Lake Alan Henry Water Supply Corporation	\$7,334,502	\$3,349	270	270	270	270	270	\$3,349	
Local groundwater development	\$21,438,369	na	10,034	12,711	15,253	15,871	16,841	na	
Lubbock brackish groundwater desalination	\$13,167,000	\$663	-	3,360	3,360	3,360	3,360	\$663	
Lubbock Jim Bertram Lake 7	\$68,288,400	\$451	-	17,650	17,650	17,650	17,650	\$451	
Lubbock North Fork diversion operation (A)	\$153,040,000	\$6,340	-	3,675	3,675	3,675	3,675	\$6,340	
Municipal water conservation	\$0	\$668	5,809	10,583	10,729	10,264	10,206	\$550	
Post Reservoir - Delivered to Lake Alan Henry Pipeline	\$110,307,000	\$695	-	25,720	25,720	25,720	25,720	\$695	
Reclaimed water - White River Municipal Water District	\$38,089,684	\$1,593	-	2,240	2,240	2,240	2,240	\$1,593	
Region O Subtotal	\$1,108,391,955	517,459	503,886	504,643	464,588	429,136	395,957		

APPENDIX A.2. RECOMMENDED WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Recommended Water Management Strategy	Total Capital Costs	First Decade Estimated Annual Average Unit Cost (\$/acre-foot/year)	Water Supply Volume (acre-feet/year)					Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
			2010	2020	2030	2040	2050	
Region P								
Conjunctive use of groundwater (temporary overdraft) - Jackson County	\$0	\$42	5,063	5,063	5,053	5,054	5,053	\$42
Conjunctive use of groundwater (temporary overdraft) - Wharton County	\$0	\$42	62,686	62,686	62,686	62,686	62,686	\$42
Region P Subtotal	\$0		67,739	67,739	67,739	67,740	67,739	67,739

1 - Denotes strategies with supply volumes included in other strategies

2 - Estimated planning costs and water supply associated with this strategy are based on the Neches River Run-of-River strategy. This project, however is only one of several water management strategies being considered to meet these 2060 needs, and through action by the Region C Water Planning Group, any of those other strategies may be substituted into the plan to represent the 'Fastrill Reservoir Replacement' strategy.

Those other strategies include: additional water conservation, Lake Texoma, Toledo Bend Reservoir, Lake O' the Pines, Lake Livingston, Ogalalla groundwater in Roberts County (Region A), Marvin Nichols Reservoir, Lake Columbia, George Parkhouse Reservoir (North), George Parkhouse Reservoir (South), and Oklahoma Water.

3 - Denotes strategies with supply volumes included in Region C Strategies (including supply from Bois D'Arc reservoir)

4 - Supply would not available during drought of record conditions

"na" = not available/applicable

APPENDIX A.3. ALTERNATIVE WATER MANAGEMENT STRATEGIES AND COST ESTIMATES

Alternative Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		2010	2020	2030	2040	2050	2060	2060		
Region A										
Palo Duro Reservoir Transmission System	\$107,839,700	\$2,891	0	0	3,758	3,758	3,758	3,758	3,758	\$390
Precipitation enhancement	\$0	\$6	0	87,558	87,558	87,558	87,558	87,558	87,558	\$6
Voluntary transfers from other users	\$3,116,400	\$1,870	0	0	300	500	800	1,000	1,000	\$871
Region B										
Develop Trinity Aquifer supplies	\$1,650,000	\$1,200	171	171	171	171	171	171	171	\$357
Develop Trinity Aquifer supplies (including overdrafting)	\$654,000	\$446	177	177	177	177	177	177	177	\$125
Purchase water from local provider (alternative 1)	\$364,500	\$1,200	584	584	584	584	584	584	584	\$1,145
Purchase water from local provider (alternative 2)	\$239,671	\$1,200	384	384	384	384	384	384	384	\$1,145
Purchase water from local provider (alternative 3)	\$848,000	\$3,050	40	40	40	40	40	40	40	\$1,200
Wastewater reuse	\$67,100,000	\$770	0	0	0	11,000	11,000	11,000	11,000	\$317
Region C										
Brazos groundwater project to DWU	\$801,451,000	\$1,222	0	0	0	100,000	100,000	100,000	100,000	\$1,222
Brazos groundwater project to NTMWD	\$913,344,000	\$1,416	0	0	100,000	100,000	100,000	100,000	100,000	\$752
Cooke County project	\$3,254,000	\$2,110	0	200	200	200	200	200	200	\$930
Indirect reuse	\$195,183,000	na	0	0	26,000	26,000	26,000	26,000	26,000	\$380
Lake Columbia to DWU	\$179,945,000	\$536	0	0	0	35,800	35,800	35,800	35,800	\$536
Lake George Parkhouse North for DWU	\$521,281,000	\$4,650	0	0	0	112,100	112,100	112,100	112,100	\$4,650
Lake George Parkhouse North for NTMWD	\$1,029,185,000	\$580	0	0	203,960	203,960	203,960	203,960	203,960	\$156
Lake George Parkhouse South for DWU	\$692,921,000	\$568	0	0	0	115,260	115,260	115,260	115,260	\$568
Lake George Parkhouse South for NTMWD	\$1,282,503,000	\$758	0	0	193,480	193,480	193,480	193,480	193,480	\$177
Lake Livingston to DWU	\$1,855,538,000	\$982	0	0	0	200,000	200,000	200,000	200,000	\$982
Lake Livingston to NTMWD	\$2,115,111,000	\$1,103	0	200,000	200,000	200,000	200,000	200,000	200,000	\$334
Lake Livingston to TRWD	\$2,084,210,000	\$1,120	0	0	200,000	200,000	200,000	200,000	200,000	\$363
Lake O' the Pines to DWU	\$541,534,000	\$705	0	0	0	89,600	89,600	89,600	89,600	\$705
Lake O' the Pines to NTMWD	\$402,431,000	\$576	0	0	87,900	87,900	87,900	87,900	87,900	\$244
Lake Ralph Hall	\$143,201,000	\$847	0	0	29,219	29,219	29,219	29,219	29,219	\$135
Lake Tehuacana	\$746,345,000	\$1,118	0	0	56,800	56,800	56,800	56,800	56,800	\$163
Lake Texoma - authorized (desalinate)	\$796,532,000	\$994	0	105,000	105,000	105,000	105,000	105,000	105,000	\$443
Lake Texoma - not authorized (blend)	\$673,749,300	\$463	0	8,400	146,400	146,400	146,400	146,400	146,400	\$112
Lake Texoma - not authorized (desalinate)	\$925,918,000	\$1,099	0	0	105,000	105,000	105,000	105,000	105,000	\$459
Lake Texoma to DWU (blend)	\$56,334,000	\$306	0	20,000	20,000	20,000	20,000	20,000	20,000	\$101
Marvin Nichols Reservoir with DWU	\$322,326,000	\$455	0	0	50,000	50,000	50,000	50,000	50,000	\$127
New wells - other aquifer	\$7,000,000	\$219	0	4,480	4,480	4,480	4,480	4,480	4,480	\$106

APPENDIX A.3. ALTERNATIVE WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Alternative Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		2010	2020	2030	2040	2050	2060	2060		
NTMWD interim purchase from DWU (alternative strategies)	\$1,777,000	\$464	0	11,200	11,200	0	0	0	0	na
Oklahoma water to DWU	\$343,934,000	\$702	0	0	0	0	0	0	50,000	\$702
Purchase water from local provider (alternative 1)	\$20,133,000	\$1,084	0	0	6,726	6,726	6,726	6,726	6,726	\$866
Roberts County project to DWU	\$2,435,534,000	\$1,109	0	0	0	200,000	200,000	200,000	200,000	\$1,109
Roberts County project to NTMWD	\$2,434,529,000	\$1,127	0	200,000	200,000	200,000	200,000	200,000	200,000	\$243
Toledo Bend Project	\$1,433,774,000	\$813	0	0	0	0	200,000	200,000	200,000	\$813
Water treatment plant - expansion	\$14,548,000	na	0	0	0	0	0	0	0	na
Water treatment plant - new	\$17,000,000	\$259	0	8,960	8,960	8,960	8,960	8,960	8,960	\$121
Water treatment plant - new (alternative strategies)	\$48,972,000	\$1,204	0	0	6,726	6,726	6,726	6,726	6,726	\$675
Wright Patman - reallocation of flood pool NTMWD	\$1,433,524,000	\$797	0	0	230,000	230,000	230,000	230,000	230,000	\$227
Wright Patman - reallocation of flood pool TRWD (180K)	\$1,694,140,000	\$954	0	0	180,000	180,000	180,000	180,000	180,000	\$270
Wright Patman - Texarkana sale to NTMWD	\$1,192,489,000	\$1,090	0	0	150,000	150,000	150,000	150,000	150,000	\$390
Wright Patman - Texarkana sale to TRWD	\$1,081,475,000	\$1,167	0	0	100,000	100,000	100,000	100,000	100,000	\$382
Wright Patman system operation	\$2,954,940,000	\$1,057	0	0	298,000	298,000	298,000	298,000	298,000	\$337
Marvin Nichols Reservoir with DWU ¹	\$634,154,000	\$661	0	0	95,931	95,931	95,931	95,931	95,931	\$181
Wright Patman system operation ¹	\$403,387,000	\$2,023	0	0	50,000	50,000	50,000	50,000	50,000	\$582
Region D										
Alternative Grand Saline Reservoir	\$54,613,652	\$225,204	0	0	29	57	104	161	161	\$11,402
Alternative reuse City of Canton	\$3,761,806	\$18,397	0	0	29	57	104	161	161	\$1,617
Region F										
Advanced treatment	\$78,000	\$664	113	113	113	113	113	113	113	\$566
Steam-electric alternative generation technology	\$626,502,088	\$1,032 - \$1,660	4,077	5,524	8,533	12,210	17,468	24,306	24,306	\$1,962
Aquifer storage recovery	\$1,752,000	\$1,271	240	240	240	240	240	240	240	\$633
Bottled water program	\$176,000	\$24,522	1	1	1	1	1	1	1	\$24,522
Desalination	\$14,494,000	\$1,740 - \$1,879	500	850	850	850	850	850	850	\$314 - \$349
Develop Edwards Trinity Aquifer supplies	\$57,062,000	\$660 - \$1,080	1,000	1,000	1,000	13,000	13,000	13,000	13,000	\$288 - \$311
Develop other aquifer supplies	\$287,925,000	\$2,060 - \$2,643	150	650	650	12,650	12,650	12,650	12,650	\$173 - \$626
New/renew water supply - new infrastructure	\$6,795,000	\$3,361	220	220	220	220	220	220	220	\$670
Off-channel reservoir	\$25,273,000	\$4,430	500	500	500	500	500	500	500	\$758
Reuse	\$2,567,000	\$1,473	0	220	220	220	220	220	220	\$455

APPENDIX A.3. ALTERNATIVE WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Alternative Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		2010	2020	2030	2040	2050	2060	2060		
Region G										
Additional Carrizo Aquifer development (includes overdrifting)	\$212,042,000	\$842	0	35,000	35,000	35,000	35,000	35,000	35,000	\$314
BRA system operations permit	\$14,086,000	\$943	0	1,530	1,530	1,530	1,530	1,530	1,530	\$140
Interconnection from Abilene to Sweetwater	\$46,964,000	\$2,365	4,000	4,000	4,000	4,000	4,000	4,000	4,000	\$1,342
Lake Aquilla Augmentation	\$64,749,000	\$552	0	5,000	5,000	5,000	5,000	5,000	5,000	\$232
Lake Palo Pinto off-channel reservoir	\$25,399,000	\$804	0	3,110	3,110	3,110	3,110	3,110	3,110	\$92
Possum Kingdom supply	\$189,947,000	\$2,077	0	12,400	12,400	12,400	12,400	12,400	12,400	\$741
Region H										
Little River Reservoir, off-channel	\$137,356,000	\$436	0	0	27,225	27,225	27,225	27,225	27,225	\$317
Montgomery MUD 8 and 9 brackish desalination	\$12,000,000	\$1,171	2,240	2,240	2,240	2,240	2,240	2,240	2,240	\$1,171
Sabine to Region H transfer	\$760,813,320	\$203	0	0	486,500	486,500	486,500	486,500	486,500	\$67
Region I										
New wells - Carrizo-Wilcox Aquifer	\$299,452	\$285	0	0	0	212	212	212	212	\$162
Purchase water from provider (1)	\$1,021,000	\$1,482	100	100	100	100	100	100	100	\$592
Purchase water from provider (2)	\$1,389,500	\$285	700	700	700	700	700	700	700	\$112
Purchase water from provider (3)	\$114,418,981	\$2,049	0	0	0	0	5,175	5,175	5,175	\$2,049
Purchase water from provider (1)'	\$0	\$1,140	0	688	688	688	688	688	688	\$1,140
Region K										
Alternative conjunctive use of groundwater - includes overdrafts	\$19,483,200	\$964	0	0	0	0	15,000	15,000	15,000	\$964
Alternative irrigation division delivery system improvements	\$4,944,000	\$39	0	20,000	25,000	40,000	48,000	48,000	48,000	\$39
Alternative on-farm conservation	\$5,425,000	\$51	0	20,000	20,000	35,000	35,000	35,000	35,000	\$51
Desalination of Ellenburger-San Saba Aquifer	\$6,285,000	\$3,168	0	0	384	384	384	384	384	\$3,168
Desalination of Brackish Gulf Coast Aquifer	\$177,600,000	\$1,260	0	0	0	22,400	22,400	22,400	22,400	\$1,260
Enhanced recharge of groundwater (Gulf Coast Aquifer)	\$56,296,000	\$354	0	0	0	0	17,200	17,200	17,200	\$354
Expansion of Gulf Coast Aquifer	\$0	\$80	0	10,000	10,000	10,000	10,000	10,000	10,000	\$80
Groundwater importation	\$395,900,000	\$1,330	0	0	0	35,000	35,000	35,000	35,000	\$1,330
Off-channel storage in additional reservoirs	\$53,386,000	\$345	0	0	30,000	40,000	40,000	40,000	40,000	\$345

APPENDIX A.3. ALTERNATIVE WATER MANAGEMENT STRATEGIES AND COST ESTIMATES - CONTINUED

Alternative Water Management Strategy	Total Capital Costs	Water Supply Volume (acre-feet/year)								Year 2060 Estimated Annual Average Unit Cost (\$/acre-foot/year)
		2010	2020	2030	2040	2050	2060	2060		
Region L										
Calhoun County brackish groundwater project	\$24,887,000	\$2,679	0	1,344	1,344	1,344	1,344	1,344	1,344	\$1,063
GBRA Lower Basin storage (500 acre site)	\$77,876,000	\$109	0	59,569	59,569	59,569	59,569	59,569	59,569	\$73
GBRA Mid-Basin project (conjunctive use)	\$282,072,000	\$1,779	0	25,000	25,000	25,000	25,000	25,000	25,000	\$425
LGWSP for upstream GBRA needs	\$1,003,219,000	\$1,921	0	60,000	60,000	60,000	60,000	60,000	60,000	\$476
LGWSP for upstream GBRA needs at reduced capacity	\$760,352,000	\$2,565	0	35,000	35,000	35,000	35,000	35,000	35,000	\$726
Local groundwater Carrizo-Wilcox Aquifer (includes overdrafts)										
Local groundwater supply (Barton Springs Edwards)	\$5,813,000	\$517	1,210	1,210	1,210	1,210	1,210	1,210	1,210	\$99
Medina Lake firm-up (off-channel reservoir)	\$4,321,000	\$203	0	0	1,358	1,358	1,358	1,358	1,358	\$84
Regional Carrizo for Guadalupe Basin (GBRA)	\$121,751,000	\$1,197	9,078	9,078	9,078	9,078	9,078	9,078	9,078	\$199
	\$239,245,000	\$1,280	0	25,000	25,000	25,000	25,000	25,000	25,000	\$454
Region N										
Brackish groundwater desalination	\$108,331,000	\$977	0	0	0	0	18,000	18,000	18,000	\$977
Desalination	\$260,914,000	\$1,696	0	0	0	0	28,000	28,000	28,000	\$1,696
Pipeline from Choke Canyon Reservoir to Lake Corpus Christi	\$48,324,000	\$588	0	0	0	0	21,905	21,905	21,905	\$588
Stage II of Lake Texana/construction of Palmetto Bend	\$232,828,000	\$1,213	0	0	0	0	0	0	12,963	\$1,213
Phase II on the Lavaca River										

¹ Denotes strategies with supply volumes included in other strategies
na = Not available/not applicable

APPENDIX B. PROJECTED POPULATION OF TEXAS COUNTIES

County	2010	2020	2030	2040	2050	2060
ANDERSON	59,390	62,720	65,230	67,838	69,873	71,619
ANDREWS	14,131	15,078	15,737	16,358	16,645	16,968
ANGELINA	91,399	104,853	120,936	140,497	165,783	197,878
ARANSAS	26,863	30,604	32,560	32,201	30,422	28,791
ARCHER	9,689	10,542	11,237	11,449	11,054	10,649
ARMSTRONG	2,171	2,240	2,163	2,074	2,053	1,994
ATASCOSA	45,504	52,945	59,598	64,844	69,320	72,578
AUSTIN	27,173	30,574	32,946	34,355	35,031	35,958
BAILEY	7,060	7,558	7,875	8,207	8,238	8,086
BANDERA	26,373	37,265	48,577	54,829	56,642	60,346
BASTROP	84,449	120,740	151,364	199,548	239,588	288,683
BAYLOR	3,865	3,735	3,534	3,353	3,230	3,066
BEE	34,298	36,099	37,198	37,591	37,598	36,686
BELL	289,672	327,610	364,632	396,478	424,255	449,460
BEXAR	1,631,935	1,857,745	2,059,112	2,222,887	2,369,950	2,500,731
BLANCO	9,946	11,756	13,487	15,002	16,641	18,544
BORDEN	792	820	782	693	644	582
BOSQUE	19,831	22,646	24,622	25,364	25,667	26,032
BOWIE	96,953	103,397	108,397	113,397	113,397	113,397
BRAZORIA	305,649	354,708	401,684	444,981	490,875	538,795
BRAZOS	178,187	205,099	229,850	248,962	271,608	279,182
BREWSTER	9,468	9,944	10,155	10,297	10,684	10,770
BRISCOE	1,862	1,899	1,865	1,779	1,747	1,700
BROOKS	8,607	9,303	9,909	10,288	10,399	10,349
BROWN	39,324	40,602	40,959	40,959	40,959	40,959
BURLESON	18,477	20,663	22,249	23,465	24,358	25,146
BURNET	47,160	61,191	78,133	94,716	105,095	115,056
CALDWELL	45,958	59,722	71,459	83,250	95,103	106,575
CALHOUN	23,556	26,610	29,964	33,046	34,642	36,049
CALLAHAN	12,829	12,980	12,750	12,492	12,206	11,968
CAMERON	424,762	510,697	599,672	688,532	777,607	862,511
CAMP	12,586	13,735	14,798	15,639	16,291	17,006
CARSON	6,541	6,610	6,557	6,345	5,767	5,237
CASS	30,990	32,240	33,490	34,740	34,740	34,740
CASTRO	9,070	9,762	10,224	10,587	10,567	10,381
CHAMBERS	34,282	40,786	46,838	52,083	57,402	62,850
CHEROKEE	50,093	54,024	57,393	60,492	63,563	67,191
CHILDRESS	7,847	7,977	8,090	8,129	8,133	7,925
CLAY	11,376	11,699	11,628	11,147	10,462	9,778
COCHRAN	4,086	4,338	4,449	4,375	4,193	3,989
COKE	3,748	3,750	3,750	3,750	3,750	3,750
COLEMAN	9,141	9,149	9,149	9,149	9,149	9,149
COLLIN	790,648	1,046,601	1,265,373	1,526,407	1,761,082	1,938,067
COLLINGSWORTH	3,134	3,139	3,029	2,880	2,767	2,578
COLORADO	21,239	22,591	23,311	23,424	23,900	24,324
COMAL	108,219	146,868	190,873	233,964	278,626	326,655
COMANCHE	14,273	14,721	14,860	14,816	14,503	14,045
CONCHO	4,467	4,628	4,628	4,628	4,628	4,628
COOKE	40,674	46,141	51,749	56,973	65,099	71,328
CORYELL	87,707	102,414	116,741	126,878	135,749	142,886

APPENDIX B. PROJECTED POPULATION OF TEXAS COUNTIES - CONTINUED

County	2010	2020	2030	2040	2050	2060
COTTLE	1,857	1,853	1,769	1,674	1,590	1,543
CRANE	4,469	4,990	5,272	5,487	5,718	5,961
CROCKETT	4,482	4,840	4,966	5,022	5,139	5,244
CROSBY	7,678	8,174	8,514	8,856	8,873	8,731
CULBERSON	3,351	3,596	3,703	3,738	3,738	3,738
DALLAM	6,851	7,387	7,724	7,808	7,645	7,291
DALLAS	2,512,352	2,756,079	2,950,635	3,128,628	3,365,780	3,695,125
DAWSON	15,523	16,010	16,421	16,665	16,268	15,652
DEAF SMITH	20,533	22,685	24,568	26,152	26,716	26,911
DELTA	5,728	6,244	6,744	7,244	7,244	7,244
DENTON	674,322	889,705	1,118,010	1,347,185	1,573,994	1,839,507
DEWITT	20,460	20,964	21,251	21,341	21,021	20,648
DICKENS	2,712	2,661	2,547	2,375	2,304	2,221
DIMITT	10,996	11,733	12,187	12,234	11,966	11,378
DONLEY	3,764	3,694	3,536	3,375	3,238	3,026
DUVAL	13,881	14,528	14,882	14,976	14,567	13,819
EASTLAND	18,336	18,382	18,061	17,566	16,989	16,226
ECTOR	132,759	144,073	154,160	163,141	170,307	177,026
EDWARDS	2,322	2,421	2,364	2,291	2,264	2,170
EL PASO	833,640	1,000,651	1,141,414	1,262,817	1,384,220	1,505,623
ELLIS	169,514	233,654	293,665	351,919	411,721	471,317
ERATH	36,666	40,609	44,160	47,734	57,200	63,155
FALLS	19,600	20,884	22,196	23,350	24,267	25,346
FANNIN	38,129	42,648	49,775	60,659	74,490	86,970
FAYETTE	24,826	28,808	32,363	35,259	38,933	44,120
FISHER	4,264	4,259	4,097	3,972	3,910	3,717
FLOYD	8,173	8,580	8,723	8,793	8,491	8,053
FOARD	1,614	1,630	1,584	1,507	1,457	1,384
FORT BEND	550,121	719,737	893,875	1,090,710	1,348,851	1,643,825
FRANKLIN	11,533	13,363	14,613	15,863	15,863	15,863
FREESTONE	19,701	21,826	23,704	25,504	27,148	28,593
FRIO	18,160	20,034	21,628	22,952	23,913	24,412
GAINES	16,130	17,663	18,774	19,560	19,434	19,169
GALVESTON	268,714	284,731	294,218	298,057	300,915	302,774
GARZA	5,072	5,265	5,158	4,961	4,733	4,416
GILLESPIE	25,258	29,117	30,861	30,861	30,861	30,861
GLASSCOCK	1,582	1,783	1,891	1,921	1,915	1,954
GOLIAD	8,087	9,508	10,648	11,395	11,964	12,324
GONZALES	19,872	21,227	22,260	23,003	23,219	23,151
GRAY	22,163	21,988	21,371	20,542	19,286	18,064
GRAYSON	126,099	152,028	179,725	203,822	227,563	253,568
GREGG	118,770	126,421	134,330	143,481	155,871	173,587
GRIMES	26,635	30,073	32,785	34,670	36,176	37,657
GUADALUPE	114,878	146,511	180,725	214,912	252,857	293,736
HALE	39,456	42,103	44,034	45,204	44,940	44,069
HALL	3,750	3,832	3,884	3,841	3,859	3,783
HAMILTON	7,790	7,681	7,596	7,624	7,512	7,504
HANSFORD	5,699	6,148	6,532	6,948	7,191	7,406
HARDEMAN	4,665	4,626	4,496	4,329	4,144	3,792
HARDIN	54,504	59,115	61,211	63,381	65,627	67,954
HARRIS	4,078,231	4,629,335	5,180,439	5,731,543	6,282,647	6,833,751

APPENDIX B. PROJECTED POPULATION OF TEXAS COUNTIES - CONTINUED

County	2010	2020	2030	2040	2050	2060
HARRISON	67,547	72,930	76,824	79,759	83,191	88,241
HARTLEY	5,697	5,889	5,989	6,026	5,950	5,646
HASKELL	5,860	5,741	5,580	5,496	5,345	5,089
HAYS	166,342	242,051	302,795	363,678	436,388	493,320
HEMPHILL	3,496	3,511	3,394	3,269	3,181	3,024
HENDERSON	80,019	91,456	104,323	116,918	131,949	150,317
HIDALGO	775,857	987,920	1,225,227	1,481,812	1,761,810	2,048,911
HILL	33,416	34,947	36,679	38,407	40,252	42,300
HOCKLEY	24,432	25,495	26,114	26,141	25,129	23,896
HOOD	49,207	58,364	66,888	75,814	87,058	100,045
HOPKINS	35,934	39,882	42,951	45,528	45,528	45,528
HOUSTON	23,947	24,555	25,539	26,559	27,622	28,727
HOWARD	34,574	35,438	35,719	35,719	35,719	35,719
HUDSPETH	3,815	4,146	4,314	4,314	4,314	4,314
HUNT	82,948	94,401	110,672	137,371	196,757	289,645
HUTCHINSON	24,320	24,655	24,311	23,513	22,209	21,087
IRION	1,888	1,938	1,892	1,774	1,680	1,606
JACK	9,567	10,275	10,915	11,415	11,915	12,415
JACKSON	15,441	16,515	17,183	17,567	17,713	17,716
JASPER	38,445	40,897	42,344	42,712	42,712	42,712
JEFF DAVIS	2,935	3,249	3,449	3,649	3,849	4,049
JEFFERSON	259,700	270,686	280,590	288,225	295,924	310,478
JIM HOGG	5,593	5,985	6,286	6,538	6,468	6,225
JIM WELLS	42,434	45,303	47,149	47,955	47,615	46,596
JOHNSON	159,451	200,381	238,590	268,082	304,454	346,999
JONES	21,211	21,729	21,695	21,366	20,738	19,933
KARNES	17,001	18,830	20,759	22,305	23,256	23,774
KAUFMAN	103,249	162,664	208,009	254,609	297,391	349,385
KENDALL	35,720	50,283	65,752	78,690	89,312	99,698
KENEDY	467	495	523	527	529	537
KENT	840	821	733	602	535	472
KERR	49,250	54,886	57,565	58,662	61,204	62,252
KIMBLE	4,660	4,702	4,702	4,702	4,702	4,702
KING	385	424	424	389	369	332
KINNEY	3,403	3,462	3,529	3,601	3,653	3,662
KLEBERG	36,959	40,849	43,370	44,989	47,118	47,212
KNOX	4,197	4,305	4,310	4,321	4,316	4,272
LA SALLE	6,599	7,278	7,930	8,578	9,048	9,407
LAMAR	52,525	56,536	60,286	64,036	64,036	64,036
LAMB	15,515	16,500	17,355	17,995	17,900	17,668
LAMPASAS	20,114	22,596	24,396	25,731	26,606	27,160
LAVACA	18,750	18,731	18,219	17,314	16,264	15,061
LEE	17,789	20,362	22,483	24,194	25,685	26,946
LEON	18,231	21,137	22,863	22,971	22,809	23,028
LIBERTY	81,930	94,898	107,335	119,519	132,875	147,845
LIMESTONE	23,322	24,944	25,828	26,505	27,177	28,050
LIPSCOMB	3,084	3,149	3,054	2,966	2,925	2,784
LIVE OAK	13,735	14,929	15,386	15,018	13,808	12,424
LLANO	21,284	23,007	23,471	23,932	24,393	24,855
LOVING	67	67	67	67	67	67
LUBBOCK	265,547	280,449	289,694	294,476	299,218	303,857

APPENDIX B. PROJECTED POPULATION OF TEXAS COUNTIES - CONTINUED

County	2010	2020	2030	2040	2050	2060
LYNN	6,969	7,280	7,243	7,216	6,891	6,413
MADISON	13,905	14,873	15,644	16,364	17,002	17,560
MARION	11,295	11,420	11,420	11,420	11,420	11,420
MARTIN	5,203	5,696	5,935	6,082	5,934	5,633
MASON	3,817	3,856	3,876	3,886	3,891	3,896
MATAGORDA	40,506	43,295	44,991	45,925	45,925	45,925
MAVERICK	58,252	67,929	77,165	85,292	92,831	99,091
MCCULLOCH	8,235	8,377	8,377	8,377	8,377	8,377
MCLENNAN	231,882	250,398	266,002	282,177	292,449	307,378
MCMULLEN	920	957	918	866	837	793
MEDINA	46,675	54,815	62,416	68,987	75,370	81,104
MENARD	2,493	2,528	2,528	2,528	2,528	2,528
MIDLAND	124,710	134,022	140,659	145,595	148,720	151,664
MILAM	26,053	28,086	29,396	30,201	30,405	30,496
MILLS	5,466	5,815	6,107	5,930	6,329	6,497
MITCHELL	9,736	9,714	9,545	9,332	9,069	8,521
MONTAGUE	19,863	20,596	20,892	21,009	21,040	21,119
MONTGOMERY	453,369	588,351	751,702	931,732	1,169,199	1,444,999
MOORE	23,049	26,241	29,057	31,293	32,655	33,474
MORRIS	13,039	13,039	13,039	13,039	13,039	13,039
MOTLEY	1,409	1,359	1,262	1,143	1,060	1,008
NACOGDOCHES	67,357	75,914	84,183	92,628	108,753	124,453
NAVARRO	52,752	58,919	65,331	72,374	80,168	89,638
NEWTON	16,008	16,731	16,825	17,329	17,849	18,385
NOLAN	16,550	17,177	17,464	17,412	16,747	15,954
NUECES	358,278	405,492	447,014	483,692	516,265	542,327
OCHILTREE	9,685	10,440	11,001	11,380	11,566	11,803
OLDHAM	2,322	2,373	2,204	1,942	1,689	1,364
ORANGE	90,503	94,274	95,818	96,473	97,843	98,836
PALO PINTO	28,895	31,147	33,048	34,897	37,074	39,589
PANOLA	23,903	24,402	24,800	25,141	25,419	25,600
PARKER	121,653	193,559	262,053	301,760	324,546	342,887
PARMER	10,641	11,302	11,585	11,666	11,301	10,674
PECOS	17,850	18,780	19,300	19,580	19,630	19,246
POLK	48,072	54,897	60,401	64,478	68,247	71,928
POTTER	127,580	142,703	156,846	172,950	190,526	204,933
PRESIDIO	8,825	10,184	11,508	12,421	12,872	13,130
RAINS	11,173	13,221	14,687	15,400	15,755	15,991
RANDALL	117,420	131,546	144,757	159,800	176,218	189,811
REAGAN	3,791	4,182	4,381	4,367	4,213	4,010
REAL	3,063	3,111	3,042	2,993	3,070	3,132
RED RIVER	14,251	14,251	14,251	14,251	14,251	14,251
REEVES	14,281	15,451	16,417	17,219	17,949	18,527
REFUGIO	8,217	8,505	8,609	8,799	8,915	8,877
ROBERTS	930	955	857	719	622	561
ROBERTSON	17,164	18,704	19,674	20,335	20,419	20,353
ROCKWALL	89,144	141,386	171,373	199,044	215,312	232,186
RUNNELS	11,610	12,025	12,339	12,686	12,956	13,298
RUSK	49,874	52,241	53,585	54,255	56,120	60,705
SABINE	11,280	11,743	12,095	12,457	12,832	13,216
SAN AUGUSTINE	9,715	9,911	10,164	10,470	10,785	10,999

APPENDIX B. PROJECTED POPULATION OF TEXAS COUNTIES - CONTINUED

County	2010	2020	2030	2040	2050	2060
SAN JACINTO	27,443	32,541	36,617	39,159	40,630	41,299
SAN PATRICIO	80,701	95,381	109,518	122,547	134,806	146,131
SAN SABA	6,387	6,746	7,059	7,332	7,365	7,409
SCHLEICHER	3,159	3,387	3,491	3,533	3,594	3,658
SCURRY	16,998	17,602	17,923	18,092	18,203	18,203
SHACKELFORD	3,456	3,638	3,603	3,406	2,997	2,516
SHELBY	26,531	28,248	29,597	30,602	31,467	32,414
SHERMAN	3,469	3,770	3,886	4,005	4,110	4,164
SMITH	194,223	208,737	223,251	237,766	262,454	295,252
SOMERVELL	7,542	8,393	9,094	9,554	9,740	9,804
STARR	69,379	83,583	98,262	113,102	127,802	141,961
STEPHENS	9,873	10,030	10,102	10,005	9,624	9,321
STERLING	1,529	1,680	1,744	1,766	1,717	1,739
STONEWALL	1,687	1,634	1,555	1,455	1,365	1,279
SUTTON	4,479	4,737	4,780	4,762	4,773	4,725
SWISHER	8,772	9,103	9,329	9,423	9,250	8,849
TARRANT	1,800,069	2,061,887	2,337,390	2,646,559	2,964,622	3,353,509
TAYLOR	136,370	142,645	145,634	146,529	143,772	139,309
TERRELL	1,156	1,200	1,200	1,200	1,200	1,200
TERRY	13,804	14,778	15,704	16,608	16,700	16,607
THROCKMORTON	1,851	1,793	1,713	1,584	1,483	1,407
TITUS	31,158	34,430	37,593	40,462	43,064	45,497
TOM GREEN	112,138	118,851	123,109	125,466	127,333	127,752
TRAVIS	1,003,253	1,201,256	1,402,153	1,583,068	1,770,347	1,918,135
TRINITY	15,361	16,572	16,972	16,951	16,581	16,243
TYLER	24,744	28,513	30,937	31,866	31,866	31,866
UPSHUR	38,372	41,496	43,619	44,953	46,003	47,385
UPTON	3,757	4,068	4,185	4,278	4,400	4,518
UVALDE	28,616	31,443	33,802	35,650	36,876	37,810
VAL VERDE	51,312	57,500	63,265	68,175	71,761	74,348
VAN ZANDT	55,423	63,079	69,539	74,392	80,547	87,414
VICTORIA	93,073	102,487	110,221	116,368	121,416	125,865
WALKER	70,672	77,915	81,402	80,547	80,737	80,737
WALLER	41,137	51,175	62,352	74,789	89,598	106,608
WARD	11,416	11,710	11,846	11,846	11,846	11,846
WASHINGTON	32,559	35,253	36,973	37,908	38,747	39,426
WEBB	257,647	333,451	418,332	511,710	613,774	721,586
WHARTON	43,560	46,045	47,648	48,567	48,590	48,074
WHEELER	5,132	5,133	5,112	5,149	5,139	5,080
WICHITA	138,058	143,805	147,606	149,595	150,981	152,102
WILBARGER	15,279	15,928	15,993	15,672	14,908	14,027
WILLACY	22,763	25,212	27,455	29,276	30,542	31,205
WILLIAMSON	408,743	553,412	701,334	880,370	1,056,891	1,240,276
WILSON	44,078	58,621	74,641	90,187	106,373	123,135
WINKLER	7,603	7,956	8,023	8,041	7,890	7,638
WISE	66,366	89,347	108,711	127,068	148,020	170,071
WOOD	42,727	48,200	51,236	51,565	51,565	51,565
YOAKUM	8,183	8,966	9,470	10,006	9,738	9,408
YOUNG	18,116	18,513	18,541	18,328	18,059	17,889
ZAPATA	14,025	16,217	18,415	20,486	22,354	23,733
ZAVALA	12,796	14,130	15,227	16,086	16,774	17,133
Grand Total	25,388,403	29,650,388	33,712,020	37,734,422	41,924,167	46,323,725

APPENDIX C. MAJOR RESERVOIRS OF TEXAS

Reservoir Name	River Basin	Year of Completion	Year 2010 Firm Yield (acre-feet) from 2011 Regional Water Plans	Original Conservation Pool Capacity (acre-feet)
Abilene, Lake	Brazos	1921	1,141	7,900
Alan Henry Reservoir	Brazos	1994	22,500	115,937
Alcoa Lake	Brazos	1952	14,000	15,650
Amistad Reservoir, International	Rio Grande	1969	1,011,976	3,505,400
Amon G. Carter, Lake	Trinity	1956	2,107	20,050
Anahuac, Lake	Trinity	1954	17,700	29,500
Anzalduas Channel Dam	Rio Grande	1960	0	13,910
Aquilla Lake	Brazos	1983	13,746	52,400
Arlington, Lake	Trinity	1957	9,850	45,710
Arrowhead, Lake	Red	1966	26,000	262,100
Athens, Lake	Neches	1963	6,064	32,790
Austin, Lake	Colorado	1939	System Operation	21,000
B. A. Steinhagen Lake	Neches	1951	System Operation	100,595
Ballinger, Lake / Moonen, Lake	Colorado	1984	30	6,850
Balmorea, Lake	Rio Grande	1917	21,844	7,707
Bardwell Lake	Trinity	1965	9,600	54,877
Bastrop, Lake	Colorado	1964	System Operation	16,590
Baylor Lake	Red	1950	0	9,220
Belton Lake	Brazos	1954	112,257	456,884
Benbrook Lake	Trinity	1950	6,833	88,250
Bob Sandlin, Lake	Cypress	1978	60,430	213,350
Bonham, Lake	Red	1969	5,340	11,976
Brady Creek Reservoir	Colorado	1963	0	30,430
Brandy Branch Cooling Pond	Sabine	1983	0	29,513
Brazoria Reservoir	Brazos	1954	Pass-through	21,970
Bridgeport, Lake	Trinity	1931	System Operation	386,420
Brownwood, Lake	Colorado	1933	47,200	149,925
Bryan Utilities Lake	Brazos	1974	85	15,227
Buchanan, Lake	Colorado	1938	402,172	992,000
Caddo Lake	Cypress	1968	10,000	129,000
Calaveras Lake	San Antonio	1969	36,900	63,200
Canyon Lake	Guadalupe	1964	87,629	386,200
Casa Blanca Lake	Rio Grande	1951	0	20,000
Cedar Bayou Generating Pond	Trinity-San Jacinto	1972	Cooling	19,250
Cedar Creek Reservoir Colorado	Colorado	1977	System Operation	74,080
Cedar Creek Reservoir Trinity	Trinity	1966	175,000	679,200
Champion Creek Reservoir	Colorado	1959	10	42,500
Cherokee, Lake	Sabine	1948	28,885	49,295
Choke Canyon Reservoir	Nueces	1982	165,000	691,130
Cisco, Lake	Brazos	1923	1,138	26,000
Clyde, Lake	Colorado	1970	500	5,748
Coleman, Lake	Colorado	1966	5	40,000
Coleta Creek Reservoir	Guadalupe	1980	12,500	31,040
Colorado City, Lake	Colorado	1949	0	31,805
Conroe, Lake	San Jacinto	1973	79,800	430,260
Corpus Christi Reservoir, Lake	Nueces	1958	System Operation	308,700
Cox Lake / Raw Water Lake / Recycle Lake	Colorado-Lavaca	1956	0	5,034
Crook, Lake	Red	1923	7,290	11,487

APPENDIX C. MAJOR RESERVOIRS OF TEXAS - CONTINUED

Reservoir Name	River Basin	Year of Completion	Year 2010 Firm Yield (acre-feet) from 2011 Regional Water Plans	Original Conservation Pool Capacity (acre-feet)
Cypress Springs, Lake	Cypress	1971	10,737	72,800
Daniel, Lake	Brazos	1948	230	9,515
Davis, Lake	Brazos	1959	220	5,454
Delta Lake	Nueces-Rio Grande	1939	0	25,000
Diversion, Lake	Red	1924	System Operation	40,000
Dunlap, Lake	Guadalupe	1928	Hydropower	5,900
E. V. Spence Reservoir	Colorado	1969	6,170	488,760
Eagle Lake	Colorado	1900	System Operation	9,600
Eagle Mountain Lake	Trinity	1932	109,833	189,523
Eagle Nest Lake / Manor Lake	Brazos	1949	1,800	18,000
Electra, Lake	Red	1950	462	8,730
Ellison Creek Reservoir	Cypress	1943	13,857	24,700
Fairfield Lake	Trinity	1969	870	50,600
Falcon Reservoir, International	Rio Grande	1954	System Operation	2,830,000
Farmers Creek Reservoir	Red	1960	1,260	26,000
Forest Grove Reservoir	Trinity	1980	8,767	20,038
Fork Reservoir, Lake	Sabine	1980	173,035	675,819
Georgetown, Lake	Brazos	1982	11,803	37,080
Gibbons Creek Reservoir	Brazos	1981	9,740	28,363
Gilmer, Lake	Cypress	1999	6,180	12,720
Gladewater, Lake	Sabine	1952	2,125	6,950
Gonzales (H-4), Lake	Guadalupe	1931	Hydropower	6,500
Graham, Lake	Brazos	1958	5,335	53,680
Granbury, Lake	Brazos	1969	64,712	155,000
Granger Lake	Brazos	1979	18,007	56,961
Grapevine Lake	Trinity	1952	19,067	188,553
Greenbelt Lake	Red	1968	8,297	60,400
Gulf Coast Water Authority Reservoir	San Jacinto-Brazos	1948	0	7,308
Halbert, Lake	Trinity	1921	0	7,420
Hords Creek Lake	Colorado	1948	0	8,640
Houston County Lake	Trinity	1966	3,500	19,500
Houston, Lake	San Jacinto	1954	187,000	146,769
Hubbard Creek Reservoir	Brazos	1962	27,708	317,750
Hubert H. Moss Lake	Red	1966	7,410	23,210
Imperial Reservoir	Rio Grande	1915	0	6,000
Inks Lake	Colorado	1938	System Operation	17,545
J. B. Thomas, Lake	Colorado	1952	20	203,600
Jacksonville, Lake	Neches	1957	6,200	30,500
Jim Chapman Lake	Sulphur	1991	127,983	310,312
Joe Pool Lake	Trinity	1991	15,192	176,900
Johnson Creek Reservoir	Cypress	1961	0	10,100
Kemp, Lake	Red	1923	100,983	319,600
Kickapoo, Lake	Red	1945	19,800	106,000
Kirby, Lake	Brazos	1928	533	7,620
Kurth, Lake	Neches	1961	18,421	16,200
Lavon Lake	Trinity	1953	112,033	456,526
Lake Creek Lake	Brazos	1952	10,000	8,400
Lake Fort Phantom Hill	Brazos	1938	11,816	74,310

APPENDIX C. MAJOR RESERVOIRS OF TEXAS - CONTINUED

Reservoir Name	River Basin	Year of Completion	Year 2010 Firm Yield (acre-feet) from 2011 Regional Water Plans	Original Conservation Pool Capacity (acre-feet)
Leon, Lake	Brazos	1954	5,938	27,290
Lewis Creek Reservoir	San Jacinto	1969	0	16,400
Lewisville Lake	Trinity	1955	7,918	640,986
Limestone, Lake	Brazos	1978	65,074	225,400
Livingston, Lake	Trinity	1969	1,344,000	1,750,000
Loma Alta Lake	Nueces-Rio Grande	1963	Storage	26,500
Lost Creek Reservoir	Trinity	1991	1,597	11,961
Lyndon B. Johnson, Lake	Colorado	1951	System Operation	138,500
Mackenzie Reservoir	Red	1974	0	46,545
Marble Falls, Lake	Colorado	1951	System Operation	8,760
Martin Lake	Sabine	1974	25,000	77,619
McQueeney, Lake	Guadalupe	1928	Hydropower	5,000
Medina Lake	San Antonio	1913	0	254,000
Meredith, Lake	Canadian	1965	69,750	864,400
Mexia, Lake	Brazos	1961	1,320	10,000
Millers Creek Reservoir	Brazos	1974	50	33,000
Mineral Wells, Lake	Brazos	1920	2,508	6,760
Mitchell County Reservoir	Colorado	1991	System Operation	27,266
Monticello Reservoir	Cypress	1973	2,439	40,100
Mountain Creek Lake	Trinity	1936	6,400	22,840
Mud Lake No. 4	Colorado-Lavaca	1974	0	11,048
Murvaul, Lake	Sabine	1958	21,792	45,815
Mustang Lake East/Mustang Lake West	San Jacinto-Brazos	1969	0	6,451
Nacogdoches, Lake	Neches	1977	17,067	41,140
Nasworthy, Lake	Colorado	1930	0	12,390
Navarro Mills Lake	Trinity	1963	19,342	63,000
New Terrell City Lake	Trinity	1955	2,283	8,712
North Fork Buffalo Creek Reservoir	Red	1964	840	15,400
North Lake	Trinity	1957	0	17,000
O. C. Fisher Lake	Colorado	1951	0	119,200
O. H. Ivie Reservoir	Colorado	1989	85,150	554,340
O' the Pines, Lake	Cypress	1958	174,960	274,443
Oak Creek Reservoir	Colorado	1952	5	39,360
Olney, Lake / Cooper, Lake	Red	1935	960	6,650
Palestine, Lake	Neches	1971	207,458	411,840
Palo Duro Reservoir	Canadian	1991	3,958	61,239
Palo Pinto, Lake	Brazos	1964	9,658	44,100
Pat Cleburne, Lake	Brazos	1964	5,075	25,560
Pat Mayse Lake	Red	1967	59,670	124,500
Pauline, Lake	Red	1905	1,200	7,000
Peacock Site 1A Tailings Reservoir	Cypress	1983	System Operation	11,248
Pinkston Reservoir	Neches	1977	3,800	7,380
Possum Kingdom Lake	Brazos	1941	230,750	724,739
Proctor Lake	Brazos	1963	19,467	59,400
Randell Lake	Red	1909	1,400	5,400
Ray Hubbard, Lake	Trinity	1969	57,427	490,000
Ray Roberts, Lake	Trinity	1987	211,364	796,875
Red Bluff Reservoir	Rio Grande	1936	41,725	310,000

APPENDIX C. MAJOR RESERVOIRS OF TEXAS - CONTINUED

Reservoir Name	River Basin	Year of Completion	Year 2010 Firm Yield (acre-feet) from 2011 Regional Water Plans	Original Conservation Pool Capacity (acre-feet)
Red Draw Reservoir	Colorado	1985	System Operation	8,538
Richland-Chambers Reservoir	Trinity	1987	223,872	1,181,866
River Crest Lake	Sulphur	1953	8,624	7,000
Sam Rayburn Reservoir	Neches	1965	820,000	2,898,500
Santa Rosa Lake	Red	1929	3,075	11,570
Sheldon Reservoir	San Jacinto	1943	0	5,420
Smithers Lake	Brazos	1957	34,300	18,700
Somerville Lake	Brazos	1967	42,120	160,100
South Texas Project Reservoir	Colorado	1981	0	202,600
Squaw Creek Reservoir	Brazos	1977	9,238	151,008
Stamford, Lake	Brazos	1953	5,667	57,632
Stillhouse Hollow Lake	Brazos	1968	66,205	235,700
Striker, Lake	Neches	1957	20,183	29,000
Sulphur Springs Draw Storage Reservoir	Colorado	1993	0	7,997
Sulphur Springs, Lake	Sulphur	1973	9,800	14,160
Sweetwater, Lake	Brazos	1930	1,051	11,900
Tawakoni, Lake	Sabine	1960	229,807	936,200
Texana, Lake	Lavaca	1981	74,500	165,918
Texoma, Lake	Red	1944	314,850	3,132,000
Toledo Bend Reservoir	Sabine	1969	750,000	4,477,000
Tradinghouse Creek Reservoir	Brazos	1968	4,958	37,800
Travis, Lake	Colorado	1942	System Operation	1,170,752
Trinidad Lake	Trinity	1925	3,050	7,450
Twin Buttes Reservoir	Colorado	1963	0	186,200
Twin Oak Reservoir	Brazos	1982	2,892	30,319
Tyler, Lake	Neches	1967	30,925	80,900
Upper Nueces Lake	Nueces	1948	0	7,590
Valley Acres Reservoir	Nueces-Rio Grande	1947	0	7,840
Valley Lake	Red	1961	0	16,400
Victor Braunig Lake	San Antonio	1962	12,000	26,500
Waco, Lake	Brazos	1965	79,098	152,500
Wallisville Lake	Trinity	1999	System Operation	58,000
Walter E Long, Lake	Colorado	1967	0	33,940
Waxahachie, Lake	Trinity	1956	2,905	13,500
Weatherford, Lake	Trinity	1957	2,967	21,233
Welsh Reservoir	Cypress	1975	4,476	23,587
White River Lake	Brazos	1963	2,431	38,650
White Rock Lake	Trinity	1911	3,500	10,740
Whitney, Lake	Brazos	1951	18,336	627,100
Wichita, Lake	Red	1901	System Operation	14,000
William Harris Reservoir	Brazos	1947	0	10,200
Winters, Lake / New Winters, Lake	Colorado	1983	0	8,374
Worth, Lake	Trinity	1914	System Operation	37,066
Wright Patman Lake	Sulphur	1954	363,000	145,300

APPENDIX C. MAJOR RESERVOIRS OF TEXAS - CONTINUED

Reservoir Name	River Basin	Year of Completion	Year 2010 Firm Yield (acre-feet) from 2011 Regional Water Plans	Original Conservation Pool Capacity (acre-feet)
Major Reservoirs with no water supply function				
Addicks Reservoir	San Jacinto	1948	No water supply function	200,840
Alders Reservoir	Trinity	1950s	No water supply function	7,064
Barker Reservoir	San Jacinto	1945	No water supply function	207,000
Barney M. Davis Reservoir	Nueces-Rio Grande	1973	No water supply function	6,600
Bivins Lake	Red	1927	No water supply function	5,122
Buffalo Lake	Red	1938	No water supply function	18,150
Camp Creek Lake	Brazos	1949	No water supply function	8,550
Coffee Mill Lake	Red	1938	No water supply function	8,000
Hawkins, Lake	Sabine	1962	No water supply function	11,890
Holbrook, Lake	Sabine	1962	No water supply function	7,990
J. D. Murphree Wildlife Impoundment	Neches-Trinity	1964	No water supply function	13,500
Kiowa, Lake	Trinity	1970	No water supply function	7,000
Lower Running Water Draw WS SCS Site 2 Dam	Brazos	1977	No water supply function	5,429
Lower Running Water Draw WS SCS Site 3 Dam	Brazos	1982	No water supply function	8,213
Nacoinche, Lake	Neches	2005	No water supply function	15,031
Natural Dam Lake	Colorado	1989	No water supply function	54,560
Quitman, Lake	Sabine	1962	No water supply function	7,440
Rita Blanca, Lake	Canadian	1939	No water supply function	12,100
San Esteban Lake	Rio Grande	1911	No water supply function	18,770
Tailing Ponds	San Antonio-Nueces	1971	No water supply function	6,400
Tailing Ponds No. 2	San Antonio-Nueces	1971	No water supply function	6,400
Truscott Brine Lake	Red	1983	No water supply function	111,147
Winnsboro, Lake	Sabine	1962	No water supply function	8,100
			9,367,813	42,900,519

Hydropower: Used to generate hydropower.

Cooling: Used as cooling pond for power plants.

Storage: Used as a water storage facility only.

Pass-through: Temporary storage facility only.

System Operation: Reservoir operated in system operation mode with several reservoirs contributing to one yield number.

(Note: When quantified separately, the sum of individual yields will not equal a system yield.)

Note: The capacity numbers for Amistad, Falcon, Toledo Bend, and Texoma are for total capacity, not Texas' share; yields are firm as reported by the regional water planning groups and are for the Texas share only.

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

AGRICULTURE

(EIGHT REGIONS: A, B, E, H, J, K, L, AND P)

WATER DATA - FIVE REGIONS: A, B, E, J, AND L

- Develop irrigation demand numbers on a regional basis - A
- Provide funding for agricultural water use data collection - B
- Improve accuracy of TWDB historical irrigation pumpage reports - E
- Develop more accurate means of estimating actual irrigation use - J
- Continue supporting evaluations of exotic animal water use to improve demand estimates - J
- Improve accuracy of water use and demand information for irrigation and livestock - L

CONSERVATION - FIVE REGIONS: A, H, K, L, AND P

- Create a water conservation reserve program to convert irrigated acreage to dry land - A
- Encourage the federal government to continue to support Conservation Reserve Program participation - A
- Provide funding to expand the High Plains Potential Evapotranspiration network into a statewide network - A
- Fund grants or subsidies to stimulate irrigation conservation practices - H
- Increase funding for TWDB agricultural water conservation programs - H, L
- Collaborate with the Natural Resources Conservation Service state conservationist in identifying projects to fund - K
- Support adequate funding of the Environmental Quality Incentives Program and its water conservation efforts - K
- Support funding of the Natural Resources Conservation Service - K, P
- Leverage federal agricultural conservation grants by providing local matching share - P

- Continue supporting state and federal programs that improve irrigation efficiency and agricultural water conservation - P
- Support adequate funding of State Soil and Water Conservation Board and local soil and conservation districts - P

OTHER - THREE REGIONS: K, L, AND P

- Develop water polices that enable agriculture and rural Texas to achieve parity with other users - K
- Provide additional funding to the Irrigation Technology Center at Texas A&M University - L
- Protect groundwater sources for agricultural production - P

CONJUNCTIVE USE

FOUR REGIONS: F, G, L, AND N

- Expand definition of conjunctive use - F
- Encourage conceptual modeling for conjunctive use projects - G
- Include conjunctive use projects as management strategies - G
- Develop incentives for conjunctive use projects - L
- Develop policy to manage all water resources on conjunctive use basis - N

CONSERVATION

FIFTEEN REGIONS: A, B, C, D, F, G, H, I, J, K, L, M, N, O, AND P

REUSE - NINE REGIONS: A, C, F, G, H, I, K, L, AND N

- Encourage Texas Commission on Environmental Quality to evaluate rules governing reuse of wastewater and quantify incentives for its use - A
- Recommend reducing legal obstacles to indirect reuse of treated wastewater - C
- Recommend Texas Commission on Environmental Quality clearly define permitting process for large-scale reuse projects - C

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

- Encourage legislation for safe and economical water reuse - F
- Work with federal agencies/representatives to develop safe procedures for disposing of reject water - F
- Encourage municipalities to manage return flows through direct and indirect reuse - G
- Encourage river authorities to manage return flows not under others' jurisdictions - G
- Clarify Texas Pollutant Discharge Elimination System after Elimination rules for wastewater permitting to eliminate double-counting of waste loads - H
- Advocate statewide reuse - H
- Resolve permitting issues for indirect reuse, including clarifying Texas Water Code Sections 11.042 and 11.046 - H, I
- Encourage Texas Commission on Environmental Quality to continue thorough review of indirect reuse applications, including environmental and water rights concerns - K
- Fund reuse technologies - L
- Promote water reuse and return flows wherever practical, after evaluating environmental needs - N

CONSERVATION FUNDING - FOUR REGIONS: F, H, K, AND O

- Fund grants or low-interest loans as incentives to use conservation technologies - F
- Leverage federal conservation grants by providing matching funds - H
- Continue and expand TWDB funding for retail utility water loss projects - K
- Fund conservation incentives for all user groups - O

WATER CONSERVATION ADVISORY COUNCIL - FOUR REGIONS: A, C, K, AND L

- Adopt definitions and methodology for gallons per capita per day proposed by Water Conservation Advisory Council - A, K
- Maintain the functionality and viability of the Water Conservation Advisory Council - A

- Fund activities of the Water Conservation Advisory Council and a statewide awareness campaign - C, L

WATER CONSERVATION IMPLEMENTATION TASK FORCE - FOUR REGIONS: C, F, L, AND O

- Follow the Water Conservation Implementation Task Force recommendation to institute voluntary, rather than mandatory, per capita water use goals - C, F
- Fund and implement programs recommended by the Water Conservation Implementation Task Force - L
- Update the 2004 Best Management Practices Guide - O

VOLUNTARY CONSERVATION - FOUR REGIONS: B, D, F, AND O

- Allow regions to establish voluntary water conservation goals - B, D
- Encourage conservation through technical assistance rather than mandatory goals - F
- Support landowner's voluntary protection of springs and seeps - O

WATER PROVIDERS - FIVE REGIONS: D, F, G, K, AND M

- Train water utilities to reduce water losses and improve their accountability - D, M
- Encourage retail water providers to use inclining block rate structure - F, G
- Support required use of conservation coordinator by all public water suppliers - K
- Encourage Texas Commission on Environmental Quality to amend 30 Texas Administrative Code Chapter 288 to require designated water conservation coordinators - K

CONSERVATION MANAGEMENT - FIVE REGIONS: J, K, L, M, AND N

- Develop conservation-oriented management plans for areas particularly susceptible to drought - J

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

- Encourage legislation to allow water providers to have dedicated funding for longer term water conservation - K
- Encourage legislation to allow property owners' associations to adopt restrictive covenants consistent with their water providers drought and conservation recommendations - K
- Encourage water users to develop and implement conservation plans that meet or exceed legal requirements - L, M
- Encourage municipal providers to develop and implement drought contingency plans that meet or exceed legal requirements - L, M
- Encourage legislation to support conservation strategies that manage water supplies more efficiently - N

OTHER - TEN REGIONS: A, B, D, F, H, J, K, L, M, AND O

- Evaluate policy barriers to using playa lakes for conservation purposes - A
- Base calculation of gallons per capita per day on residential water use only - B
- Recommend the legislature standardize the measurement of gallons per capita per day - D
- Systems with use greater than 140 gallons per capita per day should perform water audits - D
- Recommends legislature continue to address and improve water conservation in the state - H
- Require conservation on all state-owned lands - J
- Encourage conservation partnerships between water groups - K
- Recommend consideration of drought management as an interim strategy to meet near-term needs - L
- Recommend the state more actively monitor compliance with conservation and drought plans - M
- Recommend conservation and drought plans be consistent with the regional water plan - M
- Regional water planning groups should have a more active role in evaluating conservation and drought plans - M
- Develop a tiered recognition program for conservation achievements - O
- Control aquatic vegetation as water conservation practice - O

DATA COLLECTION AND RESEARCH FOURTEEN REGIONS: A, B, D, E, F, H, I, J, K, L, M, N, O, AND P

GROUNDWATER AND SURFACE WATER AVAILABILITY MODELING - NINE REGIONS: A, D, E, F, H, J, K, M, AND N

- Fund updates of water availability models - A, M, N
- Continue funding ground-water availability models - D, E, H, J, K, M, N
- Continue water availability modeling for minor Panhandle aquifers - A
- Recommend agencies coordinate with one another and planning groups in developing water availability and groundwater availability models - A
- Fund improvements to groundwater modeling and research in West Texas - E
- Request data from water agencies in Mexico to extend the Presidio Bolson groundwater availability model - E
- Allow more flexibility in the use of water availability models in the planning process - F
- Revise Hill Country Trinity Aquifer ground-water availability model - J
- Fund feasibility study linking groundwater and surface water in next generation of groundwater and water availability models - J, K
- Encourage public and private sector technical review of groundwater and water availability models - K
- Update the Central Gulf Coast Aquifer groundwater availability model - N

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

GROUNDWATER STUDIES - EIGHT REGIONS: E, F, J, K, L, N, O, AND P

- Finish study of Presidio Bolson Aquifer - E
- Study and characterize limestone formation in southern Brewster County - E
- Collect groundwater data to carry out Senate Bill 1 and Joint Planning for Groundwater - F
- Continue funding monitoring studies - J
- Study and characterize the Edwards-Trinity (Plateau) Aquifer and associated aquifers - J
- Provide groundwater conservation districts with technical assistance in gathering aquifer data - J
- Study the Frio River alluvium - J
- Study surface water/groundwater interaction in the upper Guadalupe River for springflow analysis - J
- Complete study of Trinity Aquifer use in Hays County and use results in next regional water plan - K
- Encourage legislation requiring economic and environmental studies for any groundwater project - L
- Encourage Railroad Commission of Texas to provide better information for identifying aquifer characteristics - N
- Provide additional funds to expand groundwater data program - N
- Encourage TWDB, Texas Commission on Environmental Quality, and Railroad Commission of Texas to expand and intensify ground-water data gathering and disseminating - N
- Fund computer models that quantify groundwater resources in each aquifer and project future availability based on historical net changes - O
- Continue monitoring static water levels and groundwater pumpage - P

ENVIRONMENTAL STUDIES - FOUR REGIONS: D, F, H, AND L

- Study mitigation effects as early as possible in reservoir planning - D
- Fund studies to identify and quantify environmental values to be protected and stream flows necessary to maintain priority environmental values - F
- Involve local groups in studies that evaluate streamflow issues - F
- Increase funding for research to determine freshwater inflow needs - H
- Complete the Texas Instream Flow Program - L
- Fund and improve freshwater inflow studies for bays and estuaries - L
- Examine applicability of report by Study Commission on Water for Environmental Flows - L
- Perform studies to evaluate effects of water management strategies on basin ecosystems - L

AQUIFER RECHARGE - FIVE REGIONS: A, B, J, L, AND O

- Consider the minimal recharge rate in assessments of the Ogallala Aquifer - A
- Study means to improve groundwater recharge - A
- Study the applicability of aquifer recharge programs and their impact to surface water rights - B
- Study quantity of increased groundwater from enhanced recharge structures - B
- Study aquifer recharge with harvested rainwater - J
- Fund research on Edwards (Balcones Fault Zone) Aquifer recharge and recirculation systems water management strategy - L
- Identify and quantify recharge mechanisms for Ogallala Aquifer - O
- Study and describe impact of playas on recharge - O

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

AGRICULTURE/RURAL - FIVE REGIONS: E, H, J, L, AND O

- Establish an integrated Rio Grande data management system to better manage irrigation releases and flood control - E
- Provide real time monitoring on the Rio Grande Project delivery system via information systems analysis and hydrologic operations modeling - E
- Fund research on more efficient irrigation practices - H
- Increase funding to research drought-resistant crop species - H, O
- Encourage riparian landowners to implement land stewardship practices - J
- Study impact of transient populations on rural water demand - J
- Undertake economic studies of water management strategies that meet irrigation needs - L

CONSERVATION - FOUR REGIONS: F, H, K, AND O

- Continue participating in conservation research and demonstration projects - F
- Fund research for advanced conservation technologies - H
- Fund research on developing and implementing conservation goals and successful water management strategies to update the 2004 Best Management Practices Guide - K
- Update the 2004 Best Management Practices Guide - O

BRUSH CONTROL - THREE REGIONS: D, J, AND K

- Monitor water pollution from Giant Salvinia and research and develop best management practices for its control - D
- Fund multidisciplinary research for defining watersheds with greatest potential for increasing water yields through brush management; quantify costs - J
- Fund voluntary brush control studies - K

RIVERS - ONE REGION: E

- Study effects of possible rechannelization of Rio Grande below Fort Quitman - E

GENERAL - ELEVEN REGIONS: A, B, E, F, I, J, K, L, M, N, AND O

- Improve monitoring and quantifying of small communities, manufacturers, livestock operators, and county-other categories - A
- Analyze economic effects of implementing water management strategies - A
- Remove provisions from Open Records Act restricting access to water data on private property - E
- Recommend TWDB meet with regions and consultants to discuss data collection and quality control - F
- Fund study on oral ingestion of radium before enforcing maximum containment load - F
- Fund improved data for next planning cycle - I
- Conduct studies on specific water resource issues - J
- Fund all levels of data collection and analysis - K, L, O
- Fund roles of TWDB and Texas Commission on Environmental Quality in providing data for regional planning - L
- Review the Texas Water Code regarding transfers of water out of groundwater conservation districts and provide sufficient revenue for technical studies - L
- Evaluate the effect of groundwater withdrawals on surface water availability - M
- Evaluate true impact and treaty compliance factors of aqueduct construction from Falcon Reservoir to Matamoros, Mexico - M
- Fund and establish regional research centers at local universities to focus on Coastal Bend water issues - N
- Provide funds to establish and maintain a regional water resources information management system - N

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

- Recommend TWDB consider local projects when developing mining water demand projections, specifically the Eagle Ford shale - N
- Fund a basic data network that maintains current inventory of surface water and groundwater resources - O
- Develop standardized, comprehensive methodologies for characterizing and computing per capita water use - O

EDUCATION

NINE REGIONS: D, F, G, J, K, L, M, N, AND O

CONSERVATION EDUCATION - EIGHT REGIONS: D, F, G, J, K, L, M, AND O

- Fund and implement conservation education programs for the public - D, F, J, M
- Create and fund a water conservation awareness program through TWDB - G, O
- Fund the Water IQ public education program - K, L
- Supports regional coordination and resource pooling for uniform conservation messaging - K
- Encourage TWDB to assist communities to coordinate on conservation education efforts - K

GENERAL EDUCATION - FOUR REGIONS: J, K, L, AND O

- Fund education on conservation and about water supplies programs for public sector - J, O
- Fund education on water management and rainwater harvesting programs for private sector - J
- Address sustainability through education - K
- Fund statewide education program and coordinate with Texas Cooperative Extension - L

AQUATIC WEED CONTROL - ONE REGION: D

- Develop awareness campaign and provide extension and education services to urban and industry stakeholders on giant salvinia threat and mitigation - D

REGIONAL GROUPS - ONE REGION: N

- Make funds available to planning groups and groundwater conservation districts to educate public on water issues - N

ENVIRONMENT

TWELVE REGIONS: A, B, C, D, E, F, G, H, K, L, O, AND P

UNIQUE STREAM SEGMENTS - FIVE REGIONS: A, B, C, D, AND L

- Clarify intent and uncertainties of unique stream segment designation - A, B, C, D, L
- Examine ancillary issues regarding unique stream segments - C
- Establish a working group on unique stream segments to review legislative intent, agency rules, and impacts of designations - C

INSTREAM FLOWS - THREE REGIONS: F, G, AND K

- Protect existing water rights when considering instream flows - F
- Oppose adaptive management requirements concerning instream flows - F
- Evaluate return flows to determine impact on instream flows - G
- Provide direction to protect instream/freshwater inflows - K
- Monitor and provide adequate funding for environmental flows - K
- Encourage Colorado and Lavaca Stakeholder Group to develop recommendations protective of long-term ecological productivity - K
- Recommend state evaluate ways to convert existing water rights to environmental uses - K

RESERVOIRS - TWO REGIONS: D AND P

- Consider environmental and economic impacts of reservoir development - D
- Recommend entities proposing new reservoirs through the planning process include a map of proposed mitigation acreage - D

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

- Support efforts to mitigate environmental impacts of Palmetto Bend Stage II - P

OTHER - SEVEN REGIONS: E, F, G, H, K, L, AND O

- Establish policy to protect aquifers and springs to preserve “the rural way of life” - E
- Support recognition of the importance of springs and spring-fed stream - F
- Encourage responsible land management practices to protect water sources - G, L
- Clarify agency rules on quantitative environmental analysis - H
- Support planning process structure that evaluates environmental needs to determine available water supply - K
- Evaluate land use and ecosystem health in light of sustaining future quality of life - L
- Encourage collaboration of scientists, policy makers, and agricultural representatives in managing threatened species - O

GROUNDWATER

FIFTEEN REGIONS: A, C, D, E, F, G, H, I, J, K, L, M, N, O, AND P

GROUNDWATER CONSERVATION DISTRICTS - TWELVE REGIONS: A, C, F, G, H, I, J, K, L, M, O, AND P

- Manage groundwater resources through local groundwater conservation districts - A, F, G, H, J, K, M, P
- Create or expand groundwater conservation districts in areas not currently served - A, F, I, J, K, M
- Encourage cooperation between groundwater conservation districts - C, F
- Recommend TWDB or Texas Commission on Environmental Quality oversee groundwater districts to standardize regulations - C, F
- Support groundwater conservation districts as local authority on groundwater issues - G, K
- Respect property rights and right to capture when adopting rules and regulations - F

- Base groundwater supply availability on management goals and rules - F
- Restrict export from a district until there is a plan to ensure adequate supplies are available for the district or region - F
- Ensure all state lands are subject to groundwater district rules and limits - F
- Train groundwater conservation districts in use of groundwater availability modeling - J
- Form groundwater conservation districts to administer sound, scientifically based groundwater management objectives - J
- Advocate that groundwater conservation districts consider developing management rules for Edwards (Balcones Fault Zone) Aquifer to sustain spring flows of upper Guadalupe River - J
- Strengthen groundwater conservation districts’ abilities to protect groundwater supplies - K
- Encourage TWDB to continue assisting groundwater districts - K
- Support referral of any groundwater district reorganization to the local election process - K
- Recommends groundwater districts manage groundwater as necessary to meet desired future conditions rather than use the Managed Available Groundwater as a permitting cap - K
- Review Texas Water Code to ensure groundwater conservation districts are funded and equipped for comprehensive analysis tasks - L
- Create and operate groundwater conservation districts under Texas Water Code, Chapter 36 - O

GROUNDWATER MANAGEMENT AREAS - SIX REGIONS: D, E, F, J, K, AND L

- Recommend voting representation for areas without groundwater districts be based upon the areas population, groundwater use, or number of aquifers - D

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

- Reschedule due dates in the Joint Planning process so Managed Available Groundwater data can be better integrated into the water plans - E, F
- Examine interaction of regional water planning and groundwater management areas processes to improve the resulting economic impacts - J
- Support use of groundwater management area-wide average desired future conditions to expedite establishment of managed available groundwater values - K
- Revise Texas Water Code Chapter 36 to allow groundwater districts to either manage groundwater to achieve the desired future condition or use TWDB-provided managed available groundwater to restrict permitting - K
- Support determinations of Managed Available Groundwater based on Desired Future Conditions Joint Planning process - L

REGIONAL COLLABORATION - SIX REGIONS: E, F, G, J, K, AND L

- Encourage groundwater conservation districts to collaborate in planning process - E, F, G, K
- Recommend groundwater management councils coordinate efforts with planning groups - E
- Require state lands to abide by ground-water district regulations and submit water withdrawal plans to relevant planning group - F
- Notify planning groups when significant amounts of groundwater are being exported - F
- Assess groundwater availability for regional plans based on groundwater conservation district's goals and requirements - F
- Recommend planning groups J, K, and L collaborate on Trinity Aquifer evaluation - J
- Recommend TWDB-sponsored workshops for regions sharing aquifers - J
- Encourage collaboration between regions sharing aquifers - L

RULE OF CAPTURE - FIVE REGIONS: F, H, K, O, AND P

- Support rule of capture - F, P
- Maintain rule of capture in areas not subject to defined subsidence or groundwater conservation districts - H, K
- Support rule of capture as modified by rules and regulations of existing ground-water conservation districts - K, O
- Oppose legal recognition of groundwater ownership in place as vested right of surface property owner - K

OIL AND GAS - FOUR REGIONS: D, F, M, AND N

- Recommend Railroad Commission of Texas review and enforce regulations protecting aquifers from oil well contamination - D, F
- Levy fines for oil and gas producers who violate rules governing aquifer contamination - F
- Support the industry-funded program to plug abandoned wells - F
- Encourage adequate funding for the Railroad Commission of Texas to protect water supplies - F
- Encourage restoring funding to well-plugging account - F
- Appropriate sufficient funds to Railroad Commission of Texas for capping abandoned wells - M, N

SUSTAINABILITY - THREE REGIONS: G, L, AND P

- Advocate adoption of water management strategies that do not substantially deplete aquifers - G
- Suggest the state continue developing policy that protects historical use and future sustainability - G
- Support management strategies that achieve groundwater sustainability - L
- Support sustainable yield of the Gulf Coast Aquifer as the limit for water development - P
- Recommend sustainable yield as upper limit for all groundwater conservation districts in region - P

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

STATE AGENCIES - TWO REGIONS: K AND N

- Encourage funding of TWDB groundwater programs - K
- Expand efforts of TWDB, Texas Commission on Environmental Quality, and Railroad Commission of Texas in managing groundwater - N

OTHER - THREE REGIONS: F, J, AND L

- Encourage groundwater legislation that is fair to all users - F
- Oppose historical use limits in granting water rights permits - F
- Oppose groundwater fees for wells used exclusively for dewatering - F
- Encourage state to review groundwater resources on state-owned land and determine appropriate management - F
- Standardize groundwater evaluations statewide - J
- Advocate groundwater management based on science, equity, and rationality - L
- Determine water management strategies for Edwards (Balcones Fault Zone) Aquifer during drought of record - L

INNOVATIVE STRATEGIES

TWELVE REGIONS: A, B, C, D, E, F, J, K, L, M, N, AND O

BRUSH CONTROL - NINE REGIONS: A, B, D, F, J, K, L, M, AND O

- Provide funding to implement brush control and land stewardship - B, O
- Encourage funding for new technical resources to combat giant salvinia, saltcedar, and aquatic weeds - D, M
- Request TWDB guidance on including brush control projects as source of new surface water - A
- Support brush control as funding priority - F
- Recommend completing final phase of North Concho River brush control program - F

- Continue funding Twin Buttes brush control project until completed - F
- Fund brush control for region's reservoirs - F
- Give priority funding to land conservation and management practices, including brush and burn management and follow-up grazing - F
- Continue cooperating with federal agencies to secure brush control funds - F
- Fund programs to eradicate nuisance vegetation - J
- Fund a long-term, cost-sharing program for landowners participating in brush management similar to the Natural Resources Conservation Service's Great Plains Conservation Program - J
- Encourage funding for saltcedar eradication and long-term brush management strategies in Rio Grande watershed - J, M
- Fund programs to eradicate saltcedar - J, O
- Provide pro rata funds to landowners for brush control assistance - K
- Fund brush management technologies - L

DESALINATION - SIX REGIONS: A, C, F, L, M, AND N

- Continue funding salinity control projects in Canadian and Red River basins - A
- Support research to advance desalination and reuse - C
- Provide funding to small communities for desalination projects - C
- Provide funds for desalination - F, L
- Continue funding brackish groundwater projects and seawater desalination demonstration projects - M
- Encourage Texas Commission on Environmental Quality, TWDB, and Texas Parks and Wildlife Department to investigate environmental impacts of seawater desalination discharge and allow it where no damage will occur - N
- Recommend changing regulations governing desalination brine to coincide with those governing petroleum brine - N

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

STORMWATER - ONE REGION: E

- Future planning should include stormwater, including aquifer recharge and optimization of surface water resources - E

WEATHER MODIFICATION - TWO REGIONS: F AND L

- Support funding for researching, evaluating, creating, and operating weather modification programs - F
- Fund weather modification technologies - L

AQUIFER RECHARGE - TWO REGIONS: J AND L

- Fund recharge structures and provide technical assistance - J
- Fund small aquifer recharge dams - L

PLAYAS - ONE REGION: O

- Create and preserve native grass buffers to protect playa basins - O

OTHER - THREE REGIONS: F, J, AND L

- Support state/federal funding for demineralization, reclamation, and aquifer storage and recovery - F
- Encourage and fund rainwater harvesting - J, L
- Increase funds for projects demonstrating alternative water supply strategies - L

INTERBASIN TRANSFERS

EIGHT REGIONS: C, D, F, G, H, I, K, AND N

JUNIOR RIGHTS - THREE REGIONS: F, I, AND N

- Oppose modifying the junior rights provision until basin of origin needs are ensured by reviewing water availability models to determine there are no detrimental impacts - F
- Support legislation to allow junior water rights exemptions from contracts reserving sufficient supply to meet 125 percent of demand in basin of origin - I

- Repeal junior rights provision and additional application requirements for interbasin transfers - N

BASIN OF ORIGIN - TWO REGIONS: D AND K

- Review the definition of “need” in basin of origin to ensure that needs are met before transfers are permitted - D
- Evaluate compensation to basin of origin - D
- Protect basins of origin in interbasin transfers - K

OTHER - FOUR REGIONS: C, F, H, AND K

- Recommend that unnecessary, counterproductive barriers to interbasin transfers be removed from Texas Water Code - C, H
- Support interbasin transfers as most efficient method for meeting state water needs - F
- Protect current water rights holders in interbasin transfers - F
- Verify that interbasin transfers are consistent with regional water plans - K
- Complete the Lower Colorado River Authority/ San Antonio Water System study to verify that water transport meets regional water plan guidelines - K

FUNDING FOR PLAN IMPLEMENTATION

NINE REGIONS: A, C, E, F, G, H, L, M, AND O

- Fund region-specific water supply strategies - A, E
- Change TWDB regulations to allow Water Infrastructure Funds to be used for acquisition of reservoir sites prior to permitting process - C
- Increase appropriations to the Water Infrastructure Fund - F
- Create statewide mechanism for funding state water plan projects - G, L
- Increase funding of State Participation Program to develop water supply projects meeting long-term demands - H

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

- Establish financing mechanisms to develop new water supply projects in adopted regional plans - H
- Provide sufficient funding to TWDB and Texas Commission on Environmental Quality for administering state water plan programs - L
- Fund water management strategies identified in regional water plans - M, O

PROVIDING AND FINANCING WATER AND WASTEWATER SYSTEMS SEVEN REGIONS: A, F, H, K, L, M, AND O

FEDERAL MONIES - THREE REGIONS: E, H, AND L

- Continue federal and state financial programs for substandard water and wastewater systems (colonia areas) - E
- Investigate opportunities for increased U.S. Army Corps of Engineers funding - H
- Encourage more active state solicitation of federal monies - L

STATE FUNDING PROGRAMS - FOUR REGIONS: C, H, I, AND K

- Establish more flexible deferred financing programs for large projects which allow repayment as portions of projects are brought online - C
- Increase funding of the State Loan Program for near-term infrastructure cost projections - H
- Continue state and federal support of Texas Community Development Program - H
- Increase funds for Small Towns Environment Program - H
- Increase funding of Regional Water Supply and Wastewater Facilities Planning Program; expand to include engineering design and cost estimates - H
- Increase future funding of State Revolving Fund to cover system capacity increases - H

- Make State Participation Program available to public/private partnerships and nonprofit water supply corporations - H
- Allow Water Infrastructure Funds to be used for replacement of water supply infrastructure - I
- Increase flexibility in determining categorical exclusions for Environmental Information Documents - I
- Revise Economically Disadvantaged Areas Program requirements to reduce difficult eligibility requirements, including model subdivision planning - I
- Provide low-interest loans and grants to reduce system water loss - K

OTHER - SEVEN REGIONS: A, F, H, I, K, M, AND N

- Develop or improve grant and loan programs to replace and repair aging infrastructure - A, I
- Provide grants to small and rural drinking water treatment systems to meet federal drinking water standards - F
- Increase funds for the Galveston Bay and Estuary program - H
- Provide funds for water treatment and radioactive waste disposal threatening rural water supplies - K
- Encourage regionalization of water and wastewater utility service - M
- Fund and support efforts of Groundwater Management Areas - N

REGIONAL WATER PLANNING ALL SIXTEEN REGIONS

FUNDING/SUPPORT - ELEVEN REGIONS: B, E, H, I, J, K, L, M, N, O, AND P

- Continue adequate funding of regional water planning process - B, E, H, K, L, M, N, O
- Provide additional state funding for regional planning administrative costs - B, E, J, K,
- Fund technical studies necessary to support the work of the planning groups - H

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

- Advocate that regions fund administrative costs of planning process - I
- Reimburse planning group members for reasonable expenses - J
- Consider factors other than population in funding the planning process - M
- Request public entities provide their share of funding for regional planning activities - N
- Establish funding for planning groups through TWDB - P

STATE AGENCIES - SIX REGIONS: C, F, G, J, K, AND M

- Recommend that TWDB and Texas Commission on Environmental Quality collaborate on determining which water availability modeling data to use in regional planning - C, F
- Recommend all state agencies adhere to state water plan - G
- Recommend nonvoting state agencies attend regional planning meetings or relinquish authority to alter adopted plan - J
- Encourage Texas Commission on Environmental Quality to provide technical reviews and draft permits to planning groups to ensure consistency with regional plans - K
- Suggest Texas Commission on Environmental Quality assist Rio Grande area in converting water rights from one use to another - M

ALTERNATIVE STRATEGIES - FOUR REGIONS: A, D, F, AND I

- Allow small systems to develop alternative near-term scenarios - A
- Allow alternative scenarios in population growth and economic development in determining future water demands - D
- Allow alternative water management strategies in regional plan - F, I

CONSISTENCY - SIX REGIONS: B, D, E, F, H, AND I

- Recommend waivers for surface water projects that will not significantly impact regional supplies and do not involve new water sources - B
- Recommend TWDB consider entire regional plan when determining consistency - D
- Apply consistent economic principles to water project and strategy evaluation - E
- Allow maximum flexibility in determining consistency with regional plans - F, I
- Recommend Texas Commission on Environmental Quality and TWDB collaborate on consistency determinations and waivers to allow for maximum flexibility - F, I
- Recommend TWDB publish clear criteria for consistency determinations before adopting regional water plans - F
- Recommend waivers for consistency issues for small projects - F
- Clarify rules to address consistency within regional plans - H
- Allow entities smaller than planning criteria that do not have specific needs identified in water plans to be eligible for state funds - I
- Remove willing buyer/seller transactions from consistency requirements - I
- Advocate removing consistency requirements from Senate Bill 1 - I

WATER DEMAND FIGURES - FIVE REGIONS: D, E, H, J, AND L

- Revise procedure for water demand reductions to recognize areas with low per capita consumption - D
- Allow more time for final demand figures - E
- Recommend more real life analysis of demand figures during drought conditions - E
- Recommend State Demographer explore potential changes in population distribution due to information technology advancements - H
- Develop better methodologies for estimating population and water demand - J

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

- Modify planning process so that water demand projections allow for regional input - L
- Modify regional planning process to allow for more flexibility in developing growth and water demand methodologies - L

PLANNING GROUP AUTHORITY - ONE REGION: O

- Oppose legislature empowering planning groups with any regulatory authority - O

TRAINING - ONE REGION: J

- Provide training for new planning group members - J

OTHER - TEN REGIONS: A, C, E, F, H, K, L, M, O, AND P

- Clarify relationship between drought contingency planning and regional water supply planning - A
- Include project for future groundwater quality in the region - A
- Ensure eligibility for small cities and entities included as county-other - A
- Allow flexibility in applying water availability models for planning - C, F
- Avoid constraining planning process with technical requirements - E
- Set deadlines for regional plans that avoid legislative sessions - E
- Consider all water resources available to a region including those outside of the state - E
- Recommend rule simplification before next round of planning - F
- Allow planning groups to adopt an existing water plan if there are no significant changes to the recommended water management strategies - F
- Clarify rules on quantitative environmental analysis - H
- Review the administrative provisions of SB1 and subsequent policies to determine if appropriate organizational structure exists - H
- Coordinate regional planning process with Texas Clean Rivers Program - K

- Improve representation of women and minorities on planning groups - K
- Oppose development of new water management strategies to accommodate export of supplies to another county and planning region of state - K
- Oppose use of water availability model Run 3 in regional water planning as being unreasonably restrictive - K
- Include in plan water supplies over and above those required to meet the projected need - L
- Establish contract requirements before grant proposals are submitted - L
- Oppose changes to planning process except through formal rulemaking procedure - L
- Urge prompt and full implementation of these plans - L
- Include wildlife and environmental needs as a category of water use - M
- Recommend shifting to a utility-centric method of planning rather than city-centric - M
- State should consider impacts of climate change on regional water planning and future water supplies - M
- Allow for additional region-specific planning options and forecast scenarios - O
- Review the planning process with a group of stakeholders and identify any revisions to the planning process by the end of 2010 - O
- Support a greater role for inter-regional coordination in future planning - P

RURAL WATER

THREE REGIONS: G, H, AND L

- Encourage regionalization, education, and proactive planning of small water systems - G
- Support increased funding of federal Rural Utilities Service programs and funding of the state Rural Water Assistance Fund - H
- Study implications of water export, considering its implications on rural environment and economy - L

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

SURFACE WATER

TEN REGIONS: A, B, C, D, F, G, H, L, M, AND P

RESERVOIRS - SIX REGIONS: A, B, D, H, I, AND P

- Recommend TWDB submit reservoir feasibility study plans and results to Compact Commissions - A
- Change definition of water availability in reservoirs to match owner's operational criteria - A
- Include possible reservoir sites and flood control/aquifer recharge structures in future water plans - A
- Extend designations for unique reservoir sites beyond 2015 - B, I
- Designate Toledo Bend Reservoir as a supply strategy for upper Sabine Basin in Region D and supply option for Region C - D
- Consider potential economic and environmental impacts to reservoir development - D
- Consider raising the level for Lake Wright Patman prior to development of new reservoirs in Region D - D
- Consider development of reservoirs in the Sulphur Basin in Region D as violation of the quantitative evaluations of water management strategies under 31 Texas Administrative Code 357.7(a)(8)(A) and a conflict with the Region D plan - D
- Oppose development of reservoirs in the Sulphur Basin in Region D prior to development of environmental flow standards through Senate Bill 3 process - D
- Establish flood damage liability limits for reservoirs - H
- Develop Lake Texana Stage II as supply strategy - P

WATER PERMITS - FOUR REGIONS: C, F, L, AND N

- Encourage TWDB and Texas Commission on Environmental Quality work with U.S. Environmental Protection Agency to revise Section 361(b) regulations on power plant cooling water - C

- Notify all basin water rights holders when a request to amend a water right increases quantity or changes purpose or place of use - F
- Fund Texas Commission on Environmental Quality adequately to ensure appropriate use of permitted surface water rights - L
- Urge Texas Commission on Environmental Quality to enforce existing rules and regulations regarding impoundments - N

U.S. ARMY CORPS OF ENGINEERS - FOUR REGIONS: B, D, H, AND I

- Recommend U.S. Army Corps of Engineers transfer flood storage to conservation storage - B
- Recommend the Wetlands Compensatory Mitigation Rule of "avoid, minimize, and compensate" be closely followed - D
- Allow U.S. Army Corps of Engineers to increase water supply storage in new reservoirs - H
- Include TWDB and regional water planning agencies on mitigation bank review teams - I

SEDIMENT CONTROL - THREE REGIONS: B, C, AND D

- Support efforts, including land management, to rehabilitate existing sediment control structures and construct new ones - B
- Seek additional federal funding to improve and maintain Natural Resources Conservation Service sediment and flood control structures - C, D

UNCOMMITTED WATER - TWO REGIONS: C AND F

- Recommend changing Texas Water Code to exempt from cancellation nonuse associated with developing and managing reservoirs - C
- Oppose canceling uncommitted water contracts/rights - F

WATERMASTER PROGRAM - ONE REGION: M

- Authorize Watermaster Program to manage the Rio Grande water availability model - M
- Direct all appropriate Rio Grande water rights fees to Watermaster operations - M

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

OTHER - SIX REGIONS: B, C, F, G, K, AND M

- Recommend all surface water uses, regardless of size, be consistent with regional plan - B
- Continued and increased state support of efforts to develop water supplies in Oklahoma - C
- Review state surface water policy to ensure its appropriateness for next 50 years - F
- Amend state water law to incorporate river basin subordinations in regional water plans - F
- Support long-term contracts for future projects and droughts - F
- Support long-term contracts for reliable water supply planning and shorter-term “interruptible” contracts to meet needs before long-term water rights are fully used - F
- Support coordinated operation of two or more water supply sources - G
- Give priority to water policies that increase surface water availability - K
- Encourage development of an operating plan for Mexican tributary reservoirs that ensures full compliance with 1944 Water Treaty while optimizing supply available to Mexico - M
- Continue considering allocation of Rio Grande Flows upstream of Ft. Quitman for treaty compliance - M

WATER MARKETING

FOUR REGIONS: A, F, L, AND P

- Assess potential of transporting water into or out of the Panhandle - A
- Assess potential for transferring groundwater to counties within region - A
- Oppose additional regulations in willing buyer/willing seller water transactions - F
- Require all water export plans to be submitted to regional planning groups - F
- Recommend legislative review of Water Code to consider changes in light of increasing number of water export proposals - F

- Oppose export of surface water outside of region, except for existing contracts until a comprehensive plan is in place - F
- Allow property owners to capture and market water - F
- Fund development of a standard method for evaluating water export proposals - L
- Clarify that water planning regions are not intended to be barriers to water transport - L
- Consider export fee to offset negative impacts of transferring water out of basin - P
- Allow water transfer out of basin that does not interfere with exempt, existing, or previously permitted wells - P

WATER QUALITY

SEVEN REGIONS: A, B, D, F, G, K, AND N

STANDARDS - THREE REGIONS: B, D, AND F

- Allow flexibility in drinking water standards for small systems, such as use of bottled water programs - B, F
- Recommend TWDB and Texas Commission on Environmental Quality standardize rules for minimum water supply requirements - D
- Recommend that Texas Commission on Environmental Quality revise its policy requiring use of secondary water standards, particularly total dissolved solids, when granting permits - F

WATER PLANNING - TWO REGIONS: A AND K

- Require Texas Commission on Environmental Quality to attend regional planning meetings and assist with water quality issues - A
- Support integrating water quality into water supply planning - K

APPENDIX D: REGIONAL WATER PLANNING GROUP POLICY RECOMMENDATIONS

RADIOACTIVE WASTES - TWO REGIONS: F AND K

- Recommend Texas Commission on Environmental Quality develop disposal procedures for the safe handling of radioactive wastes in water treatment process - F, K
- Develop disposal procedures for radioactive wastes threatening water supplies - K

MINING - ONE REGION: N

- Amend rules to require routine, nonpartisan water quality monitoring of mining operations - N
- Oppose in-situ mining (a process that circulates acidic water through injection and recovery wells to remove minerals) where drinking water will be contaminated - N
- Monitor water quality from mining activities - N

OTHER - THREE REGIONS: B, D, AND G

- Recognize chloride control project as regional priority - B
- Recommend Texas Commission on Environmental Quality expedite effort to replace methyl tertiary butyl ether in gasoline - D
- Encourage policies and business practices that give priority to water quality - G

OTHER

SIX REGIONS: A, J, K, L, M, AND N

- Establish guidelines differentiating between groundwater and surface rights - A
- Recommend basing drought management plans on peak use rather than annual production - J
- New electric generation facilities should utilize the most efficient technologies and conservation practices and assure water is available or can be obtained during the planning and permitting process - K
- Give counties additional authority for regulating land development to protect water resources - L
- Supports providers obtaining land for project through willing buyer-willing seller and using limited condemnation as a last resort - L
- Renew efforts to ensure Mexico's compliance with 1944 Treaty to eliminate water delivery deficits - M
- Amend state laws governing procurement of professional services to allow more flexibility in public works projects - N



Photo Citations

COVER

Water tower (Wikimedia Commons)

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CHAPTER 3

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