Region C
Water Planning Group

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Alan Plummer Associates, Inc.
CP&Y, Inc.
Cooksey Communications, Inc.

Volume II
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2016 Region C Water Plan

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Prepared for

Region C Water Planning Group

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Appendix A

APPENDIX A

BIBLIOGRAPHY OF PREVIOUS WATER PLANS FOR REGION C

APPENDIX A
BIBLIOGRAPHY OF PREVIOUS WATER PLANS IN REGION C

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Appendix B

APPENDIX B

WATER LOSS AUDIT DATA

Appendix B - Water Loss Audit

WUG	2010 Water Loss %	2011 Water Loss %	2012 Water Loss %	2013 Water Loss %
ABLES SPRINGS WSC	13.03			
ADDISON	1.02			4.1
ALEDO	12.04		22.02	16.85
ALLEN	11.84			7.76
ALVORD			0	
ANNA		25.03		0
ARGYLE WSC	13.30			
ARLINGTON	7.46		10.45	9.71
ATHENS	7.33			15.62
AZLE	3.43	1.73	5.68	5.16
BEDFORD	11.57			5.88
BELLS	2.68		19.84	20.61
BETHEL ASH WSC	15.16			
BLOOMING GROVE	16.34			
BONHAM	12.76	9.99	12.82	20.3
BOYD	23.80			
BRIDGEPORT		12.64	10.74	
BRYSON	8.77			
BUENA VISTA BETHEL SUD	36.11		49.38	45.04
CARROLLTON	6.49			4.76
CEDAR HILL	31.36			9.06
CELINA	3.78		13.14	0
CHATFIELD WSC	18.70			
COCKRELL HILL			13.57	
COMBINE WSC	5.49			
COPEVILLE SUD	10.61		9.3	13.34
COPPELL	0.66			0.55
CORBET WSC	15.58		12.08	
CORINTH	0.43			4.42
CORSICANA	28.19	13.72	19.68	22.02
CROWLEY	8.91			4.02
CULLEOKA WSC	10.48			
DALLAS WATER UTILITY	25.46		17.61	15.86
DESOTO				13.5
DECATUR	-1.19			
DENISON				17.02
DENTON	6.13	9.05		11.39
DENTON COUNTY FWSD No. 7	0.08			2.97
DENTON COUNTY FWSD No.1A			9.84	
DUNCANVILLE	5.60			3.8
EAST CEDAR CREEK FWSD	27.90		32.99	16.79
EAST FORK SUD	6.51			
ECTOR	13.34			

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WUG	2010 Water Loss %	2011 Water Loss %	2012 Water Loss %	2013 Water Loss %
EDGECLIFF VILLAGE	1.77			
ENNIS				19.24
EULESS	8.95			11.56
EUSTACE	23.72			
EVERMAN	3.66			
FAIRFIELD			7.2	
FAIRVIEW				9.44
FARMERS BRANCH	17.20		0	13.3
FATE	6.59			
FERRIS	8.05			
FLOWER MOUND	4.54			7.64
FOREST HILL	5.20			19.34
FORNEY	4.65			3.57
FORNEY LAKE WSC	4.92		9.25	10.02
FORT WORTH	17.45		15.76	16.16
FRISCO				9.08
FROST	11.93			
GAINESVILLE	23.23	0		9.6
GARLAND	11.43	0		8.19
GLENN HEIGHTS				22.56
GRAND PRAIRIE	7.08		8.24	10.95
GRAPEVINE	4.95			2.2
GUNTER	23.97			
HALTOM CITY	5.94	12.52	12.26	9.32
HEATH		0.91		
HIGHLAND PARK	6.56			1.13
HIGHLAND VILLAGE	3.53	0		5.31
HONEY GROVE	35.31	22.15	22.49	38.32
HOWE	32.70			
HURST	8.15	0		4.69
HUTCHINS	1.39		3.92	5.99
IRVING	2.15			6.23
JACKSBORO	15.45		27.07	3.56
KAUFMAN	43.58			17.5
KELLER	1.59		6.12	2.38
KEMP	5.63			
KIOWA HOMEOWNERS WSC				0.1
LADONIA	17.25			
LAKE WORTH	10.10		14.24	19.69
LAKESIDE	1.53	0		
LANCASTER	15.90			6.82
LEONARD	25.81			
LEWISVILLE	13.49			6.55

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WUG	2010 Water Loss %	2011 Water Loss %	2012 Water Loss %	2013 Water Loss %
LINDSAY	1.27			
LITTLE ELM	9.79			7.86
LUCAS	16.28			
LUELLA	10.50	10.72		
MABANK	18.10		14.95	17.25
MALAKOFF			6.04	10.98
MANSFIELD	3.73			13.61
MARILEE SUD	11.22			
MCKINNEY	7.10	13.96		12.98
MELISSA	16.19	17.17		15.66
MESQUITE	3.74	5.37	6.63	8.19
MIDLOTHIAN	21.08		22.8	8.09
MILFORD	11.88	0		
MOUNTAIN PEAK SUD				28.71
MOUNTAIN SPRINGS WSC	8.60			
MT ZION WSC	3.88			
MUENSTER	1.72			
MURPHY	8.27	9.44		14.12
MUSTANG SUD	6.04			3.8
NAVARRO MILLS WSC	27.05			
NORTH RICHLAND HILLS	3.51			3.4
NORTHLAKE	0.37			
PALMER	20.22		0.62	2.59
PARKER COUNTY SUD	52.51		52.5	45.41
PAYNE SPRINGS WSC	23.10			
PELICAN BAY	3.57		13.33	13.21
PILOT POINT	9.46			
PLANO	13.88	0		11.72
PONDER	0.35			
POTTSBORO	4.98	9.42	15.35	0
PROSPER	7.15			
RENO				0
RHOME	37.36			
RICE WSC	13.18			
RICHARDSON	10.60		9.8	10.22
RICHLAND HILLS	3.25			7.11
RIVER OAKS	1.26			
ROCKETT SUD	1.75		0	19.11
ROCKWALL	8.54		0	1.4
ROSE HILL SUD	9.10	10.57		
ROWLETT				4.07
RUNAWAY BAY	11.29	5.04		
SACHSE	5.01			19.07

Appendix B - Water Loss Audit

WUG	2010 Water Loss %	2011 Water Loss %	2012 Water Loss %	2013 Water Loss %
SAGINAW	16.72			4.13
SARDIS LONE ELM WSC	18.97	17.2		
SEAGOVILLE				3.22
SEIS LAGOS UD	-1.42		0	0.21
SHERMAN	11.98			7.94
SOUTH GRAYSON WSC	8.51			
SOUTHLAKE	1.73		2.94	10.36
SOUTHMAYD	5.60	0		
SOUTHWEST FANNIN COUNTY SUD	19.14			
SPRINGTOWN	39.29	18.82	44.03	35.69
SUNNYVALE	10.11			
TALTY WSC	8.52			
TERRELL	23.84		18.82	18.86
THE COLONY				0
TIOGA	17.00		10.68	4.75
TOM BEAN	33.55	58.03		
TRENTON	2.89			
TRINIDAD	7.62			16.06
TROPHY CLUB	6.65			8.23
TWO WAY SUD			6.47	
UNIVERSITY PARK	6.95			16.36
VAN ALSTYNE			0.53	10.5
WALNUT CREEK SUD	0.37		0	
WATAUGA		8.93		11.7
WAXAHACHIE	7.14			9.85
WEATHERFORD	14.97			13.86
WEST CEDAR CREEK MUD	16.96			12.26
WEST WISE SUD	11.15			
WESTLAKE	6.83			
WESTON WSC	23.96			
WESTOVER HILLS	11.03			
WHITESBORO			3.06	19.61
WHITEWRIGHT	13.40			
WILLOW PARK	11.30	20.26		
WOODBINE WSC	5.34			
WORTHAM	35.57	23.41	26.14	27.98
WYLIE	2.00			5.8
WYLIE NORTHEAST SUD	13.78		7.99	8.08

Appendix C

APPENDIX C

SUMMARY TABLES FOR WATER USER GROUPS

Table C-1
Ables Springs Water Supply Corporation

Regions C and D (Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,662**	**7,336**	**9,354**	**11,824**	**14,931**	**18,873**
Projected Water Demand						
Municipal Demand	383	494	630	796	1,006	1,271
Total Projected Water Demand	***383***	***494***	***630***	***796***	***1,006***	***1,271***
Currently Available Water Supplies						
North Texas Municipal Water District	353	379	446	530	629	735
Total Current Supplies	***353***	***379***	***446***	***530***	***629***	***735***
Need (Demand - Current Supply)	***30***	***115***	***184***	***266***	***377***	***536***
Water Management Strategies						
Water Conservation	3	4	5	8	12	17
Additional Water from NTMWD	27	111	179	258	365	519
Total Water Management Strategies	***30***	***115***	***184***	***266***	***377***	***536***
Ables Springs Water Supply Corporation Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-2
Addison

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**14,539**	**17,431**	**20,323**	**23,215**	**26,107**	**29,000**
Projected Water Demand						
Municipal Demand	6,002	7,113	8,235	9,376	10,536	11,701
Total Projected Water Demand	***6,002***	***7,113***	***8,235***	***9,376***	***10,536***	***11,701***
Currently Available Water Supplies						
Dallas Water Utilities	5,723	6,168	6,377	6,694	7,036	7,443
Total Current Supplies	***5,723***	***6,168***	***6,377***	***6,694***	***7,036***	***7,443***
Need (Demand - Current Supply)	***279***	***945***	***1,858***	***2,682***	***3,500***	***4,258***
Water Management Strategies						
Water Conservation	110	184	247	313	386	468
Additional Water from DWU	169	761	1,611	2,369	3,114	3,790
Total Water Management Strategies	***279***	***945***	***1,858***	***2,682***	***3,500***	***4,258***
Addison Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-3
Aledo

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,320**	**8,320**	**12,620**	**13,258**	**13,258**	**13,258**
Projected Water Demand						
Municipal Demand	822	1,262	1,900	1,992	1,991	1,990
Total Projected Water Demand	***822***	***1,262***	***1,900***	***1,992***	***1,991***	***1,990***
Currently Available Water Supplies						
Trinity Aquifer	398	398	398	398	398	398
Fort Worth (TRWD)	651	898	1,208	1,152	1,122	1,031
Total Current Supplies	***1,049***	***1,296***	***1,606***	***1,550***	***1,520***	***1,429***
Need (Demand - Current Supply)	***0***	***0***	***294***	***442***	***471***	***561***
Water Management Strategies						
Water Conservation	7	13	19	27	33	40
Add'l Water from Fort Worth (TRWD) with infrastructure as below:	0	203	540	693	836	919
Existing pipeline & pump station (3 MGD)	*0*	*203*	*474*	*530*	*560*	*651*
New parallel pipeline & pump station (0.5 MGD)			*67*	*164*	*277*	*269*
Total Water Management Strategies	***7***	***216***	***559***	***720***	***869***	***959***
Aledo Reserve (Shortage)	**234**	**250**	**265**	**278**	**398**	**398**

Table C-4
Allen

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**98,500**	**98,500**	**98,500**	**98,500**	**98,500**	**98,500**
Projected Water Demand						
Municipal Demand	20,533	20,336	20,215	20,139	20,108	20,106
Manufacturing Demand (3% Collin Co)	104	117	130	141	153	166
Total Projected Water Demand	***20,637***	***20,453***	***20,345***	***20,280***	***20,261***	***20,272***
Currently Available Water Supplies						
North Texas Municipal Water District	18,917	15,582	14,277	13,407	12,545	11,611
NTMWD for Manufacturing	96	89	92	94	96	96
Total Current Supplies	***19,013***	***15,671***	***14,369***	***13,501***	***12,641***	***11,707***
Need (Demand - Current Supply)	***1,624***	***4,782***	***5,976***	***6,779***	***7,620***	***8,565***
Water Management Strategies						
Water Conservation	763	953	1,002	1,047	1,113	1,180
Water Conservation (manufacturing)	0	0	3	4	4	5
Additional Water from NTMWD	853	3,801	4,936	5,685	6,450	7,315
Additional NTMWD for Manufacturing	8	28	35	43	53	65
Total Water Management Strategies	***1,624***	***4,782***	***5,976***	***6,779***	***7,620***	***8,565***
Allen Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-5
Alvord

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,625**	**1,957**	**2,297**	**2,800**	**3,200**	**3,600**
Projected Water Demand						
Municipal Demand	110	132	155	189	216	242
Total Projected Water Demand	***110***	***132***	***155***	***189***	***216***	***242***
Currently Available Water Supplies						
Trinity Aquifer	151	151	151	151	151	151
Total Current Supplies	***151***	***151***	***151***	***151***	***151***	***151***
Need (Demand - Current Supply)	***0***	***0***	***4***	***38***	***65***	***91***
Water Management Strategies						
Water Conservation	1	1	2	3	4	5
West Wise SUD (TRWD)	0	0	2	35	61	86
Total Water Management Strategies	***1***	***1***	***4***	***38***	***65***	***91***
Alvord Reserve (Shortage)	**42**	**20**	**0**	**0**	**0**	**0**

Table C-6
Anna

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**11,943**	**13,929**	**22,984**	**31,000**	**59,000**	**89,000**
Projected Water Demand						
Municipal Demand	1,898	2,190	3,588	4,826	9,167	13,820
Total Projected Water Demand	***1,898***	***2,190***	***3,588***	***4,826***	***9,167***	***13,820***
Currently Available Water Supplies						
Trinity Aquifer	216	216	216	216	216	216
Woodbine Aquifer	706	706	706	706	706	706
North Texas Municipal Water District (GTUA Collin-Grayson Municipal Alliance)	899	972	1,668	1,668	1,668	1,668
Total Current Supplies	***1,821***	***1,894***	***2,590***	***2,590***	***2,590***	***2,590***
Need (Demand - Current Supply)	***77***	***296***	***998***	***2,236***	***6,577***	***11,230***
Water Management Strategies						
Water Conservation	79	211	36	64	153	276
Expand Collin-Grayson Municipal Alliance, Additional Water from GTUA/NTMWD	0	85	962	2,172	6,424	10,954
Total Water Management Strategies	***79***	***296***	***998***	***2,236***	***6,577***	***11,230***
Anna Reserve (Shortage)	**2**	**0**	**0**	**0**	**0**	**0**
Alternate Water Management Strategy						
Grayson County Water Supply Project (Sherman WTP)	0	85	962	2,172	6,424	10,954

Table C-7
Annetta

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,678**	**2,068**	**2,458**	**2,848**	**3,238**	**3,628**
Projected Water Demand						
Municipal Demand	152	179	208	238	270	302
Total Projected Water Demand	***152***	***179***	***208***	***238***	***270***	***302***
Currently Available Water Supplies						
Trinity Aquifer	354	354	354	354	354	354
Total Current Supplies	***354***	***354***	***354***	***354***	***354***	***354***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	2	2	3	5	6
Weatherford (Tarrant Regional WD)	0	25	28	35	90	196
Total Water Management Strategies	***1***	***27***	***30***	***38***	***95***	***202***
Annetta Reserve (Shortage)	**203**	**202**	**176**	**154**	**179**	**254**

Table C-8
Annetta North

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**559**	**608**	**664**	**729**	**804**	**891**
Projected Water Demand						
Municipal Demand	67	71	76	83	91	100
Total Projected Water Demand	***67***	***71***	***76***	***83***	***91***	***100***
Currently Available Water Supplies						
Trinity Aquifer	100	100	100	100	100	100
Total Current Supplies	***100***	***100***	***100***	***100***	***100***	***100***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	1	2	2
Weatherford (Tarrant Regional WD)	0	0	7	16	25	38
Total Water Management Strategies	***1***	***1***	***8***	***17***	***27***	***40***
Annetta North Reserve (Shortage)	**34**	**30**	**32**	**34**	**36**	**40**

Table C-9
Annetta South

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**526**	**526**	**526**	**526**	**526**	**526**
Projected Water Demand						
Municipal Demand	63	60	58	57	57	57
Total Projected Water Demand	***63***	***60***	***58***	***57***	***57***	***57***
Currently Available Water Supplies						
Trinity Aquifer	69	69	69	69	69	69
Total Current Supplies	***69***	***69***	***69***	***69***	***69***	***69***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	1	1	1
Weatherford (Tarrant Regional WD)	0	0	5	10	16	22
Total Water Management Strategies	***1***	***1***	***6***	***11***	***17***	***23***
Annetta South Reserve (Shortage)	**7**	**10**	**17**	**23**	**29**	**35**

Table C-10
Argyle

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,000**	**9,000**	**13,000**	**13,000**	**13,000**	**13,000**
Projected Water Demand						
Municipal Demand	1,395	2,064	2,966	2,961	2,960	2,959
Total Projected Water Demand	***1,395***	***2,064***	***2,966***	***2,961***	***2,960***	***2,959***
Currently Available Water Supplies						
Argyle WSC (groundwater)	450	450	450	450	450	450
Argyle WSC (UTRWD)	909	1,184	1,471	1,201	1,097	962
Total Current Supplies	***1,359***	***1,634***	***1,921***	***1,651***	***1,547***	***1,412***
Need (Demand - Current Supply)	***36***	***430***	***1,045***	***1,310***	***1,413***	***1,547***
Water Management Strategies						
Water Conservation	36	100	158	168	178	187
Additional Water from Argyle WSC	0	375	977	1,279	1,416	1,541
Total Water Management Strategies	***36***	***475***	***1,135***	***1,447***	***1,594***	***1,728***
Argyle Reserve (Shortage)	**0**	**45**	**90**	**137**	**181**	**181**

Table C-11
Aubrey

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population - Aubrey	4,726	6,284	7,349	8,713	10,459	12,693
Projected Population - Out City Limits (Denton County Other)	1,030	12,400	21,474	35,190	40,990	42,441
Projected Population	**5,756**	**18,684**	**28,823**	**43,903**	**51,449**	**55,134**
Projected Water Demand						
Municipal Demand - Aubrey	563	731	847	999	1,197	1,452
Municipal Demand - Denton Co Other	129	1,528	2,646	4,297	4,959	5,134
Total Projected Demand	***692***	***2,259***	***3,493***	***5,296***	***6,156***	***6,586***
Currently Available Water Supplies						
Upper Trinity Regional Water District	563	575	520	486	519	552
UTRWD for Denton Co Other	129	968	1,231	2,055	2,150	1,951
Total Current Supplies	***692***	***1,543***	***1,751***	***2,541***	***2,669***	***2,503***
Need (Demand - Current Supply)	***0***	***716***	***1,742***	***2,755***	***3,487***	***4,083***
Water Management Strategies						
Water Conservation	5	8	8	13	20	29
Add'l Water from UTRWD-Aubrey	0	148	319	500	658	871
Add'l Water from UTRWD-Denton Co Other	0	560	1,415	2,242	2,809	3,183
Total Water Management Strategies	***5***	***716***	***1,742***	***2,755***	***3,487***	***4,083***
Aubrey Reserve (Shortage)	**5**	**0**	**0**	**0**	**0**	**0**

Table C-12
Aurora

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,546**	**1,918**	**2,300**	**2,800**	**3,300**	**3,900**
Projected Water Demand						
Municipal Demand	134	159	186	224	263	311
Total Projected Demand	***134***	***159***	***186***	***224***	***263***	***311***
Currently Available Water Supplies						
Trinity Aquifer	63	63	63	63	63	63
Rhome (from Walnut Ck. SUD and TRWD)	71	87	99	114	113	107
Total Current Supplies	***134***	***150***	***162***	***177***	***176***	***170***
Need (Demand - Current Supply)	***0***	***9***	***24***	***47***	***87***	***141***
Water Management Strategies						
Water Conservation	1	2	2	3	4	6
Rhome (from Walnut Ck. SUD and TRWD)	0	7	22	44	83	135
Total Water Management Strategies	***1***	***9***	***24***	***47***	***87***	***141***
Aurora Reserve (Shortage)	**1**	**0**	**0**	**0**	**0**	**0**

Table C-13
Azle

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**11,857**	**12,854**	**13,868**	**14,897**	**18,000**	**23,090**
Projected Water Demand						
Municipal Demand	1,858	1,958	2,068	2,198	2,647	3,390
Total Projected Demand	***1,858***	***1,958***	***2,068***	***2,198***	***2,647***	***3,390***
Currently Available Water Supplies						
Tarrant Regional Water District (limited by treatment plant capacity)	1,682	1,682	1,664	1,562	1,678	1,682
Total Current Supplies	***1,682***	***1,682***	***1,664***	***1,562***	***1,678***	***1,682***
Need (Demand - Current Supply)	***177***	***277***	***404***	***636***	***969***	***1,709***
Water Management Strategies						
Water Conservation	15	22	21	29	44	68
Additional Raw Water Needed from TRWD with treatment as below:	162	255	383	607	925	1,641
3 MGD WTP Expansion (TRWD)	*162*	*255*	*383*	*607*	*925*	*1,641*
Total Water Management Strategies	***177***	***277***	***404***	***636***	***969***	***1,709***
Azle Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-14
Balch Springs

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**26,423**	**28,980**	**31,606**	**34,456**	**37,233**	**40,018**
Projected Water Demand						
Municipal Demand	2,750	2,895	3,067	3,294	3,547	3,809
Total Projected Demand	***2,750***	***2,895***	***3,067***	***3,294***	***3,547***	***3,809***
Currently Available Water Supplies						
Dallas	2,622	2,510	2,375	2,352	2,369	2,423
Total Current Supplies	***2,622***	***2,510***	***2,375***	***2,352***	***2,369***	***2,423***
Need (Demand - Current Supply)	***128***	***385***	***692***	***942***	***1,178***	***1,386***
Water Management Strategies						
Water Conservation	23	33	31	44	59	76
Additional Dallas	105	352	661	898	1,119	1,310
Total Water Management Strategies	***128***	***385***	***692***	***942***	***1,178***	***1,386***
Balch Springs Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-15
Bardwell

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**831**	**1,063**	**1,333**	**1,650**	**2,024**	**4,500**
Projected Water Demand						
Municipal Demand	71	86	105	129	158	348
Total Projected Demand	***71***	***86***	***105***	***129***	***158***	***348***
Currently Available Water Supplies						
Woodbine Aquifer and Desalination	47	42	37	32	28	28
Total Current Supplies	***47***	***42***	***37***	***32***	***28***	***28***
Need (Demand - Current Supply)	***24***	***44***	***68***	***97***	***130***	***320***
Water Management Strategies						
Water Conservation	1	1	1	2	3	7
Rockett SUD	23	43	67	95	127	313
Total Water Management Strategies	***24***	***44***	***68***	***97***	***130***	***320***
Bardwell Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-16
Bartonville

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,500**	**5,000**	**5,000**	**5,000**	**5,000**	**5,000**
Projected Water Demand						
Municipal Demand	825	907	903	900	900	899
Total Projected Water Demand	***825***	***907***	***903***	***900***	***900***	***899***
Currently Available Water Supplies						
Groundwater (thru Cross Timbers WSC)	168	168	168	168	168	168
UTRWD (thru Cross Timbers WSC)	656	595	473	382	346	303
Total Current Supplies	***824***	***763***	***641***	***550***	***514***	***471***
Need (Demand - Current Supply)	***1***	***144***	***262***	***350***	***386***	***428***
Water Management Strategies						
Water Conservation	15	24	27	30	33	36
Add'l Water from UTRWD (thru Cross Timbers WSC)	0	137	269	371	420	459
Total Water Management Strategies	***15***	***161***	***296***	***401***	***453***	***495***
Bartonville Reserve (Shortage)	**14**	**17**	**34**	**51**	**67**	**67**

Table C-17
Bedford

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**48,100**	**51,983**	**55,866**	**59,750**	**59,750**	**59,750**
Projected Water Demand						
Municipal Demand	9,139	9,612	10,121	10,711	10,694	10,694
Total Projected Demand	***9,139***	***9,612***	***10,121***	***10,711***	***10,694***	***10,694***
Currently Available Water Supplies						
Trinity Aquifer	725	725	725	725	725	725
Trinity River Authority (TRWD)	8,414	8,088	7,558	7,098	6,320	5,641
Total Current Supplies	***9,139***	***8,813***	***8,283***	***7,823***	***7,045***	***6,366***
Need (Demand - Current Supply)	***0***	***799***	***1,838***	***2,888***	***3,649***	***799***
Water Management Strategies						
Water Conservation	1,036	1,122	304	357	392	428
Additional Water from TRA (TRWD)	0	0	1,534	2,531	3,257	3,900
Total Water Management Strategies	***1,036***	***1,122***	***1,838***	***2,888***	***3,649***	***4,328***
Bedford Reserve (Shortage)	**1,036**	**323**	**0**	**0**	**0**	**0**

Table C-18
Bells

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,648**	**1,943**	**2,234**	**2,568**	**6,000**	**8,000**
Projected Water Demand						
Municipal Demand	175	199	223	254	588	783
Total Projected Demand	***175***	***199***	***223***	***254***	***588***	***783***
Currently Available Water Supplies						
Woodbine Aquifer	175	175	175	175	175	175
Total Current Supplies	***175***	***175***	***175***	***175***	***175***	***175***
Need (Demand - Current Supply)	***0***	***24***	***48***	***79***	***413***	***608***
Water Management Strategies						
Water Conservation	1	2	2	3	10	16
Grayson County Water Supply Project (Sherman)	0	22	46	76	403	592
New well in Woodbine Aquifer		145	145	145	145	145
Total Water Management Strategies	***1***	***169***	***193***	***224***	***558***	***753***
Bells Reserve (Shortage)	**1**	**145**	**145**	**145**	**145**	**145**

Table C-19
Benbrook

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**22,500**	**25,000**	**27,500**	**32,833**	**48,095**	**48,095**
Projected Water Demand						
Municipal Demand	5,205	5,659	6,130	7,258	10,605	10,605
Total Projected Demand	***5,205***	***5,659***	***6,130***	***7,258***	***10,605***	***10,605***
Currently Available Water Supplies						
Trinity Aquifer	1,060	1,060	1,060	1,060	1,060	1,060
Tarrant Regional Water District (limited by contract)	3,385	3,385	3,385	3,385	3,385	3,385
Total Current Supplies	***4,445***	***4,445***	***4,445***	***4,445***	***4,445***	***4,445***
Need (Demand - Current Supply)	***760***	***1,214***	***1,685***	***2,813***	***6,160***	***6,160***
Water Management Strategies						
Water Conservation	112	186	227	296	477	512
Additional Raw Water Needed from TRWD beyond current contract with treatment as below:	648	1,028	1,458	2,517	5,683	5,648
Existing WTP	*648*	*1,028*	*1,458*	*2,517*	*3,341*	*3,341*
4.25 MGD WT Plant Expansion	*0*	*0*	*0*	*0*	*2,342*	*2,307*
Total Water Management Strategies	***760***	***1,214***	***1,685***	***2,813***	***6,160***	***6,160***
Benbrook Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-20
Bethel-Ash Water Supply Corporation (Region C Only*)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Region C Population	**2,138**	**2,410**	**2,637**	**2,937**	**3,196**	**3,447**
Projected Water Demand						
Municipal Demand	218	237	254	280	303	327
Total Projected Region C Demand	***218***	***237***	***254***	***280***	***303***	***327***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	327	327	327	327	327	327
Total Current Supplies	***327***	***327***	***327***	***327***	***327***	***327***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	2	3	3	4	5	7
Total Water Management Strategies	***2***	***3***	***3***	***4***	***5***	***7***
Bethel-Ash Water Supply Corporation (Region C Only*) Reserve (Shortage)	**111**	**93**	**76**	**51**	**29**	**7**

*Additional population for Bethel-Ash WSC is located in Regions I & D. The Region C portion is only that population in Henderson County within the Trinity River Basin.

Table C-21
Bethesda Water Supply Corporation (Regions C and G)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**24,614**	**28,132**	**31,713**	**35,503**	**39,507**	**43,693**
Projected Water Demand						
Municipal Demand	5,162	5,772	6,415	7,132	7,923	8,758
Total Projected Water Demand	***5,162***	***5,772***	***6,415***	***7,132***	***7,923***	***8,758***
Currently Available Water Supplies						
Trinity Aquifer (Region C)	305	305	305	305	305	305
Trinity Aquifer (Region G)	1,979	1,979	1,979	1,979	1,979	1,979
Fort Worth (TRWD)	1,405	1,507	1,571	1,709	1,861	1,999
Total Current Supplies	***3,689***	***3,791***	***3,855***	***3,993***	***4,145***	***4,283***
Need (Demand - Current Supply)	***1,473***	***1,981***	***2,560***	***3,139***	***3,778***	***4,475***
Water Management Strategies						
Water Conservation	35	55	69	83	99	117
Additional Fort Worth	1,054	1,461	1,941	2,410	2,928	3,496
Water from Arlington (TRWD)	1,416	1,619	1,833	2,072	2,336	2,614
Total Water Management Strategies	***2,505***	***3,135***	***3,843***	***4,565***	***5,363***	***6,227***
Bethesda Water Supply Corporation (Regions C and G) Reserve (Shortage)	**1,032**	**1,154**	**1,283**	**1,426**	**1,585**	**1,752**

Table C-22
Blackland Water Supply Corporation (Regions C & D)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,350**	**3,584**	**3,850**	**4,119**	**4,419**	**4,737**
Projected Water Demand						
Municipal Demand	678	712	754	800	857	918
Total Projected Water Demand	***678***	***712***	***754***	***800***	***857***	***918***
Currently Available Water Supplies						
North Texas Municipal Water District (through Rockwall)	618	540	528	528	530	526
Total Current Supplies	***618***	***540***	***528***	***528***	***530***	***526***
Need (Demand - Current Supply)	***60***	***172***	***226***	***272***	***327***	***392***
Water Management Strategies						
Water Conservation	12	19	22	26	31	36
Direct Connection and Additional Water from NTMWD	48	153	204	246	296	356
Total Water Management Strategies	***60***	***172***	***226***	***272***	***327***	***392***
Blackland Water Supply Corporation (Regions C & D) Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-23
Blooming Grove

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**909**	**1,002**	**1,098**	**1,208**	**1,323**	**1,445**
Projected Water Demand						
Municipal Demand	153	164	175	191	209	228
Total Projected Water Demand	***153***	***164***	***175***	***191***	***209***	***228***
Currently Available Water Supplies						
Corsicana	153	106	105	103	99	93
Total Current Supplies	***153***	***106***	***105***	***103***	***99***	***93***
Need (Demand - Current Supply)	***0***	***58***	***70***	***88***	***110***	***135***
Water Management Strategies						
Water Conservation	1	3	4	6	8	9
Additional Water from Corsicana	0	55	66	82	102	126
Trinity Aquifer (New Wells)	160	160	160	160	160	160
Total Water Management Strategies	***161***	***218***	***230***	***248***	***270***	***295***
Blooming Grove Reserve (Shortage)	**161**	**160**	**160**	**160**	**160**	**160**

Table C-24
Blue Mound

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,398**	**2,403**	**2,408**	**2,413**	**2,418**	**2,422**
Projected Water Demand						
Municipal Demand	191	181	172	167	167	167
Total Projected Water Demand	***191***	***181***	***172***	***167***	***167***	***167***
Currently Available Water Supplies						
Trinity Aquifer	191	191	191	191	191	191
Total Current Supplies	***191***	***191***	***191***	***191***	***191***	***191***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	2	2	2	2	3	3
Purchase existing water system from Monarch Utilities						
Total Water Management Strategies	***2***	***2***	***2***	***2***	***3***	***3***
Blue Mound Reserve (Shortage)	**2**	**12**	**21**	**26**	**27**	**27**

Table C-25
Blue Ridge

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**925**	**2,000**	**4,000**	**12,000**	**25,000**	**39,000**
Projected Water Demand						
Municipal Demand	92	185	362	1,412	3,221	5,461
Total Projected Water Demand	***92***	***185***	***362***	***1,412***	***3,221***	***5,461***
Currently Available Water Supplies						
Woodbine Aquifer	92	92	92	92	92	92
Total Current Supplies	***92***	***92***	***92***	***92***	***92***	***92***
Need (Demand - Current Supply)	***0***	***93***	***270***	***1,320***	***3,129***	***5,369***
Water Management Strategies						
Water Conservation	1	2	4	19	54	109
Initial Connection & Water from NTMWD	0	109	308	1,363	2,242	2,242
Upsize Connection & Water from NTWMD	0	0	0	0	895	3,080
Total Water Management Strategies	***1***	***111***	***312***	***1,382***	***3,191***	***5,431***
Blue Ridge Reserve (Shortage)	**1**	**18**	**42**	**62**	**62**	**62**

Table C-26
Bolivar Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**12,343**	**14,705**	**17,444**	**20,491**	**24,004**	**27,974**
Projected Water Demand						
Bolivar WSC Municipal Demand	1,105	1,257	1,447	1,678	1,957	2,277
Total Projected Demand	***1,105***	***1,257***	***1,447***	***1,678***	***1,957***	***2,277***
Currently Available Water Supplies						
Groundwater	1,114	1,114	1,114	1,114	1,114	1,114
Total Current Supplies	***1,114***	***1,114***	***1,114***	***1,114***	***1,114***	***1,114***
Need (Demand - Current Supply)	***0***	***143***	***333***	***564***	***843***	***1,163***
Water Management Strategies						
Water Conservation	9	14	14	22	33	46
Connect to UTRWD	0	190	467	776	1,131	1,413
Initial Connection & Water from Gainesville	0	50	75	100	125	150
Total Water Management Strategies	***9***	***254***	***556***	***898***	***1,289***	***1,609***
Bolivar Water Supply Corporation Reserve (Shortage)	**18**	**111**	**223**	**334**	**446**	**446**

Table C-27
Bonham

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**12,603**	**16,000**	**22,000**	**30,000**	**37,000**	**45,000**
Projected Water Demand						
Municipal Demand	2,024	2,506	3,393	4,598	5,663	6,883
Fannin County - Manufacturing	88	97	106	114	124	135
Fannin County - Other	399	611	614	1,096	3,260	5,753
Total Projected Water Demand	***2,511***	***3,214***	***4,113***	***5,808***	***9,047***	***12,771***
Currently Available Water Supplies						
Lake Bonham (NTMWD) for Bonham	2,024	2,491	2,636	2,665	2,747	2,813
Lake Bonham (NTMWD) for Fannin C Manf	88	96	82	66	60	55
Lake Bonham (NTMWD) for Fannin Co Other	399	607	477	464	388	327
Total Current Supplies	***2,511***	***3,195***	***3,195***	***3,195***	***3,195***	***3,195***
Need (Demand - Current Supply)	***0***	***19***	***918***	***2,613***	***5,852***	***9,576***
Water Management Strategies						
Water Conservation - Bonham	35	27	34	61	94	138
Water Conservation - County Other	3	7	6	15	54	115
Fannin Co Water Supply Project-Bonham	0	0	723	1,872	2,822	3,932
Fannin Co Water Supply Project-Fannin Co Manufaturing	0	1	24	48	64	80
Fannin Co Water Supply Project-Fannin Co Other	0	0	131	617	2,818	5,311
Total Water Management Strategies	***38***	***35***	***918***	***2,613***	***5,852***	***9,576***
Bonham Reserve (Shortage)	**38**	**16**	**0**	**0**	**0**	**0**

Table C-28
Boyd

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,303**	**1,413**	**2,000**	**2,500**	**3,500**	**3,800**
Projected Water Demand						
Municipal Demand	217	229	316	392	547	593
Total Projected Demand	***217***	***229***	***316***	***392***	***547***	***593***
Currently Available Water Supplies						
Trinity Aquifer	73	73	73	73	73	73
Walnut Creek SUD (TRWD)	144	142	195	227	267	224
Total Current Supplies	***217***	***215***	***268***	***300***	***340***	***297***
Need (Demand - Current Supply)	***0***	***14***	***48***	***92***	***207***	***296***
Water Management Strategies						
Water Conservation	9	22	31	5	9	12
Additional Water from Walnut Ck. SUD	0	0	17	87	198	284
Total Water Management Strategies	***9***	***22***	***48***	***92***	***207***	***296***
Boyd Reserve (Shortage)	**9**	**8**	**0**	**0**	**0**	**0**

Table C-29
Brandon-Irene Water Supply Corporation (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Region C Population	**294**	**339**	**388**	**444**	**507**	**578**
Projected Water Demand						
Municipal Demand	40	44	48	55	62	71
Total Projected Region C Demand	***40***	***44***	***48***	***55***	***62***	***71***
Currently Available Water Supplies						
Aquilla WSD (Lake Aquilla, Region G)	59	66	74	84	96	109
Total Current Supplies	***59***	***66***	***74***	***84***	***96***	***109***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	0	0	1	1	1
Total Water Management Strategies	***0***	***0***	***0***	***1***	***1***	***1***
Brandon-Irene Water Supply Corporation (Region C Only) Reserve (Shortage)	**19**	**22**	**26**	**30**	**35**	**39**

Table C-30
Bridgeport

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,456**	**9,144**	**10,875**	**15,000**	**20,000**	**25,000**
Projected Water Demand						
Municipal Demand	1,294	1,551	1,822	2,496	3,322	4,149
Total Projected Demand	***1,294***	***1,551***	***1,822***	***2,496***	***3,322***	***4,149***
Currently Available Water Supplies						
Tarrant Regional Water District (limited by contract amount)	1,294	1,412	1,466	1,704	1,704	1,704
Total Current Supplies	***1,294***	***1,412***	***1,466***	***1,704***	***1,704***	***1,704***
Need (Demand - Current Supply)	***0***	***139***	***356***	***792***	***1,618***	***2,445***
Water Management Strategies						
Water Conservation	24	40	55	83	122	166
Additional Raw Water Needed from TRWD beyond current contract with treatment as below:	0	99	301	709	1,496	2,279
2 MGD WTP Expansion				*40*	*827*	*1,121*
1.5 MGD WTP Expansion						*489*
Expand Capacity of Lake intake and Pump Station				*40*	*827*	*1,610*
Total Water Management Strategies	***24***	***139***	***356***	***792***	***1,618***	***2,445***
Bridgeport Reserve (Shortage)	**24**	**0**	**0**	**0**	**0**	**0**

Table C-31
Bryson

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**581**	**620**	**644**	**657**	**666**	**672**
Projected Water Demand						
Municipal Demand	80	82	83	84	85	85
Jack County Manufacturing Demand	1	1	1	1	1	1
Total Projected Demand	***80***	***82***	***83***	***84***	***85***	***85***
Currently Available Water Supplies						
Graham (through Fort Belknap WSC)	46	46	46	46	46	46
Other Aquifer	50	50	50	50	50	50
Total Current Supplies	***96***	***96***	***96***	***96***	***96***	***96***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	1	1	2
Total Water Management Strategies	***1***	***1***	***1***	***1***	***1***	***2***
Bryson Reserve (Shortage)	**17**	**15**	**14**	**13**	**12**	**13**

Table C-32
Buena Vista-Bethel Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,500**	**5,500**	**6,500**	**8,000**	**11,500**	**15,326**
Projected Water Demand						
Municipal Demand	1,249	1,509	1,772	2,173	3,119	4,154
Total Projected Demand	***1,249***	***1,509***	***1,772***	***2,173***	***3,119***	***4,154***
Currently Available Water Supplies						
Trinity Aquifer	874	874	874	874	874	874
Waxahachie (TRWD)	170	142	143	376	620	728
Waxahachie (Lake Bardwell)	279	244	255	286	389	458
Waxahachie (Lake Waxahachie)	181	157	166	187	257	292
Waxahachie (Reuse)	225	227	295	386	554	659
Total Current Supplies	***1,728***	***1,644***	***1,732***	***2,109***	***2,693***	***3,012***
Need (Demand - Current Supply)	***0***	***0***	***40***	***64***	***426***	***1,142***
Water Management Strategies						
Water Conservation	23	39	53	72	114	166
Additional Water from Waxahachie	0	0	0	0	312	976
Total Water Management Strategies	***23***	***39***	***53***	***72***	***426***	***1,142***
Buena Vista-Bethel Special Utility District Reserve (Shortage)	**502**	**174**	**13**	**8**	**0**	**0**

Table C-33
Burleson (Regions C and G)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**43,801**	**51,845**	**60,022**	**68,635**	**77,711**	**87,170**
Projected Water Demand						
Municipal Demand	6,620	7,664	8,757	9,950	11,241	12,602
Johnson County Manufacturing	2	2	2	2	2	2
Total Projected Water Demand	***6,622***	***7,666***	***8,759***	***9,952***	***11,243***	***12,604***
Currently Available Water Supplies						
Fort Worth (TRWD)	4,826	4,826	4,826	4,826	4,826	4,826
Total Current Supplies	***4,826***	***4,826***	***4,826***	***4,826***	***4,826***	***4,826***
Need (Demand - Current Supply)	***1,796***	***2,840***	***3,933***	***5,126***	***6,417***	***7,778***
Water Management Strategies						
Water Conservation	11	15	15	27	41	55
Additional Water from Fort Worth	3,109	4,358	5,670	7,089	8,625	10,244
Increase delivery capacity from Ft Worth	*0*	*0*	*967*	*2,386*	*3,922*	*5,541*
Total Water Management Strategies	***3,120***	***4,373***	***5,685***	***7,116***	***8,666***	***10,299***
Burleson (Regions C and G) Reserve (Shortage)	**1,324**	**1,533**	**1,752**	**1,990**	**2,249**	**2,521**

Table C-34
Caddo Basin Special Utility District (Regions C and D)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**8,837**	**11,401**	**15,201**	**20,067**	**26,576**	**35,581**
Projected Water Demand						
Municipal Demand	986	1,219	1,586	2,071	2,736	3,659
Total Projected Water Demand	***986***	***1,219***	***1,586***	***2,071***	***2,736***	***3,659***
Currently Available Water Supplies						
North Texas Municipal Water District	913	937	1,124	1,383	1,712	2,121
Total Current Supplies	***913***	***937***	***1,124***	***1,383***	***1,712***	***2,121***
Need (Demand - Current Supply)	***73***	***282***	***462***	***688***	***1,024***	***1,538***
Water Management Strategies						
Water Conservation	2	4	4	7	10	14
Additional Water from NTMWD	71	278	458	681	1,014	1,524
Total Water Management Strategies	***73***	***282***	***462***	***688***	***1,024***	***1,538***
Caddo Basin Special Utility District (Regions C and D) Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-35
Carrollton

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**126,763**	**129,176**	**129,179**	**129,182**	**129,185**	**129,188**
Projected Water Demand						
Municipal Demand	23,566	23,504	23,112	22,895	22,852	22,850
Total Projected Demand	***23,566***	***23,504***	***23,112***	***22,895***	***22,852***	***22,850***
Currently Available Water Supplies						
Trinity Aquifer	33	33	33	33	33	33
Dallas Water Utilities	22,470	20,382	17,898	16,346	15,261	14,534
Total Current Supplies	***22,503***	***20,415***	***17,931***	***16,379***	***15,294***	***14,567***
Need (Demand - Current Supply)	***1,063***	***3,089***	***5,181***	***6,516***	***7,558***	***8,283***
Water Management Strategies						
Water Conservation	432	627	693	763	838	914
Additional Water from DWU	631	2,462	4,488	5,753	6,720	7,369
Total Water Management Strategies	***1,063***	***3,089***	***5,181***	***6,516***	***7,558***	***8,283***
Carrollton Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-36
Cash Special Utility District (Region C & D)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Region Population (C&D)	**19,973**	**23,972**	**28,708**	**34,308**	**40,986**	**48,933**
Projected Region Population (D)	18,784	22,432	26,769	31,966	38,194	45,664
Projected Region Population (C)	1,189	1,540	1,939	2,342	2,792	3,269
Projected Water Demand						
Municipal Demand (Region D)	2,159	2,497	2,924	3,460	4,123	4,923
Municipal Demand (Region C)	137	172	212	254	302	353
Total Projected Total Demand	***2,296***	***2,669***	***3,136***	***3,714***	***4,425***	***5,276***
Currently Available Water Supplies						
North Texas Municipal Water District	1,301	1,391	1,684	1,642	1,539	1,424
Sabine River Authority (current and future)	1,651	4,705	4,705	4,705	4,704	4,679
Total Current Supplies	***2,952***	***6,096***	***6,389***	***6,347***	***6,243***	***6,103***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	2	2	3	5	7
Additional Water from NTMWD	1,165	1,075	782	824	927	1,042
Increase delivery infrastructure from NTWMD	*1,165*	*1,075*	*782*	*824*	*927*	*1,042*
Total Water Management Strategies	***1,166***	***1,077***	***784***	***827***	***932***	***1,049***
Cash Special Utility District (Region C & D) Reserve (Shortage)	**1,822**	**4,504**	**4,037**	**3,460**	**2,750**	**1,876**
Region C Supply Available to Region D	**2,329**	**2,294**	**2,254**	**2,212**	**2,164**	**2,113**

Note: Cash SUD is also supplied from the Sabine River Authority (Lake Tawakoni) to meet part of Region D demands. NTWMD supplies all of Region C demand and part of Region D demand.

Table C-37
Cedar Hill

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**53,200**	**65,119**	**77,038**	**88,956**	**88,956**	**88,956**
Projected Water Demand						
Municipal Demand	10,652	12,808	15,005	17,244	17,229	17,227
Total Projected Demand	***10,652***	***12,808***	***15,005***	***17,244***	***17,229***	***17,227***
Currently Available Water Supplies						
Trinity Aquifer	180	180	180	180	180	180
Dallas Water Utilities	9,985	10,951	11,481	12,183	11,386	10,843
Total Current Supplies	***10,165***	***11,131***	***11,661***	***12,363***	***11,566***	***11,023***
Need (Demand - Current Supply)	***487***	***1,677***	***3,344***	***4,881***	***5,663***	***6,204***
Water Management Strategies						
Water Conservation	211	374	505	641	697	755
Additional Water from DWU	276	1,303	2,839	4,240	4,966	5,449
Total Water Management Strategies	***487***	***1,677***	***3,344***	***4,881***	***5,663***	***6,204***
Cedar Hill Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-38
Celina

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**22,675**	**48,000**	**89,000**	**150,000**	**150,000**	**150,000**
Projected Water Demand						
Municipal Demand	4,716	9,889	18,303	30,828	30,826	30,823
Total Projected Water Demand	***4,716***	***9,889***	***18,303***	***30,828***	***30,826***	***30,823***
Currently Available Water Supplies						
Trinity Aquifer	132	132	132	132	132	132
Woodbine Aquifer	62	62	62	62	62	62
Upper Trinity Regional Water District	3,083	3,083	3,083	3,083	3,082	2,479
Total Current Supplies	***3,277***	***3,277***	***3,277***	***3,277***	***3,276***	***2,673***
Need (Demand - Current Supply)	***1,439***	***6,612***	***15,026***	***27,551***	***27,550***	***28,150***
Water Management Strategies						
Water Conservation	86	238	549	1,028	1,130	1,233
Additional Water from UTRWD	1,353	4,874	11,477	21,523	21,420	21,917
Connection to NTMWD	0	1,500	3,000	5,000	5,000	5,000
Total Water Management Strategies	***1,439***	***6,612***	***15,026***	***27,551***	***27,550***	***28,150***
Celina Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-39
Chatfield Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,300**	**4,400**	**4,500**	**4,600**	**4,700**	**4,800**
Projected Water Demand						
Municipal Demand	469	464	463	466	475	485
Total Projected Water Demand	***469***	***464***	***463***	***466***	***475***	***485***
Currently Available Water Supplies						
Corsicana	469	301	278	251	224	198
Total Current Supplies	***469***	***301***	***278***	***251***	***224***	***198***
Need (Demand - Current Supply)	***0***	***163***	***185***	***215***	***251***	***287***
Water Management Strategies						
Water Conservation	4	5	5	6	8	10
Additional Water from Corsicana	0	158	180	209	243	277
New wells in Trinity Aquifer	150	150	150	150	150	150
Total Water Management Strategies	***154***	***313***	***335***	***365***	***401***	***437***
Chatfield Water Supply Corporation Reserve (Shortage)	**154**	**150**	**150**	**150**	**150**	**150**

Table C-40
Chico

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,051**	**1,107**	**1,165**	**2,200**	**2,800**	**3,500**
Projected Water Demand						
Municipal Demand	207	213	221	411	522	652
Total Projected Demand	***207***	***213***	***221***	***411***	***522***	***652***
Currently Available Water Supplies						
Trinity Aquifer	193	193	193	193	193	193
West Wise SUD (TRWD)	13	13	13	13	13	13
Total Current Supplies	***206***	***206***	***206***	***206***	***206***	***206***
Need (Demand - Current Supply)	***1***	***7***	***15***	***205***	***316***	***446***
Water Management Strategies						
Water Conservation	4	6	7	14	19	26
Additional Water from West Wise SUD	0	1	8	191	297	420
Increase delivery capacity from West Wise SUD	*0*	*0*	*0*	*140*	*246*	*369*
Total Water Management Strategies	***4***	***7***	***15***	***205***	***316***	***446***
Chico Reserve (Shortage)	**3**	**0**	**0**	**0**	**0**	**0**

Table C-41
Cockrell Hill

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,670**	**5,122**	**5,122**	**5,122**	**7,000**	**15,000**
Projected Water Demand						
Municipal Demand	407	421	405	396	536	1,141
Total Projected Demand	***407***	***421***	***405***	***396***	***536***	***1,141***
Currently Available Water Supplies						
Dallas Water Utilities	388	365	314	283	358	726
Total Current Supplies	***388***	***365***	***314***	***283***	***358***	***726***
Need (Demand - Current Supply)	***19***	***56***	***91***	***113***	***178***	***415***
Water Management Strategies						
Water Conservation	3	5	4	5	9	23
Additional Water from DWU	16	51	87	108	169	392
Total Water Management Strategies	***19***	***56***	***91***	***113***	***178***	***415***
Cockrell Hill Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-42
College Mound Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**11,745**	**14,711**	**18,112**	**22,024**	**30,000**	**38,000**
Projected Water Demand						
Municipal Demand	790	989	1,218	1,481	2,017	2,554
Total Projected Water Demand	***790***	***989***	***1,218***	***1,481***	***2,017***	***2,554***
Currently Available Water Supplies						
North Texas Municipal Water District (directly and through Terrell)	728	758	860	986	1,258	1,475
Total Current Supplies	***728***	***758***	***860***	***986***	***1,258***	***1,475***
Need (Demand - Current Supply)	***62***	***231***	***358***	***495***	***759***	***1,079***
Water Management Strategies						
Water Conservation	7	11	12	20	34	51
Additional Water from Terrell/NTMWD	55	220	346	475	725	1,028
Increase delivery capacity from Terrell	*0*	*0*	*0*	*0*	*508*	*1,028*
Total Water Management Strategies	***62***	***231***	***358***	***495***	***759***	***1,079***
College Mound Water Supply Corporation Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-43
Colleyville

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**24,000**	**25,500**	**27,000**	**28,000**	**28,000**	**28,000**
Projected Water Demand						
Municipal Demand	9,320	9,808	10,314	10,657	10,649	10,648
Total Projected Water Demand	***9,320***	***9,808***	***10,314***	***10,657***	***10,649***	***10,648***
Currently Available Water Supplies						
Trinity River Authority (TRWD)	9,320	8,927	8,297	7,575	6,751	6,025
Total Current Supplies	***9,320***	***8,927***	***8,297***	***7,575***	***6,751***	***6,025***
Need (Demand - Current Supply)	***0***	***881***	***2,017***	***3,082***	***3,898***	***4,623***
Water Management Strategies						
Water Conservation	171	259	309	355	390	426
Additional Water from TRA	0	622	1,708	2,727	3,508	4,197
Total Water Management Strategies	***171***	***881***	***2,017***	***3,082***	***3,898***	***4,623***
Colleyville Reserve (Shortage)	**171**	**0**	**0**	**0**	**0**	**0**

Table C-44
Collin County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**2,995**	**2,995**	**2,995**	**2,995**	**2,995**	**2,995**
Currently Available Water Supplies						
Direct Reuse (The Colony)	457	457	457	457	457	457
Direct Reuse (NTMWD)	1,847	1,847	1,847	1,847	1,847	1,847
Trinity Aquifer (Through Frisco)	100	100	100	100	100	100
Woodbine Aquifer (Through Frisco)	40	40	40	40	40	40
Trinity Aquifer	870	870	870	870	870	870
Woodbine Aquifer	97	97	97	97	97	97
DWU Sources	1,719	1,564	1,396	1,287	1,204	1,147
Local Supplies	408	408	408	408	408	408
Total Current Supplies	***5,538***	***5,383***	***5,215***	***5,106***	***5,023***	***4,966***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	5	83	159	199	237	275
Total Water Management Strategies	***5***	***83***	***159***	***199***	***237***	***275***
Collin County Irrigation Reserve (Shortage)	**2,548**	**2,471**	**2,379**	**2,310**	**2,265**	**2,246**

Table C-45
Collin County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**860**	**860**	**860**	**860**	**860**	**860**
Currently Available Water Supplies						
Livestock Local Supply	1,002	1,002	1,002	1,002	1,002	1,002
Total Current Supplies	***1,002***	***1,002***	***1,002***	***1,002***	***1,002***	***1,002***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Collin County Livestock Reserve (Shortage)	**142**	**142**	**142**	**142**	**142**	**142**

Table C-46
Collin County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**3,456**	**3,888**	**4,319**	**4,706**	**5,109**	**5,547**
Currently Available Water Supplies						
Woodbine Aquifer	200	200	200	200	200	200
NTMWD thru Richardson (60%)	1,910	1,788	1,830	1,880	1,913	1,922
NTMWD thru Plano (12%)	382	358	366	376	383	384
NTMWD thru McKinney (15%)	478	447	458	470	478	481
NTMWD thru Allen (3%)	96	89	92	94	96	96
NTMWD thru Frisco (4%)	127	119	122	125	128	128
NTMWD thru Wylie (1%)	32	30	31	31	32	32
Total Current Supplies	***3,225***	***3,031***	***3,099***	***3,176***	***3,230***	***3,243***
Need (Demand - Current Supply)	***231***	***857***	***1,220***	***1,530***	***1,879***	***2,304***
Water Management Strategies						
Water Conservation	0	8	90	133	145	157
Additional Water from NTMWD	259	858	1,117	1,369	1,686	2,076
New Wells in Woodbine Aquifer	0	78	78	78	78	78
Total Water Management Strategies	***259***	***944***	***1,285***	***1,580***	***1,909***	***2,311***
Collin County Manufacturing Reserve (Shortage)	**28**	**87**	**65**	**50**	**30**	**7**

Table C-47
Collin County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**0**	**0**	**0**	**0**	**0**	**0**
Currently Available Water Supplies						
None	0	0	0	0	0	0
Total Current Supplies	***0***	***0***	***0***	***0***	***0***	***0***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None	0	0	0	0	0	0
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Collin County Mining Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-48
Collin County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**10,289**	**10,289**	**10,289**	**35,000**	**50,000**	**80,000**
Projected Water Demand						
Municipal Demand	1,613	1,582	1,560	5,213	7,434	11,885
Total Projected Water Demand	***1,613***	***1,582***	***1,560***	***5,213***	***7,434***	***11,885***
Currently Available Water Supplies						
Trinity Aquifer	250	250	250	250	250	250
Woodbine Aquifer	247	247	247	247	247	247
North Texas Municipal Water District (through various suppliers)	1,028	831	751	3,140	4,328	6,577
Total Current Supplies	***1,525***	***1,328***	***1,248***	***3,637***	***4,825***	***7,074***
Need (Demand - Current Supply)	***88***	***254***	***312***	***1,576***	***2,609***	***4,811***
Water Management Strategies						
Water Conservation	13	19	16	70	124	238
Additional Water from NTMWD	75	235	296	1,506	2,485	4,573
Total Water Management Strategies	***88***	***254***	***312***	***1,576***	***2,609***	***4,811***
Collin County Other Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-49
Collin County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**715**	**602**	**740**	**594**	**782**	**724**
Currently Available Water Supplies						
North Texas Municipal Water District	659	461	523	395	488	418
Total Current Supplies	***659***	***461***	***523***	***395***	***488***	***418***
Need (Demand - Current Supply)	***56***	***141***	***217***	***199***	***294***	***306***
Water Management Strategies						
Additional Water from NTMWD	56	141	217	199	294	306
Total Water Management Strategies	***56***	***141***	***217***	***199***	***294***	***306***
Collin County Steam Electric Power Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-50
Collinsville

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,117**	**2,685**	**3,246**	**3,889**	**5,000**	**6,500**
Projected Water Demand						
Municipal Demand	233	285	338	401	513	666
Total Projected Water Demand	***233***	***285***	***338***	***401***	***513***	***666***
Currently Available Water Supplies						
Trinity Aquifer	242	242	242	242	242	242
Total Current Supplies	***242***	***242***	***242***	***242***	***242***	***242***
Need (Demand - Current Supply)	***0***	***43***	***96***	***159***	***271***	***424***
Water Management Strategies						
Water Conservation	2	3	3	5	9	13
Grayson County Water Supply Project (Northwest WTP)	0	40	93	154	262	411
Total Water Management Strategies	***2***	***43***	***96***	***159***	***271***	***424***
Collinsville Reserve (Shortage)	**11**	**0**	**0**	**0**	**0**	**0**

Table C-51
Combine

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,690**	**3,278**	**3,939**	**4,692**	**5,545**	**6,501**
Projected Water Demand						
Municipal Demand	308	361	423	498	588	687
Total Projected Water Demand	***308***	***361***	***423***	***498***	***588***	***687***
Currently Available Water Supplies						
Combine WSC (DWU)	183	188	189	189	169	152
Total Current Supplies	***183***	***188***	***189***	***189***	***169***	***152***
Need (Demand - Current Supply)	***125***	***173***	***234***	***309***	***419***	***535***
Water Management Strategies						
Water Conservation	3	4	4	7	10	14
Additional Combine WSC (DWU)	122	169	230	302	409	521
Total Water Management Strategies	***125***	***173***	***234***	***309***	***419***	***535***
Combine Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-52
Community Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,498**	**3,933**	**4,363**	**4,781**	**5,200**	**5,610**
Projected Water Demand						
Municipal Demand	347	369	394	430	466	502
Total Projected Water Demand	***347***	***369***	***394***	***430***	***466***	***502***
Currently Available Water Supplies						
Tarrant Regional Water District	347	336	317	306	295	284
Total Current Supplies	***347***	***336***	***317***	***306***	***295***	***284***
Need (Demand - Current Supply)	***0***	***33***	***77***	***124***	***171***	***218***
Water Management Strategies						
Water Conservation	3	4	4	6	8	10
Additional Water from TRWD	0	29	73	118	163	208
Total Water Management Strategies	***3***	***33***	***77***	***124***	***171***	***218***
Community Water Supply Corporation Reserve (Shortage)	**3**	**0**	**0**	**0**	**0**	**0**

Table C-53
Cooke County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**300**	**300**	**300**	**300**	**300**	**300**
Currently Available Water Supplies						
Trinity Aquifer	176	176	176	176	176	176
Woodbine Aquifer	49	49	49	49	49	49
Direct Reuse (Gainesville)	9	9	9	9	9	9
Total Current Supplies	***234***	***234***	***234***	***234***	***234***	***234***
Need (Demand - Current Supply)	***66***	***66***	***66***	***66***	***66***	***66***
Water Management Strategies						
Additional Gainesville (reuse)	70	70	70	70	70	70
Total Water Management Strategies	***70***	***70***	***70***	***70***	***70***	***70***
Cooke County Irrigation Reserve (Shortage)	**4**	**4**	**4**	**4**	**4**	**4**

Table C-54
Cooke County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,494**	**1,494**	**1,494**	**1,494**	**1,494**	**1,494**
Currently Available Water Supplies						
Trinity Aquifer	307	307	307	307	307	307
Woodbine Aquifer	60	60	60	60	60	60
Local Supplies	1,187	1,187	1,187	1,187	1,187	1,187
Total Current Supplies	***1,554***	***1,554***	***1,554***	***1,554***	***1,554***	***1,554***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Cooke County Livestock Reserve (Shortage)	**60**	**60**	**60**	**60**	**60**	**60**

Table C-55
Cooke County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**226**	**247**	**268**	**286**	**310**	**336**
Currently Available Water Supplies						
Trinity Aquifer	34	34	34	34	34	34
Gainesville	192	213	234	252	276	124
Total Current Supplies	***226***	***247***	***268***	***286***	***310***	***158***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***178***
Water Management Strategies						
Water Conservation	0	0	5	8	8	9
Additional Gainesville	0	0	0	0	0	169
Total Water Management Strategies	***0***	***0***	***5***	***8***	***8***	***178***
Cooke County Manufacturing Reserve (Shortage)	**0**	**0**	**5**	**8**	**8**	**0**

Table C-56
Cooke County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,583**	**900**	**378**	**446**	**511**	**586**
Currently Available Water Supplies						
Trinity Aquifer	800	750	300	300	300	300
Total Current Supplies	***800***	***750***	***300***	***300***	***300***	***300***
Need (Demand - Current Supply)	***783***	***150***	***78***	***146***	***211***	***286***
Water Management Strategies						
Direct Reuse	99	67	71	74	77	80
Connect to Gainesville	684	83	7	72	134	206
Total Water Management Strategies	***783***	***150***	***78***	***146***	***211***	***286***
Cooke County Mining Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-57
Cooke County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**8,500**	**9,000**	**9,724**	**13,000**	**15,000**	**31,000**
Projected Water Demand						
Municipal Demand	1,123	1,149	1,209	1,590	1,830	3,767
Total Projected Water Demand	***1,123***	***1,149***	***1,209***	***1,590***	***1,830***	***3,767***
Currently Available Water Supplies						
Trinity Aquifer	916	966	1,416	1,416	1,416	1,416
Woodbine Aquifer	45	45	45	45	45	45
Other Aquifer	0	0	0	0	0	0
Gainesville	162	138	0	129	369	951
Total Current Supplies	***1,123***	***1,149***	***1,461***	***1,590***	***1,830***	***2,412***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***1,355***
Water Management Strategies						
Water Conservation	9	13	12	21	31	75
Additional Gainesville	0	0	0	0	0	1,280
Total Water Management Strategies	***9***	***13***	***12***	***21***	***31***	***1,355***
Cooke County Other Reserve (Shortage)	**9**	**13**	**264**	**21**	**31**	**0**

Table C-58
Cooke County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**0**	**0**	**0**	**0**	**0**	**0**
Currently Available Water Supplies						
None	0	0	0	0	0	0
Total Current Supplies	***0***	***0***	***0***	***0***	***0***	***0***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Cooke County Steam Electric Power Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-59
Copeville Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,846**	**4,804**	**5,972**	**8,000**	**14,000**	**24,000**
Projected Water Demand						
Municipal Demand	319	376	452	596	1,037	1,773
Total Projected Demand	***319***	***376***	***452***	***596***	***1,037***	***1,773***
Currently Available Water Supplies						
North Texas Municipal Water District	294	288	319	397	647	1,024
Total Current Supplies	***294***	***288***	***319***	***397***	***647***	***1,024***
Need (Demand - Current Supply)	***25***	***88***	***133***	***199***	***390***	***749***
Water Management Strategies						
Water Conservation	3	4	5	8	17	35
Additional Water from NTMWD	22	84	128	191	373	714
Total Water Management Strategies	***25***	***88***	***133***	***199***	***390***	***749***
Copeville Special Utility District Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-60
Coppell

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**41,460**	**42,953**	**42,953**	**42,953**	**42,953**	**42,953**
Projected Water Demand						
Municipal Demand	10,992	11,245	11,146	11,089	11,075	11,074
Total Projected Demand	***10,992***	***11,245***	***11,146***	***11,089***	***11,075***	***11,074***
Currently Available Water Supplies						
Dallas Water Utilities	10,481	9,751	8,632	7,917	7,396	7,044
Total Current Supplies	***10,481***	***9,751***	***8,632***	***7,917***	***7,396***	***7,044***
Need (Demand - Current Supply)	***511***	***1,494***	***2,514***	***3,172***	***3,679***	***4,030***
Water Management Strategies						
Water Conservation	202	299	334	370	406	443
Additional Water from DWU	309	1,195	2,180	2,802	3,273	3,587
Total Water Management Strategies	***511***	***1,494***	***2,514***	***3,172***	***3,679***	***4,030***
Coppell Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-61

Copper Canyon

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,419**	**1,523**	**1,647**	**1,785**	**1,947**	**2,131**
Projected Water Demand						
Municipal Demand	260	272	289	310	338	369
Total Projected Water Demand	***260***	***272***	***289***	***310***	***338***	***369***
Currently Available Water Supplies						
Groundwater (thru Cross Timbers WSC)	167	167	167	167	167	167
UTRWD (thru Cross Timbers WSC)	93	94	96	94	103	101
Total Current Supplies	***260***	***261***	***263***	***261***	***270***	***268***
Need (Demand - Current Supply)	***0***	***11***	***26***	***49***	***68***	***101***
Water Management Strategies						
Water Conservation	5	7	9	10	12	15
Additional Water from Cross Timbers WSC	0	21	50	89	122	152
Total Water Management Strategies	***5***	***28***	***59***	***99***	***134***	***167***
Copper Canyon Reserve (Shortage)	**5**	**17**	**33**	**50**	**66**	**66**

Table C-62

Corbet Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,865**	**3,159**	**3,462**	**3,808**	**4,170**	**4,556**
Projected Water Demand						
Municipal Demand	258	272	289	312	341	372
Total Projected Demand	***258***	***272***	***289***	***312***	***341***	***372***
Currently Available Water Supplies						
Corsicana	258	176	173	168	161	151
Total Current Supplies	***258***	***176***	***173***	***168***	***161***	***151***
Need (Demand - Current Supply)	***0***	***96***	***116***	***144***	***180***	***221***
Water Management Strategies						
Water Conservation	2	3	3	4	6	7
Additional Water from Corsicana	0	93	113	140	174	214
Total Water Management Strategies	***2***	***96***	***116***	***144***	***180***	***221***
Corbet Water Supply Corporation Reserve (Shortage)	**2**	**0**	**0**	**0**	**0**	**0**

Table C-63
Corinth

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Projected Population	**24,911**	**29,499**	**29,499**	**29,499**	**29,499**	**29,499**
Projected Water Demand						
Municipal Demand	4,266	4,983	4,956	4,939	4,932	4,931
Total Projected Demand	***4,266***	***4,983***	***4,956***	***4,939***	***4,932***	***4,931***
Currently Available Water Supplies						
Trinity Aquifer	274	274	274	274	274	274
Upper Trinity Regional Water District	3,145	2,598	2,010	1,586	1,409	1,234
Total Current Supplies	***3,419***	***2,872***	***2,284***	***1,860***	***1,683***	***1,509***
Need (Demand - Current Supply)	***847***	***2,111***	***2,672***	***3,079***	***3,249***	***3,422***
Water Management Strategies						
Water Conservation	84	143	162	178	194	210
New Wells in Trinity Aquifer	847	1,408	1,408	1,408	1,408	1,408
Additional Water from UTRWD	0	560	1,102	1,493	1,647	1,804
Total Water Management Strategies	***931***	***2,111***	***2,672***	***3,079***	***3,249***	***3,422***
Corinth Reserve (Shortage)	**84**	**0**	**0**	**0**	**0**	**0**

Table C-64
Crandall

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Projected Population	**4,295**	**5,379**	**6,623**	**8,000**	**8,000**	**8,000**
Projected Water Demand						
Municipal Demand	779	955	1,162	1,397	1,396	1,395
Total Projected Demand	***779***	***955***	***1,162***	***1,397***	***1,396***	***1,395***
Currently Available Water Supplies						
North Texas Municipal Water District	605	605	605	605	605	605
Total Current Supplies	***605***	***605***	***605***	***605***	***605***	***605***
Need (Demand - Current Supply)	***174***	***350***	***557***	***792***	***791***	***790***
Water Management Strategies						
Water Conservation	14	25	35	47	51	56
Additional water from NTMWD	160	325	522	745	740	734
Total Water Management Strategies	***174***	***350***	***557***	***792***	***791***	***790***
Crandall Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-65
Cresson (Region C Only*)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Region C Population	**451**	**505**	**566**	**637**	**720**	**815**
Projected Water Demand						
Region C Municipal Demand	68	75	83	92	104	118
Total Projected Region C Demand	***68***	***75***	***83***	***92***	***104***	***118***
Currently Available Water Supplies						
Trinity Aquifer (Region G)	57	43	32	22	11	3
Total Current Supplies	***57***	***43***	***32***	***22***	***11***	***3***
Need (Demand - Current Supply)	***11***	***32***	***51***	***70***	***93***	***115***
Water Management Strategies						
Region C Water Conservation	1	1	1	1	2	2
New well in Trinity Aquifer (Parker Co)	113	113	113	113	113	113
Total Water Management Strategies	***114***	***114***	***114***	***114***	***115***	***115***
Cresson (Region C Only*) Reserve (Shortage)	**103**	**82**	**63**	**44**	**22**	**0**

*Additional population for Cresson is located in Region G (Hood and Johnson Counties). The population shown here is only the portion of Cresson that is located in Parker County.

Table C-66
Cross Roads

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,256**	**3,096**	**3,800**	**3,800**	**3,800**	**3,800**
Projected Water Demand						
Municipal Demand	457	619	756	755	754	754
Total Projected Demand	***457***	***619***	***756***	***755***	***754***	***754***
Currently Available Water Supplies						
Mustang SUD (Groundwater)	0	0	0	0	0	0
Mustang SUD (UTRWD)	456	487	463	368	327	287
Total Current Supplies	***456***	***487***	***463***	***368***	***327***	***287***
Need (Demand - Current Supply)	***1***	***132***	***293***	***387***	***427***	***467***
Water Management Strategies						
Water Conservation	8	16	23	25	28	30
Additional Water from Mustang SUD	0	116	270	362	399	437
Total Water Management Strategies	***8***	***132***	***293***	***387***	***427***	***467***
Cross Roads Reserve (Shortage)	**7**	**0**	**0**	**0**	**0**	**0**

Table C-67
Crowley (Regions C and G)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**16,362**	**19,142**	**22,883**	**27,525**	**35,213**	**40,258**
Projected Water Demand						
Municipal Demand	2,427	2,776	3,273	3,911	4,992	5,703
Total Projected Water Demand	***2,427***	***2,776***	***3,273***	***3,911***	***4,992***	***5,703***
Currently Available Water Supplies						
Trinity Aquifer	320	320	320	320	320	320
Fort Worth (TRWD) (limited by contract)	1,682	1,681	1,682	1,682	1,681	1,682
Total Current Supplies	***2,002***	***2,001***	***2,002***	***2,002***	***2,001***	***2,002***
Need (Demand - Current Supply)	***425***	***775***	***1,271***	***1,909***	***2,991***	***3,701***
Water Management Strategies						
Water Conservation	20	30	33	52	83	113
Additional Water from TRWD	405	745	1,238	1,857	2,908	3,588
Increase delivery infrastructure from Ft Worth in future	*0*	*184*	*678*	*1,297*	*2,347*	*3,028*
Total Water Management Strategies	***425***	***775***	***1,271***	***1,909***	***2,991***	***3,701***
Crowley (Regions C and G) Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-68
Culleoka Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,500**	**5,500**	**9,000**	**11,000**	**12,000**	**15,000**
Projected Water Demand						
Municipal Demand	328	370	605	740	807	1,009
Total Projected Water Demand	***328***	***370***	***605***	***740***	***807***	***1,009***
Currently Available Water Supplies						
Princeton (NTMWD)	302	284	427	493	503	583
Total Current Supplies	***302***	***284***	***427***	***493***	***503***	***583***
Need (Demand - Current Supply)	***26***	***86***	***178***	***247***	***304***	***426***
Water Management Strategies						
Water Conservation	3	4	6	10	13	20
Add'l Water from Princeton (NTMWD)	23	82	172	237	291	406
Total Water Management Strategies	***26***	***86***	***178***	***247***	***304***	***426***
Culleoka Water Supply Corporation Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-69
Dallas-Fort Worth International Airport (Sub-WUG)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand						
Municipal Demand	4,005	4,005	4,005	4,005	4,005	4,005
Total Projected Water Demand	***4,005***	***4,005***	***4,005***	***4,005***	***4,005***	***4,005***
Currently Available Water Supplies						
Dallas Water Utilities	2,291	2,083	1,550	1,430	1,336	1,274
Fort Worth (TRWD sources)	1,485	1,228	1,163	1,048	959	881
Fort Worth Reuse	80	80	301	301	301	301
Total Current Supplies	***3,856***	***3,391***	***3,014***	***2,779***	***2,596***	***2,456***
Need (Demand - Current Supply)	***149***	***614***	***991***	***1,226***	***1,409***	***1,549***
Water Management Strategies						
Water Conservation						
Additional Fort Worth	37	294	539	654	743	821
Additional Dallas	112	320	452	572	666	728
Total Water Management Strategies	***149***	***614***	***991***	***1,226***	***1,409***	***1,549***
Dallas-Fort Worth International Airport (Sub-WUG) Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-70
Dallas County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**9,134**	**9,134**	**9,134**	**9,134**	**9,134**	**9,134**
Currently Available Water Supplies						
DWU Direct Reuse Sources	490	490	490	490	490	490
Local Supplies	791	791	791	791	791	791
Trinity Aquifer	1,587	1,587	1,587	1,587	1,587	1,587
Woodbine Aquifer	1,372	1,372	1,372	1,372	1,372	1,372
TRA Direct Reuse (Las Colinas)	8,000	8,000	8,000	8,000	8,000	8,000
TRA Direct Reuse (Ten Mile WWTP)	125	125	125	125	125	125
Joe Pool Lake (Grand Prairie)	300	300	300	300	300	300
Total Current Supplies	***12,665***	***12,665***	***12,665***	***12,665***	***12,665***	***12,665***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	18	294	565	708	841	975
Additional TRA Las Colinas	0	7,000	7,000	7,000	7,000	7,000
Total Water Management Strategies	***18***	***7,294***	***7,565***	***7,708***	***7,841***	***7,975***
Dallas County Irrigation Reserve (Shortage)	**3,549**	**10,825**	**11,096**	**11,239**	**11,372**	**11,506**

Table C-71
Dallas County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**854**	**854**	**854**	**854**	**854**	**854**
Currently Available Water Supplies						
Local supplies	198	198	198	198	198	198
Woodbine Aquifer	763	763	763	763	763	763
Total Current Supplies	***961***	***961***	***961***	***961***	***961***	***961***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Dallas County Livestock Reserve (Shortage)	**107**	**107**	**107**	**107**	**107**	**107**

Table C-72
Dallas County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,339**	**3,000**	**2,000**	**2,000**	**2,000**	**2,000**
Projected Water Demand						
Municipal Demand	3,106	2,622	2,415	2,414	2,413	2,413
Total Projected Water Demand	***3,106***	***2,622***	***2,415***	***2,414***	***2,413***	***2,413***
Currently Available Water Supplies						
Trinity Aquifer	205	205	205	205	205	205
Woodbine Aquifer	56	56	56	56	56	56
Dallas Water Utilities	803	310	117	107	100	95
Dallas Water Utilities (for DFW Airport)	1,146	1,042	775	715	668	637
TRWD sources for DFW Airport (thru Ft Worth)	761	614	582	524	480	441
Ft Worth Reuse Sources for DFW Airport	40	40	151	151	151	151
Total Current Supplies	***3,011***	***2,267***	***1,886***	***1,758***	***1,660***	***1,585***
Need (Demand - Current Supply)	***95***	***355***	***529***	***656***	***753***	***828***
Water Management Strategies						
Water Conservation	14	15	6	9	11	13
Add'l Dallas	39	48	34	43	49	54
Add'l Dallas for DFW Airport	56	160	226	286	333	364
Add'l Ft Worth/TRWD for DFW Airport	40	187	420	478	522	561
Total Water Management Strategies	***149***	***410***	***686***	***816***	***915***	***992***
Dallas County Other Reserve (Shortage)	**54**	**55**	**157**	**160**	**162**	**164**

Table C-73
Dallas County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**37,791**	**41,148**	**44,214**	**46,703**	**46,983**	**47,265**
Currently Available Water Supplies						
Dallas Water Utilities	27,213	27,008	25,371	24,526	23,058	22,097
NTMWD (thru Garland & Mequite)	3,482	3,153	3,122	3,109	2,931	2,729
Irving (Lake Chapman)	3,779	4,115	4,421	4,670	4,698	4,727
Grand Prairie	692	673	611	563	518	494
Trinity Aquifer	530	530	530	530	530	530
Woodbine Aquifer	43	43	43	43	43	43
Total Current Supplies	***35,739***	***35,522***	***34,098***	***33,441***	***31,778***	***30,620***
Need (Demand - Current Supply)	***2,052***	***5,626***	***10,116***	***13,262***	***15,205***	***16,645***
Water Management Strategies						
Water Conservation	0	80	917	1,316	1,367	1,379
Additional Water from DWU	1,327	4,137	7,390	9,827	11,469	12,643
Additional Water from NTMWD	297	962	1,299	1,561	1,767	1,997
Additional Water from Grand Prairie	429	448	510	558	603	627
Total Water Management Strategies	***2,053***	***5,626***	***10,116***	***13,262***	***15,206***	***16,645***
Dallas County Manufacturing Reserve (Shortage)	**1**	**1**	**0**	**0**	**1**	**1**

Table C-74
Dallas County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**3,038**	**2,656**	**2,279**	**1,930**	**1,922**	**1,916**
Currently Available Water Supplies						
DWU Sources	1,012	589	234	138	128	122
Local Supplies	1,525	1,525	1,525	1,525	1,525	1,525
Trinity Aquifer	452	452	452	452	452	452
Total Current Supplies	***2,989***	***2,566***	***2,211***	***2,115***	***2,105***	***2,099***
Need (Demand - Current Supply)	***49***	***90***	***68***	***0***	***0***	***0***
Water Management Strategies						
Additional Water from DWU	49	90	68	55	64	70
Total Water Management Strategies	***49***	***90***	***68***	***55***	***64***	***70***
Dallas County Mining Reserve (Shortage)	**0**	**0**	**0**	**240**	**247**	**253**

Table C-75
Dallas County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**5,000**	**5,000**	**11,066**	**11,066**	**11,066**	**11,066**
Currently Available Water Supplies						
Dallas Water Utilities	4,768	4,336	3,872	3,570	3,339	3,180
Mountain Creek Lake	6,400	6,400	6,400	6,400	6,400	6,400
Run-of-River	368	368	368	368	368	368
Total Current Supplies	***11,536***	***11,104***	***10,640***	***10,338***	***10,107***	***9,948***
Need (Demand - Current Supply)	***0***	***0***	***426***	***728***	***959***	***1,118***
Water Management Strategies						
Additional Water from DWU	232	664	1,128	1,430	1,661	1,820
TRA Reuse	0	2,000	2,000	2,000	2,000	2,000
Total Water Management Strategies	***232***	***2,664***	***3,128***	***3,430***	***3,661***	***3,820***
Dallas County Steam Electric Power Reserve (Shortage)	**6,768**	**8,768**	**2,702**	**2,702**	**2,702**	**2,702**

Table C-76
Dalworthington Gardens

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,307**	**2,359**	**2,410**	**2,460**	**2,510**	**2,559**
Projected Water Demand						
Municipal Demand	912	922	933	947	966	984
Total Projected Water Demand	***912***	***922***	***933***	***947***	***966***	***984***
Currently Available Water Supplies						
Trinity Aquifer	325	325	325	325	325	325
Fort Worth (TRWD)	570	481	416	383	361	341
Total Current Supplies	***895***	***806***	***741***	***708***	***686***	***666***
Need (Demand - Current Supply)	***17***	***116***	***192***	***239***	***280***	***318***
Water Management Strategies						
Water Conservation	17	25	28	32	35	39
Additional Water from Fort Worth	0	91	164	207	245	279
Total Water Management Strategies	***17***	***116***	***192***	***239***	***280***	***318***
Dalworthington Gardens Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-77
Dawson

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**893**	**985**	**1,080**	**1,187**	**1,300**	**1,420**
Projected Water Demand						
Municipal Demand	149	160	172	187	204	223
Total Projected Water Demand	***149***	***160***	***172***	***187***	***204***	***223***
Currently Available Water Supplies						
Corsicana	149	104	103	101	96	91
Total Current Supplies	***149***	***104***	***103***	***101***	***96***	***91***
Need (Demand - Current Supply)	***0***	***56***	***69***	***86***	***108***	***132***
Water Management Strategies						
Water Conservation	1	3	4	6	7	9
Additional Water from Corsicana	0	53	65	80	101	123
Total Water Management Strategies	***1***	***56***	***69***	***86***	***108***	***132***
Dawson Reserve (Shortage)	**1**	**0**	**0**	**0**	**0**	**0**

Table C-78
Decatur

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**8,508**	**11,738**	**15,253**	**19,751**	**23,225**	**27,000**
Projected Water Demand						
Municipal Demand	2,319	3,149	4,060	5,240	6,157	7,156
Total Projected Water Demand	***2,319***	***3,149***	***4,060***	***5,240***	***6,157***	***7,156***
Currently Available Water Supplies						
Wise Co. Water Supply District (TRWD)	1,206	1,348	1,449	1,227	1,113	1,055
Total Current Supplies	***1,206***	***1,348***	***1,449***	***1,227***	***1,113***	***1,055***
Need (Demand - Current Supply)	***1,113***	***1,801***	***2,611***	***4,013***	***5,044***	***6,101***
Water Management Strategies						
Water Conservation	43	80	122	175	226	286
Additional Water from Wise Co. WSD	1,070	1,721	2,489	3,838	4,818	5,815
Total Water Management Strategies	***1,113***	***1,801***	***2,611***	***4,013***	***5,044***	***6,101***
Decatur Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-79
Denton County Fresh Water Supply District Number 1A

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**14,000**	**25,021**	**30,000**	**30,000**	**30,000**	**30,000**
Projected Water Demand						
Municipal Demand	3,659	6,494	7,777	7,774	7,771	7,769
Total Projected Demand	***3,659***	***6,494***	***7,777***	***7,774***	***7,771***	***7,769***
Currently Available Water Supplies						
Upper Trinity Regional Water District	2,452	3,425	3,199	2,536	2,257	1,978
Lewisville (DWU)	1,151	1,857	1,959	1,748	1,581	1,581
Total Current Supplies	***3,603***	***5,282***	***5,158***	***4,284***	***3,838***	***3,559***
Need (Demand - Current Supply)	***56***	***1,212***	***2,619***	***3,490***	***3,933***	***4,210***
Water Management Strategies						
Water Conservation	67	159	233	259	285	311
Additional Water from UTRWD	0	820	1,855	2,499	2,758	3,019
Additional Water from Lewisville (DWU)	34	234	531	732	889	880
Total Water Management Strategies	***101***	***1,212***	***2,619***	***3,490***	***3,933***	***4,210***
Denton County Fresh Water Supply District Number 1A Reserve (Shortage)	**45**	**0**	**0**	**0**	**0**	**0**

Table C-80
Denton County Fresh Water Supply District Number 7

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**13,500**	**13,500**	**13,500**	**13,500**	**13,500**	**13,500**
Projected Water Demand						
Municipal Demand	3,418	3,405	3,403	3,401	3,399	3,397
Total Projected Demand	***3,418***	***3,405***	***3,403***	***3,401***	***3,399***	***3,397***
Currently Available Water Supplies						
UTRWD	3,418	2,680	2,089	1,656	1,474	1,291
Total Current Supplies	***3,418***	***2,680***	***2,089***	***1,656***	***1,474***	***1,291***
Need (Demand - Current Supply)	***0***	***725***	***1,314***	***1,745***	***1,925***	***2,106***
Water Management Strategies						
Water Conservation	66	98	110	121	132	143
Add'l UTRWD	0	627	1,204	1,624	1,793	1,963
Total Water Management Strategies	***66***	***725***	***1,314***	***1,745***	***1,925***	***2,106***
Denton County Fresh Water Supply District Number 7 Reserve (Shortage)	**66**	**0**	**0**	**0**	**0**	**0**

Table C-81
Denton County Fresh Water Supply District Number 10

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,884**	**16,750**	**16,750**	**16,750**	**16,750**	**16,750**
Projected Water Demand						
Municipal Demand	1,486	3,128	3,127	3,126	3,124	3,124
Total Projected Demand	***1,486***	***3,128***	***3,127***	***3,126***	***3,124***	***3,124***
Currently Available Water Supplies						
Mustang Special Utility District (UTRWD Sources)	298	1,539	1,201	952	848	742
Upper Trinity Regional Water District	1,188	923	719	570	506	444
Total Current Supplies	***1,486***	***2,462***	***1,920***	***1,522***	***1,354***	***1,186***
Need (Demand - Current Supply)	***0***	***666***	***1,207***	***1,604***	***1,770***	***1,938***
Water Management Strategies						
Water Conservation	29	82	100	111	121	132
Add'l Mustang SUD	0	366	692	935	1,032	1,131
Add'l UTRWD	0	219	415	559	616	675
Total Water Management Strategies	***29***	***666***	***1,207***	***1,604***	***1,770***	***1,938***
Denton County Fresh Water Supply District Number 10 Reserve (Shortage)	**29**	**0**	**0**	**0**	**0**	**0**

Table C-82
Denton County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**2,137**	**2,137**	**2,137**	**2,137**	**2,137**	**2,137**
Currently Available Water Supplies						
Direct Reuse (UTRWD)	897	897	897	897	897	897
Direct Reuse (Denton)	406	406	406	406	406	406
Direct Reuse (Trophy Club MUD #1)	800	800	800	800	800	800
Dallas Water Utilities	429	390	348	321	301	286
Trinity Aquifer	400	400	400	400	400	400
Woodbine Aquifer	1,000	1,000	1,000	1,000	1,000	1,000
Total Current Supplies	***3,932***	***3,893***	***3,851***	***3,824***	***3,804***	***3,789***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	2	37	72	90	107	124
Additional UTRWD Direct Reuse	0	560	1,121	2,240	2,240	2,240
Total Water Management Strategies	***2***	***597***	***1,193***	***2,330***	***2,347***	***2,364***
Denton County Irrigation Reserve (Shortage)	**1,797**	**2,353**	**2,907**	**4,017**	**4,014**	**4,016**

Table C-83
Denton County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**
Currently Available Water Supplies						
Local Supplies	622	622	622	622	622	622
Trinity Aquifer	240	240	240	240	240	240
Woodbine Aquifer	490	490	490	490	490	490
Total Current Supplies	***1,352***	***1,352***	***1,352***	***1,352***	***1,352***	***1,352***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Denton County Livestock Reserve (Shortage)	**307**	**307**	**307**	**307**	**307**	**307**

Table C-84
Denton County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,446**	**1,643**	**1,843**	**2,020**	**2,194**	**2,383**
Currently Available Water Supplies						
Upper Trinity Regional Water District	72	129	113	98	95	90
Denton (Lake Ray Roberts)	759	670	601	524	419	375
Denton (Lake Lewisville)	314	276	247	214	170	152
Dallas Water Utilities	96	100	100	101	103	106
Woodbine Aquifer	11	11	11	11	11	11
North Texas Municipal Water District	66	63	65	67	69	69
Northlake (TRWD sources)	14	15	14	14	14	14
Total Current Supplies	***1,332***	***1,263***	***1,151***	***1,030***	***880***	***816***
Need (Demand - Current Supply)	***114***	***380***	***692***	***990***	***1,314***	***1,567***
Water Management Strategies						
Water Conservation	0	3	38	57	62	68
Additional Water from UTRWD	0	35	67	98	118	141
Additional Water from DWU	5	15	26	36	47	56
Additional Water from NTMWD	6	19	25	31	38	47
Additional Water from Denton	128	416	650	892	1,181	1,396
Additional Water from Northlake	0	1	4	5	7	9
New Wells in Woodbine Aquifer	184	184	184	184	184	184
Total Water Management Strategies	***322***	***674***	***994***	***1,302***	***1,638***	***1,901***
Denton County Manufacturing Reserve (Shortage)	**208**	**294**	**302**	**312**	**324**	**334**

Table C-85
Denton County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**4,326**	**2,729**	**3,345**	**4,306**	**5,204**	**6,291**
Currently Available Water Supplies						
Upper Trinity Regional Water District (through multiple suppliers)	2,363	603	848	1,141	1,405	1,645
Trinity Aquifer	1,963	1,963	1,963	1,963	1,963	1,963
Total Current Supplies	***4,326***	***2,566***	***2,811***	***3,104***	***3,368***	***3,608***
Need (Demand - Current Supply)	***0***	***163***	***534***	***1,202***	***1,836***	***2,683***
Water Management Strategies						
Additional Water from UTRWD	0	163	534	1,202	1,836	2,683
Total Water Management Strategies	***0***	***163***	***534***	***1,202***	***1,836***	***2,683***
Denton County Mining Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-86
Denton County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**30,207**	**33,609**	**37,232**	**53,174**	**86,087**	**160,675**
Projected Water Demand						
Municipal Demand	3,785	4,155	4,574	6,487	10,458	19,480
Total Projected Water Demand	***3,785***	***4,155***	***4,574***	***6,487***	***10,458***	***19,480***
Currently Available Water Supplies						
Little Elm (NTMWD)	1,658	1,379	1,271	1,198	1,123	1,040
Upper Trinity Regional WD (Direct and thru Aubrey)	595	968	1,231	2,055	3,650	6,701
Upper Trinity Regional WD (thru Cross Timbers WSC)	36	56	67	72	78	80
Trinity Aquifer	1,640	1,640	1,640	1,640	1,640	1,640
Woodbine Aquifer	1,165	1,165	1,165	1,165	1,165	1,165
Total Current Supplies	***5,094***	***5,208***	***5,375***	***6,130***	***7,656***	***10,626***
Need (Demand - Current Supply)	***0***	***0***	***0***	***357***	***2,802***	***8,854***
Water Management Strategies						
Water Conservation	32	47	46	86	174	390
Additional Water from Little Elm	134	409	521	593	668	749
Add'l Water from UTRWD (Direct and thru Aubrey)	0	243	751	2,106	4,628	10,584
Add'l Water from UTRWD (thru Cross Timbers WSC)	0	208	452	673	814	923
New wells in Trinity Aquifer	504	504	504	504	504	504
New wells in Woodbine Aquifer	817	817	817	817	817	817
Total Water Management Strategies	***1,487***	***2,228***	***3,091***	***4,778***	***7,605***	***13,967***
Denton County Other Reserve (Shortage)	**2,796**	**3,281**	**3,891**	**4,421**	**4,803**	**5,113**

Table C-87
Denton County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**646**	**733**	**819**	**906**	**993**	**1,088**
Currently Available Water Supplies						
Direct Reuse (Denton)	646	733	819	906	993	1,088
Total Current Supplies	***646***	***733***	***819***	***906***	***993***	***1,088***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Denton County Steam Electric Power Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-88
De Soto

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**54,617**	**59,903**	**65,330**	**71,222**	**76,963**	**82,718**
Projected Water Demand						
Municipal Demand	9,442	10,128	10,878	11,765	12,687	13,628
Total Projected Demand	***9,442***	***10,128***	***10,878***	***11,765***	***12,687***	***13,628***
Currently Available Water Supplies						
Dallas Water Utilities	9,003	8,783	8,424	8,400	8,473	8,668
Total Current Supplies	***9,003***	***8,783***	***8,424***	***8,400***	***8,473***	***8,668***
Need (Demand - Current Supply)	***439***	***1,345***	***2,454***	***3,365***	***4,214***	***4,960***
Water Management Strategies						
Water Conservation	227	433	506	587	676	772
Additional Water from DWU	212	912	1,948	2,778	3,538	4,188
Total Water Management Strategies	***439***	***1,345***	***2,454***	***3,365***	***4,214***	***4,960***
De Soto Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-89
Double Oak

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**	**3,000**
Projected Water Demand						
Municipal Demand	558	547	539	534	533	533
Total Projected Water Demand	***558***	***547***	***539***	***534***	***533***	***533***
Currently Available Water Supplies						
Groundwater (thru Cross Timbers WSC)	325	325	325	325	325	325
UTRWD (thru Cross Timbers WSC)	233	199	170	151	146	128
Total Current Supplies	***558***	***524***	***495***	***476***	***471***	***453***
Need (Demand - Current Supply)	***0***	***23***	***44***	***58***	***62***	***80***
Water Management Strategies						
Water Conservation	10	15	16	18	20	21
Additional Water from Cross Timbers WSC	0	40	92	138	172	189
Total Water Management Strategies	***10***	***55***	***108***	***156***	***192***	***210***
Double Oak Reserve (Shortage)	10	32	64	98	130	130

Table C-90
Duncanville

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**42,927**	**47,106**	**47,106**	**47,106**	**47,106**	**47,106**
Projected Water Demand						
Municipal Demand	6,065	6,437	6,295	6,218	6,204	6,203
Total Projected Demand	***6,065***	***6,437***	***6,295***	***6,218***	***6,204***	***6,203***
Currently Available Water Supplies						
Dallas Water Utilities	5,783	5,582	4,875	4,439	4,143	3,946
Total Current Supplies	***5,783***	***5,582***	***4,875***	***4,439***	***4,143***	***3,946***
Need (Demand - Current Supply)	***282***	***855***	***1,420***	***1,779***	***2,061***	***2,257***
Water Management Strategies						
Water Conservation	51	73	63	83	103	124
Additional Water from DWU	231	782	1,357	1,696	1,958	2,133
Total Water Management Strategies	***282***	***855***	***1,420***	***1,779***	***2,061***	***2,257***
Duncanville Reserve (Shortage)	0	0	0	0	0	0

Table C-91
East Fork Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	4,684	6,151	7,785	9,533	11,423	13,447
Collin County Other Population	5,595	7,240	8,632	13,350	18,498	25,714
Rockwall County Other Population	1,523	2,035	2,583	3,469	4,519	5,851
Total Population	**11,802**	**15,426**	**19,000**	**26,352**	**34,440**	**45,012**
Projected Water Demand						
Municipal Demand for population above	572	721	891	1,081	1,293	1,520
Collin County Other Demand	382	516	625	1,016	1,441	2,048
Rockwall County Other Demand	104	145	187	264	352	466
Total Projected Demand	***1,058***	***1,382***	***1,703***	***2,361***	***3,086***	***4,034***
Currently Available Water Supplies						
North Texas Municipal Water District	527	552	629	720	807	878
NTWMD for Collin Co Other	352	395	441	676	899	1,183
NTWMD for Rockwall Co Other	96	111	132	176	220	269
Total Current Supplies	***975***	***1,058***	***1,202***	***1,572***	***1,926***	***2,330***
Need (Demand - Current Supply)	***83***	***324***	***501***	***789***	***1,160***	***1,704***
Water Management Strategies						
Water Conservation	5	8	9	14	22	30
Water Conservation-Collin Co Other	3	6	6	14	24	41
Water Conservation-Rockwall Co Other	1	2	2	3	6	9
Additional Water from NTMWD	40	161	253	347	464	612
Add'l NTMWD for Collin Co Other	27	115	178	326	518	824
Add'l NTMWD for Rockwall Co Other	7	32	53	85	126	188
Increase delivery infrastructure from NTWMD	*74*	*308*	*483*	*758*	*1,108*	*1,624*
Total Water Management Strategies	***83***	***324***	***501***	***789***	***1,160***	***1,704***
East Fork Special Utility District Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-92
Ector

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**773**	**850**	**909**	**962**	**1,044**	**1,133**
Projected Water Demand						
Municipal Demand	87	92	96	101	109	118
Total Projected Demand	***87***	***92***	***96***	***101***	***109***	***118***
Currently Available Water Supplies						
Woodbine Aquifer	87	87	87	87	87	87
Total Current Supplies	***87***	***87***	***87***	***87***	***87***	***87***
Need (Demand - Current Supply)	***0***	***5***	***9***	***14***	***22***	***31***
Water Management Strategies						
Water Conservation	1	1	1	1	2	2
NTMWD-Fannin Co Water Supply Project	0	46	50	55	62	71
Total Water Management Strategies	***1***	***47***	***51***	***56***	***64***	***73***
Ector Reserve (Shortage)	**1**	**42**	**42**	**42**	**42**	**42**

Table C-93
Edgecliff

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,924**	**2,924**	**2,924**	**2,924**	**2,924**	**2,924**
Projected Water Demand						
Municipal Demand	503	491	480	475	474	474
Total Projected Demand	***503***	***491***	***480***	***475***	***474***	***474***
Currently Available Water Supplies						
Fort Worth (TRWD)	494	396	328	292	267	245
Total Current Supplies	***494***	***396***	***328***	***292***	***267***	***245***
Need (Demand - Current Supply)	***9***	***95***	***152***	***183***	***207***	***229***
Water Management Strategies						
Water Conservation	9	13	14	16	17	19
Additional Water from Fort Worth	0	82	138	167	190	210
Total Water Management Strategies	***9***	***95***	***152***	***183***	***207***	***229***
Edgecliff Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-94
Ellis County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**572**	**572**	**572**	**572**	**572**	**572**
Currently Available Water Supplies						
Local Supplies	3	3	3	3	3	3
Trinity Aquifer	129	129	129	129	129	129
Woodbine Aquifer	440	440	440	440	440	440
Total Current Supplies	***572***	***572***	***572***	***572***	***572***	***572***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Ellis County Irrigation Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-95
Ellis County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**905**	**905**	**905**	**905**	**905**	**905**
Currently Available Water Supplies						
Local Supplies	1,112	1,112	1,112	1,112	1,112	1,112
Woodbine Aquifer	97	97	97	97	97	97
Total Current Supplies	***1,209***	***1,209***	***1,209***	***1,209***	***1,209***	***1,209***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Ellis County Livestock Reserve (Shortage)	**304**	**304**	**304**	**304**	**304**	**304**

Table C-96
Ellis County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**5,247**	**5,403**	**5,560**	**5,716**	**5,716**	**5,716**
Currently Available Water Supplies						
Trinity Aquifer	900	900	900	900	900	900
Woodbine Aquifer	1,719	1,719	1,719	1,719	1,719	1,719
Midlothian (TRWD Sources)	164	143	119	103	89	79
Midlothian (Midlothian Sources)	94	67	52	43	35	29
Ennis (TRWD sources)	35	79	89	124	88	54
Ennis (Lake Bardwell)	490	460	366	263	160	95
Waxahachie (TRWD Sources)	565	472	356	649	619	498
Waxahachie (Lake Waxahachie)	602	524	413	323	257	200
Waxahachie (Lake Bardwell)	929	814	637	493	388	313
Waxahachie (Reuse)	749	755	736	666	553	450
Total Current Supplies	***6,248***	***5,933***	***5,388***	***5,282***	***4,808***	***4,338***
Need (Demand - Current Supply)	***0***	***0***	***172***	***434***	***908***	***1,378***
Water Management Strategies						
Water Conservation	0	6	63	88	90	90
Additional Water from Midlothian	4	60	107	140	162	178
Additional Water from Ennis	0	1	101	185	323	423
Additional Water from Waxahachie	0	0	99	111	425	781
Total Water Management Strategies	***4***	***61***	***307***	***437***	***911***	***1,381***
Ellis County Manufacturing Reserve (Shortage)	**1,005**	**592**	**135**	**3**	**3**	**3**

Table C-97
Ellis County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**147**	**213**	**164**	**123**	**82**	**55**
Currently Available Water Supplies						
Woodbine Aquifer	213	213	213	213	213	213
Total Current Supplies	***213***	***213***	***213***	***213***	***213***	***213***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Ellis County Mining Reserve (Shortage)	**66**	**0**	**49**	**90**	**131**	**158**

Table C-98
Ellis County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,100**	**6,500**	**7,177**	**27,642**	**60,016**	**105,596**
Projected Water Demand						
Municipal Demand	745	762	815	3,058	6,623	11,645
Total Projected Water Demand	***745***	***762***	***815***	***3,058***	***6,623***	***11,645***
Currently Available Water Supplies						
Rockett Special Utility District (Midlothian)	481	333	224	162	142	186
Waxahachie (Lake Waxahachie)	200	178	150	149	144	165
Waxahachie (Lake Bardwell)	309	277	231	228	218	259
Waxahachie (Reuse)	249	257	268	308	310	372
Waxahachie (TRWD)	188	160	129	300	347	411
Ennis (Lake Bardwell)	172	161	134	351	464	486
Ennis (TRWD)	12	28	33	166	256	275
Trinity Aquifer	200	200	200	200	200	200
Woodbine Aquifer	345	345	345	345	345	345
Total Current Supplies	***2,156***	***1,939***	***1,715***	***2,209***	***2,425***	***2,697***
Need (Demand - Current Supply)	***0***	***0***	***0***	***849***	***4,198***	***8,948***
Water Management Strategies						
Water Conservation	6	9	8	41	110	233
Additional Water from Rockett SUD	2,033	2,179	2,289	2,333	2,966	6,020
Additional Water from Waxhachie	0	0	34	41	215	605
Additional Water from Ennis	2	2	37	241	906	2,089
Total Water Management Strategies	***2,041***	***2,190***	***2,368***	***2,656***	***4,198***	***8,948***
Ellis County Other Reserve (Shortage)	**3,452**	**3,367**	**3,268**	**1,807**	**0**	**0**

Table C-99
Ellis County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**698**	**1,450**	**3,741**	**5,754**	**7,878**	**10,786**
Currently Available Water Supplies						
Ennis Direct Reuse	909	909	909	909	909	909
Ennis Treated Water	492	492	403	333	214	129
Midlothian	219	174	138	114	96	85
Total Current Supplies	***1,620***	***1,574***	***1,450***	***1,356***	***1,219***	***1,122***
Need (Demand - Current Supply)	***0***	***0***	***2,291***	***4,398***	***6,659***	***9,664***
Water Management Strategies						
Additional water from Midlothian	5	50	86	110	128	139
Additional Treated from Ennis	0	0	89	159	278	363
Waxahachie	0	0	2,116	4,129	4,484	4,484
Trinity River Authority Ellis Co. Reuse	0	0	0	0	2,200	4,700
Total Water Management Strategies	***5***	***51***	***2,291***	***4,398***	***7,090***	***9,687***
Ellis County Steam Electric Power Reserve (Shortage)	**927**	**175**	**0**	**0**	**431**	**23**

Table C-100
Euless

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**54,214**	**57,150**	**57,150**	**57,150**	**57,150**	**57,150**
Projected Water Demand						
Municipal Demand	8,978	9,212	9,031	8,932	8,913	8,913
Total Projected Demand	***8,978***	***9,212***	***9,031***	***8,932***	***8,913***	***8,913***
Currently Available Water Supplies						
Fort Worth Direct Reuse	368	368	368	368	368	368
Trinity Aquifer	1,211	1,211	1,211	1,211	1,211	1,211
Trinity River Authority (TRWD)	7,399	6,947	5,995	5,226	4,650	4,150
Total Current Supplies	***8,978***	***8,526***	***7,574***	***6,805***	***6,229***	***5,729***
Need (Demand - Current Supply)	***0***	***686***	***1,457***	***2,127***	***2,684***	***3,184***
Water Management Strategies						
Water Conservation	178	274	300	119	149	178
Additional Water from TRA (TRWD)	0	412	1,157	2,008	2,535	3,006
Total Water Management Strategies	***178***	***686***	***1,457***	***2,127***	***2,684***	***3,184***
Euless Reserve (Shortage)	**178**	**0**	**0**	**0**	**0**	**0**
Alternate Water Management Strategy						
Additional Water from TRA (TRWD) to replace groundwater	1,211	1,211	1,211	1,211	1,211	1,211

Table C-101
Eustace

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,100**	**1,200**	**1,300**	**1,919**	**2,500**	**3,000**
Projected Water Demand						
Municipal Demand	119	125	132	191	248	297
Total Projected Demand	***119***	***125***	***132***	***191***	***248***	***297***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	194	194	194	194	194	194
Total Current Supplies	***194***	***194***	***194***	***194***	***194***	***194***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***54***	***103***
Water Management Strategies						
Water Conservation	1	1	1	3	4	6
New well in Carrizo-Wilcox	103	103	103	103	103	103
Total Water Management Strategies	***104***	***104***	***104***	***106***	***107***	***109***
Eustace Reserve (Shortage)	**179**	**173**	**166**	**109**	**53**	**6**

Table C-102
Everman

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,286**	**6,477**	**6,600**	**6,600**	**6,600**	**6,600**
Projected Water Demand						
Municipal Demand	541	528	514	501	499	499
Total Projected Demand	***541***	***528***	***514***	***501***	***499***	***499***
Currently Available Water Supplies						
Trinity Aquifer	604	604	604	604	604	604
Total Current Supplies	***604***	***604***	***604***	***604***	***604***	***604***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	5	6	5	7	8	10
Total Water Management Strategies	***5***	***6***	***5***	***7***	***8***	***10***
Everman Reserve (Shortage)	**68**	**82**	**95**	**110**	**113**	**115**

Table C-103
Fairfield

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,232**	**3,486**	**3,662**	**7,000**	**8,000**	**10,000**
Projected Water Demand						
Municipal Demand	673	708	730	1,385	1,580	1,974
Manufacturing customers	60	71	81	90	96	102
Total Projected Demand	***733***	***779***	***811***	***1,475***	***1,676***	***2,076***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	1,192	1,181	1,171	1,162	1,104	998
Carrizo-Wilcox Aquifer for Manf	60	71	81	90	96	102
Total Current Supplies	***1,252***	***1,252***	***1,252***	***1,252***	***1,200***	***1,100***
Need (Demand - Current Supply)	***0***	***0***	***0***	***223***	***476***	***976***
Water Management Strategies						
Water Conservation	6	8	7	32	50	79
Purchase water from TRWD with New WTP	0	0	0	191	426	897
Total Water Management Strategies	***6***	***8***	***7***	***223***	***476***	***976***
Fairfield Reserve (Shortage)	**525**	**481**	**448**	**0**	**0**	**0**

Table C-104
Fairview

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**13,000**	**15,000**	**20,025**	**20,025**	**20,025**	**20,025**
Projected Water Demand						
Municipal Demand	4,644	5,329	7,094	7,087	7,084	7,083
Total Projected Demand	***4,644***	***5,329***	***7,094***	***7,087***	***7,084***	***7,083***
Currently Available Water Supplies						
North Texas Municipal Water District	4,279	4,083	5,010	4,718	4,420	4,091
Total Current Supplies	***4,279***	***4,083***	***5,010***	***4,718***	***4,420***	***4,091***
Need (Demand - Current Supply)	***365***	***1,246***	***2,084***	***2,369***	***2,664***	***2,992***
Water Management Strategies						
Water Conservation	91	145	219	243	266	290
Additional Water from NTMWD	274	1,101	1,865	2,126	2,398	2,702
Total Water Management Strategies	***365***	***1,246***	***2,084***	***2,369***	***2,664***	***2,992***
Fairview Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-105
Fannin County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**8,301**	**8,301**	**8,301**	**8,301**	**8,301**	**8,301**
Currently Available Water Supplies						
Red River (Run-of-River)	4,613	4,613	4,613	4,613	4,613	4,613
Other Aquifer	2,909	2,909	2,909	2,909	2,909	2,909
Woodbine Aquifer	780	780	780	780	780	780
Total Current Supplies	***8,302***	***8,302***	***8,302***	***8,302***	***8,302***	***8,302***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None	0	0	0	0	0	0
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Fannin County Irrigation Reserve (Shortage)	**1**	**1**	**1**	**1**	**1**	**1**

Table C-106
Fannin County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,668**	**1,668**	**1,668**	**1,668**	**1,668**	**1,668**
Currently Available Water Supplies						
Local Supplies	1,306	1,306	1,306	1,306	1,306	1,306
Other Aquifer	10	10	10	10	10	10
Trinity Aquifer	320	320	320	320	320	320
Woodbine Aquifer	32	32	32	32	32	32
Total Current Supplies	***1,668***	***1,668***	***1,668***	***1,668***	***1,668***	***1,668***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Fannin County Livestock Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-107
Fannin County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**88**	**97**	**106**	**114**	**124**	**135**
Currently Available Water Supplies						
NTMWD (Lake Bonham thru Bonham)	88	96	82	66	60	55
Total Current Supplies	***88***	***96***	***82***	***66***	***60***	***55***
Need (Demand - Current Supply)	***0***	***1***	***24***	***48***	***64***	***80***
Water Management Strategies						
Fannin County Water Supply Project	0	1	24	48	64	80
Total Water Management Strategies	***0***	***1***	***24***	***48***	***64***	***80***
Fannin County Manufacturing Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-108
Fannin County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**128**	**128**	**128**	**128**	**128**	**128**
Currently Available Water Supplies						
Run-Of-River	72	72	72	72	72	72
Total Current Supplies	***72***	***72***	***72***	***72***	***72***	***72***
Need (Demand - Current Supply)	***56***	***56***	***56***	***56***	***56***	***56***
Water Management Strategies						
NTMWD Fannin County Water Supply Project	56	56	56	56	56	56
Total Water Management Strategies	***56***	***56***	***56***	***56***	***56***	***56***
Fannin County Mining Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-109
Fannin County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**13,168**	**13,168**	**13,168**	**18,250**	**40,000**	**65,000**
Projected Water Demand						
Municipal Demand	1,466	1,411	1,364	1,846	4,010	6,503
Total Projected Water Demand	***1,466***	***1,411***	***1,364***	***1,846***	***4,010***	***6,503***
Currently Available Water Supplies						
NTMWD (Lake Bonham thru Bonham)	399	607	477	464	388	327
Run-of-river - Red River	20	20	20	20	20	20
Run-of-river - Sulphur River	49	49	49	49	49	49
Trinity Aquifer	260	260	260	260	260	260
Woodbine Aquifer	738	738	738	738	738	738
Total Current Supplies	***1,466***	***1,674***	***1,544***	***1,531***	***1,455***	***1,394***
Need (Demand - Current Supply)	***0***	***0***	***0***	***315***	***2,555***	***5,109***
Water Management Strategies						
Water Conservation	12	17	14	25	67	130
Addl'l NTWMD (via Fannin Co WSP)	0	0	123	607	2,805	5,296
Total Water Management Strategies	***12***	***17***	***137***	***632***	***2,872***	***5,426***
Fannin County Other Reserve (Shortage)	**12**	**280**	**317**	**317**	**317**	**317**

Table C-110
Fannin County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**6,363**	**11,474**	**11,910**	**12,443**	**13,092**	**13,775**
Currently Available Water Supplies						
Lake Texoma (Lumiant/Valley Lake)	6,363	6,363	6,363	6,363	6,363	6,363
Woodbine Aquifer	200	200	200	200	200	200
Total Current Supplies	***6,563***	***6,563***	***6,563***	***6,563***	***6,563***	***6,563***
Need (Demand - Current Supply)	***0***	***4,911***	***5,347***	***5,880***	***6,529***	***7,212***
Water Management Strategies						
Lake Texoma (GTUA)	0	9,000	9,000	9,000	9,000	9,000
Total Water Management Strategies	***0***	***9,000***	***9,000***	***9,000***	***9,000***	***9,000***
Fannin County Steam Electric Power Reserve (Shortage)	**200**	**4,089**	**3,653**	**3,120**	**2,471**	**1,788**

Table C-111
Farmers Branch

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**30,613**	**32,509**	**34,455**	**36,567**	**38,625**	**40,689**
Projected Water Demand						
Municipal Demand	9,041	9,458	9,911	10,457	11,031	11,618
Total Projected Demand	***9,041***	***9,458***	***9,911***	***10,457***	***11,031***	***11,618***
Currently Available Water Supplies						
Dallas Water Utilities	8,621	8,202	7,675	7,466	7,367	7,390
Total Current Supplies	***8,621***	***8,202***	***7,675***	***7,466***	***7,367***	***7,390***
Need (Demand - Current Supply)	***420***	***1,256***	***2,236***	***2,991***	***3,664***	***4,228***
Water Management Strategies						
Water Conservation	215	398	456	519	588	661
Additional Water from DWU	205	858	1,780	2,472	3,076	3,567
Total Water Management Strategies	***420***	***1,256***	***2,236***	***2,991***	***3,664***	***4,228***
Farmers Branch Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-112
Farmersville

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**8,000**	**20,000**	**20,000**	**20,000**	**20,000**	**20,000**
Projected Water Demand						
Municipal Demand	958	2,310	2,299	2,293	2,291	2,291
Total Projected Demand	***958***	***2,310***	***2,299***	***2,293***	***2,291***	***2,291***
Currently Available Water Supplies						
North Texas Municipal Water District	883	1,770	1,624	1,526	1,429	1,323
Total Current Supplies	***883***	***1,770***	***1,624***	***1,526***	***1,429***	***1,323***
Need (Demand - Current Supply)	***75***	***540***	***675***	***767***	***862***	***968***
Water Management Strategies						
Water Conservation	8	20	23	31	38	46
Additional Water from NTMWD	67	520	652	736	824	922
Total Water Management Strategies	***75***	***540***	***675***	***767***	***862***	***968***
Farmersville Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-113
Fate

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**9,825**	**14,083**	**18,924**	**23,821**	**29,290**	**45,000**
Projected Water Demand						
Municipal Demand	1,731	2,457	3,291	4,135	5,079	7,797
Total Projected Demand	***1,731***	***2,457***	***3,291***	***4,135***	***5,079***	***7,797***
Currently Available Water Supplies						
North Texas Municipal Water District	1,595	1,883	2,324	2,753	3,169	4,503
Total Current Supplies	***1,595***	***1,883***	***2,324***	***2,753***	***3,169***	***4,503***
Need (Demand - Current Supply)	***136***	***574***	***967***	***1,382***	***1,910***	***3,294***
Water Management Strategies						
Water Conservation	32	62	99	138	186	312
Additional Water from NTMWD	104	512	868	1,244	1,724	2,982
Increase delivery infrastructure from NTMWD	*0*	*0*	*0*	*0*	*390*	*2,982*
Total Water Management Strategies	***136***	***574***	***967***	***1,382***	***1,910***	***3,294***
Fate Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-114
Ferris

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,946**	**3,550**	**4,174**	**4,844**	**8,022**	**15,026**
Projected Water Demand						
Municipal Demand	461	539	622	715	1,180	2,205
Total Projected Demand	***461***	***539***	***622***	***715***	***1,180***	***2,205***
Currently Available Water Supplies						
Woodbine Aquifer	353	353	353	353	353	353
Rockett Special Utility District (TRWD and Midlothian)	76	104	121	138	252	413
Total Current Supplies	***429***	***457***	***474***	***491***	***605***	***766***
Need (Demand - Current Supply)	***32***	***82***	***148***	***224***	***575***	***1,439***
Water Management Strategies						
Water Conservation	4	6	6	10	20	44
Additional Water from Rockett SUD	28	76	142	214	555	1,395
Increase delivery infrastructure from Rockett SUD in future	*0*	*0*	*0*	*0*	*394*	*1,395*
Total Water Management Strategies	***32***	***82***	***148***	***224***	***575***	***1,439***
Ferris Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-115
Files Valley Water Supply Corporation (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Region C Population	**775**	**991**	**1,243**	**1,538**	**1,887**	**2,291**
Projected Water Demand						
Municipal Demand in Region C	119	148	182	223	272	330
Milford	66	67	69	74	80	89
Total Projected Region C Demand	***185***	***215***	***251***	***297***	***352***	***419***
Currently Available Water Supplies						
Aquilla Water Supply District (BRA - Region G)	119	148	182	223	272	330
Aquilla Water Supply District (BRA - Region G) for Milford	84	84	84	84	84	84
Total Current Supplies	***203***	***232***	***266***	***307***	***356***	***414***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***5***
Water Management Strategies						
Water Conservation	1	2	2	3	5	7
Ellis County Water Supply Project (Waxahachie from TRA from TRWD)	0	55	59	63	68	72
Total Water Management Strategies	***1***	***57***	***61***	***66***	***73***	***79***
Files Valley Water Supply Corporation (Region C Only) Reserve (Shortage)	**19**	**74**	**76**	**76**	**77**	**74**

Table C-116
Flo Community Water Supply Corporation (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Region C Population	**521**	**562**	**590**	**611**	**627**	**638**
Projected Water Demand						
Municipal Demand in Region C	40	41	41	42	43	43
Total Projected Region C Demand	***40***	***41***	***41***	***42***	***43***	***43***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	40	41	41	42	43	43
Total Current Supplies	***40***	***41***	***41***	***42***	***43***	***43***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	0	0	1	1	1
Total Water Management Strategies	***0***	***0***	***0***	***1***	***1***	***1***
Flo Community Water Supply Corporation (Region C Only) Reserve (Shortage)	**0**	**0**	**0**	**1**	**1**	**1**

Table C-117
Flower Mound

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**75,555**	**93,000**	**93,000**	**93,000**	**93,000**	**93,000**
Projected Water Demand						
Municipal Demand	19,049	23,148	23,022	22,948	22,924	22,922
Total Projected Demand	***19,049***	***23,148***	***23,022***	***22,948***	***22,924***	***22,922***
Currently Available Water Supplies						
Upper Trinity Regional Water District	10,477	11,297	8,763	6,929	6,162	5,401
Dallas Water Utilities	6,166	6,166	6,166	6,166	5,817	5,540
Total Current Supplies	***16,643***	***17,462***	***14,929***	***13,094***	***11,979***	***10,941***
Need (Demand - Current Supply)	***2,407***	***5,686***	***8,093***	***9,854***	***10,945***	***11,981***
Water Management Strategies						
Water Conservation	349	597	691	765	841	917
Additional Water from UTRWD	0	2,685	5,082	6,825	7,529	8,243
Additional Water from DWU and additional pipeline	2,249	2,404	2,320	2,264	2,574	2,822
Total Water Management Strategies	***2,598***	***5,686***	***8,093***	***9,854***	***10,945***	***11,981***
Flower Mound Reserve (Shortage)	**192**	**0**	**0**	**0**	**0**	**0**

Table C-118
Forest Hill

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**13,000**	**13,788**	**15,000**	**18,000**	**23,000**	**30,000**
Projected Water Demand						
Municipal Demand	1,362	1,381	1,448	1,703	2,164	2,817
Total Projected Demand	***1,362***	***1,381***	***1,448***	***1,703***	***2,164***	***2,817***
Currently Available Water Supplies						
Fort Worth (TRWD)	1,351	1,114	990	1,048	1,219	1,459
Total Current Supplies	***1,351***	***1,114***	***990***	***1,048***	***1,219***	***1,459***
Need (Demand - Current Supply)	***11***	***267***	***458***	***655***	***945***	***1,358***
Water Management Strategies						
Water Conservation	11	16	14	23	36	56
Additional Water from Fort Worth	0	251	444	632	909	1,302
Total Water Management Strategies	***11***	***267***	***458***	***655***	***945***	***1,358***
Forest Hill Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-119
Forney Lake Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Projected Population	**5,521**	**6,918**	**8,518**	**10,340**	**17,041**	**24,209**
Projected Water Demand						
Municipal Demand	896	1,108	1,355	1,639	2,694	3,824
Total Projected Demand	***896***	***1,108***	***1,355***	***1,639***	***2,694***	***3,824***
Currently Available Water Supplies						
North Texas Municipal Water District	825	849	957	1,091	1,681	2,208
Total Current Supplies	***825***	***849***	***957***	***1,091***	***1,681***	***2,208***
Need (Demand - Current Supply)	***71***	***259***	***398***	***548***	***1,013***	***1,616***
Water Management Strategies						
Water Conservation	16	28	41	55	99	153
Additional Water from NTMWD	55	231	357	493	914	1,463
Total Water Management Strategies	***71***	***259***	***398***	***548***	***1,013***	***1,616***
Forney Lake Water Supply Corporation Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-120
Freestone County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Projected Water Demand	**298**	**298**	**298**	**298**	**298**	**298**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	298	298	298	298	298	298
Local Supplies	87	87	87	87	87	87
Total Current Supplies	***385***	***385***	***385***	***385***	***385***	***385***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	0	0	0	1	1
Total Water Management Strategies	***0***	***0***	***0***	***0***	***1***	***1***
Freestone County Irrigation Reserve (Shortage)	**87**	**87**	**87**	**87**	**88**	**88**

Table C-121
Freestone County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,852**	**1,852**	**1,852**	**1,852**	**1,852**	**1,852**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	809	809	809	809	809	809
Local Supplies	1,043	1,043	1,043	1,043	1,043	1,043
Total Current Supplies	***1,852***	***1,852***	***1,852***	***1,852***	***1,852***	***1,852***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Freestone County Livestock Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-122
Freestone County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**100**	**111**	**121**	**130**	**136**	**142**
Currently Available Water Supplies						
Teague (Carrizo-Wilcox groundwater)	40	40	40	40	40	40
Fairfield (carrizo-Wilcox groundwater)	60	71	81	90	96	102
Total Current Supplies	***100***	***111***	***121***	***130***	***136***	***142***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Freestone County Manufacturing Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-123
Freestone County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**5,347**	**5,115**	**5,251**	**5,286**	**5,356**	**5,582**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	892	892	892	892	892	892
Local Supplies	120	120	120	120	120	120
Total Current Supplies	***1,012***	***1,012***	***1,012***	***1,012***	***1,012***	***1,012***
Need (Demand - Current Supply)	***4,335***	***4,103***	***4,239***	***4,274***	***4,344***	***4,570***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Freestone County Mining Reserve (Shortage)	**-4,335**	**-4,103**	**-4,239**	**-4,274**	**-4,344**	**-4,570**

Table C-124
Freestone County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**11,719**	**11,719**	**11,719**	**15,056**	**25,000**	**50,000**
Projected Water Demand						
Municipal Demand	1,208	1,163	1,127	1,416	2,332	4,644
Total Projected Water Demand	***1,208***	***1,163***	***1,127***	***1,416***	***2,332***	***4,644***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	848	848	848	848	848	848
Corsicana	121	75	68	76	110	189
Run-of-River local supply	41	41	41	41	41	41
Total Current Supplies	***1,010***	***964***	***957***	***965***	***999***	***1,078***
Need (Demand - Current Supply)	***198***	***199***	***170***	***451***	***1,333***	***3,566***
Water Management Strategies						
Water Conservation	10	14	11	19	39	93
Additional Water from Corsicana w/ additional delivery infrastructure	0	40	44	64	119	266
Water from TRWD with new delivery and treatment facilities	189	145	115	368	1,175	3,207
Total Water Management Strategies	***199***	***199***	***170***	***451***	***1,333***	***3,566***
Freestone County Other Reserve (Shortage)	**1**	**0**	**0**	**0**	**0**	**0**

Table C-125
Freestone County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**25,000**	**25,000**	**25,000**	**28,712**	**33,963**	**40,175**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	152	152	152	152	152	152
Lake Fairfield	870	870	870	870	870	870
Trinity River Authority (upstream diversion of Lake Livingston)	20,000	20,000	20,000	20,000	20,000	20,000
TRA (TRWD Sources)	6,726	6,122	5,411	4,781	4,264	3,806
Total Current Supplies	***27,748***	***27,144***	***26,433***	***25,803***	***25,286***	***24,828***
Need (Demand - Current Supply)	***0***	***0***	***0***	***2,909***	***8,677***	***15,347***
Water Management Strategies						
Additional Water from TRWD (current contract)	0	604	1,315	1,945	2,462	2,920
Additional Water from TRWD (New contract)	0	0	0	0	0	5,667
Trinity River Authority Reuse	0	0	0	6,760	6,760	6,760
Total Water Management Strategies	***0***	***604***	***1,315***	***8,705***	***9,222***	***15,347***
Freestone County Steam Electric Power Reserve (Shortage)	**2,748**	**2,748**	**2,748**	**5,796**	**545**	**0**

Table C-126
Frisco

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**171,326**	**225,663**	**280,000**	**280,000**	**280,000**	**280,000**
Projected Water Demand						
Municipal Demand	41,595	54,375	67,287	67,224	67,180	67,167
Manufacturing (4% Collin Co)	138	156	173	188	204	222
Collin County Irrigation	140	140	140	140	140	140
Total Projected Demand	***41,873***	***54,671***	***67,600***	***67,552***	***67,524***	***67,529***
Currently Available Water Supplies						
North Texas Municipal Water District	36,258	39,090	43,532	40,991	38,388	35,527
NTWMD (for manufacturing)	127	119	122	125	128	128
Trinity Aquifer (for Irrigation)	100	100	100	100	100	100
Woodbine Aquifer (for Irrigation)	40	40	40	40	40	40
Total Current Supplies	***36,525***	***39,349***	***43,794***	***41,256***	***38,656***	***35,795***
Need (Demand - Current Supply)	***5,348***	***15,322***	***23,806***	***26,296***	***28,868***	***31,734***
Water Management Strategies						
Water Conservation	1,730	2,645	3,572	3,793	4,015	4,238
Water Conservation - Manufacturing	0	0	4	5	6	6
Add'l Water from NTMWD for Frisco	1,367	9,280	14,533	16,790	19,127	21,752
Add'l Water from NTMWD for Manf	11	37	47	58	70	88
Direct Reuse	2,240	3,360	5,650	5,650	5,650	5,650
Total Water Management Strategies	***5,348***	***15,322***	***23,806***	***26,296***	***28,868***	***31,734***
Frisco Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-127
Frost

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**712**	**785**	**860**	**946**	**1,036**	**1,132**
Projected Water Demand						
Municipal Demand	69	72	76	82	90	98
Total Projected Demand	***69***	***72***	***76***	***82***	***90***	***98***
Currently Available Water Supplies						
Corsicana	69	47	46	44	42	40
Woodbine Aquifer	16	16	16	16	16	16
Total Current Supplies	***85***	***63***	***62***	***60***	***58***	***56***
Need (Demand - Current Supply)	***0***	***9***	***14***	***22***	***32***	***42***
Water Management Strategies						
Water Conservation	1	1	1	1	2	2
Additional water from Corsicana	0	24	29	37	46	56
Total Water Management Strategies	***1***	***25***	***30***	***38***	***48***	***58***
Frost Reserve (Shortage)	**17**	**16**	**16**	**16**	**16**	**16**

Table C-128
Garrett

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population (In City Only)	**1,032**	**1,320**	**1,656**	**2,049**	**2,514**	**6,000**
Projected Water Demand						
Municipal Demand	346	438	546	674	827	1,970
Total Projected Demand	***346***	***438***	***546***	***674***	***827***	***1,970***
Currently Available Water Supplies						
Ennis Bardwell Supply (via Community WC)	317	363	442	309	232	329
TRWD sources (via Ennis, via Community WC)	23	64	88	146	128	186
Total Current Supplies	***340***	***427***	***530***	***456***	***359***	***515***
Need (Demand - Current Supply)	***6***	***11***	***16***	***218***	***468***	***1,455***
Water Management Strategies						
Water Conservation	6	11	16	22	30	79
Add'l Ennis (direct & via Community WC)	0	0	0	196	438	1,376
Total Water Management Strategies	***6***	***11***	***16***	***218***	***468***	***1,455***
Garrett Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-129
Gastonia-Scurry Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population						
Outside of Scurry	9,508	11,910	14,663	17,830	30,000	45,000
Scurry	850	1,050	1,250	1,919	2,700	6,000
Total Population Served	**10,358**	**12,960**	**15,913**	**19,749**	**32,700**	**51,000**
Projected Water Demand						
Municipal Demand (Outside of Scurry)	640	801	986	1,199	2,017	3,025
Demand in Scurry	59	71	85	129	182	404
Talty (33%)	101	124	152	185	256	425
Total Projected Demand	***800***	***996***	***1,223***	***1,513***	***2,455***	***3,854***
Currently Available Water Supplies						
North Texas Municipal Water District	554	584	669	772	903	708
NTWMD for Scurry	54	54	60	86	114	233
NTWMD for Talty	93	95	108	123	160	246
Total Current Supplies	***701***	***733***	***837***	***981***	***1,177***	***1,187***
Need (Demand - Current Supply)	***99***	***263***	***386***	***532***	***1,278***	***2,667***
Water Management Strategies						
Water Conservation GSSUD	5	9	10	16	34	61
Water Conservation Scurry	0	1	1	2	3	8
Water Conservation Talty	1	1	2	2	4	9
Add'l Water from NTMWD for GSSUD	42	169	268	372	511	457
Add'l Water from NTMWD for Scurry	5	16	24	41	65	163
Add'l Water from NTMWD for Talty	7	28	42	60	92	170
Connect to Seagoville (DWU)	39	39	39	39	569	1,799
Total Water Management Strategies	***99***	***263***	***386***	***532***	***1,278***	***2,667***
Gastonia-Scurry Special Utility District Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-130
Glenn Heights

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population (In City Only)	**17,323**	**23,308**	**29,590**	**36,506**	**43,522**	**59,000**
Projected Water Demand						
Municipal Demand	1,897	2,479	3,107	3,810	4,533	6,136
Customer Demand (Oak Leaf)	100	110	131	207	330	413
Total Projected Demand	***1,997***	***2,589***	***3,238***	***4,017***	***4,863***	***6,549***
Currently Available Water Supplies						
Trinity Aquifer	94	94	94	94	94	94
Dallas Water Utilities for Glenn Heights	1,644	2,095	2,373	2,745	3,132	4,056
Dallas Water Utilities for Oak Leaf	95	95	101	148	220	263
Woodbine Aquifer	79	79	79	79	79	79
Total Current Supplies	***1,912***	***2,363***	***2,647***	***3,066***	***3,525***	***4,492***
Need (Demand - Current Supply)	***85***	***226***	***591***	***951***	***1,338***	***2,057***
Water Management Strategies						
Water Conservation	16	26	31	51	76	123
Water Conservation (customer)	1	2	2	3	6	9
Additional DWU for Glenn Heights	64	185	530	841	1,152	1,784
Additional DWU for Oak Leaf	4	13	28	56	104	141
Increase delivery infrastructure from DWU	*0*	*0*	*0*	*0*	*289*	*1,925*
Total Water Management Strategies	***85***	***226***	***591***	***951***	***1,338***	***2,057***
Glenn Heights Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-131
Grapevine

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**52,414**	**58,930**	**60,000**	**60,000**	**60,000**	**60,000**
Projected Water Demand						
Municipal Demand	18,467	20,509	20,725	20,641	20,624	20,623
Golf Course (Tarrant County Irrigation)	1,121	1,121	1,121	1,121	1,121	1,121
Total Projected Demand	***19,588***	***21,630***	***21,846***	***21,762***	***21,745***	***21,744***
Currently Available Water Supplies						
Dallas Water Utilities	3,402	3,409	3,141	2,823	2,608	2,461
Indirect Reuse (Purchased from DCPCMUD)	3,311	3,677	3,716	3,701	3,698	3,698
Trinity River Authority (TRWD)	10,387	10,498	9,279	8,199	7,313	6,527
Lake Grapevine*	1,983	1,950	1,917	1,883	1,850	1,817
Total Current Supplies	***19,084***	***19,535***	***18,053***	***16,606***	***15,469***	***14,503***
Need (Demand - Current Supply)	***504***	***2,095***	***3,793***	***5,156***	***6,276***	***7,241***
Water Management Strategies						
Water Conservation	339	537	622	688	756	825
Additional Water from TRA/TRWD	0	1,037	2,256	3,336	4,222	5,008
Additional Water from DWU	165	522	915	1,132	1,298	1,408
Total Water Management Strategies	***504***	***2,095***	***3,793***	***5,156***	***6,276***	***7,241***
Grapevine Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**
Alternate Water Management Strategy						
Purchase unused Lake Grapevine yield from DCPCMUD	5,000	5,000	5,000	4,980	4,841	4,692

*Lake Grapevine supply is based on Grapevine's portion of the firm yield as calculated by TCEQ WAM. It is significantly less then Grapevine's water right amount.

Table C-132
Grayson County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**2,438**	**2,654**	**2,870**	**3,086**	**3,303**	**3,519**
Currently Available Water Supplies						
Trinity Aquifer	503	503	503	503	503	503
Woodbine Aquifer	3,165	3,165	3,165	3,165	3,165	3,165
Red River Authority (Lake Texoma)	150	150	150	150	150	150
Local Supplies	1,091	1,091	1,091	1,091	1,091	1,091
Total Current Supplies	***4,909***	***4,909***	***4,909***	***4,909***	***4,909***	***4,909***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	4	9	12	16	19
Total Water Management Strategies	***0***	***4***	***9***	***12***	***16***	***19***
Grayson County Irrigation Reserve (Shortage)	**2,471**	**2,259**	**2,048**	**1,835**	**1,622**	**1,409**

Table C-133
Grayson County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,458**	**1,458**	**1,458**	**1,458**	**1,458**	**1,458**
Currently Available Water Supplies						
Trinity Aquifer	104	104	104	104	104	104
Woodbine Aquifer	360	360	360	360	360	360
Local Supplies	1,075	1,075	1,075	1,075	1,075	1,075
Total Current Supplies	***1,539***	***1,539***	***1,539***	***1,539***	***1,539***	***1,539***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Grayson County Livestock Reserve (Shortage)	**81**	**81**	**81**	**81**	**81**	**81**

Table C-134
Grayson County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**4,905**	**5,329**	**5,729**	**6,065**	**6,584**	**7,147**
Currently Available Water Supplies						
Sherman (GTUA - Lake Texoma)	3,619	3,718	3,595	3,297	2,789	2,100
Denison (Lake Randell)	736	799	859	910	988	1,072
Howe (NTMWD through GTUA)	45	41	40	40	41	41
Woodbine Aquifer	1,200	1,200	1,200	1,200	1,200	1,200
Local Supplies	30	30	30	30	30	30
Total Current Supplies	***5,630***	***5,788***	***5,724***	***5,477***	***5,048***	***4,443***
Need (Demand - Current Supply)	***0***	***0***	***5***	***588***	***1,536***	***2,704***
Water Management Strategies						
Water Conservation	0	11	122	175	187	203
Additional Howe	4	12	17	21	25	30
Additional Sherman (Grayson County Water Supply Project)	60	268	580	1,076	1,962	3,058
Total Water Management Strategies	***64***	***291***	***719***	***1,272***	***2,174***	***3,291***
Grayson County Manufacturing Reserve (Shortage)	**789**	**750**	**714**	**684**	**638**	**587**
Alternate Water Management Strategy						
Direct Reuse from Sherman	561	561	561	561	561	561

Table C-135
Grayson County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**79**	**91**	**107**	**123**	**142**	**163**
Currently Available Water Supplies						
Trinity Aquifer	22	22	22	22	22	22
Red River Authority (Lake Texoma)	100	100	100	100	100	100
Total Current Supplies	***122***	***122***	***122***	***122***	***122***	***122***
Need (Demand - Current Supply)	***0***	***0***	***0***	***1***	***20***	***41***
Water Management Strategies						
New Well in Trinity Aquifer (Red Basin)				41	41	41
Total Water Management Strategies	***0***	***0***	***0***	***41***	***41***	***41***
Grayson County Mining Reserve (Shortage)	**43**	**31**	**15**	**40**	**21**	**0**

Table C-136
Grayson County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**21,617**	**21,617**	**21,617**	**21,617**	**30,000**	**50,000**
Projected Water Demand						
Municipal Demand	2,746	2,642	2,554	2,536	3,494	5,801
Total Projected Water Demand	***2,746***	***2,642***	***2,554***	***2,536***	***3,494***	***5,801***
Currently Available Water Supplies						
Denison (Lake Randell)	60	60	60	60	60	60
Red River Authority (Lake Texoma)	641	641	641	641	641	641
Denison (Lake Texoma)	340	340	340	340	340	340
Sherman (GTUA - Lake Texoma)	2,161	2,043	1,838	1,593	1,241	1,363
Trinity Aquifer	750	750	750	750	750	750
Woodbine Aquifer	800	800	800	800	800	800
Total Current Supplies	***4,752***	***4,634***	***4,429***	***4,184***	***3,832***	***3,954***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***1,847***
Water Management Strategies						
Water Conservation	23	31	26	34	58	116
Grayson County Water Supply Project (Sherman WTP)	13	123	333	570	898	2,002
Grayson County Water Supply Project (North WTP)	0	200	300	400	500	600
Grayson County Water Supply Project (Northwest WTP)	0	560	560	560	560	560
Total Water Management Strategies	***36***	***914***	***1,219***	***1,564***	***2,016***	***3,278***
Grayson County Other Reserve (Shortage)	**2,041**	**2,905**	**3,093**	**3,211**	**2,353**	**1,430**

Table C-137
Grayson County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**6,163**	**12,711**	**12,711**	**12,711**	**12,711**	**12,711**
Currently Available Water Supplies						
Sherman (GTUA - Lake Texoma)	6,163	6,163	6,163	6,163	6,163	6,163
Total Current Supplies	***6,163***	***6,163***	***6,163***	***6,163***	***6,163***	***6,163***
Need (Demand - Current Supply)	***0***	***6,548***	***6,548***	***6,548***	***6,548***	***6,548***
Water Management Strategies						
GTUA (Lake Texoma) with pipeline	0	6,548	6,548	6,548	6,548	6,548
Total Water Management Strategies	***0***	***6,548***	***6,548***	***6,548***	***6,548***	***6,548***
Grayson County Steam Electric Power Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**
Alternate Water Management Strategy						
Direct Reuse from Sherman		4,352	4,771	5,496	6,548	6,548

Table C-138
Gun Barrel City

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population (In City Only)	**6,000**	**6,500**	**7,000**	**8,211**	**12,500**	**20,000**
Projected Water Demand						
Municipal Demand	944	996	1,053	1,222	1,852	2,957
Total Projected Demand	***944***	***996***	***1,053***	***1,222***	***1,852***	***2,957***
Currently Available Water Supplies						
TRWD through East Cedar Creek Freshwater Supply District	620	611	575	594	691	794
Total Current Supplies	***620***	***611***	***575***	***594***	***691***	***794***
Need (Demand - Current Supply)	***324***	***385***	***478***	***628***	***1,161***	***2,163***
Water Management Strategies						
Water Conservation	8	11	11	16	31	59
Additional East Cedar Creek FWSD	316	374	467	612	1,130	2,104
Total Water Management Strategies	***324***	***385***	***478***	***628***	***1,161***	***2,163***
Gun Barrel City Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-139
Gunter

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population (In City Only)	**2,200**	**3,000**	**4,000**	**5,000**	**6,000**	**7,000**
Projected Water Demand						
Municipal Demand	355	473	624	776	930	1,085
Total Projected Demand	***355***	***473***	***624***	***776***	***930***	***1,085***
Currently Available Water Supplies						
Trinity Aquifer	355	355	355	355	355	355
Total Current Supplies	***355***	***355***	***355***	***355***	***355***	***355***
Need (Demand - Current Supply)	***0***	***118***	***269***	***421***	***575***	***730***
Water Management Strategies						
Water Conservation	3	21	6	10	16	22
New wells	50	100	100	100	100	100
Grayson County Water Supply Project (Sherman WTP)	0	97	263	411	559	708
Total Water Management Strategies	***53***	***218***	***369***	***521***	***675***	***830***
Gunter Reserve (Shortage)	**53**	**100**	**100**	**100**	**100**	**100**

Table C-140
Hackberry

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population (In City Only)	**1,274**	**1,645**	**2,088**	**2,583**	**3,162**	**3,823**
Projected Water Demand						
Municipal Demand	309	394	498	615	752	908
Total Projected Demand	***309***	***394***	***498***	***615***	***752***	***908***
Currently Available Water Supplies						
North Texas Municipal Water District	285	302	352	409	469	524
Total Current Supplies	***285***	***302***	***352***	***409***	***469***	***524***
Need (Demand - Current Supply)	***24***	***92***	***146***	***206***	***283***	***384***
Water Management Strategies						
Water Conservation	6	10	15	21	28	36
Additional Water from NTMWD	18	82	131	185	255	348
Increase delivery infrastructure from NTWMD	*0*	*0*	*0*	*70*	*200*	*348*
Total Water Management Strategies	***24***	***92***	***146***	***206***	***283***	***384***
Hackberry Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-141
Haltom City

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population (In City Only)	**44,000**	**45,000**	**47,000**	**51,000**	**55,000**	**60,000**
Projected Water Demand						
Municipal Demand	5,285	5,226	5,308	5,670	6,093	6,640
Total Projected Demand	***5,285***	***5,226***	***5,308***	***5,670***	***6,093***	***6,640***
Currently Available Water Supplies						
Fort Worth (TRWD)	5,241	4,215	3,628	3,490	3,432	3,439
Total Current Supplies	***5,241***	***4,215***	***3,628***	***3,490***	***3,432***	***3,439***
Need (Demand - Current Supply)	***44***	***1,011***	***1,680***	***2,180***	***2,661***	***3,201***
Water Management Strategies						
Water Conservation	44	61	53	76	102	133
Additional Water from Fort Worth	0	950	1,627	2,104	2,559	3,068
Total Water Management Strategies	***44***	***1,011***	***1,680***	***2,180***	***2,661***	***3,201***
Haltom City Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-142
Haslet

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population (In City Only)	**1,630**	**2,000**	**2,303**	**5,000**	**7,000**	**8,000**
Projected Water Demand						
Municipal Demand	532	644	736	1,589	2,222	2,539
Total Projected Demand	***532***	***644***	***736***	***1,589***	***2,222***	***2,539***
Currently Available Water Supplies						
Fort Worth (TRWD)	465	469	460	939	1,216	1,282
Trinity Aquifer	63	63	63	63	63	63
Total Current Supplies	***528***	***532***	***523***	***1,002***	***1,279***	***1,345***
Need (Demand - Current Supply)	***4***	***112***	***213***	***587***	***943***	***1,194***
Water Management Strategies						
Water Conservation	4	17	26	72	109	133
Additional Water from Fort Worth	0	95	187	515	834	1,061
Total Water Management Strategies	***4***	***112***	***213***	***587***	***943***	***1,194***
Haslet Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-143
Heath

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**12,107**	**24,300**	**24,300**	**24,300**	**24,300**	**24,300**
Projected Water Demand						
Municipal Demand	3,945	7,839	7,826	7,818	7,816	7,815
Total Projected Demand	***3,945***	***7,839***	***7,826***	***7,818***	***7,816***	***7,815***
Currently Available Water Supplies						
North Texas Municipal Water District (through Rockwall)	3,635	6,007	5,527	5,205	4,876	4,513
Total Current Supplies	***3,635***	***6,007***	***5,527***	***5,205***	***4,876***	***4,513***
Need (Demand - Current Supply)	***310***	***1,832***	***2,299***	***2,613***	***2,940***	***3,302***
Water Management Strategies						
Water Conservation	78	217	262	288	314	340
Additional Water from NTMWD (Rockwall)	232	1,615	2,037	2,325	2,626	2,962
Total Water Management Strategies	***310***	***1,832***	***2,299***	***2,613***	***2,940***	***3,302***
Heath Reserve (Shortage)	0	0	0	0	0	0

Table C-144
Henderson County Irrigation (Region C Only)

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand in Region C	0	0	0	0	0	0
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	50	50	50	50	50	50
Direct reuse	32	32	32	32	32	32
Local supplies	415	415	415	415	415	415
Total Current Supplies	***497***	***497***	***497***	***497***	***497***	***497***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Henderson County Irrigation (Region C Only) Reserve (Shortage)	497	497	497	497	497	497

Table C-145
Henderson County Livestock (Region C Only)

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand in Region C	**490**	**490**	**490**	**490**	**490**	**490**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	13	13	13	13	13	13
Queen City Aquifer	500	500	500	500	500	500
Local Supplies	341	341	341	341	341	341
Total Current Supplies	***854***	***854***	***854***	***854***	***854***	***854***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Henderson County Livestock (Region C Only) Reserve (Shortage)	**364**	**364**	**364**	**364**	**364**	**364**

Table C-146
Henderson County Manufacturing (Region C Only)

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand in Region C	**575**	**594**	**613**	**633**	**652**	**671**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	396	396	396	396	396	396
Carrizo-Wilcox Aquifer (through Malakoff)	6	6	6	6	7	7
Athens MWA (through Athens)	345	353	346	334	240	179
Total Current Supplies	***747***	***755***	***748***	***736***	***643***	***582***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***9***	***89***
Water Management Strategies						
Additional Water from Athens WMA (through Athens)	175	172	171	167	122	92
Total Water Management Strategies	***175***	***172***	***171***	***167***	***122***	***92***
Henderson County Manufacturing (Region C Only) Reserve (Shortage)	**347**	**333**	**306**	**270**	**113**	**3**

Table C-147
Henderson County Mining (Region C Only)

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand in Region C	**607**	**607**	**607**	**607**	**607**	**607**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	425	425	425	425	425	425
Tarrant Regional Water District	182	166	146	129	115	103
Total Current Supplies	***607***	***591***	***571***	***554***	***540***	***528***
Need (Demand - Current Supply)	***0***	***16***	***36***	***53***	***67***	***79***
Water Management Strategies						
Add'l TRWD	0	16	36	53	67	79
Total Water Management Strategies	***0***	***16***	***36***	***53***	***67***	***79***
Henderson County Mining (Region C Only) Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-148
Henderson County Other (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population in Region C	**3,424**	**2,700**	**2,623**	**2,319**	**2,058**	**1,807**
Projected Water Demand in Region C						
Municipal Demand	314	233	215	189	167	147
Total Projected Water Demand	***314***	***233***	***215***	***189***	***167***	***147***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	75	75	75	75	75	75
Tarrant Regional WD (direct & thru Mabank)	239	144	113	81	58	41
Total Current Supplies	***314***	***219***	***188***	***156***	***133***	***116***
Need (Demand - Current Supply)	***0***	***14***	***27***	***33***	***34***	***31***
Water Management Strategies						
Water Conservation	3	3	2	3	3	3
Additional Water from TRWD	0	11	25	30	31	28
Total Water Management Strategies	***3***	***14***	***27***	***33***	***34***	***31***
Henderson County Other (Region C Only) Reserve (Shortage)	**3**	**0**	**0**	**0**	**0**	**0**

Table C-149
Henderson County Steam Electric Power (Region C Only)

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand in Region C	**4,000**	**7,000**	**8,000**	**9,000**	**10,000**	**11,000**
Currently Available Water Supplies						
Lake Trinidad	3,050	3,050	3,050	3,050	3,050	3,050
Total Current Supplies	***3,050***	***3,050***	***3,050***	***3,050***	***3,050***	***3,050***
Need (Demand - Current Supply)	***950***	***3,950***	***4,950***	***5,950***	***6,950***	***7,950***
Water Management Strategies						
Tarrant Regional Water District	4,500	4,500	4,950	5,950	6,950	7,950
Total Water Management Strategies	***4,500***	***4,500***	***4,950***	***5,950***	***6,950***	***7,950***
Henderson County Steam Electric Power (Region C Only) Reserve (Shortage)	**3,550**	**550**	**0**	**0**	**0**	**0**

Table C-150
Hickory Creek

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,089**	**5,110**	**6,331**	**7,941**	**7,941**	**7,941**
Projected Water Demand						
Municipal Demand	583	709	865	1,078	1,076	1,076
Total Projected Demand	***583***	***709***	***865***	***1,078***	***1,076***	***1,076***
Currently Available Water Supplies						
Lake Cities Municipal Utility Authority (Groundwater)	97	97	97	97	97	97
Lake Cities Municipal Utility Authority (UTRWD)	486	485	475	481	432	379
Total Current Supplies	***583***	***582***	***572***	***578***	***529***	***476***
Need (Demand - Current Supply)	***0***	***127***	***293***	***500***	***547***	***600***
Water Management Strategies						
Water Conservation	5	8	9	14	18	22
Add'l Water from Lake Cities MUA (UTRWD)	0	129	304	516	568	617
Total Water Management Strategies	***5***	***137***	***313***	***530***	***586***	***639***
Hickory Creek Reserve (Shortage)	**5**	**10**	**20**	**30**	**39**	**39**

Table C-151
Hickory Creek Special Utility District (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population in Region C	**4,517**	**6,474**	**9,112**	**12,741**	**17,913**	**25,413**
Projected Water Demand in Region C						
Municipal Demand	36	38	40	42	46	50
Total Projected Region C Demand	***36***	***38***	***40***	***42***	***46***	***50***
Currently Available Water Supplies						
Woodbine Aquifer in Region D	50	50	50	50	50	50
Total Current Supplies	***50***	***50***	***50***	***50***	***50***	***50***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	0	0	1	1	1
Total Water Management Strategies	***0***	***0***	***0***	***1***	***1***	***1***
Hickory Creek Special Utility District (Region C Only) Reserve (Shortage)	**14**	**12**	**10**	**9**	**5**	**1**

Table C-152
High Point Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,255**	**6,585**	**8,108**	**9,847**	**15,716**	**20,831**
Projected Water Demand						
Municipal Demand	477	569	681	817	1,298	1,718
Total Projected Demand	***477***	***569***	***681***	***817***	***1,298***	***1,718***
Currently Available Water Supplies						
Forney (NTMWD)	220	218	240	272	405	496
Terrell (NTMWD)	141	141	141	141	141	141
Total Current Supplies	***361***	***359***	***382***	***413***	***546***	***637***
Need (Demand - Current Supply)	***116***	***210***	***299***	***404***	***752***	***1,081***
Water Management Strategies						
Water Conservation	4	6	7	11	22	34
Additional Water from Forney	17	64	97	132	233	346
Additional Water from Terrell (increase contract amount)	96	141	196	262	497	701
Total Water Management Strategies	***117***	***211***	***300***	***405***	***752***	***1,081***
High Point Water Supply Corporation Reserve (Shortage)	**1**	**1**	**1**	**1**	**0**	**0**

Table C-153
Highland Park

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**9,025**	**9,313**	**9,313**	**9,313**	**9,313**	**9,313**
Projected Water Demand						
Municipal Demand	4,056	4,141	4,106	4,091	4,088	4,088
Total Projected Demand	***4,056***	***4,141***	***4,106***	***4,091***	***4,088***	***4,088***
Currently Available Water Supplies						
Dallas County Park Cities Municipal Utility District (Lake Grapevine)	4,022	4,093	4,065	4,036	4,020	4,006
Total Current Supplies	***4,022***	***4,093***	***4,065***	***4,036***	***4,020***	***4,006***
Need (Demand - Current Supply)	***34***	***48***	***41***	***55***	***68***	***82***
Water Management Strategies						
Water Conservation	34	48	41	55	68	82
Total Water Management Strategies	***34***	***48***	***41***	***55***	***68***	***82***
Highland Park Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-154
Highland Village

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**17,100**	**18,000**	**18,000**	**18,000**	**18,000**	**18,000**
Projected Water Demand						
Municipal Demand	3,832	3,968	3,924	3,899	3,893	3,893
Total Projected Demand	***3,832***	***3,968***	***3,924***	***3,899***	***3,893***	***3,893***
Currently Available Water Supplies						
Trinity Aquifer	1,347	1,347	1,347	1,347	1,347	1,347
Upper Trinity Regional Water District	2,485	2,169	1,747	1,441	1,338	1,172
Total Current Supplies	***3,832***	***3,516***	***3,094***	***2,788***	***2,685***	***2,519***
Need (Demand - Current Supply)	***0***	***452***	***830***	***1,111***	***1,208***	***1,374***
Water Management Strategies						
Water Conservation	70	105	118	130	143	156
Additional Water from UTRWD	0	482	980	1,389	1,604	1,757
Total Water Management Strategies	***70***	***587***	***1,098***	***1,519***	***1,747***	***1,913***
Highland Village Reserve (Shortage)	**70**	**135**	**268**	**408**	**539**	**539**

Table C-155
Honey Grove

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,700**	**1,800**	**1,800**	**1,800**	**1,800**	**1,800**
Projected Water Demand						
Municipal Demand	274	280	274	271	271	271
Total Projected Demand	***274***	***280***	***274***	***271***	***271***	***271***
Currently Available Water Supplies						
Woodbine Aquifer	274	274	274	274	274	274
Total Current Supplies	***274***	***274***	***274***	***274***	***274***	***274***
Need (Demand - Current Supply)	***0***	***6***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	2	3	3	4	5	5
NTMWD-Fannin Co Water Supply Project	0	185	241	237	236	236
Total Water Management Strategies	***2***	***188***	***244***	***241***	***241***	***241***
Honey Grove Reserve (Shortage)	**2**	**182**	**244**	**244**	**244**	**244**

Table C-156
Howe

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,000**	**3,500**	**4,000**	**4,500**	**5,000**	**5,500**
Projected Water Demand						
Municipal Demand	287	318	352	390	432	474
Grayson County Manufacturing	49	53	57	61	66	71
Total Projected Demand	***336***	***371***	***409***	***451***	***498***	***545***
Currently Available Water Supplies						
Woodbine Aquifer	282	282	282	282	282	282
North Texas Municipal WD (Collin-Grayson Municipal Alliance Pipeline)	5	28	49	72	94	111
North Texas MWD (Collin-Grayson MA for Grayson Co Manufacturing)	45	41	40	40	41	41
Total Current Supplies	***332***	***350***	***372***	***394***	***417***	***434***
Need (Demand - Current Supply)	***4***	***21***	***37***	***56***	***81***	***111***
Water Management Strategies						
Water Conservation	2	4	4	5	7	9
Additional Water from NTMWD (Expanded CGMA Pipeline)	0	4	17	31	49	72
Additional Water from NTMWD (Expanded CGMA Pipeline for Grayson Co Manufacturing)	4	12	17	21	25	30
Total Water Management Strategies	***6***	***21***	***37***	***57***	***81***	***111***
Howe Reserve (Shortage)	**2**	**0**	**0**	**0**	**0**	**0**
Alternate Water Management Strategy						
Grayson County Water Supply Project (Sherman WTP)	2	17	33	51	74	102

Table C-157
Hudson Oaks

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,673**	**3,684**	**4,695**	**4,808**	**4,808**	**4,808**
Projected Water Demand						
Municipal Demand	458	618	779	795	795	795
Total Projected Demand	***458***	***618***	***779***	***795***	***795***	***795***
Currently Available Water Supplies						
Trinity Aquifer	229	309	390	398	398	398
TRWD supplies (thru Weatherford)	229	281	313	245	146	132
Lake Weatherford (thru Weatherford)	106	120	128	84	55	38
Total Current Supplies	***564***	***710***	***831***	***727***	***599***	***568***
Need (Demand - Current Supply)	***0***	***0***	***0***	***69***	***197***	***228***
Water Management Strategies						
Water Conservation	9	19	27	30	33	36
Additional Water from Weatherford	0	0	0	39	164	192
Total Water Management Strategies	***9***	***19***	***27***	***69***	***197***	***228***
Hudson Oaks Reserve (Shortage)	**115**	**111**	**79**	**0**	**0**	**0**

Table C-158
Hurst

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**40,000**	**41,000**	**41,000**	**41,000**	**41,000**	**41,000**
Projected Water Demand						
Municipal Demand	6,828	6,819	6,680	6,604	6,590	6,590
Total Projected Demand	***6,828***	***6,819***	***6,680***	***6,604***	***6,590***	***6,590***
Currently Available Water Supplies						
Trinity Aquifer	816	816	816	816	816	816
Fort Worth (TRWD)	5,793	4,841	4,008	3,563	3,253	2,990
Total Current Supplies	***6,609***	***5,657***	***4,824***	***4,379***	***4,069***	***3,806***
Need (Demand - Current Supply)	***219***	***1,162***	***1,856***	***2,225***	***2,521***	***2,784***
Water Management Strategies						
Water Conservation	219	275	292	311	332	354
Additional Water from Fort Worth	0	887	1,564	1,914	2,189	2,430
Total Water Management Strategies	***219***	***1,162***	***1,856***	***2,225***	***2,521***	***2,784***
Hurst Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-159
Hutchins

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Projected Population	**9,903**	**13,922**	**17,941**	**21,960**	**25,979**	**30,000**
Projected Water Demand						
Municipal Demand	1,022	1,396	1,779	2,166	2,558	2,952
Wilmer	193	190				
Total Projected Demand	***1,215***	***1,586***	***1,779***	***2,166***	***2,558***	***2,952***
Currently Available Water Supplies						
Dallas Water Utilities	974	1,211	1,378	1,546	1,708	1,878
DWU for Customer (Wilmer)	193	190				
Total Current Supplies	***1,167***	***1,401***	***1,378***	***1,546***	***1,708***	***1,878***
Need (Demand - Current Supply)	***48***	***185***	***401***	***620***	***850***	***1,074***
Water Management Strategies						
Water Conservation	9	14	18	29	43	59
Additional Water from DWU	39	171	383	591	807	1,015
Total Water Management Strategies	***48***	***185***	***401***	***620***	***850***	***1,074***
Hutchins Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-160
Irving

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Projected Population	**260,752**	**284,500**	**284,500**	**284,500**	**284,500**	**284,500**
Projected Water Demand						
Municipal Demand	56,135	60,148	59,460	59,081	59,001	58,992
Manufacturing Demand	3,779	4,115	4,421	4,670	4,698	4,727
Total Projected Demand	***59,914***	***64,263***	***63,881***	***63,751***	***63,699***	***63,719***
Currently Available Water Supplies						
Lake Chapman for Municipal	35,084	34,568	34,083	33,655	33,447	33,239
Lake Chapman for Manufacturing	3,779	4,115	4,421	4,670	4,698	4,727
Dallas Water Utilities	4,768	4,336	3,872	3,570	3,339	3,180
Total Current Supplies	***43,631***	***43,019***	***42,376***	***41,895***	***41,484***	***41,146***
Need (Demand - Current Supply)	***16,283***	***21,244***	***21,505***	***21,856***	***22,215***	***22,573***
Water Management Strategies						
Water Conservation	1,029	1,584	1,784	1,969	2,163	2,360
Water Conservation (Manufacturing)	0	8	92	132	137	138
Lake Chapman Silt Barrier Removal	3,418	3,326	3,235	3,143	3,052	2,960
Additional Water from DWU	232	664	1,128	1,430	1,661	1,820
TRA Central Reuse Project	28,025	28,025	28,025	28,025	28,025	28,025
Total Water Management Strategies	***32,704***	***33,607***	***34,263***	***34,699***	***35,037***	***35,303***
Irving Reserve (Shortage)	**16,420**	**12,363**	**12,758**	**12,842**	**12,823**	**12,730**

Table C-161
Italy

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,386**	**3,052**	**3,828**	**4,738**	**6,000**	**8,000**
Projected Water Demand						
Municipal Demand	314	386	473	580	733	976
Total Projected Demand	***314***	***386***	***473***	***580***	***733***	***976***
Currently Available Water Supplies						
Trinity Aquifer	192	192	192	192	192	192
Woodbine Aquifer	122	122	122	122	122	122
Total Current Supplies	***314***	***314***	***314***	***314***	***314***	***314***
Need (Demand - Current Supply)	***0***	***72***	***159***	***266***	***419***	***662***
Water Management Strategies						
Water Conservation	3	4	5	8	12	20
Waxahachie (TRWD through TRA)	0	68	154	258	407	642
Total Water Management Strategies	***3***	***72***	***159***	***266***	***419***	***662***
Italy Reserve (Shortage)	**3**	**0**	**0**	**0**	**0**	**0**

Table C-162
Jack County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**101**	**101**	**101**	**101**	**101**	**101**
Currently Available Water Supplies						
Other Aquifer	55	55	55	55	55	55
Direct reuse	27	26	26	25	25	24
Local supplies (Run-of-River)	110	110	110	110	110	110
Total Current Supplies	***192***	***191***	***191***	***190***	***190***	***189***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	3	6	8	10	11
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Jack County Irrigation Reserve (Shortage)	**91**	**90**	**90**	**89**	**89**	**88**

Table C-163
Jack County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**932**	**932**	**932**	**932**	**932**	**932**
Currently Available Water Supplies						
Other Aquifer	130	130	130	130	130	130
Local Livestock Supplies	802	802	802	802	802	802
Total Current Supplies	***932***	***932***	***932***	***932***	***932***	***932***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Jack County Livestock Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-164
Jack County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**2**	**2**	**2**	**2**	**2**	**2**
Currently Available Water Supplies						
Bryson	1	1	1	1	1	1
Jacksboro (Lost Creek/Jacksboro system)	1	1	1	1	1	1
Total Current Supplies	***2***	***2***	***2***	***2***	***2***	***2***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Jack County Manufacturing Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-165
Jack County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,555**	**1,745**	**1,698**	**1,731**	**1,768**	**1,862**
Currently Available Water Supplies						
Other Aquifer	204	204	204	204	204	204
Local Supplies	370	370	370	370	370	370
Total Current Supplies	***574***	***574***	***574***	***574***	***574***	***574***
Need (Demand - Current Supply)	***981***	***1,171***	***1,124***	***1,157***	***1,194***	***1,288***
Water Management Strategies						
Jacksboro Indirect Reuse to Mining	330	342	348	351	356	359
Tarrant Regional Water District	401	579	526	556	588	679
Total Water Management Strategies	***731***	***921***	***874***	***907***	***944***	***1,038***
Jack County Mining Reserve (Shortage)	**-250**	**-250**	**-250**	**-250**	**-250**	**-250**

Table C-166
Jack County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,307**	**4,598**	**4,778**	**4,873**	**4,943**	**4,988**
Projected Water Demand in Region C						
Municipal Demand	482	495	500	502	508	512
Total Projected Water Demand	***482***	***495***	***500***	***502***	***508***	***512***
Currently Available Water Supplies						
Other Aquifer	495	495	495	495	495	495
Total Current Supplies	***495***	***495***	***495***	***495***	***495***	***495***
Need (Demand - Current Supply)	***0***	***0***	***5***	***7***	***13***	***17***
Water Management Strategies						
Water Conservation	4	6	5	7	8	10
Jacksboro (Lost Creek/Jacksboro system)	7	7	7	7	7	7
Walnut Creek SUD	48	49	49	50	50	51
Total Water Management Strategies	***59***	***62***	***61***	***64***	***65***	***68***
Jack County Other Reserve (Shortage)	**72**	**62**	**56**	**57**	**52**	**51**

Table C-167
Jack County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**2,665**	**2,879**	**3,092**	**3,305**	**3,518**	**3,745**
Currently Available Water Supplies						
Tarrant Regional Water District	2,665	2,620	2,487	2,349	2,230	2,119
Total Current Supplies	***2,665***	***2,620***	***2,487***	***2,349***	***2,230***	***2,119***
Need (Demand - Current Supply)	***0***	***259***	***605***	***956***	***1,288***	***1,626***
Water Management Strategies						
Additional Tarrant Regional WD	0	259	605	956	1,288	1,626
Total Water Management Strategies	***0***	***259***	***605***	***956***	***1,288***	***1,626***
Jack County Steam Electric Power Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-168
Jacksboro

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,863**	**5,191**	**5,395**	**5,503**	**5,581**	**5,631**
Projected Water Demand						
Municipal Demand	681	706	719	725	734	740
Jack County Other	7	7	7	7	7	7
Jack County Manufacturing	1	1	1	1	1	1
Jack County Mining (Reuse Demand)	330	342	348	351	356	359
Total Projected Demand	***1,019***	***1,056***	***1,075***	***1,084***	***1,098***	***1,107***
Currently Available Water Supplies						
Lost Creek/Jacksboro system (limited by WTP Capacity of 1.3 MGD)	734	734	734	734	734	734
Total Current Supplies	***734***	***734***	***734***	***734***	***734***	***734***
Need (Demand - Current Supply)	***285***	***322***	***341***	***350***	***364***	***373***
Water Management Strategies						
Water Conservation	6	8	7	10	12	15
Jacksboro Indirect Reuse to Mining	330	342	348	351	356	359
Total Water Management Strategies	***336***	***350***	***355***	***361***	***368***	***374***
Jacksboro Reserve (Shortage)	**51**	**28**	**14**	**11**	**4**	**1**

Table C-169
Johnson County Special Utility District (Region C &G)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**39,845**	**45,919**	**52,179**	**59,015**	**66,375**	**74,235**
Projected Water Demand						
Municipal Demand	5,134	5,735	6,389	7,155	8,027	8,970
Total Projected Region C Demand	***5,134***	***5,735***	***6,389***	***7,155***	***8,027***	***8,970***
Currently Available Water Supplies						
Mansfield (TRWD)	6,887	6,304	5,633	4,720	4,262	3,860
BRA Lake Granbury	276	304	334	368	405	444
Total Current Supplies	***7,163***	***6,608***	***5,967***	***5,088***	***4,667***	***4,304***
Need (Demand - Current Supply)	***0***	***0***	***422***	***2,067***	***3,360***	***4,666***
Water Management Strategies						
Water Conservation	2	4	4	5	7	10
Additional Supply from Mansfield	3,202	3,785	4,456	5,369	5,827	6,229
Grand Prairie (multiple sources)	6,726	6,726	6,726	6,726	6,726	6,726
Total Water Management Strategies	***9,930***	***10,515***	***11,186***	***12,100***	***12,560***	***12,965***
Available for Brazos G Region	**11,959**	**11,388**	**10,764**	**10,033**	**9,200**	**8,299**

Table C-170
Josephine (Region C and D)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,859**	**2,906**	**3,953**	**5,000**	**5,000**	**5,000**
Projected Water Demand						
Municipal Demand	278	424	573	722	722	722
Total Projected Demand	***278***	***424***	***573***	***722***	***722***	***722***
Currently Available Water Supplies						
North Texas Municipal Water District	238	299	367	427	400	370
Total Current Supplies	***238***	***299***	***367***	***427***	***400***	***370***
Need (Demand - Current Supply)	***40***	***125***	***206***	***295***	***322***	***352***
Water Management Strategies						
Water Conservation	2	4	5	9	11	13
Additional Water from NTMWD	38	121	201	286	311	339
Total Water Management Strategies	***40***	***125***	***206***	***295***	***322***	***352***
Josephine (Region C and D) Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-171
Justin

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,650**	**8,325**	**12,000**	**12,000**	**12,000**	**12,000**
Projected Water Demand						
Municipal Demand	695	1,212	1,733	1,729	1,728	1,727
Total Projected Demand	***695***	***1,212***	***1,733***	***1,729***	***1,728***	***1,727***
Currently Available Water Supplies						
Upper Trinity Regional Water District	209	610	825	677	623	546
Trinity Aquifer	242	242	242	242	242	242
Total Current Supplies	***451***	***852***	***1,067***	***920***	***865***	***788***
Need (Demand - Current Supply)	***244***	***360***	***666***	***809***	***863***	***939***
Water Management Strategies						
Water Conservation	6	12	17	23	29	35
New well	244	244	244	244	244	244
Additional Water from UTRWD	0	153	502	691	785	855
Total Water Management Strategies	***250***	***409***	***763***	***957***	***1,058***	***1,134***
Justin Reserve (Shortage)	**6**	**49**	**97**	**148**	**195**	**195**

Table C-172
Kaufman

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population In City Only)	**8,000**	**10,000**	**12,500**	**18,890**	**24,445**	**30,000**
Projected Water Demand						
Municipal Demand	990	1,184	1,442	2,151	2,777	3,406
Kaufman County Other	22	31	169	441	1,332	2,022
Total Projected Demand	***1,012***	***1,215***	***1,611***	***2,592***	***4,109***	***5,428***
Currently Available Water Supplies						
North Texas Municipal Water District	912	907	1,018	1,432	1,733	1,967
NTWMD for Kaufman Co Other	19	22	102	232	733	1,043
Total Current Supplies	***931***	***929***	***1,121***	***1,664***	***2,466***	***3,010***
Need (Demand - Current Supply)	***81***	***285***	***490***	***927***	***1,643***	***2,418***
Water Management Strategies						
Water Conservation	8	13	14	29	46	68
Additional Water from NTMWD	70	264	410	690	998	1,371
Add'l NTMWD for Kaufman Co Other	3	8	67	208	599	979
Total Water Management Strategies	***81***	***285***	***490***	***927***	***1,643***	***2,418***
Kaufman Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-173
Kaufman County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**179**	**179**	**179**	**179**	**179**	**179**
Currently Available Water Supplies						
Tarrant Regional WD (Cedar Creek)	425	387	342	302	269	240
Direct Reuse	547	650	758	758	758	758
Local Supplies	64	64	64	64	64	64
Nacatoch Aquifer	89	89	89	89	89	89
Total Current Supplies	***1,125***	***1,189***	***1,252***	***1,213***	***1,180***	***1,151***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Additional Water from TRWD	0	38	83	123	156	185
Total Water Management Strategies	***0***	***38***	***83***	***123***	***156***	***185***
Kaufman County Irrigation Reserve (Shortage)	**946**	**1,049**	**1,157**	**1,157**	**1,157**	**1,157**

Table C-174
Kaufman County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,717**	**1,717**	**1,717**	**1,717**	**1,717**	**1,717**
Currently Available Water Supplies						
Nacatoch Aquifer	100	100	100	100	100	100
Local Supplies	1,622	1,622	1,622	1,622	1,622	1,622
Total Current Supplies	***1,722***	***1,722***	***1,722***	***1,722***	***1,722***	***1,722***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Kaufman County Livestock Reserve (Shortage)	**5**	**5**	**5**	**5**	**5**	**5**

Table C-175
Kaufman County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**813**	**869**	**928**	**993**	**1,061**	**1,134**
Currently Available Water Supplies						
Trinity Aquifer	487	487	487	487	487	487
North Texas Municipal Water District (through Terrell, Forney, and Kaufman)	749	666	632	609	589	568
Total Current Supplies	***1,236***	***1,153***	***1,119***	***1,096***	***1,076***	***1,055***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***79***
Water Management Strategies						
Water Conservation	0	2	20	28	30	32
Additional water from NTMWD	64	201	276	356	442	534
Total Water Management Strategies	***64***	***203***	***296***	***384***	***472***	***566***
Kaufman County Manufacturing Reserve (Shortage)	**487**	**487**	**487**	**487**	**487**	**487**

Table C-176
Kaufman County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**296**	**386**	**491**	**646**	**783**	**951**
Currently Available Water Supplies						
Local Supplies	86	86	86	86	86	86
Trinity Aquifer	350	350	350	350	350	350
Total Current Supplies	***436***	***436***	***436***	***436***	***436***	***436***
Need (Demand - Current Supply)	***0***	***0***	***55***	***210***	***347***	***515***
Water Management Strategies						
Trinity Aquifer New wells	0	0	344	344	344	344
Connect to and Purchase water from NTMWD	0	0	0	0	3	171
Total Water Management Strategies	***0***	***0***	***344***	***344***	***347***	***515***
Kaufman County Mining Reserve (Shortage)	**140**	**50**	**289**	**134**	**0**	**0**

Table C-177
Kaufman County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**15,829**	**17,093**	**24,432**	**38,000**	**65,000**	**90,000**
Projected Water Demand						
Municipal Demand	1,742	1,835	2,565	3,949	6,730	9,310
Total Projected Water Demand	***1,742***	***1,835***	***2,565***	***3,949***	***6,730***	***9,310***
Currently Available Water Supplies						
Nacatoch Aquifer	736	736	736	736	736	736
Woodbine Aquifer	200	200	200	200	200	200
DWU (through Combine WSC thru Seagoville)	156	144	172	224	288	309
North Texas Municipal Water District	313	298	599	1,123	2,450	3,408
Tarrant Regional Water District (thru Mabank)	183	194	201	179	143	114
Total Current Supplies	***1,588***	***1,572***	***1,908***	***2,461***	***3,817***	***4,767***
Need (Demand - Current Supply)	***155***	***263***	***657***	***1,488***	***2,913***	***4,543***
Water Management Strategies						
Water Conservation	15	21	26	53	112	186
Additional Water from DWU	94	116	198	347	690	1,043
Additional Water from NTMWD	47	106	382	976	1,928	3,067
Additional Water from TRWD (thru Mabank)	0	22	52	115	189	256
Water from TRWD w/ new delivery and treatment facilities (0.8 MGD)	86	91	127	194	331	457
Total Water Management Strategies	***242***	***355***	***785***	***1,685***	***3,250***	***5,009***
Kaufman County Other Reserve (Shortage)	**87**	**92**	**128**	**197**	**337**	**466**

Table C-178
Kaufman County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**8,000**	**8,000**	**8,000**	**8,000**	**8,000**	**8,000**
Currently Available Water Supplies						
Reuse from Garland (through Forney)	8,979	8,979	8,979	8,979	8,979	8,979
NTMWD treated water (through Forney)	1,033	859	792	746	699	647
Total Current Supplies	***10,012***	***9,838***	***9,771***	***9,725***	***9,678***	***9,626***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Add'l NTMWD treated water	88	262	329	375	422	474
TRA Reuse	1,000	1,000	1,000	1,000	1,000	1,000
Total Water Management Strategies	***1,088***	***1,262***	***1,329***	***1,375***	***1,422***	***1,474***
Kaufman County Steam Electric Power Reserve (Shortage)	**3,100**	**3,100**	**3,100**	**3,100**	**3,100**	**3,100**

Table C-179
Keller

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**47,663**	**51,310**	**51,310**	**51,310**	**51,310**	**51,310**
Projected Water Demand						
Municipal Demand	12,182	12,981	12,906	12,862	12,847	12,846
Total Projected Demand	***12,182***	***12,981***	***12,906***	***12,862***	***12,847***	***12,846***
Currently Available Water Supplies						
Fort Worth (TRWD)	11,959	10,469	8,822	7,917	7,237	6,653
Total Current Supplies	***11,959***	***10,469***	***8,822***	***7,917***	***7,237***	***6,653***
Need (Demand - Current Supply)	***223***	***2,512***	***4,084***	***4,945***	***5,610***	***6,193***
Water Management Strategies						
Water Conservation	223	342	387	429	471	514
Add'l Water from Fort Worth; Expand PS & Pipeline	0	2,170	3,697	4,516	5,139	5,679
Total Water Management Strategies	***223***	***2,512***	***4,084***	***4,945***	***5,610***	***6,193***
Keller Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-180
Kemp

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,734**	**2,172**	**2,674**	**3,252**	**5,000**	**7,000**
Projected Water Demand						
Municipal Demand	308	376	456	551	845	1,182
Total Projected Demand	***308***	***376***	***456***	***551***	***845***	***1,182***
Currently Available Water Supplies						
West Cedar Creek Municipal Utility District (TRWD)	269	292	315	332	380	394
Total Current Supplies	***269***	***292***	***315***	***332***	***380***	***394***
Need (Demand - Current Supply)	***39***	***84***	***141***	***219***	***465***	***788***
Water Management Strategies						
Water Conservation	11	30	38	48	76	111
Additional Water from WCCMUD	28	54	103	171	389	677
Total Water Management Strategies	***39***	***84***	***141***	***219***	***465***	***788***
Kemp Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-181
Kennedale

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**8,000**	**9,200**	**10,824**	**11,303**	**11,626**	**11,626**
Projected Water Demand						
Municipal Demand	1,413	1,588	1,840	1,909	1,961	1,961
Tarrant County Manufacturing	102	118	135	150	162	176
Total Projected Demand	***1,515***	***1,706***	***1,975***	***2,059***	***2,123***	***2,137***
Currently Available Water Supplies						
Trinity Aquifer	1,221	1,221	1,221	1,221	1,221	1,221
Fort Worth (TRWD)	356	438	543	532	516	474
Total Current Supplies	***1,577***	***1,659***	***1,764***	***1,753***	***1,737***	***1,695***
Need (Demand - Current Supply)	***0***	***47***	***211***	***306***	***386***	***442***
Water Management Strategies						
Water Conservation	12	34	46	64	72	78
Additional Fort Worth	0	71	206	268	328	364
Increase delivery infrastructure from Ft Worth	*0*	*0*	*188*	*239*	*283*	*277*
Water from Arlington (TRWD); initial connection	280	280	280	280	280	280
Total Water Management Strategies	***292***	***385***	***532***	***612***	***680***	***722***
Kennedale Reserve (Shortage)	**354**	**338**	**321**	**306**	**294**	**280**

Table C-182
Kentucky Town Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,945**	**3,532**	**4,111**	**4,776**	**6,000**	**7,500**
Projected Water Demand						
Municipal Demand	367	424	482	554	693	865
Total Projected Demand	***367***	***424***	***482***	***554***	***693***	***865***
Currently Available Water Supplies						
Woodbine Aquifer	865	865	865	865	865	865
Total Current Supplies	***865***	***865***	***865***	***865***	***865***	***865***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	3	5	5	7	12	17
Grayson County Water Supply Project (Sherman WTP)	0	0	95	93	88	83
Total Water Management Strategies	***3***	***5***	***100***	***100***	***100***	***100***
Kentucky Town Water Supply Corporation Reserve (Shortage)	**501**	**446**	**483**	**411**	**272**	**100**

Table C-183
Kerens

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,741**	**1,919**	**2,104**	**2,314**	**2,534**	**2,768**
Projected Water Demand						
Municipal Demand	206	218	231	252	275	300
Total Projected Demand	***206***	***218***	***231***	***252***	***275***	***300***
Currently Available Water Supplies						
Corsicana	206	141	139	136	130	122
Total Current Supplies	***206***	***141***	***139***	***136***	***130***	***122***
Need (Demand - Current Supply)	***0***	***77***	***92***	***116***	***145***	***178***
Water Management Strategies						
Water Conservation	2	2	2	3	5	6
Additional Water from Corsicana	0	75	90	113	140	172
Total Water Management Strategies	***2***	***77***	***92***	***116***	***145***	***178***
Kerens Reserve (Shortage)	**2**	**0**	**0**	**0**	**0**	**0**

Table C-184
Krugerville

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,986**	**2,437**	**2,889**	**3,440**	**3,440**	**3,440**
Projected Water Demand						
Municipal Demand	263	315	368	435	434	434
Total Projected Demand	***263***	***315***	***368***	***435***	***434***	***434***
Currently Available Water Supplies						
Mustang Special Utility District (UTRWD)	262	249	225	212	189	165
Total Current Supplies	***262***	***249***	***225***	***212***	***189***	***165***
Need (Demand - Current Supply)	***1***	***66***	***143***	***223***	***245***	***269***
Water Management Strategies						
Water Conservation	2	3	4	6	7	9
Additional Water from Mustang SUD	0	63	139	217	238	260
Total Water Management Strategies	***2***	***66***	***143***	***223***	***245***	***269***
Krugerville Reserve (Shortage)	**1**	**0**	**0**	**0**	**0**	**0**

Table C-185
Krum

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,195**	**6,453**	**7,957**	**9,637**	**11,603**	**13,848**
Projected Water Demand						
Municipal Demand	1,154	1,414	1,731	2,089	2,512	2,997
Total Projected Demand	***1,154***	***1,414***	***1,731***	***2,089***	***2,512***	***2,997***
Currently Available Water Supplies						
Upper Trinity Regional Water District	707	797	843	866	973	1,037
Trinity Aquifer	448	448	448	448	448	448
Total Current Supplies	***1,155***	***1,245***	***1,291***	***1,314***	***1,421***	***1,485***
Need (Demand - Current Supply)	***0***	***169***	***440***	***775***	***1,091***	***1,512***
Water Management Strategies						
Water Conservation	21	36	52	70	92	120
Additional Water from UTRWD	0	179	478	842	1,180	1,573
Additional Groundwater (new well)	577	707	866	1,025	1,025	1,025
Total Water Management Strategies	***598***	***922***	***1,396***	***1,937***	***2,297***	***2,718***
Krum Reserve (Shortage)	**599**	**753**	**955**	**1,162**	**1,206**	**1,206**

Table C-186
Ladonia

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,600**	**2,000**	**2,200**	**2,500**	**3,000**	**3,000**
Projected Water Demand						
Municipal Demand	120	144	155	175	210	209
Total Projected Demand	***120***	***144***	***155***	***175***	***210***	***209***
Currently Available Water Supplies						
Trinity Aquifer	120	120	120	120	120	120
Total Current Supplies	***120***	***120***	***120***	***120***	***120***	***120***
Need (Demand - Current Supply)	***0***	***24***	***35***	***55***	***90***	***89***
Water Management Strategies						
Water Conservation	1	2	2	2	4	4
Upper Trinity Regional Water District (Ralph Hall Lake); Connect; WTP	0	34	57	89	134	133
Total Water Management Strategies	***1***	***36***	***59***	***91***	***138***	***137***
Ladonia Reserve (Shortage)	**1**	**12**	**24**	**36**	**48**	**48**

Table C-187
Lake Dallas

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,782**	**8,603**	**9,933**	**9,933**	**9,933**	**9,933**
Projected Water Demand						
Municipal Demand	1,096	1,181	1,339	1,329	1,326	1,326
Total Projected Demand	***1,096***	***1,181***	***1,339***	***1,329***	***1,326***	***1,326***
Currently Available Water Supplies						
Lake Cities Municipal Utility Authority (Groundwater)	182	182	182	182	182	182
Lake Cities Municipal Utility Authority (UTRWD)	913	804	736	593	533	468
Total Current Supplies	***1,095***	***986***	***917***	***774***	***715***	***650***
Need (Demand - Current Supply)	***1***	***195***	***422***	***555***	***611***	***676***
Water Management Strategies						
Water Conservation	9	13	13	18	22	27
Additional Water from Lake Cities MUA	0	200	444	591	662	722
Total Water Management Strategies	***9***	***213***	***457***	***609***	***684***	***749***
Lake Dallas Reserve (Shortage)	**8**	**18**	**36**	**55**	**73**	**73**

Table C-188
Lake Kiowa Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,209**	**2,247**	**2,286**	**2,325**	**2,363**	**2,363**
Projected Water Demand						
Municipal Demand	786	790	800	813	826	826
Total Projected Demand	***786***	***790***	***800***	***813***	***826***	***826***
Currently Available Water Supplies						
Trinity Aquifer	829	829	829	829	829	829
Total Current Supplies	***829***	***829***	***829***	***829***	***829***	***829***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	7	9	8	11	14	17
Connect to Gainesville System	0	100	100	100	100	100
Total Water Management Strategies	***7***	***109***	***108***	***111***	***114***	***117***
Lake Kiowa Special Utility District Reserve (Shortage)	**50**	**148**	**137**	**127**	**117**	**120**

Table C-189
Lake Worth

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,186**	**5,831**	**6,468**	**7,500**	**8,800**	**12,000**
Projected Water Demand						
Municipal Demand	1,137	1,248	1,363	1,567	1,836	2,501
Total Projected Demand	***1,137***	***1,248***	***1,363***	***1,567***	***1,836***	***2,501***
Currently Available Water Supplies						
Trinity Aquifer	345	345	345	345	345	345
Fort Worth (TRWD)	771	728	696	752	840	1,117
Total Current Supplies	***1,116***	***1,073***	***1,041***	***1,097***	***1,185***	***1,462***
Need (Demand - Current Supply)	***21***	***175***	***322***	***470***	***651***	***1,039***
Water Management Strategies						
Water Conservation	21	33	41	52	67	100
Additional Water from Fort Worth	0	142	281	418	584	939
Total Water Management Strategies	***21***	***175***	***322***	***470***	***651***	***1,039***
Lake Worth Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-190
Lakeside

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,350**	**1,400**	**1,450**	**1,500**	**1,500**	**1,500**
Projected Water Demand						
Municipal Demand	227	230	234	239	239	239
Total Projected Demand	***227***	***230***	***234***	***239***	***239***	***239***
Currently Available Water Supplies						
Trinity Aquifer	262	262	262	262	262	262
Total Current Supplies	***262***	***262***	***262***	***262***	***262***	***262***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	2	3	2	3	4	5
Total Water Management Strategies	***2***	***3***	***2***	***3***	***4***	***5***
Lakeside Reserve (Shortage)	**37**	**35**	**30**	**26**	**27**	**28**

Table C-191
Lakewood Village

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**692**	**870**	**1,082**	**1,319**	**1,597**	**1,914**
Projected Water Demand						
Municipal Demand	83	102	125	151	182	218
Total Projected Demand	***83***	***102***	***125***	***151***	***182***	***218***
Currently Available Water Supplies						
Woodbine Aquifer	218	218	218	218	218	218
Total Current Supplies	***218***	***218***	***218***	***218***	***218***	***218***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	2	3	4
Upper Trinity Regional Water District	0	0	0	0	49	84
Total Water Management Strategies	***1***	***1***	***1***	***2***	***52***	***88***
Lakewood Village Reserve (Shortage)	**136**	**117**	**94**	**69**	**88**	**88**

Table C-192
Lancaster

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**45,184**	**58,895**	**69,717**	**77,649**	**85,582**	**93,514**
Projected Water Demand						
Municipal Demand	7,686	9,775	11,429	12,659	13,932	15,216
Wilmer (beginning in 2020)	207	242	300	400	600	800
Total Projected Demand	***7,893***	***10,017***	***11,729***	***13,059***	***14,532***	***16,016***
Currently Available Water Supplies						
Dallas Water Utilities	7,243	8,399	8,781	8,974	9,244	9,621
Rockett Special Utility District (TRWD and Midlothian)	62	50	40	34	27	20
Total Current Supplies	***7,305***	***8,449***	***8,821***	***9,008***	***9,271***	***9,641***
Need (Demand - Current Supply)	***588***	***1,568***	***2,908***	***4,051***	***5,261***	***6,375***
Water Management Strategies						
Water Conservation	145	262	358	439	530	630
Additional DWU	208	1,024	2,200	3,156	4,068	4,875
Additional DWU for Wilmer	207	242	300	400	600	800
Additional Water from Rockett SUD	28	40	50	56	63	70
Total Water Management Strategies	***588***	***1,568***	***2,908***	***4,051***	***5,261***	***6,375***
Lancaster Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-193
Lavon

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,500**	**4,500**	**6,885**	**8,891**	**20,000**	**45,000**
Projected Water Demand						
Municipal Demand	559	711	1,081	1,392	3,125	7,025
Total Projected Demand	***559***	***711***	***1,081***	***1,392***	***3,125***	***7,025***
Currently Available Water Supplies						
North Texas MWD (Thru Lavon SUD)	515	545	763	927	1,950	4,057
Total Current Supplies	***515***	***545***	***763***	***927***	***1,950***	***4,057***
Need (Demand - Current Supply)	***44***	***166***	***318***	***465***	***1,175***	***2,968***
Water Management Strategies						
Water Conservation	10	18	32	19	52	141
Additional Water from NTMWD	34	148	286	446	1,123	2,827
Total Water Management Strategies	***44***	***166***	***318***	***465***	***1,175***	***2,968***
Lavon Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-194
Lavon Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,000**	**6,200**	**7,819**	**10,303**	**18,000**	**35,000**
Projected Water Demand						
Municipal Demand	590	711	881	1,152	2,007	3,897
Lavon	559	711	1,081	1,392	3,125	7,025
Total Projected Demand	***1,149***	***1,422***	***1,962***	***2,544***	***5,132***	***10,922***
Currently Available Water Supplies						
North Texas Municipal Water District	544	545	622	767	1,252	2,251
NTMWD for Lavon	515	545	763	927	1,950	4,057
Total Current Supplies	***1,059***	***1,090***	***1,386***	***1,694***	***3,202***	***6,308***
Need (Demand - Current Supply)	***90***	***332***	***576***	***850***	***1,930***	***4,614***
Water Management Strategies						
Water Conservation Lavon SUD	5	8	9	15	33	78
Water Conservation Lavon	10	18	32	19	52	141
Add'l Water from NTMWD Lavon SUD	41	158	250	370	722	1,568
Add'l Water from NTMWD Lavon	34	148	286	446	1,123	2,827
Total Water Management Strategies	***90***	***332***	***576***	***850***	***1,930***	***4,614***
Lavon Special Utility District Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-195
Leonard

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,213**	**2,434**	**2,602**	**2,757**	**2,991**	**3,245**
Projected Water Demand						
Municipal Demand	331	352	368	386	417	452
Total Projected Demand	***331***	***352***	***368***	***386***	***417***	***452***
Currently Available Water Supplies						
Woodbine Aquifer	331	331	331	331	331	331
Total Current Supplies	***331***	***331***	***331***	***331***	***331***	***331***
Need (Demand - Current Supply)	***0***	***21***	***37***	***55***	***86***	***121***
Water Management Strategies						
Water Conservation	3	4	4	5	7	9
Fannin Co Water Supply Project (NTMWD)	0	148	194	211	240	273
Water System Improvement needed to take delivery of water from Fannin Co WSP	*0*	*148*	*194*	*211*	*240*	*273*
Total Water Management Strategies	***3***	***152***	***198***	***216***	***247***	***282***
Leonard Reserve (Shortage)	**3**	**131**	**161**	**161**	**161**	**161**

Table C-196
Lewisville

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**107,327**	**121,924**	**139,368**	**158,857**	**177,356**	**177,356**
Projected Water Demand						
Municipal Demand	20,143	22,441	25,330	28,689	31,974	31,970
Customer Demand (Denton Co FWSD1A)	1,207	2,143	2,566	2,565	2,564	2,564
Total Projected Demand	***21,350***	***24,584***	***27,896***	***31,254***	***34,538***	***34,534***
Currently Available Water Supplies						
Dallas Water Utilities (for Lewisville)	19,207	19,442	19,340	19,551	19,718	19,718
Dallas Water Utilities (Denton Co FWSD1A)	1,151	1,857	1,959	1,748	1,581	1,581
Total Current Supplies	***20,358***	***21,299***	***21,299***	***21,299***	***21,299***	***21,299***
Need (Demand - Current Supply)	***992***	***3,285***	***6,597***	***9,955***	***13,239***	***13,235***
Water Management Strategies						
Water Conservation	382	619	799	1,004	1,228	1,334
Water Conservation (DCFWSD1A)	67	159	233	259	285	311
Additional Water from DWU with treatment improvements below	543	2,507	5,565	8,692	11,726	11,590
6 MGD WTP Expansion-2030		*1,386*	*3,363*	*3,363*	*3,363*	*3,363*
6 MGD WTP Expansion-2040			*1,081*	*3,363*	*3,363*	*3,363*
7 MGD WTP Expansion-2050				*845*	*3,879*	*3,743*
Total Water Management Strategies	***992***	***3,285***	***6,597***	***9,955***	***13,239***	***13,235***
Lewisville Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-197
Lindsay

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,102**	**1,183**	**1,245**	**1,307**	**2,500**	**5,000**
Projected Water Demand						
Municipal Demand	144	150	154	160	304	605
Total Projected Demand	***144***	***150***	***154***	***160***	***304***	***605***
Currently Available Water Supplies						
Trinity Aquifer	158	158	158	158	158	158
Total Current Supplies	***158***	***158***	***158***	***158***	***158***	***158***
Need (Demand - Current Supply)	***0***	***0***	***0***	***2***	***146***	***447***
Water Management Strategies						
Water Conservation	1	2	2	2	5	12
Connect to Gainesville System	0	0	0	0	141	435
Total Water Management Strategies	***1***	***2***	***2***	***2***	***146***	***447***
Lindsay Reserve (Shortage)	**15**	**10**	**6**	**0**	**0**	**0**

Table C-198
Little Elm

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population-Little Elm	**29,860**	**33,821**	**33,821**	**33,821**	**33,821**	**33,821**
Projected Population-Customers	**14,390**	**14,390**	**14,390**	**14,390**	**14,390**	**14,390**
Projected Water Demand						
Municipal Demand	4,108	4,600	4,586	4,574	4,564	4,564
Denton County Other (partial)	1,800	1,800	1,800	1,800	1,800	1,800
Total Projected Demand	***5,908***	***6,400***	***6,386***	***6,374***	***6,364***	***6,364***
Currently Available Water Supplies						
North Texas Municipal Water District	3,785	3,525	3,239	3,045	2,847	2,636
NTWMD for Denton Co Other	1,658	1,379	1,271	1,198	1,123	1,040
Total Current Supplies	***5,443***	***4,904***	***4,510***	***4,243***	***3,970***	***3,675***
Need (Demand - Current Supply)	***465***	***1,496***	***1,876***	***2,131***	***2,394***	***2,689***
Water Management Strategies						
Water Conservation	34	51	46	61	76	91
Water Conservation (customer)	8	12	8	9	9	11
Add'l Water from NTMWD	289	1,024	1,301	1,468	1,641	1,837
Add'l Water from NTMWD for Denton Co Other	134	409	521	593	668	749
Total Water Management Strategies	***465***	***1,496***	***1,876***	***2,131***	***2,394***	***2,689***
Little Elm Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-199
Log Cabin

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**777**	**834**	**882**	**946**	**1,000**	**1,054**
Projected Water Demand						
Municipal Demand	80	82	84	89	93	98
Total Projected Demand	***80***	***82***	***84***	***89***	***93***	***98***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	98	98	98	98	98	98
Total Current Supplies	***98***	***98***	***98***	***98***	***98***	***98***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	1	2	2
Total Water Management Strategies	***1***	***1***	***1***	***1***	***2***	***2***
Log Cabin Reserve (Shortage)	**19**	**17**	**15**	**10**	**7**	**2**

Table C-200
Lowry Crossing

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,040**	**2,446**	**3,000**	**3,000**	**3,000**	**3,000**
Projected Water Demand						
Municipal Demand	222	257	308	306	305	305
Total Projected Demand	***222***	***257***	***308***	***306***	***305***	***305***
Currently Available Water Supplies						
Milligan WSC (NTMWD)	205	197	218	204	190	176
Total Current Supplies	***205***	***197***	***218***	***204***	***190***	***176***
Need (Demand - Current Supply)	***17***	***60***	***90***	***102***	***115***	***129***
Water Management Strategies						
Water Conservation	2	3	3	4	5	6
Additional Water from Milligan WSC	15	57	87	98	110	123
Total Water Management Strategies	***17***	***60***	***90***	***102***	***115***	***129***
Lowry Crossing Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-201
Lucas

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,200**	**8,200**	**10,857**	**12,131**	**13,406**	**13,406**
Projected Water Demand						
Municipal Demand	2,132	2,406	3,165	3,528	3,896	3,896
Total Projected Demand	***2,132***	***2,406***	***3,165***	***3,528***	***3,896***	***3,896***
Currently Available Water Supplies						
North Texas Municipal Water District	1,964	1,844	2,235	2,349	2,431	2,250
Total Current Supplies	***1,964***	***1,844***	***2,235***	***2,349***	***2,431***	***2,250***
Need (Demand - Current Supply)	***168***	***562***	***930***	***1,179***	***1,465***	***1,646***
Water Management Strategies						
Water Conservation	82	204	281	325	373	386
Additional Water from NTMWD	86	358	649	854	1,092	1,260
Total Water Management Strategies	***168***	***562***	***930***	***1,179***	***1,465***	***1,646***
Lucas Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-202
Luella Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,800**	**4,380**	**4,952**	**5,609**	**6,306**	**7,055**
Projected Water Demand						
Municipal Demand	400	444	490	548	614	687
Total Projected Demand	***400***	***444***	***490***	***548***	***614***	***687***
Currently Available Water Supplies						
Woodbine Aquifer	687	687	687	687	687	687
Total Current Supplies	***687***	***687***	***687***	***687***	***687***	***687***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	3	5	5	7	10	14
Grayson County Water Supply Project (Sherman WTP)	0	0	195	193	290	286
Total Water Management Strategies	***3***	***5***	***200***	***200***	***300***	***300***
Luella Special Utility District Reserve (Shortage)	**290**	**248**	**397**	**339**	**373**	**300**

Table C-203
Mabank

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population (In-city only)	**3,950**	**4,600**	**5,250**	**7,396**	**11,000**	**16,000**
Projected Water Demand						
Municipal Demand	783	896	1,012	1,417	2,103	3,056
Customer Demand (Henderson, Kaufman, & Van Zandt County Other)	410	483	556	636	710	789
Total Projected Demand	***1,193***	***1,379***	***1,568***	***2,053***	***2,813***	***3,845***
Currently Available Water Supplies						
Tarrant Regional Water District, limited to WTP Capacity	783	805	805	862	908	946
TRWD for Customers, limited to WTP capacity	410	450	457	427	381	343
Total Current Supplies	***1,193***	***1,255***	***1,261***	***1,289***	***1,289***	***1,289***
Need (Demand - Current Supply)	***0***	***124***	***307***	***764***	***1,524***	***2,556***
Water Management Strategies						
Water Conservation	14	23	30	47	77	122
Additional Raw Water Needed from TRWD with treatment as below:	0	101	277	717	1,447	2,434
2 MGD WTP Expansion		*67*	*249*	*717*	*1,121*	*1,121*
3 MGD WTP Expansion					*326*	*1,313*
Increase delivery infrastructure from Cedar Creek Lake		*67*	*249*	*717*	*1,447*	*2,434*
Total Water Management Strategies	***14***	***124***	***307***	***764***	***1,524***	***2,556***
Mabank Reserve (Shortage)	**14**	**0**	**0**	**0**	**0**	**0**

Table C-204
MacBee Special Utility District (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population in Region C	**266**	**333**	**410**	**498**	**601**	**719**
Projected Water Demand in Region C						
Municipal Demand	18	23	28	34	41	49
Total Projected Demand in Region C	***18***	***23***	***28***	***34***	***41***	***49***
Currently Available Water Supplies						
Sabine River Authority (Region D)	18	23	28	34	41	49
Total Current Supplies	***18***	***23***	***28***	***34***	***41***	***49***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	0	0	0	1	1
Total Water Management Strategies	***0***	***0***	***0***	***0***	***1***	***1***
MacBee Special Utility District (Region C Only) Reserve (Shortage)	**0**	**0**	**0**	**0**	**1**	**1**

Note: Water Management Strategies for MacBee SUD are covered in the Region D plan.

Table C-205
Malakoff

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,411**	**2,491**	**2,557**	**2,645**	**2,800**	**3,000**
Projected Water Demand						
Municipal Demand	272	270	268	272	287	307
Henderson Co Manufacturing Demand	6	6	6	6	7	7
Total Projected Demand	***278***	***276***	***274***	***278***	***294***	***314***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	243	243	243	243	242	242
Carrizo-Wilcox Aquifer for Manufacturing	6	6	6	6	7	7
Tarrant Regional Water District	29	25	20	21	29	37
Total Current Supplies	***278***	***274***	***269***	***270***	***278***	***286***
Need (Demand - Current Supply)	***0***	***2***	***5***	***8***	***16***	***28***
Water Management Strategies						
Water Conservation	2	3	3	4	5	6
Add'l Tarrant Regional WD	0	0	2	4	11	22
Total Water Management Strategies	***2***	***3***	***5***	***8***	***16***	***28***
Malakoff Reserve (Shortage)	**2**	**1**	**0**	**0**	**0**	**0**

Table C-206
Marilee Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,410**	**6,410**	**6,298**	**6,298**	**6,201**	**6,201**
Projected Water Demand						
Municipal Demand	946	931	904	901	886	885
Total Projected Demand	***946***	***931***	***904***	***901***	***886***	***885***
Currently Available Water Supplies						
Trinity Aquifer	946	946	946	946	946	946
Sherman	246	233	209	181	141	98
Total Current Supplies	***1,192***	***1,179***	***1,155***	***1,127***	***1,087***	***1,044***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	8	11	9	12	15	18
Additional Water from Sherman (Grayson Co WSP)	0	6	32	57	94	134
Total Water Management Strategies	***8***	***17***	***41***	***69***	***109***	***152***
Marilee Special Utility District Reserve (Shortage)	**254**	**265**	**292**	**295**	**310**	**311**

Table C-207
Maypearl

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,128**	**1,359**	**1,500**	**1,500**	**1,500**	**1,500**
Projected Water Demand						
Municipal Demand	117	135	145	143	143	143
Total Projected Demand	***117***	***135***	***145***	***143***	***143***	***143***
Currently Available Water Supplies						
Trinity Aquifer	55	55	55	55	55	55
Woodbine Aquifer	100	100	100	100	100	100
Total Current Supplies	***155***	***155***	***155***	***155***	***155***	***155***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	2	2	3
Connect to Waxahachie	116	134	144	141	141	140
Total Water Management Strategies	***117***	***135***	***145***	***143***	***143***	***143***
Maypearl Reserve (Shortage)	**155**	**155**	**155**	**155**	**155**	**155**

Table C-208
McKinney

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**156,924**	**188,628**	**274,566**	**358,000**	**358,000**	**358,000**
Projected Water Demand						
Municipal Demand	34,365	40,877	59,112	76,866	76,818	76,814
Municipal Customer Demand*	717	735	758	784	817	854
Manufacturing Demand (15% Collin Co)	518	583	648	706	766	832
Total Projected Demand	***35,600***	***42,195***	***60,518***	***78,356***	***78,401***	***78,500***
Currently Available Water Supplies						
North Texas Municipal Water District	31,661	31,322	41,748	51,171	47,927	44,361
NTMWD (for Customers)	661	563	535	522	510	493
NTMWD (for Manufacturing)	478	447	458	470	478	481
Total Current Supplies	***32,800***	***32,332***	***42,742***	***52,164***	***48,915***	***45,335***
Need (Demand - Current Supply)	***2,801***	***9,864***	***17,776***	***26,192***	***29,487***	***33,165***
Water Management Strategies						
Water Conservation	755	1,470	2,364	3,327	3,581	3,837
Water Conservation (customers)	18	23	26	29	32	35
Water Conservation (Manufacturing)	0	1	14	20	22	24
Add'l Water from NTMWD	1,949	8,085	15,000	22,368	25,310	28,616
Add'l Water from NTMWD for customers	38	149	197	233	275	326
Add'l Water from NTMWD for Manf	40	135	176	216	266	327
Total Water Management Strategies	***2,801***	***9,864***	***17,776***	***26,192***	***29,487***	***33,165***
McKinney Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

* Customer demand includes: 20% of North Collin WSC, and 561 ac-ft/yr for Melissa.

Table C-209
McLendon-Chisholm

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,739**	**2,188**	**2,698**	**3,215**	**3,792**	**4,403**
Projected Water Demand						
Municipal Demand	330	406	495	587	691	802
Total Projected Demand	***330***	***406***	***495***	***587***	***691***	***802***
Currently Available Water Supplies						
North Texas Municipal Water District (through High Point WSC and RCH WSC)	229	233	254	268	285	296
Total Current Supplies	***229***	***233***	***254***	***268***	***285***	***296***
Need (Demand - Current Supply)	***101***	***173***	***241***	***319***	***406***	***506***
Water Management Strategies						
Water Conservation	6	10	15	20	25	32
Additional Water from NTMWD	95	163	226	299	381	474
Total Water Management Strategies	***101***	***173***	***241***	***319***	***406***	***506***
McLendon-Chisholm Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-210
Melissa

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,978**	**9,790**	**13,216**	**30,000**	**50,000**	**75,000**
Projected Water Demand						
Municipal Demand	1,535	2,133	2,869	6,493	10,814	16,216
Total Projected Demand	***1,535***	***2,133***	***2,869***	***6,493***	***10,814***	***16,216***
Currently Available Water Supplies						
Woodbine Aquifer	201	201	201	201	201	201
North Texas Municipal Water District (through McKinney)	517	430	396	373	350	324
North Texas Municipal Water District (GTUA Collin-Grayson Municipal Alliance Pipeline)	712	1,051	1,488	3,815	6,271	8,925
Total Current Supplies	***1,430***	***1,681***	***2,085***	***4,390***	***6,822***	***9,450***
Need (Demand - Current Supply)	***105***	***452***	***784***	***2,103***	***3,992***	***6,766***
Water Management Strategies						
Water Conservation	47	81	122	298	532	852
Additional Water from NTMWD (thru McKinney)	44	131	165	188	211	237
Additional Water from NTMWD (GTUA CGMA Pipeline)	14	239	497	1,618	3,249	5,677
Total Water Management Strategies	***105***	***452***	***784***	***2,103***	***3,992***	***6,766***
Melissa Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-211
M-E-N Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,346**	**3,689**	**4,044**	**4,448**	**4,870**	**5,321**
Projected Water Demand						
Municipal Demand	472	508	548	597	652	712
Total Projected Demand	***472***	***508***	***548***	***597***	***652***	***712***
Currently Available Water Supplies						
Corsicana	472	329	329	321	307	290
Total Current Supplies	***472***	***329***	***329***	***321***	***307***	***290***
Need (Demand - Current Supply)	***0***	***179***	***219***	***276***	***345***	***422***
Water Management Strategies						
Water Conservation	4	6	5	8	11	14
Additional Water from Corsicana	0	173	214	268	334	408
Increase delivery infrastructure from Corsicana (Upsize Lake Halbert connection)	*0*	*173*	*214*	*268*	*334*	*408*
Total Water Management Strategies	***4***	***179***	***219***	***276***	***345***	***422***
M-E-N Water Supply Corporation Reserve (Shortage)	**4**	**0**	**0**	**0**	**0**	**0**

Table C-212
Mesquite

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**150,000**	**165,000**	**186,335**	**203,166**	**219,576**	**236,034**
Projected Water Demand						
Municipal Demand	22,344	23,858	26,361	28,441	30,667	32,947
Dallas County Manufacturing	378	412	442	467	470	473
Kaufman County Other	22	31	169	441	666	1,011
Total Projected Demand	***22,744***	***24,301***	***26,972***	***29,349***	***31,803***	***34,431***
Currently Available Water Supplies						
North Texas Municipal Water District	20,585	18,281	18,618	18,934	19,133	19,028
NTMWD for manufacturing	348	315	312	311	293	273
NTMWD for Kaufman County Other	19	22	102	232	367	521
Total Current Supplies	***20,952***	***18,618***	***19,032***	***19,477***	***19,793***	***19,822***
Need (Demand - Current Supply)	***1,792***	***5,683***	***7,940***	***9,872***	***12,010***	***14,609***
Water Management Strategies						
Water Conservation	186	271	264	379	511	659
Water Conservation (manufacturing)	0	1	9	13	14	14
Add'l Water from NTMWD	1,573	5,306	7,479	9,128	11,023	13,260
Add'l Water from NTMWD for Manf	30	96	121	143	163	186
Add'l Water from NTMWD for Kaufman Co Other	3	9	67	209	299	490
Total Water Management Strategies	***1,792***	***5,683***	***7,940***	***9,872***	***12,010***	***14,609***
Mesquite Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-213
Milford

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**775**	**835**	**905**	**987**	**1,083**	**1,195**
Projected Water Demand						
Municipal Demand	66	67	69	74	80	89
Total Projected Demand	***66***	***67***	***69***	***74***	***80***	***89***
Currently Available Water Supplies						
Woodbine Aquifer	32	32	32	32	32	32
Files Valley Water Supply Corporation (BRA/Aquilla WSC in Region G)	84	84	84	84	84	84
Total Current Supplies	***116***	***116***	***116***	***116***	***116***	***116***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	1	1	2
Total Water Management Strategies	***1***	***1***	***1***	***1***	***1***	***2***
Milford Reserve (Shortage)	**51**	**50**	**48**	**43**	**37**	**29**

Table C-214
Mineral Wells (Region C Only*)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population in Region C	**2,119**	**2,089**	**2,055**	**2,015**	**1,969**	**1,915**
Projected Water Demand in Region C						
Municipal Demand	346	332	320	310	302	294
Total Projected Demand in Region C	***346***	***332***	***320***	***310***	***302***	***294***
Currently Available Water Supplies						
Palo Pinto County WCID # 1 (Lake Palo Pinto)	346	332	320	310	302	294
Total Current Supplies	***346***	***332***	***320***	***310***	***302***	***294***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	6	9	3	4	5	6
Total Water Management Strategies	***6***	***9***	***3***	***4***	***5***	***6***
Mineral Wells (Region C Only*) Reserve (Shortage)	6	9	3	4	5	6

*The Region C portion is only that population in Parker County. Additional population for Mineral Wells is located in Region G (Palo Pinto County).

Table C-215
Mount Zion Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,985**	**2,497**	**3,080**	**3,669**	**4,327**	**5,025**
Projected Water Demand						
Municipal Demand	395	485	589	698	822	954
Total Projected Demand	***395***	***485***	***589***	***698***	***822***	***954***
Currently Available Water Supplies						
North Texas Municipal WD (thru Rockwall)	364	372	416	465	513	551
Total Current Supplies	***364***	***372***	***416***	***465***	***513***	***551***
Need (Demand - Current Supply)	***31***	***113***	***173***	***233***	***309***	***403***
Water Management Strategies						
Water Conservation	7	12	18	23	30	38
Add'l Water from NTMWD thru Rockwall	24	101	155	210	279	365
Total Water Management Strategies	***31***	***113***	***173***	***233***	***309***	***403***
Mount Zion Water Supply Corporation Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-216
Mountain Peak Special Utility District (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,272**	**9,183**	**11,355**	**13,866**	**16,782**	**20,116**
Projected Water Demand						
Municipal Demand	1,671	2,109	2,627	3,240	3,971	4,820
Total Projected Demand	***1,671***	***2,109***	***2,627***	***3,240***	***3,971***	***4,820***
Currently Available Water Supplies						
Trinity Aquifer	1,257	1,257	1,257	1,257	1,257	1,257
Midlothian	1,381	1,572	1,707	1,833	1,963	2,104
Total Current Supplies	***2,638***	***2,829***	***2,964***	***3,090***	***3,220***	***3,361***
Need (Demand - Current Supply)	***0***	***0***	***0***	***150***	***751***	***1,459***
Water Management Strategies						
Water Conservation	14	22	26	191	551	709
Additional Water from Midlothian	0	0	0	0	200	750
Woodbine Aquifer (new wells)	7	7	7	7	7	7
Total Water Management Strategies	***21***	***29***	***33***	***198***	***758***	***1,466***
Mountain Peak Special Utility District (Region C Only) Reserve (Shortage)	**988**	**749**	**370**	**48**	**7**	**7**

Table C-217
Mountain Spring Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,709**	**2,909**	**3,066**	**3,221**	**5,084**	**8,094**
Projected Water Demand						
Municipal Demand	456	480	499	520	816	1,296
Total Projected Demand	***456***	***480***	***499***	***520***	***816***	***1,296***
Currently Available Water Supplies						
Trinity Aquifer	520	520	520	520	520	520
Total Current Supplies	***520***	***520***	***520***	***520***	***520***	***520***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***296***	***776***
Water Management Strategies						
Water Conservation	4	5	5	7	14	26
Connect to Gainesville	0	0	0	0	282	750
Total Water Management Strategies	***4***	***5***	***5***	***7***	***296***	***776***
Mountain Spring Water Supply Corporation Reserve (Shortage)	**68**	**45**	**26**	**7**	**0**	**0**

Table C-218
Muenster

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,550**	**1,550**	**1,600**	**1,600**	**1,650**	**1,650**
Projected Water Demand						
Municipal Demand	266	259	261	258	265	265
Total Projected Demand	***266***	***259***	***261***	***258***	***265***	***265***
Currently Available Water Supplies						
Trinity Aquifer	283	283	283	283	283	283
Total Current Supplies	***283***	***283***	***283***	***283***	***283***	***283***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	2	3	5	7	10	11
New 0.5 MGD WTP at Muenster Lake	280	280	280	280	280	280
Total Water Management Strategies	***282***	***283***	***285***	***287***	***290***	***291***
Muenster Reserve (Shortage)	**299**	**307**	**307**	**312**	**308**	**309**
Alternate Water Management Strategy						
Connect to Gainesville	280	280	280	280	280	280

Table C-219
Murphy

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**23,000**	**23,000**	**23,000**	**23,000**	**23,000**	**23,000**
Projected Water Demand						
Municipal Demand	5,285	5,253	5,238	5,228	5,222	5,220
Total Projected Demand	***5,285***	***5,253***	***5,238***	***5,228***	***5,222***	***5,220***
Currently Available Water Supplies						
North Texas Municipal Water District	4,869	4,025	3,699	3,480	3,258	3,015
Total Current Supplies	***4,869***	***4,025***	***3,699***	***3,480***	***3,258***	***3,015***
Need (Demand - Current Supply)	***416***	***1,228***	***1,539***	***1,748***	***1,964***	***2,205***
Water Management Strategies						
Water Conservation	124	194	210	227	245	262
Additional Water from NTMWD	292	1,034	1,329	1,521	1,719	1,943
Total Water Management Strategies	***416***	***1,228***	***1,539***	***1,748***	***1,964***	***2,205***
Murphy Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-220
Navarro County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**58**	**58**	**58**	**58**	**58**	**58**
Currently Available Water Supplies						
Local Supplies	226	226	226	226	226	226
Total Current Supplies	***226***	***226***	***226***	***226***	***226***	***226***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	2	4	5	5	6
Total Water Management Strategies	***0***	***2***	***4***	***5***	***5***	***6***
Navarro County Irrigation Reserve (Shortage)	**168**	**170**	**172**	**173**	**173**	**174**

Table C-221
Navarro County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,544**	**1,544**	**1,544**	**1,544**	**1,544**	**1,544**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	9	9	9	9	9	9
Livestock Local Supply	1,603	1,603	1,603	1,603	1,603	1,603
Nacatoch Aquifer	10	10	10	10	10	10
Total Current Supplies	***1,622***	***1,622***	***1,622***	***1,622***	***1,622***	***1,622***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Navarro County Livestock Reserve (Shortage)	**78**	**78**	**78**	**78**	**78**	**78**

Table C-222
Navarro County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,114**	**1,249**	**1,384**	**1,519**	**1,654**	**1,789**
Currently Available Water Supplies						
Corsicana	1,109	806	827	814	777	727
Navarro County Other (Winkler WSC)	5	5	4	4	3	3
Total Current Supplies	***1,114***	***811***	***831***	***818***	***780***	***730***
Need (Demand - Current Supply)	***0***	***438***	***553***	***701***	***874***	***1,059***
Water Management Strategies						
Additional water from Corsicana	0	438	552	700	872	1,057
Additional water from TRWD	0	0	1	1	2	2
Total Water Management Strategies	***0***	***438***	***553***	***701***	***874***	***1,059***
Navarro County Manufacturing Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-223
Navarro County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**883**	**1,071**	**1,282**	**1,572**	**1,806**	**2,076**
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	6	6	6	6	6	6
Trinity Aquifer	1,100	1,100	1,100	1,100	1,100	1,100
Nacatoch Aquifer	970	970	970	970	970	970
Total Current Supplies	***2,076***	***2,076***	***2,076***	***2,076***	***2,076***	***2,076***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Navarro County Mining Reserve (Shortage)	**1,193**	**1,005**	**794**	**504**	**270**	**0**

Table C-224
Navarro County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,475**	**5,475**	**5,475**	**10,000**	**20,000**	**35,000**
Projected Water Demand						
Municipal Demand	623	606	593	1,061	2,110	3,685
Total Projected Water Demand	***623***	***606***	***593***	***1,061***	***2,110***	***3,685***
Currently Available Water Supplies						
Trinity Aquifer	200	200	200	200	200	200
Corsicana	374	236	214	343	597	900
Tarrant Regional Water District	54	43	34	163	411	560
Total Current Supplies	***628***	***479***	***448***	***706***	***1,208***	***1,660***
Need (Demand - Current Supply)	***0***	***127***	***145***	***355***	***902***	***2,025***
Water Management Strategies						
Water Conservation	5	7	6	14	35	74
Additional Water from Corsicana	0	124	138	286	648	1,267
Additional Water from TRWD	0	1	6	60	224	689
Total Water Management Strategies	***5***	***132***	***150***	***360***	***907***	***2,030***
Navarro County Other Reserve (Shortage)	**10**	**5**	**5**	**5**	**5**	**5**

Table C-225
Navarro County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**8,000**	**13,440**	**13,440**	**13,440**	**13,440**	**13,440**
Currently Available Water Supplies						
None	0	0	0	0	0	0
Total Current Supplies	***0***	***0***	***0***	***0***	***0***	***0***
Need (Demand - Current Supply)	***8,000***	***13,440***	***13,440***	***13,440***	***13,440***	***13,440***
Water Management Strategies						
TRWD	8,000	8,000	8,000	8,000	8,000	8,000
Corsicana	0	5,440	5,440	5,440	5,440	5,440
Total Water Management Strategies	***8,000***	***13,440***	***13,440***	***13,440***	***13,440***	***13,440***
Navarro County Steam Electric Power Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-226
Navarro Mills Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,308**	**3,648**	**3,999**	**4,398**	**4,816**	**5,261**
Projected Water Demand						
Municipal Demand	352	373	398	431	470	513
Total Projected Demand	***352***	***373***	***398***	***431***	***470***	***513***
Currently Available Water Supplies						
Corsicana	352	242	239	232	222	209
Woodbine Aquifer	205	205	205	205	205	205
Total Current Supplies	***557***	***447***	***444***	***437***	***427***	***414***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***43***	***99***
Water Management Strategies						
Water Conservation	3	4	4	6	8	10
Additional Water from Corsicana	0	127	155	193	240	294
Future New well in Woodbine Aquifer				79	79	79
Total Water Management Strategies	***3***	***131***	***159***	***278***	***327***	***383***
Navarro Mills Water Supply Corporation Reserve (Shortage)	**208**	**205**	**205**	**284**	**284**	**284**

Table C-227
Nevada

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**999**	**1,217**	**1,483**	**6,000**	**15,000**	**27,000**
Projected Water Demand						
Municipal Demand	96	112	133	528	1,316	2,368
Total Projected Demand	***96***	***112***	***133***	***528***	***1,316***	***2,368***
Currently Available Water Supplies						
Nevada WSC (NTMWD)	88	86	94	352	821	1,368
Total Current Supplies	***88***	***86***	***94***	***352***	***821***	***1,368***
Need (Demand - Current Supply)	***8***	***26***	***39***	***176***	***495***	***1,000***
Water Management Strategies						
Water Conservation	1	1	1	7	22	47
Additional Water from Nevada WSC	7	25	38	169	473	953
Total Water Management Strategies	***8***	***26***	***39***	***176***	***495***	***1,000***
Nevada Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-228
New Fairview

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,597**	**1,983**	**2,379**	**2,900**	**3,400**	**4,000**
Projected Water Demand						
Municipal Demand	163	199	236	286	334	392
Total Projected Demand	***163***	***199***	***236***	***286***	***334***	***392***
Currently Available Water Supplies						
Trinity Aquifer	163	163	163	163	163	163
Total Current Supplies	***163***	***163***	***163***	***163***	***163***	***163***
Need (Demand - Current Supply)	***0***	***36***	***73***	***123***	***171***	***229***
Water Management Strategies						
Water Conservation	1	2	2	4	6	8
Connect to Rhome (from Walnut Ck. SUD from TRWD)	0	34	71	119	165	221
Total Water Management Strategies	***1***	***36***	***73***	***123***	***171***	***229***
New Fairview Reserve (Shortage)	**1**	**0**	**0**	**0**	**0**	**0**

Table C-229
New Hope

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**770**	**962**	**1,195**	**1,445**	**1,741**	**2,077**
Projected Water Demand						
Municipal Demand	119	143	174	209	251	299
Total Projected Demand	***119***	***143***	***174***	***209***	***251***	***299***
Currently Available Water Supplies						
North Texas MWD (thru N. Collin WSC)	110	110	123	139	157	173
Total Current Supplies	***110***	***110***	***123***	***139***	***157***	***173***
Need (Demand - Current Supply)	***9***	***33***	***51***	***70***	***94***	***126***
Water Management Strategies						
Water Conservation	1	2	2	3	4	6
Additional Water from NTMWD	8	31	49	67	90	120
Total Water Management Strategies	***9***	***33***	***51***	***70***	***94***	***126***
New Hope Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-230
Newark

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,772**	**2,339**	**3,302**	**4,458**	**6,216**	**8,300**
Projected Water Demand						
Municipal Demand	195	249	345	462	643	858
Total Projected Demand	***195***	***249***	***345***	***462***	***643***	***858***
Currently Available Water Supplies						
Trinity Aquifer	195	195	195	195	195	195
Total Current Supplies	***195***	***195***	***195***	***195***	***195***	***195***
Need (Demand - Current Supply)	***0***	***54***	***150***	***267***	***448***	***663***
Water Management Strategies						
Water Conservation	2	3	3	6	11	17
Connect to Rhome (from Walnut Ck. SUD from TRWD)	0	51	147	261	437	646
Total Water Management Strategies	***2***	***54***	***150***	***267***	***448***	***663***
Newark Reserve (Shortage)	**2**	**0**	**0**	**0**	**0**	**0**

Table C-231
North Collin Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,319**	**6,086**	**7,020**	**8,019**	**9,202**	**10,544**
Projected Water Demand						
Municipal Demand	782	871	987	1,117	1,279	1,464
Customer Demand (New Hope)	119	143	174	209	251	299
Total Projected Demand	***901***	***1,014***	***1,161***	***1,326***	***1,530***	***1,763***
Currently Available Water Supplies						
North Texas MWD (part thru McKinney)	720	667	697	744	798	845
North Texas MWD (for New Hope)	110	110	123	139	157	173
Total Current Supplies	***830***	***777***	***820***	***883***	***955***	***1,018***
Need (Demand - Current Supply)	***71***	***237***	***341***	***443***	***575***	***745***
Water Management Strategies						
Water Conservation	7	10	10	15	21	29
Water Conservation (New Hope)	1	2	2	3	4	6
Add'l Water from NTMWD	55	194	280	358	460	590
Add'l Water from NTMWD for New Hope	8	31	49	67	90	120
Total Water Management Strategies	***71***	***237***	***341***	***443***	***575***	***745***
North Collin Water Supply Corporation Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-232
North Hunt Special Utility District (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population in Region C	**525**	**577**	**617**	**653**	**709**	**769**
Projected Water Demand in Region C						
Municipal Demand	36	39	42	44	48	52
Total Projected Demand in Region C	***36***	***39***	***42***	***44***	***48***	***52***
Currently Available Water Supplies						
Woodbine Aquifer	52	52	52	52	52	52
Total Current Supplies	***52***	***52***	***52***	***52***	***52***	***52***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	0	0	0	1	1	1
Total Water Management Strategies	***0***	***0***	***0***	***1***	***1***	***1***
North Hunt Special Utility District (Region C Only) Reserve (Shortage)	**16**	**13**	**10**	**9**	**5**	**1**

Table C-233
Northlake

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,500**	**17,000**	**31,010**	**43,005**	**55,000**	**55,000**
Projected Water Demand						
Municipal Demand	911	3,402	6,198	8,591	10,986	10,986
Denton Co Manufacturing Demand	14	16	18	20	22	24
Total Projected Demand	***925***	***3,418***	***6,216***	***8,611***	***11,008***	***11,010***
Currently Available Water Supplies						
Woodbine Aquifer	170	170	170	170	170	170
Fort Worth (TRWD)	160	573	906	1,141	1,341	1,233
Fort Worth (TRWD) (for Manufacturing)	14	15	14	14	14	14
Upper Trinity Regional Water District	578	1,984	2,887	3,199	3,658	3,206
Total Current Supplies	***922***	***2,742***	***3,977***	***4,524***	***5,183***	***4,622***
Need (Demand - Current Supply)	***3***	***676***	***2,239***	***4,087***	***5,825***	***6,388***
Water Management Strategies						
Water Conservation	17	78	186	286	403	439
Additional Water from Fort Worth	0	122	380	650	952	1,052
Add'l Water from Fort Worth (for Manf)	0	1	4	5	7	9
Upper Trinity Regional Water District	0	479	1,674	3,151	4,469	4,893
Total Water Management Strategies	***17***	***680***	***2,244***	***4,092***	***5,831***	***6,394***
Northlake Reserve (Shortage)	**14**	**4**	**5**	**5**	**5**	**6**

Table C-234
Oak Grove

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**800**	**1,000**	**1,200**	**1,850**	**2,500**	**5,000**
Projected Water Demand						
Municipal Demand	75	88	103	157	212	422
Total Projected Demand	***75***	***88***	***103***	***157***	***212***	***422***
Currently Available Water Supplies						
NTMWD	69	67	73	105	132	244
Total Current Supplies	***69***	***67***	***73***	***105***	***132***	***244***
Need (Demand - Current Supply)	***6***	***21***	***30***	***52***	***80***	***178***
Water Management Strategies						
Water Conservation	1	1	1	2	4	8
Additional NTMWD	5	20	29	50	76	170
Total Water Management Strategies	***6***	***21***	***30***	***52***	***80***	***178***
Oak Grove Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-235
Oak Leaf

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,350**	**1,500**	**1,750**	**2,500**	**3,700**	**4,500**
Projected Water Demand						
Municipal Demand	155	165	186	262	385	468
Total Projected Demand	***155***	***165***	***186***	***262***	***385***	***468***
Currently Available Water Supplies						
Glenn Heights (DWU)	95	95	101	148	220	263
Rockett Special Utility District (TRWD and Midlothian)	39	30	25	21	16	13
Total Current Supplies	***134***	***125***	***126***	***169***	***236***	***276***
Need (Demand - Current Supply)	***21***	***40***	***60***	***93***	***149***	***192***
Water Management Strategies						
Water Conservation	1	2	2	3	6	9
Additional Water from Glenn Heights	4	13	28	56	104	141
Additional Water from Rockett SUD	16	25	30	34	39	42
Total Water Management Strategies	***21***	***40***	***60***	***93***	***149***	***192***
Oak Leaf Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-236
Oak Point

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**8,305**	**12,586**	**16,868**	**21,149**	**25,430**	**25,430**
Projected Water Demand						
Municipal Demand	1,053	1,572	2,097	2,624	3,153	3,152
Total Projected Demand	***1,053***	***1,572***	***2,097***	***2,624***	***3,153***	***3,152***
Currently Available Water Supplies						
Mustang SUD (UTRWD)	788	1,050	1,157	1,188	1,299	1,138
Mustang SUD (Groundwater)	0	0	0	0	0	0
Trinity Aquifer	264	264	264	264	264	264
Total Current Supplies	***1,052***	***1,314***	***1,421***	***1,452***	***1,563***	***1,402***
Need (Demand - Current Supply)	***1***	***258***	***676***	***1,172***	***1,590***	***1,750***
Water Management Strategies						
Water Conservation	9	16	21	35	53	63
Additional Water from Mustang SUD	0	268	707	1,217	1,643	1,793
Total Water Management Strategies	***9***	***284***	***728***	***1,252***	***1,696***	***1,856***
Oak Point Reserve (Shortage)	**8**	**26**	**52**	**80**	**106**	**106**

Table C-237
Oakwood (Region C Only)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**40**	**43**	**45**	**47**	**48**	**49**
Projected Water Demand						
Municipal Demand	7	7	7	7	7	8
Total Projected Demand	***7***	***7***	***7***	***7***	***7***	***8***
Currently Available Water Supplies	7	7	7	7	7	8
Total Current Supplies	***7***	***7***	***7***	***7***	***7***	***8***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Oakwood (Region C Only) Reserve (Shortage)	0	0	0	0	0	0

Table C-238
Ovilla

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,525**	**5,791**	**7,249**	**8,946**	**10,917**	**20,000**
Projected Water Demand						
Municipal Demand	1,080	1,357	1,682	2,067	2,519	4,610
Total Projected Demand	***1,080***	***1,357***	***1,682***	***2,067***	***2,519***	***4,610***
Currently Available Water Supplies						
Dallas Water Utilities	1,030	1,177	1,303	1,476	1,682	2,932
Total Current Supplies	***1,030***	***1,177***	***1,303***	***1,476***	***1,682***	***2,932***
Need (Demand - Current Supply)	***50***	***180***	***379***	***591***	***837***	***1,678***
Water Management Strategies						
Water Conservation	20	35	50	69	92	184
Additional Water from DWU	30	145	329	522	745	1,494
Increase delivery infrastructure from DWU	*0*	*0*	*0*	*0*	*0*	*1,494*
Total Water Management Strategies	***50***	***180***	***379***	***591***	***837***	***1,678***
Ovilla Reserve (Shortage)	0	0	0	0	0	0

Table C-239
Palmer

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,562**	**3,276**	**4,109**	**5,086**	**6,500**	**12,000**
Projected Water Demand						
Municipal Demand	289	353	432	529	675	1,242
Total Projected Demand	***289***	***353***	***432***	***529***	***675***	***1,242***
Currently Available Water Supplies						
Rockett Special Utility District (TRWD & Midlothian)	201	198	194	201	205	277
Woodbine Aquifer	24	24	24	24	24	24
Total Current Supplies	***225***	***222***	***218***	***225***	***229***	***301***
Need (Demand - Current Supply)	***64***	***131***	***214***	***304***	***446***	***941***
Water Management Strategies						
Water Conservation	2	4	4	7	11	25
Additional Water from Rockett SUD	86	151	234	321	459	940
Increase delivery infrastructure from Rockett SUD	*10*	*72*	*151*	*245*	*387*	*940*
Total Water Management Strategies	***88***	***155***	***238***	***328***	***470***	***965***
Palmer Reserve (Shortage)	**24**	**24**	**24**	**24**	**24**	**24**

Table C-240
Paloma Creek

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**12,348**	**16,839**	**16,839**	**16,839**	**16,839**	**16,839**
Projected Water Demand						
Municipal Demand	2,562	3,472	3,470	3,468	3,465	3,464
Total Projected Demand	***2,562***	***3,472***	***3,470***	***3,468***	***3,465***	***3,464***
Currently Available Water Supplies						
UTRWD (thru Mustang SUD)	2,561	2,733	2,130	1,689	1,502	1,184
Total Current Supplies	***2,561***	***2,733***	***2,130***	***1,689***	***1,502***	***1,184***
Need (Demand - Current Supply)	***1***	***739***	***1,340***	***1,779***	***1,963***	***2,280***
Water Management Strategies						
Water Conservation	47	88	104	116	127	139
Additional Water from UTRWD	0	651	1,236	1,663	1,836	2,141
Total Water Management Strategies	***47***	***739***	***1,340***	***1,779***	***1,963***	***2,280***
Paloma Creek Reserve (Shortage)	**46**	**0**	**0**	**0**	**0**	**0**

Table C-241
Pantego

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,400**	**2,400**	**2,400**	**2,400**	**2,400**	**2,400**
Projected Water Demand						
Municipal Demand	621	610	601	596	595	595
Total Projected Demand	***621***	***610***	***601***	***596***	***595***	***595***
Currently Available Water Supplies						
Trinity Aquifer	732	732	732	732	732	732
Total Current Supplies	***732***	***732***	***732***	***732***	***732***	***732***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	5	7	6	8	10	12
Fort Worth (TRWD), Initial connection	0	27	27	26	25	24
Arlington (TRWD), Initial connection	0	27	27	26	25	24
Total Water Management Strategies	***5***	***61***	***60***	***60***	***60***	***60***
Pantego Reserve (Shortage)	**116**	**183**	**191**	**196**	**197**	**197**

Table C-242
Parker

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,000**	**16,000**	**20,000**	**20,000**	**20,000**	**20,000**
Projected Water Demand						
Municipal Demand	2,561	6,772	8,454	8,450	8,449	8,449
Total Projected Demand	***2,561***	***6,772***	***8,454***	***8,450***	***8,449***	***8,449***
Currently Available Water Supplies						
North Texas Municipal Water District	2,359	2,803	2,803	2,803	2,803	2,803
Total Current Supplies	***2,359***	***2,803***	***2,803***	***2,803***	***2,803***	***2,803***
Need (Demand - Current Supply)	***202***	***3,970***	***5,652***	***5,648***	***5,647***	***5,647***
Water Management Strategies						
Water Conservation	47	160	254	282	310	338
Additional Water from NTMWD	155	3,810	5,398	5,366	5,337	5,309
Increase delivery infrastructure from NTMWD	*0*	*3,810*	*5,398*	*5,366*	*5,337*	*5,309*
Total Water Management Strategies	***202***	***3,970***	***5,652***	***5,648***	***5,647***	***5,647***
Parker Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-243
Parker County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**490**	**490**	**490**	**490**	**490**	**490**
Currently Available Water Supplies						
Local Supplies	239	239	239	239	239	239
Direct Reuse	97	97	97	97	97	97
Trinity Aquifer	246	246	246	246	246	246
Weatherford	13	13	13	13	13	13
Total Current Supplies	***595***	***595***	***595***	***595***	***595***	***595***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None	0	0	0	0	0	0
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Parker County Irrigation Reserve (Shortage)	**105**	**105**	**105**	**105**	**105**	**105**

Table C-244
Parker County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,544**	**1,544**	**1,544**	**1,544**	**1,544**	**1,544**
Currently Available Water Supplies						
Trinity Aquifer	229	229	229	229	229	229
Local Supplies	1,922	1,922	1,922	1,922	1,922	1,922
Total Current Supplies	***2,151***	***2,151***	***2,151***	***2,151***	***2,151***	***2,151***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Parker County Livestock Reserve (Shortage)	**607**	**607**	**607**	**607**	**607**	**607**

Table C-245
Parker County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**638**	**729**	**821**	**912**	**1,004**	**1,095**
Currently Available Water Supplies						
Trinity Aquifer	84	84	84	84	84	84
Mineral Wells (Palo Pinto Co. WCID)	25	25	25	25	25	25
Weatherford (Lake Weatherford)	244	241	234	169	123	93
Weatherford (TRWD)	529	564	573	495	328	327
Walnut Creek SUD (TRWD sources)	96	99	99	97	85	71
Total Current Supplies	***978***	***1,013***	***1,015***	***870***	***645***	***600***
Need (Demand - Current Supply)	***0***	***0***	***0***	***42***	***359***	***495***
Water Management Strategies						
Water Conservation	0	1	17	25	28	31
Add'l water from Weatherford (TRWD sources)	0	55	125	288	545	634
Add'l water from Walnut Creek SUD/TRWD	0	10	21	35	60	87
Total Water Management Strategies	***0***	***66***	***163***	***348***	***633***	***752***
Parker County Manufacturing Reserve (Shortage)	**340**	**350**	**357**	**306**	**274**	**257**

Table C-246
Parker County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**3,182**	**4,029**	**4,006**	**4,073**	**4,124**	**4,364**
Currently Available Water Supplies						
Local supplies	20	20	20	20	20	20
Brazos River Authority	44	35	26	18	9	0
Trinity Aquifer	4,344	4,344	4,344	4,344	4,344	4,344
Total Current Supplies	***4,408***	***4,399***	***4,390***	***4,382***	***4,373***	***4,364***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Parker County Mining Reserve (Shortage)	**1,226**	**370**	**384**	**309**	**249**	**0**

Table C-247
Parker County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**54,108**	**54,108**	**54,108**	**75,898**	**116,910**	**181,910**
Projected Water Demand						
Municipal Demand	7,027	6,851	6,714	9,269	14,205	22,058
Total Projected Water Demand	***7,027***	***6,851***	***6,714***	***9,269***	***14,205***	***22,058***
Currently Available Water Supplies						
Trinity Aquifer	6,575	6,575	6,575	6,575	6,575	6,575
Other Aquifer	50	50	50	50	50	50
Local Supplies	33	33	33	33	33	33
Mineral Wells (Palo Pinto Co. WCID)	957	957	957	957	957	957
Walnut Creek (TRWD)	211	187	162	198	240	285
Total Current Supplies	***7,826***	***7,802***	***7,777***	***7,813***	***7,855***	***7,900***
Need (Demand - Current Supply)	***0***	***0***	***0***	***1,456***	***6,350***	***14,158***
Water Management Strategies						
Water Conservation	59	81	67	124	237	441
New wells in Trinity Aquifer	200	200	200	200	200	200
Additional Water from Weatherford	0	0	0	1,403	2,488	3,978
Water from TRWD with Water Treatment Plant	0	0	0	0	3,635	9,618
Additional Water from Walnut Creek	0	17	37	76	179	364
Total Water Management Strategies	***259***	***298***	***304***	***1,803***	***6,739***	***14,601***
Parker County Other Reserve (Shortage)	**1,058**	**1,249**	**1,367**	**347**	**389**	**443**

Table C-248
Parker County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**260**	**260**	**260**	**260**	**260**	**260**
Currently Available Water Supplies						
Weatherford	380	338	294	240	201	172
Total Current Supplies	***380***	***338***	***294***	***240***	***201***	***172***
Need (Demand - Current Supply)	***0***	***0***	***0***	***20***	***59***	***88***
Water Management Strategies						
Additional Weatherford	0	0	0	20	59	88
Total Water Management Strategies	***0***	***0***	***0***	***20***	***59***	***88***
Parker County Steam Electric Power Reserve (Shortage)	**120**	**78**	**34**	**0**	**0**	**0**

Table C-249
Parker County Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,162**	**8,161**	**10,420**	**13,069**	**16,140**	**19,687**
Projected Water Demand						
Municipal Demand	655	842	1,060	1,321	1,627	1,983
Total Projected Demand	***655***	***842***	***1,060***	***1,321***	***1,627***	***1,983***
Currently Available Water Supplies						
Mineral Wells (Reg G)	294	294	294	294	294	294
Brazos River Authority (Reg G) WTP capacity	561	561	561	561	561	561
Trinity Aquifer	36	36	36	36	36	36
Total Current Supplies	***891***	***891***	***891***	***891***	***891***	***891***
Need (Demand - Current Supply)	***0***	***0***	***170***	***431***	***737***	***1,093***
Water Management Strategies						
Water Conservation	5	9	11	18	27	40
1 MGD WTP expansion for BRA supply	540	540	540	540	540	540
Additional Groundwater (new wells)					513	513
Total Water Management Strategies	***545***	***549***	***551***	***558***	***1,080***	***1,093***
Parker County Special Utility District Reserve (Shortage)	**780**	**597**	**381**	**127**	**343**	**0**

Table C-250
Payne Springs

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**877**	**977**	**1,060**	**1,170**	**1,300**	**1,600**
Projected Water Demand						
Municipal Demand	143	155	165	181	200	246
Total Projected Demand	***143***	***155***	***165***	***181***	***200***	***246***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	101	101	101	101	101	101
East Cedar Creek FWSD (TRWD sources)	47	48	45	44	37	33
Total Current Supplies	***148***	***149***	***146***	***145***	***138***	***134***
Need (Demand - Current Supply)	***0***	***6***	***19***	***36***	***62***	***112***
Water Management Strategies						
Water Conservation	1	2	2	2	3	5
Carrizo-Wilcox Aquifer (new wells)	145	145	145	145	145	145
Additional ECCFWSD (TRWD)	23	27	35	44	60	85
Total Water Management Strategies	***169***	***174***	***182***	***191***	***208***	***235***
Payne Springs Reserve (Shortage)	**174**	**168**	**163**	**155**	**146**	**123**

Table C-251
Pecan Hill

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**801**	**1,025**	**1,286**	**1,592**	**2,000**	**3,000**
Projected Water Demand						
Municipal Demand	111	136	167	205	257	384
Total Projected Demand	***111***	***136***	***167***	***205***	***257***	***384***
Currently Available Water Supplies						
Rockett SUD (TRWD and Midlothian)	77	76	75	78	79	86
Total Current Supplies	***77***	***76***	***75***	***78***	***79***	***86***
Need (Demand - Current Supply)	***34***	***60***	***92***	***127***	***178***	***298***
Water Management Strategies						
Water Conservation	1	1	2	3	4	8
Add'l Rockett SUD	33	59	90	124	174	290
Total Water Management Strategies	***34***	***60***	***92***	***127***	***178***	***298***
Pecan Hill Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-252
Pelican Bay

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,575**	**1,605**	**1,635**	**1,664**	**1,693**	**1,721**
Projected Water Demand						
Municipal Demand	106	108	110	112	114	116
Total Projected Demand	***106***	***108***	***110***	***112***	***114***	***116***
Currently Available Water Supplies						
Trinity Aquifer	117	117	117	117	117	117
Total Current Supplies	***117***	***117***	***117***	***117***	***117***	***117***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	1	2	2
Azle (TRWD) initial connection	0	11	11	11	11	12
Total Water Management Strategies	***1***	***12***	***12***	***12***	***13***	***14***
Pelican Bay Reserve (Shortage)	**12**	**21**	**19**	**17**	**16**	**15**

Table C-253
Pilot Point

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,500**	**8,000**	**11,000**	**15,000**	**20,000**	**27,000**
Projected Water Demand						
Municipal Demand	891	1,070	1,449	1,965	2,615	3,527
Total Projected Demand	***891***	***1,070***	***1,449***	***1,965***	***2,615***	***3,527***
Currently Available Water Supplies						
Trinity Aquifer	1,102	1,102	1,102	1,102	1,102	1,102
Total Current Supplies	***1,102***	***1,102***	***1,102***	***1,102***	***1,102***	***1,102***
Need (Demand - Current Supply)	***0***	***0***	***347***	***863***	***1,513***	***2,425***
Water Management Strategies						
Water Conservation	7	12	14	26	44	71
Additional Trinity Aquifer (new wells)	269	269	269	269	269	269
Upper Trinity Regional Water District	0	0	68	715	1,481	2,366
Total Water Management Strategies	***276***	***281***	***351***	***1,010***	***1,794***	***2,706***
Pilot Point Reserve (Shortage)	**487**	**313**	**4**	**147**	**281**	**281**

Table C-254
Plano

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**268,000**	**278,000**	**290,656**	**292,656**	**292,656**	**292,656**
Projected Water Demand						
Municipal Demand	69,020	70,608	73,054	73,153	73,059	73,059
Customer Demand (The Colony)	1,200	2,000	2,200	2,400	2,600	2,800
Manufacturing Demand (12% Collin Co)	415	467	518	565	613	666
Total Projected Demand	***70,635***	***73,075***	***75,772***	***76,118***	***76,272***	***76,525***
Currently Available Water Supplies						
North Texas Municipal Water District	63,589	54,103	51,595	48,700	45,581	42,193
NTMWD (for The Colony)	1,106	1,532	1,554	1,598	1,622	1,617
NTMWD (for Manufacturing)	382	358	366	376	383	384
Total Current Supplies	***65,076***	***55,993***	***53,515***	***50,673***	***47,586***	***44,194***
Need (Demand - Current Supply)	***5,559***	***17,082***	***22,257***	***25,445***	***28,686***	***32,331***
Water Management Strategies						
Water Conservation	1,460	2,135	2,640	2,458	2,698	2,942
Water Conservation (The Colony)	12	26	26	37	50	65
Water Conservation (manufacturing)	0	1	11	16	17	19
Additional Water from NTMWD	3,971	14,370	18,819	21,995	24,780	27,924
Add'l Water from NTMWD for The Colony	82	442	620	765	928	1,118
Add'l Water from NTMWD for Manf	33	108	141	173	213	263
Total Water Management Strategies	***5,559***	***17,082***	***22,257***	***25,445***	***28,686***	***32,331***
Plano Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-255
Ponder

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,035**	**2,811**	**3,738**	**4,774**	**5,987**	**7,371**
Projected Water Demand						
Municipal Demand	254	343	451	574	718	883
Total Projected Demand	***254***	***343***	***451***	***574***	***718***	***883***
Currently Available Water Supplies						
Trinity Aquifer	476	476	476	476	476	476
Total Current Supplies	***476***	***476***	***476***	***476***	***476***	***476***
Need (Demand - Current Supply)	***0***	***0***	***0***	***98***	***242***	***407***
Water Management Strategies						
Water Conservation	2	4	5	8	12	18
Upper Trinity Regional Water District	0	0	65	235	421	580
Total Water Management Strategies	***2***	***4***	***70***	***243***	***433***	***598***
Ponder Reserve (Shortage)	**224**	**137**	**95**	**145**	**191**	**191**

Table C-256
Post Oak Bend City

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**800**	**1,000**	**1,200**	**1,850**	**2,500**	**5,000**
Projected Water Demand						
Municipal Demand	93	113	134	205	276	550
Total Projected Demand	***93***	***113***	***134***	***205***	***276***	***550***
Currently Available Water Supplies						
Rose Hill SUD (NTMWD)	86	87	95	136	172	318
Total Current Supplies	***86***	***87***	***95***	***136***	***172***	***318***
Need (Demand - Current Supply)	***7***	***26***	***39***	***69***	***104***	***232***
Water Management Strategies						
Water Conservation	1	1	1	3	5	11
Additional Water from Rose Hill SUD	6	25	38	66	99	221
Total Water Management Strategies	***7***	***26***	***39***	***69***	***104***	***232***
Post Oak Bend City Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-257
Pottsboro

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,896**	**3,745**	**4,582**	**6,000**	**10,000**	**18,000**
Projected Water Demand						
Municipal Demand	491	621	751	977	1,624	2,921
Total Projected Demand	***491***	***621***	***751***	***977***	***1,624***	***2,921***
Currently Available Water Supplies						
Woodbine Aquifer	129	129	129	129	129	129
Denison	362	441	458	419	357	288
Total Current Supplies	***491***	***570***	***587***	***548***	***486***	***417***
Need (Demand - Current Supply)	***0***	***51***	***164***	***429***	***1,138***	***2,504***
Water Management Strategies						
Water Conservation	4	7	15	28	60	117
Additional Denison	0	51	102	141	203	272
Grayson County Water Supply Project (North WTP)	0	0	47	260	875	2,115
Total Water Management Strategies	***4***	***58***	***164***	***429***	***1,138***	***2,504***
Pottsboro Reserve (Shortage)	**4**	**7**	**0**	**0**	**0**	**0**

Table C-258
Prosper

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**20,754**	**32,816**	**44,878**	**56,940**	**69,000**	**69,000**
Projected Water Demand						
Municipal Demand	5,322	8,355	11,405	14,457	17,511	17,509
Total Projected Demand	***5,322***	***8,355***	***11,405***	***14,457***	***17,511***	***17,509***
Currently Available Water Supplies						
North Texas Municipal Water District	4,903	5,605	5,605	5,605	5,605	5,605
Total Current Supplies	***4,903***	***5,605***	***5,605***	***5,605***	***5,605***	***5,605***
Need (Demand - Current Supply)	***419***	***2,750***	***5,800***	***8,852***	***11,906***	***11,904***
Water Management Strategies						
Water Conservation	198	365	557	754	972	1,030
Additional Water from NTMWD	221	2,385	5,243	8,098	10,934	10,874
Increase delivery infrastructure from NTWMD	*0*	*2,385*	*5,243*	*8,098*	*10,934*	*10,874*
Total Water Management Strategies	***419***	***2,750***	***5,800***	***8,852***	***11,906***	***11,904***
Prosper Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-259
Providence Village Water Control and Improvement District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,235**	**7,235**	**7,235**	**7,235**	**7,235**	**7,235**
Projected Water Demand						
Municipal Demand	938	931	929	927	926	925
Total Projected Demand	***938***	***931***	***929***	***927***	***926***	***925***
Currently Available Water Supplies						
UTRWD (Mustang SUD)	938	733	570	450	402	352
Total Current Supplies	***938***	***733***	***570***	***450***	***402***	***352***
Need (Demand - Current Supply)	***0***	***198***	***359***	***477***	***524***	***573***
Water Management Strategies						
Water Conservation	8	11	9	12	15	19
Additional Water from UTRWD	0	187	350	465	509	554
Total Water Management Strategies	***8***	***198***	***359***	***477***	***524***	***573***
Providence Village Water Control and Improvement District Reserve (Shortage)	**8**	**0**	**0**	**0**	**0**	**0**

Table C-260
Red Oak

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**12,369**	**14,000**	**19,000**	**26,000**	**32,000**	**50,000**
Projected Water Demand						
Municipal Demand	1,845	2,052	2,750	3,741	4,595	7,170
Total Projected Demand	***1,845***	***2,052***	***2,750***	***3,741***	***4,595***	***7,170***
Currently Available Water Supplies						
Woodbine Aquifer	556	556	556	556	556	556
Dallas Water Utilities	56	231	747	1,396	1,876	3,425
Rockett Special Utility District	856	688	552	468	374	275
Total Current Supplies	***1,468***	***1,475***	***1,855***	***2,420***	***2,806***	***4,256***
Need (Demand - Current Supply)	***377***	***577***	***895***	***1,321***	***1,789***	***2,914***
Water Management Strategies						
Water Conservation	15	23	28	50	77	143
Additional Water from Rockett SUD	364	527	659	729	805	860
Additional Water from DWU	0	27	208	542	907	1,911
Total Water Management Strategies	***379***	***577***	***895***	***1,321***	***1,789***	***2,914***
Red Oak Reserve (Shortage)	**2**	**0**	**0**	**0**	**0**	**0**

Table C-261
Reno

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,535**	**2,585**	**2,640**	**2,703**	**2,775**	**2,856**
Projected Water Demand						
Municipal Demand	172	175	178	183	187	193
Total Projected Demand	***172***	***175***	***178***	***183***	***187***	***193***
Currently Available Water Supplies						
Trinity Aquifer	167	167	167	167	167	167
Walnut Creek SUD (TRWD)	50	46	40	36	28	22
Total Current Supplies	***217***	***213***	***207***	***203***	***195***	***189***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***4***
Water Management Strategies						
Water Conservation	1	2	2	2	3	4
Additional Water from Walnut Ck. SUD	0	2	8	12	19	24
Total Water Management Strategies	***1***	***4***	***10***	***14***	***22***	***28***
Reno Reserve (Shortage)	**46**	**42**	**39**	**34**	**30**	**24**

Table C-262
Rhome

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,384**	**3,368**	**4,377**	**7,000**	**9,400**	**12,000**
Projected Water Demand						
Municipal Demand	411	571	738	1,175	1,576	2,011
Customer Demand - Aurora	71	96	123	161	200	248
Future Customer Demand - Newark	0	36	73	123	171	229
Future Customer Demand - New Fairview	0	54	150	267	448	663
Total Projected Demand	***482***	***757***	***1,084***	***1,726***	***2,395***	***3,151***
Currently Available Water Supplies						
Trinity Aquifer	280	280	280	280	280	280
Walnut Creek SUD (TRWD)	131	265	368	636	730	745
Walnut Creek SUD (TRWD) for Aurora	71	87	99	114	113	107
Total Current Supplies	***482***	***632***	***747***	***1,030***	***1,123***	***1,132***
Need (Demand - Current Supply)	***0***	***125***	***337***	***696***	***1,272***	***2,019***
Water Management Strategies						
Water Conservation	8	14	22	39	58	80
Water Conservation Aurora	1	2	2	3	4	6
Water Conservation Newark		2	2	4	6	8
Water Conservation New Fairview		3	3	6	11	17
Additional Water from Walnut Ck. SUD	0	12	68	220	508	906
Additional Walnut Ck. SUD - Aurora	0	7	22	44	83	135
Walnut Ck. SUD - Newark	0	51	147	261	437	646
Walnut Ck. SUD - New Fairview	0	34	71	119	165	221
Total Water Management Strategies	***9***	***125***	***337***	***696***	***1,272***	***2,019***
Rhome Reserve (Shortage)	9	0	0	0	0	0

Table C-263
Rice

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,022**	**1,126**	**1,235**	**1,358**	**1,487**	**1,625**
Projected Water Demand						
Municipal Demand	163	176	190	207	226	246
Total Projected Demand	***163***	***176***	***190***	***207***	***226***	***246***
Currently Available Water Supplies						
Rice Water Supply Corporation (Corsicana)	163	114	114	111	107	100
Total Current Supplies	***163***	***114***	***114***	***111***	***107***	***100***
Need (Demand - Current Supply)	***0***	***62***	***76***	***96***	***119***	***146***
Water Management Strategies						
Water Conservation	1	2	2	3	4	5
Additional Water from Rice WSC	0	60	74	93	115	141
Total Water Management Strategies	***1***	***62***	***76***	***96***	***119***	***146***
Rice Reserve (Shortage)	**1**	**0**	**0**	**0**	**0**	**0**

Table C-264
Rice Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population						
Outside of Rice	8,499	10,611	13,055	15,914	19,266	23,134
In Rice	1,022	1,126	1,235	1,358	1,487	1,625
Total Population Served	**9,521**	**11,737**	**14,290**	**17,272**	**20,753**	**24,759**
Projected Water Demand						
Outside of Rice	800	958	1,151	1,388	1,675	2,008
In Rice	163	176	190	207	226	246
Total Projected Demand	***963***	***1,134***	***1,341***	***1,595***	***1,901***	***2,254***
Currently Available Water Supplies						
Corsicana for Rice WSC	750	588	661	720	766	797
Corsicana for Rice	163	114	114	111	107	100
Ennis for Rice WSC	50	50	41	34	22	13
Total Current Supplies	***963***	***752***	***816***	***865***	***895***	***910***
Need (Demand - Current Supply)	***0***	***382***	***525***	***730***	***1,006***	***1,344***
Water Management Strategies						
Water Conservation (Outside of Rice)	7	10	12	19	28	40
Water Conservation (In Rice)	1	2	2	3	4	5
Add'l Corsicana for Rice WSC	0	310	428	599	831	1,121
Add'l Corsicana for Rice	0	60	74	93	115	141
Add'l Ennis for Rice WSC	0	0	9	16	28	37
Increase delivery infrastructure from Corsicana	*0*	*0*	*156*	*402*	*698*	*1,038*
Total Water Management Strategies	***8***	***382***	***525***	***730***	***1,006***	***1,344***
Rice Water Supply Corporation Reserve (Shortage)	**8**	**0**	**0**	**0**	**0**	**0**

Table C-265
Richardson

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**105,000**	**108,200**	**112,500**	**116,000**	**116,000**	**116,000**
Projected Water Demand						
Municipal Demand	26,328	26,676	27,364	28,016	27,979	27,978
Manufacturing Demand (60% Collin Co)	2,074	2,333	2,591	2,824	3,065	3,328
Total Projected Demand	***28,402***	***29,009***	***29,955***	***30,840***	***31,044***	***31,306***
Currently Available Water Supplies						
North Texas Municipal Water District	24,256	20,440	19,326	18,651	17,456	16,158
NTMWD for Collin Co Manufacturing	1,910	1,788	1,830	1,880	1,913	1,922
Total Current Supplies	***26,166***	***22,228***	***21,156***	***20,531***	***19,369***	***18,080***
Need (Demand - Current Supply)	***2,236***	***6,781***	***8,799***	***10,309***	***11,675***	***13,226***
Water Management Strategies						
Water Conservation	604	830	941	1,054	1,146	1,239
Water Conservation (manufacturing)	0	5	54	80	87	94
Additional Water from NTMWD	1,468	5,406	7,097	8,311	9,377	10,581
Add'l Water from NTMWD for Manf	164	540	707	864	1,065	1,312
Total Water Management Strategies	***2,236***	***6,781***	***8,799***	***10,309***	***11,675***	***13,226***
Richardson Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-266
Richland Hills

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**8,401**	**9,001**	**9,601**	**10,850**	**12,000**	**13,500**
Projected Water Demand						
Municipal Demand	1,148	1,185	1,228	1,372	1,513	1,700
Total Projected Demand	***1,148***	***1,185***	***1,228***	***1,372***	***1,513***	***1,700***
Currently Available Water Supplies						
Trinity Aquifer	242	242	242	242	242	242
Fort Worth (TRWD)	896	761	674	696	716	755
Total Current Supplies	***1,138***	***1,003***	***916***	***938***	***958***	***997***
Need (Demand - Current Supply)	***10***	***182***	***312***	***434***	***555***	***703***
Water Management Strategies						
Water Conservation	10	14	12	18	25	34
Additional Water from Fort Worth	0	168	300	416	530	669
Total Water Management Strategies	***10***	***182***	***312***	***434***	***555***	***703***
Richland Hills Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-267
River Oaks

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,500**	**7,500**	**7,500**	**7,500**	**7,500**	**7,500**
Projected Water Demand						
Municipal Demand	850	817	790	775	772	772
Total Projected Demand	***850***	***817***	***790***	***775***	***772***	***772***
Currently Available Water Supplies						
Tarrant Regional Water District	850	744	635	551	489	437
Total Current Supplies	***850***	***744***	***635***	***551***	***489***	***437***
Need (Demand - Current Supply)	***0***	***73***	***155***	***224***	***283***	***335***
Water Management Strategies						
Water Conservation	7	10	8	10	13	15
Additional Water from TRWD	0	63	147	214	270	320
Total Water Management Strategies	***7***	***73***	***155***	***224***	***283***	***335***
River Oaks Reserve (Shortage)	**7**	**0**	**0**	**0**	**0**	**0**

Table C-268
Roanoke

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,975**	**9,988**	**12,000**	**12,000**	**12,000**	**12,000**
Projected Water Demand						
Municipal Demand	2,263	2,807	3,356	3,350	3,348	3,348
Total Projected Demand	***2,263***	***2,807***	***3,356***	***3,350***	***3,348***	***3,348***
Currently Available Water Supplies						
Fort Worth (TRWD)	2,219	2,264	2,294	2,062	1,886	1,734
Total Current Supplies	***2,219***	***2,264***	***2,294***	***2,062***	***1,886***	***1,734***
Need (Demand - Current Supply)	***44***	***543***	***1,062***	***1,288***	***1,462***	***1,614***
Water Management Strategies						
Water Conservation	44	78	108	119	130	141
Additional Water from Fort Worth	0	465	954	1,169	1,332	1,473
Total Water Management Strategies	***44***	***543***	***1,062***	***1,288***	***1,462***	***1,614***
Roanoke Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-269
Rockwall County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**374**	**374**	**374**	**374**	**374**	**374**
Currently Available Water Supplies						
NTMWD Reuse	672	672	672	672	672	672
Dallas Water Utilities	264	240	215	198	185	176
Total Current Supplies	***936***	***912***	***887***	***870***	***857***	***848***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	12	24	30	35	41
Additional Water from NTMWD	97	94	91	89	88	86
Additional Water from DWU	12	28	44	57	66	71
Total Water Management Strategies	***110***	***134***	***159***	***176***	***189***	***198***
Rockwall County Irrigation Reserve (Shortage)	**672**	**672**	**672**	**672**	**672**	**672**

Table C-270
Rockwall County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**117**	**117**	**117**	**117**	**117**	**117**
Currently Available Water Supplies						
Local Supplies	117	117	117	117	117	117
Total Current Supplies	***117***	***117***	***117***	***117***	***117***	***117***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Rockwall County Livestock Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-271
Rockwall County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**35**	**40**	**45**	**50**	**55**	**61**
Currently Available Water Supplies						
North Texas Municipal Water District (through Rockwall)	32	31	32	33	34	35
Total Current Supplies	***32***	***31***	***32***	***33***	***34***	***35***
Need (Demand - Current Supply)	***3***	***9***	***13***	***17***	***21***	***26***
Water Management Strategies						
Water Conservation	0	0	1	1	2	2
Additional water from NTMWD	3	9	12	16	19	24
Total Water Management Strategies	***3***	***9***	***13***	***17***	***21***	***26***
Rockwall County Manufacturing Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-272
Rockwall County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**0**	**0**	**0**	**0**	**0**	**0**
Currently Available Water Supplies						
None	0	0	0	0	0	0
Total Current Supplies	***0***	***0***	***0***	***0***	***0***	***0***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Rockwall County Mining Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-273
Rockwall County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,527**	**3,527**	**3,527**	**3,527**	**12,000**	**20,000**
Projected Water Demand						
Municipal Demand	568	564	562	560	1,886	3,139
Total Projected Water Demand	***568***	***564***	***562***	***560***	***1,886***	***3,139***
Currently Available Water Supplies						
North Texas Municipal Water District (through various providers)	523	432	397	373	1,177	1,813
Total Current Supplies	***523***	***432***	***397***	***373***	***1,177***	***1,813***
Need (Demand - Current Supply)	***45***	***132***	***165***	***187***	***709***	***1,326***
Water Management Strategies						
Water Conservation	5	7	6	7	31	63
Additional Water from NTMWD	40	125	159	180	678	1,263
Total Water Management Strategies	***45***	***132***	***165***	***187***	***709***	***1,326***
Rockwall County Other Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-274
Rockwall County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**0**	**0**	**0**	**0**	**0**	**0**
Currently Available Water Supplies						
None	0	0	0	0	0	0
Total Current Supplies	***0***	***0***	***0***	***0***	***0***	***0***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Rockwall County Steam Electric Power Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-275
Rose Hill Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,278**	**6,611**	**8,139**	**9,897**	**13,000**	**20,000**
Projected Water Demand						
Municipal Demand	456	546	656	789	1,033	1,586
Customer Demand (Post Oak Bend City)	93	113	134	205	276	550
Total Projected Demand	***549***	***659***	***790***	***994***	***1,309***	***2,136***
Currently Available Water Supplies						
North Texas Municipal Water District	420	418	463	525	644	916
NTWMD (for Post Oak Bend City)	86	87	95	136	172	318
Total Current Supplies	***506***	***505***	***558***	***662***	***817***	***1,234***
Need (Demand - Current Supply)	***43***	***154***	***232***	***332***	***492***	***902***
Water Management Strategies						
Water Conservation	4	6	7	11	17	32
Water Conservation (customer)	1	1	1	3	5	11
Additional Water from NTWMD	32	122	186	253	372	638
Add'l Water from NTWMD for Post Oak	6	25	38	66	99	221
Total Water Management Strategies	***43***	***154***	***232***	***332***	***492***	***902***
Rose Hill Special Utility District Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-276
Rowlett

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**64,500**	**70,000**	**70,000**	**70,000**	**70,000**	**70,000**
Projected Water Demand						
Municipal Demand	9,870	10,484	10,348	10,270	10,249	10,248
Total Projected Demand	***9,870***	***10,484***	***10,348***	***10,270***	***10,249***	***10,248***
Currently Available Water Supplies						
North Texas Municipal Water District	9,093	8,033	7,308	6,837	6,395	5,918
Total Current Supplies	***9,093***	***8,033***	***7,308***	***6,837***	***6,395***	***5,918***
Need (Demand - Current Supply)	***777***	***2,451***	***3,040***	***3,433***	***3,854***	***4,330***
Water Management Strategies						
Water Conservation	82	119	103	137	171	205
Additional Water from NTMWD	695	2,332	2,937	3,296	3,683	4,125
Total Water Management Strategies	***777***	***2,451***	***3,040***	***3,433***	***3,854***	***4,330***
Rowlett Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-277
Royse City

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**10,864**	**15,452**	**23,572**	**45,737**	**80,973**	**91,316**
Projected Water Demand						
Municipal Demand	1,261	1,746	2,628	5,065	8,948	10,089
Total Projected Demand	***1,261***	***1,746***	***2,628***	***5,065***	***8,948***	***10,089***
Currently Available Water Supplies						
North Texas Municipal Water District	1,122	1,298	1,811	3,318	5,516	5,742
Total Current Supplies	***1,122***	***1,298***	***1,811***	***3,318***	***5,516***	***5,742***
Need (Demand - Current Supply)	***139***	***448***	***817***	***1,747***	***3,432***	***4,347***
Water Management Strategies						
Water Conservation	10	17	26	66	147	199
Additional Water from NTMWD	129	431	791	1,681	3,285	4,148
Total Water Management Strategies	***139***	***448***	***817***	***1,747***	***3,432***	***4,347***
Royse City Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-278
Runaway Bay

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,448**	**1,633**	**1,822**	**2,200**	**2,500**	**3,000**
Projected Water Demand						
Municipal Demand	350	388	428	514	584	700
Total Projected Demand	***350***	***388***	***428***	***514***	***584***	***700***
Currently Available Water Supplies						
Tarrant Regional Water District	350	353	344	365	370	396
Total Current Supplies	***350***	***353***	***344***	***365***	***370***	***396***
Need (Demand - Current Supply)	***0***	***35***	***84***	***149***	***214***	***304***
Water Management Strategies						
Water Conservation	6	10	13	17	21	28
Additional Water from TRWD with infrastructure below:	0	25	71	132	193	276
0.5 MGD Water Treatment Plant Expansion						*100*
Increase capacity of lake intake						*100*
Total Water Management Strategies	***6***	***35***	***84***	***149***	***214***	***304***
Runaway Bay Reserve (Shortage)	**6**	**0**	**0**	**0**	**0**	**0**

Table C-279
Sachse

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**28,499**	**28,499**	**28,499**	**28,499**	**28,499**	**28,499**
Projected Water Demand						
Municipal Demand	5,179	5,124	5,091	5,071	5,064	5,062
Total Projected Demand	***5,179***	***5,124***	***5,091***	***5,071***	***5,064***	***5,062***
Currently Available Water Supplies						
North Texas Municipal Water District	4,771	3,926	3,596	3,376	3,159	2,923
Total Current Supplies	***4,771***	***3,926***	***3,596***	***3,376***	***3,159***	***2,923***
Need (Demand - Current Supply)	***408***	***1,198***	***1,495***	***1,695***	***1,905***	***2,139***
Water Management Strategies						
Water Conservation	95	137	153	169	186	202
Additional Water from NTMWD	313	1,061	1,342	1,526	1,719	1,937
Total Water Management Strategies	***408***	***1,198***	***1,495***	***1,695***	***1,905***	***2,139***
Sachse Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-280
Saginaw

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**23,004**	**26,202**	**29,400**	**31,000**	**31,000**	**31,000**
Projected Water Demand						
Municipal Demand	3,148	3,503	3,876	4,059	4,052	4,051
Total Projected Demand	***3,148***	***3,503***	***3,876***	***4,059***	***4,052***	***4,051***
Currently Available Water Supplies						
Fort Worth (TRWD)	3,122	2,825	2,649	2,498	2,283	2,098
Total Current Supplies	***3,122***	***2,825***	***2,649***	***2,498***	***2,283***	***2,098***
Need (Demand - Current Supply)	***26***	***678***	***1,227***	***1,561***	***1,769***	***1,953***
Water Management Strategies						
Water Conservation	26	39	39	54	68	81
Additional Water from Fort Worth	0	639	1,188	1,507	1,701	1,872
Total Water Management Strategies	***26***	***678***	***1,227***	***1,561***	***1,769***	***1,953***
Saginaw Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-281
Sanger

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**8,632**	**10,713**	**13,199**	**15,977**	**19,229**	**22,941**
Projected Water Demand						
Municipal Demand	1,202	1,452	1,763	2,119	2,545	3,034
Total Projected Demand	***1,202***	***1,452***	***1,763***	***2,119***	***2,545***	***3,034***
Currently Available Water Supplies						
Trinity Aquifer	1,121	1,121	1,121	1,121	1,121	1,121
Upper Trinity Regional Water District	78	346	529	650	811	897
Total Current Supplies	***1,199***	***1,468***	***1,650***	***1,771***	***1,932***	***2,018***
Need (Demand - Current Supply)	***3***	***0***	***113***	***348***	***613***	***1,016***
Water Management Strategies						
Water Conservation	10	16	18	28	42	61
Additional Water from UTRWD	0	78	315	657	1,018	1,402
Total Water Management Strategies	***10***	***94***	***333***	***685***	***1,060***	***1,463***
Sanger Reserve (Shortage)	**7**	**109**	**220**	**337**	**447**	**447**

Table C-282
Sansom Park

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,800**	**5,100**	**5,723**	**6,064**	**6,406**	**6,740**
Projected Water Demand						
Municipal Demand	534	545	592	617	650	683
Total Projected Demand	***534***	***545***	***592***	***617***	***650***	***683***
Currently Available Water Supplies						
Trinity Aquifer	578	578	578	578	578	578
Fort Worth (TRWD)	0	0	10	24	41	54
Total Current Supplies	***578***	***578***	***588***	***602***	***619***	***632***
Need (Demand - Current Supply)	***0***	***0***	***4***	***15***	***31***	***51***
Water Management Strategies						
Water Conservation	4	6	6	8	11	14
Add'l Fort Worth	0	0	0	7	20	37
Total Water Management Strategies	***4***	***6***	***6***	***15***	***31***	***51***
Sansom Park Reserve (Shortage)	**48**	**39**	**2**	**0**	**0**	**0**

Table C-283
Sardis-Lone Elm Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**14,500**	**18,000**	**22,000**	**24,000**	**25,340**	**25,340**
Projected Water Demand						
Municipal Demand	3,904	4,793	5,824	6,338	6,688	6,686
Total Projected Demand	***3,904***	***4,793***	***5,824***	***6,338***	***6,688***	***6,686***
Currently Available Water Supplies						
Trinity Aquifer	352	352	352	352	352	352
Woodbine Aquifer	1,386	1,386	1,386	1,386	1,386	1,386
Rockett Special Utility District (TRWD and Midlothian)	1,508	1,525	1,484	1,417	1,343	1,105
Total Current Supplies	***3,246***	***3,263***	***3,222***	***3,155***	***3,081***	***2,843***
Need (Demand - Current Supply)	***658***	***1,530***	***2,602***	***3,183***	***3,607***	***3,843***
Water Management Strategies						
Water Conservation	72	123	175	211	245	267
Rockett Special Utility District (TRWD)	586	1,407	2,427	2,972	3,362	3,576
Increase delivery Infrastructure from Rockett SUD	*0*	*0*	*548*	*1,026*	*1,342*	*1,318*
Connect to Midlothian	1,121	1,121	1,121	1,121	1,121	1,121
Total Water Management Strategies	***1,779***	***2,651***	***3,723***	***4,304***	***4,728***	***4,964***
Sardis-Lone Elm Water Supply Corporation Reserve (Shortage)	**1,121**	**1,121**	**1,121**	**1,121**	**1,121**	**1,121**

Table C-284
Savoy

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**924**	**1,016**	**1,086**	**1,151**	**1,249**	**1,355**
Projected Water Demand						
Municipal Demand	88	92	94	98	106	115
Total Projected Demand	***88***	***92***	***94***	***98***	***106***	***115***
Currently Available Water Supplies						
Woodbine Aquifer	88	88	88	88	88	88
Total Current Supplies	***88***	***88***	***88***	***88***	***88***	***88***
Need (Demand - Current Supply)	***0***	***4***	***6***	***10***	***18***	***27***
Water Management Strategies						
Water Conservation	1	1	1	1	2	2
Fannin County Water Supply Project (NTMWD)	0	31	43	47	54	63
Total Water Management Strategies	***1***	***32***	***44***	***48***	***56***	***65***
Savoy Reserve (Shortage)	**1**	**28**	**38**	**38**	**38**	**38**

Table C-285
Scurry

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**850**	**1,050**	**1,250**	**1,919**	**2,700**	**6,000**
Projected Water Demand						
Municipal Demand	59	71	85	129	182	404
Total Projected Demand	***59***	***71***	***85***	***129***	***182***	***404***
Currently Available Water Supplies						
Gastonia-Scurry WSC (NTMWD)	54	54	60	86	114	233
Total Current Supplies	***54***	***54***	***60***	***86***	***114***	***233***
Need (Demand - Current Supply)	***5***	***17***	***25***	***43***	***68***	***171***
Water Management Strategies						
Water Conservation	0	1	1	2	3	8
Additional Water from Gastonia-Scurry WSC (NTMWD)	5	16	24	41	65	163
Total Water Management Strategies	***5***	***17***	***25***	***43***	***68***	***171***
Scurry Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-286
Seis Lagos Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,130**	**2,130**	**2,130**	**2,130**	**2,130**	**2,130**
Projected Water Demand						
Municipal Demand	603	598	596	594	594	594
Total Projected Demand	***603***	***598***	***596***	***594***	***594***	***594***
Currently Available Water Supplies						
NTMWD	556	458	421	395	371	343
Total Current Supplies	***556***	***458***	***421***	***395***	***371***	***343***
Need (Demand - Current Supply)	***47***	***140***	***175***	***199***	***223***	***251***
Water Management Strategies						
Water Conservation	34	39	41	42	44	46
Additional Water from NTMWD	13	101	134	157	179	205
Total Water Management Strategies	***47***	***140***	***175***	***199***	***223***	***251***
Seis Lagos Utility District Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-287
Seven Points

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,605**	**1,881**	**2,162**	**2,737**	**3,238**	**3,784**
Projected Water Demand						
Municipal Demand	355	409	465	586	692	808
Total Projected Demand	***355***	***409***	***465***	***586***	***692***	***808***
Currently Available Water Supplies						
West Cedar Creek Municipal Utility District (TRWD)	310	318	322	353	311	270
Total Current Supplies	***310***	***318***	***322***	***353***	***311***	***270***
Need (Demand - Current Supply)	***45***	***91***	***143***	***233***	***381***	***538***
Water Management Strategies						
Water Conservation	7	11	14	20	25	32
Additional Water from WCCMUD (retail)	38	80	129	213	356	506
Total Water Management Strategies	***45***	***91***	***143***	***233***	***381***	***538***
Seven Points Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-288
Shady Shores

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,441**	**3,936**	**3,936**	**3,936**	**3,936**	**3,936**
Projected Water Demand						
Municipal Demand	461	516	511	508	507	506
Total Projected Demand	***461***	***516***	***511***	***508***	***507***	***506***
Currently Available Water Supplies						
Lake Cities Municipal Utility Authority (Groundwater)	76	76	76	76	76	76
Lake Cities Municipal Utility Authority (UTRWD)	385	352	281	226	204	178
Total Current Supplies	***461***	***429***	***357***	***303***	***280***	***255***
Need (Demand - Current Supply)	***0***	***87***	***154***	***205***	***227***	***251***
Water Management Strategies						
Water Conservation	4	6	5	7	8	10
Additional Water from Lake Cities MUA	0	89	164	222	249	272
Total Water Management Strategies	***4***	***95***	***169***	***229***	***257***	***282***
Shady Shores Reserve (Shortage)	**4**	**7**	**15**	**23**	**30**	**30**

Table C-289
South Grayson Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,500**	**5,000**	**6,000**	**6,500**	**7,000**	**7,500**
Projected Water Demand						
Municipal Demand	551	599	708	762	818	875
Total Projected Demand	***551***	***599***	***708***	***762***	***818***	***875***
Currently Available Water Supplies						
Trinity Aquifer	275	275	275	275	275	275
Woodbine Aquifer	551	551	551	551	551	551
Total Current Supplies	***826***	***826***	***826***	***826***	***826***	***826***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***49***
Water Management Strategies						
Water Conservation	5	7	7	10	14	18
Grayson County Water Supply Project (GTUA - Sherman WTP)	95	93	93	90	86	82
Total Water Management Strategies	***100***	***100***	***100***	***100***	***100***	***100***
South Grayson Water Supply Corporation Reserve (Shortage)	**375**	**327**	**218**	**164**	**108**	**51**

Table C-290
Southlake

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**27,818**	**31,315**	**36,669**	**42,065**	**47,528**	**53,057**
Projected Water Demand						
Municipal Demand	11,501	12,865	15,005	17,178	19,392	21,642
Total Projected Demand	***11,501***	***12,865***	***15,005***	***17,178***	***19,392***	***21,642***
Currently Available Water Supplies						
Fort Worth (TRWD)	11,240	10,376	10,256	10,574	10,924	11,208
Total Current Supplies	***11,240***	***10,376***	***10,256***	***10,574***	***10,924***	***11,208***
Need (Demand - Current Supply)	***261***	***2,489***	***4,749***	***6,604***	***8,468***	***10,434***
Water Management Strategies						
Water Conservation	261	393	517	649	797	962
Additional Water from Fort Worth	0	2,096	4,232	5,955	7,671	9,472
Increase delivery infrastructure from Ft Worth	*0*	*141*	*2,157*	*4,198*	*6,264*	*8,349*
Total Water Management Strategies	***261***	***2,489***	***4,749***	***6,604***	***8,468***	***10,434***
Southlake Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-291
Southmayd

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,098**	**1,222**	**1,344**	**1,483**	**2,000**	**3,000**
Projected Water Demand						
Municipal Demand	97	103	110	119	159	238
Total Projected Demand	***97***	***103***	***110***	***119***	***159***	***238***
Currently Available Water Supplies						
Woodbine Aquifer	161	161	161	161	161	161
Total Current Supplies	***161***	***161***	***161***	***161***	***161***	***161***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***77***
Water Management Strategies						
Water Conservation	1	1	1	2	3	5
Grayson County Water Supply Project (Sherman WTP)	0	0	49	48	72	95
New Well Woodbine Aquifer						77
Total Water Management Strategies	***1***	***1***	***50***	***50***	***75***	***177***
Southmayd Reserve (Shortage)	**65**	**59**	**101**	**92**	**77**	**100**

Table C-292
Southwest Fannin County Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**5,628**	**6,913**	**8,096**	**9,384**	**12,000**	**15,000**
Projected Water Demand						
Municipal Demand	559	664	763	878	1,118	1,394
Total Projected Demand	***559***	***664***	***763***	***878***	***1,118***	***1,394***
Currently Available Water Supplies						
Woodbine Aquifer	610	610	610	610	610	610
Total Current Supplies	***610***	***610***	***610***	***610***	***610***	***610***
Need (Demand - Current Supply)	***0***	***54***	***153***	***268***	***508***	***784***
Water Management Strategies						
Water Conservation	5	7	8	12	19	28
New Well in Woodbine Aquifer and Transmission Facilities		100	100	100	100	100
Fannin County Water Supply Project		336	434	545	778	1,045
Total Water Management Strategies	***5***	***443***	***542***	***657***	***897***	***1,173***
Southwest Fannin County Special Utility District Reserve (Shortage)	**56**	**389**	**389**	**389**	**389**	**389**

Table C-293
Springtown

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,079**	**5,500**	**5,500**	**5,500**	**5,500**	**5,500**
Projected Water Demand						
Municipal Demand	577	757	749	745	744	743
Total Projected Demand	***577***	***757***	***749***	***745***	***744***	***743***
Currently Available Water Supplies						
Trinity Aquifer	95	95	95	95	95	95
Tarrant Regional Water District	340	340	340	340	340	327
Total Current Supplies	***435***	***435***	***435***	***435***	***435***	***422***
Need (Demand - Current Supply)	***142***	***322***	***314***	***310***	***309***	***321***
Water Management Strategies						
Water Conservation	5	8	7	10	12	15
Trinity Aquifer - new wells	70	70	70	70	70	70
Additional Water from TRWD	67	244	237	230	227	236
Infrastructure needs (Lake Intake modifications for lower lake levels)	*67*	*244*	*237*	*230*	*227*	*236*
Total Water Management Strategies	***142***	***322***	***314***	***310***	***309***	***321***
Springtown Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-294
Saint Paul

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,965**	**2,255**	**2,453**	**2,559**	**2,666**	**2,666**
Projected Water Demand						
Municipal Demand	265	298	322	334	348	347
Total Projected Demand	***265***	***298***	***322***	***334***	***348***	***347***
Currently Available Water Supplies						
NTMWD (through Wylie Northeast SUD)	244	228	227	222	217	200
Total Current Supplies	***244***	***228***	***227***	***222***	***217***	***200***
Need (Demand - Current Supply)	***21***	***70***	***95***	***112***	***131***	***147***
Water Management Strategies						
Water Conservation	2	3	3	4	6	7
Additional Water from NTMWD	19	67	92	108	125	140
Total Water Management Strategies	***21***	***70***	***95***	***112***	***131***	***147***
Saint Paul Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-295
Sunnyvale

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**7,000**	**10,000**	**13,000**	**15,000**	**18,000**	**18,000**
Projected Water Demand						
Municipal Demand	2,357	3,332	4,313	4,968	5,958	5,957
Total Projected Demand	***2,357***	***3,332***	***4,313***	***4,968***	***5,958***	***5,957***
Currently Available Water Supplies						
North Texas Municipal Water District	2,172	2,553	3,046	3,307	3,717	3,440
Total Current Supplies	***2,172***	***2,553***	***3,046***	***3,307***	***3,717***	***3,440***
Need (Demand - Current Supply)	***185***	***779***	***1,267***	***1,661***	***2,241***	***2,517***
Water Management Strategies						
Water Conservation	43	84	129	166	218	238
Additional Water from NTMWD and additional pipeline	142	695	1,138	1,495	2,023	2,279
Total Water Management Strategies	***185***	***779***	***1,267***	***1,661***	***2,241***	***2,517***
Sunnyvale Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-296
Talty

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,306**	**2,889**	**3,557**	**4,325**	**6,000**	**10,000**
Projected Water Demand						
Municipal Demand	305	377	462	560	775	1,289
Total Projected Demand	***305***	***377***	***462***	***560***	***775***	***1,289***
Currently Available Water Supplies						
North Texas Municipal Water District (through Talty WSC 67%)	188	194	219	250	324	499
North Texas Municipal Water District (through Gastonia-Scurry SUD 33%)	93	95	108	123	160	246
Total Current Supplies	***281***	***289***	***326***	***373***	***484***	***744***
Need (Demand - Current Supply)	***24***	***88***	***136***	***187***	***291***	***545***
Water Management Strategies						
Water Conservation	3	4	5	7	13	26
Add'l Water from Talty WSC (NTMWD)	14	56	88	121	187	347
Add'l Water from G-S SUD(NTMWD)	7	28	43	59	92	171
Total Water Management Strategies	***24***	***88***	***136***	***187***	***291***	***545***
Talty Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-297
Talty Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**9,663**	**11,103**	**12,902**	**18,121**	**23,000**	**30,000**
Projected Water Demand						
Municipal Demand	1,584	1,801	2,083	2,914	3,693	4,813
Talty (67%)	204	253	310	375	519	864
Total Projected Demand	***1,788***	***2,054***	***2,393***	***3,289***	***4,212***	***5,677***
Currently Available Water Supplies						
North Texas Municipal Water District	1,459	1,380	1,471	1,940	2,304	2,780
NTWMD (for Talty)	188	194	219	250	324	499
Total Current Supplies	***1,648***	***1,574***	***1,690***	***2,190***	***2,628***	***3,278***
Need (Demand - Current Supply)	***140***	***480***	***703***	***1,099***	***1,584***	***2,399***
Water Management Strategies						
Water Conservation Talty WSC	29	47	62	97	135	193
Water Conservation Talty (67%)	2	3	3	5	9	17
Add'l NTWMD	96	374	551	877	1,254	1,841
Add'l NTWMD for Talty	14	56	88	121	187	347
Total Water Management Strategies	***141***	***480***	***703***	***1,100***	***1,585***	***2,399***
Talty Water Supply Corporation Reserve (Shortage)	**0**	**0**	**0**	**1**	**1**	**0**

Table C-298
Tarrant County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**4,466**	**4,466**	**4,466**	**4,466**	**4,466**	**4,466**
Currently Available Water Supplies						
Local Supplies	549	549	549	549	549	549
Trinity Aquifer	752	752	752	752	752	752
Woodbine Aquifer	632	632	632	632	632	632
Indirect Reuse (DCPCMUD through Grapevine)	1,121	1,121	1,121	1,121	1,121	1,121
Direct Reuse (Azle)	300	300	300	300	300	300
Tarrant Regional Water District	1,340	1,219	1,078	952	849	758
Direct Reuse (Fort Worth)	2,000	2,000	2,000	2,000	2,000	2,000
Total Current Supplies	***6,694***	***6,574***	***6,432***	***6,307***	***6,204***	***6,112***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	8	138	266	334	396	459
Add'l Tarrant Regional WD	0	0	0	53	94	123
Total Water Management Strategies	***8***	***138***	***266***	***387***	***490***	***582***
Tarrant County Irrigation Reserve (Shortage)	**2,236**	**2,246**	**2,232**	**2,228**	**2,228**	**2,228**

Table C-299
Tarrant County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**723**	**723**	**723**	**723**	**723**	**723**
Currently Available Water Supplies						
Trinity Aquifer	281	281	281	281	281	281
Local Supplies	442	442	442	442	442	442
Total Current Supplies	***723***	***723***	***723***	***723***	***723***	***723***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Tarrant County Livestock Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-300
Tarrant County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**20,444**	**23,630**	**26,924**	**29,919**	**32,457**	**35,210**
Currently Available Water Supplies						
Trinity Aquifer	1,937	1,937	1,937	1,937	1,937	1,937
Trinity Aquifer (Through Kennedale)	102	118	135	150	162	176
Fort Worth (TRWD Sources)	16,049	14,961	14,446	14,456	14,353	14,314
Arlington (TRWD Sources)	2,275	2,418	2,455	2,424	2,356	2,289
Mansfield (TRWD Sources)	279	296	300	280	274	269
Grand Prairie (TRWD Sources)	197	180	162	157	148	147
Total Current Supplies	***20,839***	***19,910***	***19,435***	***19,404***	***19,230***	***19,132***
Need (Demand - Current Supply)	***0***	***3,720***	***7,489***	***10,515***	***13,227***	***16,078***
Water Management Strategies						
Water Conservation	0	47	556	834	919	999
Add'l water from Ft Worth (TRWD)	0	3,552	6,253	8,375	10,405	12,542
Add'l water from Arlington (TRWD)	178	412	709	1,066	1,429	1,816
Add'l water from Mansfield (TRWD)	130	176	226	302	356	415
Add'l water from Grand Prairie (TRWD)	110	173	234	279	325	366
Total Water Management Strategies	***418***	***4,361***	***7,978***	***10,856***	***13,434***	***16,138***
Tarrant County Manufacturing Reserve (Shortage)	**813**	**641**	**489**	**341**	**207**	**60**

Table C-301
Tarrant County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**7,367**	**4,482**	**1,589**	**1,537**	**1,497**	**1,464**
Currently Available Water Supplies						
Local supplies	342	342	342	342	342	342
Tarrant Regional Water District	6,567	3,351	635	524	442	376
Trinity Aquifer	800	800	800	800	800	800
Total Current Supplies	***7,709***	***4,493***	***1,777***	***1,666***	***1,584***	***1,518***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Tarrant Regional Water District	0	331	154	213	255	288
Total Water Management Strategies	***0***	***331***	***154***	***213***	***255***	***288***
Tarrant County Mining Reserve (Shortage)	**342**	**342**	**342**	**342**	**342**	**342**

Table C-302
Tarrant County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**36,012**	**36,012**	**36,012**	**60,000**	**80,000**	**110,000**
Projected Water Demand						
Municipal Demand	8,008	7,862	7,743	11,410	14,509	19,178
Total Projected Water Demand	***8,008***	***7,862***	***7,743***	***11,410***	***14,509***	***19,178***
Currently Available Water Supplies						
Trinity Aquifer	1,200	1,200	1,200	1,200	1,200	1,200
TRWD direct (5% of non-DFW Airport demand) (Monarch Utilities)	240	212	183	292	358	452
Fort Worth	4,574	3,570	2,949	4,800	6,051	7,860
Fort Worth for DFW Airport	724	614	581	524	479	440
Fort Worth Reuse for DFW Airport	40	40	150	150	150	150
Dallas Water Utilities (for DFW Aiport)	1,145	1,041	775	715	668	637
Total Current Supplies	***7,924***	***6,677***	***5,838***	***7,681***	***8,907***	***10,739***
Need (Demand - Current Supply)	***84***	***1,185***	***1,905***	***3,729***	***5,602***	***8,439***
Water Management Strategies						
Water Conservation	50	69	57	125	208	344
Additional Water from TRWD direct	0	19	42	115	199	333
Additional Water from Ft Worth	0	818	1,333	2,913	4,537	7,045
Add'l Water from Ft Worth (for DFW Airport)	77	187	420	477	522	561
Add'l Dallas (for DFW Airport)	56	160	226	286	333	364
Total Water Management Strategies	***183***	***1,253***	***2,078***	***3,915***	***5,799***	***8,647***
Tarrant County Other Reserve (Shortage)	**99**	**68**	**173**	**186**	**196**	**208**
Alternate Water Management Strategy						
Water from Euless (TRA/TRWD) to DFW Airport (in lieu of portion of Ft Worth supply)	0	1,000	1,000	2,000	2,000	2,000

Table C-303
Tarrant County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**2,448**	**4,168**	**5,000**	**5,000**	**5,000**	**5,000**
Currently Available Water Supplies						
Run-of-River supplies	959	959	959	959	959	959
Tarrant Regional Water District	2,448	2,228	1,969	1,740	1,552	1,385
Total Current Supplies	***3,407***	***3,187***	***2,928***	***2,699***	***2,511***	***2,344***
Need (Demand - Current Supply)	***0***	***981***	***2,072***	***2,301***	***2,489***	***2,656***
Water Management Strategies						
Additional Water from TRWD	0	220	479	708	896	1,063
Reuse	0	1,528	2,360	2,360	2,360	2,360
Total Water Management Strategies	***0***	***1,748***	***2,839***	***3,068***	***3,256***	***3,423***
Tarrant County Steam Electric Power Reserve (Shortage)	**959**	**767**	**767**	**767**	**767**	**767**

Table C-304
Teague

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,750**	**4,000**	**5,600**	**7,050**	**8,500**	**10,000**
Projected Water Demand						
Municipal Demand	380	386	515	637	765	899
Freestone County Manufacturing	40	40	40	40	40	40
Total Projected Demand	***420***	***426***	***555***	***677***	***805***	***939***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	681	681	681	681	681	681
Carrizo-Wilcox Aquifer for manf	40	40	40	40	40	40
Total Current Supplies	***721***	***721***	***721***	***721***	***721***	***721***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***84***	***218***
Water Management Strategies						
Water Conservation	3	4	5	8	13	18
New Wells in Carrizo-Wilcox Aquifer				200	200	200
Total Water Management Strategies	***3***	***4***	***5***	***208***	***213***	***218***
Teague Reserve (Shortage)	**304**	**299**	**171**	**252**	**129**	**0**

Table C-305
The Colony

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**51,000**	**58,000**	**62,000**	**67,600**	**67,600**	**67,600**
Projected Water Demand						
Municipal Demand	7,762	8,632	9,106	9,857	9,844	9,841
Total Projected Demand	***7,762***	***8,632***	***9,106***	***9,857***	***9,844***	***9,841***
Currently Available Water Supplies						
Trinity Aquifer	1,327	1,327	1,327	1,327	1,327	1,327
Dallas Water Utilities	4,992	4,600	4,320	4,377	3,952	3,635
Plano (NTMWD)	1,106	1,532	1,554	1,598	1,622	1,617
Total Current Supplies	***7,425***	***7,459***	***7,201***	***7,302***	***6,901***	***6,579***
Need (Demand - Current Supply)	***337***	***1,173***	***1,905***	***2,555***	***2,943***	***3,262***
Water Management Strategies						
Water Conservation	65	96	91	131	164	197
Additional Water from DWU	199	609	1,168	1,622	1,801	1,882
Additional Water from Plano	84	468	646	802	978	1,183
Total Water Management Strategies	***348***	***1,173***	***1,905***	***2,555***	***2,943***	***3,262***
The Colony Reserve (Shortage)	**11**	**0**	**0**	**0**	**0**	**0**

Table C-306
Tioga

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**865**	**936**	**1,006**	**1,087**	**3,500**	**4,800**
Projected Water Demand						
Municipal Demand	119	124	131	139	444	608
Total Projected Demand	***119***	***124***	***131***	***139***	***444***	***608***
Currently Available Water Supplies						
Trinity Aquifer	119	119	119	119	119	119
Total Current Supplies	***119***	***119***	***119***	***119***	***119***	***119***
Need (Demand - Current Supply)	***0***	***5***	***12***	***20***	***325***	***489***
Water Management Strategies						
Water Conservation	1	1	1	2	7	12
Grayson County Water Supply Project (Sherman WTP)	0	4	11	18	318	477
Total Water Management Strategies	***1***	***5***	***12***	***20***	***325***	***489***
Tioga Reserve (Shortage)	**1**	**0**	**0**	**0**	**0**	**0**
Alternate Water Management Strategies						
Grayson County Water Supply Project (Northwest WTP)	0	4	11	18	318	477

Table C-307
Tom Bean

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,176**	**1,328**	**1,477**	**1,649**	**2,000**	**3,000**
Projected Water Demand						
Municipal Demand	222	245	268	297	359	538
Total Projected Demand	***222***	***245***	***268***	***297***	***359***	***538***
Currently Available Water Supplies						
Woodbine Aquifer	222	222	222	222	222	222
Total Current Supplies	***222***	***222***	***222***	***222***	***222***	***222***
Need (Demand - Current Supply)	***0***	***23***	***46***	***75***	***137***	***316***
Water Management Strategies						
Water Conservation	2	23	64	73	90	137
Grayson County Water Supply Project (Sherman WTP)	0	0	0	2	47	179
Total Water Management Strategies	***2***	***23***	***64***	***75***	***137***	***316***
Tom Bean Reserve (Shortage)	**2**	**0**	**18**	**0**	**0**	**0**

Table C-308
Tool

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,438**	**2,618**	**2,769**	**2,968**	**4,500**	**6,000**
Projected Water Demand						
Municipal Demand	553	583	607	646	976	1,300
Total Projected Demand	***553***	***583***	***607***	***646***	***976***	***1,300***
Currently Available Water Supplies						
West Cedar Creek Municipal Utility District (TRWD)	483	453	420	390	439	434
Total Current Supplies	***483***	***453***	***420***	***390***	***439***	***434***
Need (Demand - Current Supply)	***70***	***130***	***187***	***256***	***537***	***866***
Water Management Strategies						
Water Conservation	10	15	18	22	36	52
Additional Water from WCCMUD	60	115	169	234	501	814
Total Water Management Strategies	***70***	***130***	***187***	***256***	***537***	***866***
Tool Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-309
Trenton

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**706**	**1,000**	**3,500**	**6,000**	**8,000**	**10,000**
Projected Water Demand						
Municipal Demand	131	179	609	1,041	1,387	1,733
Total Projected Demand	***131***	***179***	***609***	***1,041***	***1,387***	***1,733***
Currently Available Water Supplies						
Woodbine Aquifer	131	131	131	131	131	131
Total Current Supplies	***131***	***131***	***131***	***131***	***131***	***131***
Need (Demand - Current Supply)	***0***	***48***	***478***	***910***	***1,256***	***1,602***
Water Management Strategies						
Water Conservation	1	4	15	35	51	69
New Well in Woodbine Aquifer (Fannin Co)		25	25	25	25	25
Fannin Co Water Supply Project (NTMWD)	0	89	508	920	1,250	1,578
Total Water Management Strategies	***1***	***118***	***548***	***980***	***1,326***	***1,672***
Trenton Reserve (Shortage)	**1**	**70**	**70**	**70**	**70**	**70**

Table C-310
Trinidad

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**886**	**886**	**886**	**886**	**1,000**	**1,200**
Projected Water Demand						
Municipal Demand	91	86	83	83	93	111
Total Projected Demand	***91***	***86***	***83***	***83***	***93***	***111***
Currently Available Water Supplies						
Trinidad City Lake	450	450	450	450	450	450
Total Current Supplies	***450***	***450***	***450***	***450***	***450***	***450***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	1	1	1	1	2	2
Total Water Management Strategies	***1***	***1***	***1***	***1***	***2***	***2***
Trinidad Reserve (Shortage)	**360**	**365**	**368**	**368**	**359**	**341**

Table C-311
Trophy Club

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**14,000**	**14,000**	**14,000**	**14,000**	**14,000**	**14,000**
Projected Water Demand						
Municipal Demand	6,125	6,094	6,075	6,064	6,061	6,060
Total Projected Demand	***6,125***	***6,094***	***6,075***	***6,064***	***6,061***	***6,060***
Currently Available Water Supplies						
Trinity Aquifer	600	0	0	0	0	0
Fort Worth (TRWD)	5,292	4,915	4,152	3,733	3,414	3,138
Total Current Supplies	***5,892***	***4,915***	***4,152***	***3,733***	***3,414***	***3,138***
Need (Demand - Current Supply)	***233***	***1,179***	***1,923***	***2,331***	***2,647***	***2,922***
Water Management Strategies						
Water Conservation	233	283	302	322	342	362
Additional Water from Fort Worth	0	896	1,621	2,009	2,305	2,560
Phase I-Increase delivery infrastructure from Ft Worth; joint project with Ft Worth, Westlake, Trophy Club	*0*	*896*	*1,621*	*2,009*	*2,305*	*2,560*
Phase II-Increase delivery infrastructure from Ft Worth; 24" line	*0*	*896*	*1,621*	*2,009*	*2,305*	*2,560*
Total Water Management Strategies	***233***	***1,179***	***1,923***	***2,331***	***2,647***	***2,922***
Trophy Club Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-312
Two Way Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,394**	**8,221**	**10,020**	**12,085**	**16,000**	**20,000**
Projected Water Demand						
Municipal Demand	710	884	1,060	1,268	1,674	2,090
Total Projected Demand	***710***	***884***	***1,060***	***1,268***	***1,674***	***2,090***
Currently Available Water Supplies						
Trinity Aquifer	710	710	710	710	710	710
Total Current Supplies	***710***	***710***	***710***	***710***	***710***	***710***
Need (Demand - Current Supply)	***0***	***174***	***350***	***558***	***964***	***1,380***
Water Management Strategies						
Water Conservation	6	9	11	17	28	42
Grayson Co Water Supply Project (Northwest WTP)	0	165	339	541	936	1,338
Total Water Management Strategies	***6***	***174***	***350***	***558***	***964***	***1,380***
Two Way Special Utility District Reserve (Shortage)	**6**	**0**	**0**	**0**	**0**	**0**

Table C-313
University Park

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**25,688**	**25,688**	**25,688**	**25,688**	**25,688**	**25,688**
Projected Water Demand						
Municipal Demand	7,622	7,515	7,427	7,379	7,371	7,370
Total Projected Demand	***7,622***	***7,515***	***7,427***	***7,379***	***7,371***	***7,370***
Currently Available Water Supplies						
Dallas County Park Cities MUD	7,558	7,427	7,353	7,281	7,248	7,223
Total Current Supplies	***7,558***	***7,427***	***7,353***	***7,281***	***7,248***	***7,223***
Need (Demand - Current Supply)	***64***	***88***	***74***	***98***	***123***	***147***
Water Management Strategies						
Water Conservation	64	88	74	98	123	147
Total Water Management Strategies	***64***	***88***	***74***	***98***	***123***	***147***
University Park Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-314
Valley View

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**820**	**880**	**926**	**972**	**1,010**	**1,043**
Projected Water Demand						
Municipal Demand	56	60	63	66	68	71
Total Projected Demand	***56***	***60***	***63***	***66***	***68***	***71***
Currently Available Water Supplies						
Trinity Aquifer	56	56	56	56	56	56
Total Current Supplies	***56***	***56***	***56***	***56***	***56***	***56***
Need (Demand - Current Supply)	***0***	***4***	***7***	***10***	***12***	***15***
Water Management Strategies						
Water Conservation	0	1	1	1	1	1
Connect to Gainesville System	0	3	6	9	11	14
Total Water Management Strategies	***0***	***4***	***7***	***10***	***12***	***15***
Valley View Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-315
Van Alstyne

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Projected Population	**3,735**	**4,530**	**5,314**	**6,214**	**18,000**	**25,000**
Projected Water Demand						
Municipal Demand	517	608	700	811	2,337	3,243
Total Projected Demand	***517***	***608***	***700***	***811***	***2,337***	***3,243***
Currently Available Water Supplies						
Trinity Aquifer	0	0	0	0	0	0
Woodbine Aquifer	517	517	517	517	517	517
Greater Texoma Utility Authority (Collin-Grayson Municipal Alliance Pipeline from NTMWD)	0	70	129	196	1,135	1,291
Total Current Supplies	***517***	***587***	***646***	***713***	***1,652***	***1,808***
Need (Demand - Current Supply)	***0***	***21***	***54***	***98***	***685***	***1,435***
Water Management Strategies						
Water Conservation	4	7	7	11	39	65
Additional Water from GTUA and Expanded CGMA Pipeline	0	14	47	87	646	1,370
Water System Improvementsto take delivery of water from GTUA	*0*	*14*	*47*	*87*	*646*	*1,370*
Total Water Management Strategies	***4***	***21***	***54***	***98***	***685***	***1,435***
Van Alstyne Reserve (Shortage)	**4**	**0**	**0**	**0**	**0**	**0**

Table C-316
Venus (Regions C and G)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Projected Population	**3,418**	**3,954**	**4,510**	**5,122**	**5,785**	**6,499**
Projected Water Demand						
Municipal Demand	640	730	826	935	1,053	1,182
Total Projected Demand	***640***	***730***	***826***	***935***	***1,053***	***1,182***
Currently Available Water Supplies						
Woodbine Aquifer (Region G)	211	211	211	211	211	211
Midlothian	269	275	263	260	261	268
Total Current Supplies	***480***	***486***	***474***	***471***	***472***	***479***
Need (Demand - Current Supply)	***160***	***244***	***352***	***464***	***581***	***703***
Water Management Strategies						
Water Conservation	0	1	1	1	1	2
Additional Water from Midlothian	160	243	351	463	580	701
Total Water Management Strategies	***160***	***244***	***352***	***464***	***581***	***703***
Venus (Regions C and G) Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-317
Virginia Hill Water Supply Corporation (Regions C and I)

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,526**	**2,898**	**3,208**	**3,617**	**4,000**	**4,500**
Projected Water Demand						
Municipal Demand	420	460	494	548	602	667
Total Projected Demand	***420***	***460***	***494***	***548***	***602***	***667***
Currently Available Water Supplies						
Carrizo-Wilcox Aquifer	387	387	388	387	388	394
Carrizo-Wilcox Aquifer (to Region I portion)	280	280	279	280	279	273
Total Current Supplies	***667***	***667***	***667***	***667***	***667***	***667***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	2	3	3	4	6	8
Total Water Management Strategies	***2***	***3***	***3***	***4***	***6***	***8***
Virginia Hill Water Supply Corporation (Regions C and I) Reserve (Shortage)	**249**	**210**	**176**	**123**	**71**	**8**

Table C-318
Watauga

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**25,000**	**25,000**	**25,000**	**25,000**	**25,000**	**25,000**
Projected Water Demand						
Municipal Demand	2,899	2,794	2,707	2,659	2,650	2,650
Total Projected Demand	***2,899***	***2,794***	***2,707***	***2,659***	***2,650***	***2,650***
Currently Available Water Supplies						
North Richland Hills (from Fort Worth/TRWD)	1,895	1,642	1,426	1,416	1,414	1,372
Total Current Supplies	***1,895***	***1,642***	***1,426***	***1,416***	***1,414***	***1,372***
Need (Demand - Current Supply)	***1,004***	***1,152***	***1,281***	***1,243***	***1,236***	***1,278***
Water Management Strategies						
Water Conservation	24	33	27	35	44	53
Additional Water from North Richland Hills (Ft Worth/TRWD)	980	1,119	1,254	1,208	1,192	1,225
Increase in delivery infrastructure from Fort Worth (jointly with N. Richland Hills)	*See North Richland Hills*					
Total Water Management Strategies	***1,004***	***1,152***	***1,281***	***1,243***	***1,236***	***1,278***
Watauga Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-319
West Wise Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,459**	**3,580**	**3,705**	**3,835**	**3,969**	**4,108**
Projected Water Demand						
Municipal Demand	425	424	427	435	449	464
Demand for Chico	14	20	28	218	329	459
Total Projected Demand	***439***	***444***	***455***	***653***	***778***	***923***
Currently Available Water Supplies						
Tarrant Regional Water District (direct 95% and through Walnut Creek SUD 5%)	425	386	344	310	283	260
Tarrant Regional WD (direct 95% and through Walnut Creek SUD 5%) for Chico	13	13	13	13	13	13
Total Current Supplies	***438***	***399***	***357***	***323***	***296***	***273***
Need (Demand - Current Supply)	***1***	***45***	***98***	***330***	***482***	***650***
Water Management Strategies						
Water Conservation (West Wise SUD only)	4	5	4	6	7	9
Additional Water from TRWD with infrastructure below:	0	40	94	324	475	641
0.8 MGD Water Treatment Plant Expansion				*54*	*172*	*308*
Total Water Management Strategies	***4***	***45***	***98***	***330***	***482***	***650***
West Wise Special Utility District Reserve (Shortage)	**3**	**0**	**0**	**0**	**0**	**0**

Table C-320
Westlake

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,200**	**1,800**	**2,609**	**3,144**	**3,682**	**4,211**
Projected Water Demand						
Municipal Demand	1,388	2,078	3,007	3,623	4,242	4,850
Total Projected Demand	***1,388***	***2,078***	***3,007***	***3,623***	***4,242***	***4,850***
Currently Available Water Supplies						
Fort Worth (TRWD)	1,363	1,676	2,055	2,230	2,390	2,512
Total Current Supplies	***1,363***	***1,676***	***2,055***	***2,230***	***2,390***	***2,512***
Need (Demand - Current Supply)	***25***	***402***	***952***	***1,393***	***1,852***	***2,338***
Water Management Strategies						
Water Conservation	25	52	90	121	156	194
Additional Ft Worth (TRWD)	0	350	862	1,272	1,696	2,144
Increase delivery infrastructure from Ft Worth; joint project with Ft Worth, Westlake, Trophy Club	*42*	*705*	*1,596*	*2,181*	*2,765*	*3,335*
Total Water Management Strategies	***25***	***402***	***952***	***1,393***	***1,852***	***2,338***
Westlake Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-321
Weston

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,370**	**7,159**	**32,647**	**79,837**	**127,026**	**127,026**
Projected Water Demand						
Municipal Demand	506	1,060	4,814	11,768	18,723	18,721
Total Projected Demand	***506***	***1,060***	***4,814***	***11,768***	***18,723***	***18,721***
Currently Available Water Supplies						
Woodbine Aquifer	435	435	435	435	435	435
Total Current Supplies	***435***	***435***	***435***	***435***	***435***	***435***
Need (Demand - Current Supply)	***71***	***625***	***4,379***	***11,333***	***18,288***	***18,286***
Water Management Strategies						
Water Conservation	4	10	48	157	312	374
New Wells in Woodbine Aquifer	71	71	71	71	71	71
Connect to North Texas Municipal Water District	0	829	4,600	11,501	18,301	18,237
Total Water Management Strategies	***75***	***910***	***4,719***	***11,729***	***18,684***	***18,682***
Weston Reserve (Shortage)	**4**	**285**	**340**	**396**	**396**	**396**

Table C-322
Westover Hills

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**698**	**715**	**732**	**749**	**766**	**782**
Projected Water Demand						
Municipal Demand	952	972	992	1,013	1,036	1,058
Total Projected Demand	***952***	***972***	***992***	***1,013***	***1,036***	***1,058***
Currently Available Water Supplies						
Fort Worth (TRWD)	913	784	678	624	584	548
Total Current Supplies	***913***	***784***	***678***	***624***	***584***	***548***
Need (Demand - Current Supply)	***39***	***188***	***314***	***389***	***452***	***510***
Water Management Strategies						
Water Conservation	39	85	90	95	101	107
Additional Water from Fort Worth	0	103	224	294	351	403
Total Water Management Strategies	***39***	***188***	***314***	***389***	***452***	***510***
Westover Hills Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-323
Westworth Village

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**2,700**	**2,945**	**3,187**	**3,422**	**3,658**	**3,889**
Projected Water Demand						
Municipal Demand	395	417	441	468	499	530
Total Projected Demand	***395***	***417***	***441***	***468***	***499***	***530***
Currently Available Water Supplies						
Fort Worth (TRWD)	392	336	301	288	281	274
Total Current Supplies	***392***	***336***	***301***	***288***	***281***	***274***
Need (Demand - Current Supply)	***3***	***81***	***140***	***180***	***218***	***256***
Water Management Strategies						
Water Conservation	3	5	4	6	8	11
Additional Water from Fort Worth	0	76	136	174	210	245
Total Water Management Strategies	***3***	***81***	***140***	***180***	***218***	***256***
Westworth Village Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-324
White Settlement

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**16,957**	**17,858**	**18,750**	**22,000**	**28,000**	**34,000**
Projected Water Demand						
Municipal Demand	2,081	2,108	2,146	2,472	3,132	3,798
Total Projected Demand	***2,081***	***2,108***	***2,146***	***2,472***	***3,132***	***3,798***
Currently Available Water Supplies						
Trinity Aquifer	1,040	1,040	1,040	1,040	1,040	1,040
Fort Worth (TRWD)	1,024	861	756	881	1,178	1,428
Total Current Supplies	***2,064***	***1,901***	***1,796***	***1,921***	***2,218***	***2,468***
Need (Demand - Current Supply)	***17***	***207***	***350***	***551***	***914***	***1,330***
Water Management Strategies						
Water Conservation	17	24	21	33	52	76
Additional Water from Fort Worth	0	183	329	518	862	1,254
Total Water Management Strategies	***17***	***207***	***350***	***551***	***914***	***1,330***
White Settlement Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-325
Whitesboro

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**3,834**	**3,882**	**3,929**	**3,983**	**5,000**	**6,500**
Projected Water Demand						
Municipal Demand	469	458	450	449	560	726
Total Projected Demand	***469***	***458***	***450***	***449***	***560***	***726***
Currently Available Water Supplies						
Trinity Aquifer	547	547	547	547	547	547
Total Current Supplies	***547***	***547***	***547***	***547***	***547***	***547***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***13***	***179***
Water Management Strategies						
Water Conservation	4	5	5	6	9	15
Grayson County Water Supply Project (Northwest WTP)	0	0	0	0	4	164
Total Water Management Strategies	***4***	***5***	***5***	***6***	***13***	***179***
Whitesboro Reserve (Shortage)	**82**	**94**	**102**	**104**	**0**	**0**
Alternate Water Management Strategies						
Grayson County Water Supply Project (Sherman WTP)	0	0	0	0	4	164

Table C-326
Whitewright

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,605**	**1,625**	**1,645**	**1,665**	**1,765**	**1,865**
Projected Water Demand						
Municipal Demand	222	216	212	212	224	237
Total Projected Demand	***222***	***216***	***212***	***212***	***224***	***237***
Currently Available Water Supplies						
Woodbine Aquifer	284	284	284	284	284	284
Total Current Supplies	***284***	***284***	***284***	***284***	***284***	***284***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
Water Conservation	2	3	2	3	4	5
Grayson County Water Supply Project (Sherman WTP)	0	0	48	47	96	95
Total Water Management Strategies	***2***	***3***	***50***	***50***	***100***	***100***
Whitewright Reserve (Shortage)	**64**	**71**	**122**	**122**	**160**	**147**

Table C-327
Willow Park

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,877**	**5,960**	**7,184**	**10,000**	**13,000**	**16,000**
Projected Water Demand						
Municipal Demand	759	904	1,074	1,483	1,924	2,366
Total Projected Demand	***759***	***904***	***1,074***	***1,483***	***1,924***	***2,366***
Currently Available Water Supplies						
Trinity Aquifer	757	757	757	757	757	757
Total Current Supplies	***757***	***757***	***757***	***757***	***757***	***757***
Need (Demand - Current Supply)	***2***	***147***	***317***	***726***	***1,167***	***1,609***
Water Management Strategies						
Water Conservation	6	10	11	20	32	47
Weatherford (TRWD) initial connection	0	137	306	706	1,135	1,562
Total Water Management Strategies	***6***	***147***	***317***	***726***	***1,167***	***1,609***
Willow Park Reserve (Shortage)	**4**	**0**	**0**	**0**	**0**	**0**
Alternate Water Management Strategies						
Fort Worth (TRWD)	0	137	306	706	1,135	1,562

Table C-328
Wilmer

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**4,203**	**4,698**	**7,500**	**14,000**	**22,000**	**40,000**
Projected Water Demand						
Municipal Demand	433	466	718	1,323	2,073	3,763
Total Projected Demand	***433***	***466***	***718***	***1,323***	***2,073***	***3,763***
Currently Available Water Supplies						
Trinity Aquifer	29	29	29	29	29	29
Hutchins (DWU)	193	190				
Total Current Supplies	***222***	***219***	***29***	***29***	***29***	***29***
Need (Demand - Current Supply)	***211***	***247***	***689***	***1,294***	***2,044***	***3,734***
Water Management Strategies						
Water Conservation	4	5	7	18	35	75
New Connection to Dallas (via Lancaster)	207	242	300	400	600	800
Direct Connection to Dallas 36" Transmission Line			382	876	1,409	2,859
Total Water Management Strategies	***211***	***247***	***689***	***1,294***	***2,044***	***3,734***
Wilmer Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-329
Wise County Irrigation

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,324**	**1,324**	**1,324**	**1,324**	**1,324**	**1,324**
Currently Available Water Supplies						
Local Supplies	139	139	139	139	139	139
Trinity Aquifer	680	680	680	680	680	680
Tarrant Regional Water District	124	124	124	124	124	124
Total Current Supplies	***943***	***943***	***943***	***943***	***943***	***943***
Need (Demand - Current Supply)	***381***	***381***	***381***	***381***	***381***	***381***
Water Management Strategies						
Water Conservation	0	0	1	1	1	1
Add'l TRWD (new contract)	406	406	405	405	405	405
Total Water Management Strategies	***406***	***406***	***406***	***406***	***406***	***406***
Wise County Irrigation Reserve (Shortage)	**25**	**25**	**25**	**25**	**25**	**25**

Table C-330
Wise County Livestock

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,575**	**1,575**	**1,575**	**1,575**	**1,575**	**1,575**
Currently Available Water Supplies						
Trinity Aquifer	458	458	458	458	458	458
Local Supplies	1,117	1,117	1,117	1,117	1,117	1,117
Total Current Supplies	***1,575***	***1,575***	***1,575***	***1,575***	***1,575***	***1,575***
Need (Demand - Current Supply)	***0***	***0***	***0***	***0***	***0***	***0***
Water Management Strategies						
None						
Total Water Management Strategies	***0***	***0***	***0***	***0***	***0***	***0***
Wise County Livestock Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-331
Wise County Manufacturing

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**2,660**	**2,979**	**3,277**	**3,539**	**3,858**	**4,206**
Currently Available Water Supplies						
Trinity Aquifer	250	250	250	250	250	250
Tarrant Regional Water District direct	2,022	2,128	2,117	2,077	2,059	2,035
Tarrant Regional Water District (through Wise Co WSD)	138	128	117	83	70	62
Total Current Supplies	***2,410***	***2,506***	***2,484***	***2,410***	***2,379***	***2,347***
Need (Demand - Current Supply)	***250***	***473***	***793***	***1,129***	***1,479***	***1,859***
Water Management Strategies						
Water Conservation	0	0	1	1	1	1
Additional water from TRWD	0	223	542	878	1,228	1,608
New Wells in Trinity Aquifer	250	250	250	250	250	250
Total Water Management Strategies	***250***	***473***	***793***	***1,129***	***1,479***	***1,859***
Wise County Manufacturing Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-332
Wise County Mining

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**10,320**	**11,159**	**12,337**	**13,975**	**15,378**	**17,694**
Currently Available Water Supplies						
Reuse	6,261	6,261	6,261	6,261	6,076	6,076
Run-of-river - Trinity	133	133	133	133	133	133
Trinity Aquifer	2,155	2,155	2,155	2,155	2,155	2,155
Tarrant Regional Water District (direct & thru Bridgeport)	2,896	2,896	2,896	2,896	2,896	2,896
Total Current Supplies	***11,445***	***11,445***	***11,445***	***11,445***	***11,260***	***11,260***
Need (Demand - Current Supply)	***0***	***0***	***892***	***2,530***	***4,118***	***6,434***
Water Management Strategies						
Add'l Water from TRWD (increase contract)	200	452	805	1,297	1,717	2,412
Reuse - Recycled water	0	0	87	1,234	2,401	4,022
Total Water Management Strategies	***200***	***452***	***892***	***2,531***	***4,118***	***6,434***
Wise County Mining Reserve (Shortage)	**1,325**	**738**	**0**	**1**	**0**	**0**

Table C-333
Wise County Other

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**30,543**	**30,543**	**30,543**	**45,000**	**58,000**	**70,000**
Projected Water Demand						
Municipal Demand	3,667	3,565	3,485	5,039	6,465	7,794
Total Projected Water Demand	***3,667***	***3,565***	***3,485***	***5,039***	***6,465***	***7,794***
Currently Available Water Supplies						
Trinity Aquifer	2,584	2,584	2,584	2,584	2,584	2,584
Tarrant Regional Water District through Wise County WSD	506	374	284	540	667	733
Tarrant Regional Water District through Walnut Creek SUD	110	97	84	107	109	101
Total Current Supplies	***3,200***	***3,055***	***2,952***	***3,231***	***3,360***	***3,418***
Need (Demand - Current Supply)	***467***	***510***	***533***	***1,808***	***3,105***	***4,376***
Water Management Strategies						
Water Conservation	31	42	35	67	108	156
Additional TRWD	436	468	498	1,741	2,997	4,220
Total Water Management Strategies	***467***	***510***	***533***	***1,808***	***3,105***	***4,376***
Wise County Other Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-334
Wise County Steam Electric Power

(Values in Ac-Ft/Yr)	Projected Demand					
	2020	2030	2040	2050	2060	2070
Projected Water Demand	**1,494**	**1,459**	**2,254**	**2,450**	**3,298**	**3,673**
Currently Available Water Supplies						
Tarrant Regional Water District	1,494	1,328	1,813	1,741	2,091	2,078
Total Current Supplies	***1,494***	***1,328***	***1,813***	***1,741***	***2,091***	***2,078***
Need (Demand - Current Supply)	***0***	***131***	***441***	***709***	***1,207***	***1,595***
Water Management Strategies						
Additional Water from TRWD	0	131	441	709	1,207	1,595
Total Water Management Strategies	***0***	***131***	***441***	***709***	***1,207***	***1,595***
Wise County Steam Electric Power Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-335
Woodbine Water Supply Corporation

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**6,215**	**7,040**	**7,865**	**8,690**	**9,515**	**10,340**
Projected Water Demand						
Municipal Demand	660	717	778	848	925	1,004
Total Projected Demand	***660***	***717***	***778***	***848***	***925***	***1,004***
Currently Available Water Supplies						
Trinity Aquifer	667	667	667	667	667	667
Total Current Supplies	***667***	***667***	***667***	***667***	***667***	***667***
Need (Demand - Current Supply)	***0***	***50***	***111***	***181***	***258***	***337***
Water Management Strategies						
Water Conservation	6	8	8	11	15	20
Connect to Gainesville system	0	42	103	170	243	317
Total Water Management Strategies	***6***	***50***	***111***	***181***	***258***	***337***
Woodbine Water Supply Corporation Reserve (Shortage)	**13**	**0**	**0**	**0**	**0**	**0**

Table C-336
Wortham

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**1,175**	**1,267**	**1,331**	**1,378**	**2,300**	**2,600**
Projected Water Demand						
Municipal Demand	168	175	179	183	303	343
Total Projected Demand	***168***	***175***	***179***	***183***	***303***	***343***
Currently Available Water Supplies						
Mexia	157	157	157	157	157	157
Total Current Supplies	***157***	***157***	***157***	***157***	***157***	***157***
Need (Demand - Current Supply)	***11***	***18***	***22***	***26***	***146***	***186***
Water Management Strategies						
Water Conservation	1	2	2	2	5	7
Additional supply from Mexia (Reg G)	10	16	20	24	141	179
Total Water Management Strategies	***11***	***18***	***22***	***26***	***146***	***186***
Wortham Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-337
Wylie

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	**48,484**	**54,198**	**58,000**	**61,000**	**63,000**	**65,000**
Projected Water Demand						
Municipal Demand	7,308	8,052	8,552	8,954	9,230	9,519
Manufacturing Demand (1% Collin Co)	35	39	43	47	51	55
Total Projected Demand	***7,343***	***8,091***	***8,595***	***9,001***	***9,281***	***9,574***
Currently Available Water Supplies						
North Texas Municipal Water District	6,733	6,170	6,041	5,961	5,758	5,498
NTMWD (for Manufacturing)	32	30	31	31	32	32
Total Current Supplies	***6,765***	***6,200***	***6,072***	***5,992***	***5,790***	***5,530***
Need (Demand - Current Supply)	***578***	***1,891***	***2,523***	***3,009***	***3,491***	***4,044***
Water Management Strategies						
Water Conservation	61	90	86	119	154	190
Water Conservation - manufacturing	0	0	1	1	1	2
Additional Water from NTMWD	514	1,792	2,425	2,874	3,318	3,831
Add'l Water from NTMWD for Manf	3	9	11	15	18	21
Total Water Management Strategies	***578***	***1,891***	***2,523***	***3,009***	***3,491***	***4,044***
Wylie Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Table C-338
Wylie Northeast Special Utility District

(Values in Ac-Ft/Yr)	Projected Population and Demand					
	2020	2030	2040	2050	2060	2070
Projected Population	1,889	2,390	3,000	6,000	10,000	16,000
St. Paul Population	1,965	2,255	2,453	2,559	2,666	2,666
Collin County Other Population	1,813	4,022	4,714	2,358	0	0
Total Population	**5,667**	**8,667**	**10,167**	**10,917**	**12,666**	**18,666**
Projected Water Demand						
Municipal Demand	257	319	396	785	1,305	2,086
St. Paul	265	298	322	334	348	347
Collin County Other	0	111	136	0	0	0
Total Projected Demand	***522***	***728***	***854***	***1,119***	***1,653***	***2,433***
Currently Available Water Supplies						
NTWMD	237	244	280	523	814	1,205
NTWMD for St. Paul	244	228	227	222	217	200
NTWMD for Collin County Other	0	85	96	0	0	0
Total Current Supplies	***481***	***558***	***603***	***745***	***1,031***	***1,405***
Need (Demand - Current Supply)	***41***	***170***	***251***	***374***	***622***	***1,028***
Water Management Strategies						
Water Conservation	2	3	4	10	22	42
Water Conservation (St. Paul)	2	3	3	4	6	7
Water Conservation (Collin Co Other)	0	1	1	0	0	0
Additional Water from NTMWD	18	72	112	252	469	839
Additional Water from NTMWD for St. Paul	19	67	92	108	125	140
Additional Water from NTMWD for Collin County Other	0	25	39	0	0	0
Increase delivery infrastructure from NTWMD	*37*	*163*	*243*	*360*	*594*	*979*
Total Water Management Strategies	***41***	***170***	***251***	***374***	***622***	***1,028***
Wylie Northeast Special Utility District Reserve (Shortage)	**0**	**0**	**0**	**0**	**0**	**0**

Appendix D

APPENDIX D

REGION C POPULATION PROJECTIONS/WATER DEMANDS SURVEY INSTRUMENT

Introduction

Welcome to the Region C Water Planning Group survey of population, water demand and water supply. Thank you for taking the time to provide input to this important water planning process. The following questions will collect information from you regarding your population and water demand projections and water supply strategies. We need your input on this data by April 12, 2013 to ensure that the 2016 Region C Water Plan (and the subsequent 2017 State Water Plan) includes adequate water supplies to meet the projected water demands for your entity. If you haven't done so already, please review the new population and water demand projections prepared by the Texas Water Development Board (TWDB), which were provided to you as an attachment in the original email that also contained a link to this survey.

If your entity was included as a Water User Group (WUG) in the 2011 Region C Water Plan, then you should also review the previous population, water demand and water supply projections from the 2011 water plan – this information was also provided to you as an attachment in the original email that contained a link to this survey. (If this is the first time your entity has been included as a WUG, then there was no information regarding your specific entity in the 2011 Region C Water Plan, and therefore you did not receive a second attachment.)

The following questions are broken down into the following sections:
Section 1 – General Information
Section 2 – Population and Water Demand
Section 3 – Water Supplies
Section 4 – Conservation, Reuse and Drought Response

If you have any questions, or need help completing this survey, please contact Gil Barnett at (817) 662-1215 or by email at gbarnett@cpyi.com.

Helpful tips for completing this survey:
1. The answers that you provide on each page are saved once you select [Next] at the bottom of the page. If you select [Previous] while in the middle of answering questions on a particular page, then you will lose the information that you typed in on that page. Information provided on previous pages will still be retained.

2. If you want to change a response on a previous page without losing any answers that you've typed on a current page, then select [Next] (to save your current answers), and then select [Previous] until you get back to the desired page.

3. You may exit the survey at any time by closing the web page or browser, and may come back to finish the survey later. If you do so, the survey will remember your previous answers - provided that you selected [Next]. Therefore, if you need to stop in the middle of the survey, you can finish it later without having to re-enter all of the information again from the beginning.

4. If you start entering information from one computer, but then try to switch to a new computer to finish the survey, then it may not remember your previous answers. This is because it creates a new "entry" from the new computer.

5. Once you select [Finish] at the end of the survey, you cannot go back and edit your responses, nor can you access the survey any longer through the link. If you want to change a response after selecting [Finish], please contact Gil Barnett at (817) 354-0189 or gbarnett@cpyi.com.

Section 1 - General Information

The following questions in this section request general contact information for you and the entity you represent.

CAUTION! At any time, if you want to go back and adjust your answers to a previous question, please use the "Prev" button at the bottom of whatever current page you are on. Do not use your browser's "Back" button.

* 1. Please enter the name of the entity for which you are providing input:

* 2. Please enter your contact information:

Name:

Title (Mayor, Director, Superintendent, etc.)

Address:

Address 2:

City/Town:

State:

ZIP:

Salutation (Mr., Ms., etc.)

Email Address:

Phone Number:

3. As the contact person for your entity, you have been placed on the mailing list for the Region C newsletter. If there is someone else that you would like to also receive the Region C newsletter, you can enter their information now.

Name:

Organization:

Address:

Address 2:

City/Town:

State:

ZIP:

Email Address:

Phone Number:

If you would like to add multiple people to the distribution list for the Region C newsletter, please email Colby Walton at colby@cookseypr.com with the additional contact information.

4. For market research purposes, please enter your preferred method for receiving the Region C newsletter:

- ◯ Print version (by mail)
- ◯ Electronic version (by email)
- ◯ Both print and electronic versions

5. Is your entity a "city" (i.e. city or town), or a "non-city" (i.e. water supply corporation, special utility district, etc.)

- ◯ City/Town
- ◯ Non-city

Section 2a - Population and Water Demand (Cities and Towns)

For this section, please review the new population and water demand projections prepared by the Texas Water Development Board (TWDB) for the years 2020-2070. This information was provided to you as a PDF attachment in the original email that contained a link to this survey. (If your city/town was included as a WUG in the 2011 Region C Water Plan, you may also want to review the previous projections from that plan. This information was also provided to you as a PDF attachment in the original email.)

*** 6. Do you agree with the new population projections for your city (or town)? Please note that these projections are only for your city (or town). If you provide water to other customers outside of your city (or town) limits, then that population is included in projections elsewhere. (If you disagree, you will have the opportunity to recommend your own population projections.)**

- ◯ The new population projections for 2020-2070 are [reasonably accurate].
- ◯ The new population projections for 2020-2070 are [much too low].
- ◯ The new population projections for 2020-2070 are [slightly too low].
- ◯ The new population projections for 2020-2070 are [slightly too high].
- ◯ The new population projections for 2020-2070 are [much too high].

Additional Comments:

7. If you have an estimate of your ultimate build-out population, please enter your build-out population and the approximate year that you expect to reach build-out

Ultimate build-out population:

Anticipated year of build-out:

*** 8. Do you agree with the new water demand projections for your city (or town)? Please note that these demands are in acre-feet per year (1 MGD = 1120 acre-feet per year) and are dry-year demands with no conservation included. Please also note that these projections are only for your city (or town). If you provide water to other customers outside of your city (or town) limits, then that population is included in projections elsewhere. (If you disagree, you will have the opportunity to recommend your own water demand projections.)**

- ◯ The new water demand projections for 2020-2070 are [reasonably accurate].
- ◯ The new water demand projections for 2020-2070 are [much too low].
- ◯ The new water demand projections for 2020-2070 are [slightly too low].
- ◯ The new water demand projections for 2020-2070 are [slightly too high].
- ◯ The new water demand projections for 2020-2070 are [much too high].

Additional comments:

*** 9. If you disagreed with the new TWDB projections (for either population or water demand), would you like to recommend new population and/or water demand projections?**

- ◯ Yes
- ◯ No
- ◯ N/A, I agreed with the new TWDB projections

Section 2a - Population and Water Demand (Cities and Towns) - continued

You reached this part of Section 2a because you indicated that you wanted to provide new recommendations for population and/or water demand projections. Please answer the following questions. You may skip questions for which you do not wish to provide any information (for example, if you agreed with the TWDB population projections, but disagreed with the TWDB water demand projections, then you can skip the population-related questions and just provide new recommendations for water demand.)

10. Please enter your recommended population projections for all decades:

2020:

2030:

2040:

2050:

2060:

2070:

11. What is the basis for your recommended changes to the population projections?

12. Please enter your recommended water demand projections for all decades. (Water demand projections should be annual average water demands, not peak water demands.) Please enter only numerical values for each decade (without commas), and then indicate the units of measurement in the last box.

2020:

2030:

2040:

2050:

2060:

2070:

Unit of measurement (Acre-Feet per Year, MGD, MG per year, GPD, Thousand Gallons per Day, Thousand Gallons per Year, etc.)

13. What is the basis for your recommended changes?

Section 2a - Population and Water Demand (Cities and Towns) - continued

*** 14. Customers can be classified as either "retail" or "wholesale". When water suppliers provide water directly to the consumer (such as a person, family, or business), they are considered "retail" customers. When a water supplier provides water to another water supplier (such as to another city, town, water supply corporation, water utility district, etc.) then those are considered "wholesale" customers. Are your customers "retail", "wholesale" or do you have some of both?**

- ◯ Retail Only
- ◯ Wholesale Only
- ◯ Both Retail and Wholesale

Additional Comments:

If you indicated that you supply water ONLY on a wholesale basis (and therefore do not have any retail customers), then please skip to the bottom of this page and select "Next". Otherwise, please answer the remaining questions on this page.

15. Does your "retail" service area extend beyond your city (or town) boundary? (If your "retail" service area generally reflects your city/town boundary, then please skip to the bottom of this page and select "Next". If your "retail" service area extends beyond your city/town boundary, then the following questions will seek information about the population and water demand of your "retail" customers served outside of your city/town boundary.)

- ◯ My service area generally reflects my city (or town) boundary
- ◯ My service area extends beyond my city (or town) boundary

16. Please enter your recommended population projections for this service area that is outside of your city (or town) boundary:

2020:

2030:

2040:

2050:

2060:

2070:

17. Please enter your recommended water demand projections for this service area that is outside of your city (or town) boundary. (Water demand projections should be annual average water demands, not peak water demands.)

2020:	
2030:	
2040:	
2050:	
2060:	
2070:	
Unit of measurement (Acre-Feet per Year, MGD, MG per year, GPD, Thousand Gallons per Day, Thousand Gallons per Year, etc.)	

18. If these additional retail customers, that are located outside of your city/town boundary, are located in another city/town limits then please indicate which city or town. If they are not located within another city or town, then please indicate which county they are located in.

Section 2b - Population and Water Demand (Non-cities)

For this section, please review the new population and water demand projections prepared by the Texas Water Development Board (TWDB) for the years 2020-2070. This information was provided to you as a PDF attachment in the original email that contained a link to this survey. (If your entity was included as a WUG in the 2011 Region C Water Plan, you may also want to review the previous projections from that plan. This information was also provided to you as a PDF attachment in the original email.)

*** 19. Do you agree with the new population projections for your service area, not including any wholesale customers? (If you disagree, you will have the opportunity to recommend your own population projections.)**

- ◯ The new population projections for 2020-2070 are [reasonably accurate].
- ◯ The new population projections for 2020-2070 are [much too low].
- ◯ The new population projections for 2020-2070 are [slightly too low].
- ◯ The new population projections for 2020-2070 are [slightly too high].
- ◯ The new population projections for 2020-2070 are [much too high].

Additional Comments:

20. If you have an estimate of your ultimate build-out population, please enter your build-out population and the approximate year that you expect to reach build-out. (if you do not have an estimate of your ultimate build-out population, then you may leave this question blank.)

Ultimate build-out population:

Anticipated year of build-out:

*** 21. Do you agree with the new water demand projections for your entity? Please note that these demands are in acre-feet per year (1 MGD = 1120 acre-feet per year) and are dry-year demands with no conservation included. (If you disagree, you will have the opportunity to recommend your own water demand projections.)**

- ◯ The new water demand projections for 2020-2070 are [reasonably accurate].
- ◯ The new water demand projections for 2020-2070 are [much too low].
- ◯ The new water demand projections for 2020-2070 are [slightly too low].
- ◯ The new water demand projections for 2020-2070 are [slightly too high].
- ◯ The new water demand projections for 2020-2070 are [much too high].

Additional comments:

*** 22. If you disagreed with the new TWDB projections (for either population or water demand), would you like to recommend new population and/or water demand projections?**

- ◯ Yes
- ◯ No
- ◯ N/A, I agreed with the new TWDB projections

Section 2b - Population and Water Demand (Non-cities) - continued

You reached this part of Section 2b because you indicated that you wanted to provide new recommendations for population and/or water demand projections. Please answer the following questions. You may skip questions for which you do not wish to provide any information (for example, if you agreed with the TWDB population projections, but disagreed with the TWDB water demand projections, then you can skip the population-related questions and just provide new recommendations for water demand.)

23. Please enter your recommended population projections for all decades:

2020:

2030:

2040:

2050:

2060:

2070:

24. What is the basis for your recommended changes?

25. Please enter your recommended water demand projections for all decades. (Water demand projections should be annual average water demands, not peak water demands.)

2020:

2030:

2040:

2050:

2060:

2070:

Unit of measurement (Acre-Feet per Year, MGD, MG per year, GPD, Thousand Gallons per Day, Thousand Gallons per Year, etc.)

26. What is the basis for your recommended changes?

Section 2b - Population and Water Demand (Non-cities) - continued

*** 27. Customers can be classified as either "retail" or "wholesale". When water suppliers provide water directly to the consumer (such as a person, family, or business), they are considered "retail" customers. When a water supplier provides water to another water supplier (such as to another city, town, water supply corporation, water utility district, etc.) then those are considered "wholesale" customers. Are your customers "retail", "wholesale" or do you have some of both?**

- ◯ Retail Only
- ◯ Wholesale Only
- ◯ Both Retail and Wholesale

Additional Comments:

If you indicated that you supply water ONLY on a wholesale basis (and therefore do not have any retail customers), then please skip to the bottom of this page and select "Next". Otherwise, please answer the remaining questions on this page.

28. How much water did you supply to your retail customers during 2010, 2011 and 2012 (January - December). If you provide water to other cities or water suppliers on a wholesale basis, do not include that water in your response.

Amount supplied in 2010:

Amount supplied in 2011:

Amount supplied in 2012:

Unit of measurement:

29. Please estimate the number of water connections in your system for the years 2010, 2011 and 2012.

2010:

2011:

2012:

30. If you provide water to retail customers within a city's limits, please list the cities in which you provide retail water supply.

Section 2c - Population and Water Demand (Wholesale Water Customers)

The questions in this section seek information about any wholesale water customers that you may have - such as another city/town or another water supplier. If you do not have any wholesale water customers, please select "None" on the next question, and then skip to the next section.

*** 31. How many wholesale water customers do you provide water to?**

Comments:

If you indicated that you do not have any wholesale water customers, then please skip to the bottom of this page and select "Next".

32. Please provide the following information for the first wholesale water customer. If you provide water to multiple wholesale water customers, then please use the following questions to enter the information for each additional wholesale customer. Space is provided for entering information for up to five wholesale water customers. Once you have entered information for each of your wholesale water customers, then please skip to the next section. If you have more than five wholesale water customers, then we will contact you for additional information.

Customer Name:

Contractual Amount of Water to be Supplied (Annual Average):

Unit of Measurement:

Contractual Amount of Water to be Supplied (Peak Rate):

Unit of Measurement:

Pumping Capacity:

Unit of Measurement:

Pipeline Capacity:

Unit of Measurement:

Additional Comments:

33. Please provide the following information for the second wholesale water customer.

Customer Name:

Contractual Amount of Water to be Supplied (Annual Average):

Unit of Measurement:

Contractual Amount of Water to be Supplied (Peak Rate):

Unit of Measurement:

Pumping Capacity:

Unit of Measurement:

Pipeline Capacity:

Unit of Measurement:

Additional Comments:

34. Please provide the following information for the third wholesale water customer.

Customer Name:

Contractual Amount of Water to be Supplied (Annual Average):

Unit of Measurement:

Contractual Amount of Water to be Supplied (Peak Rate):

Unit of Measurement:

Pumping Capacity:

Unit of Measurement:

Pipeline Capacity:

Unit of Measurement:

Additional Comments:

35. Please provide the following information for the fourth wholesale water customer.

Customer Name:

Contractual Amount of Water to be Supplied (Annual Average):

Unit of Measurement:

Contractual Amount of Water to be Supplied (Peak Rate):

Unit of Measurement:

Pumping Capacity:

Unit of Measurement:

Pipeline Capacity:

Unit of Measurement:

Additional Comments:

36. Please provide the following information for the fifth wholesale water customer.

Customer Name:

Contractual Amount of Water to be Supplied (Annual Average):

Unit of Measurement:

Contractual Amount of Water to be Supplied (Peak Rate):

Unit of Measurement:

Pumping Capacity:

Unit of Measurement:

Pipeline Capacity:

Unit of Measurement:

Additional Comments:

37. If you indicated that you sell water to more than 5 wholesale water customers, please list the names of all of your wholesale water customers. We will contact you for additional information.

Section 2d - Population and Water Demand (Mining Operations)

The questions in this section seek information about any water that you supply for mining operations. If you do not suppl water for mining operations, please select "No" on the next question, and then skip to the next section.

* 38. Have you supplied, or do you plan to supply, water for mining operations in the Barnett Shale for natural gas drilling and/or exploration?

- ◯ Yes
- ◯ No

If you indicated that you do not supply water for mining operations, then please skip to the bottom of this page and select "Next".

39. Please provide any data that you may have regarding the amount of water supplied (historical and/or projections) for mining operations in the Barnett Shale for natural gas drilling and/or exploration.

Amount supplied in 2010:	
Amount supplied in 2011:	
Amount supplied in 2012:	
Projected amount to be supplied in 2020:	
Projected amount to be supplied in 2030:	
Projected amount to be supplied in 2040:	
Projected amount to be supplied in 2050:	
Projected amount to be supplied in 2060:	
Projected amount to be supplied in 2070:	
Unit of measurement (Ac-Ft/Yr, MGD, MG per Year, Thousand Gallons per Year, etc.)	

Section 3a - Water Supplies

For this section, please review your entity's current water supply sources and the proposed water management strategies from the 2011 Region C Plan (one of the PDF attachments to the original email). If the current water supply sources or water management strategy list requires changes or updates, the following series of questions will provide an opportunity for you to make updates.

*** 40. Do you agree with the list of currently available water supply sources? (If this is the first time your entity has been included as a WUG, then there is no information regarding your specific entity in the 2011 Region C Water Plan.)**

- ○ Yes
- ○ No
- ○ My entity was not included in the 2011 Region C Water Plan

41. If you selected "No", what changes are needed?

Section 3b - Water Supplies (Existing Purchased Water Contracts)

The following questions in this section are related to your contracts to purchase water (raw or treated) from other water suppliers. (Existing groundwater supplies and permitted surface water supplies are covered elsewhere in this survey.) If you do not purchase water from another water supplier, then please select "None" on the next question, and then skip to the next section.

*** 42. Do you have current contracts to purchase water from any water suppliers? How many?**

If you indicated that you do not have any contracts to purchase water from other water suppliers, then please skip to the bottom of this page and select "Next".

43. For each water supplier from whom you purchase water, please provide the following information. If you purchase water from multiple water suppliers, then please use the following questions to enter the information for each additional supplier. Space is provided for entering information for up to five contracts to purchase water. Once you have entered information for each of your water suppliers, then please skip to the next section. If you have more than five contracts to purchase water, then we will contact you for additional information.

Name of Water Supplier:

Is it "Raw" or "Treated" water:

Contractual Amount (Annual Average):

Units (Ac-Ft/Yr, MGD, etc.):

Contractual Amount (Peak Rate):

Units (Ac-Ft/Yr, MGD, etc.):

Pump Station Capacity:

Units (MGD, GPD, GPM, etc.):

Pipeline Capacity:

Units (MGD, GPD, GPM, etc.):

Additional Comments:

44. Please provide the following information for the next water supplier from whom you purchase water.

Name of Water Supplier:

Is it "Raw" or "Treated" water:

Contractual Amount (Annual Average):

Units (Ac-Ft/Yr, MGD, etc.):

Contractual Amount (Peak Rate):

Units (Ac-Ft/Yr, MGD, etc.):

Pump Station Capacity:

Units (MGD, GPD, GPM, etc.):

Pipeline Capacity:

Units (MGD, GPD, GPM, etc.):

Additional Comments:

45. Please provide the following information for the next water supplier from whom you purchase water.

Name of Water Supplier:

Is it "Raw" or "Treated" water:

Contractual Amount (Annual Average):

Units (Ac-Ft/Yr, MGD, etc.):

Contractual Amount (Peak Rate):

Units (Ac-Ft/Yr, MGD, etc.):

Pump Station Capacity:

Units (MGD, GPD, GPM, etc.):

Pipeline Capacity:

Units (MGD, GPD, GPM, etc.):

Additional Comments:

46. Please provide the following information for the next water supplier from whom you purchase water.

Name of Water Supplier:	
Is it "Raw" or "Treated" water:	
Contractual Amount (Annual Average):	
Units (Ac-Ft/Yr, MGD, etc.):	
Contractual Amount (Peak Rate):	
Units (Ac-Ft/Yr, MGD, etc.):	
Pump Station Capacity:	
Units (MGD, GPD, GPM, etc.):	
Pipeline Capacity:	
Units (MGD, GPD, GPM, etc.):	
Additional Comments:	

47. Please provide the following information for the next water supplier from whom you purchase water.

Name of Water Supplier:	
Is it "Raw" or "Treated" water:	
Contractual Amount (Annual Average):	
Units (Ac-Ft/Yr, MGD, etc.):	
Contractual Amount (Peak Rate):	
Units (Ac-Ft/Yr, MGD, etc.):	
Pump Station Capacity:	
Units (MGD, GPD, GPM, etc.):	
Pipeline Capacity:	
Units (MGD, GPD, GPM, etc.):	
Additional Comments:	

Section 3c - Water Supplies (Existing Surface Water Sources)

The following questions in this section are related to your existing permitted surface water supplies, if any. (Existing groundwater supplies and water purchased from other water suppliers are covered elsewhere in this survey.) If you do not have any permitted surface water supplies, then please select "None" on the next question and then skip to the next section.

*** 48. How many permitted Water Rights do you have?**

If you indicated that you do not have any permits for surface water supplies, then please skip to the bottom of this page and select "Next".

49. For each permitted Water Right, please provide as much of the following information as possible. If you have multiple permits, then please use the following questions to enter the information for each additional permitted Water Right. Space is provided for entering information for up to five permits. Once you have entered information for each of your permits, then please skip to the next section. If you have more than five permits, then we will contact you for additional information.

Name of water source:

Permit No.:

Permitted annual diversion amount:

Units (Ac-Ft/Yr, MGD, etc.):

Permitted peak rate diversion:

Units (Ac-Ft/Yr, MGD, etc.):

Pump Station Capacity:

Units (MGD, GPD, GPM, etc.):

Pipeline Capacity:

Units (MGD, GPD, GPM, etc.):

Additional Comments:

50. Please provide as much of the following information as possible for the next permitted Water Right.

Name of water source:	
Permit No.:	
Permitted annual diversion amount:	
Units (Ac-Ft/Yr, MGD, etc.):	
Permitted peak rate diversion:	
Units (Ac-Ft/Yr, MGD, etc.):	
Pump Station Capacity:	
Units (MGD, GPD, GPM, etc.):	
Pipeline Capacity:	
Units (MGD, GPD, GPM, etc.):	
Additional Comments:	

51. Please provide as much of the following information as possible for the next permitted Water Right.

Name of water source:	
Permit No.:	
Permitted annual diversion amount:	
Units (Ac-Ft/Yr, MGD, etc.):	
Permitted peak rate diversion:	
Units (Ac-Ft/Yr, MGD, etc.):	
Pump Station Capacity:	
Units (MGD, GPD, GPM, etc.):	
Pipeline Capacity:	
Units (MGD, GPD, GPM, etc.):	
Additional Comments:	

52. Please provide as much of the following information as possible for the next permitted Water Right.

Name of water source:	
Permit No.:	
Permitted annual diversion amount:	
Units (Ac-Ft/Yr, MGD, etc.):	
Permitted peak rate diversion:	
Units (Ac-Ft/Yr, MGD, etc.):	
Pump Station Capacity:	
Units (MGD, GPD, GPM, etc.):	
Pipeline Capacity:	
Units (MGD, GPD, GPM, etc.):	
Additional Comments:	

53. Please provide as much of the following information as possible for the next permitted Water Right.

Name of water source:	
Permit No.:	
Permitted annual diversion amount:	
Units (Ac-Ft/Yr, MGD, etc.):	
Permitted peak rate diversion:	
Units (Ac-Ft/Yr, MGD, etc.):	
Pump Station Capacity:	
Units (MGD, GPD, GPM, etc.):	
Pipeline Capacity:	
Units (MGD, GPD, GPM, etc.):	
Additional Comments:	

Section 3d - Water Supplies (Existing Groundwater Supplies)

The following questions in this section seek information about your existing groundwater supplies, if any. (Permitted surface water supplies and water purchased from other water suppliers are covered elsewhere in this survey.) If you do not own/operate any groundwater wells, then please select "No" to the next question and then skip to the next section.

*** 54. Do you own and/or operate any groundwater wells?**

◯ Yes

◯ No

Comments:

If you indicated that you do not own and/or operate any groundwater wells, then please skip to the bottom of this page and select "Next".

55. How many groundwater wells do you own and/or operate? (Please include any groundwater wells that are connected to your system - or could be easily connected - even if they are not currently being used/operated.)

Comments:

56. Please provide the following information for the first groundwater well. If you own and/or operate multiple wells, then please use the following questions to enter the information for each additional well. Space is provided for entering information for up to ten wells. Once you have entered information for each of your wells, then please skip to the next section. If you have more than ten wells, then we will contact you for additional information.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

57. Please provide the following information for the second groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

58. Please provide the following information for the third groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

59. Please provide the following information for the fourth groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

60. Please provide the following information for the fifth groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

61. Please provide the following information for the sixth groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

62. Please provide the following information for the seventh groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

63. Please provide the following information for the eigth groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

64. Please provide the following information for the ninth groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

65. Please provide the following information for the tenth groundwater well.

Well Name/ID:

Rated (Maximum) Capacity:

Unit of Measurement:

Aquifer:

Comments:

Section 3e - Water Supplies (Recommended Water Management Strategies)

For this section, please review your entity's recommended water management strategies from the 2011 Region C Plan (one of the PDF attachments to the original email). If the list of recommended water management strategies requires changes or updates, the following series of questions will provide an opportunity for you to make updates.

*** 66. Do you agree with the recommended Water Management Strategies listed in the 2011 Region C Water Plan? Please note that if this is the first time your entity has been included as a WUG, then there is no information regarding your specific entity in the 2011 Region C Water Plan.**

(If you select "No", then please complete the remaining questions in this section. If you select "Yes" or if your entity was not included in the 2011 Region C Water Plan, then please answer this question and then skip to the bottom of this page and select "Next".)

- ○ Yes
- ○ No
- ○ My entity was not included in the 2011 Region C Water Plan

67. Are there any strategies listed in the 2011 Region C Water Plan that you are NOT considering any longer?

- ○ Yes
- ○ No

If you selected "Yes", please list the strategies that you are no longer considering.

68. Have you already implemented any of the recommended water management strategies from the 2011 Region C Water Plan?

- ○ Yes
- ○ No

If you selected "Yes", please enter which of the recommended strategies you have implemented.

69. Are any of the listed strategies currently in the process of being implemented (permitting, design or construction phase)?

- ◯ Yes
- ◯ No

If you selected "Yes", please indicate which strategies you are currently implementing, in which year you expect it to be online, and also if it will be online prior to June 30, 2015.

70. Has the implementation date been changed for any of the proposed water management strategies - either pushed back or accelerated? (Please note that any proposed water management strategies implemented between 2021-2030 will be shown as "2030", 2031-2040 will be shown as "2040", etc.)

- ◯ Yes
- ◯ No

71. Please list the strategy name and provide a revised implementation date for any proposed water management strategies that have changed.

Strategy (1)	
Implementation Year (1)	
Strategy (2)	
Implementation Year (2)	
Strategy (3)	
Implementation Year (3)	
Strategy (4)	
Implementation (4)	
Strategy (5)	
Implementation (5)	

Section 3f - Water Supplies (New Water Management Strategies)

Existing WUGs (Entity was listed in the 2011 Region C Water Plan):
If you would like to add any new water management strategies as additional future water supply alternatives, then please answer the following questions. If you do not want to add any additional water management strategies, then please select "No" on the next question and skip to the next section.

New WUGs (Entity was not included in the 2011 Region C Water Plan):
If you do not have enough currently available water supplies to meet your future water demand projections, then additional Water Management Strategies must be recommended that allow you to meet your future water demand projections. Please use this section to list any future water supply strategies that you will use to meet your water demand projections in the future. (Examples might include purchasing additional water from a current supplier, purchasing additional water from another water supplier, installing additional groundwater wells, connecting to an existing reservoir, or developing a water reuse project.) If you do not want to add any additional water management strategies, then please select "No" on the next question and skip to the next section.

*** 72. Do you have any additional Water Management Strategies that you would like to add as alternatives to the recommended strategies?**

○ Yes

○ No

73. How many additional Water Management Strategies would you like to add?

Comments:

74. Please provide the following information for the first Water Management Strategy that you would like to add as an alternative. If you would like to add multiple Water Management Strategies, then please use the following questions to enter the information for each additional Water Management Strategy. Space is provided for entering information for up to four new Water Management Strategies. Once you have entered information for each of the new strategies, then please skip to the next section. If you have more than four new strategies, then we will contact you for additional information.

Water Management Strategy name:

Volume of water:

Unit of measure (Ac-Ft/Yr, MGD, etc.):

Anticipated year available:

Source type (Groundwater, Surface Water, Contract to purchase water):

If source is groundwater, which acquifer:

Brief description of strategy:

75. Please provide the following information for the next Water Management Strategy that you would like to add as an alternative.

Water Management Strategy name:	
Volume of water:	
Unit of measure (Ac-Ft/Yr, MGD, etc.):	
Anticipated year available:	
Source type (Groundwater, Surface Water, Contract to purchase water):	
If source is groundwater, which acquifer:	
Brief description of strategy:	

76. Please provide the following information for the next Water Management Strategy that you would like to add as an alternative.

Water Management Strategy name:	
Volume of water:	
Unit of measure (Ac-Ft/Yr, MGD, etc.):	
Anticipated year available:	
Source type (Groundwater, Surface Water, Contract to purchase water):	
If source is groundwater, which acquifer:	
Brief description of strategy:	

77. Please provide the following information for the next Water Management Strategy that you would like to add as an alternative.

Water Management Strategy name:	
Volume of water:	
Unit of measure (Ac-Ft/Yr, MGD, etc.):	
Anticipated year available:	
Source type (Groundwater, Surface Water, Contract to purchase water):	
If source is groundwater, which acquifer:	
Brief description of strategy:	

Section 3g - Water Supplies (Water Treatment Plant Capacity)

The following questions in this section seek information about water treatment plant capacity (if you own and/or operate any water treatment plants). If you do not own/operate any water treatment plants, then please select "No" on the next question and skip to the next section.

*** 78. Do you own and/or operate any water treatment plants (WTPs)?**

○ Yes

○ No

79. How many water treatment plants do you own and/or operate?

Additional Comments:

80. Please provide the following information for the first water treatment plant (WTP). If you own and/or operate multiple WTPs, then please use the following questions to enter the information for each additional WTP.
Space is provided for entering information for up to five WTPs. Once you have entered information for each WTP, then please skip to the next section. If you have more than five WTPs, then we will contact you for additional information.

WTP Name

Rated (Maximum) Capacity

Unit of Measurement

Comments

81. Please provide the following information for the second WTP.

WTP Name

Rated (Maximum) Capacity

Unit of Measurement

Comments

82. Please provide the following information for the third WTP.

WTP Name

Rated (Maximum) Capacity

Unit of Measurement

Comments

83. Please provide the following information for the fourth WTP.

WTP Name	
Rated (Maximum) Capacity	
Unit of Measurement	
Comments	

84. Please provide the following information for the fifth WTP.

WTP Name	
Rated (Maximum) Capacity	
Unit of Measurement	
Comments	

Section 4 - Conservation, Reuse and Drought Response

For this section, please consider the actions or best management practices that your city or entity has implemented to promote daily water conservation, to respond to drought conditions that stress the available water supply, and to utilize reuse water.

85. Does your entity have a Water Conservation Plan?

- ◯ Yes
- ◯ No

86. Does your entity have a Drought Contingency Plan?

- ◯ Yes
- ◯ No

87. Please indicate whether you have implemented any of the following conservation and/or drought management strategies. Please check all boxes that apply. (For your reference, "conservation"' strategies are implemented or enforced year round, and "drought" strategies are implemented or enforced in stages as a result of drought conditions.)

	Have implemented as a conservation strategy in the past	Have implemented as a current conservation strategy	Would implement as a conservation strategy in the future	Have implemented as a drought strategy at some time during the last 5 years	Would implement as a drought strategy in the future
Public & School Education	☐	☐	☐	☐	☐
Increasing Water Prices	☐	☐	☐	☐	☐
Water System Audit, Leak Detection and Repair, and Pressure Control	☐	☐	☐	☐	☐
Water Conservation Pricing Structure	☐	☐	☐	☐	☐
Water Waste Prohibition	☐	☐	☐	☐	☐
Time-of-Day Watering Restrictions	☐	☐	☐	☐	☐
Days per Week Watering Restrictions	☐	☐	☐	☐	☐
Coin-Operated Clothes Washer Rebate	☐	☐	☐	☐	☐
Residential Customer Water Audit	☐	☐	☐	☐	☐
Industrial, Commercial and Institutional General Rebate	☐	☐	☐	☐	☐
Industrial, Commercial and Institutional Water Audit, Water Waste Reduction, and Site-Specific Conservation Program	☐	☐	☐	☐	☐
Reuse of Treated Wastewater Effluent	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

88. Please list, and describe, any other types of water conservation strategies that you have implemented to help conserve water.

89. Please list, and describe, any other types of drought-response strategies that you have implemented to help reduce water use during drought conditions.

*** 90. Does your entity have an emergency interconnection to an alternate source of supply (or do you have plans to develop an emergency interconnection)?**

- Yes
- No

If yes, Region C is required to collect such information (Texas Administrative Code Title 31, Part 10, Rule 357.42), but is also required to keep such information CONFIDENTIAL (Texas Water Code Section 16.053). Whom may we contact for information on your emergency interconnection?

91. Do you have plans to develop a water reuse project in the future?

- Yes
- No

92. If you selected "Yes", please describe your reuse project(s) that you plan to develop (project name, source of reuse water, amount of reuse water to be used, intended use, when you anticipate starting to use reuse water, etc.).

93. If you selected "No", please explain why.

Survey Complete

ONCE YOU SELECT [DONE] YOU WILL NOT BE ABLE TO ACCESS THE SURVEY AGAIN. Do not click [Done] unles you are sure that you are finished with this survey.

Thank you for taking the time to respond to this survey. Your input will be used to help shape the 2016 Region C Water Plan (and the subsequent 2017 State Water Plan).

If you have any further questions, or would like to discuss any items in more detail, please contact Gil Barnett at (817) 662-1215, or by email at gbarnett@cpyi.com.

Appendix E

APPENDIX E

ADJUSTMENTS TO PROJECTIONS

APPENDIX E
ADJUSTMENTS TO PROJECTIONS

This appendix contains the following tables and Memoranda:

- Table – Summary of Changes Made to TWDB Draft Population Projections
- Memo – Changes to TWDB Draft Base-year GPCDs for Region C
- Memo – Non-Municipal Demand Projections, Irrigation
- Memo – Non-Municipal Demand Projections, Livestock
- Memo – Non-Municipal Demand Projections, Manufacturing
- Memo – Non-Municipal Demand Projections, Mining
- Memo – Non-Municipal Demand Projections, Steam Electric Power
- Table – Demand Revisions for DFW Airport
- Table – Savings due to Plumbing Code for Municipal WUGs by County

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Appendix E
Summary of Changes Made to TWDB Draft Population Projections

In Multiple Counties or Regions	County	Water User Group (WUG)	Comments
	COLLIN	ALLEN	From Survey; Buildout of 98,500 in 2020
	COLLIN	ANNA	Slower growth in 2020-30 per COG 2013 pop; TWDB thru 2040-50; Higher growth late
	COLLIN	BLUE RIDGE	TWDB in 2020; increase to 2011 Plan+ in out years
Yes	COLLIN	CADDO BASIN SUD	Survey comment-TWDB pop slightly too high
	COLLIN	CARROLLTON	use TWDB
Yes	COLLIN	CELINA	Input from Celina (via email) and adjusted from Collin Co Mobility Plan; Collin Co portion 97% in 2020; 90% in 2030; 82% in 2040; 75% in 2050+
	COLLIN	COPEVILLE SUD	Use TWDB thru 2040; then increase
	COLLIN	COUNTY-OTHER	
	COLLIN	CULLEOKA WSC	Lower than TWDB
Yes	COLLIN	DALLAS	Collin Co Mobility Plan
	COLLIN	DANVILLE WSC	No longer a WUG
Yes	COLLIN	EAST FORK SUD	Survey ok w/ pop
	COLLIN	FAIRVIEW	Collin Co Mobility Plan
	COLLIN	FARMERSVILLE	From Survey: Buildout is 20,000 in 2030
Yes	COLLIN	FRISCO	July #s from Direct email from City of Frisco Planning Dept 5/2/13, but revised those based on email from Gary Hartwell (Frisco Water Dept) on 7/22/13 saying buildout not to exceed 280,000; Collin Co is 60% of Total.
Yes	COLLIN	GARLAND	Keep TWDB for Collin Co; Total of counties matches BuildOut in Garland CIP (2020 & 2030 population from Garland Planning Dept 2013).
Yes	COLLIN	HICKORY CREEK SUD	Use TWDB (shared WUG with Reg G so do not change)
Yes	COLLIN	JOSEPHINE	Survey Comment: Buildout of 5,000 by 2050; Collin Co portion is dfference between Total & Hunt Co TWDB #s
	COLLIN	LAVON	Use similar to TWDB thru 2050; then increase
Yes	COLLIN	LAVON WSC	Use similar to TWDB thru 2050; then increase
	COLLIN	LOWRY CROSSING	Survey comment-agree with TWDB
	COLLIN	LUCAS	Collin Co Mobility Plan
Yes	COLLIN	MARILEE SUD	Input from GTUA; Use County Proportion from 2020 TWDB.
	COLLIN	MCKINNEY	Survey comment: buildout of 358,000 in 2050
	COLLIN	MELISSA	TWDB thru 2040; increase 2050+
	COLLIN	MILLIGAN WSC	No longer a WUG
	COLLIN	MURPHY	Survey comment: buildout is 23,000 in 2020
	COLLIN	NEVADA	TWDB thru 2040; increase 2050+
	COLLIN	NEW HOPE	Use TWDB #s
	COLLIN	NORTH COLLIN WSC	Use TWDB #s
	COLLIN	PARKER	from Survey
Yes	COLLIN	PLANO	Collin Co Mobility Plan with slower growth in 2020-30 based on NCTCOG pop estimates
	COLLIN	PRINCETON	Use TWDB thru 2040, then increase up to buildout from Collin Co Mobility Plan
Yes	COLLIN	PROSPER	Collin Co Mobility Plan
Yes	COLLIN	RICHARDSON	Survey comment-ok with pop; slightly reduced 2020-40 for slower growth per NCTCOG 2012 pop estimate
Yes	COLLIN	ROYSE CITY	Collin Co Mobility Plan; slower growth in early years
Yes	COLLIN	SACHSE	Survey comment- TWDB pop is reasonable
	COLLIN	SEIS LAGOS UD	Survey response
Yes	COLLIN	SOUTH GRAYSON WSC	Total from survey; used TWDB % split to get new # for Collin & Grayson Co
	COLLIN	St. PAUL	Collin Co Mobility Plan; Survey Comment that TWDB pop was much too high
	COLLIN	WESTON	Collin Co Mobility Plan
Yes	COLLIN	WYLIE	Total from survey - Adjusted from Collin Co Mobility Plan
	COLLIN	WYLIE NORTHEAST SUD	Use TWDB thru 2040; then increase
Yes	COOKE	BOLIVAR WSC	Survey ok w/ pop
	COOKE	COUNTY-OTHER	
	COOKE	GAINESVILLE	Use TWDB thru 2050: 2011 Plan in 2060+
	COOKE	KIOWA HOMEOWNERS WSC	GTUA input
	COOKE	LINDSAY	Use TWDB thru 2050, then increase
Yes	COOKE	MOUNTAIN SPRING WSC	Use TWDB thru 2050, then increase
	COOKE	MUENSTER	Survey comment: TWDB pop is much too high; FN adjusted down
Yes	COOKE	TWO WAY SUD	Use TWDB
	COOKE	VALLEY VIEW	UTRWD concurs with TWDB
Yes	COOKE	WOODBINE WSC	Survey ok w/ pop, but used GTUA input (GTUA direct contact w/ Woodbine WSC engineer); Cooke Co portion is total from engineer minue Grayson Co portion (from TWDB).
	DALLAS	ADDISON	Buildout is 29K per Jessica Brown, 2007 Water Dist Study; COG 2013 estimate 13,840

Appendix E
Summary of Changes Made to TWDB Draft Population Projections

In Multiple Counties or Regions	County	Water User Group (WUG)	Comments
	DALLAS	BALCH SPRINGS	Use TWDB; Supplier (Dallas Co MWD #6) commented that pop was ok (at meeting of DWU customers on 5/1/13
Yes	DALLAS	CARROLLTON	Use TWDB
Yes	DALLAS	CEDAR HILL	2012 Impact Fee for 2020 pop; Buildout pop (88,956) from Comprehensive Plan
	DALLAS	COCKRELL HILL	Use TWDB thru 2040, then increase
Yes	DALLAS	COMBINE	Survey ok w/ pop; however survey was filled out by "Combine WSC/City of Combine". The WSC was eliminated as a WUG this round so folded into County Other.
Yes	DALLAS	COMBINE WSC	No longer a WUG
Yes	DALLAS	COPPELL	Use Impact Fee pop for 2020; use TWDB for rest
	DALLAS	COUNTY-OTHER	
Yes	DALLAS	DALLAS	Total 2070=1.9M (From HDR from recent update of Long Range Water Plan); Dallas Coportion is total minus other counties
	DALLAS	DALLAS COUNTY WCID #6	No longer a WUG (still a WWP); Balch Springs is only customer so all pop is covered under Balch Springs WUG
	DALLAS	DE SOTO	DeSoto agrees with TWDB projections
	DALLAS	DUNCANVILLE	build-out
Yes	DALLAS	EAST FORK SUD	Survey ok w/ pop
	DALLAS	FARMERS BRANCH	use TWDB
Yes	DALLAS	FERRIS	use TWDB
Yes	DALLAS	GARLAND	Total of counties matches BuildOut in Garland CIP (2020 & 2030 population from Garland Planning Dept 2013).
Yes	DALLAS	GLENN HEIGHTS	Use TWDB thru 2060; then increase
Yes	DALLAS	GRAND PRAIRIE	Use TWDB; Mtg w/ WUG on 4/18/13. City OK with pop and recommended no changes
Yes	DALLAS	GRAPEVINE	from Survey
	DALLAS	HIGHLAND PARK	Use TWDB; Survey commented pop projection slightly too high. DCPCMUD says this is ok. Very little growth so will not affect any WMSs so keep as is.
	DALLAS	HUTCHINS	Buildout is 30,000
	DALLAS	IRVING	Use TWDB; OK per Mtg with Irving 4/19/13
	DALLAS	LANCASTER	Survey comment: buildout is 93,514. Impact Fee (2012) pops of 46,949 in 2022 & 65,751 in 2035
Yes	DALLAS	LEWISVILLE	Use TWDB #s; Survey Comment: TWDB #s look reaonably accurate; Buildout of 177,356 in 2060
Yes	DALLAS	MESQUITE	Use TWDB except decreased slighlty in 2020-2030 based on NCTCOG 2013 pop est of 140,240; Survey comment-TWDB pop reasonably accurate
Yes	DALLAS	OVILLA	Use TWDB thru 2060, then increase
Yes	DALLAS	RICHARDSON	Survey comment-ok with pop; slightly reduced 2020-40 for slower growth per COG current pop estimate
Yes	DALLAS	ROCKETT SUD	Use similar to 2011 Plan
Yes	DALLAS	ROWLETT	Difference between total city and Rockwall Co portion. Per 2008 Water CIP Update - Buildout is 70K; 2017 pop is 63,863
Yes	DALLAS	SACHSE	Use TWDB; Survey comment- TWDB pop is reasonable
Yes	DALLAS	SARDIS-LONE ELM WSC	TWDB
Yes	DALLAS	SEAGOVILLE	Difference between total city and Kaufman Co portion; From Survey - Buildout is 35,000 in 2050
	DALLAS	SUNNYVALE	from Survey
	DALLAS	UNIVERSITY PARK	Use TWDB; Supplier (DCPCMUD) says this is ok. Very little growth--already at buildout.
	DALLAS	WILMER	Use 2011 Plan
Yes	DALLAS	WYLIE	(Total from Survey minus Collin Co) x 40%
	DENTON	ARGYLE	UTRWD Recommended for 2040-70; lower in 2020-2030
	DENTON	ARGYLE WSC	UTRWD Recommended
	DENTON	AUBREY	UTRWD Recommended
	DENTON	BARTONVILLE	UTRWD concurs with TWDB
	DENTON	BARTONVILLE WSC	No longer a WUG
Yes	DENTON	BOLIVAR WSC	Survey said pop was ok; UTRWD concurs with TWDB
Yes	DENTON	CARROLLTON	Use TWDB
Yes	DENTON	CELINA	Direct email from City of Celina 6/4/13; Denton Co portion 3% in 2020; 10% in 2030; 18% in 2040; 25% in 2050+
Yes	DENTON	COPPELL	Use TWDB
	DENTON	COPPER CANYON	UTRWD concurs with TWDB
	DENTON	CORINTH	Survey comment: Buildout of 29,499 in 2040; UTRWD recommended for 2020 & 2030
	DENTON	COUNTY-OTHER	
	DENTON	CROSS ROADS	UTRWD concurs with TWDB
Yes	DENTON	DALLAS	Proportionate growth to total Dallas growth up to 1.9 M
	DENTON	DENTON	Slightly slower growth thru 2040 than from Survey, but same 2050-2070 # as survey (See column AW for survey #s)
	DENTON	DENTON COUNTY FWSD No. 10	UTRWD Recommended
	DENTON	DENTON COUNTY FWSD No.1A	UTRWD Recommended for 2040-70; lower in 2020-2030

Appendix E
Summary of Changes Made to TWDB Draft Population Projections

In Multiple Counties or Regions	County	Water User Group (WUG)	Comments
	DENTON	DENTON COUNTY FWSD No. 7	UTRWD Recommended
	DENTON	DOUBLE OAK	UTRWD concurs with TWDB
Yes	DENTON	FLOWER MOUND	from Survey; UTRWD concurs; total of Denton & Tarrant Co matches survey
Yes	DENTON	FORT WORTH	Total from Survey (except lower in 2030-40); County Split estimated
Yes	DENTON	FRISCO	Draft #s from Direct email from City of Frisco Planning Dept 5/2/13, but revised those based on email from Gary Hartwell Utility Dir on 7/22/13 saying buildout not to exceed 280,000; Denton Co is 40% of Total.
	DENTON	HACKBERRY	use TWDB
	DENTON	HEBRON	No longer a WUG
	DENTON	HICKORY CREEK	UTRWD concurs with TWDB
	DENTON	HIGHLAND VILLAGE	Buildout of 18,000 in 2030 per survey
	DENTON	JUSTIN	Survey comment: Buildout of 12,000 in 2040; UTRWD recommended for 2020 & 2030
	DENTON	KRUGERVILLE	UTRWD Recommended
	DENTON	KRUM	UTRWD concurs with TWDB
	DENTON	LAKE DALLAS	UTRWD concurs with TWDB
	DENTON	LAKEWOOD VILLAGE	UTRWD concurs with TWDB
Yes	DENTON	LEWISVILLE	Survey comment: pop is reasonably accurate; use TWDB
	DENTON	LINCOLN PARK	Responded to survey even tho not a WUG anymore; 2060 Buildout of 1,500
	DENTON	LITTLE ELM	Survey response received 7/29/13. Buildout in 2030 of 33,821
Yes	DENTON	MOUNTAIN SPRING WSC	use TWDB
	DENTON	MUSTANG SUD	UTRWD Recommended
	DENTON	NORTHLAKE	Survey comment: Buildout of 55,000 in 2060; UTRWD recommended 2040-2070; lower than UTRWD recommend in 2020-30
	DENTON	OAK POINT	UTRWD Recommended; Mustang SUD also gave input
	DENTON	PALOMA CREEK	UTRWD Recommended
	DENTON	PILOT POINT	from Survey (Buildout of 50,000 in 2090)
Yes	DENTON	PLANO	slight change from TWDB
	DENTON	PONDER	UTRWD Recommended
Yes	DENTON	PROSPER	Difference between total Prosper (BuildOut=69k) and Collin Co portion (from Mobility Study)
	DENTON	PROVIDENCE VILLAGE WCID	UTRWD Recommended
	DENTON	ROANOKE	Survey reponse gives a buildout of 12,000 in 2022 (used 2040 instead based on NCTCOG estimate); comment TWDB pop much too high
	DENTON	SANGER	UTRWD concurs with TWDB
	DENTON	SHADY SHORES	UTRWD concurs with TWDB
Yes	DENTON	SOUTHLAKE	use TWDB for Denton Co
	DENTON	THE COLONY	2011 WW Master Plan buildout =67,600 & 2020=56,200; Growth has been slightly slower per city staff-> use 51,000 for 2020 & 58,000 for 2030 & 62,000 for 2040
Yes	DENTON	TROPHY CLUB	From Trophy Club MUD
Yes	DENTON	WESTLAKE	Use TWDB
	ELLIS	BARDWELL	Use TWDB thru 2060, then increase
Yes	ELLIS	BRANDON-IRENE WSC	Use TWDB
	ELLIS	BUENA VISTA - BETHEL SUD	Slower growth thru 2060; Use TWDB 2070
Yes	ELLIS	CEDAR HILL	Use TWDB for Ellis Co thru 2050; then level for buildout
Yes	ELLIS	COMMUNITY WATER COMPANY	No longer a WUG
	ELLIS	COUNTY-OTHER	
	ELLIS	ENNIS	Specific info from Ennis via email 7/19/2013
Yes	ELLIS	FERRIS	TWDB thru 2050; increase 2060+
Yes	ELLIS	FILES VALLEY WSC	Use TWDB
	ELLIS	GARRETT	TWDB thru 2060; increase in 2070
Yes	ELLIS	GLENN HEIGHTS	TWDB thru 2060; increase in 2070
Yes	ELLIS	GRAND PRAIRIE	Use TWDB; Mtg w/ WUG on 4/18/13. City OK with pop and recommended no changes
	ELLIS	ITALY	Use TWDB thru 2050, then increase
Yes	ELLIS	JOHNSON COUNTY SUD	Use TWDB; Survey ok w/ pop
Yes	ELLIS	MANSFIELD	Use TWDB
	ELLIS	MAYPEARL	Use TWDB
	ELLIS	MIDLOTHIAN	Original Survey said TWDB slightly too high; sent revised # on 7/19/2013; city (Mike Adams) responded on 7/25/2013 with updated population projections.
	ELLIS	MILFORD	Survey ok w/ pop

Appendix E
Summary of Changes Made to TWDB Draft Population Projections

In Multiple Counties or Regions	County	Water User Group (WUG)	Comments
Yes	ELLIS	MOUNTAIN PEAK SUD	Survey ok w/ pop
	ELLIS	OAK LEAF	Survey said TWDB slighlty too high.
Yes	ELLIS	OVILLA	Use TWDB thru 2060, then increase
	ELLIS	PALMER	Use TWDB thru 2050, then increase
	ELLIS	PECAN HILL	Use TWDB thru 2050, then increase
	ELLIS	RED OAK	lower than TWDB thru 2050, then increase
Yes	ELLIS	RICE WSC	Survey ok w/ pop
Yes	ELLIS	ROCKETT SUD	Use TWDB thru 2060; then increase
Yes	ELLIS	SARDIS-LONE ELM WSC	Survey response for 2060-70; slightly lower than survey in 2020-2040, but still higher than TWDB draft
Yes	ELLIS	VENUS	Use TWDB
	ELLIS	WAXAHACHIE	from Survey
	FANNIN	BONHAM	from Survey
	FANNIN	COUNTY-OTHER	
	FANNIN	ECTOR	Use TWDB
Yes	FANNIN	HICKORY CREEK SUD	Use TWDB (shared WUG with Reg D so do not change)
	FANNIN	HONEY GROVE	from Survey
	FANNIN	LADONIA	UTRWD Recommended
	FANNIN	LEONARD	Survey ok w/ pop
Yes	FANNIN	NORTH HUNT WSC	Use TWDB (shared WUG with Reg D so do not change)
	FANNIN	SAVOY	Use TWDB
Yes	FANNIN	SOUTHWEST FANNIN COUNTY SUD	Use TWDB thru 2050, then increase
	FANNIN	TRENTON	Use TWDB in 2020; move to 2011 Plan in 2030+
Yes	FANNIN	WHITEWRIGHT	Use TWDB
	FREESTONE	COUNTY-OTHER	
	FREESTONE	FAIRFIELD	Use TWDB thru 2040; move to 2011 Plan in 2050+
Yes	FREESTONE	FLO COMMUNITY WSC	Survey ok w/ pop
	FREESTONE	OAKWOOD	Use TWDB (shared WUG so do not change)
	FREESTONE	TEAGUE	Slower growth in early years; larger growth in later years
	FREESTONE	WORTHAM	Use TWDB thru 2050; then increase
	GRAYSON	BELLS	Use TWDB thru 2050; Survey comment: Buildout of 10,000 in 2090
	GRAYSON	COLLINSVILLE	Use TWDB thru 2050; then increase
	GRAYSON	COUNTY-OTHER	Use TWDB 2020, hold steady, then increase in later years
	GRAYSON	DENISON	Use TWDB thru 2050; then increase
	GRAYSON	GUNTER	GTUA input
	GRAYSON	HOWE	GTUA input
	GRAYSON	KENTUCKY TOWN WSC	Use TWDB thru 2050; then increase
	GRAYSON	LUELLA WSC	Survey ok w/ pop
Yes	GRAYSON	MARILEE SUD	Input from GTUA; Use County proportion from 2020 TWDB.
	GRAYSON	POTTSBORO	Use TWDB thru 2040; then increase
	GRAYSON	SHERMAN	
Yes	GRAYSON	SOUTH GRAYSON WSC	Total from survey; used TWDB % split to get new # for Collin & Grayson Co
	GRAYSON	SOUTHMAYD	Use TWDB thru 2050; then increase
Yes	GRAYSON	SOUTHWEST FANNIN COUNTY SUD	Use TWDB thru 2050; then increase
	GRAYSON	TIOGA	Use TWDB thru 2050; then increase
	GRAYSON	TOM BEAN	Use TWDB thru 2050; then increase
Yes	GRAYSON	TWO WAY SUD	Use TWDB thru 2050; then increase
	GRAYSON	VAN ALSTYNE	Use TWDB thru 2050; then increase
	GRAYSON	WHITESBORO	Use TWDB thru 2050; then increase
Yes	GRAYSON	WHITEWRIGHT	GTUA input on total; this is total minus Fannin Co portion
Yes	GRAYSON	WOODBINE WSC	Use TWDB for Grayson Co
Yes	HENDERSON	ATHENS	Use TWDB thru 2050; then increase
Yes	HENDERSON	BETHEL-ASH WSC	Survey ok w/ pop
	HENDERSON	COUNTY-OTHER	TWDB #s except 2030
	HENDERSON	EAST CEDAR CREEK FWSD	Survey comment pop was "reasonably accurate" but provided other pop #s

Appendix E
Summary of Changes Made to TWDB Draft Population Projections

In Multiple Counties or Regions	County	Water User Group (WUG)	Comments
	HENDERSON	EUSTACE	Use less than TWDB thru 2050; then increase
	HENDERSON	GUN BARREL CITY	Use less than TWDB thru 2050; then increase
	HENDERSON	LOG CABIN	Survey ok w/ pop
Yes	HENDERSON	MABANK	Use less than TWDB thru 2050; then increase
	HENDERSON	MALAKOFF	Use TWDB thru 2050; then increase
	HENDERSON	PAYNE SPRINGS	Use TWDB thru 2050; then increase
Yes	HENDERSON	SEVEN POINTS	Use less than TWDB thru 2050; then increase
	HENDERSON	TOOL	Use TWDB thru 2050; then increase
	HENDERSON	TRINIDAD	Use TWDB thru 2050; then increase
	HENDERSON	VIRGINIA HILL WSC	Use TWDB thru 2050; then increase
Yes	HENDERSON	WEST CEDAR CREEK MUD	Use TWDB thru 2050; then increase
	JACK	BRYSON	Use TWDB
	JACK	COUNTY-OTHER	Use TWDB
	JACK	JACKSBORO	Use TWDB
Yes	KAUFMAN	ABLES SPRINGS WSC	Survey ok w/ pop
	KAUFMAN	COLLEGE MOUND WSC	Use TWDB thru 2050; then increase
Yes	KAUFMAN	COMBINE	See Comment above for Combine in Dallas County
Yes	KAUFMAN	COMBINE WSC	no longer a WUG
	KAUFMAN	COUNTY-OTHER	
	KAUFMAN	CRANDALL	Survey comment: TWDB pop is much too high; survey buildout is 8000 (in 2020, but FNI extended to 2050 based on current pop estimate)
Yes	KAUFMAN	DALLAS	
	KAUFMAN	FORNEY	Use TWDB thru 2050 (except 2030); then increase
Yes	KAUFMAN	FORNEY LAKE WSC	Use TWDB thru 2050; then increase
	KAUFMAN	GASTONIA-SCURRY SUD	Use TWDB thru 2050; then increase
Yes	KAUFMAN	HIGH POINT WSC	Use TWDB thru 2050; then increase
	KAUFMAN	KAUFMAN	Survey Comment: Buildout of 30,000 in 2070. Kaufman is further out from Metroplex; assume higher growth occurs in later years.
	KAUFMAN	KEMP	Use TWDB thru 2050; then increase
Yes	KAUFMAN	MABANK	Use less than TWDB thru 2050; then increase
Yes	KAUFMAN	MACBEE SUD	Survey ok w/ pop
Yes	KAUFMAN	MESQUITE	Survey comment-TWDB pop reasonably accurate
	KAUFMAN	OAK GROVE	Use lower than TWDB thru 2040; then increase
	KAUFMAN	POST OAK BEND CITY	Use lower than TWDB thru 2040; then increase
	KAUFMAN	ROSE HILL SUD	Use TWDB thru 2050; then increase
	KAUFMAN	SCURRY	Use lower then TWDB thru 2040; then increase
Yes	KAUFMAN	SEAGOVILLE	Use TWDB
Yes	KAUFMAN	SEVEN POINTS	Keep TWDB for Kaufman Co
	KAUFMAN	TALTY	Use TWDB thru 2050; then increase
	KAUFMAN	TALTY WSC	Use TWDB thru 2050; then increase
	KAUFMAN	TERRELL	Slightly slower growth than from Survey in early years, and use same 2050-2070 # from survey (See column AW for survey #s)
Yes	KAUFMAN	WEST CEDAR CREEK MUD	Use TWDB thru 2050; then increase
	NAVARRO	BLOOMING GROVE	Use TWDB
Yes	NAVARRO	BRANDON-IRENE WSC	Use TWDB
	NAVARRO	CHATFIELD WSC	Survey
Yes	NAVARRO	COMMUNITY WATER COMPANY	no longer a WUG
	NAVARRO	CORBET WSC	Survey ok w/ pop
	NAVARRO	CORSICANA	Survey ok w/ pop
	NAVARRO	COUNTY-OTHER	Steady thru 2040; then increase
	NAVARRO	DAWSON	Use TWDB
	NAVARRO	FROST	Use TWDB
	NAVARRO	KERENS	Use TWDB
	NAVARRO	M E N WSC	Use TWDB
	NAVARRO	NAVARRO MILLS WSC	Survey ok w/ pop
	NAVARRO	RICE	Use TWDB

Appendix E
Summary of Changes Made to TWDB Draft Population Projections

In Multiple Counties or Regions	County	Water User Group (WUG)	Comments
Yes	NAVARRO	RICE WSC	Survey ok w/ pop
	PARKER	ALEDO	from Survey
	PARKER	ANNETTA	from Survey
	PARKER	ANNETTA NORTH	Use TWDB
	PARKER	ANNETTA SOUTH	Use TWDB
Yes	PARKER	AZLE	Survey Comment: new TWDB pop is more reasonable than previous Region C Plan; Buildout of 23,090 in 2070; Parker Co is 20% of total
	PARKER	COUNTY-OTHER	
Yes	PARKER	CRESSON	Survey comment -TWDB much too low, however they were commenting on total pop, when asked only about Parker Co portion.
Yes	PARKER	FORT WORTH	Total from Survey (except lower in 2030-40); County Split estimated
	PARKER	HUDSON OAKS	Survey Comment: Buildout is 4,808 in 2050
Yes	PARKER	MINERAL WELLS	Use TWDB
	PARKER	PARKER COUNTY SUD	Survey ok w/ pop
Yes	PARKER	RENO	Use TWDB
	PARKER	SANCTUARY	no longer a WUG
	PARKER	SPRINGTOWN	Survey Comment: Buildout is 5,500 in 2025 (used 2030)
Yes	PARKER	WALNUT CREEK SUD	Use TWDB thru 2040; 2050+ increase growth
	PARKER	WEATHERFORD	Use TWDB thru 2040; 2050+ Increase toward buildout; 2013 Water Master Plan-2021 pop is 31,604; Buildout is 160,720.
	PARKER	WILLOW PARK	Use TWDB thru 2040, then increase
Yes	ROCKWALL	BLACKLAND WSC	Use TWDB
Yes	ROCKWALL	CASH SUD	Survey ok w/ pop
	ROCKWALL	COUNTY-OTHER	Steady thru 2050; then increase
Yes	ROCKWALL	DALLAS	Use TWDB
Yes	ROCKWALL	EAST FORK SUD	Survey ok w/ pop
	ROCKWALL	FATE	Use TWDB thru 2060; then increase
Yes	ROCKWALL	FORNEY LAKE WSC	Use TWDB
Yes	ROCKWALL	GARLAND	Total of counties matches BuildOut in Garland CIP, so kept TWDB projections
	ROCKWALL	HEATH	from Survey
Yes	ROCKWALL	HIGH POINT WSC	Use TWDB
Yes	ROCKWALL	LAVON WSC	
	ROCKWALL	MCLENDON-CHISHOLM	Use TWDB
	ROCKWALL	MT ZION WSC	Use TWDB
	ROCKWALL	R-C-H WSC	no longer a WUG
	ROCKWALL	ROCKWALL	Survey ok w/ pop
Yes	ROCKWALL	ROWLETT	Use TWDB
Yes	ROCKWALL	ROYSE CITY	Use less than TWDB thru 2040, then increase
Yes	ROCKWALL	WYLIE	(Total from Survey minus Collin Co) x 60%
	TARRANT	ARLINGTON	from Survey
Yes	TARRANT	AZLE	Survey Comment: new TWDB pop is more reasonable than previous Region C Plan; Buildout of 23,090 in 2070; Tarrant Co is 80%
	TARRANT	BEDFORD	Slower growth; same buildout
	TARRANT	BENBROOK	Increasing to buildout (from survey) of 48,095 in 2060
Yes	TARRANT	BETHESDA WSC	Shared Reg G WUG; do not change from TWDB
	TARRANT	BLUE MOUND	Use TWDB
Yes	TARRANT	BURLESON	Tarrant Co portion based on pop data and mapping info from 2010 W/WW Mater Plan; build out estimated from mapping showing Tarrant Co portion
	TARRANT	COLLEYVILLE	Slower growth; same buildout (buildout from 2011 survey)
Yes	TARRANT	COMMUNITY WSC	Use TWDB
	TARRANT	COUNTY-OTHER	Steady thru 2040, then increase
	TARRANT	CROWLEY	TWDB in 2020; slower growth thru 2030-40; slightly increase buildout
	TARRANT	DALWORTHINGTON GARDENS	Use TWDB
	TARRANT	EDGECLIFF	Use TWDB
	TARRANT	EULESS	Survey comment: TWDB pop is much too high, buildout is 57,150 in 2030
	TARRANT	EVERMAN	Use TWDB (buildout from 2011 survey)
Yes	TARRANT	FLOWER MOUND	from Survey
	TARRANT	FOREST HILL	Slower growth in early years; larger growth in later years
Yes	TARRANT	FORT WORTH	Total from Survey (except lower in 2030-40) (Frank Crumb approved 2030&2040 changes via email on 7/18/13); County Split estimated
Yes	TARRANT	GRAND PRAIRIE	Mtg w/ WUG on 4/18/13. City OK with pop and recommended no changes

Appendix E
Summary of Changes Made to TWDB Draft Population Projections

In Multiple Counties or Regions	County	Water User Group (WUG)	Comments
Yes	TARRANT	GRAPEVINE	from Survey
	TARRANT	HALTOM CITY	Slower growth in early years; larger growth in later years
	TARRANT	HASLET	Slower growth in early years; larger growth in later years
	TARRANT	HURST	Dec 2009 Impact Fee had 2019 pop as 39,745 (NCTCOG). City almost at buildout
Yes	TARRANT	JOHNSON COUNTY SUD	Survey ok w/ pop
	TARRANT	KELLER	Use TWDB; they match Impact Fee Study closely
	TARRANT	KENNEDALE	from Survey
	TARRANT	LAKE WORTH	Use TWDB thru 2040; increase 2050 on
	TARRANT	LAKESIDE	Survey comment: TWDB pop is much too high
Yes	TARRANT	MANSFIELD	Slower growth in 2020-40 per COG; TWDB 2050; Higher growth late per W/WW Master Plan buildout; Tarrant Co is 79% of total based on GIS county split
	TARRANT	NORTH RICHLAND HILLS	Use TWDB; 2011 W/WW Master Plan, 2019 pop of 73,118. Buildout of 77,063; growth has been slower than anticipated based on NCTCOG 2013 pop of 64,240 so USE TWDB
	TARRANT	PANTEGO	Survey comment: buildout is 2400 in 2013
	TARRANT	PELICAN BAY	Use TWDB
Yes	TARRANT	RENO	Use TWDB
	TARRANT	RICHLAND HILLS	Slower growth in early years based on NCTCOG 2013 pop est of 7870; higher growth later yrs
	TARRANT	RIVER OAKS	Survey comment: buildout is 7500, 99% built out as of 2013
	TARRANT	SAGINAW	Survey comment TWDB slightly too high, buildout is 31,000 in 2045
	TARRANT	SANSOM PARK	Slower growth in early years based on NCTCOG 2013 pop est of 4690
Yes	TARRANT	SOUTHLAKE	Slower growth thru 2040; increase 2050+
Yes	TARRANT	TROPHY CLUB	From Trophy Club MUD
	TARRANT	WATAUGA	Ok per Survey, BO is 25,000 in 2020
Yes	TARRANT	WESTLAKE	TWDB, but slower growth
	TARRANT	WESTOVER HILLS	Use TWDB
	TARRANT	WESTWORTH VILLAGE	Use TWDB
	TARRANT	WHITE SETTLEMENT	Use TWDB thru 2040; incease 2050+
	WISE	ALVORD	Use TWDB thru 2040, then increase
	WISE	AURORA	Use TWDB thru 2040, then increase
Yes	WISE	BOLIVAR WSC	Use TWDB
	WISE	BOYD	Use TWDB thru 2030, then increase to 2011 Plan
	WISE	BRIDGEPORT	Use TWDB thru 2040; then move to 2011 Plan
	WISE	CHICO	Use TWDB thru 2040; then move to 2011 Plan
Yes	WISE	COMMUNITY WSC	no longer a WUG
	WISE	COUNTY-OTHER	Steady 2040; increase 2050+
	WISE	DECATUR	Survey response (use 2011 Plan #s)
Yes	WISE	FORT WORTH	Total from Survey (except lower in 2030-40); County Split estimated
	WISE	NEW FAIRVIEW	Use TWDB thru 2040, then increase
	WISE	NEWARK	Use 2011 Plan
	WISE	PARADISE	no longer a WUG
	WISE	RHOME	Use TWDB thru 2040, then 2011 Plan
	WISE	RUNAWAY BAY	Use TWDB thru 2040, then increase
Yes	WISE	WALNUT CREEK SUD	Use TWDB thru 2040; 2050+ increase growth
	WISE	WEST WISE RURAL SUD	Survey

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TO: Kevin Kluge, TWDB

CC: Matt Nelson , TWDB

FROM: Amy Kaarlela

SUBJECT: Changes to TWDB Draft Base-year GPCDs for Region C

DATE: August 6, 2013

PROJECT: NTD11336 – Region C Water Plan Update

The Texas Water Development Board provided draft population and municipal water demand projections for use in the 2016 Region C Water Plan to Freese and Nichols (FNI) on March 5, 2013. The municipal demand projections were calculated using population projections and gallons per capita per day (GPCD) water use projections. TWDB based these GPCD projections on each Water User Group's year 2011 actual GPCD as calculated by TWDB. FNI met with TWDB to discuss the draft projections on May 17, 2013 at TWDB offices. At that meeting, TWDB preliminarily agreed to some alternate methods of calculating the base GPCDs, which were to be used on a limited basis. This memorandum outlines the changes that FNI made to the TWDB draft base-year GPCDs. It should be noted that FNI retained TWDB's recommended GPCD for 73% of the Region C WUGs.

TWDB indicated it would allow corrections to their calculated 2011 GPCD's with sufficient documentation. **Table 1** outlines the changes to GPCDs based on corrections made to the year 2011 calculation of GPCD. The specific nature of the correction is shown in Comment column. Excel files for each of these WUGs showing the specific corrections to the 2011 GPCD Detail calculations are being transmitted with this memo. Any cells in those Excel files that were changed are highlighted in yellow and contain comments explaining the correction. Corrections were made to about 10% of the WUGs.

Because year 2011 was not representative of the driest recent year conditions for much of Region C, TWDB indicated it would allow limited use of a GPCD calculation using the average GPCD from years 2006, 2008, and 2011. These three years are generally recognized as recent drought years in Region C, with 2006 and 2008 being more severe drought years than 2011 in many portions of Region C. **Table 2** outlines the changes to the Base GPCDs using the average of TWDB historical GPCDs for 2006, 2008, and 2011. This methodology was employed in about 15% of the WUGs in Region C.

When determining which WUGs to apply this gpcd averaging method to, we identified cases where the 2011 gpcd was significantly less than 2006, "significantly less" meaning more than about 20-25% less. These were cases where we felt it would be inappropriate, if not irresponsible, to use the 2011 gpcd, which would lead to planning for only 75-80% of a WUG's demonstrated need during times of drought. Drought Contingency Plans do not typically contain water reduction goals to that degree except in stages of emergency infrastructure failure. We also considered a number of other factors including: did the WUG already have a very low gpcd, was the WUG shifting from rural to suburban or urban, and apparent errors in 2011 gpcd for which data was not available to correct. We are transmitting this comparison of 2011 to 2006 gpcd with this memo.

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TWDB indicated it would allow limited use of a GPCD change based on special circumstances. Region C would like to request this be applied to seven WUGs (only 2% of WUGs) as follows:

- Irving – Irving has requested that their Base GPCD be calculated as the average of 2006 and 2008 only, excluding the year 2011 due to infrastructure limitations. "Infrastructure limitations" is one of the exception criteria listed in the TWDB Regional Planning Guidelines. A letter from Irving is included with this transmittal as supporting documentation.
- The Colony – The Colony has requested that their Base GPCD be increased from their 2011 historical of 135 GPCD to 146 GPCD because of large future commercial development expected within the City. A letter from The Colony is included with this transmittal as supporting documentation.
- Blue Ridge – Region C is requesting that the City of Blue Ridge's GPCD be increased beginning in in year 2050. Blue Ridge's base GPCD is less than 100, but the city is expected to experience large population growth beginning in 2050 and will change from a rural area to suburban and urban area (much like Plano and Allen have done in recent years). For that reason we are recommending GPCDs of 105 in 2050, 115 in 2060, and 125 in 2070. (These gpcds already reflect adjustment due to plumbing code.)
- Blue Mound–Region C is requesting that Blue Mound's Base GPCD be changed from 66 to 80 GPCD. Recent use in the city has been suppressed due to system inadequacies which are being addressed. "Infrastructure limitations" is one of the exception criteria listed in the TWDB Regional Planning Guidelines.
- Kentucky Town WSC – Region C is requesting the use of year 2006 GPCD (121) be used as the base GPCD, rather than TWDB's 2011 calculation of 106 GPCD. TWDB's 2011 calculation appeared to be an estimate as it was an exact repeat of the 2010 calculation.
- Garland - Region C is requesting that Garland's Base GPCD be changed from the year 2011 value of 149 gpcd to the 2006 value of 156 GPCD. Garland staff has indicated that use in recent years has been depressed by significant demand reduction programs in response to infrastructure limitations of their water supplier (unavailability of water from Lake Texoma due to Zebra mussels). City staff indicated that the 2006 value of 156 was a better indication of their dry-year water use in the absence of infrastructure limitations.
- Mesquite - Region C is requesting that Mesquite's Base GPCD be changed from the year 2011 value of 122 gpcd to 142 gpcd. Mesquite provided a copy of their *2011 Water System Master Plan*, a recent engineering report which contained a detailed calculation of city-wide gpcd for planning purposes. The value of 152 gpcd from the report is higher than use in recent years because anticipated growth in the city includes a substantial increase in commercial land use (with resulting water use) compared to current conditions. The gpcd of 152 from the Master Plan includes industrial sales, so it has been decreased to take out those sales (6.5% of total sales), resulting in a base GPCD of 142 gpcd. It should be noted that this calculation already takes into account some reductions in demand due to water-efficient plumbing fixtures. A copy of the Master Plan is being transmitted with this memo.

The Region C Water Planning Group approved these suggested revisions at their August 5, 2013 meeting. If you have any questions regarding these requested changes, please contact me at adk@freese.com or 817-735-7438. We appreciate your consideration.

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Table 1 – GPCD changes based on Corrected 2011 GPCD Calculation

WUG Name	TWDB Draft 2011 GPCD	Corrected Base GPCD	Comments
BELLS[1]	74	104	Percent system allocation correction - corrected 2011 gpcd of 78.
BRIDGEPORT	136	164	Corrected amount of purchases from Tarrant Regional WD
CARROLLTON	167	175	Percent system allocation correction
CHICO	170	185	Purchases from West Wise SUD were omitted from original gpcd calculation
DALLAS	194	214	Corrected values for: Self-Supplied Surface Water Intake, sales to multiple wholesale customers, and population
DENTON	157	171	Percent system allocation correction and population correction
EUSTACE	69	105	Percent system allocation correction
FAIRVIEW	319	327	Corrected Intake amount from supplier (NTWMD)
GAINESVILLE	133	138	Percent system allocation correction
HOWE	90	95	Percent system allocation correction
HUTCHINS	88	102	Correction for Percent system allocation and pumping records
KERENS	108	116	Percent system allocation correction
LINDSAY	82	125	Percent system allocation correction
LUCAS	249	273	Percent system allocation correction
MARILEE SUD	113	142	Corrected 2011 population, based on year 2010 persons per connection ratio.
M E N WSC	101	134	Corrected TWDB's estimate of 2011 intake with actual intake provided by supplier (Corsicana)
MELISSA	170	203	Percent system allocation correction
MUENSTER	121	162	Percent system allocation correction; specific data came directly from city
NORTHLAKE	115	189	Percent system allocation correction and 2012 intake (no records for 2011); TWDB provided this correction via email.
PARKER	263	389	Corrections for: percent system allocation, intake amount
POTTSBORO	138	161	Percent system allocation correction
RUNAWAY BAY	252	224	Percent system allocation correction
SEAGOVILLE	69	107	Corrected intake and wholesale sales. Total Intake did not include Combine WSC pass through amount & prison use should not have been taken out as sales.
TOM BEAN	155	178	Percent system allocation correction
WILLOW PARK	105	148	Percent system allocation correction

[1]Bells' gpcd correction also utilized the average of year 2006, 2008, and corrected 2011 gpcd data.

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Table 2 – GPCD changes based on Use of Average of 2006, 2008, and 2011 GPCDs

WUG Name	TWDB Draft 2011 GPCD	Corrected Base GPCD
ALEDO	119	148
ANNETTA	80	90
ARGYLE	199	218
ARGYLE WSC	174	189
AURORA	78	86
BARDWELL	67	85
BARTONVILLE	170	177
BELLS	74	104
CELINA	148	195
COLLINSVILLE	103	108
COMMUNITY WSC	94	99
CORBET WSC	82	89
CROSS ROADS	135	188
DENTON COUNTY FWSD 1A	210	240
EAST FORK SUD	114	121
ECTOR	102	109
FARMERS BRANCH	263	273
FARMERSVILLE	110	121
FORT WORTH	166	185
GRAND PRAIRIE	138	153
HURST	154	162
JUSTIN	125	142
LAKESIDE	126	158
MANSFIELD	229	252
MCLENDON-CHISHOLM	151	178
NORTH COLLIN WSC	124	140
PALOMA CREEK CRU[2]	94	191
PARKER COUNTY SUD	86	103
RED OAK	121	140
RHOME	133	162
RICHARDSON	222	233
ROANOKE	214	261
SOUTH GRAYSON WSC[3]	108	116
SOUTHWEST FANNIN COUNTY SUD	73	97
WATAUGA	107	113
WHITE SETTLEMENT	112	119

WUG Name	TWDB Draft 2011 GPCD	Corrected Base GPCD
WILMER	90	101
WORTHAM	119	137
WYLIE	135	141

[2]No TWDB data was available for Paloma Creek CRU for 2006 and 2008. Upper Trinity Regional Water District (supplier to Paloma Creek) provided information for 2006, 2008, and corrected data for 2011. This information is being transmitted with this memo.
[3]Southwest Fannin County SUD calculation used the average of only years 2008 and 2011. No TWDB data was available for 2006.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 11:48:42 AM
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Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
BELLS	2011	39,917,465	0	39,917,465		1,399	78

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF BELLS	100.00	C
PINK HILL WSC	8.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF BELLS	N	34,062,905	0	0	0	100.00	34,062,905		34,062,905
PINK HILL WSC	N	73,182,000	0	0	0	8.00	73,182,000		5,854,560
TOTAL	**n/a**	**107,244,905**	**0**	**0**	**0**	**n/a**	**107,244,905**	**n/a**	**39,917,465**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF BELLS	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**100.00**	**0**
PINK HILL WSC	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**8.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF BELLS	34,062,905	0	100.00	34,062,905
PINK HILL WSC	5,854,560	0	8.00	5,854,560
TOTAL	**39,917,465**	**0**	**n/a**	**39,917,465**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

Table 1. Calculated GPCD of Water User Group (WUG) Entity
This report displays the total intake calculated in Table 2, the sales calculated in Table 3, and the net use volumes for the entity calculated in Table 4, as well as the population estimate and the calculated per-person water use. Please not that some small difference may occur between the total volumes and the sum of volumes presented earlier due to rounding when applying the allocation percentages.
Population - For city WUG Entities, the population values are from the U.S. Census Bureau (July 1 estimates). TWDB staff have historically used annual population estimates from the Texas State Data Center, however such estimates were not available in January 2012. For non-city utility water user groups, the population values are based on the population-served reported in returned water use surveys or a calculated estimate of population-served from the system's number of total connections. Because the GPCD and water use summary calculations are calculated annually and staff resources are limited, the population values for the non-city utility WUG Entities are not calibrated with county or state-level annual population estimates, however steps are taken to taken to ensure that the reported population served and the reported number of connections is within a reasonable range.
WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

Table 2. Water System(s) Providing Water to the WUG Entity
This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.
Water System – This field contains the name of name of the public water system or facility. If the system/facility is owned by a larger utility or corporation or is being operated by another company or utility, then the name of the larger organization or operator will precede the system name.
Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
Primary Region – The WUG Entity and individual systems may serve multiple water planning regions, however, this is the primary region served.

Table 3. Water Intake Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
This table displays the intake reported by the water system/facility, or the intake estimated by staff for non-responding systems, and the intake volume allocated to the WUG Entity based on the Percent Allocation (see Table 1).
TWDB Estimation – "Y" indicates that the water system/facility did not return a water use survey for that particular year and staff used the intake volume from the last returned survey as an estimate. "N" indicates that the intake volumes were from a returned water use survey.
Intake Volume Allocated to WUG Entity - The System Total Intake multiplied by the Percent of System Volume Allocated to WUG Entity.

Table 4. Water Sales Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
This table displays the specific municipal wholesale and industrial sales that were recognized and subtracted from the intake to calculate the system's net use. If a system's intake was allocated to the WUG Entity, the system's sales were allocated at the same percentage. In many cases, the TWDB surveys both the water seller and buyers.
Seller Volume – The water sales volume reported in an annual water use survey by the system selling the water. If the system did not return a water use survey, then the previous-year's reported sales were used as estimates.
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Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
This table displays a summary of the intake, sales and net use volume for each system/facility which contributes to the intake, sales and net use of the WUG Entity.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

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Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
BRIDGEPORT	2011	443,589,439	82,096,680	361,492,759	1,109	6,047	164

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF BRIDGEPORT	100.00	C
WEST WISE SUD	13.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity	Ac-ft/yr
CITY OF BRIDGEPORT	N	0	0	0	423,648,661	100.00	423,648,661	TARRANT REGIONAL WD-LAKE BRIDGEPORT - 08010	423,648,661	1,300
WEST WISE SUD	N	0	0	0	144,889,900	13.00	144,889,900	TARRANT REGIONAL WD-LAKE BRIDGEPORT - 08010	18,835,687	58
WEST WISE SUD	N	0	0	0	8,500,700	13.00	8,500,700	WALNUT CREEK SUD-GENERAL WATER DISTRIBUTION SYSTEM (WALNUT CREEK SUD)	1,105,091	3
TOTAL	**n/a**	**0**	**0**	**0**	**514,801,720**	**n/a**	**577,039,261**	**n/a**	**443,589,439**	1,361

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity	
CITY OF BRIDGEPORT	0	1,500,000	ACME BRICK COMPANY-BRIDGEPORT PLANT	Ind-Mfg	BUYER-VOLUME	1,500,000			
	0	7,716,280	DEVON ENERGY CORPORATION	Ind-Min	BUYER-VOLUME	7,716,280			
	72,000,000	0	MITCHELL ENERGY	Mun	SELLER-VOLUME	72,000,000			
	0	0	OTHER MINING	Mun	SELLER-VOLUME	0			
	SELLER TOTAL					**81,216,280**	**100.00**	**81,216,280**	249
WEST WISE SUD	0	1,356,910	DEVON ENERGY CORPORATION	Ind-Min	BUYER-VOLUME	1,356,910			
	5,415,400	0	CITY OF CHICO	Mun	SELLER-VOLUME	5,415,400			
	SELLER TOTAL					**6,772,310**	**13.00**	**880,400**	3
TOTAL								**82,096,680**	

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity				
Water System	**WUG Entity Intake Total**	**WUG Entity Sales Total**	**Percent of System Volume Allocated to WUG Entity**	**WUG Entity Total Net Use**
CITY OF BRIDGEPORT	423,648,661	81,216,280	100.00	342,432,381
WEST WISE SUD	19,940,778	880,400	13.00	19,060,378
TOTAL	**443,589,439**	**82,096,680**	**n/a**	**361,492,759**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

Table 1. Calculated GPCD of Water User Group (WUG) Entity
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WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

Table 2. Water System(s) Providing Water to the WUG Entity
This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.
Water System – This field contains the name of name of the public water system or facility. If the system/facility is owned by a larger utility or corporation or is being operated by another company or utility, then the name of the larger organization or operator will precede the system name.
Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
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Table 3. Water Intake Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
This table displays the intake reported by the water system/facility, or the intake estimated by staff for non-responding systems, and the intake volume allocated to the WUG Entity based on the Percent Allocation (see Table 1).
TWDB Estimation – "Y" indicates that the water system/facility did not return a water use survey for that particular year and staff used the intake volume from the last returned survey as an estimate. "N" indicates that the intake volumes were from a returned water use survey.
Intake Volume Allocated to WUG Entity - The System Total Intake multiplied by the Percent of System Volume Allocated to WUG Entity.

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Seller Volume – The water sales volume reported in an annual water use survey by the system selling the water. If the system did not return a water use survey, then the previous-year's reported sales were used as estimates.
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Volume Source - This field indicates whether the seller volume or buyer volume is used in the calculations. If both the seller and the buyer returned the annual survey, then the buyer volume is used in the calculations. If the seller or buyer did not return an annual survey (see Table 2. TWDB Estimation), then the volume reported by the other is used.
Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
This table displays a summary of the intake, sales and net use volume for each system/facility which contributes to the intake, sales and net use of the WUG Entity.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

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Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
CARROLLTON	2011	8,136,687,000	291,208,502	7,845,478,498		122,640	175

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF CARROLLTON	100.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF CARROLLTON	N	0	0	0	8,125,940,000	100.00	8,125,940,000	CITY OF DALLAS	8,125,940,000
CITY OF CARROLLTON	N	10,747,000	0	0	0	100.00	10,747,000		10,747,000
TOTAL	n/a	**10,747,000**	**0**	**0**	**8,125,940,000**	n/a	**8,136,687,000**	n/a	**8,136,687,000**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF CARROLLTON	0	10,633,000	AER MANUFACTURING, INC	Ind-Mfg	BUYER-VOLUME	10,633,000		
	0	14,152,000	AKZONOBEL PAINTS LLC	Ind-Mfg	BUYER-VOLUME	14,152,000		
	0	7,624,913	B A E AUTOMATED SYSTEM, INC	Ind-Mfg	BUYER-VOLUME	7,624,913		
	0	7,449,000	BEAUTICONTROL COSMETICS INC - CARROLLTON PLANT	Ind-Mfg	BUYER-VOLUME	7,449,000		
	24,457,000	0	EARTHGRAINS BAKING COMPANY-DALLAS PLANT	Ind-Mfg	SELLER-VOLUME	24,457,000		
	0	4,245,000	GERDAU AMERISTEEL-CARROLLTON WIRE	Ind-Mfg	BUYER-VOLUME	4,245,000		
	23,500,000	23,346,589	HALLIBURTON ENERGY SERVICES-CARROLLTON PLANT	Ind-Mfg	BUYER-VOLUME	23,346,589		
	0	4,921,000	HERITAGE BAG COMPANY	Ind-Mfg	BUYER-VOLUME	4,921,000		
	0	5,666,000	HILITE INDUSTRIES-CARROLLTON PLANT	Ind-Mfg	BUYER-VOLUME	5,666,000		
	0	4,443,000	INTERNATIONAL PAPER COMPANY-CARROLLTON PLANT	Ind-Mfg	BUYER-VOLUME	4,443,000		
	0	23,792,000	SARA LEE RDP, LLC	Ind-Mfg	BUYER-VOLUME	23,792,000		
	0	1,529,000	SONOCO PRODUCTS COPORATION	Ind-Mfg	BUYER-VOLUME	1,529,000		
	0	20,585,000	SSDC, INC	Ind-Mfg	BUYER-VOLUME	20,585,000		
	0	1,246,000	TEGRANT CORP PROTEXIC BRANDS	Ind-Mfg	BUYER-VOLUME	1,246,000		
	0	1,053,000	VINYLEX CORPORATION	Ind-Mfg	BUYER-VOLUME	1,053,000		
	75,372,000	75,441,000	WESTERN EXTRUSIONS CORPORATION	Ind-Mfg	BUYER-VOLUME	75,441,000		
	0	464,000	CHROMALLOY OF DALLAS-PLANT #2	Mun	BUYER-VOLUME	464,000		

	17,881,000	0	FIRST INDUSTRIAL	Mun	SELLER-VOLUME	17,881,000		
	12,760,000	0	GLIDDEN PAINT	Mun	SELLER-VOLUME	12,760,000		
	14,056,000	0	INLAND CONTAINER CORPORATION	Mun	SELLER-VOLUME	14,056,000		
	15,464,000	0	ST MICROELECTRONICS, INC	Mun	SELLER-VOLUME	15,464,000		
	SELLER TOTAL					**291,208,502**	**100.00**	**291,208,502**
TOTAL								**291,208,502**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF CARROLLTON	8,136,687,000	291,208,502	100.00	7,845,478,498
TOTAL	**8,136,687,000**	**291,208,502**	**n/a**	**7,845,478,498**

NOTES:

The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
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Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
CHICO	2011	68,471,400	0	68,471,400	210	1,015	185

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF CHICO	100.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF CHICO	N	63,056,000	0	0	0	100.00	63,056,000		63,056,000
CITY OF CHICO	N				5,415,400	100.00	5,415,400	West Wise SUD	5,415,400
TOTAL	n/a	**63,056,000**	**0**	**0**	**0**	n/a	**63,056,000**	n/a	**68,471,400**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF CHICO	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**100.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use

CITY OF CHICO	68,471,400	0	100.00	68,471,400
TOTAL	**68,471,400**	**0**	**n/a**	**68,471,400**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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This report displays the total intake calculated in Table 2, the sales calculated in Table 3, and the net use volumes for the entity calculated in Table 4, as well as the population estimate and the calculated per-person water use. Please not that some small difference may occur between the total volumes and the sum of volumes presented earlier due to rounding when applying the allocation percentages.
Population - For city WUG Entities, the population values are from the U.S. Census Bureau (July 1 estimates). TWDB staff have historically used annual population estimates from the Texas State Data Center, however such estimates were not available in January 2012. For non-city utility water user groups, the population values are based on the population-served reported in returned water use surveys or a calculated estimate of population-served from the system's number of total connections. Because the GPCD and water use summary calculations are calculated annually and staff resources are limited, the population values for the non-city utility WUG Entities are not calibrated with county or state-level annual population estimates, however steps are taken to taken to ensure that the reported population served and the reported number of connections is within a reasonable range.
WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

Table 2. Water System(s) Providing Water to the WUG Entity
This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.
Water System – This field contains the name of name of the public water system or facility. If the system/facility is owned by a larger utility or corporation or is being operated by another company or utility, then the name of the larger organization or operator will precede the system name.
Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
Primary Region – The WUG Entity and individual systems may serve multiple water planning regions, however, this is the primary region served.

Table 3. Water Intake Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
This table displays the intake reported by the water system/facility, or the intake estimated by staff for non-responding systems, and the intake volume allocated to the WUG Entity based on the Percent Allocation (see Table 1).
TWDB Estimation – "Y" indicates that the water system/facility did not return a water use survey for that particular year and staff used the intake volume from the last returned survey as an estimate. "N" indicates that the intake volumes were from a returned water use survey.
Intake Volume Allocated to WUG Entity - The System Total Intake multiplied by the Percent of System Volume Allocated to WUG Entity.

Table 4. Water Sales Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
This table displays the specific municipal wholesale and industrial sales that were recognized and subtracted from the intake to calculate the system's net use. If a system's intake was allocated to the WUG Entity, the system's sales were allocated at the same percentage. In many cases, the TWDB surveys both the water seller and buyers.
Seller Volume – The water sales volume reported in an annual water use survey by the system selling the water. If the system did not return a water use survey, then the previous-year's reported sales were used as estimates.
Buyer Volume – The water purchase volume reported in an annual water use survey by the system/facility buying the water. If the system did not return a water use survey, then the previous-year's reported sales were used as estimates.
Volume Source - This field indicates whether the seller volume or buyer volume is used in the calculations. If both the seller and the buyer returned the annual survey, then the buyer volume is used in the calculations. If the seller or buyer did not return an annual survey (see Table 2. TWDB Estimation), then the volume reported by the other is used.
Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
This table displays a summary of the intake, sales and net use volume for each system/facility which contributes to the intake, sales and net use of the WUG Entity.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/7/2013 1:41:25 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
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Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
DALLAS	2011	157,118,610,933	63,409,915,750	93,708,695,183	287,581	1,198,739	214

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
BROOKHAVEN COUNTRY CLUB	100.00	C
CITY OF COCKRELL HILL	3.00	C
CITY OF DALLAS	100.00	C
DALLAS COUNTY WCID #6	3.00	C
TOWN OF ADDISON	2.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
BROOKHAVEN COUNTRY CLUB	N	0	0	0	40,237,000	100.00	40,237,000	CITY OF FARMERS BRANCH	40,237,000
BROOKHAVEN COUNTRY CLUB	N	30,500,000	0	0	0	100.00	30,500,000		30,500,000
CITY OF COCKRELL HILL	Y	0	0	0	141,760,000	3.00	141,760,000	CITY OF DALLAS	4,252,800
CITY OF DALLAS	N	0	156,983,453,213	0	0	100.00	156,983,453,213		156,983,453,213
DALLAS COUNTY WCID #6	N	0	0	0	753,174,000	3.00	753,174,000	CITY OF DALLAS	22,595,220
TOWN OF ADDISON	N	0	0	0	1,878,635,000	2.00	1,878,635,000	CITY OF DALLAS	37,572,700
TOTAL	**n/a**	**30,500,000**	**156,983,453,213**	**0**	**2,813,806,000**	**n/a**	**154,435,867,524**	**n/a**	**157,118,610,933**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
BROOKHAVEN COUNTRY CLUB	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**100.00**	**0**
CITY OF COCKRELL HILL	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**3.00**	**0**
	0	51,232,700	AIR LIQUIDE AMERICA CORPORTION-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	51,232,700		
	0	28,292,912	AIR PRODUCTS & CHEMICAL, INC-ELECTRONIC CHEMICALS DIVISION	Ind-Mfg	BUYER-VOLUME	28,292,912		
	0	922,000	AKZONOBEL PAINTS LLC	Ind-Mfg	BUYER-VOLUME	922,000		
	0	3,812,457	ALOE VERA OF AMERICA, INC	Ind-Mfg	BUYER-VOLUME	3,812,457		
	0	67,438,000	AMERICANA FOODS LIMITED	Ind-Mfg	BUYER-VOLUME	67,438,000		
	0	1,727,700	AUTO WAX COMPANY, INC	Ind-Mfg	BUYER-VOLUME	1,727,700		
	0	831,300	AVO INTL	Ind-Mfg	BUYER-VOLUME	831,300		
	0	1,068,000	BLANKS PRINTING & IMAG[illegible]	Ind-Mfg	BUYER-VOLUME	1,068,000		
	0	108,136,100	BORDEN PRODUCTS, LP	Ind-Mfg	BUYER-VOLUME	108,136,100		

0	2,867,100	BUNTING'S WHOLESALE MARKET, INC	Ind-Mfg	BUYER-VOLUME	2,867,100		
0	481,600	CAIN FOOD INDUSTRIES, INC	Ind-Mfg	BUYER-VOLUME	481,600		
0	6,954,000	CKS PACKAGING, INC-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	6,954,000		
0	92,430,745	Coca-Cola Refreshments USA, Inc-BUCKNER PRODUCTION CENTER	Ind-Mfg	BUYER-VOLUME	92,430,745		
0	95,781,800	Coca-Cola Refreshments USA, Inc-SYRUP PLANT	Ind-Mfg	BUYER-VOLUME	95,781,800		
0	4,699,900	COLUMBIA PACKING COMPANY	Ind-Mfg	BUYER-VOLUME	4,699,900		
0	9,762,400	CONSTAR INTERNATIONAL	Ind-Mfg	BUYER-VOLUME	9,762,400		
0	1,153,000	CONTINENTAL ELECTRONICS MANUFACTURING COMPANY	Ind-Mfg	BUYER-VOLUME	1,153,000		
0	3,303,800	DAL CHROME COMPANY	Ind-Mfg	BUYER-VOLUME	3,303,800		
0	5,070,000	DAL TILE CORPORATION-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	5,070,000		
0	34,311,000	DALLAS AIRMOTIVE, INC	Ind-Mfg	BUYER-VOLUME	34,311,000		
0	3,651,800	DALLAS CITY PACKING, INC	Ind-Mfg	BUYER-VOLUME	3,651,800		
0	16,834,000	DARLING INT, INC	Ind-Mfg	BUYER-VOLUME	16,834,000		
0	6,288,900	DOLCO PACKAGING	Ind-Mfg	BUYER-VOLUME	6,288,900		
0	8,274,000	EARTHGRAINS BAKING COMPANY-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	8,274,000		
0	750,100	FLINT INK NORTH AMERICA CORPORATION	Ind-Mfg	BUYER-VOLUME	750,100		
0	38,669,000	FRITO-LAY, INC-DBS PLANT	Ind-Mfg	BUYER-VOLUME	38,669,000		
0	2,957,600	G P PLASTICS CORPORATION	Ind-Mfg	BUYER-VOLUME	2,957,600		
0	33,092,357	GAF BUILDING MATERIALS CORPORATION	Ind-Mfg	BUYER-VOLUME	33,092,357		
0	106,100	GOLDEN GATE FOODS, INC	Ind-Mfg	BUYER-VOLUME	106,100		
0	66,400	HARCROS CHEMICALS, INC	Ind-Mfg	BUYER-VOLUME	66,400		
0	2,667,400	ILLES FOOD INGREDIENT,LTD	Ind-Mfg	BUYER-VOLUME	2,667,400		
0	4,178,100	JONES BLAIR COMPANY	Ind-Mfg	BUYER-VOLUME	4,178,100		
0	582,600	LANE PLATING WORKS, INC	Ind-Mfg	BUYER-VOLUME	582,600		
0	3,850,700	MARLOW INDUSTRIES, INC	Ind-Mfg	BUYER-VOLUME	3,850,700		
0	14,869,900	MARTIN FOUNDRY	Ind-Mfg	BUYER-VOLUME	14,869,900		
0	31,641,700	MARY KAY, INC	Ind-Mfg	BUYER-VOLUME	31,641,700		
0	1,183,100	Mestex A Division of Mestek Inc.	Ind-Mfg	BUYER-VOLUME	1,183,100		
0	116,567,000	MISSION FOOD CORPORATION	Ind-Mfg	BUYER-VOLUME	116,567,000		
0	877,000	MOZZARELLA COMPANY	Ind-Mfg	BUYER-VOLUME	877,000		
0	533,200	NATIONAL BANNER COMPANY, INC	Ind-Mfg	BUYER-VOLUME	533,200		
0	2,263,800	NATIONAL FOOD & BEVERAGE	Ind-Mfg	BUYER-VOLUME	2,263,800		
0	72,626,295	OAK FARMS, INC	Ind-Mfg	BUYER-VOLUME	72,626,295		
0	31,593,100	OCCIDENTAL CHEMICAL CORPORATION-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	31,593,100		
0	3,470,450	OLDCASTLE APG TEXAS	Ind-Mfg	BUYER-VOLUME	3,470,450		
0	10,034,100	PETRA CHEMICAL COMPANY	Ind-Mfg	BUYER-VOLUME	10,034,100		
0	358,687,600	PILGRIM PRIDE INDUSTRIES, INC-DALLAS DIVISION	Ind-Mfg	BUYER-VOLUME	358,687,600		
0	576,700	PRIMROSE OIL	Ind-Mfg	BUYER-VOLUME	576,700		
0	1,545,094	PSC ENVIROMENTAL	Ind-Mfg	BUYER-VOLUME	1,545,094		
0	138,357,000	QUALITY SAUSAGE COMPANY	Ind-Mfg	BUYER-VOLUME	138,357,000		
0	23,404,900	RAYTHEON AIRCRAFT COMPANY	Ind-Mfg	BUYER-VOLUME	23,404,900		
0	55,343,700	REDDY ICE, LTD-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	55,343,700		
0	1,769,600	ROCHESTER GAUGES,INC	Ind-Mfg	BUYER-VOLUME	1,769,600		
0	110,814,900	ROCK TENN COMPANY-MILL DIVISION	Ind-Mfg	BUYER-VOLUME	110,814,900		
0	370,400	RTS PACKAGING	Ind-Mfg	BUYER-VOLUME	370,400		
0	1,021,800	RUDOLPH FOODS	Ind-Mfg	BUYER-VOLUME	1,021,800		
0	3,217,800	SANDEN INTERNATIONAL USA, INC	Ind-Mfg	BUYER-VOLUME	3,217,800		
0	102,963,200	SCHEPPS-FOREMOST, INC	Ind-Mfg	BUYER-VOLUME	102,963,200		
0	42,075,900	SOLO CUP CORPORATION	Ind-Mfg	BUYER-VOLUME	42,075,900		
0	1,075,308	SOUTHERN GRAPHIC SYSTEMS	Ind-Mfg	BUYER-VOLUME	1,075,308		
0	622,200	STANDEX ADP	Ind-Mfg	BUYER-VOLUME	622,200		
0	202,225,700	SVC MANUFACTURING INC	Ind-Mfg	BUYER-VOLUME	202,225,700		
0	17,744,415	TAMKO BUILDING PRODUCTS INC-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	17,744,415		
0	806,800	TEXAS BYPRODUCTS, INC-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	806,800		

	0	6,953,600	TEXAS INDUSTRIES, INC-CORINTH STREET PLANT	Ind-Mfg	BUYER-VOLUME	6,953,600		
	0	10,574,800	TEXAS INDUSTRIES, INC-SPANGLER ROAD PLANT	Ind-Mfg	BUYER-VOLUME	10,574,800		
	0	56,131,204	TEXAS INSTRUMENTS, INC-FOREST LANE PLANT-SOUTH CAMPUS	Ind-Mfg	BUYER-VOLUME	56,131,204		
	0	1,766,876,891	TEXAS INSTRUMENTS, INC-NORTH CENTRAL EXPWY PLANT	Ind-Mfg	BUYER-VOLUME	1,766,876,891		
	0	467,400	THERMAL SOLUTIONS MFG, INC	Ind-Mfg	BUYER-VOLUME	467,400		
	0	1,983,400	THERMO SERVICE	Ind-Mfg	BUYER-VOLUME	1,983,400		
	0	211,221,000	TRIUMPH AEROSTRUCTURES - VOUGHT INTEGRATED PROGRAMS DIVISION	Ind-Mfg	BUYER-VOLUME	211,221,000		
	0	81,611,700	TYSON FOODS, INC-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	81,611,700		
	0	5,562,600	U S GYPSUM COMPANY-DALLAS PLANT	Ind-Mfg	BUYER-VOLUME	5,562,600		
	0	1,812,400	UNITRON, LP	Ind-Mfg	BUYER-VOLUME	1,812,400		
	0	2,888,300	WELLMARK INTERNATIONAL	Ind-Mfg	BUYER-VOLUME	2,888,300		
	0	3,577,200	WILLIAMSON PRINTING CORPORATION	Ind-Mfg	BUYER-VOLUME	3,577,200		
	4,561,965,838	0	LUMINANT MINING COMPANY, LLC-OAK HILL LIGNITE AREA	Ind-Pwr	SELLER-VOLUME	4,561,965,838		
	0	7,363,000	EXELON GENERATION COMPANY LLC	Ind-Pwr	BUYER-VOLUME	7,363,000		
	304,004,800	0	LUMINANT GENERATION COMPANY, LLC-LAKE HUBBARD STEAM ELECTRIC PLANT	Ind-Pwr	SELLER-VOLUME	304,004,800		
	0	4,131,986,185	LUMINANT GENERATION COMPANY, LLC-MARTIN LAKE STEAM ELECTRIC STATION	Ind-Pwr	BUYER-VOLUME		Counted above	
	18,623,995	0	BROOKS COURT WATER SUPPY	Mun	SELLER-VOLUME	18,623,995		
	3,527,994	0	CARROLLTON-FARMERS BRANCH ISD	Mun	SELLER-VOLUME	3,527,994		
	69,554,995	0	CITY OF ALLEN	Mun	SELLER-VOLUME	69,554,995		
	7,708,076,994	8,125,940,000	CITY OF CARROLLTON	Mun	BUYER-VOLUME	7,708,076,994		
	2,813,572,994	3,086,561,000	CITY OF CEDAR HILL	Mun	BUYER-VOLUME	2,813,572,994		
	110,052,996	141,760,000	CITY OF COCKRELL HILL	Mun	SELLER-VOLUME	110,052,996		
	3,537,392,995	3,537,393,000	CITY OF COPPELL	Mun	BUYER-VOLUME	3,537,392,995		
	0	182,500,000	CITY OF DENTON	Mun	BUYER-VOLUME	0		
	2,928,982,995	2,932,633,000	CITY OF DESOTO	Mun	BUYER-VOLUME	2,928,982,995		
	2,151,400,996	1,977,859,000	CITY OF DUNCANVILLE	Mun	BUYER-VOLUME	2,151,400,996		
	3,168,807,994	2,986,651,000	CITY OF FARMERS BRANCH	Mun	BUYER-VOLUME	3,168,807,994		
	2,682,849,996	2,657,620,000	CITY OF FLOWER MOUND	Mun	BUYER-VOLUME	2,682,849,996		
	446,215,996	491,633,000	CITY OF GLENN HEIGHTS	Mun	BUYER-VOLUME	446,215,996		
	5,831,038,995	8,168,387,000	CITY OF GRAND PRAIRIE	Mun	BUYER-VOLUME	5,831,038,995		
	297,812,997	349,075,127	CITY OF GRAPEVINE	Mun	BUYER-VOLUME	297,812,997		
	415,216,996	418,335,000	CITY OF HUTCHINS	Mun	BUYER-VOLUME	415,216,996		
	5,188,214,994	2,582,930,000	CITY OF IRVING	Mun	BUYER-VOLUME	5,188,214,994		
	1,697,063,996	2,183,966,300	CITY OF LANCASTER	Mun	BUYER-VOLUME	1,697,063,996		
	6,127,512,996	3,087,259,994	CITY OF LEWISVILLE	Mun	BUYER-VOLUME	6,127,512,996		
	148,369,993	248,960,000	CITY OF OVILLA	Mun	BUYER-VOLUME	148,369,993		
	259,902,995	0	CITY OF RED OAK	Mun	SELLER-VOLUME	259,902,995		
	589,819,994	590,504,000	CITY OF SEAGOVILLE	Mun	BUYER-VOLUME	589,819,994		
	1,367,422,996	1,374,355,994	CITY OF THE COLONY	Mun	BUYER-VOLUME	1,367,422,996		
	113,415,995	0	COMBINE WSC	Mun	SELLER-VOLUME	113,415,995		
	0	24,217,600	COMMUNITY WATER SERVICE, INC-DANIELDALE WATER SYSTEM	Mun	BUYER-VOLUME	24,217,600		
	752,892,995	753,174,000	DALLAS COUNTY WCID #6	Mun	BUYER-VOLUME	752,892,995		
	890,638,995	890,638,996	DFW INTERNATIONAL AIRPORT	Mun	BUYER-VOLUME	890,638,995		
	279,076,995	0	HP ENTERPRISE SERVICE	Mun	SELLER-VOLUME	279,076,995		
	0	0	NORTH TEXAS MWD-DALLAS COUNTY RESERVOIRS - 08155	Mun	SELLER-VOLUME	0		
	13,469,395	0	PLANTATION SERVICE INC	Mun	SELLER-VOLUME	13,469,395		
	1,860,607,996	1,878,635,000	TOWN OF ADDISON	Mun	BUYER-VOLUME	1,860,607,996		
	2,883,605,994	0	UPPER TRINITY REGIONAL WATER DIS	Mun	SELLER-VOLUME	2,883,605,994		
	16,984,095	0	WATER VIEW DEVELOPMENT INC	Mun	SELLER-VOLUME	16,984,095		
	SELLER TOTAL					**63,409,870,318**	**100.00**	**63,409,870,318**
DALLAS COUNTY WCID #6	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**3.00**	**0**
TOWN OF ADDISON	0	892,000	AIRBORN, INC-ADDISON PLANT	Ind-Mfg	BUYER-VOLUME	892,000		
	0	1,006,600	ALL-PLASTICS MOLDING, I	Ind-Mfg	BUYER-VOLUME	1,006,600		

	0	373,000	PLASTECH CORPORATION	Ind-Mfg	BUYER-VOLUME	373,000		
	SELLER TOTAL					2,271,600	2[illegible]	45,432
TOTAL								63,409,915,750

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity				
Water System	**WUG Entity Intake Total**	**WUG Entity Sales Total**	**Percent of System Volume Allocated to WUG Entity**	**WUG Entity Total Net Use**
BROOKHAVEN COUNTRY CLUB	70,737,000	0	100.00	70,737,000
CITY OF COCKRELL HILL	4,252,800	0	3.00	4,252,800
CITY OF DALLAS	156,983,453,213	63,409,870,318	100.00	86,148,608,513
DALLAS COUNTY WCID #6	22,595,220	0	3.00	22,595,220
TOWN OF ADDISON	37,572,700	45,432	2.00	37,527,268
TOTAL	**157,118,610,933**	**63,409,915,750**	**n/a**	**93,708,695,183**

NOTES:
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This table displays the specific municipal wholesale and industrial sales that were recognized and subtracted from the intake to calculate the system's net use. If a system's intake was allocated to the WUG Entity, the system's sales were allocated at the same percentage. In many cases, the TWDB surveys both the water seller and buyers.
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Volume Source - This field indicates whether the seller volume or buyer volume is used in the calculations. If both the seller and the buyer returned the annual survey, then the buyer volume is used in the calculations. If the seller or buyer did not return an annual survey (see Table 2. TWDB Estimation), then the volume reported by the other is used.
Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
This table displays a summary of the intake, sales and net use volume for each system/facility which contributes to the intake, sales and net use of the WUG Entity.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 10:31:49 AM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
DENTON	2011	10,278,564,840	2,914,537,625	7,170,780,699	22,006	114,960	171

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF DENTON	98.10	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF DENTON	N	0	0	0	182,500,000	98.10	182,500,000	CITY OF DALLAS	179,032,500
CITY OF DENTON	N	0	10,295,140,000	0	0	98.10	10,295,140,000		10,099,532,340
TOTAL	**n/a**	**0**	**10,295,140,000**	**0**	**182,500,000**	**n/a**	**10,477,640,000**	**n/a**	**10,278,564,840**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF DENTON	0	2,313,542	CMS HARTZELL MANUFACTURING, INC	Ind-Mfg	BUYER-VOLUME	2,313,542		
	0	17,176,900	JOSTENS, INC	Ind-Mfg	BUYER-VOLUME	17,176,900		
	0	50,190,000	PETERBILT MOTORS COMPANY	Ind-Mfg	BUYER-VOLUME	50,190,000		
	0	9,158,600	SAFETY KLEEN SYSTEMS, INC	Ind-Mfg	BUYER-VOLUME	9,158,600		
	0	19,824,000	TETRA PAK MATERIALS, LP	Ind-Mfg	BUYER-VOLUME	19,824,000		
	0	2,391,100	THERMADYNE HOLDINGS, CORPORATION	Ind-Mfg	BUYER-VOLUME	2,391,100		
	0	7,402,540	GARLAND POWER & LIGHT-SPENCER GENERATING STATION	Ind-Pwr	BUYER-VOLUME	7,402,540		
	0	1,388,999	SHELDON BOMBERG DBA-SHERWOOD MOBILE HOME PARK	Mun	BUYER-VOLUME	1,388,999		
	113,854,999	0	UPPER TRINITY REGIONAL WATER DISTRICT	Mun	SELLER-VOLUME	113,854,999		
	2,944,274,999	0	UPPER TRINITY REGIONAL WD-GENERAL WATER DISTRIBUTION SYSTEM	Mun	SELLER-VOLUME	2,944,274,999		
	SELLER TOTAL					**3,167,975,679**	**98.10**	**3,107,784,141**
TOTAL								**3,107,784,141**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF DENTON	10,278,564,840	3,107,784,141	98.10	7,170,780,699
TOTAL	**10,278,564,840**	**3,107,784,141**	**n/a**	**7,170,780,699**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

Table 1. Calculated GPCD of Water User Group (WUG) Entity
This report displays the total intake calculated in Table 2, the sales calculated in Table 3, and the net use volumes for the entity calculated in Table 4, as well as the population estimate and the calculated per-person water use. Please not that some small difference may occur between the total volumes and the sum of volumes presented earlier due to rounding when applying the allocation percentages.
Population - For city WUG Entities, the population values are from the U.S. Census Bureau (July 1 estimates). TWDB staff have historically used annual population estimates from the Texas State Data Center, however such estimates were not available in January 2012. For non-city utility water user groups, the population values are based on the population-served reported in returned water use surveys or a calculated estimate of population-served from the system's number of total connections. Because the GPCD and water use summary calculations are calculated annually and staff resources are limited, the population values for the non-city utility WUG Entities are not calibrated with county or state-level annual population estimates, however steps are taken to taken to ensure that the reported population served and the reported number of connections is within a reasonable range.
WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

Table 2. Water System(s) Providing Water to the WUG Entity
This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.
Water System – This field contains the name of name of the public water system or facility. If the system/facility is owned by a larger utility or corporation or is being operated by another company or utility, then the name of the larger organization or operator will precede the system name.
Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
Primary Region – The WUG Entity and individual systems may serve multiple water planning regions, however, this is the primary region served.

Table 3. Water Intake Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
This table displays the intake reported by the water system/facility, or the intake estimated by staff for non-responding systems, and the intake volume allocated to the WUG Entity based on the Percent Allocation (see Table 1).
TWDB Estimation – "Y" indicates that the water system/facility did not return a water use survey for that particular year and staff used the intake volume from the last returned survey as an estimate. "N" indicates that the intake volumes were from a returned water use survey.
Intake Volume Allocated to WUG Entity - The System Total Intake multiplied by the Percent of System Volume Allocated to WUG Entity.

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Seller Volume – The water sales volume reported in an annual water use survey by the system selling the water. If the system did not return a water use survey, then the previous-year's reported sales were used as estimates.
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Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
This table displays a summary of the intake, sales and net use volume for each system/facility which contributes to the intake, sales and net use of the WUG Entity.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 2:05:57 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
EUSTACE	2011	38,379,822	0	38,379,822		999	105

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF EUSTACE	94.00	C
PERCENT OF NON-SYSTEM POPULATION	10.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF EUSTACE	N	35,610,957	0	0	0	96.00	35,610,957		34,186,519
NON-SYSTEM POPULATION	Y	4,193,303	0	0	0	10.00	4,193,303	N/A	4,193,303
TOTAL	**n/a**	**48,960,303**	**0**	**0**	**0**	**n/a**	**48,960,303**	**n/a**	**38,379,822**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF EUSTACE	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**96.00**	**0**
N/A	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**10.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF EUSTACE	34,186,519	0	47.00	34,186,519
NON-SYSTEM POPULATION	4,193,303	0	10.00	4,193,303
TOTAL	**38,379,822**	**0**	**n/a**	**38,379,822**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

Table 2. Water System(s) Providing Water to the WUG Entity
This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.
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Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
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Intake Volume Allocated to WUG Entity - The System Total Intake multiplied by the Percent of System Volume Allocated to WUG Entity.

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Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
This table displays a summary of the intake, sales and net use volume for each system/facility which contributes to the intake, sales and net use of the WUG Entity.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/7/2013 1:59:07 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
FAIRVIEW	2011	897,632,400	0	897,632,400	2,686	7,527	327

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
TOWN OF FAIRVIEW	96.52	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
TOWN OF FAIRVIEW	N	0	0	0	929,977,000	96.52	929,977,000	NORTH TEXAS MWD-WYLIE WTP - LAKE LAVON - 08160	897,632,400
TOTAL	**n/a**	**0**	**0**	**0**	**929,977,000**	**n/a**	**929,977,000**	**n/a**	**897,632,400**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
TOWN OF FAIRVIEW	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**96.52**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use

TOWN OF FAIRVIEW	897,632,400	0	96.52	897,632,400
TOTAL	**897,632,400**	**0**	**n/a**	**897,632,400**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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Table 2. Water System(s) Providing Water to the WUG Entity
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Percent of System Volume Allocated to Planning Entity – This value is the percentage of the <u>system's</u> population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
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Intake Volume Allocated to WUG Entity - The System Total Intake multiplied by the Percent of System Volume Allocated to WUG Entity.

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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

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Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
GAINESVILLE	2011	853,505,280	45,612,622	807,892,658		15,984	138

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
BACK 40 UTILITY SYSTEMS #1 & #2	9.00	C
CITY OF GAINESVILLE	96.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF GAINESVILLE	N	0	203,447,900	0	0	96.00	203,447,900		195,309,984
CITY OF GAINESVILLE	N	685,620,100	0	0	0	96.00	685,620,100		658,195,296
TOTAL	**n/a**	**685,620,100**	**203,447,900**	**0**	**0**	**n/a**	**889,068,000**	**n/a**	**853,505,280**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
BACK 40 UTILITY SYSTEMS #1 & #2	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**9.00**	**0**
CITY OF GAINESVILLE	0	3,146,490	A E P INDUSTRIES, INC	Ind-Mfg	BUYER-VOLUME	3,146,490		
	0	43,700	CATTLE LAC LIQUIDS, INC	Ind-Mfg	BUYER-VOLUME	43,700		
	0	1,002,540	GAINESVILLE FOUNDRY, INC	Ind-Mfg	BUYER-VOLUME	1,002,540		
	0	1,218,200	PETROFLEX, LTD	Ind-Mfg	BUYER-VOLUME	1,218,200		
	5,800,899	5,986,000	POLYPIPE, INC-GAINESVILLE PLANT	Ind-Mfg	BUYER-VOLUME	5,986,000		
	8,609,299	21,298,019	WEBER AIRCRAFT	Ind-Mfg	BUYER-VOLUME	21,298,019		
	6,253,999	0	MOLDED FIBERGLAR	Mun	SELLER-VOLUME	6,253,999		
	0	8,564,200	TEXAS YOUTH COMMISSION-(GAINESVILLE)	Mun	BUYER-VOLUME	8,564,200		
	SELLER TOTAL					**47,513,148**	**96.00**	**45,612,622**
TOTAL								**45,612,622**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity				
Water System	**WUG Entity Intake Total**	**WUG Entity Sales Total**	**Percent of System Volume Allocated to WUG Entity**	**WUG Entity Total Net Use**
CITY OF GAINESVILLE	817,942,560	43,712,096	92.00	774,230,464
TOTAL	**817,942,560**	**43,712,096**	**n/a**	**774,230,464**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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Table 2. Water System(s) Providing Water to the WUG Entity
This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.
Water System – This field contains the name of name of the public water system or facility. If the system/facility is owned by a larger utility or corporation or is being operated by another company or utility, then the name of the larger organization or operator will precede the system name.
Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
Primary Region – The WUG Entity and individual systems may serve multiple water planning regions, however, this is the primary region served.

Table 3. Water Intake Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
This table displays the intake reported by the water system/facility, or the intake estimated by staff for non-responding systems, and the intake volume allocated to the WUG Entity based on the Percent Allocation (see Table 1).
TWDB Estimation – "Y" indicates that the water system/facility did not return a water use survey for that particular year and staff used the intake volume from the last returned survey as an estimate. "N" indicates that the intake volumes were from a returned water use survey.
Intake Volume Allocated to WUG Entity - The System Total Intake multiplied by the Percent of System Volume Allocated to WUG Entity.

Table 4. Water Sales Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
This table displays the specific municipal wholesale and industrial sales that were recognized and subtracted from the intake to calculate the system's net use. If a system's intake was allocated to the WUG Entity, the system's sales were allocated at the same percentage. In many cases, the TWDB surveys both the water seller and buyers.
Seller Volume – The water sales volume reported in an annual water use survey by the system selling the water. If the system did not return a water use survey, then the previous-year's reported sales were used as estimates.
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Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 11:51:25 AM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
HOWE	2011	91,770,600	1,017,400	90,753,200		2,613	95

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF HOWE	100.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF HOWE	N	91,770,600	0	0	0	100.00	91,770,600		91,770,600
TOTAL	**n/a**	**91,770,600**	**0**	**0**	**0**	**n/a**	**91,770,600**	**n/a**	**91,770,600**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF HOWE	0	464,700	MAGNI FAB SOUTHWEST COMPANY, INC-HOWE PLANT	Ind-Mfg	BUYER-VOLUME	464,700		
	0	552,700	MAGNI FAB SOUTHWEST COMPANY, INC-HOWE PLANT #2	Ind-Mfg	BUYER-VOLUME	552,700		
	SELLER TOTAL					**1,017,400**	**100.00**	**1,017,400**
TOTAL								**1,017,400**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use

CITY OF HOWE	91,770,600	1,017,400	100.00	90,753,200
TOTAL	**91,770,600**	**1,017,400**	**n/a**	**90,753,200**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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Population - For city WUG Entities, the population values are from the U.S. Census Bureau (July 1 estimates). TWDB staff have historically used annual population estimates from the Texas State Data Center, however such estimates were not available in January 2012. For non-city utility water user groups, the population values are based on the population-served reported in returned water use surveys or a calculated estimate of population-served from the system's number of total connections. Because the GPCD and water use summary calculations are calculated annually and staff resources are limited, the population values for the non-city utility WUG Entities are not calibrated with county or state-level annual population estimates, however steps are taken to taken to ensure that the reported population served and the reported number of connections is within a reasonable range.
WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

Table 2. Water System(s) Providing Water to the WUG Entity
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Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 9:12:23 AM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
HUTCHINS	2011	437,930,000	236,242,000	201,688,000		5,403	102

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF HUTCHINS	100.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF HUTCHINS	N	0	0	0	437,930,000	100.00	418,335,000	CITY OF DALLAS	437,930,000
TOTAL	**n/a**	**0**	**0**	**0**	**437,930,000**	**n/a**	**418,335,000**	**n/a**	**437,930,000**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF HUTCHINS	0	1,898,000	CARY PRODUCTS COMPANY,INC	Ind-Mfg	BUYER-VOLUME	1,898,000		
	0	4,888,000	CONSOLIDATED CASTINGS CORPORATION	Ind-Mfg	BUYER-VOLUME	4,888,000		
	162,475,000	117,482,000	CITY OF WILMER	Mun	SELLER-VOLUME	162,475,000		
	66,981,000	0	TDCJ-HUTCHINS UNIT	Mun	SELLER-VOLUME	66,981,000		
	SELLER TOTAL					**236,242,000**	**100.00**	**236,242,000**
TOTAL								**236,242,000**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF HUTCHINS	437,930,000	236,242,000	100.00	201,688,000
TOTAL	**437,930,000**	**236,242,000**	**n/a**	**201,688,000**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

Table 1. Calculated GPCD of Water User Group (WUG) Entity
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Population - For city WUG Entities, the population values are from the U.S. Census Bureau (July 1 estimates). TWDB staff have historically used annual population estimates from the Texas State Data Center, however such estimates were not available in January 2012. For non-city utility water user groups, the population values are based on the population-served reported in returned water use surveys or a calculated estimate of population-served from the system's number of total connections. Because the GPCD and water use summary calculations are calculated annually and staff resources are limited, the population values for the non-city utility WUG Entities are not calibrated with county or state-level annual population estimates, however steps are taken to taken to ensure that the reported population served and the reported number of connections is within a reasonable range.
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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 3:30:51 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
KERENS	2011	67,345,536	0	67,345,536		1,584	116

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF KERENS	99.60	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF KERENS	N	0	0	0	67,616,000	99.60	67,616,000	CITY OF CORSICANA	67,345,536
TOTAL	**n/a**	**0**	**0**	**0**	**67,616,000**	**n/a**	**67,616,000**	**n/a**	**67,345,536**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF KERENS	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**92.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF KERENS	67,345,536	0	99.60	67,345,536

TOTAL	67,345,536	0	n/a	67,345,536

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/7/2013 4:46:50 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
LINDSAY	2011	46,475,039	0	46,475,039		1,016	125

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
LINDSAY WSC	99.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
LINDSAY WSC	N	51,638,932	0	0	0	99.00	51,638,932		46,475,039
TOTAL	**n/a**	**51,638,932**	**0**	**0**	**0**	**n/a**	**51,638,932**	**n/a**	**46,475,039**

Table 4. Sales to Users Not Included in WUG Entity

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	SELLER TOTAL					**0**	**99.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
LINDSAY WSC	46,475,039	0	99.00	46,475,039

TOTAL	46,475,039	0	n/a	46,475,039

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Volume Source - This field indicates whether the seller volume or buyer volume is used in the calculations. If both the seller and the buyer returned the annual survey, then the buyer volume is used in the calculations. If the seller or buyer did not return an annual survey (see Table 2. TWDB Estimation), then the volume reported by the other is used.
Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
This table displays a summary of the intake, sales and net use volume for each system/facility which contributes to the intake, sales and net use of the WUG Entity.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/7/2013 4:22:43 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
LUCAS	2011	535,037,120	0	535,037,120	1,496	5,364	273

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF LUCAS	90.00	C
WYLIE NORTHEAST SUD	1.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF LUCAS	N	0	0	0	592,549,000	90.00	592,549,000	NORTH TEXAS MWD-WYLIE WTP - LAKE LAVON - 08160	533,294,100
WYLIE NORTHEAST SUD	Y	0	0	0	174,302,000	1.00	174,302,000	NORTH TEXAS MWD-WYLIE WTP - LAKE LAVON - 08160	1,743,020
TOTAL	**n/a**	**0**	**0**	**0**	**766,851,000**	**n/a**	**766,851,000**	**n/a**	**535,037,120**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF LUCAS	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**90.00**	**0**
WYLIE NORTHEAST SUD	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**1.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF LUCAS	533,294,100	0	90.00	533,294,100
WYLIE NORTHEAST SUD	1,743,020	0	1.00	1,743,020
TOTAL	**535,037,120**	**0**	**n/a**	**535,037,120**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

Table 1. Calculated GPCD of Water User Group (WUG) Entity
This report displays the total intake calculated in Table 2, the sales calculated in Table 3, and the net use volumes for the entity calculated in Table 4, as well as the population estimate and the calculated per-person water use. Please not that some small difference may occur between the total volumes and the sum of volumes presented earlier due to rounding when applying the allocation percentages.
Population - For city WUG Entities, the population values are from the U.S. Census Bureau (July 1 estimates). TWDB staff have historically used annual population estimates from the Texas State Data Center, however such estimates were not available in January 2012. For non-city utility water user groups, the population values are based on the population-served reported in returned water use surveys or a calculated estimate of population-served from the system's number of total connections. Because the GPCD and water use summary calculations are calculated annually and staff resources are limited, the population values for the non-city utility WUG Entities are not calibrated with county or state-level annual population estimates, however steps are taken to taken to ensure that the reported population served and the reported number of connections is within a reasonable range.
WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

Table 2. Water System(s) Providing Water to the WUG Entity
This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.
Water System – This field contains the name of name of the public water system or facility. If the system/facility is owned by a larger utility or corporation or is being operated by another company or utility, then the name of the larger organization or operator will precede the system name.
Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
Primary Region – The WUG Entity and individual systems may serve multiple water planning regions, however, this is the primary region served.

Table 3. Water Intake Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity
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This table displays the specific municipal wholesale and industrial sales that were recognized and subtracted from the intake to calculate the system's net use. If a system's intake was allocated to the WUG Entity, the system's sales were allocated at the same percentage. In many cases, the TWDB surveys both the water seller and buyers.
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Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity
This table displays a summary of the intake, sales and net use volume for each system/facility which contributes to the intake, sales and net use of the WUG Entity.

Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 3:31:26 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
M E N WSC	2011	158,046,999	0	158,046,999	485	3,220	134

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
M E N WSC	100.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
M E N WSC	N	0	0	0	158,046,999	100.00	158,046,999	CITY OF CORSICANA	158,046,999
TOTAL	n/a	0	0	0	158,046,999	n/a	158,046,999	n/a	158,046,999

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
M E N WSC	0	0		Mun	N/A	0		
	SELLER TOTAL					0	100.00	0
TOTAL								0

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
M E N WSC	158,046,999	0	100.00	158,046,999

TOTAL		**158,046,999**	**0**	**n/a**	**158,046,999**

NOTES:

The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

Table 1. Calculated GPCD of Water User Group (WUG) Entity

This report displays the total intake calculated in Table 2, the sales calculated in Table 3, and the net use volumes for the entity calculated in Table 4, as well as the population estimate and the calculated per-person water use. Please not that some small difference may occur between the total volumes and the sum of volumes presented earlier due to rounding when applying the allocation percentages.

Population - For city WUG Entities, the population values are from the U.S. Census Bureau (July 1 estimates). TWDB staff have historically used annual population estimates from the Texas State Data Center, however such estimates were not available in January 2012. For non-city utility water user groups, the population values are based on the population-served reported in returned water use surveys or a calculated estimate of population-served from the system's number of total connections. Because the GPCD and water use summary calculations are calculated annually and staff resources are limited, the population values for the non-city utility WUG Entities are not calibrated with county or state-level annual population estimates, however steps are taken to taken to ensure that the reported population served and the reported number of connections is within a reasonable range.

WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

Table 2. Water System(s) Providing Water to the WUG Entity

This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.

Water System – This field contains the name of name of the public water system or facility. If the system/facility is owned by a larger utility or corporation or is being operated by another company or utility, then the name of the larger organization or operator will precede the system name.

Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.

Primary Region – The WUG Entity and individual systems may serve multiple water planning regions, however, this is the primary region served.

Table 3. Water Intake Volumes of Surveyed Systems and the Volume Allocated to the WUG Entity

This table displays the intake reported by the water system/facility, or the intake estimated by staff for non-responding systems, and the intake volume allocated to the WUG Entity based on the Percent Allocation (see Table 1).

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Intake Volume Allocated to WUG Entity - The System Total Intake multiplied by the Percent of System Volume Allocated to WUG Entity.

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This table displays the specific municipal wholesale and industrial sales that were recognized and subtracted from the intake to calculate the system's net use. If a system's intake was allocated to the WUG Entity, the system's sales were allocated at the same percentage. In many cases, the TWDB surveys both the water seller and buyers.

Seller Volume – The water sales volume reported in an annual water use survey by the system selling the water. If the system did not return a water use survey, then the previous-year's reported sales were used as estimates.

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Sales Volume Used - The volume used in the further summary calculations, as determined by the process described in Volume Source notes

Table 5. Total Intake, Sales, and Net Water Use Volumes of Water Systems Allocated to the WUG Entity

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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/7/2013 4:23:43 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
MARILEE SUD	2011	187,441,140	0	187,441,140	575	3,614	142

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
MARILEE SUD	85.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
MARILEE SUD	N	0	0	0	73,756,000	85.00	73,756,000	CITY OF SHERMAN	62,692,600
MARILEE SUD	N	146,762,988	0	0	0	85.00	146,762,988		124,748,540
TOTAL	n/a	**146,762,988**	**0**	**0**	**73,756,000**	n/a	**220,518,988**	n/a	**187,441,140**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
MARILEE SUD	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**85.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use

MARILEE SUD	187,441,140	0	85.00	187,441,140
TOTAL	**187,441,140**	**0**	**n/a**	**187,441,140**

NOTES:
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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

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Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
MELISSA	2011	359,815,900	0	359,815,900		4,863	203

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF MELISSA-CITY WATER DEPARTMENT	100.00	C
NORTH COLLIN WSC	18.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF MELISSA-CITY WATER DEPARTMENT	N	0	0	0	201,643,000	100.00	201,643,000	NORTH TEXAS MWD-WYLIE WTP - LAKE LAVON - 08160	201,643,000
CITY OF MELISSA-CITY WATER DEPARTMENT	N	0	0	0	106,800,000	100.00	106,800,000	GREATER TEXOMA UTILITY AUTHORITY	106,800,000
NORTH COLLIN WSC	Y	0	0	0	285,405,000	18.00	285,405,000	CITY OF MCKINNEY	51,372,900
TOTAL	**n/a**	**0**	**0**	**0**	**593,848,000**	**n/a**	**593,848,000**	**n/a**	**359,815,900**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF MELISSA-CITY WATER DEPARTMENT	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**100.00**	**0**
NORTH COLLIN WSC	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**18.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF MELISSA-CITY WATER DEPARTMENT	308,443,000	0	100.00	308,443,000
NORTH COLLIN WSC	51,372,900	0	18.00	51,372,900
TOTAL	**359,815,900**	**0**	**n/a**	**359,815,900**

NOTES:
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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

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Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
MUENSTER	2011	91,225,530	0	91,225,530	209	1,543	162

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF MUENSTER	99.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF MUENSTER	N	92,147,000	0	0	0	74.00	92,147,000		91,225,530
TOTAL	**n/a**	**92,147,000**	**0**	**0**	**0**	**n/a**	**92,147,000**	**n/a**	**91,225,530**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF MUENSTER	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**99.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF MUENSTER	91,225,530	0	99.00	91,225,530

TOTAL	91,225,530	0	n/a	91,225,530

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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Amy Kaarlela

From: Kevin Kluge <Kevin.Kluge@twdb.texas.gov>
Sent: Monday, July 15, 2013 4:24 PM
To: Amy Kaarlela
Subject: RE: Region C - Northlake gpcd

Amy,
Since we didn't have a survey at the time, I'm sure that we used the GIS boundaries and census blocks to arrive at the 78-22% allocation. If they only have one retail connection outside of city limits, then the pop within their CCN but outside of city limits are probably self-supplied households.

With this new information, I'd suggest that we throw out the 78-22% and use their entire (100%) 2012 use (121.6 mg) in estimating a base GPCD: 121,609,320 + 4,407,375 (Aero) / 1,827 / 365 = 189.

I believe Mr. Corn may be referencing the Denton Creek Estates PWS owned by Monarch Utilities, just to the southeast of IH 35 and FM 1171. Only a small portion of the System's CCN is covered by the 2010 city boundaries, though it is surrounded by the city, so we didn't include it in the Northlake WUG. Unless they annexed the area, I'd leave it out of the calculations. (Just fyi, they did use 5,103,000 of self-supplied GW in 2012.)

K

From: Amy Kaarlela [mailto:adk@freese.com]
Sent: Monday, July 15, 2013 4:06 PM
To: Kevin Kluge
Subject: RE: Region C - Northlake gpcd

Kevin, I'm again struggling with the % allocation. Below is it 78%. I called City of Northlake (Drew Corn) and he said the only retail connection they have outside the city is one church. He's sending me their 2011 use, but said it was not on the order of 22% of total use. They do have 2 small water systems (separate CCNs) that are within their ETJ—Aero Valley (you mention below) and another called Monarch. Would this Monarch system be why the allocation is 78%? Wonder why it would not have been treated like Aero in your calculation. Any thoughts???

From: Kevin Kluge [mailto:Kevin.Kluge@twdb.texas.gov]
Sent: Monday, July 15, 2013 2:40 PM609
To: Amy Kaarlela
Subject: RE: Region C - Northlake gpcd

Amy,

An explanation and suggested revision...

When the demand projections were being developed, we had never surveyed the Town of Northlake system.

Initially, the estimate was derived from the average daily consumption, as listed on the TCEQ iWUD page, of 0.487 mgd or 177,755,000 gal. per year. The reported sale from FW was 74,140,807, so the estimated GW use was estimated at 103,614,193. This would have actually given the System (not the WUG) a very large gpcd of 314 with the estimated pop served of 1,550.

On May 2nd, we reconsidered the estimated GPCD, opting to go for the GPCD of 115, the estimate we give to private-well households within city limits. Thus, the GW use was changed from 103,614,193 gallons to 16,441,246 in order for the net use to total 75mg necessary for a 115 GPCD.

Since then, we've received the 2012 water use survey from the system, reporting 89,104,136 from Fort Worth and 32,505,184 of self-supplied groundwater, for a total of 121,609,320 gallons. Since I don't know the 2011 groundwater pumpage for the city, I would suggest an alternative base-year gpcd from the following:

Northlake 2012 surveyed use data: 121,609,320 gallons times 78% inside-city allocation = 94,855,270

Plus

Aero Valley Water Service 2011 use (2012 survey not yet received): 4,407,375 gallons

Equals 99,262,645 gallons

Divided by 1,827 population (interpolated valued between the 2010 pop of 1,724 and 2020 pop of 2,303)

Results in a base-year GPCD of 149.

Let me know what you think?

Kevin

From: Amy Kaarlela [mailto:adk@freese.com]
Sent: Monday, July 15, 2013 10:32 AM
To: Kevin Kluge
Subject: Region C - Northlake gpcd

Kevin,
I'm working on gpcd's for 7 remaining WUGs (I'm getting close!). Northlake is a WUG for which TWDB does not show any historical data in the spreadsheet you all sent us. (see below) There is a 2011 detail calculation (attached excel), but it doesn't match other information from TWDB database (see attached pdf). The volumes don't seem to jive. I believe the purchase from Ft Worth is correct on the Excel, but the groundwater seems incorrect. The pdf doesn't show any purchases from Ft Worth (which is incorrect), but shows much more groundwater than the excel file. Can you advise? Thanks.
Amy

Primary Region	Year	WUG Name	Population (See FAQ # 6)	Intake (Acre-Feet)	Intake Groundwater (Acre-Feet)	Sales, Total (Acre-Feet)	Sal Municip Fe
C	2011	NORTHLAKE	NULL = 1788	NULL = 0	NULL = 0	NULL = 0	NULL = 0
C	2010	NORTHLAKE	NULL = 1724	NULL = 0	NULL = 0	NULL = 0	NULL = 0
C	2009	NORTHLAKE	NULL = 2359	NULL = 0	NULL = 0	NULL = 0	NULL = 0
C	2008	NORTHLAKE	NULL = 1825	NULL = 0	NULL = 0	NULL = 0	NULL = 0
C	2007	NORTHLAKE	NULL =	NULL	NULL	NULL = 0	NULL = 0

C	2006	NORTHLAKE	1702 NULL = 1501	NULL	NULL	NULL = 0	NULL = C

Amy D. Kaarlela, P.H.
Water Resources Planning

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Malcolm Baldrige
National Quality Award
2010 Award Recipient

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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/7/2013 4:30:22 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
PARKER	2011	561,618,644	0	561,618,644		3,958	389

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF PARKER	99.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF PARKER	No	0	0	0	567,291,560	99.00	561,618,644	NORTH TEXAS MWD-WYLIE WTP - LAKE LAVON - 08160	561,618,644
TOTAL	**n/a**	**0**	**0**	**0**	**567,291,560**	**n/a**	**561,618,644**	**n/a**	**561,618,644**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF PARKER	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**100.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use

CITY OF PARKER	567,291,560	0	99.00	561,618,644
TOTAL	**561,618,644**	**0**	**n/a**	**561,618,644**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 11:59:40 AM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

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WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
POTTSBORO	2011	130,864,365	3,139,672	127,724,693	336	2,170	161

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF DENISON	1.00	C
CITY OF POTTSBORO	96.00	C

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CITY OF DENISON	N	0	2,816,429,935	0	0	1.00	2,816,429,935		28,164,299
CITY OF DENISON	N	27,238,900	0	0	0	1.00	27,238,900		272,389
CITY OF POTTSBORO	N	0	0	0	70,204,843	96.00	70,204,843	CITY OF DENISON	67,396,649
CITY OF POTTSBORO	N	36,490,654	0	0	0	96.00	36,490,654		35,031,028
TOTAL	**n/a**	**63,729,554**	**2,816,429,935**	**0**	**70,204,843**	**n/a**	**2,950,364,332**	**n/a**	**130,864,365**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF DENISON	0	327,927	CATERPILLAR GLOBAL MINING EQUIPMENT LLC	Ind-Mfg	BUYER-VOLUME	327,927		
	0	5,384,134	CHAMPION COOLER, CORPORATION	Ind-Mfg	BUYER-VOLUME	5,384,134		
	0	765,983	DENISON INDUSTRIES, INC	Ind-Mfg	BUYER-VOLUME	765,983		
	40,032,350	36,212,125	KWIKSET CORPORATON	Ind-Mfg	BUYER-VOLUME	36,212,125		
	69,900,517	70,204,843	CITY OF POTTSBORO	Mun	BUYER-VOLUME	70,204,843		
	4,772,053	0	MONARCH RIDGE	Mun	SELLER-VOLUME	4,772,053		
	8,624,327	1,008,940	NORTHERN HILLS WATER SERVICE	Mun	BUYER-VOLUME	1,008,940		
	74,240,999	75,981,600	OAK RIDGE-SOUTH GALE WSC	Mun	BUYER-VOLUME	75,981,600		
	0	8,838,686	ROCKY POINT SYSTEMS A & B	Mun	BUYER-VOLUME	8,838,686		
	82,727,716	0	RUIZ FOOD	Mun	SELLER-VOLUME	82,727,716		
	14,897,512	19,037,430	THOMPSON HEIGHTS DEVELOPMENT COMPANY	Mun	BUYER-VOLUME	19,037,430		
	8,705,909	0	U.S. CORPS OF ENGINEERS (MONARCH UTILITIES, LP)	Mun	SELLER-VOLUME	8,705,909		
	SELLER TOTAL					**313,967,346**	**1.00**	**3,139,672**

CITY OF POTTSBORO	0	0		Mun	N/A	0		
	SELLER TOTAL					0	96.00	0
TOTAL								3,139,672

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Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF DENISON	28,436,688	3,139,673	1.00	25,297,015
CITY OF POTTSBORO	102,427,677	0	96.00	102,427,677
TOTAL	**130,864,365**	**3,139,673**	**n/a**	**127,724,692**

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As of 5/8/2013 4:32:23 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

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WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
RUNAWAY BAY	2011	112,829,142	6,556,720	106,272,422		1,302	224

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF RUNAWAY BAY	82.00	C
PERCENT OF NON-SYSTEM POPULATION	9.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF RUNAWAY BAY	N	0	0	0	131,598,184	82.00	131,598,184	TARRANT REGIONAL WD-LAKE BRIDGEPORT - 08010	107,910,511
NON-SYSTEM POPULATION	Y	4,918,631	0	0	0	9.00	4,918,631	N/A	4,918,631
TOTAL	**n/a**	**4,918,631**	**0**	**0**	**131,598,184**	**n/a**	**136,516,815**	**n/a**	**112,829,142**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF RUNAWAY BAY	0	5,534,000	GRAND HARBOR WSC	Mun	BUYER-VOLUME	5,534,000		
	2,462,000	0	WEST FORK TANK	Mun	SELLER-VOLUME	2,462,000		
	SELLER TOTAL					**7,996,000**	**82.00**	**6,556,720**
N/A	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**9.00**	**0**
TOTAL								**6,556,720**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity				
Water System	**WUG Entity Intake Total**	**WUG Entity Sales Total**	**Percent of System Volume Allocated to WUG Entity**	**WUG Entity Total Net Use**
CITY OF RUNAWAY BAY	107,910,511	6,556,720	82.00	101,353,791
NON-SYSTEM POPULATION	4,918,631	0	9.00	4,918,631
TOTAL	**112,829,142**	**6,556,720**	**n/a**	**106,272,422**

NOTES:

The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

Table 1. Calculated GPCD of Water User Group (WUG) Entity
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Population - For city WUG Entities, the population values are from the U.S. Census Bureau (July 1 estimates). TWDB staff have historically used annual population estimates from the Texas State Data Center, however such estimates were not available in January 2012. For non-city utility water user groups, the population values are based on the population-served reported in returned water use surveys or a calculated estimate of population-served from the system's number of total connections. Because the GPCD and water use summary calculations are calculated annually and staff resources are limited, the population values for the non-city utility WUG Entities are not calibrated with county or state-level annual population estimates, however steps are taken to taken to ensure that the reported population served and the reported number of connections is within a reasonable range.
WUG Entity Gallons Per Capita Daily – This value is calculated by dividing the WUG Entity Total Net Use (gallons) by the Population and 365.

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This table displays the water system(s) that provides retail water to residents and non-industrial businesses within the city limits or within the service area boundaries if the WUG Entity is non-city utility.
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Percent of System Volume Allocated to Planning Entity – This value is the percentage of the system's population and water use that is assumed to be within the city limits. This percentage is estimated by TWDB staff through review of water use survey information and service area boundaries.
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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 9:21:02 AM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
SEAGOVILLE	2011	701,899,609	112,275,460	589,624,149	1,809	15,094	107

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF SEAGOVILLE	99.85	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF SEAGOVILLE	N	0	0	0	702,947,000	99.85	702,947,000	CITY OF DALLAS	701,899,609
TOTAL	**n/a**	**0**	**0**	**0**	**702,947,000**	**n/a**	**702,947,000**	**n/a**	**701,899,609**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF SEAGOVILLE	112,443,000	112,443,000	COMBINE WSC	Mun	BUYER-VOLUME	112,443,000		
	94,966,000	0	FEDERAL CORRECTION INSTITUTION	Mun	SELLER-VOLUME	94,966,000		
	SELLER TOTAL					**112,443,000**	**99.85**	**112,275,460**
TOTAL								**112,275,460**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use

CITY OF SEAGOVILLE	701,899,609	112,275,460	99.85	589,624,149
TOTAL	**701,899,609**	**112,275,460**	**n/a**	**589,624,149**

NOTES:
The intent of this report is to describe the detailed volumes and processes used to calculate the water use and per-person water use (Gallons Per Capita Daily or GPCD) for Regional Water Planning Water User Group (WUG) Entities. The GPCD-calculation process is illustrated in the sequence shown in the numbered tables. Additional information regarding the tables is shown below. The data has been primarily collected through the Texas Water Development Board's annual survey of water use and is stored in the Texas Water Development Board's water use database. Any changes to data in the water use database should be reflected in this report.

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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT 2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 12:02:42 PM

Revised as Additional or More Accurate Data Becomes Available Through Survey Responses

Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
TOM BEAN	2011	68,329,032	0	68,329,032		1,051	178

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF TOM BEAN	96.00	C
KENTUCKY TOWN WATER SUPPLY	6.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF TOM BEAN	N	63,741,200	0	0	0	96.00	63,741,200		61,191,552
KENTUCKY TOWN WATER SUPPLY	Y	118,958,000	0	0	0	6.00	118,958,000		7,137,480
TOTAL	**n/a**	**182,699,200**	**0**	**0**	**0**	**n/a**	**182,699,200**	**n/a**	**68,329,032**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF TOM BEAN	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**96.00**	**0**
KENTUCKY TOWN WATER SUPPLY	0	0		Mun	N/A	0		
	SELLER TOTAL					**0**	**6.00**	**0**
TOTAL								**0**

Table 5. Total Intake, Sales, & Net Water Use Volumes of Water Systems Allocated to the WUG Entity

Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF TOM BEAN	61,191,552	0	96.00	61,191,552
KENTUCKY TOWN WATER SUPPLY	7,137,480	0	6.00	7,137,480
TOTAL	**68,329,032**	**0**	**n/a**	**68,329,032**

NOTES:
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Texas Water Development Board

WATER USER GROUP-ENTITY DETAILED GPCD REPORT
2011

(All Volumes Reported in Gallons Unless Otherwise Noted)

As of 5/8/2013 3:51:38 PM
Revised as Additional or More Accurate Data Becomes Available Through Survey Responses
Report Filename: SumFinal_WUG_Entity_Detail

Table 1. Calculated GPCD of Water User Group (WUG) Entity

WUG Entity	Year	Total Intake from Table 3	Total Sales from Table 4	Total Net Use from Table 5	Total Net Use (acre-feet)	Population	Gallons Per Capita Daily (GPCD)
WILLOW PARK	2011	220,801,856	3,156,000	217,645,856		4,033	148

Table 2. Water System(s) Providing Water to the WUG Entity

Water System	Percent of System Volume Allocated to Planning Entity	Primary Region
CITY OF WILLOW PARK-CITY OF WILLOW PARK	93.00	C

Table 3. Intake Volumes of Surveyed Systems & the Volume Allocated to the WUG Entity

Water System	TWDB Estimation (Yes or No)	System Self-Supplied Ground Water Intake	System Self-Supplied Surface Water Intake	System Purchased Ground Water Intake	System Purchased Surface Water Intake	Percent of System Volume Allocated to WUG Entity	System Total Intake	Seller Name (if Purchased Water)	Intake Volume Allocated to WUG Entity
CITY OF WILLOW PARK-CITY OF WILLOW PARK	N	237,421,351	0	0	0	80.00	237,421,351		220,801,856
TOTAL	n/a	**237,421,351**	**0**	**0**	**0**	n/a	**237,421,351**	n/a	**220,801,856**

Table 4. Sales to Users Not Included in WUG Entity

Seller	Seller Volume	Buyer Volume	Buyer	Sale Type	Volume Source	Sales Volume Used	Percent of System Volume Allocated to WUG Entity	Total Sales Volume Allocated to WUG Entity
CITY OF WILLOW PARK-CITY OF WILLOW PARK	0	3,945,000	LOCKHEED MARTIN RECREATION ASSOCIATION	Mun	BUYER-VOLUME	3,945,000		
	SELLER TOTAL					**3,945,000**	**80.00**	**3,156,000**
TOTAL								**3,156,000**

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Water System	WUG Entity Intake Total	WUG Entity Sales Total	Percent of System Volume Allocated to WUG Entity	WUG Entity Total Net Use
CITY OF WILLOW PARK-CITY OF WILLOW PARK	220,801,856	3,156,000	80.00	217,645,856

TOTAL	220,801,856	3,156,000	n/a	217,645,856

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Comparison of 2011 gpcd to 2006 gpcd

Year	WUG Name	Gallons Per Person Per Day (GPCD) Source: TWDB	Corrected GPCD	Average of 2006, 2008, 2011	% redution of 2011 gpcd from 2006 gpcd	Comments
2011	ALEDO	119		148	19%	
2010	ALEDO	120				
2009	ALEDO	129				
2008	ALEDO	179				
2007	ALEDO	122				
2006	ALEDO	147				
2011	ANNETTA	80		90	27%	
2010	ANNETTA	80				
2009	ANNETTA	76				
2008	ANNETTA	80				
2007	ANNETTA	100				
2006	ANNETTA	109				
2011	ARGYLE	199		218	23%	
2010	ARGYLE	223				
2009	ARGYLE	191				
2008	ARGYLE	197				
2007	ARGYLE	191				
2006	ARGYLE	257				
2011	ARGYLE WSC	174		189	21%	
2010	ARGYLE WSC	191				
2009	ARGYLE WSC	179				
2008	ARGYLE WSC	173				
2007	ARGYLE WSC	170				
2006	ARGYLE WSC	219				
2011	AURORA	78		86	24%	
2010	AURORA	74				
2009	AURORA	65				
2008	AURORA	76				
2007	AURORA	71				
2006	AURORA	103				
2011	BARDWELL	67		85	30%	
2010	BARDWELL	79				
2009	BARDWELL	89				
2008	BARDWELL	91				
2007	BARDWELL	94				
2006	BARDWELL	96				
2011	BARTONVILLE	170		177	15%	
2010	BARTONVILLE	156				
2009	BARTONVILLE	151				
2008	BARTONVILLE	160				
2007	BARTONVILLE	137				
2006	BARTONVILLE	200				
2011	BELLS	74	78	104	37%	2011 gpcd corrected for percent allocation
2010	BELLS	102				
2009	BELLS	112				
2008	BELLS	117				
2007	BELLS	101				
2006	BELLS	117				
2011	CELINA	148		195	37%	
2010	CELINA	157				
2009	CELINA	194				
2008	CELINA	202				
2007	CELINA	153				
2006	CELINA	235				
2011	COLLINSVILLE	103		108	13%	
2010	COLLINSVILLE	97				
2009	COLLINSVILLE	101				
2008	COLLINSVILLE	102				
2007	COLLINSVILLE	117				
2006	COLLINSVILLE	119				
2011	COMMUNITY WSC	94		99	11%	
2010	COMMUNITY WSC	94				

Year	WUG Name	Gallons Per Person Per Day (GPCD) Source: TWDB	Corrected GPCD	Average of 2006, 2008, 2011	% redution of 2011 gpcd from 2006 gpcd	Comments
2009	COMMUNITY WSC	88				
2008	COMMUNITY WSC	98				
2007	COMMUNITY WSC	81				
2006	COMMUNITY WSC	106				
2011	CORBET WSC	82		89	23%	
2010	CORBET WSC	60				
2009	CORBET WSC	54				
2008	CORBET WSC	78				
2007	CORBET WSC	106				
2006	CORBET WSC	107				
2011	CROSS ROADS	135		188	40%	
2010	CROSS ROADS	106				
2009	CROSS ROADS	183				
2008	CROSS ROADS	204				
2007	CROSS ROADS	NULL = 6				NULL indicated no TWDB data available
2006	CROSS ROADS	224				
2011	DENTON COUNTY FWSD 1A	210		240	30%	
2010	DENTON COUNTY FWSD 1A	229				
2009	DENTON COUNTY FWSD 1A	205				
2008	DENTON COUNTY FWSD 1A	207				
2007	DENTON COUNTY FWSD 1A	220				
2006	DENTON COUNTY FWSD 1A	302				
2011	EAST FORK SUD	114		121	19%	
2010	EAST FORK SUD	105				
2009	EAST FORK SUD	110				
2008	EAST FORK SUD	110				
2007	EAST FORK SUD	90				
2006	EAST FORK SUD	140				
2011	ECTOR	102		109	21%	
2010	ECTOR	93				
2009	ECTOR	94				
2008	ECTOR	96				
2007	ECTOR	100				
2006	ECTOR	129				
2011	FARMERS BRANCH	263		273	11%	
2010	FARMERS BRANCH	268				
2009	FARMERS BRANCH	200				
2008	FARMERS BRANCH	262				
2007	FARMERS BRANCH	226				
2006	FARMERS BRANCH	294				
2011	FARMERSVILLE	110		121	7%	
2010	FARMERSVILLE	78			19%	2011 as compared to 2008
2009	FARMERSVILLE	132				
2008	FARMERSVILLE	135				
2007	FARMERSVILLE	147				
2006	FARMERSVILLE	118				
2011	FORT WORTH	166		185	18%	
2010	FORT WORTH	152				
2009	FORT WORTH	156				
2008	FORT WORTH	186				
2007	FORT WORTH	159				
2006	FORT WORTH	203				
2011	GRAND PRAIRIE	138		153	18%	
2010	GRAND PRAIRIE	131				
2009	GRAND PRAIRIE	143				
2008	GRAND PRAIRIE	152				
2007	GRAND PRAIRIE	152				
2006	GRAND PRAIRIE	168				
2011	HURST	154		162	15%	
2010	HURST	172				
2009	HURST	139				
2008	HURST	149				
2007	HURST	129				
2006	HURST	182				
2011	JUSTIN	125		142	18%	

Year	WUG Name	Gallons Per Person Per Day (GPCD) Source: TWDB	Corrected GPCD	Average of 2006, 2008, 2011	% redution of 2011 gpcd from 2006 gpcd	Comments
2010	JUSTIN	116				
2009	JUSTIN	134				
2008	JUSTIN	148				
2007	JUSTIN	125				
2006	JUSTIN	152				
2011	LAKESIDE	126		158	29%	
2010	LAKESIDE	96				
2009	LAKESIDE	168				
2008	LAKESIDE	171				
2007	LAKESIDE	148				
2006	LAKESIDE	177				
2011	MANSFIELD	229		252	16%	
2010	MANSFIELD	171				
2009	MANSFIELD	220				
2008	MANSFIELD	252				
2007	MANSFIELD	216				
2006	MANSFIELD	274				
2011	MCLENDON-CHISHOLM	151		178	33%	
2010	MCLENDON-CHISHOLM	146				
2009	MCLENDON-CHISHOLM	125				
2008	MCLENDON-CHISHOLM	156				
2007	MCLENDON-CHISHOLM	154				
2006	MCLENDON-CHISHOLM	226				
2011	NORTH COLLIN WSC	124		140	19%	
2010	NORTH COLLIN WSC	124				
2009	NORTH COLLIN WSC	NULL = 0				NULL indicated no TWDB data available
2008	NORTH COLLIN WSC	142				
2007	NORTH COLLIN WSC	153				
2006	NORTH COLLIN WSC	153				
2011	PALOMA CREEK CRU	94	129	191	47%	Corrected gpcd provided by UTRWD
2010	PALOMA CREEK CRU	NULL = 0				NULL indicated no TWDB data available
2009	PALOMA CREEK CRU	NULL = 0				NULL indicated no TWDB data available
2008	PALOMA CREEK CRU	NULL = 0	203			NULL indicated no TWDB data available
2007	PALOMA CREEK CRU	NULL = 0				NULL indicated no TWDB data available
2006	PALOMA CREEK CRU	NULL = 0	242			NULL indicated no TWDB data available
2011	PARKER COUNTY SUD	86		103	23%	
2010	PARKER COUNTY SUD	78				
2009	PARKER COUNTY SUD	108				
2008	PARKER COUNTY SUD	112				
2007	PARKER COUNTY SUD	77				
2006	PARKER COUNTY SUD	111				
2011	RED OAK	121		140	27%	
2010	RED OAK	113				
2009	RED OAK	118				
2008	RED OAK	133				
2007	RED OAK	133				
2006	RED OAK	166				
2011	RHOME	133		162	24%	Sales data on gpcd calc seemed in error
2010	RHOME	138				
2009	RHOME	166				
2008	RHOME	179				
2007	RHOME	171				
2006	RHOME	175				
2011	RICHARDSON	222		233	15%	
2010	RICHARDSON	197				
2009	RICHARDSON	186				
2008	RICHARDSON	216				
2007	RICHARDSON	189				
2006	RICHARDSON	261				
2011	ROANOKE	214		261	35%	
2010	ROANOKE	NULL = 7				NULL indicated no TWDB data available
2009	ROANOKE	245				
2008	ROANOKE	238				
2007	ROANOKE	280				
2006	ROANOKE	330				

Year	WUG Name	Gallons Per Person Per Day (GPCD) Source: TWDB	Corrected GPCD	Average of 2006, 2008, 2011	% redution of 2011 gpcd from 2006 gpcd	Comments
2011	SOUTH GRAYSON WSC	108		116	12%	2011 compared to 2008 (no TWDB data for 2006)
2010	SOUTH GRAYSON WSC	102				
2009	SOUTH GRAYSON WSC	86				
2008	SOUTH GRAYSON WSC	123				
2007	SOUTH GRAYSON WSC	108				
2006	SOUTH GRAYSON WSC	NULL = 0				NULL indicated no TWDB data available
2011	SOUTHWEST FANNIN COUNTY SUD	73		97	34%	
2010	SOUTHWEST FANNIN COUNTY SUD	70				
2009	SOUTHWEST FANNIN COUNTY SUD	63				
2008	SOUTHWEST FANNIN COUNTY SUD	108				
2007	SOUTHWEST FANNIN COUNTY SUD	72				
2006	SOUTHWEST FANNIN COUNTY SUD	111				
2011	WATAUGA	107		113	14%	
2010	WATAUGA	119				
2009	WATAUGA	107				
2008	WATAUGA	108				
2007	WATAUGA	96				
2006	WATAUGA	125				
2011	WHITE SETTLEMENT	112		119	13%	
2010	WHITE SETTLEMENT	112				
2009	WHITE SETTLEMENT	113				
2008	WHITE SETTLEMENT	115				
2007	WHITE SETTLEMENT	109				
2006	WHITE SETTLEMENT	129				
2011	WILMER	90		101	17%	
2010	WILMER	92				
2009	WILMER	88				
2008	WILMER	106				
2007	WILMER	107				
2006	WILMER	108				
2011	WORTHAM	119		137	34%	
2010	WORTHAM	113				
2009	WORTHAM	92				
2008	WORTHAM	114				
2007	WORTHAM	178				
2006	WORTHAM	179				
2011	WYLIE	135		141	17%	
2010	WYLIE	125				
2009	WYLIE	114				
2008	WYLIE	126				
2007	WYLIE	132				
2006	WYLIE	163				

Gallons Per Capita Per Day for Paloma Creek

UPPER TRINITY REGIONAL WATER DISTRICT

Calendar Years 2006, 2008 & 2011

YEAR 2006

Member/Customer	(1,000 gallons)			Population	2006 Actual GPCD
	UTRWD	Groundwater	TOTAL		
DCFWSD #8A - Paloma Creek North	85,158	-	85,158	1,110	210
DCFWSD #11A - Paloma Creek South	74,836	-	74,836	700	293
Paloma Creek (Total)	**159,994**		**159,994**	**1,810**	**242**

YEAR 2008

Member/Customer	(1,000 gallons)			Population	2008 Actual GPCD
	UTRWD	Groundwater	TOTAL		
DCFWSD #8A - Paloma Creek North	105,798	-	105,798	1,500	193
DCFWSD #11A - Paloma Creek South	108,890	-	108,890	1,400	213
Paloma Creek (Total)	**214,689**		**214,689**	**2,900**	**203**

YEAR 2011

Member/Customer	(1,000 gallons)			Population	2011 Actual GPCD
	UTRWD	Groundwater	TOTAL		
DCFWSD #8A - Paloma Creek North	130,840	-	130,840	3,160	113
DCFWSD #11A - Paloma Creek South	159,313	-	159,313	3,018	145
Paloma Creek (Total)	**290,152**		**290,152**	**6,178**	**129**

Prepared: July 15, 2013

IRVING
TEXAS

Malcolm Baldrige National Quality Award
2012 Award Recipient

June 21, 2013

Amy Kaarlela
Region C Consultant
Freese and Nichols, Inc.
4055 International Plaza
Fort Worth, Texas 76109

Re: City of Irving Water Use Projections for the 2016 Region C Water Plan

Dear Ms. Kaarlela:

Subsequent to our review of the TWDB draft municipal demand projections released March 2013, we formally request a revision to Irving's municipal demand projections for use in the 2016 Region C Water Plan. TWDB's Guidelines for Regional Water Plan Development (dated October 2012) allow for revision of municipal demand projections based on several criteria including "Evidence that dry year water use was abnormal due to temporary infrastructure constraints."

Irving's 2011 per capita demand of 158 gpcd, which is being used as the basis for TWDB demand projections, was abnormally low due to temporary infrastructure constraints. In 2011, use from Irving's primary source of supply, Jim Chapman Lake, was severely limited due to pump station infrastructure constraints. Sedimentation surrounding the lower levels of the pump station intake threatened to cut off the pump station's access to water as the water level dropped. In response, the City took extraordinary measure to lower demand in 2011 by implementing Stage 3 of the Drought Contingency Plan and limiting irrigation to once per week. In addition, the city increased communication to customers regarding the seriousness of the drought and increased efforts in the field to catch violators of Stage 3.

It is our understanding that the TWDB will allow limited alternative calculations of the base gpcd, including the averaging of select previous years' use. Due to extraordinary circumstances mentioned above, we request that Region C discard 2011 data and use a base gpcd for Irving calculated as the average of 2006 and 2008 gpcd since these were both drought years with below average rainfall. The average of those two years is 202 gpcd, which is substantially lower than the 246-249 gpcd used in the *2011 Region C Water Plan,* and demonstrates a good deal of conservation that has already been implemented.

Sincerely,

Todd Reck

Todd Reck, P.E.
Water Utilities Director

cc: Dan Hardin, TWDB

City of Irving | 825 W. Irving Blvd. | Irving, TX 75060 | (972) 721-2600 | www.cityofirving.org

City of The Colony comments to support changing water demand projections and (GPCD) on the 2016 Region C Plan.

The 2011 TWDB Water Conservation Annual Report had an error in the estimated population. The report overestimated the population of service area by 3,967. The population used was 40,500 and gallons produced for the year were 1,810,276 for a total GPCD of 122. The actual population would have been closer the 2010 Census report of 36,328 plus a small addition of 62 new residential homes built in 2011 the residential population would have increased by 205 for a total of 36,533. Using the new population figure of 36,533 the GPCD would have been 135. By making this population adjustment it will more accurately reflect our future demand and GPCD projections.

The Colony is seeing a increase in residential home building in 2012 as well as an even larger increase in commercial development. We believe that the commercial development will greatly increase our water demands and GPCD over the next few decades. The increased commercial building will justify increasing our GPCD.

The City is over 70% built out on residential development, but only about 15% built out for commercial development. Below is a list of new commercial developments in progress.

- 430-acre $1.5B commercial development that will include the largest single retailer in the US in a 1.8M sq ft building, several hotels, retail, restaurants, and an amusement park
- 56-acre development that will include the flagship Rooms to Go Store, restaurants, and other commercial stores
- 23-acre development that will include several hotels, retail stores, and restaurants
- 40-acre development that will include Top Golf, Specs with a deli, restaurants, and other commercial

Please review all attached reports that support our decision for making adjustments to future demand and GPCD projections.

TABLE OF CONTENTS

FULL VERSION OF MESQUITE WATER MASTER PLAN AVAILABLE ON REQUEST AND WITH PERMISSION FROM CITY OF MESQUITE

TECHNICAL MEMORANDUM

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS • DESIGNERS • SCIENTISTS

Region C Water Planning Group
2016 Regional Water Planning Cycle
Non-Municipal Demand Projections, Irrigation

Project No.: 0312-046-01

Date: May 8, 2012

Prepared For: Tom Gooch, Freese and Nichols, Inc.
Amy Kaarlela, Freese and Nichols, Inc.
Rachel Ickert, Freese and Nichols, Inc.

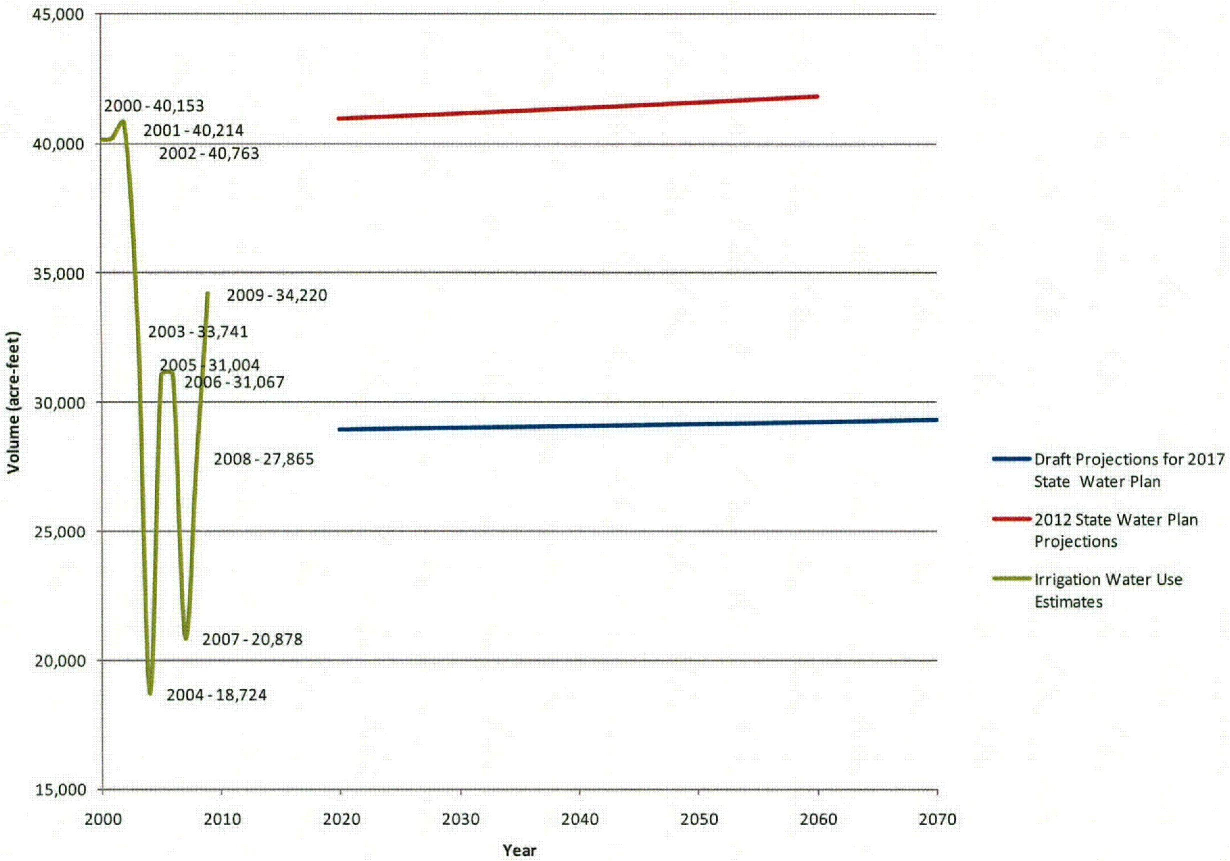
Prepared By: Preston Dillard, Alan Plummer Associates, Inc.
Lauren Plunk, Alan Plummer Associates, Inc.

The *2016 Region C Water Plan* (hereafter referred to as the 2016 Plan) will incorporate projections for municipal demands, as well as non-municipal demands for irrigation, livestock, manufacturing, mining, and steam-electric power. The Texas Water Development Board (TWDB) provided the planning groups with draft non-municipal demand projections. The draft non-municipal demand projections will be reviewed by the individual planning groups, and recommendations will be provided to the TWDB. The TWDB will consider the recommended changes from the planning groups, and the final projections will ultimately be adopted by the planning groups and TWDB and incorporated into the 2017 State Water Plan. The purpose of this technical memorandum is to document information related to historical irrigation usage and provide information supporting recommended modifications to the draft irrigation demands.

BACKGROUND

Irrigation water use is defined by the TWDB as irrigation of agricultural crops and golf courses. TWDB's draft non-municipal irrigation demand projections for the 2017 State Water Plan utilize an average of the 2005-2009 irrigation water use estimates as a base (2020 projection), and the rate of change for projections from the *2011 Region C Water Plan* is applied to the base for the years 2030-2070. At the time this memo was written, historical data estimates are available through the year 2009. The historical 2005-2009 use estimates are based on annual crop acreage from the Natural Resources Conservation Service (prior to 2001) and the Farm Service Administration (2001 and later). Irrigation rates per acre are estimated based on potential evapotranspiration and then applied to the calculated crop and golf course acreage. Since the year 2000, the region-wide irrigation water use estimates have ranged from 18,274 to 40,763 acre-feet (see Figure 1 for usage information by year).

Figure 1. Region C Irrigation – Comparison of Water Use Estimates and Projections



Source: Texas Water Development Board

Since some golf courses in Region C are served by municipal supply, the current method of calculating total irrigated golf course acreage without removing golf courses supplied by municipal supply may be counting the usage of some golf courses as part of both the municipal and irrigation demand. In order to more accurately account for golf course irrigation, it is recommended that future TWDB Annual Surveys of Water System ask utilities for golf course irrigation, so that the golf course irrigation that is supplied from municipal systems as treated water can be removed from historical irrigation use estimates (since it is included as municipal use).

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the irrigation water use projections:

- Evidence that a different year between 2005-2009 would be more representative of typical irrigated acreage or below-normal rainfall than the designated dry year.

- Evidence that irrigation water use estimates for a county from another source are more accurate than those used by TWDB.
- Evidence that the expectation of conditions in the region are such that the projected annual rates of change for irrigation water use in the 2012 State Water Plan are no longer valid.

The Planning Group must provide the Executive Administrator the following data associated with the identified criteria for justifying any adjustments to the irrigation water demand projections:

- Acreage and water use data for irrigated crops grown in a region, as published by the Texas Agricultural Statistics Service, the Texas Agricultural Extension Service, or the Farm Service Agency (USDA), for the designated dry year and/or a different year that the Planning Group wishes to present for consideration.
- Any economic, technical, and/or water supply-related evidence that may show cause for adjustment in the future rate of change in irrigation water use.

PROPOSED IRRIGATION WATER USE

A comparison of the draft projections for the 2017 SWP (provided by TWDB), the final 2012 SWP projections, and the proposed RCWPG revisions to the 2017 SWP projections is presented in Table 1 and Figure 2. Deviations from the draft projections for the 2017 State Water Plan are explained below:

- Collin County – This county has several reuse projects with known supplies, and the associated demand for these projects is more than the 2017 projections. Therefore, it is recommended that the 2012 projections be used to more accurately reflect existing conditions.
- Cooke County – The historical use between 2005-2009 has varied from 115 to 300 acre-feet/year (average value of 205 acre-feet/year). Due to this variation in use, it is recommended that the projections utilize the peak usage for the period (2007) as the base year for the projections to provide a more conservative dry year estimate.
- Grayson County – The historical use between 2005-2009 has varied from 394 to 2,222 acre-feet/year (average value of 1,275 acre-feet/year). Due to this variation in use, it is recommended that the projections utilize the peak usage for the period (2005) as the base year for the projections to provide a more conservative dry year estimate.
- Jack County – Recent usage data from the TCEQ water rights database indicates that consumption in 2005 was approximately 101 acre-feet/year. Therefore, it is recommended that the projections be raised to 101 acre-feet/year to more accurately reflect existing conditions.
- Kaufman County – The historical use between 2005-2009 has varied from 0 to 179 acre-feet/year (average value of 107 acre-feet/year). Due to this variation in use, it is recommended that the

projections utilize the peak usage for the period (2006) as the base year for the projections to provide a more conservative dry year estimate.

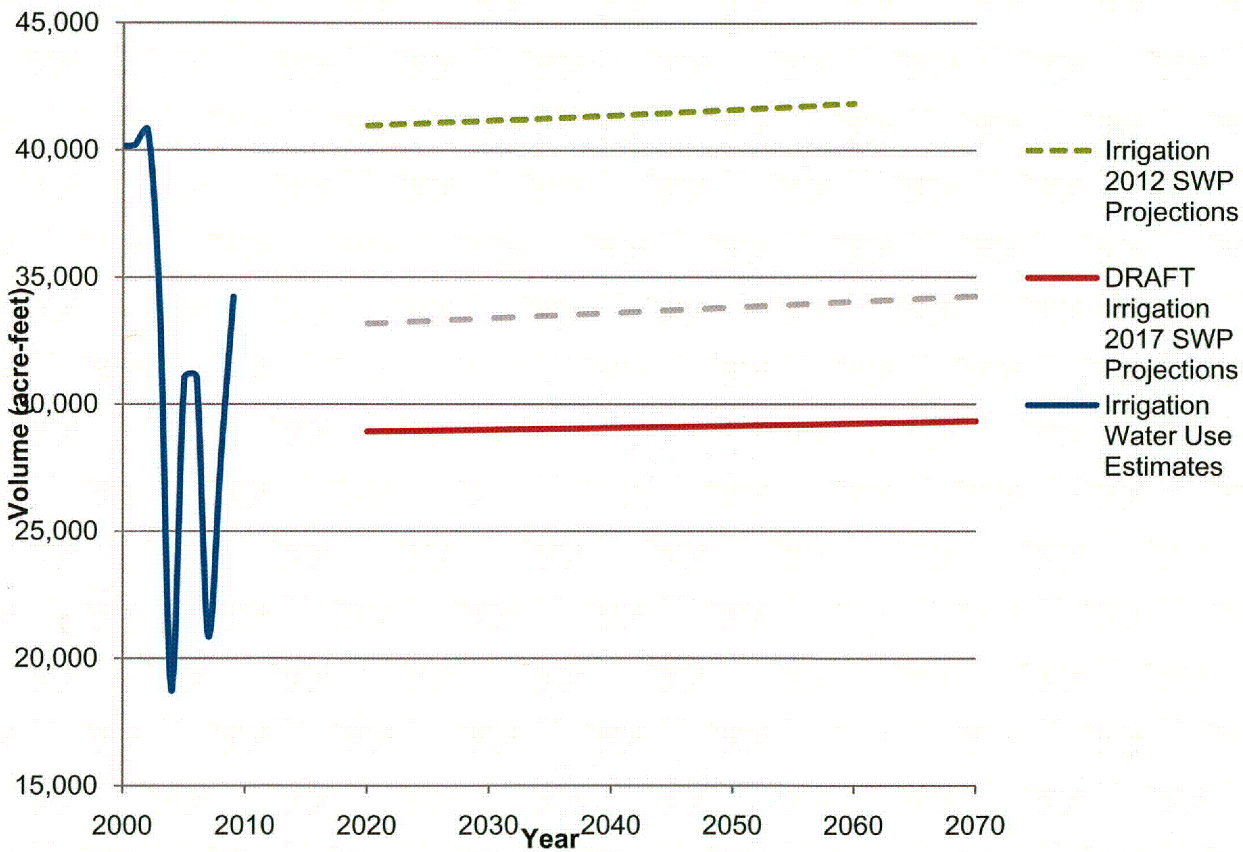
- Navarro County – Recent usage data from the TCEQ water rights database indicates that consumption in 2005 was approximately 58 acre-feet/year. Therefore, it is recommended that the projections be raised to 58 acre-feet/year to more accurately reflect existing conditions.
- Parker County – The historical use between 2005-2009 has varied from 80 to 490 acre-feet/year (average value of 258 acre-feet/year). Due to this variation in use, it is recommended that the projections utilize the peak usage for the period (2006) as the base year for the projections to provide a more conservative dry year estimate.
- Rockwall County – Recent usage data from the TCEQ water rights database combined with recent usage data from reuse providers indicates that consumption in 2006 was approximately 374 acre-feet/year. Therefore, it is recommended that the projections be raised to 374 acre-feet/year to more accurately reflect existing conditions.

Table 1. Comparison of Irrigation Demand Projections

County Name	Draft Projections for 2017 SWP						2012 SWP Projections					RWPG Revisions					
	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2020	2030	2040	2050	2060	2070
Collin	718	718	718	718	718	718	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995
Cooke	205	205	205	205	205	205	444	444	444	444	444	300	300	300	300	300	300
Dallas	9,134	9,134	9,134	9,134	9,134	9,134	13,087	13,087	13,087	13,087	13,087	9,134	9,134	9,134	9,134	9,134	9,134
Denton	2,137	2,137	2,137	2,137	2,137	2,137	2,108	2,108	2,108	2,108	2,108	2,137	2,137	2,137	2,137	2,137	2,137
Ellis	572	572	572	572	572	572	583	583	583	583	583	572	572	572	572	572	572
Fannin	8,301	8,301	8,301	8,301	8,301	8,301	4,608	4,608	4,608	4,608	4,608	8,301	8,301	8,301	8,301	8,301	8,301
Freestone	298	298	298	298	298	298	8	8	8	8	8	298	298	298	298	298	298
Grayson	1,344	1,415	1,490	1,570	1,654	1,752	3,751	3,950	4,158	4,381	4,616	2,438	2,654	2,870	3,086	3,303	3,519
Henderson	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jack	56	56	56	56	56	56	0	0	0	0	0	101	101	101	101	101	101
Kaufman	107	107	107	107	107	107	2,916	2,916	2,916	2,916	2,916	179	179	179	179	179	179
Navarro	0	0	0	0	0	0	0	0	0	0	0	58	58	58	58	58	58
Parker	258	258	258	258	258	258	422	422	422	422	422	490	490	490	490	490	490
Rockwall	0	0	0	0	0	0	1,125	1,125	1,125	1,125	1,125	374	374	374	374	374	374
Tarrant	4,466	4,466	4,466	4,466	4,466	4,466	8,417	8,417	8,417	8,417	8,417	4,466	4,466	4,466	4,466	4,466	4,466
Wise	1,324	1,324	1,324	1,324	1,324	1,324	502	502	502	502	502	1,324	1,324	1,324	1,324	1,324	1,324
Total	**28,920**	**28,991**	**29,066**	**29,146**	**29,230**	**29,328**	**40,966**	**41,165**	**41,373**	**41,596**	**41,831**	**33,168**	**33,384**	**33,600**	**33,816**	**34,032**	**34,248**

Indicates no changes are proposed from the draft projections for the 2017 SWP.

Figure 2. Region C Irrigation – Comparison of Water Use Estimates, 2012 State Water Plan Projection, Proposed Projections, and Revised Projections



Attachment A
Irrigation Demand by County
Historical Usage and Projections Comparison

Figure 1. Collin County Irrigation Comparison

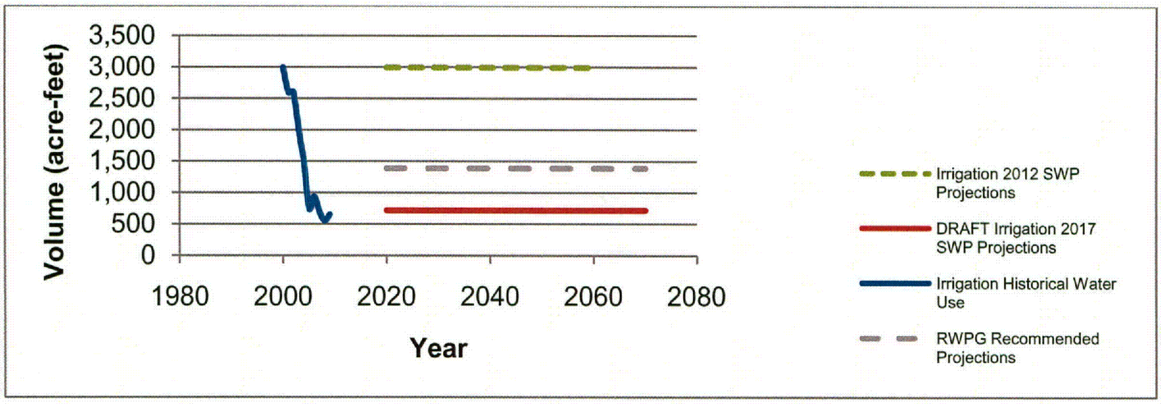


Figure 2. Cooke County Irrigation Comparison

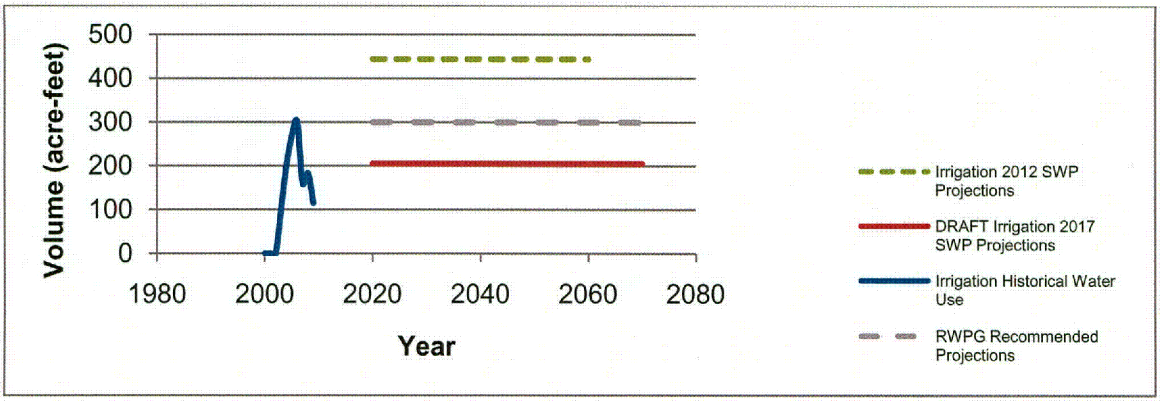


Figure 3. Dallas County Irrigation Comparison

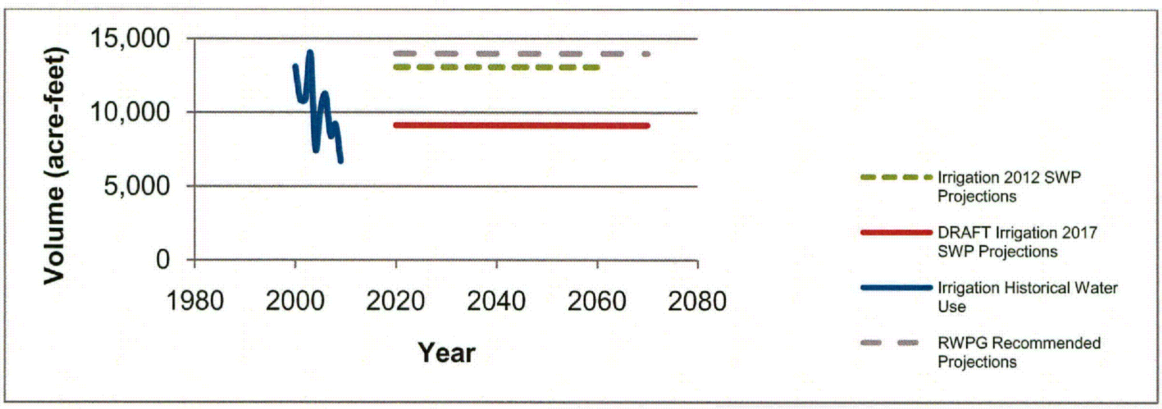


Figure 4. Denton County Irrigation Comparison

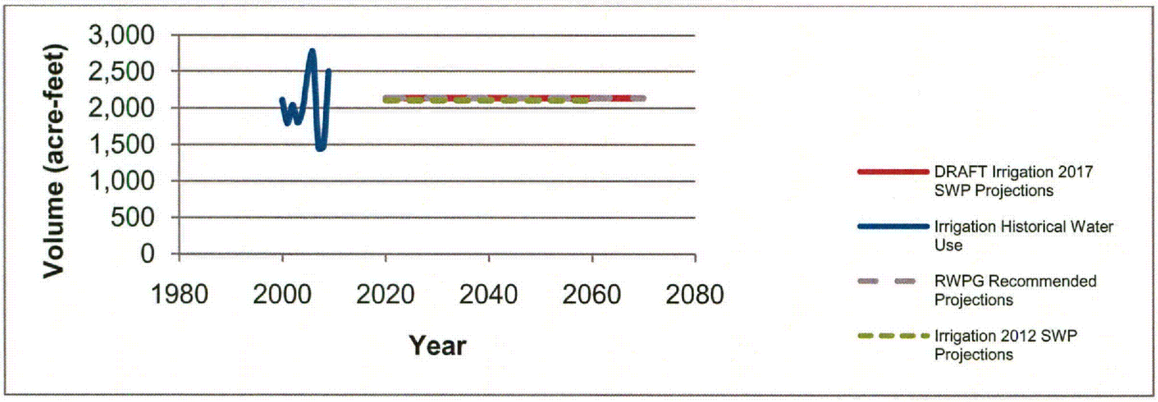


Figure 5. Ellis County Irrigation Comparison

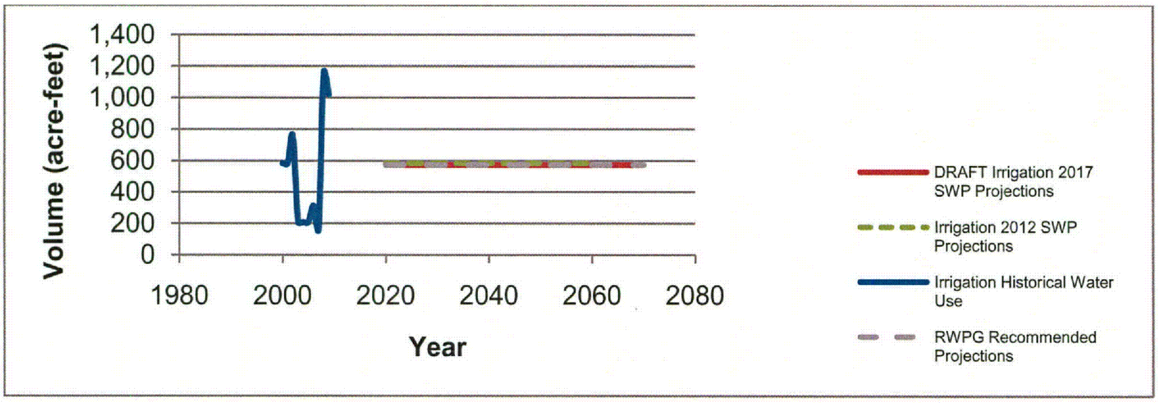


Figure 6. Fannin County Irrigation Comparison

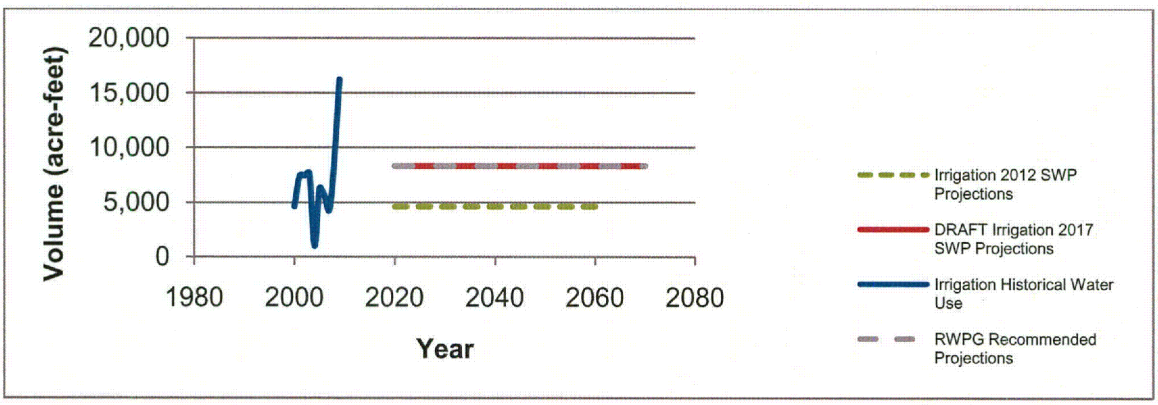


Figure 7. Freestone County Irrigation Comparison

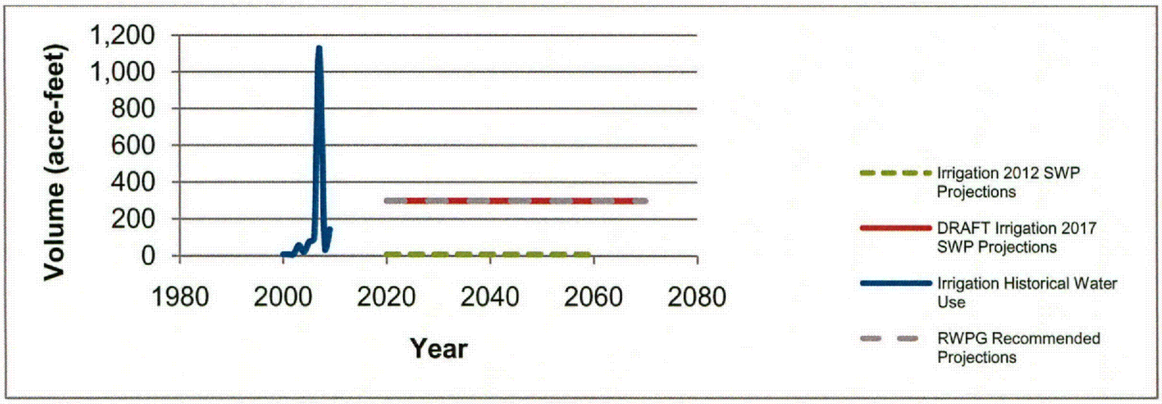


Figure 8. Grayson County Irrigation Comparison

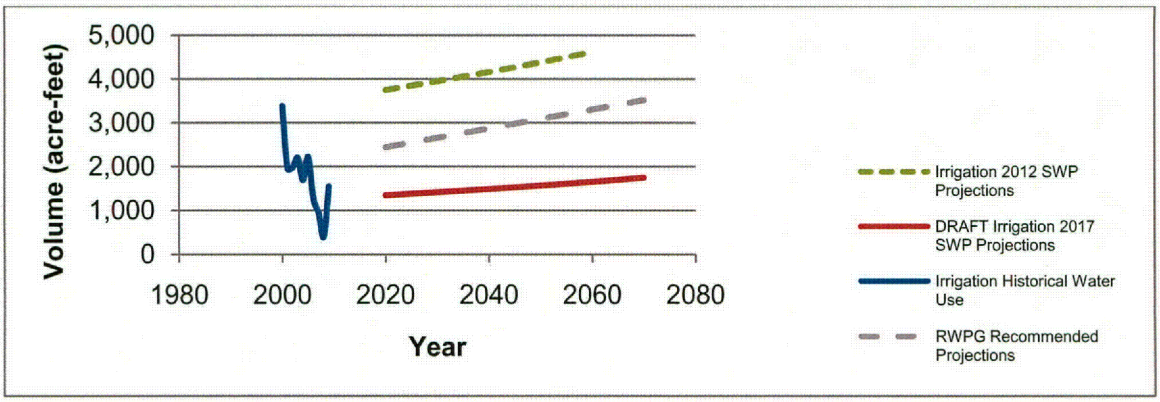


Figure 9. Henderson County Irrigation Comparison

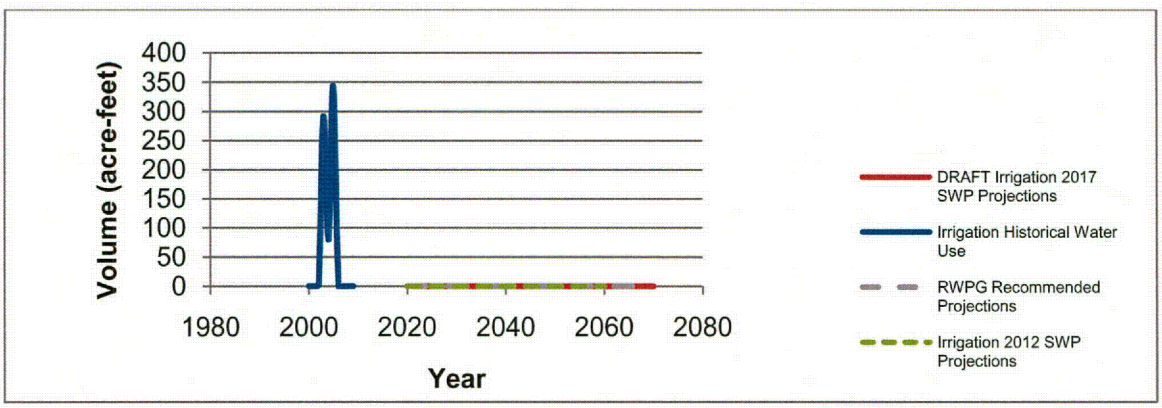


Figure 10. Jack County Irrigation Comparison

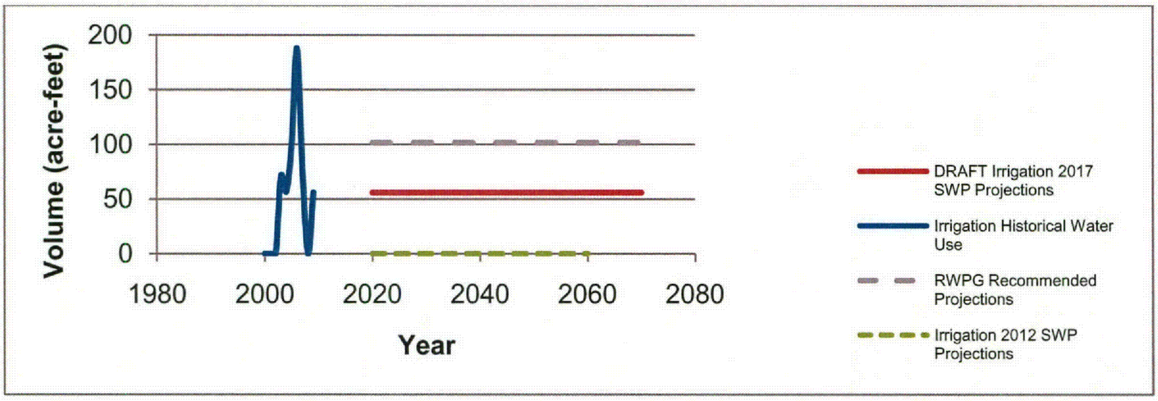


Figure 11. Kaufman County Irrigation Comparison

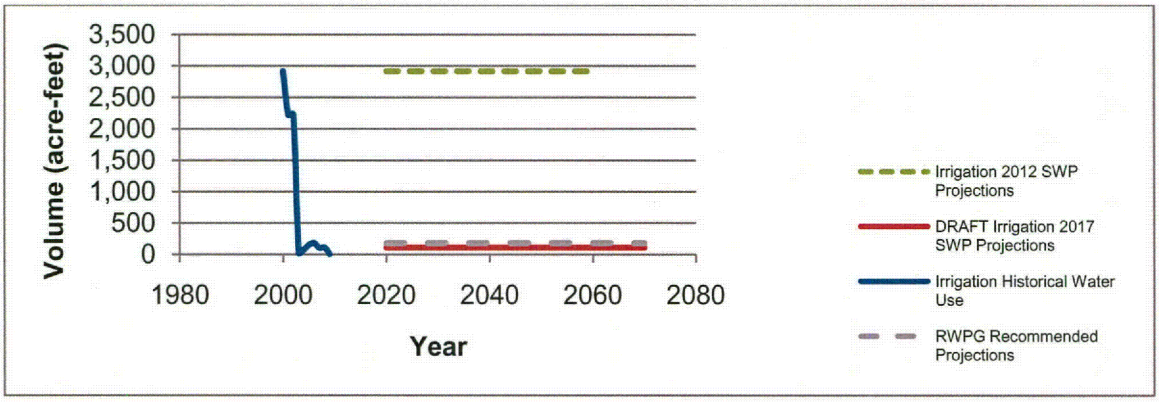


Figure 12. Navarro County Irrigation Comparison

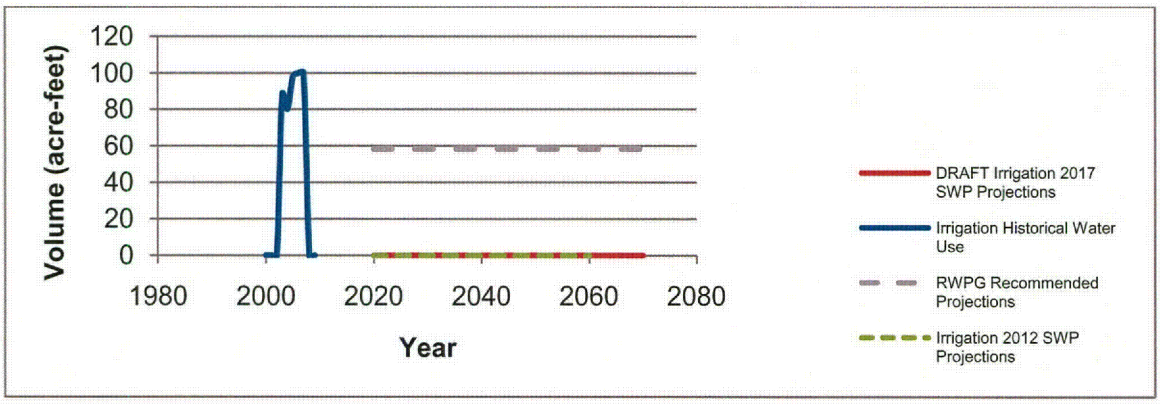


Figure 13. Parker County Irrigation Comparison

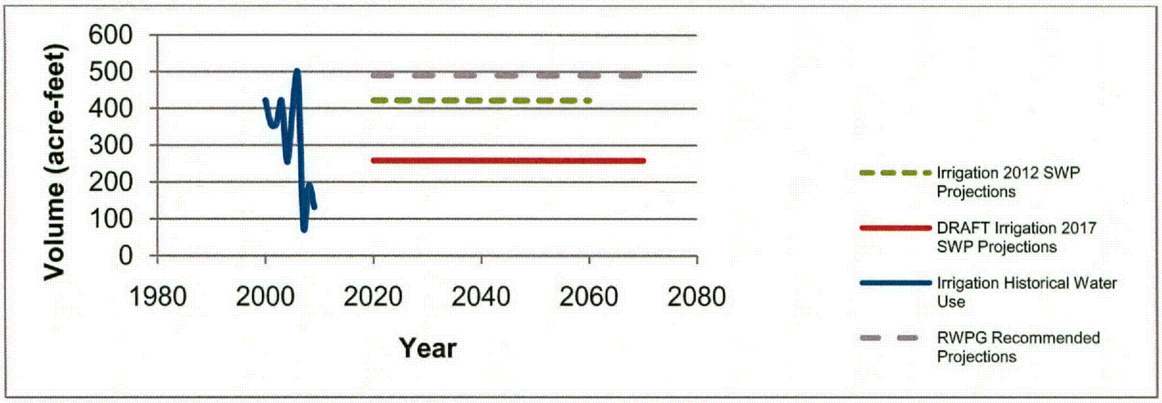


Figure 14. Rockwall County Irrigation Comparison

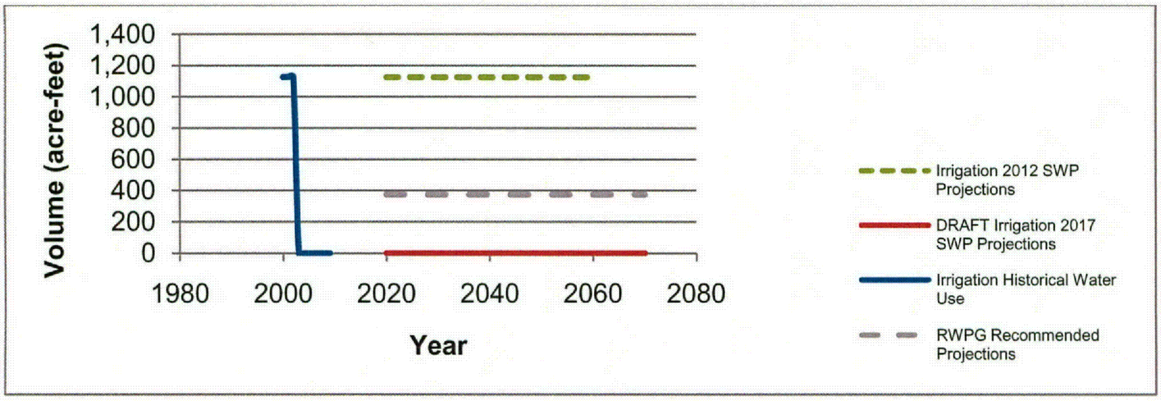


Figure 15. Tarrant County Irrigation Comparison

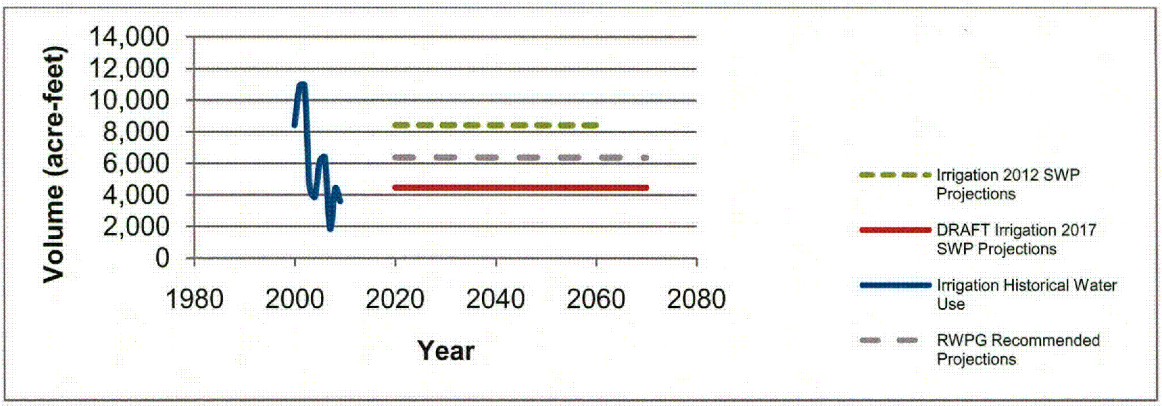
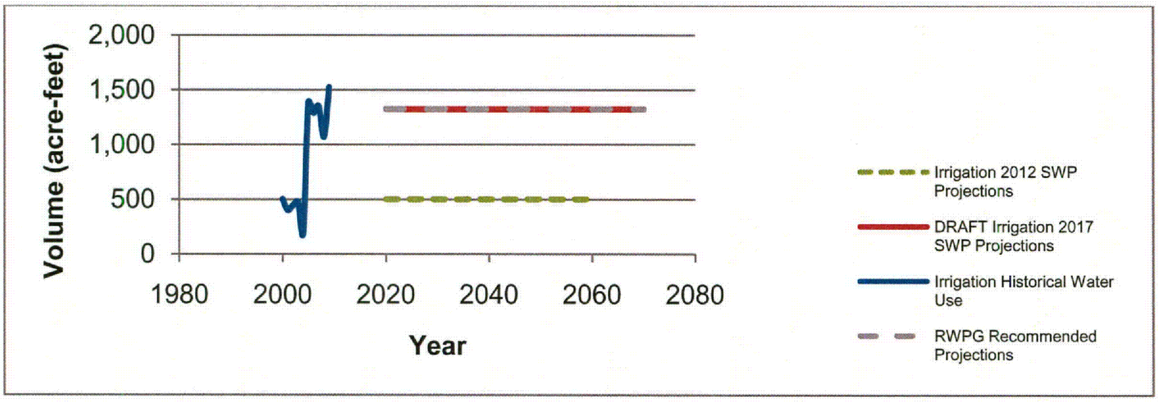


Figure 16. Wise County Irrigation Comparison



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TECHNICAL MEMORANDUM

Region C Water Planning Group
2016 Regional Water Planning Cycle
Non-Municipal Demand Projections, Livestock

Project No.: 0312-046-01

Date: May 8, 2012

Prepared For: Tom Gooch, Freese and Nichols, Inc.
Amy Kaarlela, Freese and Nichols, Inc.
Rachel Ickert, Freese and Nichols, Inc.

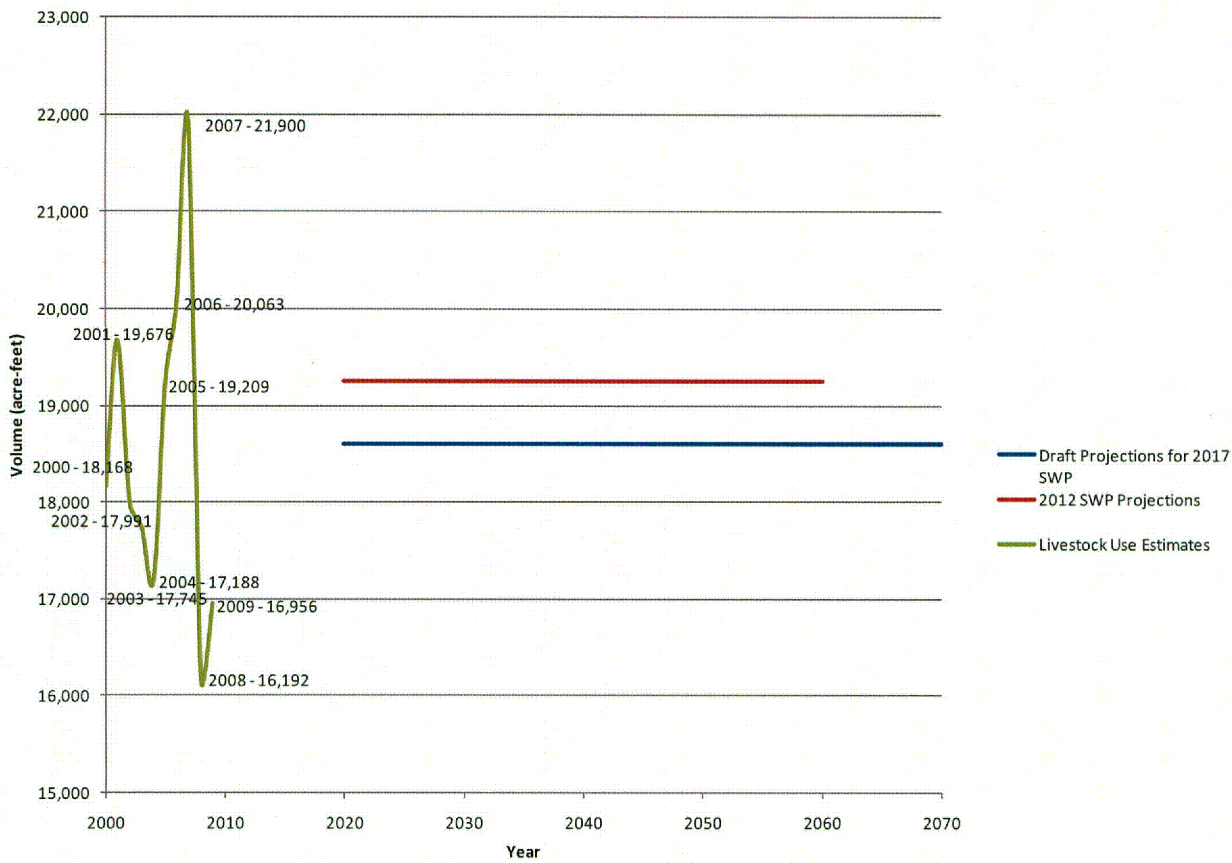
Prepared By: Preston Dillard, Alan Plummer Associates, Inc.
Lauren Plunk, Alan Plummer Associates, Inc.

The *2016 Region C Water Plan* (hereafter referred to as the 2016 Plan) will incorporate projections for municipal demands, as well as non-municipal demands for irrigation, livestock, manufacturing, mining, and steam-electric power. The Texas Water Development Board (TWDB) provided the planning groups with draft non-municipal demand projections. The draft non-municipal demand projections will be reviewed by the individual planning groups, and recommendations will be provided to the TWDB. The TWDB will consider the recommended changes from the planning groups, and the final projections will ultimately be adopted by the planning groups and the TWDB and incorporated into the 2017 State Water Plan. The purpose of this technical memorandum is to document information related to historical livestock usage and provide information supporting recommended modifications to the draft livestock demands.

BACKGROUND

Livestock water use is defined by the TWDB as water used in the production of livestock, both for drinking and for cleaning or environmental purposes. TWDB's draft non-municipal livestock demand projections for the 2017 State Water Plan utilize an average of the 2005-2009 livestock water use estimates as a base (2020 projection), and the rate of change for projections from the *2011 Region C Water Plan* is applied to the base for the years 2030-2070. The historical 2005-2009 use estimates are calculated by applying a water use coefficient for each livestock category to county level inventory estimates from the Texas Agricultural Statistics Service. Since the year 2000, the region-wide livestock water use estimates have ranged from 16,192 to 21,900 acre-feet (see Figure 1 for usage information by year). At the time this memo was written, historical data estimates are available through the year 2009.

Figure 1. Region C Livestock – Comparison of Water Use Estimates and Projections



Source: Texas Water Development Board

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the livestock water use projections:

- Plans for the construction of a confined livestock feeding operation in a county at some future date.
- Other evidence of change in livestock inventory or water requirements that would justify a adjustment in the projected future rate of change in livestock water use.

The Planning Group must provide the Executive Administrator the following data associated with the identified criteria for justifying any adjustments to the livestock water demand projections:

- Documentation of plans for the construction of a confined livestock feeding facility in a county at some future date will include the following:

- Confirmation of land purchase or lease arrangements for the facility.
- The construction schedule including the date the livestock feeding facility will become operational.
- The daily water requirements of the planned livestock feeding facility.

- Other evidence that would document an expected increase or decrease in the livestock inventory in the county.

PROPOSED LIVESTOCK WATER USE

A comparison of the draft projections for the 2017 SWP (provided by TWDB), the final 2012 SWP projections, and the proposed RCWPG revisions to the 2017 SWP projections is presented in Table 1 and Figure 2. The majority of the proposed RCWPG county-level projections are identical to the draft projections for the 2017 SWP. Deviations from the draft projections are explained below:

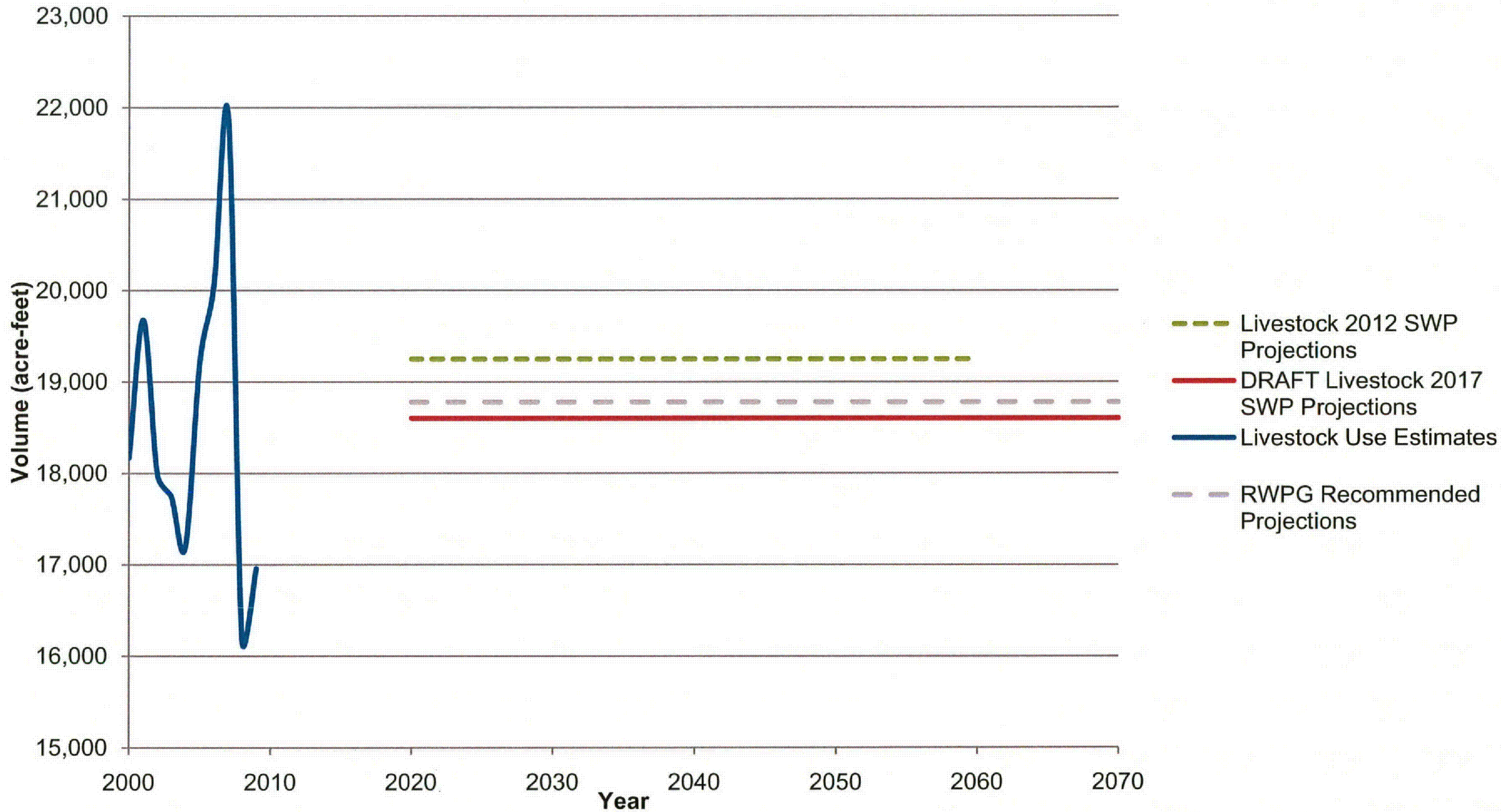
- Henderson County – The average livestock use provided for 2005-2009 in the draft projections (313 acre-feet/year) differs from the average livestock use provided in the historical water use estimates (490 acre-feet/year). It is recommended that the projections be adjusted to reflect the recalculated average.

Table 1. Comparison of Livestock Demand Projections

County Name	Draft Projections for 2017 SWP						2012 SWP Projections					RWPG Revisions					
	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2020	2030	2040	2050	2060	2070
Collin	860	860	860	860	860	860	884	884	884	884	884	860	860	860	860	860	860
Cooke	1,494	1,494	1,494	1,494	1,494	1,494	1,898	1,898	1,898	1,898	1,898	1,494	1,494	1,494	1,494	1,494	1,494
Dallas	854	854	854	854	854	854	482	482	482	482	482	854	854	854	854	854	854
Denton	1,045	1,045	1,045	1,045	1,045	1,045	1,235	1,235	1,235	1,235	1,235	1,045	1,045	1,045	1,045	1,045	1,045
Ellis	905	905	905	905	905	905	1,183	1,183	1,183	1,183	1,183	905	905	905	905	905	905
Fannin	1,668	1,668	1,668	1,668	1,668	1,668	1,270	1,270	1,270	1,270	1,270	1,668	1,668	1,668	1,668	1,668	1,668
Freestone	1,852	1,852	1,852	1,852	1,852	1,852	1,528	1,528	1,528	1,528	1,528	1,852	1,852	1,852	1,852	1,852	1,852
Grayson	1,458	1,458	1,458	1,458	1,458	1,458	1,297	1,297	1,297	1,297	1,297	1,458	1,458	1,458	1,458	1,458	1,458
Henderson	313	313	313	313	313	313	854	854	854	854	854	490	490	490	490	490	490
Jack	932	932	932	932	932	932	1,025	1,025	1,025	1,025	1,025	932	932	932	932	932	932
Kaufman	1,717	1,717	1,717	1,717	1,717	1,717	1,545	1,545	1,545	1,545	1,545	1,717	1,717	1,717	1,717	1,717	1,717
Navarro	1,544	1,544	1,544	1,544	1,544	1,544	1,543	1,543	1,543	1,543	1,543	1,544	1,544	1,544	1,544	1,544	1,544
Parker	1,544	1,544	1,544	1,544	1,544	1,544	1,856	1,856	1,856	1,856	1,856	1,544	1,544	1,544	1,544	1,544	1,544
Rockwall	117	117	117	117	117	117	131	131	131	131	131	117	117	117	117	117	117
Tarrant	723	723	723	723	723	723	803	803	803	803	803	723	723	723	723	723	723
Wise	1,575	1,575	1,575	1,575	1,575	1,575	1,714	1,714	1,714	1,714	1,714	1,575	1,575	1,575	1,575	1,575	1,575
Total	**18,601**	**18,601**	**18,601**	**18,601**	**18,601**	**18,601**	**19,248**	**19,248**	**19,248**	**19,248**	**19,248**	**18,778**	**18,778**	**18,778**	**18,778**	**18,778**	**18,778**

(shaded) Indicates no changes are proposed from the draft projections for the 2017 SWP.

Figure 2. Region C Livestock – Comparison of Water Use Estimates, 2012 State Water Plan Projection, Proposed Projections, and Revised Projections



Attachment A
Livestock Demand by County
Historical Usage and Projections Comparison

Figure 1. Collin County Livestock Comparison

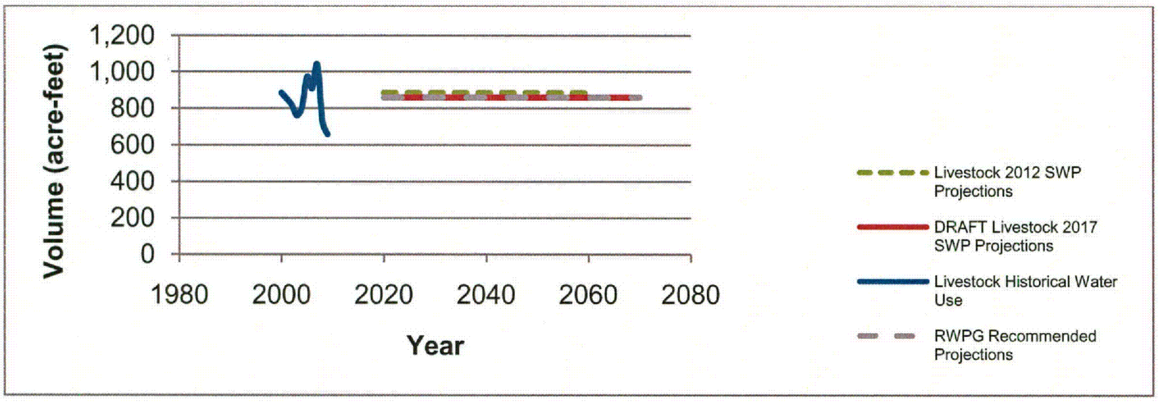


Figure 2. Cooke County Livestock Comparison

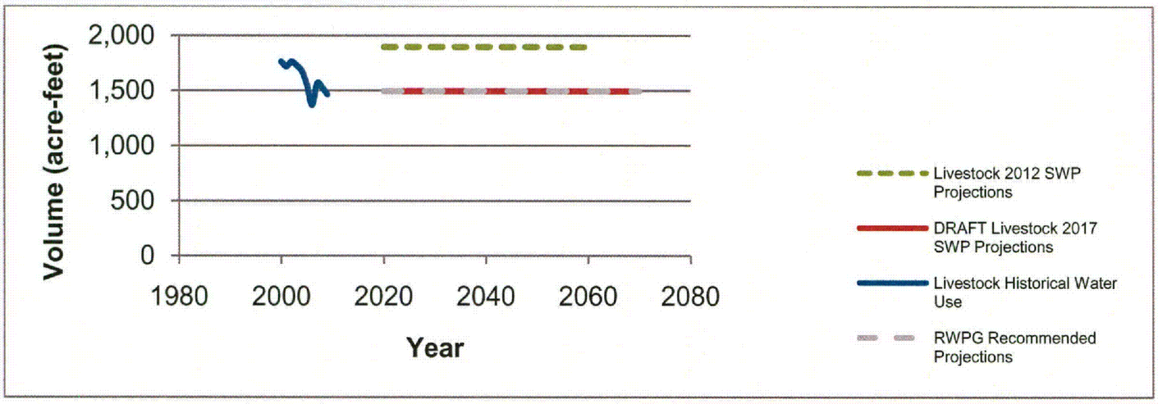


Figure 3. Dallas County Livestock Comparison

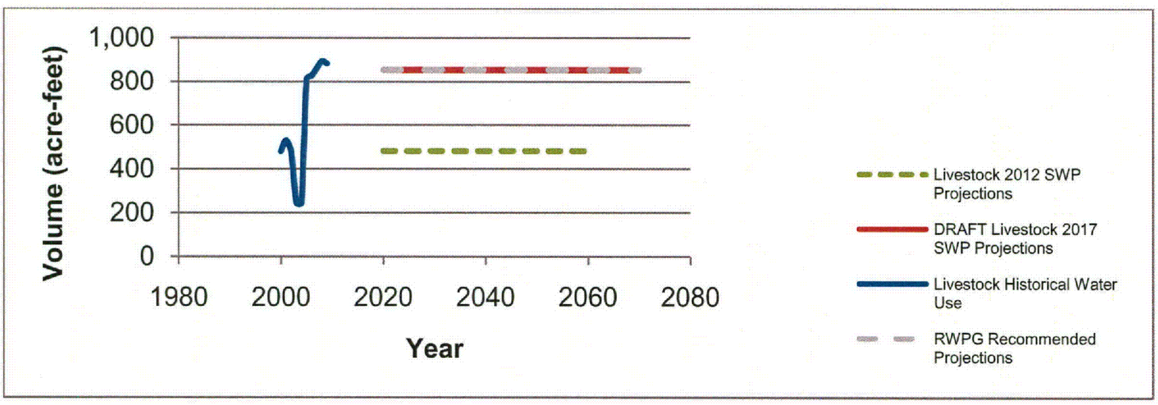


Figure 4. Denton County Livestock Comparison

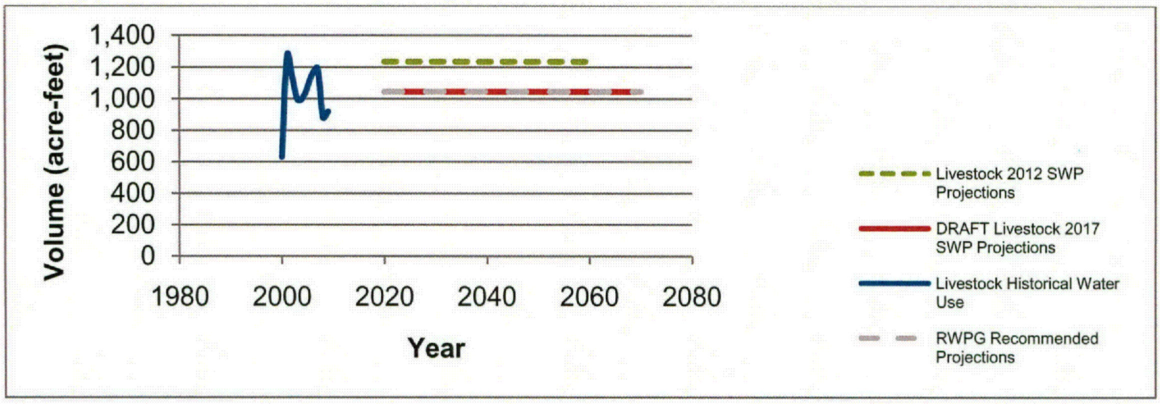


Figure 5. Ellis County Livestock Comparison

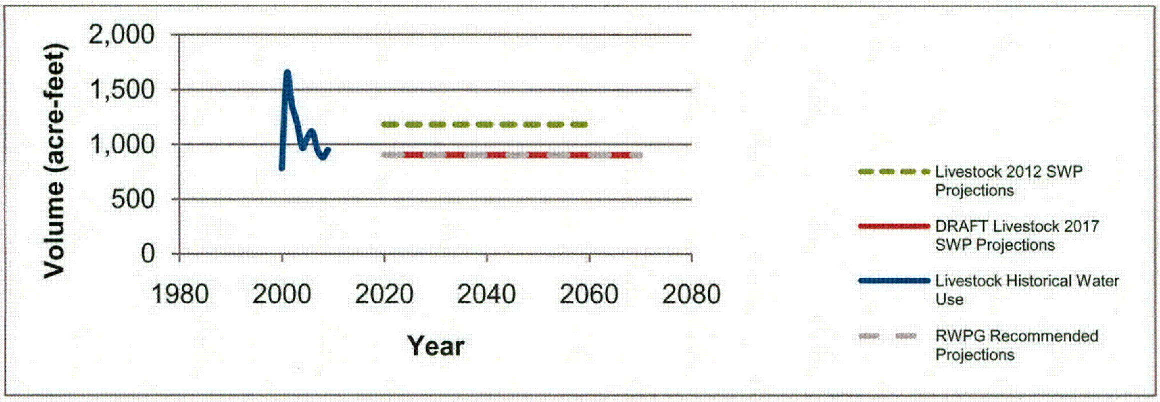


Figure 6. Fannin County Livestock Comparison

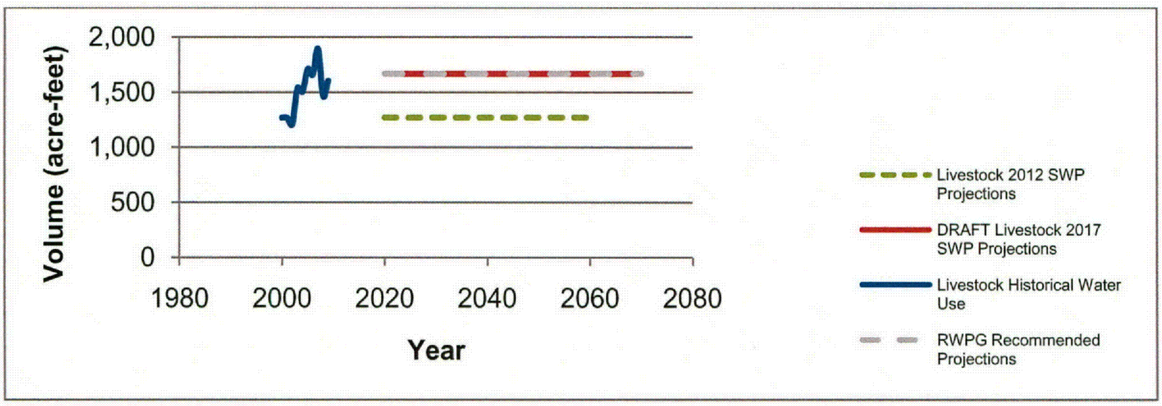


Figure 7. Freestone County Livestock Comparison

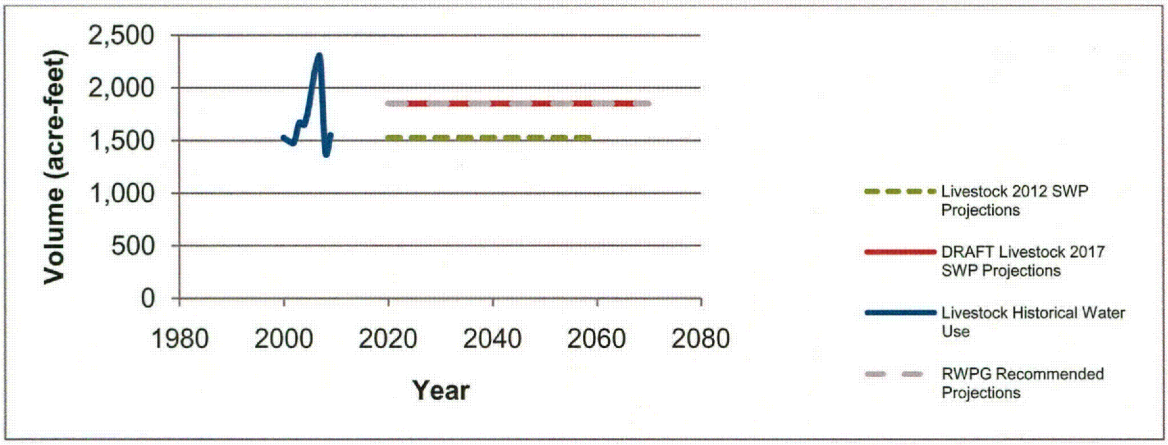


Figure 8. Grayson County Livestock Comparison

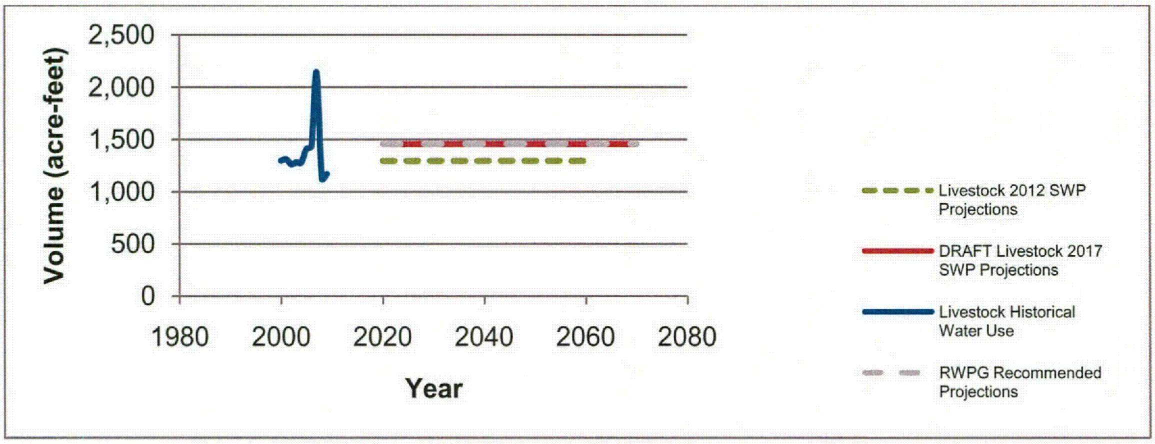


Figure 9. Henderson County Livestock Comparison

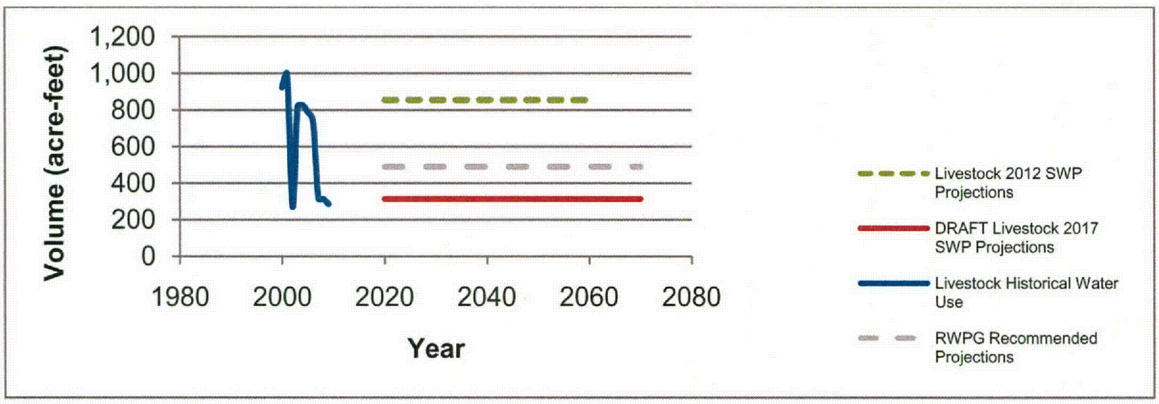


Figure 10. Jack County Livestock Comparison

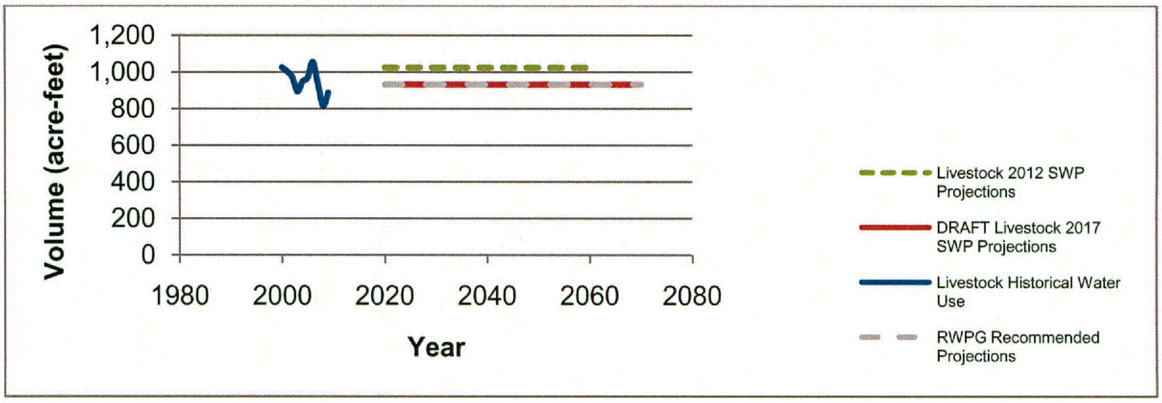


Figure 11. Kaufman County Livestock Comparison

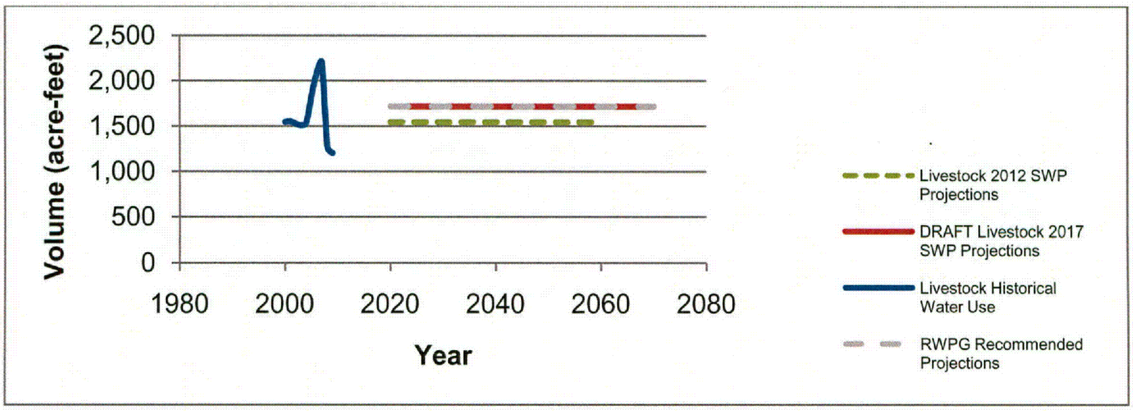


Figure 12. Navarro County Livestock Comparison

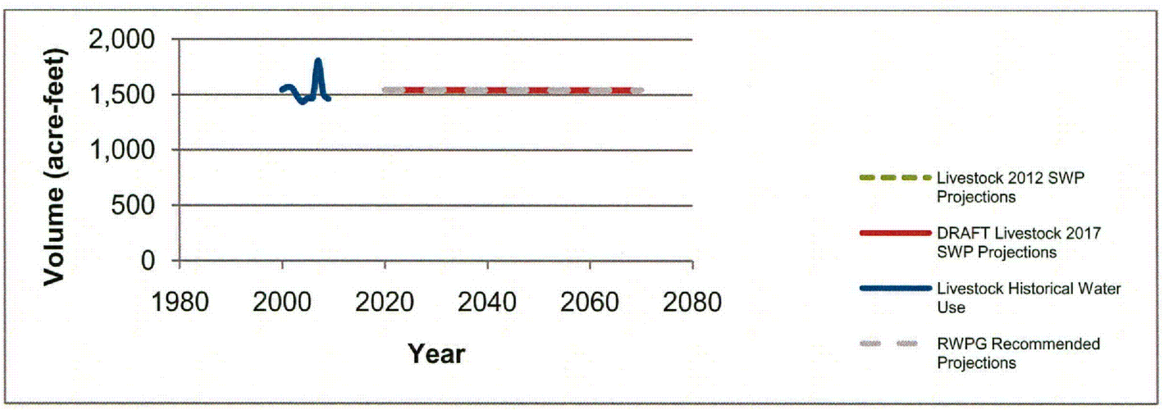


Figure 13. Parker County Livestock Comparison

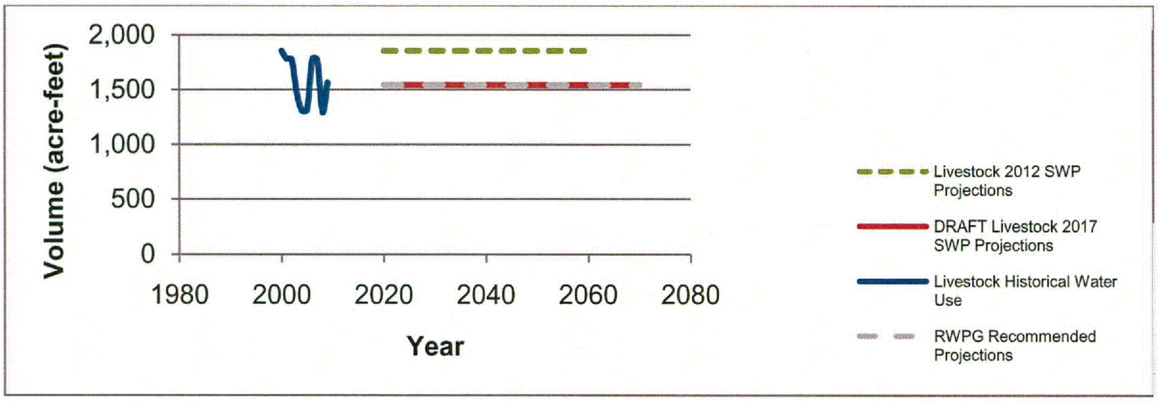


Figure 14. Rockwall County Livestock Comparison

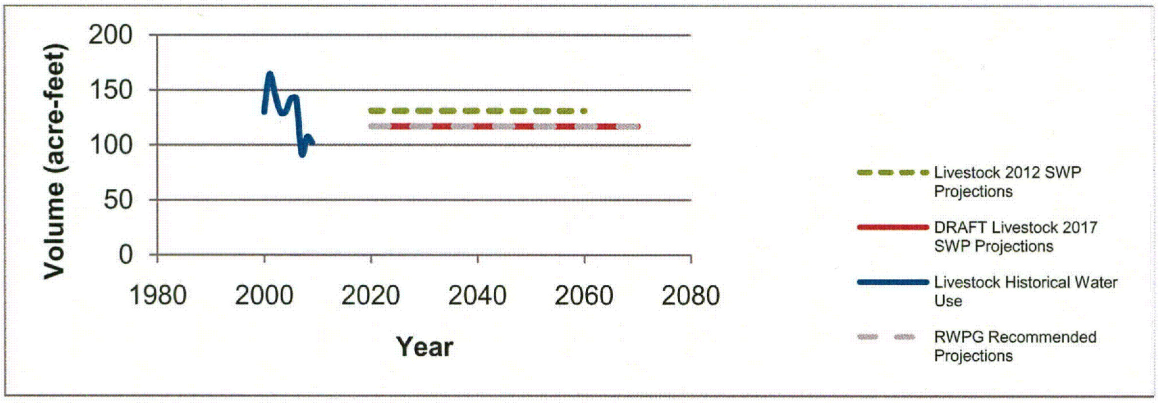


Figure 15. Tarrant County Livestock Comparison

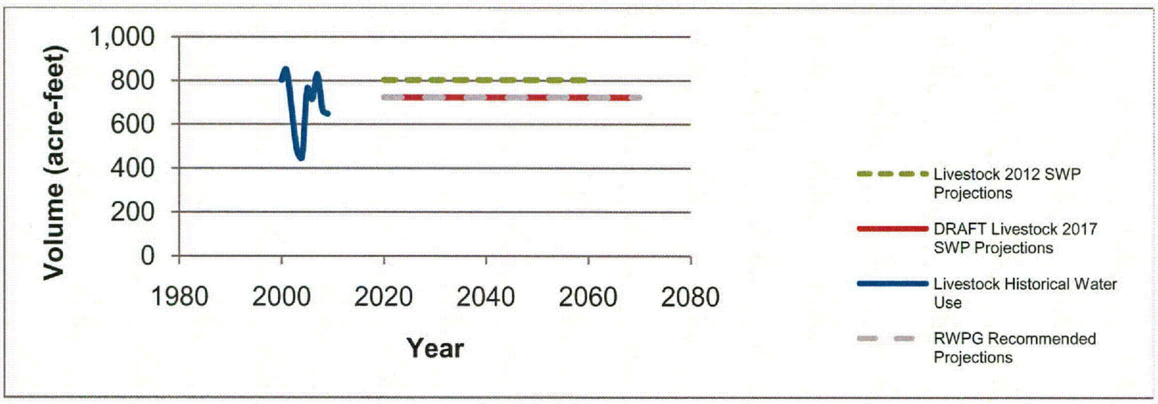
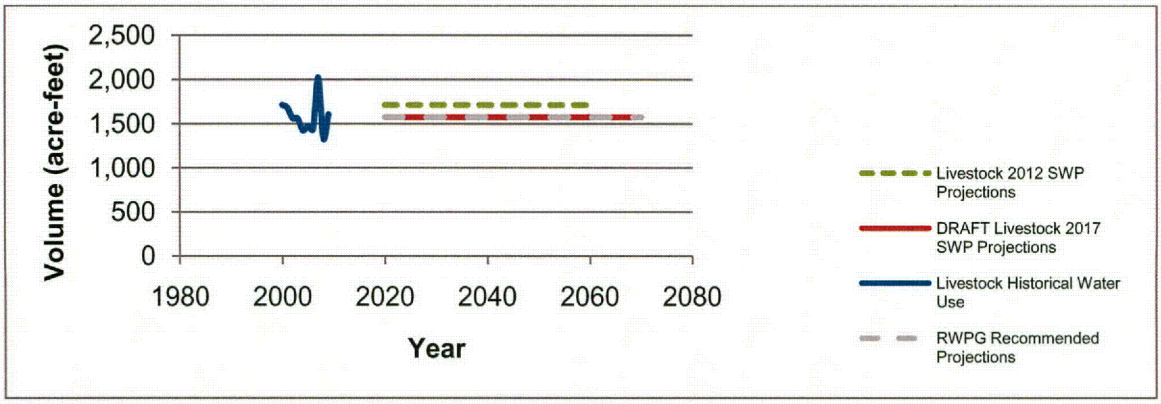


Figure 16. Wise County Livestock Comparison



TECHNICAL MEMORANDUM

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS • DESIGNERS • SCIENTISTS

Region C Water Planning Group
2016 Regional Water Planning Cycle
Non-Municipal Demand Projections, Manufacturing

Project No.: 0312-046-01

Date: May 8, 2012

Prepared For: Tom Gooch, Freese and Nichols, Inc.
Amy Kaarlela, Freese and Nichols, Inc.
Rachel Ickert, Freese and Nichols, Inc.

Prepared By: Preston Dillard, Alan Plummer Associates, Inc.
Lauren Plunk, Alan Plummer Associates, Inc.

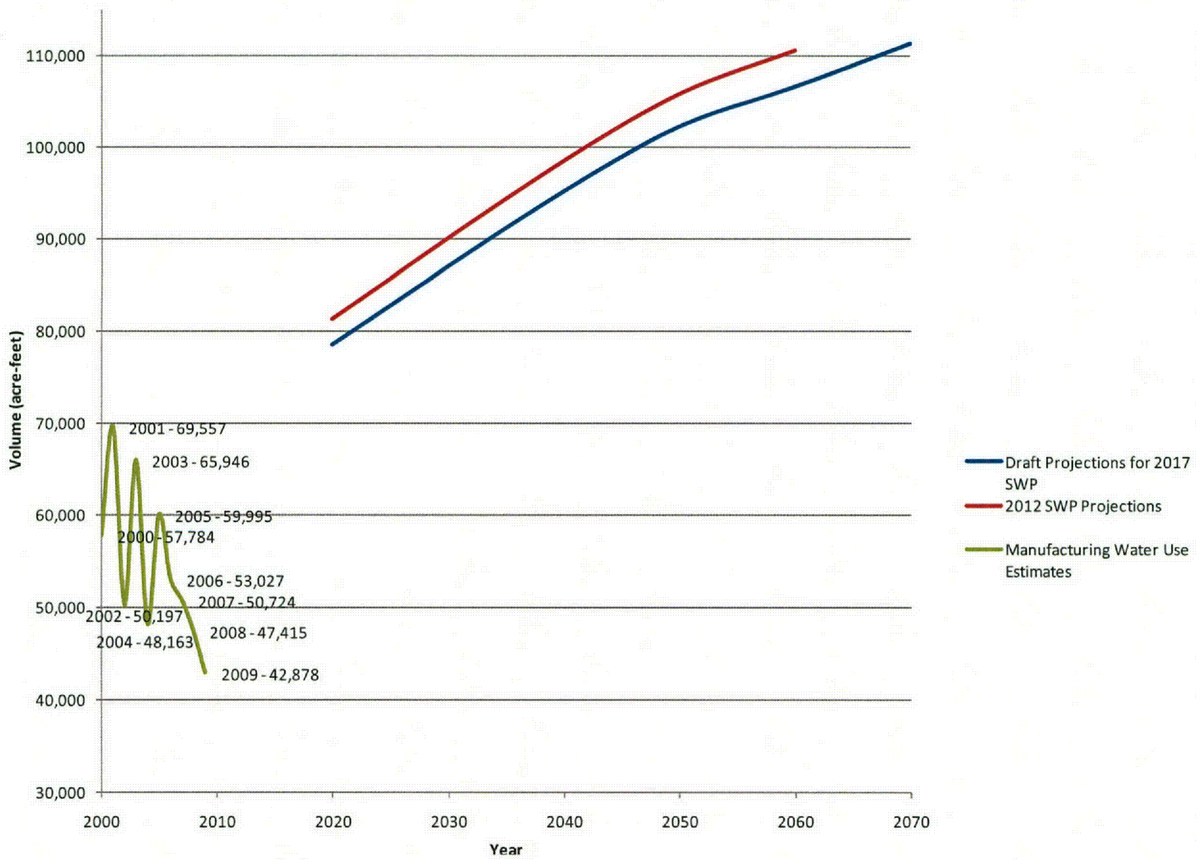
The *2016 Region C Water Plan* (hereafter referred to as the 2016 Plan) will incorporate projections for municipal demands, as well as non-municipal demands for irrigation, livestock, manufacturing, mining, and steam-electric power. The Texas Water Development Board (TWDB) provided the planning groups with draft non-municipal demand projections. The draft non-municipal demand projections will be reviewed by the individual planning groups, and recommendations will be provided to the TWDB. The TWDB will consider the recommended changes from the planning groups, and the final projections will ultimately be adopted by the planning groups and the TWDB and incorporated into the 2017 State Water Plan. The purpose of this technical memorandum is to document information related to historical manufacturing usage and provide information supporting recommended modifications to the draft manufacturing demands.

BACKGROUND

Manufacturing water use is defined by the TWDB as water used in the production process of manufactured products, including water used by employees for drinking and sanitation purposes. TWDB's draft non-municipal manufacturing demand projections for the 2017 State Water Plan utilize an adjusted average of the 2004-2008 data from the TWDB's Water Use Survey as a base to calculate the 2020 projection, and the rate of change for projections from the *2011 Region C Water Plan* is applied to the base for the years 2030-2070. The TWDB's Water Use Survey estimates are adjusted in counties where reported employment from the companies returning surveys was lower than the manufacturing employment data reported by the Bureau of Economic Analysis (the surveyed water use was adjusted to account for the apparent non-responses). The TWDB also reviews industrial publications and reports sales for new facilities prior to making adjustments. A significant number of manufacturing firms are supplied under the municipal water use category and are not reported in the Water Use Survey. While there is not any direct evidence that water use is unreported in the Water Use Survey, this method allows for adjustments for facilities whose volumes may not otherwise be accounted for.

The historical manufacturing water use estimates that are published by the TWDB summarize the findings of the annual Water Use Survey, but do not include adjustments for apparent non-responses described above. At the time this memo was written, historical data estimates are available through the year 2009. Since the year 2000, the region-wide manufacturing water use estimates have ranged from 42,878 to 69,557 acre-feet (see Figure 1 for usage information by year). However, as noted above, since the historical manufacturing water use estimates do not adjust for non-responses and new facilities, on a regional level these estimates are less than the base year used to develop the projections for 2020-2070.

Figure 1. Region C Manufacturing – Comparison of Water Use Estimates and Projections



Source: Texas Water Development Board
Note: the water use estimates do not include adjustments for apparent non-responses/new facilities.

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the manufacturing water use projections:

- A manufacturing facility which has recently located in a county and may not have been included in the Board's database. Documentation and analysis must be provided that justify that the new manufacturing facility will increase the future manufacturing water use for the county above the manufacturing water use projections.
- A manufacturing facility has recently closed its operation in a county.
- Plans for the construction of a manufacturing facility in a county at some future date.

The Planning Group must provide the Executive Administrator the following data associated with the identified criteria for justifying any adjustments to the manufacturing water demand projections:

- The quantity of water used on an annual basis by a manufacturing facility that has recently located in a county and was not included in the Board's database.
- The North American Industrial Classification (NAIC) of the manufacturing facility that has recently located in a county. The NAIC is the numerical code for identifying the classification of establishments by type of activity in which they are engaged as defined by the U.S. Office of Management and Budget and is a successor of the Standard Industrial Classification (SIC).
- Documentation of plans for a manufacturing facility to locate in a county at some future date will include the following data:
    - Confirmation of land purchased for the facility or lease arrangements for the facility.
    - The quantity of water required by the planned facility on an annual basis.
    - The proposed construction schedule for the facility including the date the facility will become operational.
    - The NAIC for the planned facility.

PROPOSED MANUFACTURING WATER USE

A comparison of the draft projections for the 2017 SWP (provided by TWDB), the final 2012 SWP projections, and the proposed RCWPG revisions to the 2017 SWP projections is presented in Table 1 and Figure 2. The majority of the proposed RCWPG county-level projections are identical to the draft projections for the 2017 SWP. Deviations from the draft projections are explained below:

- Ellis County – The historical manufacturing water use (not including adjustments for non-responses/new facilities) between 2004 – 2008 (5,091 acre-feet/year) appears to be higher than the base year used in the calculations incorporating the adjusted use estimates. It is recommended that the base year used to calculate this projection be adjusted accordingly.

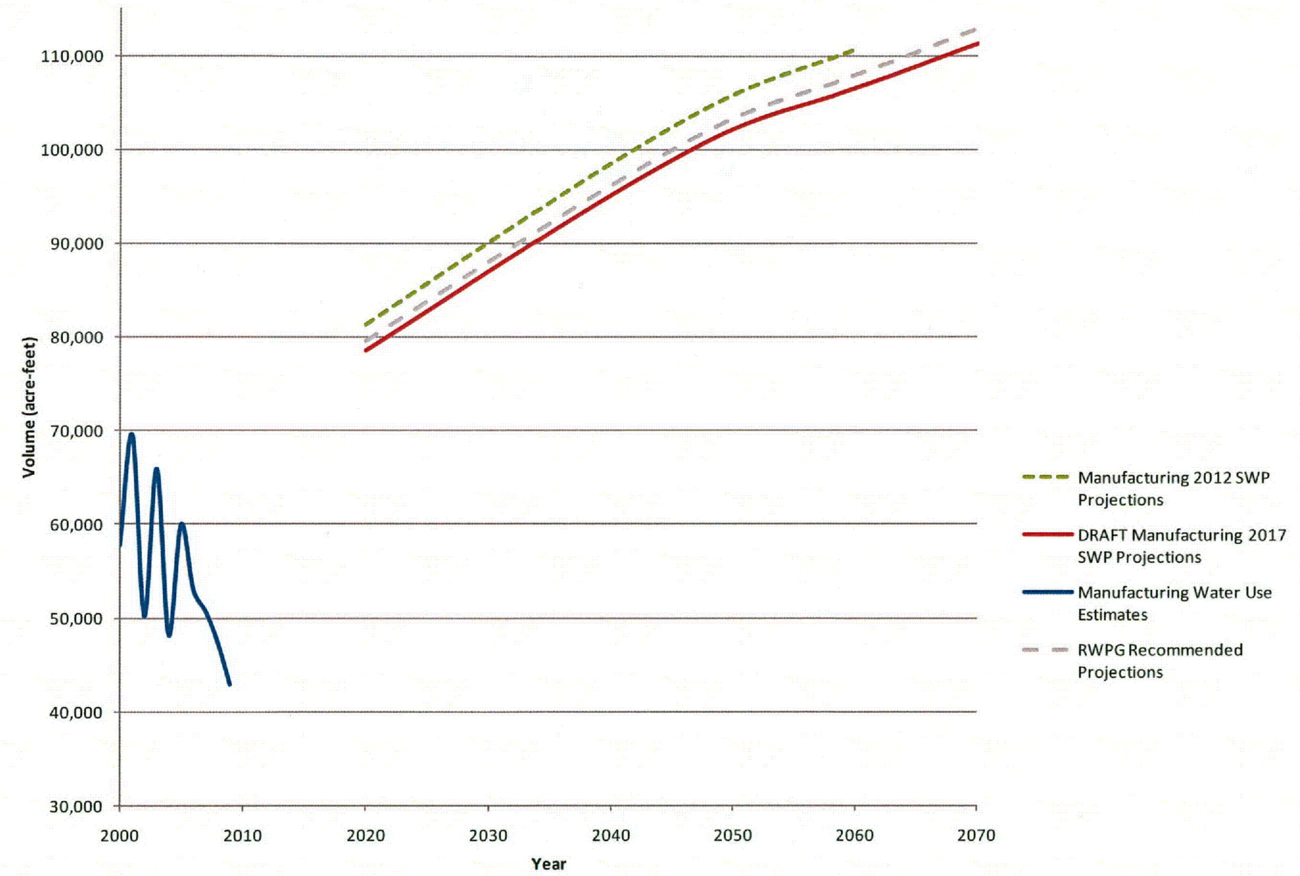
- Henderson County – The historical manufacturing water use (not including adjustments for non-responses/new facilities) between 2004 – 2008 (555 acre-feet/year) appears to be higher than the base year used in the calculations incorporating the adjusted use estimates. It is recommended that the base year used to calculate this projection be adjusted accordingly.
- Navarro County – The historical manufacturing water use (not including adjustments for non-responses/new facilities) between 2004 – 2008 (979 acre-feet/year) appears to be higher than the base year used in the calculations incorporating the adjusted use estimates. It is recommended that the base year used to calculate this projection be adjusted accordingly.
- Parker County – The historical manufacturing water use (not including adjustments for non-responses/new facilities) between 2004 – 2008 (547 acre-feet/year) appears to be higher than the base year used in the calculations incorporating the adjusted use estimates. It is recommended that the base year used to calculate this projection be adjusted accordingly.

Table 1. Comparison of Irrigation Demand Projections

County Name	Draft Projections for 2017 SWP						2012 SWP Projections					RWPG Revisions					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**	**2020**	**2030**	**2040**	**2050**	**2060**	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Collin	718	718	718	718	718	718	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995	2,995
Cooke	205	205	205	205	205	205	444	444	444	444	444	300	300	300	300	300	300
Dallas	9,134	9,134	9,134	9,134	9,134	9,134	13,087	13,087	13,087	13,087	13,087	9,134	9,134	9,134	9,134	9,134	9,134
Denton	2,137	2,137	2,137	2,137	2,137	2,137	2,108	2,108	2,108	2,108	2,108	2,137	2,137	2,137	2,137	2,137	2,137
Ellis	572	572	572	572	572	572	583	583	583	583	583	572	572	572	572	572	572
Fannin	8,301	8,301	8,301	8,301	8,301	8,301	4,608	4,608	4,608	4,608	4,608	8,301	8,301	8,301	8,301	8,301	8,301
Freestone	298	298	298	298	298	298	8	8	8	8	8	298	298	298	298	298	298
Grayson	1,344	1,415	1,490	1,570	1,654	1,752	3,751	3,950	4,158	4,381	4,616	2,438	2,654	2,870	3,086	3,303	3,519
Henderson	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jack	56	56	56	56	56	56	0	0	0	0	0	101	101	101	101	101	101
Kaufman	107	107	107	107	107	107	2,916	2,916	2,916	2,916	2,916	179	179	179	179	179	179
Navarro	0	0	0	0	0	0	0	0	0	0	0	58	58	58	58	58	58
Parker	258	258	258	258	258	258	422	422	422	422	422	490	490	490	490	490	490
Rockwall	0	0	0	0	0	0	1,125	1,125	1,125	1,125	1,125	374	374	374	374	374	374
Tarrant	4,466	4,466	4,466	4,466	4,466	4,466	8,417	8,417	8,417	8,417	8,417	4,466	4,466	4,466	4,466	4,466	4,466
Wise	1,324	1,324	1,324	1,324	1,324	1,324	502	502	502	502	502	1,324	1,324	1,324	1,324	1,324	1,324
Total	**28,920**	**28,991**	**29,066**	**29,146**	**29,230**	**29,328**	**40,966**	**41,165**	**41,373**	**41,596**	**41,831**	**33,168**	**33,384**	**33,600**	**33,816**	**34,032**	**34,248**

Indicates no changes are proposed from the draft projections for the 2017 SWP.

Figure 2. Region C Manufacturing – Comparison of Water Use Estimates, 2012 State Water Plan Projection, Proposed Projections, and Revised Projections



Source: Texas Water Development Board

Note: the water use estimates do not include adjustments for apparent non-responses/new facilities.

Attachment A
Manufacturing Demand by County
Historical Usage and Projections Comparison

Figure 1. Collin County Manufacturing Comparison

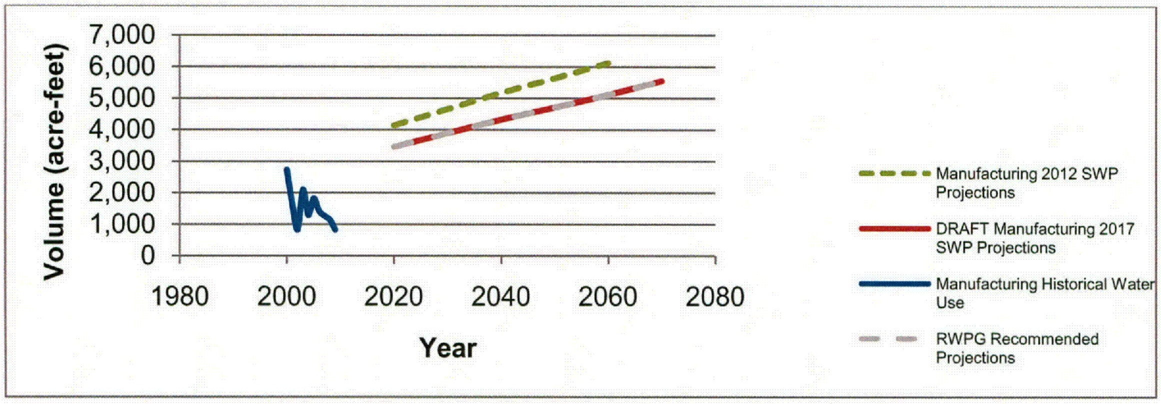


Figure 2. Cooke County Manufacturing Comparison

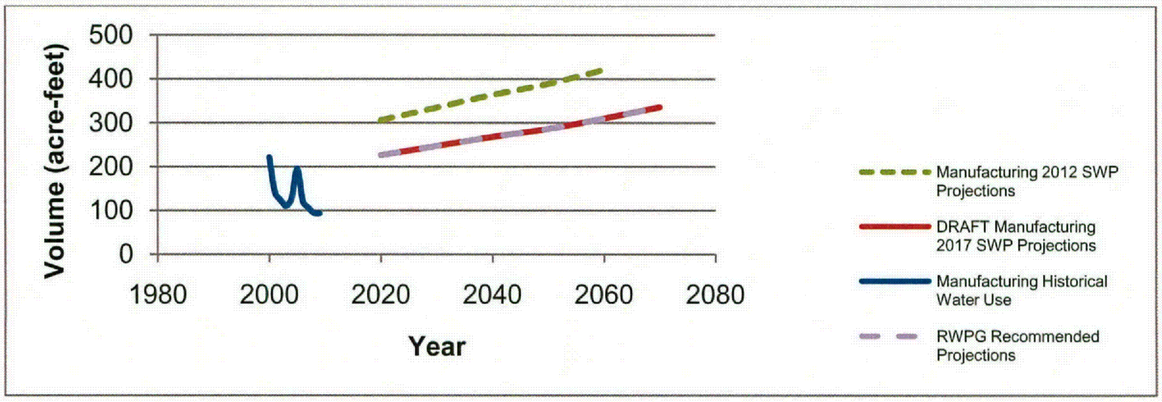


Figure 3. Dallas County Manufacturing Comparison

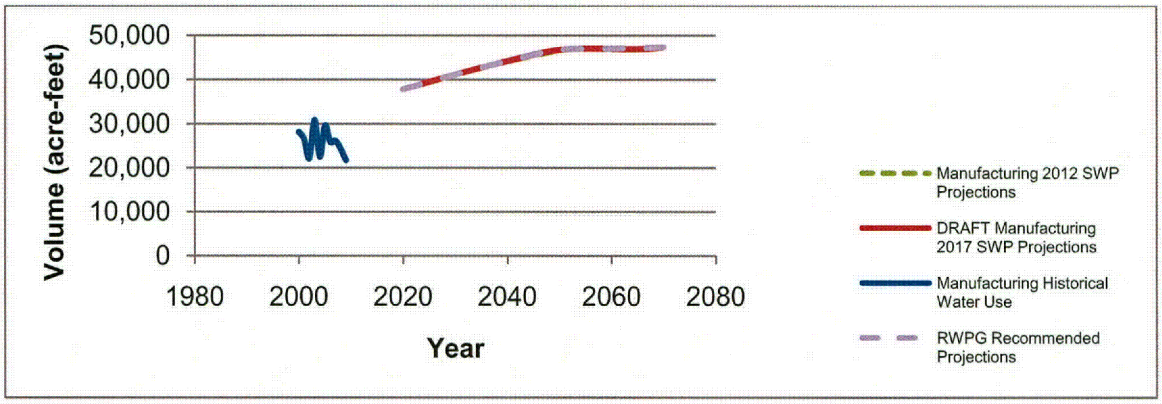


Figure 4. Denton County Manufacturing Comparison

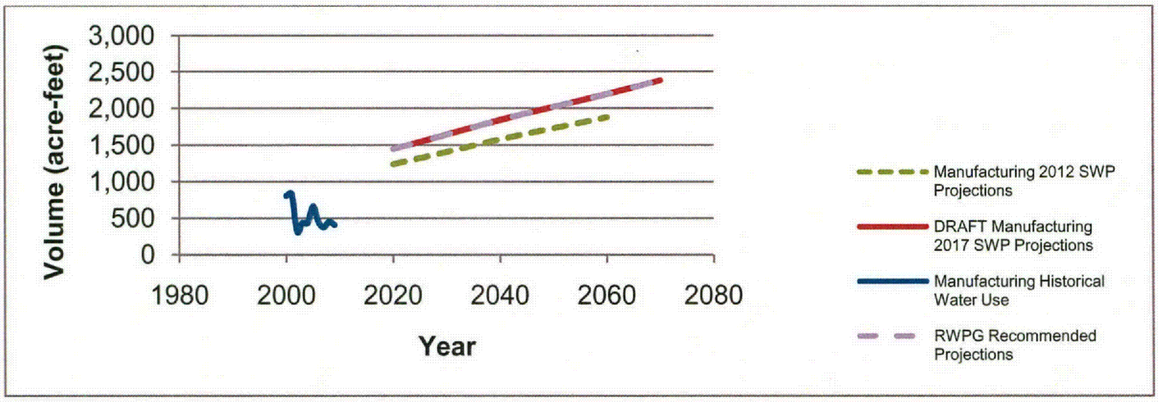


Figure 5. Ellis County Manufacturing Comparison

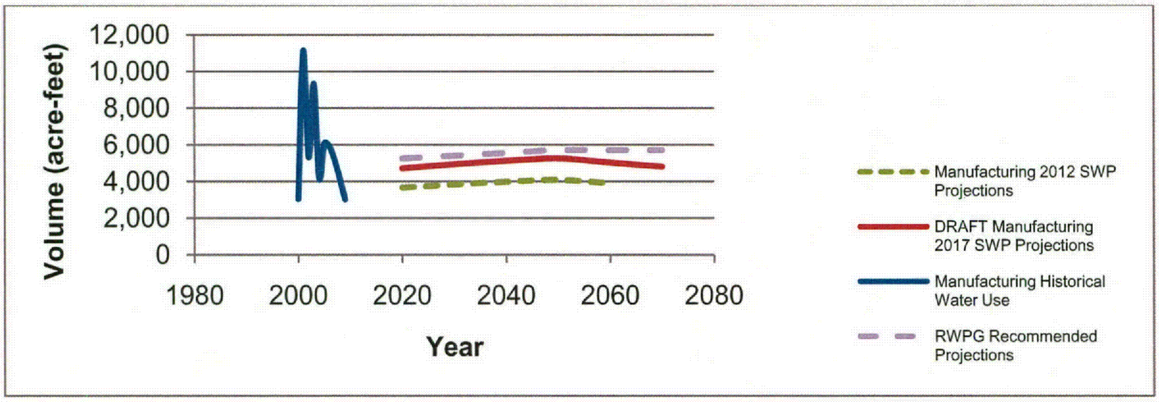


Figure 6. Fannin County Manufacturing Comparison

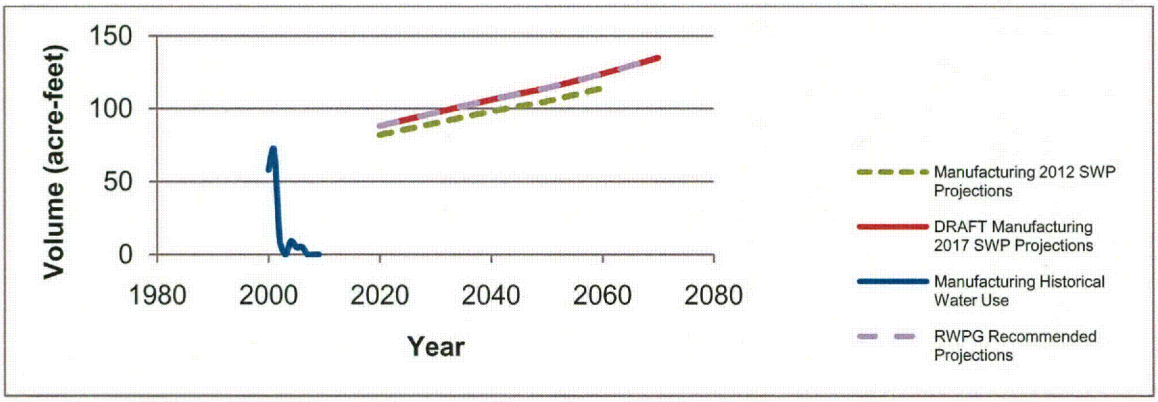


Figure 7. Freestone County Manufacturing Comparison

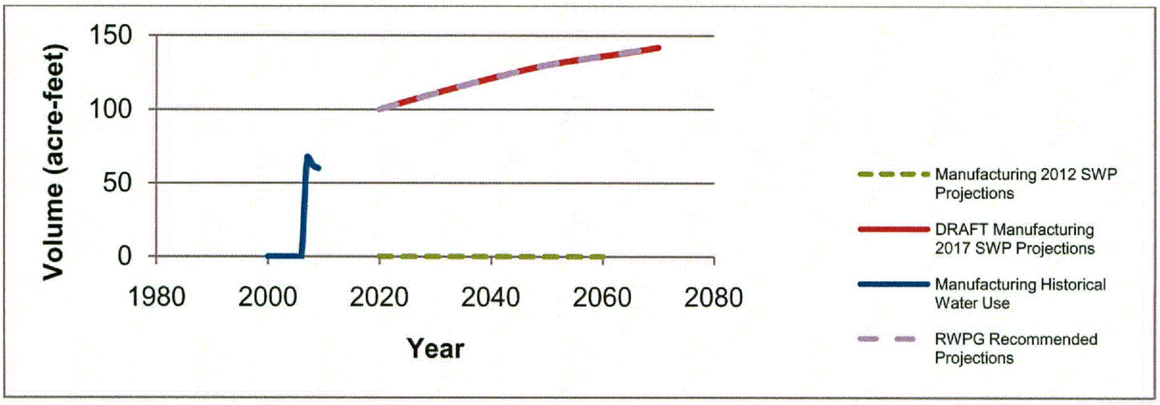


Figure 8. Grayson County Manufacturing Comparison

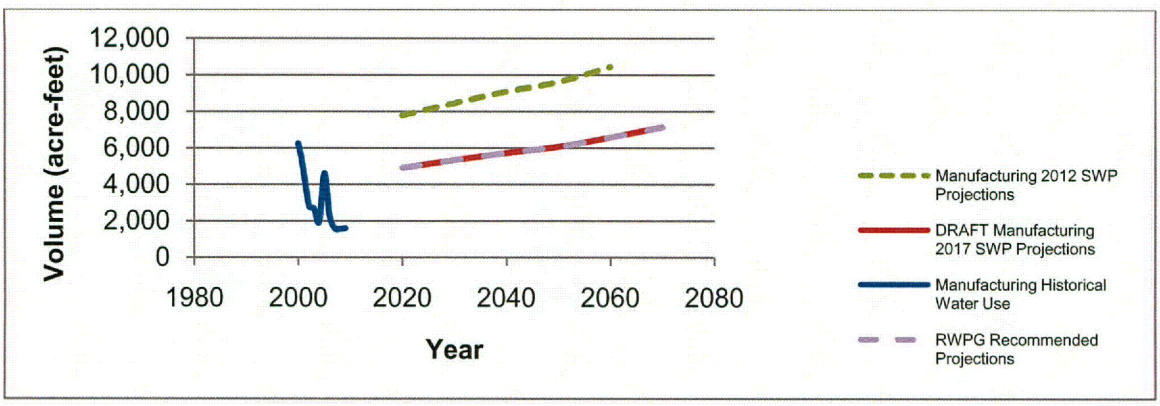


Figure 9. Henderson County Manufacturing Comparison

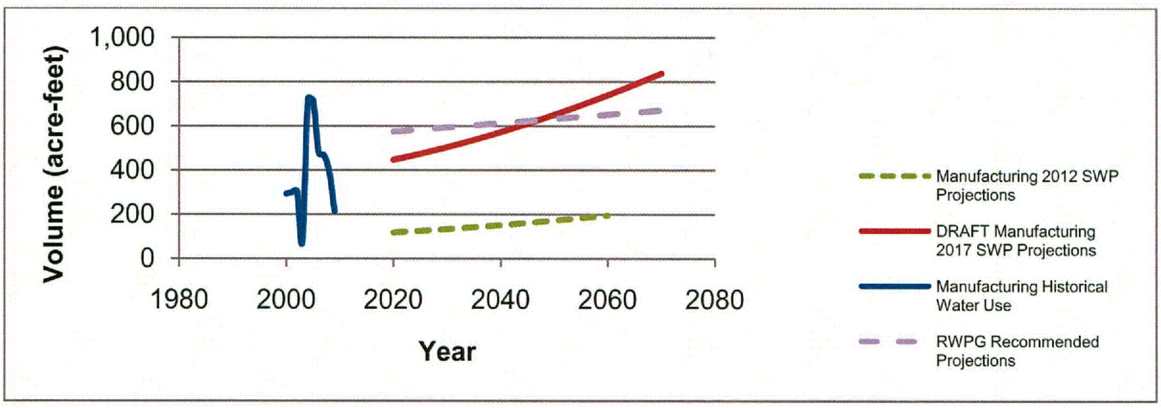


Figure 10. Jack County Manufacturing Comparison

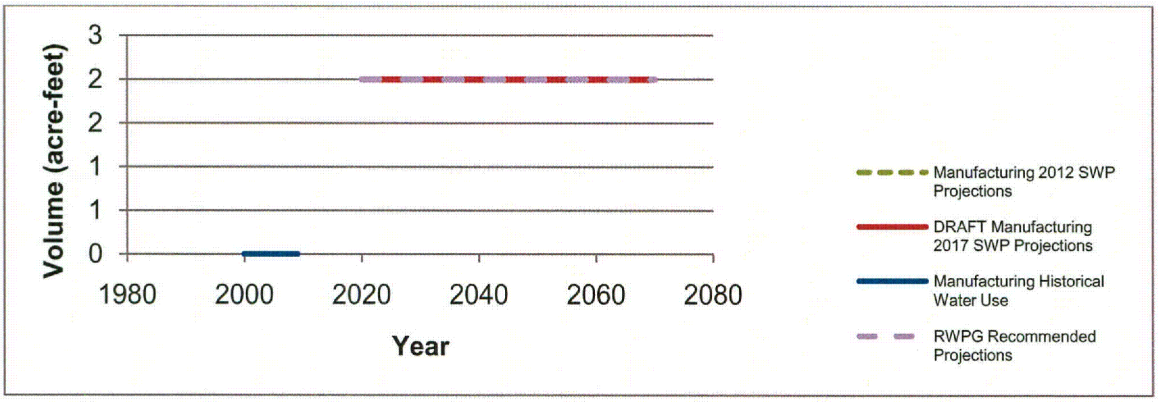


Figure 11. Kaufman County Manufacturing Comparison

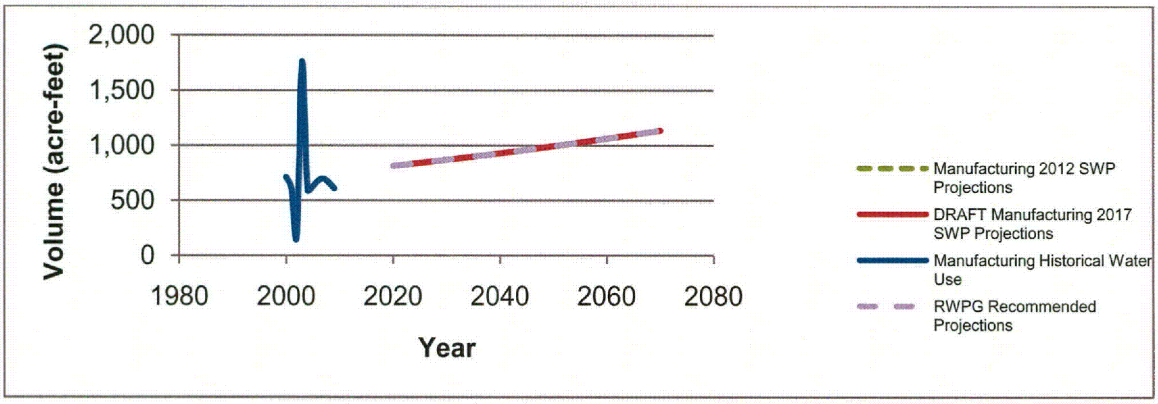


Figure 12. Navarro County Manufacturing Comparison

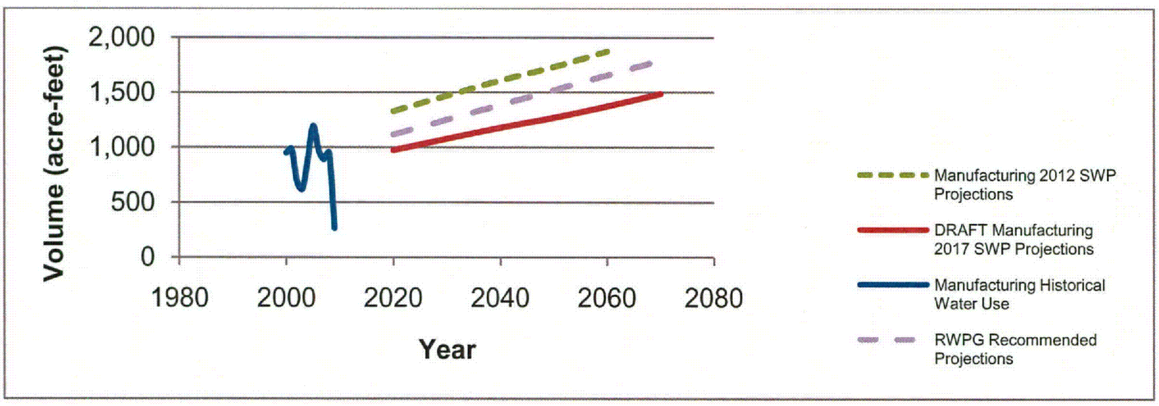


Figure 13. Parker County Manufacturing Comparison

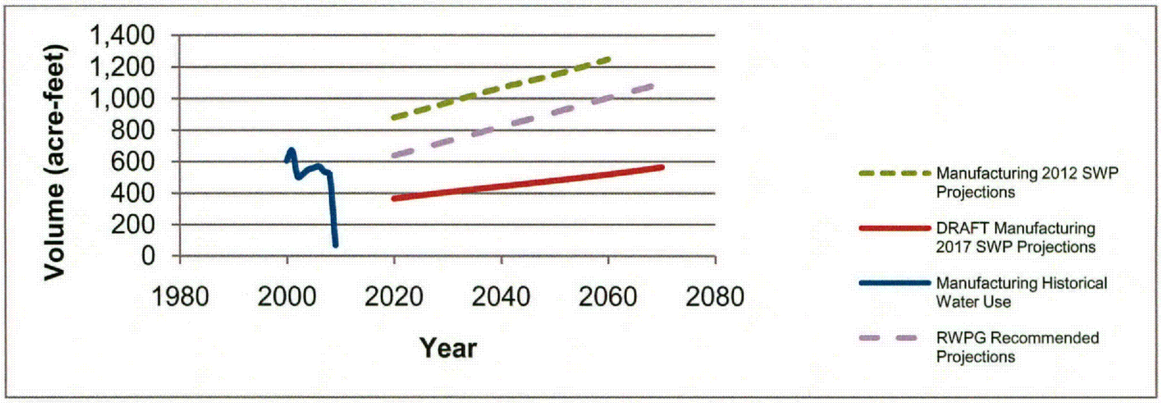


Figure 14. Rockwall County Manufacturing Comparison

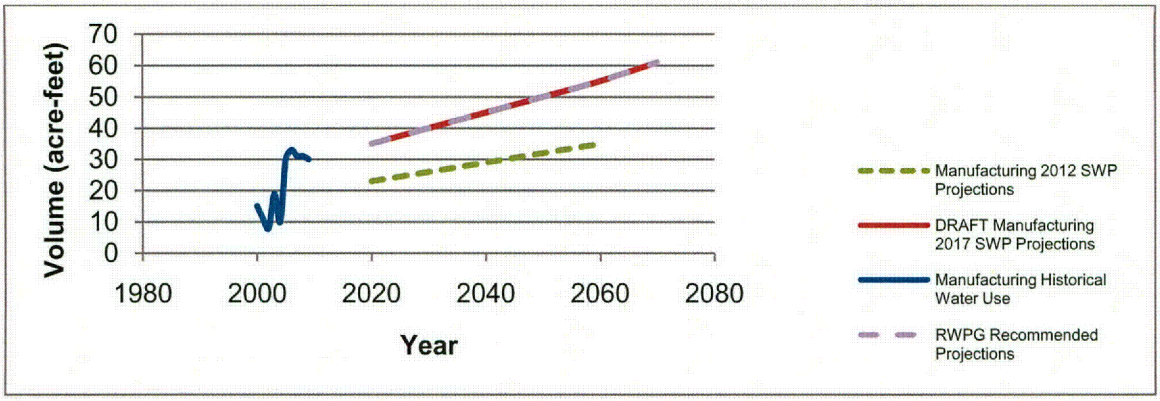


Figure 15. Tarrant County Manufacturing Comparison

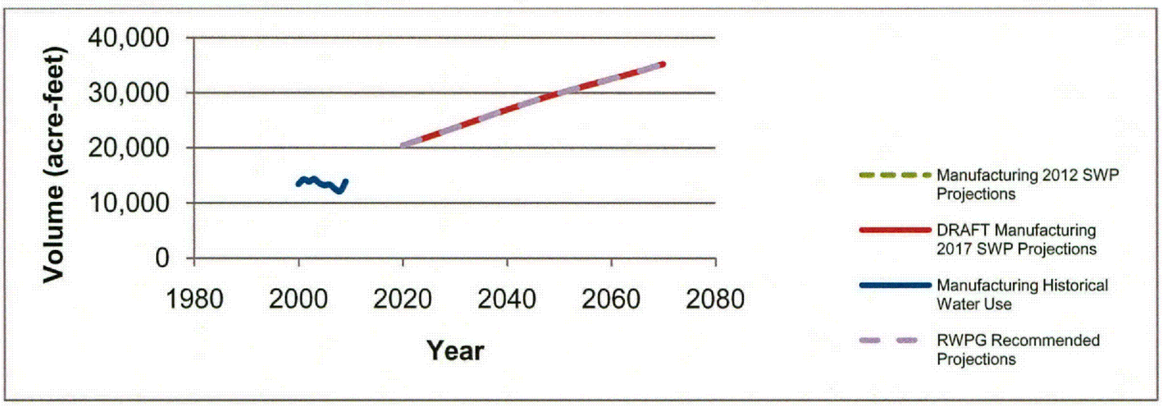
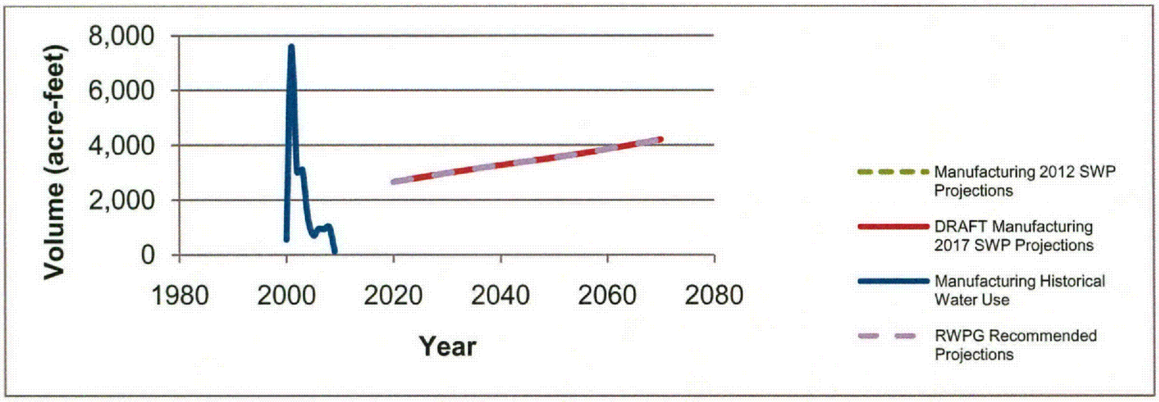


Figure 16. Wise County Manufacturing Comparison



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ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS • DESIGNERS • SCIENTISTS

TECHNICAL MEMORANDUM

Region C Water Planning Group
2016 Regional Water Planning Cycle
Non-Municipal Demand Projections, Mining

Project No.: 0312-046-01

Date: March 11, 2013

Prepared For: Tom Gooch, Freese and Nichols, Inc.
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Rachel Ickert, Freese and Nichols, Inc.

Prepared By: Preston Dillard, Alan Plummer Associates, Inc.
Lauren Plunk, Alan Plummer Associates, Inc.

The *2016 Region C Water Plan* (hereafter referred to as the 2016 Plan) will incorporate projections for municipal demands, as well as non-municipal demands for irrigation, livestock, manufacturing, mining, and steam-electric power. The Texas Water Development Board (TWDB) provided the planning groups with draft non-municipal demand projections. The draft non-municipal demand projections will be reviewed by the individual planning groups, and recommendations will be provided to the TWDB. The TWDB will consider the recommended changes from the planning groups, and the final projections will ultimately be adopted by the planning groups and the TWDB and incorporated into the 2017 State Water Plan. The purpose of this technical memorandum is to document information related to historical mining usage and provide information supporting recommended modifications to the draft mining demands.

BACKGROUND

Mining water use is defined by the TWDB as water used in the production process of mined products, including water used by employees for drinking and sanitation purposes. The TWDB publishes historical mining water use estimates. Since the year 2000, the region-wide mining water use estimates have ranged from 9,930 to 33,297 acre-feet (see Figure 1 for usage information by year). As of April 2012, historical data estimates were available through the year 2009.

Draft State Water Plan Projections

TWDB's draft non-municipal mining demand projections for the 2017 State Water Plan were originally developed through a TWDB-contracted study with the Bureau of Economic Geology (BEG).[1] The study was updated in September 2012 following (1) a major shift of the oil and gas industry from gas to oil production, displacing production centers across the state and impacting county-level projections and (2) rapid development of technology advances, resulting in more common reuse and in the ability to use more brackish water.[2] This memorandum, originally published in Spring 2012, was updated in March 2013 to incorporate changes in Freestone and Tarrant counties using information from the updated BEG Study.

The BEG study estimates current mining water use and projects use across the planning horizon using data collected from trade organizations, government agencies, and other industry representatives. The projections include information from four mining categories: oil and gas, aggregates, coal and lignite, and other. The BEG study projects the overall state-wide mining use to peak between 2020-2030 (primarily influenced by oil and gas production). The coal and aggregate mining industry will continue to increase throughout the planning period. The pattern in Figure 1 indicates that the primary driver for mining water use in Region C is the oil and gas categories. However, mining water use in several Region C counties appears to be driven by the coal/aggregate mining industries.

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the mining water use projections:

- A mining facility which has recently located in a county and may not have been included in the Board's database. Documentation and analysis must be provided that justify that the new mining facility will increase the future mining water use for the county above the mining water use projections.
- A mining facility has recently closed its operation in a county.
- Plans for the construction of a mining facility in a county at some future date.

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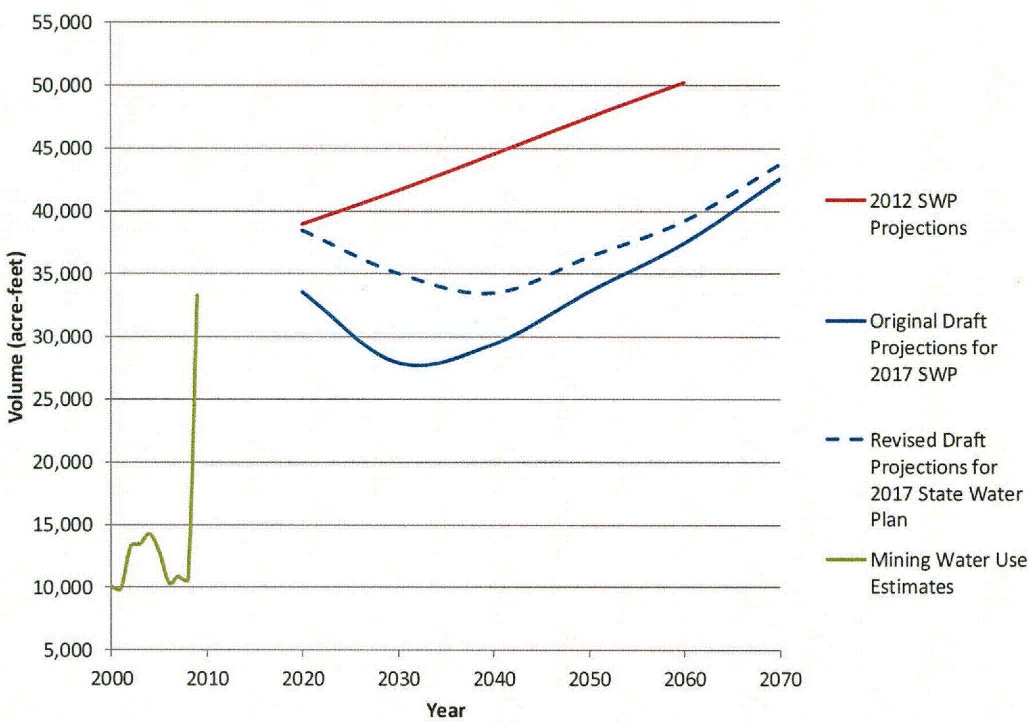
[1] Bureau of Economic Geology, *Current and Projected Water Use in the Texas Mining and Oil and Gas Industry*, prepared for Texas Water Development Board, June 2011.

[2] Bureau of Economic Geology, *Oil and Gas Water Use in Texas: Update to the 2011 Mining Water Use Report*, prepared for Texas Water Development Board, September 2012.

The Planning Group must provide the Executive Administrator the following data associated with the identified criteria for justifying any adjustments to the mining water demand projections:

- The quantity of water used on an annual basis by a mining facility that has recently located in a county and was not included in the Board's database.
- The North American Industrial Classification (NAIC) of the mining facility that has recently located in a county. The NAIC is the numerical code for identifying the classification of establishments by type of activity in which they are engaged as defined by the U.S. Office of Management and Budget and is a successor of the Standard Industrial Classification (SIC).
- Documentation of plans for a mining facility to locate in a county at some future date will include the following data:
  - Confirmation of land purchased for the facility or lease arrangements for the facility.
  - The quantity of water required by the planned facility on an annual basis.
  - The proposed construction schedule for the facility including the date the facility will become operational.
  - The NAIC for the planned facility.

Figure 1. Region C Mining – Comparison of Water Use Estimates and Projections



Source: Texas Water Development Board

PROPOSED MINING WATER USE

A comparison of the draft projections for the 2017 SWP (provided by TWDB), the final 2012 SWP projections, and the proposed RCWPG revisions to the 2017 SWP projections is presented in Table 1 and Figure 2. The majority of the proposed RCWPG county-level projections are identical to the draft projections for the 2017 SWP. Deviations from the draft projections are explained below:

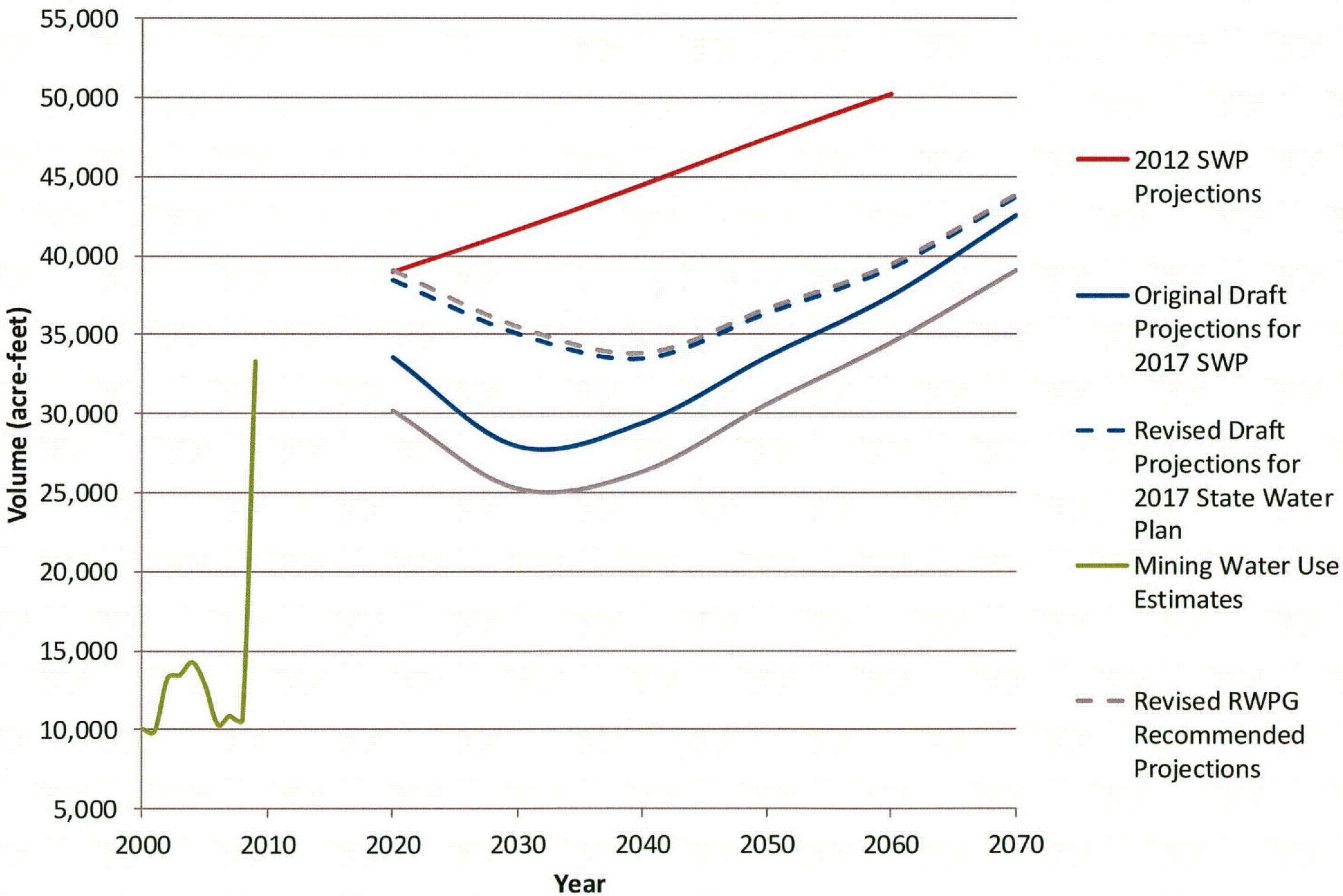
- Collin County – The BEG Study projects 0 acre-feet/year of use over the course of the planning period for Collin County. However, there has been historical mining water use in this county, as recently as 2005. In order to incorporate this demand, it is recommended that the projections include an average of the historical usage from 2005-2009 (39 acre-feet/year). The average value is recommended rather than the peak value since usage in this county is declining.
- Fannin County – The BEG Study projects that the mining water use in Fannin County will increase from 11 to 40 acre-feet/year over the course of the planning period. However, from 2005-2009, the historical water use has been estimated between 1 and 128 acre-feet/year (no discernable trend). Therefore, in order to provide for a more conservative projection, it is recommended that the peak usage value be utilized as the projection throughout the planning period.
- Grayson County – The BEG Study projects that the mining water use in Grayson County will increase from 79 to 163 acre-feet/year over the course of the planning period. However, from 2005-2009, the historical water use has been estimated between 19 and 1,058 acre-feet/year (decreasing trend). It is recommended that the projections be adjusted to the average of the historical usage from 2005-2009 (234 acre-feet/year) to provide for a more conservative estimate. The average value is recommended rather than the peak value since usage in this county is declining.
- Henderson County - The BEG Study projects that the mining water use in Henderson County will increase from 313 to 658 acre-feet/year over the course of the planning period. However, from 2005-2009, the historical water use has been estimated between 163 and 607 acre-feet/year (no discernable trend). Therefore, in order to provide for a more conservative projection, it is recommended that the peak usage value be utilized as the projection throughout the planning period.
- Rockwall County – The BEG Study projects 0 acre-feet/year of use over the course of the planning period for Rockwall County. However, there has been historical mining water use in this county, as recently as 2005. In order to incorporate this demand, it is recommended that the projections include an average of the historical usage from 2005-2009 (7 acre-feet/year). The average value is recommended rather than the peak value since usage in this county is declining.

Table 1. Comparison of Mining Demand Projections

County Name	Original TWDB Draft Projections for 2017 SWP						Revised TWDB Draft Projections for 2017 SWP						2012 SWP Projections					RWPG Revisions					
	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2020	2030	2040	2050	2060	2070
Collin	0	0	0	0	0	0	0	0	0	0	0	0	341	341	341	341	341	39	39	39	39	39	39
Cooke	553	424	363	433	500	577	1,583	900	378	446	511	586	484	421	428	435	441	1,583	900	378	446	511	586
Dallas	2,786	2,245	1,940	1,930	1,922	1,916	3,038	2,656	2,279	1,930	1,922	1,916	3,040	3,030	3,030	3,030	3,030	3,038	2,656	2,279	1,930	1,922	1,916
Denton	2,802	2,722	3,345	4,306	5,204	6,291	4,326	2,729	3,345	4,306	5,204	6,291	751	751	751	751	751	4,326	2,729	3,345	4,306	5,204	6,291
Ellis	254	69	0	0	0	0	147	213	164	123	82	55	140	140	140	140	140	147	213	164	123	82	55
Fannin	11	16	23	27	33	40	11	16	23	27	33	40	12	12	12	12	12	128	128	128	128	128	128
Freestone	5,388	4,947	4,989	4,862	4,794	5,209	5,347	5,115	5,251	5,286	5,356	5,582	126	132	138	144	149	5,347	5,115	5,251	5,286	5,356	5,582
Grayson	75	87	102	120	138	160	79	91	107	123	142	163	1,050	1,049	1,048	1,047	1,046	234	234	234	234	234	234
Henderson	412	492	483	497	503	589	313	457	535	571	598	658	302	327	352	378	399	607	607	607	607	607	607
Jack	3,396	1,821	1,212	1,366	1,524	1,702	1,555	1,745	1,698	1,731	1,768	1,862	983	973	973	973	973	1,555	1,745	1,698	1,731	1,768	1,862
Kaufman	296	386	491	646	783	951	296	386	491	646	783	951	80	81	82	83	84	296	386	491	646	783	951
Navarro	874	1,062	1,274	1,565	1,800	2,071	883	1,071	1,282	1,572	1,806	2,076	89	89	89	89	89	883	1,071	1,282	1,572	1,806	2,076
Parker	3,702	2,254	2,474	2,924	3,357	3,855	3,182	4,029	4,006	4,073	4,124	4,364	1,702	1,692	1,702	1,712	1,720	3,182	4,029	4,006	4,073	4,124	4,364
Rockwall	0	0	0	0	0	0	0	0	0	0	0	0	33	33	33	33	33	7	7	7	7	7	7
Tarrant	2,991	1,736	1,589	1,537	1,497	1,464	7,367	4,482	1,589	1,537	1,497	1,464	904	939	974	1,009	1,036	7,367	4,482	1,589	1,537	1,497	1,464
Wise	10,014	9,646	11,113	13,363	15,377	17,707	10,320	11,159	12,337	13,975	15,378	17,694	28,924	31,620	34,393	37,258	39,956	10,320	11,159	12,337	13,975	15,378	17,694
Total	**33,554**	**27,907**	**29,398**	**33,576**	**37,432**	**42,532**	**38,447**	**35,049**	**33,485**	**36,346**	**39,204**	**43,702**	**38,961**	**41,630**	**44,486**	**47,435**	**50,200**	**39,059**	**35,500**	**33,835**	**36,640**	**39,446**	**43,856**

Shading indicates no changes are proposed from TWDB's revised draft projections for the 2017 SWP.

Figure 2. Region C Mining – Comparison of Water Use Estimates, 2012 State Water Plan Projection, Proposed Projections, and Revised Projections



Attachment A
Mining Demand by County
Historical Usage and Projections Comparison

Figure 1. Collin County Mining Comparison

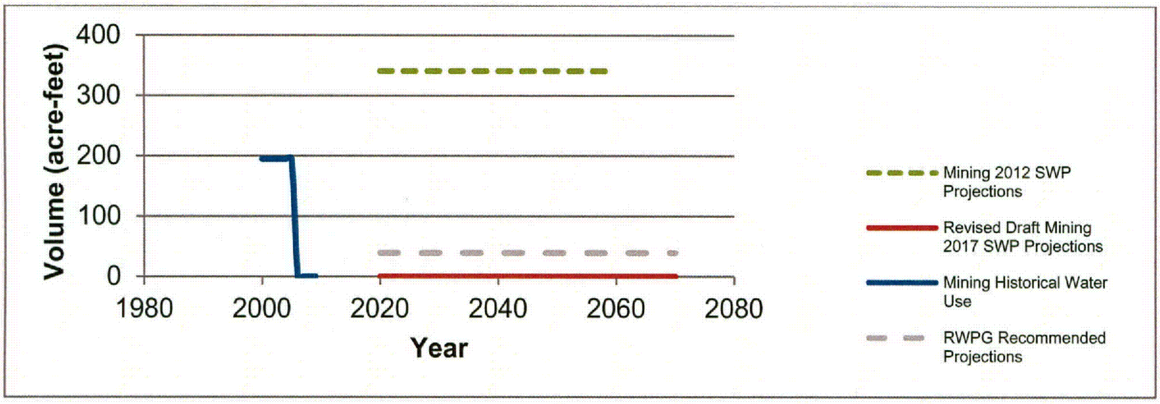


Figure 2. Cooke County Mining Comparison

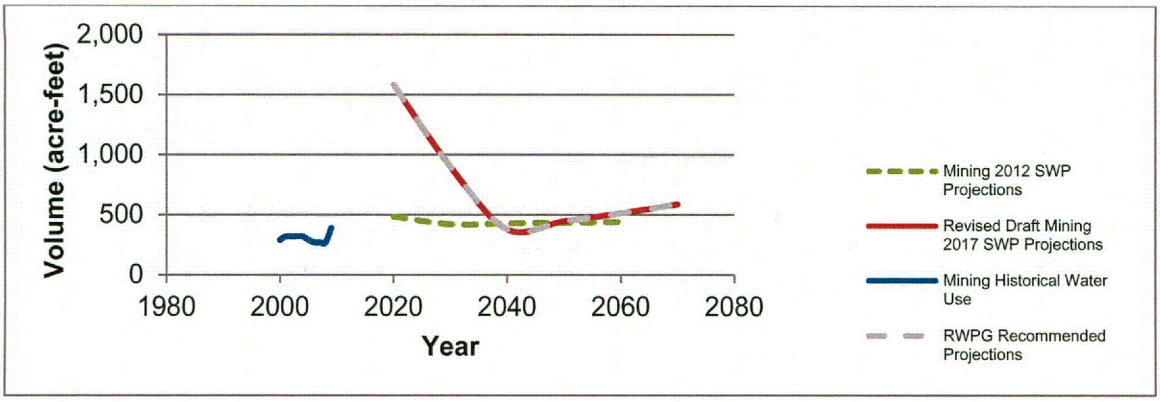


Figure 3. Dallas County Mining Comparison

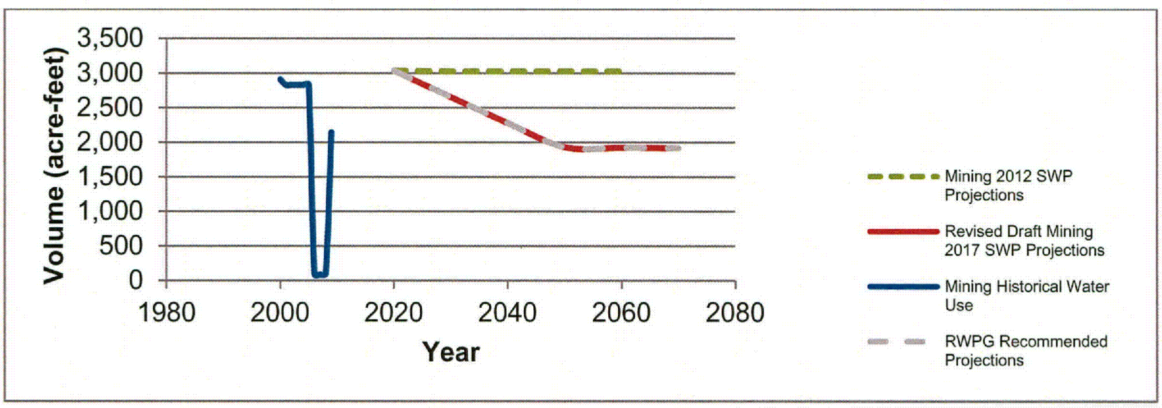


Figure 4. Denton County Mining Comparison

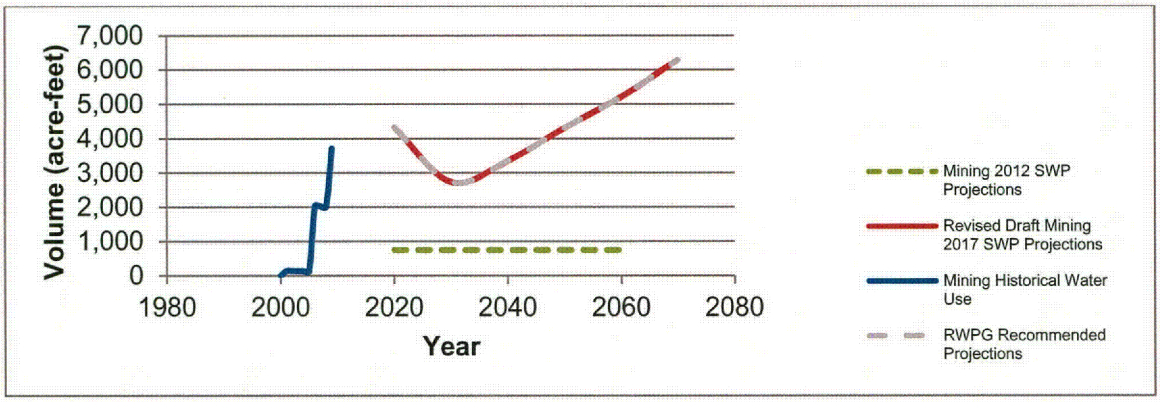


Figure 5. Ellis County Mining Comparison

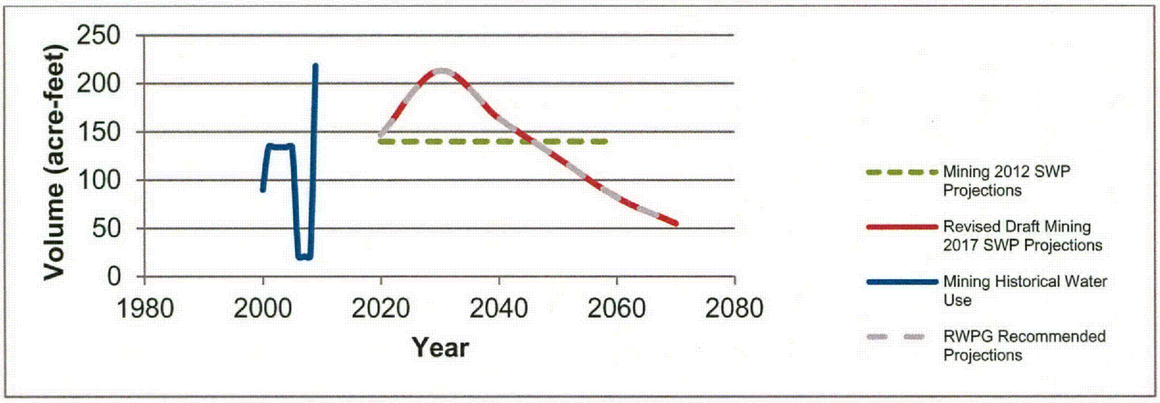


Figure 6. Fannin County Mining Comparison

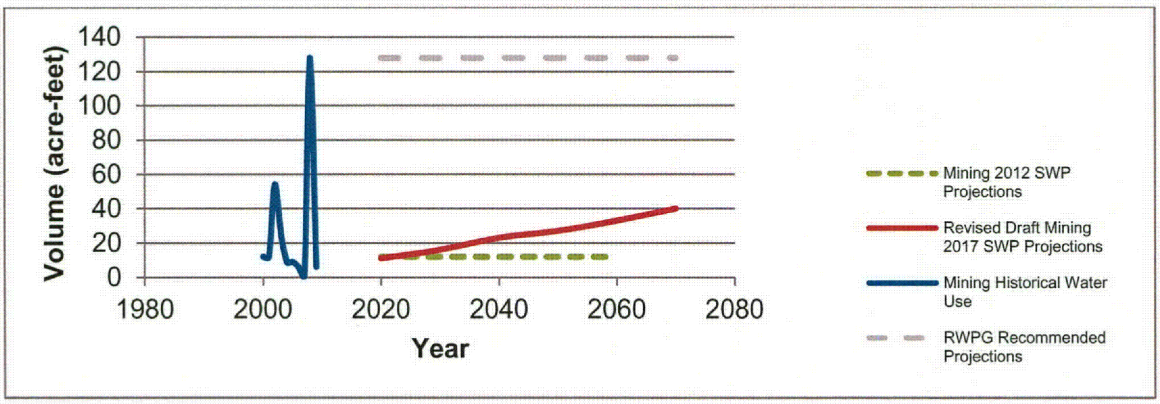


Figure 7. Freestone County Mining Comparison

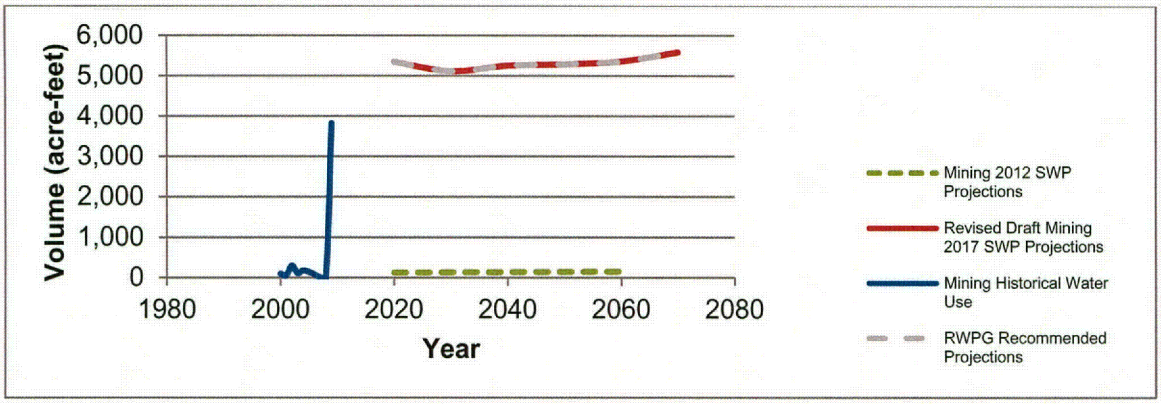


Figure 8. Grayson County Mining Comparison

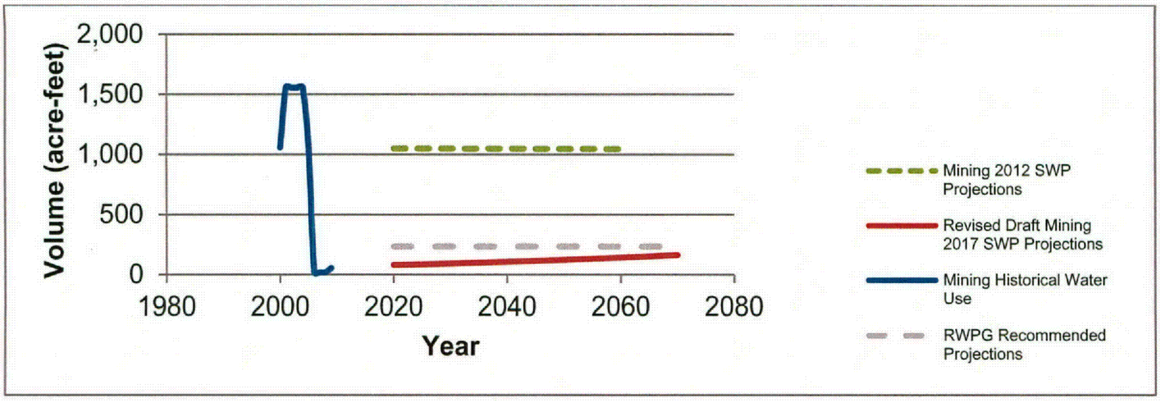


Figure 9. Henderson County Mining Comparison

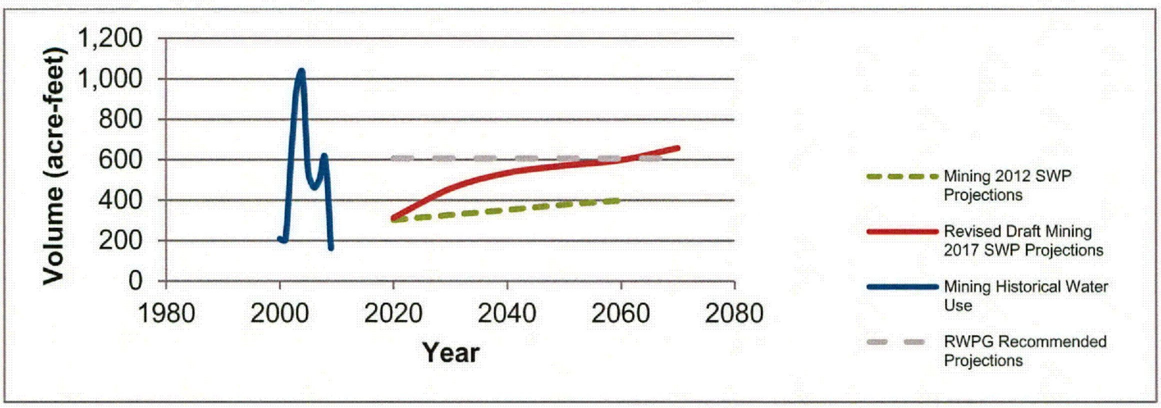


Figure 10. Jack County Mining Comparison

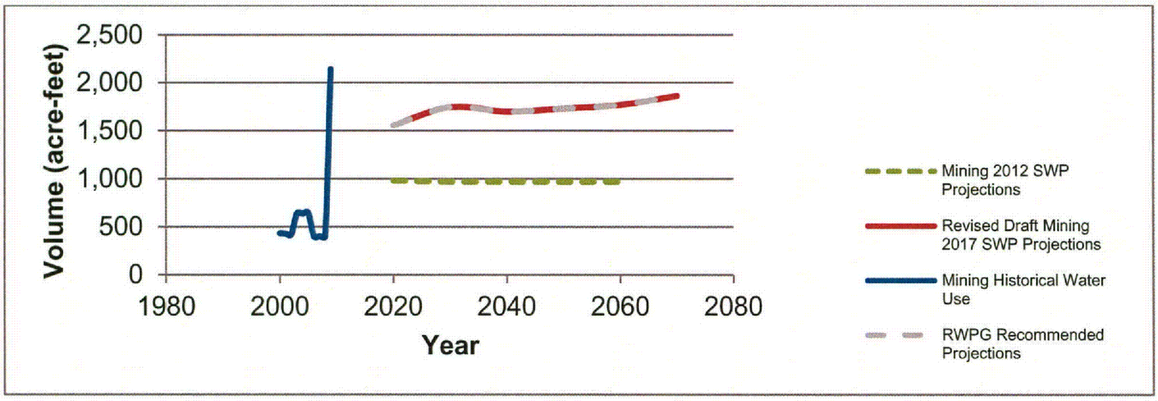


Figure 11. Kaufman County Mining Comparison

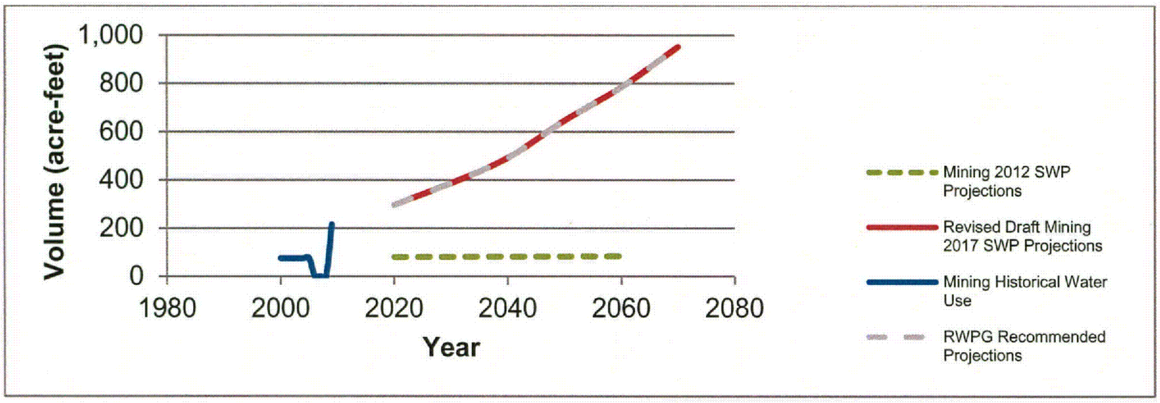


Figure 12. Navarro County Mining Comparison

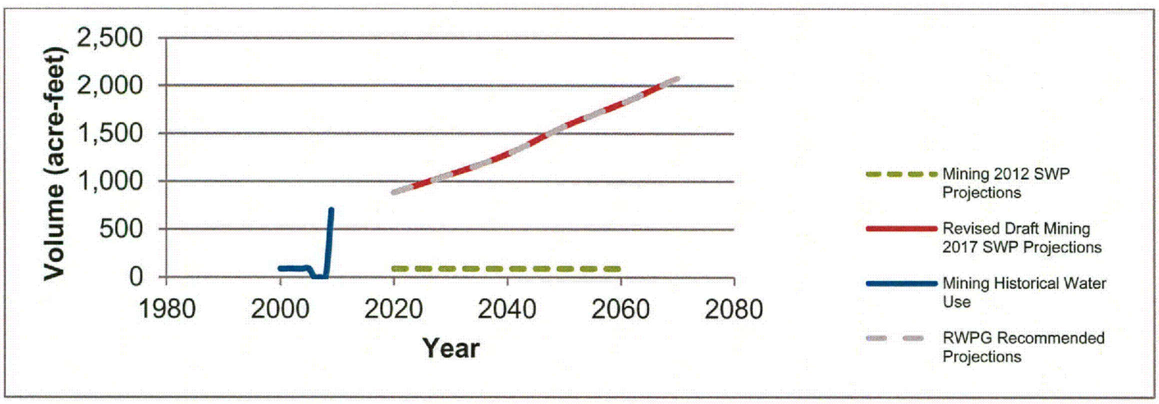


Figure 13. Parker County Mining Comparison

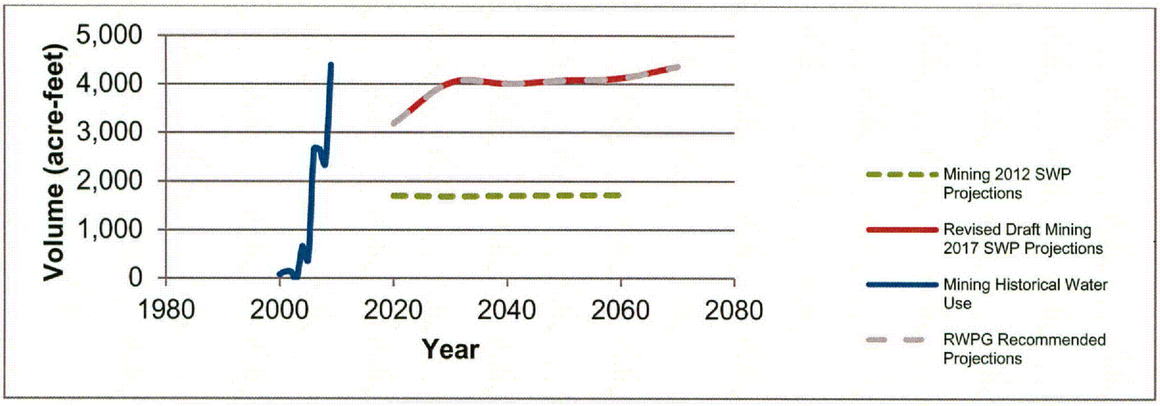


Figure 14. Rockwall County Mining Comparison

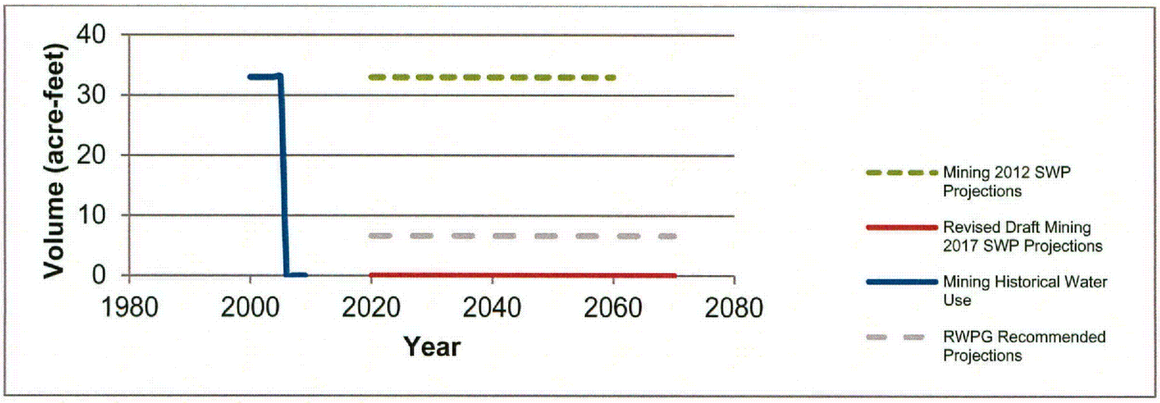


Figure 15. Tarrant County Mining Comparison

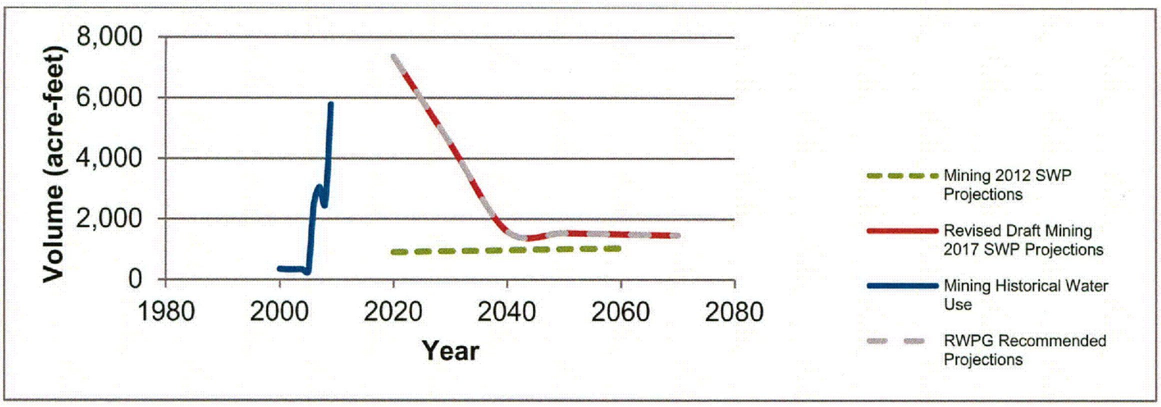
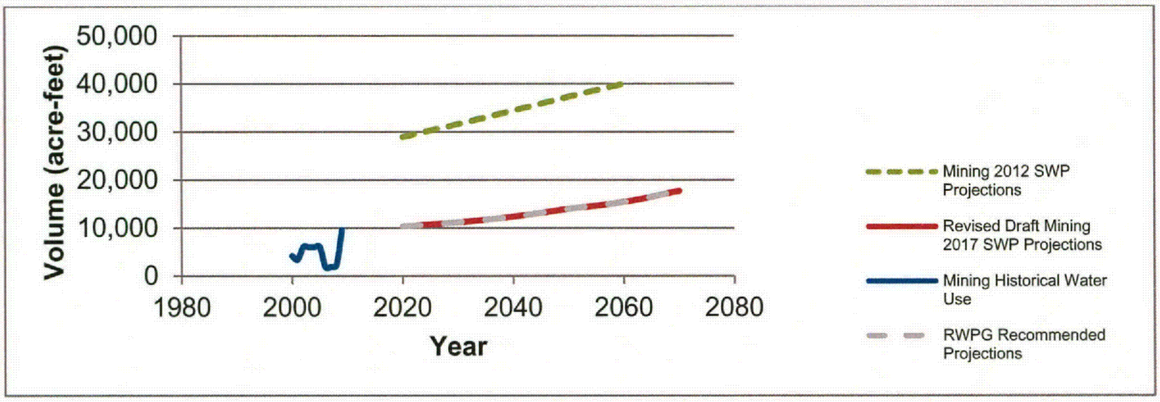


Figure 16. Wise County Mining Comparison



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TECHNICAL MEMORANDUM

Region C Water Planning Group
2016 Regional Water Planning Cycle
Non-Municipal Demand Projections, Steam Electric Power

Project No.: 0312-046-01

Date: May 8, 2012

Prepared For: Tom Gooch, Freese and Nichols, Inc.
Amy Kaarlela, Freese and Nichols, Inc.
Rachel Ickert, Freese and Nichols, Inc.

Prepared By: Preston Dillard, Alan Plummer Associates, Inc.
Lauren Plunk, Alan Plummer Associates, Inc.

The *2016 Region C Water Plan* (hereafter referred to as the 2016 Plan) will incorporate projections for municipal demands, as well as non-municipal demands for irrigation, livestock, manufacturing, mining, and steam-electric power (SEP). The Texas Water Development Board (TWDB) provided the planning groups with draft non-municipal demand projections. The draft non-municipal demand projections will be reviewed by the individual planning groups, and recommendations will be provided to the TWDB. The TWDB will consider the recommended changes from the planning groups, and the final projections will ultimately be adopted by the planning groups and the TWDB and incorporated into the 2017 State Water Plan. The purpose of this technical memorandum is to document information related to historical SEP usage and provide information supporting recommended modifications to the draft SEP demands.

BACKGROUND

SEP water use is defined by the TWDB as water used in the production process of SEP, including water used by employees for drinking and sanitation purposes. In 2008, the TWDB, in conjunction with the Bureau of Economic Geology, developed "Water Demand Projections for Power Generation in Texas" (hereafter referred to as the BEG Report). The BEG Report states that future water demand in Texas for the electric generation sector depends on: the rate of economic growth and resultant future demand for electric power; the future types of generation capacity (natural gas combined cycle, pulverized coal, advanced coal, nuclear etc.); whether or not a price is put on carbon dioxide emissions (for mitigation of global warming) such that some power plants have incentive to employ carbon capture and storage technologies; and the extent and success of future efficiency programs.

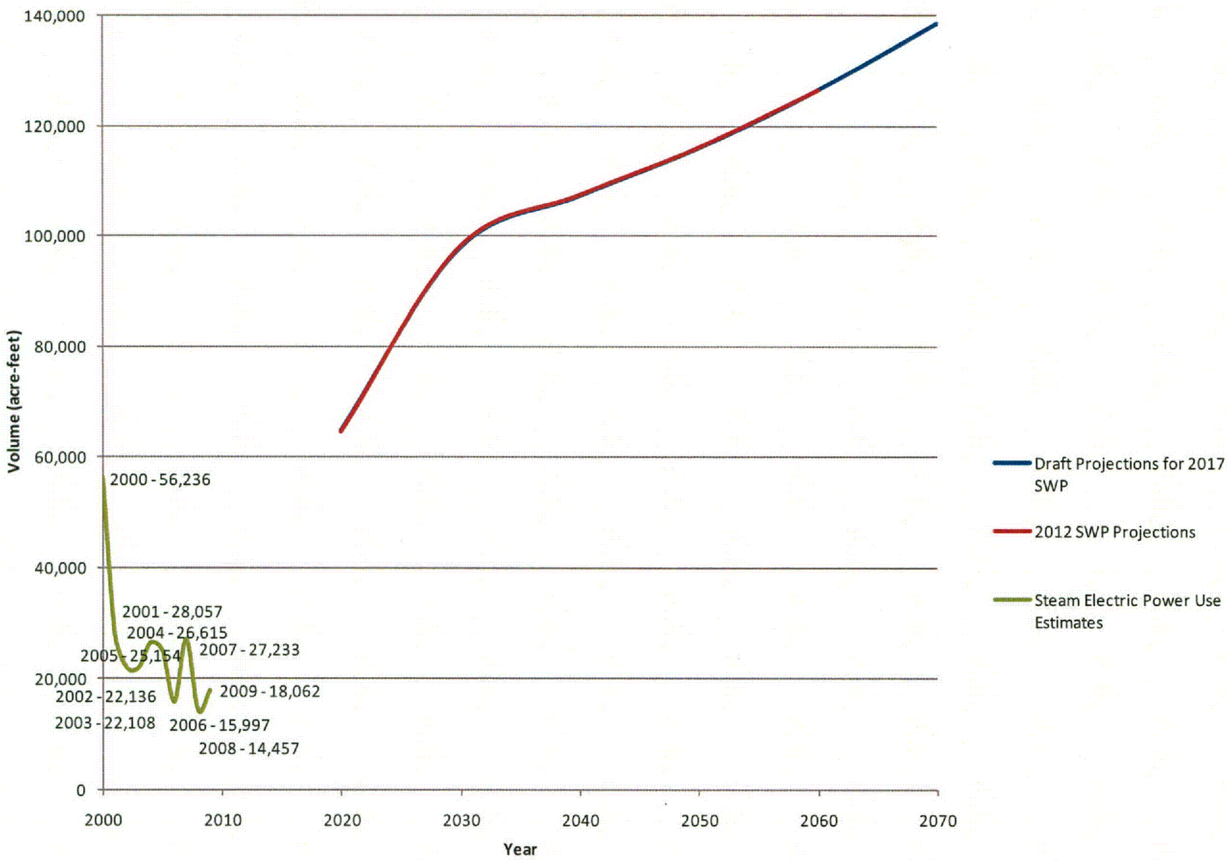
The TWDB solicited an opinion from each planning group regarding SEP projections for the 2007-2012 planning cycle. The TWDB requested that the Region C Water Planning Group (RCWPG) determine whether to adopt the 2006 Plan projections or the projections provided as part of the BEG Report for the 2011 Plan's SEP projections. In response to the request from the TWDB memorandum, an analysis of available projections and data was initiated by the RCWPG. After reviewing the background usage data in RCWPG from previous TWDB reports and the BEG Report, data from the TCEQ, TWDB, and several direct reuse providers was requested. Using this information, the RCWPG determined which projection best matched both the near term demands (through 2020) and long term demands (through 2060) for each county. A decision was made to proceed with one of the following methodologies:

- Preferred option: If the near term and long term projections for either the BEG or the 2006 Plan are consistent with regional estimates, choose the most appropriate projection for a county through the duration of the planning period (2010-2060).
- Hybrid option: If the near term projection for either the BEG Report or 2006 Plan is reasonable, but the long term projection is not, choose the 2010 projection that is most reasonable and modify the most appropriate projection pattern by adding or subtracting the difference from the regional estimates for each decade.

A complete copy of the 2009 RCWPG memo documenting the SEP projections is included in Attachment A. The projections recommended in the 2009 memo were ultimately adopted in the 2012 State Water Plan. Accordingly, the methodology described above is the basis for modifications to the projections recommended in this memorandum.

The TWDB also publishes historical SEP water use estimates. Since the year 2000, the region-wide SEP water use estimates have ranged from 14,457 to 56,236 acre-feet (see Figure 1 for usage information by year). At the time this memo was written, historical data estimates are available through the year 2009. It should be noted that the TWDB historical SEP water use estimates shown in Figure 1 do not appear to include water provided by reuse programs. In the RCWPG, there are at least three facilities that have received reuse water – the Spencer Facility in Denton County, the Florida Power & Light Energy Company Facility in Kaufman County, and the Tractebel Facility in Ellis County. Additionally, there are some differences in usage values between the TCEQ historical consumption data and the TWDB estimates. These discrepancies are addressed in the 2012 State Water Plan (SWP) projections and are documented in Attachment A.

Figure 1. Region C SEP – Comparison of Water Use Estimates and Projections



Source: Texas Water Development Board

One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the SEP water use projections:

- A SEP facility which has recently located in a county and may not have been included in the Board's database. Documentation and analysis must be provided that justify that the new SEP facility will increase the future SEP water use for the county above the SEP water use projections.
- A SEP facility has recently closed its operation in a county.
- Plans for the construction of a SEP facility in a county at some future date.

The Planning Group must provide the Executive Administrator the following data associated with the identified criteria for justifying any adjustments to the SEP water demand projections:

- The quantity of water used on an annual basis by a SEP facility that has recently located in a county and was not included in the Board's database.
- The North American Industrial Classification (NAIC) of the SEP facility that has recently located in a county. The NAIC is the numerical code for identifying the classification of establishments by type of activity in which they are engaged as defined by the U.S. Office of Management and Budget and is a successor of the Standard Industrial Classification (SIC).
- Documentation of plans for a SEP facility to locate in a county at some future date will include the following data:
    - Confirmation of land purchased for the facility or lease arrangements for the facility.
    - The quantity of water required by the planned facility on an annual basis.
    - The proposed construction schedule for the facility including the date the facility will become operational.
    - The NAIC for the planned facility.

PROPOSED SEP WATER USE

A comparison of the draft projections for the 2017 SWP (provided by TWDB), the final 2012 SWP projections, and the proposed RCWPG revisions to the 2017 SWP projections is presented in Table 1 and Figure 2. The majority of the proposed RCWPG county-level projections are identical to the projections from the 2012 SWP. Deviations from the 2012 SWP are explained below:

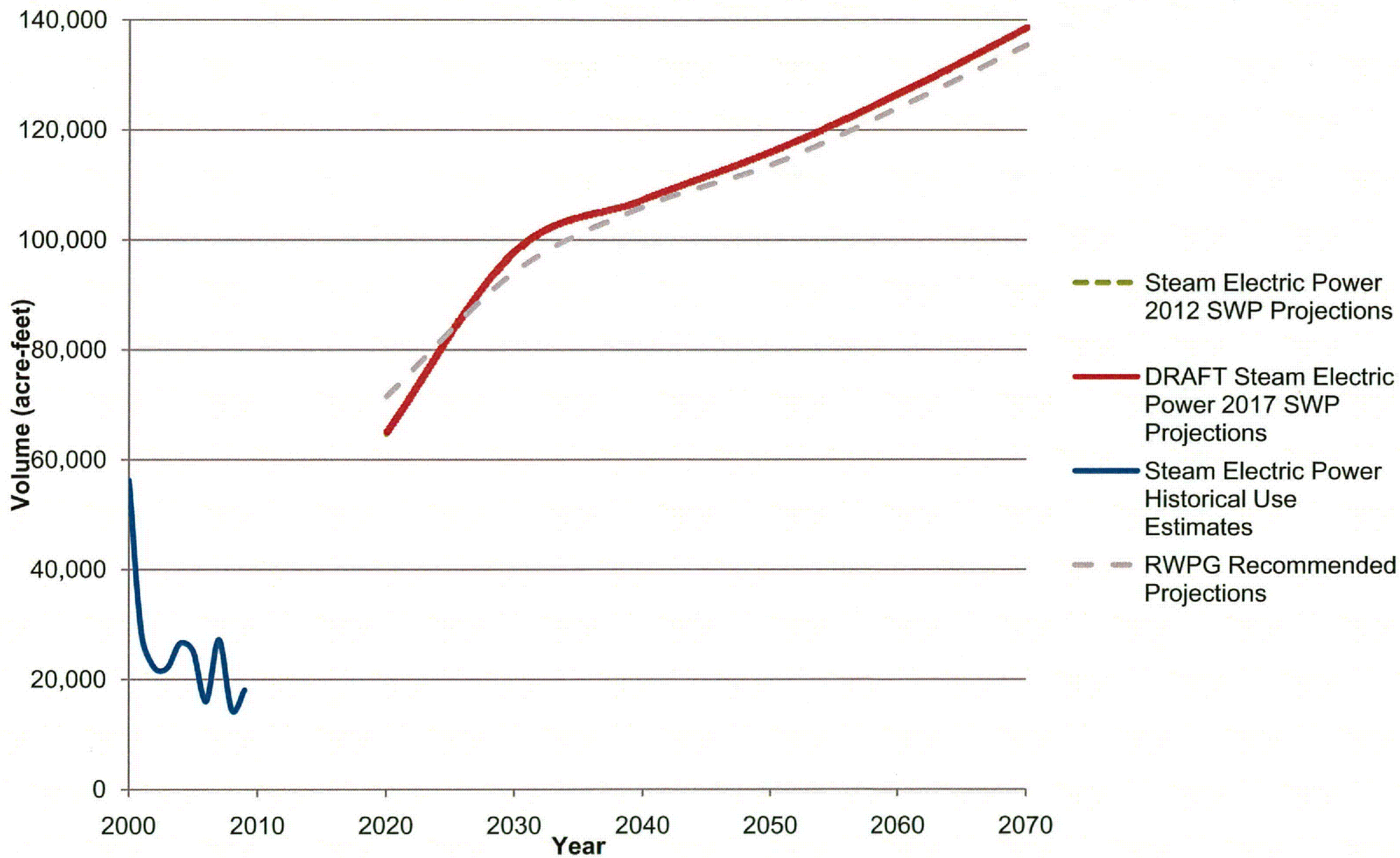
- Collin County – Since the 2011 planning cycle, the Collin Plant has been demolished. Additionally, Collin County is in a non-attainment county so future growth is unlikely. Therefore, the 2008 BEG Report projections now more accurately reflect the conditions in Collin County and are recommended as a proposed revision to the 2017 SWP draft projections, beyond the year 2020.
- Dallas County – Since the 2011 planning cycle, the Parkdale Plant has been demolished (this plant was previously mothballed and not included in near term projections). Additionally, recent usage data from the TWDB indicates consumption in 2007 was approximately 5,000 acre-feet/year. Therefore, it is recommended that the projections from the 2012 SWP be adopted, with the exception of the years 2020 and 2030. In these years, the projections should be adjusted to 5,000 acre-feet/year to more accurately reflect existing conditions (projections will be slightly raised in 2020 and lowered in 2030).
- Freestone County - Recent usage data from the TCEQ water rights database indicates that consumption in 2006 was approximately 25,000 acre-feet/year. Therefore, it is recommended that the draft 2017 SWP projections be adopted, with the exception of the years 2020 - 2040. In these

Table 1. Comparison of SEP Demand Projections

County Name	Draft Projections for 2017 SWP						2012 SWP Projections					RWPG Revisions					
	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2020	2030	2040	2050	2060	2070
Collin	715	1,000	1,200	1,600	2,000	2,638	715	1,000	1,200	1,600	2,000	715	602	740	594	782	724
Cooke	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dallas	3,956	10,991	11,066	11,066	11,066	11,066	4,290	11,918	12,000	12,000	12,000	5,000	5,000	11,066	11,066	11,066	11,066
Denton	646	733	819	906	993	1,088	744	844	944	1,044	1,144	646	733	819	906	993	1,088
Ellis	698	1,450	3,741	5,754	7,878	10,786	698	1,450	3,741	5,754	7,878	698	1,450	3,741	5,754	7,878	10,786
Fannin	6,363	11,474	11,910	12,443	13,092	13,775	6,363	11,474	11,910	12,443	13,092	6,363	11,474	11,910	12,443	13,092	13,775
Freestone	18,518	20,871	24,405	28,712	33,963	40,175	18,210	20,524	23,999	28,234	33,398	25,000	25,000	25,000	28,712	33,963	40,175
Grayson	9,243	12,711	12,711	12,711	12,711	12,711	8,963	12,326	12,326	12,326	12,326	6,163	12,711	12,711	12,711	12,711	12,711
Henderson	427	7,000	8,000	9,000	10,000	11,000	427	7,000	8,000	9,000	10,000	4,000	7,000	8,000	9,000	10,000	11,000
Jack	2,665	2,879	3,092	3,305	3,518	3,745	2,500	2,700	2,900	3,100	3,300	2,665	2,879	3,092	3,305	3,518	3,745
Kaufman	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	8,000	8,000	8,000	8,000	8,000	8,000
Navarro	8,000	13,440	13,440	13,440	13,440	13,440	8,000	13,440	13,440	13,440	13,440	8,000	13,440	13,440	13,440	13,440	13,440
Parker	22	28	56	75	102	139	22	28	56	75	102	260	260	260	260	260	260
Rockwall	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tarrant	2,448	4,168	5,000	5,000	5,000	5,000	2,448	4,168	5,000	5,000	5,000	2,448	4,168	5,000	5,000	5,000	5,000
Wise	1,245	1,216	1,878	2,042	2,748	3,061	1,245	1,216	1,878	2,042	2,748	1,494	1,459	2,254	2,450	3,298	3,673
Total	**64,946**	**97,961**	**107,318**	**116,054**	**126,511**	**138,624**	**64,625**	**98,088**	**107,394**	**116,058**	**126,428**	**71,452**	**94,176**	**106,032**	**113,641**	**124,000**	**135,443**

Indicates no changes are proposed from the draft projections for the 2017 SWP.

Figure 2. Region C Steam Electric Power – Comparison of Water Use Estimates, 2012 State Water Plan Projection, Proposed Projections, and Revised Projections



years, the projections should be raised to 25,000 acre-feet/year to more accurately reflect existing conditions.

- Grayson County – the 2012 SWP projections included the construction of a new Panda Energy Plant. The construction of this plant has since been delayed. Therefore, it is recommended that the projections from the 2012 SWP be adopted, with the exception of the year 2020. In the year 2020, it is recommended that the demand from the proposed Panda Energy Plant be reduced by 50%.
- Henderson County - Recent usage data from the TCEQ water rights database indicates that consumption in 2006 was approximately 4,000 acre-feet/year. Therefore, it is recommended that the draft 2017 SWP projections be adopted, with the exception of the year 2020. In 2020, the projections should be raised to 4,000 acre-feet/year to more accurately reflect existing conditions.
- Kaufman County – Recent usage data from the reuse provider for the SEP plant in this county indicates that consumption in 2006 was approximately 8,000 acre-feet/year. Therefore, it is recommended that the projections should be lowered to 8,000 acre-feet/year to more accurately reflect existing conditions. Since Kaufman County is designated as a non-attainment county, it is unlikely that new plants will be constructed.
- Parker County - Recent usage data from the TWDB indicates that consumption in 2009 was approximately 260 acre-feet/year. Therefore, it is recommended that the projections should be raised to 260 acre-feet/year throughout the planning period to more accurately reflect existing conditions.
- Wise County – The Bridgeport Gas Processing Plant is planning a 20% expansion of the facility. Therefore, it is recommended that the 2012 SWP projections be increased by 20% to reflect the proposed facility expansion.

Attachment A
Region C Water Planning Group
2009 Steam Electric Power Demand Projections Memo

Region C Water Planning Group
Steam Electric Power Demand Projections

PROJECT: 0312-041-01

DATE: August 31, 2009

PREPARED FOR: Region C Water Planning Group

PREPARED BY: Alan Plummer Associates, Inc.

Background

The *2006 Region C Plan* (hereafter referred to as the 2006 Plan) included projections for municipal demands, as well as non-municipal demands such as irrigation, livestock, manufacturing, mining, and steam-electric power. As part of the 2011 update to the Region C Water Plan, steam electric power demands were reviewed to determine if changes should be made to the future projections. In the 2006 Plan, projections of the steam electric power demand were based on the analysis of historical trends and Texas Water Development Board (TWDB) draft projections. The power industry reports annual water consumption associated with steam electric power as part of the Texas Water Development Board's Survey of Ground and Surface Water Use.

In 2003, the TWDB in conjunction with a research project team consisting of industry representatives developed "Power Generation Water Use in Texas for the Years 2000 Through 2060" (hereafter referred to as the 2003 Report). The objective and purpose of this research project was to develop improved methodologies for projecting water demands by the steam electric generation water use sector for a 50 year planning horizon, as well as develop actual projections for this sector on a regional and county specific basis throughout the state of Texas. A summary of the methodology utilized in this project is included below. A more detailed outline of the methodology used in the 2003 Report is included in Attachment A.

- An electric demand growth factor was determined from the projections of the Public Utility Commission of Texas. This factor was extrapolated over a 50-year planning period and resulted in a 2% statewide annual electric demand growth rate.

- Consumptive water use for various generating and cooling technologies was determined and applied to 214 generating plants in Texas.

- The base year (2000) water demand for each plant was calculated by taking actual generation by fuel type and applying water use factors. Projections for 2010-2060 were calculated on unit by unit basis.

- The 2010 and 2020 water demand for coal fired, nuclear, and conventional gas was based on 2000 demand adjusted by a correction factor for linear trending. The 2030 – 2060 factors were increased at the same rate despite fuel/generation types.

The projections and methodology of the 2003 Report were utilized during the development of the steam electric power consumption projections included in the 2006 Plan. In cases where historical data appeared to be questionable, basic data was sought to confirm or correct information. A summary of the stream electric power consumption projections from the 2006 Plan is included in Table 1.

Table 1. 2006 Region C Steam Electric Power Water Consumption Projections

	Year						
County	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Collin County	1,901	1,581	1,260	1,473	1,733	2,050	2,436
Cooke County	0	0	0	0	0	0	0
Dallas County	13,749	12,264	10,842	11,918	13,230	14,829	16,778
Denton County	631	524	418	489	575	680	808
Ellis County	744	14,237	20,379	23,825	28,027	33,148	39,391
Fannin County	5,638	5,152	4,748	5,184	5,717	6,366	7,157
Freestone County	13,004	18,210	20,524	23,999	28,234	33,398	39,692
Grayson County	0	0	0	0	0	0	0
Henderson County	2,465	2,387	2,308	2,376	2,458	2,559	2,681
Jack County	0	0	3,674	4,296	5,053	5,977	7,102
Kaufman County	0	8,979	17,798	20,808	24,478	28,950	34,403
Navarro County	0	0	0	0	0	0	0
Parker County	36	30	4,617	5,397	6,349	7,509	8,923
Rockwall County	0	0	0	0	0	0	0
Tarrant County	4,903	4,158	3,419	4,168	5,081	6,194	7,550
Wise County	0	3,949	5,653	6,609	7,774	9,195	10,927
Region C Total	**43,071**	**71,471**	**95,640**	**110,542**	**128,709**	**150,855**	**177,848**

Recent Studies

In 2008, the TWDB in conjunction with the Bureau of Economic Geology (BEG) developed "Water Demand Projections for Power Generation in Texas" (hereafter referred to as the BEG Report). The BEG Report stated that future water demand in Texas for the electric generation sector depends on: the rate of economic growth and resultant future demand for electric power; the future mix of generation capacity (natural gas combined cycle, pulverized coal, advanced coal, nuclear etc.); whether or not a price is put on carbon dioxide emissions (for mitigation of global warming) such that some power plants have incentive to employ carbon capture and storage technologies; and the extent and success of future efficiency programs.

Considering the difficulties associated with projecting future water demand in the steam electric power industry, the BEG Report attempted to project electric power demand and associated water needs in Texas over the next fifty years using the scenarios described in Table 2. As noted in Figure 1, the base year in the BEG Report is assumed to be the year 2006. The BEG Report compiled water consumption data from the TCEQ for 2006 and the TWDB for 2001-2005 (2006 was not available at the publish date of the BEG Report). A summary of the methodology developed in the BEG Report is included in Figure 1. A more detailed outline of the methodology used in the BEG Report is included in Attachment A.

Table 2. Scenarios for Electricity Generation in Texas

Scenario	Annual Electric Sales Growth*	Natural Gas Prices	Carbon Price causes Carbon Capture to be implemented
1L	Low	High	No
1BAU	BAU	High	No
2L	Low	High	Yes
2BAU	BAU	High	Yes
3L	Low	Low	No
3BAU	BAU	Low	No
4L	Low	Low	Yes
4BAU	BAU	Low	Yes

* L = Low Usage Scenario, BAU = "Business as Usual" Usage Scenario

Figure 1. Water Consumption for Steam-Electric: Projection Methodology from BEG Report

Calculate "Today's" Water (2006)

Given:

- TCEQ data for surface water consumption
  - 2001 – 2006 data (use 2006 values if possible)
- TWDB data for groundwater consumption
  - 2001 – 2005 data
- EIA data for net electricity generation (EIA-920/906)
  - 2001 – 2006 Data (use values to match water data)

Calculate:

- "gal/kWh" for power plant facilities
  - Use greater of 2006 value or average over 2001-2006 time span
  - Estimate for facilities with insufficient data
- Ac-ft/yr for each
  - County
  - RWPA
  - Fuel, generator, cooling combination
- Electricity generated in each county per
  - Fuel type

Near Term Projection (2007-2015)

Given:

- 2006 Results
- Near term plant additions
- PUCT data
- ERCOT data
- TCEQ data

Estimate:

- Capacity factor by power plant (generation unit) type
- Typical values for "gal/kWh" for new plants

Calculate:

- Ac-ft/yr for each
  - County
  - RWPA
  - Fuel, generator, cooling combination
- Electricity generated in each county per
  - Fuel type
- "gal/kWh" per county per fuel type
  - Use of Matlab computer code to take Excel input and then output to Excel

Long Term Projection (2020-2060)

Given:

- Projection for annual electricity generation, per fuel and generation type, for Texas overall

Assume:

- County specific information (from Scenario 2015 1BAU) remains constant
- % of fuel type
- "gal/kWh" per fuel type

Calculate:

- Ac-ft/yr for each
  - County
  - RWPA
  - Fuel, generator, cooling combination

* The method for projecting future water demand for electricity generation starts with 2006 calculations ("today"), moves to a near term projection (through 2015), and then uses the distribution of water demand from 2015 to project into the long term future through 2060.

Projection Discrepancies

A February 2009 memorandum from the TWDB to Jim Parks, Region C Water Planning Group Chair, entitled "Steam-Electric Water Demand Projections For The 2007-2012 Planning Cycle" provides the following analysis of the BEG Report:

> *"At the state level, BEG projections are based on a sound methodology; and although lower in the near-term, they do not differ substantially from projections used in the 2007 State Water Plan over the planning horizon. However, when allocating projected energy generation at the local and regional level, the BEG used assumptions that differ from previous TWDB studies resulting in large deviations from the 2007 State Water Plan. Some of these deviations appear valid; however, some are based on assumptions that do not appear realistic. "*

Accordingly, the memorandum solicits an opinion from each planning group regarding steam electric projections for the 2007-2012 planning cycle. The memorandum requests that Region C determine whether they wish to plan for steam electric demands based on the 2006 Plan projections or the projections provided as Scenario 2L of the BEG Report. Attachment C provides a graphical representation of the discrepancies between the 2006 Plan and the BEG Report.

Region C Methodology

In response to the request from the TWDB memorandum, an analysis of available projections and data was initiated by the Region C Planning Group. After reviewing the background usage data in Region C from the 2003 Report and the BEG Report, data from the TCEQ, TWDB, and several direct reuse providers was requested. In order to gain an accurate comparison of historical consumption between all data sources, the year 2006 was chosen for comparison. 2006 was the only year in which historical usage was available for all data sources.

As noted in Table 3, the historical usage data from all sources is significantly less than the 2006 Plan projections for the year 2006. No one source appears to fully account for all steam electric power plants in Region C. The TCEQ historical data accounts for steam electric power water consumption from steam electric power plants with water rights. The TWDB historical data provides usage on a county wide level, making it difficult to interpret individual plant contributions. The BEG historical data for 2006 attempted to reconcile the TWDB and TCEQ data, but used estimates for plants not accounted for in either data set. For this reason, an attempt was made in this study to collect data on an individual plant basis for the Year 2006 (see "Best Available Data for 2006" column). The "Best Available Data for 2006" column in Table 3 represents the data received from the TCEQ with several exceptions:

- Usage numbers for Spencer (Denton County), FPLE (Kaufman County), and Tractebel (Ellis County) were collected from the reuse provider. The TWDB data does also not appear to account for steam electric power consumption that is satisfied by reuse.
- Usage numbers for Newman, Olinger, Jack, and Freestone were taken from the BEG estimates (no TCEQ data was available).

Table 3. Base Year Comparisons

County	Best Available Data for 2006 (acre-feet/year)*	2006 BEG (acre-feet/year)	2006 TWDB (acre-feet/year)	2006 Plan Projections (acre-feet/year)
Collin	531	531	525	1,709
Cooke	0	0	0	0
Dallas	1,675	1,598	1,443	12,858
Denton	644	395	639	567
Ellis	706	975	0	8,840
Fannin	281	325	361	5,346
Freestone	12,173	10,168	9,936	16,128
Grayson	0	0	0	0
Henderson	57	117	25	2,418
Jack	2,162	2,162	0	0
Kaufman	8,018	5,814	0	5,387
Navarro	0	0	0	0
Parker	0	3	9	32
Rockwall	0	0	0	0
Tarrant	1,300	1,053	3,054	4,456
Wise	2,100	2,205	0	2,369
TOTAL	**29,646**	**25,346**	**15,992**	**60,111**

*Newman (Dallas County), Olinger (Collin County), Jack, and Freestone taken from BEG report - no TCEQ data. Spencer (Denton County), FPLE (Kaufman County), and Tractebel (Ellis County) were collected from the reuse provider.

Senate Bill 1 requires planning efforts to account for the "drought of record" conditions, which typically correspond to below normal rainfall conditions. In some cases this may correspond to a year of high electric consumption. However, as alluded to in the BEG report, many factors, including natural gas prices may affect steam electric power water consumption. The year 2000, which was the base year in the 2003 Report, was representative of a "worst case scenario" year. The year 2000 was both the driest year for the majority of the regions in the state and a year with low natural gas prices. The BEG Report's goal was to use only 2006 TCEQ data because they are the latest available, and 2006 was considered a dry year and thus a good baseline or "worse case scenario" for estimating water diversions for power plants. The BEG Report considered natural gas prices in its scenarios, but not when selecting a base year.

The closing and mothballing of existing plants, the emergence of increased air quality regulations in the early 2000s, and rising natural gas prices likely decreased stream electric power water consumption in Region C from 2000-2006. For the 2011 Planning Cycle, the use of the Year 2000 for a base year is not appropriate for these reasons. The use of the Year 2006 is also not entirely appropriate based on the high natural gas prices. The "Best Available Data for 2006" accounts for more consumption than both the BEG and TWDB collected data for 2006, but is still over 30,000 acre-feet/year less than the 2006 Plan projections. Considering the climatic similarities between the Years 2000 and 2006, it is unlikely that a decrease in natural gas prices would have doubled the stream electric water consumption in 2006. With this information in mind, this study does not attempt to develop projections from a base year, but to modify existing projections to account for the observed 2006 data being roughly half of what was originally projected in the 2006 Plan.

An outline of the data collection procedure and methodology for the 2011 Region C Plan is included in Attachment B. The 2011 Region C Plan methodology for steam electric power demands includes the comparison of the 2006 Plan and BEG Report projections with consideration to both near term and long term demands. In addition to modifying the existing projections to reflect less usage than anticipated in 2006, this study also considers the construction of new plants and the mothballing of existing plants. In the near term the "moth-balling" of the Luminant Northlake plant was considered in the 2010 projections for Dallas County. In addition, the construction of Waxahachie LS Power (Fannin County), Ellis Power (Navarro County), Babcock and Brown (Navarro County), and Corsicana (intake and plant located in Freestone County) Plants were considered in the 2020 projections. Construction of the Panda Plant (Grayson County) was considered in the 2010 projections. The estimated water consumption for these plants and the BEG and 2006 Plan projections by county are included in Table 4. As noted in this table, demand projections for new plants in Grayson and Navarro counties are not included in either the 2006 Plan or the BEG projections.

Table 4. Comparison of Near Term Consumptions Changes and Projections

County	Estimated Near Term Water Consumption Changes* in Region C		2010 Projections (acre-feet/year)		2020 Projections (acre-feet/year)	
	2010 Demand (acre-feet/year)	2020 Demand (acre-feet/year)	BEG	2006 Plan	BEG	2006 Plan
Dallas	-80		3,367	12,264	4,290	10,842
Fannin		+4,480	1,261	5,152	1,169	4,748
Fannin/Grayson**		+6,726	0	0	0	0
Freestone		+4,480	9,323	18,210	7,636	20,524
Grayson	+5,600		0	0	0	0
Navarro		+13,440	0	0	0	0
OVERALL REGION C	**+5,520**	**+29,086**				

* Due to the construction of new plants and the mothballing of existing plants.

**The construction of a new plant in this area would require supply from both counties.

Proposed Projections

After considering which projection best matched both the near term (through 2020) and long term demands (through 2060) for each county, a decision was made to select one of the following:

- Preferred option: If the near term <u>and</u> long term projections for either the BEG or 2006 Plan are reasonable, choose either projection for a county through the duration of the projections (2010-2060).
- Hybrid option: If the near term projection for either the BEG Report or 2006 Plan is reasonable, but the long term projection is not, choose the 2010 projection that is most reasonable and modify the most appropriate projection pattern by adding or deducting the difference from each decade.

The 2006 Plan projections were chosen in the case of Kaufman County in the near term. The BEG Report projections were in chosen in the case of Collin, Dallas, Ellis, Henderson, Parker, Tarrant, and Wise counties in the near term. A hybrid projection was developed for all other counties throughout the planning period in the near term. The BEG Report projections were in chosen in the case of Ellis, Parker, and Wise counties in the long term. A hybrid projection was developed for all other counties throughout the planning period in the long term. This information is displayed graphically in Tables 5 and 6. The proposed 2011 Region C Proposed

Projections are included in the Table 7 with changes shown in red. Figure 2 compares the various projections through 2060. Attachment C includes a county-by-county comparison.

Table 5. Near Term Decision

County	BEG Report	2006 Plan	Hybrid	No Demand
Collin*	X			
Cooke				X
Dallas*	X			
Denton*			X	
Ellis*	X			
Fannin			X	
Freestone			X	
Grayson			X	
Henderson	X			
Jack			X	
Kaufman*		X		
Navarro			X	
Parker*	X			
Rockwall*				X
Tarrant*	X			
Wise	X			

* Denotes a non-attainment county.

Table 6. Long Term Decision

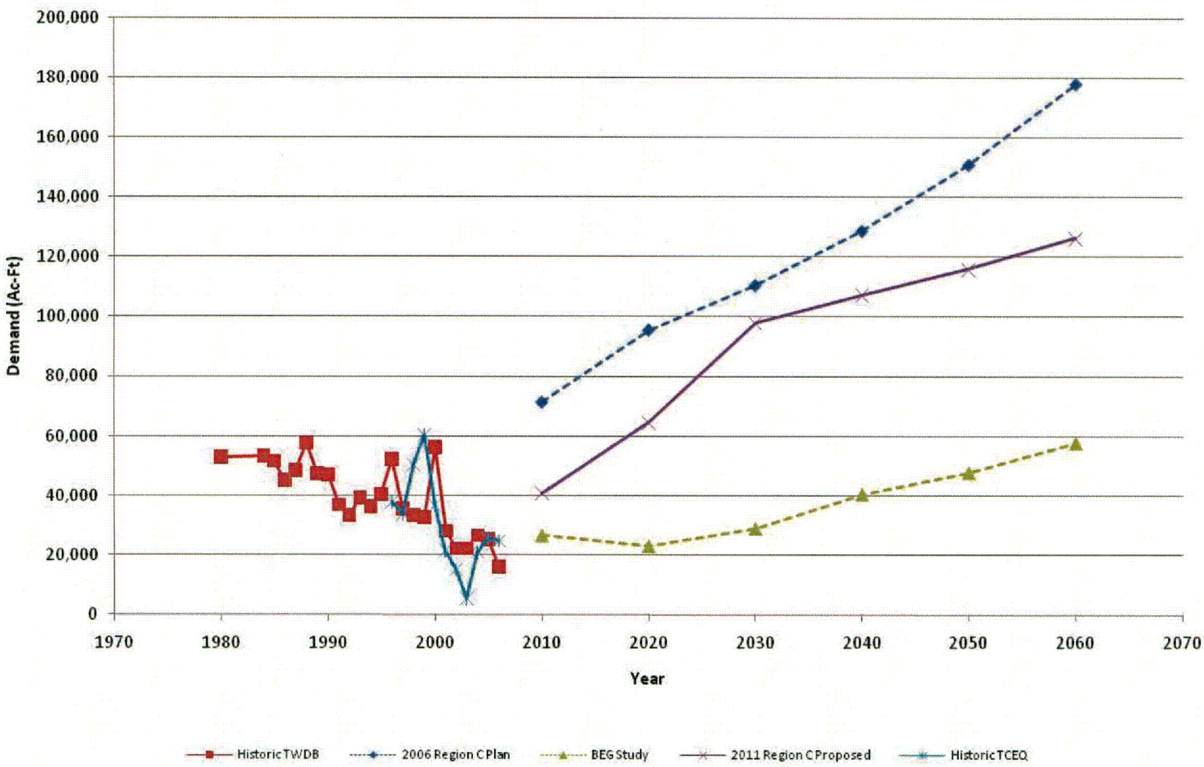
County	BEG Report	2006 Plan	Hybrid	No Demand
Collin*			X	
Cooke				X
Dallas*			X	
Denton*			X	
Ellis*	X			
Fannin			X	
Freestone			X	
Grayson			X	
Henderson			X	
Jack			X	
Kaufman*			X	
Navarro			X	
Parker*	X			
Rockwall*				X
Tarrant*			X	
Wise	X			

* Denotes a non-attainment county.

Table 7. Proposed 2011 Region C Projections

	2011 Region C Proposed					
County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Collin	771	715	1,000	1,200	1,600	2,000
Cooke	0	0	0	0	0	0
Dallas	3,367	4,290	11,918	12,000	12,000	12,000
Denton	644	744	844	944	1,044	1,144
Ellis	981	698	1,450	3,741	5,754	7,878
Fannin	1,261	6,363	11,474	11,910	12,443	13,092
Freestone	12,173	18,210	20,524	23,999	28,234	33,398
Grayson	5,600	8,963	12,326	12,326	12,326	12,326
Henderson	460	427	7,000	8,000	9,000	10,000
Jack	2,162	2,500	2,700	2,900	3,100	3,300
Kaufman	8,979	10,000	10,000	10,000	10,000	10,000
Navarro	0	8,000	13,440	13,440	13,440	13,440
Parker	24	22	28	56	75	102
Rockwall	0	0	0	0	0	0
Tarrant	2,640	2,448	4,168	5,000	5,000	5,000
Wise	1,751	1,245	1,216	1,878	2,042	2,748
Region C Total	40,813	64,625	98,088	107,394	116,058	126,428

Figure 2. Comparison of Region C Steam Electric Water Use Projections



Attachment A

Projection Methodologies

Water Use Projection Methodology
Power Generation Water Use in Texas – 2000-2060
2003 Report

1. Projected electric demands statewide (assume all generation occurs in Texas)
    a. Determined electric demand growth factor from projections of Public Utility Commission of Texas. Extrapolated over 50-year planning period.

    b. Determined per capita electric use factor from existing data (population and total electric use) for last two decades. Used that factor with TWDB population projections to get total electric use through 2060.

    c. Two methods yielded similar results. Used 1.a. Believed most reliable. Resulted in 2% statewide annual electric demand growth rate.

2. Determined statewide water requirements.
    a. Determined consumptive water use for various generating and cooling technologies. Applied to 214 generating plants in Texas. Gave water demand projections (low, medium, and high) through 2060. Selected medium scenario.

3. Water demand for each generating plant in Texas estimated as a percentage of statewide demand.

    a. For base year (2000) water demand for each plant was calculated by taking actual generation by fuel type and applying water use factors. Projections for 2010-2060 calculated on unit by unit basis.

    b. 2010 and 2020 water demand for coal fired, nuclear, and conventional gas based on 2000 demand adjusted by a correction factor for linear trending.

    c. For 2030 – 2060 factors were increased at the same rate despite fuel/generation types.

4. Individual plant projections were summed by county/region.

Water Use Projection Methodology
Power Generation Water Use in Texas
2010-2060
BEG Report

1) **Current Consumption:** Consumption data was obtained from TCEQ and TWDB concerning water intake, diversion, and return of surface and groundwater.
    a. The TCEQ data was given preference due to the year 2006 being available for analysis. However, the TCEQ data only accounted for about half of the electricity produced in Texas. Water consumption and electrical generation was calculated for the single year of 2006 as a "worst case scenario."

    b. In addition to the TCEQ 2006 data, average water consumption values from 2001-2006 were calculated from the TCEQ data and average values from 2001-2005 were calculated from the TWDB data. Both averages were divided by the electricity generated at a facility within the years of interest. This step provided more data, but some plants were still left with no information.

    c. For power plants with no TCEQ/TWDB data, gal/kWh factors were assigned depending on the type of plant.

Fuel	Prime Mover	Once-through or Cooling Tower?	Water consumption rate (gal/kWh)
NG	CC	cooling tower	0.23
NG	GT	cooling tower	0.05
NG	ST	cooling tower	0.70
NG	CC	Once-through or recirculating	0.23
NG	GT	Once-through or recirculating	0.05
NG	ST	Once-through or recirculating	0.35
Coal (any)	ST	cooling tower	0.60
Coal (any)	ST	Once-through or recirculating	0.35
Nuclear	ST	Any	0.60

* NG = Natural Gas, CC = Combined Cycle, GT = Gas Turbine, ST = Steam Turbine

2) Near-Term/Long Term Methodology (see figure below):

Calculate "Today's" Water (2006)

Given:

- TCEQ data for surface water consumption
  - 2001 – 2006 data (use 2006 values if possible)
- TWDB data for groundwater consumption
  - 2001 – 2005 data
- EIA data for net electricity generation (EIA-920/906)
  - 2001 – 2006 Data (use values to match water data)

Calculate:

- "gal/kWh" for power plant facilities
  - Use greater of 2006 value or average over 2001-2006 time span
  - Estimate for facilities with insufficient data
- Ac-ft/yr for each
  - County
  - RWPA
  - Fuel, generator, cooling combination
- Electricity generated in each county per
  - Fuel type

Near Term Projection (2007-2015)

Given:

- 2006 Results
- Near term plant additions
- PUCT data
- ERCOT data
- TCEQ data

Estimate:

- Capacity factor by power plant (generation unit) type
- Typical values for "gal/kWh" for new plants

Calculate:

- Ac-ft/yr for each
  - County
  - RWPA
  - Fuel, generator, cooling combination
- Electricity generated in each county per
  - Fuel type
- "gal/kWh" per county per fuel type
  - Use of Matlab computer code to take Excel input and then output to Excel

Long Term Projection (2020-2060)

Given:

- Projection for annual electricity generation, per fuel and generation type, for Texas overall

Assume:

- County specific information (from Scenario 2015 1BAU) remains constant
- % of fuel type
- "gal/kWh" per fuel type

Calculate:

- Ac-ft/yr for each
  - County
  - RWPA
  - Fuel, generator, cooling combination

* The method for projecting future water demand for electricity generation starts with 2006 calculations ("today"), moves to a near term projection (through 2015), and then uses the distribution of water demand from 2015 to project into the long term future through 2060.

Attachment B
2011 Region C Methodology

I. **Data Collection – (Annual water or power consumption, type of plant, status to include in a spreadsheet deliverable)**

a. Historical
   i. Industry
      1. Major Sources (will cover 85% of 2006 demand in BEG Report)
         a. Luminant – Collin, Lake Ray Hubbard, Northlake, Valley, Big Brown, Trinidad, Eagle Mountain
         b. City of Garland – Olinger, Newman, Lewisville, Spencer
         c. Exelon – Mountain Creek, Handley
         d. FPLE – Janet Sims can request from City of Garland (reuse water from Duck Creek) (APAI has data for all but 2008).
         e. Brazos Electric Power Coop – North Texas, Jack
         f. Wise County Power

      2. Minor Sources (remaining 15% of 2006 demand in BEG Report)
         a. Devon Gas Service, Weatherford Municipal Utility System, City of Fort Worth, City of Whitesboro, Freestone Power Generation – Calpine, USACE – Denison, WM Renewable Energy, ANP Operations, Ennis Tractebel, Rock-Tenn, State Farm Mutual, UTD, City of Denton
   ii. TWDB
      1. Historical data available through 2006.
   iii. TCEQ
      1. Collects historical data on a yearly basis.

b. Historical Estimates (when historical data is not available)
   i. Industry guidance on gal/kwh (modify table from BEG report).

c. Projected Use
   i. 2003 TWDB Report
   ii. BEG Report

II. Decision Process for Region C SEP Water Consumption Projections

a. Near Term Projections
   i. Compare available usage data with base years for 2003 and BEG Reports.
   ii. Compare available usage data with 2010 projections for 2003 and BEG Reports.
   iii. Consider climatology (precipitation and temperature), natural gas prices, etc. while analyzing historical data. Use allocated water rights as a "sanity check."
   iv. On a county-by-county basis, identify the 2010 projection (2003 or BEG Report) that is mostly likely to correspond to the base year.

b. Long Term Projections
   i. Consider county specific growth limitations
      1. Mothballing of plants, non-attainment counties, water rights
   ii. Consider planned plants/expansions of existing plants. Use allocated water rights as a "sanity check."
   iii. On a county-by-county basis, identify the projection pattern that is most likely to correspond to future demand projections.

c. County-by-county Decision
   i. After considering which projection best matches both the near term and long term demands for each county, make the following choice:
      1. Preferred option: If the near term and long term projections for either the BEG or 2003 report are reasonable, choose either projection for a county through the duration of the projections (2010-2060).
      2. Hybrid option: If the near term projection for either the BEG or 2003 report is reasonable, but the long term projection is not, choose the 2010 projection that is most reasonable and modify the most appropriate projection pattern by adding or deducting the difference from each decade.

Attachment C
Projection Comparisons
Including Proposed Region C 2011 Projections

Figure A-1. Region C Steam Electric Power Demands

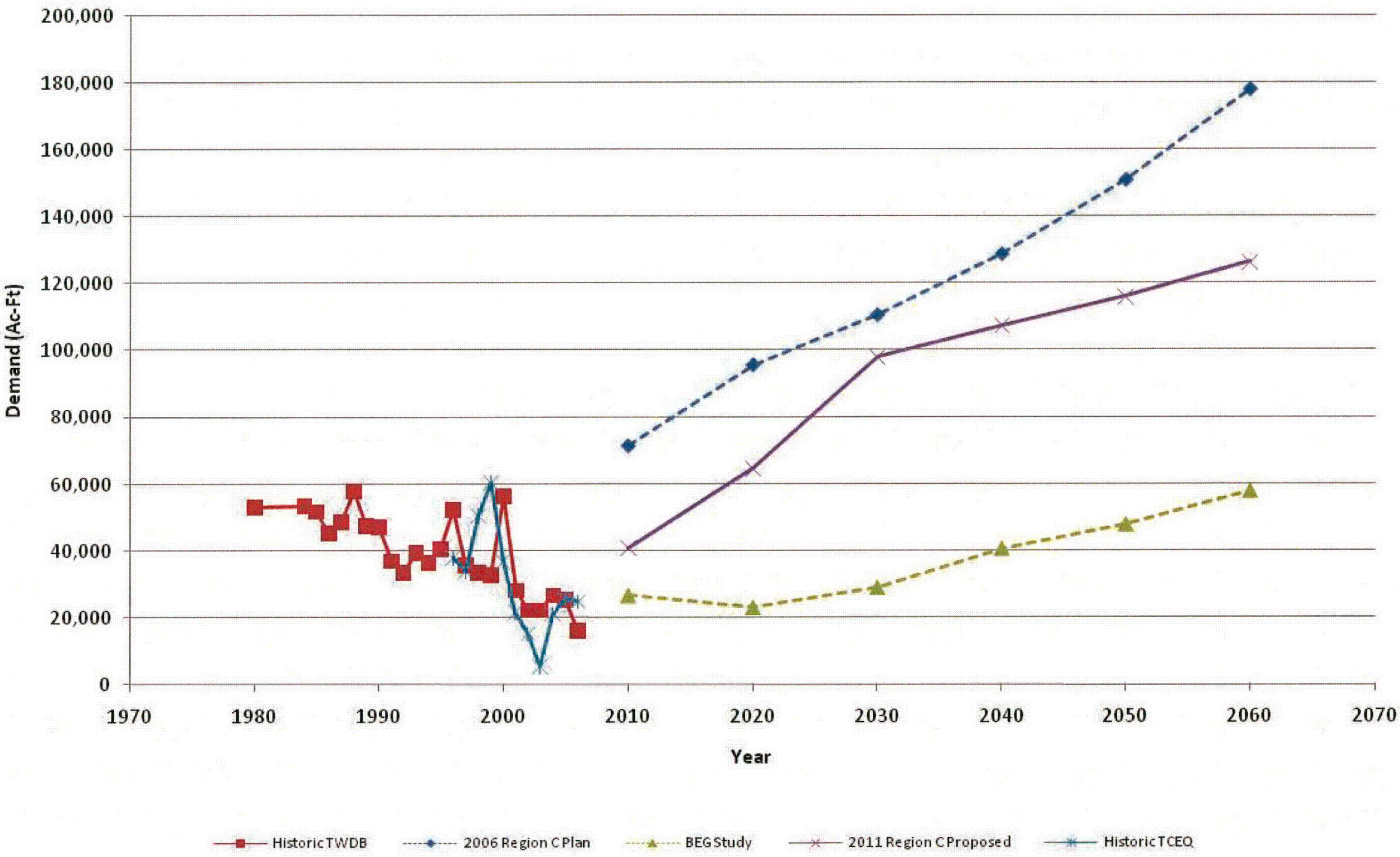


Figure A-2. Collin County Steam Electric Power Demands

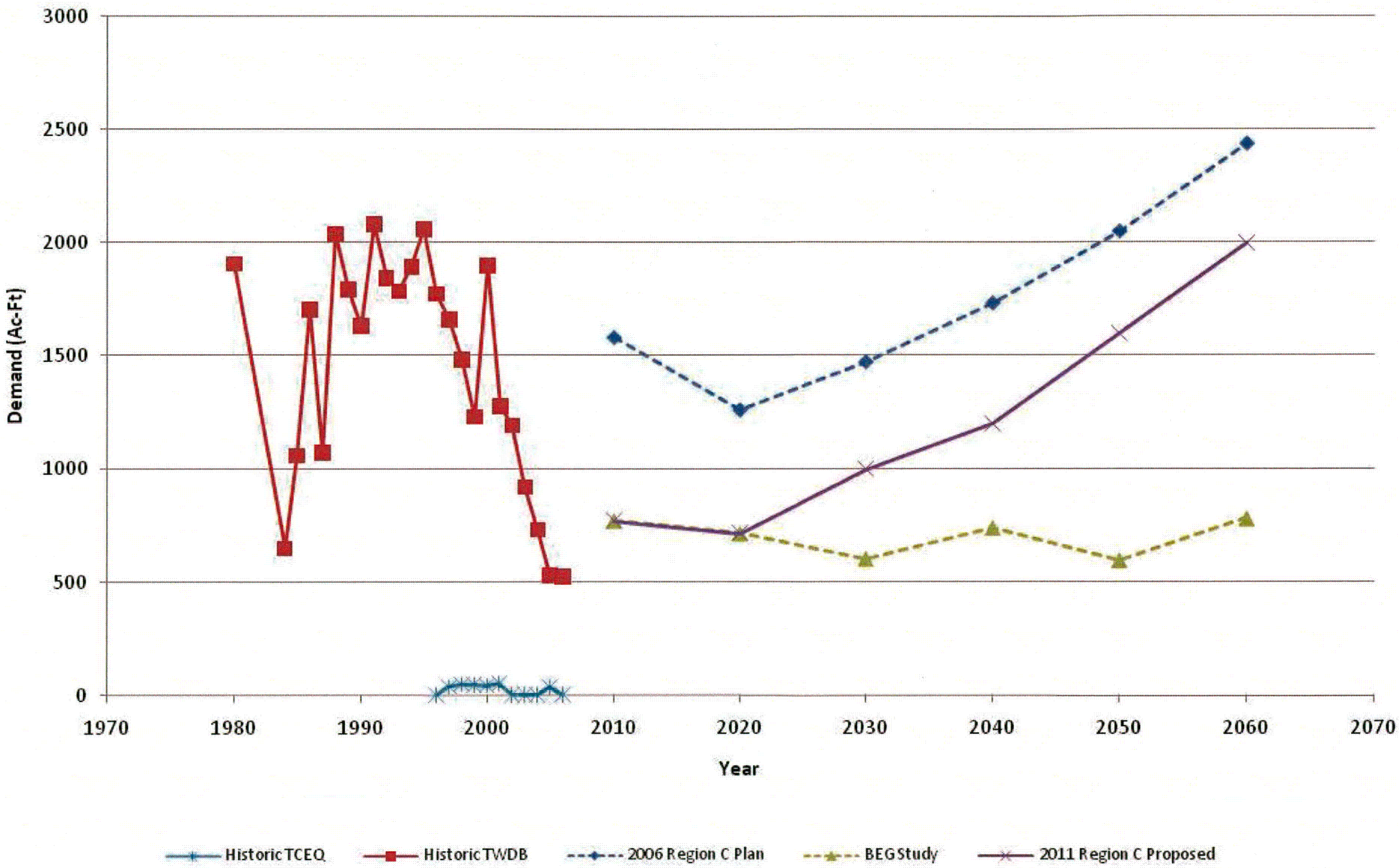


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Figure A-3. Cooke County Steam Electric Power Demands

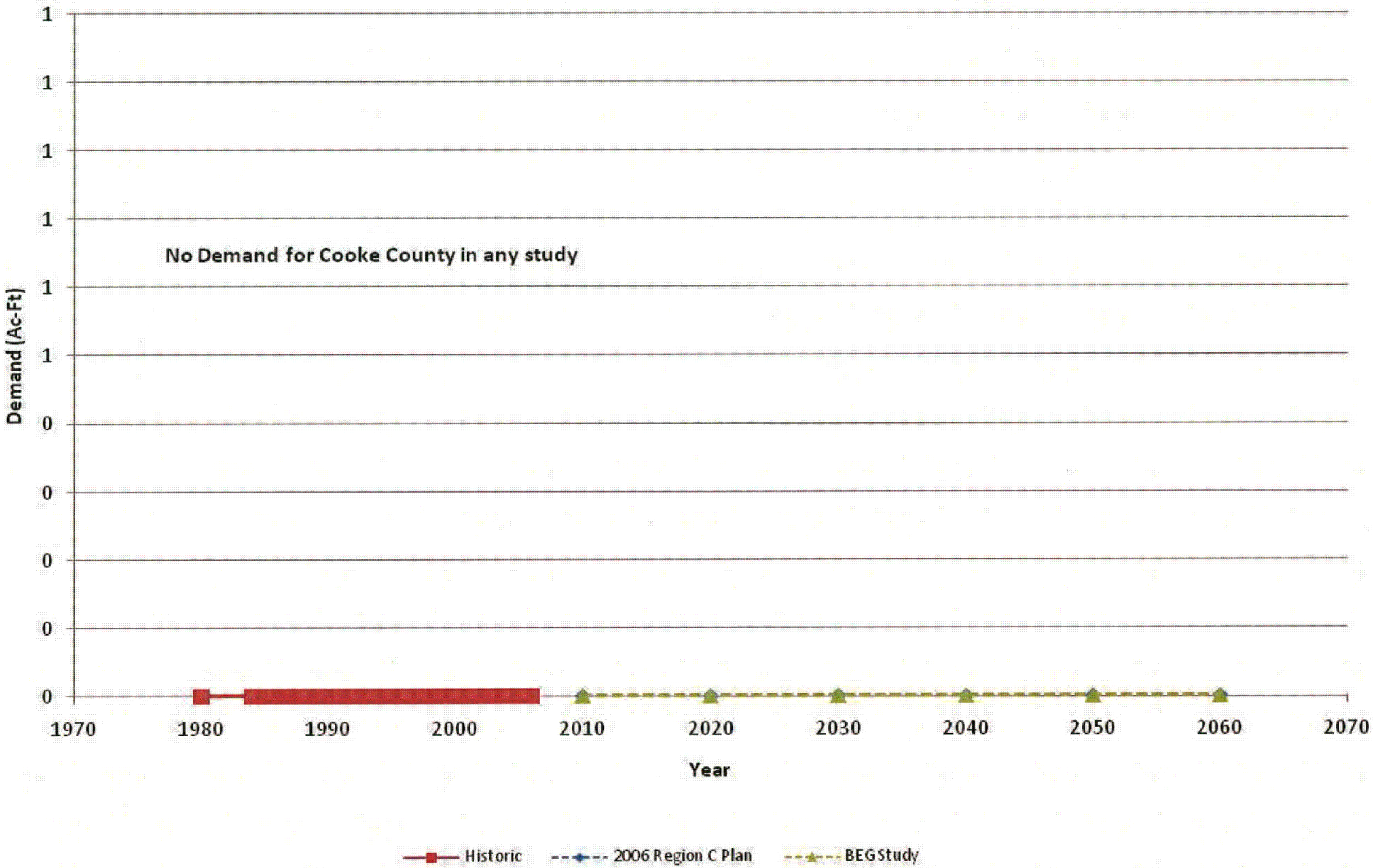

Figure A-4. Dallas County Steam Electric Power Demands

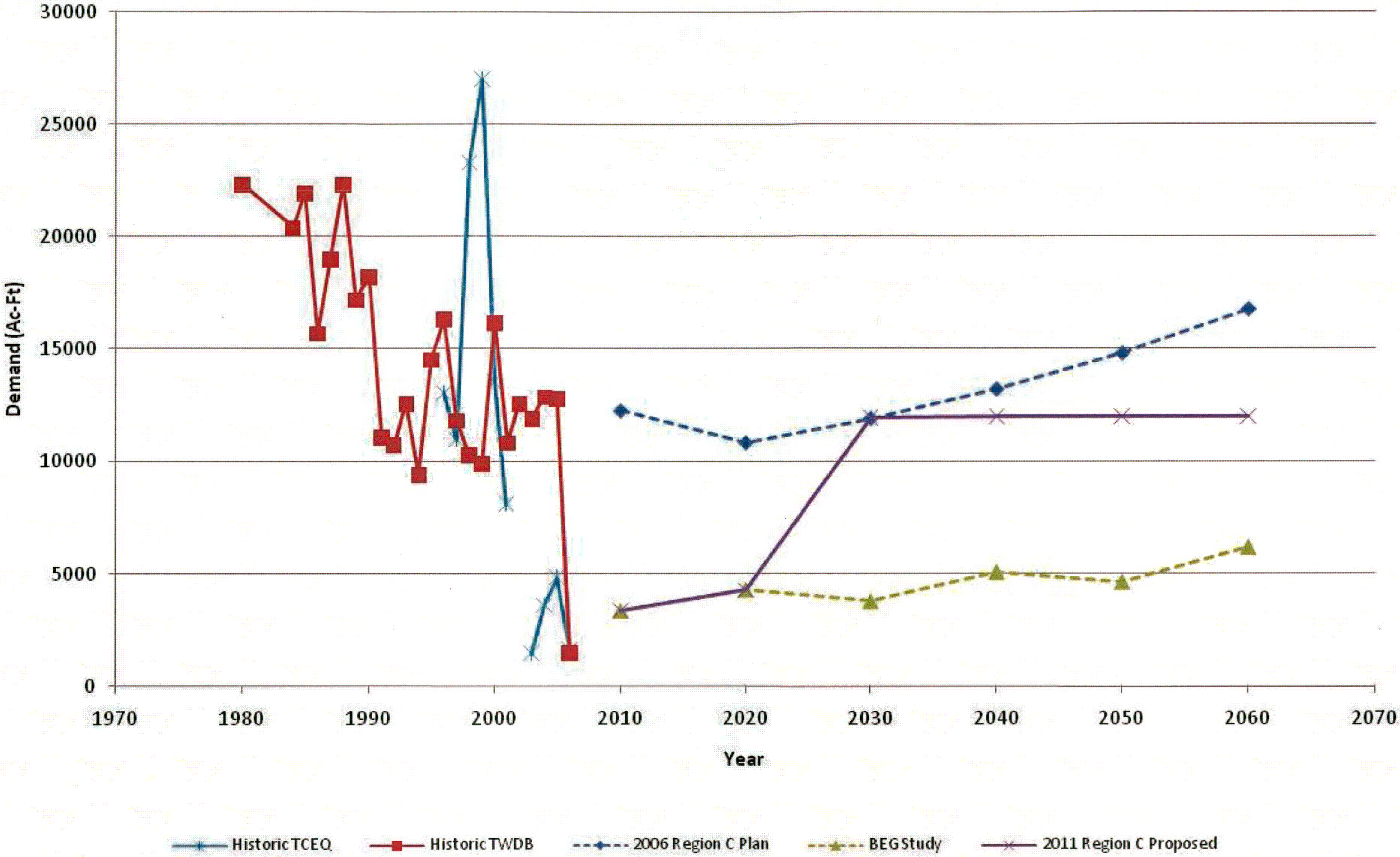

Figure A-5. Denton County Steam Electric Power Demands

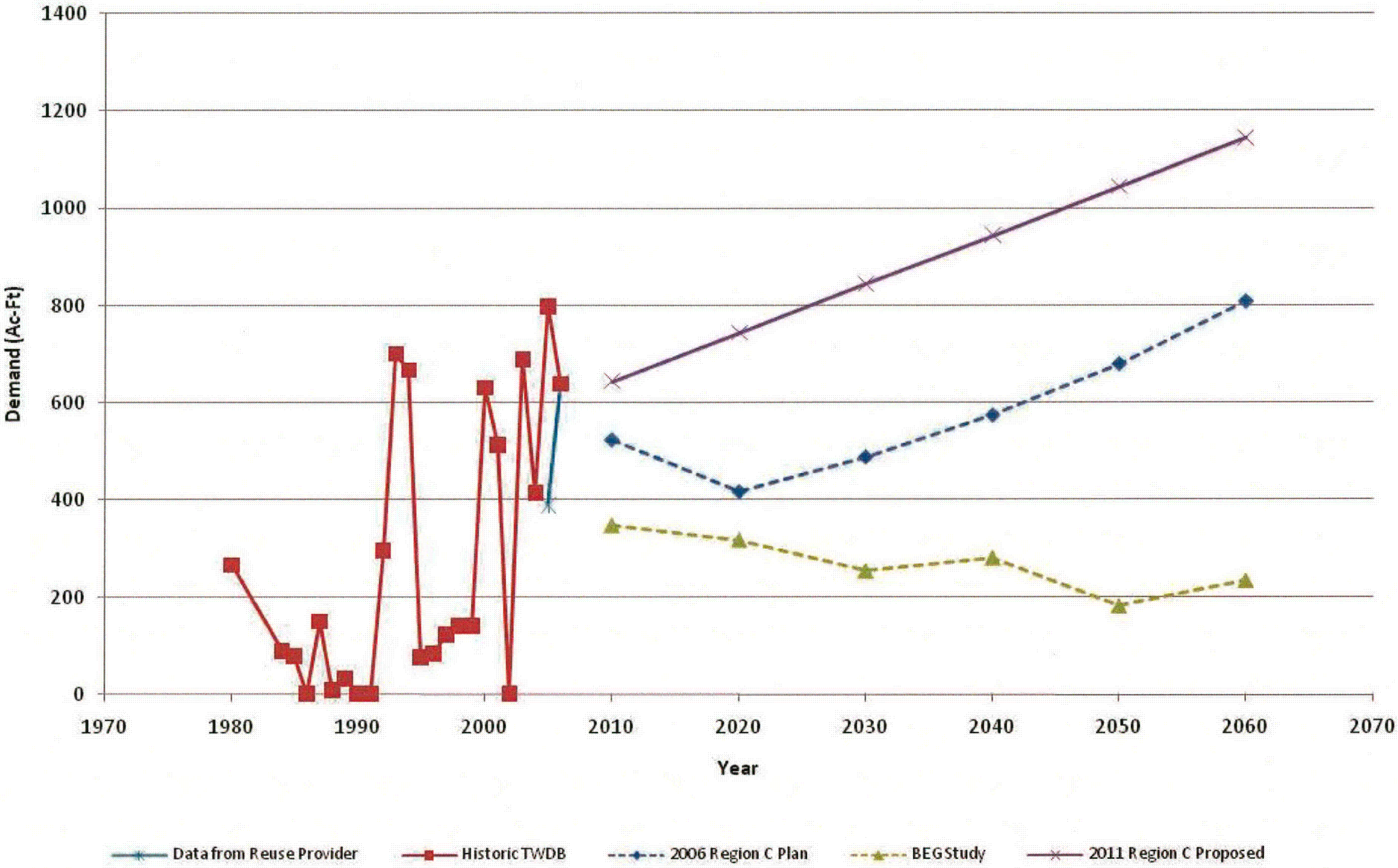

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Figure A-6. Ellis County Steam Electric Power Demands

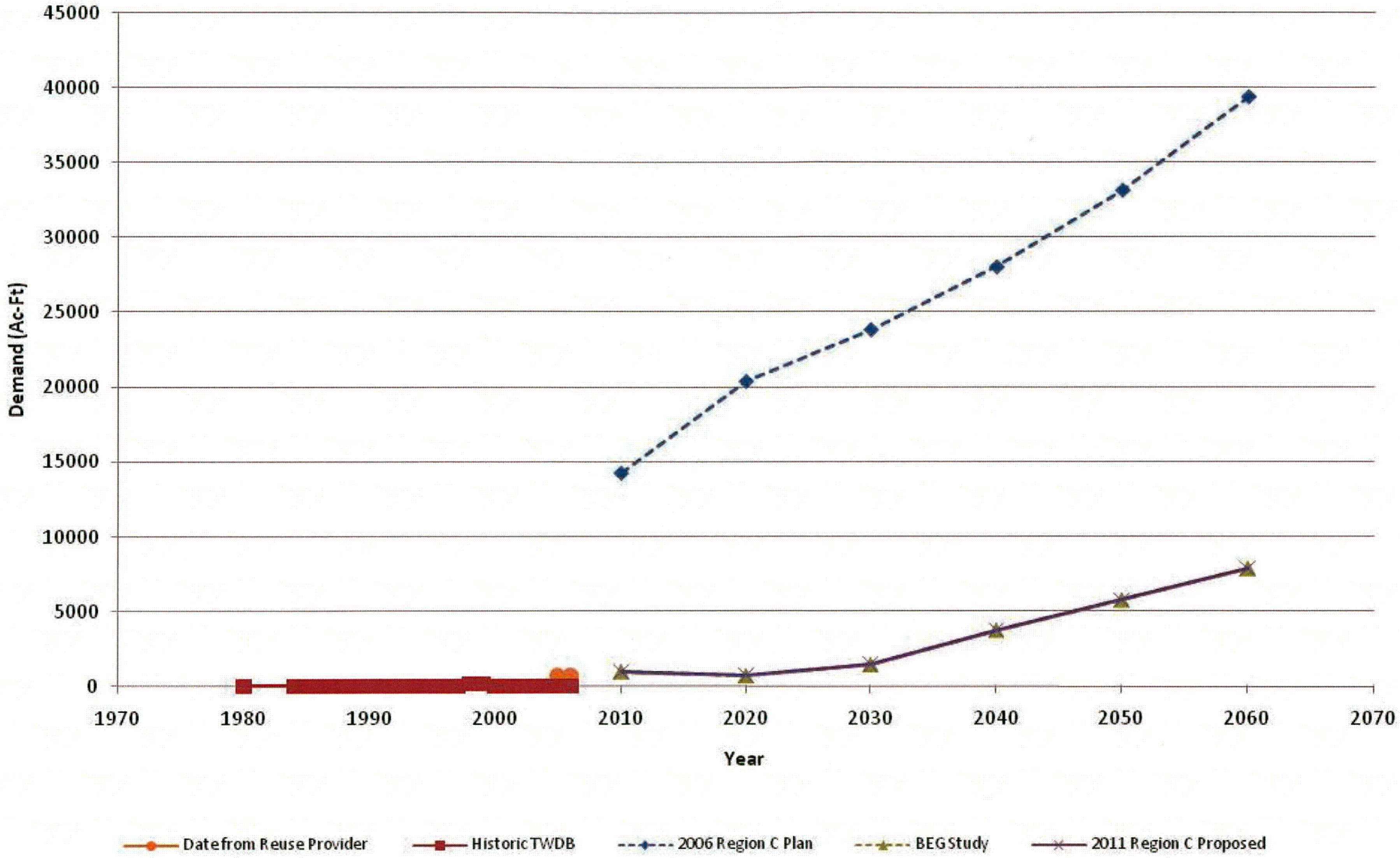

Figure A-7. Fannin County Steam Electric Power Demands

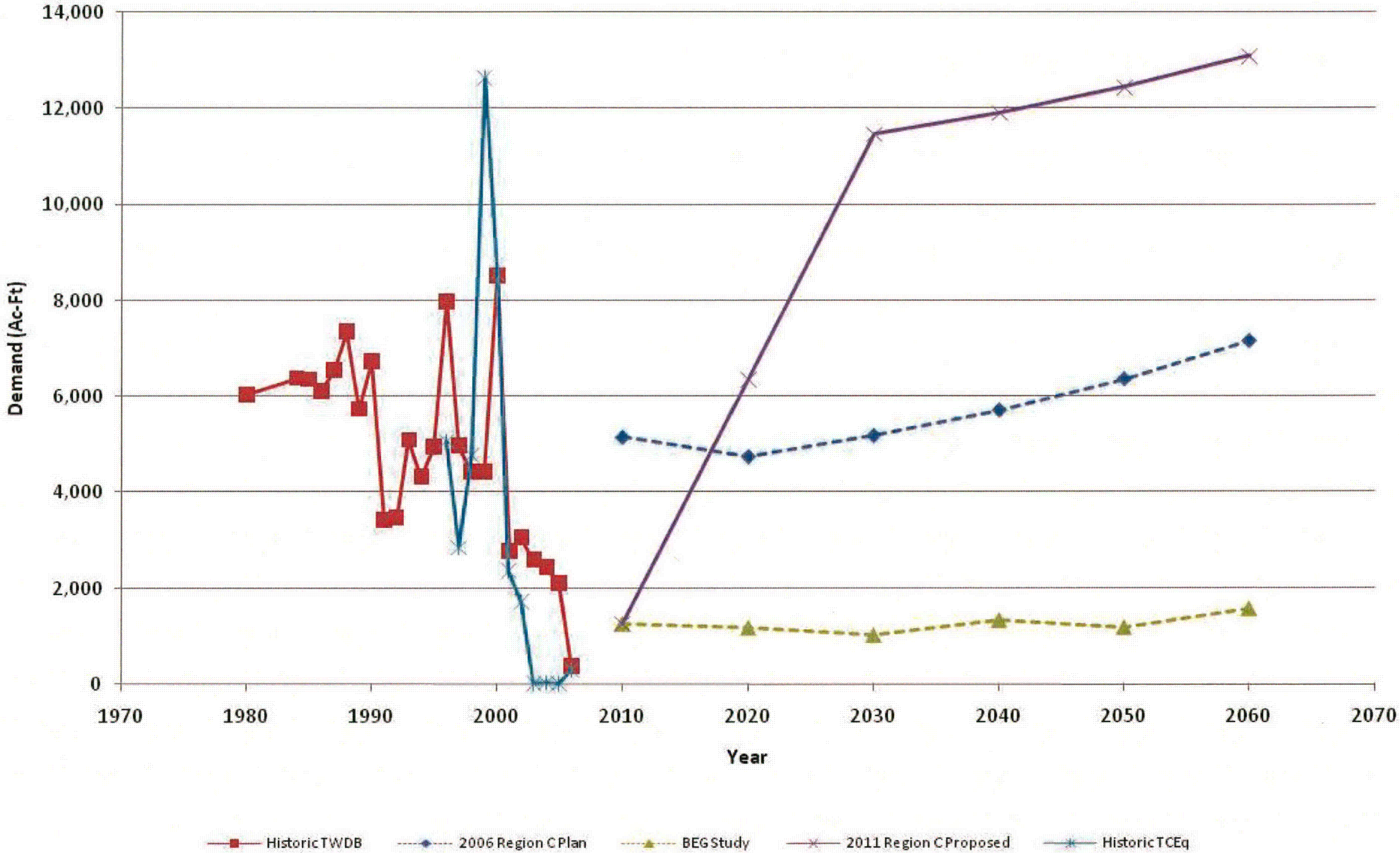

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Figure A-8. Freestone County Steam Electric Power Demands

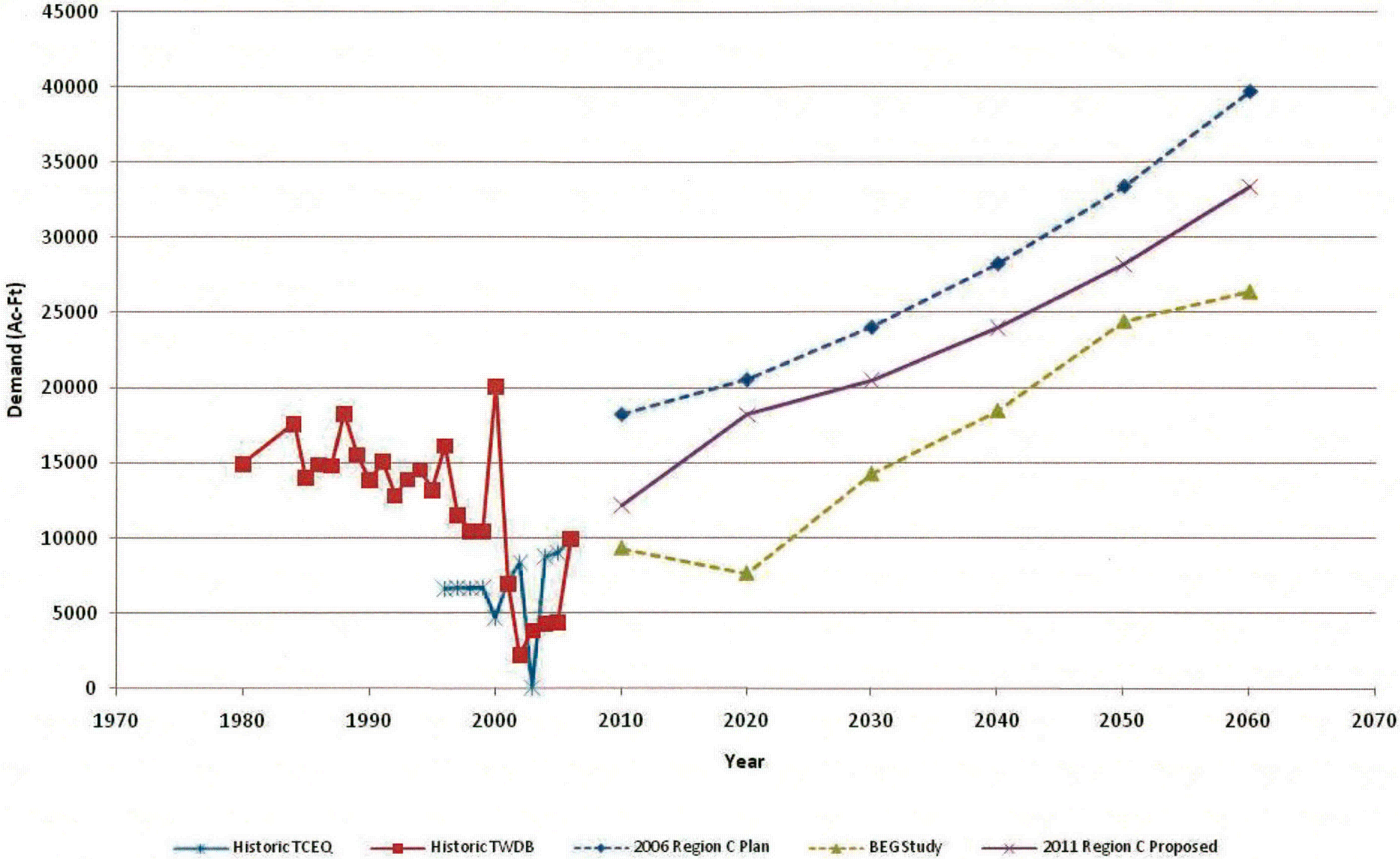

Figure A-9. Grayson County Steam Electric Power Demands

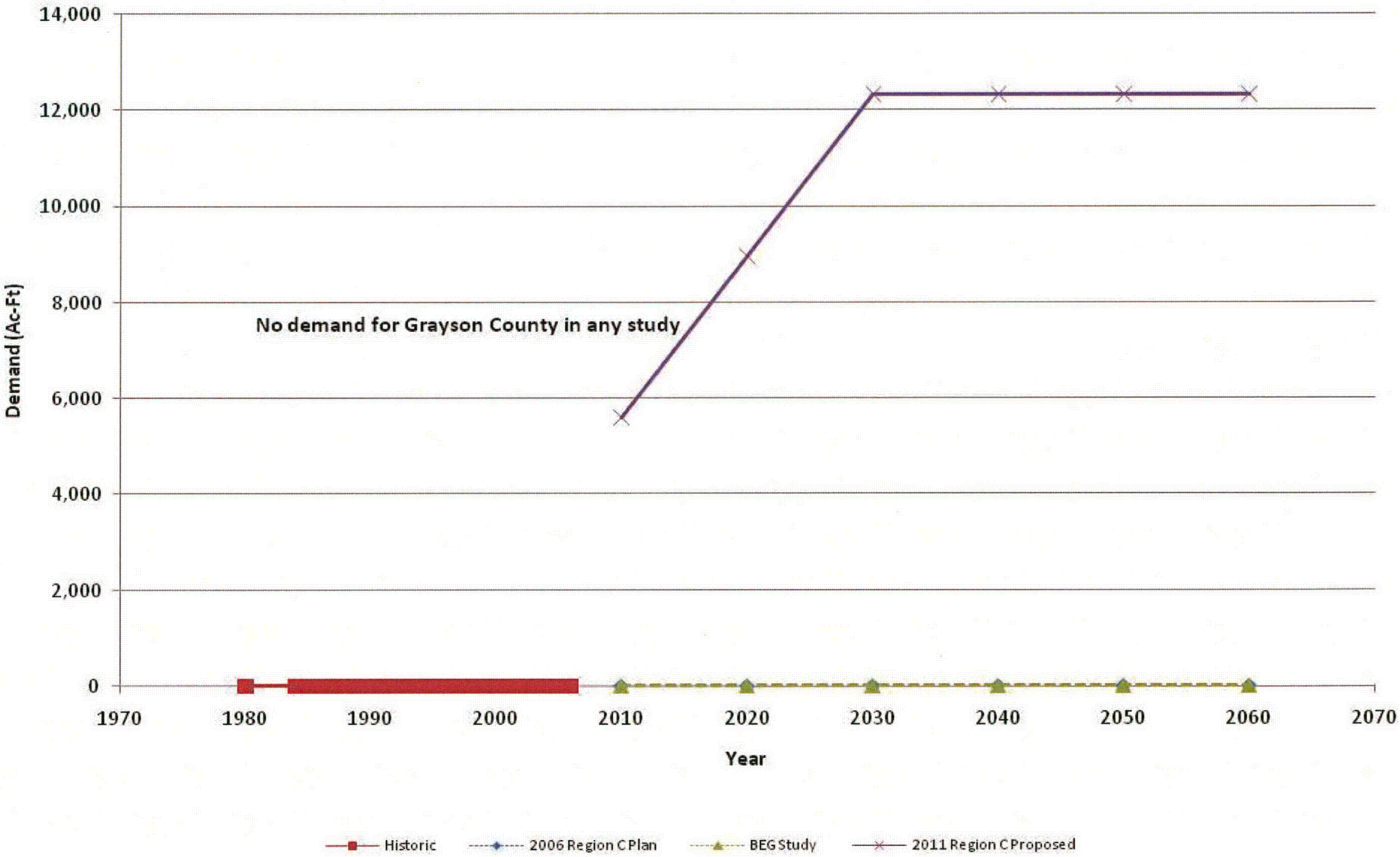

Figure A-10. Henderson County Steam Electric Power Demands

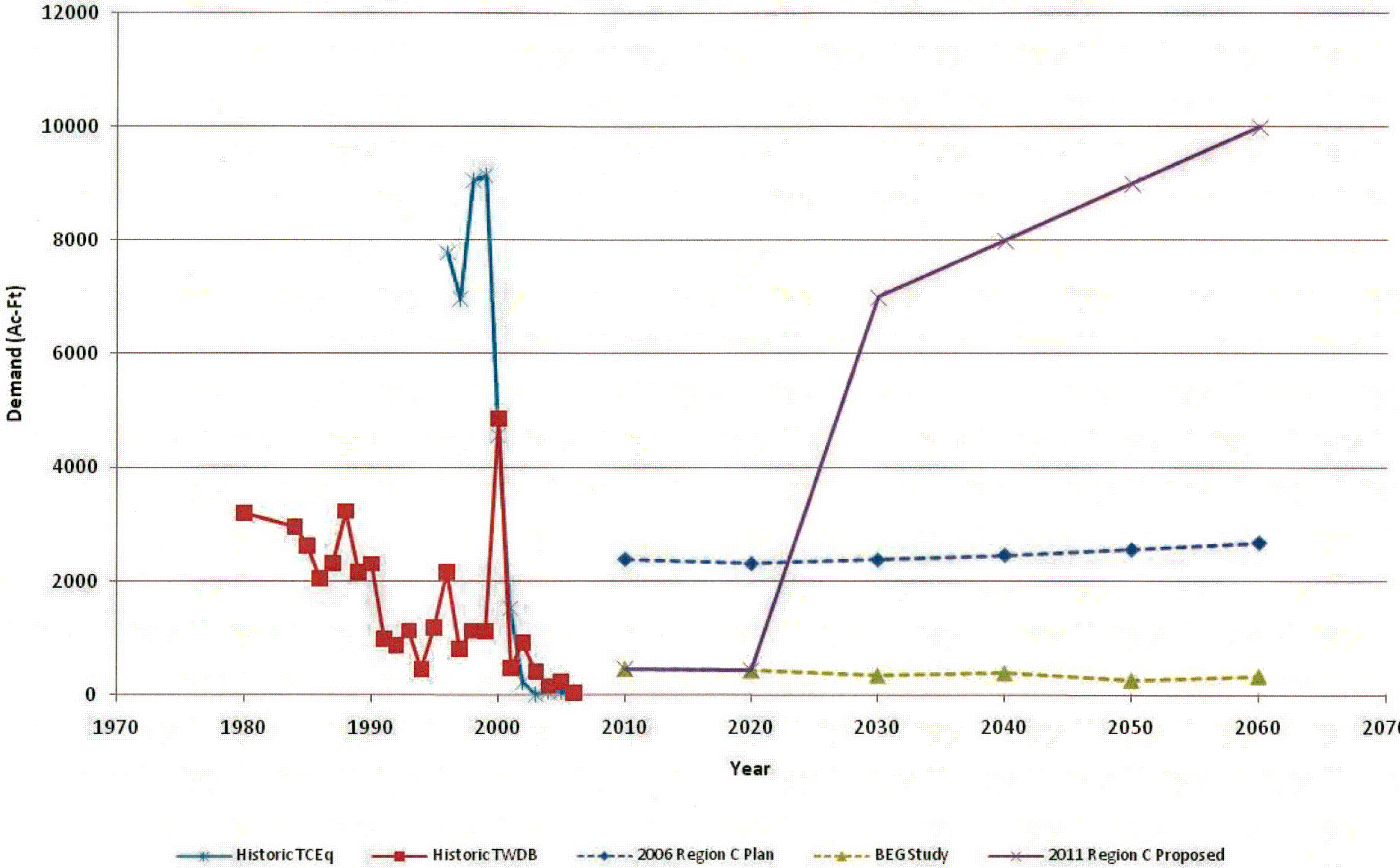

Figure A-11. Jack County Steam Electric Power Demands

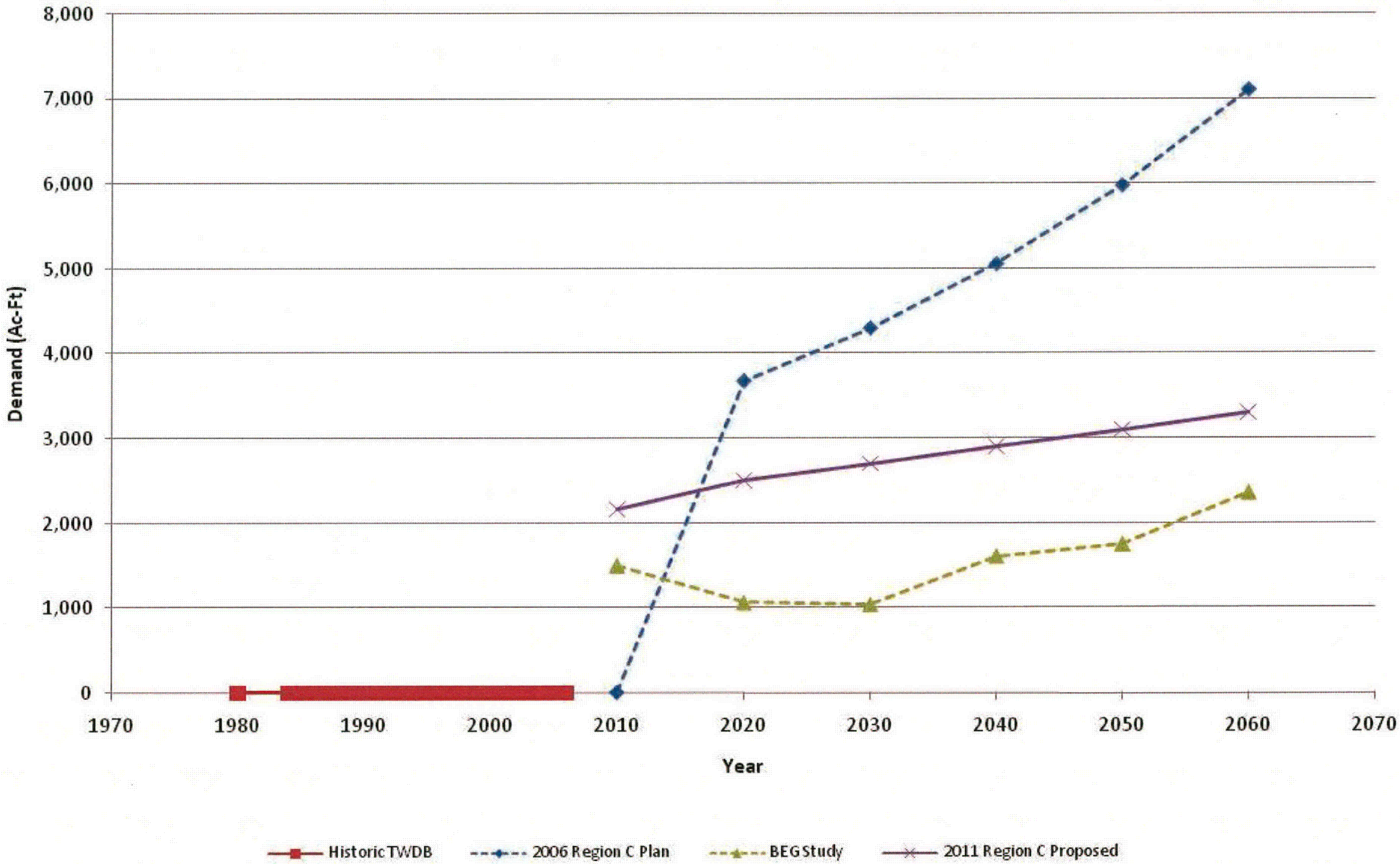

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Figure A-12. Kaufman County Steam Electric Power Demands

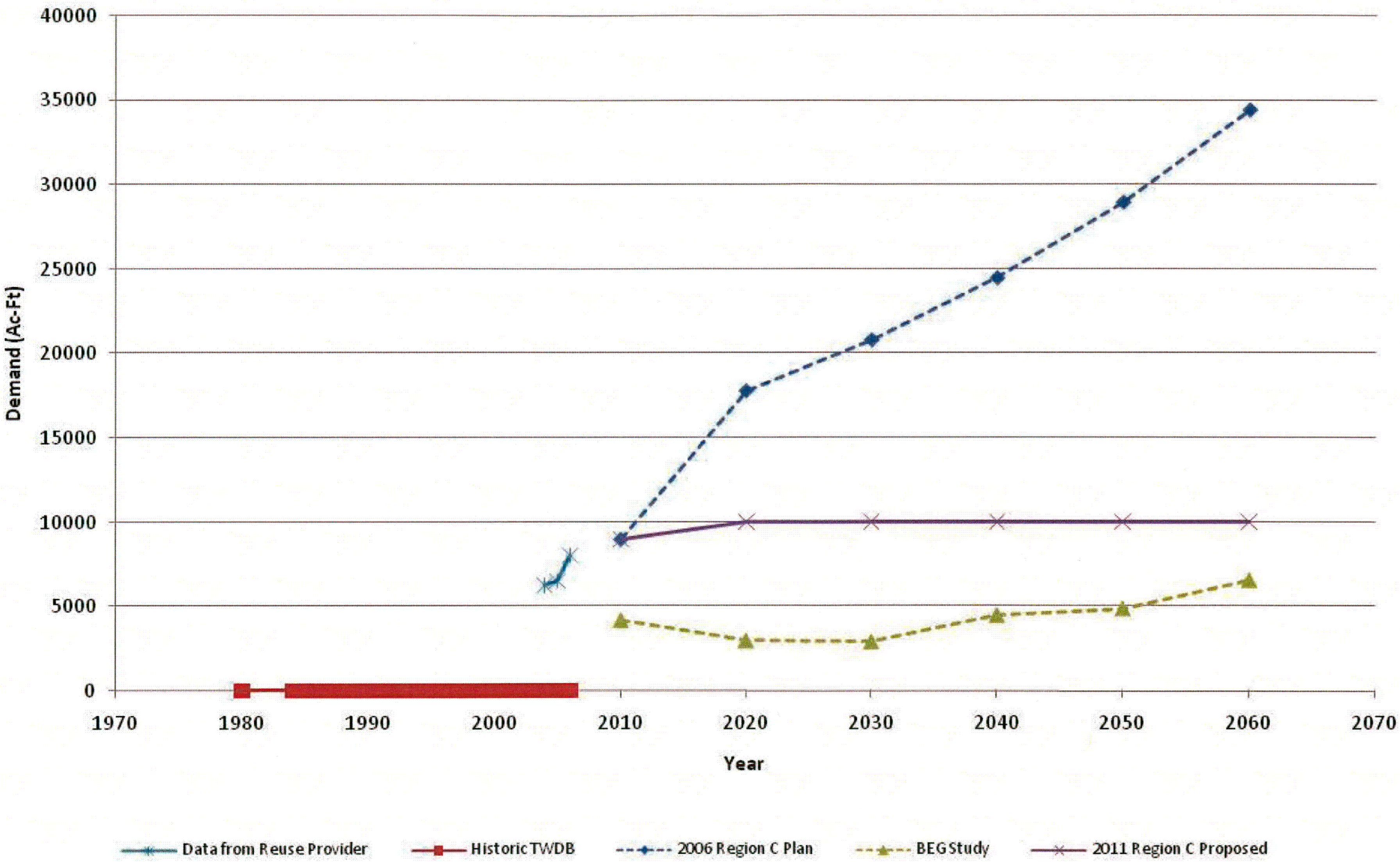

Figure A-13. Navarro County Steam Electric Power Demands

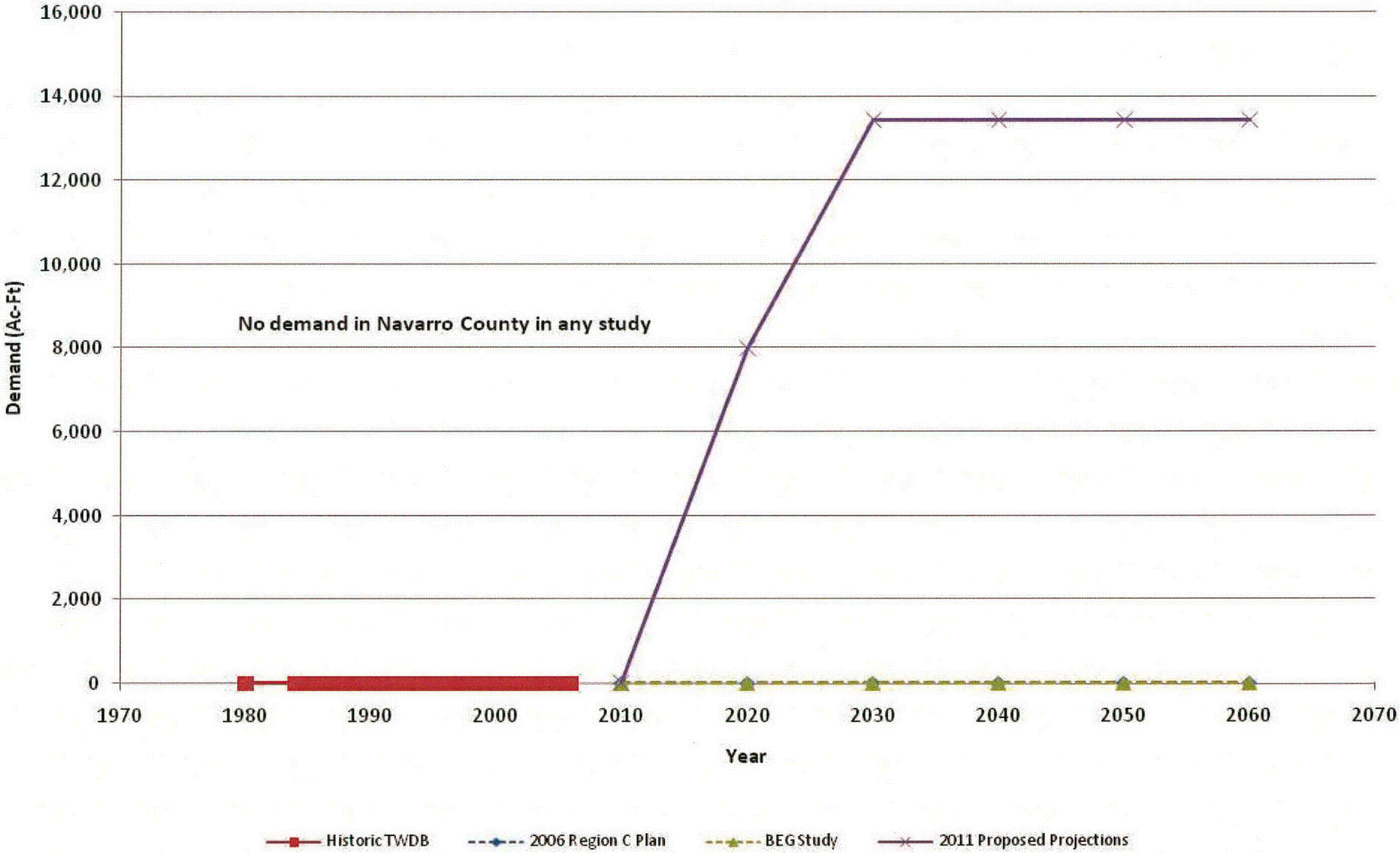

Figure A-14. Parker County Steam Electric Power Demands

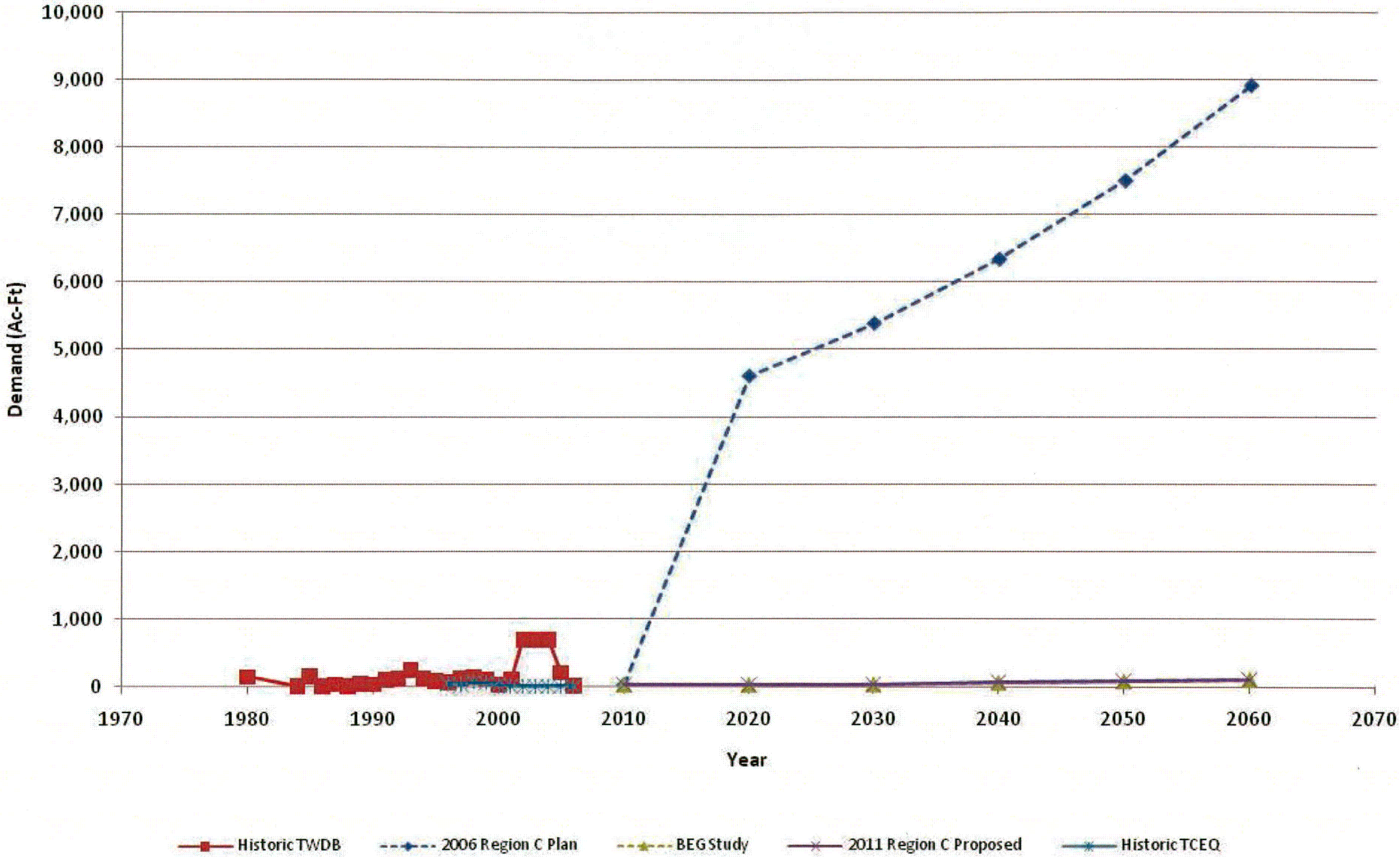

Figure A-15. Rockwall County Steam Electric Power Demands

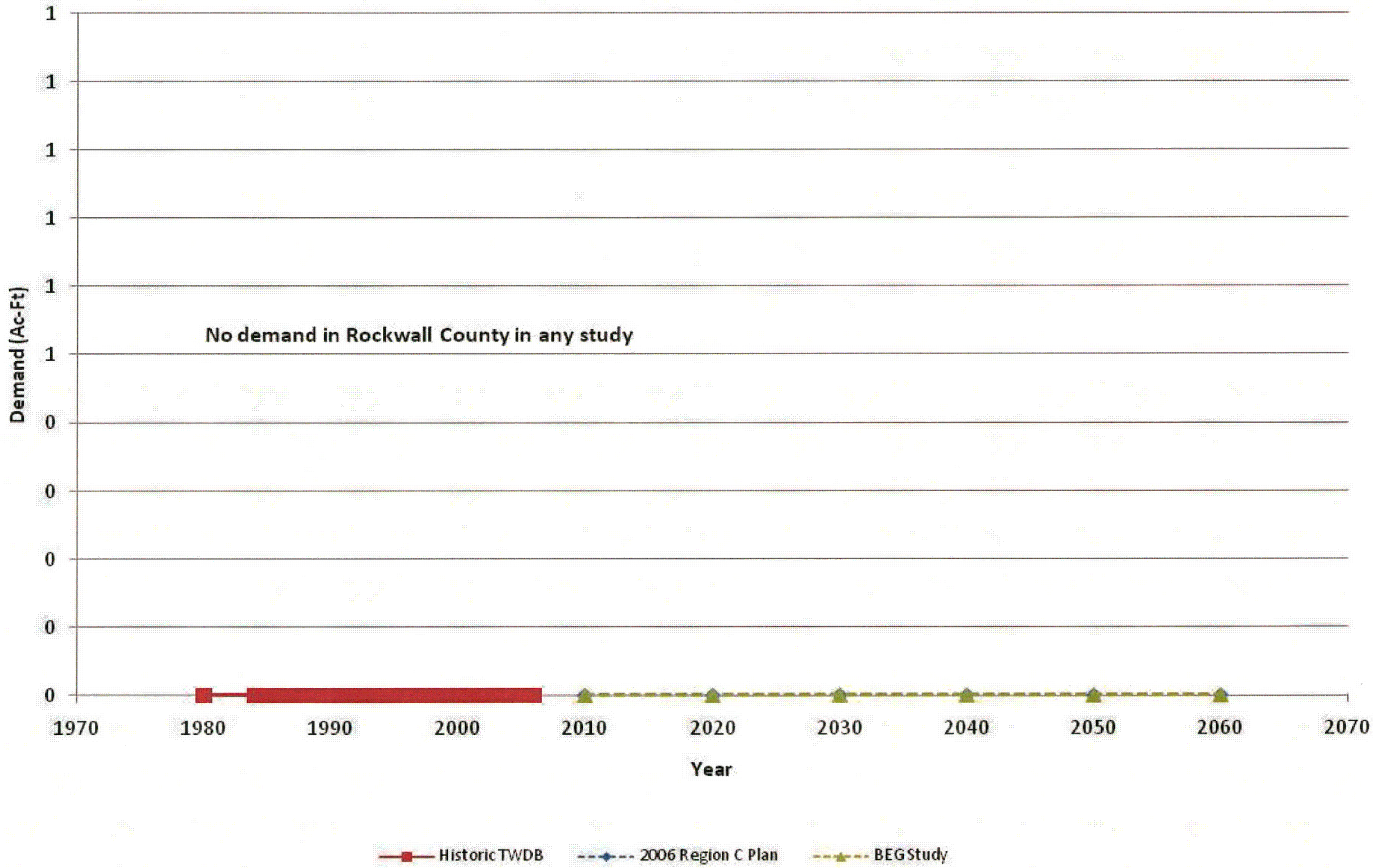

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Figure A-16. Tarrant County Steam Electric Power Demands

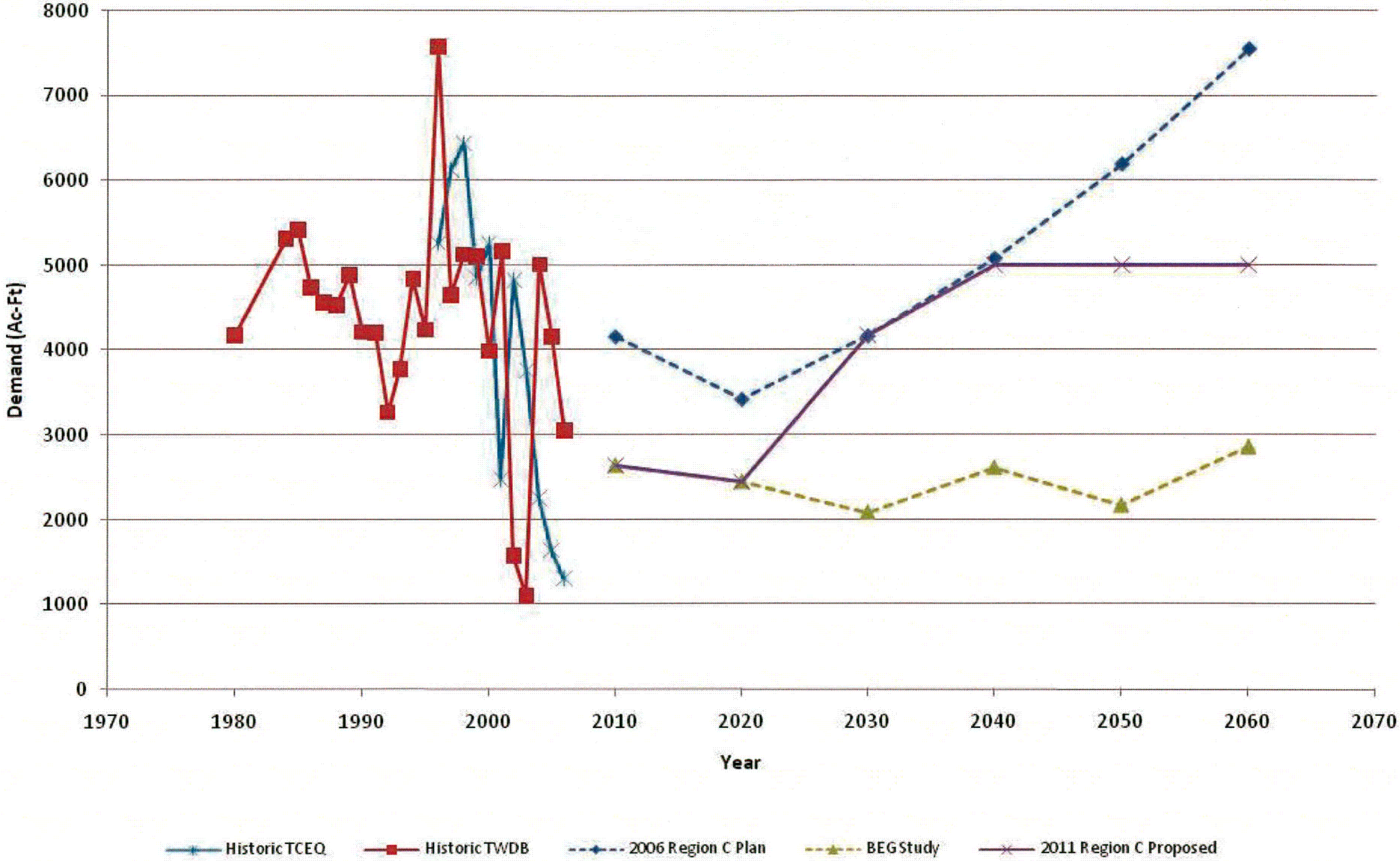

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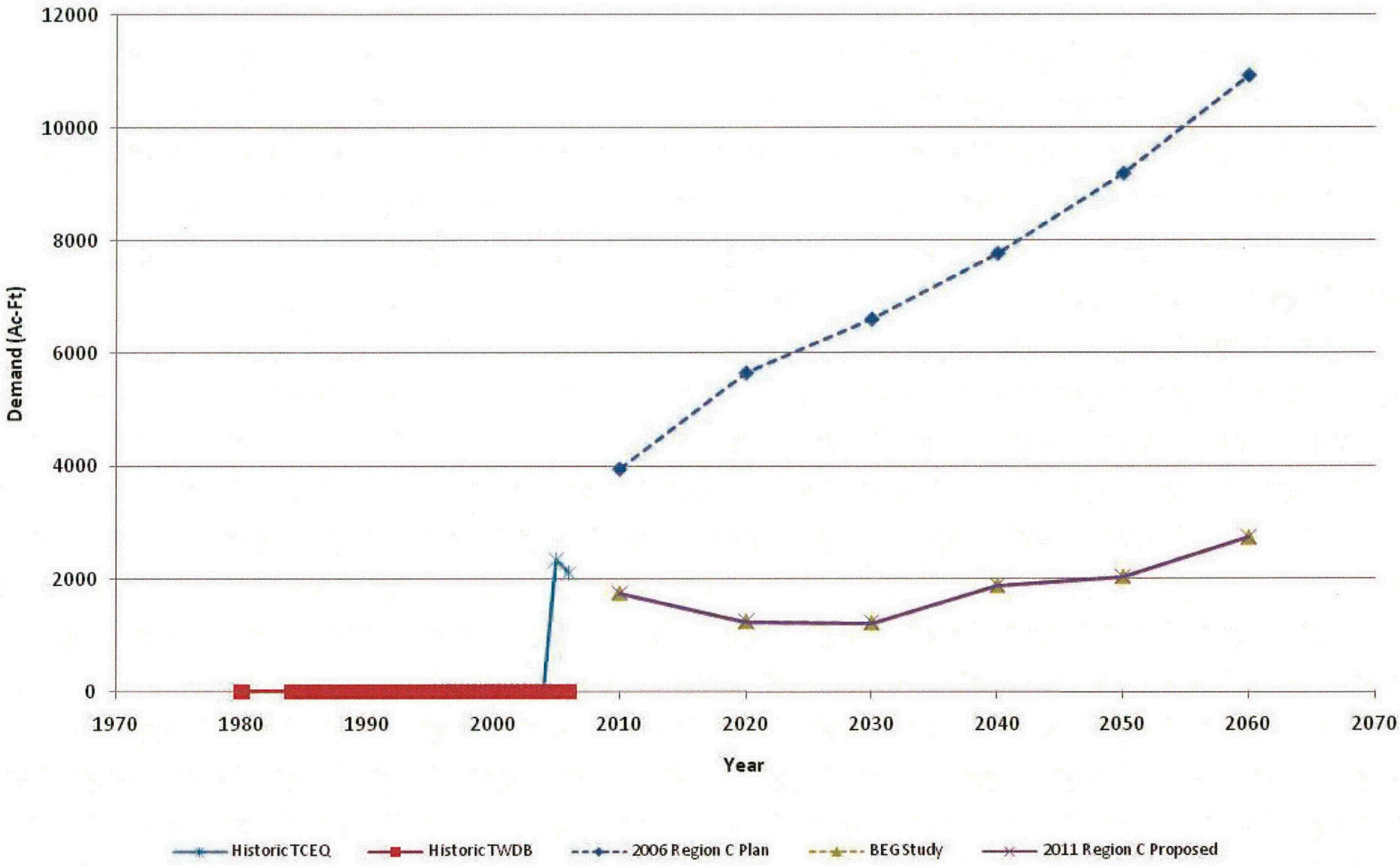
Figure A-17. Wise County Steam Electric Power Demands



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Attachment D
Projection Summary Table

Basic Info			Regulatory Information				Historical																			
							Reclaimed Water Consumption					TCEQ Water Consumption								TWDB Water Consumption						
County	Company	Plant Name	Water Right No.	Diversion Amount Value (acre-feet/year)	Status	Non-attainment county?	2004 Usage (acre-feet/year)	2005 Usage (acre-feet/year)	2006 Usage (acre-feet/year)	2007 Usage (acre-feet/year)	2008 Usage (acre-feet/year)	2000 Usage (acre-feet/year)	2001 Usage (acre-feet/year)	2002 Usage (acre-feet/year)	2003 Usage (acre-feet/year)	2004 Usage (acre-feet/year)	2005 Usage (acre-feet/year)	2006 Usage (acre-feet/year)	2007 Usage (acre-feet/year)	2000 Usage (acre-feet/year)	2001 Usage (acre-feet/year)	2002 Usage (acre-feet/year)	2003 Usage (acre-feet/year)	2004 Usage (acre-feet/year)	2005 Usage (acre-feet/year)	2006 Usage (acre-feet/year)
Collin	City of Garland	Ray Olinger	32	2,000		yes						42	52	0	0	0	35	0	28	1,901	1,278	1,194	923	734	530	525
	Luminant Generation Company LLC	Collin			mothballed in 2004	yes																				
Dallas	City of Garland	CE Newman				yes														16,165	10,817	12,541	11,902	12,874	12,775	1,443
	Exelon Generation Co LLC	Mountain Creek	3408	6,400		yes						4,732	1,334	1,627	1,439	1,084	1,258	696	648							
	Luminant Generation Company LLC	Lake Hubbard	43	4,500		yes						5,153	1,684	414,583	0	817	731	705	688							
	Luminant Generation Company LLC	North Lake	2365/1932	1000/9550	planned to mothball, currently operational	yes						1,801	4,293	1,470	0	1,691	2,857	247	408							
	Rock-Tenn	Rock-Tenn Dallas Mill				yes																				
	State Farm Mutual Auto Insurance Co	State Farm Insurance Medical Center				yes																				
	University of Texas at Dallas	UTD				yes																				
	Exelon Power	Mountain Creek			planned	yes																				
	?	Parkdale			mothballed?	yes						1,859	781	0	0	0	0	0	0							
Denton	City of Denton	Ray Roberts	2335	?	mothballed?	yes														631	514	0	689	415	799	639
	City of Garland	Lewisville	1780		mothballed?	yes																				
	City of Garland	Spencer				yes		388	644	173																
	WM Renewable Energy LLC	DFW Gas Recovery				yes																				
Ellis	ANP Operations Co	Midlothian Energy Facility				yes														0	0	0	0	0	0	0
	Ennis Tracetebel Power Co LLP	Ennis Tracetebel Power Co LLP				yes		708	706	861																
	?	Waxahachie			planned	yes																				
Fannin	Valley NG Power Company LLC (Luminant)	Valley	4900	16,400		no						8,549	2,362	1,708	0	13	1	281	208	8,525	2,768	3,051	2,585	2,440	2,104	361
	LS Power	LS Power			planned	no																				
Fannin/ Grayson	Merchant Power Plant	-			planned	no																				
Freestone	Big Brown Power Company LLC (Luminant)	Big Brown	5040	14,150		no						4,692	7,021	8,352	0	8,761	9,008	9,936	9,543	20,130	6,941	2,164	3,794	4,289	4,350	9,936
	Calpine - Freestone Power Generation LP	Calpine				no																				
	Luminant	Big Brown Update			planned	no																				
Grayson	City of Whitesboro	Whitesboro				no														0	0	0	0	0	0	0
	USCE - Tulsa District	Denison				no																				
	Panda Energy	Sherman			planned	no																				
Henderson	Luminant Generation Company LLC	Trinidad	4970	4,000		no						4,557	1,521	219	0	46	42	57	70	4,860	464	910	410	150	230	25
	Luminant Generation Company LLC	Forest Grove			mothballed?	no						0	0	0	0	0	0	0	0							
Jack	Brazos Electric Power Coop Inc	Jack Energy Facility	18?			no														0	0	0	0	0	0	0
	Gamesa Energy	Barton Chapel Wind 1			planned	no																				
Kaufman	FPLE Forney LLP	Forney Energy Center				yes	6,265	6,522	8,018											0	0	0	0	0	0	0
Navarro	Ellis Power	Ellis Power			planned	no														0	0	0	0	0	0	0
	Babcock and Brown (Navarro Energy)	Babcock and Brown (Navarro Energy)			planned	no																				
	?	Corsicana			planned	no																				
Parker	Brazos Electric Power Coop Inc	North Texas	2147	75		yes						28	6	2	0	0	0	0	0	36	110	703	703	703	209	9
	Weatherford Mun Utility System	Weatherford				yes																				
Tarrant	City of Fort Worth	Village Creek WWTP				yes														3,988	5,165	1,573	1,102	5,010	4,157	3,054
	Exelon Generation Co LLC	Handley	3391	10,120		yes						3,890	2,026	3,256	2,664	1,807	1,510	1,300	1,008							
	Luminant Generation Company LLC	Eagle Mountain	451	4,636		yes						1,362	450	1,573	1,097	448	125	0	0							
	?	North Main			mothballed?	yes																				
Wise	Devon Gas Service	Bridgeport Gas Processing Plant	18?	?		no														0	0	0	0	0	0	0
	Wise County Power Co LP	Wise County Power LP	2273	?		no						0	0	6	0	0	2,333	2,100	1,241							
TOTAL												36,666	21,530	432,795	5,200	14,668	17,899	15,322	13,842	56,236	28,057	22,136	22,108	26,615	25,154	15,992

Basic Info			Past Projections												Comparison of 2006 Projections/ Actual Consumption					
			2006 Region C Water Demand Projections						2006 BEG Water Demand Projections						Reclaimed Sources	TCEQ	TWDB	BEG	2006 Region C Plan Projections	Best Available Sources - Actual Usage
County	Company	Plant Name	2010 Usage (acre-feet/year)	2020 Usage (acre-feet/year)	2030 Usage (acre-feet/year)	2040 Usage (acre-feet/year)	2050 Usage (acre-feet/year)	2060 Usage (acre-feet/year)	2010 Usage (acre-feet/year)	2020 Usage (acre-feet/year)	2030 Usage (acre-feet/year)	2040 Usage (acre-feet/year)	2050 Usage (acre-feet/year)	2060 Usage (acre-feet/year)	2006 Usage (acre-feet/year)	2006 Usage (acre-feet/year)	2006 Usage (acre-feet/year)	2006 Usage (acre-feet/year)	2006 Usage (acre-feet/year)	2006 Usage (acre-feet/year)
Collin	City of Garland	Ray Olinger	1,581	1,260	1,473	1,733	2,050	2,436	771	715	602	740	594	782		0	525	531	1,709	531
	Luminant Generation Company LLC	Collin																		
Dallas	City of Garland	CE Newman	12,264	10,842	11,918	13,230	14,829	16,778	3,367	4,290	3,791	5,075	4,643	6,178		1,648	1,443	1,598	12,858	1,675 (TCEQ data used for all plants except Newman where no data was present. BEG estimates where used for Newman).
	Exelon Generation Co LLC	Mountain Creek																		
	Luminant Generation Company LLC	Lake Hubbard																		
	Luminant Generation Company LLC	North Lake																		
	Rock-Tenn	Rock-Tenn Dallas Mill																		
	State Farm Mutual Auto Insurance Co	State Farm Insurance Medical Center																		
	University of Texas at Dallas	UTD																		
	Exelon Power	Mountain Creek																		
	?	Parkdale																		
Denton	City of Denton	Ray Roberts	524	418	489	575	680	808	348	318	254	281	182	234	644	0	639	395	567	644
	City of Garland	Lewisville																		
	City of Garland	Spencer																		
	WM Renewable Energy LLC	DFW Gas Recovery																		
Ellis	ANP Operations Co	Midlothian Energy Facility	14,237	20,379	23,825	28,027	33,148	39,391	981	698	1,450	3,741	5,754	7,878	706	0	0	975	8,840	706
	Ennis Tracetebel Power Co LLP	Ennis Tracetebel Power Co LLP																		
	?	Waxahachie																		
Fannin	Valley NG Power Company LLC (Luminant)	Valley	5,152	4,748	5,184	5,717	6,366	7,157	1,261	1,169	1,019	1,334	1,182	1,569		281	361	325	5,346	281
	LS Power	LS Power																		
Fannin/ Grayson	Merchant Power Plant	-																		
Freestone	Big Brown Power Company LLC (Luminant)	Big Brown	18,210	20,524	23,999	28,234	33,398	39,692	9,323	7,636	14,270	18,468	24,429	26,397		9,936	9,936	10,168	16,128	12,173 (TCEQ data used for all plants except Freestone where no data was present. BEG estimates where used for Freestone).
	Calpine - Freestone Power Generation LP	Calpine																		
	Luminant	Big Brown Update																		
Grayson	City of Whitesboro	Whitesboro	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
	USCE - Tulsa District	Denison																		
	Panda Energy	Sherman																		
Henderson	Luminant Generation Company LLC	Trinidad	2,387	2,308	2,376	2,458	2,559	2,681	460	427	342	383	253	328		57	25	117	2,418	57
	Luminant Generation Company LLC	Forest Grove																		
Jack	Brazos Electric Power Coop Inc	Jack Energy Facility	0	3,674	4,296	5,053	5,977	7,102	1,502	1,068	1,043	1,611	1,752	2,357		0	0	2,162	0	2,162
	Gamesa Energy	Barton Chapel Wind 1																		
Kaufman	FPLE Forney LLP	Forney Energy Center	8,979	17,798	20,808	24,478	28,950	34,403	4,186	2,977	2,907	4,490	4,883	6,570	8,018	0	0	5,814	5,387	8,018
Navarro	Ellis Power	Ellis Power	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
	Babcock and Brown (Navarro Energy)	Babcock and Brown (Navarro Energy)																		
	?	Corsicana																		
Parker	Brazos Electric Power Coop Inc	North Texas	30	4,617	5,397	6,349	7,509	8,923	24	22	28	56	75	102		0	9	3	32	0
	Weatherford Mun Utility System	Weatherford																		
Tarrant	City of Fort Worth	Village Creek WWTP	4,158	3,419	4,168	5,081	6,194	7,550	2,640	2,448	2,082	2,614	2,167	2,861		1,300	3,054	1,053	4,456	1,300
	Exelon Generation Co LLC	Handley																		
	Luminant Generation Company LLC	Eagle Mountain																		
	?	North Main																		
Wise	Devon Gas Service	Bridgeport Gas Processing Plant	3,949	5,653	6,609	7,774	9,195	10,927	1,751	1,245	1,216	1,878	2,042	2,748		2,100	0	2,205	2,369	2,100
	Wise County Power Co LP	Wise County Power LP																		
TOTAL			**71,471**	**95,640**	**110,542**	**128,709**	**150,855**	**177,848**	**26,614**	**23,013**	**29,004**	**40,671**	**47,956**	**58,004**	**9,368**	**15,322**	**15,992**	**25,346**	**60,111**	**29,647**

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Basic Info			Projection Adoption and Revised Region C Projections													
			Near Term Projection Used (2010 and 2020)				Long Term Projection Used (2030 on)				2011 Modified Region C Water Demand Projections					
County	Company	Plant Name	BEG	2006 Plan	Hybrid	Notes	BEG	2006 Plan	Hybrid	Notes	2010 Usage (acre-feet/year)	2020 Usage (acre-feet/year)	2030 Usage (acre-feet/year)	2040 Usage (acre-feet/year)	2050 Usage (acre-feet/year)	2060 Usage (acre-feet/year)
Collin	City of Garland	Ray Olinger	X			BEG most closely corresponds to observed consumption.			X	The BEG projections most closely match current consumption in the near term. The BEG projections were fairly consistent (approximately 600 acre-feet/year) through the reminder of the planning period despite the presence of a mothballed facility which could potentially re-open. The 2006 Plan showed a radical increase through 2060, which is unrealistic considering the counties non-attainment designation.	771	715	1,000	1,200	1,600	2,000
	Luminant Generation Company LLC	Collin														
Dallas	City of Garland	CE Newman	X			BEG most closely corresponds to observed consumption.			X	Since Dallas County is designated as a non-attainment county, it is unlikely that new plants will be constructed. The water demand was capped in the long term to correspond to recent high demands.	3,367	4,290	11,918	12,000	12,000	12,000
	Exelon Generation Co LLC	Mountain Creek														
	Luminant Generation Company LLC	Lake Hubbard														
	Luminant Generation Company LLC	North Lake														
	Rock-Tenn	Rock-Tenn Dallas Mill														
	State Farm Mutual Auto Insurance Co	State Farm Insurance Medical Center														
	University of Texas at Dallas	UTD														
	Exelon Power	Mountain Creek														
	?	Parkdale														
Denton	City of Denton	Ray Roberts			X	Data for Denton County was obtained from reclaimed water provider. Actual consumption in 2006 was more than either projection, so a hybrid was used.			X	Data for Denton County was obtained from reclaimed water provider. Actual consumption in 2006 was more than either projection, so a hybrid was used.	644	744	844	944	1,044	1,144
	City of Garland	Lewisville														
	City of Garland	Spencer														
	WM Renewable Energy LLC	DFW Gas Recovery														
Ellis	ANP Operations Co	Midlothian Energy Facility	X			BEG most closely corresponds to observed consumption.	X			BEG most closely corresponds to predicted consumption.	981	698	1,450	3,741	5,754	7,878
	Ennis Tracetebel Power Co LLP	Ennis Tracetebel Power Co LLP														
	?	Waxahachie														
Fannin	Valley NG Power Company LLC (Luminant)	Valley			X	A new plant is planned in this county in the near term that was not accounted for previously.			X	A new plant is planned in this county in the near term that was not accounted for previously.	1,261	3,000	4,748	5,184	19,169	6,366
	LS Power	LS Power														
Fannin/ Grayson	Merchant Power Plant	-			X	A new plant is planned in this county in the near term that was not			X	A new plant is planned in this county in the near term that was not	0	6,726	13,452	13,452	13,452	13,452
Freestone	Big Brown Power Company LLC (Luminant)	Big Brown			X	A new plant is planned in this county in the near term that was not accounted for previously.			X	A new plant is planned in this county in the near term that was not accounted for previously.	12,173	18,210	20,524	23,999	28,234	33,398
	Calpine - Freestone Power Generation LP	Calpine														
	Luminant	Big Brown Update														
Grayson	City of Whitesboro	Whitesboro			X	A new plant is planned in this county in the near term that was not accounted for previously.			X	A new plant is planned in this county in the near term that was not accounted for previously.	5,600	5,600	5,600	5,600	5,600	5,600
	USCE - Tulsa District	Denison														
	Panda Energy	Sherman														
Henderson	Luminant Generation Company LLC	Trinidad	X			BEG most closely corresponds to observed consumption.			X	A mothballed facility is planned to be online in the long-term scenario. The water consumption was provided by industry representatives.	460	427	7,000	8,000	9,000	10,000
	Luminant Generation Company LLC	Forest Grove														
Jack	Brazos Electric Power Coop Inc	Jack Energy Facility			X	A new plant is planned in this county in the near term that was not accounted for previously.			X	A new plant is planned in this county in the near term that was not accounted for previously.	2,162	2,500	2,700	2,900	3,100	3,300
	Gamesa Energy	Barton Chapel Wind 1														
Kaufman	FPLE Forney LLP	Forney Energy Center		X		The 2006 Plan most closely corresponds to observed consumption.			X	One SEP plant is currently in Kaufman County. Since Kaufman County is designated as a non-attainment county, it is unlikely that new plants will be constructed.	8,979	10,000	10,000	10,000	10,000	10,000
Navarro	Ellis Power	Ellis Power			X	New plants are planned in this county in the near term that were not accounted for previously.			X	New plants are planned in this county in the near term that were not accounted for previously.	0	8,000	13,440	13,440	13,440	13,440
	Babcock and Brown (Navarro Energy)	Babcock and Brown (Navarro Energy)														
	?	Corsicana														
Parker	Brazos Electric Power Coop Inc	North Texas	X			BEG most closely corresponds to observed consumption.	X			BEG most closely corresponds to predicted consumption.	24	22	28	56	75	102
	Weatherford Mun Utility System	Weatherford														
Tarrant	City of Fort Worth	Village Creek WWTP	X			BEG most closely corresponds to observed consumption.			X	Since Tarrant County is designated as a non-attainment county, it is unlikely that new plants will be constructed. The water demand was capped in the long term to correspond to recent high demands.	2,640	2,448	4,168	5,000	5,000	5,000
	Exelon Generation Co LLC	Handley														
	Luminant Generation Company LLC	Eagle Mountain														
	?	North Main														
Wise	Devon Gas Service	Bridgeport Gas Processing Plant	X			BEG most closely corresponds to observed consumption.	X			BEG most closely corresponds to predicted consumption.	1,751	1,245	1,216	1,878	2,042	2,748
	Wise County Power Co LP	Wise County Power LP														
TOTAL											40,813	64,625	98,088	107,394	129,510	126,428

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Attachment B
Steam Electric Power Demand by County
Historical Usage and Projections Comparison

Figure 1. Collin County Steam Electric Power Comparison

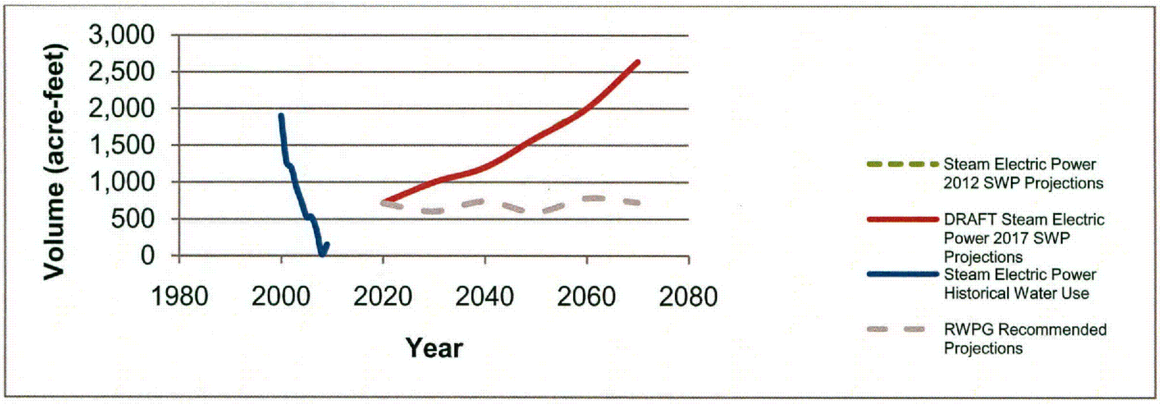


Figure 2. Cooke County Steam Electric Power Comparison

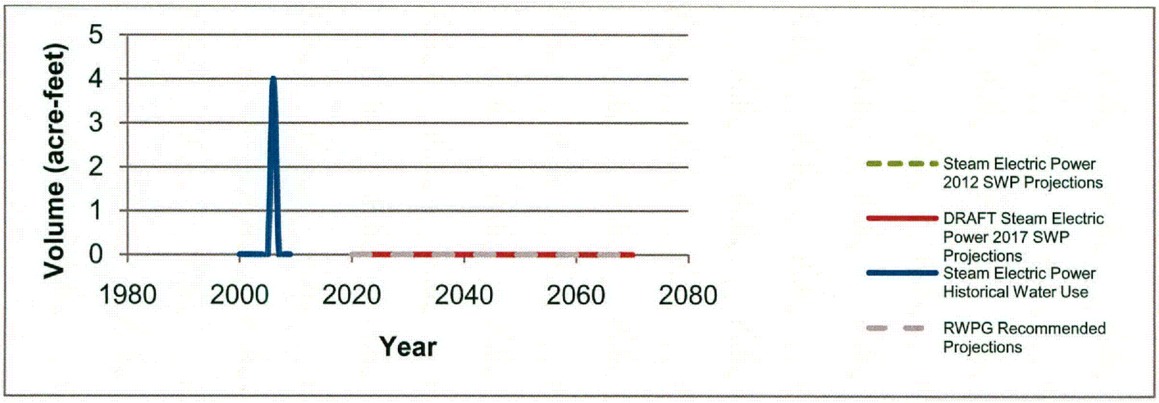


Figure 3. Dallas County Steam Electric Power Comparison

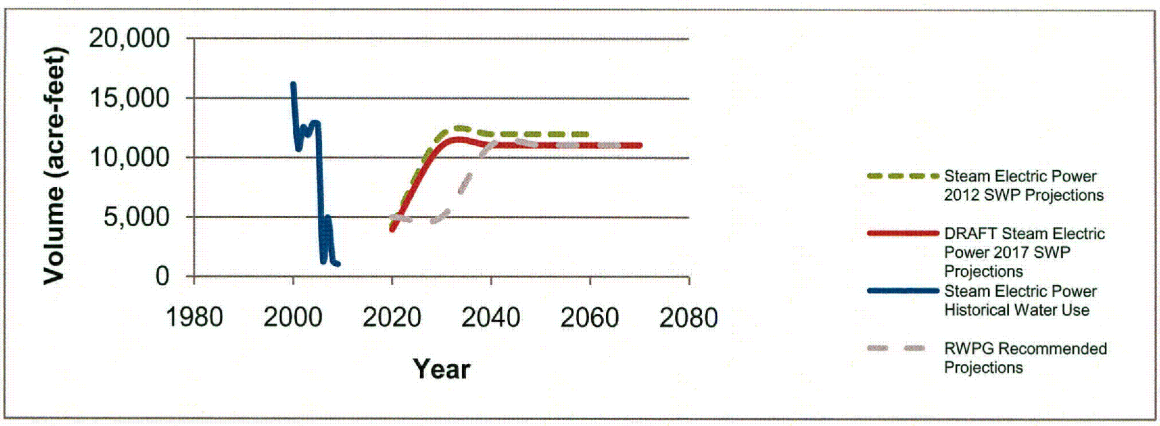


Figure 4. Denton County Steam Electric Power Comparison

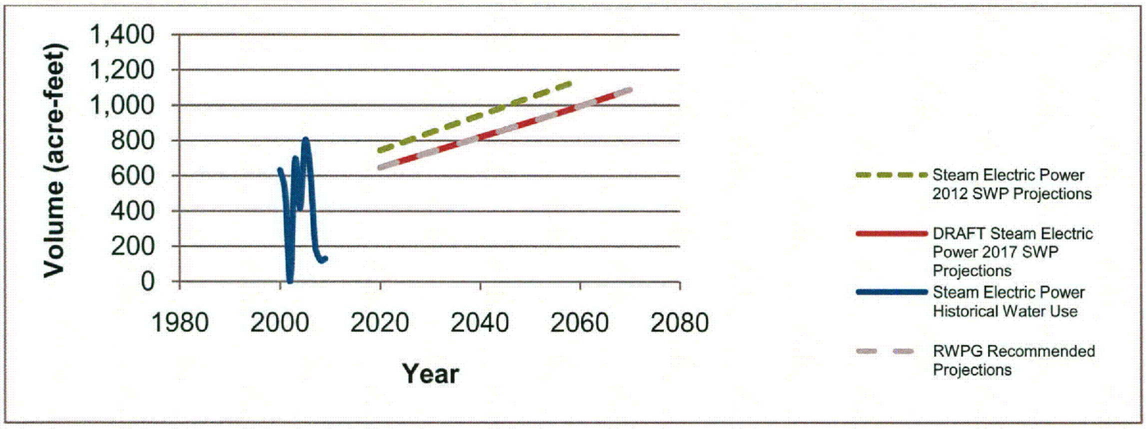


Figure 5. Ellis County Steam Electric Power Comparison

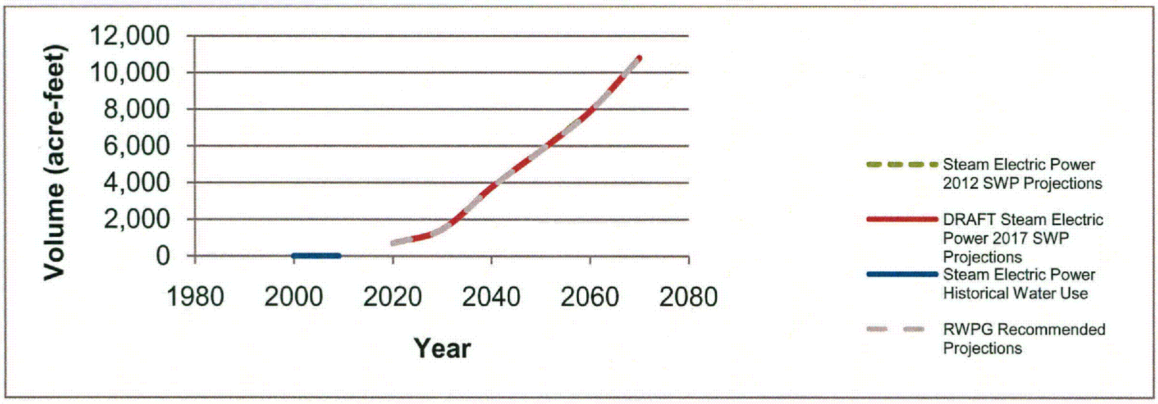


Figure 6. Fannin County Steam Electric Power Comparison

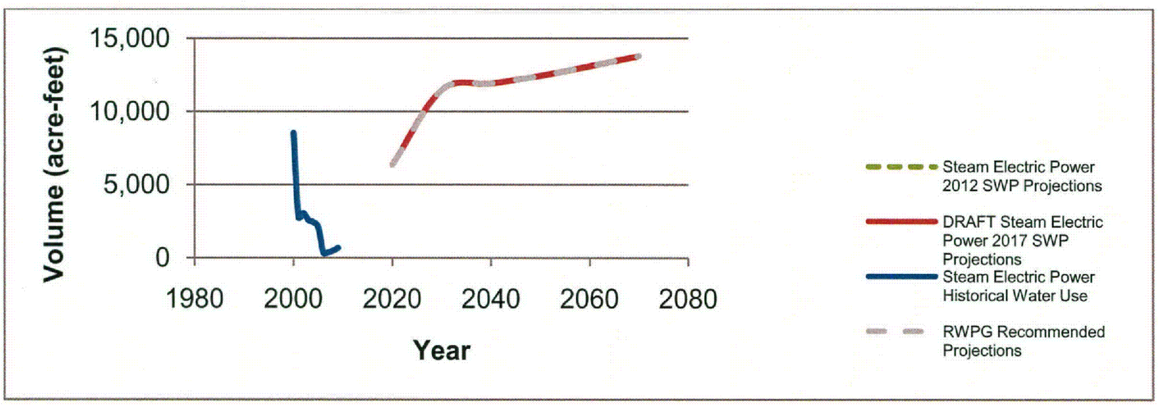


Figure 7. Freestone County Steam Electric Power Comparison

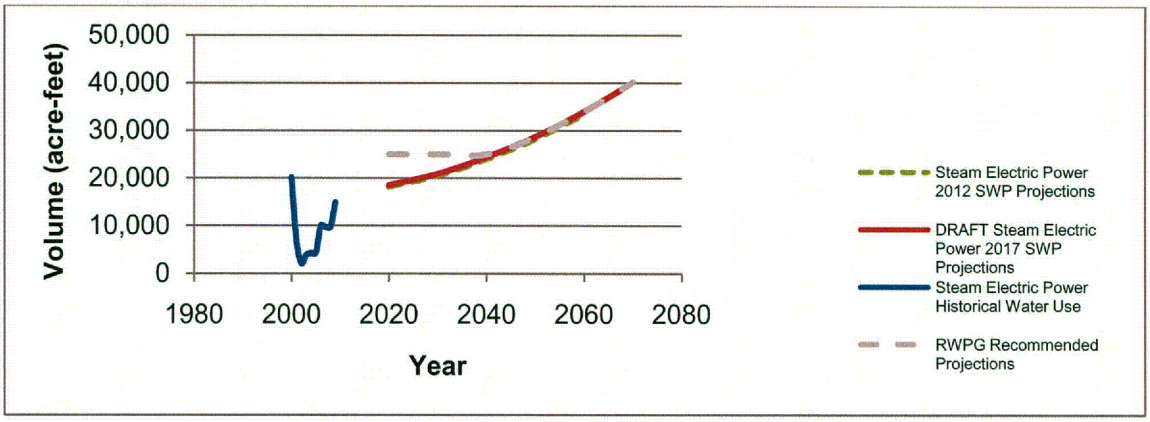


Figure 8. Grayson County Steam Electric Power Comparison

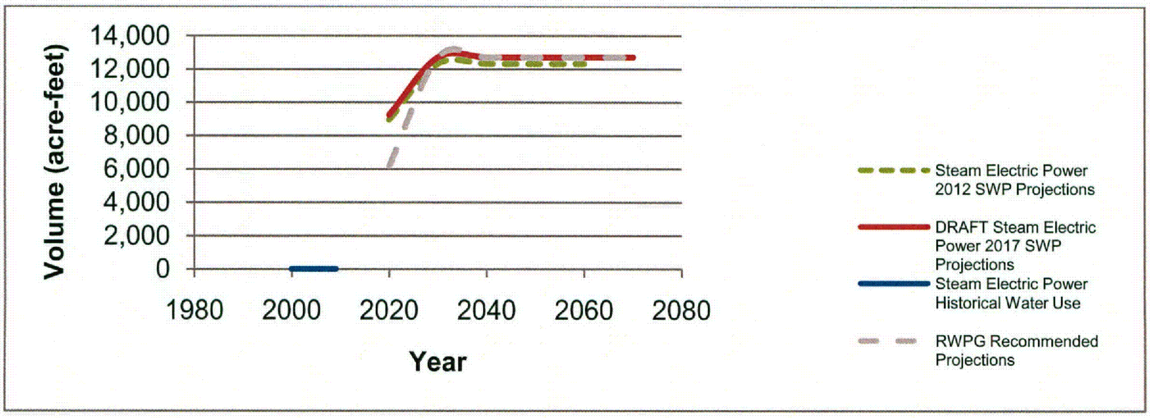


Figure 9. Henderson County Steam Electric Power Comparison

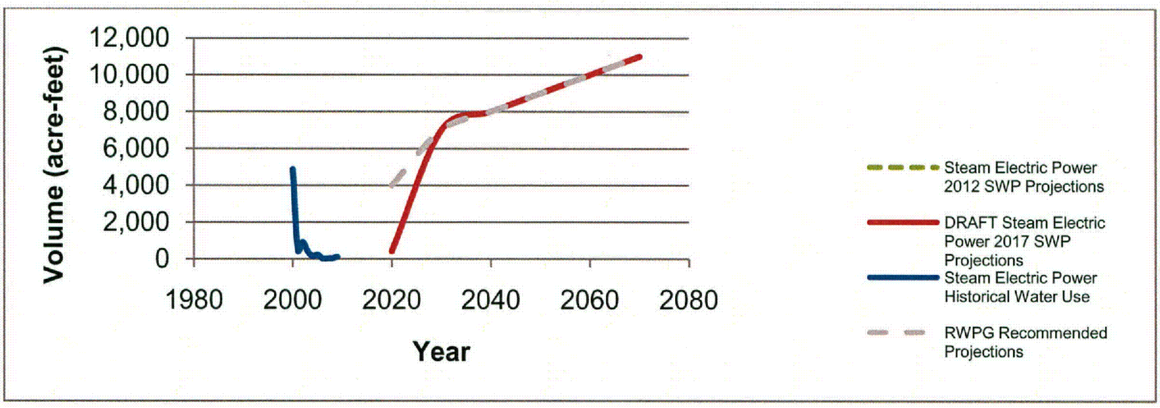


Figure 10. Jack County Steam Electric Power Comparison

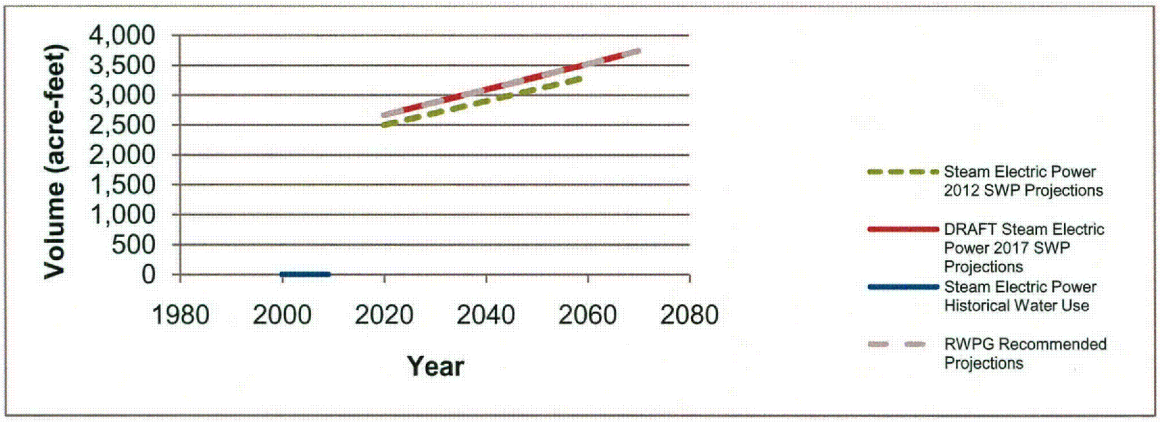


Figure 11. Kaufman County Steam Electric Power Comparison

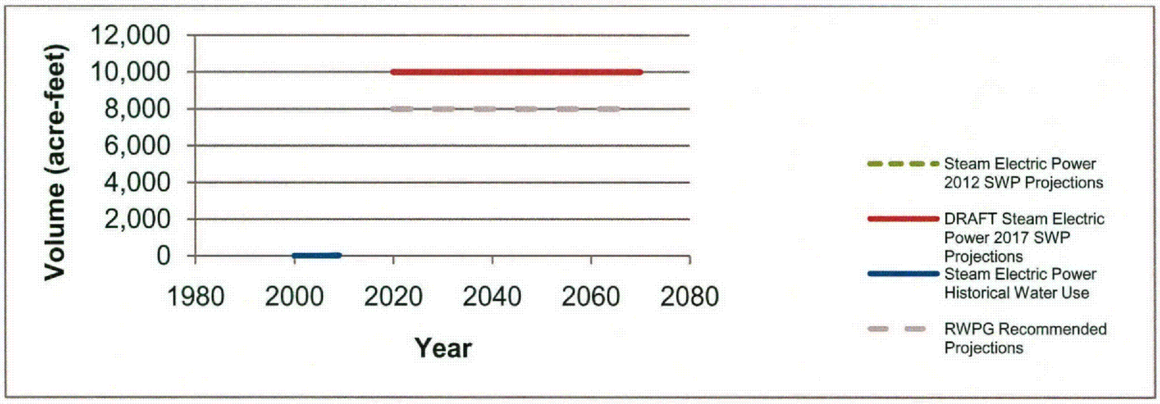


Figure 12. Navarro County Steam Electric Power Comparison

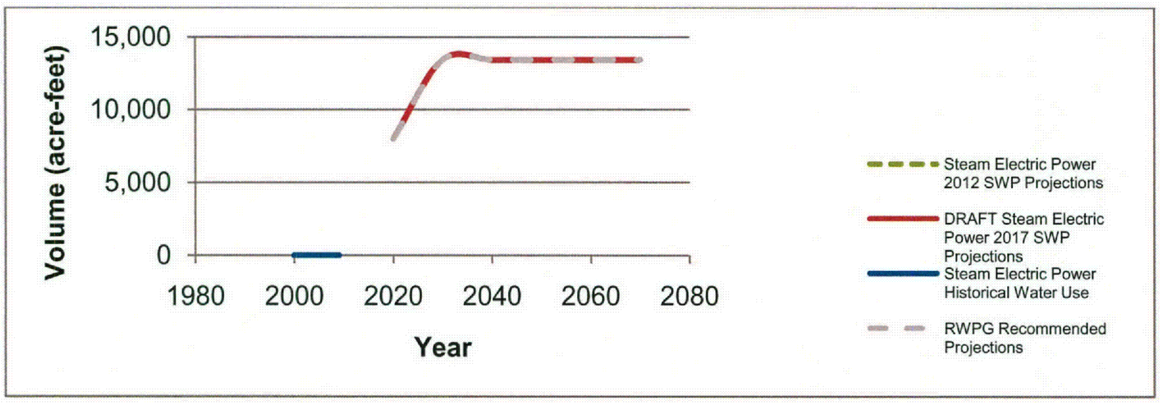


Figure 13. Parker County Steam Electric Power Comparison

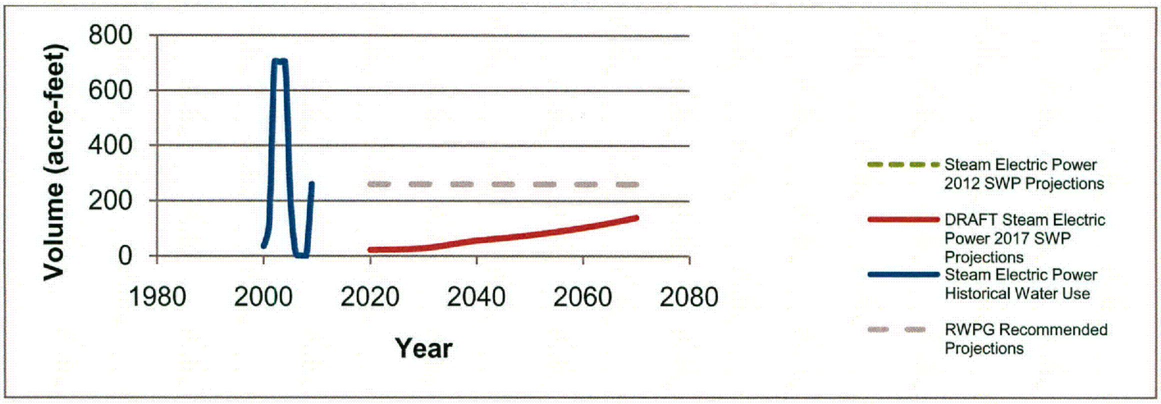


Figure 14. Rockwall County Steam Electric Power Comparison

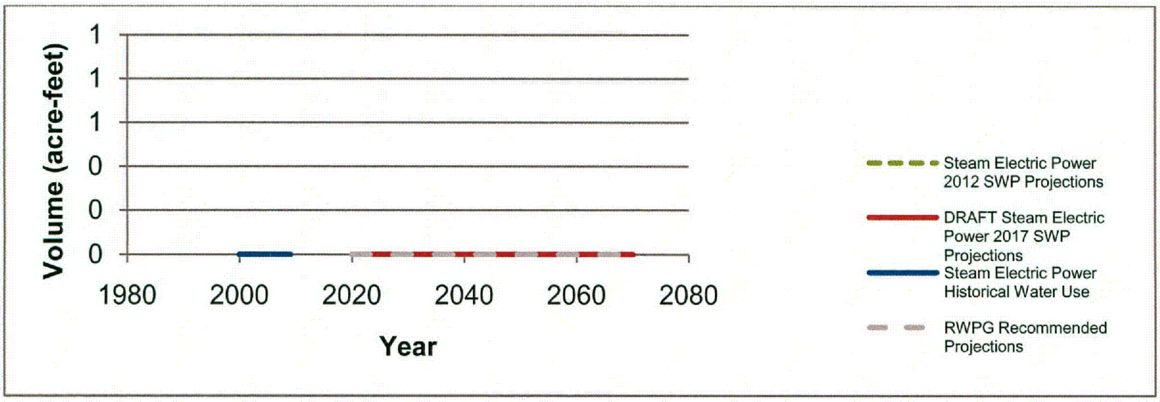


Figure 15. Tarrant County Steam Electric Power Comparison

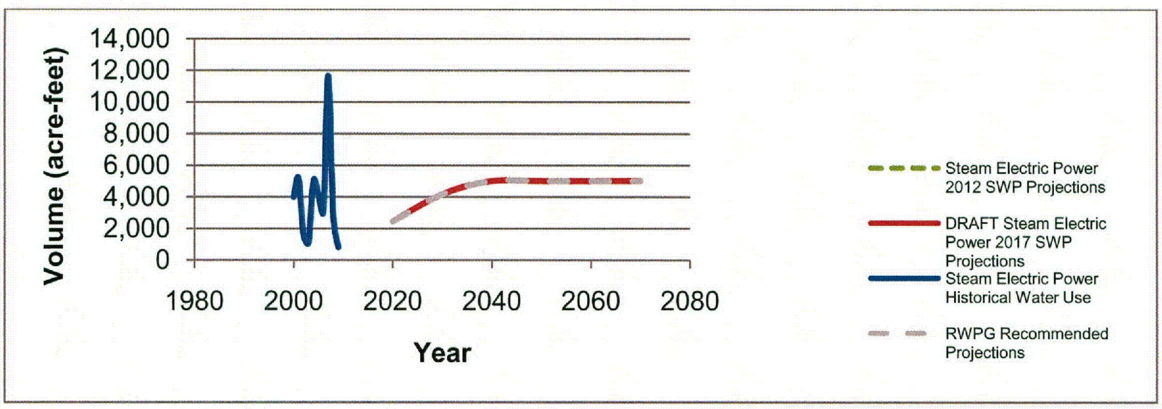
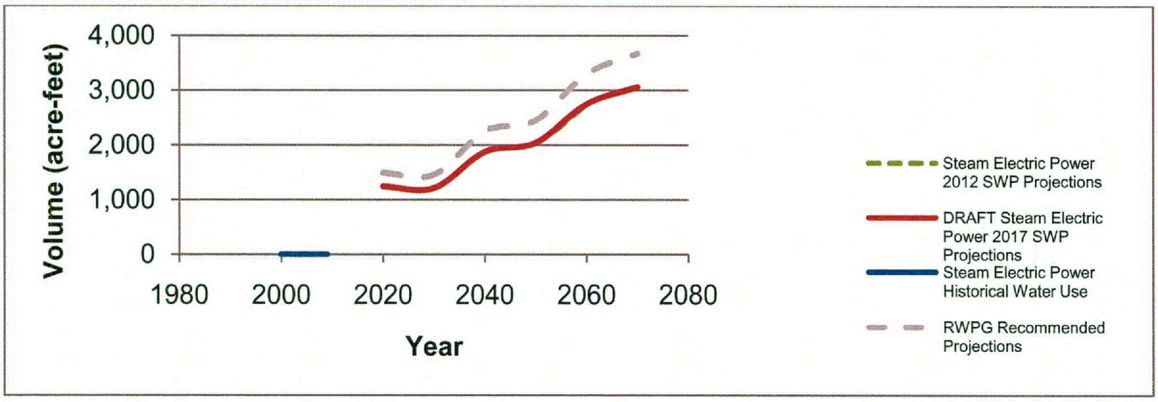


Figure 16. Wise County Steam Electric Power Comparison



Revision to Tarrant Co Other and Dallas Co Other to include DFW Airport Demands (4,005 af/y)
Approved by Region C Water Planning Group on March 31, 2014

Tarrant County-Other	**Municipal Demands 2020**	**Municipal Demands 2030**	**Municipal Demands 2040**	**Municipal Demands 2050**	**Municipal Demands 2060**	**Municipal Demands 2070**
Board-Approved Municipal Demand Projections (acre-feet)	6,006	5,860	5,741	9,408	12,507	17,176
DFWIA Demands To Add (acre-feet)	*2,002*	*2,002*	*2,002*	*2,002*	*2,002*	*2,002*
Proposed Muncipal Demend Projections (acre-feet)	8,008	7,862	7,743	11,410	14,509	19,178

Dallas County-Other	**Municipal Demands 2020**	**Municipal Demands 2030**	**Municipal Demands 2040**	**Municipal Demands 2050**	**Municipal Demands 2060**	**Municipal Demands 2070**
Board-Approved Municipal Demand Projections (acre-feet)	1,723	967	644	642	640	640
*Assumed DFWIA Water Use Imbedded In Board-Approved Projections (acre-feet)**	*620*	*348*	*232*	*231*	*230*	*230*
Assumed non-DFWIA Water Use in Board-Approved Projections (acre-feet)	*1,103*	*619*	*412*	*411*	*410*	*410*
DFWIA Demands To Add: 2,003 acre-feet Minus Imbedded Use (acre-feet)	*1,383*	*1,655*	*1,771*	*1,772*	*1,773*	*1,773*
Proposed Revision - Municipal Demand Projection (acre-feet)	3,106	2,622	2,415	2,414	2,413	2,413

* Estimated by TWDB

Savings due to Plumbing Code for Municipal WUGs by County - in acre-feet

County	WUG Name	2020	2030	2040	2050	2060	2070
COLLIN	ALLEN	762.41	958.8	1080.17	1156.3	1187.2	1189.4
COLLIN	ANNA	82.54	119.83	223.21	313.56	614.62	935.12
COLLIN	BLUE RIDGE	9.19	32.66	73.03	0	0	0
COLLIN	CADDO BASIN SUD	29.21	49	75.81	100.09	121.71	142.79
COLLIN	CARROLLTON	0.04	0.08	0.15	0.23	0.29	0.34
COLLIN	CELINA	231.1	536.16	933.56	1452.97	1454.23	1456.75
COLLIN	COPEVILLE SUD	43.86	76.41	110.38	157.36	281.02	485.52
COLLIN	COUNTY-OTHER, COLLIN	82.17	112.25	134.73	550.83	799.22	1288.61
COLLIN	CULLEOKA WSC	50.71	92.41	151.22	184.82	201.63	252.03
COLLIN	DALLAS	730.18	1091.65	1367.5	1491.29	1516.21	1518.7
COLLIN	EAST FORK SUD	31.36	53.31	75.48	95.88	116.68	139.72
COLLIN	FAIRVIEW	118.1	165.33	241.8	248.53	251.23	252.35
COLLIN	FARMERSVILLE	127.16	400.79	412.21	418.71	419.83	420.72
COLLIN	FRISCO	720.82	1196.64	1593.92	1631.56	1657.9	1665.43
COLLIN	GARLAND	3.34	5.91	8.99	11.96	14.68	17.5
COLLIN	HICKORY CREEK SUD	0.72	1.07	1.33	1.53	1.73	1.94
COLLIN	JOSEPHINE	23.48	44.54	63.47	80.49	80.79	80.94
COLLIN	LAVON	25.44	41.03	68.95	92.12	213.72	485.92
COLLIN	LAVON SUD	42.91	56.78	74.82	87.92	207.11	521.43
COLLIN	LOWRY CROSSING	20.29	33.81	48.46	51.08	51.72	51.78
COLLIN	LUCAS	69.84	102.23	155.3	181.81	203.93	204.38
COLLIN	MARILEE SUD	42.56	50.81	56.29	58.19	58.12	58.44
COLLIN	MCKINNEY	1142.55	1804.42	3014.02	4138.44	4186.56	4190.57
COLLIN	MELISSA	51.74	93.32	136.49	328.99	556.15	838.43
COLLIN	MURPHY	151.75	183.69	198.12	208.43	214.87	216.15
COLLIN	NEVADA	9.83	16.56	23.39	104.44	263.79	475.73
COLLIN	NEW HOPE	9.58	16.82	24.4	31.3	38.18	45.79
COLLIN	NORTH COLLIN WSC	52.55	84.06	114.81	140.93	164.82	190.04
COLLIN	PARKER	53.5	200.55	260.99	264.8	266.15	266.59
COLLIN	PLANO	2360.64	3407.98	4312.3	4735.01	4827.47	4827.47
COLLIN	PRINCETON	84.22	148.51	215.29	549.26	877.4	1203.41
COLLIN	PROSPER	159.54	274.34	334.51	354.5	371.1	372.28
COLLIN	RICHARDSON	323.43	458.62	585.8	662.68	673.34	673.72
COLLIN	ROYSE CITY	11.97	56.86	141.41	250.24	483.54	521.44
COLLIN	SACHSE	69.01	84.23	93.35	98.92	100.96	101.4
COLLIN	SEIS LAGOS UD	22.9	27.15	29.7	31.21	31.66	31.85
COLLIN	SOUTH GRAYSON WSC	8.86	15.04	23.66	29.51	34.87	39.91
COLLIN	ST. PAUL	21.9	30.49	36.02	39.1	41.21	41.39
COLLIN	WESTON	60.32	143.3	671.41	1647.28	2620.93	2622.36
COLLIN	WYLIE	304.83	449.03	540.09	605.01	641.09	663.26
COLLIN	WYLIE NORTHEAST SUD	16.21	27.25	38.41	82.73	140.35	226.18
COOKE	BOLIVAR WSC	16.83	25.14	30.91	34.64	36.61	38.04
COOKE	COUNTY-OTHER, COOKE	86.92	131.66	174.93	259.64	304.79	643.45
COOKE	GAINESVILLE	188.17	288.25	368.73	422.67	526.75	747.64
COOKE	LAKE KIOWA SUD	30.66	41.1	45.4	46.83	48.23	48.33
COOKE	LINDSAY	10.68	16.11	20.37	23.29	46.74	95.1
COOKE	MOUNTAIN SPRING WSC	24.41	35.76	44.4	50.43	83.79	136.39
COOKE	MUENSTER	15.82	22.8	29.77	32.98	34.65	34.65
COOKE	TWO WAY SUD	1.01	1.47	1.73	1.92	2.03	2.11
COOKE	VALLEY VIEW	0	0	0	0	0	0
COOKE	WOODBINE WSC	63.46	102.64	137.39	164	182.6	199.32
DALLAS	ADDISON	154.88	268.28	370.61	454.03	518.49	578.54
DALLAS	BALCH SPRINGS	269.93	416.16	544.15	643	707.34	763.39
DALLAS	CARROLLTON	504.5	702.06	853.3	937.01	953.76	954.87
DALLAS	CEDAR HILL	486.29	821.47	1116.39	1368.14	1383.83	1385.79
DALLAS	COCKRELL HILL	53.62	83.94	100.4	109.41	154.08	337.89
DALLAS	COMBINE	10.28	15.66	20.21	23.96	26.83	29.53
DALLAS	COPPELL	377.16	529.77	625.8	681.07	694.65	695.12

Savings due to Plumbing Code for Municipal WUGs by County - in acre-feet

County	WUG Name	2020	2030	2040	2050	2060	2070
DALLAS	COUNTY-OTHER, DALLAS	36	21.57	14.85	16.8	18.75	18.75
DALLAS	DALLAS	11682.29	18519.97	26195.75	32008.41	35216.7	36561.72
DALLAS	DESOTO	530.42	809.9	1050.85	1239.76	1365.56	1475.08
DALLAS	DUNCANVILLE	474.59	739.77	881.18	958.75	973	974.05
DALLAS	EAST FORK SUD	26.49	49.32	71.72	93.05	111.4	129.38
DALLAS	FARMERS BRANCH	320.96	483.95	625.62	725.82	780.51	824.95
DALLAS	FERRIS	0.07	0.16	0.27	0.37	0.46	0.56
DALLAS	GARLAND	2341.18	3422.53	4219.02	4640.92	4725.3	4725.3
DALLAS	GLENN HEIGHTS	143.86	254.65	357.22	458.94	550.47	729.62
DALLAS	GRAND PRAIRIE	1674.06	2824.06	3612.81	3822.89	3874.76	3882.54
DALLAS	HIGHLAND PARK	99.27	147.19	181.83	196.64	199.77	199.88
DALLAS	HUTCHINS	110.15	194.78	271.5	343.39	410.31	476.17
DALLAS	IRVING	2865.3	4225.71	4914.06	5293.29	5372.96	5382.52
DALLAS	LANCASTER	463.61	847.07	1144.06	1344.68	1502.19	1648.75
DALLAS	LEWISVILLE	7.97	11.01	12.95	13.92	14.19	14.21
DALLAS	MESQUITE	1514.15	2385.39	3275.24	3870.61	4253.84	4590.41
DALLAS	OVILLA	5.43	9.57	13.46	17.09	20.17	35.38
DALLAS	RICHARDSON	753.92	1106.07	1412.82	1598.22	1623.94	1624.86
DALLAS	ROCKETT SUD	11.26	31.12	53.43	75.18	95.38	115.06
DALLAS	ROWLETT	535.08	789.27	910	979.78	997.92	999.32
DALLAS	SACHSE	179.98	219.67	243.44	257.98	263.29	264.44
DALLAS	SEAGOVILLE	198.63	328.7	444.46	542.28	622.93	623.48
DALLAS	SUNNYVALE	66.26	129.26	186.83	224.48	273.2	273.61
DALLAS	UNIVERSITY PARK	291.2	397.95	486	534.05	542.39	542.97
DALLAS	WILMER	43.08	66.36	130.89	261.73	416.72	762.59
DALLAS	WYLIE	18.4	24.62	28.25	30.78	32.35	34.08
DENTON	ARGYLE	70.23	133.78	209.4	213.91	215.08	215.66
DENTON	ARGYLE WSC	71.87	76.67	77.17	77.74	78.25	78.98
DENTON	AUBREY	51.77	85.88	108.41	133.32	162.14	198.06
DENTON	BARTONVILLE	67.39	84.96	89.28	91.68	92.19	92.8
DENTON	BOLIVAR WSC	97.8	165.63	234.72	299.65	363.18	432.56
DENTON	CARROLLTON	779.07	1118.13	1358.99	1492.31	1518.98	1520.76
DENTON	CELINA	7.14	59.57	204.93	484.32	484.74	485.58
DENTON	COPPELL	10.63	14.39	17	18.5	18.87	18.88
DENTON	COPPER CANYON	14.35	21.94	28.89	34.17	37.99	41.8
DENTON	CORINTH	198.68	304.66	331.42	348.6	355.87	356.87
DENTON	COUNTY-OTHER, DENTON	208.09	288	347.82	541.42	920.9	1758.4
DENTON	CROSS ROADS	18.62	33.4	44.65	46.01	46.61	46.74
DENTON	DALLAS	303.87	480.12	674.78	820.13	899.29	932.3
DENTON	DENTON	1766.95	3133.63	4470.92	5963.12	8301.5	10170.62
DENTON	DENTON COUNTY FWSD #10	51.57	136.97	138.09	139.4	140.72	141.47
DENTON	DENTON COUNTY FWSD #1A	104.91	233.19	288.66	292.02	294.37	296.05
DENTON	DENTON COUNTY FWSD #7	90.58	103.74	105.7	107.67	109.63	111.3
DENTON	DOUBLE OAK	27.69	38.17	46.44	51.08	52.15	52.15
DENTON	FLOWER MOUND	669	1122.84	1247.49	1321.24	1345.13	1347.21
DENTON	FORT WORTH	377.41	794.2	1316.54	1953.03	2535.82	3105.04
DENTON	FRISCO	480.54	797.76	1062.61	1087.7	1105.27	1110.29
DENTON	HACKBERRY	10.2	17.12	23.97	31.07	38.82	47.32
DENTON	HICKORY CREEK	40.76	70.06	99.78	132.71	133.87	134.05
DENTON	HIGHLAND VILLAGE	172.2	246.59	290.95	315.95	321.39	321.79
DENTON	JUSTIN	45.21	112.65	176.49	180.39	181.6	181.87
DENTON	KRUGERVILLE	17.57	29.73	40.42	51.21	51.83	51.9
DENTON	KRUM	44.75	75.1	105.26	134.83	165.45	199.02
DENTON	LAKE DALLAS	72.79	110.92	152.43	162.56	165.23	165.34
DENTON	LAKEWOOD VILLAGE	6.39	10.83	15.28	19.67	24.24	29.24
DENTON	LEWISVILLE	1009.11	1585.52	2133.59	2616.07	2977.7	2981.65
DENTON	LITTLE ELM	174.26	249.28	263.68	275.8	285.27	286.03
DENTON	MOUNTAIN SPRING WSC	0.51	0.77	1.01	1.2	1.41	1.6

Savings due to Plumbing Code for Municipal WUGs by County - in acre-feet

County	WUG Name	2020	2030	2040	2050	2060	2070
DENTON	MUSTANG SUD	114.25	282.18	440.05	594.43	745.57	895.89
DENTON	NORTHLAKE	41.74	197.66	367.85	513.51	657.97	658.59
DENTON	OAK POINT	91.63	162.83	227.11	289.96	350.94	352.08
DENTON	PALOMA CREEK	79.95	131.47	133.54	135.62	137.69	139.01
DENTON	PILOT POINT	84.97	131.37	202.2	287.48	387.57	525.94
DENTON	PLANO	67.96	98.38	122.05	133.07	135.67	135.67
DENTON	PONDER	17.76	32.34	47.44	63.1	80.41	99.66
DENTON	PROSPER	5.98	46.93	125.46	241.85	359.29	360.43
DENTON	PROVIDENCE VILLAGE WCID	42.79	50.25	51.95	53.73	55.51	56
DENTON	ROANOKE	68.96	113.67	152.29	158.48	160.63	161.03
DENTON	SANGER	84.6	144.12	204.03	261.65	320.29	384.69
DENTON	SHADY SHORES	32.42	48.45	54.01	57.23	58.2	58.37
DENTON	SOUTHLAKE	7.9	13.65	20	26.51	33.33	40.61
DENTON	THE COLONY	578.7	854.33	1034.09	1198.67	1211.55	1214.58
DENTON	TROPHY CLUB	153.76	182.37	200.41	210.98	213.62	214.79
DENTON	WESTLAKE	0.18	0.34	0.5	0.65	0.82	1
ELLIS	BARDWELL	8.82	15.36	21.95	28.67	35.71	80.7
ELLIS	BRANDON-IRENE WSC	0.91	1.69	2.59	3.41	4.24	5.16
ELLIS	BUENA VISTA - BETHEL SUD	36.39	62.47	85.19	112.28	166.3	223.86
ELLIS	CEDAR HILL	6.53	11.54	16.65	21.89	22.14	22.17
ELLIS	COUNTY-OTHER, ELLIS	62.11	97.35	134.18	596.35	1310.25	2312.43
ELLIS	ENNIS	239.04	395.21	534.64	790.14	1300.93	2184.62
ELLIS	FERRIS	34.22	58.13	80.29	99.47	168.92	320.25
ELLIS	FILES VALLEY WSC	8.07	14.6	21.9	29.36	36.65	44.7
ELLIS	GARRETT	9.53	16.56	23.56	30.76	38.41	93.49
ELLIS	GLENN HEIGHTS	36.4	60.48	83.61	107.82	133.99	206.2
ELLIS	GRAND PRAIRIE	0.57	1	1.44	1.88	2.34	2.85
ELLIS	ITALY	30.79	55.38	80.7	104.87	134.42	180.39
ELLIS	JOHNSON COUNTY SUD	2.13	3.79	5.59	7.41	9.25	11.31
ELLIS	MANSFIELD	0.96	1.49	2.11	3.13	3.96	4.92
ELLIS	MAYPEARL	12.45	21.1	27.05	28.77	29.1	29.13
ELLIS	MIDLOTHIAN	123.57	238.88	364.74	472.56	560.71	622.07
ELLIS	MILFORD	8.33	13.02	17.36	20.71	23.13	25.65
ELLIS	MOUNTAIN PEAK SUD	58.35	102.14	146.77	192.05	238.93	291.88
ELLIS	OAK LEAF	13.53	22.06	31.68	49.79	75.39	92.14
ELLIS	OVILLA	46.22	80.85	115.97	151.46	188.33	351.52
ELLIS	PALMER	30.53	54.49	79.03	103.52	134.11	250.42
ELLIS	PECAN HILL	10.15	18.21	26.51	34.72	44.18	66.81
ELLIS	RED OAK	94.91	143.8	230.07	336.96	423.68	671.53
ELLIS	RICE WSC	72.13	126.12	181.46	237.73	296.44	362.26
ELLIS	ROCKETT SUD	370.17	654.22	939.37	1226.99	1621.46	2013.57
ELLIS	SARDIS-LONE ELM WSC	172.82	268.77	362.25	410.51	437.4	438.54
ELLIS	VENUS	0.66	1.12	1.59	2.1	2.63	3.24
ELLIS	WAXAHACHIE	391.47	601.43	853.44	1108.75	1375.25	1684.84
FANNIN	BONHAM	135.95	237.11	377.53	543.72	678.87	829.69
FANNIN	COUNTY-OTHER, FANNIN	127.14	182.91	229.07	362.44	829.8	1360.81
FANNIN	ECTOR	7.74	11.85	15.05	17.22	19.06	20.79
FANNIN	HICKORY CREEK SUD	3.32	4.92	5.88	6.48	7.12	7.76
FANNIN	HONEY GROVE	18.18	28.55	35.41	37.81	38.43	38.43
FANNIN	LADONIA	27.73	40.68	47.81	55.06	66.54	66.74
FANNIN	LEONARD	24.37	38.14	49.11	56.49	62.35	67.97
FANNIN	NORTH HUNT SUD	0	0	0	0	0	0
FANNIN	SAVOY	10.72	16.91	21.91	24.65	27.18	29.63
FANNIN	SOUTHWEST FANNIN COUNTY	36.52	53.76	65.07	72.92	89.22	106.34
FANNIN	TRENTON	8.18	18.02	77.71	135.76	181.64	227.27
FANNIN	WHITEWRIGHT	0.08	0.14	0.2	0.23	0.26	0.28
FREESTONE	COUNTY-OTHER, FREESTONE	105.67	150.04	186.01	271.19	469.34	957.17
FREESTONE	FAIRFIELD	37.29	57.87	74.25	152.82	176.53	221.9

Savings due to Plumbing Code for Municipal WUGs by County - in acre-feet

County	WUG Name	2020	2030	2040	2050	2060	2070
FREESTONE	FLO COMMUNITY WSC	4.94	7.46	9.55	10.88	11.24	11.43
FREESTONE	OAKWOOD	0.43	0.68	0.9	0.96	1	1.02
FREESTONE	TEAGUE	40.57	62.81	112.97	153.52	187.76	222.02
FREESTONE	WORTHAM	13.11	20.14	25.66	28.96	50.14	56.91
GRAYSON	BELLS	17.04	27.84	37.31	45.85	111.3	149.2
GRAYSON	COLLINSVILLE	23.14	40.21	55.49	70.31	91.91	120.35
GRAYSON	COUNTY-OTHER, GRAYSON	232.45	336.58	424.96	443.12	639.49	1088.22
GRAYSON	DENISON	283.15	451.45	600.34	719.36	864.3	1089.9
GRAYSON	GUNTER	24.79	44.73	66.54	86.7	105.18	123.26
GRAYSON	HOWE	33.13	54.66	73.98	89.32	100.75	111.33
GRAYSON	KENTUCKY TOWN WSC	33.05	55.71	75.93	94.32	120.57	151.81
GRAYSON	LUELLA SUD	38.52	61.58	81.66	99.27	113.65	127.87
GRAYSON	MARILEE SUD	31.9	38.08	42.19	43.61	43.57	43.81
GRAYSON	POTTSBORO	31.3	55	76.17	105.45	179.45	326.03
GRAYSON	SHERMAN	456.3	662.85	897.8	1137.6	1507.15	2134.71
GRAYSON	SOUTH GRAYSON WSC	25.32	36.6	49.26	54.8	58.05	60.23
GRAYSON	SOUTHMAYD	11.38	17.73	23.21	27.69	38.38	58.37
GRAYSON	SOUTHWEST FANNIN COUNTY	17.06	34.35	51.74	70.35	98.02	129.73
GRAYSON	TIOGA	8.85	13.55	17.59	20.7	70.41	97
GRAYSON	TOM BEAN	12.6	20.2	26.83	32.4	40.1	60.99
GRAYSON	TWO WAY SUD	63.67	110.15	151.48	192.61	260.34	328.1
GRAYSON	VAN ALSTYNE	40.33	67.84	92.32	114.99	345.59	482.22
GRAYSON	WHITESBORO	38.27	55.4	69.71	78.21	101.43	133.61
GRAYSON	WHITEWRIGHT	16.77	24.94	31.94	34.61	37.45	39.7
GRAYSON	WOODBINE WSC	0.87	1.37	1.81	2.16	2.43	2.68
HENDERSON	ATHENS	157.47	247.38	320.85	384.05	682.37	1044.53
HENDERSON	BETHEL-ASH WSC	21.67	33.15	41.91	49.94	55.27	59.92
HENDERSON	COUNTY-OTHER, HENDERSON	35.25	42.64	52.97	47.77	43.32	38.05
HENDERSON	EAST CEDAR CREEK FWSD	61.81	67.21	81.59	88.34	95.06	101.71
HENDERSON	EUSTACE	10.93	16.65	21.57	35.21	46.79	56.49
HENDERSON	GUN BARREL CITY	58.27	89.41	116.13	149.28	235.09	381.52
HENDERSON	LOG CABIN	8	11.98	15.19	17.74	19.1	20.2
HENDERSON	MABANK	7.75	10.99	13.36	17.31	34.52	69.67
HENDERSON	MALAKOFF	25.2	37.42	47.55	54.28	58.56	63.04
HENDERSON	PAYNE SPRINGS	9.5	14.83	19.15	22.87	25.86	32.13
HENDERSON	SEVEN POINTS	13.54	22.09	29.5	40.46	48.76	57.28
HENDERSON	TOOL	26.13	39.65	50.74	59.31	93	125.21
HENDERSON	TRINIDAD	9.82	14.64	17.37	17.7	20.51	24.89
HENDERSON	VIRGINIA HILL WSC	28.29	45.22	58.93	71.51	80.25	90.73
HENDERSON	WEST CEDAR CREEK MUD	33.69	33.73	33.77	33.81	40.33	50.41
JACK	BRYSON	6.4	9.79	12.41	13.84	14.23	14.38
JACK	COUNTY-OTHER, JACK	44.38	66.9	83.92	93.28	96.18	97.22
JACK	JACKSBORO	49.3	73.32	91.31	101.22	104.46	105.52
KAUFMAN	ABLES SPRINGS WSC	15.91	19.93	24.54	29.84	36.01	43.06
KAUFMAN	COLLEGE MOUND WSC	144.72	181.26	223.17	271.37	369.65	468.22
KAUFMAN	COMBINE	23.89	40.01	56.48	72.64	88.76	106.64
KAUFMAN	COUNTY-OTHER, KAUFMAN	120.03	176.34	308.71	520.58	915.22	1276.29
KAUFMAN	CRANDALL	54.03	87.91	121.59	154.04	155.12	155.39
KAUFMAN	FORNEY	190.53	283.08	412.19	524.36	780.29	1050.25
KAUFMAN	FORNEY LAKE WSC	40.73	65.17	88.07	112.08	195.53	283.65
KAUFMAN	GASTONIA-SCURRY SUD	106.5	133.41	164.25	199.72	336.04	504.06
KAUFMAN	HIGH POINT WSC	66.94	110.34	153.9	196.65	324.62	434.84
KAUFMAN	KAUFMAN	95.26	171.38	252.73	409.65	536.41	661
KAUFMAN	KEMP	24.59	40.58	56.7	72.38	112.97	159.02
KAUFMAN	MABANK	33.05	52.19	69.15	107.62	155.35	209.02
KAUFMAN	MACBEE SUD	0.89	1.12	1.38	1.68	2.02	2.41
KAUFMAN	MESQUITE	1.4	2.53	3.78	5	6.13	7.36
KAUFMAN	OAK GROVE	10.7	18.45	25.34	40.04	54.75	110.5

Savings due to Plumbing Code for Municipal WUGs by County - in acre-feet

County	WUG Name	2020	2030	2040	2050	2060	2070
KAUFMAN	POST OAK BEND CITY	7.67	12.64	16.99	27.93	38.39	77.79
KAUFMAN	ROSE HILL SUD	64.86	105.82	146.42	186.8	248.86	386.45
KAUFMAN	SCURRY	9.06	12.94	15.4	23.65	33.27	73.93
KAUFMAN	SEAGOVILLE	0.32	0.53	0.76	0.98	1.21	1.45
KAUFMAN	SEVEN POINTS	0.95	1.65	2.39	3.14	3.87	4.65
KAUFMAN	TALTY	18.06	27.7	36.54	46.17	65.8	111.57
KAUFMAN	TALTY WSC	72.63	102.48	128.77	191.82	249.39	328.99
KAUFMAN	TERRELL	305.12	781.77	1031.6	1323.72	1547.34	1801.68
KAUFMAN	WEST CEDAR CREEK MUD	32.55	40.78	50.2	61.05	80.65	117.62
NAVARRO	BLOOMING GROVE	10.47	16.58	22.09	26.07	29.02	31.82
NAVARRO	BRANDON-IRENE WSC	2.44	3.87	5.2	6.05	6.73	7.38
NAVARRO	CHATFIELD WSC	47.11	63.78	77.22	85.59	88.92	91.08
NAVARRO	CORBET WSC	28.24	43.56	56.93	67.82	75.72	83.13
NAVARRO	CORSICANA	301.06	477.14	635.53	758.12	843.41	925.24
NAVARRO	COUNTY-OTHER, NAVARRO	46.43	63.05	75.62	160.18	332.91	588.86
NAVARRO	DAWSON	10.07	15.9	21.13	25.24	28.08	30.81
NAVARRO	FROST	7.99	12.57	16.68	19.93	22.18	24.35
NAVARRO	KERENS	20.3	32.26	43.11	49.27	54.81	60.15
NAVARRO	M-E-N WSC	30.36	46.24	59.84	71.15	79.54	87.44
NAVARRO	NAVARRO MILLS WSC	33.68	52.3	68.67	81.88	91.33	100.24
NAVARRO	RICE	9.97	15.25	19.85	23.61	26.35	28.96
NAVARRO	RICE WSC	14.97	22.57	28.39	33.04	36.77	40.44
PARKER	ALEDO	60.19	118.27	192.96	206.58	207.47	208.06
PARKER	ANNETTA	17.95	29.74	40.23	49.26	56.8	64.01
PARKER	ANNETTA NORTH	5.14	7.68	9.91	11.78	13.28	14.81
PARKER	ANNETTA SOUTH	5.38	7.79	9.82	10.93	11.12	11.12
PARKER	AZLE	24.49	37.81	49.47	57.86	71.62	92.85
PARKER	COUNTY-OTHER, PARKER	489.11	665.49	801.85	1273.55	2033.75	3209.3
PARKER	CRESSON	4.5	6.76	8.55	10.15	11.65	13.26
PARKER	FORT WORTH	654.17	1411.91	1863.4	2158.6	2332.95	2488.67
PARKER	HUDSON OAKS	33.44	59.55	83.51	88.32	88.97	89.13
PARKER	MINERAL WELLS	22.5	31.43	37.52	40.22	39.94	38.91
PARKER	PARKER COUNTY SUD	56.74	100.19	142.75	187.67	235.57	289.33
PARKER	RENO	0	0	0	0	0	0
PARKER	SPRINGTOWN	49.39	87.67	95.49	99.93	100.85	101.16
PARKER	WALNUT CREEK SUD	180.74	285.91	384.04	530.37	806.59	1066.07
PARKER	WEATHERFORD	306.32	510.31	705.56	1247.5	1997.33	2938.09
PARKER	WILLOW PARK	49.77	84.32	117.73	175.64	232.12	287.29
ROCKWALL	BLACKLAND WSC	31.93	47.98	62.22	72.56	79.47	85.64
ROCKWALL	CASH SUD	12.63	21.89	31.58	40.43	48.98	57.75
ROCKWALL	COUNTY-OTHER, ROCKWALL	24.65	29.36	31.53	33.26	130.78	221.57
ROCKWALL	DALLAS	0.79	1.54	2.43	3.26	3.99	4.71
ROCKWALL	EAST FORK SUD	6.32	12.02	18.14	23.79	29.37	35.16
ROCKWALL	FATE	63.06	115	164.71	214.53	269.03	419.39
ROCKWALL	FORNEY LAKE WSC	3.86	6.2	8.39	10.46	12.72	14.91
ROCKWALL	GARLAND	0.03	0.06	0.07	0.1	0.12	0.14
ROCKWALL	HEATH	123.55	327.72	340.52	348.14	350.59	351.68
ROCKWALL	HIGH POINT WSC	4.46	7.38	10.31	12.92	15.5	18.07
ROCKWALL	LAVON SUD	28.61	53.23	78.37	122.59	165.69	208.57
ROCKWALL	MCLENDON-CHISHOLM	17.63	30.51	43.16	54.38	65.12	76.05
ROCKWALL	MOUNT ZION WSC	23.64	41.68	59.72	75.41	90.05	105.09
ROCKWALL	ROCKWALL	392.98	660.39	915.15	1148.29	1380.97	1615.72
ROCKWALL	ROWLETT	72.54	97.55	112.47	121.1	123.34	123.51
ROCKWALL	ROYSE CITY	64.71	98.22	129.62	312.8	534.44	625.81
ROCKWALL	WYLIE	27.61	36.92	42.36	46.14	48.48	51.14
TARRANT	ARLINGTON	3856.65	5811.55	7152.42	7888.73	8061.47	8071.46
TARRANT	AZLE	97.97	151.24	197.84	231.49	286.47	371.41
TARRANT	BEDFORD	505.92	811.12	1081.35	1269.64	1287.04	1287.04

Savings due to Plumbing Code for Municipal WUGs by County - in acre-feet

County	WUG Name	2020	2030	2040	2050	2060	2070
TARRANT	BENBROOK	239.18	390.37	524.59	686.27	1032.21	1032.21
TARRANT	BETHESDA WSC	100	158.14	208.26	245.73	271.5	294.38
TARRANT	BLUE MOUND	24.36	35.23	44.37	49.41	50.41	50.49
TARRANT	BURLESON	78.14	111.5	142.93	213.28	264.12	296.89
TARRANT	COLLEYVILLE	223.67	332.48	423.41	477.99	486.14	486.46
TARRANT	COMMUNITY WSC	41.85	67.71	90.61	101.11	111.6	120.9
TARRANT	COUNTY-OTHER, TARRANT	342.07	487.69	607.1	1158	1532.36	2261.01
TARRANT	CROWLEY	157.76	246.84	339.45	434.48	567.69	652.37
TARRANT	DALWORTHINGTON GARDENS	23.83	35.2	44.89	50.67	52.63	53.72
TARRANT	EDGECLIFF VILLAGE	30.89	43.46	53.91	59.64	60.66	60.69
TARRANT	EULESS	556.87	839.25	1019.78	1119	1137.57	1138.21
TARRANT	EVERMAN	65.06	96.78	122.35	134.92	137.14	137.21
TARRANT	FLOWER MOUND	2.13	3.27	3.63	3.85	3.92	3.92
TARRANT	FOREST HILL	138.05	210.66	283.12	374.62	490.02	645.2
TARRANT	FORT WORTH	8769.77	14729.74	20719.52	23734.73	25728.05	27534.52
TARRANT	GRAND PRAIRIE	522.28	708.18	809.27	856.32	867.94	869.68
TARRANT	GRAPEVINE	556	878.59	1051.14	1135.15	1151.96	1153.3
TARRANT	HALTOM CITY	432.24	622.02	799.7	957.45	1054.11	1156.66
TARRANT	HASLET	14.84	26.61	35.99	86.48	122.79	140.69
TARRANT	HURST	431.03	621.38	760.07	836.31	850.09	850.55
TARRANT	JOHNSON COUNTY SUD	21.06	32.86	42.79	50.31	55.71	60.44
TARRANT	KELLER	418.57	583.94	658.08	702.34	717.28	718.43
TARRANT	KENNEDALE	84.15	133.45	185.02	205.61	214.22	214.49
TARRANT	LAKE WORTH	60.59	97.52	130.34	163.65	195.17	268.97
TARRANT	LAKESIDE	12.57	18.46	23.36	26.51	27	27
TARRANT	MANSFIELD	574.05	877.44	1194.89	1677.35	1973.64	2272.76
TARRANT	NORTH RICHLAND HILLS	752.07	1116.09	1318.78	1431.77	1455.06	1456.78
TARRANT	PANTEGO	24.54	35.57	44.84	49.92	50.81	50.81
TARRANT	PELICAN BAY	3.53	3.6	3.66	3.73	3.79	3.86
TARRANT	RENO	0	0	0	0	0	0
TARRANT	RICHLAND HILLS	94.48	146.2	191.65	232.86	261.98	296.39
TARRANT	RIVER OAKS	75.11	107.62	134.59	149.46	152.14	152.23
TARRANT	SAGINAW	202.53	312.58	405.73	455.58	462.88	463.57
TARRANT	SANSOM PARK	46.94	72.44	101.09	116.9	125.72	132.72
TARRANT	SOUTHLAKE	208.04	311.51	419.49	513.47	593.28	664.25
TARRANT	TROPHY CLUB	10.59	12.56	13.8	14.53	14.71	14.79
TARRANT	WATAUGA	265.47	371.05	457.86	505.74	514.43	514.71
TARRANT	WESTLAKE	8.52	18.17	29.58	37.04	43.98	50.51
TARRANT	WESTOVER HILLS	7.28	10.81	13.83	15.66	16.29	16.65
TARRANT	WESTWORTH VILLAGE	28.73	44.93	59.08	69.07	75.07	80.07
TARRANT	WHITE SETTLEMENT	179.5	273.25	354.32	460.58	600.62	734.66
WISE	ALVORD	9.1	10.96	12.86	15.68	17.92	20.16
WISE	AURORA	15.41	26.02	35.6	45.98	55.08	65.48
WISE	BOLIVAR WSC	12.71	20.39	27.08	32.72	37.41	42.04
WISE	BOYD	13.73	21.34	38.2	51.3	73.2	79.64
WISE	BRIDGEPORT	76.5	128.85	176.27	260.27	353.07	444.14
WISE	CHICO	10.88	16.45	21.3	45.66	59	74.18
WISE	COUNTY-OTHER, WISE	267.54	370.18	450.24	758.62	1006.36	1223.98
WISE	DECATUR	102.07	191.57	280.03	379.87	451.11	526.24
WISE	FORT WORTH	125.8	247.1	364.58	493.39	608.59	720.1
WISE	NEW FAIRVIEW	12.43	19.68	25.82	33.1	39.68	47.14
WISE	NEWARK	23.98	40.01	62.58	87.59	123.31	165.4
WISE	RHOME	21.87	40.25	57.17	95.82	130.25	167.22
WISE	RUNAWAY BAY	14.19	22.21	29.21	38.17	44.19	53.46
WISE	WALNUT CREEK SUD	35.93	64.68	92.92	121.8	185.07	241.2
WISE	WEST WISE SUD	40.57	57.38	71.67	80.89	85	88.26
C Total		**73,851.34**	**117,316.91**	**157,078.82**	**190,552.35**	**218,797.08**	**246,868.53**

Appendix F

APPENDIX F

POPULATION PROJECTIONS

Appendix F - Region C Approved Population by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Final Region C Population					
			2020	2030	2040	2050	2060	2070
	COLLIN	ALLEN	98,500	98,500	98,500	98,500	98,500	98,500
	COLLIN	ANNA	11,943	13,929	22,984	31,000	59,000	89,000
	COLLIN	BLUE RIDGE	925	2,000	4,000	12,000	25,000	39,000
Yes	COLLIN	CADDO BASIN SUD	2,500	3,000	4,000	5,000	6,000	7,000
	COLLIN	CARROLLTON	4	6	9	12	15	18
Yes	COLLIN	CELINA	21,995	43,200	72,980	112,500	112,500	112,500
	COLLIN	COPEVILLE SUD	3,846	4,804	5,972	8,000	14,000	24,000
	COLLIN	COUNTY-OTHER	10,289	10,289	10,289	35,000	50,000	80,000
	COLLIN	CULLEOKA WSC	4,500	5,500	9,000	11,000	12,000	15,000
Yes	COLLIN	DALLAS	71,320	73,220	74,169	74,169	74,169	74,169
Yes	COLLIN	EAST FORK SUD	2,289	2,860	3,554	4,297	5,177	6,175
	COLLIN	FAIRVIEW	13,000	15,000	20,025	20,025	20,025	20,025
	COLLIN	FARMERSVILLE	8,000	20,000	20,000	20,000	20,000	20,000
Yes	COLLIN	FRISCO	102,796	135,398	168,000	168,000	168,000	168,000
Yes	COLLIN	GARLAND	334	417	518	626	755	900
Yes	COLLIN	HICKORY CREEK SUD	63	69	77	85	95	106
Yes	COLLIN	JOSEPHINE	1,728	2,674	3,584	4,441	4,441	4,441
	COLLIN	LAVON	3,500	4,500	6,885	8,891	20,000	45,000
Yes	COLLIN	LAVON WSC	3,000	3,200	3,819	4,303	10,000	25,000
	COLLIN	LOWRY CROSSING	2,040	2,446	3,000	3,000	3,000	3,000
	COLLIN	LUCAS	7,200	8,200	10,857	12,131	13,406	13,406
Yes	COLLIN	MARILEE SUD	3,664	3,664	3,600	3,600	3,544	3,544
	COLLIN	MCKINNEY	156,924	188,628	274,566	358,000	358,000	358,000
	COLLIN	MELISSA	6,978	9,790	13,216	30,000	50,000	75,000
	COLLIN	MURPHY	23,000	23,000	23,000	23,000	23,000	23,000
	COLLIN	NEVADA	999	1,217	1,483	6,000	15,000	27,000
	COLLIN	NEW HOPE	770	962	1,195	1,445	1,741	2,077
	COLLIN	NORTH COLLIN WSC	5,319	6,086	7,020	8,019	9,202	10,544
	COLLIN	PARKER	6,000	16,000	20,000	20,000	20,000	20,000
Yes	COLLIN	PLANO	260,500	270,200	282,656	284,656	284,656	284,656
	COLLIN	PRINCETON	9,080	11,880	15,290	36,295	57,300	78,304
Yes	COLLIN	PROSPER	20,004	28,022	32,637	33,848	35,058	35,058
Yes	COLLIN	RICHARDSON	31,522	31,714	32,974	34,000	34,000	34,000
Yes	COLLIN	ROYSE CITY	1,639	5,500	12,000	20,000	38,000	40,906
Yes	COLLIN	SACHSE	7,899	7,899	7,899	7,899	7,899	7,899
	COLLIN	SEIS LAGOS UD	2,130	2,130	2,130	2,130	2,130	2,130
Yes	COLLIN	SOUTH GRAYSON WSC	1,166	1,456	1,947	2,275	2,627	2,989
	COLLIN	SAINT PAUL	1,965	2,255	2,453	2,559	2,666	2,666
	COLLIN	WESTON	3,370	7,159	32,647	79,837	127,026	127,026
Yes	COLLIN	WYLIE	42,126	47,666	51,294	54,120	55,946	57,599
	COLLIN	WYLIE NORTHEAST SUD	1,889	2,390	3,000	6,000	10,000	16,000
	COLLIN TOTAL		**956,716**	**1,116,830**	**1,363,229**	**1,646,663**	**1,853,878**	**2,053,638**
Yes	COOKE	BOLIVAR WSC	1,631	1,751	1,842	1,934	2,010	2,076
	COOKE	COUNTY-OTHER	8,500	9,000	9,724	13,000	15,000	31,000
	COOKE	GAINESVILLE	17,336	18,607	19,582	20,552	25,000	35,000
	COOKE	KIOWA HOMEOWNERS WSC	2,209	2,247	2,286	2,325	2,363	2,363
	COOKE	LINDSAY	1,102	1,183	1,245	1,307	2,500	5,000
Yes	COOKE	MOUNTAIN SPRING WSC	2,654	2,848	2,998	3,146	5,000	8,000
	COOKE	MUENSTER	1,550	1,550	1,600	1,600	1,650	1,650
Yes	COOKE	TWO WAY SUD	100	108	113	119	124	128
	COOKE	VALLEY VIEW	820	880	926	972	1,010	1,043

Appendix F - Region C Approved Population by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Final Region C Population 2020	2030	2040	2050	2060	2070
Yes	COOKE	WOODBINE WSC	6,131	6,947	7,763	8,577	9,390	10,203
	COOKE TOTAL		**42,033**	**45,121**	**48,079**	**53,532**	**64,047**	**96,463**
	DALLAS	ADDISON	14,539	17,431	20,323	23,215	26,107	29,000
	DALLAS	BALCH SPRINGS	26,423	28,980	31,606	34,456	37,233	40,018
Yes	DALLAS	CARROLLTON	49,822	49,822	49,822	49,822	49,822	49,822
Yes	DALLAS	CEDAR HILL	52,495	64,217	75,906	87,555	87,555	87,555
	DALLAS	COCKRELL HILL	4,670	5,122	5,122	5,122	7,000	15,000
Yes	DALLAS	COMBINE	809	922	1,038	1,164	1,287	1,410
Yes	DALLAS	COPPELL	40,324	41,817	41,817	41,817	41,817	41,817
	DALLAS	COUNTY-OTHER	5,339	3,000	2,000	2,000	2,000	2,000
Yes	DALLAS	DALLAS	1,141,059	1,242,191	1,420,781	1,591,937	1,722,709	1,785,569
	DALLAS	DE SOTO	54,617	59,903	65,330	71,222	76,963	82,718
	DALLAS	DUNCANVILLE	42,927	47,106	47,106	47,106	47,106	47,106
Yes	DALLAS	EAST FORK SUD	1,934	2,646	3,377	4,170	4,943	5,718
	DALLAS	FARMERS BRANCH	30,613	32,509	34,455	36,567	38,625	40,689
Yes	DALLAS	FERRIS	6	10	14	18	22	26
Yes	DALLAS	GARLAND	234,313	241,346	243,000	243,000	243,000	243,000
Yes	DALLAS	GLENN HEIGHTS	13,825	18,835	23,978	29,561	35,002	46,000
Yes	DALLAS	GRAND PRAIRIE	166,241	206,822	231,537	231,537	231,537	231,537
Yes	DALLAS	GRAPEVINE	0	0	0	0	0	0
	DALLAS	HIGHLAND PARK	9,025	9,313	9,313	9,313	9,313	9,313
	DALLAS	HUTCHINS	9,903	13,922	17,941	21,960	25,979	30,000
	DALLAS	IRVING	260,752	284,500	284,500	284,500	284,500	284,500
	DALLAS	LANCASTER	45,184	58,895	69,717	77,649	85,582	93,514
Yes	DALLAS	LEWISVILLE	841	841	841	841	841	841
Yes	DALLAS	MESQUITE	149,861	164,825	186,120	202,904	219,260	235,656
Yes	DALLAS	OVILLA	476	613	754	907	1,056	1,829
Yes	DALLAS	RICHARDSON	73,478	76,486	79,526	82,000	82,000	82,000
Yes	DALLAS	ROCKETT SUD	1,000	2,000	3,000	4,000	5,000	6,000
Yes	DALLAS	ROWLETT	56,800	62,300	62,300	62,300	62,300	62,300
Yes	DALLAS	SACHSE	20,600	20,600	20,600	20,600	20,600	20,600
Yes	DALLAS	SARDIS-LONE ELM WSC	0	0	0	0	0	0
Yes	DALLAS	SEAGOVILLE	18,824	22,836	26,846	30,855	34,932	34,919
	DALLAS	SUNNYVALE	7,000	10,000	13,000	15,000	18,000	18,000
	DALLAS	UNIVERSITY PARK	25,688	25,688	25,688	25,688	25,688	25,688
	DALLAS	WILMER	4,203	4,698	7,500	14,000	22,000	40,000
Yes	DALLAS	WYLIE	2,543	2,613	2,683	2,753	2,823	2,960
	DALLAS TOTAL		**2,566,134**	**2,822,809**	**3,107,541**	**3,355,539**	**3,552,602**	**3,697,105**
	DENTON	ARGYLE	6,000	9,000	13,000	13,000	13,000	13,000
	DENTON	ARGYLE WSC	5,040	5,040	5,040	5,040	5,040	5,040
	DENTON	AUBREY	4,726	6,284	7,349	8,713	10,459	12,693
	DENTON	BARTONVILLE	4,500	5,000	5,000	5,000	5,000	5,000
Yes	DENTON	BOLIVAR WSC	9,480	11,534	13,988	16,730	19,940	23,604
Yes	DENTON	CARROLLTON	76,937	79,348	79,348	79,348	79,348	79,348
Yes	DENTON	CELINA	680	4,800	16,020	37,500	37,500	37,500
Yes	DENTON	COPPELL	1,136	1,136	1,136	1,136	1,136	1,136
	DENTON	COPPER CANYON	1,419	1,523	1,647	1,785	1,947	2,131
	DENTON	CORINTH	24,911	29,499	29,499	29,499	29,499	29,499
	DENTON	COUNTY-OTHER	30,207	33,609	37,232	53,174	86,087	160,675
	DENTON	CROSS ROADS	2,256	3,096	3,800	3,800	3,800	3,800
Yes	DENTON	DALLAS	29,680	32,203	36,598	40,789	43,991	45,531

Appendix F - Region C Approved Population by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Final Region C Population 2020	2030	2040	2050	2060	2070
	DENTON	DENTON	160,145	211,773	268,780	341,471	468,168	570,694
	DENTON	DENTON COUNTY FWSD No. 10	7,884	16,750	16,750	16,750	16,750	16,750
	DENTON	DENTON COUNTY FWSD No.1A	14,000	25,021	30,000	30,000	30,000	30,000
	DENTON	DENTON COUNTY FWSD No. 7	13,500	13,500	13,500	13,500	13,500	13,500
	DENTON	DOUBLE OAK	3,000	3,000	3,000	3,000	3,000	3,000
Yes	DENTON	FLOWER MOUND	75,315	92,730	92,730	92,730	92,730	92,730
Yes	DENTON	FORT WORTH	36,268	55,784	80,890	114,032	146,148	178,264
Yes	DENTON	FRISCO	68,530	90,265	112,000	112,000	112,000	112,000
	DENTON	HACKBERRY	1,274	1,645	2,088	2,583	3,162	3,823
	DENTON	HICKORY CREEK	4,089	5,110	6,331	7,941	7,941	7,941
	DENTON	HIGHLAND VILLAGE	17,100	18,000	18,000	18,000	18,000	18,000
	DENTON	JUSTIN	4,650	8,325	12,000	12,000	12,000	12,000
	DENTON	KRUGERVILLE	1,986	2,437	2,889	3,440	3,440	3,440
	DENTON	KRUM	5,195	6,453	7,957	9,637	11,603	13,848
	DENTON	LAKE DALLAS	7,782	8,603	9,933	9,933	9,933	9,933
	DENTON	LAKEWOOD VILLAGE	692	870	1,082	1,319	1,597	1,914
Yes	DENTON	LEWISVILLE	106,486	121,083	138,527	158,016	176,515	176,515
	DENTON	LITTLE ELM	29,860	33,821	33,821	33,821	33,821	33,821
Yes	DENTON	MOUNTAIN SPRING WSC	55	61	68	75	84	94
	DENTON	MUSTANG SUD	12,500	23,946	35,392	46,838	58,284	69,730
	DENTON	NORTHLAKE	4,500	17,000	31,010	43,005	55,000	55,000
	DENTON	OAK POINT	8,305	12,586	16,868	21,149	25,430	25,430
	DENTON	PALOMA CREEK	12,348	16,839	16,839	16,839	16,839	16,839
	DENTON	PILOT POINT	6,500	8,000	11,000	15,000	20,000	27,000
Yes	DENTON	PLANO	7,500	7,800	8,000	8,000	8,000	8,000
	DENTON	PONDER	2,035	2,811	3,738	4,774	5,987	7,371
Yes	DENTON	PROSPER	750	4,794	12,241	23,092	33,942	33,942
	DENTON	PROVIDENCE VILLAGE WCID	7,235	7,235	7,235	7,235	7,235	7,235
	DENTON	ROANOKE	7,975	9,988	12,000	12,000	12,000	12,000
	DENTON	SANGER	8,632	10,713	13,199	15,977	19,229	22,941
	DENTON	SHADY SHORES	3,441	3,936	3,936	3,936	3,936	3,936
Yes	DENTON	SOUTHLAKE	1,018	1,315	1,669	2,065	2,528	3,057
	DENTON	THE COLONY	51,000	58,000	62,000	67,600	67,600	67,600
Yes	DENTON	TROPHY CLUB	13,098	13,098	13,098	13,098	13,098	13,098
Yes	DENTON	WESTLAKE	25	33	43	54	67	82
	DENTON TOTAL		**901,645**	**1,135,397**	**1,348,271**	**1,576,424**	**1,846,314**	**2,090,485**
	ELLIS	BARDWELL	831	1,063	1,333	1,650	2,024	4,500
Yes	ELLIS	BRANDON-IRENE WSC	80	103	129	160	196	238
	ELLIS	BUENA VISTA - BETHEL SUD	4,500	5,500	6,500	8,000	11,500	15,326
Yes	ELLIS	CEDAR HILL	705	902	1,132	1,401	1,401	1,401
	ELLIS	COUNTY-OTHER	6,100	6,500	7,177	27,642	60,016	105,596
	ELLIS	ENNIS	22,000	26,000	30,000	41,059	66,101	110,000
Yes	ELLIS	FERRIS	2,940	3,540	4,160	4,826	8,000	15,000
Yes	ELLIS	FILES VALLEY WSC	775	991	1,243	1,538	1,887	2,291
	ELLIS	GARRETT	1,032	1,320	1,656	2,049	2,514	6,000
Yes	ELLIS	GLENN HEIGHTS	3,498	4,473	5,612	6,945	8,520	13,000
Yes	ELLIS	GRAND PRAIRIE	57	73	92	114	140	170
	ELLIS	ITALY	2,386	3,052	3,828	4,738	6,000	8,000
Yes	ELLIS	JOHNSON COUNTY SUD	211	270	339	419	514	625
Yes	ELLIS	MANSFIELD	116	138	173	241	299	369
	ELLIS	MAYPEARL	1,128	1,359	1,500	1,500	1,500	1,500

Appendix F - Region C Approved Population by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Final Region C Population 2020	2030	2040	2050	2060	2070
	ELLIS	MIDLOTHIAN	18,025	23,643	31,011	37,802	43,871	48,460
	ELLIS	MILFORD	775	835	905	987	1,083	1,195
Yes	ELLIS	MOUNTAIN PEAK SUD	5,321	6,805	8,536	10,564	12,959	15,735
	ELLIS	OAK LEAF	1,350	1,500	1,750	2,500	3,700	4,500
Yes	ELLIS	OVILLA	4,049	5,178	6,495	8,039	9,861	18,171
	ELLIS	PALMER	2,562	3,276	4,109	5,086	6,500	12,000
	ELLIS	PECAN HILL	801	1,025	1,286	1,592	2,000	3,000
	ELLIS	RED OAK	12,369	14,000	19,000	26,000	32,000	50,000
Yes	ELLIS	RICE WSC	7,038	9,000	11,289	13,972	17,140	20,811
Yes	ELLIS	ROCKETT SUD	32,882	42,048	52,743	65,279	85,000	105,000
Yes	ELLIS	SARDIS-LONE ELM WSC	14,500	18,000	22,000	24,000	25,340	25,340
Yes	ELLIS	VENUS	83	106	133	165	202	246
	ELLIS	WAXAHACHIE	37,700	43,300	52,800	64,400	78,500	95,500
	ELLIS TOTAL		**183,814**	**224,000**	**276,931**	**362,668**	**488,768**	**683,974**
	FANNIN	BONHAM	12,603	16,000	22,000	30,000	37,000	45,000
	FANNIN	COUNTY-OTHER	13,168	13,168	13,168	18,250	40,000	65,000
	FANNIN	ECTOR	773	850	909	962	1,044	1,133
Yes	FANNIN	HICKORY CREEK SUD	290	319	341	361	392	425
	FANNIN	HONEY GROVE	1,700	1,800	1,800	1,800	1,800	1,800
	FANNIN	LADONIA	1,600	2,000	2,200	2,500	3,000	3,000
	FANNIN	LEONARD	2,213	2,434	2,602	2,757	2,991	3,245
Yes	FANNIN	NORTH HUNT WSC	525	577	617	653	709	769
	FANNIN	SAVOY	924	1,016	1,086	1,151	1,249	1,355
Yes	FANNIN	SOUTHWEST FANNIN COUNTY SUD	3,836	4,218	4,510	4,776	5,718	6,757
	FANNIN	TRENTON	706	1,000	3,500	6,000	8,000	10,000
Yes	FANNIN	WHITEWRIGHT	8	9	10	11	12	13
	FANNIN TOTAL		**38,346**	**43,391**	**52,743**	**69,221**	**101,915**	**138,497**
	FREESTONE	COUNTY-OTHER	11,719	11,719	11,719	15,056	25,000	50,000
	FREESTONE	FAIRFIELD	3,232	3,486	3,662	7,000	8,000	10,000
Yes	FREESTONE	FLO COMMUNITY WSC	521	562	590	611	627	638
	FREESTONE	OAKWOOD	40	43	45	47	48	49
	FREESTONE	TEAGUE	3,750	4,000	5,600	7,050	8,500	10,000
	FREESTONE	WORTHAM	1,175	1,267	1,331	1,378	2,300	2,600
	FREESTONE TOTAL		**20,437**	**21,077**	**22,947**	**31,142**	**44,475**	**73,287**
	GRAYSON	BELLS	1,648	1,943	2,234	2,568	6,000	8,000
	GRAYSON	COLLINSVILLE	2,117	2,685	3,246	3,889	5,000	6,500
	GRAYSON	COUNTY-OTHER	21,617	21,617	21,617	21,617	30,000	50,000
	GRAYSON	DENISON	25,127	27,949	30,731	33,925	40,000	50,000
	GRAYSON	GUNTER	2,200	3,000	4,000	5,000	6,000	7,000
	GRAYSON	HOWE	3,000	3,500	4,000	4,500	5,000	5,500
	GRAYSON	KENTUCKY TOWN WSC	2,945	3,532	4,111	4,776	6,000	7,500
	GRAYSON	LUELLA WSC	3,800	4,380	4,952	5,609	6,306	7,055
Yes	GRAYSON	MARILEE SUD	2,746	2,746	2,698	2,698	2,657	2,657
	GRAYSON	POTTSBORO	2,896	3,745	4,582	6,000	10,000	18,000
	GRAYSON	SHERMAN	42,880	45,000	50,000	58,000	75,000	105,000
Yes	GRAYSON	SOUTH GRAYSON WSC	3,334	3,544	4,053	4,225	4,373	4,511
	GRAYSON	SOUTHMAYD	1,098	1,222	1,344	1,483	2,000	3,000
Yes	GRAYSON	SOUTHWEST FANNIN COUNTY SUD	1,792	2,695	3,586	4,608	6,282	8,243
	GRAYSON	TIOGA	865	936	1,006	1,087	3,500	4,800

Appendix F - Region C Approved Population by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Final Region C Population 2020	2030	2040	2050	2060	2070
	GRAYSON	TOM BEAN	1,176	1,328	1,477	1,649	2,000	3,000
Yes	GRAYSON	TWO WAY SUD	6,294	8,113	9,907	11,966	15,876	19,872
	GRAYSON	VAN ALSTYNE	3,735	4,530	5,314	6,214	18,000	25,000
	GRAYSON	WHITESBORO	3,834	3,882	3,929	3,983	5,000	6,500
Yes	GRAYSON	WHITEWRIGHT	1,597	1,616	1,635	1,654	1,753	1,852
Yes	GRAYSON	WOODBINE WSC	84	93	102	113	125	137
	GRAYSON TOTAL		**134,785**	**148,056**	**164,524**	**185,564**	**250,872**	**344,127**
Yes	HENDERSON	ATHENS	14,287	15,957	17,349	19,186	33,000	50,000
Yes	HENDERSON	BETHEL-ASH WSC	2,138	2,410	2,637	2,937	3,196	3,447
	HENDERSON	COUNTY-OTHER	3,424	2,700	2,623	2,319	2,058	1,807
	HENDERSON	EAST CEDAR CREEK FWSD	11,036	12,000	14,568	15,773	16,973	18,161
	HENDERSON	EUSTACE	1,100	1,200	1,300	1,919	2,500	3,000
	HENDERSON	GUN BARREL CITY	6,000	6,500	7,000	8,211	12,500	20,000
	HENDERSON	LOG CABIN	777	834	882	946	1,000	1,054
Yes	HENDERSON	MABANK	750	800	850	1,025	2,000	4,000
	HENDERSON	MALAKOFF	2,411	2,491	2,557	2,645	2,800	3,000
	HENDERSON	PAYNE SPRINGS	877	977	1,060	1,170	1,300	1,600
Yes	HENDERSON	SEVEN POINTS	1,500	1,750	2,000	2,540	3,000	3,500
	HENDERSON	TOOL	2,438	2,618	2,769	2,968	4,500	6,000
	HENDERSON	TRINIDAD	886	886	886	886	1,000	1,200
	HENDERSON	VIRGINIA HILL WSC	2,526	2,898	3,208	3,617	4,000	4,500
Yes	HENDERSON	WEST CEDAR CREEK MUD	10,025	10,038	10,048	10,062	12,000	15,000
	HENDERSON TOTAL		**60,175**	**64,059**	**69,737**	**76,204**	**101,827**	**136,269**
	JACK	BRYSON	581	620	644	657	666	672
	JACK	COUNTY-OTHER	4,307	4,598	4,778	4,873	4,943	4,988
	JACK	JACKSBORO	4,863	5,191	5,395	5,503	5,581	5,631
	JACK TOTAL		**9,751**	**10,409**	**10,817**	**11,033**	**11,190**	**11,291**
Yes	KAUFMAN	ABLES SPRINGS WSC	4,735	5,931	7,302	8,880	10,716	12,814
	KAUFMAN	COLLEGE MOUND WSC	11,745	14,711	18,112	22,024	30,000	38,000
Yes	KAUFMAN	COMBINE	1,881	2,356	2,901	3,528	4,258	5,091
	KAUFMAN	COUNTY-OTHER	15,829	17,093	24,432	38,000	65,000	90,000
	KAUFMAN	CRANDALL	4,295	5,379	6,623	8,000	8,000	8,000
Yes	KAUFMAN	DALLAS	0	0	0	0	0	0
	KAUFMAN	FORNEY	22,033	26,000	33,978	41,317	60,000	80,000
Yes	KAUFMAN	FORNEY LAKE WSC	5,043	6,317	7,777	9,457	16,000	23,000
	KAUFMAN	GASTONIA-SCURRY SUD	9,508	11,910	14,663	17,830	30,000	45,000
Yes	KAUFMAN	HIGH POINT WSC	4,927	6,172	7,599	9,240	15,000	20,000
	KAUFMAN	KAUFMAN	8,000	10,000	12,500	18,890	24,445	30,000
	KAUFMAN	KEMP	1,734	2,172	2,674	3,252	5,000	7,000
Yes	KAUFMAN	MABANK	3,200	3,800	4,400	6,371	9,000	12,000
Yes	KAUFMAN	MACBEE SUD	266	333	410	498	601	719
Yes	KAUFMAN	MESQUITE	139	175	215	262	316	378
	KAUFMAN	OAK GROVE	800	1,000	1,200	1,850	2,500	5,000
	KAUFMAN	POST OAK BEND CITY	800	1,000	1,200	1,850	2,500	5,000
	KAUFMAN	ROSE HILL SUD	5,278	6,611	8,139	9,897	13,000	20,000
	KAUFMAN	SCURRY	850	1,050	1,250	1,919	2,700	6,000
Yes	KAUFMAN	SEAGOVILLE	30	37	46	56	68	81
Yes	KAUFMAN	SEVEN POINTS	105	131	162	197	238	284
	KAUFMAN	TALTY	2,306	2,889	3,557	4,325	6,000	10,000
	KAUFMAN	TALTY WSC	9,663	11,103	12,902	18,121	23,000	30,000
	KAUFMAN	TERRELL	23,769	43,403	52,959	65,689	76,235	88,473

Appendix F - Region C Approved Population by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Final Region C Population					
			2020	2030	2040	2050	2060	2070
Yes	KAUFMAN	WEST CEDAR CREEK MUD	9,687	12,134	14,939	18,166	24,000	35,000
	KAUFMAN TOTAL		**146,623**	**191,707**	**239,940**	**309,619**	**428,577**	**571,840**
	NAVARRO	BLOOMING GROVE	909	1,002	1,098	1,208	1,323	1,445
Yes	NAVARRO	BRANDON-IRENE WSC	214	236	259	284	311	340
	NAVARRO	CHATFIELD WSC	4,300	4,400	4,500	4,600	4,700	4,800
	NAVARRO	CORBET WSC	2,865	3,159	3,462	3,808	4,170	4,556
	NAVARRO	CORSICANA	26,298	28,997	31,785	34,959	38,279	41,823
	NAVARRO	COUNTY-OTHER	5,475	5,475	5,475	10,000	20,000	35,000
	NAVARRO	DAWSON	893	985	1,080	1,187	1,300	1,420
	NAVARRO	FROST	712	785	860	946	1,036	1,132
	NAVARRO	KERENS	1,741	1,919	2,104	2,314	2,534	2,768
	NAVARRO	M E N WSC	3,346	3,689	4,044	4,448	4,870	5,321
	NAVARRO	NAVARRO MILLS WSC	3,308	3,648	3,999	4,398	4,816	5,261
	NAVARRO	RICE	1,022	1,126	1,235	1,358	1,487	1,625
Yes	NAVARRO	RICE WSC	1,461	1,611	1,766	1,942	2,126	2,323
	NAVARRO TOTAL		**52,544**	**57,032**	**61,667**	**71,452**	**86,952**	**107,814**
	PARKER	ALEDO	5,320	8,320	12,620	13,258	13,258	13,258
	PARKER	ANNETTA	1,678	2,068	2,458	2,848	3,238	3,628
	PARKER	ANNETTA NORTH	559	608	664	729	804	891
	PARKER	ANNETTA SOUTH	526	526	526	526	526	526
Yes	PARKER	AZLE	2,371	2,571	2,774	2,979	3,600	4,618
	PARKER	COUNTY-OTHER	54,108	54,108	54,108	75,898	116,910	181,910
Yes	PARKER	CRESSON	451	505	566	637	720	815
Yes	PARKER	FORT WORTH	62,864	99,172	114,490	126,035	134,456	142,877
	PARKER	HUDSON OAKS	2,673	3,684	4,695	4,808	4,808	4,808
Yes	PARKER	MINERAL WELLS	2,119	2,089	2,055	2,015	1,969	1,915
	PARKER	PARKER COUNTY SUD	6,162	8,161	10,420	13,069	16,140	19,687
Yes	PARKER	RENO	2,520	2,563	2,611	2,667	2,732	2,807
	PARKER	SPRINGTOWN	4,079	5,500	5,500	5,500	5,500	5,500
Yes	PARKER	WALNUT CREEK SUD	19,464	23,141	27,428	35,627	52,869	69,317
	PARKER	WEATHERFORD	30,184	36,157	42,908	70,000	110,000	160,720
	PARKER	WILLOW PARK	4,877	5,960	7,184	10,000	13,000	16,000
	PARKER TOTAL		**199,955**	**255,133**	**291,007**	**366,596**	**480,530**	**629,277**
Yes	ROCKWALL	BLACKLAND WSC	3,318	3,552	3,818	4,087	4,387	4,705
Yes	ROCKWALL	CASH SUD	1,189	1,540	1,939	2,342	2,792	3,269
	ROCKWALL	COUNTY-OTHER	3,527	3,527	3,527	3,527	12,000	20,000
Yes	ROCKWALL	DALLAS	77	103	132	162	195	230
Yes	ROCKWALL	EAST FORK SUD	461	645	854	1,066	1,303	1,554
	ROCKWALL	FATE	9,825	14,083	18,924	23,821	29,290	45,000
Yes	ROCKWALL	FORNEY LAKE WSC	478	601	741	883	1,041	1,209
Yes	ROCKWALL	GARLAND	3	4	4	5	6	7
	ROCKWALL	HEATH	12,107	24,300	24,300	24,300	24,300	24,300
Yes	ROCKWALL	HIGH POINT WSC	328	413	509	607	716	831
Yes	ROCKWALL	LAVON WSC	2,000	3,000	4,000	6,000	8,000	10,000
	ROCKWALL	MCLENDON-CHISHOLM	1,739	2,188	2,698	3,215	3,792	4,403
	ROCKWALL	MT ZION WSC	1,985	2,497	3,080	3,669	4,327	5,025
	ROCKWALL	ROCKWALL	47,474	59,732	73,669	87,768	103,514	120,202
Yes	ROCKWALL	ROWLETT	7,700	7,700	7,700	7,700	7,700	7,700
Yes	ROCKWALL	ROYSE CITY	8,861	9,500	11,000	25,000	42,000	49,094
Yes	ROCKWALL	WYLIE	3,815	3,919	4,023	4,127	4,231	4,441
	ROCKWALL TOTAL		**104,887**	**137,304**	**160,918**	**198,279**	**249,594**	**301,970**

Appendix F - Region C Approved Population by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Final Region C Population 2020	2030	2040	2050	2060	2070
	TARRANT	ARLINGTON	387,725	412,746	421,748	426,308	428,127	428,403
Yes	TARRANT	AZLE	9,486	10,283	11,094	11,918	14,400	18,472
	TARRANT	BEDFORD	48,100	51,983	55,866	59,750	59,750	59,750
	TARRANT	BENBROOK	22,500	25,000	27,500	32,833	48,095	48,095
Yes	TARRANT	BETHESDA WSC	9,073	10,201	11,316	12,401	13,488	14,552
	TARRANT	BLUE MOUND	2,398	2,403	2,408	2,413	2,418	2,422
Yes	TARRANT	BURLESON	8,634	9,000	10,000	14,000	17,000	19,000
	TARRANT	COLLEYVILLE	24,000	25,500	27,000	28,000	28,000	28,000
Yes	TARRANT	COMMUNITY WSC	3,498	3,933	4,363	4,781	5,200	5,610
	TARRANT	COUNTY-OTHER	36,012	36,012	36,012	60,000	80,000	110,000
Yes	TARRANT	CROWLEY	16,301	19,046	22,751	27,354	35,000	40,000
	TARRANT	DALWORTHINGTON GARDENS	2,307	2,359	2,410	2,460	2,510	2,559
	TARRANT	EDGECLIFF	2,924	2,924	2,924	2,924	2,924	2,924
	TARRANT	EULESS	54,214	57,150	57,150	57,150	57,150	57,150
	TARRANT	EVERMAN	6,286	6,477	6,600	6,600	6,600	6,600
Yes	TARRANT	FLOWER MOUND	240	270	270	270	270	270
	TARRANT	FOREST HILL	13,000	13,788	15,000	18,000	23,000	30,000
Yes	TARRANT	FORT WORTH	842,750	1,034,608	1,273,035	1,385,808	1,482,797	1,580,787
Yes	TARRANT	GRAND PRAIRIE	51,864	51,864	51,864	51,864	51,864	51,864
Yes	TARRANT	GRAPEVINE	52,414	58,930	60,000	60,000	60,000	60,000
	TARRANT	HALTOM CITY	44,000	45,000	47,000	51,000	55,000	60,000
	TARRANT	HASLET	1,630	2,000	2,303	5,000	7,000	8,000
	TARRANT	HURST	40,000	41,000	41,000	41,000	41,000	41,000
Yes	TARRANT	JOHNSON COUNTY SUD	2,082	2,341	2,597	2,846	3,095	3,339
	TARRANT	KELLER	47,663	51,310	51,310	51,310	51,310	51,310
	TARRANT	KENNEDALE	8,000	9,200	10,824	11,303	11,626	11,626
	TARRANT	LAKE WORTH	5,186	5,831	6,468	7,500	8,800	12,000
	TARRANT	LAKESIDE	1,350	1,400	1,450	1,500	1,500	1,500
Yes	TARRANT	MANSFIELD	69,254	81,090	97,865	129,090	149,065	170,503
	TARRANT	NORTH RICHLAND HILLS	71,655	77,000	77,000	77,000	77,000	77,000
	TARRANT	PANTEGO	2,400	2,400	2,400	2,400	2,400	2,400
	TARRANT	PELICAN BAY	1,575	1,605	1,635	1,664	1,693	1,721
Yes	TARRANT	RENO	15	22	29	36	43	49
	TARRANT	RICHLAND HILLS	8,401	9,001	9,601	10,850	12,000	13,500
	TARRANT	RIVER OAKS	7,500	7,500	7,500	7,500	7,500	7,500
	TARRANT	SAGINAW	23,004	26,202	29,400	31,000	31,000	31,000
	TARRANT	SANSOM PARK VILLAGE	4,800	5,100	5,723	6,064	6,406	6,740
Yes	TARRANT	SOUTHLAKE	26,800	30,000	35,000	40,000	45,000	50,000
Yes	TARRANT	TROPHY CLUB	902	902	902	902	902	902
	TARRANT	WATAUGA	25,000	25,000	25,000	25,000	25,000	25,000
Yes	TARRANT	WESTLAKE	1,175	1,767	2,566	3,090	3,615	4,129
	TARRANT	WESTOVER HILLS	698	715	732	749	766	782
	TARRANT	WESTWORTH VILLAGE	2,700	2,945	3,187	3,422	3,658	3,889
	TARRANT	WHITE SETTLEMENT	16,957	17,858	18,750	22,000	28,000	34,000
	TARRANT TOTAL		**2,006,473**	**2,281,666**	**2,579,553**	**2,797,060**	**2,991,972**	**3,184,348**
	WISE	ALVORD	1,625	1,957	2,297	2,800	3,200	3,600
	WISE	AURORA	1,546	1,918	2,300	2,800	3,300	3,900
Yes	WISE	BOLIVAR WSC	1,232	1,420	1,614	1,827	2,054	2,294
	WISE	BOYD	1,303	1,413	2,000	2,500	3,500	3,800
	WISE	BRIDGEPORT	7,456	9,144	10,875	15,000	20,000	25,000
	WISE	CHICO	1,051	1,107	1,165	2,200	2,800	3,500

Appendix F - Region C Approved Population by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Final Region C Population					
			2020	2030	2040	2050	2060	2070
	WISE	COUNTY-OTHER	30,543	30,543	30,543	45,000	58,000	70,000
	WISE	DECATUR	8,508	11,738	15,253	19,751	23,225	27,000
Yes	WISE	FORT WORTH	12,089	17,356	22,400	28,808	35,075	41,342
	WISE	NEW FAIRVIEW	1,597	1,983	2,379	2,900	3,400	4,000
	WISE	NEWARK	1,772	2,339	3,302	4,458	6,216	8,300
	WISE	RHOME	2,384	3,368	4,377	7,000	9,400	12,000
	WISE	RUNAWAY BAY	1,448	1,633	1,822	2,200	2,500	3,000
Yes	WISE	WALNUT CREEK SUD	3,869	5,235	6,636	8,182	12,131	15,683
	WISE	WEST WISE RURAL SUD	3,459	3,580	3,705	3,835	3,969	4,108
	WISE TOTAL		**79,882**	**94,734**	**110,668**	**149,261**	**188,770**	**227,527**
	REGIONAL TOTAL		**7,504,200**	**8,648,725**	**9,908,572**	**11,260,257**	**12,742,283**	**14,347,912**

Appendix F - Region C Approved Population by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Final Region C Population					
		2020	2030	2040	2050	2060	2070
KAUFMAN	ABLES SPRINGS WSC	4,735	5,931	7,302	8,880	10,716	12,814
HUNT (D)	ABLES SPRINGS WSC	893	1,368	2,012	2,902	4,170	6,013
VAN ZANDT (D)	ABLES SPRINGS WSC	34	37	40	42	45	46
	ABLES SPRINGS WSC TOTAL	**5,662**	**7,336**	**9,354**	**11,824**	**14,931**	**18,873**
HENDERSON	ATHENS	14,287	15,957	17,349	19,186	33,000	50,000
HENDERSON	ATHENS (I)	275	295	312	334	353	372
	ATHENS TOTAL	**14,562**	**16,252**	**17,661**	**19,520**	**33,353**	**50,372**
PARKER	AZLE	2,371	2,571	2,774	2,979	3,600	4,618
TARRANT	AZLE	9,486	10,283	11,094	11,918	14,400	18,472
	AZLE TOTAL	**11,857**	**12,854**	**13,868**	**14,897**	**18,000**	**23,090**
HENDERSON	BETHEL-ASH WSC	2,138	2,410	2,637	2,937	3,196	3,447
HENDERSON	BETHEL-ASH WSC (I)	3,186	3,602	3,949	4,407	4,803	5,187
VAN ZANDT	BETHEL-ASH WSC (D)	915	1,198	1,414	1,629	1,807	1,959
	BETHEL-ASH WSC TOTAL	**6,239**	**7,210**	**8,000**	**8,973**	**9,806**	**10,593**
TARRANT	BETHESDA WSC	9,073	10,201	11,316	12,401	13,488	14,552
JOHNSON	BETHESDA WSC (G)	15,541	17,931	20,397	23,102	26,019	29,141
	BETHESDA WSC TOTAL	**24,614**	**28,132**	**31,713**	**35,503**	**39,507**	**43,693**
ROCKWALL	BLACKLAND WSC	3,318	3,552	3,818	4,087	4,387	4,705
HUNT (D)	BLACKLAND WSC	32	32	32	32	32	32
	BLACKLAND WSC TOTAL	**3,350**	**3,584**	**3,850**	**4,119**	**4,419**	**4,737**
COOKE	BOLIVAR WSC	1,631	1,751	1,842	1,934	2,010	2,076
DENTON	BOLIVAR WSC	9,480	11,534	13,988	16,730	19,940	23,604
WISE	BOLIVAR WSC	1,232	1,420	1,614	1,827	2,054	2,294
	BOLIVAR WSC TOTAL	**12,343**	**14,705**	**17,444**	**20,491**	**24,004**	**27,974**
ELLIS	BRANDON-IRENE WSC	80	103	129	160	196	238
NAVARRO	BRANDON-IRENE WSC	214	236	259	284	311	340
HILL	BRANDON-IRENE WSC (G)	1,937	2,062	2,147	2,234	2,301	2,354
	BRANDON-IRENE WSC TOTAL	**2,231**	**2,401**	**2,535**	**2,678**	**2,808**	**2,932**
TARRANT	BURLESON	8,634	9,000	10,000	14,000	17,000	19,000
JOHNSON	BURLESON (G)	35,167	42,845	50,022	54,635	60,711	68,170
	BURLESON TOTAL	**43,801**	**51,845**	**60,022**	**68,635**	**77,711**	**87,170**
COLLIN	CADDO BASIN SUD	2,500	3,000	4,000	5,000	6,000	7,000
HUNT (D)	CADDO BASIN SUD	6,337	8,401	11,201	15,067	20,576	28,581
	CADDO BASIN SUD TOTAL	**8,837**	**11,401**	**15,201**	**20,067**	**26,576**	**35,581**
COLLIN	CARROLLTON	4	6	9	12	15	18
DALLAS	CARROLLTON	49,822	49,822	49,822	49,822	49,822	49,822
DENTON	CARROLLTON	76,937	79,348	79,348	79,348	79,348	79,348
	CARROLLTON TOTAL	**126,763**	**129,176**	**129,179**	**129,182**	**129,185**	**129,188**
ROCKWALL	CASH SUD	1,189	1,540	1,939	2,342	2,792	3,269
HOPKINS (D)	CASH SUD	101	109	116	124	132	139
HUNT (D)	CASH SUD	17,992	23,653	31,333	41,938	57,047	79,003
RAINS (D)	CASH SUD	691	733	745	753	756	758
	CASH SUD TOTAL	**19,973**	**26,035**	**34,133**	**45,157**	**60,727**	**83,169**
DALLAS	CEDAR HILL	52,495	64,217	75,906	87,555	87,555	87,555
ELLIS	CEDAR HILL	705	902	1,132	1,401	1,401	1,401
	CEDAR HILL TOTAL	**53,200**	**65,119**	**77,038**	**88,956**	**88,956**	**88,956**
COLLIN	CELINA	21,995	43,200	72,980	112,500	112,500	112,500
DENTON	CELINA	680	4,800	16,020	37,500	37,500	37,500
	CELINA TOTAL	**22,675**	**48,000**	**89,000**	**150,000**	**150,000**	**150,000**
DALLAS	COMBINE	809	922	1,038	1,164	1,287	1,410

Appendix F - Region C Approved Population by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Final Region C Population					
		2020	2030	2040	2050	2060	2070
KAUFMAN	COMBINE	1,881	2,356	2,901	3,528	4,258	5,091
	COMBINE TOTAL	**2,690**	**3,278**	**3,939**	**4,692**	**5,545**	**6,501**
TARRANT	COMMUNITY WSC	3,498	3,933	4,363	4,781	5,200	5,610
WISE	COMMUNITY WSC	0	0	0	0	0	0
	COMMUNITY WSC TOTAL	3,498	3,933	4,363	4,781	5,200	5,610
DALLAS	COPPELL	40,324	41,817	41,817	41,817	41,817	41,817
DENTON	COPPELL	1,136	1,136	1,136	1,136	1,136	1,136
	COPPELL TOTAL	**41,460**	**42,953**	**42,953**	**42,953**	**42,953**	**42,953**
HOOD (G)	CRESSON	372	512	612	698	764	815
JOHNSON (G)	CRESSON	154	208	263	324	389	459
PARKER	CRESSON	451	505	566	637	720	815
	CRESSON TOTAL	**977**	**1,225**	**1,441**	**1,659**	**1,873**	**2,089**
TARRANT	CROWLEY	16,301	19,046	22,751	27,354	35,000	40,000
JOHNSON (G)	CROWLEY	61	96	132	171	213	258
	CROWLEY TOTAL	**16,362**	**19,142**	**22,883**	**27,525**	**35,213**	**40,258**
COLLIN	DALLAS	71,320	73,220	74,169	74,169	74,169	74,169
DALLAS	DALLAS	1,141,059	1,242,191	1,420,781	1,591,937	1,722,709	1,785,569
DENTON	DALLAS	29,680	32,203	36,598	40,789	43,991	45,531
KAUFMAN	DALLAS	0	0	0	0	0	0
ROCKWALL	DALLAS	77	103	132	162	195	230
	DALLAS TOTAL	**1,242,136**	**1,347,717**	**1,531,680**	**1,707,057**	**1,841,064**	**1,905,499**
COLLIN	EAST FORK SUD	2,289	2,860	3,554	4,297	5,177	6,175
DALLAS	EAST FORK SUD	1,934	2,646	3,377	4,170	4,943	5,718
ROCKWALL	EAST FORK SUD	461	645	854	1,066	1,303	1,554
	EAST FORK SUD TOTAL	**4,684**	**6,151**	**7,785**	**9,533**	**11,423**	**13,447**
DALLAS	FERRIS	6	10	14	18	22	26
ELLIS	FERRIS	2,940	3,540	4,160	4,826	8,000	15,000
	FERRIS TOTAL	**2,946**	**3,550**	**4,174**	**4,844**	**8,022**	**15,026**
ELLIS	FILES VALLEY WSC	775	991	1,243	1,538	1,887	2,291
HILL	FILES VALLEY WSC (G)	2,641	2,812	2,927	3,047	3,137	3,210
	FILES VALLEY WSC TOTAL	**3,416**	**3,803**	**4,170**	**4,585**	**5,024**	**5,501**
FREESTONE	FLO COMMUNITY WSC	521	562	590	611	627	638
LEON	FLO COMMUNITY WSC (H)	3,916	3,978	4,028	4,097	4,156	4,214
	FLO COMMUNITY WSC TOTAL	**4,437**	**4,540**	**4,618**	**4,708**	**4,783**	**4,852**
DENTON	FLOWER MOUND	75,315	92,730	92,730	92,730	92,730	92,730
TARRANT	FLOWER MOUND	240	270	270	270	270	270
	FLOWER MOUND TOTAL	**75,555**	**93,000**	**93,000**	**93,000**	**93,000**	**93,000**
KAUFMAN	FORNEY LAKE WSC	5,043	6,317	7,777	9,457	16,000	23,000
ROCKWALL	FORNEY LAKE WSC	478	601	741	883	1,041	1,209
	FORNEY LAKE WSC TOTAL	**5,521**	**6,918**	**8,518**	**10,340**	**17,041**	**24,209**
DENTON	FORT WORTH	36,268	55,784	80,890	114,032	146,148	178,264
JOHNSON (G)		0	0	0	5,000	8,000	10,000
PARKER	FORT WORTH	62,864	99,172	114,490	126,035	134,456	142,877
TARRANT	FORT WORTH	842,750	1,034,608	1,273,035	1,385,808	1,482,797	1,580,787
WISE	FORT WORTH	12,089	17,356	22,400	28,808	35,075	41,342
	FORT WORTH TOTAL	**953,971**	**1,206,920**	**1,490,815**	**1,659,683**	**1,806,476**	**1,953,270**
COLLIN	FRISCO	102,796	135,398	168,000	168,000	168,000	168,000
DENTON	FRISCO	68,530	90,265	112,000	112,000	112,000	112,000
	FRISCO TOTAL	**171,326**	**225,663**	**280,000**	**280,000**	**280,000**	**280,000**
COLLIN	GARLAND	334	417	518	626	755	900

Appendix F - Region C Approved Population by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Final Region C Population					
		2020	2030	2040	2050	2060	2070
DALLAS	GARLAND	234,313	241,346	243,000	243,000	243,000	243,000
ROCKWALL	GARLAND	3	4	4	5	6	7
	GARLAND TOTAL	**234,650**	**241,767**	**243,522**	**243,631**	**243,761**	**243,907**
DALLAS	GLENN HEIGHTS	13,825	18,835	23,978	29,561	35,002	46,000
ELLIS	GLENN HEIGHTS	3,498	4,473	5,612	6,945	8,520	13,000
	GLENN HEIGHTS TOTAL	**17,323**	**23,308**	**29,590**	**36,506**	**43,522**	**59,000**
DALLAS	GRAND PRAIRIE	166,241	206,822	231,537	231,537	231,537	231,537
ELLIS	GRAND PRAIRIE	57	73	92	114	140	170
TARRANT	GRAND PRAIRIE	51,864	51,864	51,864	51,864	51,864	51,864
	GRAND PRAIRIE TOTAL	**218,162**	**258,759**	**283,493**	**283,515**	**283,541**	**283,571**
DALLAS	GRAPEVINE	0	0	0	0	0	0
TARRANT	GRAPEVINE	52,414	58,930	60,000	60,000	60,000	60,000
	GRAPEVINE TOTAL	**52,414**	**58,930**	**60,000**	**60,000**	**60,000**	**60,000**
COLLIN	HICKORY CREEK SUD	63	69	77	85	95	106
FANNIN	HICKORY CREEK SUD	290	319	341	361	392	425
HUNT (D)	HICKORY CREEK SUD	4,164	6,086	8,694	12,295	17,426	24,882
	HICKORY CREEK SUD TOTAL	**4,517**	**6,474**	**9,112**	**12,741**	**17,913**	**25,413**
KAUFMAN	HIGH POINT WSC	4,927	6,172	7,599	9,240	15,000	20,000
ROCKWALL	HIGH POINT WSC	328	413	509	607	716	831
	HIGH POINT WSC TOTAL	**5,255**	**6,585**	**8,108**	**9,847**	**15,716**	**20,831**
ELLIS	JOHNSON COUNTY SUD	211	270	339	419	514	625
TARRANT	JOHNSON COUNTY SUD	2,082	2,341	2,597	2,846	3,095	3,339
HILL	JOHNSON COUNTY SUD (G)	218	232	242	252	259	265
JOHNSON	JOHNSON COUNTY SUD (G)	37,334	43,076	49,001	55,498	62,507	70,006
	JOHNSON COUNTY SUD TOTAL	**39,845**	**45,919**	**52,179**	**59,015**	**66,375**	**74,235**
COLLIN	JOSEPHINE	1,728	2,674	3,584	4,441	4,441	4,441
HUNT (D)	JOSEPHINE	131	232	369	559	559	559
	JOSEPHINE TOTAL	**1,859**	**2,906**	**3,953**	**5,000**	**5,000**	**5,000**
COLLIN	LAVON WSC	3,000	3,200	3,819	4,303	10,000	25,000
ROCKWALL	LAVON WSC	2,000	3,000	4,000	6,000	8,000	10,000
	LAVON WSC TOTAL	**5,000**	**6,200**	**7,819**	**10,303**	**18,000**	**35,000**
DALLAS	LEWISVILLE	841	841	841	841	841	841
DENTON	LEWISVILLE	106,486	121,083	138,527	158,016	176,515	176,515
	LEWISVILLE TOTAL	**107,327**	**121,924**	**139,368**	**158,857**	**177,356**	**177,356**
HENDERSON	MABANK	750	800	850	1,025	2,000	4,000
KAUFMAN	MABANK	3,200	3,800	4,400	6,371	9,000	12,000
	MABANK TOTAL	**3,950**	**4,600**	**5,250**	**7,396**	**11,000**	**16,000**
KAUFMAN	MACBEE SUD	266	333	410	498	601	719
HUNT (D)	MACBEE SUD	337	419	530	683	902	1,219
VAN ZANDT (D)	MACBEE SUD	6,891	7,562	8,075	8,585	9,008	9,370
	MACBEE SUD TOTAL	**7,494**	**8,314**	**9,015**	**9,766**	**10,511**	**11,308**
ELLIS	MANSFIELD	116	138	173	241	299	369
TARRANT	MANSFIELD	69,254	81,090	97,865	129,090	149,065	170,503
JOHNSON	MANSFIELD (G)	2,630	3,772	4,950	6,242	7,636	9,128
	MANSFIELD TOTAL	**72,000**	**85,000**	**102,988**	**135,573**	**157,000**	**180,000**
COLLIN	MARILEE SUD	3,664	3,664	3,600	3,600	3,544	3,544
GRAYSON	MARILEE SUD	2,746	2,746	2,698	2,698	2,657	2,657
	MARILEE SUD TOTAL	**6,410**	**6,410**	**6,298**	**6,298**	**6,201**	**6,201**
DALLAS	MESQUITE	149,861	164,825	186,120	202,904	219,260	235,656
KAUFMAN	MESQUITE	139	175	215	262	316	378

Appendix F - Region C Approved Population by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Final Region C Population					
		2020	2030	2040	2050	2060	2070
	MESQUITE TOTAL	**150,000**	**165,000**	**186,335**	**203,166**	**219,576**	**236,034**
PARKER	MINERAL WELLS	2,119	2,089	2,055	2,015	1,969	1,915
PALO PINTO	MINERAL WELLS (G)	15,907	17,072	17,858	18,585	19,139	19,577
	MINERAL WELLS TOTAL	**18,026**	**19,161**	**19,913**	**20,600**	**21,108**	**21,492**
ELLIS	MOUNTAIN PEAK SUD	5,321	6,805	8,536	10,564	12,959	15,735
JOHNSON	MOUNTAIN PEAK SUD (G)	1,951	2,378	2,819	3,302	3,823	4,381
	MOUNTAIN PEAK SUD TOTAL	**7,272**	**9,183**	**11,355**	**13,866**	**16,782**	**20,116**
COOKE	MOUNTAIN SPRING WSC	2,654	2,848	2,998	3,146	5,000	8,000
DENTON	MOUNTAIN SPRING WSC	55	61	68	75	84	94
	MOUNTAIN SPRING WSC TOTAL	**2,709**	**2,909**	**3,066**	**3,221**	**5,084**	**8,094**
FANNIN	NORTH HUNT WSC	525	577	617	653	709	769
DELTA (D)	NORTH HUNT WSC	238	241	241	241	241	241
HUNT (D)	NORTH HUNT WSC	3,483	4,551	6,000	8,001	10,851	14,993
	NORTH HUNT WSC TOTAL	**4,246**	**5,369**	**6,858**	**8,895**	**11,801**	**16,003**
DALLAS	OVILLA	476	613	754	907	1,056	1,829
ELLIS	OVILLA	4,049	5,178	6,495	8,039	9,861	18,171
	OVILLA TOTAL	**4,525**	**5,791**	**7,249**	**8,946**	**10,917**	**20,000**
COLLIN	PLANO	260,500	270,200	282,656	284,656	284,656	284,656
DENTON	PLANO	7,500	7,800	8,000	8,000	8,000	8,000
	PLANO TOTAL	**268,000**	**278,000**	**290,656**	**292,656**	**292,656**	**292,656**
COLLIN	PROSPER	20,004	28,022	32,637	33,848	35,058	35,058
DENTON	PROSPER	750	4,794	12,241	23,092	33,942	33,942
	PROSPER TOTAL	**20,754**	**32,816**	**44,878**	**56,940**	**69,000**	**69,000**
PARKER	RENO	2,520	2,563	2,611	2,667	2,732	2,807
TARRANT	RENO	15	22	29	36	43	49
	RENO TOTAL	**2,535**	**2,585**	**2,640**	**2,703**	**2,775**	**2,856**
ELLIS	RICE WSC	7,038	9,000	11,289	13,972	17,140	20,811
NAVARRO	RICE WSC	1,461	1,611	1,766	1,942	2,126	2,323
	RICE WSC TOTAL	**8,499**	**10,611**	**13,055**	**15,914**	**19,266**	**23,134**
COLLIN	RICHARDSON	31,522	31,714	32,974	34,000	34,000	34,000
DALLAS	RICHARDSON	73,478	76,486	79,526	82,000	82,000	82,000
	RICHARDSON TOTAL	105,000	108,200	112,500	116,000	116,000	116,000
DALLAS	ROCKETT SUD	1,000	2,000	3,000	4,000	5,000	6,000
ELLIS	ROCKETT SUD	32,882	42,048	52,743	65,279	85,000	105,000
	ROCKETT SUD TOTAL	**33,882**	**44,048**	**55,743**	**69,279**	**90,000**	**111,000**
DALLAS	ROWLETT	56,800	62,300	62,300	62,300	62,300	62,300
ROCKWALL	ROWLETT	7,700	7,700	7,700	7,700	7,700	7,700
	ROWLETT TOTAL	64,500	**70,000**	**70,000**	**70,000**	**70,000**	**70,000**
COLLIN	ROYSE CITY	1,639	5,500	12,000	20,000	38,000	40,906
ROCKWALL	ROYSE CITY	8,861	9,500	11,000	25,000	42,000	49,094
HUNT (D)	ROYSE CITY	364	452	572	737	973	1,316
	ROYSE CITY TOTAL	**10,864**	**15,452**	**23,572**	**45,737**	**80,973**	**91,316**
COLLIN	SACHSE	7,899	7,899	7,899	7,899	7,899	7,899
DALLAS	SACHSE	20,600	20,600	20,600	20,600	20,600	20,600
	SACHSE TOTAL	**28,499**	**28,499**	**28,499**	**28,499**	**28,499**	**28,499**

Appendix F - Region C Approved Population by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Final Region C Population					
		2020	2030	2040	2050	2060	2070
DALLAS	SARDIS-LONE ELM WSC	0	0	0	0	0	0
ELLIS	SARDIS-LONE ELM WSC	14,500	18,000	22,000	24,000	25,340	25,340
	SARDIS-LONE ELM WSC TOTAL	**14,500**	**18,000**	**22,000**	**24,000**	**25,340**	**25,340**
DALLAS	SEAGOVILLE	18,824	22,836	26,846	30,855	34,932	34,919
KAUFMAN	SEAGOVILLE	30	37	46	56	68	81
	SEAGOVILLE TOTAL	**18,854**	**22,873**	**26,892**	**30,911**	**35,000**	**35,000**
HENDERSON	SEVEN POINTS	1,500	1,750	2,000	2,540	3,000	3,500
KAUFMAN	SEVEN POINTS	105	131	162	197	238	284
	SEVEN POINTS TOTAL	**1,605**	**1,881**	**2,162**	**2,737**	**3,238**	**3,784**
COLLIN	SOUTH GRAYSON WSC	1,166	1,456	1,947	2,275	2,627	2,989
GRAYSON	SOUTH GRAYSON WSC	3,334	3,544	4,053	4,225	4,373	4,511
	SOUTH GRAYSON WSC TOTAL	**4,500**	**5,000**	**6,000**	**6,500**	**7,000**	**7,500**
DENTON	SOUTHLAKE	1,018	1,315	1,669	2,065	2,528	3,057
TARRANT	SOUTHLAKE	26,800	30,000	35,000	40,000	45,000	50,000
	SOUTHLAKE TOTAL	**27,818**	**31,315**	**36,669**	**42,065**	**47,528**	**53,057**
FANNIN	SOUTHWEST FANNIN COUNTY SI	3,836	4,218	4,510	4,776	5,718	6,757
GRAYSON	SOUTHWEST FANNIN COUNTY SI	1,792	2,695	3,586	4,608	6,282	8,243
	SOUTHWEST FANNIN COUNTY SUD TOTAL	**5,628**	**6,913**	**8,096**	**9,384**	**12,000**	**15,000**
DENTON	TROPHY CLUB	13,098	13,098	13,098	13,098	13,098	13,098
TARRANT	TROPHY CLUB	902	902	902	902	902	902
	TROPHY CLUB TOTAL	**14,000**	**14,000**	**14,000**	**14,000**	**14,000**	**14,000**
COOKE	TWO WAY SUD	100	108	113	119	124	128
GRAYSON	TWO WAY SUD	6,294	8,113	9,907	11,966	15,876	19,872
	TWO WAY SUD TOTAL	**6,394**	**8,221**	**10,020**	**12,085**	**16,000**	**20,000**
ELLIS	VENUS	83	106	133	165	202	246
JOHNSON	VENUS (G)	3,335	3,848	4,377	4,957	5,583	6,253
	VENUS TOTAL	**3,418**	**3,954**	**4,510**	**5,122**	**5,785**	**6,499**
HENDERSON	VIRGINIA HILL WSC	2,526	2,898	3,208	3,617	4,000	4,500
HENDERSON (I)	VIRGINIA HILL WSC	1,825	2,095	2,320	2,617	2,874	3,123
	VIRGINIA HILL WSC TOTAL	**4,351**	**4,993**	**5,528**	**6,234**	**6,874**	**7,623**
PARKER	WALNUT CREEK SUD	19,464	23,141	27,428	35,627	52,869	69,317
WISE	WALNUT CREEK SUD	3,869	5,235	6,636	8,182	12,131	15,683
	WALNUT CREEK SUD TOTAL	**23,333**	**28,376**	**34,064**	**43,809**	**65,000**	**85,000**
HENDERSON	WEST CEDAR CREEK MUD	10,025	10,038	10,048	10,062	12,000	15,000
KAUFMAN	WEST CEDAR CREEK MUD	9,687	12,134	14,939	18,166	24,000	35,000
	WEST CEDAR CREEK MUD TOTA	**19,712**	**22,172**	**24,987**	**28,228**	**36,000**	**50,000**
DENTON	WESTLAKE	25	33	43	54	67	82
TARRANT	WESTLAKE	1,175	1,767	2,566	3,090	3,615	4,129
	WESTLAKE TOTAL	**1,200**	**1,800**	**2,609**	**3,144**	**3,682**	**4,211**
FANNIN	WHITEWRIGHT	8	9	10	11	12	13
GRAYSON	WHITEWRIGHT	1,597	1,616	1,635	1,654	1,753	1,852
	WHITEWRIGHT TOTAL	**1,605**	**1,625**	**1,645**	**1,665**	**1,765**	**1,865**
COOKE	WOODBINE WSC	6,131	6,947	7,763	8,577	9,390	10,203
GRAYSON	WOODBINE WSC	84	93	102	113	125	137
	WOODBINE WSC TOTAL	**6,215**	**7,040**	**7,865**	**8,690**	**9,515**	**10,340**
COLLIN	WYLIE	42,126	47,666	51,294	54,120	55,946	57,599
DALLAS	WYLIE	2,543	2,613	2,683	2,753	2,823	2,960
ROCKWALL	WYLIE	3,815	3,919	4,023	4,127	4,231	4,441
	WYLIE TOTAL	**48,484**	**54,198**	**58,000**	**61,000**	**63,000**	**65,000**

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
COLLIN COUNTY						
SABINE BASIN						
CADDO BASIN SUD	1,677	2,013	2,684	3,355	4,026	4,697
FARMERSVILLE	12	30	30	30	30	30
JOSEPHINE	1,728	2,674	3,584	4,441	4,441	4,441
NEVADA	112	136	166	672	1,680	3,024
ROYSE CITY	1,639	5,500	12,000	20,000	38,000	40,906
COUNTY-OTHER	397	343	266	230	207	148
SABINE BASIN TOTAL POPULATION	**5,565**	**10,696**	**18,730**	**28,728**	**48,384**	**53,246**
TRINITY BASIN						
ALLEN	98,500	98,500	98,500	98,500	98,500	98,500
ANNA	11,943	13,929	22,984	31,000	59,000	89,000
BLUE RIDGE	925	2,000	4,000	12,000	25,000	39,000
CADDO BASIN SUD	823	987	1,316	1,645	1,974	2,303
CARROLLTON	4	6	9	12	15	18
CELINA	21,995	43,200	72,980	112,500	112,500	112,500
COPEVILLE SUD	3,846	4,804	5,972	8,000	14,000	24,000
CULLEOKA WSC	4,500	5,500	9,000	11,000	12,000	15,000
DALLAS	71,320	73,220	74,169	74,169	74,169	74,169
EAST FORK SUD	2,289	2,860	3,554	4,297	5,177	6,175
FAIRVIEW	13,000	15,000	20,025	20,025	20,025	20,025
FARMERSVILLE	7,988	19,970	19,970	19,970	19,970	19,970
FRISCO	102,796	135,398	168,000	168,000	168,000	168,000
GARLAND	334	417	518	626	755	900
HICKORY CREEK SUD	63	69	77	85	95	106
LAVON	3,500	4,500	6,885	8,891	20,000	45,000
LAVON SUD	3,000	3,200	3,819	4,303	10,000	25,000
LOWRY CROSSING	2,040	2,446	3,000	3,000	3,000	3,000
LUCAS	7,200	8,200	10,857	12,131	13,406	13,406
MARILEE SUD	3,664	3,664	3,600	3,600	3,544	3,544
MCKINNEY	156,924	188,628	274,566	358,000	358,000	358,000
MELISSA	6,978	9,790	13,216	30,000	50,000	75,000
MURPHY	23,000	23,000	23,000	23,000	23,000	23,000
NEVADA	887	1,081	1,317	5,328	13,320	23,976
NEW HOPE	770	962	1,195	1,445	1,741	2,077
NORTH COLLIN WSC	5,319	6,086	7,020	8,019	9,202	10,544
PARKER	6,000	16,000	20,000	20,000	20,000	20,000
PLANO	260,500	270,200	282,656	284,656	284,656	284,656
PRINCETON	9,080	11,880	15,290	36,295	57,300	78,304
PROSPER	20,004	28,022	32,637	33,848	35,058	35,058
RICHARDSON	31,522	31,714	32,974	34,000	34,000	34,000
SACHSE	7,899	7,899	7,899	7,899	7,899	7,899
SEIS LAGOS UD	2,130	2,130	2,130	2,130	2,130	2,130
SOUTH GRAYSON WSC	1,166	1,456	1,947	2,275	2,627	2,989
ST. PAUL	1,965	2,255	2,453	2,559	2,666	2,666
WESTON	3,370	7,159	32,647	79,837	127,026	127,026
WYLIE	42,126	47,666	51,294	54,120	55,946	57,599
WYLIE NORTHEAST SUD	1,889	2,390	3,000	6,000	10,000	16,000

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
COLLIN COUNTY						
TRINITY BASIN						
COUNTY-OTHER	9,892	9,946	10,023	34,770	49,793	79,852
TRINITY BASIN TOTAL POPULATION	**951,151**	**1,106,134**	**1,344,499**	**1,617,935**	**1,805,494**	**2,000,392**
COLLIN COUNTY TOTAL POPULATION	**956,716**	**1,116,830**	**1,363,229**	**1,646,663**	**1,853,878**	**2,053,638**
COOKE COUNTY						
RED BASIN						
GAINESVILLE	26	28	29	31	37	52
TWO WAY SUD	100	108	113	119	124	128
WOODBINE WSC	484	549	613	678	742	806
COUNTY-OTHER	1,824	1,928	2,029	2,272	2,806	4,600
RED BASIN TOTAL POPULATION	**2,434**	**2,613**	**2,784**	**3,100**	**3,709**	**5,586**
TRINITY BASIN						
BOLIVAR WSC	1,631	1,751	1,842	1,934	2,010	2,076
GAINESVILLE	17,310	18,579	19,553	20,521	24,963	34,948
LAKE KIOWA SUD	2,209	2,247	2,286	2,325	2,363	2,363
LINDSAY	1,102	1,183	1,245	1,307	2,500	5,000
MOUNTAIN SPRING WSC	2,654	2,848	2,998	3,146	5,000	8,000
MUENSTER	1,550	1,550	1,600	1,600	1,650	1,650
VALLEY VIEW	820	880	926	972	1,010	1,043
WOODBINE WSC	5,647	6,398	7,150	7,899	8,648	9,397
COUNTY-OTHER	6,676	7,072	7,695	10,728	12,194	26,400
TRINITY BASIN TOTAL POPULATION	**39,599**	**42,508**	**45,295**	**50,432**	**60,338**	**90,877**
COOKE COUNTY TOTAL POPULATION	**42,033**	**45,121**	**48,079**	**53,532**	**64,047**	**96,463**
DALLAS COUNTY						
TRINITY BASIN						
ADDISON	14,539	17,431	20,323	23,215	26,107	29,000
BALCH SPRINGS	26,423	28,980	31,606	34,456	37,233	40,018
CARROLLTON	49,822	49,822	49,822	49,822	49,822	49,822
CEDAR HILL	52,495	64,217	75,906	87,555	87,555	87,555
COCKRELL HILL	4,670	5,122	5,122	5,122	7,000	15,000
COMBINE	809	922	1,038	1,164	1,287	1,410
COPPELL	40,324	41,817	41,817	41,817	41,817	41,817
DALLAS	1,141,059	1,242,191	1,420,781	1,591,937	1,722,709	1,785,569
DESOTO	54,617	59,903	65,330	71,222	76,963	82,718
DUNCANVILLE	42,927	47,106	47,106	47,106	47,106	47,106
EAST FORK SUD	1,934	2,646	3,377	4,170	4,943	5,718
FARMERS BRANCH	30,613	32,509	34,455	36,567	38,625	40,689
FERRIS	6	10	14	18	22	26
GARLAND	234,313	241,346	243,000	243,000	243,000	243,000
GLENN HEIGHTS	13,825	18,835	23,978	29,561	35,002	46,000
GRAND PRAIRIE	166,241	206,822	231,537	231,537	231,537	231,537
HIGHLAND PARK	9,025	9,313	9,313	9,313	9,313	9,313
HUTCHINS	9,903	13,922	17,941	21,960	25,979	30,000
IRVING	260,752	284,500	284,500	284,500	284,500	284,500
LANCASTER	45,184	58,895	69,717	77,649	85,582	93,514
LEWISVILLE	841	841	841	841	841	841
MESQUITE	149,861	164,825	186,120	202,904	219,260	235,656

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
DALLAS COUNTY						
TRINITY BASIN						
OVILLA	476	613	754	907	1,056	1,829
RICHARDSON	73,478	76,486	79,526	82,000	82,000	82,000
ROCKETT SUD	1,000	2,000	3,000	4,000	5,000	6,000
ROWLETT	56,800	62,300	62,300	62,300	62,300	62,300
SACHSE	20,600	20,600	20,600	20,600	20,600	20,600
SEAGOVILLE	18,824	22,836	26,846	30,855	34,932	34,919
SUNNYVALE	7,000	10,000	13,000	15,000	18,000	18,000
UNIVERSITY PARK	25,688	25,688	25,688	25,688	25,688	25,688
WILMER	4,203	4,698	7,500	14,000	22,000	40,000
WYLIE	2,543	2,613	2,683	2,753	2,823	2,960
COUNTY-OTHER	5,339	3,000	2,000	2,000	2,000	2,000
TRINITY BASIN TOTAL POPULATION	**2,566,134**	**2,822,809**	**3,107,541**	**3,355,539**	**3,552,602**	**3,697,105**
DALLAS COUNTY TOTAL POPULATION	**2,566,134**	**2,822,809**	**3,107,541**	**3,355,539**	**3,552,602**	**3,697,105**
DENTON COUNTY						
TRINITY BASIN						
ARGYLE	6,000	9,000	13,000	13,000	13,000	13,000
ARGYLE WSC	5,040	5,040	5,040	5,040	5,040	5,040
AUBREY	4,726	6,284	7,349	8,713	10,459	12,693
BARTONVILLE	4,500	5,000	5,000	5,000	5,000	5,000
BOLIVAR WSC	9,480	11,534	13,988	16,730	19,940	23,604
CARROLLTON	76,937	79,348	79,348	79,348	79,348	79,348
CELINA	680	4,800	16,020	37,500	37,500	37,500
COPPELL	1,136	1,136	1,136	1,136	1,136	1,136
COPPER CANYON	1,419	1,523	1,647	1,785	1,947	2,131
CORINTH	24,911	29,499	29,499	29,499	29,499	29,499
CROSS ROADS	2,256	3,096	3,800	3,800	3,800	3,800
DALLAS	29,680	32,203	36,598	40,789	43,991	45,531
DENTON	160,145	211,773	268,780	341,471	468,168	570,694
DENTON COUNTY FWSD #10	7,884	16,750	16,750	16,750	16,750	16,750
DENTON COUNTY FWSD #1A	14,000	25,021	30,000	30,000	30,000	30,000
DENTON COUNTY FWSD #7	13,500	13,500	13,500	13,500	13,500	13,500
DOUBLE OAK	3,000	3,000	3,000	3,000	3,000	3,000
FLOWER MOUND	75,315	92,730	92,730	92,730	92,730	92,730
FORT WORTH	36,268	55,784	80,890	114,032	146,148	178,264
FRISCO	68,530	90,265	112,000	112,000	112,000	112,000
HACKBERRY	1,274	1,645	2,088	2,583	3,162	3,823
HICKORY CREEK	4,089	5,110	6,331	7,941	7,941	7,941
HIGHLAND VILLAGE	17,100	18,000	18,000	18,000	18,000	18,000
JUSTIN	4,650	8,325	12,000	12,000	12,000	12,000
KRUGERVILLE	1,986	2,437	2,889	3,440	3,440	3,440
KRUM	5,195	6,453	7,957	9,637	11,603	13,848
LAKE DALLAS	7,782	8,603	9,933	9,933	9,933	9,933
LAKEWOOD VILLAGE	692	870	1,082	1,319	1,597	1,914
LEWISVILLE	106,486	121,083	138,527	158,016	176,515	176,515
LITTLE ELM	29,860	33,821	33,821	33,821	33,821	33,821
MOUNTAIN SPRING WSC	55	61	68	75	84	94

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
DENTON COUNTY						
TRINITY BASIN						
MUSTANG SUD	12,500	23,946	35,392	46,838	58,284	69,730
NORTHLAKE	4,500	17,000	31,010	43,005	55,000	55,000
OAK POINT	8,305	12,586	16,868	21,149	25,430	25,430
PALOMA CREEK	12,348	16,839	16,839	16,839	16,839	16,839
PILOT POINT	6,500	8,000	11,000	15,000	20,000	27,000
PLANO	7,500	7,800	8,000	8,000	8,000	8,000
PONDER	2,035	2,811	3,738	4,774	5,987	7,371
PROSPER	750	4,794	12,241	23,092	33,942	33,942
PROVIDENCE VILLAGE WCID	7,235	7,235	7,235	7,235	7,235	7,235
ROANOKE	7,975	9,988	12,000	12,000	12,000	12,000
SANGER	8,632	10,713	13,199	15,977	19,229	22,941
SHADY SHORES	3,441	3,936	3,936	3,936	3,936	3,936
SOUTHLAKE	1,018	1,315	1,669	2,065	2,528	3,057
THE COLONY	51,000	58,000	62,000	67,600	67,600	67,600
TROPHY CLUB	13,098	13,098	13,098	13,098	13,098	13,098
WESTLAKE	25	33	43	54	67	82
COUNTY-OTHER	30,207	33,609	37,232	53,174	86,087	160,675
TRINITY BASIN TOTAL POPULATION	**901,645**	**1,135,397**	**1,348,271**	**1,576,424**	**1,846,314**	**2,090,485**
DENTON COUNTY TOTAL POPULATION	**901,645**	**1,135,397**	**1,348,271**	**1,576,424**	**1,846,314**	**2,090,485**
ELLIS COUNTY						
TRINITY BASIN						
BARDWELL	831	1,063	1,333	1,650	2,024	4,500
BRANDON-IRENE WSC	80	103	129	160	196	238
BUENA VISTA - BETHEL SUD	4,500	5,500	6,500	8,000	11,500	15,326
CEDAR HILL	705	902	1,132	1,401	1,401	1,401
ENNIS	22,000	26,000	30,000	41,059	66,101	110,000
FERRIS	2,940	3,540	4,160	4,826	8,000	15,000
FILES VALLEY WSC	775	991	1,243	1,538	1,887	2,291
GARRETT	1,032	1,320	1,656	2,049	2,514	6,000
GLENN HEIGHTS	3,498	4,473	5,612	6,945	8,520	13,000
GRAND PRAIRIE	57	73	92	114	140	170
ITALY	2,386	3,052	3,828	4,738	6,000	8,000
JOHNSON COUNTY SUD	211	270	339	419	514	625
MANSFIELD	116	138	173	241	299	369
MAYPEARL	1,128	1,359	1,500	1,500	1,500	1,500
MIDLOTHIAN	18,025	23,643	31,011	37,802	43,871	48,460
MILFORD	775	835	905	987	1,083	1,195
MOUNTAIN PEAK SUD	5,321	6,805	8,536	10,564	12,959	15,735
OAK LEAF	1,350	1,500	1,750	2,500	3,700	4,500
OVILLA	4,049	5,178	6,495	8,039	9,861	18,171
PALMER	2,562	3,276	4,109	5,086	6,500	12,000
PECAN HILL	801	1,025	1,286	1,592	2,000	3,000
RED OAK	12,369	14,000	19,000	26,000	32,000	50,000
RICE WSC	7,038	9,000	11,289	13,972	17,140	20,811
ROCKETT SUD	32,882	42,048	52,743	65,279	85,000	105,000
SARDIS-LONE ELM WSC	14,500	18,000	22,000	24,000	25,340	25,340

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
ELLIS COUNTY						
TRINITY BASIN						
VENUS	83	106	133	165	202	246
WAXAHACHIE	37,700	43,300	52,800	64,400	78,500	95,500
COUNTY-OTHER	6,100	6,500	7,177	27,642	60,016	105,596
TRINITY BASIN TOTAL POPULATION	**183,814**	**224,000**	**276,931**	**362,668**	**488,768**	**683,974**
ELLIS COUNTY TOTAL POPULATION	**183,814**	**224,000**	**276,931**	**362,668**	**488,768**	**683,974**
FANNIN COUNTY						
RED BASIN						
BONHAM	12,603	16,000	22,000	30,000	37,000	45,000
ECTOR	773	850	909	962	1,044	1,133
HONEY GROVE	376	398	398	398	398	398
LEONARD	18	19	21	22	24	26
SAVOY	924	1,016	1,086	1,151	1,249	1,355
SOUTHWEST FANNIN COUNTY SUD	3,656	4,020	4,298	4,552	5,449	6,439
TRENTON	1	2	7	12	16	20
WHITEWRIGHT	8	9	10	11	12	13
COUNTY-OTHER	9,866	9,624	10,093	13,842	29,823	47,557
RED BASIN TOTAL POPULATION	**28,225**	**31,938**	**38,822**	**50,950**	**75,015**	**101,941**
SULPHUR BASIN						
HICKORY CREEK SUD	275	302	323	342	371	402
HONEY GROVE	1,324	1,402	1,402	1,402	1,402	1,402
LADONIA	1,600	2,000	2,200	2,500	3,000	3,000
LEONARD	42	46	49	52	57	62
NORTH HUNT SUD	525	577	617	653	709	769
COUNTY-OTHER	954	1,015	1,901	3,573	7,007	11,414
SULPHUR BASIN TOTAL POPULATION	**4,720**	**5,342**	**6,492**	**8,522**	**12,546**	**17,049**
TRINITY BASIN						
HICKORY CREEK SUD	15	17	18	19	21	23
LEONARD	2,153	2,369	2,532	2,683	2,910	3,157
SOUTHWEST FANNIN COUNTY SUD	180	198	212	224	269	318
TRENTON	705	998	3,493	5,988	7,984	9,980
COUNTY-OTHER	2,348	2,529	1,174	835	3,170	6,029
TRINITY BASIN TOTAL POPULATION	**5,401**	**6,111**	**7,429**	**9,749**	**14,354**	**19,507**
FANNIN COUNTY TOTAL POPULATION	**38,346**	**43,391**	**52,743**	**69,221**	**101,915**	**138,497**
FREESTONE COUNTY						
BRAZOS BASIN						
TEAGUE	1,856	1,980	2,772	3,490	4,208	4,950
COUNTY-OTHER	1,371	1,348	852	1,428	2,815	6,623
BRAZOS BASIN TOTAL POPULATION	**3,227**	**3,328**	**3,624**	**4,918**	**7,023**	**11,573**
TRINITY BASIN						
FAIRFIELD	3,232	3,486	3,662	7,000	8,000	10,000
FLO COMMUNITY WSC	521	562	590	611	627	638
OAKWOOD	40	43	45	47	48	49
TEAGUE	1,894	2,020	2,828	3,560	4,292	5,050
WORTHAM	1,175	1,267	1,331	1,378	2,300	2,600

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
FREESTONE COUNTY						
TRINITY BASIN						
COUNTY-OTHER	10,348	10,371	10,867	13,628	22,185	43,377
TRINITY BASIN TOTAL POPULATION	**17,210**	**17,749**	**19,323**	**26,224**	**37,452**	**61,714**
FREESTONE COUNTY TOTAL POPULATION	**20,437**	**21,077**	**22,947**	**31,142**	**44,475**	**73,287**
GRAYSON COUNTY						
RED BASIN						
BELLS	1,648	1,943	2,234	2,568	6,000	8,000
DENISON	25,127	27,949	30,731	33,925	40,000	50,000
HOWE	804	938	1,072	1,206	1,340	1,474
KENTUCKY TOWN WSC	1,479	1,774	2,065	2,399	3,014	3,768
LUELLA SUD	3,292	3,794	4,290	4,859	5,463	6,111
POTTSBORO	2,896	3,745	4,582	6,000	10,000	18,000
SHERMAN	42,880	45,000	50,000	58,000	75,000	105,000
SOUTHMAYD	1,098	1,222	1,344	1,483	2,000	3,000
SOUTHWEST FANNIN COUNTY SUD	1,792	2,695	3,586	4,608	6,282	8,243
TOM BEAN	142	161	179	200	242	363
TWO WAY SUD	3,972	5,119	6,251	7,551	10,018	12,539
WHITESBORO	1,645	1,665	1,686	1,709	2,145	2,788
WHITEWRIGHT	1,584	1,603	1,622	1,641	1,739	1,837
COUNTY-OTHER	20,620	20,601	20,582	20,387	29,097	49,118
RED BASIN TOTAL POPULATION	**108,979**	**118,209**	**130,224**	**146,536**	**192,340**	**270,241**
TRINITY BASIN						
COLLINSVILLE	2,117	2,685	3,246	3,889	5,000	6,500
GUNTER	2,200	3,000	4,000	5,000	6,000	7,000
HOWE	2,196	2,562	2,928	3,294	3,660	4,026
KENTUCKY TOWN WSC	1,466	1,758	2,046	2,377	2,986	3,732
LUELLA SUD	508	586	662	750	843	944
MARILEE SUD	2,746	2,746	2,698	2,698	2,657	2,657
SOUTH GRAYSON WSC	3,334	3,544	4,053	4,225	4,373	4,511
TIOGA	865	936	1,006	1,087	3,500	4,800
TOM BEAN	1,034	1,167	1,298	1,449	1,758	2,637
TWO WAY SUD	2,322	2,994	3,656	4,415	5,858	7,333
VAN ALSTYNE	3,735	4,530	5,314	6,214	18,000	25,000
WHITESBORO	2,189	2,217	2,243	2,274	2,855	3,712
WHITEWRIGHT	13	13	13	13	14	15
WOODBINE WSC	84	93	102	113	125	137
COUNTY-OTHER	997	1,016	1,035	1,230	903	882
TRINITY BASIN TOTAL POPULATION	**25,806**	**29,847**	**34,300**	**39,028**	**58,532**	**73,886**
GRAYSON COUNTY TOTAL POPULATION	**134,785**	**148,056**	**164,524**	**185,564**	**250,872**	**344,127**
HENDERSON COUNTY						
TRINITY BASIN						
ATHENS	14,287	15,957	17,349	19,186	33,000	50,000
BETHEL-ASH WSC	2,138	2,410	2,637	2,937	3,196	3,447
EAST CEDAR CREEK FWSD	11,036	12,000	14,568	15,773	16,973	18,161
EUSTACE	1,100	1,200	1,300	1,919	2,500	3,000
GUN BARREL CITY	6,000	6,500	7,000	8,211	12,500	20,000
LOG CABIN	777	834	882	946	1,000	1,054

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
HENDERSON COUNTY						
TRINITY BASIN						
MABANK	750	800	850	1,025	2,000	4,000
MALAKOFF	2,411	2,491	2,557	2,645	2,800	3,000
PAYNE SPRINGS	877	977	1,060	1,170	1,300	1,600
SEVEN POINTS	1,500	1,750	2,000	2,540	3,000	3,500
TOOL	2,438	2,618	2,769	2,968	4,500	6,000
TRINIDAD	886	886	886	886	1,000	1,200
VIRGINIA HILL WSC	2,526	2,898	3,208	3,617	4,000	4,500
WEST CEDAR CREEK MUD	10,025	10,038	10,048	10,062	12,000	15,000
COUNTY-OTHER	3,424	2,700	2,623	2,319	2,058	1,807
TRINITY BASIN TOTAL POPULATION	**60,175**	**64,059**	**69,737**	**76,204**	**101,827**	**136,269**
HENDERSON COUNTY TOTAL POPULATION	**60,175**	**64,059**	**69,737**	**76,204**	**101,827**	**136,269**
JACK COUNTY						
BRAZOS BASIN						
BRYSON	581	620	644	657	666	672
COUNTY-OTHER	1,544	1,649	1,714	1,748	1,773	1,789
BRAZOS BASIN TOTAL POPULATION	**2,125**	**2,269**	**2,358**	**2,405**	**2,439**	**2,461**
TRINITY BASIN						
JACKSBORO	4,863	5,191	5,395	5,503	5,581	5,631
COUNTY-OTHER	2,763	2,949	3,064	3,125	3,170	3,199
TRINITY BASIN TOTAL POPULATION	**7,626**	**8,140**	**8,459**	**8,628**	**8,751**	**8,830**
JACK COUNTY TOTAL POPULATION	**9,751**	**10,409**	**10,817**	**11,033**	**11,190**	**11,291**
KAUFMAN COUNTY						
SABINE BASIN						
ABLES SPRINGS WSC	2,850	3,570	4,396	5,346	6,451	7,714
MACBEE SUD	233	291	359	436	526	629
COUNTY-OTHER	301	510	765	1,508	1,453	2,906
SABINE BASIN TOTAL POPULATION	**3,384**	**4,371**	**5,520**	**7,290**	**8,430**	**11,249**
TRINITY BASIN						
ABLES SPRINGS WSC	1,885	2,361	2,906	3,534	4,265	5,100
COLLEGE MOUND WSC	11,745	14,711	18,112	22,024	30,000	38,000
COMBINE	1,881	2,356	2,901	3,528	4,258	5,091
CRANDALL	4,295	5,379	6,623	8,000	8,000	8,000
FORNEY	22,033	26,000	33,978	41,317	60,000	80,000
FORNEY LAKE WSC	5,043	6,317	7,777	9,457	16,000	23,000
GASTONIA-SCURRY SUD	9,508	11,910	14,663	17,830	30,000	45,000
HIGH POINT WSC	4,927	6,172	7,599	9,240	15,000	20,000
KAUFMAN	8,000	10,000	12,500	18,890	24,445	30,000
KEMP	1,734	2,172	2,674	3,252	5,000	7,000
MABANK	3,200	3,800	4,400	6,371	9,000	12,000
MACBEE SUD	33	42	51	62	75	90
MESQUITE	139	175	215	262	316	378
OAK GROVE	800	1,000	1,200	1,850	2,500	5,000
POST OAK BEND CITY	800	1,000	1,200	1,850	2,500	5,000
ROSE HILL SUD	5,278	6,611	8,139	9,897	13,000	20,000
SCURRY	850	1,050	1,250	1,919	2,700	6,000
SEAGOVILLE	30	37	46	56	68	81

WUG POPULATION

REGION C	WUG POPULATION					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
KAUFMAN COUNTY						
TRINITY BASIN						
SEVEN POINTS	105	131	162	197	238	284
TALTY	2,306	2,889	3,557	4,325	6,000	10,000
TALTY WSC	9,663	11,103	12,902	18,121	23,000	30,000
TERRELL	23,769	43,403	52,959	65,689	76,235	88,473
WEST CEDAR CREEK MUD	9,687	12,134	14,939	18,166	24,000	35,000
COUNTY-OTHER	15,528	16,583	23,667	36,492	63,547	87,094
TRINITY BASIN TOTAL POPULATION	**143,239**	**187,336**	**234,420**	**302,329**	**420,147**	**560,591**
KAUFMAN COUNTY TOTAL POPULATION	**146,623**	**191,707**	**239,940**	**309,619**	**428,577**	**571,840**
NAVARRO COUNTY						
TRINITY BASIN						
BLOOMING GROVE	909	1,002	1,098	1,208	1,323	1,445
BRANDON-IRENE WSC	214	236	259	284	311	340
CHATFIELD WSC	4,300	4,400	4,500	4,600	4,700	4,800
CORBET WSC	2,865	3,159	3,462	3,808	4,170	4,556
CORSICANA	26,298	28,997	31,785	34,959	38,279	41,823
DAWSON	893	985	1,080	1,187	1,300	1,420
FROST	712	785	860	946	1,036	1,132
KERENS	1,741	1,919	2,104	2,314	2,534	2,768
M-E-N WSC	3,346	3,689	4,044	4,448	4,870	5,321
NAVARRO MILLS WSC	3,308	3,648	3,999	4,398	4,816	5,261
RICE	1,022	1,126	1,235	1,358	1,487	1,625
RICE WSC	1,461	1,611	1,766	1,942	2,126	2,323
COUNTY-OTHER	5,475	5,475	5,475	10,000	20,000	35,000
TRINITY BASIN TOTAL POPULATION	**52,544**	**57,032**	**61,667**	**71,452**	**86,952**	**107,814**
NAVARRO COUNTY TOTAL POPULATION	**52,544**	**57,032**	**61,667**	**71,452**	**86,952**	**107,814**
PARKER COUNTY						
BRAZOS BASIN						
MINERAL WELLS	2,119	2,089	2,055	2,015	1,969	1,915
PARKER COUNTY SUD	6,162	8,161	10,420	13,069	16,140	19,687
WEATHERFORD	1,690	2,025	2,403	3,920	6,160	9,000
COUNTY-OTHER	32,045	41,336	46,271	58,028	76,704	101,627
BRAZOS BASIN TOTAL POPULATION	**42,016**	**53,611**	**61,149**	**77,032**	**100,973**	**132,229**
TRINITY BASIN						
ALEDO	5,320	8,320	12,620	13,258	13,258	13,258
ANNETTA	1,678	2,068	2,458	2,848	3,238	3,628
ANNETTA NORTH	559	608	664	729	804	891
ANNETTA SOUTH	526	526	526	526	526	526
AZLE	2,371	2,571	2,774	2,979	3,600	4,618
CRESSON	451	505	566	637	720	815
FORT WORTH	62,864	99,172	114,490	126,035	134,456	142,877
HUDSON OAKS	2,673	3,684	4,695	4,808	4,808	4,808
RENO	2,520	2,563	2,611	2,667	2,732	2,807
SPRINGTOWN	4,079	5,500	5,500	5,500	5,500	5,500
WALNUT CREEK SUD	19,464	23,141	27,428	35,627	52,869	69,317
WEATHERFORD	28,494	34,132	40,505	66,080	103,840	151,720
WILLOW PARK	4,877	5,960	7,184	10,000	13,000	16,000

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
PARKER COUNTY						
TRINITY BASIN						
COUNTY-OTHER	22,063	12,772	7,837	17,870	40,206	80,283
TRINITY BASIN TOTAL POPULATION	**157,939**	**201,522**	**229,858**	**289,564**	**379,557**	**497,048**
PARKER COUNTY TOTAL POPULATION	**199,955**	**255,133**	**291,007**	**366,596**	**480,530**	**629,277**
ROCKWALL COUNTY						
SABINE BASIN						
BLACKLAND WSC	1,513	1,620	1,741	1,864	2,000	2,145
CASH SUD	1,189	1,540	1,939	2,342	2,792	3,269
FATE	5,252	6,661	8,264	8,885	9,695	14,895
LAVON SUD	1,040	1,560	2,080	3,120	4,160	5,200
ROYSE CITY	8,861	9,500	11,000	25,000	42,000	49,094
COUNTY-OTHER	1,401	1,600	1,715	1,911	3,097	4,200
SABINE BASIN TOTAL POPULATION	**19,256**	**22,481**	**26,739**	**43,122**	**63,744**	**78,803**
TRINITY BASIN						
BLACKLAND WSC	1,805	1,932	2,077	2,223	2,387	2,560
DALLAS	77	103	132	162	195	230
EAST FORK SUD	461	645	854	1,066	1,303	1,554
FATE	4,573	7,422	10,660	14,936	19,595	30,105
FORNEY LAKE WSC	478	601	741	883	1,041	1,209
GARLAND	3	4	4	5	6	7
HEATH	12,107	24,300	24,300	24,300	24,300	24,300
HIGH POINT WSC	328	413	509	607	716	831
LAVON SUD	960	1,440	1,920	2,880	3,840	4,800
MCLENDON-CHISHOLM	1,739	2,188	2,698	3,215	3,792	4,403
MOUNT ZION WSC	1,985	2,497	3,080	3,669	4,327	5,025
ROCKWALL	47,474	59,732	73,669	87,768	103,514	120,202
ROWLETT	7,700	7,700	7,700	7,700	7,700	7,700
WYLIE	3,815	3,919	4,023	4,127	4,231	4,441
COUNTY-OTHER	2,126	1,927	1,812	1,616	8,903	15,800
TRINITY BASIN TOTAL POPULATION	**85,631**	**114,823**	**134,179**	**155,157**	**185,850**	**223,167**
ROCKWALL COUNTY TOTAL POPULATION	**104,887**	**137,304**	**160,918**	**198,279**	**249,594**	**301,970**
TARRANT COUNTY						
TRINITY BASIN						
ARLINGTON	387,725	412,746	421,748	426,308	428,127	428,403
AZLE	9,486	10,283	11,094	11,918	14,400	18,472
BEDFORD	48,100	51,983	55,866	59,750	59,750	59,750
BENBROOK	22,500	25,000	27,500	32,833	48,095	48,095
BETHESDA WSC	9,073	10,201	11,316	12,401	13,488	14,552
BLUE MOUND	2,398	2,403	2,408	2,413	2,418	2,422
BURLESON	8,634	9,000	10,000	14,000	17,000	19,000
COLLEYVILLE	24,000	25,500	27,000	28,000	28,000	28,000
COMMUNITY WSC	3,498	3,933	4,363	4,781	5,200	5,610
CROWLEY	16,301	19,046	22,751	27,354	35,000	40,000
DALWORTHINGTON GARDENS	2,307	2,359	2,410	2,460	2,510	2,559
EDGECLIFF VILLAGE	2,924	2,924	2,924	2,924	2,924	2,924
EULESS	54,214	57,150	57,150	57,150	57,150	57,150
EVERMAN	6,286	6,477	6,600	6,600	6,600	6,600

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
TARRANT COUNTY						
TRINITY BASIN						
FLOWER MOUND	240	270	270	270	270	270
FOREST HILL	13,000	13,788	15,000	18,000	23,000	30,000
FORT WORTH	842,750	1,034,608	1,273,035	1,385,808	1,482,797	1,580,787
GRAND PRAIRIE	51,864	51,864	51,864	51,864	51,864	51,864
GRAPEVINE	52,414	58,930	60,000	60,000	60,000	60,000
HALTOM CITY	44,000	45,000	47,000	51,000	55,000	60,000
HASLET	1,630	2,000	2,303	5,000	7,000	8,000
HURST	40,000	41,000	41,000	41,000	41,000	41,000
JOHNSON COUNTY SUD	2,082	2,341	2,597	2,846	3,095	3,339
KELLER	47,663	51,310	51,310	51,310	51,310	51,310
KENNEDALE	8,000	9,200	10,824	11,303	11,626	11,626
LAKE WORTH	5,186	5,831	6,468	7,500	8,800	12,000
LAKESIDE	1,350	1,400	1,450	1,500	1,500	1,500
MANSFIELD	69,254	81,090	97,865	129,090	149,065	170,503
NORTH RICHLAND HILLS	71,655	77,000	77,000	77,000	77,000	77,000
PANTEGO	2,400	2,400	2,400	2,400	2,400	2,400
PELICAN BAY	1,575	1,605	1,635	1,664	1,693	1,721
RENO	15	22	29	36	43	49
RICHLAND HILLS	8,401	9,001	9,601	10,850	12,000	13,500
RIVER OAKS	7,500	7,500	7,500	7,500	7,500	7,500
SAGINAW	23,004	26,202	29,400	31,000	31,000	31,000
SANSOM PARK	4,800	5,100	5,723	6,064	6,406	6,740
SOUTHLAKE	26,800	30,000	35,000	40,000	45,000	50,000
TROPHY CLUB	902	902	902	902	902	902
WATAUGA	25,000	25,000	25,000	25,000	25,000	25,000
WESTLAKE	1,175	1,767	2,566	3,090	3,615	4,129
WESTOVER HILLS	698	715	732	749	766	782
WESTWORTH VILLAGE	2,700	2,945	3,187	3,422	3,658	3,889
WHITE SETTLEMENT	16,957	17,858	18,750	22,000	28,000	34,000
COUNTY-OTHER	36,012	36,012	36,012	60,000	80,000	110,000
TRINITY BASIN TOTAL POPULATION	**2,006,473**	**2,281,666**	**2,579,553**	**2,797,060**	**2,991,972**	**3,184,348**
TARRANT COUNTY TOTAL POPULATION	**2,006,473**	**2,281,666**	**2,579,553**	**2,797,060**	**2,991,972**	**3,184,348**
WISE COUNTY						
TRINITY BASIN						
ALVORD	1,625	1,957	2,297	2,800	3,200	3,600
AURORA	1,546	1,918	2,300	2,800	3,300	3,900
BOLIVAR WSC	1,232	1,420	1,614	1,827	2,054	2,294
BOYD	1,303	1,413	2,000	2,500	3,500	3,800
BRIDGEPORT	7,456	9,144	10,875	15,000	20,000	25,000
CHICO	1,051	1,107	1,165	2,200	2,800	3,500
DECATUR	8,508	11,738	15,253	19,751	23,225	27,000
FORT WORTH	12,089	17,356	22,400	28,808	35,075	41,342
NEW FAIRVIEW	1,597	1,983	2,379	2,900	3,400	4,000
NEWARK	1,772	2,339	3,302	4,458	6,216	8,300
RHOME	2,384	3,368	4,377	7,000	9,400	12,000
RUNAWAY BAY	1,448	1,633	1,822	2,200	2,500	3,000

WUG POPULATION

REGION C	WUG POPULATION					
	2020	2030	2040	2050	2060	2070
WISE COUNTY						
TRINITY BASIN						
WALNUT CREEK SUD	3,869	5,235	6,636	8,182	12,131	15,683
WEST WISE SUD	3,459	3,580	3,705	3,835	3,969	4,108
COUNTY-OTHER	30,543	30,543	30,543	45,000	58,000	70,000
TRINITY BASIN TOTAL POPULATION	**79,882**	**94,734**	**110,668**	**149,261**	**188,770**	**227,527**
WISE COUNTY TOTAL POPULATION	**79,882**	**94,734**	**110,668**	**149,261**	**188,770**	**227,527**
REGION C TOTAL POPULATION	**7,504,200**	**8,648,725**	**9,908,572**	**11,260,257**	**12,742,283**	**14,347,912**

Appendix G

APPENDIX G

WATER DEMAND PROJECTIONS BY WATER USER GROUP

Table G.1 - Region C Approved Municipal Demand by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
			2020	2030	2040	2050	2060	2070
	COLLIN	ALLEN	20,533	20,336	20,215	20,139	20,108	20,106
	COLLIN	ANNA	1,898	2,190	3,588	4,826	9,167	13,820
	COLLIN	BLUE RIDGE	92	185	362	1,412	3,221	5,461
Yes	COLLIN	CADDO BASIN SUD	279	321	418	516	618	720
	COLLIN	CARROLLTON	1	2	2	3	3	4
Yes	COLLIN	CELINA	4,574	8,900	15,008	23,121	23,119	23,117
	COLLIN	COPEVILLE SUD	319	376	452	596	1,037	1,773
	COLLIN	COUNTY-OTHER	1,613	1,582	1,560	5,213	7,434	11,885
	COLLIN	CULLEOKA WSC	328	370	605	740	807	1,009
Yes	COLLIN	DALLAS	15,807	15,886	15,831	15,707	15,682	15,679
Yes	COLLIN	EAST FORK SUD	279	335	407	487	586	698
	COLLIN	FAIRVIEW	4,644	5,329	7,094	7,087	7,084	7,083
	COLLIN	FARMERSVILLE	958	2,310	2,299	2,293	2,291	2,291
Yes	COLLIN	FRISCO	24,957	32,625	40,372	40,334	40,308	40,300
Yes	COLLIN	GARLAND	54	66	80	96	115	137
Yes	COLLIN	HICKORY CREEK SUD	7	7	8	8	9	10
Yes	COLLIN	JOSEPHINE	258	390	519	641	641	641
	COLLIN	LAVON	559	711	1,081	1,392	3,125	7,025
Yes	COLLIN	LAVON WSC	354	367	430	481	1,115	2,783
	COLLIN	LOWRY CROSSING	222	257	308	306	305	305
	COLLIN	LUCAS	2,132	2,406	3,165	3,528	3,896	3,896
Yes	COLLIN	MARILEE SUD	541	532	517	515	506	506
	COLLIN	MCKINNEY	34,365	40,877	59,112	76,866	76,818	76,814
	COLLIN	MELISSA	1,535	2,133	2,869	6,493	10,814	16,216
	COLLIN	MURPHY	5,285	5,253	5,238	5,228	5,222	5,220
	COLLIN	NEVADA	96	112	133	528	1,316	2,368
	COLLIN	NEW HOPE	119	143	174	209	251	299
	COLLIN	NORTH COLLIN WSC	782	871	987	1,117	1,279	1,464
	COLLIN	PARKER	2,561	6,772	8,454	8,450	8,449	8,449
Yes	COLLIN	PLANO	67,088	68,626	71,043	71,153	71,061	71,061
	COLLIN	PRINCETON	974	1,236	1,566	3,679	5,798	7,919
Yes	COLLIN	PROSPER	5,129	7,134	8,294	8,594	8,897	8,896
Yes	COLLIN	RICHARDSON	7,904	7,819	8,021	8,212	8,201	8,201
Yes	COLLIN	ROYSE CITY	190	621	1,338	2,215	4,199	4,519
Yes	COLLIN	SACHSE	1,436	1,420	1,411	1,406	1,404	1,403
	COLLIN	SEIS LAGOS UD	603	598	596	594	594	594
Yes	COLLIN	SOUTH GRAYSON WSC	143	175	230	267	307	349
	COLLIN	SAINT PAUL	265	298	322	334	348	347
	COLLIN	WESTON	506	1,060	4,814	11,768	18,723	18,721
Yes	COLLIN	WYLIE	6,349	7,080	7,562	7,943	8,196	8,434
	COLLIN	WYLIE NORTHEAST SUD	257	319	396	785	1,305	2,086
	COLLIN Total		**215,996**	**248,030**	**296,881**	**345,282**	**374,359**	**402,609**
Yes	COOKE	BOLIVAR WSC	146	150	153	159	164	169
	COOKE	COUNTY-OTHER	1,123	1,149	1,209	1,590	1,830	3,767
	COOKE	GAINESVILLE	2,492	2,589	2,659	2,755	3,338	4,663
	COOKE	KIOWA HOMEOWNERS WSC	786	790	800	813	826	826
	COOKE	LINDSAY	144	150	154	160	304	605
Yes	COOKE	MOUNTAIN SPRING WSC	446	469	487	507	802	1,280
	COOKE	MUENSTER	266	259	261	258	265	265
Yes	COOKE	TWO WAY SUD	12	12	12	13	13	14
	COOKE	VALLEY VIEW	56	60	63	66	68	71
Yes	COOKE	WOODBINE WSC	651	707	767	836	912	990
	COOKE Total		**6,122**	**6,335**	**6,565**	**7,157**	**8,522**	**12,650**
	DALLAS	ADDISON	6,002	7,113	8,235	9,376	10,536	11,701
	DALLAS	BALCH SPRINGS	2,750	2,895	3,067	3,294	3,547	3,809

Table G.1 - Region C Approved Municipal Demand by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
			2020	2030	2040	2050	2060	2070
Yes	DALLAS	CARROLLTON	9,262	9,065	8,914	8,830	8,813	8,812
Yes	DALLAS	CEDAR HILL	10,510	12,630	14,784	16,972	16,957	16,955
	DALLAS	COCKRELL HILL	407	421	405	396	536	1,141
Yes	DALLAS	COMBINE	93	102	112	124	137	149
Yes	DALLAS	COPPELL	10,690	10,947	10,851	10,795	10,782	10,781
	DALLAS	COUNTY-OTHER	3,106	2,622	2,415	2,414	2,413	2,413
Yes	DALLAS	DALLAS	252,895	269,507	303,241	337,114	364,228	377,458
	DALLAS	DE SOTO	9,442	10,128	10,878	11,765	12,687	13,628
	DALLAS	DUNCANVILLE	6,065	6,437	6,295	6,218	6,204	6,203
Yes	DALLAS	EAST FORK SUD	236	310	386	473	559	646
	DALLAS	FARMERS BRANCH	9,041	9,458	9,911	10,457	11,031	11,618
Yes	DALLAS	FERRIS	1	2	3	3	4	4
Yes	DALLAS	GARLAND	37,816	37,940	37,427	37,005	36,921	36,921
Yes	DALLAS	GLENN HEIGHTS	1,514	2,003	2,517	3,085	3,645	4,784
Yes	DALLAS	GRAND PRAIRIE	26,817	32,622	36,069	35,859	35,807	35,799
	DALLAS	HIGHLAND PARK	4,056	4,141	4,106	4,091	4,088	4,088
	DALLAS	HUTCHINS	1,022	1,396	1,779	2,166	2,558	2,952
	DALLAS	IRVING	56,135	60,148	59,460	59,081	59,001	58,992
	DALLAS	LANCASTER	7,686	9,775	11,429	12,659	13,932	15,216
Yes	DALLAS	LEWISVILLE	158	155	153	152	152	152
Yes	DALLAS	MESQUITE	22,323	23,832	26,330	28,404	30,622	32,894
Yes	DALLAS	OVILLA	114	144	175	210	244	422
Yes	DALLAS	RICHARDSON	18,424	18,857	19,343	19,804	19,778	19,777
Yes	DALLAS	ROCKETT SUD	115	220	323	427	532	638
Yes	DALLAS	ROWLETT	8,691	9,330	9,209	9,140	9,121	9,120
Yes	DALLAS	SACHSE	3,743	3,704	3,680	3,665	3,660	3,659
Yes	DALLAS	SEAGOVILLE	2,058	2,409	2,774	3,156	3,564	3,562
	DALLAS	SUNNYVALE	2,357	3,332	4,313	4,968	5,958	5,957
	DALLAS	UNIVERSITY PARK	7,622	7,515	7,427	7,379	7,371	7,370
	DALLAS	WILMER	433	466	718	1,323	2,073	3,763
Yes	DALLAS	WYLIE	384	389	396	405	414	434
	DALLAS Total		**521,968**	**560,015**	**607,125**	**651,210**	**687,875**	**711,818**
	DENTON	ARGYLE	1,395	2,064	2,966	2,961	2,960	2,959
	DENTON	ARGYLE WSC	996	991	990	990	989	989
	DENTON	AUBREY	563	731	847	999	1,197	1,452
	DENTON	BARTONVILLE	825	907	903	900	900	899
Yes	DENTON	BOLIVAR WSC	848	985	1,160	1,369	1,625	1,921
Yes	DENTON	CARROLLTON	14,303	14,437	14,196	14,062	14,036	14,034
Yes	DENTON	CELINA	142	989	3,295	7,707	7,707	7,706
Yes	DENTON	COPPELL	302	298	295	294	293	293
	DENTON	COPPER CANYON	260	272	289	310	338	369
	DENTON	CORINTH	4,266	4,983	4,956	4,939	4,932	4,931
	DENTON	COUNTY-OTHER	3,785	4,155	4,574	6,487	10,458	19,480
	DENTON	CROSS ROADS	457	619	756	755	754	754
Yes	DENTON	DALLAS	6,579	6,987	7,812	8,638	9,301	9,625
	DENTON	DENTON	28,908	37,431	47,013	59,444	81,374	99,143
	DENTON	DENTON COUNTY FWSD No. 10	1,486	3,128	3,127	3,126	3,124	3,124
	DENTON	DENTON COUNTY FWSD No.1A	3,659	6,494	7,777	7,774	7,771	7,769
	DENTON	DENTON COUNTY FWSD No. 7	3,418	3,405	3,403	3,401	3,399	3,397
	DENTON	DOUBLE OAK	558	547	539	534	533	533
Yes	DENTON	FLOWER MOUND	18,988	23,080	22,955	22,881	22,857	22,855
Yes	DENTON	FORT WORTH	7,139	10,766	15,447	21,678	27,750	33,837
Yes	DENTON	FRISCO	16,638	21,750	26,915	26,890	26,872	26,867
	DENTON	HACKBERRY	309	394	498	615	752	908
	DENTON	HICKORY CREEK	583	709	865	1,078	1,076	1,076

Table G.1 - Region C Approved Municipal Demand by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
			2020	2030	2040	2050	2060	2070
	DENTON	HIGHLAND VILLAGE	3,832	3,968	3,924	3,899	3,893	3,893
	DENTON	JUSTIN	695	1,212	1,733	1,729	1,728	1,727
	DENTON	KRUGERVILLE	263	315	368	435	434	434
	DENTON	KRUM	1,154	1,414	1,731	2,089	2,512	2,997
	DENTON	LAKE DALLAS	1,096	1,181	1,339	1,329	1,326	1,326
	DENTON	LAKEWOOD VILLAGE	83	102	125	151	182	218
Yes	DENTON	LEWISVILLE	19,985	22,286	25,177	28,537	31,822	31,818
	DENTON	LITTLE ELM	4,108	4,600	4,586	4,574	4,564	4,564
Yes	DENTON	MOUNTAIN SPRING WSC	10	11	12	13	14	16
	DENTON	MUSTANG SUD	1,875	3,527	5,190	6,856	8,526	10,196
	DENTON	NORTHLAKE	911	3,402	6,198	8,591	10,986	10,986
	DENTON	OAK POINT	1,053	1,572	2,097	2,624	3,153	3,152
	DENTON	PALOMA CREEK	2,562	3,472	3,470	3,468	3,465	3,464
	DENTON	PILOT POINT	891	1,070	1,449	1,965	2,615	3,527
Yes	DENTON	PLANO	1,932	1,982	2,011	2,000	1,998	1,998
	DENTON	PONDER	254	343	451	574	718	883
Yes	DENTON	PROSPER	193	1,221	3,111	5,863	8,614	8,613
	DENTON	PROVIDENCE VILLAGE WCID	938	931	929	927	926	925
	DENTON	ROANOKE	2,263	2,807	3,356	3,350	3,348	3,348
	DENTON	SANGER	1,202	1,452	1,763	2,119	2,545	3,034
	DENTON	SHADY SHORES	461	516	511	508	507	506
Yes	DENTON	SOUTHLAKE	421	541	683	844	1,032	1,247
	DENTON	THE COLONY	7,762	8,632	9,106	9,857	9,844	9,841
	DENTON	TROPHY CLUB	5,730	5,701	5,683	5,673	5,670	5,669
Yes	DENTON	WESTLAKE	29	39	50	63	78	95
	DENTON Total		**176,110**	**218,419**	**256,631**	**295,870**	**341,498**	**379,398**
	ELLIS	BARDWELL	71	86	105	129	158	348
Yes	ELLIS	BRANDON-IRENE WSC	11	14	16	20	24	29
	ELLIS	BUENA VISTA - BETHEL SUD	1,249	1,509	1,772	2,173	3,119	4,154
Yes	ELLIS	CEDAR HILL	142	178	221	272	272	272
	ELLIS	COUNTY-OTHER	745	762	815	3,058	6,623	11,645
	ELLIS	ENNIS	4,148	4,789	5,447	7,397	11,879	19,748
Yes	ELLIS	FERRIS	460	537	619	712	1,176	2,201
Yes	ELLIS	FILES VALLEY WSC	119	148	182	223	272	330
	ELLIS	GARRETT	346	438	546	674	827	1,970
Yes	ELLIS	GLENN HEIGHTS	383	476	590	725	888	1,352
Yes	ELLIS	GRAND PRAIRIE	10	12	15	18	22	27
	ELLIS	ITALY	314	386	473	580	733	976
Yes	ELLIS	JOHNSON COUNTY SUD	28	34	42	51	63	76
Yes	ELLIS	MANSFIELD	32	38	47	65	81	100
	ELLIS	MAYPEARL	117	135	145	143	143	143
	ELLIS	MIDLOTHIAN	4,198	5,429	7,069	8,589	9,956	10,995
	ELLIS	MILFORD	66	67	69	74	80	89
Yes	ELLIS	MOUNTAIN PEAK SUD	1,671	2,109	2,627	3,240	3,971	4,820
	ELLIS	OAK LEAF	155	165	186	262	385	468
Yes	ELLIS	OVILLA	966	1,213	1,507	1,857	2,275	4,188
	ELLIS	PALMER	289	353	432	529	675	1,242
	ELLIS	PECAN HILL	111	136	167	205	257	384
	ELLIS	RED OAK	1,845	2,052	2,750	3,741	4,595	7,170
Yes	ELLIS	RICE WSC	662	812	995	1,218	1,490	1,806
Yes	ELLIS	ROCKETT SUD	3,756	4,621	5,678	6,963	9,043	11,160
Yes	ELLIS	SARDIS-LONE ELM WSC	3,904	4,793	5,824	6,338	6,688	6,686
Yes	ELLIS	VENUS	16	20	25	31	37	45
	ELLIS	WAXAHACHIE	6,872	7,741	9,320	11,299	13,749	16,715
	ELLIS Total		**32,686**	**39,053**	**47,684**	**60,586**	**79,481**	**109,139**

Table G.1 - Region C Approved Municipal Demand by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
			2020	2030	2040	2050	2060	2070
	FANNIN	BONHAM	2,024	2,506	3,393	4,598	5,663	6,883
	FANNIN	COUNTY-OTHER	1,466	1,411	1,364	1,846	4,010	6,503
	FANNIN	ECTOR	87	92	96	101	109	118
Yes	FANNIN	HICKORY CREEK SUD	29	31	32	34	37	40
	FANNIN	HONEY GROVE	274	280	274	271	271	271
	FANNIN	LADONIA	120	144	155	175	210	209
	FANNIN	LEONARD	331	352	368	386	417	452
Yes	FANNIN	NORTH HUNT WSC	36	39	42	44	48	52
	FANNIN	SAVOY	88	92	94	98	106	115
Yes	FANNIN	SOUTHWEST FANNIN COUNTY SUD	381	405	425	447	533	628
	FANNIN	TRENTON	131	179	609	1,041	1,387	1,733
Yes	FANNIN	WHITEWRIGHT	2	2	2	2	2	2
	FANNIN Total		**4,969**	**5,533**	**6,854**	**9,043**	**12,793**	**17,006**
	FREESTONE	COUNTY-OTHER	1,208	1,163	1,127	1,416	2,332	4,644
	FREESTONE	FAIRFIELD	673	708	730	1,385	1,580	1,974
Yes	FREESTONE	FLO COMMUNITY WSC	40	41	41	42	43	43
	FREESTONE	OAKWOOD	7	7	7	7	7	8
	FREESTONE	TEAGUE	380	386	515	637	765	899
	FREESTONE	WORTHAM	168	175	179	183	303	343
	FREESTONE Total		**2,476**	**2,480**	**2,599**	**3,670**	**5,030**	**7,911**
	GRAYSON	BELLS	175	199	223	254	588	783
	GRAYSON	COLLINSVILLE	233	285	338	401	513	666
	GRAYSON	COUNTY-OTHER	2,746	2,642	2,554	2,536	3,494	5,801
	GRAYSON	DENISON	6,641	7,251	7,868	8,629	10,158	12,688
	GRAYSON	GUNTER	355	473	624	776	930	1,085
	GRAYSON	HOWE	287	318	352	390	432	474
	GRAYSON	KENTUCKY TOWN WSC	367	424	482	554	693	865
	GRAYSON	LUELLA WSC	400	444	490	548	614	687
Yes	GRAYSON	MARILEE SUD	405	399	387	386	380	379
	GRAYSON	POTTSBORO	491	621	751	977	1,624	2,921
	GRAYSON	SHERMAN	10,543	10,881	11,928	13,741	17,732	24,800
Yes	GRAYSON	SOUTH GRAYSON WSC	408	424	478	495	511	526
	GRAYSON	SOUTHMAYD	97	103	110	119	159	238
Yes	GRAYSON	SOUTHWEST FANNIN COUNTY SUD	178	259	338	431	585	766
	GRAYSON	TIOGA	119	124	131	139	444	608
	GRAYSON	TOM BEAN	222	245	268	297	359	538
Yes	GRAYSON	TWO WAY SUD	698	872	1,048	1,255	1,661	2,076
	GRAYSON	VAN ALSTYNE	517	608	700	811	2,337	3,243
	GRAYSON	WHITESBORO	469	458	450	449	560	726
Yes	GRAYSON	WHITEWRIGHT	220	214	210	210	222	235
Yes	GRAYSON	WOODBINE WSC	9	10	11	12	13	14
	GRAYSON Total		**25,580**	**27,254**	**29,741**	**33,410**	**44,009**	**60,119**
Yes	HENDERSON	ATHENS	2,916	3,185	3,411	3,743	6,415	9,709
Yes	HENDERSON	BETHEL-ASH WSC	218	237	254	280	303	327
	HENDERSON	COUNTY-OTHER	314	233	215	189	167	147
	HENDERSON	EAST CEDAR CREEK FWSD	742	807	980	1,061	1,141	1,221
	HENDERSON	EUSTACE	119	125	132	191	248	297
	HENDERSON	GUN BARREL CITY	944	996	1,053	1,222	1,852	2,957
	HENDERSON	LOG CABIN	80	82	84	89	93	98
Yes	HENDERSON	MABANK	149	156	164	197	383	764
	HENDERSON	MALAKOFF	272	270	268	272	287	307
	HENDERSON	PAYNE SPRINGS	143	155	165	181	200	246
Yes	HENDERSON	SEVEN POINTS	331	380	430	543	641	747
	HENDERSON	TOOL	553	583	607	646	976	1,300
	HENDERSON	TRINIDAD	91	86	83	83	93	111

Table G.1 - Region C Approved Municipal Demand by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
			2020	2030	2040	2050	2060	2070
	HENDERSON	VIRGINIA HILL WSC	244	267	287	318	350	394
Yes	HENDERSON	WEST CEDAR CREEK MUD	674	675	676	677	807	1,009
	HENDERSON Total		**7,790**	**8,237**	**8,809**	**9,692**	**13,956**	**19,634**
	JACK	BRYSON	80	82	83	84	85	85
	JACK	COUNTY-OTHER	482	495	500	502	508	512
	JACK	JACKSBORO	681	706	719	725	734	740
	JACK Total		**1,243**	**1,283**	**1,302**	**1,311**	**1,327**	**1,337**
Yes	KAUFMAN	ABLES SPRINGS WSC	319	399	491	597	721	862
	KAUFMAN	COLLEGE MOUND WSC	790	989	1,218	1,481	2,017	2,554
Yes	KAUFMAN	COMBINE	215	259	311	374	451	538
	KAUFMAN	COUNTY-OTHER	1,742	1,835	2,565	3,949	6,730	9,310
	KAUFMAN	CRANDALL	779	955	1,162	1,397	1,396	1,395
	KAUFMAN	FORNEY	3,191	3,707	4,803	5,817	8,428	11,227
Yes	KAUFMAN	FORNEY LAKE WSC	818	1,011	1,237	1,499	2,529	3,633
	KAUFMAN	GASTONIA-SCURRY SUD	640	801	986	1,199	2,017	3,025
Yes	KAUFMAN	HIGH POINT WSC	447	533	638	766	1,238	1,649
	KAUFMAN	KAUFMAN	990	1,184	1,442	2,151	2,777	3,406
	KAUFMAN	KEMP	308	376	456	551	845	1,182
Yes	KAUFMAN	MABANK	634	740	848	1,220	1,720	2,292
Yes	KAUFMAN	MACBEE SUD	18	23	28	34	41	49
Yes	KAUFMAN	MESQUITE	21	26	31	37	45	53
	KAUFMAN	OAK GROVE	75	88	103	157	212	422
	KAUFMAN	POST OAK BEND CITY	93	113	134	205	276	550
	KAUFMAN	ROSE HILL SUD	456	546	656	789	1,033	1,586
	KAUFMAN	SCURRY	59	71	85	129	182	404
Yes	KAUFMAN	SEAGOVILLE	4	4	5	6	7	9
Yes	KAUFMAN	SEVEN POINTS	24	29	35	43	51	61
	KAUFMAN	TALTY	305	377	462	560	775	1,289
	KAUFMAN	TALTY WSC	1,584	1,801	2,083	2,914	3,693	4,813
	KAUFMAN	TERRELL	4,035	7,143	8,638	10,670	12,372	14,353
Yes	KAUFMAN	WEST CEDAR CREEK MUD	652	816	1,005	1,221	1,614	2,353
	KAUFMAN Total		**18,199**	**23,826**	**29,422**	**37,766**	**51,170**	**67,015**
	NAVARRO	BLOOMING GROVE	153	164	175	191	209	228
Yes	NAVARRO	BRANDON-IRENE WSC	29	30	32	35	38	42
	NAVARRO	CHATFIELD WSC	469	464	463	466	475	485
	NAVARRO	CORBET WSC	258	272	289	312	341	372
	NAVARRO	CORSICANA	6,003	6,474	6,984	7,622	8,333	9,101
	NAVARRO	COUNTY-OTHER	623	606	593	1,061	2,110	3,685
	NAVARRO	DAWSON	149	160	172	187	204	223
	NAVARRO	FROST	69	72	76	82	90	98
	NAVARRO	KERENS	206	218	231	252	275	300
	NAVARRO	M E N WSC	472	508	548	597	652	712
	NAVARRO	NAVARRO MILLS WSC	352	373	398	431	470	513
	NAVARRO	RICE	163	176	190	207	226	246
Yes	NAVARRO	RICE WSC	138	146	156	170	185	202
	NAVARRO Total		**9,084**	**9,663**	**10,307**	**11,613**	**13,608**	**16,207**
	PARKER	ALEDO	822	1,262	1,900	1,992	1,991	1,990
	PARKER	ANNETTA	152	179	208	238	270	302
	PARKER	ANNETTA NORTH	67	71	76	83	91	100
	PARKER	ANNETTA SOUTH	63	60	58	57	57	57
Yes	PARKER	AZLE	372	392	414	440	530	678
	PARKER	COUNTY-OTHER	7,027	6,851	6,714	9,269	14,205	22,058
Yes	PARKER	Cresson	68	75	83	92	104	118
Yes	PARKER	FORT WORTH	12,373	19,140	21,862	23,960	25,530	27,120
	PARKER	HUDSON OAKS	458	618	779	795	795	795

Table G.1 - Region C Approved Municipal Demand by Water User Group

In Multiple Counties or Regions?	County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
			2020	2030	2040	2050	2060	2070
Yes	PARKER	MINERAL WELLS	346	332	320	310	302	294
	PARKER	PARKER COUNTY SUD	655	842	1,060	1,321	1,627	1,983
Yes	PARKER	RENO	170	173	176	180	184	189
	PARKER	SPRINGTOWN	577	757	749	745	744	743
Yes	PARKER	WALNUT CREEK SUD	1,455	1,659	1,921	2,463	3,635	4,758
	PARKER	WEATHERFORD	5,307	6,213	7,273	11,769	18,457	26,947
	PARKER	WILLOW PARK	759	904	1,074	1,483	1,924	2,366
	PARKER Total		**30,671**	**39,528**	**44,667**	**55,197**	**70,446**	**90,498**
Yes	ROCKWALL	BLACKLAND WSC	671	705	747	793	850	911
Yes	ROCKWALL	CASH SUD	137	172	212	254	302	353
	ROCKWALL	COUNTY-OTHER	568	564	562	560	1,886	3,139
Yes	ROCKWALL	DALLAS	18	23	29	35	42	49
Yes	ROCKWALL	EAST FORK SUD	57	76	98	121	148	176
	ROCKWALL	FATE	1,731	2,457	3,291	4,135	5,079	7,797
Yes	ROCKWALL	FORNEY LAKE WSC	78	97	118	140	165	191
Yes	ROCKWALL	GARLAND	1	1	1	1	1	2
	ROCKWALL	HEATH	3,945	7,839	7,826	7,818	7,816	7,815
Yes	ROCKWALL	HIGH POINT WSC	30	36	43	51	60	69
Yes	ROCKWALL	LAVON WSC	236	344	451	671	892	1,114
	ROCKWALL	MCLENDON-CHISHOLM	330	406	495	587	691	802
	ROCKWALL	MT ZION WSC	395	485	589	698	822	954
	ROCKWALL	ROCKWALL	8,914	11,049	13,526	16,057	18,911	21,947
Yes	ROCKWALL	ROWLETT	1,179	1,154	1,139	1,130	1,128	1,128
Yes	ROCKWALL	ROYSE CITY	1,028	1,073	1,226	2,768	4,641	5,424
Yes	ROCKWALL	WYLIE	575	583	594	606	620	651
	ROCKWALL Total		**19,893**	**27,064**	**30,947**	**36,425**	**44,054**	**52,522**
	TARRANT	ARLINGTON	66,936	69,550	69,852	69,949	70,108	70,148
Yes	TARRANT	AZLE	1,486	1,566	1,654	1,758	2,117	2,712
	TARRANT	BEDFORD	9,139	9,612	10,121	10,711	10,694	10,694
	TARRANT	BENBROOK	5,205	5,659	6,130	7,258	10,605	10,605
Yes	TARRANT	BETHESDA WSC	1,903	2,093	2,289	2,491	2,705	2,917
	TARRANT	BLUE MOUND	191	181	172	167	167	167
Yes	TARRANT	BURLESON	1,305	1,331	1,459	2,030	2,459	2,747
	TARRANT	COLLEYVILLE	9,320	9,808	10,314	10,657	10,649	10,648
Yes	TARRANT	COMMUNITY WSC	347	369	394	430	466	502
	TARRANT	COUNTY-OTHER	8,008	7,862	7,743	11,410	14,509	19,178
Yes	TARRANT	CROWLEY	2,417	2,762	3,254	3,886	4,961	5,666
	TARRANT	DALWORTHINGTON GARDENS	912	922	933	947	966	984
	TARRANT	EDGECLIFF	503	491	480	475	474	474
	TARRANT	EULESS	8,978	9,212	9,031	8,932	8,913	8,913
	TARRANT	EVERMAN	541	528	514	501	499	499
Yes	TARRANT	FLOWER MOUND	61	68	67	67	67	67
	TARRANT	FOREST HILL	1,362	1,381	1,448	1,703	2,164	2,817
Yes	TARRANT	FORT WORTH	165,871	199,669	243,088	263,442	281,547	300,047
Yes	TARRANT	GRAND PRAIRIE	8,367	8,181	8,080	8,033	8,021	8,019
Yes	TARRANT	GRAPEVINE	18,467	20,509	20,725	20,641	20,624	20,623
	TARRANT	HALTOM CITY	5,285	5,226	5,308	5,670	6,093	6,640
	TARRANT	HASLET	532	644	736	1,589	2,222	2,539
	TARRANT	HURST	6,828	6,819	6,680	6,604	6,590	6,590
Yes	TARRANT	JOHNSON COUNTY SUD	269	293	318	345	375	404
	TARRANT	KELLER	12,182	12,981	12,906	12,862	12,847	12,846
	TARRANT	KENNEDALE	1,413	1,588	1,840	1,909	1,961	1,961
	TARRANT	LAKE WORTH	1,137	1,248	1,363	1,567	1,836	2,501
	TARRANT	LAKESIDE	227	230	234	239	239	239
Yes	TARRANT	MANSFIELD	18,975	22,013	26,431	34,762	40,104	45,857

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In Multiple Counties or Regions?	County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
			2020	2030	2040	2050	2060	2070
	TARRANT	NORTH RICHLAND HILLS	12,733	13,375	13,172	13,059	13,036	13,034
	TARRANT	PANTEGO	621	610	601	596	595	595
	TARRANT	PELICAN BAY	106	108	110	112	114	116
Yes	TARRANT	RENO	2	2	2	3	3	4
	TARRANT	RICHLAND HILLS	1,148	1,185	1,228	1,372	1,513	1,700
	TARRANT	RIVER OAKS	850	817	790	775	772	772
	TARRANT	SAGINAW	3,148	3,503	3,876	4,059	4,052	4,051
	TARRANT	SANSOM PARK VILLAGE	534	545	592	617	650	683
Yes	TARRANT	SOUTHLAKE	11,080	12,324	14,322	16,334	18,360	20,395
	TARRANT	TROPHY CLUB	395	393	392	391	391	391
	TARRANT	WATAUGA	2,899	2,794	2,707	2,659	2,650	2,650
Yes	TARRANT	WESTLAKE	1,359	2,039	2,957	3,560	4,164	4,755
	TARRANT	WESTOVER HILLS	952	972	992	1,013	1,036	1,058
	TARRANT	WESTWORTH VILLAGE	395	417	441	468	499	530
	TARRANT	WHITE SETTLEMENT	2,081	2,108	2,146	2,472	3,132	3,798
	TARRANT Total		**396,470**	**443,988**	**497,892**	**538,525**	**575,949**	**612,536**
	WISE	ALVORD	110	132	155	189	216	242
	WISE	AURORA	134	159	186	224	263	311
Yes	WISE	BOLIVAR WSC	111	122	134	150	168	187
	WISE	BOYD	217	229	316	392	547	593
	WISE	BRIDGEPORT	1,294	1,551	1,822	2,496	3,322	4,149
	WISE	CHICO	207	213	221	411	522	652
	WISE	COUNTY-OTHER	3,667	3,565	3,485	5,039	6,465	7,794
	WISE	DECATUR	2,319	3,149	4,060	5,240	6,157	7,156
Yes	WISE	FORT WORTH	2,380	3,350	4,278	5,477	6,660	7,848
	WISE	NEW FAIRVIEW	163	199	236	286	334	392
	WISE	NEWARK	195	249	345	462	643	858
	WISE	RHOME	411	571	738	1,175	1,576	2,011
	WISE	RUNAWAY BAY	350	388	428	514	584	700
Yes	WISE	WALNUT CREEK SUD	290	376	465	566	835	1,077
	WISE	WEST WISE RURAL SUD	425	424	427	435	449	464
	WISE Total		**12,273**	**14,677**	**17,296**	**23,056**	**28,741**	**34,434**
	Region C Total		**1,481,530**	**1,675,385**	**1,894,722**	**2,119,813**	**2,352,818**	**2,594,833**

Table G.2 - Region C Approved Municipal Demand by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
		2020	2030	2040	2050	2060	2070
KAUFMAN	ABLES SPRINGS WSC	319	399	491	597	721	862
HUNT (D)	ABLES SPRINGS WSC	61	92	136	196	281	405
VAN ZANDT (D)	ABLES SPRINGS WSC	3	3	3	3	4	4
	ABLES SPRINGS WSC TOTAL	**383**	**494**	**630**	**796**	**1,006**	**1,271**
HENDERSON	ATHENS	2,916	3,185	3,411	3,743	6,415	9,709
HENDERSON (I)	ATHENS	57	59	62	66	69	73
	ATHENS TOTAL	**2,973**	**3,244**	**3,473**	**3,809**	**6,484**	**9,782**
PARKER	AZLE	372	392	414	440	530	678
TARRANT	AZLE	1,486	1,566	1,654	1,758	2,117	2,712
	AZLE TOTAL	**1,858**	**1,958**	**2,068**	**2,198**	**2,647**	**3,390**
HENDERSON	BETHEL-ASH WSC	218	237	254	280	303	327
HENDERSON (I)	BETHEL-ASH WSC	325	354	380	419	455	491
VAN ZANDT (D)	BETHEL-ASH WSC	94	118	136	155	172	186
	BETHEL-ASH WSC TOTAL	**637**	**709**	**770**	**854**	**930**	**1,004**
TARRANT	BETHESDA WSC	1,903	2,093	2,289	2,491	2,705	2,917
JOHNSON (G)	BETHESDA WSC	3,259	3,679	4,126	4,641	5,218	5,841
	BETHESDA WSC TOTAL	**5,162**	**5,772**	**6,415**	**7,132**	**7,923**	**8,758**
ROCKWALL	BLACKLAND WSC	671	705	747	793	850	911
HUNT (D)	BLACKLAND WSC	7	7	7	7	7	7
	BLACKLAND WSC TOTAL	**678**	**712**	**754**	**800**	**857**	**918**
COOKE	BOLIVAR WSC	146	150	153	159	164	169
DENTON	BOLIVAR WSC	848	985	1,160	1,369	1,625	1,921
WISE	BOLIVAR WSC	111	122	134	150	168	187
	BOLIVAR WSC TOTAL	**1,105**	**1,257**	**1,447**	**1,678**	**1,957**	**2,277**
ELLIS	BRANDON-IRENE WSC	11	14	16	20	24	29
NAVARRO	BRANDON-IRENE WSC	29	30	32	35	38	42
HILL (G)	BRANDON-IRENE WSC	256	262	265	273	281	287
	BRANDON-IRENE WSC TOTAL	**296**	**306**	**313**	**328**	**343**	**358**
TARRANT	BURLESON	1,305	1,331	1,459	2,030	2,459	2,747
JOHNSON (G)	BURLESON	5,315	6,333	7,298	7,920	8,782	9,855
	BURLESON TOTAL	**6,620**	**7,664**	**8,757**	**9,950**	**11,241**	**12,602**
COLLIN	CADDO BASIN SUD	279	321	418	516	618	720
HUNT (D)	CADDO BASIN SUD	707	898	1,168	1,555	2,118	2,939
	CADDO BASIN SUD TOTAL	**986**	**1,219**	**1,586**	**2,071**	**2,736**	**3,659**
COLLIN	CARROLLTON	1	2	2	3	3	4
DALLAS	CARROLLTON	9,262	9,065	8,914	8,830	8,813	8,812
DENTON	CARROLLTON	14,303	14,437	14,196	14,062	14,036	14,034
	CARROLLTON TOTAL	**23,566**	**23,504**	**23,112**	**22,895**	**22,852**	**22,850**
ROCKWALL	CASH SUD	137	172	212	254	302	353
HOPKINS (D)	CASH SUD	12	13	13	14	15	15
HUNT (D)	CASH SUD	2,067	2,402	2,829	3,364	4,026	4,826
RAINS (D)	CASH SUD	80	82	82	82	82	82
	CASH SUD TOTAL	**2,296**	**2,669**	**3,136**	**3,714**	**4,425**	**5,276**
DALLAS	CEDAR HILL	10,510	12,630	14,784	16,972	16,957	16,955
ELLIS	CEDAR HILL	142	178	221	272	272	272
	CEDAR HILL TOTAL	**10,652**	**12,808**	**15,005**	**17,244**	**17,229**	**17,227**
COLLIN	CELINA	4,574	8,900	15,008	23,121	23,119	23,117
DENTON	CELINA	142	989	3,295	7,707	7,707	7,706
	CELINA TOTAL	**4,716**	**9,889**	**18,303**	**30,828**	**30,826**	**30,823**
DALLAS	COMBINE	93	102	112	124	137	149
KAUFMAN	COMBINE	215	259	311	374	451	538
	COMBINE TOTAL	**308**	**361**	**423**	**498**	**588**	**687**
TARRANT	COMMUNITY WSC	347	369	394	430	466	502
WISE	COMMUNITY WSC	0	0	0	0	0	0

Table G.2 - Region C Approved Municipal Demand by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
		2020	2030	2040	2050	2060	2070
	COMMUNITY WSC TOTAL	347	369	394	430	466	502
DALLAS	COPPELL	10,690	10,947	10,851	10,795	10,782	10,781
DENTON	COPPELL	302	298	295	294	293	293
	COPPELL TOTAL	**10,992**	**11,245**	**11,146**	**11,089**	**11,075**	**11,074**
HOOD	CRESSON	56	76	89	101	111	118
JOHNSON	CRESSON	24	31	39	47	57	67
PARKER	CRESSON	68	75	83	92	104	118
	CRESSON TOTAL	**148**	**182**	**211**	**240**	**272**	**303**
TARRANT	CROWLEY	2,417	2,762	3,254	3,886	4,961	5,666
JOHNSON (G)	CROWLEY	10	14	19	25	31	37
	CROWLEY TOTAL	**2,427**	**2,776**	**3,273**	**3,911**	**4,992**	**5,703**
COLLIN	DALLAS	15,807	15,886	15,831	15,707	15,682	15,679
DALLAS	DALLAS	252,895	269,507	303,241	337,114	364,228	377,458
DENTON	DALLAS	6,579	6,987	7,812	8,638	9,301	9,625
KAUFMAN	DALLAS	0	0	0	0	0	0
ROCKWALL	DALLAS	18	23	29	35	42	49
	DALLAS TOTAL	**275,299**	**292,403**	**326,913**	**361,494**	**389,253**	**402,811**
COLLIN	EAST FORK SUD	279	335	407	487	586	698
DALLAS	EAST FORK SUD	236	310	386	473	559	646
ROCKWALL	EAST FORK SUD	57	76	98	121	148	176
	EAST FORK SUD TOTAL	**572**	**721**	**891**	**1,081**	**1,293**	**1,520**
DALLAS	FERRIS	1	2	3	3	4	4
ELLIS	FERRIS	460	537	619	712	1,176	2,201
	FERRIS TOTAL	**461**	**539**	**622**	**715**	**1,180**	**2,205**
ELLIS	FILES VALLEY WSC	119	148	182	223	272	330
HILL (G)	FILES VALLEY WSC	405	419	428	441	453	463
	FILES VALLEY WSC TOTAL	**524**	**567**	**610**	**664**	**725**	**793**
FREESTONE	FLO COMMUNITY WSC	40	41	41	42	43	43
LEON (H)	FLO COMMUNITY WSC	297	286	278	276	280	284
	FLO COMMUNITY WSC TOTAL	**337**	**327**	**319**	**318**	**323**	**327**
DENTON	FLOWER MOUND	18,988	23,080	22,955	22,881	22,857	22,855
TARRANT	FLOWER MOUND	61	68	67	67	67	67
	FLOWER MOUND TOTAL	**19,049**	**23,148**	**23,022**	**22,948**	**22,924**	**22,922**
KAUFMAN	FORNEY LAKE WSC	818	1,011	1,237	1,499	2,529	3,633
ROCKWALL	FORNEY LAKE WSC	78	97	118	140	165	191
	FORNEY LAKE WSC TOTAL	**896**	**1,108**	**1,355**	**1,639**	**2,694**	**3,824**
DENTON	FORT WORTH	7,139	10,766	15,447	21,678	27,750	33,837
JOHNSON	FORT WORTH	0	0	0	951	1,520	1,899
PARKER	FORT WORTH	12,373	19,140	21,862	23,960	25,530	27,120
TARRANT	FORT WORTH	165,871	199,669	243,088	263,442	281,547	300,047
WISE	FORT WORTH	2,380	3,350	4,278	5,477	6,660	7,848
	FORT WORTH TOTAL	**187,763**	**232,925**	**284,675**	**315,508**	**343,007**	**370,751**
COLLIN	FRISCO	24,957	32,625	40,372	40,334	40,308	40,300
DENTON	FRISCO	16,638	21,750	26,915	26,890	26,872	26,867
	FRISCO TOTAL	**41,595**	**54,375**	**67,287**	**67,224**	**67,180**	**67,167**
COLLIN	GARLAND	54	66	80	96	115	137
DALLAS	GARLAND	37,816	37,940	37,427	37,005	36,921	36,921
ROCKWALL	GARLAND	1	1	1	1	1	2
	GARLAND TOTAL	**37,871**	**38,007**	**37,508**	**37,102**	**37,037**	**37,060**
DALLAS	GLENN HEIGHTS	1,514	2,003	2,517	3,085	3,645	4,784
ELLIS	GLENN HEIGHTS	383	476	590	725	888	1,352
	GLENN HEIGHTS TOTAL	**1,897**	**2,479**	**3,107**	**3,810**	**4,533**	**6,136**
DALLAS	GRAND PRAIRIE	26,817	32,622	36,069	35,859	35,807	35,799
ELLIS	GRAND PRAIRIE	10	12	15	18	22	27

Table G.2 - Region C Approved Municipal Demand by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
		2020	2030	2040	2050	2060	2070
TARRANT	GRAND PRAIRIE	8,367	8,181	8,080	8,033	8,021	8,019
	GRAND PRAIRIE TOTAL	**35,194**	**40,815**	**44,164**	**43,910**	**43,850**	**43,845**
DALLAS	GRAPEVINE	0	0	0	0	0	0
TARRANT	GRAPEVINE	18,467	20,509	20,725	20,641	20,624	20,623
	GRAPEVINE TOTAL	**18,467**	**20,509**	**20,725**	**20,641**	**20,624**	**20,623**
COLLIN	HICKORY CREEK SUD	7	7	8	8	9	10
FANNIN	HICKORY CREEK SUD	29	31	32	34	37	40
HUNT (D)	HICKORY CREEK SUD	415	581	815	1,143	1,616	2,305
	HICKORY CREEK SUD TOTAL	**451**	**619**	**855**	**1,185**	**1,662**	**2,355**
KAUFMAN	HIGH POINT WSC	447	533	638	766	1,238	1,649
ROCKWALL	HIGH POINT WSC	30	36	43	51	60	69
	HIGH POINT WSC TOTAL	**477**	**569**	**681**	**817**	**1,298**	**1,718**
ELLIS	JOHNSON COUNTY SUD	28	34	42	51	63	76
TARRANT	JOHNSON COUNTY SUD	269	293	318	345	375	404
HILL (G)	JOHNSON COUNTY SUD	29	29	30	31	32	33
JOHNSON (G)	JOHNSON COUNTY SUD	4,808	5,379	5,999	6,728	7,557	8,457
	JOHNSON COUNTY SUD TOTAL	**5,134**	**5,735**	**6,389**	**7,155**	**8,027**	**8,970**
COLLIN	JOSEPHINE	258	390	519	641	641	641
HUNT (D)	JOSEPHINE	20	34	54	81	81	81
	JOSEPHINE TOTAL	**278**	**424**	**573**	**722**	**722**	**722**
COLLIN	LAVON WSC	354	367	430	481	1,115	2,783
ROCKWALL	LAVON WSC	236	344	451	671	892	1,114
	LAVON WSC TOTAL	**590**	**711**	**881**	**1,152**	**2,007**	**3,897**
DALLAS	LEWISVILLE	158	155	153	152	152	152
DENTON	LEWISVILLE	19,985	22,286	25,177	28,537	31,822	31,818
	LEWISVILLE TOTAL	**20,143**	**22,441**	**25,330**	**28,689**	**31,974**	**31,970**
HENDERSON	MABANK	149	156	164	197	383	764
KAUFMAN	MABANK	634	740	848	1,220	1,720	2,292
	MABANK TOTAL	**783**	**896**	**1,012**	**1,417**	**2,103**	**3,056**
KAUFMAN	MACBEE SUD	18	23	28	34	41	49
HUNT (D)	MACBEE SUD	23	29	36	46	61	82
VAN ZANDT (D)	MACBEE SUD	464	509	543	577	606	630
	MACBEE SUD TOTAL	**505**	**561**	**607**	**657**	**708**	**761**
ELLIS	MANSFIELD	32	38	47	65	81	100
TARRANT	MANSFIELD	18,975	22,013	26,431	34,762	40,104	45,857
JOHNSON (G)	MANSFIELD	721	1,024	1,337	1,681	2,055	2,455
	MANSFIELD TOTAL	**19,728**	**23,075**	**27,815**	**36,508**	**42,240**	**48,412**
COLLIN	MARILEE SUD	541	532	517	515	506	506
GRAYSON	MARILEE SUD	405	399	387	386	380	379
	MARILEE SUD TOTAL	**946**	**931**	**904**	**901**	**886**	**885**
DALLAS	MESQUITE	22,323	23,832	26,330	28,404	30,622	32,894
KAUFMAN	MESQUITE	21	26	31	37	45	53
	MESQUITE TOTAL	**22,344**	**23,858**	**26,361**	**28,441**	**30,667**	**32,947**
PARKER	MINERAL WELLS	346	332	320	310	302	294
PALO PINTO (G)	MINERAL WELLS	2,593	2,708	2,775	2,856	2,935	3,002
	MINERAL WELLS TOTAL	**2,939**	**3,040**	**3,095**	**3,166**	**3,237**	**3,296**
ELLIS	MOUNTAIN PEAK SUD	1,671	2,109	2,627	3,240	3,971	4,820
JOHNSON (G)	MOUNTAIN PEAK SUD	613	737	868	1,013	1,172	1,342
	MOUNTAIN PEAK SUD TOTAL	**2,284**	**2,846**	**3,495**	**4,253**	**5,143**	**6,162**
COOKE	MOUNTAIN SPRING WSC	446	469	487	507	802	1,280
DENTON	MOUNTAIN SPRING WSC	10	11	12	13	14	16
	MOUNTAIN SPRING WSC TOTAL	**456**	**480**	**499**	**520**	**816**	**1,296**

Table G.2 - Region C Approved Municipal Demand by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
		2020	2030	2040	2050	2060	2070
FANNIN	NORTH HUNT WSC	36	39	42	44	48	52
DELTA (D)	NORTH HUNT WSC	16	17	17	17	17	17
HUNT (D)	NORTH HUNT WSC	235	306	404	538	730	1,008
	NORTH HUNT WSC TOTAL	**287**	**362**	**463**	**599**	**795**	**1,077**
DALLAS	OVILLA	114	144	175	210	244	422
ELLIS	OVILLA	966	1,213	1,507	1,857	2,275	4,188
	OVILLA TOTAL	**1,080**	**1,357**	**1,682**	**2,067**	**2,519**	**4,610**
COLLIN	PLANO	67,088	68,626	71,043	71,153	71,061	71,061
DENTON	PLANO	1,932	1,982	2,011	2,000	1,998	1,998
	PLANO TOTAL	**69,020**	**70,608**	**73,054**	**73,153**	**73,059**	**73,059**
COLLIN	PROSPER	5,129	7,134	8,294	8,594	8,897	8,896
DENTON	PROSPER	193	1,221	3,111	5,863	8,614	8,613
	PROSPER TOTAL	**5,322**	**8,355**	**11,405**	**14,457**	**17,511**	**17,509**
PARKER	RENO	170	173	176	180	184	189
TARRANT	RENO	2	2	2	3	3	4
	RENO TOTAL	**172**	**175**	**178**	**183**	**187**	**193**
ELLIS	RICE WSC	662	812	995	1,218	1,490	1,806
NAVARRO	RICE WSC	138	146	156	170	185	202
	RICE WSC TOTAL	**800**	**958**	**1,151**	**1,388**	**1,675**	**2,008**
COLLIN	RICHARDSON	7,904	7,819	8,021	8,212	8,201	8,201
DALLAS	RICHARDSON	18,424	18,857	19,343	19,804	19,778	19,777
	RICHARDSON TOTAL	26,328	26,676	27,364	28,016	27,979	27,978
DALLAS	ROCKETT SUD	115	220	323	427	532	638
ELLIS	ROCKETT SUD	3,756	4,621	5,678	6,963	9,043	11,160
	ROCKETT SUD TOTAL	**3,871**	**4,841**	**6,001**	**7,390**	**9,575**	**11,798**
DALLAS	ROWLETT	8,691	9,330	9,209	9,140	9,121	9,120
ROCKWALL	ROWLETT	1,179	1,154	1,139	1,130	1,128	1,128
	ROWLETT TOTAL	**9,870**	**10,484**	**10,348**	**10,270**	**10,249**	**10,248**
COLLIN	ROYSE CITY	190	621	1,338	2,215	4,199	4,519
ROCKWALL	ROYSE CITY	1,028	1,073	1,226	2,768	4,641	5,424
HUNT (D)	ROYSE CITY	43	52	64	82	108	146
	ROYSE CITY TOTAL	**1,261**	**1,746**	**2,628**	**5,065**	**8,948**	**10,089**
COLLIN	SACHSE	1,436	1,420	1,411	1,406	1,404	1,403
DALLAS	SACHSE	3,743	3,704	3,680	3,665	3,660	3,659
	SACHSE TOTAL	**5,179**	**5,124**	**5,091**	**5,071**	**5,064**	**5,062**
DALLAS	SARDIS-LONE ELM WSC	0	0	0	0	0	0
ELLIS	SARDIS-LONE ELM WSC	3,904	4,793	5,824	6,338	6,688	6,686
	SARDIS-LONE ELM WSC TOTAL	**3,904**	**4,793**	**5,824**	**6,338**	**6,688**	**6,686**
DALLAS	SEAGOVILLE	2,058	2,409	2,774	3,156	3,564	3,562
KAUFMAN	SEAGOVILLE	4	4	5	6	7	9
	SEAGOVILLE TOTAL	**2,062**	**2,413**	**2,779**	**3,162**	**3,571**	**3,571**
HENDERSON	SEVEN POINTS	331	380	430	543	641	747
KAUFMAN	SEVEN POINTS	24	29	35	43	51	61
	SEVEN POINTS TOTAL	**355**	**409**	**465**	**586**	**692**	**808**
COLLIN	SOUTH GRAYSON WSC	143	175	230	267	307	349
GRAYSON	SOUTH GRAYSON WSC	408	424	478	495	511	526
	SOUTH GRAYSON WSC TOTAL	**551**	**599**	**708**	**762**	**818**	**875**
DENTON	SOUTHLAKE	421	541	683	844	1,032	1,247
TARRANT	SOUTHLAKE	11,080	12,324	14,322	16,334	18,360	20,395
	SOUTHLAKE TOTAL	**11,501**	**12,865**	**15,005**	**17,178**	**19,392**	**21,642**
FANNIN	SOUTHWEST FANNIN COUNTY SUD	381	405	425	447	533	628
GRAYSON	SOUTHWEST FANNIN COUNTY SUD	178	259	338	431	585	766

Table G.2 - Region C Approved Municipal Demand by Water User Group for WUGS Split by County or Region

County	Water User Group (WUG)	Region C Final Demand (Acre-feet per year)					
		2020	2030	2040	2050	2060	2070
	SOUTHWEST FANNIN COUNTY SUD TOTAL	**559**	**664**	**763**	**878**	**1,118**	**1,394**
DENTON	TROPHY CLUB	5,730	5,701	5,683	5,673	5,670	5,669
TARRANT	TROPHY CLUB	395	393	392	391	391	391
	TROPHY CLUB TOTAL	**6,125**	**6,094**	**6,075**	**6,064**	**6,061**	**6,060**
COOKE	TWO WAY SUD	12	12	12	13	13	14
GRAYSON	TWO WAY SUD	698	872	1,048	1,255	1,661	2,076
	TWO WAY SUD TOTAL	**710**	**884**	**1,060**	**1,268**	**1,674**	**2,090**
ELLIS	VENUS	16	20	25	31	37	45
JOHNSON (G)	VENUS	624	710	801	904	1,016	1,137
	VENUS TOTAL	**640**	**730**	**826**	**935**	**1,053**	**1,182**
HENDERSON	VIRGINIA HILL WSC	244	267	287	318	350	394
HENDERSON (I)	VIRGINIA HILL WSC	176	193	207	230	252	273
	VIRGINIA HILL WSC TOTAL	**420**	**460**	**494**	**548**	**602**	**667**
PARKER	WALNUT CREEK SUD	1,455	1,659	1,921	2,463	3,635	4,758
WISE	WALNUT CREEK SUD	290	376	465	566	835	1,077
	WALNUT CREEK SUD TOTAL	**1,745**	**2,035**	**2,386**	**3,029**	**4,470**	**5,835**
HENDERSON	WEST CEDAR CREEK MUD	674	675	676	677	807	1,009
KAUFMAN	WEST CEDAR CREEK MUD	652	816	1,005	1,221	1,614	2,353
	WEST CEDAR CREEK MUD TOTAL	**1,326**	**1,491**	**1,681**	**1,898**	**2,421**	**3,362**
DENTON	WESTLAKE	29	39	50	63	78	95
TARRANT	WESTLAKE	1,359	2,039	2,957	3,560	4,164	4,755
	WESTLAKE TOTAL	**1,388**	**2,078**	**3,007**	**3,623**	**4,242**	**4,850**
FANNIN	WHITEWRIGHT	2	2	2	2	2	2
GRAYSON	WHITEWRIGHT	220	214	210	210	222	235
	WHITEWRIGHT TOTAL	**222**	**216**	**212**	**212**	**224**	**237**
COOKE	WOODBINE WSC	651	707	767	836	912	990
GRAYSON	WOODBINE WSC	9	10	11	12	13	14
	WOODBINE WSC TOTAL	**660**	**717**	**778**	**848**	**925**	**1,004**
COLLIN	WYLIE	6,349	7,080	7,562	7,943	8,196	8,434
DALLAS	WYLIE	384	389	396	405	414	434
ROCKWALL	WYLIE	575	583	594	606	620	651
	WYLIE TOTAL	**7,308**	**8,052**	**8,552**	**8,954**	**9,230**	**9,519**

Table G.3 - GPCDs Used to Determine Demand Projections (listed by County)

County	Water User Group	Base GPCD	GPCD Used to Determine Demand Projections 2020	2030	2040	2050	2060	2070
COLLIN	ALLEN	**193**	186.09	184.31	183.21	182.52	182.24	182.22
COLLIN	ANNA	**148**	141.83	140.32	139.33	138.97	138.70	138.62
COLLIN	BLUE RIDGE	**97**	88.13	82.42	80.70	105.00	115.00	125.00
COLLIN	CADDO BASIN SUD	**110**	99.57	95.42	93.08	92.13	91.89	91.79
COLLIN	CARROLLTON	**175**	165.96	162.42	159.71	158.21	157.91	157.89
COLLIN	CELINA	**195**	185.62	183.92	183.58	183.47	183.46	183.44
COLLIN	COPEVILLE SUD	**84**	73.82	69.80	67.50	66.44	66.08	65.94
COLLIN	COUNTY-OTHER	**147**	139.87	137.26	135.31	132.95	132.73	132.62
COLLIN	CULLEOKA WSC	**75**	64.94	60.00	60.00	60.00	60.00	60.00
COLLIN	DALLAS	**207**	197.86	193.69	190.54	189.05	188.75	188.72
COLLIN	EAST FORK SUD	**121**	108.77	104.36	102.04	101.08	100.88	100.80
COLLIN	FAIRVIEW	**327**	318.89	317.16	316.22	315.92	315.80	315.75
COLLIN	FARMERSVILLE	**121**	106.81	103.11	102.60	102.31	102.26	102.22
COLLIN	FRISCO	**223**	216.74	215.11	214.53	214.33	214.19	214.15
COLLIN	GARLAND	**153**	144.08	140.34	137.50	135.95	135.64	135.64
COLLIN	HICKORY CREEK SUD	**99**	88.77	85.22	83.61	82.96	82.78	82.70
COLLIN	JOSEPHINE	**145**	132.87	130.13	129.19	128.82	128.76	128.73
COLLIN	LAVON	**149**	142.51	140.86	140.06	139.75	139.46	139.36
COLLIN	LAVON SUD	**118**	105.23	102.16	100.51	99.76	99.51	99.38
COLLIN	LOWRY CROSSING	**106**	97.12	93.66	91.58	90.80	90.61	90.59
COLLIN	LUCAS	**273**	264.34	261.87	260.23	259.62	259.42	259.39
COLLIN	MARILEE SUD	**142**	131.63	129.62	128.04	127.57	127.36	127.28
COLLIN	MCKINNEY	**202**	195.50	193.46	192.20	191.68	191.56	191.55
COLLIN	MELISSA	**203**	196.38	194.49	193.78	193.21	193.07	193.02
COLLIN	MURPHY	**211**	205.11	203.87	203.31	202.91	202.66	202.61
COLLIN	NEVADA	**94**	85.21	81.85	79.92	78.46	78.30	78.27
COLLIN	NEW HOPE	**148**	136.89	132.39	129.77	128.66	128.42	128.32
COLLIN	NORTH COLLIN WSC	**140**	131.18	127.67	125.40	124.31	124.01	123.91
COLLIN	PARKER	**389**	381.04	377.81	377.35	377.18	377.12	377.10
COLLIN	PLANO	**238**	229.91	226.74	224.38	223.15	222.86	222.86
COLLIN	PRINCETON	**104**	95.72	92.84	91.43	90.49	90.33	90.28
COLLIN	PROSPER	**236**	228.88	227.26	226.85	226.65	226.55	226.52
COLLIN	RICHARDSON	**233**	223.84	220.09	217.14	215.60	215.32	215.31
COLLIN	ROYSE CITY	**110**	103.48	100.77	99.48	98.83	98.64	98.62
COLLIN	SACHSE	**170**	162.20	160.48	159.45	158.82	158.59	158.54
COLLIN	SEIS LAGOS UD	**262**	252.40	250.62	249.55	248.92	248.73	248.65
COLLIN	SOUTH GRAYSON WSC	**116**	109.22	106.78	105.15	104.42	104.15	104.08
COLLIN	ST. PAUL	**130**	120.05	117.93	116.89	116.36	116.20	116.14
COLLIN	WESTON	**150**	134.02	132.13	131.64	131.58	131.58	131.57
COLLIN	WYLIE	**141**	134.54	132.59	131.60	131.02	130.77	130.72
COLLIN	WYLIE NORTHEAST SUD	**129**	121.34	118.82	117.57	116.69	116.47	116.38
COOKE	BOLIVAR WSC	**89**	79.79	76.18	74.02	73.01	72.74	72.64
COOKE	COUNTY-OTHER	**127**	117.87	113.94	110.94	109.17	108.86	108.47
COOKE	GAINESVILLE	**138**	128.31	124.17	121.19	119.64	119.19	118.93
COOKE	LAKE KIOWA SUD	**330**	317.61	313.67	312.27	312.02	311.78	311.74
COOKE	LINDSAY	**125**	116.35	112.84	110.39	109.09	108.31	108.02
COOKE	MOUNTAIN SPRING WSC	**158**	149.79	146.79	144.78	143.69	143.04	142.78
COOKE	MUENSTER	**162**	152.89	148.87	145.39	143.60	143.25	143.25
COOKE	TWO WAY SUD	**108**	98.97	95.88	94.35	93.63	93.36	93.26
COOKE	VALLEY VIEW	**60**	60.00	60.00	60.00	60.00	60.00	60.00
COOKE	WOODBINE WSC	**104**	94.76	90.81	88.20	86.93	86.64	86.56
DALLAS	ADDISON	**378**	368.49	364.26	361.72	360.54	360.27	360.19
DALLAS	BALCH SPRINGS	**102**	92.88	89.18	86.63	85.34	85.04	84.97

Table G.3 - GPCDs Used to Determine Demand Projections (listed by County)

County	Water User Group	Base GPCD	GPCD Used to Determine Demand Projections 2020	2030	2040	2050	2060	2070
DALLAS	CARROLLTON	**175**	165.96	162.42	159.71	158.21	157.91	157.89
DALLAS	CEDAR HILL	**187**	178.73	175.58	173.87	173.05	172.89	172.87
DALLAS	COCKRELL HILL	**88**	77.75	73.37	70.50	68.93	68.35	67.89
DALLAS	COMBINE	**113**	101.66	97.84	95.62	94.62	94.39	94.30
DALLAS	COPPELL	**245**	236.65	233.69	231.64	230.46	230.17	230.16
DALLAS	COUNTY-OTHER	**294**	287.98	287.58	287.37	286.50	285.63	285.63
DALLAS	DALLAS	**207**	197.86	193.69	190.54	189.05	188.75	188.72
DALLAS	DESOTO	**163**	154.33	150.93	148.64	147.46	147.16	147.08
DALLAS	DUNCANVILLE	**136**	126.13	121.98	119.30	117.83	117.56	117.54
DALLAS	EAST FORK SUD	**121**	108.77	104.36	102.04	101.08	100.88	100.80
DALLAS	FARMERS BRANCH	**273**	263.64	259.71	256.79	255.28	254.96	254.90
DALLAS	FERRIS	**150**	139.61	135.34	132.77	131.60	131.15	130.94
DALLAS	GARLAND	**153**	144.08	140.34	137.50	135.95	135.64	135.64
DALLAS	GLENN HEIGHTS	**107**	97.71	94.93	93.70	93.14	92.96	92.84
DALLAS	GRAND PRAIRIE	**153**	144.01	140.81	139.07	138.26	138.06	138.03
DALLAS	HIGHLAND PARK	**411**	401.18	396.89	393.57	392.15	391.85	391.84
DALLAS	HUTCHINS	**102**	92.07	89.51	88.49	88.04	87.90	87.83
DALLAS	IRVING	**202**	192.19	188.74	186.58	185.39	185.14	185.11
DALLAS	LANCASTER	**161**	151.84	148.16	146.35	145.54	145.33	145.26
DALLAS	LEWISVILLE	**176**	167.54	164.31	162.25	161.22	160.94	160.92
DALLAS	MESQUITE	**142**	132.98	129.08	126.29	124.97	124.68	124.61
DALLAS	OVILLA	**223**	212.81	209.06	207.06	206.18	205.95	205.73
DALLAS	RICHARDSON	**233**	223.84	220.09	217.14	215.60	215.32	215.31
DALLAS	ROCKETT SUD	**112**	101.95	98.11	96.10	95.22	94.97	94.88
DALLAS	ROWLETT	**145**	136.59	133.69	131.96	130.96	130.70	130.68
DALLAS	SACHSE	**170**	162.20	160.48	159.45	158.82	158.59	158.54
DALLAS	SEAGOVILLE	**107**	97.58	94.15	92.22	91.31	91.08	91.06
DALLAS	SUNNYVALE	**309**	300.55	297.46	296.17	295.64	295.45	295.43
DALLAS	UNIVERSITY PARK	**275**	264.88	261.17	258.11	256.44	256.15	256.13
DALLAS	WILMER	**101**	91.85	88.39	85.42	84.31	84.09	83.98
DALLAS	WYLIE	**141**	134.54	132.59	131.60	131.02	130.77	130.72
DENTON	ARGYLE	**218**	207.55	204.73	203.62	203.31	203.23	203.19
DENTON	ARGYLE WSC	**189**	176.27	175.42	175.33	175.23	175.14	175.01
DENTON	AUBREY	**116**	106.22	103.80	102.83	102.34	102.16	102.07
DENTON	BARTONVILLE	**177**	163.63	161.83	161.06	160.63	160.54	160.43
DENTON	BOLIVAR WSC	**89**	79.79	76.18	74.02	73.01	72.74	72.64
DENTON	CARROLLTON	**175**	165.96	162.42	159.71	158.21	157.91	157.89
DENTON	CELINA	**195**	185.62	183.92	183.58	183.47	183.46	183.44
DENTON	COPPELL	**245**	236.65	233.69	231.64	230.46	230.17	230.16
DENTON	COPPER CANYON	**172**	162.97	159.14	156.34	154.91	154.58	154.49
DENTON	CORINTH	**160**	152.88	150.78	149.97	149.45	149.23	149.20
DENTON	COUNTY-OTHER	**118**	111.85	110.35	109.66	108.91	108.45	108.23
DENTON	CROSS ROADS	**188**	180.63	178.37	177.51	177.19	177.05	177.02
DENTON	DALLAS	**207**	197.86	193.69	190.54	189.05	188.75	188.72
DENTON	DENTON	**171**	161.15	157.79	156.15	155.41	155.17	155.09
DENTON	DENTON COUNTY FWSD #10	**174**	168.16	166.70	166.64	166.57	166.50	166.46
DENTON	DENTON COUNTY FWSD #1A	**240**	233.31	231.68	231.41	231.31	231.24	231.19
DENTON	DENTON COUNTY FWSD #7	**232**	226.01	225.14	225.01	224.88	224.75	224.64
DENTON	DOUBLE OAK	**174**	165.76	162.64	160.18	158.80	158.48	158.48
DENTON	FLOWER MOUND	**233**	225.07	222.19	220.99	220.28	220.05	220.03
DENTON	FORT WORTH	**185**	175.71	172.29	170.47	169.71	169.51	169.45
DENTON	FRISCO	**223**	216.74	215.11	214.53	214.33	214.19	214.15
DENTON	HACKBERRY	**223**	215.85	213.71	212.75	212.26	212.04	211.95

Table G.3 - GPCDs Used to Determine Demand Projections (listed by County)

County	Water User Group	GPCD Used to Determine Demand Projections						
		Base GPCD	2020	2030	2040	2050	2060	2070
DENTON	HICKORY CREEK	**136**	127.10	123.76	121.93	121.08	120.95	120.93
DENTON	HIGHLAND VILLAGE	**209**	200.01	196.77	194.57	193.33	193.06	193.04
DENTON	JUSTIN	**142**	133.32	129.92	128.87	128.58	128.49	128.47
DENTON	KRUGERVILLE	**126**	118.10	115.11	113.51	112.71	112.55	112.53
DENTON	KRUM	**206**	198.31	195.61	194.19	193.51	193.27	193.17
DENTON	LAKE DALLAS	**134**	125.65	122.49	120.30	119.39	119.15	119.14
DENTON	LAKEWOOD VILLAGE	**115**	106.76	103.89	102.39	101.69	101.45	101.36
DENTON	LEWISVILLE	**176**	167.54	164.31	162.25	161.22	160.94	160.92
DENTON	LITTLE ELM	**128**	122.79	121.42	121.04	120.72	120.47	120.45
DENTON	MOUNTAIN SPRING WSC	**158**	149.79	146.79	144.78	143.69	143.04	142.78
DENTON	MUSTANG SUD	**142**	133.84	131.48	130.90	130.67	130.58	130.53
DENTON	NORTHLAKE	**189**	180.72	178.62	178.41	178.34	178.32	178.31
DENTON	OAK POINT	**123**	113.15	111.45	110.98	110.76	110.68	110.64
DENTON	PALOMA CREEK	**191**	185.22	184.03	183.92	183.81	183.70	183.63
DENTON	PILOT POINT	**134**	122.33	119.34	117.59	116.89	116.70	116.61
DENTON	PLANO	**238**	229.91	226.74	224.38	223.15	222.86	222.86
DENTON	PONDER	**119**	111.21	108.73	107.67	107.20	107.01	106.93
DENTON	PROSPER	**236**	228.88	227.26	226.85	226.65	226.55	226.52
DENTON	PROVIDENCE VILLAGE WCID	**121**	115.72	114.80	114.59	114.37	114.15	114.09
DENTON	ROANOKE	**261**	253.28	250.84	249.67	249.21	249.05	249.02
DENTON	SANGER	**133**	124.25	120.99	119.20	118.38	118.13	118.03
DENTON	SHADY SHORES	**128**	119.59	117.01	115.75	115.02	114.80	114.76
DENTON	SOUTHLAKE	**376**	369.07	366.73	365.30	364.54	364.23	364.14
DENTON	THE COLONY	**146**	135.87	132.85	131.11	130.17	130.00	129.96
DENTON	TROPHY CLUB	**401**	390.52	388.57	387.34	386.62	386.44	386.36
DENTON	WESTLAKE	**1,039**	1,032.53	1,029.82	1,028.71	1,028.30	1,028.14	1,028.08
ELLIS	BARDWELL	**85**	75.53	72.10	70.30	69.49	69.25	68.99
ELLIS	BRANDON-IRENE WSC	**128**	117.83	113.36	110.09	108.99	108.69	108.63
ELLIS	BUENA VISTA - BETHEL SUD	**255**	247.78	244.86	243.30	242.47	242.09	241.96
ELLIS	CEDAR HILL	**187**	178.73	175.58	173.87	173.05	172.89	172.87
ELLIS	COUNTY-OTHER	**118**	108.91	104.63	101.31	98.74	98.51	98.45
ELLIS	ENNIS	**178**	168.30	164.43	162.09	160.82	160.43	160.27
ELLIS	FERRIS	**150**	139.61	135.34	132.77	131.60	131.15	130.94
ELLIS	FILES VALLEY WSC	**146**	136.70	132.85	130.27	128.96	128.66	128.58
ELLIS	GARRETT	**307**	298.76	295.80	294.30	293.60	293.36	293.09
ELLIS	GLENN HEIGHTS	**107**	97.71	94.93	93.70	93.14	92.96	92.84
ELLIS	GRAND PRAIRIE	**153**	144.01	140.81	139.07	138.26	138.06	138.03
ELLIS	ITALY	**129**	117.48	112.80	110.18	109.24	109.00	108.87
ELLIS	JOHNSON COUNTY SUD	**124**	114.97	111.47	109.29	108.22	107.93	107.84
ELLIS	MANSFIELD	**252**	244.60	242.34	241.10	240.40	240.18	240.10
ELLIS	MAYPEARL	**102**	92.15	88.14	85.90	84.88	84.68	84.66
ELLIS	MIDLOTHIAN	**214**	207.88	204.98	203.50	202.84	202.59	202.54
ELLIS	MILFORD	**85**	75.40	71.08	67.88	66.27	65.93	65.84
ELLIS	MOUNTAIN PEAK SUD	**290**	280.21	276.60	274.65	273.77	273.54	273.44
ELLIS	OAK LEAF	**111**	102.05	97.87	94.84	93.22	92.81	92.72
ELLIS	OVILLA	**223**	212.81	209.06	207.06	206.18	205.95	205.73
ELLIS	PALMER	**111**	100.36	96.15	93.83	92.83	92.58	92.37
ELLIS	PECAN HILL	**134**	122.69	118.14	115.60	114.53	114.28	114.12
ELLIS	RED OAK	**140**	133.15	130.83	129.19	128.43	128.18	128.01
ELLIS	RICE WSC	**93**	83.85	80.49	78.65	77.81	77.56	77.46
ELLIS	ROCKETT SUD	**112**	101.95	98.11	96.10	95.22	94.97	94.88
ELLIS	SARDIS-LONE ELM WSC	**251**	240.36	237.67	236.30	235.73	235.59	235.55
ELLIS	VENUS	**174**	166.87	164.57	163.33	162.64	162.36	162.26

Table G.3 - GPCDs Used to Determine Demand Projections (listed by County)

County	Water User Group	GPCD Used to Determine Demand Projections						
		Base GPCD	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
ELLIS	WAXAHACHIE	**172**	162.73	159.60	157.57	156.63	156.36	156.25
FANNIN	BONHAM	**153**	143.37	139.77	137.68	136.82	136.62	136.54
FANNIN	COUNTY-OTHER	**108**	99.38	95.60	92.47	90.27	89.48	89.31
FANNIN	ECTOR	**109**	100.06	96.55	94.22	93.02	92.70	92.62
FANNIN	HICKORY CREEK SUD	**99**	88.77	85.22	83.61	82.96	82.78	82.70
FANNIN	HONEY GROVE	**153**	143.45	138.84	135.44	134.25	133.94	133.94
FANNIN	LADONIA	**82**	66.53	63.84	62.60	62.34	62.20	62.14
FANNIN	LEONARD	**143**	133.17	129.01	126.15	124.71	124.39	124.30
FANNIN	NORTH HUNT SUD	**60**	60.00	60.00	60.00	60.00	60.00	60.00
FANNIN	SAVOY	**95**	84.64	80.14	76.99	75.88	75.57	75.48
FANNIN	SOUTHWEST FANNIN	**97**	88.50	85.62	84.12	83.37	83.07	82.95
FANNIN	TRENTON	**175**	164.65	158.92	155.18	154.80	154.73	154.71
FANNIN	WHITEWRIGHT	**132**	122.63	118.22	114.56	113.32	112.93	112.86
FREESTONE	COUNTY-OTHER	**100**	91.95	88.57	85.83	83.92	83.24	82.91
FREESTONE	FAIRFIELD	**196**	185.70	181.18	177.90	176.51	176.30	176.19
FREESTONE	FLO COMMUNITY WSC	**76**	67.54	64.15	61.55	60.11	60.00	60.00
FREESTONE	OAKWOOD	**147**	137.44	132.88	129.10	128.77	128.45	128.44
FREESTONE	TEAGUE	**100**	90.34	85.98	81.99	80.56	80.28	80.18
FREESTONE	WORTHAM	**137**	127.04	122.81	119.79	118.24	117.54	117.46
GRAYSON	BELLS	**104**	94.77	91.21	89.09	88.06	87.44	87.35
GRAYSON	COLLINSVILLE	**108**	98.24	94.63	92.74	91.86	91.59	91.47
GRAYSON	COUNTY-OTHER	**123**	113.40	109.10	105.45	104.70	103.97	103.57
GRAYSON	DENISON	**246**	235.94	231.58	228.56	227.07	226.71	226.54
GRAYSON	GUNTER	**154**	143.94	140.69	139.15	138.52	138.35	138.28
GRAYSON	HOWE	**95**	85.14	81.06	78.49	77.28	77.01	76.93
GRAYSON	KENTUCKY TOWN WSC	**121**	110.98	106.92	104.51	103.37	103.06	102.93
GRAYSON	LUELLA SUD	**103**	93.95	90.45	88.28	87.20	86.91	86.82
GRAYSON	MARILEE SUD	**142**	131.63	129.62	128.04	127.57	127.36	127.28
GRAYSON	POTTSBORO	**161**	151.35	147.89	146.16	145.31	144.98	144.83
GRAYSON	SHERMAN	**229**	219.50	215.85	212.97	211.49	211.06	210.85
GRAYSON	SOUTH GRAYSON WSC	**116**	109.22	106.78	105.15	104.42	104.15	104.08
GRAYSON	SOUTHMAYD	**88**	78.75	75.05	72.58	71.33	70.87	70.63
GRAYSON	SOUTHWEST FANNIN	**97**	88.50	85.62	84.12	83.37	83.07	82.95
GRAYSON	TIOGA	**131**	121.87	118.08	115.39	114.00	113.04	112.96
GRAYSON	TOM BEAN	**178**	168.43	164.42	161.78	160.46	160.10	159.85
GRAYSON	TWO WAY SUD	**108**	98.97	95.88	94.35	93.63	93.36	93.26
GRAYSON	VAN ALSTYNE	**133**	123.36	119.63	117.49	116.48	115.86	115.78
GRAYSON	WHITESBORO	**118**	109.09	105.26	102.16	100.47	99.89	99.65
GRAYSON	WHITEWRIGHT	**132**	122.63	118.22	114.56	113.32	112.93	112.86
GRAYSON	WOODBINE WSC	**104**	94.76	90.81	88.20	86.93	86.64	86.56
HENDERSON	ATHENS	**192**	182.16	178.16	175.49	174.13	173.54	173.35
HENDERSON	BETHEL-ASH WSC	**100**	90.95	87.72	85.81	84.82	84.56	84.48
HENDERSON	COUNTY-OTHER	**91**	81.81	76.90	72.97	72.61	72.21	72.20
HENDERSON	EAST CEDAR CREEK FWSD	**65**	60.00	60.00	60.00	60.00	60.00	60.00
HENDERSON	EUSTACE	**105**	96.13	92.61	90.19	88.62	88.29	88.19
HENDERSON	GUN BARREL CITY	**149**	140.33	136.72	134.19	132.77	132.21	131.97
HENDERSON	LOG CABIN	**100**	90.81	87.18	84.62	83.26	82.95	82.89
HENDERSON	MABANK	**186**	176.78	173.74	171.97	170.92	170.59	170.45
HENDERSON	MALAKOFF	**110**	100.67	96.59	93.40	91.68	91.33	91.24
HENDERSON	PAYNE SPRINGS	**155**	145.33	141.45	138.87	137.55	137.24	137.07
HENDERSON	SEVEN POINTS	**205**	196.94	193.73	191.83	190.78	190.49	190.39
HENDERSON	TOOL	**212**	202.43	198.48	195.64	194.16	193.55	193.37
HENDERSON	TRINIDAD	**101**	91.11	86.25	83.50	83.17	82.69	82.48

Table G.3 - GPCDs Used to Determine Demand Projections (listed by County)

County	Water User Group	Base GPCD	GPCD Used to Determine Demand Projections 2020	2030	2040	2050	2060	2070
HENDERSON	VIRGINIA HILL WSC	**96**	86.00	82.07	79.60	78.35	78.09	78.00
HENDERSON	WEST CEDAR CREEK MUD	**63**	60.00	60.00	60.00	60.00	60.00	60.00
JACK	BRYSON	**132**	122.17	117.91	114.80	113.20	112.92	112.90
JACK	COUNTY-OTHER	**109**	99.80	96.01	93.32	91.91	91.63	91.60
JACK	JACKSBORO	**134**	124.95	121.39	118.89	117.58	117.29	117.27
KAUFMAN	ABLES SPRINGS WSC	**63**	60.00	60.00	60.00	60.00	60.00	60.00
KAUFMAN	COLLEGE MOUND WSC	**71**	60.00	60.00	60.00	60.00	60.00	60.00
KAUFMAN	COMBINE	**113**	101.66	97.84	95.62	94.62	94.39	94.30
KAUFMAN	COUNTY-OTHER	**105**	98.23	95.79	93.72	92.77	92.43	92.34
KAUFMAN	CRANDALL	**173**	161.77	158.41	156.61	155.81	155.69	155.66
KAUFMAN	FORNEY	**137**	129.28	127.28	126.17	125.67	125.39	125.28
KAUFMAN	FORNEY LAKE WSC	**152**	144.79	142.79	141.89	141.42	141.09	140.99
KAUFMAN	GASTONIA-SCURRY SUD	**70**	60.00	60.00	60.00	60.00	60.00	60.00
KAUFMAN	HIGH POINT WSC	**93**	80.87	77.04	74.92	74.00	73.68	73.59
KAUFMAN	KAUFMAN	**121**	110.37	105.70	102.95	101.64	101.41	101.33
KAUFMAN	KEMP	**171**	158.34	154.32	152.07	151.13	150.83	150.72
KAUFMAN	MABANK	**186**	176.78	173.74	171.97	170.92	170.59	170.45
KAUFMAN	MACBEE SUD	**63**	60.00	60.00	60.00	60.00	60.00	60.00
KAUFMAN	MESQUITE	**142**	132.98	129.08	126.29	124.97	124.68	124.61
KAUFMAN	OAK GROVE	**95**	83.06	78.53	76.15	75.68	75.45	75.27
KAUFMAN	POST OAK BEND CITY	**112**	103.44	100.72	99.36	98.52	98.29	98.11
KAUFMAN	ROSE HILL SUD	**88**	77.03	73.71	71.94	71.15	70.91	70.75
KAUFMAN	SCURRY	**71**	61.48	60.00	60.00	60.00	60.00	60.00
KAUFMAN	SEAGOVILLE	**107**	97.58	94.15	92.22	91.31	91.08	91.06
KAUFMAN	SEVEN POINTS	**205**	196.94	193.73	191.83	190.78	190.49	190.39
KAUFMAN	TALTY	**125**	118.01	116.44	115.83	115.47	115.21	115.04
KAUFMAN	TALTY WSC	**153**	146.29	144.76	144.09	143.55	143.32	143.21
KAUFMAN	TERRELL	**163**	151.54	146.92	145.61	145.01	144.88	144.82
KAUFMAN	WEST CEDAR CREEK MUD	**63**	60.00	60.00	60.00	60.00	60.00	60.00
NAVARRO	BLOOMING GROVE	**160**	149.72	145.23	142.04	140.73	140.42	140.34
NAVARRO	BRANDON-IRENE WSC	**128**	117.83	113.36	110.09	108.99	108.69	108.63
NAVARRO	CHATFIELD WSC	**107**	97.22	94.06	91.68	90.39	90.11	90.06
NAVARRO	CORBET WSC	**89**	80.20	76.69	74.32	73.10	72.79	72.71
NAVARRO	CORSICANA	**214**	203.78	199.31	196.15	194.64	194.33	194.25
NAVARRO	COUNTY-OTHER	**109**	101.43	98.72	96.67	94.70	94.14	93.98
NAVARRO	DAWSON	**159**	148.93	144.59	141.53	140.02	139.72	139.63
NAVARRO	FROST	**96**	85.98	81.70	78.69	77.19	76.89	76.80
NAVARRO	KERENS	**116**	105.59	100.99	97.71	96.99	96.69	96.60
NAVARRO	M-E-N WSC	**134**	125.90	122.81	120.79	119.72	119.42	119.33
NAVARRO	NAVARRO MILLS WSC	**104**	94.91	91.20	88.67	87.38	87.07	86.99
NAVARRO	RICE	**151**	142.29	138.91	136.65	135.48	135.18	135.09
NAVARRO	RICE WSC	**93**	83.85	80.49	78.65	77.81	77.56	77.46
PARKER	ALEDO	**148**	137.90	135.31	134.35	134.09	134.03	133.99
PARKER	ANNETTA	**90**	80.45	77.16	75.39	74.56	74.34	74.25
PARKER	ANNETTA NORTH	**115**	106.79	103.73	101.67	100.58	100.25	100.16
PARKER	ANNETTA SOUTH	**115**	105.87	101.78	98.34	96.45	96.13	96.13
PARKER	AZLE	**149**	139.78	135.87	133.08	131.66	131.24	131.05
PARKER	COUNTY-OTHER	**124**	115.93	113.02	110.77	109.02	108.47	108.25
PARKER	CRESSON	**143**	134.10	131.05	129.52	128.77	128.56	128.48
PARKER	FORT WORTH	**185**	175.71	172.29	170.47	169.71	169.51	169.45
PARKER	HUDSON OAKS	**164**	152.83	149.57	148.12	147.60	147.48	147.45
PARKER	MINERAL WELLS	**155**	145.52	141.57	138.70	137.18	136.89	136.86
PARKER	PARKER COUNTY SUD	**103**	94.78	92.04	90.77	90.18	89.97	89.88

Table G.3 - GPCDs Used to Determine Demand Projections (listed by County)

County	Water User Group	Base GPCD	GPCD Used to Determine Demand Projections 2020	2030	2040	2050	2060	2070
PARKER	RENO	**60**	60.00	60.00	60.00	60.00	60.00	60.00
PARKER	SPRINGTOWN	**137**	126.19	122.77	121.50	120.78	120.63	120.58
PARKER	WALNUT CREEK SUD	**75**	66.71	63.97	62.50	61.71	61.38	61.27
PARKER	WEATHERFORD	**166**	156.94	153.40	151.32	150.09	149.79	149.68
PARKER	WILLOW PARK	**148**	138.89	135.37	133.37	132.32	132.06	131.97
ROCKWALL	BLACKLAND WSC	**189**	180.41	176.94	174.45	173.15	172.83	172.75
ROCKWALL	CASH SUD	**112**	102.52	99.31	97.46	96.59	96.34	96.23
ROCKWALL	COUNTY-OTHER	**150**	143.76	142.57	142.02	141.58	140.27	140.11
ROCKWALL	DALLAS	**207**	197.86	193.69	190.54	189.05	188.75	188.72
ROCKWALL	EAST FORK SUD	**121**	108.77	104.36	102.04	101.08	100.88	100.80
ROCKWALL	FATE	**163**	157.27	155.71	155.23	154.96	154.80	154.68
ROCKWALL	FORNEY LAKE WSC	**152**	144.79	142.79	141.89	141.42	141.09	140.99
ROCKWALL	GARLAND	**153**	144.08	140.34	137.50	135.95	135.64	135.64
ROCKWALL	HEATH	**300**	290.89	287.96	287.49	287.21	287.12	287.08
ROCKWALL	HIGH POINT WSC	**93**	80.87	77.04	74.92	74.00	73.68	73.59
ROCKWALL	LAVON SUD	**118**	105.23	102.16	100.51	99.76	99.51	99.38
ROCKWALL	MCLENDON-CHISHOLM	**178**	168.95	165.55	163.72	162.90	162.67	162.58
ROCKWALL	MOUNT ZION WSC	**188**	177.37	173.10	170.69	169.65	169.42	169.33
ROCKWALL	ROCKWALL	**175**	167.61	165.13	163.91	163.32	163.09	163.00
ROCKWALL	ROWLETT	**145**	136.59	133.69	131.96	130.96	130.70	130.68
ROCKWALL	ROYSE CITY	**110**	103.48	100.77	99.48	98.83	98.64	98.62
ROCKWALL	WYLIE	**141**	134.54	132.59	131.60	131.02	130.77	130.72
TARRANT	ARLINGTON	**163**	154.12	150.43	147.86	146.48	146.19	146.18
TARRANT	AZLE	**149**	139.78	135.87	133.08	131.66	131.24	131.05
TARRANT	BEDFORD	**179**	169.61	165.07	161.72	160.03	159.77	159.77
TARRANT	BENBROOK	**216**	206.51	202.06	198.97	197.34	196.84	196.84
TARRANT	BETHESDA WSC	**197**	187.16	183.16	180.57	179.31	179.03	178.94
TARRANT	BLUE MOUND	**80**	70.93	66.91	63.55	61.72	61.39	61.39
TARRANT	BURLESON	**143**	134.92	131.94	130.24	129.40	129.13	129.05
TARRANT	COLLEYVILLE	**355**	346.68	343.36	341.00	339.76	339.50	339.49
TARRANT	COMMUNITY WSC	**99**	88.32	83.63	80.46	80.12	79.84	79.76
TARRANT	COUNTY-OTHER	**157**	148.88	145.26	142.30	139.97	139.56	139.39
TARRANT	CROWLEY	**141**	132.36	129.43	127.68	126.82	126.52	126.44
TARRANT	DALWORTHINGTON	**362**	352.78	348.68	345.37	343.61	343.28	343.26
TARRANT	EDGECLIFF VILLAGE	**163**	153.57	149.73	146.54	144.79	144.48	144.47
TARRANT	EULESS	**157**	147.83	143.89	141.07	139.52	139.23	139.22
TARRANT	EVERMAN	**86**	76.76	72.66	69.45	67.75	67.45	67.44
TARRANT	FLOWER MOUND	**233**	225.07	222.19	220.99	220.28	220.05	220.03
TARRANT	FOREST HILL	**103**	93.52	89.36	86.15	84.42	83.98	83.80
TARRANT	FORT WORTH	**185**	175.71	172.29	170.47	169.71	169.51	169.45
TARRANT	GRAND PRAIRIE	**153**	144.01	140.81	139.07	138.26	138.06	138.03
TARRANT	GRAPEVINE	**324**	314.53	310.69	308.36	307.11	306.86	306.84
TARRANT	HALTOM CITY	**116**	107.23	103.66	100.81	99.24	98.89	98.79
TARRANT	HASLET	**299**	290.87	287.12	285.05	283.56	283.34	283.30
TARRANT	HURST	**162**	152.38	148.47	145.45	143.79	143.49	143.48
TARRANT	JOHNSON COUNTY SUD	**124**	114.97	111.47	109.29	108.22	107.93	107.84
TARRANT	KELLER	**236**	228.16	225.84	224.55	223.78	223.52	223.50
TARRANT	KENNEDALE	**167**	157.61	154.05	151.74	150.76	150.55	150.53
TARRANT	LAKE WORTH	**206**	195.57	191.07	188.01	186.52	186.20	185.99
TARRANT	LAKESIDE	**158**	149.69	146.23	143.62	142.22	141.93	141.93
TARRANT	MANSFIELD	**252**	244.60	242.34	241.10	240.40	240.18	240.10
TARRANT	NORTH RICHLAND HILLS	**168**	158.63	155.06	152.71	151.40	151.13	151.11
TARRANT	PANTEGO	**240**	230.87	226.77	223.32	221.43	221.10	221.10

Table G.3 - GPCDs Used to Determine Demand Projections (listed by County)

		GPCD Used to Determine Demand Projections						
County	Water User Group	Base GPCD	2020	2030	2040	2050	2060	2070
TARRANT	PELICAN BAY	**62**	60.00	60.00	60.00	60.00	60.00	60.00
TARRANT	RENO	**60**	60.00	60.00	60.00	60.00	60.00	60.00
TARRANT	RICHLAND HILLS	**132**	121.96	117.50	114.18	112.84	112.51	112.40
TARRANT	RIVER OAKS	**110**	101.06	97.19	93.98	92.21	91.89	91.88
TARRANT	SAGINAW	**130**	122.14	119.35	117.68	116.88	116.67	116.65
TARRANT	SANSOM PARK	**108**	99.27	95.32	92.23	90.79	90.48	90.42
TARRANT	SOUTHLAKE	**376**	369.07	366.73	365.30	364.54	364.23	364.14
TARRANT	TROPHY CLUB	**401**	390.52	388.57	387.34	386.62	386.44	386.36
TARRANT	WATAUGA	**113**	103.52	99.75	96.65	94.94	94.63	94.62
TARRANT	WESTLAKE	**1,039**	1,032.53	1,029.82	1,028.71	1,028.30	1,028.14	1,028.08
TARRANT	WESTOVER HILLS	**1,226**	1,216.69	1,212.50	1,209.13	1,207.34	1,207.01	1,206.99
TARRANT	WESTWORTH VILLAGE	**140**	130.50	126.38	123.45	121.98	121.68	121.62
TARRANT	WHITE SETTLEMENT	**119**	109.55	105.34	102.13	100.31	99.85	99.71
WISE	ALVORD	**65**	60.00	60.00	60.00	60.00	60.00	60.00
WISE	AURORA	**86**	77.10	73.89	72.18	71.34	71.10	71.01
WISE	BOLIVAR WSC	**89**	79.79	76.18	74.02	73.01	72.74	72.64
WISE	BOYD	**158**	148.59	144.52	140.95	139.68	139.33	139.29
WISE	BRIDGEPORT	**164**	154.84	151.42	149.53	148.51	148.24	148.14
WISE	CHICO	**185**	175.76	171.73	168.68	166.47	166.19	166.08
WISE	COUNTY-OTHER	**115**	107.18	104.18	101.84	99.95	99.51	99.39
WISE	DECATUR	**254**	243.29	239.43	237.61	236.83	236.66	236.60
WISE	FORT WORTH	**185**	175.71	172.29	170.47	169.71	169.51	169.45
WISE	NEW FAIRVIEW	**98**	91.05	89.14	88.31	87.81	87.58	87.48
WISE	NEWARK	**110**	97.92	94.73	93.08	92.46	92.29	92.21
WISE	RHOME	**162**	153.81	151.33	150.34	149.78	149.63	149.56
WISE	RUNAWAY BAY	**224**	215.25	211.86	209.69	208.51	208.22	208.09
WISE	WALNUT CREEK SUD	**75**	66.71	63.97	62.50	61.71	61.38	61.27
WISE	WEST WISE SUD	**120**	109.53	105.69	102.73	101.17	100.88	100.82

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COLLIN COUNTY						
SABINE BASIN						
CADDO BASIN SUD	187	215	280	346	414	483
FARMERSVILLE	2	4	4	4	4	4
JOSEPHINE	258	390	519	641	641	641
NEVADA	11	13	15	60	148	266
ROYSE CITY	190	621	1,338	2,215	4,199	4,519
COUNTY-OTHER	63	53	40	34	30	22
LIVESTOCK	86	86	86	86	86	86
IRRIGATION	68	68	68	68	68	68
SABINE BASIN TOTAL DEMAND	**865**	**1,450**	**2,350**	**3,454**	**5,590**	**6,089**
TRINITY BASIN						
ALLEN	20,533	20,336	20,215	20,139	20,108	20,106
ANNA	1,898	2,190	3,588	4,826	9,167	13,820
BLUE RIDGE	92	185	362	1,412	3,221	5,461
CADDO BASIN SUD	92	106	138	170	204	237
CARROLLTON	1	2	2	3	3	4
CELINA	4,574	8,900	15,008	23,121	23,119	23,117
COPEVILLE SUD	319	376	452	596	1,037	1,773
CULLEOKA WSC	328	370	605	740	807	1,009
DALLAS	15,807	15,886	15,831	15,707	15,682	15,679
EAST FORK SUD	279	335	407	487	586	698
FAIRVIEW	4,644	5,329	7,094	7,087	7,084	7,083
FARMERSVILLE	956	2,306	2,295	2,289	2,287	2,287
FRISCO	24,957	32,625	40,372	40,334	40,308	40,300
GARLAND	54	66	80	96	115	137
HICKORY CREEK SUD	7	7	8	8	9	10
LAVON	559	711	1,081	1,392	3,125	7,025
LAVON SUD	354	367	430	481	1,115	2,783
LOWRY CROSSING	222	257	308	306	305	305
LUCAS	2,132	2,406	3,165	3,528	3,896	3,896
MARILEE SUD	541	532	517	515	506	506
MCKINNEY	34,365	40,877	59,112	76,866	76,818	76,814
MELISSA	1,535	2,133	2,869	6,493	10,814	16,216
MURPHY	5,285	5,253	5,238	5,228	5,222	5,220
NEVADA	85	99	118	468	1,168	2,102
NEW HOPE	119	143	174	209	251	299
NORTH COLLIN WSC	782	871	987	1,117	1,279	1,464
PARKER	2,561	6,772	8,454	8,450	8,449	8,449
PLANO	67,088	68,626	71,043	71,153	71,061	71,061
PRINCETON	974	1,236	1,566	3,679	5,798	7,919
PROSPER	5,129	7,134	8,294	8,594	8,897	8,896
RICHARDSON	7,904	7,819	8,021	8,212	8,201	8,201
SACHSE	1,436	1,420	1,411	1,406	1,404	1,403
SEIS LAGOS UD	603	598	596	594	594	594
SOUTH GRAYSON WSC	143	175	230	267	307	349
ST. PAUL	265	298	322	334	348	347
WESTON	506	1,060	4,814	11,768	18,723	18,721
WYLIE	6,349	7,080	7,562	7,943	8,196	8,434

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
COLLIN COUNTY						
TRINITY BASIN						
WYLIE NORTHEAST SUD	257	319	396	785	1,305	2,086
COUNTY-OTHER	1,550	1,529	1,520	5,179	7,404	11,863
MANUFACTURING	3,456	3,888	4,319	4,706	5,109	5,547
STEAM ELECTRIC POWER	715	602	740	594	782	724
LIVESTOCK	774	774	774	774	774	774
IRRIGATION	2,927	2,927	2,927	2,927	2,927	2,927
TRINITY BASIN TOTAL DEMAND	**223,157**	**254,925**	**303,445**	**350,983**	**378,515**	**406,646**
COLLIN COUNTY TOTAL DEMAND	**224,022**	**256,375**	**305,795**	**354,437**	**384,105**	**412,735**
COOKE COUNTY						
RED BASIN						
GAINESVILLE	4	4	4	5	5	7
TWO WAY SUD	12	12	12	13	13	14
WOODBINE WSC	52	56	61	67	73	79
COUNTY-OTHER	241	247	253	278	343	559
LIVESTOCK	708	708	708	708	708	708
IRRIGATION	90	90	90	90	90	90
RED BASIN TOTAL DEMAND	**1,107**	**1,117**	**1,128**	**1,161**	**1,232**	**1,457**
TRINITY BASIN						
BOLIVAR WSC	146	150	153	159	164	169
GAINESVILLE	2,488	2,585	2,655	2,750	3,333	4,656
LAKE KIOWA SUD	786	790	800	813	826	826
LINDSAY	144	150	154	160	304	605
MOUNTAIN SPRING WSC	446	469	487	507	802	1,280
MUENSTER	266	259	261	258	265	265
VALLEY VIEW	56	60	63	66	68	71
WOODBINE WSC	599	651	706	769	839	911
COUNTY-OTHER	882	902	956	1,312	1,487	3,208
MANUFACTURING	226	247	268	286	310	336
MINING	1,583	900	378	446	511	586
LIVESTOCK	786	786	786	786	786	786
IRRIGATION	210	210	210	210	210	210
TRINITY BASIN TOTAL DEMAND	**8,618**	**8,159**	**7,877**	**8,522**	**9,905**	**13,909**
COOKE COUNTY TOTAL DEMAND	**9,725**	**9,276**	**9,005**	**9,683**	**11,137**	**15,366**
DALLAS COUNTY						
TRINITY BASIN						
ADDISON	6,002	7,113	8,235	9,376	10,536	11,701
BALCH SPRINGS	2,750	2,895	3,067	3,294	3,547	3,809
CARROLLTON	9,262	9,065	8,914	8,830	8,813	8,812
CEDAR HILL	10,510	12,630	14,784	16,972	16,957	16,955
COCKRELL HILL	407	421	405	396	536	1,141
COMBINE	93	102	112	124	137	149
COPPELL	10,690	10,947	10,851	10,795	10,782	10,781
DALLAS	252,895	269,507	303,241	337,114	364,228	377,458
DESOTO	9,442	10,128	10,878	11,765	12,687	13,628
DUNCANVILLE	6,065	6,437	6,295	6,218	6,204	6,203
EAST FORK SUD	236	310	386	473	559	646

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
DALLAS COUNTY						
TRINITY BASIN						
FARMERS BRANCH	9,041	9,458	9,911	10,457	11,031	11,618
FERRIS	1	2	3	3	4	4
GARLAND	37,816	37,940	37,427	37,005	36,921	36,921
GLENN HEIGHTS	1,514	2,003	2,517	3,085	3,645	4,784
GRAND PRAIRIE	26,817	32,622	36,069	35,859	35,807	35,799
HIGHLAND PARK	4,056	4,141	4,106	4,091	4,088	4,088
HUTCHINS	1,022	1,396	1,779	2,166	2,558	2,952
IRVING	56,135	60,148	59,460	59,081	59,001	58,992
LANCASTER	7,686	9,775	11,429	12,659	13,932	15,216
LEWISVILLE	158	155	153	152	152	152
MESQUITE	22,323	23,832	26,330	28,404	30,622	32,894
OVILLA	114	144	175	210	244	422
RICHARDSON	18,424	18,857	19,343	19,804	19,778	19,777
ROCKETT SUD	115	220	323	427	532	638
ROWLETT	8,691	9,330	9,209	9,140	9,121	9,120
SACHSE	3,743	3,704	3,680	3,665	3,660	3,659
SEAGOVILLE	2,058	2,409	2,774	3,156	3,564	3,562
SUNNYVALE	2,357	3,332	4,313	4,968	5,958	5,957
UNIVERSITY PARK	7,622	7,515	7,427	7,379	7,371	7,370
WILMER	433	466	718	1,323	2,073	3,763
WYLIE	384	389	396	405	414	434
COUNTY-OTHER	3,106	2,622	2,415	2,414	2,413	2,413
MANUFACTURING	37,791	41,148	44,214	46,703	46,983	47,265
MINING	3,038	2,656	2,279	1,930	1,922	1,916
STEAM ELECTRIC POWER	5,000	5,000	11,066	11,066	11,066	11,066
LIVESTOCK	854	854	854	854	854	854
IRRIGATION	9,134	9,134	9,134	9,134	9,134	9,134
TRINITY BASIN TOTAL DEMAND	**577,785**	**618,807**	**674,672**	**720,897**	**757,834**	**782,053**
DALLAS COUNTY TOTAL DEMAND	**577,785**	**618,807**	**674,672**	**720,897**	**757,834**	**782,053**
DENTON COUNTY						
TRINITY BASIN						
ARGYLE	1,395	2,064	2,966	2,961	2,960	2,959
ARGYLE WSC	996	991	990	990	989	989
AUBREY	563	731	847	999	1,197	1,452
BARTONVILLE	825	907	903	900	900	899
BOLIVAR WSC	848	985	1,160	1,369	1,625	1,921
CARROLLTON	14,303	14,437	14,196	14,062	14,036	14,034
CELINA	142	989	3,295	7,707	7,707	7,706
COPPELL	302	298	295	294	293	293
COPPER CANYON	260	272	289	310	338	369
CORINTH	4,266	4,983	4,956	4,939	4,932	4,931
CROSS ROADS	457	619	756	755	754	754
DALLAS	6,579	6,987	7,812	8,638	9,301	9,625
DENTON	28,908	37,431	47,013	59,444	81,374	99,143
DENTON COUNTY FWSD #10	1,486	3,128	3,127	3,126	3,124	3,124
DENTON COUNTY FWSD #1A	3,659	6,494	7,777	7,774	7,771	7,769

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
DENTON COUNTY						
TRINITY BASIN						
DENTON COUNTY FWSD #7	3,418	3,405	3,403	3,401	3,399	3,397
DOUBLE OAK	558	547	539	534	533	533
FLOWER MOUND	18,988	23,080	22,955	22,881	22,857	22,855
FORT WORTH	7,139	10,766	15,447	21,678	27,750	33,837
FRISCO	16,638	21,750	26,915	26,890	26,872	26,867
HACKBERRY	309	394	498	615	752	908
HICKORY CREEK	583	709	865	1,078	1,076	1,076
HIGHLAND VILLAGE	3,832	3,968	3,924	3,899	3,893	3,893
JUSTIN	695	1,212	1,733	1,729	1,728	1,727
KRUGERVILLE	263	315	368	435	434	434
KRUM	1,154	1,414	1,731	2,089	2,512	2,997
LAKE DALLAS	1,096	1,181	1,339	1,329	1,326	1,326
LAKEWOOD VILLAGE	83	102	125	151	182	218
LEWISVILLE	19,985	22,286	25,177	28,537	31,822	31,818
LITTLE ELM	4,108	4,600	4,586	4,574	4,564	4,564
MOUNTAIN SPRING WSC	10	11	12	13	14	16
MUSTANG SUD	1,875	3,527	5,190	6,856	8,526	10,196
NORTHLAKE	911	3,402	6,198	8,591	10,986	10,986
OAK POINT	1,053	1,572	2,097	2,624	3,153	3,152
PALOMA CREEK	2,562	3,472	3,470	3,468	3,465	3,464
PILOT POINT	891	1,070	1,449	1,965	2,615	3,527
PLANO	1,932	1,982	2,011	2,000	1,998	1,998
PONDER	254	343	451	574	718	883
PROSPER	193	1,221	3,111	5,863	8,614	8,613
PROVIDENCE VILLAGE WCID	938	931	929	927	926	925
ROANOKE	2,263	2,807	3,356	3,350	3,348	3,348
SANGER	1,202	1,452	1,763	2,119	2,545	3,034
SHADY SHORES	461	516	511	508	507	506
SOUTHLAKE	421	541	683	844	1,032	1,247
THE COLONY	7,762	8,632	9,106	9,857	9,844	9,841
TROPHY CLUB	5,730	5,701	5,683	5,673	5,670	5,669
WESTLAKE	29	39	50	63	78	95
COUNTY-OTHER	3,785	4,155	4,574	6,487	10,458	19,480
MANUFACTURING	1,446	1,643	1,843	2,020	2,194	2,383
MINING	4,326	2,729	3,345	4,306	5,204	6,291
STEAM ELECTRIC POWER	646	733	819	906	993	1,088
LIVESTOCK	1,045	1,045	1,045	1,045	1,045	1,045
IRRIGATION	2,137	2,137	2,137	2,137	2,137	2,137
TRINITY BASIN TOTAL DEMAND	**185,710**	**226,706**	**265,820**	**306,284**	**353,071**	**392,342**
DENTON COUNTY TOTAL DEMAND	**185,710**	**226,706**	**265,820**	**306,284**	**353,071**	**392,342**
ELLIS COUNTY						
TRINITY BASIN						
BARDWELL	71	86	105	129	158	348
BRANDON-IRENE WSC	11	14	16	20	24	29
BUENA VISTA - BETHEL SUD	1,249	1,509	1,772	2,173	3,119	4,154
CEDAR HILL	142	178	221	272	272	272

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ELLIS COUNTY						
TRINITY BASIN						
ENNIS	4,148	4,789	5,447	7,397	11,879	19,748
FERRIS	460	537	619	712	1,176	2,201
FILES VALLEY WSC	119	148	182	223	272	330
GARRETT	346	438	546	674	827	1,970
GLENN HEIGHTS	383	476	590	725	888	1,352
GRAND PRAIRIE	10	12	15	18	22	27
ITALY	314	386	473	580	733	976
JOHNSON COUNTY SUD	28	34	42	51	63	76
MANSFIELD	32	38	47	65	81	100
MAYPEARL	117	135	145	143	143	143
MIDLOTHIAN	4,198	5,429	7,069	8,589	9,956	10,995
MILFORD	66	67	69	74	80	89
MOUNTAIN PEAK SUD	1,671	2,109	2,627	3,240	3,971	4,820
OAK LEAF	155	165	186	262	385	468
OVILLA	966	1,213	1,507	1,857	2,275	4,188
PALMER	289	353	432	529	675	1,242
PECAN HILL	111	136	167	205	257	384
RED OAK	1,845	2,052	2,750	3,741	4,595	7,170
RICE WSC	662	812	995	1,218	1,490	1,806
ROCKETT SUD	3,756	4,621	5,678	6,963	9,043	11,160
SARDIS-LONE ELM WSC	3,904	4,793	5,824	6,338	6,688	6,686
VENUS	16	20	25	31	37	45
WAXAHACHIE	6,872	7,741	9,320	11,299	13,749	16,715
COUNTY-OTHER	745	762	815	3,058	6,623	11,645
MANUFACTURING	5,247	5,403	5,560	5,716	5,716	5,716
MINING	147	213	164	123	82	55
STEAM ELECTRIC POWER	698	1,450	3,741	5,754	7,878	10,786
LIVESTOCK	905	905	905	905	905	905
IRRIGATION	572	572	572	572	572	572
TRINITY BASIN TOTAL DEMAND	**40,255**	**47,596**	**58,626**	**73,656**	**94,634**	**127,173**
ELLIS COUNTY TOTAL DEMAND	**40,255**	**47,596**	**58,626**	**73,656**	**94,634**	**127,173**
FANNIN COUNTY						
RED BASIN						
BONHAM	2,024	2,506	3,393	4,598	5,663	6,883
ECTOR	87	92	96	101	109	118
HONEY GROVE	61	62	61	60	60	60
LEONARD	3	3	3	4	4	4
SAVOY	88	92	94	98	106	115
SOUTHWEST FANNIN COUNTY SUD	363	386	405	426	507	598
TRENTON	1	1	2	3	3	4
WHITEWRIGHT	2	2	2	2	2	2
COUNTY-OTHER	1,098	1,031	1,045	1,400	2,989	4,757
MANUFACTURING	88	97	106	114	124	135
MINING	97	97	97	97	97	97
STEAM ELECTRIC POWER	6,363	11,474	11,910	12,443	13,092	13,775
LIVESTOCK	1,243	1,243	1,243	1,243	1,243	1,243

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
FANNIN COUNTY						
RED BASIN						
IRRIGATION	7,703	7,703	7,703	7,703	7,703	7,703
RED BASIN TOTAL DEMAND	**19,221**	**24,789**	**26,160**	**28,292**	**31,702**	**35,494**
SULPHUR BASIN						
HICKORY CREEK SUD	27	29	30	32	35	38
HONEY GROVE	213	218	213	211	211	211
LADONIA	120	144	155	175	210	209
LEONARD	7	7	7	8	8	9
NORTH HUNT SUD	36	39	42	44	48	52
COUNTY-OTHER	107	109	197	361	703	1,142
MINING	31	31	31	31	31	31
LIVESTOCK	347	347	347	347	347	347
IRRIGATION	146	146	146	146	146	146
SULPHUR BASIN TOTAL DEMAND	**1,034**	**1,070**	**1,168**	**1,355**	**1,739**	**2,185**
TRINITY BASIN						
HICKORY CREEK SUD	2	2	2	2	2	2
LEONARD	321	342	358	374	405	439
SOUTHWEST FANNIN COUNTY SUD	18	19	20	21	26	30
TRENTON	130	178	607	1,038	1,384	1,729
COUNTY-OTHER	261	271	122	85	318	604
LIVESTOCK	78	78	78	78	78	78
IRRIGATION	452	452	452	452	452	452
TRINITY BASIN TOTAL DEMAND	**1,262**	**1,342**	**1,639**	**2,050**	**2,665**	**3,334**
FANNIN COUNTY TOTAL DEMAND	**21,517**	**27,201**	**28,967**	**31,697**	**36,106**	**41,013**
FREESTONE COUNTY						
BRAZOS BASIN						
TEAGUE	188	191	255	315	379	445
COUNTY-OTHER	142	134	82	135	263	616
MINING	588	563	578	581	589	614
LIVESTOCK	21	21	21	21	21	21
IRRIGATION	33	33	33	33	33	33
BRAZOS BASIN TOTAL DEMAND	**972**	**942**	**969**	**1,085**	**1,285**	**1,729**
TRINITY BASIN						
FAIRFIELD	673	708	730	1,385	1,580	1,974
FLO COMMUNITY WSC	40	41	41	42	43	43
OAKWOOD	7	7	7	7	7	8
TEAGUE	192	195	260	322	386	454
WORTHAM	168	175	179	183	303	343
COUNTY-OTHER	1,066	1,029	1,045	1,281	2,069	4,028
MANUFACTURING	100	111	121	130	136	142
MINING	4,759	4,552	4,673	4,705	4,767	4,968
STEAM ELECTRIC POWER	25,000	25,000	25,000	28,712	33,963	40,175
LIVESTOCK	1,831	1,831	1,831	1,831	1,831	1,831
IRRIGATION	265	265	265	265	265	265
TRINITY BASIN TOTAL DEMAND	**34,101**	**33,914**	**34,152**	**38,863**	**45,350**	**54,231**
FREESTONE COUNTY TOTAL DEMAND	**35,073**	**34,856**	**35,121**	**39,948**	**46,635**	**55,960**

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
GRAYSON COUNTY						
RED BASIN						
BELLS	175	199	223	254	588	783
DENISON	6,641	7,251	7,868	8,629	10,158	12,688
HOWE	77	86	95	105	116	128
KENTUCKY TOWN WSC	184	213	242	278	348	434
LUELLA SUD	346	384	424	474	531	595
POTTSBORO	491	621	751	977	1,624	2,921
SHERMAN	10,543	10,881	11,928	13,741	17,732	24,800
SOUTHMAYD	97	103	110	119	159	238
SOUTHWEST FANNIN COUNTY SUD	178	259	338	431	585	766
TOM BEAN	27	30	33	36	44	65
TWO WAY SUD	440	550	661	791	1,048	1,309
WHITESBORO	202	197	193	193	241	312
WHITEWRIGHT	218	212	208	208	220	233
COUNTY-OTHER	2,619	2,517	2,431	2,391	3,388	5,698
MANUFACTURING	4,880	5,302	5,700	6,035	6,551	7,111
MINING	79	91	107	123	142	163
STEAM ELECTRIC POWER	3,698	7,627	7,627	7,627	7,627	7,627
LIVESTOCK	932	932	932	932	932	932
IRRIGATION	1,325	1,442	1,559	1,677	1,795	1,912
RED BASIN TOTAL DEMAND	**33,152**	**38,897**	**41,430**	**45,021**	**53,829**	**68,715**
TRINITY BASIN						
COLLINSVILLE	233	285	338	401	513	666
GUNTER	355	473	624	776	930	1,085
HOWE	210	232	257	285	316	346
KENTUCKY TOWN WSC	183	211	240	276	345	431
LUELLA SUD	54	60	66	74	83	92
MARILEE SUD	405	399	387	386	380	379
SOUTH GRAYSON WSC	408	424	478	495	511	526
TIOGA	119	124	131	139	444	608
TOM BEAN	195	215	235	261	315	473
TWO WAY SUD	258	322	387	464	613	767
VAN ALSTYNE	517	608	700	811	2,337	3,243
WHITESBORO	267	261	257	256	319	414
WHITEWRIGHT	2	2	2	2	2	2
WOODBINE WSC	9	10	11	12	13	14
COUNTY-OTHER	127	125	123	145	106	103
MANUFACTURING	25	27	29	30	33	36
STEAM ELECTRIC POWER	2,465	5,084	5,084	5,084	5,084	5,084
LIVESTOCK	526	526	526	526	526	526
IRRIGATION	1,113	1,212	1,311	1,409	1,508	1,607
TRINITY BASIN TOTAL DEMAND	**7,471**	**10,600**	**11,186**	**11,832**	**14,378**	**16,402**
GRAYSON COUNTY TOTAL DEMAND	**40,623**	**49,497**	**52,616**	**56,853**	**68,207**	**85,117**
HENDERSON COUNTY						
TRINITY BASIN						
ATHENS	2,916	3,185	3,411	3,743	6,415	9,709
BETHEL-ASH WSC	218	237	254	280	303	327
EAST CEDAR CREEK FWSD	742	807	980	1,061	1,141	1,221

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
HENDERSON COUNTY						
TRINITY BASIN						
EUSTACE	119	125	132	191	248	297
GUN BARREL CITY	944	996	1,053	1,222	1,852	2,957
LOG CABIN	80	82	84	89	93	98
MABANK	149	156	164	197	383	764
MALAKOFF	272	270	268	272	287	307
PAYNE SPRINGS	143	155	165	181	200	246
SEVEN POINTS	331	380	430	543	641	747
TOOL	553	583	607	646	976	1,300
TRINIDAD	91	86	83	83	93	111
VIRGINIA HILL WSC	244	267	287	318	350	394
WEST CEDAR CREEK MUD	674	675	676	677	807	1,009
COUNTY-OTHER	314	233	215	189	167	147
MANUFACTURING	575	594	613	633	652	671
MINING	607	607	607	607	607	607
STEAM ELECTRIC POWER	4,000	7,000	8,000	9,000	10,000	11,000
LIVESTOCK	490	490	490	490	490	490
TRINITY BASIN TOTAL DEMAND	**13,462**	**16,928**	**18,519**	**20,422**	**25,705**	**32,402**
HENDERSON COUNTY TOTAL DEMAND	**13,462**	**16,928**	**18,519**	**20,422**	**25,705**	**32,402**
JACK COUNTY						
BRAZOS BASIN						
BRYSON	80	82	83	84	85	85
COUNTY-OTHER	173	178	180	180	182	184
MANUFACTURING	2	2	2	2	2	2
MINING	622	698	679	692	707	745
LIVESTOCK	268	268	268	268	268	268
IRRIGATION	29	29	29	29	29	29
BRAZOS BASIN TOTAL DEMAND	**1,174**	**1,257**	**1,241**	**1,255**	**1,273**	**1,313**
TRINITY BASIN						
JACKSBORO	681	706	719	725	734	740
COUNTY-OTHER	309	317	320	322	326	328
MINING	933	1,047	1,019	1,039	1,061	1,117
STEAM ELECTRIC POWER	2,665	2,879	3,092	3,305	3,518	3,745
LIVESTOCK	664	664	664	664	664	664
IRRIGATION	72	72	72	72	72	72
TRINITY BASIN TOTAL DEMAND	**5,324**	**5,685**	**5,886**	**6,127**	**6,375**	**6,666**
JACK COUNTY TOTAL DEMAND	**6,498**	**6,942**	**7,127**	**7,382**	**7,648**	**7,979**
KAUFMAN COUNTY						
SABINE BASIN						
ABLES SPRINGS WSC	192	240	295	359	434	519
MACBEE SUD	16	20	24	29	35	42
COUNTY-OTHER	34	55	81	157	151	301
MINING	15	19	25	32	39	48
LIVESTOCK	53	53	53	53	53	53
IRRIGATION	9	9	9	9	9	9
SABINE BASIN TOTAL DEMAND	**319**	**396**	**487**	**639**	**721**	**972**

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
KAUFMAN COUNTY						
TRINITY BASIN						
ABLES SPRINGS WSC	127	159	196	238	287	343
COLLEGE MOUND WSC	790	989	1,218	1,481	2,017	2,554
COMBINE	215	259	311	374	451	538
CRANDALL	779	955	1,162	1,397	1,396	1,395
FORNEY	3,191	3,707	4,803	5,817	8,428	11,227
FORNEY LAKE WSC	818	1,011	1,237	1,499	2,529	3,633
GASTONIA-SCURRY SUD	640	801	986	1,199	2,017	3,025
HIGH POINT WSC	447	533	638	766	1,238	1,649
KAUFMAN	990	1,184	1,442	2,151	2,777	3,406
KEMP	308	376	456	551	845	1,182
MABANK	634	740	848	1,220	1,720	2,292
MACBEE SUD	2	3	4	5	6	7
MESQUITE	21	26	31	37	45	53
OAK GROVE	75	88	103	157	212	422
POST OAK BEND CITY	93	113	134	205	276	550
ROSE HILL SUD	456	546	656	789	1,033	1,586
SCURRY	59	71	85	129	182	404
SEAGOVILLE	4	4	5	6	7	9
SEVEN POINTS	24	29	35	43	51	61
TALTY	305	377	462	560	775	1,289
TALTY WSC	1,584	1,801	2,083	2,914	3,693	4,813
TERRELL	4,035	7,143	8,638	10,670	12,372	14,353
WEST CEDAR CREEK MUD	652	816	1,005	1,221	1,614	2,353
COUNTY-OTHER	1,708	1,780	2,484	3,792	6,579	9,009
MANUFACTURING	813	869	928	993	1,061	1,134
MINING	281	367	466	614	744	903
STEAM ELECTRIC POWER	8,000	8,000	8,000	8,000	8,000	8,000
LIVESTOCK	1,664	1,664	1,664	1,664	1,664	1,664
IRRIGATION	170	170	170	170	170	170
TRINITY BASIN TOTAL DEMAND	**28,885**	**34,581**	**40,250**	**48,662**	**62,189**	**78,024**
KAUFMAN COUNTY TOTAL DEMAND	**29,204**	**34,977**	**40,737**	**49,301**	**62,910**	**78,996**
NAVARRO COUNTY						
TRINITY BASIN						
BLOOMING GROVE	153	164	175	191	209	228
BRANDON-IRENE WSC	29	30	32	35	38	42
CHATFIELD WSC	469	464	463	466	475	485
CORBET WSC	258	272	289	312	341	372
CORSICANA	6,003	6,474	6,984	7,622	8,333	9,101
DAWSON	149	160	172	187	204	223
FROST	69	72	76	82	90	98
KERENS	206	218	231	252	275	300
M-E-N WSC	472	508	548	597	652	712
NAVARRO MILLS WSC	352	373	398	431	470	513
RICE	163	176	190	207	226	246
RICE WSC	138	146	156	170	185	202
COUNTY-OTHER	623	606	593	1,061	2,110	3,685

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
NAVARRO COUNTY						
TRINITY BASIN						
MANUFACTURING	1,114	1,249	1,384	1,519	1,654	1,789
MINING	883	1,071	1,282	1,572	1,806	2,076
STEAM ELECTRIC POWER	8,000	13,440	13,440	13,440	13,440	13,440
LIVESTOCK	1,544	1,544	1,544	1,544	1,544	1,544
IRRIGATION	58	58	58	58	58	58
TRINITY BASIN TOTAL DEMAND	**20,683**	**27,025**	**28,015**	**29,746**	**32,110**	**35,114**
NAVARRO COUNTY TOTAL DEMAND	**20,683**	**27,025**	**28,015**	**29,746**	**32,110**	**35,114**
PARKER COUNTY						
BRAZOS BASIN						
MINERAL WELLS	346	332	320	310	302	294
PARKER COUNTY SUD	655	842	1,060	1,321	1,627	1,983
WEATHERFORD	298	348	408	660	1,034	1,509
COUNTY-OTHER	4,161	5,234	5,741	7,086	9,319	12,323
MANUFACTURING	13	15	16	18	20	22
MINING	1,973	2,498	2,484	2,525	2,557	2,706
LIVESTOCK	896	896	896	896	896	896
IRRIGATION	385	385	385	385	385	385
BRAZOS BASIN TOTAL DEMAND	**8,727**	**10,550**	**11,310**	**13,201**	**16,140**	**20,118**
TRINITY BASIN						
ALEDO	822	1,262	1,900	1,992	1,991	1,990
ANNETTA	152	179	208	238	270	302
ANNETTA NORTH	67	71	76	83	91	100
ANNETTA SOUTH	63	60	58	57	57	57
AZLE	372	392	414	440	530	678
CRESSON	68	75	83	92	104	118
FORT WORTH	12,373	19,140	21,862	23,960	25,530	27,120
HUDSON OAKS	458	618	779	795	795	795
RENO	170	173	176	180	184	189
SPRINGTOWN	577	757	749	745	744	743
WALNUT CREEK SUD	1,455	1,659	1,921	2,463	3,635	4,758
WEATHERFORD	5,009	5,865	6,865	11,109	17,423	25,438
WILLOW PARK	759	904	1,074	1,483	1,924	2,366
COUNTY-OTHER	2,866	1,617	973	2,183	4,886	9,735
MANUFACTURING	625	714	805	894	984	1,073
MINING	1,209	1,531	1,522	1,548	1,567	1,658
STEAM ELECTRIC POWER	260	260	260	260	260	260
LIVESTOCK	648	648	648	648	648	648
IRRIGATION	105	105	105	105	105	105
TRINITY BASIN TOTAL DEMAND	**28,058**	**36,030**	**40,478**	**49,275**	**61,728**	**78,133**
PARKER COUNTY TOTAL DEMAND	**36,785**	**46,580**	**51,788**	**62,476**	**77,868**	**98,251**
ROCKWALL COUNTY						
SABINE BASIN						
BLACKLAND WSC	306	322	341	362	388	416
CASH SUD	137	172	212	254	302	353
FATE	926	1,162	1,437	1,543	1,682	2,581
LAVON SUD	123	179	235	349	464	579

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
ROCKWALL COUNTY						
SABINE BASIN						
ROYSE CITY	1,028	1,073	1,226	2,768	4,641	5,424
COUNTY-OTHER	225	256	273	303	487	659
MANUFACTURING	35	40	45	50	55	61
LIVESTOCK	58	58	58	58	58	58
IRRIGATION	123	123	123	123	123	123
SABINE BASIN TOTAL DEMAND	**2,961**	**3,385**	**3,950**	**5,810**	**8,200**	**10,254**
TRINITY BASIN						
BLACKLAND WSC	365	383	406	431	462	495
DALLAS	18	23	29	35	42	49
EAST FORK SUD	57	76	98	121	148	176
FATE	805	1,295	1,854	2,592	3,397	5,216
FORNEY LAKE WSC	78	97	118	140	165	191
GARLAND	1	1	1	1	1	2
HEATH	3,945	7,839	7,826	7,818	7,816	7,815
HIGH POINT WSC	30	36	43	51	60	69
LAVON SUD	113	165	216	322	428	535
MCLENDON-CHISHOLM	330	406	495	587	691	802
MOUNT ZION WSC	395	485	589	698	822	954
ROCKWALL	8,914	11,049	13,526	16,057	18,911	21,947
ROWLETT	1,179	1,154	1,139	1,130	1,128	1,128
WYLIE	575	583	594	606	620	651
COUNTY-OTHER	343	308	289	257	1,399	2,480
LIVESTOCK	59	59	59	59	59	59
IRRIGATION	251	251	251	251	251	251
TRINITY BASIN TOTAL DEMAND	**17,458**	**24,210**	**27,533**	**31,156**	**36,400**	**42,820**
ROCKWALL COUNTY TOTAL DEMAND	**20,419**	**27,595**	**31,483**	**36,966**	**44,600**	**53,074**
TARRANT COUNTY						
TRINITY BASIN						
ARLINGTON	66,936	69,550	69,852	69,949	70,108	70,148
AZLE	1,486	1,566	1,654	1,758	2,117	2,712
BEDFORD	9,139	9,612	10,121	10,711	10,694	10,694
BENBROOK	5,205	5,659	6,130	7,258	10,605	10,605
BETHESDA WSC	1,903	2,093	2,289	2,491	2,705	2,917
BLUE MOUND	191	181	172	167	167	167
BURLESON	1,305	1,331	1,459	2,030	2,459	2,747
COLLEYVILLE	9,320	9,808	10,314	10,657	10,649	10,648
COMMUNITY WSC	347	369	394	430	466	502
CROWLEY	2,417	2,762	3,254	3,886	4,961	5,666
DALWORTHINGTON GARDENS	912	922	933	947	966	984
EDGECLIFF VILLAGE	503	491	480	475	474	474
EULESS	8,978	9,212	9,031	8,932	8,913	8,913
EVERMAN	541	528	514	501	499	499
FLOWER MOUND	61	68	67	67	67	67
FOREST HILL	1,362	1,381	1,448	1,703	2,164	2,817
FORT WORTH	165,871	199,669	243,088	263,442	281,547	300,047
GRAND PRAIRIE	8,367	8,181	8,080	8,033	8,021	8,019
GRAPEVINE	18,467	20,509	20,725	20,641	20,624	20,62[illegible]

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
TARRANT COUNTY						
TRINITY BASIN						
HALTOM CITY	5,285	5,226	5,308	5,670	6,093	6,640
HASLET	532	644	736	1,589	2,222	2,539
HURST	6,828	6,819	6,680	6,604	6,590	6,590
JOHNSON COUNTY SUD	269	293	318	345	375	404
KELLER	12,182	12,981	12,906	12,862	12,847	12,846
KENNEDALE	1,413	1,588	1,840	1,909	1,961	1,961
LAKE WORTH	1,137	1,248	1,363	1,567	1,836	2,501
LAKESIDE	227	230	234	239	239	239
MANSFIELD	18,975	22,013	26,431	34,762	40,104	45,857
NORTH RICHLAND HILLS	12,733	13,375	13,172	13,059	13,036	13,034
PANTEGO	621	610	601	596	595	595
PELICAN BAY	106	108	110	112	114	116
RENO	2	2	2	3	3	4
RICHLAND HILLS	1,148	1,185	1,228	1,372	1,513	1,700
RIVER OAKS	850	817	790	775	772	772
SAGINAW	3,148	3,503	3,876	4,059	4,052	4,051
SANSOM PARK	534	545	592	617	650	683
SOUTHLAKE	11,080	12,324	14,322	16,334	18,360	20,395
TROPHY CLUB	395	393	392	391	391	391
WATAUGA	2,899	2,794	2,707	2,659	2,650	2,650
WESTLAKE	1,359	2,039	2,957	3,560	4,164	4,755
WESTOVER HILLS	952	972	992	1,013	1,036	1,058
WESTWORTH VILLAGE	395	417	441	468	499	530
WHITE SETTLEMENT	2,081	2,108	2,146	2,472	3,132	3,798
COUNTY-OTHER	8,008	7,862	7,743	11,410	14,509	19,178
MANUFACTURING	20,444	23,630	26,924	29,919	32,457	35,210
MINING	7,367	4,482	1,589	1,537	1,497	1,464
STEAM ELECTRIC POWER	2,448	4,168	5,000	5,000	5,000	5,000
LIVESTOCK	723	723	723	723	723	723
IRRIGATION	4,466	4,466	4,466	4,466	4,466	4,466
TRINITY BASIN TOTAL DEMAND	**431,918**	**481,457**	**536,594**	**580,170**	**620,092**	**659,399**
TARRANT COUNTY TOTAL DEMAND	**431,918**	**481,457**	**536,594**	**580,170**	**620,092**	**659,399**
WISE COUNTY						
TRINITY BASIN						
ALVORD	110	132	155	189	216	242
AURORA	134	159	186	224	263	311
BOLIVAR WSC	111	122	134	150	168	187
BOYD	217	229	316	392	547	593
BRIDGEPORT	1,294	1,551	1,822	2,496	3,322	4,149
CHICO	207	213	221	411	522	652
DECATUR	2,319	3,149	4,060	5,240	6,157	7,156
FORT WORTH	2,380	3,350	4,278	5,477	6,660	7,848
NEW FAIRVIEW	163	199	236	286	334	392
NEWARK	195	249	345	462	643	858
RHOME	411	571	738	1,175	1,576	2,011
RUNAWAY BAY	350	388	428	514	584	700

WUG DEMAND

REGION C	WUG DEMAND (ACRE-FEET PER YEAR)					
	2020	2030	2040	2050	2060	2070
WISE COUNTY						
TRINITY BASIN						
WALNUT CREEK SUD	290	376	465	566	835	1,077
WEST WISE SUD	425	424	427	435	449	464
COUNTY-OTHER	3,667	3,565	3,485	5,039	6,465	7,794
MANUFACTURING	2,660	2,979	3,277	3,539	3,858	4,206
MINING	10,320	11,159	12,337	13,975	15,378	17,694
STEAM ELECTRIC POWER	1,494	1,459	2,254	2,450	3,298	3,673
LIVESTOCK	1,575	1,575	1,575	1,575	1,575	1,575
IRRIGATION	1,324	1,324	1,324	1,324	1,324	1,324
TRINITY BASIN TOTAL DEMAND	**29,646**	**33,173**	**38,063**	**45,919**	**54,174**	**62,906**
WISE COUNTY TOTAL DEMAND	**29,646**	**33,173**	**38,063**	**45,919**	**54,174**	**62,906**
REGION C TOTAL DEMAND	**1,723,325**	**1,944,991**	**2,182,948**	**2,425,837**	**2,676,836**	**2,939,880**

Appendix H

APPENDIX H

DEMAND PROJECTIONS BY WHOLESALE WATER PROVIDER

Table H.1
Argyle WSC
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Argyle WSC	996	991	990	990	989	989
Argyle	1,395	2,064	2,966	2,961	2,960	2,959
Total	**2,391**	**3,055**	**3,956**	**3,951**	**3,949**	**3,948**

Current Supply	2020	2030	2040	2050	2060	2070
Groundwater	950	950	950	950	950	950
Currently Available from UTRWD	1,441	1,732	1,962	1,603	1,464	1,284
Total	**2,391**	**2,682**	**2,912**	**2,553**	**2,414**	**2,234**

Supplies Less Current Demands	**0**	**-373**	**-1,044**	**-1,398**	**-1,535**	**-1,714**

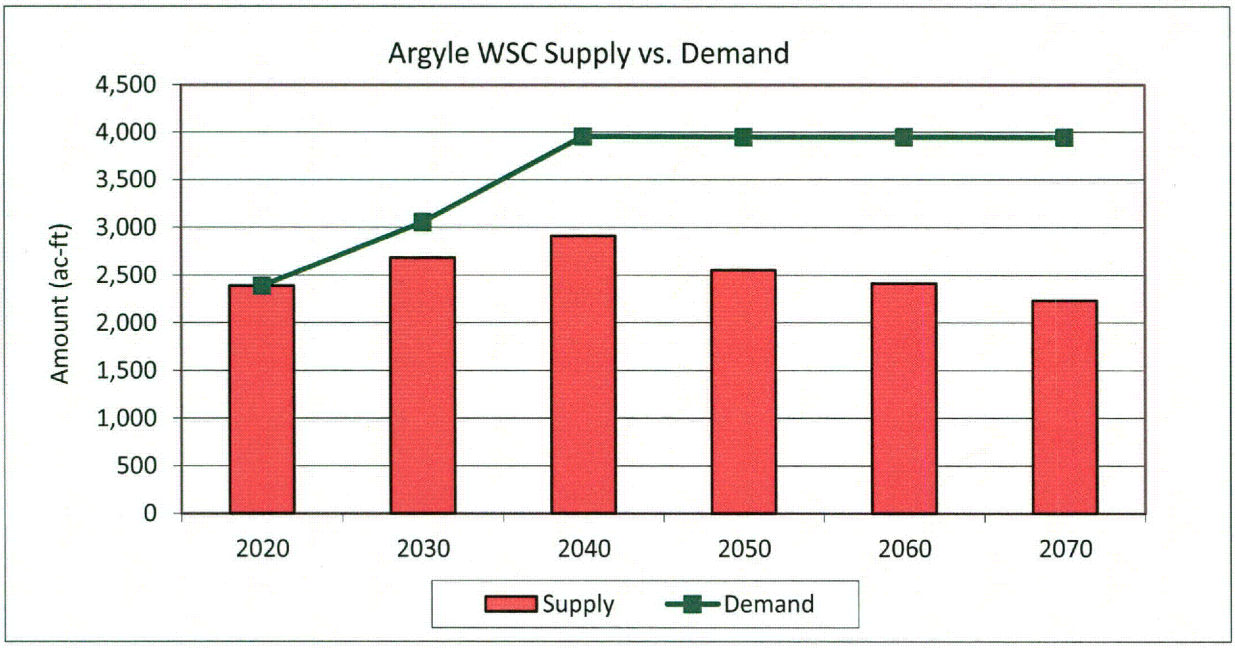


Table H.2
City of Arlington
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Arlington Municipal	66,936	69,550	69,852	69,949	70,108	70,148
12% of Tarrant County Manufacturing	2,453	2,836	3,231	3,590	3,895	4,225
Grand Prairie (Future)	1,121	1,121	1,682	1,682	2,242	2,242
Bethesda WSC (Future)	1,416	1,619	1,833	2,072	2,336	2,614
Pantego (Future)	0	31	30	30	30	30
Kennedale (Future)	280	280	280	280	280	280
Total	**72,206**	**75,437**	**76,908**	**77,603**	**78,891**	**79,539**

Current Supply	2020	2030	2040	2050	2060	2070
TRWD	72,028	68,467	61,699	55,011	49,884	44,891
Fort Worth Reuse	178	178	178	178	178	178
Limit of Current Plant Capacity (75 mgd PB South; 97.5 mgd John F. Kubala WTP)	96,686	96,686	96,686	96,686	96,686	96,686
Total	**72,206**	**68,645**	**61,877**	**55,189**	**50,062**	**45,069**

Supplies Less Current & Potential Demands	**0**	**-6,792**	**-15,031**	**-22,414**	**-28,829**	**-34,470**

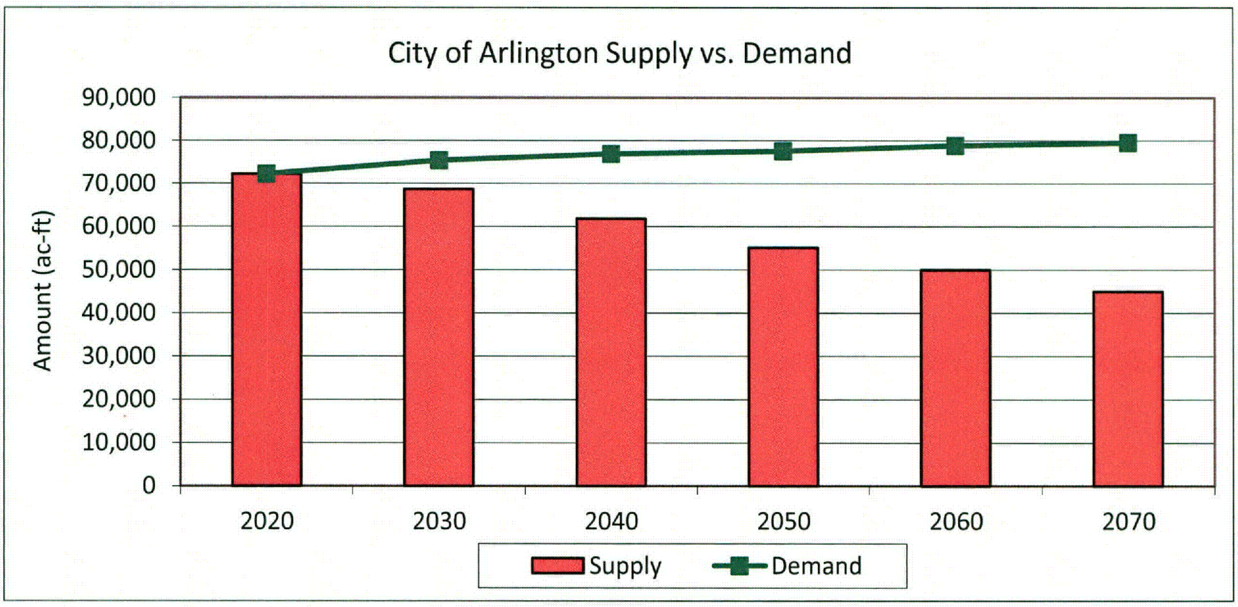


Table H.3
Athens Municipal Water Authority
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
City of Athens	2,128	2,399	2,628	2,964	5,639	8,937
Lawn Irrigation (Henderson Co. Irrigation - Region I)	170	170	170	170	170	170
Henderson County Livestock (TPWD Fish Hatchery)	3,023	3,023	3,023	3,023	3,023	3,023
Henderson County Manufacturing (60% - Reg C)	345	356	368	380	391	403
Total Demand	**5,666**	**5,948**	**6,189**	**6,537**	**9,223**	**12,533**

Current Supplies	2020	2030	2040	2050	2060	2070
Lake Athens (firm yield)	5,983	5,903	5,822	5,741	5,660	5,580
Lake Athens (yield above Fish Hatchery Intake)	*2,900*	*2,900*	*2,900*	*2,900*	*2,900*	*2,900*
Existing wells in Carrizo-Wilcox	966	966	966	966	966	966
Reuse	0	0	0	0	0	0
Total	**6,949**	**6,869**	**6,788**	**6,707**	**6,626**	**6,546**
Supplies Less Current Demands	**1,283**	**921**	**599**	**170**	**-2,597**	**-5,987**

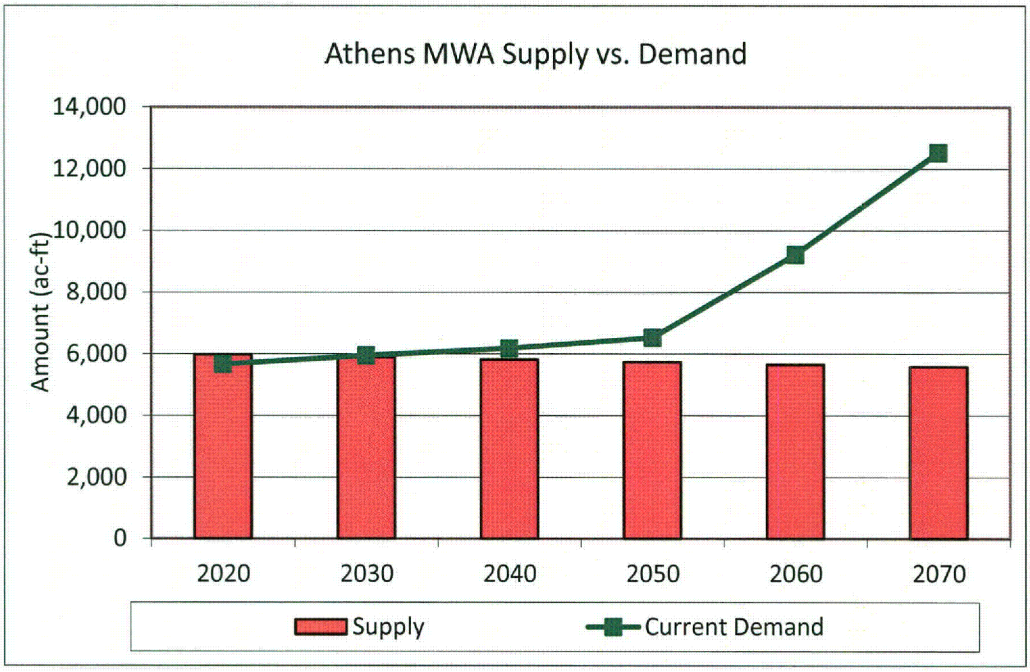


Table H.4
City of Corsicana
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Corsicana	6,003	6,474	6,984	7,622	8,333	9,101
Blooming Grove	153	164	175	191	209	228
Chatfield WSC	469	464	463	466	475	485
Corbet WSC	258	272	289	312	341	372
Coolidge (Reg G)	180	195	207	222	235	247
Dawson	149	160	172	187	204	223
Freestone County-Other (City of Streetman 10%)	121	116	113	142	233	464
Frost	69	72	76	82	90	98
Hill County-Other (50%) (Reg G)	484	506	521	539	553	566
Hubbard (Region G)	151	153	152	158	162	166
Kerens	206	218	231	252	275	300
M E N WSC	472	508	548	597	652	712
Navarro County - Manufacturing	1,109	1,244	1,379	1,514	1,649	1,784
Navarro County Steam Electric	0	5,440	5,440	5,440	5,440	5,440
Navarro County-Other (60%) (Through Community WC)	374	364	356	637	1,266	2,211
Navarro Mills WSC	352	373	398	431	470	513
Rice WSC	750	908	1,101	1,338	1,625	1,958
Rice	163	176	190	207	226	246
Total Demand	**11,463**	**17,807**	**18,795**	**20,337**	**22,438**	**25,114**

Current Supplies	2020	2030	2040	2050	2060	2070
Lake Halbert and Richland-Chambers System	13,863	13,855	13,847	13,838	13,830	13,822
Navarro Mills Reservoir	17,828	17,325	16,317	15,308	14,300	13,292
Total	**31,691**	**31,180**	**30,163**	**29,147**	**28,130**	**27,114**
Total Supply limited by WTP Capacity = 24 MGD (20 MGD Navarro Mills, 4 MGD Halbert)	**13,452**	**13,452**	**13,452**	**13,452**	**13,452**	**13,452**
Supplies Less Current Demands	**1,989**	**-4,355**	**-5,343**	**-6,885**	**-8,986**	**-11,662**

Table H.4
City of Corsicana
-Values in Acre-Feet per Year-

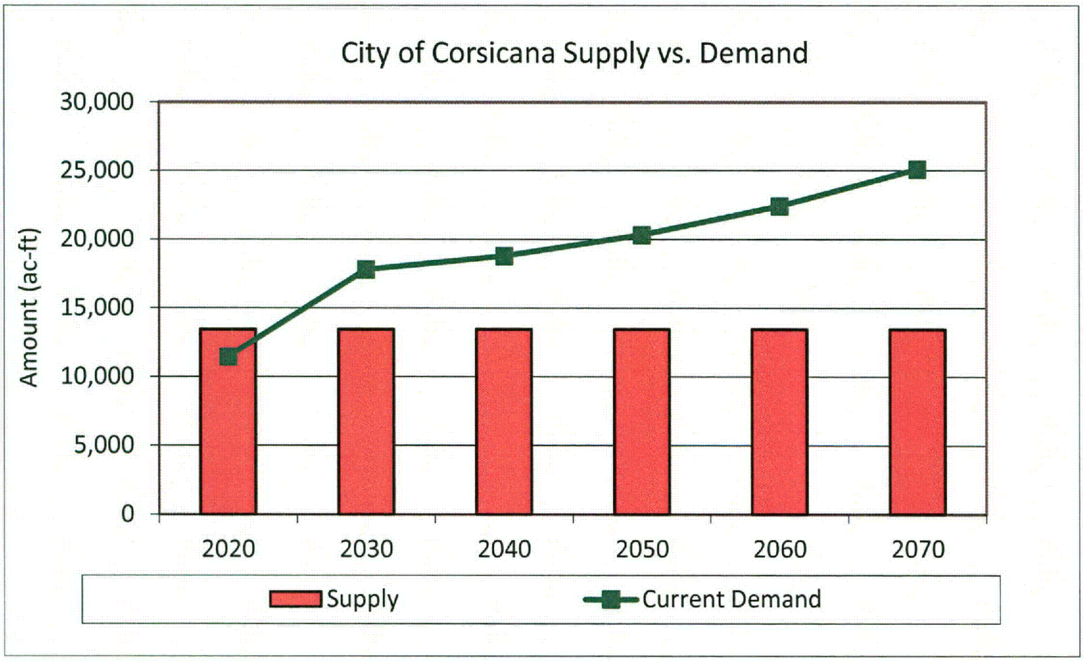


Table H.5
Cross Timbers WSC
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Denton County Other	176	197	222	244	266	290
Bartonville	825	907	903	900	900	899
Copper Canyon	260	272	289	310	338	369
Double Oak	558	547	539	534	533	533
Total	**1,819**	**1,923**	**1,953**	**1,988**	**2,037**	**2,091**

Current Supply	2020	2030	2040	2050	2060	2070
Groundwater	800	800	800	800	800	800
Currently Available from UTRWD	1,019	947	805	696	675	612
Total	**1,819**	**1,747**	**1,605**	**1,496**	**1,475**	**1,412**

Supplies Less Current Demands	**0**	**-176**	**-347**	**-492**	**-562**	**-679**

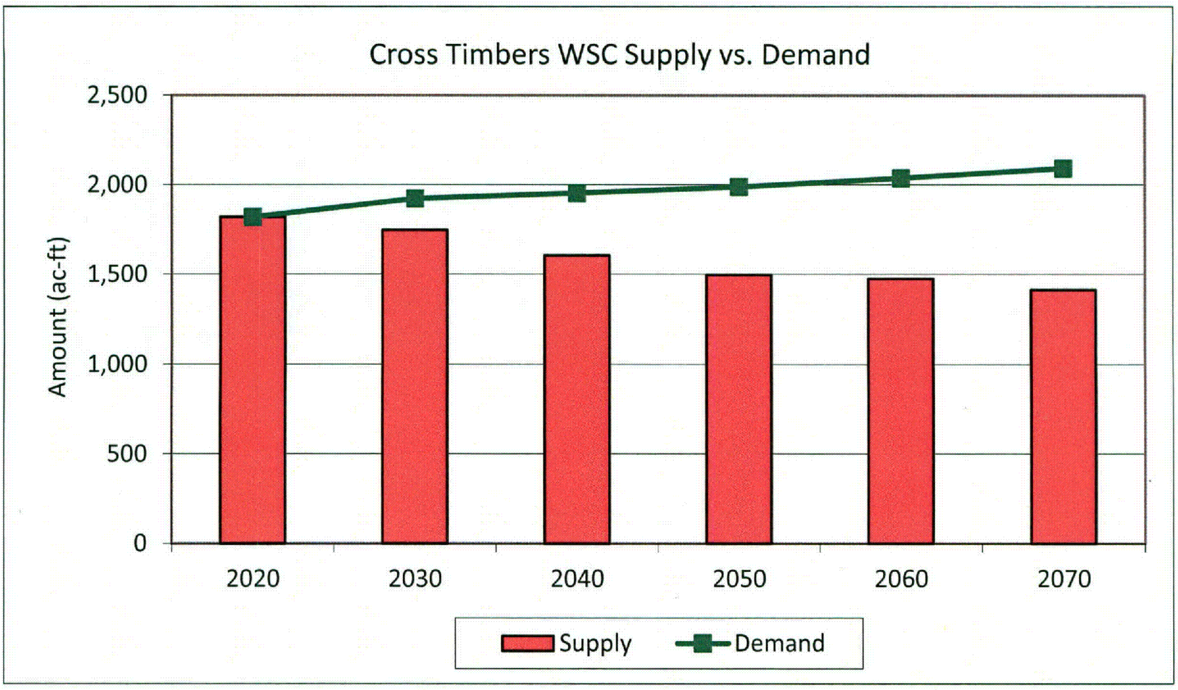


Table H.6
Dallas Water Utilities
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Addison	6,002	7,113	8,235	9,376	10,536	11,701
Carrollton[a]	23,566	23,504	23,112	22,895	22,852	22,850
Cedar Hill[a]	10,472	12,628	14,825	17,064	17,049	17,047
Cockrell Hill	407	421	405	396	536	1,141
Collin County Irrigation	1,803	1,803	1,803	1,803	1,803	1,803
Coppell	10,992	11,245	11,146	11,089	11,075	11,074
Dallas	275,299	292,403	326,913	361,494	389,253	402,811
Balch Springs	2,750	2,895	3,067	3,294	3,547	3,809
Dallas County-Other[a] (Includes DFW Airport)	2,044	1,560	1,152	1,151	1,150	1,150
Dallas County Irrigation	490	490	490	490	490	490
Dallas County Manufacturing[a]	28,540	31,145	32,761	34,353	34,527	34,740
Dallas County Mining[a]	1,061	679	302	193	192	192
Dallas County Steam Electric (TXU)[a]	5,000	5,000	5,000	5,000	5,000	5,000
Denton[a]	0	2,653	9,988	20,216	41,686	59,027
Denton County Irrigation	450	450	450	450	450	450
Denton County Manufacturing (40%)	101	115	129	141	154	167
DeSoto[a]	9,442	10,128	10,878	11,765	12,687	13,628
Duncanville	6,065	6,437	6,295	6,218	6,204	6,203
Farmers Branch	9,041	9,458	9,911	10,457	11,031	11,618
Flower Mound[a]	8,572	8,796	8,748	8,720	8,711	8,710
Glenn Heights[a]	1,724	2,306	2,934	3,637	4,360	5,963
Oak Leaf	100	110	131	207	330	413
Grand Prairie[a]	25,135	30,803	33,641	33,432	32,850	32,886
Grapevine[a]	3,567	3,931	4,056	3,955	3,906	3,869
Hutchins[a]	1,022	1,396	1,779	2,166	2,558	2,952
Wilmer	404	437	689	1,294	2,044	3,734
Irving[a]	5,000	5,000	5,000	5,000	5,000	5,000
Lancaster[a]	7,596	9,685	11,339	12,569	13,842	15,126
Lewisville	20,143	22,441	25,330	28,689	31,974	31,970
Denton County FWSD NO. 1A	1,207	2,143	2,566	2,565	2,564	2,564

Table H.6
Dallas Water Utilities
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Ovilla[a]	1,080	1,357	1,682	2,067	2,519	4,610
Red Oak[a]	59	266	964	1,955	2,809	5,384
Rockwall County Irrigation	277	277	277	277	277	277
Seagoville	2,062	2,413	2,779	3,162	3,571	3,571
Kaufman County Other (Combine WSC)	261	275	385	592	1,010	1,397
Combine	308	361	423	498	588	687
Gastonia-Scurry WSC	39	39	39	39	569	1,799
Tarrant County-Other[a] (DFW Airport)	1,201	1,201	1,001	1,001	1,001	1,001
The Colony[a]	5,235	5,305	5,579	6,130	5,917	5,714
UTRWD Current Contract[a]	39,126	46,718	48,978	49,346	49,545	49,507
UTRWD Additional	0	0	0	5,605	11,210	11,210
TRWD Interim Purchase					71,300	
Total	**517,643**	**565,386**	**625,183**	**690,751**	**828,677**	**803,244**

Potential Future Customers	2020	2030	2040	2050	2060	2070
Total	**0**	**0**	**0**	**0**	**0**	**0**
Total Current and Potential Customer Demand	**517,643**	**565,386**	**625,183**	**690,751**	**828,677**	**803,244**

Supply	2020	2030	2040	2050	2060	2070
Elm Fork System	172,975	165,580	158,185	150,791	143,396	136,001
Grapevine Lake	7,367	7,150	6,933	6,717	6,500	6,283
Lake Ray Hubbard	56,113	54,800	53,487	52,173	50,860	49,547
Lake Ray Hubbard Temporary	0	0	0	0	0	0
Lake Tawakoni	174,080	169,120	164,160	159,200	154,240	149,280
Lake Fork	50,120	55,080	60,040	65,000	69,960	74,920
Direct Reuse (Golf courses)	1,121	1,121	1,121	1,121	1,121	1,121
White Rock Lake (Irrigation Only)	3,200	2,900	2,600	2,300	2,000	1,700
Return Flow[b]	32,550	38,223	41,048	55,000	73,091	87,511
Total	**497,526**	**493,974**	**487,574**	**492,302**	**501,168**	**506,363**

Supplies Less Current Demands	**-20,117**	**-71,412**	**-137,609**	**-198,449**	**-327,509**	**-296,881**
Supplies Less Current & Future Demands	**-20,117**	**-71,412**	**-137,609**	**-198,449**	**-327,509**	**-296,881**

[a] Supplies from other sources
[b] Includes return flows from Flower Mound, Lewisville, Denton, NTMWD and UTRWD.

Table H.6
Dallas Water Utilities
-Values in Acre-Feet per Year-

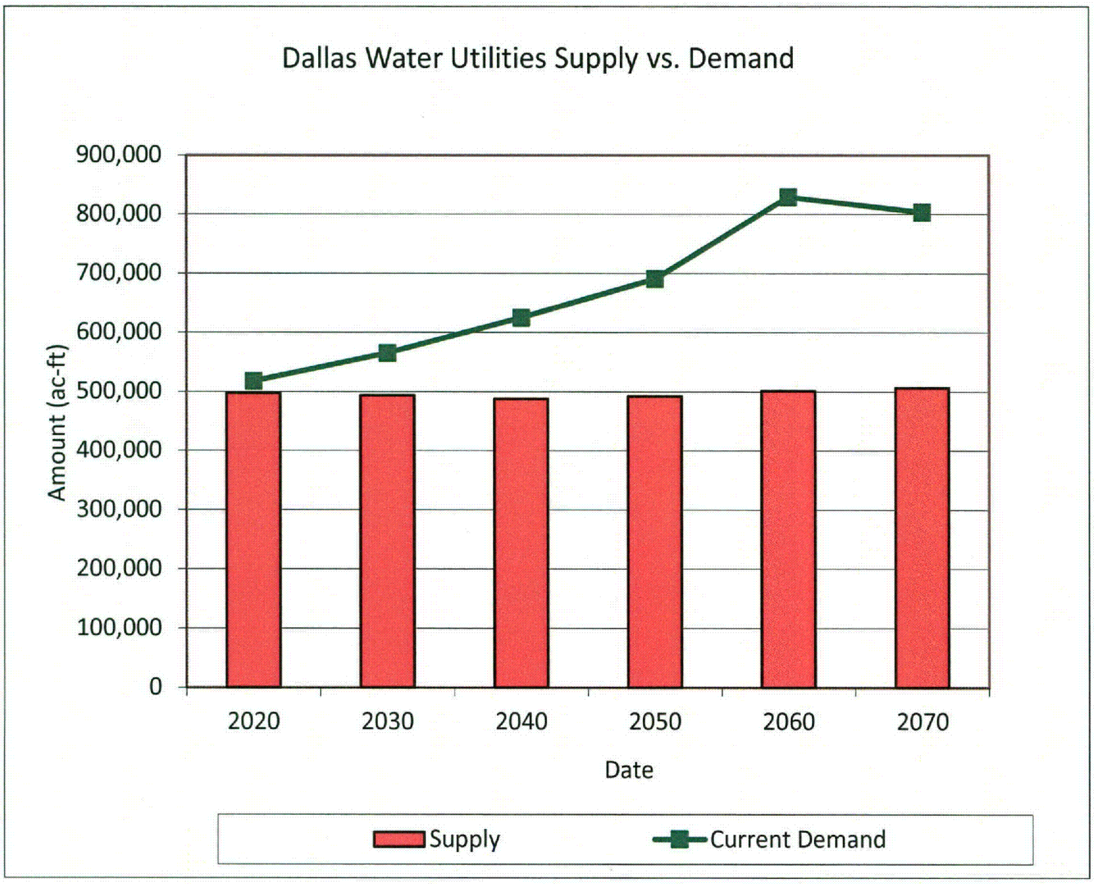


Table H.7
Dallas County Park Cities MUD
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Highland Park	4,056	4,141	4,106	4,091	4,088	4,088
University Park	7,622	7,515	7,427	7,379	7,371	7,370
Tarrant County Irrigation (Thru Grapevine) (Reuse)	1,121	1,121	1,121	1,121	1,121	1,121
Grapevine (Municipal) (Reuse)	2,190	2,556	2,595	2,580	2,577	2,577
Total Demand (Treated)	**11,678**	**11,656**	**11,533**	**11,470**	**11,459**	**11,458**
Total Demand (Reuse)	**3,311**	**3,677**	**3,716**	**3,701**	**3,698**	**3,698**
Total Demand	**14,989**	**15,333**	**15,249**	**15,171**	**15,157**	**15,156**

Current Supplies (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Lake Grapevine	16,900	16,750	16,600	16,450	16,300	16,150
Reuse	3,311	3,677	3,716	3,701	3,698	3,698
Total Supply	**20,211**	**20,427**	**20,316**	**20,151**	**19,998**	**19,848**

Supplies Less Current Demands	**5,222**	**5,094**	**5,067**	**4,980**	**4,841**	**4,692**

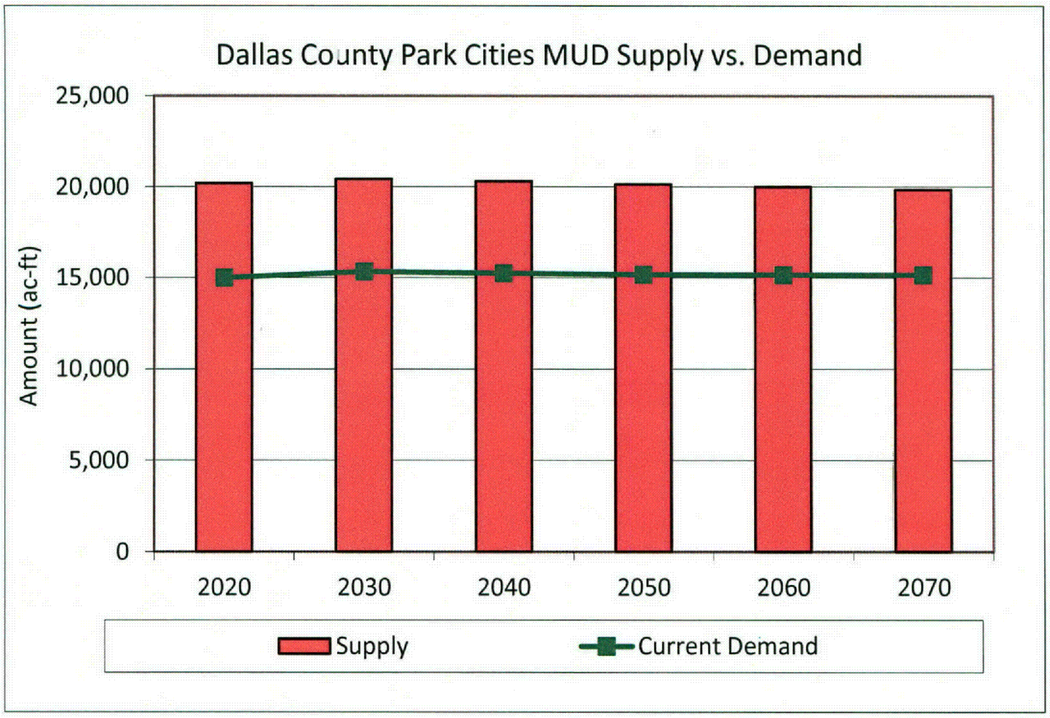


Table H.8
City of Denison
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Denison	6,641	7,251	7,868	8,629	10,158	12,688
Grayson Co Mfg (raw)	736	799	859	910	988	1,072
Grayson Co Other	400	400	400	400	400	400
Pottsboro	362	492	560	560	560	560
Total Demand	**8,139**	**8,942**	**9,687**	**10,499**	**12,106**	**14,720**

Current Supplies (acre-feet/year)	2020	2030	2040	2050	2060	2070
Lake Randell*	1,400	1,400	1,400	1,400	1,400	1,400
Lake Texoma (water right)	24,400	24,400	24,400	24,400	24,400	24,400
Lake Texoma (contracted with GTUA)	12,204	12,204	12,204	12,204	12,204	12,204
Trinity Aquifer	0	0	0	0	0	0
Woodbine Aquifer	121	121	121	121	121	121
Total	**38,125**	**38,125**	**38,125**	**38,125**	**38,125**	**38,125**
WTP capacity	**7,287**	**7,287**	**7,287**	**7,287**	**7,287**	**7,287**
Total supply limited by WTP capacity	**8,144**	**8,207**	**8,267**	**8,318**	**8,396**	**8,480**

Supplies Less Current Demand	**0**	**-736**	**-1,421**	**-2,182**	**-3,711**	**-6,241**

* Denison's water right amount in Lake Randell is 5,280 acre-feet per year. The amount shown in this table is the yield of Lake Randell as calculated by approved TCEQ Water Availability Model (modelled without Texoma Backup). Denison's actual use from Lake Randell is not limited by the amount shown in this table.

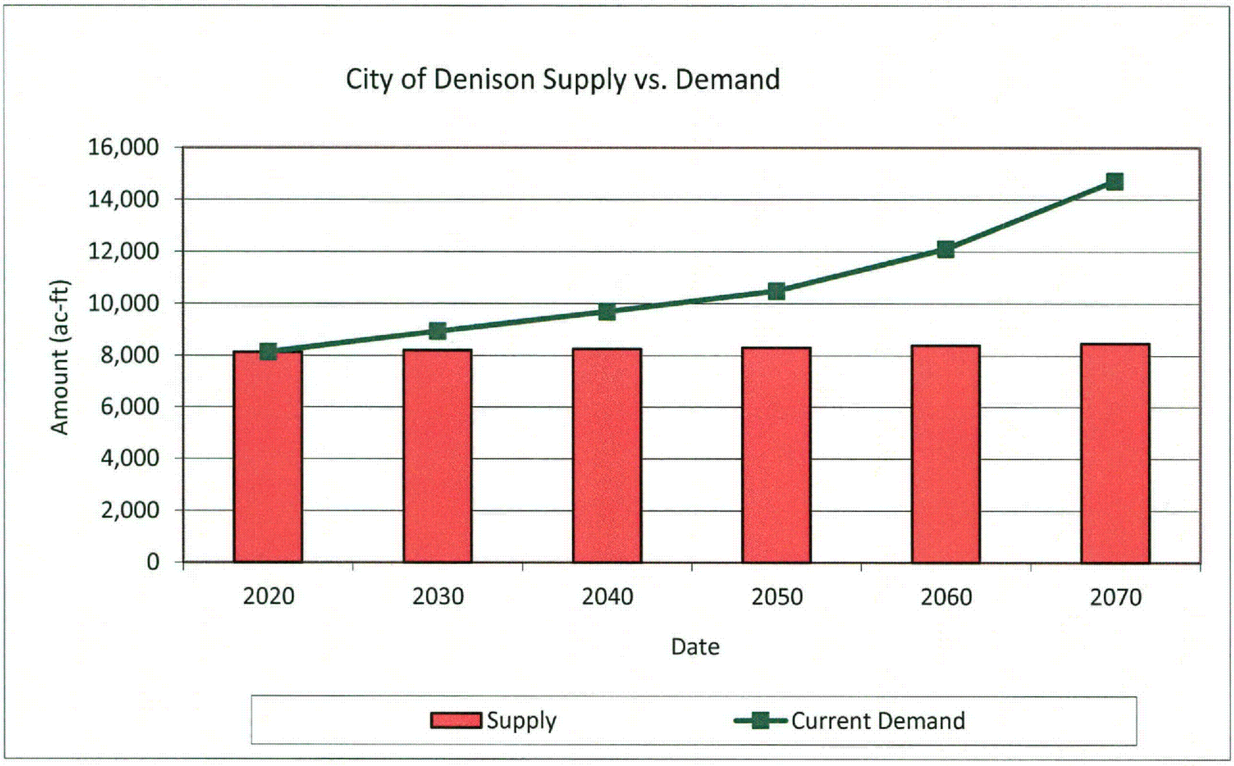


Table H.9
City of Denton
-Values in Acre-Feet per Year-

Demand (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Denton	28,908	37,431	47,013	59,444	81,374	99,143
Denton County Manufacturing (83%)	1,200	1,364	1,530	1,677	1,821	1,978
Denton County SEP	646	733	819	906	993	1,088
Denton County Irrigation (19%)	406	406	406	406	406	406
Total Demand	**31,160**	**39,934**	**49,768**	**62,433**	**84,594**	**102,615**

Current Supplies (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Lake Lewisville	7,817	7,715	7,613	7,512	7,410	7,308
Lake Ray Roberts	18,902	18,733	18,564	18,395	18,226	18,057
Indirect Reuse	6,775	8,729	10,922	12,953	12,818	12,683
DWU	0	2,301	7,735	14,433	27,839	37,545
Direct Reuse (SEP)	646	733	819	906	993	1,088
Direct Reuse (IRR)	406	406	406	406	406	406
Total	**34,546**	**38,617**	**46,059**	**54,605**	**67,692**	**77,087**
WTP capacity	**26,904**	**26,904**	**26,904**	**26,904**	**26,904**	**26,904**
Treated Supply (limited by WTP)	**26,904**	**26,904**	**26,904**	**26,904**	**26,904**	**26,904**
Total supply w/ reuse	**27,956**	**28,043**	**28,129**	**28,216**	**28,303**	**28,398**

Supplies Less Current Demand	**-3,204**	**-11,891**	**-21,639**	**-34,217**	**-56,291**	**-74,217**

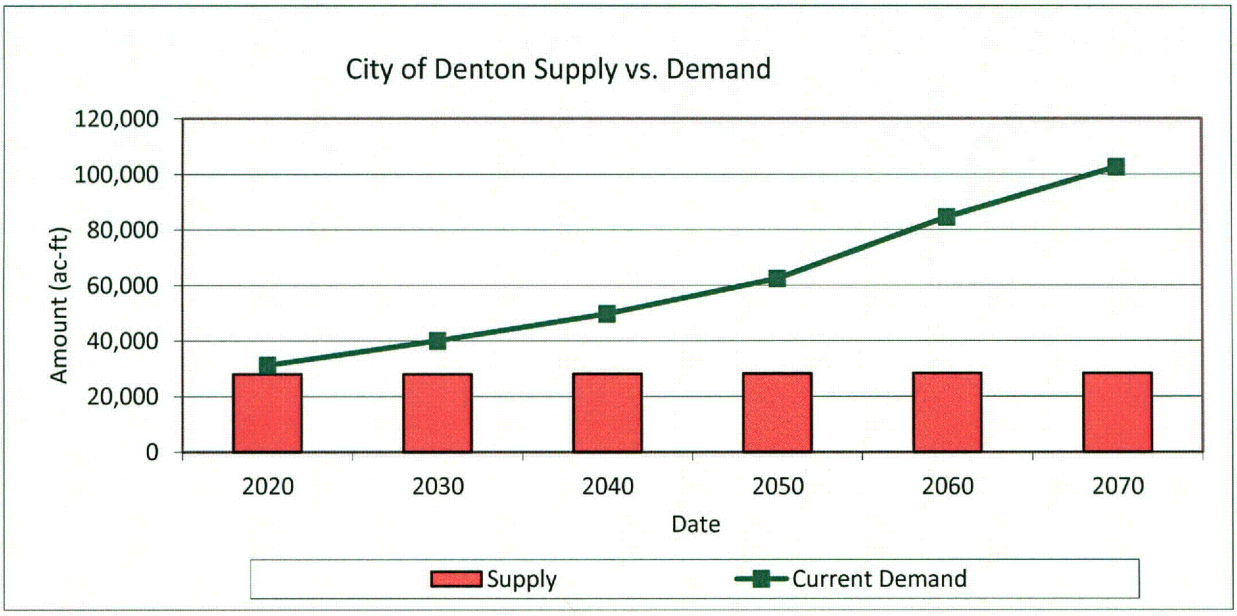


Table H.10
East Cedar Creek FWSD
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
East Cedar Creek FWSD	742	807	980	1,061	1,141	1,221
Payne Springs	72	78	83	91	100	123
Gun Barrel City	944	996	1,053	1,222	1,852	2,957
Total	**1,758**	**1,881**	**2,116**	**2,374**	**3,093**	**4,301**

Current Supply	2020	2030	2040	2050	2060	2070
TRWD Sources (limited by contract)	1,758	1,712	1,702	1,687	1,961	2,434
Total	**1,758**	**1,712**	**1,702**	**1,687**	**1,961**	**2,434**

Supplies Less Current Demands	**0**	**-169**	**-414**	**-687**	**-1,132**	**-1,867**

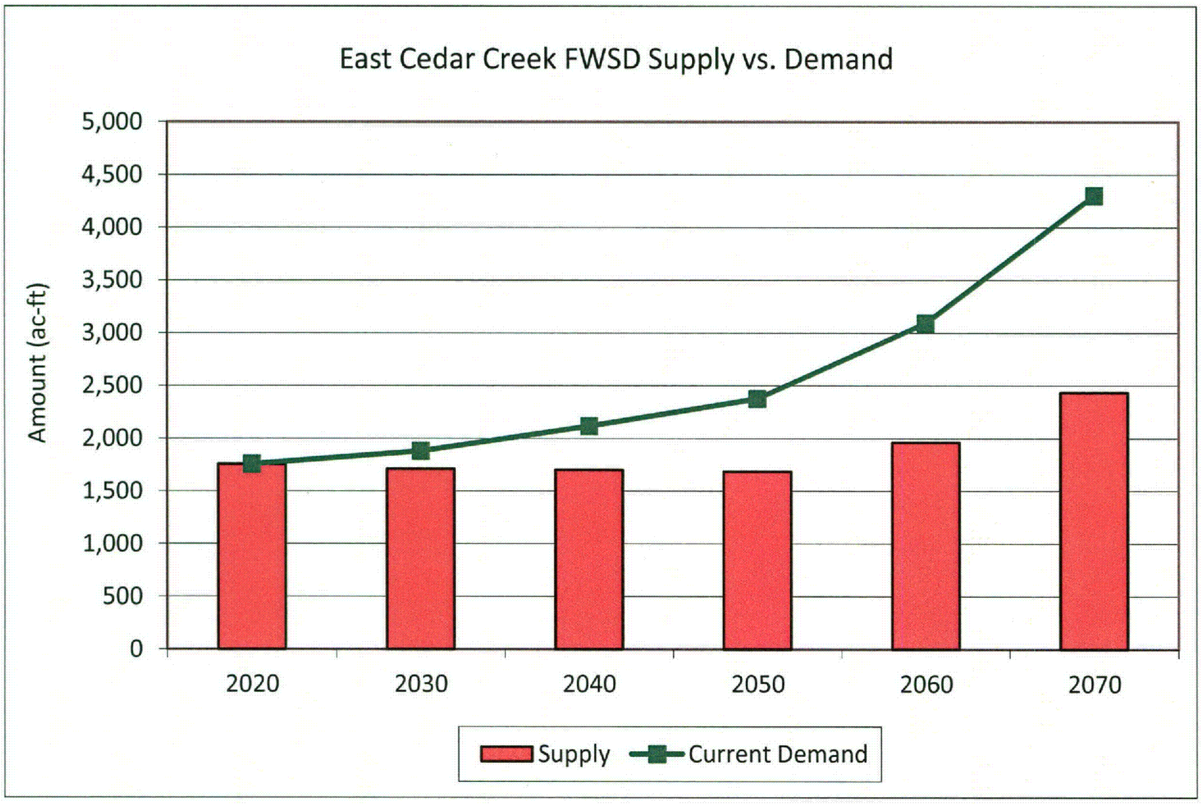


Table H.11
City of Ennis
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
City of Ennis	4,148	4,789	5,447	7,397	11,879	19,748
Garrett	346	438	546	674	827	1,970
Ellis County Other (East Garrett WSC, Community Water Company)	186	191	204	765	1,656	2,911
Rice WSC	50	50	50	50	50	50
Ellis County Manufacturing (10%)	525	540	556	572	572	572
Ellis County Steam Electric Power (Suez, NA Electric Power)	1,401	1,401	1,401	1,401	1,401	1,401
Total	**6,656**	**7,409**	**8,204**	**10,859**	**16,385**	**26,652**

Current Supply	2020	2030	2040	2050	2060	2070
Lake Bardwell (TRA)[(a)]	5,200	5,035	4,801	4,567	4,333	4,296
Direct reuse	909	909	909	909	909	909
Contracted amount from TRWD	*3,991*	*3,991*	*3,991*	*3,991*	*3,991*	*3,991*
Expected Use from TRWD under Current Contract	*379*	*946*	*1,173*	*2,309*	*3,934*	*3,991*
Availability from TRWD	379	946	1,173	2,309	3,934	3,991
Expected Use from Rockett SUD	*17*	*17*	*17*	*17*	*17*	*17*
Availability from Rockett SUD (retail connections)	12	9	8	6	5	3
Total Currently Available Supplies with Availability from TRWD & Rockett Limited by Water Treatment	***6,500***	***6,899***	***6,891***	***7,641***	***7,640***	***7,638***

(a) Ennis has a contract with the Trinity River Authority for 5,20C acre-feet per year. The yield of Bardwell is decreasing over time due to sedimentation, and Ennis' share of the reduced yield is shown here.

Supplies Less Current Demands	**-156**	**-510**	**-1,313**	**-3,218**	**-8,745**	**-19,014**

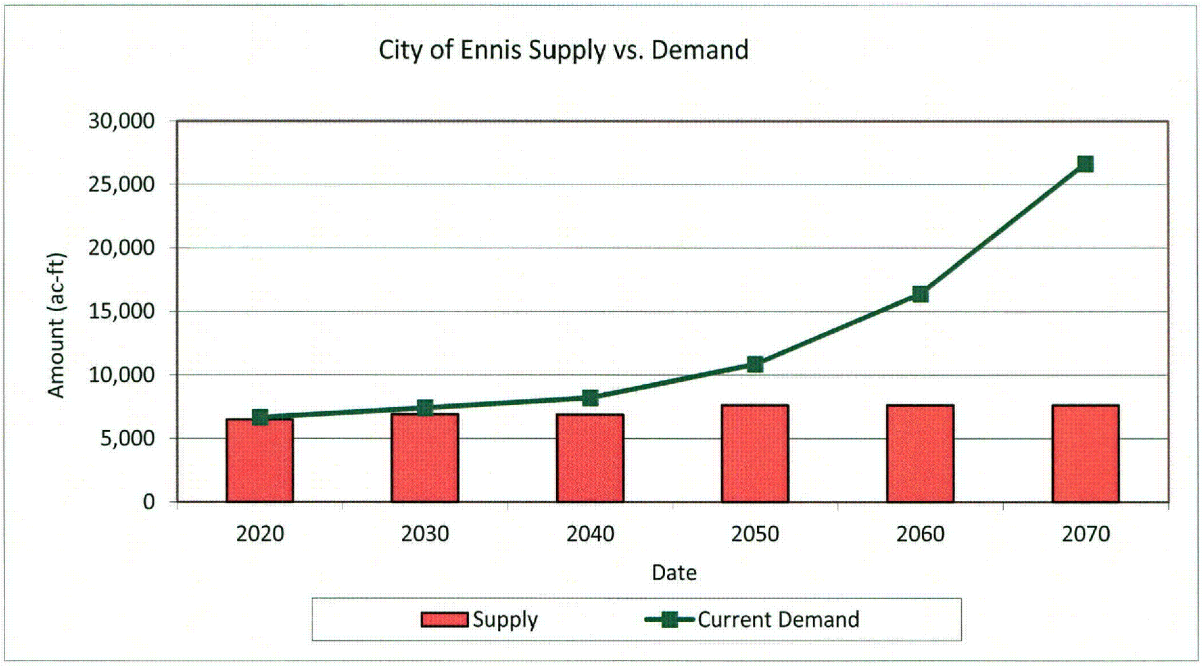


Table H. 12
City of Forney
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Forney	3,191	3,707	4,803	5,817	8,428	11,227
High Point WSC (50%)	239	285	341	409	649	859
McLendon-Chisholm	83	102	124	147	173	201
Talty WSC	1,584	1,801	2,083	2,914	3,693	4,813
Talty	203	251	308	373	517	859
Kaufman County-Other (10%)	174	184	257	395	673	931
(Markout WSC)						
Kaufman County Manufacturing (69%)	561	600	640	685	732	782
Kaufman Co SEP Treated (1 mgd)*	1,121	1,121	1,121	1,121	1,121	1,121
Kaufman CO SEP Raw (remaining demand	6,879	6,879	6,879	6,879	6,879	6,879
Total Demand	**14,035**	**14,930**	**16,556**	**18,740**	**22,865**	**27,672**

*contract limited to 14 mgd

Current Supplies (acre-feet/year)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Treated water from NTMWD	5,560	5,309	6,042	7,150	9,274	10,330
Treated water from NTMWD for SEP	1,033	859	792	746	699	647
Reuse from Garland (SEP only)	6,879	6,879	6,879	6,879	6,879	6,879
Total	**13,471**	**13,047**	**13,713**	**14,775**	**16,852**	**17,857**

Treated Supplies Less Current Demands	**-564**	**-1,883**	**-2,843**	**-3,965**	**-6,013**	**-9,815**
Raw Supplies Less Current Demands	**0**	**0**	**0**	**0**	**0**	**0**

* Forney will provide 100% of Kaufman County SEP demand. 1,121 af/y will be supplied from Treated water from NTWMD (Florida Plant); remaining demand will be supplied by reuse water from Garland.

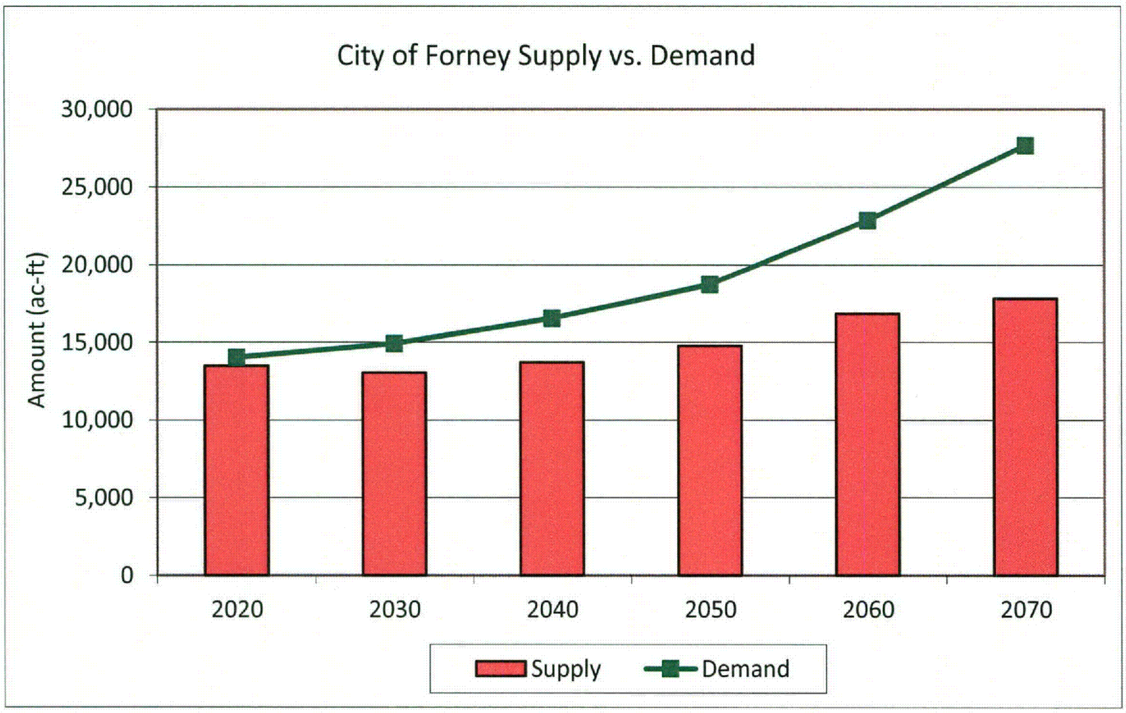


Table H.13
City of Fort Worth
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Fort Worth Municipal	187,763	232,925	284,675	315,508	343,007	370,751
78.5% of Tarrant County Manufacturing (direct or through customers)	16,049	18,550	21,135	23,486	25,479	27,640
Aledo	658	1,114	1,767	1,872	1,991	1,990
Bethesda WSC	1,462	1,869	2,298	2,776	3,303	3,860
Burleson	6,622	7,666	8,759	9,952	11,243	12,604
Crowley	2,107	2,456	2,953	3,591	4,672	5,383
Dallas County Other (DFWIA) partially reuse	801	801	1,002	1,002	1,002	1,002
Dalworthington Gardens	587	597	608	622	641	659
Denton County-Other	0	0	0	0	0	0
Edgecliff	503	491	480	475	474	474
Forest Hill	1,362	1,381	1,448	1,703	2,164	2,817
Grand Prairie	2,803	2,803	2,803	2,803	2,803	2,803
Haltom City	5,285	5,226	5,308	5,670	6,093	6,640
Haslet	469	581	673	1,526	2,159	2,476
Hurst	6,012	6,003	5,864	5,788	5,774	5,774
Keller	12,182	12,981	12,906	12,862	12,847	12,846
Kennedale	368	543	795	864	916	916
Lake Worth	792	903	1,018	1,222	1,491	2,156
North Richland Hills	8,489	8,917	8,781	8,706	8,691	8,689
Watauga	2,899	2,794	2,707	2,659	2,650	2,650
Northlake	163	711	1,326	1,853	2,380	2,380
Denton Co Manf (1%)	14	16	18	20	22	24
Richland Hills	906	943	986	1,130	1,271	1,458
Roanoke	2,263	2,807	3,356	3,350	3,348	3,348
Saginaw	3,148	3,503	3,876	4,059	4,052	4,051
Sansom Park Village	0	0	14	39	72	105
Southlake (Tarrant & Denton Co)	11,501	12,865	15,005	17,178	19,392	21,642
Tarrant County Other	4,566	4,427	4,314	7,798	10,742	15,177
Tarrant County Other (DFWIA) partially reuse	801	801	1,001	1,001	1,001	1,001
Trophy Club	5,525	6,094	6,075	6,064	6,061	6,060
Westlake	1,388	2,078	3,007	3,623	4,242	4,850
Westover Hills	952	972	992	1,013	1,036	1,058
Westworth Village	395	417	441	468	499	530
White Settlement	1,041	1,068	1,106	1,432	2,092	2,758
Pantego (Future)	0	31	30	30	30	30
Willow Park (Future)	2	147	317	726	1,167	1,609
Arlington (reuse)	178	178	178	178	178	178
Euless (reuse)	368	368	368	368	368	368
Tarrant County Irrigation (reuse)	2,000	2,000	2,000	2,000	2,000	2,000
Total	**292,423**	**348,026**	**410,390**	**455,416**	**497,352**	**540,757**

Table H.13
City of Fort Worth
-Values in Acre-Feet per Year-

Current Supplies	2020	2030	2040	2050	2060	2070
TRWD Raw Water	275,830	297,042	307,638	303,755	296,564	288,536
Water Treatment Capacity (497 mgd Total)	278,569	278,569	278,569	278,569	278,569	278,569
TRWD Limited by Treatment	275,830	278,569	278,569	278,569	278,569	278,569
Waterchase Golf Course Direct Reuse	897	897	897	897	897	897
Village Creek Direct Reuse	3,469	3,526	3,526	3,526	3,526	3,526
Total Supply	**280,196**	**282,992**	**282,992**	**282,992**	**282,992**	**282,992**
Supplies Less Current Demands	**-12,227**	**-65,035**	**-127,398**	**-172,425**	**-214,360**	**-257,766**

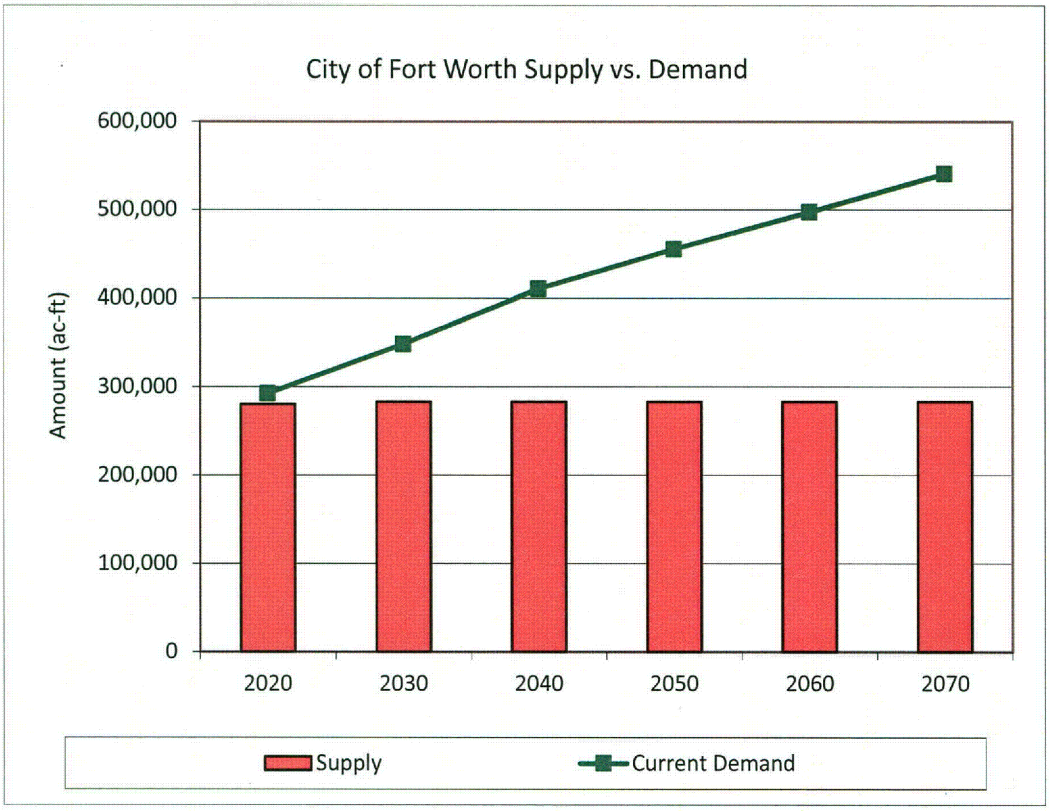


Table H.14
City of Gainesville
-Values in Acre-Feet per Year-

Demand (Acre-Feet/Year)	2020	2030	2040	2050	2060	2070
Gainesville	2,492	2,589	2,659	2,755	3,338	4,663
Bolivar WSC	0	50	75	100	125	150
Cooke County Other	162	138	0	129	369	2,306
Kiowa Homeowners WSC	0	100	100	100	100	100
Lindsay	0	0	0	2	146	447
Mountain Springs WSC	0	0	0	0	296	776
Valley View	0	4	7	10	12	15
Woodbine WSC	0	50	111	181	258	337
Cooke County Irrigation	75	75	75	75	75	75
Cooke County Manufacturing	192	213	234	252	276	302
Cooke County Mining	684	83	7	72	134	206
TOTAL Demand on Gainesville	**3,605**	**3,302**	**3,268**	**3,676**	**5,129**	**9,377**

Current Supplies (Acre-Feet/Year)	2020	2030	2040	2050	2060	2070
Moss Lake (limited to capacity)	2,242	2,242	2,242	2,242	2,242	2,242
Direct Reuse	9	9	9	9	9	9
Trinity Aquifer	2,104	2,104	2,104	2,104	2,104	2,104
Supply Limited by Capacity	**4,355**	**4,355**	**4,355**	**4,355**	**4,355**	**4,355**

Supplies Less Current Demands	**750**	**1,053**	**1,087**	**679**	**-774**	**-5,022**

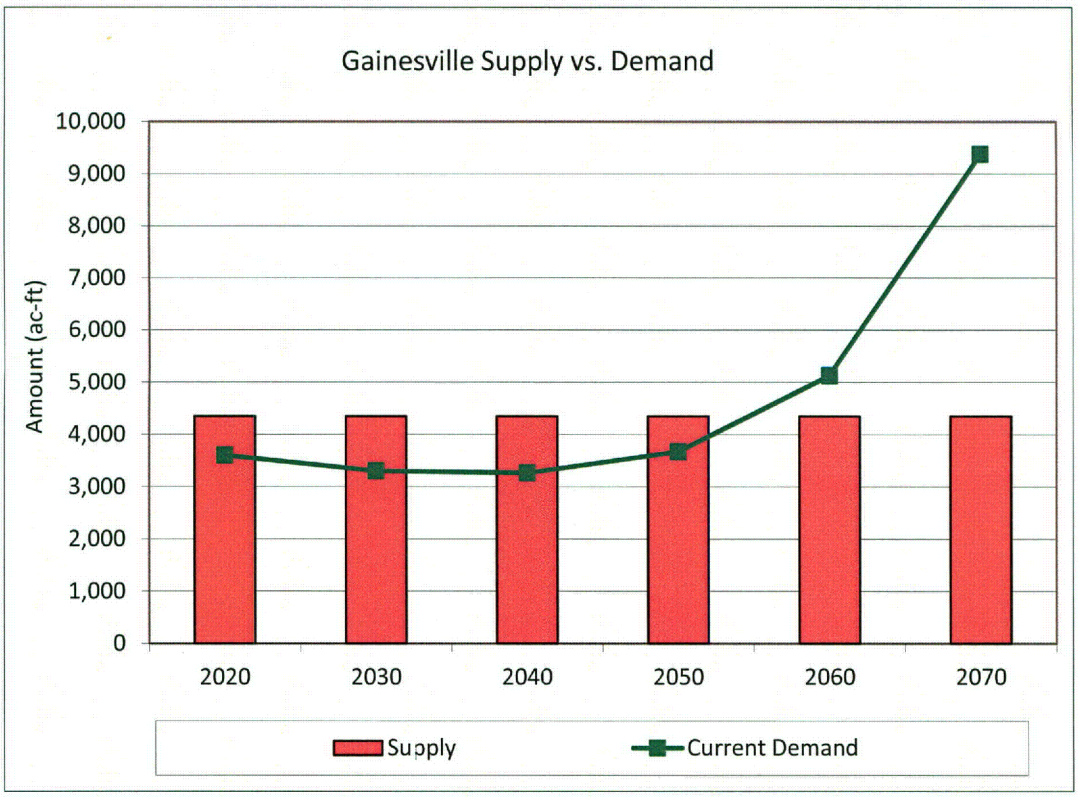


Table H.15
City of Garland
-Values in Acre-Feet per Year-

Demand (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Garland	37,871	38,007	37,508	37,102	37,037	37,060
Dallas County Manufacturing (9%)	3,401	3,703	3,979	4,203	4,228	4,254
Collin County SEP (Ray Olinger Plant)	715	602	740	594	782	724
Forney (reuse sales)	8,979	8,979	8,979	8,979	8,979	8,979
Total Demand	**50,966**	**51,291**	**51,206**	**50,878**	**51,026**	**51,017**

Current Supplies (Acre-feet/year)	2020	2030	2040	2050	2060	2070
NTMWD	38,683	32,422	29,823	27,893	26,233	24,277
Reuse (raw water) (from Garland)	8,979	8,979	8,979	8,979	8,979	8,979
Total Supply	**47,662**	**41,401**	**38,802**	**36,872**	**35,212**	**33,256**

Supplies Less Current Demands	**-3,304**	**-9,890**	**-12,404**	**-14,006**	**-15,814**	**-17,761**

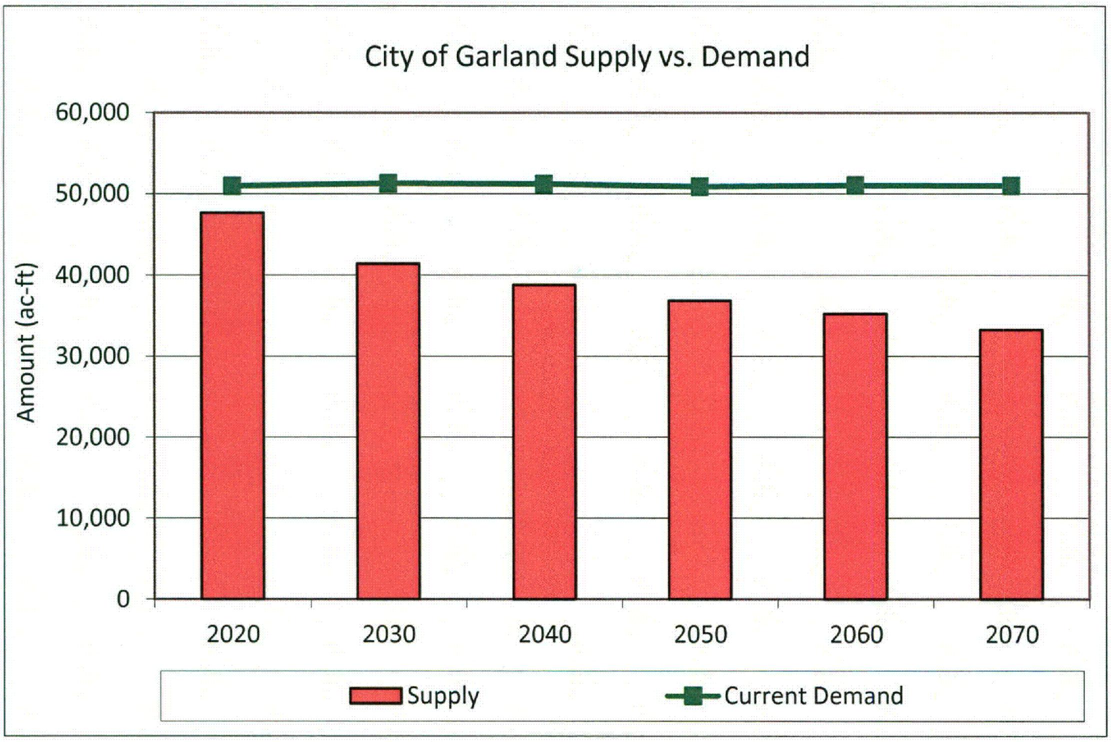


Table H.16
City of Grand Prairie
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Grand Prairie	35,194	40,815	44,164	43,910	43,850	43,845
Johnson County SUD	6,726	6,726	6,726	6,726	6,726	6,726
Dallas County Irrigation (golf course)	300	300	300	300	300	300
Dallas County Manufacturing	1,121	1,121	1,121	1,121	1,121	1,121
Tarrant County Manufacturing (1.5%)	307	354	404	449	487	528
Total Demand	**43,648**	**49,316**	**52,715**	**52,506**	**52,484**	**52,520**

Current Supply	2020	2030	2040	2050	2060	2070
Trinity Aquifer	4,200	4,200	4,200	4,200	4,200	4,200
Joe Pool Lake (raw water)	300	300	300	300	300	300
Fort Worth	2,752	2,260	1,916	1,725	1,579	1,451
Midlothian (Joe Pool)	3,363	3,363	3,363	3,363	3,363	3,363
Mansfield (TRWD)	3,363	3,363	3,363	3,146	2,841	2,573
Arlington (TRWD)	0	0	0	0	0	0
DWU	23,966	26,712	26,052	23,869	21,938	20,918
Total	**37,944**	**40,198**	**39,194**	**36,603**	**34,221**	**32,805**

Supplies Less Current Demands	**-5,704**	**-9,118**	**-13,521**	**-15,903**	**-18,263**	**-19,715**

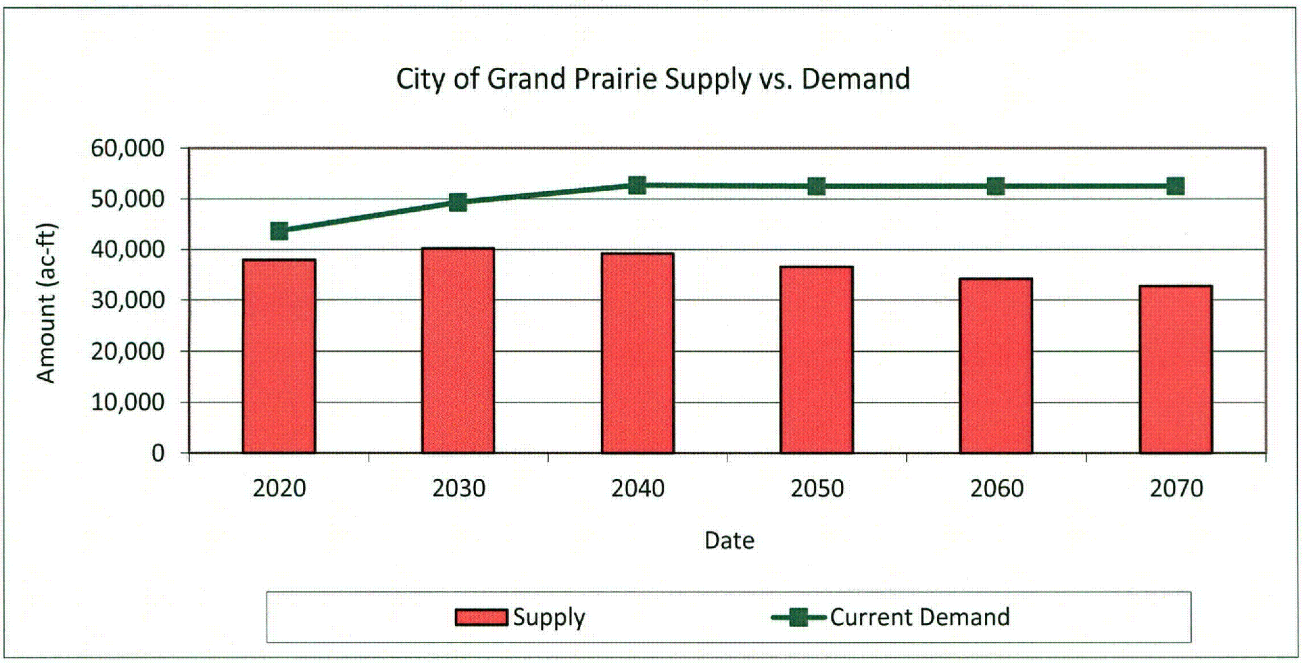


Table H.17
Greater Texoma Utility Authority
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Sherman	5,171	5,509	6,556	8,369	12,360	19,428
Grayson County Manufacturing (net of thru Howe)	3,679	3,997	4,297	4,548	4,938	5,361
Grayson County Steam Electric	6,163	6,163	6,163	6,163	6,163	6,163
Bells	0	24	48	79	413	608
Grayson County Other	2,197	2,197	2,197	2,197	2,197	3,481
Gunter	0	118	269	421	575	730
Kentucky Town WSC	0	0	100	100	100	100
Luella WSC	0	0	200	200	300	300
Marilee SUD	250	250	250	250	250	250
South Grayson WSC (net of thru CGMA)	100	100	100	100	100	100
Southmayd	0	0	50	50	75	100
Tioga	0	5	12	20	325	489
Tom Bean	0	23	46	75	137	316
Whitewright	0	0	50	50	100	100
Subtotal Sherman	**17,560**	**18,386**	**20,338**	**22,622**	**28,033**	**37,526**
Grayson County Water Supply Project - Plant North of Pottsboro						
Grayson County Other	0	200	300	400	500	600
Pottsboro (net of thru Denison)	0	0	62	288	935	2,232
Subtotal North	**0**	**200**	**362**	**688**	**1,435**	**2,832**
Grayson County Water Supply Project - Northwest Plant						
Collinsville	0	43	96	159	271	424
Grayson County Other	0	560	560	560	560	560
Two Way SUD	0	174	350	558	964	1,380
Whitesboro	0	0	0	0	13	179
Subtotal Northwest	**0**	**777**	**1,006**	**1,277**	**1,808**	**2,543**
Other Grayson County						
Pottsboro Through Denison	362	492	560	560	560	560
Grayson County Steam Electric	0	6,548	6,548	6,548	6,548	6,548
Fannin County Steam Electric	0	9,000	9,000	9,000	9,000	9,000
Subtotal Other	**362**	**16,040**	**16,108**	**16,108**	**16,108**	**16,108**
Grayson Co. WSP and Other Grayson County	17,922	35,403	37,814	40,695	47,384	59,009

Table H.17
Greater Texoma Utility Authority
-Values in Acre-Feet per Year-

Collin-Grayson Municipal Alliance

Anna	976	1,268	2,666	3,904	8,245	12,898
Howe	5	36	70	108	150	192
Melissa	773	1,371	2,107	5,731	10,052	15,454
South Grayson WSC	0	0	0	0	0	0
Van Alstyne	0	91	183	294	1,820	2,726
Grayson County Manf (Howe)	49	53	57	61	66	71
Subtotal CGMA	**1,803**	**2,819**	**5,083**	**10,098**	**20,333**	**31,341**

Total Demand	**19,725**	**38,222**	**42,897**	**50,793**	**67,717**	**90,350**
Total Demand - Raw Water	**6,163**	**21,711**	**21,711**	**21,711**	**21,711**	**21,711**
Total Demand - Treated Water	**11,759**	**13,692**	**16,103**	**18,984**	**25,673**	**37,298**
Total Demand - NTMWD Water	**1,803**	**2,819**	**5,083**	**10,098**	**20,333**	**31,341**

Current Supplies (Acre-Feet/Year)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Lake Texoma potable	11,210	11,210	11,210	11,210	11,210	11,210
Available Lk Texoma Raw*	71,990	71,990	71,990	71,990	71,990	71,990
Supply for Pottsboro (from Denison)	362	492	560	560	560	560
Collin-Grayson MA (from NTMWD)	1,661	2,160	3,375	5,400	5,400	5,400
Potable Water Available	**13,233**	**13,862**	**15,145**	**17,170**	**17,170**	**17,170**
Total Current Supplies	**85,223**	**85,852**	**87,135**	**89,160**	**89,160**	**89,160**

* Additional facilities are required to utilize this water

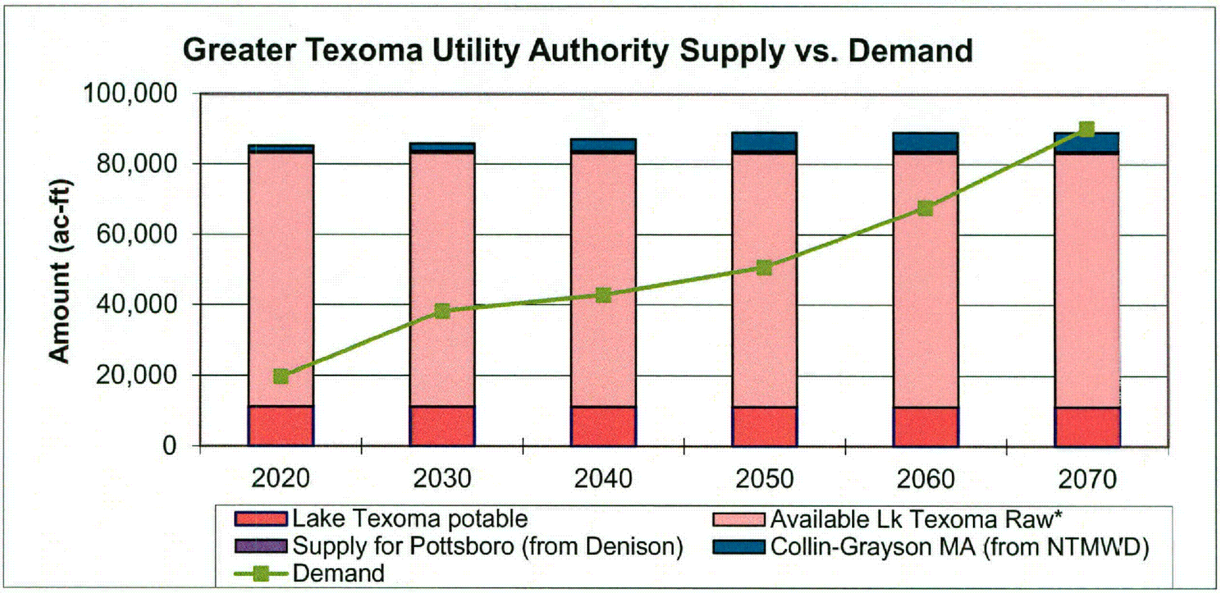


Table H.18
Lake Cities Municipal Utilitiy Authority
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Lake Dallas	1,096	1,181	1,339	1,329	1,326	1,326
Hickory Creek	583	709	865	1,078	1,076	1,076
Shady Shores	461	516	511	508	507	506
Total	**2,140**	**2,406**	**2,715**	**2,915**	**2,909**	**2,908**

Current Supplies	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
UTRWD	1,785	1,642	1,492	1,299	1,169	1,024
Trinity Aquifer	355	355	355	355	355	355
Total	**2,140**	**1,997**	**1,847**	**1,654**	**1,524**	**1,379**

Supplies Less Current Demands	**0**	**-409**	**-868**	**-1,261**	**-1,385**	**-1,529**

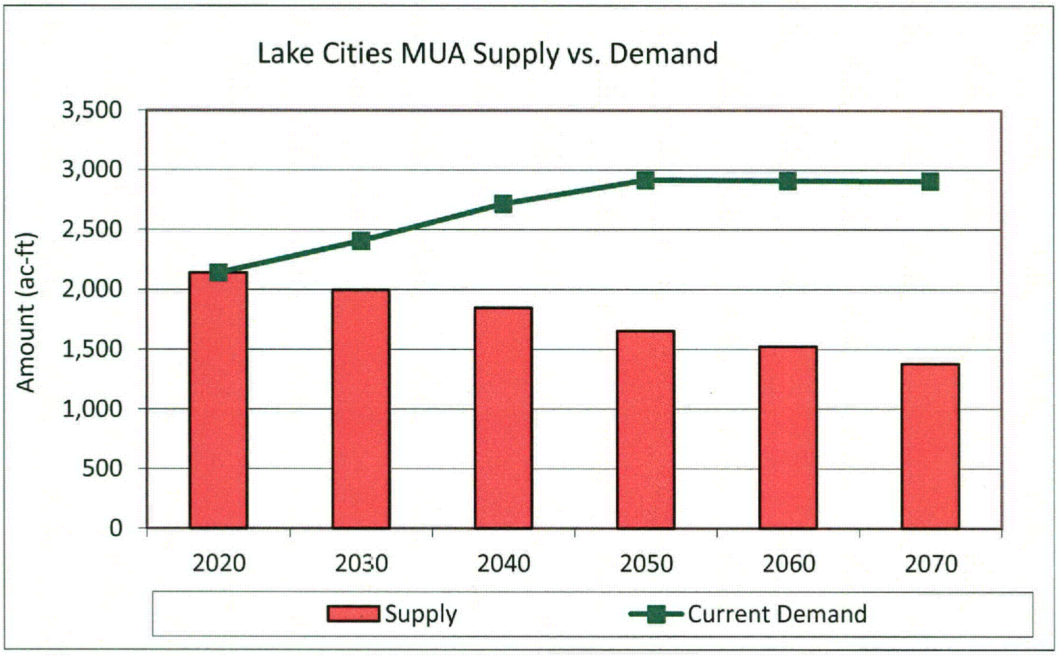


Table H.19
City of Mansfield
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Mansfield Municipal	19,728	23,075	27,815	36,508	42,240	48,412
2% of Tarrant Co. Manufacturing	409	473	538	598	649	704
Sale to Grand Prairie (Maximum)	6,726	6,726	6,726	6,726	6,726	6,726
Sale to Johnson County SUD (Maximum)	10,089	10,089	10,089	10,089	10,089	10,089
Total	**36,952**	**40,363**	**45,168**	**53,921**	**59,704**	**65,931**

Current Supply	2020	2030	2040	2050	2060	2070
TRWD *	25,223	25,223	25,223	25,223	25,223	25,223
Total	**25,223**	**25,223**	**25,223**	**25,223**	**25,223**	**25,223**

* Limited by WTP Capacity

Supplies Less Current Demands	**-11,730**	**-15,141**	**-19,946**	**-28,699**	**-34,482**	**-40,709**

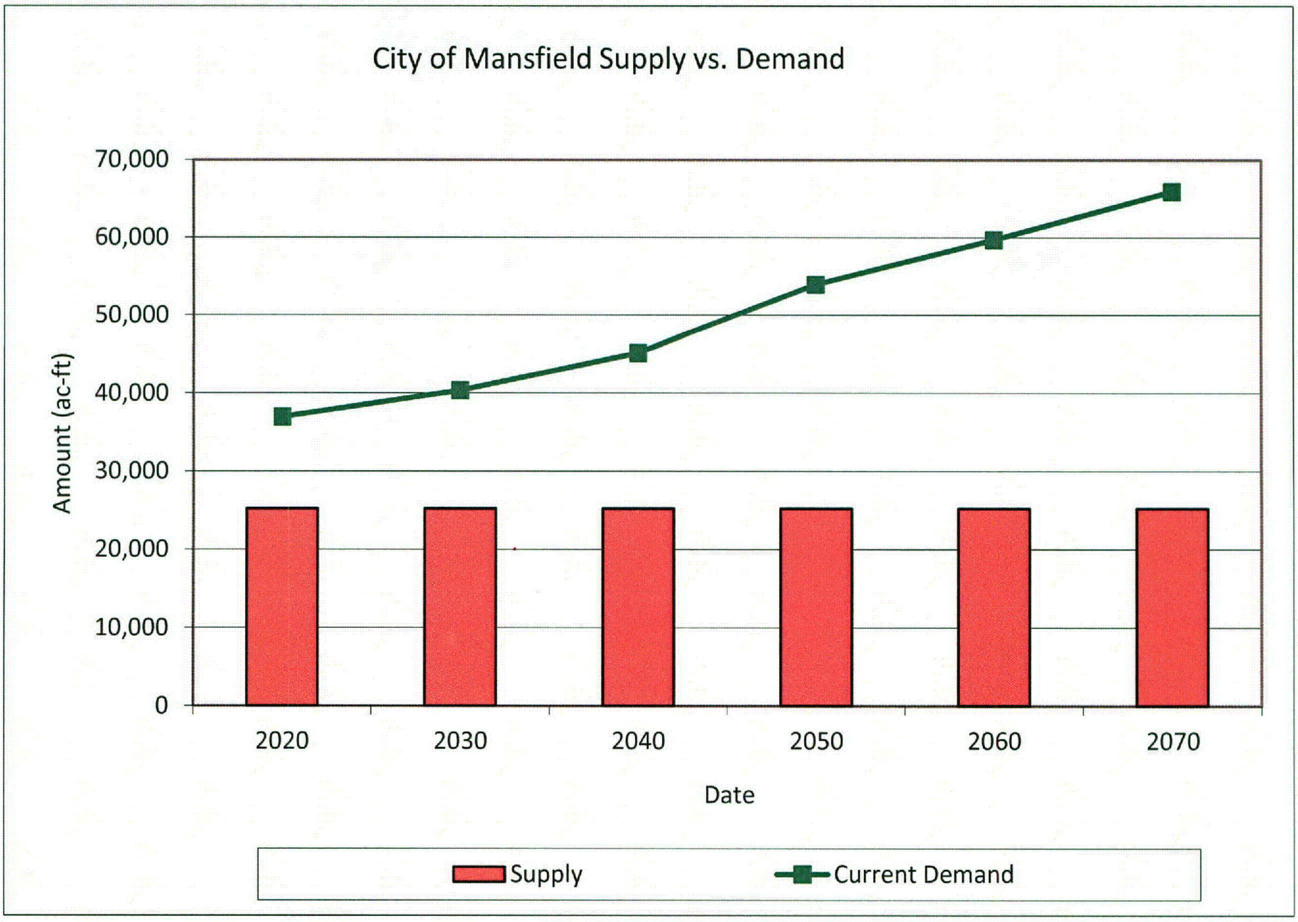


Table H.20
City of Midlothian
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Midlothian	4,198	5,429	7,069	8,589	9,956	10,995
Mountain Peak SUD	414	852	1,370	1,983	2,714	3,563
Ellis County-Manufacturing (40%)	262	270	278	286	286	286
Ellis County Steam Electric Power	224	224	224	224	224	224
Grand Prairie	3,363	3,363	3,363	3,363	3,363	3,363
Rockett SUD	2,242	2,242	2,242	2,242	2,242	2,242
Venus	429	519	615	724	842	971
Sardis-Lone Elm	1121	1121	1121	1121	1121	1121
Total Demand	**12,253**	**14,020**	**16,282**	**18,532**	**20,748**	**22,765**

Current Supplies	2020	2030	2040	2050	2060	2070
Trinity Aquifer	0	0	0	0	0	0
Joe Pool Lake (TRA)	5,833	5,712	5,591	5,470	5,349	5,229
Joe Pool from Grand Prairie	0	0	0	0	0	0
TRA (through TRWD - Cedar Creek/Richland Chambers System)	4,870	6,069	7,204	7,973	8,518	8,739
Total	**10,703**	**11,781**	**12,795**	**13,443**	**13,867**	**13,968**
WTP capacity						
Supply w/ Joe Pool WTP lmts	**5,833**	**5,712**	**5,591**	**5,470**	**5,349**	**5,229**
Supply w/ TRWD WTP lmts	**4,870**	**5,045**	**5,045**	**5,045**	**5,045**	**5,045**
Total Supply	**10,703**	**10,757**	**10,636**	**10,515**	**10,394**	**10,274**

Supplies Less Current Demands	**-1,550**	**-3,263**	**-5,646**	**-8,017**	**-10,354**	**-12,491**

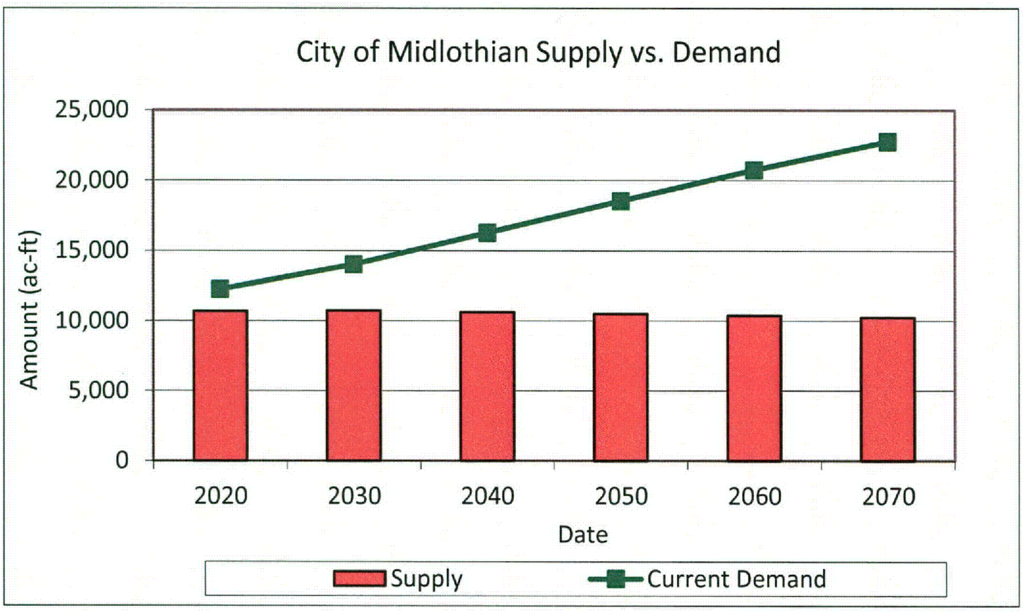


Table H.21
Mustang SUD
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Mustang SUD	1,875	3,527	5,190	6,856	8,526	10,196
Cross Roads	457	619	756	755	754	754
Krugerville	263	315	368	435	434	434
Oak Point	789	1,334	1,885	2,440	2,995	2,994
Paloma Creek	2,562	3,472	3,470	3,468	3,465	3,464
Providence Village WCID	938	931	929	927	926	925
Denton County FWSD #10	298	1,956	1,956	1,956	1,956	1,956
Total	**7,182**	**12,154**	**14,554**	**16,837**	**19,056**	**20,723**

Current Supply	2020	2030	2040	2050	2060	2070
Trinity Aquifer	1,104	1,104	1,104	1,104	1,104	1,104
Woodbine Aquifer	71	71	71	71	71	71
UTRWD Sources	6,007	8,734	8,357	7,800	7,957	7,607
Total	**7,182**	**9,909**	**9,532**	**8,975**	**9,132**	**8,782**

Supplies Less Current Demands	**0**	**-2,245**	**-5,022**	**-7,862**	**-9,924**	**-11,941**

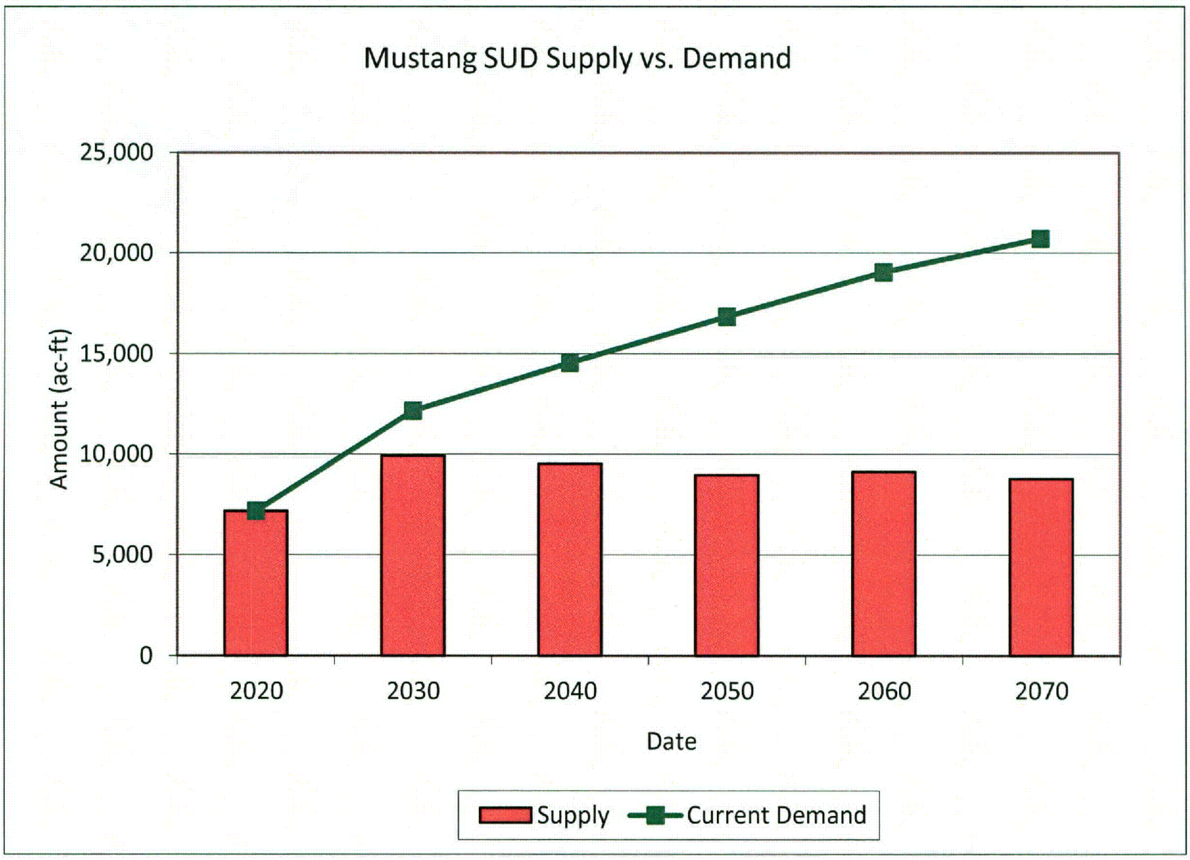


Table H.22
City of North Richland Hills
-Values in Acre-Feet per Year-

Demand (Acre-Feet/year)	2020	2030	2040	2050	2060	2070
North Richland Hills	12,733	13,375	13,172	13,059	13,036	13,034
Watauga	2,899	2,794	2,707	2,659	2,650	2,650
Total Demand	**15,632**	**16,169**	**15,879**	**15,718**	**15,686**	**15,684**

Current Supplies (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Trinity Aquifer	0	0	0	0	0	0
TRA (TRWD Sources)	4,244	4,058	3,532	3,094	2,755	2,459
Fort Worth (TRWD Sources) (infrastructure limit of 6,053 af/y)	6,053	6,053	6,053	6,053	6,053	5,872
Total Currently Available Supplies Limited by Infrastructure Capacity	**10,297**	**10,111**	**9,585**	**9,147**	**8,808**	**8,331**

Supplies Less Current Demands	**-5,335**	**-6,058**	**-6,294**	**-6,571**	**-6,878**	**-7,353**

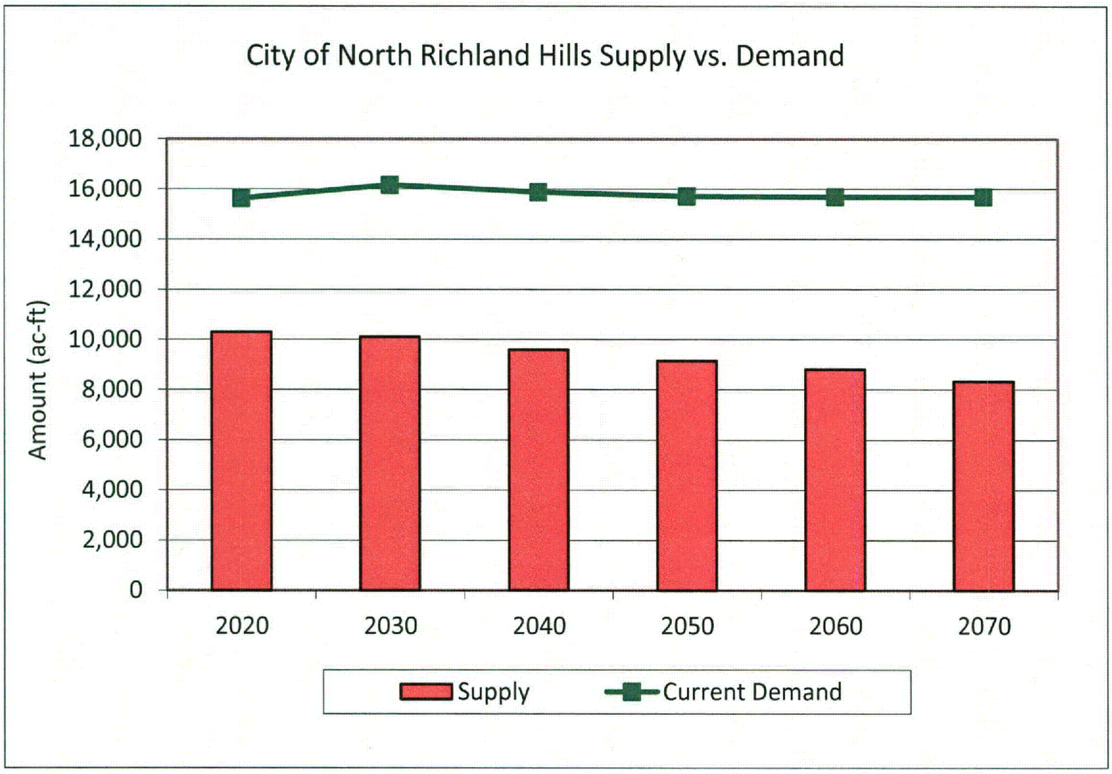


Table H.23
North Texas Municipal Water District
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Ables Springs WSC	383	494	630	796	1,006	1,271
Allen	20,533	20,336	20,215	20,139	20,108	20,106
Anna	976	1,268	2,666	3,904	8,245	12,898
Blackland WSC	678	712	754	800	857	918
Bonham	2,024	2,506	3,393	4,598	5,663	6,883
BHP WSC (Hunt Co portion)	342	371	429	454	438	387
Caddo Basin SUD	986	1,219	1,586	2,071	2,736	3,659
Cash SUD	2,466	2,466	2,466	2,466	2,466	2,466
College Mound WSC	790	989	1,218	1,481	2,017	2,554
Collin Co. Other	953	929	911	3,833	5,610	9,171
Copeville SUD	319	376	452	596	1,037	1,773
Crandall	779	955	1,162	1,397	1,396	1,395
Culleoka WSC	328	370	605	740	807	1,009
Denton County Other	1,800	1,800	1,800	1,800	1,800	1,800
East Fork SUD	572	721	891	1,081	1,293	1,520
Fairview	4,644	5,329	7,094	7,087	7,084	7,083
Farmersville	958	2,310	2,299	2,293	2,291	2,291
Fate	1,731	2,457	3,291	4,135	5,079	7,797
Forney	3,191	3,707	4,803	5,817	8,428	11,227
Forney Lake WSC	896	1,108	1,355	1,639	2,694	3,824
Frisco	39,355	51,015	61,637	61,574	61,530	61,517
Garland	37,871	38,007	37,508	37,102	37,037	37,060
Gastonia-Scurry SUD	601	762	947	1,160	1,448	1,226
Hackberry	309	394	498	615	752	908
Heath	3,945	7,839	7,826	7,818	7,816	7,815
High Point WSC	477	569	681	817	1,298	1,718
Howe	5	36	70	108	150	192
Hunt County Other	274	371	514	726	1,052	1,547
Josephine	278	424	573	722	722	722
Kaufman	990	1,184	1,442	2,151	2,777	3,406
Kaufman County Other	362	408	991	2,127	4,452	6,607
Lavon	559	711	1,081	1,392	3,125	7,025
Lavon WSC	590	711	881	1,152	2,007	3,897
Little Elm	4,108	4,600	4,586	4,574	4,564	4,564
Lowry Crossing	222	257	308	306	305	305
Lucas	2,132	2,406	3,165	3,528	3,896	3,896
McKinney	34,365	40,877	59,112	76,866	76,818	76,814
McLendon-Chisolm	330	406	495	587	691	802
Melissa	1,334	1,932	2,668	6,292	10,613	16,015
Mesquite	22,344	23,858	26,361	28,441	30,667	32,947
Milligan WSC	163	156	152	883	1,327	2,217

Table H.23
North Texas Municipal Water District
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Mt. Zion WSC	395	485	589	698	822	954
Murphy	5,285	5,253	5,238	5,228	5,222	5,220
Nevada	96	112	133	528	1,316	2,368
North Collin WSC	782	871	987	1,117	1,279	1,464
New Hope	119	143	174	209	251	299
Oak Grove	75	88	103	157	212	422
Parker	2,561	6,772	8,454	8,450	8,449	8,449
Plano	69,020	70,608	73,054	73,153	73,059	73,059
Post Oak Bend City	93	113	134	205	276	550
Princeton	974	1,236	1,566	3,679	5,798	7,919
Prosper	5,322	8,355	11,405	14,457	17,511	17,509
RCH WSC	540	536	534	532	900	912
Richardson	26,328	26,676	27,364	28,016	27,979	27,978
Rockwall	8,914	11,049	13,526	16,057	18,911	21,947
Rockwall Co. Other	28	28	28	28	986	2,227
Rose Hill SUD	456	546	656	789	1,033	1,586
Rowlett	9,870	10,484	10,348	10,270	10,249	10,248
Royse City	1,261	1,746	2,628	5,065	8,948	10,089
Sachse	5,179	5,124	5,091	5,071	5,064	5,062
Saint Paul	265	298	322	334	348	347
Scurry	59	71	85	129	182	404
Seis Lagos UD	603	598	596	594	594	594
Sunnyvale	2,357	3,332	4,313	4,968	5,958	5,957
Talty	305	377	462	560	775	1,289
Talty WSC	1,584	1,801	2,083	2,914	3,693	4,813
Terrell	4,035	7,143	8,638	10,670	12,372	14,353
The Colony	1,200	2,000	2,200	2,400	2,600	2,800
Van Alstyne	0	91	183	294	1,820	2,726
Wylie	7,308	8,052	8,552	8,954	9,230	9,519
Wylie Northeast SUD	257	319	396	785	1,305	2,086
Non-Municipal Customers						
Collin County Manufacturing	3,283	3,694	4,103	4,471	4,854	5,270
Collin County Irrigation (Demand for Rowlett Creek & Stewart Creek Reuse Projects)	0	0	0	0	0	0
Collin County Mining	0	0	0	0	0	0
Dallas County Manufacturing	3,779	4,115	4,421	4,670	4,698	4,726
Dallas County Steam Electric	0	0	0	0	0	0
Denton County Manufacturing	72	82	92	101	110	119
Fannin County Manufacturing	88	97	106	114	124	135
Grayson County Manufacturing	49	53	57	61	66	71
Kaufman County Irrigation	0	0	0	0	0	0

Table H.23
North Texas Municipal Water District
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Kaufman County Manufacturing	813	869	928	993	1,061	1,134
Kaufman County Steam Electric	1,121	1,121	1,121	1,121	1,121	1,121
Rockwall County Irrigation	97	97	97	97	97	97
Rockwall County Manufacturing	35	40	45	50	55	61
Total	**360,571**	**411,821**	**470,328**	**524,057**	**573,430**	**627,116**
Potential Future Customers	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**

Blue Ridge	0	111	312	1,382	3,191	5,431
Celina	0	1,500	3,000	5,000	5,000	5,000
Ector	0	47	51	56	64	73
Fannin County Other	399	611	614	1,096	3,260	5,753
Honey Grove	0	188	244	241	241	241
Leonard	0	152	198	216	247	282
Savoy	0	32	44	48	56	65
South Grayson WSC	0	0	0	0	0	0
Southwest Fannin Co SUD	0	343	442	557	797	1,073
Trenton	0	93	523	955	1,301	1,647
Weston	0	839	4,648	11,658	18,613	18,611
Kaufman County Mining	0	0	0	0	3	171
Fannin County Mining	56	56	56	56	56	56
Total	455	3,972	10,132	21,265	32,829	38,403
Total Treated Water Demands	361,026	415,793	480,460	545,322	606,259	665,519
Losses in Treatment & Delivery	18,051	20,790	24,023	27,266	30,313	33,276
Collin Co Steam Elec raw water	715	602	740	594	782	724
Total Demand	**379,792**	**437,185**	**505,223**	**573,182**	**637,354**	**699,519**

Current Supply	2020	2030	2040	2050	2060	2070
Lake Lavon	86,500	85,900	85,300	84,700	84,100	83,500
Lake Texoma	70,623	70,623	70,623	70,623	70,623	70,623
Lake Chapman	41,172	40,982	40,792	40,602	40,412	40,222
Wilson Creek Reuse	47,418	56,386	63,785	71,882	71,882	71,882
Lake Bonham	2,511	3,195	3,195	3,195	3,195	3,195
East Fork Reuse (with Ray Hubbard Pass through)	47,802	62,977	75,524	87,291	97,655	100,890
Interim GTUA	0	0	0	0	0	0
Upper Sabine Basin	50,707	10,629	10,550	10,472	10,394	10,315
Direct Reuse for Irrigation (Collin & Rockwall Co)	2,519	2,519	2,519	2,519	2,519	2,519
Total Supply	**349,252**	**333,211**	**352,288**	**371,284**	**380,780**	**383,146**

Supplies Less Current Demands	**-30,540**	**-103,975**	**-152,935**	**-201,898**	**-256,574**	**-316,373**

Table H.23
North Texas Municipal Water District
-Values in Acre-Feet per Year-

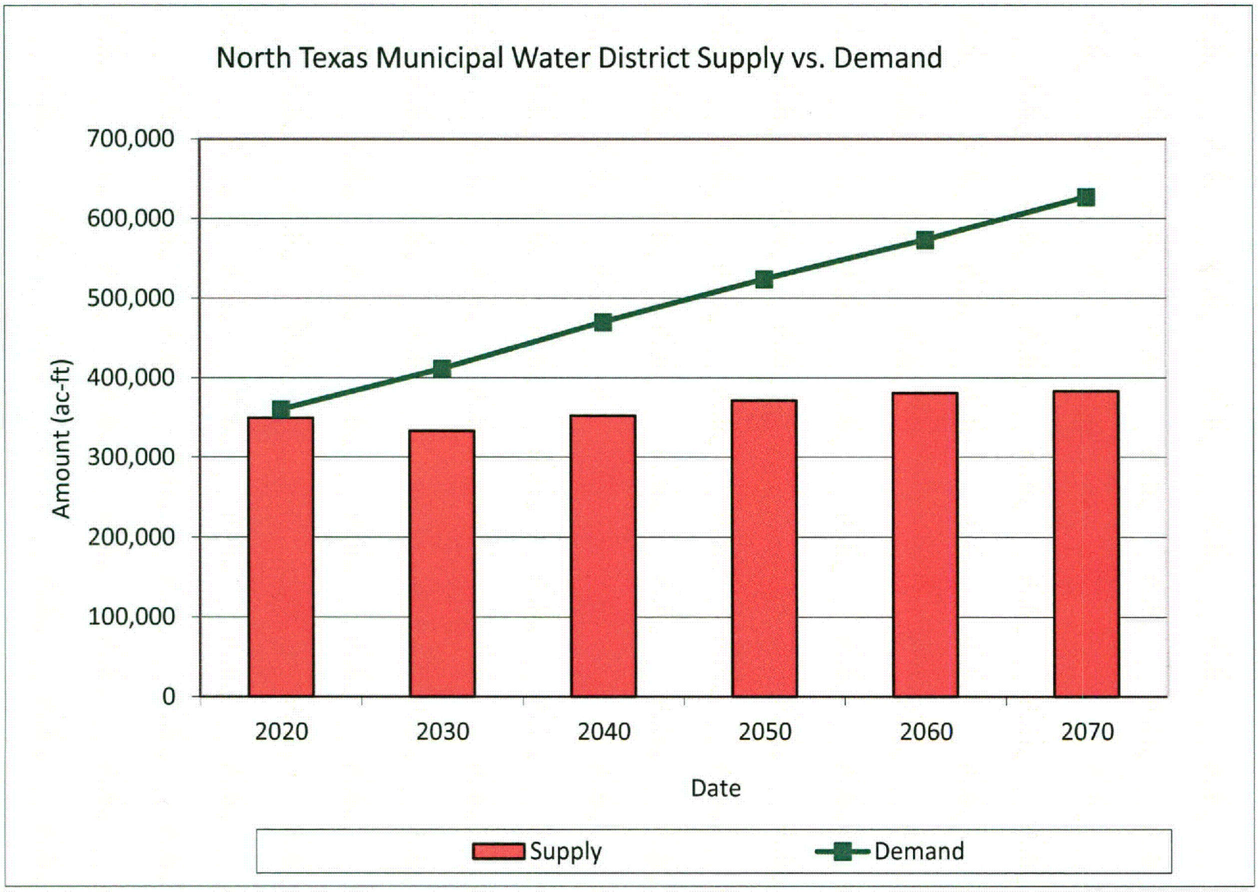


Table H.24
Princeton
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Princeton	974	1,236	1,566	3,679	5,798	7,919
Culleoka WSC	328	370	605	740	807	1,009
Total	**1,302**	**1,606**	**2,171**	**4,419**	**6,605**	**8,928**

Current Supply	2020	2030	2040	2050	2060	2070
NTMWD	1,200	1,231	1,533	2,942	4,121	5,156
Total	**1,200**	**1,231**	**1,533**	**2,942**	**4,121**	**5,156**

Supplies Less Current Demands	**-102**	**-375**	**-638**	**-1,477**	**-2,484**	**-3,772**

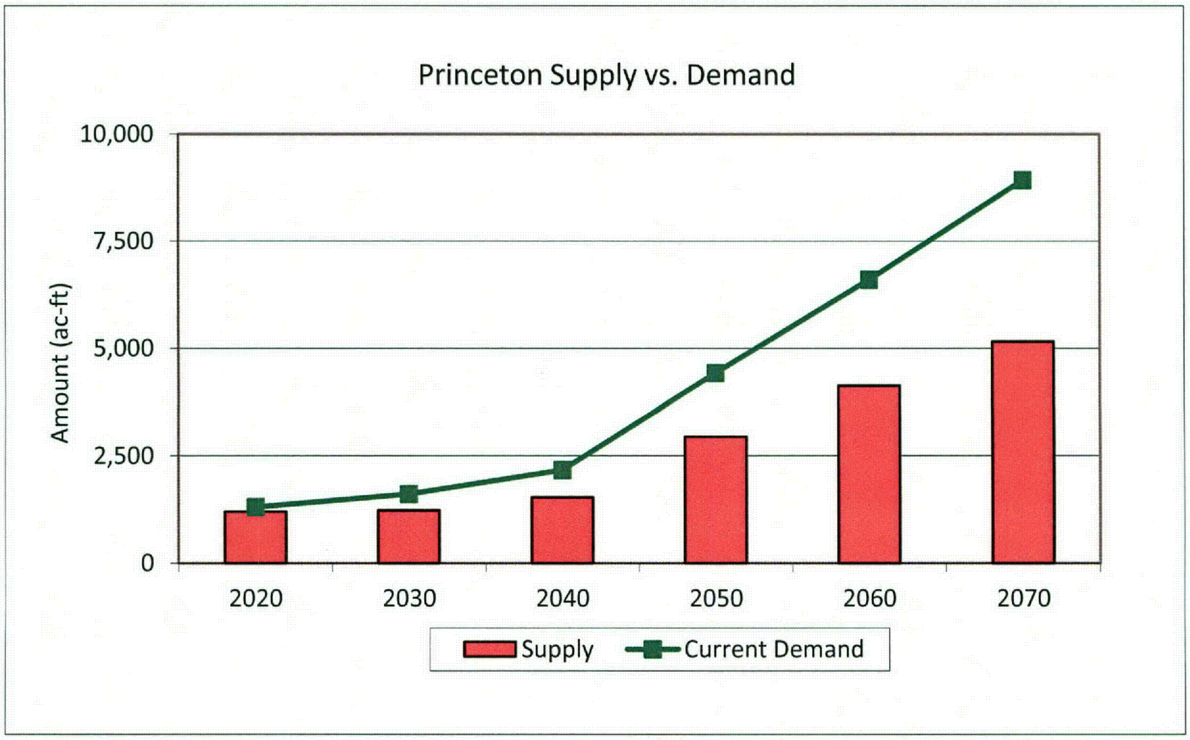


Table H.25
Rockett SUD
-Values in Acre-Feet per Year-

Demand (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Rockett SUD	3,871	4,841	6,001	7,390	9,575	11,798
Ennis (23 retail connections)	17	17	17	17	17	17
Palmer	289	353	432	529	675	1,242
Pecan Hill	111	136	167	205	257	384
Red Oak	1,230	1,230	1,230	1,230	1,230	1,230
Lancaster	90	90	90	90	90	90
Oak Leaf	55	55	55	55	55	55
Waxahachie	613	613	613	613	613	613
Ellis County Other	2,519	2,519	2,519	2,519	3,165	6,339
Sardis-Lone Elm WSC	2,166	3,055	4,086	4,600	4,950	4,948
Ferris	108	186	269	362	827	1,852
Bardwell	24	44	68	97	130	320
Total	**11,093**	**13,139**	**15,547**	**17,707**	**21,584**	**28,888**

Current Supplies (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Midlothian (treated)	2,118	1,738	1,382	1,141	969	848
TRWD through TRA	6,781	6,781	6,781	6,781	6,781	6,781
TRWD Limited by Sokoll WTP Capacity	5,605	5,605	5,605	5,605	5,605	5,605
Total	**7,723**	**7,343**	**6,987**	**6,746**	**6,574**	**6,453**

Supplies Less Current Demands	**-3,370**	**-5,796**	**-8,560**	**-10,961**	**-15,010**	**-22,435**

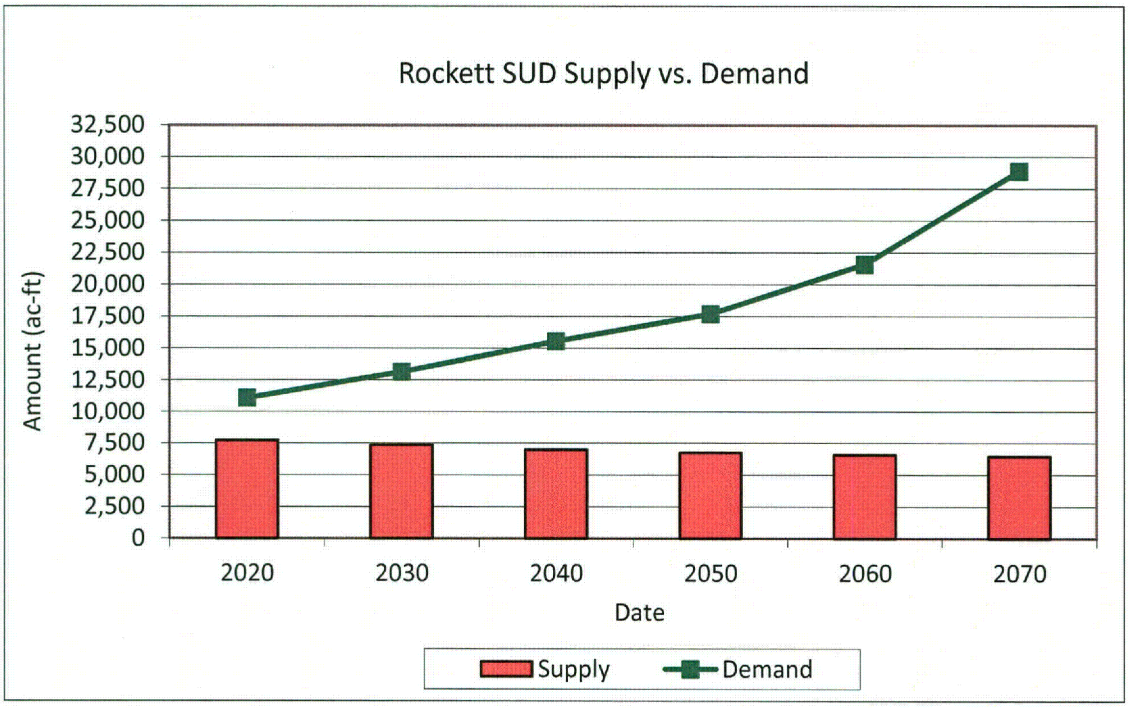


Table H.26
City of Rockwall
-Values in Acre-Feet per Year-

Demand (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Rockwall	8,914	11,049	13,526	16,057	18,911	21,947
Heath	3,945	7,839	7,826	7,818	7,816	7,815
Blackland WSC	678	712	754	800	857	918
Mt Zion	395	485	589	698	822	954
Rockwall County-Other (RCH +75% of remaining)	561	557	555	553	1,640	2,582
McLendon-Chisholm (Thru RCH)	165	203	248	294	346	401
Rockwall Co Manufacturing (100%)	35	40	45	50	55	61
Total	**14,693**	**20,885**	**23,543**	**26,270**	**30,447**	**34,678**

Current Supplies (Acre-feet/year)	2020	2030	2040	2050	2060	2070
NTMWD	13,537	16,003	16,627	17,488	18,995	20,027
Total	**13,537**	**16,003**	**16,627**	**17,488**	**18,995**	**20,027**

Supplies Less Current Demands	**-1,156**	**-4,882**	**-6,916**	**-8,782**	**-11,452**	**-14,651**

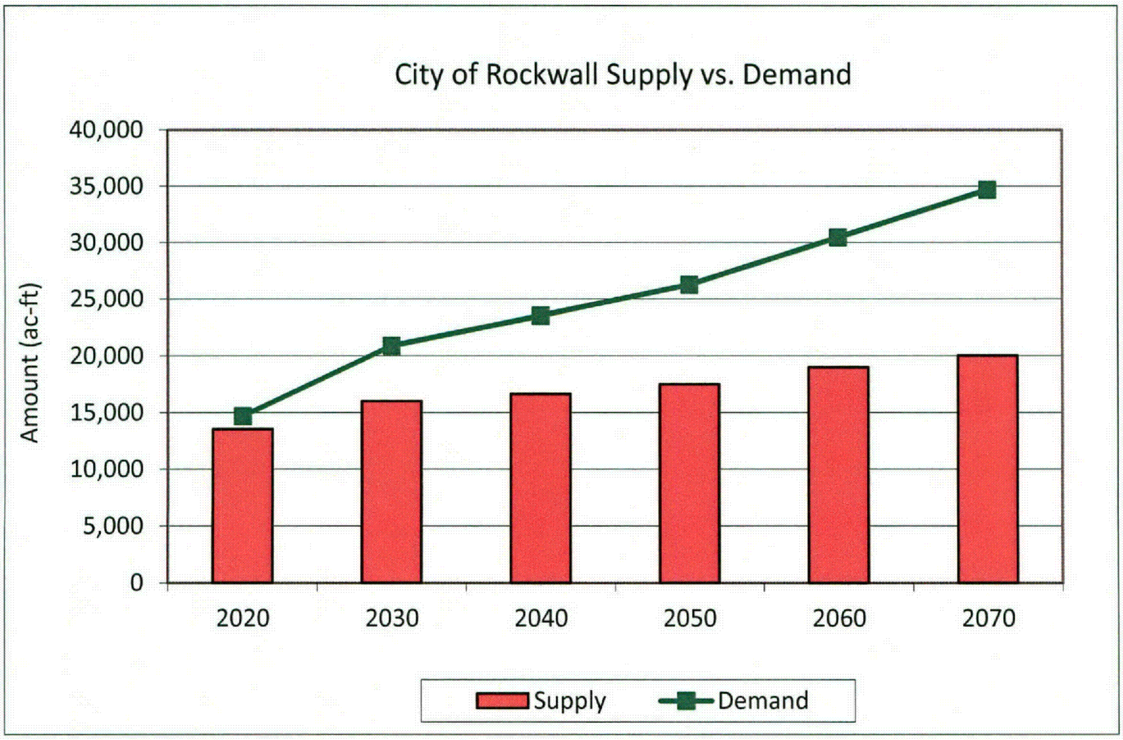


Table H.27
City of Seagoville
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Seagoville	2,062	2,413	2,779	3,162	3,571	3,571
Kaufman Co Other (Combine WSC)	261	275	385	592	1,010	1,397
Dallas Co Other (Combine WSC)	149	149	149	149	149	149
Combine	308	361	423	498	588	687
Gastonia-Scurry SUD	39	39	39	39	569	1,799
Total	**2,819**	**3,237**	**3,775**	**4,440**	**5,887**	**7,603**

Current Supply	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
DWU Sources	2,404	2,396	2,453	2,595	3,230	4,247
DWU Sources Limited by Contract	1,682	1,682	1,682	1,682	1,682	1,682
Total	**1,682**	**1,682**	**1,682**	**1,682**	**1,682**	**1,682**

Supplies Less Current Demands	**-1,138**	**-1,556**	**-2,094**	**-2,759**	**-4,206**	**-5,922**

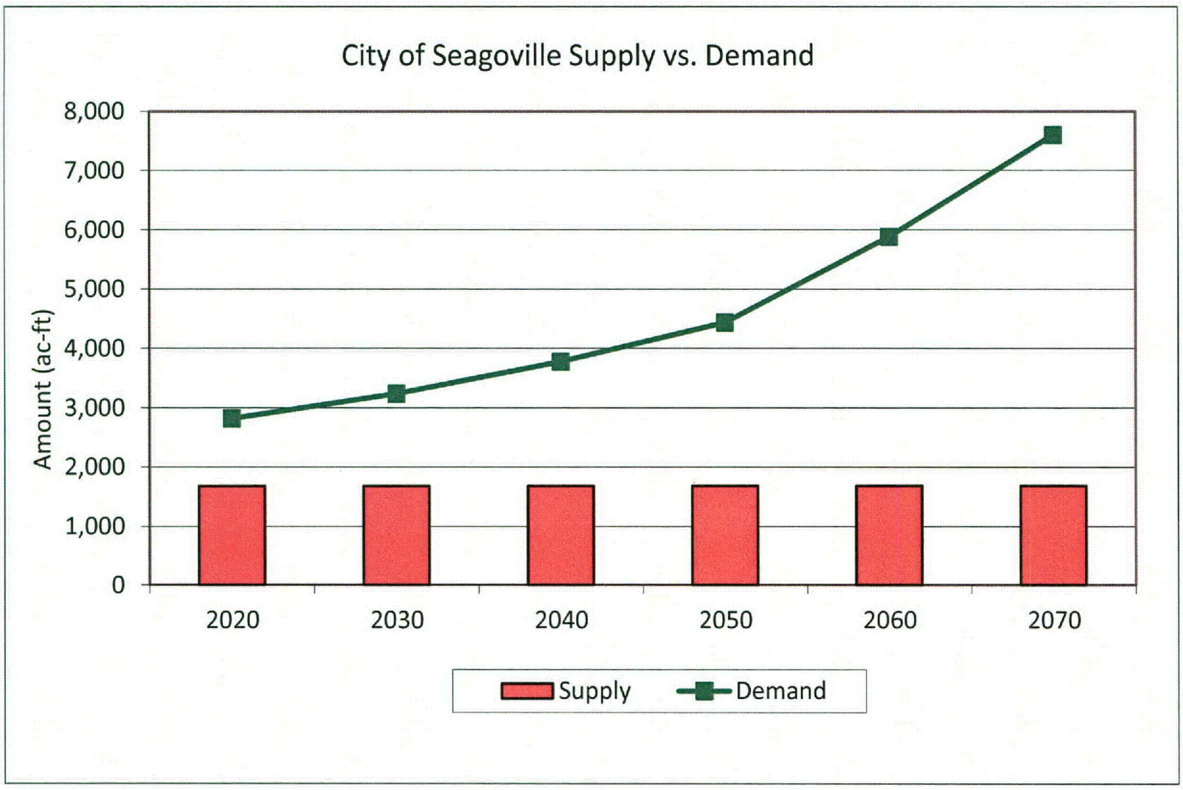


Table H.28
City of Sherman
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Sherman Municipal Demand	10,543	10,881	11,928	13,741	17,732	24,800
Grayson Co Manufacturing	3,679	3,997	4,297	4,548	4,938	5,361
Grayson Co Steam Electric	6,163	6,163	6,163	6,163	6,163	6,163
Bells	0	24	48	79	413	608
Grayson Co Other	2,197	2,197	2,197	2,197	2,197	3,481
Gunter	0	118	269	421	575	730
Kentucky Town WSC	0	0	100	100	100	100
Luella WSC	0	0	200	200	300	300
Marilee SUD	250	250	250	250	250	250
South Grayson WSC	100	100	100	100	100	100
Southmayd	0	0	50	50	75	100
Tioga	0	5	12	20	325	489
Tom Bean	0	23	46	75	137	316
Whitewright	0	0	50	50	100	100
Total	**22,932**	**23,758**	**25,710**	**27,994**	**33,405**	**42,898**

Current Supply	2020	2030	2040	2050	2060	2070
Trinity Aquifer	4,083	4,083	4,083	4,083	4,083	4,083
Woodbine Aquifer	1,289	1,289	1,289	1,289	1,289	1,289
Greater Texoma Utility Authority (Lake Texoma, Treated, limited by WTP)	11,210	11,210	11,210	11,210	11,210	11,210
Greater Texoma Utility Authority (Lake Texoma, Treated, raw water supply for SEP)	6,163	6,163	6,163	6,163	6,163	6,163
Total	**22,745**	**22,745**	**22,745**	**22,745**	**22,745**	**22,745**

Supplies Less Current Demands	**-187**	**-1,013**	**-2,965**	**-5,249**	**-10,660**	**-20,153**

Table H.28
City of Sherman
-Values in Acre-Feet per Year-

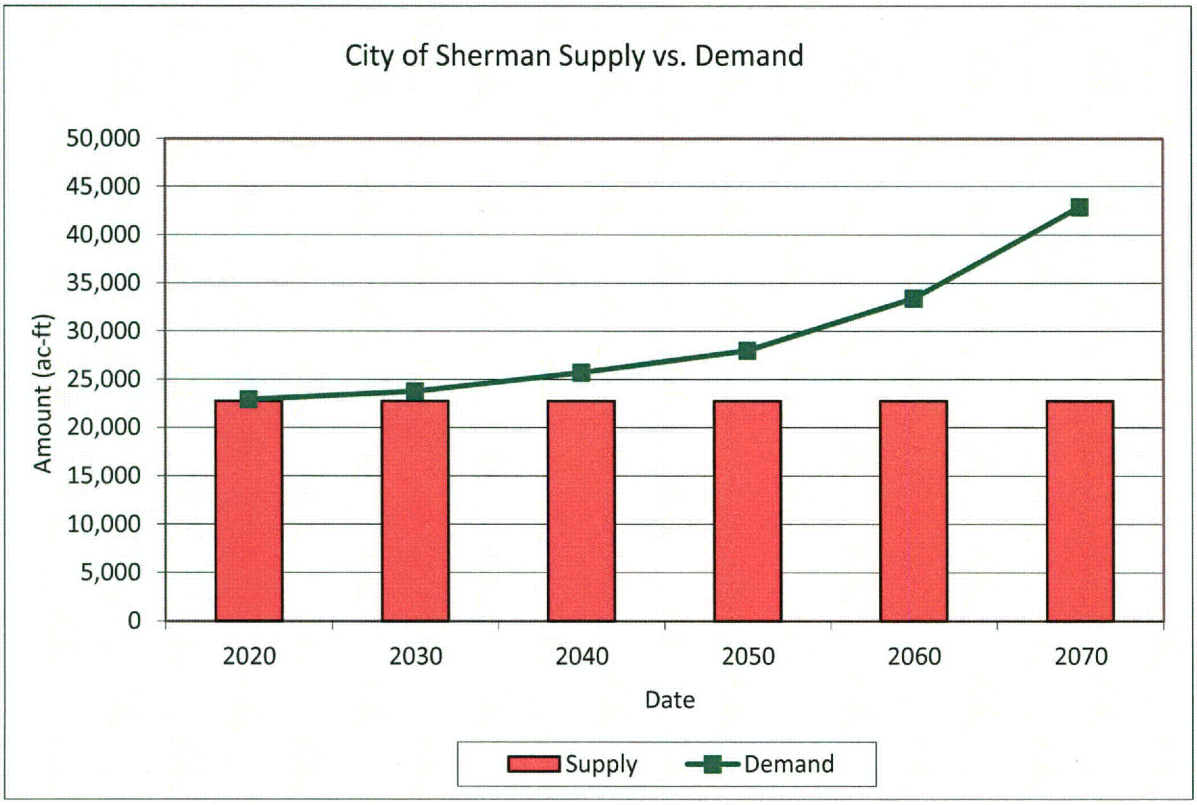


Table H.29
Tarrant Regional Water District
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Arlington and Customers	72,028	75,228	76,700	77,395	78,683	79,331
Azle	1,858	1,958	2,068	2,198	2,647	3,390
Benbrook	4,145	5,235	5,960	7,190	10,605	10,605
Bridgeport	1,294	1,551	1,822	2,496	3,322	4,149
Community WSC	347	369	394	430	466	502
Decatur	2,319	3,149	4,060	5,240	6,157	7,156
East Cedar Creek FWSD	742	807	980	1,061	1,141	1,221
Gun Barrel City	944	996	1,053	1,222	1,852	2,957
Fort Worth	178,455	219,314	264,791	295,624	323,123	350,867
Aledo	658	1,114	1,767	1,872	1,991	1,990
Bethesda WSC	1,462	1,869	2,298	2,776	3,303	3,860
Burleson	6,622	7,666	8,759	9,952	11,243	12,604
Crowley	2,107	2,456	2,953	3,591	4,672	5,383
Dalworthington Gardens	587	597	608	622	641	659
Denton County-Other	0	0	0	0	0	0
Edgecliff	503	491	480	475	474	474
Everman	0	0	0	0	0	0
Forest Hill	1,362	1,381	1,448	1,703	2,164	2,817
Grand Prairie (through Fort Worth)	2,803	2,803	2,803	2,803	2,803	2,803
Haltom City	5,285	5,226	5,308	5,670	6,093	6,640
Haslet	469	581	673	1,526	2,159	2,476
Hurst	6,012	6,003	5,864	5,788	5,774	5,774
Keller	12,182	12,981	12,906	12,862	12,847	12,846
Kennedale	368	543	795	864	916	916
Lake Worth	792	903	1,018	1,222	1,491	2,156
North Richland Hills	8,489	8,917	8,781	8,706	8,691	8,689
Watauga	2,899	2,794	2,707	2,659	2,650	2,650
Northlake	163	711	1,326	1,853	2,380	2,380
Richland Hills	906	943	986	1,130	1,271	1,458
Roanoke	2,263	2,807	3,356	3,350	3,348	3,348
Saginaw	3,148	3,503	3,876	4,059	4,052	4,051
Sansom Park Village	0	0	14	39	72	105
Southlake (Tarrant & Denton Co)	11,501	12,865	15,005	17,178	19,392	21,642
Tarrant County Other	5,326	5,188	5,165	8,648	11,593	16,028
Trophy Club	5,525	6,094	6,075	6,064	6,061	6,060
Westlake	1,388	2,078	3,007	3,623	4,242	4,850
Westover Hills	952	972	992	1,013	1,036	1,058
Westworth Village	395	417	441	468	499	530

Table H.29
Tarrant Regional Water District
-Values in Acre-Feet per Year-

White Settlement	1,041	1,068	1,106	1,432	2,092	2,758
Payne Springs	72	78	83	91	100	123
Kemp	308	376	456	551	845	1,182
Mabank (Henderson & Kaufman Co.)	783	896	1,012	1,417	2,103	3,056
Malakoff	29	27	25	29	45	65
Mansfield and Customers	36,952	40,363	45,168	53,921	59,704	65,931
River Oaks	850	817	790	775	772	772
Runaway Bay	350	388	428	514	584	700
Springtown	412	592	584	580	579	578
Trinity River Authority						
Bedford	8,414	8,887	9,396	9,986	9,969	9,969
Colleyville	9,320	9,808	10,314	10,657	10,649	10,648
Ennis & Customers Total	379	1,039	1,458	3,249	6,205	15,576
Grapevine	10,387	11,535	11,535	11,535	11,535	11,535
Euless	7,399	7,633	7,452	7,353	7,334	7,334
North Richland Hills	4,244	4,458	4,391	4,353	4,345	4,345
Watauga	0	0	0	0	0	0
Midlothian & Customers Total	4,456	5,816	7,585	9,234	10,722	11,881
Rockett SUD & Customers Total	6,827	8,853	11,237	13,368	16,566	20,506
Waxahachie & Customers Total	2,500	2,500	2,500	6,217	9,340	12,742
Walnut Creek SUD & Customers Total	2,627	3,210	3,982	5,482	7,952	10,410
Weatherford	144	1,093	2,196	6,736	13,467	22,000
Hudson Oaks	229	309	390	398	398	398
Parker County Other	0	0	0	1,409	2,500	4,000
Parker County SEP	260	260	260	260	260	260
West Cedar Creek MUD	1,326	1,491	1,681	1,898	2,421	3,362
Seven Points	355	409	465	586	692	808
Tool	553	583	607	646	976	1,300
West Wise SUD	404	403	406	413	427	441
Chico	14	20	28	218	329	459
Dallas County-Other	761	761	851	851	851	851
Henderson County-Other	239	158	140	114	92	72
Navarro County-Other	54	47	42	229	649	1,279
Tarrant County-Other	240	233	227	410	565	799
Van Zandt County-Other	185	218	251	287	321	357
Wise County-Other	973	874	796	2,304	3,687	4,976
Denton County Manufacturing	14	16	18	20	22	24
Freestone County Steam Electric	6,726	6,726	6,726	6,726	6,726	6,726
Henderson County SEP	4,500	4,500	4,950	5,950	6,950	7,950
Henderson County Mining	182	182	182	182	182	182

Table H.29
Tarrant Regional Water District
-Values in Acre-Feet per Year-

Jack County-SEP	2,665	2,879	3,092	3,305	3,518	3,745
Jack County Mining	401	579	526	556	588	679
Kaufman County Irrigation	425	425	425	425	425	425
Kaufman County Other (Part)	183	216	253	294	332	370
50% of Navarro County manufacturing	5	5	5	5	5	5
Parker County Manufacturing	529	620	712	803	895	986
Tarrant County Manufacturing	16,049	18,550	21,135	23,486	25,479	27,640
Tarrant County Mining	6,567	3,682	789	737	697	664
Tarrant County Irrigation	1,340	1,340	1,340	1,340	1,340	1,340
Tarrant County Steam Electric Power	2,448	2,448	2,448	2,448	2,448	2,448
Wise County Irrigation	530	530	530	530	530	530
Wise County Manufacturing	2,160	2,479	2,777	3,039	3,358	3,706
Wise County Steam Electric Power	1,494	1,459	2,254	2,450	3,298	3,673
Wise County Mining	3,096	3,348	3,701	4,193	4,613	5,308
Subtotal - Existing	**498,700**	**565,696**	**636,943**	**717,363**	**800,335**	**892,298**

Potential Future Customers	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Alvord (through West Wise WSC)	0	0	4	38	65	91
Alvarado (Region G)	0	0	0	0	0	0
Annetta (through Weatherford)	0	27	30	38	95	202
Annetta North (through Weatherford)	0	0	8	17	27	40
Annetta South (through Weatherford)	0	0	6	11	17	23
Bardwell	24	44	68	97	130	320
Corsicana and Customers	0	0	0	0	0	0
Freestone County Other (part)	198	158	125	385	1,210	3,291
Kaufman County-Other	87	92	128	197	337	466
Freestone County Steam Electric Power	0	0	0	0	0	5,667
Navarro County Steam Electric Power	8,000	8,000	8,000	8,000	8,000	8,000
Ellis County Other	2,000	2,000	2,000	2,000	2,646	5,820
Fairfield	0	0	0	223	476	976
Mountain Peak SUD (through Midlothian)	414	852	1,370	1,983	2,714	3,563
Pantego	0	61	60	60	60	60
Parker County-Other	0	0	0	0	3,697	9,814
Italy	0	72	159	266	419	662
Maypearl	117	135	145	143	143	143
Buena Vista - Bethel SUD	673	673	898	1,299	2,245	3,280
Files Valley WSC	0	57	61	66	73	79
Pelican Bay	0	11	11	11	11	12

Table H.29
Tarrant Regional Water District
-Values in Acre-Feet per Year-

Sardis-Lone Elm WSC	1,121	1,121	1,121	1,121	1,121	1,121
Venus (Region G)	429	519	615	724	842	971
Willow Park	2	147	317	726	1,167	1,609
Subtotal - Potential	**13,065**	**13,969**	**15,126**	**17,405**	**25,495**	**46,210**
Allocation of supplies beyond approved demands						
Burleson	1,324	1,533	1,752	1,990	2,249	2,521
Bethesda WSC	1,032	1,154	1,283	1,426	1,585	1,752
Rockett SUD	1,814	2,219	2,696	3,122	3,762	4,550
Fort Worth	2,080	2,080	2,301	2,301	2,301	2,301
Total	**518,015**	**586,651**	**660,101**	**743,607**	**835,727**	**949,632**

Current Supply	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
West Fork System	96,458	95,625	94,792	93,958	93,125	92,292
Lake Arlington	7,667	7,550	7,433	7,317	7,200	7,083
Benbrook Lake	5,417	5,400	5,383	5,367	5,350	5,333
Cedar Creek Lake	126,731	127,267	128,018	129,208	131,932	135,885
Richland-Chambers Reservoir	186,600	182,700	178,800	174,900	171,000	167,100
Richland-Chambers Reuse	61,831	65,731	69,631	73,531	77,431	81,331
Total	**484,704**	**484,273**	**484,057**	**484,281**	**486,038**	**489,024**

Supplies Less Current Demands	**-33,311**	**-102,377**	**-176,044**	**-259,326**	**-349,689**	**-460,608**

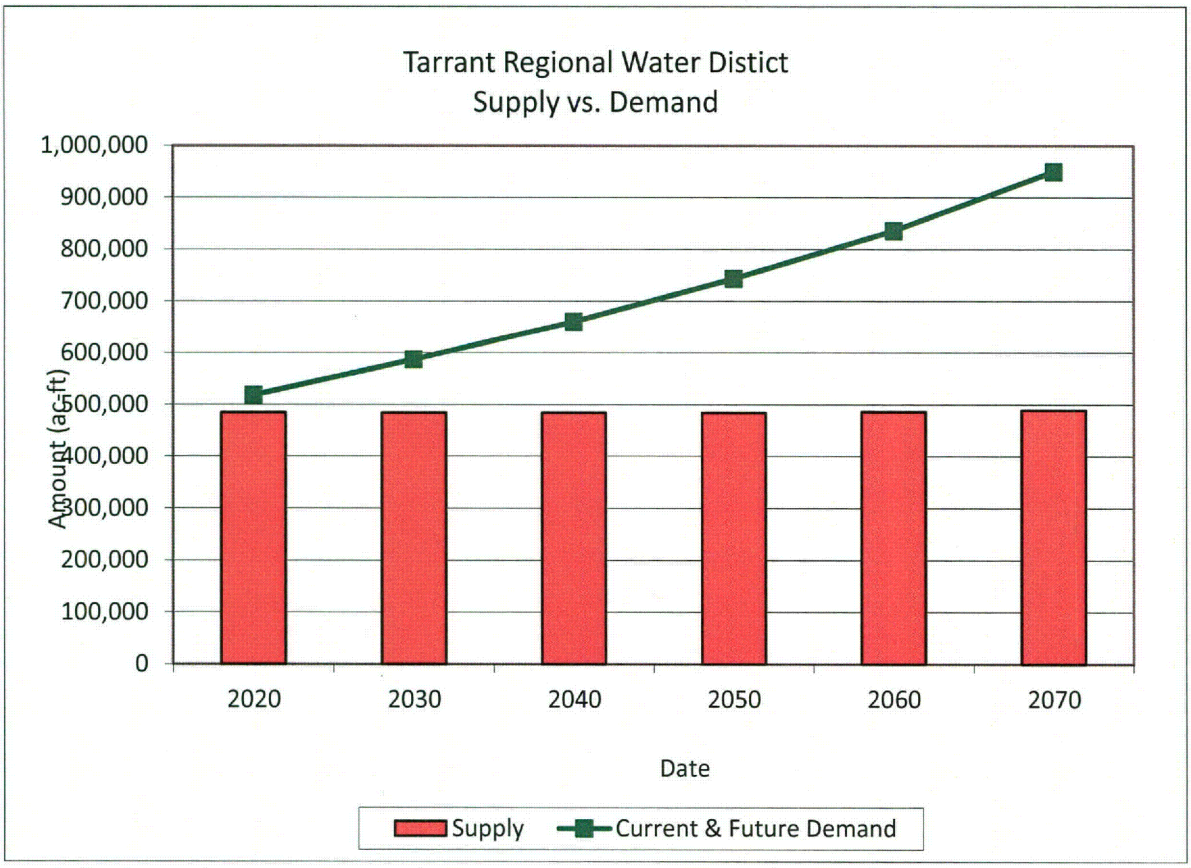


Table H.30
City of Terrell
-Values in Acre-Feet per Year-

Demand (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Terrell	4,035	7,143	8,638	10,670	12,372	14,353
College Mound WSC	316	396	487	592	807	1,022
High Point WSC	239	285	341	409	649	859
McLendon-Chisholm	83	102	124	147	173	201
Hunt County-Other	274	371	514	726	1,052	1,547
Kaufman County-Other	145	163	396	851	1,781	2,643
Kaufman County Manufacturing	244	261	278	298	318	340
Total	**5,336**	**8,721**	**10,778**	**13,693**	**17,152**	**20,965**

Current Supplies (Acre-feet/year)	2020	2030	2040	2050	2060	2070
NTMWD (limited to contract of 6,726 af/y)	4,915	6,682	6,726	6,726	6,726	6,726
Total	**4,915**	**6,682**	**6,726**	**6,726**	**6,726**	**6,726**

Supplies Less Current Demands	-421	-2,039	-4,052	-6,967	-10,426	-14,239

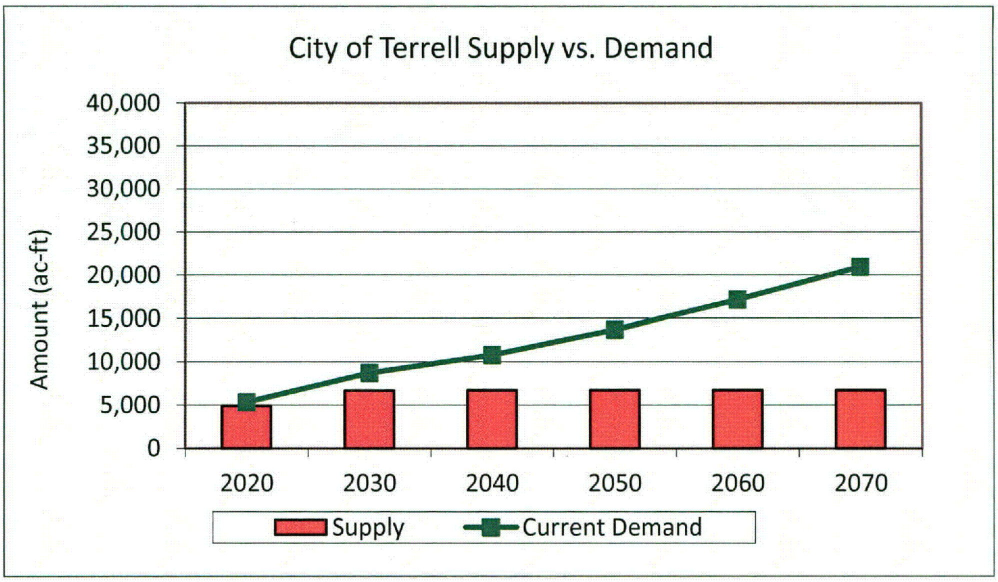


Table H.31
Trinity River Authority
-Values in Acre-Feet per Year-

Demands (Acre-feet/year)	2020	2030	2040	2050	2060	2070
Navarro County Supplies - Direct from TRA (Navarro Mills).						
Corsicana & Customer Total	**17,828**	**17,325**	**16,317**	**15,308**	**14,300**	**13,292**
TXU	450	450	450	450	450	450
Ellis County Supplies - Direct from TRA (Bardwell & Joe Pool) and from TRWD through TRA.						
Ennis Total	379	1,039	1,458	3,249	6,205	15,576
Italy (by 2020)	0	72	159	266	419	662
Maypearl (by 2020)	117	135	145	143	143	143
Midlothian and Customers	4,456	5,816	7,585	9,234	10,722	11,881
Rockett SUD and Customers	6,827	8,853	11,237	13,368	16,566	20,506
Waxahachie total	2,500	2,500	2,500	6,217	9,340	12,742
Potential Future Ellis County Customers						
Bardwell	24	44	68	97	130	320
Mountain Peak WSC	414	852	1,370	1,983	2,714	3,563
Venus	429	519	615	724	842	971
Sardis-Lone Elm	1,121	1,121	1,121	1,121	1,121	1,121
Ellis County Other	2,000	2,000	2,000	2,000	2,646	5,820
Buena Vista - Bethel SUD	673	673	898	1,299	2,245	3,280
Files Valley WSC	0	57	61	66	73	79
Total Ellis County	**18,940**	**23,681**	**29,217**	**39,767**	**53,166**	**76,664**

Tarrant County Project						
Bedford	8,414	8,887	9,396	9,986	9,969	9,969
Colleyville	9,320	9,808	10,314	10,657	10,649	10,648
Euless	7,399	7,633	7,452	7,353	7,334	7,334
Grapevine	10,387	11,535	11,535	11,535	11,535	11,535
North Richland Hills	4,244	4,458	4,391	4,353	4,345	4,345
Total Tarrant County Project	**39,764**	**42,321**	**43,088**	**43,884**	**43,832**	**43,831**

Table H.31
Trinity River Authority
-Values in Acre-Feet per Year-

Reuse						
10 Mile Plant Reuse (Dallas Co. Irr.)	125	125	125	125	125	125
Dallas County Irrigation (Las Colinas)	8,000	8,000	8,000	8,000	8,000	8,000
Waxahachie	Counted above under Ellis County					
Potential Future Reuse						
Additional Los Colinas (Dallas County Irrigation)	7,000	7,000	7,000	7,000	7,000	7,000
Tarrant and Denton County Reuse Project (Alliance Corridor)	3,921	3,921	11,537	11,537	11,537	11,537
Ennis Indirect Reuse (through TRA)	0	0	518	1,392	3,696	3,696
Dallas County Steam Electric	0	2,000	2,000	2,000	2,000	2,000
Ellis County Steam Electric Reuse	0	0	0	0	2,200	4,700
Freestone County Steam Electric Reuse	0	0	0	6,760	6,760	6,760
Kaufman County Steam Electric Reuse	1,000	1,000	1,000	1,000	1,000	1,000
Central Reuse to Irving	28,025	28,025	28,025	28,025	28,025	28,025
Central Reuse to NTWMD	53,088	37,913	25,366	13,599	3,235	0
Total Reuse Demand (Not including Waxahachie)	**101,159**	**87,984**	**83,571**	**79,438**	**73,578**	**72,843**

Other						
Freestone SEP (from TRWD)[a]	6,726	6,726	6,726	6,726	6,726	6,726
Freestone SEP Power (Livingston to Luminant)	20,000	20,000	20,000	20,000	20,000	20,000
Total Other	**26,726**	**26,726**	**26,726**	**26,726**	**26,726**	**26,726**

Total	**204,867**	**198,487**	**199,369**	**205,574**	**212,053**	**233,806**

Table H.31
Trinity River Authority
-Values in Acre-Feet per Year-

Current Supplies	2020	2030	2040	2050	2060	2070
Joe Pool Lake (Midlothian)	5,833	5,712	5,591	5,470	5,349	5,229
Joe Pool Lake (Grand Prairie)	1,272	1,239	1,207	1,174	1,141	1,109
Joe Pool Lake (Grand Prairie Raw)	300	300	300	300	300	300
Navarro Mills Lake	18,333	17,325	16,317	15,308	14,300	13,292
Lake Bardwell	9,600	9,295	8,863	8,432	8,000	7,931
Lake Livingston	20,000	20,000	20,000	20,000	20,000	20,000
Current Reuse	11,604	12,007	12,739	13,254	13,254	13,254
Las Colinas	*8,000*	*8,000*	*8,000*	*8,000*	*8,000*	*8,000*
*Lake Waxahachie**	*3,479*	*3,882*	*4,614*	*5,129*	*5,129*	*5,129*
Ten Mile Creek WWTP Reuse	*125*	*125*	*125*	*125*	*125*	*125*
Mountain Creek Reuse	*0*	*0*	*0*	*0*	*0*	*0*
Current TRWD (Tarrant Co.)	39,764	38,518	34,661	31,192	27,789	24,802
Current TRWD (Ellis Co.)	14,959	16,542	17,663	21,997	24,980	25,273
Current TRWD (Freestone Co SEP)	6,726	6,122	5,411	4,781	4,264	3,806
Total	**128,391**	**127,060**	**122,752**	**121,908**	**119,377**	**114,996**

Supplies Less Current Demands	**-76,476**	**-71,427**	**-76,617**	**-83,666**	**-92,676**	**-118,810**

*Physically diverted out of Lake Bardwell (downstream of Lake Waxahachie)

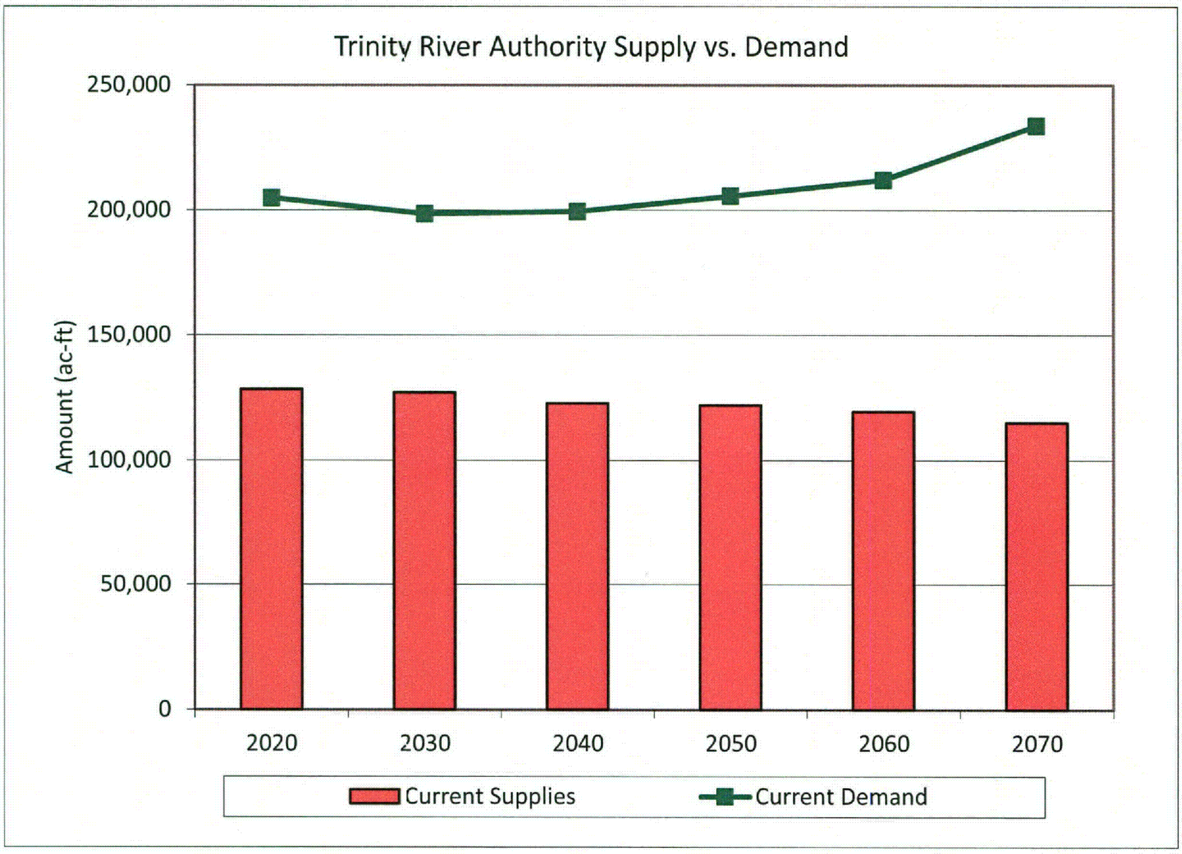


Table H.32
Upper Trinity Regional Water District
-Values in Acre-Feet per Year-

Demands (Acre-feet/year)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Argyle WSC	496	541	589	641	689	689
Argyle	945	1,659	2,606	2,648	2,691	2,690
Total for Argyle WSC	*1,441*	*2,200*	*3,195*	*3,289*	*3,380*	*3,379*
Aubrey	563	731	847	999	1,197	1,452
Cross Timbers WSC	36	71	110	147	183	207
Bartonville	657	756	769	783	799	798
Copper Canyon	93	122	155	193	237	268
Double Oak	233	254	278	307	338	338
Total for Cross Timbers WSC	*1,019*	*1,203*	*1,312*	*1,430*	*1,557*	*1,611*
Bolivar WSC	0	204	481	798	1,164	1,459
Celina	4,522	8,195	15,109	25,634	25,632	25,629
Corinth	3,145	3,301	3,274	3,257	3,250	3,249
Denton County Other	595	1,230	2,006	4,220	8,419	17,635
Denton County FWSD NO. 1A	2,452	4,351	5,211	5,209	5,207	5,205
Denton County FWSD NO. 7	3,418	3,405	3,403	3,401	3,399	3,397
Denton County FWSD NO. 10(direct)	1,188	1,172	1,171	1,170	1,168	1,168
Flower Mound	10,477	14,352	14,274	14,228	14,213	14,212
Highland Village	2,485	2,756	2,845	2,960	3,085	3,085
Justin	209	775	1,344	1,391	1,437	1,436
Krum	707	1,012	1,373	1,778	2,245	2,730
Ladonia	0	36	59	91	138	137
Lakewood Village	0	0	0	0	52	88
Lake Cities MUA						
Hickory Creek	486	622	788	1,011	1,018	1,018
Lake Dallas	914	1,017	1,193	1,202	1,217	1,217
Shady Shores	385	447	450	455	461	460
Total for Lake Cities MUA	*1,785*	*2,086*	*2,431*	*2,668*	*2,696*	*2,695*
Mustang SUD	700	2,469	4,248	6,036	7,821	9,491
Cross Roads	457	619	756	755	754	754
Denton County FWSD NO. 10 (thru Mustang)*	298	1,956	1,956	1,956	1,956	1,956
Krugerville	263	315	368	435	434	434
Oak Point	789	1,334	1,885	2,440	2,995	2,994
Paloma Creek*	2,562	3,472	3,470	3,468	3,465	3,464
Providence Village WCID*	938	931	929	927	926	925
Total for Mustang SUD	*6,007*	*11,096*	*13,612*	*16,017*	*18,351*	*20,018*
Lincoln Park	105	122	141	159	181	181
Northlake	578	2,521	4,702	6,568	8,436	8,436
Pilot Point	0	0	351	1,010	1,794	2,706
Ponder	0	0	70	243	433	598

Table H.32
Upper Trinity Regional Water District
-Values in Acre-Feet per Year-

Prosper	0	0	0	0	0	0
Sanger	78	440	862	1,335	1,871	2,360
Denton County Mining	2,363	766	1,382	2,343	3,241	4,328
Denton County Manufacturing	72	164	184	202	219	238
Total Demands	43,207	62,118	79,638	100,399	112,765	127,433
Losses in Treatment and Delivery (5%)	2,160	3,106	3,982	5,020	5,638	6,372
Denton County Irrigation	897	1,000	1,100	1,200	1,300	1,400
Total Needed	**46,264**	**66,224**	**84,720**	**106,619**	**119,703**	**135,205**

Current Supply (Acre-feet/year)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
DWU**	37,307	40,513	37,930	35,231	33,087	31,490
Chapman	11,356	11,303	8,438	8,399	8,360	5,547
Chapman Reuse	5,435	5,575	4,287	4,392	4,497	3,068
Direct Reuse	897	897	897	897	897	897
Total	**54,995**	**58,288**	**51,552**	**48,919**	**46,841**	**41,002**

Supplies Less Demands	**8,731**	**-7,936**	**-33,168**	**-57,700**	**-72,862**	**-94,203**

* These three entities contract directly with UTRWD for wholesale supply, but Mustang SUD is the contract operator for their water systems, providing general operational functions including billing, operations and maintenance, etc.

** Under the existing contracts, UTRWD is entitled to 39,126 acre-feet per year from Dallas in 2020. However, given limited Dallas supplies in 2010 and other supplies available to UTRWD, a supply of 9,000 af/y (current 8,290 ac-ft/ yr + strategy of 710 ac-ft/y) from Dallas to UTRWD is assumed for 2010.

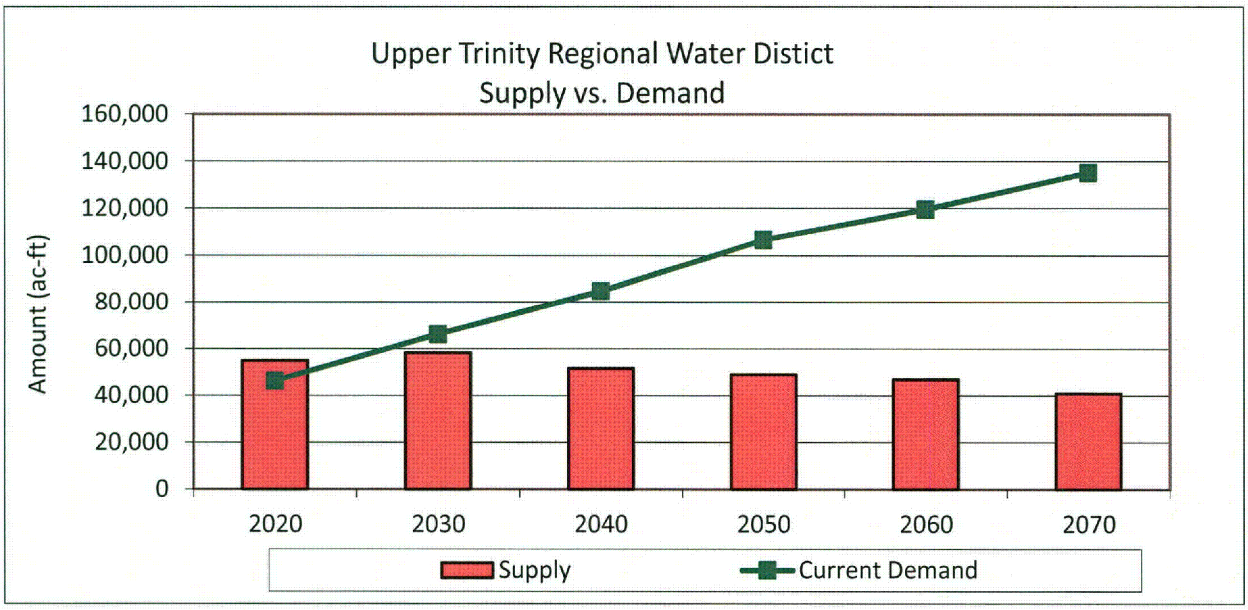


Table H.33
Walnut Creek SUD
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Walnut Creek SUD	1,745	2,035	2,386	3,029	4,470	5,835
Boyd	144	156	243	319	474	520
Rhome	131	291	458	895	1,296	1,731
Aurora	71	96	123	161	200	248
West Wise SUD	21	21	21	22	22	23
Reno	50	50	50	50	50	50
Parker County Other (3%)	211	206	201	278	426	662
Wise County Other (3%)	110	107	105	151	194	234
Parker County Manufacturing (15%)	96	109	123	137	151	164
TOTAL	**2,579**	**3,071**	**3,710**	**5,042**	**7,283**	**9,467**

Potential Customers	2020	2030	2040	2050	2060	2070
New Fairview	0	36	73	123	171	229
Newark	0	54	150	267	448	663
Jack County Other (Perrin)	48	49	49	50	50	51
TOTAL FUTURE and CURRENT	**2,627**	**3,210**	**3,982**	**5,482**	**7,952**	**10,410**

Current Supplies	2020	2030	2040	2050	2060	2070
TRWD Sources (Limited by Contract of 4,480	2,627	2,922	3,203	3,897	4,480	4,480
WTP Capacity	5,605	5,605	5,605	5,605	5,605	5,605
Supply Limited by Capacity	**2,627**	**2,922**	**3,203**	**3,897**	**4,480**	**4,480**

Supplies Less Current Demands	**0**	**-288**	**-779**	**-1,585**	**-3,472**	**-5,930**

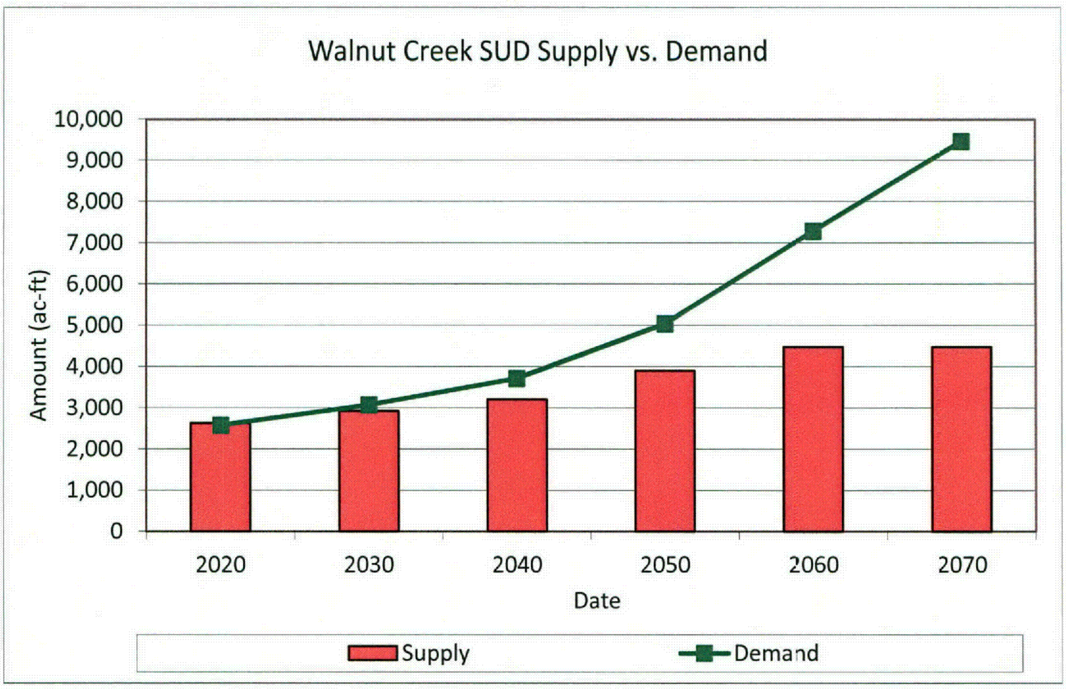


Table H.34
City of Waxahachie
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Waxahachie	6,872	7,741	9,320	11,299	13,749	16,715
Ellis County-Other	745	762	815	1,036	1,257	1,850
Ellis County Manufacturing	2,242	2,242	2,242	2,242	2,242	2,242
Buena Vista-Bethel SUD	673	673	898	1,299	2,245	3,280
Ellis County Steam Electric (future)	0	0	2,116	4,129	4,484	4,484
Files Valley WSC (future)	0	57	61	66	73	79
Italy (future)	0	72	159	266	419	662
Maypearl (future)	117	135	145	143	143	143
Total	**10,649**	**11,682**	**15,756**	**20,480**	**24,612**	**29,455**

Current Supplies	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Lake Waxahachie	2,800	2,695	2,590	2,485	2,380	2,275
Rockett SUD Supplies (for Rockett Retail Connection)	427	343	275	234	187	137
TRA (Bardwell)	4,320	4,183	3,989	3,794	3,600	3,569
TRA (Reuse)	3,479	3,882	4,614	5,129	5,129	5,129
TRWD through TRA for Sokoll	2,500	2,275	2,011	4,419	5,212	5,212
Total Supplies	13,526	13,378	13,479	16,061	16,508	16,322
TRWD Current Supply Limited by Sokoll WTP capacity	**2,500**	**2,275**	**2,011**	**4,419**	**5,212**	**5,212**
Non-TRWD Supply Limited by Howard WTP capacity	**10,516**	**10,432**	**10,364**	**10,323**	**10,276**	**10,226**
Total Supplies Limited by WTP	**13,016**	**12,707**	**12,375**	**14,742**	**15,488**	**15,438**

Supplies Less Current Demands	**2,367**	**1,025**	**-3,381**	**-5,738**	**-9,124**	**-14,017**

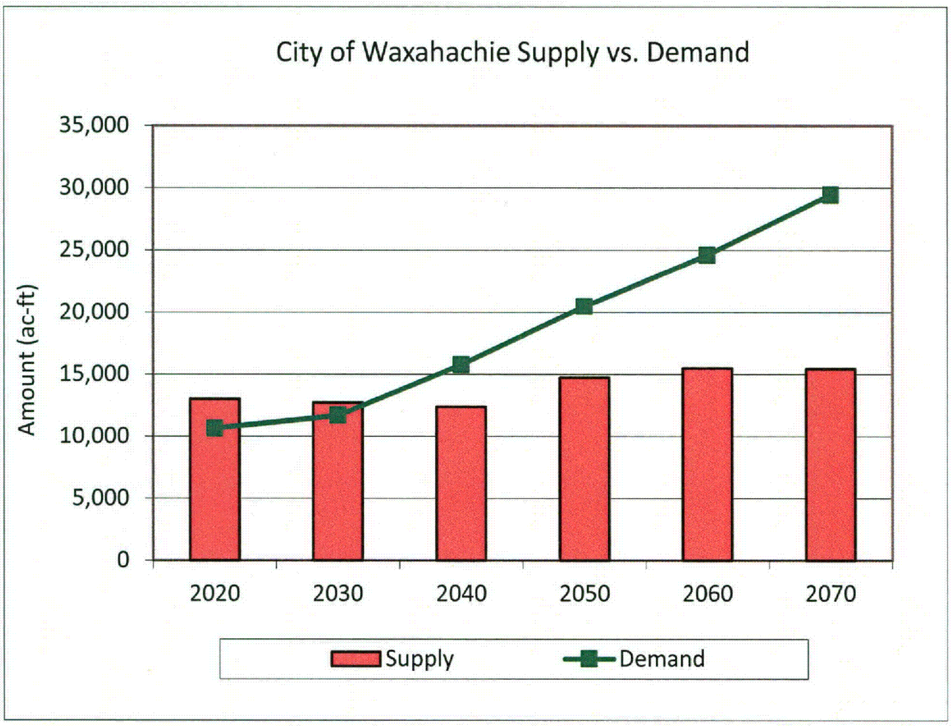


Table H.35
City of Weatherford
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Weatherford	5,307	6,213	7,273	11,769	18,457	26,947
Hudson Oaks	229	309	390	398	398	398
Parker County-Other	0	0	0	1,409	2,500	4,000
Parker County Manufacturing	529	620	712	803	895	986
Parker County Irrigation	13	13	13	13	13	13
Brazos Electric Co-op	260	260	260	260	260	260
Total	**6,338**	**7,415**	**8,648**	**14,652**	**22,523**	**32,604**

Potential Customers	2020	2030	2040	2050	2060	2070
Annetta	0	27	30	38	95	202
Annetta North	0	0	8	17	27	40
Annetta South	0	0	6	11	17	23
Willow Park (net of GW)	2	147	317	726	1,167	1,609
TOTAL WITH FUTURE DEMAND	**6,340**	**7,589**	**9,009**	**15,444**	**23,829**	**34,478**

Current Supplies	2020	2030	2040	2050	2060	2070
Lake Weatherford	2,923	2,880	2,837	2,793	2,750	2,707
TRWD	1,162	2,077	2,862	5,826	8,824	8,770
Total	**4,085**	**4,957**	**5,699**	**8,619**	**11,574**	**11,477**
WTP capacity=14 mgd	**7,847**	**7,847**	**7,847**	**7,847**	**7,847**	**7,847**
Supplies Limited by WTP (plus irrigation water which is not limited by WTP capacity)	**4,085**	**4,957**	**5,699**	**7,860**	**7,860**	**7,860**

Supplies Less Current Demands	-2,255	-2,632	-3,310	-7,584	-15,969	-26,618

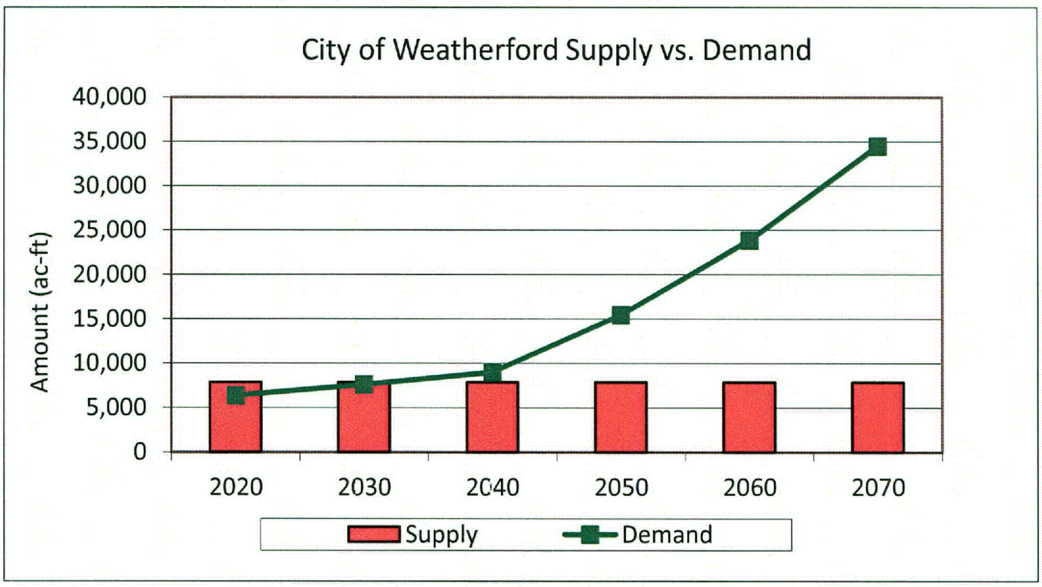


Table H.36
West Cedar Creek MUD
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
West Cedar Creek MUD	1,326	1,491	1,681	1,898	2,421	3,362
Kemp	308	376	456	551	845	1,182
Seven Points	355	409	465	586	692	808
Tool	553	583	607	646	976	1,300
Total	**2,542**	**2,859**	**3,209**	**3,681**	**4,934**	**6,652**

Current Supply	2020	2030	2040	2050	2060	2070
TRWD Sources (contract limit)	2,220	2,220	2,220	2,220	2,220	2,220
Total	**2,220**	**2,220**	**2,220**	**2,220**	**2,220**	**2,220**

Supplies Less Current Demands	**-322**	**-639**	**-989**	**-1,461**	**-2,714**	**-4,432**

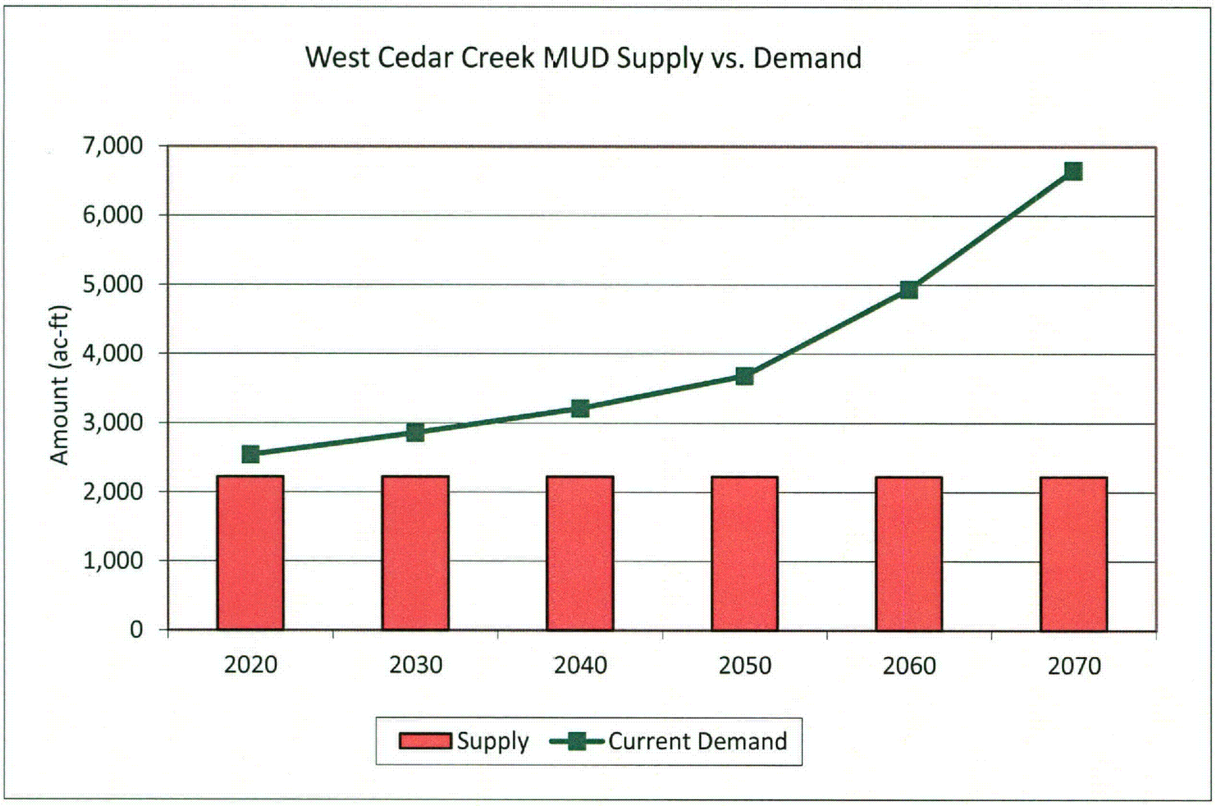


Table H.37
Wise County WSD
-Values in Acre-Feet per Year-

Demand (acre-feet/year)	2020	2030	2040	2050	2060	2070
Decatur	2,319	3,149	4,060	5,240	6,157	7,156
Wise County Manufacturing (10%)	266	298	328	354	386	421
Wise County Other	973	874	796	2,304	3,687	4,976
Total	**3,558**	**4,321**	**5,184**	**7,898**	**10,230**	**12,553**

Current Supplies	2020	2030	2040	2050	2060	2070
TRWD (Limited by WTP Capacity)	1,850	1,850	1,850	1,850	1,850	1,850
Total	**1,850**	**1,850**	**1,850**	**1,850**	**1,850**	**1,850**

Supplies Less Current Demands	-1,708	-2,471	-3,334	-6,048	-8,380	-10,703

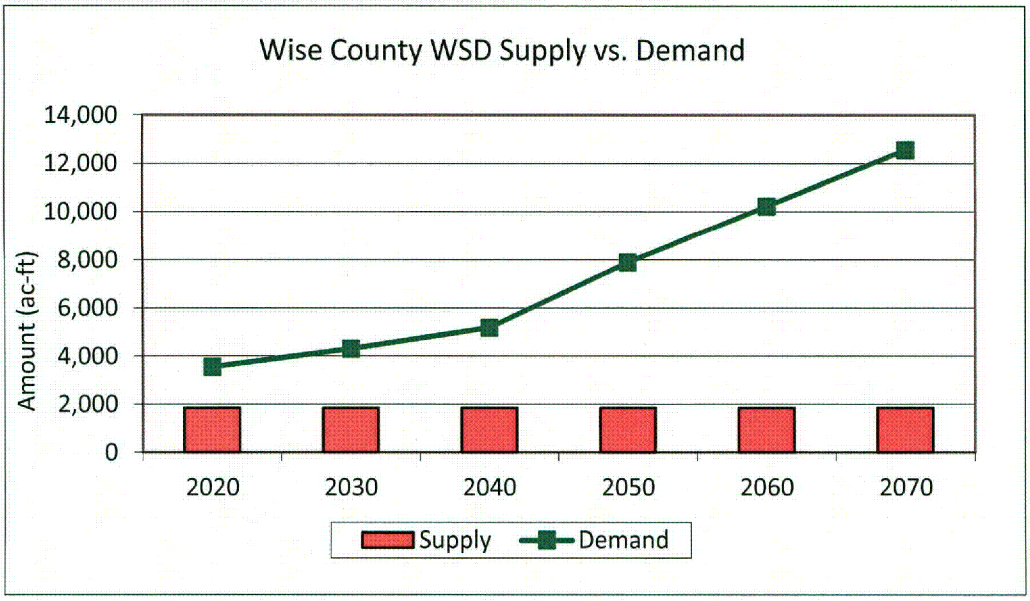
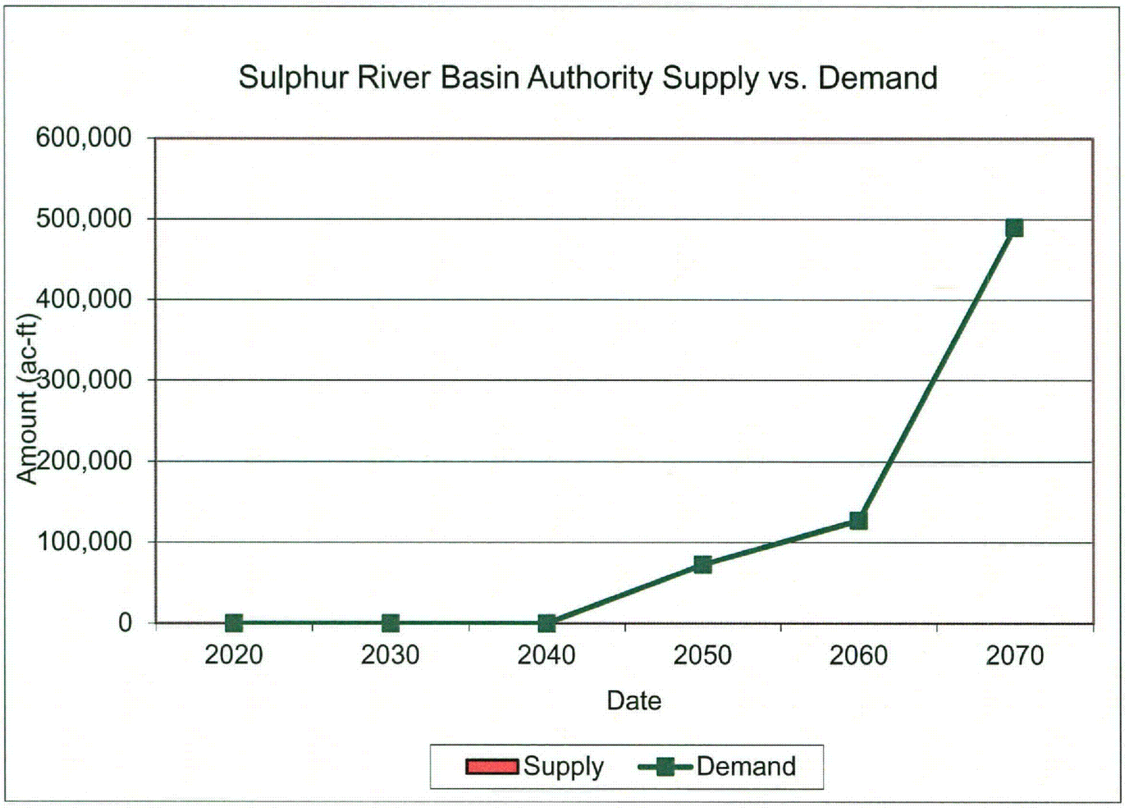


Table H.38
Sulphur River Basin Authority
-Values in Acre-Feet per Year-

Demand (acre-feet/yr)	2020	2030	2040	2050	2060	2070
Tarrant Regional Water District	0	0	0	72,670	72,670	280,000
North Texas Municipal Water District	0	0	0	0	45,367	174,800
Upper Trinity Regional Water District	0	0	0	0	9,083	35,000
Total	**0**	**0**	**0**	**72,670**	**127,120**	**489,800**

Current Supply	2020	2030	2040	2050	2060	2070
None	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**

Supplies Less Current Demands	0	0	0	-72,670	-127,120	-489,800



City of Arlington - Water Customer Contract Status						
				Use whichever column you prefer		
Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume (Acre-feet)	Contract Volume (MGD)	Notes
TREATED WATER CUSTOMER CONTRACTS						
Bethesda WSC	N/A					
Grand Prairie	2/9/2011	20 Years	**2/9/2031**		**2.5MGD**	No water has been delivered to date
Pantego	N/A					

CITY OF CORSICANA

	Contract	Contact	Contract Date/Amendments	Term	Expiration Date	Account No. & Meter Size	Max. Quantity in gpm/MG
1	Angus Water Supply 212 FM RD 739 Corsicana TX 75109	Jeanne Crespo/ O.M. Office 903-874-6773	Org. Contract 5/18/71 Contr Chg 4/16/75 10/16/2001 - Vol&Term-Vol Chg 11/9/10	45 Yrs	Oct. 16 2046	25-1032-01-2" 25-1371-01-4"	264 11.5632
2	B&B Water Supply 1501 # C N. 45th St. Corsicana TX 75151	Bobby Armstrong Office 903-872-0650 Cell 903-654-0054	Org. Contract 8/2/1966 12/26/1979 - Volume 08/05/1997 - Volume	20 Yrs	Aug. 20 2022	27-2610-01-4" 34-0192-01-4"	463 20
3	Chatfield Water Supply P.O. Box 158 Powell TX 75153-0158	Jim Metcalfe Office 903-345-3463 Cell 903-654-0364	Org. Contract 9/3/1967 02/05/1970 - Term 12/26/1979 - Volume 01/05/1982 - Volume 11/28/1995 Volume	40 Yrs	2050	26-0597-01-6" 26-0599-01-2" 26-0620-01-2"	1389 60
4	Community Water Beaton Lake P.O.Box 730	Scott Hampel Office 903-874-8244	New Contract 3/4/08	20 Yrs	2028	25-1034-01-2"	62 0.8208
5	Community Water Emhouse P.O. Box 730 Corsicana TX 75151	Scott Hampel Office 903-874-8244 Cell 903-654-2858	Org. Contract 2/3/1970 Volume 10/21/2003 Volume 4/20/2004	60 Yrs	2030	33-1815-01-4"	232 10
6	Community Water Northcrest P.O. Box 730 Corsicana TX 75151	Scott Hampel Office 903-874-8244 Cell 903-654-2858	Original Contract 8/18/2009	20 Yrs	2029	33-1435-01-2"	60 0.7776
7	Community Water Purdon P.O. Box 730 Corsicana TX 75151	Scott Hampel Office 903-874-8244 Cell 903-654-2858	Org. Contract 3/5/1968 11/6/90 - Volume New Contract 3/4/08	20 Yrs	2028	34-0660-02-2"	380 5.4
8	Community Water Retreat P.O. Box 730 Corsicana TX 75151	Scott Hampel Office 903-874-8244 Cell 903-654-2858	Org. Contract 11/16/1976 10/19/90 - Volume	20 Yrs	2028	25-1245-01-4"	640 8.3
9	Corbet Water Supply 1724 FM RD 2452 Corsicana TX 75110	David Weinkauf Office 903-874-4821 Cell 903-467-4835	Org. Contract 9/5/1967 12/26/79 - Volume 8/20/96 - Volume New Contract 10/21/2003	34 Yrs	Sept. 5 2037	28-1031-01-3" 34-0120-01-3"	695 30
10	Lakeside Water Supply 1501 Lake Halbert Rd. Corsicana TX 75110	Bill Stoner Home 903-874-2886 Office 903-872-6822	No Contract No Contract needed this is not a PWS They do not have enough connections			25-1358-01-2"	
11	M.E.N. Water Supply P.O. Box 3019 Corsicana TX 75151-3019	Dennis Donaho Office 903-872-1899 Home 903-874-6089	Org. Contract 3/19/1963 12/26/79 - Volume 12/06/84 - Volume 10/21/80 - Term 07/02/85 - Airport	38.75 Yrs	Mar. 19 2043	25-1370-01-3" 25-1410-01-4" 25-1367-01-1"	1042 40
12	Navarro Mills Water Supply 1160 FM RD 667 Purdon TX 76679	Mary Woods/ O.M. Jean Sanders/ B.P. Office 254-578-1618	Org. Contract 7/21/1970 04/03/90 - Volume 12/26/79 - Volume	75 Yrs	Jul. 1 2045	34-0725-01-6"	913 40
13	Northtown Acres Rt. 3 18770 FM 709N Dawson TX 76639-3003	Roger Richardson Home 254-578-1601 Cell 903-879-0839	Org. Contract 2/20/1973 12/20/88 - Volume 03/19/96 - Term	65 Yrs	Feb. 20 2038	33-2055-01-2"	114 5
14	North Pettys Chapel Rt. 3 18770 FM 709N Dawson TX	Roger Richardson Home 254-578-1601	Org. Contract 3/2/2010	20 Yrs	2030	26-1508-01-4"	30 1.315
15	Post Oak S.U.D. P. O. Box 246 Hubbard, TX 76648	Dorothy Jackson City Hall 254-576-2576 Office 254-576-2881	Org. Contract 12/1/1991 12/07/94 -Name Change 08/29/97 - Rate Chg. effective date	30 Yrs	2021	34-0800-02-8"	456 20
16	City of Blooming Grove P.O. Box 237 Blooming Grove TX 76626	Beth Nemeth City Hall 903-695-2711	Org. Contract 8/17/1976 10/06/87 - Volume 12/06/88 - Volume	40 Yrs	2016	34-0662-01-4"	343 15
17	City of Dawson P.O. Box 400 Dawson TX 76639	Randy Jankowski City Hall 254-578-1515 Cell 903-879-0504	Org. Contract Expired 1999 10/16/01 New Contract Volume 1/9/2007	20 Yrs	2021	34-0795-01-6"	417 18
18	City of Frost P.O. Box X	Danny Gillespie City Hall 903-682-3861	Org. Contract 4/5/1999 Volume 4/5/2005	40 Yrs	Apr. 1 2039	34-0735-01-4"	197 8.5
19	City of Kerens P.O. Drawer 160 Kerens TX	Cindy Scott City Hall 903-396-2971	Org. Contract 9/6/1994	20 Yrs	2014	26-0606-01-3"	228 10
20	Rice Water Supply P.O. Box 137 Rice TX 75155	Joey Smith Office 903-326-5551	Org. Contract 6/1/1974 06/15/76-Volume 12/20/88-Volume New Contract 9/17/2002 VOID CONTRACT 6/12/07	45 Yrs	2047	32-2145-01-8"	3473 150
21	City of Richland(Community Water)	Sharon Settlemyer City Hall 903-362-3707	Org. Contract 1/4/1995	40 Yrs	2035	25-1368-01-2"	278 12.167

Dallas County Park Cities MUD

Treated Water

customer		**University park**		**Highland Park**
contract date		Mar-04		Apr-04
term		20 yr		20 yr
extensions		2-10 yr extensions		2-10 yr extensions
volume		16MGD or 720k gph		12MGD or 500k gph

RAW

customer		**Grapevine**		**Brookhollow County club**
		sale equivalent of wwp discharge volume		
		ongoing contract		
volume		up to 4 MGD		up to 120 MG per year
term		40 yr term		20 yr term
contract date		Sep-00		Jan-11

WHOLESALE CONTRACTS ADMINISTERED BY DWU

WHOLESALE CUSTOMER	TYPE OF SERVICE	TERM YEARS	DATE START	DATE EXPIRE	MAXIMUM
Addison	Treated Water	30	1/6/2012	1/6/2042	Not Specified in Contract
Carrollton	Treated Water	30	6/29/2013	6/29/2043	Not Specified in Contract
Cedar Hill	Treated Water	30	9/26/1984	9/26/2014	Not Specified in Contract
Cockrell Hill	Treated Water	30	2/22/1984	2/22/2014	Not Specified in Contract
Combine WSC	Treated Water	30	12/14/2005	12/14/2035	Not Specified in Contract
Coppell	Treated Water	30	11/18/1987	11/18/2017	Not Specified in Contract
D/FW International Airport	Treated Water	30	10/23/1985	10/23/2015	Not Specified in Contract
Dallas County WCID #6	Treated Water	30	9/11/1985	9/11/2015	Not Specified in Contract
Denton	Untreated Water - MUNICIPAL USE	30	8/7/1985	8/7/2015	Not Specified in Contract
DeSoto	Treated Water	30	8/24/2013	8/24/2043	Not Specified in Contract
Duncanville	Treated Water	30	12/20/1984	12/20/2014	Not Specified in Contract
Ellis County WCID #1	Treated Water	30	8/13/2003	8/13/2033	Not Specified in Contract
Farmers Branch	Treated Water	30	8/1/2010	8/1/2040	Not Specified in Contract
Flower Mound	Treated Water	30	1/21/1987	1/21/2017	Not Specified in Contract
Glenn Heights	Treated Water	30	2/12/1992	2/12/2022	Not Specified in Contract
Grand Prairie	Treated Water	30	1/6/2012	1/6/2042	Not Specified in Contract
Grapevine	Untreated Water - MUNICIPAL USE	30	6/14/2000	6/14/2030	Not Specified in Contract
Hutchins	Treated Water	30	3/31/2012	3/31/2042	Not Specified in Contract
Irving	Treated Water	30	6/30/2003	6/30/2033	Not Specified in Contract
Irving	Treatment Services	30	6/30/2003	6/30/2033	63 MGD
Lancaster	Treated Water	30	11/11/2011	11/11/2041	Not Specified in Contract
Lewisville	Treated Water	30	6/4/1986	6/4/2016	Not Specified in Contract
Lewisville	Untreated Water - MUNICIPAL USE	30	12/17/1986	12/17/2016	Not Specified in Contract
Ovilla	Treated Water	30	12/14/2005	12/14/2035	Not Specified in Contract
Red Oak	Treated Water	30	8/13/2003	8/13/2033	Not Specified in Contract
The Colony	Treated Water	30	11/5/2010	11/4/2040	Not Specified in Contract
UTRWD	Untreated Water - MUNICIPAL USE	30	2/12/1992	2/12/2022	3650 MG/yr + Unspecified amount of water provided to certain entities.
Allen	Untreated Water - Irrigation	15	11/10/2010	11/09/2020	145,000,000 gallons
Carrollton (Indian Creek Golf Course)	Untreated Water - irrigation	15	2/27/2008	02/27/2018	146,633,000 gallons
Carrollton Farmers Branch I.S.D.	Untreated Water - irrigation	15	11/10/2010	11/09/2020	4,000,000
Garland's Firewheel Golf Park	Untreated Water - irrigation	30	3/24/1993	3/24/2023	155,576,000 gallons
Hewlett-Packard (formerly EDS)	Untreated Water - irrigation	25	10/14/1992	10/14/2017	287,075,000 gallons
Luminant Generation Company, LLC	Untreated Water - industrial	40	1/1/2011	1/1/2051	12,000 ac-ft
U.S. Army Corps	Untreated Water - industrial	25	6/13/1990	6/13/2015	29,326,500 gallons

Ennis

Customer	Contract Date	Amendment Date	Contract Term	Contract Volume	units	Type Water
Rice Water Supply Corp	5/20/1969	12/21/2010	none	300,000	gpd	Treated Water
East Garrett WSC	5/4/1999		20 yrs	356,000	gpd	Treated Water
Community Water Company	2/11/1999		21 yrs	237600	gpd	Treated Water

City of Fort Worth Wholesale Water Customer Contract Status					
			Contract	Contract Volume	
Customer Name	Contract Date	Contract Term	Expiration Date	FY2012 Usage (Gallons)	Notes
TREATED WATER WHOLESALE CUSTOMER CONTRACTS					
Aledo	01/01/11		09/30/31	0	They started taking water when line was completed in March 2013
Bethesda WSC	01/01/11		09/30/31	972,590,331	
Burleson	01/01/11		09/30/31	1,684,943,857	
Crowley	01/01/11		09/30/31	591,272,305	
D/FW Regional Airport	01/01/11		09/30/31	399,321,300	
Dalworthington Gardens	01/01/11		09/30/31	155,075,600	
Edgecliff Village	01/01/11		09/30/31	138,123,764	
Everman	01/01/11		09/30/31	0	Standby Customer
Forest Hill	01/01/11		09/30/31	459,858,162	
Grand Prairie	01/01/11		09/30/31	823,582,110	
Haltom City	01/01/11		09/30/31	1,892,324,440	
Haslet	01/01/11		09/30/31	165,824,562	
Hurst	01/01/11		09/30/31	2,041,911,410	
Keller	01/01/11		09/30/31	3,225,916,176	
Kennedale	01/01/11		09/30/31	121,230,412	
Lake Worth	01/01/11		09/30/31	266,420,329	
North Richland Hills	01/01/11		09/30/31	3,041,143,020	
Northlake	01/01/11		09/30/31	80,409,181	
Richland Hills	01/01/11		09/30/31	271,996,420	
River Oaks	01/01/11		09/30/31	28,900,720	Standby Customer
Roanoke	01/01/11		09/30/31	519,358,408	
Saginaw	01/01/11		09/30/31	1,109,996,510	
Sansom park	01/01/11		09/30/31	0	Standby Customer
Southlake	01/01/11		09/30/31	3,573,647,792	
TRA (Mosier Valley)	10/22/97	20 Years	10/22/17	0	**Supplemental Water Supply Agreement**
Trophy Club MUD #1	01/01/11		09/30/31	804,781,898	
Westlake	01/01/11		09/30/31	407,304,703	
Westover Hills	01/01/11		09/30/31	266,441,603	
Westworth Village	01/01/11		09/30/31	111,598,810	
White Settlement	01/01/11		09/30/31	447,541,977	
RAW WATER CUSTOMER CONTRACTS					
RECYCLED (REUSE) WHOLESALE WATER CUSTOMER CONTRACTS					
Arlington	02/02/10	20 Years	02/02/30	30,922,300	
DFW	02/02/10	20 Years	02/02/30	1,306,000	
Euless	02/02/10	20 Years	02/02/30	119,019,512	

Greater Texoma Utility Authority

	Date	Duration	Max Amt		source
One RAW Water Contract					
City of Sherman	1991	indefinite	35.5 MGD		source is Lake Texoma
Treated water contract with a group of cities*					
Mellissa, Anna, Van Alstyne, Howe	2005	indefinite	9.5 MGD		source is NTMWD

* 9.5 MGD shared among the cities - so far demand has not reached max amount

Mansfield

Customer	Contract Date	Amendment Date	Contract Term	Contract Volume	units	Comments*	Type Water
Johnson SUD	1/1/2008	1/1/2028	20 yrs	9	MGD	Only take 1 MG/Month	Treated Water
City of Grand Prairie	1/1/2008	1/1/2028	20 yrs	13	MGD	Do not take any water	Treated Water

City of Midlothian

Contract Water Customers City of Midlothian	Contract Effective Date	Contract Exp Date	Minimum take	Maximum take
International Power (ANP)	9/22/1998	20 yrs	6,083,340/mth	?
		+ Renewable/or		
		Extended		

Rockett Special Utility District	9/28/2010	20 yrs	2.0 MGD	2.5 MGD
		Renewable		

Mt Peak Special Utility District	12/10/1996	20 yrs	.25 MGD	1.00 MGD
		w/20 yr renewal	.25 MGD	1.00 MGD
			.26 MGD	1.00 MGD
			.27 MGD	1.00 MGD

			Required take	
			50% of contract	
City of Venus	1/4/2005	35 yrs	.275 MGD	.55 MGD
		Renewable	.295 MGD	.59 MGD
			.318 MGD	.63 MGD
			.335 MGD	.67 MGD

City of Grand Prairie	9/30/2005	30 yrs		4.0 MGD
		Renewable		

City of Grand Prairie Golf Crs	7/11/1994	20 yrs		1.0 MGD
(raw water transport)		w/20 yr renewal		

Mustang Special Utility District Water Customer Contract Status				
Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume (MGD)
TREATED WATER CUSTOMER CONTRACTS				
Southwest Water	3/1/2011	3 years	**3/1/2014**	**.3 MGD**

North Texas Municipal Water District

RWS - 2014 Annual Minimums (1,000 Gallons)

Members	
Allen	6,011,208
Farmersville	280,467
Forney	1,625,905
Frisco	9,977,663
Garland	13,721,955
McKinney	10,150,735
Mesquite	8,297,666
Plano	26,719,809
Princeton	485,886
Richardson	11,019,311
Rockwall	3,330,881
Royse City	526,912
Wylie	1,721,763
Total	93,870,161

Customers	
Able Springs	75,600
Bonham	640,000
Caddo Basin SUD	320,642
Cash SUD	305,643
College Mound WSC	66,769
Copeville WSC	81,827
East Fork SUD	379,152
Fairview	887,811
Fate	279,932
Fate #2	529,453
Forney Lake WSC	329,424
Gasonia-Scurry WSC	110,490
GTUA	237,250
Josephine	57,407
Kaufman	440,188
Kaufman Four-One*	528,801
Lavon WSC	225,073
Little Elm	1,160,174
Lucas	628,590
Melissa	225,305
Milligan WSC	149,894
Mt. Zion WSC	159,302
Murphy	1,384,066
Nevada WSC	47,179
Nevada WSC #2	70,985
North Collin WSC	346,058
Parker	533,654
Prosper	923,205
Rose Hill SUD	143,271
Rowlett	3,192,039
Sachse	1,332,153
Seis Lagos MUD	111,094
Sunnyvale	595,071
Terrell	1,400,000
Wylie NE SUD	197,289
Total	18,094,791
Total	111,964,952

*Kaufman Four-One Participants	
College Mound	74,721
Crandall	203,130
Gastonia-Scurry	204,014
Rose Hill	46,936
	528,801

Rocket SUD Water Customer Contract Status					
Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume (MGD)	Notes
ED WATER CUSTOMER CONTRACTS					
City of Ferris	10/15/2012	20 years	**10/15/2032**	**0.10 MGD**	
City of Palmer	2/18/2005	20 years	**2/18/2025**	**0.20 MGD**	
Sardis Lone Elm WSC	8/6/2009	20 years	**8/6/2029**	**0.20 MGD**	Increasing 0.040 MGD each year up to 1. MGD
Bardwell WSC	7/31/2013	20 years	**7/31/2032**	**0.065 MGD**	

City of Rockwall - Water Customer Contract Status

Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume (MGD)
TREATED WATER CUSTOMER CONTRACTS				
City of Heath	11/18/2005		Renewed Annually	**3.20**
RCH Water Supply Corporation	10/5/2009		12/31/2014	**2.10**
Blackland Water Supply Corporation	12/13/2007		12/31/2014	**1.81**

Sabine River Authority - Water Customer Contract Status					
Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume (Acre-feet)	Notes
TED WATER CUSTOMER CONTRACTS					
No treated water sales					
W WATER CUSTOMER CONTRACTS					
Cash SUD	10/1/2009	40 years	9/30/2049	5,804	Lake Tawakoni and Lake Fork (from Lake Tawakoni under Joint Use)
Dallas, Lake Tawakoni	7/14/1956	NA	NA	190,480	Lake Tawakoni
Dallas, Lake Fork	10/1/1981	NA	NA	131,860	Lake Fork
MacBee	10/1/2009	40 years	9/30/2049	2,240	Lake Fork (from Lake Tawakoni under Joint Use)
NTMWD/Terrell	1/1/2007	20 years	12/31/2026	10,081	Lake Tawakoni
NTMWD/Ables Springs	5/1/2013	20 years	4/30/2033	1,120	Lake Fork (from Lake Tawakoni under Joint Use)

Terrell Water Customer Contract Status					
Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume (MGD)	Notes
D WATER CUSTOMER CONTRACTS					
College Mound WSC	6/1/2007	40 Years	**6/1/2047 ***	**0.300**	1.) Contract Volume is expressed in average MGD.
Elmo WSC	6/1/2007	40 Years	**6/1/2047 ***	**0.197**	2.) Contracts are based on "Take or Pay".
High Point WSC	6/1/2007	40 Years	**6/1/2047 ***	**0.125**	3.) MGD contracted for will increase if usage exceeds
Lawrence WSC	6/1/2007	40 Years	**6/1/2047 ***	**0.075**	contact amount.
North Kaufman WSC	6/1/2007	40 Years	**6/1/2047 ***	**0.142**	* Contract term has option for a 20 year extension.
Poetry WSC	6/1/2007	40 Years	**6/1/2047 ***	**0.269**	

TRWD Water Customer Contract Status

Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume Acre-feet	Contract Volume MGD	Notes
MUNICIPAL						
Azle, City of	10/24/1989	40 Years	10/23/2029	1,680	1.50	
Benbrook Water and Sewer (Benbrook)	6/11/1992	40 Years	6/10/2032	3,380	3.02	
Bridgeport, City of	6/22/1988	40 Years	6/21/2028	1,700	1.52	
Community Water Supply	8/22/2002	40 Years	8/21/2042	1,850.56	1.65	
East Cedar Creek Fresh Water Supply District	10/16/1995	55 Years	10/15/2050	1,155	1.03	ECC/Trinidad Transaction
Fairfield, City of	1/15/2002	30 Years	1/14/2032	1,680	1.50	Hill/TRWD, Oct '10 Obligation
Jacksboro, City of	10/15/1987	40 Years	10/14/2027	263	0.23	
Kemp, City of	11/16/1998	25 Years	11/16/2023	600	0.54	
Mabank, City of	8/23/1995	20 Years	8/22/2015	1,870	1.67	ECC/Mabank CCN Swop
Malakoff, City of	8/30/2000	40 Years	8/29/2040	560	0.50	
Monarch Utilities (Southwest Water Co.)	11/20/2003	30 Years	11/19/2033	1,020	0.91	
River Oaks, City of	5/11/1993	40 Years	5/10/2033	1,344	1.20	
Runaway Bay, City of	8/25/2004	40 Years	8/24/2044	1,120.14	1.00	
Springtown, City of	7/25/2002	30 Years	7/24/2032	1,344	1.20	
Star Harbor, City of	1/7/2009	30 Years	1/6/2039	168	0.15	Meter Issue
TRA - Ellis County Contract #1	12/3/1991	40 Years	12/2/2031	16,117.92	14.39	
TRA - Ellis County Contract #2	7/19/1993	40 Years	7/18/2033	2,240	2.00	
TRA - City of Ennis	7/9/2002	30 Years	7/8/2032	3,988	3.56	FY2012 Annual TOP Waiver
TRA - Midlothian	12/12/2003	30 Years	12/11/2033	10,081.30	9.00	FY2012 Annual TOP Waiver
Walnut Creek Special Utility District	9/14/1992	40 Years	9/13/2032	2,200	1.96	
Weatherford, City of (Benbrook)	6/26/2001	30 Years	6/25/2031	5,892	5.26	
Weatherford, City of (Parker County)	6/26/2001	30 Years	6/25/2031	2,770	2.47	
West Cedar Creek MUD	12/1/1996	20 Years	11/30/2016	1,614	1.44	
West Wise Special Utility District	11/6/1981	43 Years	11/5/2024	986	0.88	
Winkler Water Supply Corporation	3/26/1995	40 Years	3/25/2035	560	0.50	
Wise County Water Supply District	9/10/1997	40 Years	9/9/2037	4,000	3.57	
INDUSTRIAL						
Brazos Electric Cooperative/Duke Energy	11/20/2007	30 Years	11/19/2037	5,429	4.85	
Blue Star Materials						Informal Request to Contract,
Exelon	1971	6/29/2055		N/A	N/A	
Freestone/Calpine (Freestone Power)	11/16/2001	20 Years	11/15/2021	6,722	6.00	
Hanson Aggregates LLC (Beazer- West)	12/18/1990	25 Years	12/17/2015	1,475	1.32	
Luminant (TXU Forest Grove)	3/15/1976	3/14/2016				
Martin Marrietta Materials	1/15/2008	5 Years	1/14/2018	1,200	1.07	Renewed in 2012 for another
Suez/Wise County Power (Tractebel)	2/4/2000	30 Years	2/3/2030	5,772	5.15	
Trinity Materials, Inc. (Big Sandy Creek)	10/28/2009	5 Years	10/27/2014	100	0.09	
Tristream East Texas, LLC (Regency)	8/1/2010	10 Years	7/31/2020	150	0.13	
TXU Electric - Eagle Mountain Lake	5/6/2002	50 Years	5/5/2052	N/A	N/A	
TXI Operations (formerly Texas Industries)	3/11/2010	15 Years	3/10/2025	1,200	1.07	
IRRIGATION						
505 Cedar Creek Ranch - Polo						Informal Request to Contract,
Benbrook, City of (Tap at EM Connection)	2/10/2009	10 Years	2/9/2019	76.60	0.07	
Hawks Creek Golf Club	7/1/2006	10 Years	6/30/2016	350	0.31	
Cedar Creek County Club	4/27/2005	10 Years	4/26/2015	125	0.11	
Eagle Mountain Country Club	10/29/2003	10 Years	10/1/2013	300	0.27	2013 Renewal
Fort Worth Country Day School	2/27/2008	10 Years	2/26/2018	153.45	0.14	
Post Oak Ranch, LP	8/7/2009	10 Years	8/6/2019	76.72	0.07	
Long Cove Ranch (formerly McNarosa Ranch Co	9/4/2007	10 Years	9/3/2017	30	0.03	
MV Club (formerly Mira Vista)	5/18/1993	25 Years	5/17/2018	568	0.51	
Pinnacle Holdings	5/6/2004	10 Years	10/1/2014	125	0.11	
The Resort at Eagle Mountain Lake	8/29/2009	1 Year, 4 Months	12/31/2010	350	0.31	404 Permit, Aeration Issue
Ridglea Country Club	5/18/1993	25 Years	5/17/2018	475.58	0.42	
Warrior Acquisitions, L.L.C. (Bay Golf Course, Ro	8/25/2004	10 Years	10/1/2014	124	0.11	
Whitestone Golf Club	8/12/1998	25 Years	8/11/2023	400	0.36	
Shady Oaks Country Club	10/29/1990	25 Years	10/28/2015	575	0.51	
MISCELLANEOUS CONTRACTS						
City of Corsicana	1985	N/A	N/A			
Texas Parks and Wildlife Department	No Contract	N/A	N/A			
City of Trinidad (Town of Trinidad)	No Contract	N/A	N/A			
Temporary Raw Water Supply Contracts - Not to exceed 10 acre-feet per year						
Azle Little League	10/21/2009	2 Years	10/20/2011			
Azle Youth Association	10/31/2009	2 Years	10/30/2011			
Golf Driving Range, Inc.	4/30/2008	3 Years	4/30/2011			
K'Ohana Properties, Ltd.	6/15/2009	2 Years	6/15/2011			
Lodge Homeowner's Association	8/1/2009	1 Year	7/31/2011			
Shady Oaks Golf/Bill Sisul	7/16/2007	10 Years	7/16/2016			
INITIAL CONTRACTING PARTIES						
City of Arlington	1982	Life of TRWD System				
City of Fort Worth	1982	Life of TRWD System				
City of Mansfield	1982	Life of TRWD System				
Trinity River Authority	1982	Life of TRWD System				

Upper Neches River Municipal Water Authority - Water Customer Contract Status						
Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract (Acre-feet)	Contract (MGD)	Notes
TREATED WATER CUSTOMER CONTRACTS						
None						
RAW WATER CUSTOMER CONTRACTS						
Monarch Utilities	1/1/2000	10yrs/5 yr ren	**1/15**	**100/yr**		
City of Dallas	2/28/1972	perpetual	**N/A**	**114,337/yr***	~102 mgd	*53.73% of calculated dependable annual yield
City of Tyler	9/21/1965	perpetual	**N/A**	**67,200/yr***	~60 mgd	*40.00% of calcuated dependable annual yield
City of Palestine	2/22/1999	perpetual	**N/A**	**28,000/yr***	~25 mgd	*13.16% of calculated dependable annual yeild
INDUSTRIAL CUSTOMER CONTRACTS						
None						
IRRIGATION CUSTOMER CONTRACTS						
Emerald Bay (Golf Course)	7/1/1987	Indefinite	**N/A**	**105**		
Arborgen (International Paper)	1/26/1982	99 years	**1/25/2081**	**300**		

UTRWD Water Customer Contract Status					
Customer Name	**Contract Date**	**Contract Term**	**Contract Expiration Date**	**Contract Volume (MGD)**	**Notes**
EATED WATER CUSTOMER CONTRACTS					
Argyle	NA	NA	NA	**NA**	Argyle Water Supply
Aubrey	3/18/1999	30 yrs	3/17/2029	**0.10**	
Bartonville	NA	NA	NA	**NA**	Cross Timbers Water Supply
Celina	2/14/2000	30 yrs	2/13/2030	**2.50**	
Copper Canyon	NA	NA	NA	**NA**	Cross Timbers Water Supply
Corinth	11/13/1990	30 yrs	11/12/2020	**7.50**	
FWSD #1A (Castle Hills)	5/7/1992	30 yrs	5/6/2022	**3.00**	
FWSD #7 (Lantana)	11/15/2001	24 yrs 7 mo	6/26/2025	**3.00**	
Double Oak	NA	NA	NA	**NA**	Cross Timbers Water Supply
Flower Mound	5/7/1992	30 yrs	5/6/2022	**30.00**	
Highland Village	11/13/1990	30 yrs	11/12/2020	**3.00**	
Justin	7/6/2000	30 yrs	7/5/2030	**0.75**	
Krum	9/18/2003	30 yrs	9/17/2033	**0.40**	
Lake Cities MUA	11/13/1990	30 yrs	11/12/2020	**3.80**	
Lincoln Park	5/6/1999	30 yrs	5/5/2029	**0.10**	
Mustang SUD	11/19/1998	30 yrs	11/18/2028	**2.80**	
Oak Point	NA	NA	NA	**NA**	Mustang Special Utility
Sanger	11/13/1990	30 yrs	11/12/2020	**0.50**	
Argyle WSC	11/2/1990	30 yrs	11/1/2020	**2.00**	
Bartonville WSC	11/2/1990	30 yrs	11/1/2020	**2.50**	
Crossroads	NA	NA	NA	**NA**	Mustang Special Utility
FWSD #8A (Paloma Creek)	8/29/2001	25 yrs	8/28/2026	**2.17**	
FWSD #11A (Paloma Creek)	8/29/2001	25 yrs	8/28/2026	**3.00**	
FWSD #9 (Providence Village WCID)	8/29/2001	25 yrs	8/28/2026	**2.40**	
FWSD #10 (Savannah)	8/29/2001	25 yrs	8/28/2026	**2.40**	
Hickory Creek	NA	NA	NA	**NA**	Cities Municipal Utility
Lake Dallas	NA	NA	NA	**NA**	Cities Municipal Utility
Northlake	12/2/2010	25 yrs	12/1/2035	**0.50**	
Shady Shores	NA	NA	NA	**NA**	Cities Municipal Utility
NON POTABLE CONTRACTS					
FWSD #1A (Castle Hills)	3/8/1995	30 yrs	3/8/2025		

City of Waxahachie Water Customer Contract Status					
				ichever column you	
Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume (MGD)	Notes
WATER CUSTOMER CONTRACTS					
Nash Forreston WSC	3/19/2012	40-years	**3/18/2052**	**< 0.250 MGD**	
Hilco Electric Coop	11/3/2003	20-years	**11/17/2023**	**0 mgd currently**	On as needed basis.
Rockett SUD	12/18/1996	20-years	**12/17/2016**	**1.5 mgd**	Currently Inactive

Weatherford Water Customer Contract Status					
Customer Name	Contract Date	Contract Term	Contract Expiration Date	Contract Volume (MGD)	Notes
ATED WATER CUSTOMER CONTRACTS					
Hudson Oaks	7/23/2012	20 years	**7/23/2032**		
AW WATER CUSTOMER CONTRACTS					
Brazos Electric Power	3/26/1999				Billed no less than 25 acre feet per year @ $100/acre ft
First National Bank of Granbury	12/28/2011	1 year	**automatic 1 yr renewal**		Billed at current TRWD system rate; also subject to electrical usage required to pump purchased raw water from Benbrook

Appendix I

APPENDIX I

WATER SUPPLY AVAILABLE TO REGION C

APPENDIX I

WATER SUPPLY AVAILABLE TO REGION C

Table I.1 shows the overall water supply available to Region C. Table I.2 shows the overall water supply available to Region C that was reported in the *2011 Region C Water Plan* [1]. The decrease in overall water supply from the *2011 Region C Water Plan* [1] is mainly due to the decreased yield in Lake Chapman from the new critical drought period and decreased supplies from the use of safe yields by Dallas Water Utilities (DWU) and Tarrant Regional Water District (TRWD). The rest of the appendix explains the sources of the data in Table I.1. The table represents the water supply that might be available to the region, whether it is currently connected to a water user group or not. The table is based on:

- Existing water rights [2,3]
- Available supply for reservoirs
- Reliable supplies from run-of-the-river diversions
- Available supply from groundwater
- Estimated local supplies for mining and livestock
- Existing and permitted reuse supplies

Limits to water supply due to current water transmission facilities and wells are not considered in the development of Table I.1. They are considered in Appendix J, Current Supplies by Water User Group.

Table I.1
Overall Water Supply Availability in Region C
(Acre-Feet per Year)

SUMMARY	2020	2030	2040	2050	2060	2070
Reservoirs in Region C	1,275,970	1,256,257	1,236,417	1,216,578	1,196,738	1,177,262
Local Irrigation	8,734	8,734	8,734	8,734	8,734	8,734
Other Local Supply	19,931	19,931	19,931	19,931	19,931	19,931
Surface Water Imports	581,567	531,265	520,931	510,717	501,415	491,109
Groundwater	146,178	146,190	146,188	146,135	146,132	146,096
Reuse	283,893	316,972	343,226	380,051	408,880	427,011
REGION C TOTAL	**2,316,273**	**2,279,349**	**2,275,427**	**2,282,147**	**2,281,830**	**2,270,143**

Table I.2
2011 Plan [1] – Overall Water Supply Availability in Region C
(Acre-Feet per Year)

SUMMARY	2010	2020	2030	2040	2050	2060
Reservoirs in Region C	1,342,326	1,335,224	1,327,817	1,320,283	1,312,749	1,305,213
Local Irrigation	20,205	20,205	20,205	20,205	20,205	20,205
Other Local Supply	23,701	23,701	23,701	23,701	23,701	23,701
Surface Water Imports	598,775	576,120	552,672	549,222	545,782	542,352
Groundwater	146,152	146,152	146,152	146,152	146,152	146,152
Reuse	203,974	246,510	289,995	312,972	321,405	336,082
REGION C TOTAL	**2,335,133**	**2,347,912**	**2,360,542**	**2,374,535**	**2,369,994**	**2,373,705**
Change from 2011 Plan to 2016 Plan		**-84,210**	**-113,930**	**-132,283**	**-134,341**	**-138,533**

Water Supply Systems and Reservoirs

Table I.3 presents the water availability for water supply systems and reservoirs in Region C. The table also shows the water availability that was presented in the *2011 Region C Water Plan* [1]. In accordance with the Texas Water Development Board's (TWDB) established procedures [4], these surface water supplies are determined using the TCEQ-approved Water Availability Models (WAM). .WAMs have been completed for each of the major river basins in Texas. The WAM models were developed for the purpose of reviewing and granting new surface water rights permits. The assumptions in the WAM models are based on the legal interpretation of water rights, and in some cases do not accurately reflect current operations. Availabilities for each water right are analyzed in priority date order, with water rights with the earliest permit date diverting first. WAM Run 3, which is the version used for planning, assumes full permitted diversions by all water rights and no return flows unless return flows are specifically required in the water right. Run 3 also does not include agreements or operations that are not reflected in the water right permits and does not account for reductions in reservoir capacities due to sediment accumulation. For planning purposes, adjustments were made to the WAMs to better reflect current and future surface water conditions in the region. Generally, changes to the WAMs included:

- Assessment of reservoir sedimentation rates and calculation of area-capacity conditions for 2000 and 2060 conditions.
- Inclusion of subordination agreements not already included in the TCEQ WAM
- Inclusion of system operation where appropriate

- Other corrections

The reliable supply from run-of-the-river diversions was calculated as the minimum monthly diversion for the permitted water rights located on the main stem and tributaries of the river and are based on the Texas Commission on Environmental Quality Water Availability Model (WAM) run 3.

Specific adjustments to the WAMs to more accurately reflect the water rights and agreements for water supply sources in Region C are:

Trinity River Basin WAM

- Modeling of Lake Jacksboro and Lost Creek Reservoir as a system.
- Modeling of Tarrant Regional Water District's West Fork reservoirs (Bridgeport, Eagle Mountain, and Worth) as a system.
- Inclusion of a minimum elevation for Lake Fairfield (305.0 ft. msl). This is the minimum operating elevation for the intake to the power plant according to the *1999 Volumetric Survey of Fairfield Lake* prepared by the Texas Water Development Board.
- Modeling of Dallas' water rights in the Elm Fork of the Trinity River as a system with Lake Lewisville and Ray Roberts.

Red River Basin WAM

- Modeling of Lake Randell and Valley Lake as stand-alone reservoirs without Lake Texoma backups for the firm yield calculation of these two reservoirs. Backup supply for these reservoirs from Lake Texoma is included in the supplies from Lake Texoma. This prevents double counting of the makeup water from Lake Texoma. For firm yield calculations for reservoirs other than Lake Randell, Valley Lake and Lake Texoma, the backups for Lake Randell and Valley Lake were retained.
- Use of water from Lake Texoma is authorized by multiple Texas water rights and Oklahoma water rights, as well as authorizations by the US Congress and contracts with the Corps. In the TCEQ Red River WAM, each Texas water right is given its own "evaporation allocation" pool. Oklahoma's share of the lake, storage reserved for hydropower and dead storage in the reservoir are given their own pools as well. This type of modeling facilitates water availability modeling of the individual water rights but does not allow a meaningful calculation of the firm yield of the entire reservoir. To enable calculation of the overall firm yield of Lake Texoma, FNI modeled Lake Texoma as a single reservoir with multiple priority dates for the conservation storage and diversion, plus inactive storage corresponding to the dead storage. For the firm yield calculation of other reservoirs, multiple storage pools were retained in Lake Texoma.
- Currently the U.S. Congress has allocated 450,000 acre-feet of storage in Lake Texoma for water supply use - the original 150,000 acre-feet for Texas, 150,000 acre-feet for Oklahoma, plus the 150,000 acre-feet reallocated from hydropower storage currently contracted to NTMWD and GTUA. In the TCEQ WAM, an additional 100,000 acre-feet of new storage plus 113,000 acre-feet per year of diversion was added to the Oklahoma portion of the reservoir. The reason for this

addition is not clear, but it does mirror NTMWD's most recent application for a new Texas water right in the reservoir. Since this portion of the model does not reflect any existing or proposed use by the State of Oklahoma, FNI removed this portion of the model. (TCEQ currently assumes a diversion of 168,000 acre-feet per year from the existing 150,000 acre-feet of storage reserved for Oklahoma. Currently there are less than 5,000 acre-feet per year of permitted Oklahoma diversions.)

- Addition of 50,000 acre-feet of storage and 56,500 acre-feet per year of diversion from Lake Texoma corresponding to the recent water right obtained by the Greater Texoma Utility Authority. This water right has been granted by TCEQ but was not included in the Red River WAM used as the basis for the Region C model.
- Removal of diversion backups of individual Texas water rights in Lake Texoma from the hydropower pool. All Texas water rights are 100% reliable in the WAM, so these backups are not invoked in the WAM. The code was removed because it made the modeling unnecessarily complicated.

Unless there were changed conditions (new water rights, WAM modifications, new area/capacity relationships, other), the firm yields from the *2011 Region C Water Plan* [1] were used, extrapolating 2070 from 2060. The Region C reservoirs for which new firm yields were calculated include the Elm Fork of the Trinity River System, Forest Grove Reservoir, and Lake Lavon. The Elm Fork System and Lake Lavon yields were updated to reflect new area/capacity relationships. The yield for Forest Grove was updated to reflect that the gates on the dam at the reservoir have not been closed.

TRWD has elected to show the currently available supplies for the reservoirs they obtain water from as safe yields, rather than firm yields, based on the operation of these reservoirs. DWU has also elected to do this for most of their reservoirs. Both the firm yield and safe yields are reported for these reservoirs. However, the safe yield is what is used to determine the overall water supply availability in Region C.

At the end of this appendix, Table I.10 summarizes the WAM models used for the 2016 Region C Plan.

Imports to Region C

Supplies from Lake Chapman were determined using the Sulphur River Basin WAM with extended hydrology to include the new critical period for the reservoir.

The yields for Lake Fork and Lake Tawakoni were updated from the *2011 Region C Water Plan* [1] yields to reflect new area/capacity relationships. The new yields were provided to Region D for inclusion in the 2016 Region D Water Plan.

Region C has very few water supplies in the Brazos River Basin. Thus, the water availability information as determined by the Brazos G Regional Water Planning Group was adopted.

For Lake Palestine and Lake Athens, both in the Neches River Basin, the water availability information as determined by the Region I Water Planning Group was adopted. For Lake Livingston, the water availability information as determined by the Region H Water Planning Group was adopted.

WATER SUPPLY SYSTEMS

The water supply systems listed are operated as physical systems – the water they provide cannot easily be separated by individual source. The supply available is based on the calculation of the Water Availability Models (WAMs), as described above. More detailed discussions on water supply available for each system are given below. Unless otherwise noted, the 2070 yields shown below were extrapolated from the 2060 yields calculated for the *2011 Region C Water Plan* [1].

Lost Creek/Jacksboro System (Jacksboro). Lake Jacksboro is a 2,129 acre-foot reservoir located just outside of the City of Jacksboro in the Trinity River Basin in Jack County, and Lost Creek Reservoir is an 11,961 acre-foot reservoir located 1.5 miles downstream of the Lake Jacksboro dam. The City of Jacksboro holds a water right for the combined use of both reservoirs for municipal water supply and the right to divert 1,440 acre-feet per year. The water right authorizes the reservoirs to be operated as a system, so the WAM was modified to include system operation and the subordination agreement with TRWD. According to the WAM, the firm yield from this system as of 2070 is 1,597 acre-feet per year. The available supply from this system is limited to 1,597 acre-feet per year, which is the permitted amount of 1,397 plus 200 acre-feet per year of return flows that Jacksboro is authorized to use.

West Fork including Bridgeport Local System (Tarrant Regional Water District). Tarrant Regional Water District's West Fork Reservoir system is comprised of Lake Bridgeport, Lake Worth, and Eagle Mountain Lake. The WAM was modified to include the system operation of these three reservoirs. The resulting combined system firm yield was 123,459 acre-feet per year in 2020 and 120,570 acre-feet per year in 2070.

Table I.3
Currently Available Surface Water Supplies from Reservoirs in Region C
(Not Considering Transmission Constraints)
(Acre-Feet per Year)

	Water Right Number(s)	Basin	Revised Surface Water Availability						Surface Water Availability in 2011 Plan					
			2020	2030	2040	2050	2060	2070	2010	2020	2030	2040	2050	2060
WATER SUPPLY SYSTEMS														
Lost Creek/ Jacksboro System		Trinity	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597	1,597
West Fork (includes Bridgeport Local) [a]		Trinity	96,458	95,625	94,792	93,958	93,125	92,292	109,833	109,167	108,500	107,833	107,167	106,500
Elm Fork/ Lewisville/ Ray Roberts (Dallas) [a]		Trinity	172,975	165,580	158,185	150,791	143,396	136,001	184,801	183,733	182,665	181,597	180,529	179,459
Grapevine - Dallas [a]		Trinity	7,367	7,150	6,933	6,717	6,500	6,283	7,583	7,367	7,150	6,933	6,717	6,500
Subtotal Systems			**278,397**	**269,952**	**261,507**	**253,063**	**244,618**	**236,173**	**303,814**	**301,864**	**299,912**	**297,960**	**296,010**	**294,056**
RESERVOIRS IN REGION C														
Cedar Creek [a]	4976C	Trinity	159,367	157,850	156,333	154,817	153,300	151,783	175,000	175,000	175,000	175,000	175,000	175,000
Richland-Chambers (TRWD) [a]	5030, 5035C	Trinity	186,600	182,700	178,800	174,900	171,000	167,100	210,000	210,000	210,000	210,000	210,000	210,000
Richland-Chambers (Corsicana) and Lake Halbert	5030, 5035C	Trinity	13,863	13,855	13,847	13,838	13,830	13,822	13,872	13,863	13,855	13,847	13,838	13,830
Moss	4881	Red	7,410	7,410	7,410	7,410	7,410	7,410	7,410	7,410	7,410	7,410	7,410	7,410
Lake Texoma (Texas' Share – NTMWD)	5003	Red	197,000	197,000	197,000	197,000	197,000	197,000	190,300	190,300	190,300	190,300	190,300	190,300
Lake Texoma (Texas' Share – GTUA)	4301B, 4301C	Red	83,200	83,200	83,200	83,200	83,200	83,200	81,500	81,500	81,500	81,500	81,500	81,500

Table I.3, Continued

	Water Right Number(s	Basin	Revised Surface Water Availability						Surface Water Availability in 2011 Plan					
			2020	2030	2040	2050	2060	2070	2010	2020	2030	2040	2050	2060
Lake Texoma (Texas' Share – Denison)	4901	Red	24,400	24,400	24,400	24,400	24,400	24,400	24,400	24,400	24,400	24,400	24,400	24,400
LakeTexoma (Texas' Share – Luminant)	4900	Red	16,400	16,400	16,400	16,400	16,400	16,400	16,400	16,400	16,400	16,400	16,400	16,400
Lake Texoma (Texas' Share – RRA)	4898, 4899	Red	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250
Randell	4901	Red	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
Valley	4900	Red	0	0	0	0	0	0	0	0	0	0	0	0
Bonham	4925	Red	5,340	5,340	5,340	5,340	5,340	5,340	5,340	5,340	5,340	5,340	5,340	5,340
Ray Roberts (Denton)	2335A, 2455B	Trinity	18,902	18,733	18,564	18,395	18,226	18,057	18,980	18,720	18,460	18,200	17,940	17,680
Lewisville (Denton)	2348, 2456	Trinity	7,817	7,715	7,613	7,512	7,410	7,308	7,918	7,817	7,715	7,613	7,512	7,410
Benbrook [(a)]	5157A	Trinity	5,417	5,400	5,383	5,367	5,350	5,333	6,833	6,833	6,833	6,833	6,833	6,833
Weatherford	3356	Trinity	2,923	2,880	2,837	2,793	2,750	2,707	2,967	2,923	2,880	2,837	2,793	2,750
Grapevine (PCMUD)	2362A, 2363A, 2458C	Trinity	16,900	16,750	16,600	16,450	16,300	16,150	17,050	16,900	16,750	16,600	16,450	16,300
Grapevine (Grapevine)	2362A, 2363A, 2458C	Trinity	1,983	1,950	1,917	1,883	1,850	1,817	2,017	1,983	1,950	1,917	1,883	1,850
Arlington [(a)]	3391	Trinity	7,667	7,550	7,433	7,317	7,200	7,083	9,850	9,700	9,550	9,400	9,250	9,100

Table I.3, Continued

	Water Right Number(s	Basin	Revised Surface Water Availability						Surface Water Availability in 2011 Plan					
			2020	2030	2040	2050	2060	2070	2010	2020	2030	2040	2050	2060
Joe Pool	3404C	Trinity	14,883	14,575	14,267	13,958	13,650	13,342	15,192	14,883	14,575	14,267	13,958	13,650
Mountain Creek	3408	Trinity	6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400	6,400
North		Trinity	0	0	0	0	0	0	0	0	0	0	0	0
Lake Ray Hubbard (Dallas)	2462H	Trinity	56,113	54,800	53,487	52,173	50,860	49,547	57,427	56,113	54,800	53,487	52,173	50,860
White Rock	2461B	Trinity	3,200	2,900	2,600	2,300	2,000	1,700	3,500	3,200	2,900	2,600	2,300	2,000
Terrell	4972	Trinity	2,267	2,250	2,233	2,217	2,200	2,183	2,283	2,267	2,250	2,233	2,217	2,200
Clark	5019	Trinity	210	210	210	210	210	210	210	210	210	210	210	210
Bardwell	5021A	Trinity	9,600	9,295	8,863	8,432	8,000	7,931	9,600	9,600	9,295	8,863	8,432	8,000
Waxahachie	5018	Trinity	2,800	2,695	2,590	2,485	2,380	2,275	2,905	2,800	2,695	2,590	2,485	2,380
Forest Grove	4983	Trinity	8,653	8,590	8,527	8,463	8,400	8,337	8,767	8,693	8,620	8,547	8,473	8,400
Trinidad City Lake	5291	Trinity	450	450	450	450	450	450	450	450	450	450	450	450
Trinidad	4970	Trinity	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050	3,050
Navarro Mills	4992	Trinity	18,333	17,325	16,317	15,308	14,300	13,292	19,342	18,333	17,325	16,317	15,308	14,300
Fairfield	5040	Trinity	870	870	870	870	870	870	870	870	870	870	870	870
Bryson	[illegible]	Brazos	0	0	0	0	0	0	0	0	0	0	0	0
Mineral Wells	4039	Brazos	2,495	2,483	2,470	2,458	2,445	2,433	2,508	2,495	2,483	2,470	2,458	2,445
Teague City Lake	5291	Brazos	189	189	189	189	189	189	189	189	189	189	189	189
Lake Lavon	2410G	Trinity	108,920	107,140	105,360	103,580	101,800	100,020	112,033	110,767	109,500	108,233	106,967	105,700
Muenster	2323	Trinity	300	300	300	300	300	300	300	300	300	300	300	300
Subtotal Reservoirs			**997,573**	**986,305**	**974,910**	**963,515**	**952,120**	**941,088**	**1,038,513**	**1,033,359**	**1,027,905**	**1,022,323**	**1,016,739**	**1,011,157**
TOTAL			**1,275,970**	**1,256,257**	**1,236,417**	**1,216,578**	**1,196,738**	**1,177,261**	**1,342,327**	**1,335,223**	**1,327,817**	**1,320,283**	**1,312,749**	**1,305,213**

[a] Amounts reported for 2016 Plan are safe yields.

Under current conditions, this system provides somewhat less supply than shown. With existing facilities, it is not possible to divert water from Lake Worth when the lake is drawn down more than four feet, which makes some of the water stored in Lake Worth unavailable. In addition, the Tarrant Regional Water District operates its water supplies on a safe yield basis, which provides a smaller supply than the firm yield numbers shown. (In safe yield operation, the user takes less than the firm yield in order to leave a reserve supply in the reservoir in case a drought worse than any historical drought occurs). The safe yield for the West Fork System, which includes Eagle Mountain Lake, Lake Worth, and Lake Bridgeport, is 96,458 acre-feet per year in 2020 and 92,292 acre-feet per year in 2070.

Elm Fork/Lake Lewisville/Ray Roberts System (Dallas). This system, owned by Dallas, is comprised of Lake Lewisville, Lake Ray Roberts, and run-of-the-river rights from Elm Fork. The WAM was modified to include the system operation of these supplies. The resulting combined system yield was 184,166 acre-feet per year in 2020 and 179,907 acre-feet per year in 2070. The firm yield is higher than what was shown in the *2011 Region C Water Plan* (1) due to changes made in the WAM with respect to the area/capacity relationships. The increase from the available supply shown in the *2011 Region C Water Plan* (1) is due to using a lower sedimentation rate, which was calculated using the 2008 volumetric survey of Lake Ray Roberts. The safe yield of the reservoir system in 2070 is 136,001 acre-feet per year.

Lake Grapevine (Dallas). Dallas includes its portion of supply from Lake Grapevine in its system operation with Elm Fork/Lewisville/Ray Roberts. The WAM was modified to include this system operation. The resulting yield for Dallas' portion of Lake Grapevine was 7,367 acre-feet per year in 2020 and 6,283 acre-feet per year in 2070. The WAM modeling for Lake Grapevine does not include the Lake Grapevine Accounting Plan.

RESERVOIRS IN REGION C

All major reservoirs in Region C as well as some smaller reservoirs used for municipal supply are listed in Table I.3. The supply available is based on the calculation of the Water Availability Models (WAMs), which limits the supply to the lesser of the firm yield or the permit amount. In some cases the safe yield is used as the supply available based on operational policies of the reservoir.

Cedar Creek. Cedar Creek Reservoir is located on Cedar Creek in the Trinity River Basin in Henderson and Kaufman Counties. The reservoir has a permitted conservation storage of 678,900 acre-feet. Tarrant Regional Water District holds a water right for diversion of 175,000 acre-feet per year. According to the

WAM, the firm yield is 209,667 acre-feet per year in 2020 decreasing to 204,083 acre-feet per year by 2070. The available supply from Cedar Creek is limited to the permit amount of 175,000 acre-feet per year. The safe yield, which TRWD operates its supplies based on, is 159,367 acre-feet per year in 2020 decreasing to 151,783 acre-feet per year in 2070.

Richland-Chambers (and Lake Halbert). Richland-Chambers Reservoir is located on Richland Creek in the Trinity River Basin in Freestone and Navarro Counties. The reservoir has a permitted conservation storage of 1,135,000 acre-feet. Tarrant Regional Water District and City of Corsicana hold water rights in the reservoir (210,000 acre-feet per year for TRWD and 13,650 acre-feet per year for Corsicana). According to the WAM, the firm yield of the TRWD water right is 222,467 acre-feet per year in 2020, decreasing to 207,883 acre-feet per year by 2070. The available supply to TRWD from Richland-Chambers is limited to the permitted amount of 210,000 acre-feet per year. The safe yield is 186,600 acre-feet per year in 2020 decreasing to 167,100 acre-feet per year in 2070.

Corsicana's water right in Lake Halbert is backed up by the City's water right in Richland-Chambers. Lake Halbert is located on Elm Creek in the Trinity River Basin in Navarro County. The reservoir has permitted conservation storage of 7,357 acre-feet. The City of Corsicana holds a water right in Lake Halbert for 4,003 acre-feet per year. According to the WAM, the available supply from Richland Chambers Reservoir and Lake Halbert to Corsicana as of 2070 is 13,822 acre-feet per year.

Moss. Moss Lake is located on Fish Creek in the Red River Basin in Cooke County. The reservoir has permitted conservation storage of 23,210 acre-feet. The City of Gainesville holds water rights in the reservoir for 7,740 acre-feet per year. According to the WAM, the available supply from Moss Lake in 2070 is 7,410 acre-feet per year.

Texoma (Texas' share). Lake Texoma is located along the Texas and Oklahoma border in the Red River Basin in Grayson and Cooke Counties. The permitted conservation storage for water supply in Texas is 300,000 acre-feet. Red River Authority, Greater Texoma Utility Authority, Denison, North Texas Municipal Water District, and Luminant all hold water rights in the reservoir. Since the *2011 Region C Water Plan* [1], GTUA increased its Lake Texoma water right by 1,700 acre-feet per year. The total Texoma supply available to Region C as of 2070 is 316,550 acre-feet per year (2,250 acre-feet per year for Red River Authority; 83,200 acre-feet per year for Greater Texoma Utility Authority; 24,400 acre-feet per year for Denison; 197,000 acre-feet per year for NTMWD; and 16,400 acre-feet per year for Luminant). In the case of Texoma, the available supply is limited to the water right amount. The firm yield of Texas' share of Lake Texoma is 642,608 acre-feet per year in 2020, decreasing to 640,067 acre-feet per year by 2070.

Randell. Randell Reservoir is located on an unnamed tributary of Shawnee Creek in the Red River Basin in Grayson County. The reservoir has permitted conservation storage of 5,400 acre-feet. The City of Denison holds a water right in the reservoir for 5,280 acre-feet per year. The supply from Lake Randell is backed up by up to 24,400 acre-feet per year of diversions from Lake Texoma, which are fully reliable. The available supply from Randell Reservoir as of 2070 is 1,400 acre-feet per year without a backup from Lake Texoma.

Valley. Valley Lake is located on Sand Creek in the Red River Basin in Fannin and Grayson Counties. The reservoir has a permitted conservation storage of 15,000 acre-feet. This reservoir is operated by Luminant for steam electric power cooling in conjunction with their water right in Lake Texoma. The total amount of water that can be diverted from either Texoma or Valley Lake is 16,400 acre-feet per year. During drought, it is assumed that the full permitted diversion would be taken from Lake Texoma (see Lake Texoma discussion). Therefore the available supply from Valley Lake is 0 acre-feet per year.

Bonham. Lake Bonham is located on Timber Creek in the Red River Basin in Fannin County. The reservoir has permitted conservation storage of 13,000 acre-feet. The City of Bonham holds a water right in the reservoir for 5,340 acre-feet per year. The NTMWD has an agreement with the City of Bonham to operate the lake and water treatment plant. According to the WAM, the firm yield of Lake Bonham is 6,267 acre-feet per year in 2020, decreasing to 5,683 acre-feet per year by 2070. The available supply from Lake Bonham is limited to the permitted amount of 5,340 acre-feet per year.

Ray Roberts (Denton). Lake Ray Roberts and Lake Lewisville were modeled as part of the Elm Fork System to find the firm yields of Denton's water rights. Lake Ray Roberts is located on the Elm Fork of the Trinity River in Denton, Cooke, and Grayson Counties. The reservoir has a permitted conservation storage of 799,600 acre-feet. The City of Dallas and the City of Denton hold combined water rights in the reservoir totaling 799,600 acre-feet per year, which is much greater than the actual yield of the reservoir. Dallas' share of Lake Ray Roberts was discussed above under Water Supply Systems. According to the WAM, Denton's available supply from Ray Roberts as of 2070 is 18,057 acre-feet per year. The increase from the available supply shown in the *2011 Region C Water Plan* is due to using a lower sedimentation rate, which was calculated using the 2008 volumetric survey of Ray Roberts.

Lewisville (Denton). Lake Lewisville is located on the Elm Fork of the Trinity River in Denton County. The reservoir has a permitted conservation storage of 618,400 acre-feet. The City of Dallas and the City of Denton hold combined water rights in the reservoir totaling 598,900 acre-feet per year, which is much greater than the actual yield of the reservoir. Dallas' share of Lake Lewisville was discussed above under Water Supply Systems. According to the WAM, Denton's available supply from Lewisville as of 2070 is 7,308 acre-feet per year.

Benbrook. Lake Benbrook is located on the Clear Fork of the Trinity River in Tarrant County. The reservoir has a permitted conservation storage of 72,500 acre-feet. The authorized use from Lake Benbrook is 6,833 acre-feet per year. Tarrant Regional Water District holds the water right, which specifies use amounts for Benbrook Water and Sewer Authority, City of Fort Worth, and City of Weatherford. According to the WAM, the firm yield of Lake Benbrook is 7,131 acre-feet per year in 2020, decreasing to 6,759 acre-feet per year by 2070. The safe yield is 5,417 acre-feet per year in 2020 and 5,333 acre-feet per year in 2070. The available supply from Lake Benbrook is limited to the permitted amount of 6,833 acre-feet per year. Lake Benbrook is used as terminal storage for water pumped from Cedar Creek and Richland Chambers Reservoirs. The available supply does not include water from these sources.

Weatherford. Lake Weatherford is located on the Clear Fork of the Trinity River in Parker County. The reservoir has permitted conservation storage of 19,470 acre-feet. The City of Weatherford holds a water right for consumptive use 5,220 acre-feet per year. (The permit also authorizes 59,400 acre-feet per year of non-consumptive industrial use.) According to the WAM, available supply from Lake Weatherford as of 2070 is 2,707 acre-feet per year.

Grapevine. Lake Grapevine is located on Denton Creek in the Trinity River Basin in Tarrant and Denton Counties. The reservoir has a permitted conservation storage of 161,250 acre-feet. City of Dallas, City of Grapevine, and Dallas County Park Cities MUD hold combined water rights in the reservoir totaling 161,250 acre-feet per year, which is much greater than the actual yield of the reservoir. Dallas' share of Lake Grapevine was discussed above under Water Supply Systems. According to the WAM, Dallas County PCMUD's available supply from Lake Grapevine as of 2070 is 16,150 acre-feet per year, and the City of Grapevine's available supply from Lake Grapevine as of 2070 is 1,817 acre-feet per year..

Arlington. Lake Arlington is located on Village Creek in the Trinity River Basin in Tarrant County. The reservoir has a permitted conservation storage of 45,710 acre-feet. The City of Arlington and Luminant jointly hold a water right for 23,120 acre-feet per year (13,000 acre-feet per year for Arlington and 10,120 acre-feet per year for Luminant). By contract, City of Arlington has dedicated its Lake Arlington water rights to the TRWD System. According to the WAM, available supply from Lake Arlington as of 2070 is 8,950 acre-feet per year. The safe yield is 7,667 acre-feet per year in 2020 and 7,083 acre-feet per year in 2070. Like Lake Benbrook, Lake Arlington serves as terminal storage for water pumped from Richland-Chambers and Cedar Creek Reservoirs. The available supply from Lake Arlington does not include water from these sources.

Joe Pool. Joe Pool Lake is located on Mountain Creek in the Trinity River Basin in Dallas and Tarrant Counties. The reservoir has a permitted conservation storage of 176,900 acre-feet. The Trinity River Authority holds a water right for 17,000 acre-feet per year. According to the WAM, available supply from Joe Pool Lake as of 2070 is 13,342 acre-feet per year.

Mountain Creek. Mountain Creek Lake is located on Mountain Creek in the Trinity River Basin in Dallas County. The reservoir has a permitted conservation storage of 22,840 acre-feet. Luminant holds a water right for 6,400 acre-feet per year. According to the WAM, the firm yield of Mountain Creek Lake is 12,767 acre-feet per year in 2020, decreasing to 11,433 acre-feet per year by 2070. The available supply from Mountain Creek Lake is limited to the permitted amount of 6,400 acre-feet per year.

North. North Lake is an off-channel reservoir located on the South Fork of Grapevine Creek in the Trinity River Basin in Dallas County. The reservoir has a permitted conservation storage of 17,100 acre-feet. Luminant holds a water right for 1,000 acre-feet per year. According to the WAM, available supply from North Lake as of 2070 is 0 acre-feet per year without backup from the Elm Fork.

Ray Hubbard. Lake Ray Hubbard is located on the Elm Fork of the Trinity River in Dallas, Kaufman, and Rockwall Counties. The reservoir has a permitted conservation storage of 490,000 acre-feet. The City of Dallas holds a water right for 89,700 acre-feet per year. According to the WAM, available supply from Ray Hubbard as of 2020 is 56,113 acre-feet per year, decreasing to 49,547 acre-feet per year by 2070.

White Rock. White Rock Lake is located on White Rock Creek in the Trinity River Basin in Dallas County. The reservoir has a permitted conservation storage of 21,345 acre-feet. The City of Dallas holds a water right for 8,703 acre-feet per year. According to the WAM, available supply from White Rock Lake as of 2070 is 1,700 acre-feet per year.

Terrell. Lake Terrell is located on Muddy Cedar Creek in the Trinity River Basin in Kaufman County. The reservoir has a permitted conservation storage of 8,712 acre-feet. The City of Terrell holds a water right for 6,000 acre-feet per year. According to the WAM, available supply from Terrell as of 2070 is 2,183 acre-feet per year. The City of Terrell no longer uses water from Lake Terrell.

Clark. Lake Clark is located on Little Mustang Creek in the Trinity River Basin in Ellis County. The reservoir has a permitted conservation storage of 1,549 acre-feet. The City of Ennis holds a water right for 450 acre-feet per year. According to the WAM, available supply from Lake Clark as of 2070 is 210 acre-feet per year. The City of Ennis no longer uses water from Lake Clark.

Bardwell. Lake Bardwell is located on Waxahachie Creek in the Trinity River Basin in Ellis County. The reservoir has a permitted conservation storage of 54,900 acre-feet. The Trinity River Authority holds a water right for 18,424.5 acre-feet per year (which includes reuse of up to 5,129 acre-feet per year of return flows). According to the WAM, the firm yield of Lake Bardwell is 9,727 acre-feet per year in 2020, decreasing to 7,931 acre-feet per year by 2070. The available supply from Lake Bardwell is the smaller of the firm yield or the permitted amount of 9,600 acre-feet per year without return flows.

Waxahachie. Lake Waxahachie is located on Waxahachie Creek in the Trinity River Basin in Ellis County. The reservoir has a permitted conservation storage of 13,500 acre-feet. Ellis County Water Control and Improvement District #1 holds a water right for 3,570 acre-feet per year. According to the WAM, available supply from Lake Waxahachie as of 2070 is 2,275 acre-feet per year.

Forest Grove. Forest Grove Reservoir is located on Caney Creek in the Trinity River Basin in Henderson County. The reservoir has a permitted conservation storage of 20,038 acre-feet. Luminant holds a water right for 9,500 acre-feet per year (not including non-consumptive use). Presently, the dam for Forest Grove Reservoir is built, but the lake has not begun to store water. According to the WAM, available supply from Forest Grove as of 2070 is 8,337 acre-feet per year. The available supply is different from what was shown in the *2011 Region C Water Plan* because a different sedimentation rate was used assuming sediment gathers below the current storage elevation until the gates are closed.

Trinidad City Lake. Trinidad City Lake is located on Cedar Creek in the Trinity River Basin in Henderson County. The reservoir has a permitted conservation storage of 498 acre-feet. The City of Trinidad holds a water right for 1,000 acre-feet per year. According to the WAM, available supply from Trinidad City Lake as of 2070 is 450 acre-feet per year.

Trinidad. Lake Trinidad is an off-channel reservoir located just off the Trinity River in Henderson County, with permitted diversions from the Trinity River. The reservoir has a permitted conservation storage of 6,200 acre-feet. Luminant holds a water right for 4,000 acre-feet per year. According to the WAM, available supply from Lake Trinidad with the diversions from the Trinity as of 2070 is 3,050 acre-feet per year. However, return flows in the Trinity River watershed make the Lake Trinidad permitted supply fully reliable.

Navarro Mills. Lake Navarro Mills is located on Richland Creek in the Trinity River Basin in Navarro County. The reservoir has a permitted conservation storage of 63,300 acre-feet. The Trinity River Authority holds a water right for 19,400 acre-feet per year. According to the WAM, available supply from Navarro Mills as of 2070 is 13,292 acre-feet per year.

Fairfield. Lake Fairfield is located on Big Brown Creek in the Trinity River Basin in Freestone County. The reservoir has a permitted conservation storage of 50,600 acre-feet. Luminant holds a water right for 14,150 acre-feet per year. According to the WAM, available supply from Lake Fairfield as of 2070 is 870 acre-feet per year with a minimum operating level of 305.0 feet msl and without backup from the Trinity River.

Bryson. Lake Bryson is located on East Rock Creek in the Brazos River Basin in Jack County. The reservoir has a permitted conservation storage of 950 acre-feet. The City of Bryson holds a water right for 90 acre-feet per year. According to the WAM, available supply from Bryson as of 2070 is 0 acre-feet per year.

Mineral Wells. Lake Mineral Wells is located on Rock Creek in the Brazos River Basin in Parker County. The reservoir has a permitted conservation storage of 7,065 acre-feet. The City of Mineral Wells holds a water right for 2,520 acre-feet per year. According to the WAM, available supply from Mineral Wells as of 2070 is 2,433 acre-feet per year. The City of Mineral Wells is not currently using water from Lake Mineral Wells.

Teague City Lake. Teague City Lake is located on Holman Creek in the Brazos River Basin in Freestone County. The reservoir has permitted conservation storage of 1,160 acre-feet. The City of Teague holds a water right for 605 acre-feet per year. According to the WAM, available supply from Teague City Lake as of 2070 is 189 acre-feet per year. The City of Teague no longer uses Teague City Lake for water supply.

Lavon. Lake Lavon is located on the East Fork of the Trinity River in Collin County. The reservoir has permitted conservation storage of 443,800 acre-feet. North Texas Municipal Water District holds water rights for 118,670 acre-feet per year. According to the WAM, the available supply from Lake Lavon is 108,920 acre-feet per year in 2020, decreasing to 100,020 acre-feet per year by 2070. This yield does not include return flows or imported water. The decrease from the available supply shown in the *2011 Region C Water Plan* (1) is due to using a higher sedimentation rate, which was calculated using the 2011 volumetric survey of Lake Lavon.

UNPERMITTED YIELDS IN REGION C RESERVOIRS

According to the WAMs, there are eight reservoirs and one reservoir system in Region C with firm yields that exceed the currently permitted diversion amounts. These reservoirs with their unpermitted yields are listed in Table I.4. Note that the Oklahoma share of Lake Texoma yield is not included in the table. The Oklahoma yield in Lake Texoma would be about 640,000 acre-feet per year in 2070.

Table I.4
Unpermitted Yields in Region C Reservoirs

Reservoir	Basin	Unpermitted Yield, acre-feet per year					
		2020	2030	2040	2050	2060	2070
Lost Creek/Jacksboro System	Trinity	886	873	860	846	833	820
Cedar Creek	Trinity	34,667	33,550	32,433	31,317	30,200	29,083
Richland Chambers	Trinity	12,467	9,550	6,633	3,717	800	0
Lake Texoma (Texas' Share)[a]	Red	319,358	318,850	318,342	317,833	317,325	316,817
Benbrook	Trinity	298	224	149	75	0	0
Bonham	Red	927	810	693	577	460	343
Mountain Creek	Trinity	6,367	6,100	5,833	5,567	5,300	5,033
Bardwell	Trinity	127	0	0	0	0	0
Navarro Mills	Trinity	0	0	0	0	0	0

[a] This amount assumes the full permitted amount of 84,000 acre-feet per year, a portion of which NTMWD is not currently authorized to use. According to their water right, NTMWD is only authorized to use up to 77,300 acre-feet per year. The remaining 6,700 acre-feet per year are allocated to the channel losses between Lake Texoma and Lake Lavon.

Groundwater

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

The TWDB created sixteen Groundwater Management Areas in Texas. GMA 8 covers all of Region C except for Jack County, Henderson County, and a small portion of Navarro County. The GMAs are responsible for developing Desired Future Conditions (DFCs) for aquifers within their respective areas. The TWDB quantifies Modeled Available Groundwater (MAG) based on the DFCs provided by the GMAs. The regional water planning groups must use MAG estimates as the basis for existing groundwater supplies for all locations that have a DFC [(4)]. The groundwater availability for "other aquifer" are based on historical pumping data obtained from the TWDB [(5)]. Table I.5 details the groundwater availability for Region C.

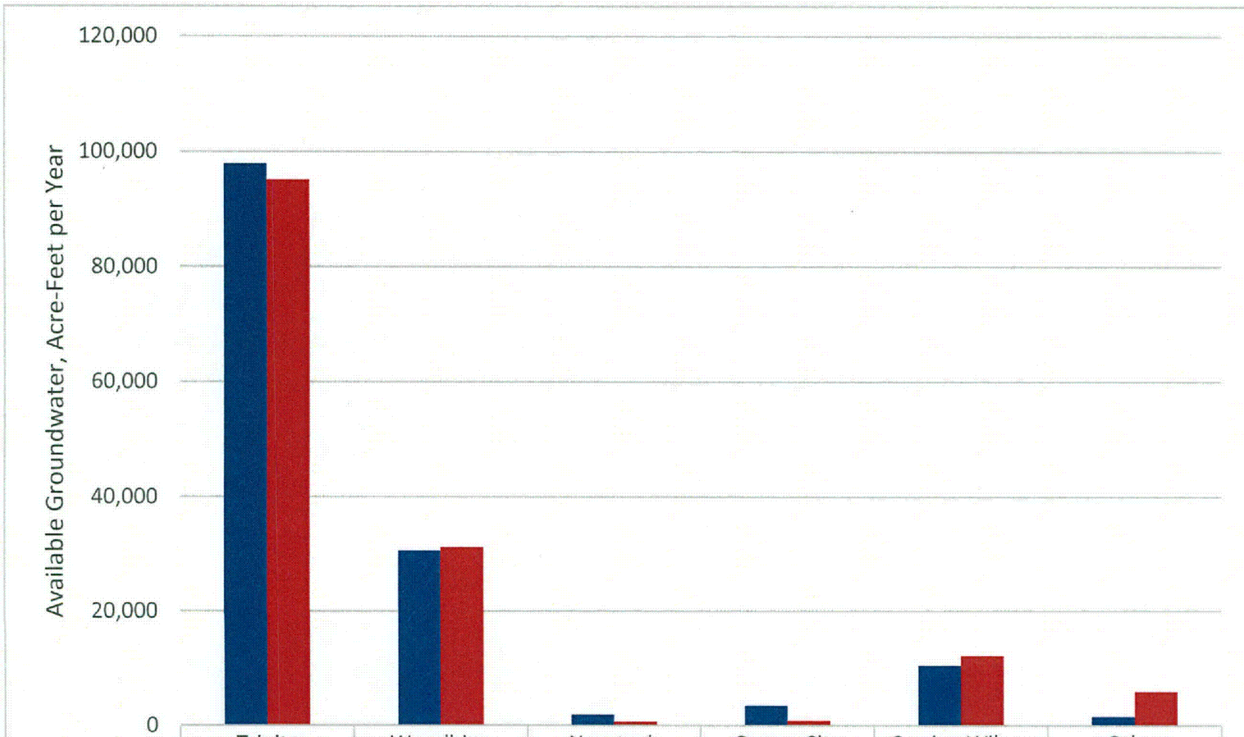
There are currently seven Groundwater Conservation Districts (GCDs) that include one or more counties in Region C:

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

The overall groundwater availability in Region C is very similar to the availability shown in the *2011 Region C Water Plan* [(1)]. In 2020 through 2040 the overall availability increased between 26 and 38 acre-feet per year. In 2050 and 2060, the overall groundwater availability decreased by 17 and 20 acre-feet per year, respectively. These changes are largely due to changes to the availability from the Nacatoch, Queen City, Carrizo-Wilcox and other aquifers. MAG estimates for these aquifers were not available for the *2011 Region C Water Plan* [(1)]. The availability from the Nacatoch and Queen City aquifers has increased by 1,242 acre-feet per year and 2,660 acre-feet per year, respectively since the *2011 Region C Water Plan* [(1)]. The availability from the Carrizo-Wilcox decreased by a maximum of 1,742 acre-feet per year since the *2011 Region C Water Plan* [(1)].

The availability from other aquifers has decreased by a maximum of 2,084 acre-feet per year since the *2011 Region C Water Plan* [(1)]. **Error! Reference source not found.** compares the 2020 Region C groundwater availability from the TWDB MAG estimates to the availability reported in the *2011 Region C Water Plan* [(1)].

Figure I.1
Region C Groundwater Availability in 2020



	Trinity	Woodbine	Nacatoch	Queen City	Carrizo-Wilcox	Other
2016 Plan	97,929	30,686	1,939	3,533	10,507	1,584
2011 Plan	95,189	31,203	697	873	12,203	5,987

Table I.5
Groundwater Availability for Region C
(Acre-Feet per Year)

Aquifer	County	Basin	Revised Groundwater Availability [a]						Groundwater Availability in 2011 Plan						Change in Groundwater Availability since 2011 Plan				
			2020	2030	2040	2050	2060	2070	2010	2020	2030	2040	2050	2060	2020	2030	2040	2050	2060
Other	Collin	Sabine	0	0	0	0	0	0	5	5	5	5	5	5	-5	-5	-5	-5	-5
Other	Collin	Trinity	0	0	0	0	0	0	134	134	134	134	134	134	-134	-134	-134	-134	-134
Trinity	Collin	Sabine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trinity	Collin	Trinity	2,104	2,104	2,104	2,104	2,104	2,104	2,100	2,100	2,100	2,100	2,100	2,100	4	4	4	4	4
Woodbine	Collin	Sabine	40	40	40	40	40	40	40	40	40	40	40	40	0	0	0	0	0
Woodbine	Collin	Trinity	2,469	2,469	2,469	2,469	2,469	2,469	2,469	2,469	2,469	2,469	2,469	2,469	0	0	0	0	0
	Collin		**4,613**	**4,613**	**4,613**	**4,613**	**4,613**	**4,613**	**4,748**	**4,748**	**4,748**	**4,748**	**4,748**	**4,748**	**-135**	**-135**	**-135**	**-135**	**-135**
Other	Cooke	Red	0	0	0	0	0	0	237	237	237	237	237	237	-237	-237	-237	-237	-237
Other	Cooke	Trinity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trinity	Cooke	Red	1,284	1,284	1,284	1,284	1,284	1,284	1,284	1,284	1,284	1,284	1,284	1,284	0	0	0	0	0
Trinity	Cooke	Trinity	5,566	5,566	5,566	5,566	5,566	5,566	5,566	5,566	5,566	5,566	5,566	5,566	0	0	0	0	0
Woodbine	Cooke	Red	18	18	18	18	18	18	18	18	18	18	18	18	0	0	0	0	0
Woodbine	Cooke	Trinity	136	136	136	136	136	136	136	136	136	136	136	136	0	0	0	0	0
	Cooke		**7,004**	**7,004**	**7,004**	**7,004**	**7,004**	**7,004**	**7,241**	**7,241**	**7,241**	**7,241**	**7,241**	**7,241**	**-237**	**-237**	**-237**	**-237**	**-237**
Other	Dallas	Trinity	0	0	0	0	0	0	593	593	593	593	593	593	-593	-593	-593	-593	-593
Trinity	Dallas	Trinity	5,458	5,458	5,458	5,458	5,458	5,458	5,458	5,458	5,458	5,458	5,458	5,458	0	0	0	0	0
Woodbine	Dallas	Trinity	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	0	0	0	0	0
	Dallas		**7,771**	**7,771**	**7,771**	**7,771**	**7,771**	**7,771**	**8,364**	**8,364**	**8,364**	**8,364**	**8,364**	**8,364**	**-593**	**-593**	**-593**	**-593**	**-593**
Other	Denton	Trinity	0	0	0	0	0	0	5	5	5	5	5	5	-5	-5	-5	-5	-5
Trinity	Denton	Trinity	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333	0	0	0	0	0
Woodbine	Denton	Trinity	4,126	4,126	4,126	4,126	4,126	4,126	4,126	4,126	4,126	4,126	4,126	4,126	0	0	0	0	0
	Denton		**23,459**	**23,459**	**23,459**	**23,459**	**23,459**	**23,459**	**23,464**	**23,464**	**23,464**	**23,464**	**23,464**	**23,464**	**-5**	**-5**	**-5**	**-5**	**-5**
Nacatoch	Ellis	Trinity	20	20	20	20	20	20	139	139	139	139	139	139	-119	-119	-119	-119	-119
Trinity	Ellis	Trinity	3,959	3,959	3,959	3,959	3,959	3,959	3,959	3,959	3,959	3,959	3,959	3,959	0	0	0	0	0
Woodbine	Ellis	Trinity	5,441	5,441	5,441	5,441	5,441	5,441	5,441	5,441	5,441	5,441	5,441	5,441	0	0	0	0	0
	Ellis		**9,420**	**9,420**	**9,420**	**9,420**	**9,420**	**9,420**	**9,539**	**9,539**	**9,539**	**9,539**	**9,539**	**9,539**	**-119**	**-119**	**-119**	**-119**	**-119**
Trinity	Fannin	Red	617	617	617	617	617	617	617	617	617	617	617	617	0	0	0	0	0
Trinity	Fannin	Sulphur	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trinity	Fannin	Trinity	83	83	83	83	83	83	83	83	83	83	83	83	0	0	0	0	0
Woodbine	Fannin	Red	2,676	2,676	2,676	2,676	2,676	2,676	2,676	2,676	2,676	2,676	2,676	2,676	0	0	0	0	0
Woodbine	Fannin	Sulphur	21	21	21	21	21	21	21	21	21	21	21	21	0	0	0	0	0
Woodbine	Fannin	Trinity	600	600	600	600	600	600	600	600	600	600	600	600	0	0	0	0	0
Other	Fannin	Red	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	2,919	0	0	0	0	0
	Fannin		**6,916**	**6,916**	**6,916**	**6,916**	**6,916**	**6,916**	**6,916**	**6,916**	**6,916**	**6,916**	**6,916**	**6,916**	**0**	**0**	**0**	**0**	**0**
Carrizo-Wilcox	Freestone	Trinity	4,420	4,448	4,452	4,414	4,411	4,385	5,578	5,578	5,578	5,578	5,578	5,578	-1,158	-1,130	-1,126	-1,164	-1,167

Table I.5, continued

Aquifer	County	Basin	Revised Groundwater Availability [a]						Groundwater Availability in 2011 Plan						Change in Groundwater Availability since 2011 Plan				
			2020	2030	2040	2050	2060	2070	2010	2020	2030	2040	2050	2060	2020	2030	2040	2050	2060
Carrizo-Wilcox	Freestone	Brazos	885	869	863	848	848	838	1,075	1,075	1,075	1,075	1,075	1,075	-190	-206	-212	-227	-227
Other	Freestone	Trinity	0	0	0	0	0	0	51	51	51	51	51	51	-51	-51	-51	-51	-51
Other	Freestone	Brazos	0	0	0	0	0	0	21	21	21	21	21	21	-21	-21	-21	-21	-21
Queen City	Freestone	Trinity	0	0	0	0	0	0	345	345	345	345	345	345	-345	-345	-345	-345	-345
Queen City	Freestone	Brazos	0	0	0	0	0	0	48	48	48	48	48	48	-48	-48	-48	-48	-48
	Freestone		**5,305**	**5,317**	**5,315**	**5,262**	**5,259**	**5,223**	**7,118**	**7,118**	**7,118**	**7,118**	**7,118**	**7,118**	**-1,813**	**-1,801**	**-1,803**	**-1,856**	**-1,859**
Other	Grayson	Red	0	0	0	0	0	0	35	35	35	35	35	35	-35	-35	-35	-35	-35
Other	Grayson	Trinity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trinity	Grayson	Red	7,722	7,722	7,722	7,722	7,722	7,722	7,722	7,722	7,722	7,722	7,722	7,722	0	0	0	0	0
Trinity	Grayson	Trinity	1,678	1,678	1,678	1,678	1,678	1,678	1,678	1,678	1,678	1,678	1,678	1,678	0	0	0	0	0
Woodbine	Grayson	Red	6,590	6,590	6,590	6,590	6,590	6,590	6,590	6,590	6,590	6,590	6,590	6,590	0	0	0	0	0
Woodbine	Grayson	Trinity	5,497	5,497	5,497	5,497	5,497	5,497	5,497	5,497	5,497	5,497	5,497	5,497	0	0	0	0	0
	Grayson		**21,487**	**21,487**	**21,487**	**21,487**	**21,487**	**21,487**	**21,522**	**21,522**	**21,522**	**21,522**	**21,522**	**21,522**	**-35**	**-35**	**-35**	**-35**	**-35**
Carrizo-Wilcox	Henderson	Trinity	5,187	5,187	5,187	5,187	5,187	5,187	5,370	5,370	5,370	5,370	5,370	5,370	-183	-183	-183	-183	-183
Nacatoch	Henderson	Trinity	0	0	0	0	0	0	10	10	10	10	10	10	-10	-10	-10	-10	-10
Other	Henderson	Trinity	0	0	0	0	0	0	167	167	167	167	167	167	-167	-167	-167	-167	-167
Queen City	Henderson	Trinity	3,533	3,533	3,533	3,533	3,533	3,533	480	480	480	480	480	480	3,053	3,053	3,053	3,053	3,053
	Henderson		**8,720**	**8,720**	**8,720**	**8,720**	**8,720**	**8,720**	**6,027**	**6,027**	**6,027**	**6,027**	**6,027**	**6,027**	**2,693**	**2,693**	**2,693**	**2,693**	**2,693**
Other	Jack	Brazos	284	284	284	284	284	284	284	284	284	284	284	284	0	0	0	0	0
Other	Jack	Trinity	650	650	650	650	650	650	650	650	650	650	650	650	0	0	0	0	0
Trinity	Jack	Trinity	0	0	0	0	0	0	50	50	50	50	50	50	-50	-50	-50	-50	-50
Trinity	Jack	Brazos	0	0	0	0	0	0	50	50	50	50	50	50	-50	-50	-50	-50	-50
	Jack		**934**	**934**	**934**	**934**	**934**	**934**	**1,034**	**1,034**	**1,034**	**1,034**	**1,034**	**1,034**	**-100**	**-100**	**-100**	**-100**	**-100**
Nacatoch	Kaufman	Sabine	49	49	49	49	49	49	10	10	10	10	10	10	39	39	39	39	39
Nacatoch	Kaufman	Trinity	877	877	877	877	877	877	308	308	308	308	308	308	569	569	569	569	569
Other	Kaufman	Sabine	0	0	0	0	0	0	124	124	124	124	124	124	-124	-124	-124	-124	-124
Other	Kaufman	Trinity	0	0	0	0	0	0	87	87	87	87	87	87	-87	-87	-87	-87	-87
Trinity	Kaufman	Sabine	45	45	45	45	45	45	45	45	45	45	45	45	0	0	0	0	0
Trinity	Kaufman	Trinity	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136	0	0	0	0	0
Woodbine	Kaufman	Trinity	200	200	200	200	200	200	200	200	200	200	200	200	0	0	0	0	0
	Kaufman		**2,307**	**2,307**	**2,307**	**2,307**	**2,307**	**2,307**	**1,910**	**1,910**	**1,910**	**1,910**	**1,910**	**1,910**	**397**	**397**	**397**	**397**	**397**
Carrizo-Wilcox	Navarro	Trinity	15	15	15	15	15	15	180	180	180	180	180	180	-165	-165	-165	-165	-165
Nacatoch	Navarro	Trinity	980	980	980	980	980	980	229	229	229	229	229	229	751	751	751	751	751
Other	Navarro	Trinity	0	0	0	0	0	0	104	104	104	104	104	104	-104	-104	-104	-104	-104
Trinity	Navarro	Trinity	1,873	1,873	1,873	1,873	1,873	1,873	1,873	1,873	1,873	1,873	1,873	1,873	0	0	0	0	0
Woodbine	Navarro	Trinity	300	300	300	300	300	300	300	300	300	300	300	300	0	0	0	0	0
	Navarro		**3,168**	**3,168**	**3,168**	**3,168**	**3,168**	**3,168**	**2,686**	**2,686**	**2,686**	**2,686**	**2,686**	**2,686**	**482**	**482**	**482**	**482**	**482**

Table I.5, continued

Aquifer	County	Basin	Revised Groundwater Availability [a]						Groundwater Availability in 2011 Plan						Change in Groundwater Availability since 2011 Plan				
			2020	**2030**	**2040**	**2050**	**2060**	**2070**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**2020**	**2030**	**2040**	**2050**	**2060**
Other	Parker	Trinity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	Parker	Brazos	50	50	50	50	50	50	50	50	50	50	50	50	0	0	0	0	0
Trinity	Parker	Trinity	12,449	12,449	12,449	12,449	12,449	12,449	12,449	12,449	12,449	12,449	12,449	12,449	0	0	0	0	0
Trinity	Parker	Brazos	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	2,799	0	0	0	0	0
	Parker		**15,298**	**15,298**	**15,298**	**15,298**	**15,298**	**15,298**	**15,298**	**15,298**	**15,298**	**15,298**	**15,298**	**15,298**	**0**	**0**	**0**	**0**	**0**
Nacatoch	Rockwall	Trinity	13	13	13	13	13	13	1	1	1	1	1	1	12	12	12	12	12
Other	Rockwall	Sabine	0	0	0	0	0	0	187	187	187	187	187	187	-187	-187	-187	-187	-187
Other	Rockwall	Trinity	0	0	0	0	0	0	21	21	21	21	21	21	-21	-21	-21	-21	-21
Trinity	Rockwall	Sabine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trinity	Rockwall	Trinity	958	958	958	958	958	958	958	958	958	958	958	958	0	0	0	0	0
Woodbine	Rockwall	Trinity	144	144	144	144	144	144	144	144	144	144	144	144	0	0	0	0	0
	Rockwall		**1,115**	**1,115**	**1,115**	**1,115**	**1,115**	**1,115**	**1,311**	**1,311**	**1,311**	**1,311**	**1,311**	**1,311**	**-196**	**-196**	**-196**	**-196**	**-196**
Other	Tarrant	Trinity	0	0	0	0	0	0	207	207	207	207	207	207	-207	-207	-207	-207	-207
Trinity	Tarrant	Trinity	18,747	18,747	18,747	18,747	18,747	18,747	18,747	18,747	18,747	18,747	18,747	18,747	0	0	0	0	0
Woodbine	Tarrant	Trinity	632	632	632	632	632	632	632	632	632	632	632	632	0	0	0	0	0
	Tarrant		**19,379**	**19,379**	**19,379**	**19,379**	**19,379**	**19,379**	**19,586**	**19,586**	**19,586**	**19,586**	**19,586**	**19,586**	**-207**	**-207**	**-207**	**-207**	**-207**
Other	Wise	Trinity	0	0	0	0	0	0	106	106	106	106	106	106	-106	-106	-106	-106	-106
Trinity	Wise	Trinity	9,282	9,282	9,282	9,282	9,282	9,282	9,282	9,282	9,282	9,282	9,282	9,282	0	0	0	0	0
	Wise		**9,282**	**9,282**	**9,282**	**9,282**	**9,282**	**9,282**	**9,388**	**9,388**	**9,388**	**9,388**	**9,388**	**9,388**	**-106**	**-106**	**-106**	**-106**	**-106**
Region C Total			**146,178**	**146,190**	**146,188**	**146,135**	**146,132**	**146,096**	**146,152**	**146,152**	**146,152**	**146,152**	**146,152**	**146,152**	**26**	**38**	**36**	**-17**	**-20**

[a] All values, with the exception of "other" aquifer, are MAG [7] values.

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Irrigation Local Supply and Other Local Supply

The local irrigation availability is based on existing run-of-the-river surface water rights for irrigation not associated with major reservoirs. The reliable supply from run-of-the-river diversions was calculated using the WAM run 3 as the minimum monthly diversion for the permitted water rights located on the main stem and tributaries of the river. In the previous Region C Water Plans the reliable supply from run-of-the-river diversions was assumed equal to the permitted diversion for water rights located on the main stem of the river and 75 percent of the permitted diversion for water rights located on tributaries. This revision decreased the local irrigation availability in the Red River Basin.

Other local supply includes non-irrigation run-of-the-river supplies and mining and livestock local supplies that do not have a water right. Most surface water used for livestock is taken from unpermitted stock ponds or directly from streams. These supplies are based on historical use. For livestock and mining local supplies, some of the available supply volumes were revised considering the historical use over the past ten years [6], 2011 use [6], and the projected demands. Table I.6 shows the available supply for irrigation and other local supplies.

Table I.6
Summary of Local Surface Water Supplies for Region C
(Acre-Feet per Year)

Use	County	Basin	2020	2030	2040	2050	2060	2070
IRRIGATION RUN-OF-THE-RIVER SUPPLIES								
Irrigation	Cooke	Red	0	0	0	0	0	0
Irrigation	Fannin	Red	4,613	4,613	4,613	4,613	4,613	4,613
Irrigation	Grayson	Red	1,091	1,091	1,091	1,091	1,091	1,091
Irrigation	Fannin	Sulphur	0	0	0	0	0	0
Irrigation	Collin	Trinity	408	408	408	408	408	408
Irrigation	Cooke	Trinity	0	0	0	0	0	0
Irrigation	Dallas	Trinity	791	791	791	791	791	791
Irrigation	Denton	Trinity	0	0	0	0	0	0
Irrigation	Ellis	Trinity	3	3	3	3	3	3
Irrigation	Fannin	Trinity	0	0	0	0	0	0
Irrigation	Grayson	Trinity	0	0	0	0	0	0
Irrigation	Henderson	Trinity	415	415	415	415	415	415
Irrigation	Jack	Trinity	110	110	110	110	110	110
Irrigation	Kaufman	Trinity	64	64	64	64	64	64
Irrigation	Navarro	Trinity	226	226	226	226	226	226
Irrigation	Parker	Trinity	122	122	122	122	122	122
Irrigation	Rockwall	Trinity	0	0	0	0	0	0
Irrigation	Tarrant	Trinity	549	549	549	549	549	549
Irrigation	Wise	Trinity	139	139	139	139	139	139
Irrigation	Freestone	Trinity	87	87	87	87	87	87

Table I.6, continued

Use	County	Basin	2020	2030	2040	2050	2060	2070
IRRIGATION RUN-OF-THE-RIVER SUPPLIES, Continued								
Irrigation	Jack	Brazos	0	0	0	0	0	0
Irrigation	Parker	Brazos	117	117	117	117	117	117
Irrigation	Freestone	Brazos	0	0	0	0	0	0
SUBTOTAL			**8,734**	**8,734**	**8,734**	**8,734**	**8,734**	**8,734**
NON-IRRIGATION RUN-OF-THE-RIVER SUPPLIES								
Mining	Fannin	Red	72	72	72	72	72	72
Mining	Wise	Trinity	133	133	133	133	133	133
Municipal	Fannin	Red	20	20	20	20	20	20
Municipal	Fannin	Sulphur	49	49	49	49	49	49
Municipal	Freestone	Trinity	41	41	41	41	41	41
Municipal	Navarro	Trinity	252	252	252	252	252	252
Municipal	Parker	Trinity	33	33	33	33	33	33
Industrial	Dallas	Trinity	368	368	368	368	368	368
Industrial	Grayson	Red	30	30	30	30	30	30
Industrial	Tarrant	Trinity	959	959	959	959	959	959
LIVESTOCK AND MINING LOCAL SUPPLIES								
Livestock	Collin	Sabine	31	31	31	31	31	31
Livestock	Collin	Trinity	971	971	971	971	971	971
Livestock	Cooke	Red	380	380	380	380	380	380
Livestock	Cooke	Trinity	807	807	807	807	807	807
Livestock	Dallas	Trinity	198	198	198	198	198	198
Livestock	Denton	Trinity	622	622	622	622	622	622
Livestock	Ellis	Trinity	1,112	1,112	1,112	1,112	1,112	1,112
Livestock	Fannin	Red	973	973	973	973	973	973
Livestock	Fannin	Sulphur	272	272	272	272	272	272
Livestock	Fannin	Trinity	61	61	61	61	61	61
Livestock	Freestone	Brazos	83	83	83	83	83	83
Livestock	Freestone	Trinity	960	960	960	960	960	960
Livestock	Grayson	Red	687	687	687	687	687	687
Livestock	Grayson	Trinity	388	388	388	388	388	388
Livestock	Henderson	Trinity	341	341	341	341	341	341
Livestock	Jack	Brazos	231	231	231	231	231	231

Table I.6, continued

Use	County	Basin	2020	2030	2040	2050	2060	2070
Livestock	Jack	Trinity	571	571	571	571	571	571
Livestock	Kaufman	Sabine	98	98	98	98	98	98
Livestock	Kaufman	Trinity	1,524	1,524	1,524	1,524	1,524	1,524
Livestock	Navarro	Trinity	1,603	1,603	1,603	1,603	1,603	1,603
Livestock	Parker	Brazos	903	903	903	903	903	903
Livestock	Parker	Trinity	1,019	1,019	1,019	1,019	1,019	1,019
Livestock	Rockwall	Sabine	58	58	58	58	58	58
Livestock	Rockwall	Trinity	59	59	59	59	59	59
Livestock	Tarrant	Trinity	442	442	442	442	442	442
Livestock	Wise	Trinity	1,117	1,117	1,117	1,117	1,117	1,117
Mining	Collin	Trinity	0	0	0	0	0	0
Mining	Dallas	Trinity	1,525	1,525	1,525	1,525	1,525	1,525
Mining	Freestone	Trinity	120	120	120	120	120	120
Mining	Jack	Trinity	370	370	370	370	370	370
Mining	Kaufman	Trinity	86	86	86	86	86	86
Mining	Parker	Brazos	12	12	12	12	12	12
Mining	Parker	Trinity	8	8	8	8	8	8
Mining	Rockwall	Sabine	0	0	0	0	0	0
Mining	Tarrant	Trinity	342	342	342	342	342	342
SUBTOTAL NON-IRRIGATION SUPPLIES			**19,931**	**19,931**	**19,931**	**19,931**	**19,931**	**19,931**
TOTAL RUN-OF-THE-RIVER AND LOCAL SUPPLIES			**28,665**	**28,665**	**28,665**	**28,665**	**28,665**	**28,665**

Reuse

The reuse quantities listed in Table I.1 are limited to currently permitted and operating indirect reuse projects and existing direct reuse for irrigation or industrial purposes. Table I.8 shows the individual reuse projects that make up the total reuse amount in Table I.1. The recommended regional reuse plan is outlined in Chapter 5E of the Region C plan.

Water Right Amendments Involving Reuse Since the *2011 Region C Water Plan* (1)

The Texas Commission on Environmental Quality (TCEQ) has granted reuse-based amendments to water right certificates of adjudication held by the Tarrant Regional Water District. These recent amendments are discussed below and summarized in **Error! Reference source not found.**.

On December 4, 2014, the District received amendments to its water rights in Richland-Chambers Reservoir (Certificate of Adjudication 08-5035D) and Cedar Creek Reservoir (Certificate of Adjudication 08-4976D). The amended certificates allow the District to divert District Return Flows from Richland-Chambers and Cedar Creek Reservoirs up to the maximum annual delivery amount.

Table I.7
Water Right Amendments and Permit Applications Involving Reuse

Entity	Description	Certification of Adjudication/ Permit Number	Status	Amendment Date	Additional Annual Diversion for Water Supply (ac-ft/year)
Tarrant Regional Water District	District return flow diversions from Cedar Creek Reservoir	08-4976D	Amended	12/04/14	35,559
Tarrant Regional Water District	District return flow diversions from Richland-Chambers Reservoir	08-5035D	Amended	12/04/14	37,465

The maximum annual delivery from the Richland-Chambers wetland impoundment to Richland-Chambers Reservoir is 100,465 acre-feet per year. The recent amendment increases the authorized reuse from the reservoir by 37,465 acre-feet per year from 63,000 acre-feet per year to 100,465 acre-feet per year. The total authorized diversion from the lake, including reuse, will be 310,465 acre-feet per year. The Richland-Chambers Reuse project began operation in 2009 and was expanded in 2013.

Table I.8
Summary of Supplies Available from Reuse
(Acre-Feet per Year)

Provider	Project Name	User/Receiving Water	Type	County	2020	2030	2040	2050	2060	2070
Azle	Azle Reuse	Cross Timbers Golf Course	direct	Tarrant	300	300	300	300	300	300
Bryson	Jack County Reuse	Clayton Ranch Irrigation	direct	Jack	27	26	26	25	25	24
Country Club WSC	Country Club WSC Reuse	Cedar Creek Country Club	direct	Kaufman	92	92	92	92	92	92
Crandall	Crandall Reuse	Creekview Golf Club	direct	Kaufman	455	558	666	666	666	666
Denton	Denton Power Plant Reuse	City of Garland Steam Electric Power Plant, Denton Regional Medical Office Building, Caruthers Oil Co. Inc., Robert Donnelly, Day Surgery Center DRMC, Denton Landfill, Denton State School, Oakmont Country Club	direct	Denton	646	836	1,051	1,328	1,818	2,216
Denton	Denton Indirect Reuse	indirect reuse	indirect	Denton	6,775	8,729	10,922	12,953	12,818	12,683
Denton County	Denton Direct Reuse	Direct Reuse	direct	Denton	455	503	556	614	678	749
Denton County FWSD#1/ UTRWD/Lewisville	UTRWD Reuse	Castle Hills Golf Course	direct	Denton	897	897	897	897	897	897
Dallas	Cedar Crest Golf Course Reuse	Cedar Crest Golf Course	direct	Dallas	561	561	561	561	561	561
Dallas	Indirect Reuse	Dallas	indirect	Dallas	32,550	38,223	41,048	55,000	73,091	87,511
Ennis	Ennis Reuse	Tractabel Steam Electric Power Plant	direct	Ellis	909	909	909	909	909	909
Fort Worth	Village Creek Reuse		direct	Tarrant	3,469	3,526	3,526	3,526	3,526	3,526
Fort Worth	Waterchase Golf Course	Golf Course	direct	Tarrant	897	897	897	897	897	897
Gainesville	Kenetso Park Reuse	City of Gainesville - Keneteso Park	direct	Cooke	9	9	9	9	9	9
Garland/Forney	Garland/Forney Reuse	FPLE Steam Electric Power Plant	direct	Kaufman	8,979	8,979	8,979	8,979	8,979	8,979
Grapevine	Grapevine Reuse	Lake Grapevine	indirect	Tarrant	3,311	3,677	3,716	3,701	3,698	3,698
Dallas	Stevens Park Golf Course Direct Reuse (Dallas)	Dallas	direct	Dallas	560	560	560	560	560	560
Annetta	Annetta Direct Reuse	Golf Course	direct	Parker	95	95	95	95	95	95
Millsap WWTP	Millsap ISD Reuse	Millsap High School Athletic Fields	direct	Parker	2	2	2	2	2	2
NTMWD	Rowlett Creek Reuse	Los Rios Country Club, Golf Center of Plano, Pecan Hollow Municipal Golf Course	direct	Collin	1,540	1,540	1,540	1,540	1,540	1,540

Table I.8, continued

Provider	Project Name	User/Receiving Water	Type	County	2020	2030	2040	2050	2060	2070
NTMWD	Buffalo Creek Reuse	Buffalo Creek Golf Course	direct	Rockwall	672	672	672	672	672	672
NTMWD	Wilson Creek Reuse	Lake Lavon	indirect	Collin	47,418	56,386	63,785	71,882	71,882	71,882
NTMWD	East Fork Reuse	Trinity River	indirect	Kaufman	47,802	62,977	75,524	87,291	97,655	100,890
NTMWD/Frisco	Stewart Creek West Reuse	Trails of Frisco Golf Course	direct	Collin	307	307	307	307	307	307
Pinnacle Club	Pinnacle Club Reuse	Pinnacle Club Golf Course	direct	Henderson	32	32	32	32	32	32
TRWD	Richland Chambers Reservoir Reuse Project	Richland Chambers	indirect	Navarro	100,465	100,465	100,465	100,465	100,465	100,465
The Colony	Collin County Reuse	Stonebriar Country Club	direct	Collin	457	457	457	457	457	457
TRA	Ten Mile Creek WWTP Reuse	Pecan Orchard	direct	Dallas	125	125	125	125	125	125
TRA	TRA/Waxahachie Reuse		indirect	Ellis	3,479	3,882	4,614	5,129	5,129	5,129
TRA/DCURD	Las Colinas Reuse	Las Colinas - golf course irrigation, landscape irrigation, and lake level maintenance	direct/ indirect	Dallas	8,000	8,000	8,000	8,000	8,000	8,000
Trophy Club	Denton County Golf Reuse	Trophy Club Country Club	direct	Denton	800	800	800	800	800	800
UTRWD	Lake Chapman Indirect Reuse	Lake Chapman	indirect	Henderson	5,546	5,689	5,832	5,976	6,119	6,262
Wise County	Wise County Mining Reuse	Mining	direct	Wise	6,261	6,261	6,261	6,261	6,076	6,076
Total					**283,893**	**316,972**	**343,226**	**380,051**	**408,880**	**427,011**

[1] County reflects location of reuse project.

The maximum annual delivery from the Cedar Creek wetland impoundment to Cedar Creek Reservoir is 88,059 acre-feet per year. The recent amendment increases the authorized reuse from the reservoir by 35,559 acre-feet per year from 52,500 acre-feet per year to 88,059 acre-feet per year. The total authorized diversion from the lake, including reuse, will be 263,059 acre-feet per year. The Cedar Creek Reservoir reuse project is expected to be completed by 2020.

Desalination

Two desalination facilities are currently operated by public water systems within Region C. The City of Sherman operates an electro dialysis reversal membrane plant to treat brackish water from Lake Texoma. The City of Bardwell operates a reverse osmosis facility to treat brackish groundwater. In addition, the Brazos River Authority (BRA) operates the Lake Granbury Surface Water and Treatment System (SWATS). Although Lake Granbury is located in Region G, BRA provides water from SWATS to the Johnson County SUD, which serves customers within Region C. The amount of water provided by SWATS is accounted for as an import to Region C (Table I.9).

Imports

The total supply available (not limited to infrastructure constraints) from imports is based upon the Water Availability Models (WAMs) from the TCEQ and the current contracts with the owners of the water sources. Table I.9 shows those imports. Below is a discussion of each of the imported water sources.

Table I.9
Currently Available Surface Water Supplies – Imports
(Acre-Feet per Year)

Source	Basin of Origin	2020	2030	2040	2050	2060	2070	2060 from 2011 Plan
Chapman (NTMWD)[a]	Sulphur	44,792	44,505	44,218	43,931	43,644	43,357	47,132
Chapman (Irving)	Sulphur	42,280	42,009	41,739	41,468	41,197	40,926	44,484
Chapman (Upper Trinity MWD)	Sulphur	12,606	12,525	12,445	12,364	12,283	12,202	13,268
Tawakoni (Dallas)	Sabine	174,080	169,120	164,160	159,200	154,240	149,280	176,777
Fork (Dallas)[b]	Sabine	120,028	116,180	112,332	108,484	104,636	100,788	116,551
Upper Sabine Basin (NTMWD)[c]	Sabine	50,707	10,629	10,550	10,472	10,394	10,315	9,356
Palestine (Dallas)[d]	Neches	111,776	110,670	109,563	108,455	107,347	106,239	107,347
Livingston[e]	Trinity	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Lake Athens[f]	Neches	2,432	2,711	2,949	3,293	4,534	4,759	3,647
Possum Kingdom[g]	Brazos	1,000	1,000	1,000	1,000	1,000	1,000	2,000
Lake Aquilla	Brazos	262	298	340	391	452	523	329
Lake Granbury	Brazos	276	304	334	368	405	444	231
Lake Palo Pinto	Brazos	1,328	1,314	1,302	1,292	1,284	1,276	1,230
TOTAL		**581,567**	**531,265**	**520,931**	**510,717**	**501,415**	**491,109**	**542,352**

a. The supplies from Lake Chapman for NTMWD include NTMWD's share of Lake Chapman and sales from the City of Cooper.
b. The import of water from Lake Fork to the Trinity Basin is limited to 224,200 acre-feet per year. The first phase of infrastructure to transport this water to DWU is completed. The second phase is scheduled to be completed in the next five years.
c. NTMWD acquired Terrell's and Ables Springs WSC's supply in Lake Tawakoni with additional water from the Upper Sabine Basin for 2020.
d. There is no current infrastructure to transport the water from Lake Palestine to DWU.
e. Water supply contract from Lake Livingston is for 20,000 acre-feet per year in any one year with no more than 48,000 acre-feet per year over a three year period.
f. The amount of water from Lake Athens is the amount that is imported to Region C.
g. The supply from Possum Kingdom Lake is for Vulcan Materials (Parker County Mining).
h. Supply amount reported is the safe yield.

Chapman. North Texas Municipal Water District, the City of Irving, and the Sulphur River Water District hold water rights in Lake Chapman totaling 146,520 acre-feet per year. Of this total, 127,320 acre-feet per year can be exported for use in Region C – 57,214 acre-feet per year for North Texas Municipal Water District, 54,000 acre-feet per year for Irving, and 16,106 acre-feet per year for the Upper Trinity Regional Water District (purchased from the Sulphur River Water District). Yields for Lake Chapman were updated because of a new critical period. The previous critical period was from June 1953 to January 1957. The new critical period is from April 2003 to November 2006. Flows from 1940 to 1996 are based on WAM inflows. The hydrology from 1997 through March 2012 was extended using mass balance of the reservoir.

Accounting for the new critical period, the year 2020 firm yield of Lake Chapman is about 114,705 acre-feet per year, decreasing to 111,030 acre-feet per year by 2070.

The values in Table I.9 show Lake Chapman's computed firm yield divided proportionally among the Region C water suppliers with a share of the water. The water supply for Upper Trinity Regional Water District could reduce by 25 percent in 2040 through 2060 and by 50 percent in 2070 because the City of Commerce has the option to reclaim a portion of the water it has sold to UTRWD beginning in 2040. However, based on water projections for the City of Commerce, it is expected that Commerce may not need to exercise the option, thereby letting the water remain available to UTRWD.

Tawakoni. Lake Tawakoni is located in the Sabine River Basin. The Sabine River Authority holds water rights for 238,100 acre-feet per year. The City of Dallas has a contract for 190,480 acre-feet per year. The North Texas Municipal Water District has contracts for 11,098 acre-feet per year that were transferred from the City of Terrell and Ables Springs WSC. Using the Sabine River WAM, the firm yield of Lake Tawakoni is 229,710 in year 2020, reducing to 221,310 acre-feet per year by 2070. The available supply shown in the *2011 Region C Water Plan* [(1)] differs slightly from the yields presented here because a new sedimentation rate, which was calculated using the 2009 volumetric survey of Tawakoni, was used. The supplies available to the cities of Dallas and NTMWD are based on the proportion of the contracted amount to the firm yield. Adjustments were made to ensure that supplies to each customer of the Sabine River Authority were reduced proportionally. NTMWD's share of the Lake Tawakoni supply is included in the Upper Sabine Basin Supply in Table I.9.

Lake Fork (Dallas). Lake Fork is located in the Sabine River Basin. The Sabine River Authority holds water rights for 188,660 acre-feet per year. The City of Dallas has a contract for 131,860 acre-feet per year. Of this amount, 120,000 acre-feet per year can be exported to the Trinity Basin in Region C. The remainder can only be used in the Sabine River Basin. The firm yield of Lake Fork was calculated as 171,260 acre-feet per year in year 2020, reducing due to sedimentation to 161,360 acre-feet per year in 2070. The decrease from the available supply shown in the *2011 Region C Water Plan* [(1)] is due to using a higher sedimentation rate, which was calculated using the 2009 volumetric survey of Lake Fork. The supply to Dallas was reduced in proportion to the reduced yield. The total amount exported to Region C was limited to the 120,000 acre-feet per year specified in the trans-basin diversion permit.

Upper Sabine Basin Supply (NTMWD). In addition to the Lake Tawakoni supply transferred to NTMWD from Terrell and Ables Springs WSC, NTMWD has a temporary water right for additional supply from the Upper Sabine Basin. The additional supply is 40,000 acre-feet per year in 2020. The available supply to NTMWD from the Upper Sabine Basin that is shown in Table I.19 includes the temporary supply (2020 only) and the firm yield of the Lake Tawakoni water rights that were transferred from Terrell and Ables Springs WSC to NTMWD.

Palestine (Dallas). Lake Palestine is located on the Neches River in the Neches River Basin. The lake is owned and operated by the Upper Neches River Municipal Water Authority (UNRMWA) in conjunction with a downstream diversion point (Rocky Point). The UNRMWA holds water rights totaling 238,110 acre-feet per year from the Lake Palestine system. The firm yield of the Palestine system using the numbers provided by Region I is estimated at 205,417 acre-feet per year in year 2020, reducing to 195,229 acre-feet per year by 2070. The City of Dallas has a contract with the UNRMWA for 114,337 acre-feet per year. The supply to Dallas was reduced due to the reduced yield. Presently there is no infrastructure to transport this water from Lake Palestine to Dallas. This will be considered as a water management strategy.

Athens (Athens). Lake Athens is located in Henderson County in the Neches River Basin. The Athens Municipal Water Authority holds water rights in Lake Athens totaling 8,500 acre-feet per year. Of this amount 3,023 acre-feet per year is designated for industrial use for the Athens Fish Hatchery, which is located at the lake. The yield of Lake Athens was determined by Region I using the Neches Basin Water Availability Model and is estimated at 5,983 acre-feet per year in 2020. The amount that is exported to Region C for use by the City of Athens is 2,432 acre-feet per year, increasing to 4,759 acre-feet per year in 2070.

Possum Kingdom Lake (Vulcan Materials). Vulcan Materials has a contract to purchase 1,000 acre-feet per year of water originating in Possum Kingdom Lake from the Brazos River Authority for mining use. Possum Kingdom Lake is in the Brazos River Basin in Region G.

Lake Aquilla. Lake Aquilla is located in the Brazos River Basin in Region G. The Aquilla Water Supply Corporation provides water to entities in Ellis and Navarro Counties in Region C. The total estimated supply provided to Region C from Lake Aquilla is 178 acre-feet per year in 2020, increasing to 429 acre-feet per year by 2070.

Lake Granbury. Lake Granbury is located in the Brazos River Basin in Region G. The Brazos River Authority (BRA) owns and operates the lake as part of the Authority's water system. Currently, the Authority sells water from Lake Granbury to Johnson County Special Utility District (SUD). Johnson County SUD provides water to customers in both Region C and Region G. The amount of water imported to Region C is estimated at 276 acre-feet per year in 2020, increasing to 444 acre-feet per year in 2070. Parker County SUD also has a contract with the BRA for 700 acre-feet per year from Lake Granbury.

Lake Palo Pinto. Lake Palo Pinto is located in Palo Pinto County in the Brazos River Basin in Region G. A portion of Mineral Wells is in Parker County in Region C. All of Mineral Wells' water supply currently comes from Lake Palo Pinto. (Mineral Wells has a water right in Lake Mineral Wells in Parker County but has no plans to use that source for water supply.) The supply from Lake Palo Pinto to Region C consists of:

- All projected City of Mineral Wells demand in Parker County
- 25 acre-feet per year of demand for Parker County Manufacturing, provided through the City of Mineral Wells
- 957 acre-feet per year for Parker County Other.
- 294 acre-feet per year for Parker County SUD.

Table I.10

Summary of Water Availability Models (WAM) Used by Region C

Name of Model	Summary of Modifications	Entity That Performed the Model Run	Date of Model Run
TCEQ WAM trin3	See letter to EA dated March 5, 2009; EA modifications approved by EA in April 6, 2009 letter	Freese and Nichols, Inc	March 2009
TCEQ WAM trin3	See letter to EA dated April 30, 2012; EA modifications approved by EA in December 2012 letter	Freese and Nichols, Inc	April 2012
TCEQ Sabine WAM	None requested by Region C	Freese and Nichols, Inc	November 2013
TCEQ Red River WAM	None requested by Region C	Freese and Nichols, Inc	December 2013

APPENDIX I
LIST OF REFERENCES

(1) Freese and Nichols, Inc., Alan Plummer Associates, Inc., CP&Y, Inc., and Cooksey Communications, Inc.: *2011 Region C Water Plan*, prepared for the Region C Water Planning Group, Fort Worth, October 2010.

(2) Texas Commission on Environmental Quality: Water Rights Database, provided on January 22, 2009 by Marian Chervenka with TCEQ to be used in regional water planning.

(3) Texas Commission on Environmental Quality: *Water Rights Database Files*, Austin, [Online] Available URL: http://www.tceq.state.tx.us/permitting/water_rights/wr_databases.html, April 16, 2012.

(4) Texas Water Development Board, Exhibit C First Amended General Guidelines for Regional Water Plan Development (October 2012), Austin, [Online] Available URL: http://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2016/doc/current_docs/contract_docs/2012_exhC_1st_amended_gen_guidelines.pdf, January 28, 2013.

(5) Texas Water Development Board: Groundwater Pumpage Estimates, Pumpage Detail, 2000 and Later, Austin, [Online] Available URL: http://www.twdb.texas.gov/waterplanning/waterusesurvey/historical-pumpage.asp, September 2013.

(6) Texas Water Development Board: Water Use Summary Estimates, County, Summary, 2000 and Later, Austin, [Online] Available URL: http://www.twdb.texas.gov/waterplanning/waterusesurvey/estimates/, February 2, 2015.

(7) Texas Water Development Board: Updated MAG Estimates, provided on April 4, 2012 by Temple McKinnon with TWDB.

Appendix J

APPENDIX J

EXISTING SUPPLIES BY WATER USER GROUP

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COLLIN COUNTY							
SABINE BASIN							
CADDO BASIN SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	43	43	48	54	58	62
CADDO BASIN SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	36	36	40	43	48	52
CADDO BASIN SUD	C | TRINITY INDIRECT REUSE	46	61	80	100	117	129
CADDO BASIN SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	20	21	23	26	28	29
CADDO BASIN SUD	D | FORK LAKE/RESERVOIR	11	0	0	0	0	0
CADDO BASIN SUD	D | TAWAKONI LAKE/RESERVOIR	16	6	6	7	8	8
FARMERSVILLE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	1	1	1	1	1
FARMERSVILLE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	1	1	1	0	0
FARMERSVILLE	C | TRINITY INDIRECT REUSE	0	2	2	2	1	1
FARMERSVILLE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	0	0	0	0	0
FARMERSVILLE	D | FORK LAKE/RESERVOIR	0	0	0	0	0	0
FARMERSVILLE	D | TAWAKONI LAKE/RESERVOIR	0	0	0	0	0	0
JOSEPHINE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	60	78	91	99	90	82
JOSEPHINE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	48	64	74	83	75	68
JOSEPHINE	C | TRINITY INDIRECT REUSE	64	109	147	185	180	170
JOSEPHINE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	28	38	43	47	43	39
JOSEPHINE	D | FORK LAKE/RESERVOIR	14	0	0	0	0	0
JOSEPHINE	D | TAWAKONI LAKE/RESERVOIR	22	10	12	13	12	11
NEVADA	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	3	3	3	9	21	34
NEVADA	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2	2	2	8	17	29
NEVADA	C | TRINITY INDIRECT REUSE	2	4	4	18	42	71
NEVADA	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1	1	1	4	10	16
NEVADA	D | FORK LAKE/RESERVOIR	1	0	0	0	0	0
NEVADA	D | TAWAKONI LAKE/RESERVOIR	1	0	0	1	3	4
ROYSE CITY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	44	125	232	341	586	573
ROYSE CITY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	36	102	192	284	492	485
ROYSE CITY	C | TRINITY INDIRECT REUSE	48	173	380	642	1,181	1,199
ROYSE CITY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	21	59	111	164	282	276
ROYSE CITY	D | FORK LAKE/RESERVOIR	11	0	0	0	0	0
ROYSE CITY	D | TAWAKONI LAKE/RESERVOIR	16	16	31	45	78	77
COUNTY-OTHER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	10	7	5	5	4	3
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	8	6	4	4	3	2
COUNTY-OTHER	C | TRINITY AQUIFER | COLLIN COUNTY	10	8	6	2	1	0

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COLLIN COUNTY							
SABINE BASIN							
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	12	10	8	9	8	5
COUNTY-OTHER	C | WOODBINE AQUIFER | COLLIN COUNTY	10	8	6	2	1	0
COUNTY-OTHER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	5	3	2	2	2	1
COUNTY-OTHER	D | FORK LAKE/RESERVOIR	2	0	0	0	0	0
COUNTY-OTHER	D | TAWAKONI LAKE/RESERVOIR	4	1	1	1	1	0
LIVESTOCK	C | SABINE LIVESTOCK LOCAL SUPPLY	3	3	3	3	3	3
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	97	97	97	97	97	97
IRRIGATION	C | DIRECT REUSE	52	52	52	52	52	52
IRRIGATION	C | RAY HUBBARD LAKE/RESERVOIR	39	36	32	29	27	26
IRRIGATION	C | TRINITY AQUIFER | COLLIN COUNTY	22	22	22	22	22	22
IRRIGATION	C | TRINITY RUN-OF-RIVER	9	9	9	9	9	9
IRRIGATION	C | WOODBINE AQUIFER | COLLIN COUNTY	3	3	3	3	3	3
SABINE BASIN TOTAL EXISTING SUPPLY		**880**	**1,220**	**1,774**	**2,417**	**3,606**	**3,639**
TRINITY BASIN							
DALLAS	C | RAY HUBBARD LAKE/RESERVOIR	1,751	1,603	1,416	1,246	1,108	1,013
DALLAS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	4,215	3,529	3,020	2,587	2,224	1,951
DALLAS	C | TRINITY INDIRECT REUSE	1,154	1,259	1,211	1,454	1,756	1,968
DALLAS	D | FORK LAKE/RESERVOIR	1,778	1,814	1,771	1,719	1,680	1,685
DALLAS	D | TAWAKONI LAKE/RESERVOIR	6,174	5,571	4,842	4,209	3,705	3,357
GARLAND	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	12	13	14	15	16	17
GARLAND	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	10	11	11	12	13	15
GARLAND	C | TRINITY INDIRECT REUSE	14	19	22	28	33	36
GARLAND	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	6	6	7	7	8	8
GARLAND	D | FORK LAKE/RESERVOIR	3	0	0	0	0	0
GARLAND	D | TAWAKONI LAKE/RESERVOIR	5	2	2	2	2	2
ALLEN	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	4,725	4,080	3,507	3,099	2,806	2,549
ALLEN	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	3,857	3,355	2,904	2,585	2,357	2,156
ALLEN	C | TRINITY INDIRECT REUSE	5,201	5,671	5,728	5,826	5,658	5,335
ALLEN	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2,249	1,947	1,677	1,486	1,349	1,228
ALLEN	D | FORK LAKE/RESERVOIR	1,139	0	0	0	0	0
ALLEN	D | TAWAKONI LAKE/RESERVOIR	1,749	530	461	411	375	343
ANNA	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	225	255	410	386	374	367
ANNA	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	183	209	339	322	313	310
ANNA	C | TRINITY AQUIFER | COLLIN COUNTY	216	216	216	216	216	216
ANNA	C | TRINITY INDIRECT REUSE	247	354	669	724	752	766
ANNA	C | WOODBINE AQUIFER | COLLIN COUNTY	706	706	706	706	706	706
ANNA	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	107	121	196	185	179	176

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COLLIN COUNTY							
TRINITY BASIN							
ANNA	D | FORK LAKE/RESERVOIR	54	0	0	0	0	0
ANNA	D | TAWAKONI LAKE/RESERVOIR	83	33	54	51	50	49
BLUE RIDGE	C | WOODBINE AQUIFER | COLLIN COUNTY	92	92	92	92	92	92
CADDO BASIN SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	21	22	24	26	29	30
CADDO BASIN SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	16	17	20	22	24	25
CADDO BASIN SUD	C | TRINITY INDIRECT REUSE	24	30	40	49	58	63
CADDO BASIN SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	10	10	11	13	14	14
CADDO BASIN SUD	D | FORK LAKE/RESERVOIR	5	0	0	0	0	0
CADDO BASIN SUD	D | TAWAKONI LAKE/RESERVOIR	8	3	3	4	4	4
CARROLLTON	C | RAY HUBBARD LAKE/RESERVOIR	0	0	0	0	0	0
CARROLLTON	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	0	0	0	0	0	0
CARROLLTON	C | TRINITY AQUIFER | DALLAS COUNTY	0	0	0	0	0	0
CARROLLTON	C | TRINITY INDIRECT REUSE	0	0	0	0	0	1
CARROLLTON	D | FORK LAKE/RESERVOIR	0	0	0	0	0	0
CARROLLTON	D | TAWAKONI LAKE/RESERVOIR	0	1	1	1	1	1
CELINA	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,012	1,914	1,706	1,521	1,486	1,457
CELINA	C | TRINITY AQUIFER | COLLIN COUNTY	128	119	108	99	99	99
CELINA	C | WOODBINE AQUIFER | COLLIN COUNTY	60	56	51	47	46	46
CELINA	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	680	591	559	533	552	112
CELINA	D | SULPHUR INDIRECT REUSE	299	269	262	258	274	289
CULLEOKA WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	75	75	105	113	112	128
CULLEOKA WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	62	61	87	95	95	108
CULLEOKA WSC	C | TRINITY INDIRECT REUSE	83	103	171	215	227	268
CULLEOKA WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	36	35	50	55	54	62
CULLEOKA WSC	D | FORK LAKE/RESERVOIR	18	0	0	0	0	0
CULLEOKA WSC	D | TAWAKONI LAKE/RESERVOIR	28	10	14	15	15	17
EAST FORK SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	64	68	70	74	80	88
EAST FORK SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	52	55	59	62	69	75
EAST FORK SUD	C | TRINITY INDIRECT REUSE	71	93	116	141	164	185
EAST FORK SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	31	32	34	36	39	42
EAST FORK SUD	D | FORK LAKE/RESERVOIR	16	0	0	0	0	0
EAST FORK SUD	D | TAWAKONI LAKE/RESERVOIR	24	9	9	10	11	12
FAIRVIEW	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,069	1,070	1,230	1,091	990	897
FAIRVIEW	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	872	879	1,019	909	830	760

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
COLLIN COUNTY							
TRINITY BASIN							
FAIRVIEW	C | TRINITY INDIRECT REUSE	1,176	1,486	2,010	2,050	1,993	1,880
FAIRVIEW	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	508	510	589	523	475	433
FAIRVIEW	D | FORK LAKE/RESERVOIR	258	0	0	0	0	0
FAIRVIEW	D | TAWAKONI LAKE/RESERVOIR	396	139	162	145	132	121
FARMERSVILLE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	220	463	399	352	319	289
FARMERSVILLE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	180	380	329	293	268	246
FARMERSVILLE	C | TRINITY INDIRECT REUSE	243	642	649	661	643	607
FARMERSVILLE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	105	221	191	169	154	140
FARMERSVILLE	D | FORK LAKE/RESERVOIR	53	0	0	0	0	0
FARMERSVILLE	D | TAWAKONI LAKE/RESERVOIR	82	60	52	47	43	39
FRISCO	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	5,437	6,142	6,417	5,687	5,150	4,677
FRISCO	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	4,439	5,050	5,313	4,742	4,325	3,956
FRISCO	C | TRINITY INDIRECT REUSE	5,986	8,536	10,479	10,687	10,383	9,791
FRISCO	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2,588	2,930	3,069	2,726	2,475	2,253
FRISCO	D | FORK LAKE/RESERVOIR	1,305	0	0	0	0	0
FRISCO	D | TAWAKONI LAKE/RESERVOIR	2,002	797	841	752	699	640
MARILEE SUD	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	141	133	120	103	81	56
MARILEE SUD	C | TRINITY AQUIFER | COLLIN COUNTY	273	273	273	273	272	273
MARILEE SUD	C | TRINITY AQUIFER | GRAYSON COUNTY	268	268	268	268	268	268
HICKORY CREEK SUD	D | WOODBINE AQUIFER | HUNT COUNTY	12	8	6	4	4	3
LOWRY CROSSING	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	52	51	54	47	43	38
LOWRY CROSSING	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	42	42	44	39	36	33
LOWRY CROSSING	C | TRINITY INDIRECT REUSE	56	72	87	89	85	81
LOWRY CROSSING	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	24	25	26	23	20	19
LOWRY CROSSING	D | FORK LAKE/RESERVOIR	12	0	0	0	0	0
LOWRY CROSSING	D | TAWAKONI LAKE/RESERVOIR	19	7	7	6	6	5
LUCAS	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	491	483	548	543	544	494
LUCAS	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	400	397	455	453	457	418
LUCAS	C | TRINITY INDIRECT REUSE	540	671	897	1,021	1,096	1,034
LUCAS	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	233	230	263	260	261	238
LUCAS	D | FORK LAKE/RESERVOIR	118	0	0	0	0	0
LUCAS	D | TAWAKONI LAKE/RESERVOIR	182	63	72	72	73	66
MCKINNEY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	7,906	8,201	10,255	11,831	10,722	9,738

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COLLIN COUNTY							
TRINITY BASIN							
MCKINNEY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	6,456	6,744	8,491	9,865	9,004	8,237
MCKINNEY	C | TRINITY INDIRECT REUSE	8,704	11,399	16,751	22,234	21,614	20,385
MCKINNEY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	3,764	3,914	4,905	5,672	5,152	4,691
MCKINNEY	D | FORK LAKE/RESERVOIR	1,907	0	0	0	0	0
MCKINNEY	D | TAWAKONI LAKE/RESERVOIR	2,928	1,065	1,347	1,570	1,435	1,309
MELISSA	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	307	390	462	967	1,481	2,031
MELISSA	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	250	319	383	808	1,244	1,717
MELISSA	C | TRINITY INDIRECT REUSE	338	538	756	1,820	2,986	4,250
MELISSA	C | WOODBINE AQUIFER | COLLIN COUNTY	201	201	201	201	201	201
MELISSA	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	146	185	221	464	712	978
MELISSA	D | FORK LAKE/RESERVOIR	74	0	0	0	0	0
MELISSA	D | TAWAKONI LAKE/RESERVOIR	114	50	61	128	198	273
MURPHY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,216	1,053	908	804	730	661
MURPHY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	993	867	752	671	612	560
MURPHY	C | TRINITY INDIRECT REUSE	1,339	1,465	1,485	1,512	1,469	1,386
MURPHY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	579	503	435	386	350	319
MURPHY	D | FORK LAKE/RESERVOIR	293	0	0	0	0	0
MURPHY	D | TAWAKONI LAKE/RESERVOIR	450	137	119	107	97	89
NEVADA	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	19	20	21	72	163	266
NEVADA	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	16	16	17	60	137	225
NEVADA	C | TRINITY INDIRECT REUSE	22	27	33	135	328	558
NEVADA	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	10	10	10	35	78	129
NEVADA	D | FORK LAKE/RESERVOIR	4	0	0	0	0	0
NEVADA	D | TAWAKONI LAKE/RESERVOIR	7	3	3	10	22	36
NEW HOPE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	28	28	30	33	35	38
NEW HOPE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	22	24	25	27	29	32
NEW HOPE	C | TRINITY INDIRECT REUSE	30	40	50	60	71	80
NEW HOPE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	13	14	14	15	17	18
NEW HOPE	D | FORK LAKE/RESERVOIR	7	0	0	0	0	0
NEW HOPE	D | TAWAKONI LAKE/RESERVOIR	10	4	4	4	5	5
NORTH COLLIN WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	179	174	171	173	178	185
NORTH COLLIN WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	147	144	142	143	150	157
NORTH COLLIN WSC	C | TRINITY INDIRECT REUSE	199	243	280	323	360	389
NORTH COLLIN WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	86	83	82	82	86	89

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COLLIN COUNTY							
TRINITY BASIN							
NORTH COLLIN WSC	D | FORK LAKE/RESERVOIR	43	0	0	0	0	0
NORTH COLLIN WSC	D | TAWAKONI LAKE/RESERVOIR	67	23	22	23	24	25
PARKER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	589	734	689	648	627	616
PARKER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	481	604	570	540	527	520
PARKER	C | TRINITY INDIRECT REUSE	649	1,020	1,125	1,218	1,264	1,288
PARKER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	281	350	329	311	301	296
PARKER	D | FORK LAKE/RESERVOIR	142	0	0	0	0	0
PARKER	D | TAWAKONI LAKE/RESERVOIR	218	95	90	86	84	83
PLANO	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	15,444	13,771	12,326	10,951	9,915	9,005
PLANO	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	12,609	11,323	10,206	9,132	8,326	7,617
PLANO	C | TRINITY INDIRECT REUSE	16,999	19,136	20,132	20,585	19,988	18,851
PLANO	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	7,350	6,570	5,895	5,250	4,764	4,338
PLANO	D | FORK LAKE/RESERVOIR	3,714	0	0	0	0	0
PLANO	D | TAWAKONI LAKE/RESERVOIR	5,701	1,786	1,615	1,448	1,342	1,228
PRINCETON	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	224	248	272	566	809	1,004
PRINCETON	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	183	204	225	472	680	849
PRINCETON	C | TRINITY INDIRECT REUSE	247	345	443	1,065	1,632	2,101
PRINCETON	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	107	118	130	271	389	484
PRINCETON	D | FORK LAKE/RESERVOIR	54	0	0	0	0	0
PRINCETON	D | TAWAKONI LAKE/RESERVOIR	83	32	36	75	108	135
PROSPER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,181	1,253	1,001	770	637	625
PROSPER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	964	1,031	829	643	535	529
PROSPER	C | TRINITY INDIRECT REUSE	1,299	1,741	1,635	1,448	1,285	1,308
PROSPER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	562	598	479	369	306	301
PROSPER	D | FORK LAKE/RESERVOIR	284	0	0	0	0	0
PROSPER	D | TAWAKONI LAKE/RESERVOIR	437	163	132	102	85	84
RICHARDSON	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,819	1,569	1,392	1,264	1,145	1,040
RICHARDSON	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,485	1,290	1,152	1,054	961	879
RICHARDSON	C | TRINITY INDIRECT REUSE	2,002	2,180	2,273	2,376	2,307	2,176
RICHARDSON	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	866	749	665	606	550	501
RICHARDSON	D | FORK LAKE/RESERVOIR	439	0	0	0	0	0
RICHARDSON	D | TAWAKONI LAKE/RESERVOIR	673	204	183	168	153	140
SACHSE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	331	285	245	217	196	178
SACHSE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	270	234	203	180	164	150

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
COLLIN COUNTY							
TRINITY BASIN							
SACHSE	C | TRINITY INDIRECT REUSE	364	396	400	407	395	372
SACHSE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	157	136	117	104	94	86
SACHSE	D | FORK LAKE/RESERVOIR	80	0	0	0	0	0
SACHSE	D | TAWAKONI LAKE/RESERVOIR	122	37	32	29	26	24
SOUTH GRAYSON WSC	C | TRINITY AQUIFER | GRAYSON COUNTY	71	80	89	96	103	110
SOUTH GRAYSON WSC	C | WOODBINE AQUIFER | GRAYSON COUNTY	143	161	179	193	207	220
WESTON	C | WOODBINE AQUIFER | COLLIN COUNTY	435	435	435	435	435	435
WYLIE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,461	1,420	1,310	1,225	1,144	1,069
WYLIE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,193	1,168	1,086	1,019	960	904
WYLIE	C | TRINITY INDIRECT REUSE	1,608	1,975	2,144	2,298	2,307	2,238
WYLIE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	695	678	628	586	549	515
WYLIE	D | FORK LAKE/RESERVOIR	353	0	0	0	0	0
WYLIE	D | TAWAKONI LAKE/RESERVOIR	541	185	172	163	152	144
LAVON SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	82	73	75	74	156	353
LAVON SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	67	61	62	62	131	299
LAVON SUD	C | TRINITY INDIRECT REUSE	90	103	122	140	314	739
LAVON SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	39	35	36	35	75	170
LAVON SUD	D | FORK LAKE/RESERVOIR	20	0	0	0	0	0
LAVON SUD	D | TAWAKONI LAKE/RESERVOIR	30	10	10	10	20	47
COPEVILLE SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	73	76	78	91	144	225
COPEVILLE SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	60	62	65	77	122	190
COPEVILLE SUD	C | TRINITY INDIRECT REUSE	81	104	128	173	292	471
COPEVILLE SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	35	36	38	44	70	108
COPEVILLE SUD	D | FORK LAKE/RESERVOIR	18	0	0	0	0	0
COPEVILLE SUD	D | TAWAKONI LAKE/RESERVOIR	27	10	10	12	19	30
WYLIE NORTHEAST SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	60	63	69	120	181	264
WYLIE NORTHEAST SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	48	53	57	101	153	224
WYLIE NORTHEAST SUD	C | TRINITY INDIRECT REUSE	65	89	112	228	368	554
WYLIE NORTHEAST SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	28	31	33	58	88	127
WYLIE NORTHEAST SUD	D | FORK LAKE/RESERVOIR	14	0	0	0	0	0
WYLIE NORTHEAST SUD	D | TAWAKONI LAKE/RESERVOIR	22	8	9	16	24	36
SEIS LAGOS UD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	139	119	104	91	83	75
SEIS LAGOS UD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	114	99	86	76	70	64

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COLLIN COUNTY **TRINITY BASIN**							
SEIS LAGOS UD	C | TRINITY INDIRECT REUSE	153	167	168	172	167	158
SEIS LAGOS UD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	66	57	49	44	40	36
SEIS LAGOS UD	D | FORK LAKE/RESERVOIR	33	0	0	0	0	0
SEIS LAGOS UD	D | TAWAKONI LAKE/RESERVOIR	51	16	14	12	11	10
ST. PAUL	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	60	60	56	50	48	44
ST. PAUL	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	50	49	46	43	41	37
ST. PAUL	C | TRINITY INDIRECT REUSE	67	83	91	97	99	92
ST. PAUL	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	29	28	27	25	23	21
ST. PAUL	D | FORK LAKE/RESERVOIR	15	0	0	0	0	0
ST. PAUL	D | TAWAKONI LAKE/RESERVOIR	23	8	7	7	6	6
LAVON	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	129	142	187	214	436	891
LAVON	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	105	117	155	179	366	753
LAVON	C | TRINITY INDIRECT REUSE	141	199	306	403	880	1,864
LAVON	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	61	68	90	103	210	429
LAVON	D | FORK LAKE/RESERVOIR	31	0	0	0	0	0
LAVON	D | TAWAKONI LAKE/RESERVOIR	48	19	25	28	58	120
COUNTY-OTHER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	246	210	179	722	965	1,442
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	202	173	149	601	810	1,219
COUNTY-OTHER	C | TRINITY AQUIFER | COLLIN COUNTY	240	242	244	248	249	250
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	271	293	293	1,355	1,943	3,017
COUNTY-OTHER	C | WOODBINE AQUIFER | COLLIN COUNTY	237	239	241	245	246	247
COUNTY-OTHER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	117	101	87	346	463	694
COUNTY-OTHER	D | FORK LAKE/RESERVOIR	60	0	0	0	0	0
COUNTY-OTHER	D | TAWAKONI LAKE/RESERVOIR	91	27	23	95	129	194
MANUFACTURING	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	756	740	711	687	679	669
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	616	609	589	575	569	565
MANUFACTURING	C | TRINITY INDIRECT REUSE	829	1,033	1,163	1,293	1,363	1,399
MANUFACTURING	C | WOODBINE AQUIFER | COLLIN COUNTY	200	200	200	200	200	200
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	359	355	341	329	324	322
MANUFACTURING	D | FORK LAKE/RESERVOIR	183	0	0	0	0	0
MANUFACTURING	D | TAWAKONI LAKE/RESERVOIR	280	96	94	90	90	90
STEAM ELECTRIC POWER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	195	124	133	94	112	94
STEAM ELECTRIC POWER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	159	103	110	79	95	80
STEAM ELECTRIC POWER	C | TRINITY INDIRECT REUSE	213	174	217	177	227	198

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COLLIN COUNTY							
TRINITY BASIN							
STEAM ELECTRIC POWER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	92	60	63	45	54	46
LIVESTOCK	C | SABINE LIVESTOCK LOCAL SUPPLY	28	28	28	28	28	28
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	874	874	874	874	874	874
IRRIGATION	C | DIRECT REUSE	2,252	2,252	2,252	2,252	2,252	2,252
IRRIGATION	C | RAY HUBBARD LAKE/RESERVOIR	1,680	1,528	1,364	1,258	1,177	1,121
IRRIGATION	C | TRINITY AQUIFER | COLLIN COUNTY	948	948	948	948	948	948
IRRIGATION	C | TRINITY RUN-OF-RIVER	399	399	399	399	399	399
IRRIGATION	C | WOODBINE AQUIFER | COLLIN COUNTY	134	134	134	134	134	134
TRINITY BASIN TOTAL EXISTING SUPPLY		**207,179**	**192,172**	**201,095**	**209,256**	**205,517**	**203,645**
COLLIN COUNTY TOTAL EXISTING SUPPLY		**208,059**	**193,392**	**202,869**	**211,673**	**209,123**	**207,284**
COOKE COUNTY							
RED BASIN							
GAINESVILLE	C | HUBERT H MOSS LAKE/RESERVOIR	1	1	1	1	2	2
GAINESVILLE	C | TRINITY AQUIFER | COOKE COUNTY	3	3	3	4	3	3
TWO WAY SUD	C | TRINITY AQUIFER | GRAYSON COUNTY	12	10	8	7	6	5
WOODBINE WSC	C | TRINITY AQUIFER | COOKE COUNTY	53	52	52	53	53	53
COUNTY-OTHER	C | HUBERT H MOSS LAKE/RESERVOIR	35	30	0	23	69	141
COUNTY-OTHER	C | TRINITY AQUIFER | COOKE COUNTY	196	207	296	247	266	210
COUNTY-OTHER	C | WOODBINE AQUIFER | COOKE COUNTY	10	10	9	8	8	7
LIVESTOCK	C | RED LIVESTOCK LOCAL SUPPLY	180	180	180	180	180	180
LIVESTOCK	C | TRINITY AQUIFER | COOKE COUNTY	146	146	146	146	146	146
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	382	382	382	382	382	382
LIVESTOCK	C | WOODBINE AQUIFER | COOKE COUNTY	29	29	29	29	29	29
IRRIGATION	C | DIRECT REUSE	3	3	3	3	3	3
IRRIGATION	C | TRINITY AQUIFER | COOKE COUNTY	53	53	53	53	53	53
IRRIGATION	C | WOODBINE AQUIFER | COOKE COUNTY	14	14	14	14	14	14
RED BASIN TOTAL EXISTING SUPPLY		**1,117**	**1,120**	**1,176**	**1,150**	**1,214**	**1,228**
TRINITY BASIN							
GAINESVILLE	C | HUBERT H MOSS LAKE/RESERVOIR	387	484	554	650	1,232	1,080
GAINESVILLE	C | TRINITY AQUIFER | COOKE COUNTY	2,101	2,101	2,101	2,100	2,101	2,101
BOLIVAR WSC	C | TRINITY AQUIFER | DENTON COUNTY	133	119	105	95	84	74
BOLIVAR WSC	C | TRINITY AQUIFER | WISE COUNTY	16	14	12	11	9	9
LINDSAY	C | TRINITY AQUIFER | COOKE COUNTY	158	158	158	158	158	158
MUENSTER	C | TRINITY AQUIFER | COOKE COUNTY	283	283	283	283	283	283
VALLEY VIEW	C | TRINITY AQUIFER | COOKE COUNTY	56	56	56	56	56	56
WOODBINE WSC	C | TRINITY AQUIFER | COOKE COUNTY	605	606	606	605	605	605
LAKE KIOWA SUD	C | TRINITY AQUIFER | COOKE COUNTY	829	829	829	829	829	829
MOUNTAIN SPRING WSC	C | TRINITY AQUIFER | COOKE COUNTY	509	508	507	507	511	514
COUNTY-OTHER	C | HUBERT H MOSS LAKE/RESERVOIR	127	108	0	106	300	810
COUNTY-OTHER	C | TRINITY AQUIFER | COOKE COUNTY	720	759	1,120	1,169	1,150	1,206
COUNTY-OTHER	C | WOODBINE AQUIFER | COOKE COUNTY	35	35	36	37	37	38

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
COOKE COUNTY							
TRINITY BASIN							
MANUFACTURING	C | HUBERT H MOSS LAKE/RESERVOIR	192	213	234	252	276	124
MANUFACTURING	C | TRINITY AQUIFER | COOKE COUNTY	34	34	34	34	34	34
MINING	C | TRINITY AQUIFER | COOKE COUNTY	800	750	300	300	300	300
LIVESTOCK	C | RED LIVESTOCK LOCAL SUPPLY	200	200	200	200	200	200
LIVESTOCK	C | TRINITY AQUIFER | COOKE COUNTY	161	161	161	161	161	161
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	425	425	425	425	425	425
LIVESTOCK	C | WOODBINE AQUIFER | COOKE COUNTY	31	31	31	31	31	31
IRRIGATION	C | DIRECT REUSE	6	6	6	6	6	6
IRRIGATION	C | TRINITY AQUIFER | COOKE COUNTY	123	123	123	123	123	123
IRRIGATION	C | WOODBINE AQUIFER | COOKE COUNTY	35	35	35	35	35	35
TRINITY BASIN TOTAL EXISTING SUPPLY		**7,966**	**8,038**	**7,916**	**8,173**	**8,946**	**9,202**
COOKE COUNTY TOTAL EXISTING SUPPLY		**9,083**	**9,158**	**9,092**	**9,323**	**10,160**	**10,430**
DALLAS COUNTY							
TRINITY BASIN							
CEDAR HILL	C | RAY HUBBARD LAKE/RESERVOIR	1,145	1,256	1,306	1,333	1,186	1,084
CEDAR HILL	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,756	2,768	2,787	2,766	2,380	2,088
CEDAR HILL	C | TRINITY AQUIFER | DALLAS COUNTY	178	177	177	177	177	177
CEDAR HILL	C | TRINITY INDIRECT REUSE	755	987	1,117	1,555	1,879	2,106
CEDAR HILL	D | FORK LAKE/RESERVOIR	1,162	1,422	1,635	1,838	1,798	1,803
CEDAR HILL	D | TAWAKONI LAKE/RESERVOIR	4,036	4,367	4,468	4,502	3,964	3,592
DALLAS	C | RAY HUBBARD LAKE/RESERVOIR	28,009	27,194	27,121	26,736	25,735	24,384
DALLAS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	67,438	59,862	57,853	55,515	51,659	46,961
DALLAS	C | TRINITY INDIRECT REUSE	18,471	21,361	23,192	31,209	40,774	47,374
DALLAS	D | FORK LAKE/RESERVOIR	28,440	30,781	33,922	36,883	39,027	40,558
DALLAS	D | TAWAKONI LAKE/RESERVOIR	98,780	94,513	92,748	90,337	86,044	80,813
GARLAND	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	8,709	7,614	6,493	5,695	5,149	4,678
GARLAND	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	7,110	6,260	5,378	4,751	4,325	3,956
GARLAND	C | TRINITY INDIRECT REUSE	9,587	10,580	10,608	10,707	10,380	9,791
GARLAND	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	4,145	3,633	3,106	2,731	2,474	2,253
GARLAND	D | FORK LAKE/RESERVOIR	2,089	0	0	0	0	0
GARLAND	D | TAWAKONI LAKE/RESERVOIR	3,206	987	849	751	706	647
ROCKETT SUD	C | JOE POOL LAKE/RESERVOIR	7	9	9	8	7	5
ROCKETT SUD	C | TRWD LAKE/RESERVOIR SYSTEM	111	164	187	203	203	208
SEAGOVILLE	C | RAY HUBBARD LAKE/RESERVOIR	143	146	142	133	107	82
SEAGOVILLE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	343	319	305	276	216	155
SEAGOVILLE	C | TRINITY INDIRECT REUSE	94	115	121	156	172	155
SEAGOVILLE	D | FORK LAKE/RESERVOIR	145	165	178	183	164	133
SEAGOVILLE	D | TAWAKONI LAKE/RESERVOIR	503	506	488	448	359	264
ADDISON	C | RAY HUBBARD LAKE/RESERVOIR	665	718	737	744	745	756

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
DALLAS COUNTY							
TRINITY BASIN							
ADDISON	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,600	1,580	1,571	1,544	1,495	1,457
ADDISON	C | TRINITY INDIRECT REUSE	438	564	630	868	1,180	1,469
ADDISON	D | FORK LAKE/RESERVOIR	675	812	921	1,026	1,129	1,257
ADDISON	D | TAWAKONI LAKE/RESERVOIR	2,346	2,495	2,519	2,513	2,488	2,505
BALCH SPRINGS	C | RAY HUBBARD LAKE/RESERVOIR	305	292	274	261	251	246
BALCH SPRINGS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	733	643	584	543	502	474
BALCH SPRINGS	C | TRINITY INDIRECT REUSE	201	230	235	305	397	478
BALCH SPRINGS	D | FORK LAKE/RESERVOIR	309	331	344	360	380	409
BALCH SPRINGS	D | TAWAKONI LAKE/RESERVOIR	1,075	1,015	939	883	839	816
CARROLLTON	C | RAY HUBBARD LAKE/RESERVOIR	1,026	915	797	700	623	569
CARROLLTON	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,470	2,014	1,701	1,454	1,250	1,097
CARROLLTON	C | TRINITY AQUIFER | DALLAS COUNTY	13	13	13	13	13	13
CARROLLTON	C | TRINITY INDIRECT REUSE	677	719	682	818	987	1,106
CARROLLTON	D | FORK LAKE/RESERVOIR	1,042	1,036	997	966	944	947
CARROLLTON	D | TAWAKONI LAKE/RESERVOIR	3,619	3,179	2,727	2,367	2,082	1,887
COCKRELL HILL	C | RAY HUBBARD LAKE/RESERVOIR	45	42	36	31	38	74
COCKRELL HILL	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	107	94	78	65	76	142
COCKRELL HILL	C | TRINITY INDIRECT REUSE	30	33	31	37	60	143
COCKRELL HILL	D | FORK LAKE/RESERVOIR	46	48	45	43	57	123
COCKRELL HILL	D | TAWAKONI LAKE/RESERVOIR	160	148	124	107	127	244
COMBINE	C | RAY HUBBARD LAKE/RESERVOIR	6	6	6	5	4	3
COMBINE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	15	14	12	11	8	7
COMBINE	C | TRINITY INDIRECT REUSE	4	5	5	6	7	7
COMBINE	D | FORK LAKE/RESERVOIR	7	7	7	7	6	6
COMBINE	D | TAWAKONI LAKE/RESERVOIR	23	21	20	18	14	11
COPPELL	C | RAY HUBBARD LAKE/RESERVOIR	1,185	1,105	971	857	762	697
COPPELL	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,850	2,432	2,070	1,779	1,529	1,341
COPPELL	C | TRINITY INDIRECT REUSE	781	867	830	1,000	1,207	1,353
COPPELL	D | FORK LAKE/RESERVOIR	1,202	1,251	1,214	1,181	1,156	1,159
COPPELL	D | TAWAKONI LAKE/RESERVOIR	4,177	3,839	3,320	2,892	2,547	2,309
DUNCANVILLE	C | RAY HUBBARD LAKE/RESERVOIR	672	650	563	493	438	401
DUNCANVILLE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,617	1,431	1,200	1,023	881	771
DUNCANVILLE	C | TRINITY INDIRECT REUSE	443	510	482	576	695	779
DUNCANVILLE	D | FORK LAKE/RESERVOIR	682	735	705	681	665	667
DUNCANVILLE	D | TAWAKONI LAKE/RESERVOIR	2,370	2,257	1,926	1,667	1,465	1,328
EAST FORK SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	54	62	67	73	79	82
EAST FORK SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	44	51	55	61	66	69

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
DALLAS COUNTY							
TRINITY BASIN							
EAST FORK SUD	C | TRINITY INDIRECT REUSE	60	87	109	137	158	172
EAST FORK SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	26	30	32	35	38	40
EAST FORK SUD	D | FORK LAKE/RESERVOIR	13	0	0	0	0	0
EAST FORK SUD	D | TAWAKONI LAKE/RESERVOIR	20	8	9	10	10	11
FARMERS BRANCH	C | RAY HUBBARD LAKE/RESERVOIR	1,002	954	887	830	780	751
FARMERS BRANCH	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,411	2,102	1,891	1,722	1,565	1,446
FARMERS BRANCH	C | TRINITY INDIRECT REUSE	660	750	758	968	1,235	1,458
FARMERS BRANCH	D | FORK LAKE/RESERVOIR	1,017	1,080	1,109	1,144	1,182	1,248
FARMERS BRANCH	D | TAWAKONI LAKE/RESERVOIR	3,532	3,317	3,032	2,803	2,606	2,488
FERRIS	C | JOE POOL LAKE/RESERVOIR	0	0	0	0	0	0
FERRIS	C | TRWD LAKE/RESERVOIR SYSTEM	0	0	1	1	1	1
FERRIS	C | WOODBINE AQUIFER | ELLIS COUNTY	1	1	2	1	1	1
GLENN HEIGHTS	C | RAY HUBBARD LAKE/RESERVOIR	152	188	212	234	248	300
GLENN HEIGHTS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	367	415	454	485	498	580
GLENN HEIGHTS	C | TRINITY AQUIFER | DALLAS COUNTY	75	76	76	76	76	73
GLENN HEIGHTS	C | TRINITY INDIRECT REUSE	101	147	181	273	392	583
GLENN HEIGHTS	C | WOODBINE AQUIFER | DALLAS COUNTY	63	64	64	64	64	62
GLENN HEIGHTS	D | FORK LAKE/RESERVOIR	155	213	266	322	376	500
GLENN HEIGHTS	D | TAWAKONI LAKE/RESERVOIR	538	653	728	789	828	994
GRAND PRAIRIE	C | JOE POOL LAKE/RESERVOIR	2,341	2,481	2,549	2,548	2,546	2,544
GRAND PRAIRIE	C | RAY HUBBARD LAKE/RESERVOIR	1,922	2,281	2,270	1,999	1,750	1,602
GRAND PRAIRIE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	4,627	5,019	4,842	4,151	3,512	3,083
GRAND PRAIRIE	C | TRINITY INDIRECT REUSE	1,268	1,791	1,941	2,335	2,772	3,112
GRAND PRAIRIE	C | TRWD LAKE/RESERVOIR SYSTEM	3,800	3,800	3,692	3,402	3,088	2,805
GRAND PRAIRIE	D | FORK LAKE/RESERVOIR	1,951	2,582	2,840	2,759	2,654	2,664
GRAND PRAIRIE	D | TAWAKONI LAKE/RESERVOIR	6,780	7,928	7,765	6,757	5,852	5,307
HIGHLAND PARK	C | GRAPEVINE LAKE/RESERVOIR NON-SYSTEM PORTION	4,022	4,093	4,065	4,036	4,020	4,006
HUTCHINS	C | RAY HUBBARD LAKE/RESERVOIR	113	141	159	172	181	191
HUTCHINS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	271	311	340	356	363	367
HUTCHINS	C | TRINITY INDIRECT REUSE	75	110	136	200	286	370
HUTCHINS	D | FORK LAKE/RESERVOIR	116	159	199	237	274	317
HUTCHINS	D | TAWAKONI LAKE/RESERVOIR	400	490	544	582	605	633
IRVING	C | RAY HUBBARD LAKE/RESERVOIR	554	505	447	397	353	323
IRVING	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,334	1,111	955	823	709	623
IRVING	C | TRINITY INDIRECT REUSE	365	396	382	463	560	627
IRVING	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	38,501	37,894	37,318	36,798	36,499	36,199

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
DALLAS COUNTY							
TRINITY BASIN							
IRVING	D | FORK LAKE/RESERVOIR	562	571	559	547	536	537
IRVING	D | TAWAKONI LAKE/RESERVOIR	1,953	1,753	1,529	1,340	1,181	1,070
LANCASTER	C | JOE POOL LAKE/RESERVOIR	6	4	2	2	1	1
LANCASTER	C | RAY HUBBARD LAKE/RESERVOIR	841	977	1,014	997	978	977
LANCASTER	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,025	2,149	2,164	2,070	1,963	1,882
LANCASTER	C | TRINITY INDIRECT REUSE	555	768	867	1,164	1,550	1,899
LANCASTER	C | TRWD LAKE/RESERVOIR SYSTEM	56	46	38	32	26	19
LANCASTER	D | FORK LAKE/RESERVOIR	855	1,107	1,269	1,375	1,483	1,625
LANCASTER	D | TAWAKONI LAKE/RESERVOIR	2,968	3,397	3,469	3,369	3,271	3,239
LEWISVILLE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	151	134	117	104	94	94
MESQUITE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	5,136	4,783	4,569	4,372	4,272	4,170
MESQUITE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	4,193	3,932	3,783	3,645	3,590	3,527
MESQUITE	C | TRINITY INDIRECT REUSE	5,653	6,646	7,460	8,216	8,617	8,730
MESQUITE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2,445	2,282	2,184	2,095	2,054	2,009
MESQUITE	D | FORK LAKE/RESERVOIR	1,239	0	0	0	0	0
MESQUITE	D | TAWAKONI LAKE/RESERVOIR	1,902	621	600	580	571	560
OVILLA	C | RAY HUBBARD LAKE/RESERVOIR	13	15	16	17	17	27
OVILLA	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	31	32	33	35	35	52
OVILLA	C | TRINITY INDIRECT REUSE	8	11	13	19	27	53
OVILLA	D | FORK LAKE/RESERVOIR	13	16	20	23	26	45
OVILLA	D | TAWAKONI LAKE/RESERVOIR	44	51	54	56	58	90
RICHARDSON	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	4,239	3,783	3,356	3,048	2,762	2,507
RICHARDSON	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	3,461	3,111	2,779	2,542	2,318	2,121
RICHARDSON	C | TRINITY INDIRECT REUSE	4,667	5,259	5,480	5,728	5,566	5,249
RICHARDSON	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2,017	1,805	1,605	1,461	1,327	1,208
RICHARDSON	D | FORK LAKE/RESERVOIR	1,022	0	0	0	0	0
RICHARDSON	D | TAWAKONI LAKE/RESERVOIR	1,570	491	441	404	369	337
ROWLETT	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2,000	1,872	1,598	1,407	1,274	1,156
ROWLETT	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,633	1,540	1,322	1,173	1,069	978
ROWLETT	C | TRINITY INDIRECT REUSE	2,201	2,601	2,608	2,643	2,566	2,420
ROWLETT	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	952	893	764	675	611	557
ROWLETT	D | FORK LAKE/RESERVOIR	483	0	0	0	0	0
ROWLETT	D | TAWAKONI LAKE/RESERVOIR	741	243	210	187	170	156
SACHSE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	861	743	639	564	510	464
SACHSE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	703	612	528	471	429	393
SACHSE	C | TRINITY INDIRECT REUSE	948	1,033	1,043	1,059	1,030	971

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
DALLAS COUNTY							
TRINITY BASIN							
SACHSE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	410	355	305	270	246	223
SACHSE	D | FORK LAKE/RESERVOIR	207	0	0	0	0	0
SACHSE	D | TAWAKONI LAKE/RESERVOIR	319	96	84	75	69	62
SUNNYVALE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	639	693	773	789	857	778
SUNNYVALE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	523	569	640	658	720	658
SUNNYVALE	C | TRINITY INDIRECT REUSE	705	961	1,263	1,482	1,728	1,629
SUNNYVALE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	305	330	370	378	412	375
UNIVERSITY PARK	C | GRAPEVINE LAKE/RESERVOIR NON-SYSTEM PORTION	7,559	7,427	7,353	7,281	7,248	7,223
WILMER	C | RAY HUBBARD LAKE/RESERVOIR	45	44	62	103	144	241
WILMER	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	108	97	132	213	290	465
WILMER	C | TRINITY AQUIFER | DALLAS COUNTY	29	29	29	29	29	29
WILMER	C | TRINITY INDIRECT REUSE	29	35	53	120	229	469
WILMER	D | FORK LAKE/RESERVOIR	45	50	77	142	219	401
WILMER	D | TAWAKONI LAKE/RESERVOIR	158	153	210	346	483	799
WYLIE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	88	78	69	62	58	55
WYLIE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	72	64	57	52	49	47
WYLIE	C | TRINITY INDIRECT REUSE	97	108	112	117	116	115
WYLIE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	42	37	33	30	28	26
WYLIE	D | FORK LAKE/RESERVOIR	21	0	0	0	0	0
WYLIE	D | TAWAKONI LAKE/RESERVOIR	33	10	9	8	8	7
DESOTO	C | RAY HUBBARD LAKE/RESERVOIR	1,046	1,022	973	933	897	880
DESOTO	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,518	2,250	2,077	1,938	1,799	1,696
DESOTO	C | TRINITY INDIRECT REUSE	690	803	832	1,089	1,421	1,711
DESOTO	D | FORK LAKE/RESERVOIR	1,062	1,157	1,217	1,288	1,360	1,464
DESOTO	D | TAWAKONI LAKE/RESERVOIR	3,689	3,552	3,327	3,153	2,997	2,918
COUNTY-OTHER	C | DIRECT REUSE	40	40	150	150	150	150
COUNTY-OTHER	C | RAY HUBBARD LAKE/RESERVOIR	236	166	112	97	87	78
COUNTY-OTHER	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	569	366	237	203	173	149
COUNTY-OTHER	C | TRINITY AQUIFER | DALLAS COUNTY	205	205	205	205	205	205
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	157	130	96	114	136	152
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	761	614	582	524	480	441
COUNTY-OTHER	C | WOODBINE AQUIFER | DALLAS COUNTY	56	56	56	56	56	56
COUNTY-OTHER	D | FORK LAKE/RESERVOIR	240	188	139	135	130	130
COUNTY-OTHER	D | TAWAKONI LAKE/RESERVOIR	834	577	378	329	286	257
MANUFACTURING	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,026	854	792	743	676	618
MANUFACTURING	C | RAY HUBBARD LAKE/RESERVOIR	3,242	3,221	3,002	2,788	2,495	2,29[illegible]

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
DALLAS COUNTY							
TRINITY BASIN							
MANUFACTURING	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	7,805	7,091	6,402	5,789	5,007	4,419
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	838	703	656	618	568	522
MANUFACTURING	C | TRINITY AQUIFER | DALLAS COUNTY	530	530	530	530	530	530
MANUFACTURING	C | TRINITY INDIRECT REUSE	3,268	3,719	3,861	4,647	5,317	5,750
MANUFACTURING	C | WOODBINE AQUIFER | DALLAS COUNTY	43	43	43	43	43	43
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	3,779	4,115	4,421	4,670	4,698	4,727
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	488	408	379	356	326	297
MANUFACTURING	D | FORK LAKE/RESERVOIR	3,292	3,647	3,754	3,845	3,784	3,816
MANUFACTURING	D | TAWAKONI LAKE/RESERVOIR	11,433	11,196	10,262	9,417	8,340	7,606
MINING	C | RAY HUBBARD LAKE/RESERVOIR	118	69	27	15	14	12
MINING	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	282	150	57	32	25	24
MINING	C | TRINITY AQUIFER | DALLAS COUNTY	452	452	452	452	452	452
MINING	C | TRINITY INDIRECT REUSE	78	54	23	18	21	24
MINING	C | TRINITY OTHER LOCAL SUPPLY	1,525	1,525	1,525	1,525	1,525	1,525
MINING	D | FORK LAKE/RESERVOIR	119	78	34	21	21	21
MINING	D | TAWAKONI LAKE/RESERVOIR	415	238	92	52	45	41
STEAM ELECTRIC POWER	C | MOUNTAIN CREEK LAKE/RESERVOIR	6,400	6,400	6,400	6,400	6,400	6,400
STEAM ELECTRIC POWER	C | RAY HUBBARD LAKE/RESERVOIR	4,768	4,337	3,873	3,570	3,340	3,181
STEAM ELECTRIC POWER	C | TRINITY RUN-OF-RIVER	368	368	368	368	368	368
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	198	198	198	198	198	198
LIVESTOCK	C | WOODBINE AQUIFER | DALLAS COUNTY	763	763	763	763	763	763
IRRIGATION	C | DIRECT REUSE	615	615	615	615	615	615
IRRIGATION	C | JOE POOL LAKE/RESERVOIR	300	300	300	300	300	300
IRRIGATION	C | TRINITY AQUIFER | DALLAS COUNTY	1,587	1,587	1,587	1,587	1,587	1,587
IRRIGATION	C | TRINITY INDIRECT REUSE	8,000	8,000	8,000	8,000	8,000	8,000
IRRIGATION	C | TRINITY RUN-OF-RIVER	791	791	791	791	791	791
IRRIGATION	C | WOODBINE AQUIFER | DALLAS COUNTY	1,372	1,372	1,372	1,372	1,372	1,372
TRINITY BASIN TOTAL EXISTING SUPPLY		**545,288**	**526,894**	**518,607**	**518,094**	**513,241**	**505,259**
DALLAS COUNTY TOTAL EXISTING SUPPLY		**545,288**	**526,894**	**518,607**	**518,094**	**513,241**	**505,259**
DENTON COUNTY							
TRINITY BASIN							
DALLAS	C | RAY HUBBARD LAKE/RESERVOIR	729	705	699	685	657	622
DALLAS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,754	1,552	1,490	1,422	1,319	1,197
DALLAS	C | TRINITY INDIRECT REUSE	480	554	597	800	1,041	1,208
DALLAS	D | FORK LAKE/RESERVOIR	740	798	874	945	997	1,034
DALLAS	D | TAWAKONI LAKE/RESERVOIR	2,570	2,450	2,389	2,315	2,197	2,061
DENTON	C | LEWISVILLE LAKE/RESERVOIR NON-SYSTEM PORTION	7,817	7,715	7,613	7,512	7,410	7,308

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
DENTON COUNTY							
TRINITY BASIN							
DENTON	C | RAY ROBERTS LAKE/RESERVOIR NON-SYSTEM PORTION	17,830	17,787	17,716	17,657	17,637	17,531
DENTON	C | TRINITY INDIRECT REUSE	185	456	727	997	1,268	1,539
FORT WORTH	C | DIRECT REUSE	32	42	37	47	55	62
FORT WORTH	C | TRINITY INDIRECT REUSE	2,351	3,038	3,778	5,052	6,264	7,423
FORT WORTH	C | TRWD LAKE/RESERVOIR SYSTEM	4,491	5,781	6,874	8,449	9,621	10,434
MUSTANG SUD	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	472	1,325	2,046	2,014	2,479	2,267
MUSTANG SUD	C | TRINITY AQUIFER | DENTON COUNTY	1,104	1,104	1,104	1,104	1,104	1,104
MUSTANG SUD	C | WOODBINE AQUIFER | DENTON COUNTY	71	71	71	71	71	71
MUSTANG SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	162	391	265	581	494	153
MUSTANG SUD	D | SULPHUR INDIRECT REUSE	70	187	268	326	401	0
ARGYLE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	634	811	984	785	703	606
ARGYLE	C | TRINITY AQUIFER | DENTON COUNTY	450	450	450	450	450	450
ARGYLE	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	191	247	323	276	261	235
ARGYLE	D | SULPHUR INDIRECT REUSE	84	112	151	133	130	121
ARGYLE WSC	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	335	369	329	263	235	202
ARGYLE WSC	C | TRINITY AQUIFER | DENTON COUNTY	500	500	500	500	500	500
ARGYLE WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	137	118	108	92	87	78
ARGYLE WSC	D | SULPHUR INDIRECT REUSE	60	54	51	45	44	40
AUBREY	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	379	392	348	318	332	347
AUBREY	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	128	121	114	112	124	134
AUBREY	D | SULPHUR INDIRECT REUSE	56	55	54	54	61	69
BARTONVILLE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	442	406	316	249	222	190
BARTONVILLE	C | TRINITY AQUIFER | DENTON COUNTY	168	168	168	168	168	168
BARTONVILLE	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	148	125	104	87	82	74
BARTONVILLE	D | SULPHUR INDIRECT REUSE	66	57	49	42	41	38
BOLIVAR WSC	C | TRINITY AQUIFER | DENTON COUNTY	767	784	802	816	830	844
BOLIVAR WSC	C | TRINITY AQUIFER | WISE COUNTY	87	89	91	93	95	96
CARROLLTON	C | RAY HUBBARD LAKE/RESERVOIR	1,585	1,457	1,270	1,116	992	907
CARROLLTON	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	3,814	3,209	2,709	2,316	1,992	1,748
CARROLLTON	C | TRINITY AQUIFER | DALLAS COUNTY	20	20	20	20	20	20
CARROLLTON	C | TRINITY INDIRECT REUSE	1,045	1,144	1,086	1,302	1,572	1,761
CARROLLTON	D | FORK LAKE/RESERVOIR	1,609	1,649	1,589	1,539	1,505	1,508
CARROLLTON	D | TAWAKONI LAKE/RESERVOIR	5,588	5,063	4,342	3,769	3,315	3,004
CELINA	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	62	213	375	507	495	486
CELINA	C | TRINITY AQUIFER | COLLIN COUNTY	4	13	24	33	33	33
CELINA	C | WOODBINE AQUIFER | COLLIN COUNTY	2	6	11	15	16	16

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
DENTON COUNTY							
TRINITY BASIN							
CELINA	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	21	66	123	178	184	38
CELINA	D | SULPHUR INDIRECT REUSE	9	30	58	86	92	97
COPPELL	C | RAY HUBBARD LAKE/RESERVOIR	33	30	26	23	21	19
COPPELL	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	81	66	56	48	42	36
COPPELL	C | TRINITY INDIRECT REUSE	22	24	23	27	33	37
COPPELL	D | FORK LAKE/RESERVOIR	34	34	33	32	31	31
COPPELL	D | TAWAKONI LAKE/RESERVOIR	118	105	90	79	69	63
COPPER CANYON	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	63	66	63	62	66	64
COPPER CANYON	C | TRINITY AQUIFER | DENTON COUNTY	167	167	167	167	167	167
COPPER CANYON	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	21	19	22	22	24	24
COPPER CANYON	D | SULPHUR INDIRECT REUSE	9	9	10	10	12	13
CORINTH	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,116	1,770	1,346	1,038	902	776
CORINTH	C | TRINITY AQUIFER | DENTON COUNTY	274	274	274	274	274	274
CORINTH	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	714	547	441	364	335	301
CORINTH	D | SULPHUR INDIRECT REUSE	315	249	207	176	167	154
CROSS ROADS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	307	332	310	241	209	180
CROSS ROADS	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	103	103	101	84	78	70
CROSS ROADS	D | SULPHUR INDIRECT REUSE	46	47	48	41	39	36
DENTON COUNTY FWSD #1A	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,800	4,220	4,118	3,416	3,031	2,828
DENTON COUNTY FWSD #1A	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	557	729	708	585	538	150
DENTON COUNTY FWSD #1A	D | SULPHUR INDIRECT REUSE	245	332	332	283	268	248
DOUBLE OAK	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	156	135	115	97	93	81
DOUBLE OAK	C | TRINITY AQUIFER | DENTON COUNTY	325	325	325	325	325	325
DOUBLE OAK	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	54	42	36	35	36	31
DOUBLE OAK	D | SULPHUR INDIRECT REUSE	23	19	17	17	17	16
FLOWER MOUND	C | RAY HUBBARD LAKE/RESERVOIR	714	715	710	683	614	561
FLOWER MOUND	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	8,744	9,248	7,364	5,938	5,165	4,468
FLOWER MOUND	C | TRINITY INDIRECT REUSE	470	562	607	798	972	1,090
FLOWER MOUND	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	2,373	2,373	1,919	1,586	1,460	1,312
FLOWER MOUND	D | FORK LAKE/RESERVOIR	725	810	888	942	931	933
FLOWER MOUND	D | SULPHUR INDIRECT REUSE	1,045	1,078	899	767	728	673
FLOWER MOUND	D | TAWAKONI LAKE/RESERVOIR	2,518	2,487	2,429	2,308	2,052	1,859
FRISCO	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	3,625	4,095	4,278	3,792	3,434	3,118
FRISCO	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2,960	3,367	3,542	3,161	2,884	2,637

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
DENTON COUNTY							
TRINITY BASIN							
FRISCO	C | TRINITY INDIRECT REUSE	3,990	5,690	6,987	7,125	6,922	6,526
FRISCO	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,726	1,954	2,046	1,818	1,650	1,502
FRISCO	D | FORK LAKE/RESERVOIR	870	0	0	0	0	0
FRISCO	D | TAWAKONI LAKE/RESERVOIR	1,335	531	560	501	466	426
HACKBERRY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	84	82	89	97	108	119
HACKBERRY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	69	67	74	81	91	100
HACKBERRY	C | TRINITY INDIRECT REUSE	92	114	146	184	218	248
HACKBERRY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	40	39	43	47	52	57
HICKORY CREEK	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	327	330	319	314	277	238
HICKORY CREEK	C | TRINITY AQUIFER | DENTON COUNTY	97	97	97	97	97	97
HICKORY CREEK	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	110	103	105	110	103	91
HICKORY CREEK	D | SULPHUR INDIRECT REUSE	49	46	49	53	51	47
HIGHLAND VILLAGE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,672	1,478	1,169	943	857	737
HIGHLAND VILLAGE	C | TRINITY AQUIFER | DENTON COUNTY	1,347	1,347	1,347	1,347	1,347	1,347
HIGHLAND VILLAGE	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	564	457	384	331	318	285
HIGHLAND VILLAGE	D | SULPHUR INDIRECT REUSE	249	208	180	160	158	147
JUSTIN	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	141	416	553	443	399	343
JUSTIN	C | TRINITY AQUIFER | DENTON COUNTY	242	242	242	242	242	242
JUSTIN	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	47	129	181	156	148	133
JUSTIN	D | SULPHUR INDIRECT REUSE	21	58	85	75	74	68
KRUGERVILLE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	177	169	151	139	120	103
KRUGERVILLE	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	59	53	49	49	46	40
KRUGERVILLE	D | SULPHUR INDIRECT REUSE	26	24	23	24	22	21
KRUM	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	476	543	564	566	623	652
KRUM	C | TRINITY AQUIFER | DENTON COUNTY	447	447	447	447	447	447
KRUM	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	160	168	185	199	232	253
KRUM	D | SULPHUR INDIRECT REUSE	71	76	87	96	115	130
LAKE DALLAS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	615	549	491	387	342	294
LAKE DALLAS	C | TRINITY AQUIFER | DENTON COUNTY	182	182	182	182	182	182
LAKE DALLAS	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	207	168	161	137	127	115
LAKE DALLAS	D | SULPHUR INDIRECT REUSE	91	77	76	66	63	59
LEWISVILLE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	19,056	19,308	19,223	19,447	19,624	19,624
LITTLE ELM	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,117	955	822	726	658	596

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
DENTON COUNTY							
TRINITY BASIN							
LITTLE ELM	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	911	786	681	606	551	504
LITTLE ELM	C | TRINITY INDIRECT REUSE	1,227	1,328	1,343	1,365	1,323	1,248
LITTLE ELM	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	531	456	393	348	315	287
NORTHLAKE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	389	1,352	2,264	2,093	2,342	3,147
NORTHLAKE	C | TRWD LAKE/RESERVOIR SYSTEM	160	573	905	1,140	1,340	1,233
NORTHLAKE	C | WOODBINE AQUIFER | DENTON COUNTY	170	170	170	170	170	170
NORTHLAKE	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	131	418	304	734	869	50
NORTHLAKE	D | SULPHUR INDIRECT REUSE	58	190	297	355	433	0
OAK POINT	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	531	715	775	777	832	715
OAK POINT	C | TRINITY AQUIFER | DENTON COUNTY	264	264	264	264	264	264
OAK POINT	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	178	221	254	273	309	277
OAK POINT	D | SULPHUR INDIRECT REUSE	79	100	119	132	154	142
PILOT POINT	C | TRINITY AQUIFER | DENTON COUNTY	1,102	1,102	1,102	1,102	1,102	1,102
PLANO	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	445	398	349	308	279	253
PLANO	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	363	327	289	257	234	214
PLANO	C | TRINITY INDIRECT REUSE	490	553	570	578	562	530
PLANO	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	212	190	167	148	134	122
PLANO	D | FORK LAKE/RESERVOIR	107	0	0	0	0	0
PLANO	D | TAWAKONI LAKE/RESERVOIR	164	52	46	41	38	35
PONDER	C | TRINITY AQUIFER | DENTON COUNTY	476	476	476	476	476	476
PROSPER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	44	215	376	525	616	606
PROSPER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	36	176	311	438	518	512
PROSPER	C | TRINITY INDIRECT REUSE	49	298	614	988	1,243	1,267
PROSPER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	21	102	179	252	297	292
PROSPER	D | FORK LAKE/RESERVOIR	11	0	0	0	0	0
PROSPER	D | TAWAKONI LAKE/RESERVOIR	16	28	49	70	83	81
ROANOKE	C | TRWD LAKE/RESERVOIR SYSTEM	2,219	2,264	2,294	2,062	1,886	1,734
SANGER	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	52	236	354	426	519	564
SANGER	C | TRINITY AQUIFER | DENTON COUNTY	1,121	1,121	1,121	1,121	1,121	1,121
SANGER	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	18	73	117	149	193	218
SANGER	D | SULPHUR INDIRECT REUSE	8	33	54	72	96	112
SHADY SHORES	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	258	240	188	148	130	112
SHADY SHORES	C | TRINITY AQUIFER | DENTON COUNTY	76	76	76	76	76	76
SHADY SHORES	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	88	75	62	52	48	43
SHADY SHORES	D | SULPHUR INDIRECT REUSE	39	34	29	25	24	22

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
DENTON COUNTY							
TRINITY BASIN							
SOUTHLAKE	C | TRWD LAKE/RESERVOIR SYSTEM	411	436	467	520	581	646
THE COLONY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	326	415	394	381	374	366
THE COLONY	C | RAY HUBBARD LAKE/RESERVOIR	580	535	499	486	418	369
THE COLONY	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,398	1,177	1,064	1,009	839	712
THE COLONY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	266	342	327	318	314	309
THE COLONY	C | TRINITY AQUIFER | DENTON COUNTY	1,327	1,327	1,327	1,327	1,327	1,327
THE COLONY	C | TRINITY INDIRECT REUSE	741	999	1,071	1,284	1,416	1,483
THE COLONY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	155	198	189	183	180	176
THE COLONY	D | FORK LAKE/RESERVOIR	589	606	624	671	634	614
THE COLONY	D | TAWAKONI LAKE/RESERVOIR	2,044	1,862	1,707	1,643	1,399	1,223
TROPHY CLUB	C | TRINITY AQUIFER | DENTON COUNTY	561	0	0	0	0	0
TROPHY CLUB	C | TRWD LAKE/RESERVOIR SYSTEM	4,951	4,598	3,884	3,492	3,194	2,936
MOUNTAIN SPRING WSC	C | TRINITY AQUIFER | COOKE COUNTY	11	12	13	13	9	6
DENTON COUNTY FWSD #7	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2,299	1,826	1,399	1,084	943	812
DENTON COUNTY FWSD #7	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	777	565	459	380	351	315
DENTON COUNTY FWSD #7	D | SULPHUR INDIRECT REUSE	342	256	215	184	174	161
PROVIDENCE VILLAGE WCID	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	631	499	382	295	257	221
PROVIDENCE VILLAGE WCID	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	213	154	125	103	95	87
PROVIDENCE VILLAGE WCID	D | SULPHUR INDIRECT REUSE	94	70	59	50	48	44
DENTON COUNTY FWSD #10	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	999	1,677	1,285	996	868	746
DENTON COUNTY FWSD #10	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	338	536	430	353	326	290
DENTON COUNTY FWSD #10	D | SULPHUR INDIRECT REUSE	149	235	198	169	160	149
PALOMA CREEK	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,723	1,862	1,426	1,105	962	828
PALOMA CREEK	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	582	576	468	388	358	321
PALOMA CREEK	D | SULPHUR INDIRECT REUSE	256	261	219	187	178	33
LAKEWOOD VILLAGE	C | WOODBINE AQUIFER | DENTON COUNTY	218	218	218	218	218	218
WESTLAKE	C | TRWD LAKE/RESERVOIR SYSTEM	28	31	34	39	44	49
COUNTY-OTHER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	488	375	323	286	260	235
COUNTY-OTHER	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	929	1,113	1,656	2,084	3,682	6,858
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	399	307	267	238	217	199
COUNTY-OTHER	C | TRINITY AQUIFER | DENTON COUNTY	1,640	1,640	1,640	1,640	1,640	1,640
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	538	519	527	537	522	493
COUNTY-OTHER	C | WOODBINE AQUIFER | DENTON COUNTY	165	165	165	165	165	16[illegible]

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	**2030**	**2040**	**2050**	**2060**	**2070**
DENTON COUNTY							
TRINITY BASIN							
COUNTY-OTHER	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	313	344	15	16	18	20
COUNTY-OTHER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	233	178	154	137	124	113
COUNTY-OTHER	D | SULPHUR INDIRECT REUSE	139	156	44	264	192	10
MANUFACTURING	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	19	17	16	16	16	16
MANUFACTURING	C | RAY HUBBARD LAKE/RESERVOIR	11	12	12	11	11	11
MANUFACTURING	C | RAY ROBERTS LAKE/RESERVOIR NON-SYSTEM PORTION	1,072	946	848	738	589	526
MANUFACTURING	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	75	113	100	88	84	78
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	16	14	14	13	13	13
MANUFACTURING	C | TRINITY INDIRECT REUSE	29	33	37	43	49	53
MANUFACTURING	C | TRWD LAKE/RESERVOIR SYSTEM	13	13	13	13	13	12
MANUFACTURING	C | WOODBINE AQUIFER | DENTON COUNTY	11	11	11	11	11	11
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	17	27	24	23	24	22
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	9	8	8	8	8	8
MANUFACTURING	D | FORK LAKE/RESERVOIR	11	13	14	15	17	18
MANUFACTURING	D | SULPHUR INDIRECT REUSE	7	12	12	11	12	11
MANUFACTURING	D | TAWAKONI LAKE/RESERVOIR	40	41	40	38	36	35
MINING	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,590	411	568	746	900	1,597
MINING	C | TRINITY AQUIFER | DENTON COUNTY	1,963	1,963	1,963	1,963	1,963	1,963
MINING	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	537	127	187	262	334	44
MINING	D | SULPHUR INDIRECT REUSE	236	58	87	127	166	0
STEAM ELECTRIC POWER	C | DIRECT REUSE	646	733	819	906	993	1,088
LIVESTOCK	C | TRINITY AQUIFER | DENTON COUNTY	240	240	240	240	240	240
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	622	622	622	622	622	622
LIVESTOCK	C | WOODBINE AQUIFER | DENTON COUNTY	490	490	490	490	490	490
IRRIGATION	C | DIRECT REUSE	1,303	1,303	1,303	1,303	1,303	1,303
IRRIGATION	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	429	390	348	321	301	286
IRRIGATION	C | TRINITY AQUIFER | DENTON COUNTY	400	400	400	400	400	400
IRRIGATION	C | WOODBINE AQUIFER | DENTON COUNTY	1,000	1,000	1,000	1,000	1,000	1,000
TRINITY BASIN TOTAL EXISTING SUPPLY		**176,445**	**181,879**	**180,760**	**178,575**	**179,451**	**177,218**
DENTON COUNTY TOTAL EXISTING SUPPLY		**176,445**	**181,879**	**180,760**	**178,575**	**179,451**	**177,218**
ELLIS COUNTY							
TRINITY BASIN							
CEDAR HILL	C | RAY HUBBARD LAKE/RESERVOIR	15	18	20	21	19	17
CEDAR HILL	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	37	39	42	44	38	33
CEDAR HILL	C | TRINITY AQUIFER | DALLAS COUNTY	2	3	3	3	3	3
CEDAR HILL	C | TRINITY INDIRECT REUSE	10	14	17	25	30	34

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
ELLIS COUNTY							
TRINITY BASIN							
CEDAR HILL	D | FORK LAKE/RESERVOIR	16	20	24	29	29	29
CEDAR HILL	D | TAWAKONI LAKE/RESERVOIR	55	62	67	72	64	58
ENNIS	C | BARDWELL LAKE/RESERVOIR	3,714	3,588	3,502	3,395	3,325	3,296
ENNIS	C | JOE POOL LAKE/RESERVOIR	1	1	1	0	0	0
ENNIS	C | TRWD LAKE/RESERVOIR SYSTEM	285	704	883	1,611	1,842	1,867
MANSFIELD	C | TRWD LAKE/RESERVOIR SYSTEM	24	25	27	30	34	38
MIDLOTHIAN	C | JOE POOL LAKE/RESERVOIR	1,584	1,675	1,711	1,694	1,650	1,585
MIDLOTHIAN	C | TRWD LAKE/RESERVOIR SYSTEM	2,632	2,872	3,023	3,085	3,088	3,034
ROCKETT SUD	C | JOE POOL LAKE/RESERVOIR	243	195	155	134	117	90
ROCKETT SUD	C | TRWD LAKE/RESERVOIR SYSTEM	3,623	3,437	3,286	3,307	3,453	3,635
WAXAHACHIE	C | BARDWELL LAKE/RESERVOIR	2,595	2,587	2,473	2,349	2,274	2,251
WAXAHACHIE	C | JOE POOL LAKE/RESERVOIR	39	26	17	12	8	5
WAXAHACHIE	C | TRINITY INDIRECT REUSE	2,090	2,401	2,860	3,176	3,241	3,235
WAXAHACHIE	C | TRWD LAKE/RESERVOIR SYSTEM	1,965	1,818	1,641	3,316	3,805	3,707
WAXAHACHIE	C | WAXAHACHIE LAKE/RESERVOIR	1,682	1,667	1,606	1,539	1,504	1,435
BARDWELL	C | WOODBINE AQUIFER | ELLIS COUNTY	47	42	37	32	28	28
BRANDON-IRENE WSC	G | BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	9	11	14	15	18	20
BRANDON-IRENE WSC	G | TRINITY AQUIFER | HILL COUNTY	6	8	9	11	12	14
BUENA VISTA - BETHEL SUD	C | BARDWELL LAKE/RESERVOIR	279	244	255	286	389	458
BUENA VISTA - BETHEL SUD	C | TRINITY AQUIFER | ELLIS COUNTY	874	874	874	874	874	874
BUENA VISTA - BETHEL SUD	C | TRINITY INDIRECT REUSE	225	227	295	386	554	659
BUENA VISTA - BETHEL SUD	C | TRWD LAKE/RESERVOIR SYSTEM	170	142	143	376	620	728
BUENA VISTA - BETHEL SUD	C | WAXAHACHIE LAKE/RESERVOIR	181	157	166	187	257	292
FERRIS	C | JOE POOL LAKE/RESERVOIR	7	8	7	7	10	15
FERRIS	C | TRWD LAKE/RESERVOIR SYSTEM	69	96	113	130	241	397
FERRIS	C | WOODBINE AQUIFER | ELLIS COUNTY	352	352	351	352	352	352
FILES VALLEY WSC	G | BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	259	336	385	433	484	536
GLENN HEIGHTS	C | RAY HUBBARD LAKE/RESERVOIR	39	45	50	55	60	85
GLENN HEIGHTS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	93	99	106	114	121	164
GLENN HEIGHTS	C | TRINITY AQUIFER | DALLAS COUNTY	19	18	18	18	18	21
GLENN HEIGHTS	C | TRINITY INDIRECT REUSE	25	35	43	64	96	165
GLENN HEIGHTS	C | WOODBINE AQUIFER | DALLAS COUNTY	16	15	15	15	15	17
GLENN HEIGHTS	D | FORK LAKE/RESERVOIR	39	50	62	76	92	141
GLENN HEIGHTS	D | TAWAKONI LAKE/RESERVOIR	136	155	171	185	202	281
GRAND PRAIRIE	C | JOE POOL LAKE/RESERVOIR	1	1	1	1	2	2
GRAND PRAIRIE	C | RAY HUBBARD LAKE/RESERVOIR	1	1	1	1	1	1
GRAND PRAIRIE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	2	2	2	2	2	2

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
ELLIS COUNTY							
TRINITY BASIN							
GRAND PRAIRIE	C | TRINITY INDIRECT REUSE	0	1	1	1	2	2
GRAND PRAIRIE	C | TRWD LAKE/RESERVOIR SYSTEM	2	2	2	2	2	2
GRAND PRAIRIE	D | FORK LAKE/RESERVOIR	1	1	1	1	2	2
GRAND PRAIRIE	D | TAWAKONI LAKE/RESERVOIR	3	3	3	3	4	4
ITALY	C | TRINITY AQUIFER | ELLIS COUNTY	192	192	192	192	192	192
ITALY	C | WOODBINE AQUIFER | ELLIS COUNTY	122	122	122	122	122	122
JOHNSON COUNTY SUD	C | TRWD LAKE/RESERVOIR SYSTEM	37	37	37	33	33	32
JOHNSON COUNTY SUD	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	18	19	20	20	20	20
JOHNSON COUNTY SUD	G | TRINITY AQUIFER | JOHNSON COUNTY	12	12	12	15	18	18
MAYPEARL	C | TRINITY AQUIFER | ELLIS COUNTY	55	55	55	55	55	55
MAYPEARL	C | WOODBINE AQUIFER | ELLIS COUNTY	100	100	100	100	100	100
MILFORD	C | WOODBINE AQUIFER | ELLIS COUNTY	32	32	32	32	32	32
MILFORD	G | BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	84	84	84	84	84	84
MOUNTAIN PEAK SUD	C | TRINITY AQUIFER | ELLIS COUNTY	1,257	1,257	1,257	1,257	1,257	1,257
MOUNTAIN PEAK SUD	C | TRWD LAKE/RESERVOIR SYSTEM	260	451	586	712	842	983
OAK LEAF	C | JOE POOL LAKE/RESERVOIR	4	2	2	1	1	0
OAK LEAF	C | RAY HUBBARD LAKE/RESERVOIR	11	11	12	16	23	27
OAK LEAF	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	27	24	25	34	47	51
OAK LEAF	C | TRINITY INDIRECT REUSE	7	9	10	19	37	52
OAK LEAF	C | TRWD LAKE/RESERVOIR SYSTEM	35	28	23	20	15	12
OAK LEAF	D | FORK LAKE/RESERVOIR	11	13	15	23	35	44
OAK LEAF	D | TAWAKONI LAKE/RESERVOIR	39	38	39	56	78	89
OVILLA	C | RAY HUBBARD LAKE/RESERVOIR	107	122	134	147	161	271
OVILLA	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	258	269	288	306	322	521
OVILLA	C | TRINITY INDIRECT REUSE	71	97	116	172	255	526
OVILLA	D | FORK LAKE/RESERVOIR	108	139	168	203	244	451
OVILLA	D | TAWAKONI LAKE/RESERVOIR	377	425	461	498	537	897
PALMER	C | JOE POOL LAKE/RESERVOIR	19	15	12	10	8	10
PALMER	C | TRWD LAKE/RESERVOIR SYSTEM	182	183	182	191	197	267
PALMER	C | WOODBINE AQUIFER | ELLIS COUNTY	24	24	24	24	24	24
PECAN HILL	C | JOE POOL LAKE/RESERVOIR	7	6	5	4	3	3
PECAN HILL	C | TRWD LAKE/RESERVOIR SYSTEM	70	70	70	74	76	83
RED OAK	C | JOE POOL LAKE/RESERVOIR	79	52	33	23	16	10
RED OAK	C | RAY HUBBARD LAKE/RESERVOIR	7	27	86	155	198	348
RED OAK	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	14	59	184	322	399	670
RED OAK	C | TRINITY INDIRECT REUSE	4	21	74	181	314	676
RED OAK	C | TRWD LAKE/RESERVOIR SYSTEM	777	636	519	445	358	265

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
ELLIS COUNTY							
TRINITY BASIN							
RED OAK	C | WOODBINE AQUIFER | ELLIS COUNTY	556	556	556	556	556	556
RED OAK	D | FORK LAKE/RESERVOIR	7	30	108	214	301	578
RED OAK	D | TAWAKONI LAKE/RESERVOIR	24	94	295	524	664	1,153
RICE WSC	C | BARDWELL LAKE/RESERVOIR	39	36	29	20	12	7
RICE WSC	C | NAVARRO MILLS LAKE/RESERVOIR	517	415	476	527	568	597
RICE WSC	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	103	83	95	105	114	120
RICE WSC	C | TRWD LAKE/RESERVOIR SYSTEM	2	6	7	10	7	4
SARDIS-LONE ELM WSC	C | JOE POOL LAKE/RESERVOIR	139	128	111	87	63	39
SARDIS-LONE ELM WSC	C | TRINITY AQUIFER | ELLIS COUNTY	352	352	352	352	352	352
SARDIS-LONE ELM WSC	C | TRWD LAKE/RESERVOIR SYSTEM	1,369	1,579	1,725	1,665	1,444	1,066
SARDIS-LONE ELM WSC	C | WOODBINE AQUIFER | ELLIS COUNTY	1,386	1,386	1,386	1,386	1,386	1,386
VENUS		0	0	0	0	0	0
GARRETT	C | BARDWELL LAKE/RESERVOIR	317	363	442	309	231	329
GARRETT	C | TRWD LAKE/RESERVOIR SYSTEM	23	64	88	146	128	186
COUNTY-OTHER	C | BARDWELL LAKE/RESERVOIR	481	438	365	579	682	745
COUNTY-OTHER	C | JOE POOL LAKE/RESERVOIR	162	106	69	48	40	50
COUNTY-OTHER	C | TRINITY AQUIFER | ELLIS COUNTY	200	200	200	200	200	200
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	249	257	268	308	310	372
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	519	415	317	580	705	822
COUNTY-OTHER	C | WAXAHACHIE LAKE/RESERVOIR	200	178	150	149	144	165
COUNTY-OTHER	C | WOODBINE AQUIFER | ELLIS COUNTY	345	345	345	345	345	345
MANUFACTURING	C | BARDWELL LAKE/RESERVOIR	1,419	1,274	1,003	756	549	408
MANUFACTURING	C | JOE POOL LAKE/RESERVOIR	94	67	52	43	35	29
MANUFACTURING	C | TRINITY AQUIFER | ELLIS COUNTY	900	900	900	900	900	900
MANUFACTURING	C | TRINITY INDIRECT REUSE	749	755	736	666	553	450
MANUFACTURING	C | TRWD LAKE/RESERVOIR SYSTEM	764	694	564	876	796	631
MANUFACTURING	C | WAXAHACHIE LAKE/RESERVOIR	602	524	413	323	257	200
MANUFACTURING	C | WOODBINE AQUIFER | ELLIS COUNTY	1,719	1,719	1,719	1,719	1,719	1,719
MINING	C | WOODBINE AQUIFER | ELLIS COUNTY	213	213	213	213	213	213
STEAM ELECTRIC POWER	C | BARDWELL LAKE/RESERVOIR	460	420	324	226	138	82
STEAM ELECTRIC POWER	C | DIRECT REUSE	909	909	909	909	909	909
STEAM ELECTRIC POWER	C | JOE POOL LAKE/RESERVOIR	79	55	42	34	27	23
STEAM ELECTRIC POWER	C | TRWD LAKE/RESERVOIR SYSTEM	172	191	175	187	145	108
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	1,112	1,112	1,112	1,112	1,112	1,112
LIVESTOCK	C | WOODBINE AQUIFER | ELLIS COUNTY	97	97	97	97	97	97
IRRIGATION	C | TRINITY AQUIFER | ELLIS COUNTY	129	129	129	129	129	129
IRRIGATION	C | TRINITY RUN-OF-RIVER	3	3	3	3	3	3

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
ELLIS COUNTY							
TRINITY BASIN							
IRRIGATION	C | WOODBINE AQUIFER | ELLIS COUNTY	440	440	440	440	440	440
TRINITY BASIN TOTAL EXISTING SUPPLY		**44,725**	**45,241**	**45,677**	**49,758**	**51,359**	**54,331**
ELLIS COUNTY TOTAL EXISTING SUPPLY		**44,725**	**45,241**	**45,677**	**49,758**	**51,359**	**54,331**
FANNIN COUNTY							
RED BASIN							
BONHAM	C | BONHAM LAKE/RESERVOIR	2,024	2,492	2,636	2,665	2,747	2,813
ECTOR	C | WOODBINE AQUIFER | FANNIN COUNTY	87	87	87	87	87	87
HONEY GROVE	C | WOODBINE AQUIFER | FANNIN COUNTY	61	61	61	61	61	61
LEONARD	C | WOODBINE AQUIFER | FANNIN COUNTY	3	3	3	3	3	3
SAVOY	C | WOODBINE AQUIFER | FANNIN COUNTY	88	88	88	88	88	88
SOUTHWEST FANNIN COUNTY SUD	C | WOODBINE AQUIFER | FANNIN COUNTY	363	325	296	272	253	240
SOUTHWEST FANNIN COUNTY SUD	C | WOODBINE AQUIFER | GRAYSON COUNTY	33	30	27	25	23	22
TRENTON	C | WOODBINE AQUIFER | FANNIN COUNTY	1	1	0	0	0	0
WHITEWRIGHT	C | WOODBINE AQUIFER | GRAYSON COUNTY	3	3	3	3	3	3
COUNTY-OTHER	C | BONHAM LAKE/RESERVOIR	299	443	365	352	289	240
COUNTY-OTHER	C | RED RUN-OF-RIVER	15	14	15	15	14	14
COUNTY-OTHER	C | SULPHUR RUN-OF-RIVER	36	36	38	37	36	35
COUNTY-OTHER	C | TRINITY AQUIFER | FANNIN COUNTY	195	190	199	197	193	190
COUNTY-OTHER	C | WOODBINE AQUIFER | FANNIN COUNTY	553	539	565	560	550	539
MANUFACTURING	C | BONHAM LAKE/RESERVOIR	88	96	82	66	60	55
MINING	C | RED RUN-OF-RIVER	55	55	55	55	55	55
STEAM ELECTRIC POWER	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	6,363	6,363	6,363	6,363	6,363	6,363
STEAM ELECTRIC POWER	C | WOODBINE AQUIFER | FANNIN COUNTY	200	200	200	200	200	200
LIVESTOCK	C | OTHER AQUIFER | FANNIN COUNTY	8	8	8	8	8	8
LIVESTOCK	C | RED LIVESTOCK LOCAL SUPPLY	725	725	725	725	725	725
LIVESTOCK	C | SULPHUR LIVESTOCK LOCAL SUPPLY	202	202	202	202	202	202
LIVESTOCK	C | TRINITY AQUIFER | FANNIN COUNTY	239	239	239	239	239	239
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	45	45	45	45	45	45
LIVESTOCK	C | WOODBINE AQUIFER | FANNIN COUNTY	24	24	24	24	24	24
IRRIGATION	C | OTHER AQUIFER | FANNIN COUNTY	2,700	2,700	2,700	2,700	2,700	2,700
IRRIGATION	C | RED RUN-OF-RIVER	4,281	4,281	4,281	4,281	4,281	4,281
IRRIGATION	C | WOODBINE AQUIFER | FANNIN COUNTY	723	723	723	723	723	723
RED BASIN TOTAL EXISTING SUPPLY		**19,414**	**19,973**	**20,030**	**19,996**	**19,972**	**19,955**
SULPHUR BASIN							
HICKORY CREEK SUD	D | WOODBINE AQUIFER | HUNT COUNTY	45	36	26	21	16	14
HONEY GROVE	C | WOODBINE AQUIFER | FANNIN COUNTY	213	213	213	213	213	213
LADONIA	C | TRINITY AQUIFER | FANNIN COUNTY	120	120	120	120	120	120
LEONARD	C | WOODBINE AQUIFER | FANNIN COUNTY	7	6	6	7	7	7

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
FANNIN COUNTY							
SULPHUR BASIN							
NORTH HUNT SUD	D | WOODBINE AQUIFER | HUNT COUNTY	52	39	42	44	48	52
COUNTY-OTHER	C | BONHAM LAKE/RESERVOIR	29	47	69	91	68	57
COUNTY-OTHER	C | RED RUN-OF-RIVER	1	2	3	4	4	4
COUNTY-OTHER	C | SULPHUR RUN-OF-RIVER	4	4	7	10	9	9
COUNTY-OTHER	C | TRINITY AQUIFER | FANNIN COUNTY	19	20	38	51	46	46
COUNTY-OTHER	C | WOODBINE AQUIFER | FANNIN COUNTY	54	57	107	144	129	130
MINING	C | RED RUN-OF-RIVER	17	17	17	17	17	17
LIVESTOCK	C | OTHER AQUIFER | FANNIN COUNTY	2	2	2	2	2	2
LIVESTOCK	C | RED LIVESTOCK LOCAL SUPPLY	202	202	202	202	202	202
LIVESTOCK	C | SULPHUR LIVESTOCK LOCAL SUPPLY	57	57	57	57	57	57
LIVESTOCK	C | TRINITY AQUIFER | FANNIN COUNTY	66	66	66	66	66	66
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	13	13	13	13	13	13
LIVESTOCK	C | WOODBINE AQUIFER | FANNIN COUNTY	7	7	7	7	7	7
IRRIGATION	C | OTHER AQUIFER | FANNIN COUNTY	51	51	51	51	51	51
IRRIGATION	C | RED RUN-OF-RIVER	81	81	81	81	81	81
IRRIGATION	C | WOODBINE AQUIFER | FANNIN COUNTY	14	14	14	14	14	14
SULPHUR BASIN TOTAL EXISTING SUPPLY		**1,054**	**1,054**	**1,141**	**1,215**	**1,170**	**1,162**
TRINITY BASIN							
HICKORY CREEK SUD	D | WOODBINE AQUIFER | HUNT COUNTY	3	2	2	2	0	0
LEONARD	C | WOODBINE AQUIFER | FANNIN COUNTY	321	322	322	321	321	321
SOUTHWEST FANNIN COUNTY SUD	C | WOODBINE AQUIFER | FANNIN COUNTY	18	16	15	13	13	12
SOUTHWEST FANNIN COUNTY SUD	C | WOODBINE AQUIFER | GRAYSON COUNTY	2	1	1	1	1	1
TRENTON	C | WOODBINE AQUIFER | FANNIN COUNTY	130	130	131	131	131	131
COUNTY-OTHER	C | BONHAM LAKE/RESERVOIR	71	117	43	21	31	30
COUNTY-OTHER	C | RED RUN-OF-RIVER	4	4	2	1	2	2
COUNTY-OTHER	C | SULPHUR RUN-OF-RIVER	9	9	4	2	4	5
COUNTY-OTHER	C | TRINITY AQUIFER | FANNIN COUNTY	46	50	23	12	21	24
COUNTY-OTHER	C | WOODBINE AQUIFER | FANNIN COUNTY	131	142	66	34	59	69
LIVESTOCK	C | RED LIVESTOCK LOCAL SUPPLY	46	46	46	46	46	46
LIVESTOCK	C | SULPHUR LIVESTOCK LOCAL SUPPLY	13	13	13	13	13	13
LIVESTOCK	C | TRINITY AQUIFER | FANNIN COUNTY	15	15	15	15	15	15
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	3	3	3	3	3	3
LIVESTOCK	C | WOODBINE AQUIFER | FANNIN COUNTY	1	1	1	1	1	1
IRRIGATION	C | OTHER AQUIFER | FANNIN COUNTY	158	158	158	158	158	158
IRRIGATION	C | RED RUN-OF-RIVER	251	251	251	251	251	251
IRRIGATION	C | WOODBINE AQUIFER | FANNIN COUNTY	43	43	43	43	43	43
TRINITY BASIN TOTAL EXISTING SUPPLY		**1,265**	**1,323**	**1,139**	**1,068**	**1,113**	**1,125**
FANNIN COUNTY TOTAL EXISTING SUPPLY		**21,733**	**22,350**	**22,310**	**22,279**	**22,255**	**22,242**

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
FREESTONE COUNTY							
BRAZOS BASIN							
TEAGUE	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	337	337	338	337	337	337
COUNTY-OTHER	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	100	98	62	81	96	112
COUNTY-OTHER	C | NAVARRO MILLS LAKE/RESERVOIR	12	7	4	6	10	21
COUNTY-OTHER	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	2	1	1	1	2	4
COUNTY-OTHER	C | TRINITY RUN-OF-RIVER	5	5	3	4	5	5
MINING	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	114	114	114	114	114	114
MINING	C | TRINITY OTHER LOCAL SUPPLY	13	13	13	13	13	13
LIVESTOCK	C | BRAZOS LIVESTOCK LOCAL SUPPLY	1	1	1	1	1	1
LIVESTOCK	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	9	9	9	9	9	9
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	11	11	11	11	11	11
IRRIGATION	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	33	33	33	33	33	33
IRRIGATION	C | TRINITY RUN-OF-RIVER	10	10	10	10	10	10
BRAZOS BASIN TOTAL EXISTING SUPPLY		**647**	**639**	**599**	**620**	**641**	**670**
TRINITY BASIN							
FAIRFIELD	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	1,192	1,181	1,171	1,162	1,104	998
FLO COMMUNITY WSC	H | CARRIZO-WILCOX AQUIFER | LEON COUNTY	40	41	41	42	43	43
TEAGUE	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	344	344	343	344	344	344
WORTHAM	G | CARRIZO-WILCOX AQUIFER | LIMESTONE COUNTY	157	157	157	157	157	157
OAKWOOD	H | CARRIZO-WILCOX AQUIFER | LEON COUNTY	7	7	7	7	7	8
COUNTY-OTHER	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	748	750	786	767	752	736
COUNTY-OTHER	C | NAVARRO MILLS LAKE/RESERVOIR	89	55	53	57	82	136
COUNTY-OTHER	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	18	12	10	12	16	28
COUNTY-OTHER	C | TRINITY RUN-OF-RIVER	36	36	38	37	36	36
MANUFACTURING	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	100	111	121	130	136	142
MINING	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	778	778	778	778	778	778
MINING	C | TRINITY OTHER LOCAL SUPPLY	107	107	107	107	107	107
STEAM ELECTRIC POWER	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	152	152	152	152	152	152
STEAM ELECTRIC POWER	C | FAIRFIELD LAKE/RESERVOIR	870	870	870	870	870	870
STEAM ELECTRIC POWER	C | TRWD LAKE/RESERVOIR SYSTEM	6,726	6,122	5,411	4,781	4,264	3,806
STEAM ELECTRIC POWER	H | LIVINGSTON-WALLISVILLE LAKE/RESERVOIR SYSTEM	20,000	20,000	20,000	20,000	20,000	20,000
LIVESTOCK	C | BRAZOS LIVESTOCK LOCAL SUPPLY	82	82	82	82	82	82
LIVESTOCK	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	800	800	800	800	800	800
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	949	949	949	949	949	949

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
FREESTONE COUNTY							
TRINITY BASIN							
IRRIGATION	C | CARRIZO-WILCOX AQUIFER | FREESTONE COUNTY	265	265	265	265	265	265
IRRIGATION	C | TRINITY RUN-OF-RIVER	77	77	77	77	77	77
TRINITY BASIN TOTAL EXISTING SUPPLY		**33,537**	**32,896**	**32,218**	**31,576**	**31,021**	**30,514**
FREESTONE COUNTY TOTAL EXISTING SUPPLY		**34,184**	**33,535**	**32,817**	**32,196**	**31,662**	**31,184**
GRAYSON COUNTY							
RED BASIN							
BELLS	C | WOODBINE AQUIFER | GRAYSON COUNTY	175	175	175	175	175	175
DENISON	C | RANDELL LAKE/RESERVOIR	604	541	481	430	352	268
DENISON	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	5,920	5,905	5,947	6,038	6,177	6,330
DENISON	C | WOODBINE AQUIFER | GRAYSON COUNTY	121	121	121	121	121	121
HOWE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	1	4	5	6	7
HOWE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	2	3	4	5	6
HOWE	C | TRINITY INDIRECT REUSE	0	3	5	9	12	14
HOWE	C | WOODBINE AQUIFER | GRAYSON COUNTY	76	76	76	76	76	76
HOWE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	1	2	2	3	3
POTTSBORO	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	362	441	458	419	357	288
POTTSBORO	C | WOODBINE AQUIFER | GRAYSON COUNTY	129	129	129	129	129	129
SHERMAN	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	5,086	5,124	5,485	6,067	6,982	7,610
SHERMAN	C | TRINITY AQUIFER | GRAYSON COUNTY	4,083	4,083	4,083	4,083	4,083	4,083
SHERMAN	C | WOODBINE AQUIFER | GRAYSON COUNTY	1,289	1,289	1,289	1,289	1,289	1,289
SOUTHMAYD	C | WOODBINE AQUIFER | GRAYSON COUNTY	161	161	161	161	161	161
SOUTHWEST FANNIN COUNTY SUD	C | WOODBINE AQUIFER | FANNIN COUNTY	178	218	248	274	293	307
SOUTHWEST FANNIN COUNTY SUD	C | WOODBINE AQUIFER | GRAYSON COUNTY	16	20	23	25	27	28
TOM BEAN	C | WOODBINE AQUIFER | GRAYSON COUNTY	27	27	27	27	27	27
TWO WAY SUD	C | TRINITY AQUIFER | GRAYSON COUNTY	440	441	443	443	444	444
WHITESBORO	C | TRINITY AQUIFER | GRAYSON COUNTY	236	235	235	235	235	235
WHITEWRIGHT	C | WOODBINE AQUIFER | GRAYSON COUNTY	278	278	278	278	278	278
LUELLA SUD	C | WOODBINE AQUIFER | GRAYSON COUNTY	595	594	595	594	594	595
KENTUCKY TOWN WSC	C | WOODBINE AQUIFER | GRAYSON COUNTY	434	435	434	434	434	434
COUNTY-OTHER	C | RANDELL LAKE/RESERVOIR	57	57	57	57	58	59
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	5,057	4,827	4,432	3,929	3,358	3,642
COUNTY-OTHER	C | TRINITY AQUIFER | GRAYSON COUNTY	715	715	714	708	728	736
COUNTY-OTHER	C | WOODBINE AQUIFER | GRAYSON COUNTY	763	762	761	754	776	786
MANUFACTURING	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	14	12	10	9	9	10
MANUFACTURING	C | RANDELL LAKE/RESERVOIR	732	795	855	905	983	1,067
MANUFACTURING	C | RED RUN-OF-RIVER	30	30	30	30	30	30

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
GRAYSON COUNTY							
RED BASIN							
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	3,601	3,699	3,577	3,281	2,775	2,089
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	11	9	8	8	8	8
MANUFACTURING	C | TRINITY INDIRECT REUSE	14	15	17	18	19	19
MANUFACTURING	C | WOODBINE AQUIFER | GRAYSON COUNTY	1,193	1,193	1,193	1,195	1,193	1,193
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	6	5	5	5	5	4
MINING	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	100	100	100	100	100	100
MINING	C | TRINITY AQUIFER | GRAYSON COUNTY	22	22	22	22	22	22
STEAM ELECTRIC POWER	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	3,698	3,698	3,698	3,698	3,698	3,698
LIVESTOCK	C | RED LIVESTOCK LOCAL SUPPLY	439	439	439	439	439	439
LIVESTOCK	C | TRINITY AQUIFER | GRAYSON COUNTY	66	66	66	66	66	66
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	248	248	248	248	248	248
LIVESTOCK	C | WOODBINE AQUIFER | GRAYSON COUNTY	230	230	230	230	230	230
IRRIGATION	C | RED RUN-OF-RIVER	593	593	593	593	593	593
IRRIGATION	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	82	81	81	82	82	82
IRRIGATION	C | TRINITY AQUIFER | GRAYSON COUNTY	273	273	273	273	273	273
IRRIGATION	C | WOODBINE AQUIFER | GRAYSON COUNTY	1,720	1,720	1,719	1,720	1,720	1,720
RED BASIN TOTAL EXISTING SUPPLY		**39,874**	**39,889**	**39,830**	**39,688**	**39,673**	**40,022**
TRINITY BASIN							
COLLINSVILLE	C | TRINITY AQUIFER | GRAYSON COUNTY	242	242	242	242	242	242
GUNTER	C | TRINITY AQUIFER | GRAYSON COUNTY	355	355	355	355	355	355
MARILEE SUD	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	105	100	89	78	60	42
MARILEE SUD	C | TRINITY AQUIFER | COLLIN COUNTY	204	204	204	204	205	204
MARILEE SUD	C | TRINITY AQUIFER | GRAYSON COUNTY	201	201	201	201	201	201
HOWE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1	4	10	12	16	18
HOWE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1	4	7	10	13	15
HOWE	C | TRINITY INDIRECT REUSE	2	8	15	24	32	39
HOWE	C | WOODBINE AQUIFER | GRAYSON COUNTY	206	206	206	206	206	206
HOWE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1	3	4	6	7	9
SOUTH GRAYSON WSC	C | TRINITY AQUIFER | GRAYSON COUNTY	204	195	186	179	172	165
SOUTH GRAYSON WSC	C | WOODBINE AQUIFER | GRAYSON COUNTY	408	390	372	358	344	331
TIOGA	C | TRINITY AQUIFER | GRAYSON COUNTY	119	119	119	119	119	119
TOM BEAN	C | WOODBINE AQUIFER | GRAYSON COUNTY	195	195	195	195	195	195
TWO WAY SUD	C | TRINITY AQUIFER | GRAYSON COUNTY	258	259	259	260	260	261
VAN ALSTYNE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	19	33	47	261	292
VAN ALSTYNE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	16	27	39	220	247
VAN ALSTYNE	C | TRINITY INDIRECT REUSE	0	26	53	88	528	611

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
GRAYSON COUNTY							
TRINITY BASIN							
VAN ALSTYNE	C | WOODBINE AQUIFER | GRAYSON COUNTY	517	517	517	517	517	517
VAN ALSTYNE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	9	16	22	126	141
WHITESBORO	C | TRINITY AQUIFER | GRAYSON COUNTY	311	312	312	312	312	312
WHITEWRIGHT	C | WOODBINE AQUIFER | GRAYSON COUNTY	3	3	3	3	3	3
WOODBINE WSC	C | TRINITY AQUIFER | COOKE COUNTY	9	9	9	9	9	9
LUELLA SUD	C | WOODBINE AQUIFER | GRAYSON COUNTY	92	93	92	93	93	92
KENTUCKY TOWN WSC	C | WOODBINE AQUIFER | GRAYSON COUNTY	431	430	431	431	431	431
COUNTY-OTHER	C | RANDELL LAKE/RESERVOIR	3	3	3	3	2	1
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	246	240	225	238	105	65
COUNTY-OTHER	C | TRINITY AQUIFER | GRAYSON COUNTY	35	35	36	42	22	14
COUNTY-OTHER	C | WOODBINE AQUIFER | GRAYSON COUNTY	37	38	39	46	24	14
MANUFACTURING	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	0	0	0	0	0
MANUFACTURING	C | RANDELL LAKE/RESERVOIR	4	4	4	5	5	5
MANUFACTURING	C | RED RUN-OF-RIVER	0	0	0	0	0	0
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	18	19	18	16	14	11
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	0	0	0	0	0
MANUFACTURING	C | TRINITY INDIRECT REUSE	0	0	0	0	0	0
MANUFACTURING	C | WOODBINE AQUIFER | GRAYSON COUNTY	7	7	7	5	7	7
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	0	0	0	0	0
STEAM ELECTRIC POWER	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	2,465	2,465	2,465	2,465	2,465	2,465
LIVESTOCK	C | RED LIVESTOCK LOCAL SUPPLY	248	248	248	248	248	248
LIVESTOCK	C | TRINITY AQUIFER | GRAYSON COUNTY	38	38	38	38	38	38
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	140	140	140	140	140	140
LIVESTOCK	C | WOODBINE AQUIFER | GRAYSON COUNTY	130	130	130	130	130	130
IRRIGATION	C | RED RUN-OF-RIVER	498	498	498	498	498	498
IRRIGATION	C | TEXOMA LAKE/RESERVOIR NON-SYSTEM PORTION	68	69	69	68	68	68
IRRIGATION	C | TRINITY AQUIFER | GRAYSON COUNTY	230	230	230	230	230	230
IRRIGATION	C | WOODBINE AQUIFER | GRAYSON COUNTY	1,445	1,445	1,446	1,445	1,445	1,445
TRINITY BASIN TOTAL EXISTING SUPPLY		**9,477**	**9,528**	**9,553**	**9,627**	**10,368**	**10,436**
GRAYSON COUNTY TOTAL EXISTING SUPPLY		**49,351**	**49,417**	**49,383**	**49,315**	**50,041**	**50,458**
HENDERSON COUNTY							
TRINITY BASIN							
EAST CEDAR CREEK FWSD	C | TRWD LAKE/RESERVOIR SYSTEM	488	496	535	517	427	328
WEST CEDAR CREEK MUD	C | TRWD LAKE/RESERVOIR SYSTEM	578	515	460	401	357	331
ATHENS	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	829	852	1,005	1,230	1,460	1,554
ATHENS	I | ATHENS LAKE/RESERVOIR	1,977	2,200	2,303	2,444	3,332	3,923

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
HENDERSON COUNTY							
TRINITY BASIN							
BETHEL-ASH WSC	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	327	327	327	327	327	327
EUSTACE	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	194	194	194	194	194	194
GUN BARREL CITY	C | TRWD LAKE/RESERVOIR SYSTEM	620	611	575	594	691	794
LOG CABIN	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	98	98	98	98	98	98
MABANK	C | TRWD LAKE/RESERVOIR SYSTEM	149	140	130	120	165	236
MALAKOFF	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	243	243	243	243	242	242
MALAKOFF	C | TRWD LAKE/RESERVOIR SYSTEM	29	25	20	21	29	37
PAYNE SPRINGS	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	101	101	101	101	101	101
PAYNE SPRINGS	C | TRWD LAKE/RESERVOIR SYSTEM	47	48	45	44	37	33
SEVEN POINTS	C | TRWD LAKE/RESERVOIR SYSTEM	289	295	298	327	288	250
TOOL	C | TRWD LAKE/RESERVOIR SYSTEM	483	453	420	390	439	434
TRINIDAD	C | TRINIDAD CITY LAKE/RESERVOIR	450	450	450	450	450	450
VIRGINIA HILL WSC	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	387	387	388	387	388	394
COUNTY-OTHER	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	75	75	75	75	75	75
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	239	144	112	81	59	41
MANUFACTURING	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	402	402	402	402	403	403
MANUFACTURING	I | ATHENS LAKE/RESERVOIR	341	335	333	326	238	179
MINING	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	425	425	425	425	425	425
MINING	C | TRWD LAKE/RESERVOIR SYSTEM	182	166	146	129	115	103
STEAM ELECTRIC POWER	C | TRINIDAD LAKE/RESERVOIR	3,050	3,050	3,050	3,050	3,050	3,050
LIVESTOCK	C | CARRIZO-WILCOX AQUIFER | HENDERSON COUNTY	13	13	13	13	13	13
LIVESTOCK	C | QUEEN CITY AQUIFER | HENDERSON COUNTY	500	500	500	500	500	500
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	341	341	341	341	341	341
TRINITY BASIN TOTAL EXISTING SUPPLY		**12,857**	**12,886**	**12,989**	**13,230**	**14,244**	**14,856**
HENDERSON COUNTY TOTAL EXISTING SUPPLY		**12,857**	**12,886**	**12,989**	**13,230**	**14,244**	**14,856**
JACK COUNTY							
BRAZOS BASIN							
BRYSON	C | OTHER AQUIFER | JACK COUNTY	49	49	49	49	49	49
BRYSON	G | GRAHAM/EDDLEMAN LAKE/RESERVOIR	46	46	46	46	46	46
COUNTY-OTHER	C | OTHER AQUIFER | JACK COUNTY	178	178	178	178	178	178
MANUFACTURING	C | LOST CREEK-JACKSBORO LAKE/RESERVOIR SYSTEM	1	1	1	1	1	1
MANUFACTURING	C | OTHER AQUIFER | JACK COUNTY	1	1	1	1	1	1
MINING	C | OTHER AQUIFER | JACK COUNTY	82	82	82	82	82	82
MINING	C | TRINITY OTHER LOCAL SUPPLY	148	148	148	148	148	148
LIVESTOCK	C | BRAZOS LIVESTOCK LOCAL SUPPLY	66	66	66	66	66	66
LIVESTOCK	C | OTHER AQUIFER | JACK COUNTY	38	38	38	38	38	38

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
JACK COUNTY							
BRAZOS BASIN							
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	164	164	164	164	164	164
IRRIGATION	C | DIRECT REUSE	8	7	7	7	7	7
IRRIGATION	C | OTHER AQUIFER | JACK COUNTY	15	15	15	15	15	15
IRRIGATION	C | TRINITY RUN-OF-RIVER	32	32	32	32	32	32
BRAZOS BASIN TOTAL EXISTING SUPPLY		**828**	**827**	**827**	**827**	**827**	**827**
TRINITY BASIN							
JACKSBORO	C | LOST CREEK-JACKSBORO LAKE/RESERVOIR SYSTEM	733	733	733	733	733	733
COUNTY-OTHER	C | OTHER AQUIFER | JACK COUNTY	317	317	317	317	317	317
MINING	C | OTHER AQUIFER | JACK COUNTY	122	122	122	122	122	122
MINING	C | TRINITY OTHER LOCAL SUPPLY	222	222	222	222	222	222
STEAM ELECTRIC POWER	C | TRWD LAKE/RESERVOIR SYSTEM	2,665	2,620	2,487	2,349	2,230	2,119
LIVESTOCK	C | BRAZOS LIVESTOCK LOCAL SUPPLY	165	165	165	165	165	165
LIVESTOCK	C | OTHER AQUIFER | JACK COUNTY	92	92	92	92	92	92
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	407	407	407	407	407	407
IRRIGATION	C | DIRECT REUSE	19	19	19	18	18	17
IRRIGATION	C | OTHER AQUIFER | JACK COUNTY	40	40	40	40	40	40
IRRIGATION	C | TRINITY RUN-OF-RIVER	78	78	78	78	78	78
TRINITY BASIN TOTAL EXISTING SUPPLY		**4,860**	**4,815**	**4,682**	**4,543**	**4,424**	**4,312**
JACK COUNTY TOTAL EXISTING SUPPLY		**5,688**	**5,642**	**5,509**	**5,370**	**5,251**	**5,139**
KAUFMAN COUNTY							
SABINE BASIN							
ABLES SPRINGS WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	44	47	50	55	60	66
ABLES SPRINGS WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	36	40	43	46	51	56
ABLES SPRINGS WSC	C | TRINITY INDIRECT REUSE	49	68	85	104	122	138
ABLES SPRINGS WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	20	23	23	25	27	30
ABLES SPRINGS WSC	D | FORK LAKE/RESERVOIR	11	0	0	0	0	0
ABLES SPRINGS WSC	D | TAWAKONI LAKE/RESERVOIR	17	6	7	7	9	9
MACBEE SUD	D | TAWAKONI LAKE/RESERVOIR	16	85	92	101	111	122
COUNTY-OTHER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2	2	6	13	14	27
COUNTY-OTHER	C | NACATOCH AQUIFER | KAUFMAN COUNTY	14	22	24	29	16	24
COUNTY-OTHER	C | RAY HUBBARD LAKE/RESERVOIR	0	1	1	1	1	1
COUNTY-OTHER	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1	1	1	2	1	2
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2	2	4	11	12	23
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	0	4	9	25	30	58
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	4	6	6	7	3	4
COUNTY-OTHER	C | WOODBINE AQUIFER | KAUFMAN COUNTY	4	6	6	8	4	6
COUNTY-OTHER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	1	2	7	7	13

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
KAUFMAN COUNTY							
SABINE BASIN							
COUNTY-OTHER	D | FORK LAKE/RESERVOIR	0	1	1	1	1	2
COUNTY-OTHER	D | TAWAKONI LAKE/RESERVOIR	1	2	2	5	3	6
MINING	C | TRINITY AQUIFER | KAUFMAN COUNTY	18	17	18	17	17	18
MINING	C | TRINITY OTHER LOCAL SUPPLY	4	4	4	4	4	4
LIVESTOCK	C | NACATOCH AQUIFER | KAUFMAN COUNTY	3	3	3	3	3	3
LIVESTOCK	C | SABINE LIVESTOCK LOCAL SUPPLY	3	3	3	3	3	3
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	47	47	47	47	47	47
IRRIGATION	C | DIRECT REUSE	28	33	38	38	38	38
IRRIGATION	C | NACATOCH AQUIFER | KAUFMAN COUNTY	4	4	4	4	4	4
IRRIGATION	C | TRINITY RUN-OF-RIVER	3	3	3	3	3	3
IRRIGATION	C | TRWD LAKE/RESERVOIR SYSTEM	21	19	17	15	14	12
SABINE BASIN TOTAL EXISTING SUPPLY		**352**	**450**	**499**	**581**	**605**	**719**
TRINITY BASIN							
FORNEY	C | DIRECT REUSE	0	0	0	0	0	0
FORNEY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	735	744	833	895	1,177	1,197
FORNEY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	599	612	690	747	988	1,012
FORNEY	C | TRINITY INDIRECT REUSE	808	1,033	1,361	1,683	2,371	2,506
FORNEY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	349	355	399	429	565	577
FORNEY	D | FORK LAKE/RESERVOIR	177	0	0	0	0	0
FORNEY	D | TAWAKONI LAKE/RESERVOIR	272	97	109	119	157	161
SEAGOVILLE	C | RAY HUBBARD LAKE/RESERVOIR	0	0	0	0	0	0
SEAGOVILLE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1	1	1	1	0	0
SEAGOVILLE	C | TRINITY INDIRECT REUSE	0	0	0	0	0	0
SEAGOVILLE	D | FORK LAKE/RESERVOIR	0	0	0	0	0	0
SEAGOVILLE	D | TAWAKONI LAKE/RESERVOIR	1	1	1	1	1	1
TERRELL	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	928	1,433	1,312	1,183	1,029	925
TERRELL	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	758	1,179	1,088	987	866	781
TERRELL	C | TRINITY INDIRECT REUSE	1,022	1,992	2,147	2,223	2,079	1,933
TERRELL	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	422	684	629	567	496	445
TERRELL	D | FORK LAKE/RESERVOIR	224	0	0	0	0	0
TERRELL	D | TAWAKONI LAKE/RESERVOIR	344	186	173	157	138	124
WEST CEDAR CREEK MUD	C | TRWD LAKE/RESERVOIR SYSTEM	560	622	683	724	713	771
ABLES SPRINGS WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	29	32	34	37	40	43
ABLES SPRINGS WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	24	26	28	30	34	37
ABLES SPRINGS WSC	C | TRINITY INDIRECT REUSE	32	44	56	69	81	91
ABLES SPRINGS WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	14	15	16	18	19	21

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
KAUFMAN COUNTY							
TRINITY BASIN							
ABLES SPRINGS WSC	D | FORK LAKE/RESERVOIR	7	0	0	0	0	0
ABLES SPRINGS WSC	D | TAWAKONI LAKE/RESERVOIR	11	4	4	5	5	6
COLLEGE MOUND WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	183	199	199	204	240	268
COLLEGE MOUND WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	148	163	167	170	201	225
COLLEGE MOUND WSC	C | TRINITY INDIRECT REUSE	200	275	329	383	482	557
COLLEGE MOUND WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	87	95	96	97	115	128
COLLEGE MOUND WSC	D | FORK LAKE/RESERVOIR	44	0	0	0	0	0
COLLEGE MOUND WSC	D | TAWAKONI LAKE/RESERVOIR	67	26	27	27	32	36
COMBINE	C | RAY HUBBARD LAKE/RESERVOIR	15	16	16	16	14	12
COMBINE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	36	34	35	33	28	23
COMBINE	C | TRINITY INDIRECT REUSE	10	12	14	18	21	23
COMBINE	D | FORK LAKE/RESERVOIR	15	18	20	22	21	20
COMBINE	D | TAWAKONI LAKE/RESERVOIR	52	55	54	53	46	40
CRANDALL	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	151	158	149	139	135	133
CRANDALL	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	123	130	123	117	114	112
CRANDALL	C | TRINITY INDIRECT REUSE	167	220	242	263	273	278
CRANDALL	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	72	76	71	67	65	64
CRANDALL	D | FORK LAKE/RESERVOIR	36	0	0	0	0	0
CRANDALL	D | TAWAKONI LAKE/RESERVOIR	56	21	20	19	18	18
FORNEY LAKE WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	189	203	215	231	353	461
FORNEY LAKE WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	153	167	178	192	297	390
FORNEY LAKE WSC	C | TRINITY INDIRECT REUSE	207	282	351	434	711	963
FORNEY LAKE WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	89	97	102	111	170	222
FORNEY LAKE WSC	D | FORK LAKE/RESERVOIR	46	0	0	0	0	0
FORNEY LAKE WSC	D | TAWAKONI LAKE/RESERVOIR	69	26	28	30	47	62
GASTONIA-SCURRY SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	137	154	163	177	201	156
GASTONIA-SCURRY SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	113	126	136	149	170	131
GASTONIA-SCURRY SUD	C | TRINITY INDIRECT REUSE	153	212	268	335	408	326
GASTONIA-SCURRY SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	66	73	79	86	97	75
GASTONIA-SCURRY SUD	D | FORK LAKE/RESERVOIR	33	0	0	0	0	0
GASTONIA-SCURRY SUD	D | TAWAKONI LAKE/RESERVOIR	51	20	22	24	27	21

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
KAUFMAN COUNTY							
TRINITY BASIN							
HIGH POINT WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	104	107	104	101	141	164
HIGH POINT WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	84	88	86	86	118	137
HIGH POINT WSC	C | TRINITY INDIRECT REUSE	113	150	172	195	283	340
HIGH POINT WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	48	50	49	49	68	79
HIGH POINT WSC	D | FORK LAKE/RESERVOIR	24	0	0	0	0	0
HIGH POINT WSC	D | TAWAKONI LAKE/RESERVOIR	40	14	14	15	19	21
KAUFMAN	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	228	238	250	331	388	431
KAUFMAN	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	186	195	207	276	326	365
KAUFMAN	C | TRINITY INDIRECT REUSE	251	330	408	622	781	904
KAUFMAN	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	108	112	120	158	185	208
KAUFMAN	D | FORK LAKE/RESERVOIR	55	0	0	0	0	0
KAUFMAN	D | TAWAKONI LAKE/RESERVOIR	83	31	33	44	52	58
KEMP	C | TRWD LAKE/RESERVOIR SYSTEM	269	292	315	332	380	394
MABANK	C | TRWD LAKE/RESERVOIR SYSTEM	634	665	675	742	743	710
MACBEE SUD	D | TAWAKONI LAKE/RESERVOIR	2	12	15	17	18	20
MESQUITE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	5	5	5	6	6	7
MESQUITE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	4	4	4	5	5	6
MESQUITE	C | TRINITY INDIRECT REUSE	6	7	9	11	12	14
MESQUITE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2	2	3	3	3	3
MESQUITE	D | FORK LAKE/RESERVOIR	1	0	0	0	0	0
MESQUITE	D | TAWAKONI LAKE/RESERVOIR	2	1	1	1	1	1
OAK GROVE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	17	18	18	24	30	54
OAK GROVE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	14	14	15	20	25	45
OAK GROVE	C | TRINITY INDIRECT REUSE	20	25	29	46	59	112
OAK GROVE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	8	8	9	12	14	26
OAK GROVE	D | FORK LAKE/RESERVOIR	4	0	0	0	0	0
OAK GROVE	D | TAWAKONI LAKE/RESERVOIR	6	2	2	3	4	7
SEVEN POINTS	C | TRWD LAKE/RESERVOIR SYSTEM	21	23	24	26	23	20
TALTY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	71	76	81	87	108	163
TALTY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	57	62	66	72	91	138
TALTY	C | TRINITY INDIRECT REUSE	77	105	131	162	219	342
TALTY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	33	36	38	41	52	79
TALTY	D | FORK LAKE/RESERVOIR	17	0	0	0	0	0
TALTY	D | TAWAKONI LAKE/RESERVOIR	26	10	11	11	14	22
[illegible]OST OAK BEND CITY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	21	22	24	32	38	70

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
KAUFMAN COUNTY							
TRINITY BASIN							
POST OAK BEND CITY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	18	19	19	26	32	59
POST OAK BEND CITY	C | TRINITY INDIRECT REUSE	24	32	38	59	78	146
POST OAK BEND CITY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	10	11	11	15	19	34
POST OAK BEND CITY	D | FORK LAKE/RESERVOIR	5	0	0	0	0	0
POST OAK BEND CITY	D | TAWAKONI LAKE/RESERVOIR	8	3	3	4	5	9
SCURRY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	15	14	15	20	26	51
SCURRY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	11	12	12	17	21	43
SCURRY	C | TRINITY INDIRECT REUSE	14	19	24	37	52	107
SCURRY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	6	7	7	9	12	25
SCURRY	D | FORK LAKE/RESERVOIR	3	0	0	0	0	0
SCURRY	D | TAWAKONI LAKE/RESERVOIR	5	2	2	3	3	7
ROSE HILL SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	104	110	114	123	146	201
ROSE HILL SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	86	90	94	101	121	170
ROSE HILL SUD	C | TRINITY INDIRECT REUSE	116	152	186	228	290	421
ROSE HILL SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	50	52	54	58	69	97
ROSE HILL SUD	D | FORK LAKE/RESERVOIR	25	0	0	0	0	0
ROSE HILL SUD	D | TAWAKONI LAKE/RESERVOIR	39	14	15	16	19	27
TALTY WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	316	311	308	391	442	502
TALTY WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	260	256	255	326	372	424
TALTY WSC	C | TRINITY INDIRECT REUSE	350	432	503	735	894	1,049
TALTY WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	152	148	148	188	213	241
TALTY WSC	D | FORK LAKE/RESERVOIR	77	0	0	0	0	0
TALTY WSC	D | TAWAKONI LAKE/RESERVOIR	118	40	40	52	60	67
COUNTY-OTHER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	80	79	166	314	607	811
COUNTY-OTHER	C | NACATOCH AQUIFER | KAUFMAN COUNTY	722	714	712	707	720	712
COUNTY-OTHER	C | RAY HUBBARD LAKE/RESERVOIR	18	16	19	24	30	30
COUNTY-OTHER	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	43	36	41	50	60	59
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	66	65	138	262	510	685
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	104	123	289	620	1,271	1,756
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	179	188	195	172	140	110
COUNTY-OTHER	C | WOODBINE AQUIFER | KAUFMAN COUNTY	196	194	194	192	196	194
COUNTY-OTHER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	40	38	80	150	292	391
COUNTY-OTHER	D | FORK LAKE/RESERVOIR	38	18	24	33	45	50
COUNTY-OTHER	D | TAWAKONI LAKE/RESERVOIR	94	67	89	122	183	211

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
KAUFMAN COUNTY							
TRINITY BASIN							
MANUFACTURING	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	187	175	157	142	131	124
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	154	143	128	117	110	105
MANUFACTURING	C | TRINITY AQUIFER | KAUFMAN COUNTY	487	487	487	487	487	487
MANUFACTURING	C | TRINITY INDIRECT REUSE	206	241	253	266	267	260
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	89	83	74	67	63	61
MANUFACTURING	D | FORK LAKE/RESERVOIR	45	0	0	0	0	0
MANUFACTURING	D | TAWAKONI LAKE/RESERVOIR	70	23	19	18	18	16
MINING	C | TRINITY AQUIFER | KAUFMAN COUNTY	332	333	332	333	333	332
MINING	C | TRINITY OTHER LOCAL SUPPLY	82	82	82	82	82	82
STEAM ELECTRIC POWER	C | DIRECT REUSE	8,979	8,979	8,979	8,979	8,979	8,979
STEAM ELECTRIC POWER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	257	225	195	172	156	143
STEAM ELECTRIC POWER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	211	185	161	144	131	120
STEAM ELECTRIC POWER	C | TRINITY INDIRECT REUSE	284	313	317	324	316	297
STEAM ELECTRIC POWER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	123	107	93	83	75	68
STEAM ELECTRIC POWER	D | FORK LAKE/RESERVOIR	62	0	0	0	0	0
STEAM ELECTRIC POWER	D | TAWAKONI LAKE/RESERVOIR	96	29	26	23	21	19
LIVESTOCK	C | NACATOCH AQUIFER | KAUFMAN COUNTY	97	97	97	97	97	97
LIVESTOCK	C | SABINE LIVESTOCK LOCAL SUPPLY	95	95	95	95	95	95
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	1,477	1,477	1,477	1,477	1,477	1,477
IRRIGATION	C | DIRECT REUSE	519	617	720	720	720	720
IRRIGATION	C | NACATOCH AQUIFER | KAUFMAN COUNTY	85	85	85	85	85	85
IRRIGATION	C | TRINITY RUN-OF-RIVER	61	61	61	61	61	61
IRRIGATION	C | TRWD LAKE/RESERVOIR SYSTEM	404	368	325	287	255	228
TRINITY BASIN TOTAL EXISTING SUPPLY		**30,520**	**32,089**	**33,544**	**35,915**	**40,138**	**42,860**
KAUFMAN COUNTY TOTAL EXISTING SUPPLY		**30,872**	**32,539**	**34,043**	**36,496**	**40,743**	**43,579**
NAVARRO COUNTY							
TRINITY BASIN							
CORSICANA	C | NAVARRO MILLS LAKE/RESERVOIR	5,003	3,496	3,493	3,418	3,277	3,089
CORSICANA	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	1,000	698	697	681	651	617
BLOOMING GROVE	C | NAVARRO MILLS LAKE/RESERVOIR	127	88	87	86	82	77
BLOOMING GROVE	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	26	18	18	17	17	16
BRANDON-IRENE WSC	G | BRAZOS RIVER AUTHORITY AQUILLA LAKE/RESERVOIR SYSTEM	23	25	26	27	28	30
BRANDON-IRENE WSC	G | TRINITY AQUIFER | HILL COUNTY	17	17	17	18	19	20
CHATFIELD WSC	C | NAVARRO MILLS LAKE/RESERVOIR	391	251	232	209	187	165
CHATFIELD WSC	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	78	50	46	42	37	33

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
NAVARRO COUNTY							
TRINITY BASIN							
DAWSON	C | NAVARRO MILLS LAKE/RESERVOIR	124	87	86	84	80	76
DAWSON	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	25	17	17	17	16	15
FROST	C | NAVARRO MILLS LAKE/RESERVOIR	57	39	38	37	35	33
FROST	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	12	8	8	7	7	7
FROST	C | WOODBINE AQUIFER | NAVARRO COUNTY	16	16	16	16	16	16
KERENS	C | NAVARRO MILLS LAKE/RESERVOIR	172	117	116	113	108	102
KERENS	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	34	24	23	23	22	20
NAVARRO MILLS WSC	C | NAVARRO MILLS LAKE/RESERVOIR	293	202	199	193	185	174
NAVARRO MILLS WSC	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	59	40	40	39	37	35
NAVARRO MILLS WSC	C | WOODBINE AQUIFER | NAVARRO COUNTY	205	205	205	205	205	205
RICE	C | NAVARRO MILLS LAKE/RESERVOIR	136	95	95	92	89	83
RICE	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	27	19	19	19	18	17
RICE WSC	C | BARDWELL LAKE/RESERVOIR	8	7	4	3	2	1
RICE WSC	C | NAVARRO MILLS LAKE/RESERVOIR	108	75	75	73	70	67
RICE WSC	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	22	15	15	15	14	13
RICE WSC	C | TRWD LAKE/RESERVOIR SYSTEM	1	1	1	1	1	1
M-E-N WSC	C | NAVARRO MILLS LAKE/RESERVOIR	393	274	274	267	256	242
M-E-N WSC	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	79	55	55	54	51	48
CORBET WSC	C | NAVARRO MILLS LAKE/RESERVOIR	215	147	144	140	134	126
CORBET WSC	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	43	29	29	28	27	25
COUNTY-OTHER	C | NAVARRO MILLS LAKE/RESERVOIR	312	197	178	286	497	750
COUNTY-OTHER	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	62	39	36	57	100	150
COUNTY-OTHER	C | TRINITY AQUIFER | NAVARRO COUNTY	200	200	200	200	200	200
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	49	38	30	159	408	557
MANUFACTURING	C | NAVARRO MILLS LAKE/RESERVOIR	924	672	689	678	647	606
MANUFACTURING	C | RICHLAND CHAMBERS LAKE/RESERVOIR NON-SYSTEM PORTION	185	134	138	136	130	121
MANUFACTURING	C | TRWD LAKE/RESERVOIR SYSTEM	5	5	4	4	3	3
MINING	C | CARRIZO-WILCOX AQUIFER | NAVARRO COUNTY	6	6	6	6	6	6
MINING	C | NACATOCH AQUIFER | NAVARRO COUNTY	970	970	970	970	970	970
MINING	C | TRINITY AQUIFER | NAVARRO COUNTY	1,100	1,100	1,100	1,100	1,100	1,100
STEAM ELECTRIC POWER		0	0	0	0	0	0
LIVESTOCK	C | CARRIZO-WILCOX AQUIFER | NAVARRO COUNTY	9	9	9	9	9	9
LIVESTOCK	C | NACATOCH AQUIFER | NAVARRO COUNTY	10	10	10	10	10	10
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	1,603	1,603	1,603	1,603	1,603	1,603
IRRIGATION	C | TRINITY RUN-OF-RIVER	226	226	226	226	226	226

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
NAVARRO COUNTY							
TRINITY BASIN TOTAL EXISTING SUPPLY		**14,355**	**11,324**	**11,274**	**11,368**	**11,580**	**11,664**
NAVARRO COUNTY TOTAL EXISTING SUPPLY		**14,355**	**11,324**	**11,274**	**11,368**	**11,580**	**11,664**
PARKER COUNTY							
BRAZOS BASIN							
WEATHERFORD	C | TRWD LAKE/RESERVOIR SYSTEM	8	53	99	233	239	257
WEATHERFORD	C | WEATHERFORD LAKE/RESERVOIR	138	135	134	139	142	143
MINERAL WELLS	G | PALO PINTO LAKE/RESERVOIR	346	332	320	310	302	294
PARKER COUNTY SUD	C | TRINITY AQUIFER | PARKER COUNTY	36	36	36	36	36	36
PARKER COUNTY SUD	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	561	561	561	561	561	561
PARKER COUNTY SUD	G | PALO PINTO LAKE/RESERVOIR	294	294	294	294	294	294
COUNTY-OTHER	C | OTHER AQUIFER | PARKER COUNTY	30	38	43	38	33	28
COUNTY-OTHER	C | TRINITY AQUIFER | PARKER COUNTY	3,893	5,023	5,622	5,027	4,313	3,674
COUNTY-OTHER	C | TRINITY RUN-OF-RIVER	20	25	28	25	22	18
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	125	143	139	151	157	159
COUNTY-OTHER	G | PALO PINTO LAKE/RESERVOIR	393	507	567	507	435	370
MANUFACTURING	C | TRINITY AQUIFER | PARKER COUNTY	2	2	2	2	2	2
MANUFACTURING	C | TRWD LAKE/RESERVOIR SYSTEM	13	14	13	12	9	8
MANUFACTURING	C | WEATHERFORD LAKE/RESERVOIR	5	5	5	3	2	2
MANUFACTURING	G | PALO PINTO LAKE/RESERVOIR	1	1	0	0	0	1
MINING	C | BRAZOS OTHER LOCAL SUPPLY	8	8	8	8	8	8
MINING	C | TRINITY AQUIFER | PARKER COUNTY	2,693	2,693	2,694	2,693	2,693	2,694
MINING	C | TRINITY OTHER LOCAL SUPPLY	4	4	4	4	4	4
MINING	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	27	22	16	11	6	0
LIVESTOCK	C | BRAZOS LIVESTOCK LOCAL SUPPLY	524	524	524	524	524	524
LIVESTOCK	C | TRINITY AQUIFER | PARKER COUNTY	133	133	133	133	133	133
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	591	591	591	591	591	591
IRRIGATION	C | BRAZOS RUN-OF-RIVER	92	92	92	92	92	92
IRRIGATION	C | DIRECT REUSE	87	87	87	87	87	87
IRRIGATION	C | TRINITY AQUIFER | PARKER COUNTY	193	193	193	193	193	193
IRRIGATION	C | TRINITY RUN-OF-RIVER	96	96	96	96	96	96
IRRIGATION	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	393	393	393	393	393	393
BRAZOS BASIN TOTAL EXISTING SUPPLY		**10,706**	**12,005**	**12,694**	**12,163**	**11,367**	**10,662**
TRINITY BASIN							
FORT WORTH	C | DIRECT REUSE	56	74	52	52	51	50
FORT WORTH	C | TRINITY INDIRECT REUSE	4,074	5,401	5,347	5,584	5,763	5,949
FORT WORTH	C | TRWD LAKE/RESERVOIR SYSTEM	7,783	10,277	9,729	9,338	8,852	8,363
WALNUT CREEK SUD	C | TRWD LAKE/RESERVOIR SYSTEM	1,455	1,736	2,130	2,936	4,634	6,443
WEATHERFORD	C | TRWD LAKE/RESERVOIR SYSTEM	136	902	1,668	3,921	4,019	4,338
WEATHERFORD	C | WEATHERFORD LAKE/RESERVOIR	2,315	2,283	2,256	2,345	2,394	2,408
ALEDO	C | TRINITY AQUIFER | PARKER COUNTY	398	398	398	398	398	398

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
PARKER COUNTY							
TRINITY BASIN							
ALEDO	C | TRWD LAKE/RESERVOIR SYSTEM	651	898	1,208	1,152	1,122	1,031
ANNETTA	C | TRINITY AQUIFER | PARKER COUNTY	354	354	354	354	354	354
ANNETTA SOUTH	C | TRINITY AQUIFER | PARKER COUNTY	69	69	69	69	69	69
AZLE	C | TRWD LAKE/RESERVOIR SYSTEM	337	337	333	314	331	336
HUDSON OAKS	C | TRINITY AQUIFER | PARKER COUNTY	229	309	390	398	398	398
HUDSON OAKS	C | TRWD LAKE/RESERVOIR SYSTEM	229	281	313	245	146	132
HUDSON OAKS	C | WEATHERFORD LAKE/RESERVOIR	106	120	128	84	55	38
RENO	C | TRINITY AQUIFER | PARKER COUNTY	165	165	165	164	164	164
RENO	C | TRWD LAKE/RESERVOIR SYSTEM	49	45	40	35	28	22
SPRINGTOWN	C | TRINITY AQUIFER | PARKER COUNTY	95	95	95	95	95	95
SPRINGTOWN	C | TRWD LAKE/RESERVOIR SYSTEM	340	340	340	340	340	327
WILLOW PARK	C | TRINITY AQUIFER | PARKER COUNTY	757	757	757	757	757	757
CRESSON	G | TRINITY AQUIFER | HOOD COUNTY	56	57	65	74	86	100
CRESSON	G | WOODBINE AQUIFER | JOHNSON COUNTY	21	19	18	18	18	18
ANNETTA NORTH	C | TRINITY AQUIFER | PARKER COUNTY	100	100	100	100	100	100
COUNTY-OTHER	C | OTHER AQUIFER | PARKER COUNTY	20	12	7	12	17	22
COUNTY-OTHER	C | TRINITY AQUIFER | PARKER COUNTY	2,682	1,552	953	1,548	2,262	2,901
COUNTY-OTHER	C | TRINITY RUN-OF-RIVER	13	8	5	8	11	15
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	86	44	23	47	83	126
COUNTY-OTHER	G | PALO PINTO LAKE/RESERVOIR	270	156	96	156	228	293
MANUFACTURING	C | TRINITY AQUIFER | PARKER COUNTY	82	82	82	82	82	82
MANUFACTURING	C | TRWD LAKE/RESERVOIR SYSTEM	612	649	659	580	404	390
MANUFACTURING	C | WEATHERFORD LAKE/RESERVOIR	239	236	229	166	121	91
MANUFACTURING	G | PALO PINTO LAKE/RESERVOIR	24	24	25	25	25	24
MINING	C | BRAZOS OTHER LOCAL SUPPLY	6	6	6	6	6	6
MINING	C | TRINITY AQUIFER | PARKER COUNTY	1,651	1,651	1,650	1,651	1,651	1,650
MINING	C | TRINITY OTHER LOCAL SUPPLY	2	2	2	2	2	2
MINING	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	17	13	10	7	3	0
STEAM ELECTRIC POWER	C | TRWD LAKE/RESERVOIR SYSTEM	260	237	209	185	165	147
STEAM ELECTRIC POWER	C | WEATHERFORD LAKE/RESERVOIR	120	101	85	55	36	25
LIVESTOCK	C | BRAZOS LIVESTOCK LOCAL SUPPLY	379	379	379	379	379	379
LIVESTOCK	C | TRINITY AQUIFER | PARKER COUNTY	96	96	96	96	96	96
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	428	428	428	428	428	428
IRRIGATION	C | BRAZOS RUN-OF-RIVER	25	25	25	25	25	25
IRRIGATION	C | DIRECT REUSE	23	23	23	23	23	23
IRRIGATION	C | TRINITY AQUIFER | PARKER COUNTY	53	53	53	53	53	53
IRRIGATION	C | TRINITY RUN-OF-RIVER	26	26	26	26	26	26
IRRIGATION	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	107	107	107	107	107	107
TRINITY BASIN TOTAL EXISTING SUPPLY		**26,996**	**30,927**	**31,133**	**34,440**	**36,407**	**38,801**
PARKER COUNTY TOTAL EXISTING SUPPLY		**37,702**	**42,932**	**43,827**	**46,603**	**47,774**	**49,463**

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
ROCKWALL COUNTY							
SABINE BASIN							
CASH SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	16	20	23	22	20	18
CASH SUD	C | TRINITY INDIRECT REUSE	22	33	46	49	47	44
CASH SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	9	11	14	13	11	10
CASH SUD	D | FORK LAKE/RESERVOIR	17	16	29	92	169	236
CASH SUD	D | TAWAKONI LAKE/RESERVOIR	83	92	100	78	55	45
BLACKLAND WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	71	65	59	56	54	53
BLACKLAND WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	57	53	49	47	46	44
BLACKLAND WSC	C | TRINITY INDIRECT REUSE	77	90	96	105	109	110
BLACKLAND WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	33	31	28	27	26	25
BLACKLAND WSC	D | FORK LAKE/RESERVOIR	17	0	0	0	0	0
BLACKLAND WSC	D | TAWAKONI LAKE/RESERVOIR	26	9	8	7	7	7
ROYSE CITY	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	237	216	213	425	648	688
ROYSE CITY	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	193	177	176	355	544	581
ROYSE CITY	C | TRINITY INDIRECT REUSE	261	299	347	800	1,306	1,439
ROYSE CITY	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	112	103	102	204	311	331
ROYSE CITY	D | FORK LAKE/RESERVOIR	57	0	0	0	0	0
ROYSE CITY	D | TAWAKONI LAKE/RESERVOIR	87	28	28	56	87	93
FATE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	213	233	249	238	235	327
FATE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	174	192	207	198	197	277
FATE	C | TRINITY INDIRECT REUSE	235	324	407	447	474	685
FATE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	102	111	119	114	113	158
FATE	D | FORK LAKE/RESERVOIR	51	0	0	0	0	0
FATE	D | TAWAKONI LAKE/RESERVOIR	79	30	33	31	31	44
LAVON SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	28	36	41	54	65	74
LAVON SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	23	29	34	45	54	62
LAVON SUD	C | TRINITY INDIRECT REUSE	31	50	66	100	130	153
LAVON SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	14	17	19	26	31	35
LAVON SUD	D | FORK LAKE/RESERVOIR	7	0	0	0	0	0
LAVON SUD	D | TAWAKONI LAKE/RESERVOIR	10	5	5	7	9	10
COUNTY-OTHER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	60	52	48	49	69	84
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	49	43	40	40	58	72
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	66	73	79	92	140	177
COUNTY-OTHER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	29	25	24	26	34	40
COUNTY-OTHER	D | FORK LAKE/RESERVOIR	0	0	0	0	0	0

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
ROCKWALL COUNTY							
SABINE BASIN							
COUNTY-OTHER	D | TAWAKONI LAKE/RESERVOIR	1	0	0	1	5	8
MANUFACTURING	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	9	8	7	8	7	7
MANUFACTURING	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	6	7	7	6	6	7
MANUFACTURING	C | TRINITY INDIRECT REUSE	8	11	13	14	16	16
MANUFACTURING	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	4	4	4	4	4	4
MANUFACTURING	D | FORK LAKE/RESERVOIR	3	0	0	0	0	0
MANUFACTURING	D | TAWAKONI LAKE/RESERVOIR	2	1	1	1	1	1
LIVESTOCK	C | SABINE LIVESTOCK LOCAL SUPPLY	29	29	29	29	29	29
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	29	29	29	29	29	29
IRRIGATION	C | DIRECT REUSE	32	32	32	32	32	32
IRRIGATION	C | RAY HUBBARD LAKE/RESERVOIR	87	79	71	65	61	58
SABINE BASIN TOTAL EXISTING SUPPLY		**2,756**	**2,663**	**2,882**	**3,992**	**5,270**	**6,113**
TRINITY BASIN							
DALLAS	C | RAY HUBBARD LAKE/RESERVOIR	2	2	3	3	3	3
DALLAS	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	5	5	6	6	6	6
DALLAS	C | TRINITY INDIRECT REUSE	1	2	2	3	5	6
DALLAS	D | FORK LAKE/RESERVOIR	2	3	3	4	5	5
DALLAS	D | TAWAKONI LAKE/RESERVOIR	7	8	9	9	10	10
GARLAND	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	0	0	0	0	0
GARLAND	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	0	0	0	0	0
GARLAND	C | TRINITY INDIRECT REUSE	0	0	0	0	0	0
GARLAND	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	0	0	0	0	0	0
GARLAND	D | FORK LAKE/RESERVOIR	0	0	0	0	0	0
GARLAND	D | TAWAKONI LAKE/RESERVOIR	0	0	0	0	0	0
ROCKWALL	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	2,050	2,214	2,346	2,469	2,638	2,782
ROCKWALL	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	1,675	1,823	1,943	2,061	2,217	2,354
ROCKWALL	C | TRINITY INDIRECT REUSE	2,258	3,081	3,833	4,644	5,321	5,824
ROCKWALL	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	976	1,058	1,121	1,184	1,268	1,340
ROCKWALL	D | FORK LAKE/RESERVOIR	495	0	0	0	0	0
ROCKWALL	D | TAWAKONI LAKE/RESERVOIR	760	287	307	328	352	374
BLACKLAND WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	84	77	71	66	64	63
BLACKLAND WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	69	63	58	55	54	53
BLACKLAND WSC	C | TRINITY INDIRECT REUSE	92	106	115	124	130	131
BLACKLAND WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	41	36	34	31	31	30
BLACKLAND WSC	D | FORK LAKE/RESERVOIR	21	0	0	0	0	0
BLACKLAND WSC	D | TAWAKONI LAKE/RESERVOIR	31	10	9	9	9	9

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
ROCKWALL COUNTY							
TRINITY BASIN							
EAST FORK SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	13	15	17	19	21	22
EAST FORK SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	11	13	14	16	17	19
EAST FORK SUD	C | TRINITY INDIRECT REUSE	14	21	28	35	42	47
EAST FORK SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	6	7	8	9	10	11
EAST FORK SUD	D | FORK LAKE/RESERVOIR	3	0	0	0	0	0
EAST FORK SUD	D | TAWAKONI LAKE/RESERVOIR	5	2	2	2	3	3
FORNEY LAKE WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	18	19	20	22	23	24
FORNEY LAKE WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	15	16	17	18	19	20
FORNEY LAKE WSC	C | TRINITY INDIRECT REUSE	20	27	33	40	47	51
FORNEY LAKE WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	9	9	10	10	11	12
FORNEY LAKE WSC	D | FORK LAKE/RESERVOIR	4	0	0	0	0	0
FORNEY LAKE WSC	D | TAWAKONI LAKE/RESERVOIR	7	3	3	3	3	3
HEATH	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	907	1,573	1,359	1,204	1,091	991
HEATH	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	741	1,293	1,124	1,003	916	838
HEATH	C | TRINITY INDIRECT REUSE	1,000	2,186	2,217	2,261	2,199	2,074
HEATH	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	432	751	649	577	524	477
HEATH	D | FORK LAKE/RESERVOIR	219	0	0	0	0	0
HEATH	D | TAWAKONI LAKE/RESERVOIR	336	204	178	160	146	133
HIGH POINT WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	6	8	7	7	7	6
HIGH POINT WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	6	6	6	5	6	6
HIGH POINT WSC	C | TRINITY INDIRECT REUSE	8	10	11	12	14	14
HIGH POINT WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	4	4	4	3	3	3
HIGH POINT WSC	D | FORK LAKE/RESERVOIR	2	0	0	0	0	0
HIGH POINT WSC	D | TAWAKONI LAKE/RESERVOIR	2	1	1	1	1	1
MCLENDON-CHISHOLM	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	56	60	63	63	64	65
MCLENDON-CHISHOLM	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	47	51	52	52	54	55
MCLENDON-CHISHOLM	C | TRINITY INDIRECT REUSE	64	85	101	117	128	136
MCLENDON-CHISHOLM	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	27	28	29	28	30	31
MCLENDON-CHISHOLM	D | FORK LAKE/RESERVOIR	14	0	0	0	0	0
MCLENDON-CHISHOLM	D | TAWAKONI LAKE/RESERVOIR	21	9	9	8	9	9
ROWLETT	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	271	232	198	174	157	143
ROWLETT	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	221	190	164	145	132	121

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR) 2020	2030	2040	2050	2060	2070
ROCKWALL COUNTY							
TRINITY BASIN							
ROWLETT	C | TRINITY INDIRECT REUSE	299	322	323	327	318	299
ROWLETT	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	129	111	95	83	76	69
ROWLETT	D | FORK LAKE/RESERVOIR	65	0	0	0	0	0
ROWLETT	D | TAWAKONI LAKE/RESERVOIR	100	30	26	23	21	19
WYLIE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	132	117	103	93	87	83
WYLIE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	108	96	85	78	73	70
WYLIE	C | TRINITY INDIRECT REUSE	146	163	168	175	174	173
WYLIE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	63	56	49	45	42	40
WYLIE	D | FORK LAKE/RESERVOIR	32	0	0	0	0	0
WYLIE	D | TAWAKONI LAKE/RESERVOIR	49	15	14	12	12	11
FATE	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	186	260	322	399	474	662
FATE	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	151	213	266	333	398	559
FATE	C | TRINITY INDIRECT REUSE	203	362	525	749	955	1,384
FATE	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	88	124	154	191	228	318
FATE	D | FORK LAKE/RESERVOIR	45	0	0	0	0	0
FATE	D | TAWAKONI LAKE/RESERVOIR	68	34	42	53	64	89
LAVON SUD	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	26	33	38	49	60	68
LAVON SUD	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	21	27	31	41	50	57
LAVON SUD	C | TRINITY INDIRECT REUSE	28	46	61	93	120	142
LAVON SUD	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	12	16	18	24	29	33
LAVON SUD	D | FORK LAKE/RESERVOIR	6	0	0	0	0	0
LAVON SUD	D | TAWAKONI LAKE/RESERVOIR	10	4	5	7	8	9
MOUNT ZION WSC	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	91	98	102	107	116	122
MOUNT ZION WSC	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	74	80	85	90	96	102
MOUNT ZION WSC	C | TRINITY INDIRECT REUSE	100	135	167	202	231	253
MOUNT ZION WSC	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	43	46	49	52	55	58
MOUNT ZION WSC	D | FORK LAKE/RESERVOIR	22	0	0	0	0	0
MOUNT ZION WSC	D | TAWAKONI LAKE/RESERVOIR	34	13	13	14	15	16
COUNTY-OTHER	C | LAVON LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	91	64	52	40	197	316
COUNTY-OTHER	C | TEXOMA LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	76	53	43	34	167	268
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	103	90	86	75	400	664
COUNTY-OTHER	D | CHAPMAN/COOPER LAKE/RESERVOIR NORTH TEXAS MWD SYSTEM	44	33	26	19	95	154
COUNTY-OTHER	D | FORK LAKE/RESERVOIR	2	0	0	0	0	0
COUNTY-OTHER	D | TAWAKONI LAKE/RESERVOIR	2	1	1	0	14	31
LIVESTOCK	C | SABINE LIVESTOCK LOCAL SUPPLY	29	29	29	29	29	29

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
ROCKWALL COUNTY							
TRINITY BASIN							
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	30	30	30	30	30	30
IRRIGATION	C | DIRECT REUSE	65	65	65	65	65	65
IRRIGATION	C | RAY HUBBARD LAKE/RESERVOIR	177	161	144	133	124	118
TRINITY BASIN TOTAL EXISTING SUPPLY		**16,028**	**18,525**	**19,401**	**20,655**	**22,613**	**24,616**
ROCKWALL COUNTY TOTAL EXISTING SUPPLY		**18,784**	**21,188**	**22,283**	**24,647**	**27,883**	**30,729**
TARRANT COUNTY							
TRINITY BASIN							
FORT WORTH	C | DIRECT REUSE	744	771	581	567	558	551
FORT WORTH	C | TRINITY INDIRECT REUSE	54,622	56,347	59,460	61,397	63,558	65,820
FORT WORTH	C | TRWD LAKE/RESERVOIR SYSTEM	104,336	107,208	108,184	102,672	97,616	92,524
MANSFIELD	C | TRWD LAKE/RESERVOIR SYSTEM	14,136	14,560	15,135	16,263	16,945	17,545
NORTH RICHLAND HILLS	C | TRWD LAKE/RESERVOIR SYSTEM	5,643	6,216	6,309	6,094	5,901	5,587
ARLINGTON	C | TRWD LAKE/RESERVOIR SYSTEM	66,936	63,301	56,192	49,721	44,450	39,697
AZLE	C | TRWD LAKE/RESERVOIR SYSTEM	1,345	1,345	1,331	1,248	1,347	1,346
BEDFORD	C | TRINITY AQUIFER | TARRANT COUNTY	725	725	725	725	725	725
BEDFORD	C | TRWD LAKE/RESERVOIR SYSTEM	8,414	8,088	7,558	7,098	6,320	5,641
BENBROOK	C | TRINITY AQUIFER | TARRANT COUNTY	1,060	1,060	1,060	1,060	1,060	1,060
BENBROOK	C | TRWD LAKE/RESERVOIR SYSTEM	3,385	3,385	3,385	3,385	3,385	3,385
BETHESDA WSC	C | TRINITY AQUIFER | TARRANT COUNTY	113	111	109	107	105	101
BETHESDA WSC	C | TRWD LAKE/RESERVOIR SYSTEM	526	546	561	597	635	666
BETHESDA WSC	G | TRINITY AQUIFER | JOHNSON COUNTY	730	718	1,716	1,881	1,918	1,917
BLUE MOUND	C | TRINITY AQUIFER | TARRANT COUNTY	191	191	191	191	191	191
BURLESON	C | TRWD LAKE/RESERVOIR SYSTEM	951	838	804	984	1,055	1,051
COLLEYVILLE	C | TRWD LAKE/RESERVOIR SYSTEM	9,320	8,927	8,297	7,575	6,751	6,025
COMMUNITY WSC	C | TRWD LAKE/RESERVOIR SYSTEM	347	336	317	306	295	284
CROWLEY	C | TRINITY AQUIFER | TARRANT COUNTY	319	318	318	318	318	318
CROWLEY	C | TRWD LAKE/RESERVOIR SYSTEM	1,675	1,674	1,672	1,671	1,672	1,671
DALWORTHINGTON GARDENS	C | TRINITY AQUIFER | TARRANT COUNTY	325	325	325	325	325	325
DALWORTHINGTON GARDENS	C | TRWD LAKE/RESERVOIR SYSTEM	570	481	416	383	361	341
EULESS	C | DIRECT REUSE	368	368	368	368	368	368
EULESS	C | TRINITY AQUIFER | TARRANT COUNTY	1,211	1,211	1,211	1,211	1,211	1,211
EULESS	C | TRWD LAKE/RESERVOIR SYSTEM	7,399	6,947	5,995	5,226	4,650	4,150
EVERMAN	C | TRINITY AQUIFER | TARRANT COUNTY	604	604	604	604	604	604
FLOWER MOUND	C | RAY HUBBARD LAKE/RESERVOIR	2	2	2	2	2	2
FLOWER MOUND	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	29	28	21	17	16	13
FLOWER MOUND	C | TRINITY INDIRECT REUSE	2	2	2	2	3	3
FLOWER MOUND	D | CHAPMAN/COOPER LAKE/RESERVOIR NON-SYSTEM PORTION	8	7	6	5	4	4
FLOWER MOUND	D | FORK LAKE/RESERVOIR	2	2	3	3	3	3
FLOWER MOUND	D | SULPHUR INDIRECT REUSE	3	3	3	2	2	2

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
TARRANT COUNTY							
TRINITY BASIN							
FLOWER MOUND	D | TAWAKONI LAKE/RESERVOIR	8	7	7	7	6	5
FOREST HILL	C | TRWD LAKE/RESERVOIR SYSTEM	1,351	1,114	990	1,048	1,219	1,459
GRAND PRAIRIE	C | JOE POOL LAKE/RESERVOIR	730	622	571	571	571	570
GRAND PRAIRIE	C | RAY HUBBARD LAKE/RESERVOIR	600	572	508	448	392	359
GRAND PRAIRIE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	1,444	1,259	1,085	930	787	691
GRAND PRAIRIE	C | TRINITY INDIRECT REUSE	396	449	435	523	621	697
GRAND PRAIRIE	C | TRWD LAKE/RESERVOIR SYSTEM	1,186	953	827	762	691	629
GRAND PRAIRIE	D | FORK LAKE/RESERVOIR	609	647	636	618	594	597
GRAND PRAIRIE	D | TAWAKONI LAKE/RESERVOIR	2,116	1,988	1,739	1,514	1,311	1,189
GRAPEVINE	C | GRAPEVINE LAKE/RESERVOIR NON-SYSTEM PORTION	1,983	1,950	1,917	1,883	1,850	1,817
GRAPEVINE	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	3,402	3,409	3,141	2,823	2,608	2,461
GRAPEVINE	C | TRINITY INDIRECT REUSE	2,190	2,556	2,595	2,580	2,577	2,577
GRAPEVINE	C | TRWD LAKE/RESERVOIR SYSTEM	10,387	10,498	9,279	8,199	7,313	6,527
HALTOM CITY	C | TRWD LAKE/RESERVOIR SYSTEM	5,241	4,215	3,628	3,490	3,432	3,439
HASLET	C | TRINITY AQUIFER | TARRANT COUNTY	63	63	63	63	63	63
HASLET	C | TRWD LAKE/RESERVOIR SYSTEM	465	469	460	939	1,216	1,282
HURST	C | TRINITY AQUIFER | TARRANT COUNTY	816	816	816	816	816	816
HURST	C | TRWD LAKE/RESERVOIR SYSTEM	5,793	4,841	4,008	3,563	3,253	2,990
JOHNSON COUNTY SUD	C | TRWD LAKE/RESERVOIR SYSTEM	360	322	279	227	199	172
JOHNSON COUNTY SUD	G | BRAZOS RIVER AUTHORITY MAIN STEM LAKE/RESERVOIR SYSTEM	174	161	148	134	119	104
JOHNSON COUNTY SUD	G | TRINITY AQUIFER | JOHNSON COUNTY	109	107	104	100	97	94
KELLER	C | TRWD LAKE/RESERVOIR SYSTEM	11,959	10,469	8,822	7,917	7,237	6,653
KENNEDALE	C | TRINITY AQUIFER | TARRANT COUNTY	1,119	1,103	1,086	1,071	1,059	1,045
KENNEDALE	C | TRWD LAKE/RESERVOIR SYSTEM	356	438	543	532	516	474
LAKE WORTH	C | TRINITY AQUIFER | TARRANT COUNTY	345	345	345	345	345	345
LAKE WORTH	C | TRWD LAKE/RESERVOIR SYSTEM	771	728	696	752	840	1,117
LAKESIDE	C | TRINITY AQUIFER | TARRANT COUNTY	262	262	262	262	262	262
PANTEGO	C | TRINITY AQUIFER | TARRANT COUNTY	732	732	732	732	732	732
PELICAN BAY	C | TRINITY AQUIFER | TARRANT COUNTY	117	117	117	117	117	117
RENO	C | TRINITY AQUIFER | PARKER COUNTY	2	2	2	3	3	3
RENO	C | TRWD LAKE/RESERVOIR SYSTEM	1	1	0	1	0	0
RICHLAND HILLS	C | TRINITY AQUIFER | TARRANT COUNTY	242	242	242	242	242	242
RICHLAND HILLS	C | TRWD LAKE/RESERVOIR SYSTEM	896	761	674	696	716	755
RIVER OAKS	C | TRWD LAKE/RESERVOIR SYSTEM	850	744	635	551	489	437
SAGINAW	C | TRWD LAKE/RESERVOIR SYSTEM	3,122	2,825	2,649	2,498	2,283	2,098
SOUTHLAKE	C | TRWD LAKE/RESERVOIR SYSTEM	10,829	9,940	9,789	10,054	10,343	10,562
TROPHY CLUB	C | TRINITY AQUIFER | DENTON COUNTY	39	0	0	0	0	0
TROPHY CLUB	C | TRWD LAKE/RESERVOIR SYSTEM	341	317	268	241	220	202
WATAUGA	C | TRWD LAKE/RESERVOIR SYSTEM	1,895	1,642	1,426	1,416	1,414	1,372

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
TARRANT COUNTY							
TRINITY BASIN							
WESTOVER HILLS	C | TRWD LAKE/RESERVOIR SYSTEM	913	784	678	624	584	548
WESTWORTH VILLAGE	C | TRWD LAKE/RESERVOIR SYSTEM	392	336	301	288	281	274
WHITE SETTLEMENT	C | TRINITY AQUIFER | TARRANT COUNTY	1,040	1,040	1,040	1,040	1,040	1,040
WHITE SETTLEMENT	C | TRWD LAKE/RESERVOIR SYSTEM	1,024	861	756	881	1,178	1,428
EDGECLIFF VILLAGE	C | TRWD LAKE/RESERVOIR SYSTEM	494	396	328	292	267	245
SANSOM PARK	C | TRINITY AQUIFER | TARRANT COUNTY	578	578	578	578	578	578
SANSOM PARK	C | TRWD LAKE/RESERVOIR SYSTEM	0	0	10	24	41	54
WESTLAKE	C | TRWD LAKE/RESERVOIR SYSTEM	1,335	1,645	2,021	2,191	2,346	2,463
COUNTY-OTHER	C | DIRECT REUSE	40	40	150	150	150	150
COUNTY-OTHER	C | RAY HUBBARD LAKE/RESERVOIR	133	121	90	79	71	65
COUNTY-OTHER	C | RAY ROBERTS-LEWISVILLE-GRAPEVINE LAKE/RESERVOIR SYSTEM	320	267	190	165	142	125
COUNTY-OTHER	C | TRINITY AQUIFER | TARRANT COUNTY	1,200	1,200	1,200	1,200	1,200	1,200
COUNTY-OTHER	C | TRINITY INDIRECT REUSE	88	95	77	93	112	126
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	5,538	4,396	3,713	5,616	6,888	8,752
COUNTY-OTHER	D | FORK LAKE/RESERVOIR	135	137	112	110	107	108
COUNTY-OTHER	D | TAWAKONI LAKE/RESERVOIR	469	422	306	268	237	213
MANUFACTURING	C | DIRECT REUSE	178	178	178	178	178	178
MANUFACTURING	C | JOE POOL LAKE/RESERVOIR	70	67	63	64	64	67
MANUFACTURING	C | TRINITY AQUIFER | TARRANT COUNTY	2,039	2,055	2,072	2,087	2,099	2,113
MANUFACTURING	C | TRWD LAKE/RESERVOIR SYSTEM	18,728	17,788	17,300	17,253	17,067	16,952
MINING	C | TRINITY AQUIFER | TARRANT COUNTY	800	800	800	800	800	800
MINING	C | TRINITY OTHER LOCAL SUPPLY	342	342	342	342	342	342
MINING	C | TRWD LAKE/RESERVOIR SYSTEM	6,567	3,351	635	524	442	376
STEAM ELECTRIC POWER	C | TRINITY RUN-OF-RIVER	959	959	959	959	959	959
STEAM ELECTRIC POWER	C | TRWD LAKE/RESERVOIR SYSTEM	2,448	2,228	1,969	1,740	1,552	1,385
LIVESTOCK	C | TRINITY AQUIFER | TARRANT COUNTY	281	281	281	281	281	281
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	442	442	442	442	442	442
IRRIGATION	C | DIRECT REUSE	2,300	2,300	2,300	2,300	2,300	2,300
IRRIGATION	C | TRINITY AQUIFER | TARRANT COUNTY	752	752	752	752	752	752
IRRIGATION	C | TRINITY INDIRECT REUSE	1,121	1,121	1,121	1,121	1,121	1,121
IRRIGATION	C | TRINITY RUN-OF-RIVER	549	549	549	549	549	549
IRRIGATION	C | TRWD LAKE/RESERVOIR SYSTEM	1,340	1,219	1,078	952	849	758
IRRIGATION	C | WOODBINE AQUIFER | TARRANT COUNTY	632	632	632	632	632	632
TRINITY BASIN TOTAL EXISTING SUPPLY		**412,589**	**401,713**	**387,408**	**375,251**	**364,558**	**355,461**
TARRANT COUNTY TOTAL EXISTING SUPPLY		**412,589**	**401,713**	**387,408**	**375,251**	**364,558**	**355,461**
WISE COUNTY							
TRINITY BASIN							
FORT WORTH	C | DIRECT REUSE	11	13	10	12	13	14
FORT WORTH	C | TRINITY INDIRECT REUSE	784	945	1,046	1,276	1,503	1,722

Water User Group (WUG) Existing Water Supply

REGION C	SOURCE REGION | SOURCE NAME	EXISTING SUPPLY (ACRE-FEET PER YEAR)					
		2020	2030	2040	2050	2060	2070
WISE COUNTY							
TRINITY BASIN							
FORT WORTH	C | TRWD LAKE/RESERVOIR SYSTEM	1,497	1,799	1,904	2,135	2,309	2,420
WALNUT CREEK SUD	C | TRWD LAKE/RESERVOIR SYSTEM	290	393	516	675	1,065	1,459
ALVORD	C | TRINITY AQUIFER | WISE COUNTY	151	151	151	151	151	151
AURORA	C | TRINITY AQUIFER | WISE COUNTY	63	63	63	63	63	63
AURORA	C | TRWD LAKE/RESERVOIR SYSTEM	71	87	99	114	113	107
BOLIVAR WSC	C | TRINITY AQUIFER | DENTON COUNTY	100	97	93	89	86	82
BOLIVAR WSC	C | TRINITY AQUIFER | WISE COUNTY	11	11	11	10	10	9
BOYD	C | TRINITY AQUIFER | WISE COUNTY	73	73	73	73	73	73
BOYD	C | TRWD LAKE/RESERVOIR SYSTEM	144	142	195	227	267	224
BRIDGEPORT	C | TRWD LAKE/RESERVOIR SYSTEM	1,294	1,412	1,466	1,704	1,704	1,704
CHICO	C | TRINITY AQUIFER | WISE COUNTY	193	193	193	193	193	193
CHICO	C | TRWD LAKE/RESERVOIR SYSTEM	13	13	13	13	13	13
DECATUR	C | TRWD LAKE/RESERVOIR SYSTEM	1,206	1,348	1,449	1,227	1,113	1,055
NEW FAIRVIEW	C | TRINITY AQUIFER | WISE COUNTY	163	163	163	163	163	163
NEWARK	C | TRINITY AQUIFER | WISE COUNTY	195	195	195	195	195	195
RHOME	C | TRINITY AQUIFER | WISE COUNTY	280	280	280	280	280	280
RHOME	C | TRWD LAKE/RESERVOIR SYSTEM	131	265	368	636	730	745
RUNAWAY BAY	C | TRWD LAKE/RESERVOIR SYSTEM	350	353	344	365	370	396
WEST WISE SUD	C | TRWD LAKE/RESERVOIR SYSTEM	425	386	344	310	283	260
COUNTY-OTHER	C | TRINITY AQUIFER | WISE COUNTY	2,584	2,584	2,584	2,584	2,584	2,584
COUNTY-OTHER	C | TRWD LAKE/RESERVOIR SYSTEM	616	471	368	647	776	834
MANUFACTURING	C | TRINITY AQUIFER | WISE COUNTY	250	250	250	250	250	250
MANUFACTURING	C | TRWD LAKE/RESERVOIR SYSTEM	2,160	2,256	2,234	2,160	2,129	2,097
MINING	C | DIRECT REUSE	6,261	6,261	6,261	6,261	6,076	6,076
MINING	C | TRINITY AQUIFER | WISE COUNTY	2,155	2,155	2,155	2,155	2,155	2,155
MINING	C | TRINITY RUN-OF-RIVER	133	133	133	133	133	133
MINING	C | TRWD LAKE/RESERVOIR SYSTEM	2,896	2,896	2,896	2,896	2,896	2,896
STEAM ELECTRIC POWER	C | TRWD LAKE/RESERVOIR SYSTEM	1,494	1,328	1,813	1,741	2,091	2,078
LIVESTOCK	C | TRINITY AQUIFER | WISE COUNTY	458	458	458	458	458	458
LIVESTOCK	C | TRINITY LIVESTOCK LOCAL SUPPLY	1,117	1,117	1,117	1,117	1,117	1,117
IRRIGATION	C | TRINITY AQUIFER | WISE COUNTY	680	680	680	680	680	680
IRRIGATION	C | TRINITY RUN-OF-RIVER	139	139	139	139	139	139
IRRIGATION	C | TRWD LAKE/RESERVOIR SYSTEM	124	124	124	124	124	124
TRINITY BASIN TOTAL EXISTING SUPPLY		**28,512**	**29,234**	**30,188**	**31,256**	**32,305**	**32,949**
WISE COUNTY TOTAL EXISTING SUPPLY		**28,512**	**29,234**	**30,188**	**31,256**	**32,305**	**32,949**
REGION C TOTAL EXISTING SUPPLY		**1,650,227**	**1,619,324**	**1,609,036**	**1,615,434**	**1,611,630**	**1,602,246**

Appendix K

APPENDIX K

ESTIMATION OF SAVINGS AND COSTS FOR WATER CONSERVATION STRATEGIES

Estimation of Savings and Costs for Recommended Water Conservation Strategies in Region C

PROJECT: 0312-046-01

DATE: October 3, 2014

PREPARED FOR: File

PREPARED BY: Brian K. McDonald, P.E.
Alan Plummer Associates, Inc. (APAI)

1.0 INTRODUCTION

The *2016 Region C Water Plan* recommends a Water Conservation Package for municipal water user groups (WUGs) and additional strategies for manufacturing and irrigation WUGs (Table K.1).

Table K.1: Recommended Water Conservation Strategies

Recommended Strategies	Water Conservation Measures	User Group Type	Memo Section
Municipal Water Conservation Package	Low-flow plumbing fixture rules [a]	Municipal	2.0
	Efficient new residential clothes washer standards [a]	Municipal	3.0
	Efficient new residential dishwasher standards [a]	Municipal	4.0
	Enhanced public and school education	Municipal	5.0
	Price elasticity/rate structure impacts	Municipal	6.0
	Enhanced water loss control program	Municipal	7.0
	Water waste prohibition	Municipal	8.0
	Time-of-day irrigation restrictions	Municipal	9.0
Non-Municipal	Manufacturing general rebate	Manufacturing	10.0
	Golf course conservation	Irrigation	11.0

[a] These measures are implicit in the water demand projections.

This memorandum has two purposes:

- To document the criteria for recommending strategies in the Water Conservation Package for a WUG, and
- To document assumptions made in projecting water savings and opinions of probable cost for these strategies.

Sections 2 through 4 include conservation measures mandated by state or federal laws. The remainder of the measures in the municipal Water Conservation Package are included in Sections 5 through 10. Sections 11 and 12 include non-municipal conservation measures.

Summaries of the potential water savings and cost per thousand gallons of water saved for each municipal conservation measure are presented in Tables K.2 and K.3. The water savings represent regional totals and the costs are regional average costs. Water savings and costs may differ for individual water user groups.

2.0 LOW FLOW PLUMBING FIXTURE RULES

2.1. *Applicability*

Potential savings from state low flow plumbing fixture rules were evaluated for all municipal WUGs. The Water Saving Performance Standards for Plumbing Act, implemented by Texas in 1992, restricted flowrates of plumbing fixtures manufactured after January 1, 1994 to 1.6 gallons per flush (gpf) for toilets and 2.5 gallons per minute for showerheads. House Bill 2667, implemented September 1, 2009, further restricted toilet flowrates to 1.28 gpf by January 1, 2014.

2.2 *Projected Water Savings*

The Texas Water Development Board (TWDB) projected water savings from the gradual conversion to 1.6 gpf toilets and 2.5 gpm showerheads at 10.5 gallons per capita per day (gpcd) for toilets and 5.5 gpcd for showerheads [(1)]. The TWDB projected the additional water savings from conversion to 1.28 gpf toilets at 1.63 gpcd.

For a given WUG, the initial number of inefficient toilets is based on the 1995 population. The TWDB assumes that 2 percent of this initial number will be replaced each year. Some of the projected water savings has already occurred as residents and businesses replace toilets and showerheads. For a given WUG, the percentage of the population that has installed low-flow plumbing fixtures depends on the 1995 population, the natural fixture replacement rate, and population growth since 1995 [(1)]. Based on these factors the TWDB estimated future water savings for each municipal WUG from the low flow plumbing fixture rules.

To project future water demands, the TWDB started with a dry-year per capita water use estimate (typically based on 2011 usage) and subtracted projected water savings from three state/federal regulatory measures:

- Low-flow plumbing fixture rules (this section),
- Efficient new residential clothes washer rules (Section 3.0), and
- Efficient new residential dishwasher rules (Section 4.0).

Although the savings from each measure are not broken out separately, the savings from all three measures in a given decade is the difference in the dry-year per capita water use and the projected per capita water demand multiplied by the projected population (Table K.2) The projected 2020 regional municipal water demand is reduced by 4.7 percent from what it would be without these three regulatory measures, and the projected 2070 regional municipal water demand is reduced by 8.7 percent.

Table K.2: Summary of Projected Municipal Water Savings by Conservation Measure

Measure	Water Savings (acre-feet per year)					
	2020	2030	2040	2050	2060	2070
Low Flow Plumbing Fixture Rules [a]						
Efficient New Residential Clothes Washer Standards [a]	73,851	117,317	157,079	190,552	218,797	246,869
Efficient New Residential Dishwasher Standards [a]						
Water Savings Implicit in Water Demand Projections	**73,851**	**117,317**	**157,079**	**190,552**	**218,797**	**246,869**
Enhanced Public and School Education	12,720	21,704	31,089	34,290	37,258	39,974
Price Elasticity/Rate Structure Impacts	4,927	11,145	18,911	28,214	39,153	51,822
Enhanced Water Loss Control Program	26,649	29,752	10,612	8,915	6,843	4,277
Time-of-Day Irrigation Restriction	60	165	193	222	260	286
Water Waste Prohibition	135	325	383	471	646	830
Other [b]	11,041	24,994	35,025	36,844	35,868	33,919
Water Savings Over and Above Water Demand Projections	**55,532**	**88,085**	**96,213**	**108,956**	**120,028**	**131,108**
Total Municipal Water Savings	***129,383***	***205,402***	***253,292***	***299,508***	***338,825***	***377,977***

(a) Water savings estimated by Texas Water Development Board

(b) "Other" water conservation includes water savings from two sources:

(1) According to their water conservation plans, 15 WUGs have implemented significant measures in addition to the Water Conservation Package. These conservation measures have been implemented recently and were not reflected in the historical water data that were used to project water demands. These measures were evaluated on a WUG-specific basis.

(2) Conservation water savings estimates over and above the Water Conservation Package that were submitted by WUGs or their consultants.

Table K.3: Summary of Cost by Municipal Conservation Measure

Measure	Cost Per Thousand Gallons of Water Saved					
	2020	**2030**	**2040**	**2050**	**2060**	**2070**
Low Flow Plumbing Fixture Rules	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Efficient New Residential Clothes Washer Standards	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Efficient New Residential Dishwasher Standards	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Water Costs Implicit in Water Demand Projections	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Enhanced Public and School Education	$2.02	$1.35	$0.99	$0.98	$0.97	$0.97
Price Elasticity/Rate Structure Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Enhanced Water Loss Control Program	$3.74	$3.53	$2.54	$2.43	$2.07	$1.88
Time-of-Day Irrigation Restriction	$8.20	$3.55	$3.25	$3.19	$3.14	$3.17
Water Waste Prohibition	$2.51	$1.18	$1.04	$0.87	$0.82	$0.80
Other	$0.61	$0.42	$0.38	$0.39	$0.39	$0.39
Water Costs Over and Above Water Demand Projections	**$2.18**	**$1.43**	**$0.58**	**$0.54**	**$0.50**	**$0.47**
Total Water Costs	***$0.86***	***$0.58***	***$0.21***	***$0.19***	***$0.17***	***$0.16***

2.3 *Additional Data Requirements*

No additional data are needed to project water savings from low flow plumbing fixture rules.

2.4 *Reliability*

The projected water savings will be realized without action by the WUG. Therefore, the reliability of the potential water savings is relatively high.

2.5 *Opinion of Probable Cost*

The projected water savings will be realized at no cost to the WUGs.

3.0 EFFICIENT NEW RESIDENTIAL CLOTHES WASHER STANDARDS

3.1 *Applicability*

Potential savings from federal residential clothes washer standards were evaluated for all municipal WUGs. The federal Department of Energy has set water usage requirements for residential clothes washers by manufacture date (Table K.4).

Table K.4: Federal New Residential Clothes Washer Standards

Type of Clothes Washer	Manufacture Date (on or after)	Water Use Standard [a] (gal/ft^3)	TWDB Projected Water Savings [b] (gpcd)
Front-Loading	January 1, 2011	WF = 9.5	5.23
	March 7, 2015	MIWF = 4.5	6.67
Top-Loading	January 1, 2011	WF = 9.5	5.23
	March 7, 2015	MIWF = 8.4	5.56
	January 1, 2018	MIWF = 6.5	6.13

[a] For 2011, the water use standard is expressed in terms of water factor (WF). The WF is the total weighted per-cycle water consumption for the cold wash/cold rinse cycle divided by the clothes container capacity. Other water use standards are expressed in terms of maximum integrated water factor (MIWF). The MIWF is the total weighted per-cycle water consumption for all wash cycles divided by the clothes container capacity. The listed standards apply to "standard" sized clothes washers of 1.6 cubic feet and larger.

[b] Water savings projections depend on the number of people per household (2.75), the number of loads washed per household per year (300), the proportion of households with clothes washers (75 percent), the percentage of new construction installing a clothes washer (91 percent), the proportion of top-loading machines to front-loading machines (40 percent/60 percent), and the useful life of clothes washers (11 years for a front-loading machine and 14 years for a top-loading machine [1].

3.2 *Projected Water Savings*

The TWDB projected water savings from the gradual conversion to more efficient residential clothes washers using the per capita savings projections (Table K.4), the useful life of clothes washers, the regulatory deadlines, and projected populations for each WUG.

As described in Section 2.2, the projected water savings from efficient new residential clothes washer standards are implicit in the TWDB's future water demand projections and comprise a portion of the water savings shown in Table K.2.

3.3 *Additional Data Requirements*

No additional data are necessary to project savings from federal residential clothes washer standards.

3.4 *Reliability*

The projected water savings will be realized without action by the WUG, as residents gradually replace inefficient clothes washers. Therefore, the reliability of the potential water savings is relatively high.

3.5 *Opinion of Probable Cost*

The projected water savings will be realized at no cost to the WUGs.

4.0 EFFICIENT NEW RESIDENTIAL DISHWASHER STANDARDS

4.1 *Applicability*

Potential savings from federal residential dishwasher standards were evaluated for all municipal WUGs. The federal Department of Energy has set a requirement that "standard" sized residential dishwashers (capacity for 8 place settings) manufactured on or after January 1, 2010, must achieve a water consumption of 6.5 gallons per cycle. This requirement decreases to 5.0 gallons per cycle for dishwashers manufactured on or after May 30, 2013.

4.2 *Projected Water Savings*

The TWDB projected water savings of 1.83 gpcd from dishwashers that use 6.5 gallons per cycle and 1.93 gpcd from dishwashers that use 5.0 gallons per cycle (1). As described in Section 2.2, the projected water savings from efficient new residential dishwasher standards are implicit in the TWDB's future water demand projections and comprise a portion of the water savings shown in Table K.1.

4.3 *Additional Data Requirements*

No additional data are necessary to project savings from federal residential dishwasher standards.

4.4 *Reliability*

The projected water savings will be realized without action by the WUG, as residents gradually replace inefficient dishwashers. Therefore, the reliability of the potential water savings is relatively high.

4.5 *Opinion of Probable Cost*

The projected water savings will be realized at no cost to the WUGs.

5.0 ENHANCED PUBLIC AND SCHOOL EDUCATION

Most utilities in Region C have some kind of public and school education program. However, the levels of effort put into these programs, the budgets for these programs, and the water savings from these programs are highly variable. Although this measure does not define how a utility should conduct its public and school education program, it assumes that participating utilities will operate their programs at a high (or "enhanced") level, committing resources as necessary to achieve significant water savings.

5.1. *Applicability*

The enhanced public and school education program measure was evaluated for municipal WUGs with the following characteristics:

- Existing or projected total water usage of more than 140 gpcd,
- A projected water need,
- An identified sponsor for the public and school education program

5.2 *Projected Water Savings*

Water savings from public and school education are difficult to measure. Public and school education results in indirect savings through enhancement of other water conservation measures and direct savings from changes in customer behavior. In this memorandum, the indirect savings from public education will be attributed to the other water conservation measures with which they are associated. Therefore, the potential water savings from public and school education will be the direct savings from changes in customer behavior. Given the significant amount of public education on water conservation that has already taken place in Region C, the projected water savings in a given decade is estimated to be from 1 to 2 percent of municipal water demand, with savings increasing each decade over the planning period according to Table K.5. WUGs that implement this program by 2020 are projected to achieve 2 percent savings by 2070.

Table K.5: Projected Percentage Savings by Decade for Enhanced Public and School Education

2020	2030	2040	2050	2060	2070
1.0%	1.5%	2.0%	2.0%	2.0%	2.0%

It is assumed that the savings from public and school education last one year [2] and that the program must be renewed each year to maintain and increase the estimated savings.

5.3 *Additional Data Requirements*

No additional data are needed to project water savings from enhanced public and school education.

5.4 *Reliability*

Water savings from enhanced public and school education are difficult to measure and depend on customer behavior. For these reasons, the reliability of the estimated water savings is low. Enhanced public and school education reinforces and builds on previously delivered conservation messages; therefore, it is important that the enhanced public and school education program be continued from year to year in order to increase the reliability of the savings.

5.5 *Opinion of Probable Cost*

Actual spending per resident can be difficult to track, because media markets overlap many cities. For example, in 2010, the City of Dallas spent about $1.65 million on its public awareness program and its environmental education initiative. Based on the retail customer population, this corresponds to $1.37 per resident. However, the associated media buys also reached wholesale customers. When the wholesale customer population is taken into account, the per capita spending was $0.65.

As another example, the City of Fort Worth currently spends about $0.19 per retail resident for public and school education. The Tarrant Regional Water District also spends about $0.84 per wholesale resident (including Fort Worth residents) for its public awareness program. Therefore, different entities are funding and conducting public and school education programs costing a total of about $1.03 per Fort Worth resident.

Based on this information, the cost of enhanced public and school education is expected to be about $1.00 per resident for the largest WUGs. It is anticipated that smaller cities would have to spend up to $3.00 per resident per year to deliver effective water conservation messages (3).

The opinion of probable annual cost for each WUG to which this measure applies was derived using population projections. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

These costs have been associated with the WUGs that benefit from the programs, regardless of whether the funding comes from the WUG itself or from a wholesale supplier.

6.0 PRICE ELASTICITY/RATE STRUCTURE IMPACTS

6.1 *Applicability*

The impact of real increases in water prices was evaluated for all municipal WUGs. Although many WUGs in Region C already have conservation-oriented rate structures, this measure is also assumed to account for rate structure changes.

6.2 *Projected Water Savings*

The change in water demand due to a real increase in the water price is called the price elasticity of water demand. A price elasticity of -0.20 indicates that a 1.0 percent increase in water rates will cause a -0.2 percent change in water usage. Estimation of potential water savings from the price elasticity of water demand requires projection of future treated water prices.

Unfortunately, historical price elasticities depend upon economic and other conditions that may not persist in the future, and no projections of future price elasticities were identified. Therefore, a long-term price elasticity of -0.20 is recommended for projecting the impact of increasing water prices in Region C (3). It has also been assumed that real water prices will increase by 20 percent over the planning period and that half of the potential impact of increasing water prices will be offset by increasing income.

The projected water savings for each WUG is one half of the long-term price elasticity multiplied by the change in real water price multiplied by the municipal water demand. It was assumed that real water prices will increase linearly during planning period, for a total 20 percent increase by 2070 (Table K.6). By the end of the planning period, increasing water prices are projected to cause a 2 percent reduction in total water demand.

Table K.6: Projected Real Water Price Increases During Planning Period

2020	2030	2040	2050	2060	2070
3.3%	6.7%	10.0%	13.3%	16.6%	20%

6.3 *Additional Data Requirements and Reliability*

Customer participation is highly reliable for this measure, since changes in water prices automatically affect all water customers. However, the projected water savings are based on broad, general assumptions, and the reliability of the above projections is medium.

The reliability of the above projections could be increased if detailed projections of real treated water prices and real income were available. This would require projections of raw water costs, treatment costs, distribution costs, and administrative costs for each WUG.

6.4 *Opinion of Probable Cost*

The projected water savings due to real increases in water price will be realized at no cost to the WUGs.

7.0 ENHANCED WATER LOSS CONTROL PROGRAM

Most utilities in Region C have some kind of water loss control program. However, the levels of effort put into these programs, the budgets for these programs, and the water savings from these programs are highly variable. Although this measure does not define how a utility should conduct its water loss control program, it assumes that participating utilities will operate their programs at a high (or "enhanced") level, committing resources as necessary to achieve significant water savings.

The enhanced water loss control program consists of:

- Water audits, pressure control, and leak detection and repair (including Automated Metering infrastructure), and
- Water main replacement

7.1 *Applicability*

Retail public utilities that supply potable water to more than 3,300 connections or receive financial assistance from the TWDB must file a system water loss audit with the TWDB by May 1 each year. Other retail public utilities that supply potable water must file a system water loss audit with the TWDB every five years (the next due date is May 1, 2016) [4]. In addition, the feasibility of water audits, pressure control, and leak detection and repair was evaluated for publicly-owned municipal WUGs with the following characteristics:

- Existing or projected total water usage of more than 140 gpcd,
- Total water loss in excess of the target level.
- A projected water need, and
- An identified sponsor for this measure.

Water main replacement was evaluated for every WUG.

7.2 *Projected Water Savings*

For a given WUG, the projected water savings associated with water audits, pressure control, and leak detection and repair is the difference between the WUG's actual water loss percentage and the target water loss percentage multiplied by the municipal water demand multiplied by an implementation schedule percentage. The target water loss is 12 percent for urban/suburban WUGs and 18 percent for WUGs with widespread, rural systems. It has been assumed this measure will be 33 percent complete by the first decade of implementation and 100 percent complete by the second decade of implementation. The program should be continued indefinitely to maintain the target water loss. No water savings were projected from these measures for WUGs that have not reported their water loss.

Water savings from main replacement was estimated to be 0.5 percent of total water demand for each WUG. For each WUG, main replacement was assumed to take place in 2020, and the main replacements are projected to save water for 20 years.

7.3 *Additional Data Requirements*

Some WUGs did not report their water loss to the TWDB. In addition, some water loss accounting quantities are difficult to estimate (e.g., fire fighting, main flushing, etc.). As more utilities report and refine their system water audit data, the overall estimate of potential water savings from this measure should be refined.

In addition, there is little information available regarding the concentration of leakage within Region C water systems (e.g., "80 percentage of the leakage occurs within 20 percent of the system").

7.4 *Reliability*

The projected water savings are based on reported water loss data, which increases the reliability of the estimates. However, water loss as a percentage of total produced and/or purchased water can vary widely from year to year, even if the total system water loss does not change. Therefore, the reliability of the potential water savings is medium.

7.5 *Opinion of Probable Cost*

The cost for a system water audit is highly variable and depends on the size of the water system and the degree of uncertainty present in the estimated losses. The opinion of probable cost for a "desktop" audit, conducted by assembling readily available data and estimating losses for which data are not available, may range from $5,000 to $50,000. The opinion of probable cost for an "intensive" audit, where field investigations are conducted to generate additional data with which to refine the desktop audit, may range from $50,000 to $500,000 or more. It has been assumed that WUGs will implement the desktop audit.

In addition, a cost for leak detection and repair of $587 per mile of main per year has been assumed. This unit cost was derived from the typical leak detection and repair cost of $400 per mile of main per year used in the *2006 Region C Water Plan*, with adjustment for inflation. Using estimates of the number of miles per main for different populations, an opinion of the probable annual cost for leak detection and repair was generated.

Since small diameter pipes are prevalent in a water distribution system, the large majority of the main replacements will be small diameter pipes. Costs were calculated assuming an 8-inch diameter for each main replacement, using pipe installation costs from the TWDB's Unified Costing Model, assuming a multiplier of 1.5 to account for other costs involved in pipe replacement, and assuming a multiplier of 1.03 to inflate the cost from the Unified Costing Model basis (March 2012) to the *2016 Region C Water Plan* basis (September 2013).

In some instances, water user groups provided their own estimate of cost to replace mains that are a significant source of measurable water loss.

For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

8.0 WATER WASTE PROHIBITION

8.1 *Applicability*

Water waste prohibition was evaluated for municipal WUGs with the following characteristics:

- Existing or projected total water usage of more than 140 gpcd,
- A projected water need,
- No current water waste prohibition/ordinance, and
- An identified sponsor to implement a water waste prohibition measure.

Some WUGs may be unable to implement this measure, because they lack ordinance-making authority.

8.2 *Projected Water Savings*

The projected water savings for each WUG is the product of the following parameters:

- Potential water savings (as a percentage of irrigation water demand[1])
- Municipal water demand
- Percent seasonal water demand
- Percent automatic irrigation
- Compliance rate

[1] Irrigation water demand is a percentage of total water demand. The percentage is WUG-specific and is estimated based on historical water use.

- Implementation schedule percentage

The projected savings are based on use of rain sensors that shut off automatic irrigation systems when it is raining or when it has rained recently (depending on the type of sensor). It is estimated that the percentage of watering cycles missed during a drought year is approximately equal to the minimum annual percentage of days with ½-inch rainfall events. The projected water savings from an irrigation water waste prohibition is 3.3 percent of irrigation water use for accounts that have automatic irrigation systems.

The percentage of customers that have automatic irrigation systems varies considerably across the region and is unknown in most cases. In the July 2004 RCWPG survey, 52 out of 129 total responses provided an estimate of the percentage of customers that have automatic irrigation systems.

It is anticipated that it will take ten years of implementation to realize full compliance with the water waste prohibition. However, anecdotal evidence indicates that there is some fraction of rain sensors that will be out of order. Therefore, "full compliance" is projected to be 90 percent participation.

The estimated potential water savings has been based on a requirement for rain sensors for automatic irrigation systems. As discussed previously, a water waste prohibition may address numerous other sources of waste, but it is not possible to predict what the ordinance for an individual WUG might prohibit. The potential water savings from other sources of water waste have not been estimated.

It is anticipated that the customer will replace the rain sensor at the end of its useful life at his or her own expense to maintain compliance with the water waste prohibition and that the projected water savings will be permanent.

8.3 *Additional Data Requirements*

The status of whether a WUG has implemented a water waste prohibition is known for WUGs that comprise 81 percent of 2070 municipal water demand. Additional information is necessary to project water savings for the remainder of the WUGs.

In addition, the percentage of customer accounts that have automatic irrigation systems is unknown for most WUGs. Additional data would improve the reliability of the assumptions stated in Section 8.2.

8.4 *Reliability*

For an individual automatic irrigation system with a rain sensor in working order, the reliability of the potential water savings should be high. However, for an entire WUG to realize its projected savings, there must be enforcement of the water waste prohibition to ensure that the projected number of rain sensors are installed, and automatic irrigation system owners must keep the rain sensor in working order. In addition, there are uncertainties associated with the estimates of the market penetration of automatic irrigation systems. Due to uncertainties described above, the reliability of the projected savings is medium.

8.5 *Opinion of Probable Cost*

The primary costs for this measure include adoption of an ordinance and enforcement of the ordinance similar to Section 7. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

It has been assumed that the probable cost to pass an ordinance in a city of up to 25,000 people is $7,334 and that the cost to pass an ordinance in a city of more than 50,000 people is $14,668. To obtain an opinion of probable annual costs, probable capital costs were amortized at a 5.5 percent interest rate for a term of 20 years, and enforcement costs were assumed to be $0.37 per resident per year. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

9.0 TIME-OF-DAY IRRIGATION RESTRICTION

9.1 *Applicability*

The time-of-day irrigation restriction was evaluated for municipal WUGs with the following characteristics:

- Existing or projected total water usage of more than 140 gpcd,
- A projected water need,
- The ability for WUG to create and enforce ordinances,
- No existing time-of-day irrigation restriction, and
- An identified sponsor for the time-of-day irrigation restriction.

9.2 *Projected Water Savings*

Time-of-day irrigation restriction ordinances have been passed for a number of WUGs in Region C, although in varying forms. Some ordinances specify time-of-day restrictions (no automatic irrigation watering from 10am through 6pm) throughout the year, while some choose only the warmer months (e.g., April through October). The exact times allowed throughout a day also vary across the Region. Almost all WUGs still allow hand irrigation regardless of time of day or year.

Sprinkler evaporation losses depend on relative humidity, air temperature, wind speed, nozzle diameter, and nozzle pressure [(5)]. Using long-term, monthly average weather data from the Dallas-Fort Worth International Airport weather station and assuming 5/16-inch nozzle diameter[2] and 50 psi nozzle pressure, annual sprinkler evaporation losses were estimated to be 6.9 percent of irrigation water applied for irrigation between 10am and 6 pm and 4.0 percent if irrigation is restricted to 6pm to 10am. For each WUG, it was assumed that one-third of customers that have automatic irrigation systems would change their irrigation time in response to this restriction. For these customers, the estimated water savings is 2.9 percent of seasonal water demands. Seasonal water demands are calculated as the difference between monthly water usage and winter usage. Seasonal water demands are attributable largely to landscape irrigation, although cooling water usage and other factors may also contribute.

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[2] Sprinkler nozzles are available in diameters ranging from 1/8-inch to 1-inch. A 5/16-inch nozzle diameter is considered to be a "mid-range" diameter.[(5)]

It is anticipated that it will take ten years of implementation to realize full compliance with the time-of-day irrigation restriction. However, some customers will continue to irrigation from 10am to 6pm. Therefore, "full compliance" is projected to be 90 percent participation.

9.3 *Additional Data Requirements*

Additional WUG surveys would help refine the number and type of ordinances currently enforced and the percentages of customers that have automatic irrigation systems.

9.4 *Reliability*

Customer participation is related to knowledge of ordinance and ordinance enforcement, which varies by WUG. It is also not possible to predict the exact landscape irrigation restrictions that each WUG would adopt. In addition, amounts of water used in irrigation are dependent on weather patterns which cannot be predicted throughout the planning periods. Due to these unknowns the reliability of the savings estimate is medium.

9.5 *Opinion of Probable Cost*

The primary costs for this measure include adoption of an ordinance and enforcement of the ordinance similar to Section 8. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

10.0 MANUFACTURING GENERAL REBATE PROGRAM

10.1 *Applicability*

The manufacturing general rebate program was evaluated for manufacturing WUGs that have a projected water need.

10.2 *Potential Water Savings*

It has been assumed that where the manufacturing general rebate is implemented, the potential water savings is three percent of water sales from a municipal WUG to a manufacturing WUG and that the potential water savings will last for 15 years. These assumptions are consistent with the assumption in the TWDB-sponsored study of conservation potential in Texas [2].

It is anticipated that water savings will be realized at a rate of 0.2 percent per year for 15 years until the full 3 percent of total manufacturing water usage is realized. The 15-year implementation period is designed to match the projected life of the water savings. After the initial implementation period, the manufacturing general rebate program must be continued indefinitely to maintain the projected water savings.

It has also been assumed that the program will be implemented beginning in 2030.

10.3 *Additional Data Requirements*

No additional data are required to estimate potential water savings from a manufacturing general rebate program.

10.4 *Reliability*

The effectiveness of this measure depends on the degree of participation of manufacturing customers. In addition, the estimate of potential water savings is not based on WUG-specific data. Therefore, the reliability of the potential water savings for the manufacturing general rebate program is low.

10.5 *Opinion of Probable Cost*

The opinion of probable cost for rebates is $300 per acre-foot of savings, including the rebate, marketing, and overhead. The cost for a single rebate is amortized at 5.5 percent interest over 15 years, the expected life of the measure. The opinion of probable annual cost is the sum of amortized costs for all rebates given in the previous 15 years. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

11.0 GOLF COURSE CONSERVATION PROGRAM

11.1 *Applicability*

The golf course conservation measure was evaluated for irrigation WUGs that have a projected water need.

11.2 *Potential Water Savings*

It has been assumed that where the measure is implemented, the potential water savings for the golf course conservation program is 15 percent of golf course water demand and that the potential water savings will last indefinitely (the golf course will continue to maintain and implement the conservation program at its own expense). In addition, it has been assumed that participation rates will be 20 percent in 2020, 40 percent in 2030, 50 percent in 2040, 60 percent in 2050, 70 percent in 2060, and 80 percent in 2070.

11.3 *Additional Data Requirements*

No additional data are required to estimate potential water savings from a golf course conservation program.

11.4 *Reliability*

The effectiveness of this measure depends on the degree of participation of golf courses. In addition, the estimate of potential water savings is not based on course-specific data. Therefore, the reliability of the potential water savings for the golf course conservation program is low.

11.5 *Opinion of Probable Cost*

Implementation alternatives include voluntary implementation for self-supplied golf courses, rebates for courses supplied by a municipal WUG, and ordinances if supplied by a city. The opinion of probable cost assumes that a municipal WUG offers a rebate to a golf course to implement a conservation program.

The opinion of probable cost for rebates is $300 per acre-foot of savings, including the rebate, marketing, and overhead. The cost for a single rebate is amortized at 5.5 percent interest over 15 years, the expected life of the associated measure. The opinion of probable annual cost is the sum of amortized costs for all rebates given in the previous 15 years. For a given WUG and given year, the probable unit cost was calculated as the probable annual cost divided by projected water savings.

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Appendix L

APPENDIX L

INFORMATION FROM 2014 DRAFT DALLAS LONG RANGE WATER SUPPLY PLAN

7.2 Additional Water Conservation

7.2.1 Introduction

Water conservation is defined as "those practices, techniques, and technologies that will reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses" (Texas Water Code §11.002 (a) (8) (B)).

Because the City of Dallas holds water rights in excess of 1,000 acft/yr, the State of Texas in 30 Texas Administrative Code, Chapter 288 requires that the City of Dallas develop, submit and implement a water conservation plan and prepare updates to the plan on a specified schedule. To meet these requirements, the City of Dallas has prepared the following documents:

- The *City of Dallas Water Conservation Five-Year Strategic Plan* (the "Strategic Plan"). The Strategic Plan is updated approximately every five years with the last update occurring in 2010. The Strategic Plan includes a list of Best Management Practices (BMPs) and policy recommendations that are developed through detailed analysis and stakeholder input. The Strategic Plan contains detailed analyses of an exhaustive list of potential water conservation strategies (or BMPs) for which water savings, avoided water and wastewater O&M costs, and additional revenue from enhanced apparent loss reduction is provided.
- The *City of Dallas Water Conservation Plan* (or the "Water Conservation Plan"). The Water Conservation Plan is prepared to meet the regulatory requirement specified in 30 TAC 288. The Water Conservation Plan is based on the information contained in the Strategic Plan and presents an analysis of water conservation strategies adopted for implementation by the DWU. Both of these plans provide a wealth of information regarding the near-term (5 years) water conservation efforts adopted for the City of Dallas and associated wholesale water customers. The latest version of the Water Conservation Plan was approved by the Dallas City Council on February 26, 2014.

Conserving existing water supplies through demand reduction can be one of the most cost-effective strategies available to municipal water suppliers to increase available supply. The purpose of this section is to consider quantitative conservation goals applicable over the 50-year planning timeframe of the 2014 LRWSP and to provide ideas on how this goal could potentially be met through strategies that are identified as part of Dallas' Strategic Plan and Water Conservation Plan.

7.2.2 Plumbing Code Reductions

The Plumbing Fixtures Act mandated revisions to local building codes that require low use plumbing fixtures such as low flow showers and low use toilets for all new or retrofitted construction. Reductions associated with this Act are expected to reduce the average per capita water use for the City of Dallas and its customers by 8.7% over the 50-year planning period (from 184 gpcd in 2020 to 168 gpcd by 2070). The water demand projections presented in Section 4 include this 8.7% reduction in future per capita consumption.

7.2.3 City of Dallas Water Conservation Goals

Table 7.2-1 presents future estimates of per capita water (gpcd) use for the City of Dallas (excluding the City's wholesale customers) based on both the TWDB's projections (to be used in both the 2016 Region C Plan (2016 RCP) and the 2014 LRWSP) and recommended 50-year water conservation targets based on Dallas' continuing efforts to reduce water use. These recommended conservation targets are generally consistent with both the Strategic Plan and the Water Conservation Plan. The additional reduction in per capita water use resulting from using the recommended values rather than the TWDB's estimates reflects the potential additional conservation savings as a result of Dallas' conservation targets being achieved.

The year 2011 gpcd value of 207 is used as the starting point for projecting recommended additional conservation savings. The reduced water use associated with the additional conservation savings is calculated by reducing per capita water use by 1.0% per year until 2025. Beginning in 2026, the gpcd value is reduced at the rate of 0.5% per year until 2043 to reflect a reduced conservation rate as per capita use rates begin to harden due to previous conservation measures. Beginning in 2043, the per capita water use rate is stabilized at 164. This represents a reduction in per capita use of 43 gpcd or about 21% from the 2011 baseline gpcd value of 207.

As shown in Table 7.2-1 and Figure 7.2-1, the annual volume of water saved under the additional conservation savings strategy is estimated to be 10.8 MGD in 2020 (12,107 acft/year) and 46.3 MGD in 2070 (51,902 acft/year). This represents a potential additional reduction in water use by the City of Dallas of 4.4% in 2020 and 12.9% in 2070 as compared to the TWDB's baseline projections. The values in this table are shown to more than three significant figures in order to calculate the conservation savings more accurately.

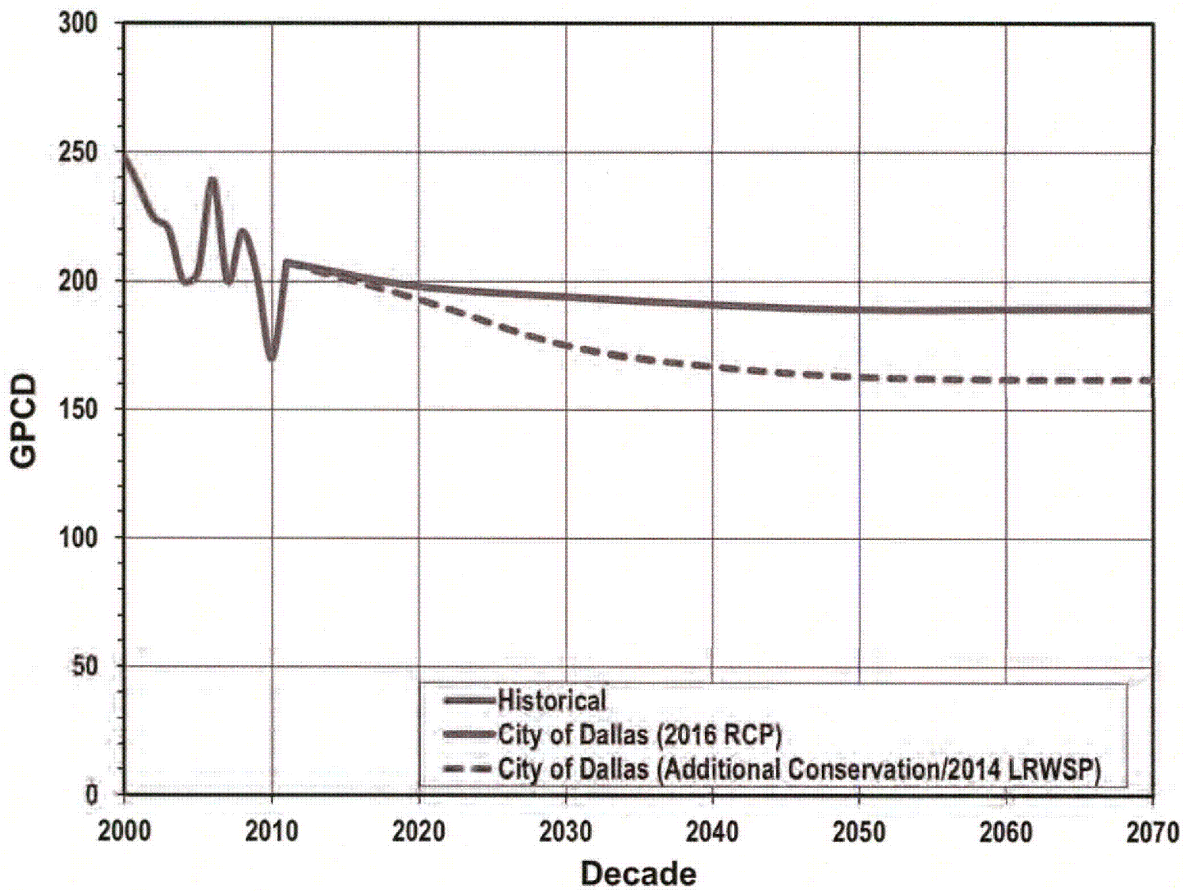
7.2.4 Water Conservation Goals for City of Dallas' Wholesale Customers

It is important to note that Dallas has much less control over conservation measures taken by its wholesale customers, so there is a significant degree of uncertainty regarding whether additional conservation savings would occur over the planning period. Current contracts between the City of Dallas and wholesale customers contain the following typical provisions related to water conservation: (1) the customer agrees to develop a water conservation plan which incorporates loss-reduction measures and demand management practices designed to ensure that the available supply is used in an economically efficient and environmentally sensitive manner, and (2) if Dallas grants authorization for the customer to sell water purchased from Dallas, then Dallas may establish the terms and conditions of the conveyance. During the Region C planning process, estimated conservation amounts were determined for the City of Dallas customers; however, they are not included as part of this strategy due to the uncertainties discussed above and Dallas' limited ability to influence their conservation efforts.

Table 7.2-1. Estimated Reduction in City of Dallas Water Demands with Additional Conservation Strategy

Component	2020	2030	2040	2050	2060	2070
Dallas Population Projections	1,242,136	1,347,717	1,531,680	1,707,057	1,841,064	1,905,499
TWDB Projected gpcd	198	194	191	189	189	189
TWDB Projected Water Demand (MGD)	245.6	260.8	291.6	322.5	347.2	359.3
Recommended gpcd with Additional Conservation (2014 LRWSP)	189	175	167	164	164	164
Projected Water Demand w/ Additional Conservation – (MGD)	234.8	236.0	255.1	280.2	302.4	313.0
Additional Conservation Savings (MGD)	10.8	24.8	36.5	42.3	44.8	46.3
Percentage Decrease in Water Demand with Additional Conservation	4.4%	9.5%	12.5%	13.1%	12.9%	12.9%

Figure 7.2-1. Comparison of Per Capita Water Use Goals for the City of Dallas



7.2.5 Strategies to Achieve Recommended Water Conservation Goal

Water conservation savings are achieved through the synergy of technology, education, ordinances and incentives. The Strategic Plan and the Water Conservation Plan both recommend that water conservation savings be derived from a combination of education, rates, irrigation efficiency and restrictions, non-residential efficiency, reuse and reduced system losses.

The City of Dallas Strategic Plan and Water Conservation Plan include the following goals:

- Develop water conservation programs aimed at:
  - developing and implementing programs aimed at reducing seasonal peak demands,
  - reducing water loss and waste, and
  - decreasing per capita water use (gpcd),
- Continuation of heightened public awareness of water conservation,
- Continue to implement conservation practices that will maintain quality of life and allow economic growth and development,
- Continue to implement broad-based public and private stakeholder groups, leading by example by upgrading city facilities with water-efficient fixtures, landscapes, and irrigation systems wherever possible,
- Assist in facilitating regional conservation efforts among DWU wholesale customer cities and neighboring municipalities, and
- Establish the foundation for continuation of water savings targets for the following five-year period and beyond.

The Strategic Plan anticipates that additional conservation savings will be derived by continuing current programs outlined in the previous section, as well as:

- Expand the public awareness campaign,
- Offer Industrial, Commercial, and Institutional (ICI) water audits,
- Conduct training programs for ICI managers and irrigators,
- Offer ICI business partnership program for top water users,
- Offer ICI hospitality program for hotels and restaurants,
- Implement Water-wise landscape design requirements limiting turf areas and types of landscaping in new landscapes,
- Implement ICI equipment rule for retrofits in new and newly-occupied ICI establishments,
- Offer residential irrigation system rebates,
- Lower residential toilet incentive to 1.28 gallons per flush,
- Offer residential clothes washer rebates,

- Offer ICI cost-sharing of retrofits and upgrades,
- Enforce new State maximum flow-rate requirements for plumbing fixtures,
- Include conservation clause in all wholesale contracts, and
- Continue coordination with regional water planning group.

The Strategic Plan provides probable costs associated with these programs that total approximately $38 million dollars over the five-year implementation period. Estimated savings from these programs are about 100 billion gallons over the next twenty years. Thus, these savings are estimated to cost about $380 per million gallons (MG), or approximately $124 per acft ($0.38/1,000 gallons). These costs do not include avoided costs related to water supply strategies/infrastructure that can be delayed as a result of reduced water demand. The $124 per acft is the unit cost shown for additional conservation in the 2014 LRWSP to compare against other strategies. As conservation savings become more challenging to achieve, this unit cost will likely increase.

In order for Dallas to achieve the recommended 46.3 MGD additional water conservation savings by 2070, the following are potential additional conservation strategies that may be considered:

- <u>Increasing irrigation water use restrictions</u>: As indicated in the Strategic Plan, residential outdoor water use represents about 37 percent of Dallas residential water use based on analysis of all single family water user accounts. Outdoor water use can be reduced with more efficient landscaping and irrigation technology. One challenge with more efficient landscaping is that many homeowner associations require well maintained turf area, thus significant gains in irrigation water use may require changing not only attitudes but ordinances about acceptable landscapes. In addition, irrigation systems require regular maintenance to maintain efficiency; otherwise they can also become water wasters.
- <u>Improving water use efficiency for commercial, industrial, and institutional properties</u>: Industrial, Commercial, and Institutional (ICI) audits and incentives, such as those proposed in the Strategic Plan and Water Conservation Plan can help reduce inefficient water uses within commercial, industrial, and institutional properties. The Strategic Plan estimates that almost 31% of DWU water users can be categorized as commercial and industrial with outdoor water use averaging about 40 percent of Dallas commercial water use. Thus landscape design and irrigation efficiency offer significant potential for reducing non-residential water use. As with residential properties, education, public awareness and strategic partnerships, and incentives are needed to maintain realized and projected gains in water use efficiency.
- <u>Improved leak detection and line replacement</u>: Regular leak detection and line replacement is required to maintain water distribution system efficiency. DWU's operations division has an on-going program for water loss control. Under Texas House Bill 3338, DWU is required to submit water loss audits which help track performance in managing and controlling apparent losses (e.g., billing and metering errors) and real losses (e.g., leaks).

Additionally, the 46.3 MGD projected water savings for the recommended additional water conservation strategy assumes that:

- Incentive programs will be provided on a continual basis to address fixtures that wear out over time,
- New targets for commercial water use efficiency will emerge, considering new methods and equipment to achieve additional water savings, and
- Emerging new technologies will introduce new opportunities for residential, commercial and industrial water efficiency in the future, and
- Marginally cost-effective water efficiency programs will become more cost-effective to implement over time as the cost of water increases.

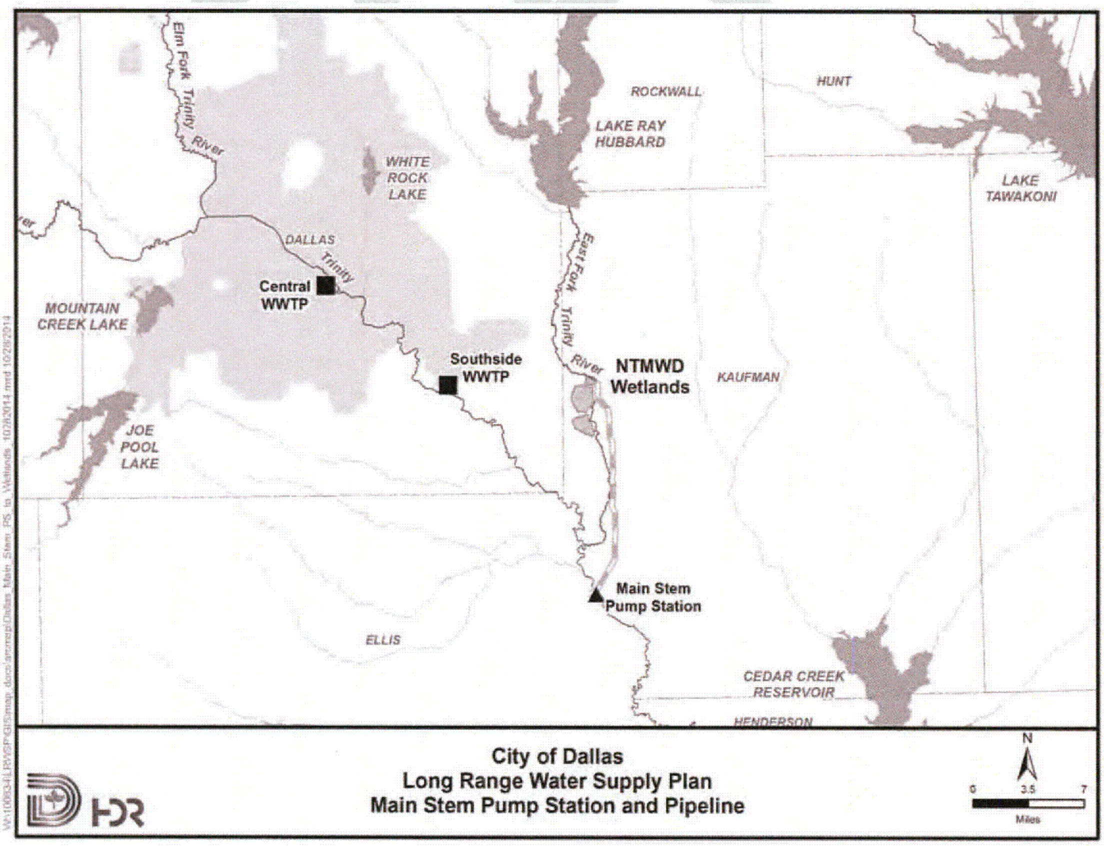
7.3 Main Stem Pump Station

In December 2008, Dallas and the North Texas Municipal Water District (NTMWD) entered into an agreement (swap agreement) for the exchange of return flows. The swap agreement allows Dallas to use NTMWD return flows discharged into Lake Ray Hubbard in exchange for NTMWD utilizing a portion of Dallas' return flows from the main-stem of the Trinity River. Under the swap agreement Dallas and NTMWD will cooperate in the construction of a pump station (Main Stem Pump Station) and transmission pipeline to deliver up to 90 MGD of return flows (from Dallas and other entities) from a location on the main stem of the Trinity River to an agreed "point of delivery" near the NTMWD wetlands located near the East Fork of the Trinity River and Hwy 175 near Seagoville. The swap agreement is currently being amended to accommodate NTMWD's need for the project to be operational by about 2017. Upon completion of the Main Stem Pump Station and pipeline, Dallas will have the right to utilize all NTMWD water discharged into Lake Ray Hubbard. Until the Main Stem Pump Station and pipeline is completed, Dallas has previously agreed to pass NTMWD's discharges from Lake Ray Hubbard.

7.3.1 Strategy Description

The project to be constructed under the swap agreement includes the construction of a Main Stem Pump Station (90 MGD) and a 72-inch diameter, 14.2 mile pipeline to transport water to the NTMWD wetlands as shown in Figure 7.3-1.

Figure 7.3-1. Main Stem Pump Station and Pipeline



7.3.2 Water Availability

Under the swap agreement, Dallas will exchange return flows from their Central and Southside WWTPs for an equal amount of return flows from NTMWD as discharged into Lake Ray Hubbard. Estimated average daily flows for this strategy for the 2020 to 2070 timeframe are shown in Table 7.3-1. By 2040 the volume of NTMWD return flows discharged into Lake Ray Hubbard is estimated to total 31.1 MGD (34,863 acft/yr). NTMWD has indicated they will attempt to acquire additional return flow quantities from Dallas and/or other entities that discharge to the Trinity River to more fully utilize the 90 MGD capacity pump station and pipeline.

Table 7.3-1. Projected Average Daily Flow Exchange under Swap Agreement [a]

Year	Average Daily Flow (MGD)
2020	23.1
2030	27.5
2040	31.1
2050	31.1
2060	31.1
2070	31.1

[a] Source Freese and Nichols memorandum dated January 30, 2014

7.3.3 Environmental Issues

Table 7.3-2 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of these conditions and further detailed studies would need to be performed during permitting to address these potential concerns with the respective regulatory agencies.

Habitat

River and transmission infrastructure would be located to avoid conflicts with environmentally sensitive areas when feasible. The majority of the pipeline route occurs within areas of agricultural use including crops and pasture. Impacts to preferred habitats will be minimized by utilizing these agricultural areas which have been previously disturbed. Wooded riparian areas also commonly occur along and adjacent to stream and river areas that will be crossed by the pipeline corridor. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. The pipeline route will also potentially cross wetland areas which will be disturbed by construction activities. The use of best management practices (BMPs) during construction activities will help to minimize potential impacts to these areas.

However, specific project components such as pipelines generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats. As a result any impacts to existing habitat are anticipated to be low.

Environmental Water Needs

Implementation and operation of the Main Stem Pump Station relies on the use of previously permitted return flows and will leave adequate flows in the Trinity River to meet required TCEQ environmental flow requirements.

Bays and Estuaries

Similarly, since the Main Stem Pump Station relies on the use of previously permitted return flows, it will have very limited effects on freshwater inflow to the Trinity Bay.

Threatened and Endangered Species

The species included in Table 7.3-2 represent all species federally or state listed as threatened or endangered, and federal candidate species in the county for which the project will be located. The project area includes seventeen species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipeline to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area. The numbers of listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

The relatively small footprint of the project would have minimal impact to any wetlands located in the area. It is likely the project could be sited in a way to minimize these potential impacts or avoid them altogether. It is possible that some small wetlands could be located close to the riverine areas.

Table 7.3-2. Environmental Factors for Main Stem Pump Station

Environmental Factors	Comment(s)	Level of Concern
Habitat	No presence of critical or unique habitat in project area	Low
Environmental Water Needs	Minimal Impact	Low
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Low impact American peregrine falcon ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, white-faced ibis ST, whooping crane LE and SE, wood stork ST, red wolf FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, Louisiana pigtoe ST, sandbank pocketbook ST, Texas heelsplitter ST, and Texas pigtoe ST.	Low
Wetlands	Low Impact – potential for wetlands close to river	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered. ST = State Listed as Threatened. C = Candidate for Federal Listing

7.3.4 Planning Cost Estimate

Infrastructure required for the Main Stem Pump Station includes a 90 MGD intake and pump station and 72-in diameter pipeline to convey flows to the NTMWD wetlands. Costs for a new channel dam to create a stable pool elevation near the intake and pump station have been included. However, it may be possible to eliminate the need for a new structure if investigations of an existing channel dam indicate its condition is acceptable or can be improved for future operations. Project costs for Dallas are estimated to be about 34.6% of the total project cost based on the ratio of estimated 2070 return flows from NTMWD return flows into Lake Ray Hubbard and the total capacity of the pipeline.

A summary of project and annual costs for the Main Stem Pump Station strategy is listed in Table 7.3-3. Total project costs are $75.5 million with Dallas' portion of the total project cost being $26 million. Dallas annual costs for the project assume a 30-year debt service with a 5.5 percent interest rate and delivery of 31.1 MGD are estimated to be $2,863,000 per year. The unit cost of water for this project (to Dallas) would be about $83 per acft or $0.25/1,000 gallons. After debt service, the unit cost of water (to Dallas) is decreased to $31 per acft or $0.10/1,000 gallons. Unit water costs to NTMWD would be similar to Dallas' unit costs but would need to consider the cost to purchase water from other entities.

Table 7.3-3. Cost Estimate Summary for Main Stem Pump Station

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities	DWU Portion of Costs
CAPITAL COST		
Intake, Pump Station and Channel Dam	$22,145,000	$7,628,000
Transmission Pipeline	$32,546,000	$11,210,000
TOTAL COST OF FACILITIES	**$54,691,000**	**$18,838,000**
OTHER PROJECT COSTS		
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$17,515,000	$6,033,000
Environmental & Archaeology Studies and Mitigation	$374,000	$129,000
Land Acquisition and Surveying	$353,000	$121,000
Interest During Construction (4% for 1 year with a 1% ROI)	$2,553,000	$878,000
TOTAL COST OF PROJECT	**$75,486,000**	**$25,999,000**
ANNUAL COST		
Debt Service (5.5 percent, 30 years)	$5,194,000	$1,787,000
Operation and Maintenance		
Intake, Pipeline, Pump Station	$879,000	$302,000
Pumping Energy Costs (kW-hr @ 0.08 $/kW-hr)	$2,249,000	$774,000
TOTAL ANNUAL COST	**$8,322,000**	**$2,863,000**

Table 7.3-3. Cost Estimate Summary for Main Stem Pump Station

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities	DWU Portion of Costs
Available Project Yield (acft/yr)	**100,800**	**34,863**
Annual Cost of Water ($ per acft)	**$83**	**$83**
Annual Cost of Water ($ per 1,000 gallons)	**$0.25**	**$0.25**
Annual Cost of Water after Debt Service ($ per acft)	**$31**	**$31**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.10**	**$0.10**

7.3.5 Permitting and Implementation Issues

Dallas has a water right permit that allows for the diversion of Dallas' return flows from the Trinity River. Therefore the only significant permit required for the construction of the Main Stem Pump Station project would be a Section 404 permit from the USACE for impacts to a waterway associated with the construction of the diversion facilities and pipeline. Additionally, if it were necessary to construct a new channel dam on the Trinity River, then this structure would require a new state water rights permit and need to be considered in the Section 404 permitting process, Table 7.3-4.

Table 7.3-4. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right and Storage Permit	TCEQ	Required if a new channel dam is constructed on the Trinity River.
404	USACE	Required for construction activities in waters of the US.

7.3.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can include permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict. The Main Stem Pump Station is susceptible to permitting risk associated with availability of return flows and required environmental flows.

7.3.7 Agricultural and Natural Resources

Construction activities associated with the project pipeline will impact an estimated 69 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because these areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.4 Main Stem Balancing Reservoir

The DWU 1975 Long Range Water Supply Plan identified a 64,000 acft balancing reservoir in Ellis County southeast of Bristol Texas as a potential delivery location for water from the proposed Tennessee Colony Reservoir. For the 2014 LRWSP the same site was identified as the Main Stem Balancing Reservoir, a proposed off channel reservoir (OCR) that could store approximately 300,000 acft. This site is shown in Figure 7.4-1 and could store Dallas' (and potentially other entities') return flows as well as stormwater runoff originating in the upstream Trinity River watershed. Additionally, because the diversion location for this strategy is located downstream of the confluence with the East Fork of the Trinity River (East Fork), the Main Stem Balancing Reservoir could also be used to transfer water from Dallas' eastern system to Dallas' western system by storing water released from either Lake Ray Hubbard or from Dallas' eastern raw water transmission pipelines where they cross the East Fork.

7.4.1 Strategy Description

Dallas has secured water rights to use return flows from their Central and Southside wastewater treatment plants. This reuse water is a valuable asset that can be utilized by Dallas and does not require additional appropriation of state water.

The storage of return flows in the balancing reservoir provides several benefits including water quality benefits and the benefit of being able to store the water during times of plenty and diverting it for subsequent use during times of drought. Figure 7.4-1 provides the location of the Main Stem Balancing Reservoir and diversion site from the Trinity River. Water supplies will be delivered to the Joe Pool area through a 36.5 mile transmission system.

7.4.2 Water Availability

The Main Stem Balancing Reservoir was preliminarily designed to achieve a desired firm yield of 102 MGD (114,000 acft/yr) by 2070. The water availability analysis indicated that by 2070, 109 MGD of return flows would be available for diversion after considering the swap agreement with NTMWD and an amended instream flow requirement associated with Dallas' return flow permit (12468). As shown in Table 7.4-1, after considering a 7 MGD loss for reservoir evaporation, the resulting 2070 firm yield is 102 MGD (114,000 acft/yr).

7.4.3 Environmental Issues

Table 7.4-2 provides a summary of known environmental factors that would need to be considered during the permitting of this project. These categories provide a general summary of these conditions and further study would be needed during permitting to address these potential concerns with the respective regulatory agencies.

Habitat

The footprint of the reservoir occurs within an area of developed agricultural land in the Trinity River floodplain. River and transmission infrastructure would need to be located

Figure 7.4-1. Main Stem Balancing Reservoir and Pipeline

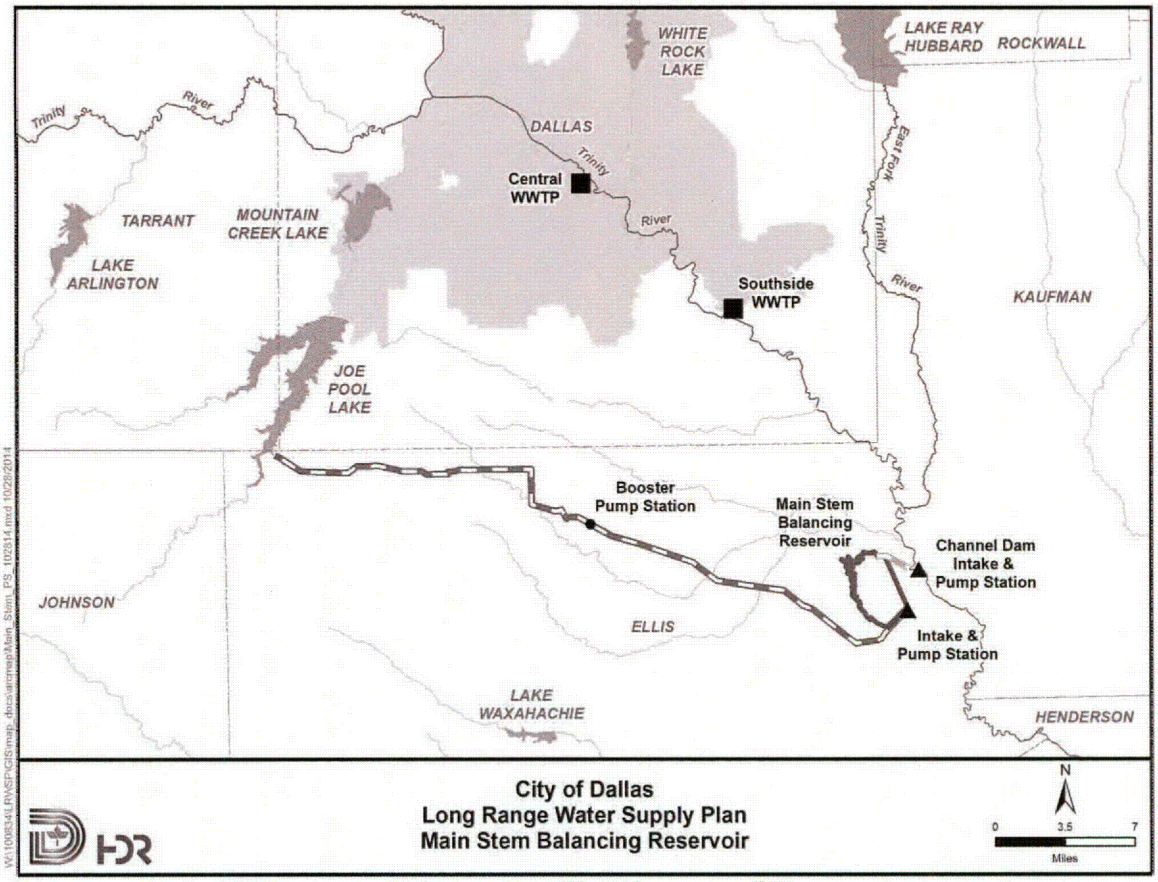


Table 7.4-1. Summary of Available Return Flows

Criteria	2020	2030	2040	2050	2060	2070
Dallas Return Flows considering conservation (MGD)	164	165	176	191	206	214
Amended Instream Flow Requirement (MGD)	74	74	74	74	74	74
NTMWD Swap Agreement (MGD)	23	28	31	31	31	31
Available Return Flows (MGD)	67	63	71	86	101	109

to avoid conflicts with environmentally sensitive areas where feasible. No designated critical habitat currently occurs within the project area. The pipeline route primarily crosses areas of agricultural use including crops and pasture but also includes some forested areas. Impacts to preferred habitats will be minimized by utilizing the agricultural areas which have been previously disturbed. Wooded riparian areas also commonly occur along and adjacent to stream and river areas that will be crossed by the pipeline corridor. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. The pipeline route will also cross wetland areas which will be disturbed by construction activities. The use of best management practices (BMPs) during construction activities will help to minimize potential impacts to these areas.

Specific project components such as pipelines generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats. As a result any impacts to existing habitat are anticipated to be low.

Environmental Water Needs

Implementation and operation of the Main Stem Balancing Reservoir will have a very limited impact on daily flows in the Trinity River since it relies on permitted return flows and will leave adequate flows in the Trinity River to meet TCEQ environmental flow standards.

Bays and Estuaries

The Main Stem Balancing Reservoir will have very limited effects on freshwater inflow to the Trinity Bay since it relies on permitted return flows and will leave adequate flows in the Trinity River to meet TCEQ environmental flow standards.

Threatened and Endangered Species

The species included in Table 7.4-2 represent all species federally or state listed as threatened or endangered, and federal candidate species in the county for which the project will be located. The project area includes sixteen species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipelines to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area. The numbers of listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

Review of available mapping of the reservoir footprint indicates minimal wetland acreage would be affected by the project. To the extent wetlands are located at the site; they would be mitigated in accordance with required federal regulations as administered through the US Army Corps of Engineers section 404 permitting process.

Although a number of wetlands occur along the proposed pipeline corridor flexibility in the pipeline siting would be used to minimize or avoid potential impacts to the majority of these areas.

Table 7.4-2. Environmental Factors for Main Stem Balancing Reservoir Project

Environmental Factors	Comment(s)	Level of Concern
Habitat	No designated critical habitat in project area.	Low
Environmental Water Needs	Minimal Impact	Low
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Low impact American peregrine falcon ST, bald eagle ST, golden-cheeked warbler FE and SE, interior least tern FE and SE, peregrine falcon ST, Sprague's pipit C, white-faced ibis ST, whooping crane FE and SE, wood stork ST, red wolf FE and SE, Louisiana pigtoe ST, Texas heelsplitter ST, Texas pigtoe, alligator snapping turtle ST, Texas horned lizard ST, and timber rattlesnake ST.	Low
Wetlands	No wetland vegetation areas in footprint of OCR however emergent wetlands may occur.	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered. ST = State Listed as Threatened. C = Candidate for Federal Listing

7.4.4 Planning Cost Estimate

Infrastructure required for the Main Stem Balancing Reservoir include a potential channel dam on the Trinity River, a 102 MGD intake and pump station and a 72-in diameter pipeline to convey available flows to the reservoir. The Balancing Reservoir includes a sedimentation basin so that suspended sediments will settle and accumulate for periodic removal. Stored water would be diverted from the reservoir though an intake and pump station and delivered to the Joe Pool Lake area through an 84-in dia., 36.5-mile pipeline.

A summary of project and annual costs for the Main Stem Balancing Reservoir strategy with delivery to the Joe Pool area is listed in Table 7.4-3. Total project costs are $674.5 million. Annual costs for the project assume a 30-year debt service with a 5.5 percent interest rate and are estimated to be $64,887,000 per year. The unit cost of water for this project to deliver water to the Joe Pool area would be about $568 per acft or $1.74 per 1,000 gallons. After debt service, the unit cost of water is decreased to $162 per acft or $0.50 per 1,000 gallons.

7.4.5 Permitting and Implementation Issues

The Main Stem Balancing Reservoir project would pose some permitting challenges along with the typical challenges associated with a new project (Table 7.4-4). Similar to other new water projects in Texas, a surface water permit for the channel dam (if needed) on the Trinity River would be required from TCEQ. While Dallas has rights to divert their Trinity River discharges, a new water right permit would be required to divert stormwater. In addition to the surface water permit, a Section 404 permit from the USACE for impacts to a waterway from construction activities would be needed for the construction of the diversion facilities and pipeline. While yield analyses did not indicate any impacts to the firm yield of downstream reservoirs; a subordination agreement may be necessary for the diversion of stormwater.

Table 7.4-3. Cost Estimate Summary for Main Stem Balancing Reservoir Project

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities
CAPITAL COST	
Off-Channel Storage (Conservation Pool 300,000 acft, 4337 acres)	$199,834,000
Intake, Pump Station and Channel Dam	$21,041,000
Transmission Pipeline	$163,304,000
Transmission Pump Station(s)	$44,023,000
Relocations	$5,761,000
TOTAL COST OF FACILITIES	**$433,963,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$143,722,000
Environmental & Archaeology Studies and Mitigation	$16,263,000
Land Acquisition and Surveying	$16,425,000
Interest During Construction (4% for 3 years with a 1% ROI)	$64,090,000
TOTAL COST OF PROJECT	**$674,463,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$46,407,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$3,098,000
Dam and Reservoir (1.5% of Cost of Facilities)	$2,998,000
Pumping Energy Costs (kW-hr @ 0.08 $/kW-hr)	$12,384,000
TOTAL ANNUAL COST	**$64,887,000**
Available Project Yield (acft/yr)	**114,337**
Annual Cost of Water ($ per acft)	**$568**
Annual Cost of Water ($ per 1,000 gallons)	**$1.74**
Annual Cost of Water after Debt Service ($ per acft)	**$162**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.50**

Table 7.4-4. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right and Storage Permit	TCEQ	Dallas has rights to divert their wastewater discharges but will need additional permits to store water in the Balancing Reservoir and channel dam.
404	USACE	Required for construction activities in waters of the US.

7.4.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and / or risks associated with various types of conflict. The Main Stem Balancing Reservoir is susceptible to performance risk associated with availability of return flows, water quality considerations and required environmental flows.

The project's water quality risks could be mitigated through blending with other DWU sources and by operating the reservoir to maintain minimal residence time to allow natural processes to enhance water quality, and by the addition of mixing units at the reservoir to reduce stratification. While not anticipated to be required at this time, land for potential future wetlands for treatment has been included in the project cost estimate.

Additionally, this strategy is situated so that there are several potential regional cooperation opportunities that could include trades of this water with other regional providers in exchange for water delivered to Dallas' western system.

7.4.7 Agricultural and Natural Resources

The project Balancing Reservoir site will permanently impact an estimated 2,140 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. This area represents less than 1% of the Ellis County prime farmland. Construction activities associated with the project pipeline would impact an additional 120 acres of prime farmland soils. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because the pipeline areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.5 Lake Palestine Pipeline (IPL)

The City of Dallas and the Tarrant Regional Water District (TRWD) are partnering on the planning and development of an integrated raw water transmission system to meet future water needs. The purpose of the transmission system also known as the Integrated Pipeline (IPL) is to bring water from Lake Palestine, Richland-Chambers Reservoir, and Cedar Creek Reservoir to Dallas and TRWD in a cost efficient way to ensure water supply reliability as demands increase. The IPL connects the Dallas and TRWD raw water transmission systems making it possible to share water resources and establish a platform for integrating future water supplies in the region.

7.5.1 Strategy Description

The 134-mile long raw water transmission pipeline ranges in diameter from 84-inch to 108-inch and will convey water at a planned peak capacity of 347 MGD. Dallas' portion of the capacity of the shared pipeline is currently planned to be 150 MGD. Dallas has contracted for 102 MGD of Lake Palestine supply which will be conveyed through the IPL.

The IPL is subdivided into segments to allocate costs between TRWD and Dallas as well as to split the permitting, design and construction into multiple packages. Figure 7.5-1 shows the overall transmission system and ownership. The IPL will deliver Dallas' share of Lake Palestine water to a location near the upper end of Joe Pool Lake. From this location, Dallas will construct a delivery system to transport water to the Bachman WTP.

Several alternative delivery options were evaluated to deliver the IPL water from the Joe Pool Lake area to the Bachman WTP. These include the use of a combination of pipelines, reservoirs (Joe Pool and Mountain Creek Lakes) and natural stream channels (Mountain Creek and the West and Elm Forks of the Trinity River). Of the various options evaluated, the most economical option, which utilizes Joe Pool Lake and natural stream channels, is presented here with associated costs. Figure 7.5-2 shows the details of this option.

Under this option water from the IPL is first delivered into the upper end of Joe Pool Lake. From Joe Pool Lake it is released by gravity into Mountain Creek where it flows into Mountain Creek Lake. The water is then released from Mountain Creek Lake into Mountain Creek where it flows into the West Fork of the Trinity River (West Fork) and down to the confluence with the Elm Fork. Thru the use of a proposed low-head channel dam (located below the confluence of the two forks of the Trinity River), water would be allowed to flow upstream within the Elm Fork channel to Frasier dam where it would be pumped over Frasier dam and into the pool of water that supplies the Bachman WTP.

Figure 7.5-1. Lake Palestine Pipeline Project (IPL)

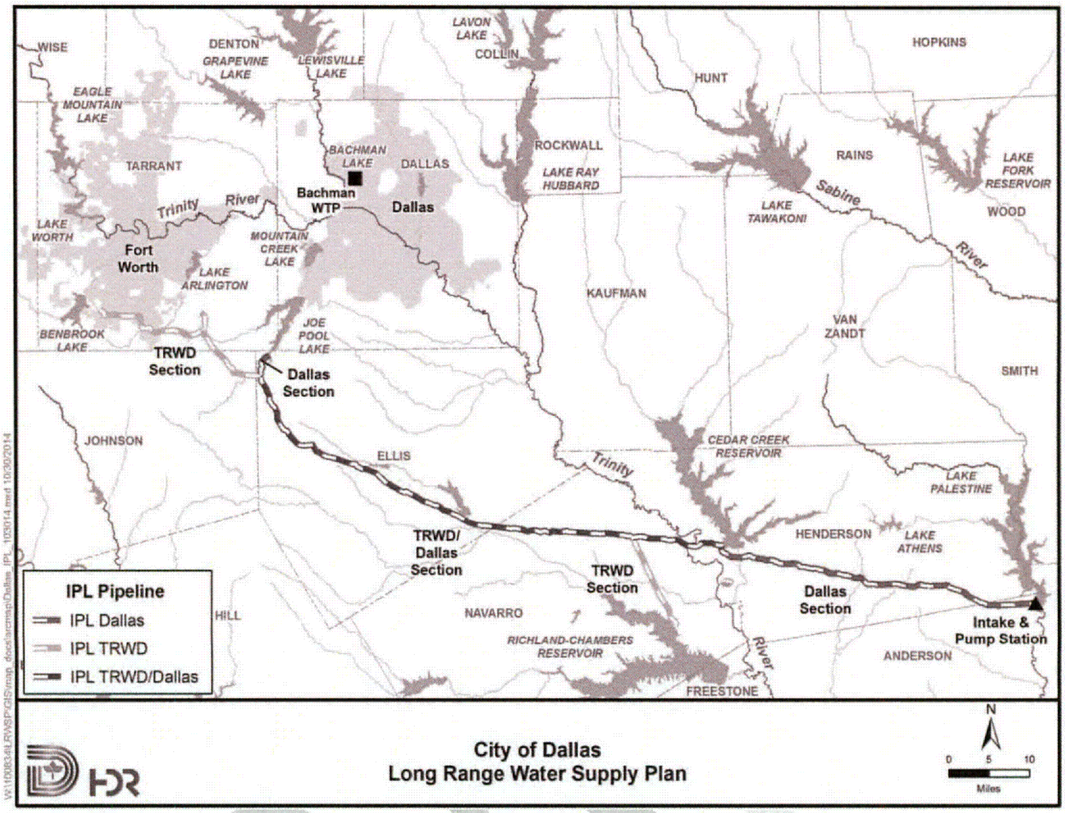
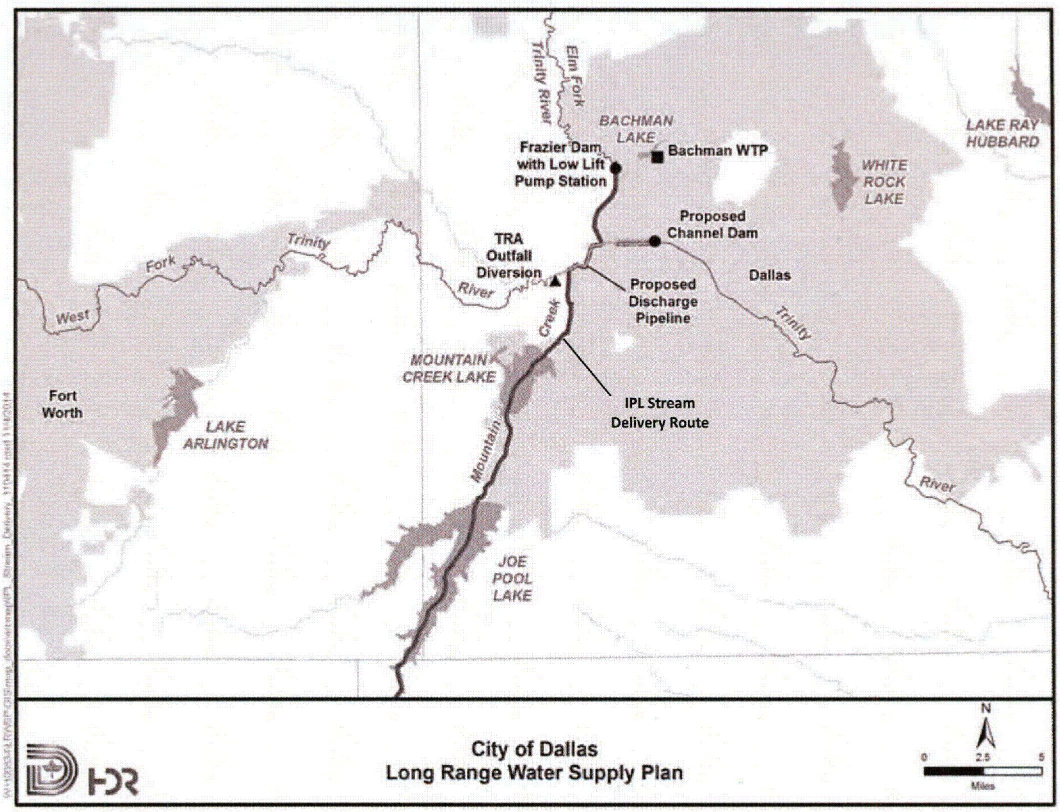


Figure 7.5-2. Delivery of Supplies from IPL to Bachman WTP



7.5.2 Water Availability

Water supply for Dallas from the IPL will initially be from Dallas' existing contract with the Upper Neches River Municipal Water Authority (UNRMWA) for Lake Palestine water. This contract is for an annual quantity of 102 MGD (114,337 acft/yr). Lake Palestine is estimated to have a firm yield of 189 MGD (211,800 acft/yr) based on the 1950's drought and permitted (WAM Run 3) conditions[1]. For the 2014 LRWSP six (6) different yield scenarios were evaluated for Lake Palestine resulting from a combination of either 2020 or 2070 sediment conditions and three different drought periods 1950s, 1908, 2006. The results of this analysis showed that Dallas receives its full share of 102 MGD in all scenarios except a repeat of the 1908 drought under 2070 sediment and evaporation conditions which supplies 95.4 MGD (106,943 acft/yr) to Dallas.

While the IPL will initially convey up to 150 MGD of peak day supply from Lake Palestine to the Joe Pool area, it will have, on average, an unutilized capacity of approximately 48 MGD (or about 53,800 acft/yr) which could be utilized by Dallas to deliver additional water from other strategies located within the Neches River Basin.

7.5.3 Environmental Issues

Table 7.5-1 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of conditions and further study would be needed in any feasibility or permitting efforts to address potential concerns with the respective regulatory agencies. In general, the pipeline corridor does not have any major environmental issues that can not be avoided.

Habitat

River intake and transmission pipeline infrastructure would be located to avoid conflicts with environmentally sensitive bottomland hardwoods and riparian areas in addition to ecologically significant stream sections. A large portion of the proposed pipeline route follows existing road right-of-ways or crosses areas of agricultural use including crops and pasture. Impacts to preferred habitats would be minimized by utilizing these previously disturbed areas. Wooded riparian areas commonly occur along and adjacent to stream and river crossings that will be crossed by the pipeline corridor especially in its eastern sections. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. The pipeline route will also cross wetland areas which will be disturbed during construction. The use of best management practices (BMPs) during construction activities will help to minimize potential impacts to these areas. However pipelines generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats.

In addition, approximately 18 miles of stream channel along segments of the West Fork of the Trinity (2.25 miles) and Elm Fork of the Trinity River (6 miles) and Mountain Creek (9.75 miles) and 37 acres of bottomland hardwoods mostly in the Elm Fork portion would be inundated with the implementation of the channel dam in the Elm Fork channel.

[1] UNRMWA. Upper Neches River Water Supply Project Feasibility Study. HDR 2014.

Habitat found along approximately four miles of Mountain Creek would potentially benefit from the additional flows provided by the project. Impacts to existing habitat from project activities are anticipated to be medium to low.

Environmental Water Needs

Implementation and operation of the IPL will have a very limited impact on daily flows in the Neches River since it will operate in accordance with its water right permit and will leave flows in the Neches River in accordance with TCEQ required minimum flows.

Bays and Estuaries

Similarly, the IPL Project will have very limited effects on freshwater inflow to the Sabine Lake and Sabine Lake Estuary since it will operate in accordance with its authorized water right permit

Threatened and Endangered Species

The species included in Table 7.5-1 represent all species federally or state listed as threatened or endangered, and federal candidate species in the counties for which the project will be located. The project area includes thirty three species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipeline to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area. No designated areas of critical habitat currently occur within the project area. The numbers of listed species which potentially occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

Nearly 27 acres of potential wetland vegetation area could be inundated with the proposed Trinity River channel reservoir and would need to be mitigated. Although a number of wetlands occur along the proposed pipeline corridor, flexibility in the pipeline siting would be used to minimize or avoid potential impacts to the majority of these areas. Impacts to wetlands associated with this project are anticipated to be low.

7.5.4 Planning Cost Estimate

The final design for the IPL project was initiated in July 2012. Construction is scheduled to include 3 Phases. Phase 1 includes facilities needed to fully access supplies available from Cedar Creek Reservoir and is planned to be completed in 2020. Phase 2 includes facilities needed to fully access supplies available from Richland Chambers Reservoir with bidding currently planned for 2021 and 2022. Phase 3 includes facilities needed to access Dallas supplies available from Lake Palestine with bidding currently planned to occur between 2025 and 2027.

Table 7.5-1. Environmental Factors for Lake Palestine Pipeline Project

Environmental Factors	Comment(s)	Level of Concern
Habitat	No presence of critical or unique habitat in project area. Inundation of 18 miles of stream channel and 37 acres bottomland hardwoods along the West and Elm Forks.	Medium to Low
Environmental Water Needs	Minimal Impact	Low
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Low impact – American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, red-cockaded woodpecker FE and SE, white-faced ibis ST, whooping crane FE and SE, wood stork ST, golden-cheeked warbler FE and SE, black-capped vireo FE and SE, sharpnose shiner FE, smalleye shiner FE, paddlefish ST, shovelnose sturgeon ST, gray wolf FE and SE, black bear ST, Louisiana black bear, FT and ST, red wolf FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, northern scarlet snake ST, earth fruit LT and ST, Brazos water snake ST, Texas fawnsfoot C and ST, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, and Texas pigtoe ST.	Low
Wetlands	27 acres of wetlands inundated in West and Elm Fork channel.	Medium

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered.
ST = State Listed as Threatened. C = Candidate for Federal Listing

Costs are shown in Table 7.5-2 for Dallas' portion of costs for the IPL to deliver water to the Joe Pool area based on March 2012 prices along with estimated pumping costs to deliver Dallas' portion of their Lake Palestine water (102 MGD). These costs come from the April 2012 TRWD / City of Dallas report which contains the latest opinion of probable cost. The decision was made to report the cost of this project using the more detailed cost estimate provided in the earlier report and not convert the prices using the Unified Costing Model. The September 2013 prices are estimated to be about 3% higher than March 2012 prices according to the Engineering News Record Construction Cost Index, a potential increase in capital costs of about $21 million. The unit cost to deliver Dallas' Lake Palestine supplies through the IPL to the Joe Pool area is $751 per acft or $2.31 per 1,000 gallons. After debt service, the unit cost would decrease to $186 per acft or $0.57 per 1,000 gallons.

Table 7.5-2. Cost Estimate Summary for IPL Project to Deliver Lake Palestine Water to the Joe Pool Area (Dallas Portion Only)

Table units: March 2012 Dollars

Item	Estimated Cost for Dallas Facilities
CAPITAL COST (Source: Latest Opinion of Probable Cost – TRWD / Dallas 2012 Study)	
Construction Costs	$678,900,000
Materials and Equipment	$49,270,000
TOTAL COST OF FACILITIES	**$728,620,000**
OTHER PROJECT COSTS	
Design Expenses	$48,720,000
Professional Services Expenses (Conceptual Design, Environmental Permitting, Geotechnical, etc.)	$95,360,000
Land Acquisition and Surveying	$38,040,000
Program Level Contingency	$28,210,000
TOTAL COST OF PROJECT	**$938,950,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$64,605,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$7,286,000
Pumping Energy Costs (0.08 $/kW-hr)	$14,009,000
TOTAL ANNUAL COST	**$85,900,000**
Available Project Yield (acft/yr)	**114,337**
Annual Cost of Water ($ per acft)	**$751**
Annual Cost of Water ($ per 1,000 gallons)	**$2.31**
Annual Cost of Water after Debt Service ($ per acft)	**$186**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.57**

As described in Section 7.4.1, water supplied through the IPL is initially discharged into the upper end of Joe Pool Lake and would then be released into Mountain Creek and Mountain Creek Lake eventually flowing into the West and Elm Forks until being pumped over Frasier dam and into the pool supplying the Bachman WTP. Required infrastructure includes construction of a low head dam below the confluence of the West and Elm Forks of the Trinity River. The low head dam would be equipped with collapsible or low head gates to adjust the impoundment level and minimize or eliminate increased flood levels. Water would be allowed to flow upstream within the Elm Fork channel to Frasier dam. A low head pump station would pump from the backwater pool over the Frasier dam into Fishing Hole Lake for deliveries into Bachman WTP. The project would also include relocating the outfall of TRA's Central wastewater treatment plant to a point below the low head dam (about 17,000 LF of 108 inch pipe).

To integrate supplies delivered through the IPL and routed to Bachman WTP into DWU distribution system will eventually require a 150 MGD WTP expansion and other system improvements (However, based on planned WTP capacity expansions and projected growth in water demands, this 150 MGD expansion can be delayed until about 2050. Due to physical constraints at the Bachman WTP, an expansion of the Elm Fork WTP is envisioned. This is discussed in additional detail in Section 8 of this report.

Costs are shown in Table 7.5-3 for the portion of the IPL project that would deliver water from Joe Pool Lake to Bachman WTP and includes a 150 MGD Elm Fork WTP expansion. Other system integration costs for DWU which could include upsized or new pipelines and pump stations within DWU distribution system are not included in the cost estimate. The project costs for the portion of the IPL project that would deliver water from Joe Pool Lake to Bachman WTP total $502.8 million as shown on Table 7.5-3. The unit cost for this portion of the project is $474 per acft or $1.45 per 1,000 gallons. After debt service, the unit cost would decrease to $171 per acft or $0.53 per 1,000 gallons.

Total unit cost for both parts of the IPL as discussed above to deliver supplies from Lake Palestine to the Bachman WTP and expand the Elm Fork WTP is $1,225 per acft or $3.76 per 1,000 gallons. After debt service is retired unit costs will decrease to about $357 per acft or $1.10 per 1,000 gallons.

7.5.5 Permitting and Implementation Issues

The Integrated Pipeline project would pose several permitting challenges along with the typical challenges associated with a new project. A Section 404 permit from the USACE for impacts to a waterway from construction activities would be needed for the construction of the diversion facilities and pipeline. A 408 permit from the USACE may be required for construction activities near a levee. Water rights permits from TCEQ would be necessary to temporarily store water in the various reservoirs and new channel reservoir. Additionally, permits from TCEQ will be necessary to utilize the bed and banks of the various stream channels. These permits are summarized in Table 7.5-4.

There are several issues associated with conveying water through Joe Pool Lake that will require resolution including the right for Dallas to store water in the lake and operational issues. The conservation pool of Joe Pool Lake is owned by the U.S. Army Corps of Engineers (USACE) and is regulated by the USACE in coordination with the Trinity River Authority (TRA) under TRA's state water rights permit. Coordination will be necessary with the USACE and TRA to allow Dallas to temporarily store water in Joe Pool Lake.

For Dallas to store and transport water within the West and Elm Fork channels of the Trinity River, several permitting issues would need to be resolved. Approvals from the USACE would be needed to address potential impacts to levee structural integrity, flood impacts associated within the impounded water, and operation of the channel dam. Additionally a water rights permit from TCEQ would be necessary to temporarily store water in the new channel reservoir. The additional area of inundation in the Trinity River floodway inside the levee system under backwater conditions is estimated to include 235 acres.

Table 7.5-3. Cost Estimate Summary for Delivery of IPL water from Joe Pool area to Bachman WTP

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities
CAPITAL COST	
Low Head Channel Dam	$4,739,000
Pipeline (Relocate TRA Outfall)	$63,339,000
Low Head Pump Station at Frazier Dam	$2,327,000
Elm Fork Water Treatment Plant Expansion (150 MGD)	$298,809,000
TOTAL COST OF FACILITIES	**$369,214,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$126,058,000
Environmental & Archaeology Studies and Mitigation	$2,411,000
Land Acquisition and Surveying	$5,159,000
TOTAL COST OF PROJECT	**$502,842,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$34,598,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$177,000
Water Treatment Plant	$19,364,000
Pumping Energy Costs (kW-hr @ 0.08 $/kW-hr)	$20,000
TOTAL ANNUAL COST	**$54,159,000**
Available Project Yield (acft/yr)	**114,337**
Annual Cost of Water ($ per acft)	**$474**
Annual Cost of Water ($ per 1,000 gallons)	**$1.45**
Annual Cost of Water after Debt Service ($ per acft)	**$171**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.53**

Table 7.5-4. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right Permit	TCEQ	Required to store water in new channel reservoir and to use the bed and banks of affected streams and reservoirs to transfer water.
404	USACE	Required for construction activities in waters of the US.
408	USACE	Required for construction activities near a levee.

7.5.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict. The Lake Palestine IPL Project is susceptible to permitting risk particularly associated with delivery from Joe Pool Lake to the Bachman WTP.

However, several other delivery options have been identified that could help address the potential risks associated with delivery from Joe Pool Lake to Bachman WTP including constructing various pipeline segments to Bachman WTP. It is recommended that a follow-on study to the 2014 LRWSP be performed to determine the most feasible and cost effective option to deliver the IPL water to Bachman WTP as well as supplies from other strategies planned to be delivered to Dallas' western system.

7.5.7 Agricultural and Natural Resources

The project will impact an estimated 358 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils within 5 counties along the transmission pipeline route. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because these areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.5.8 References

Tarrant Regional Water District and City of Dallas. Integrated Pipeline Project Conceptual Design Operations Study Final Report. CDM Smith, April 20, 2012.

UNRMWA. Upper Neches River Water Supply Project Feasibility Study. HDR 2014.

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7.6 Upper Neches Project

In 2013 Dallas and the Upper Neches River Municipal Water Authority (UNRMWA) initiated the Upper Neches River Water Supply Project Feasibility Study (study) to evaluate options to replace the Fastrill Reservoir project that was rendered not feasible by the establishment of a US Fish & Wildlife Service (USFWS) wildlife refuge in the footprint of the reservoir. The study provided technical evaluations of a range of potential water supply strategies for an Upper Neches Project. These strategies include run-of-river diversion of unappropriated water from the upper Neches River operated conjunctively with tributary storage, groundwater, and/or system operations with Lake Palestine. Dallas and UNRMWA are long-term partners on Lake Palestine with their initial water sale contract being in place since 1972.

After considering the various strategy scenarios developed during the course of the study, Dallas decided the preferred Upper Neches Project would include run-of-river diversion of unappropriated streamflow from the Neches River operated conjunctively with Lake Palestine. This additional water supply would be used to supplement existing water supplies available to Dallas from Lake Palestine and potentially other UNRMWA customers.

The proposed integrated pipeline project (IPL) includes the construction of a new intake and pump station at Lake Palestine that is currently proposed to have an initial 150 MGD capacity to deliver Dallas' Lake Palestine supplies through the IPL. Dallas' existing contract with UNRMWA for Lake Palestine water is for an annual quantity of 114,337 acft/yr (102 MGD). Since the IPL will have a capacity of 150 MGD, the remaining capacity of approximately 48 MGD (or about 53,800 acft/yr) could be utilized by Dallas to deliver additional water from the Upper Neches Project.

7.6.1 Strategy Description

The selected Upper Neches Project strategy includes a new river intake and pump station for a run-of-river diversion from the Neches River near the SH 21 crossing. Water would be delivered through a 42-mile, 72-inch diameter pipeline to Dallas' pump station at Lake Palestine for delivery to Dallas through the IPL. Facilities include a small diversion dam on the Neches River, a river intake and pump station, and a transmission pipeline and booster pump station with delivery to the IPL pump station site near Lake Palestine (Figure 7.6-1).

7.6.2 Water Availability

The Upper Neches Project includes a run-of-river diversion from Neches River backed up by storage in Lake Palestine when streamflows are not available due to drought conditions, senior water rights calls, and/or TCEQ environmental flow restrictions. Water availability at this diversion point was computed based on a maximum diversion rate of 141 cfs (91 MGD). The firm yield for this strategy is about 42 MGD (47,250 acft/yr), assuming conjunctive system operations with Lake Palestine. This firm yield was calculated using the TCEQ's Neches River Basin Water Availability Model (Neches WAM) which covers the 1940 to 1996 timeframe.

Figure 7.6-1. Upper Neches Project

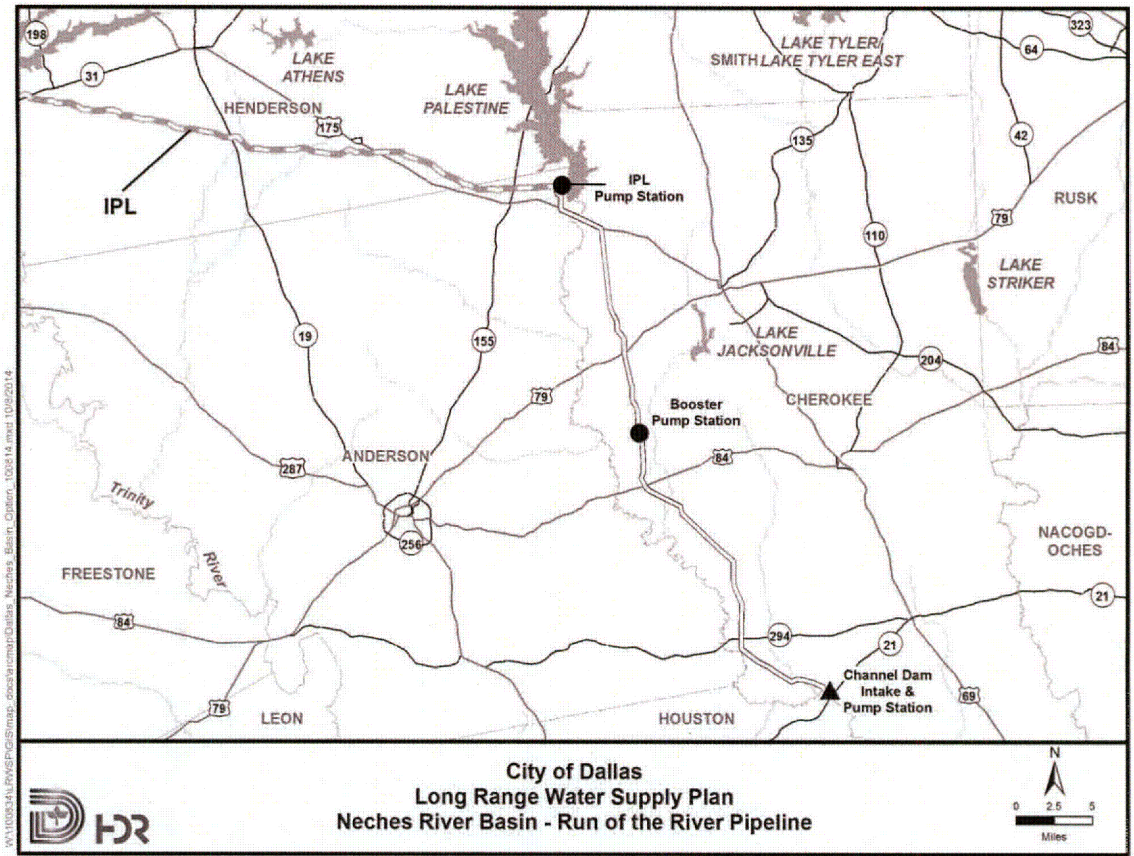


Figure 7.6-2 illustrates the percent of time that unappropriated water is available for diversion from the Neches River near SH 21 under a new appropriation. The transmission capacity of a 72-inch pipeline (~141 cfs or 91 MGD) is available about 47 percent of the time. Since the new run-of-river diversions will be interruptible, the firm yield associated with the Upper Neches Project is the incremental increase in the firm yield of Lake Palestine resulting from system operations of the new diversion and the existing reservoir. The resulting incremental system firm yield is 42 MGD (47,250 acft/yr).

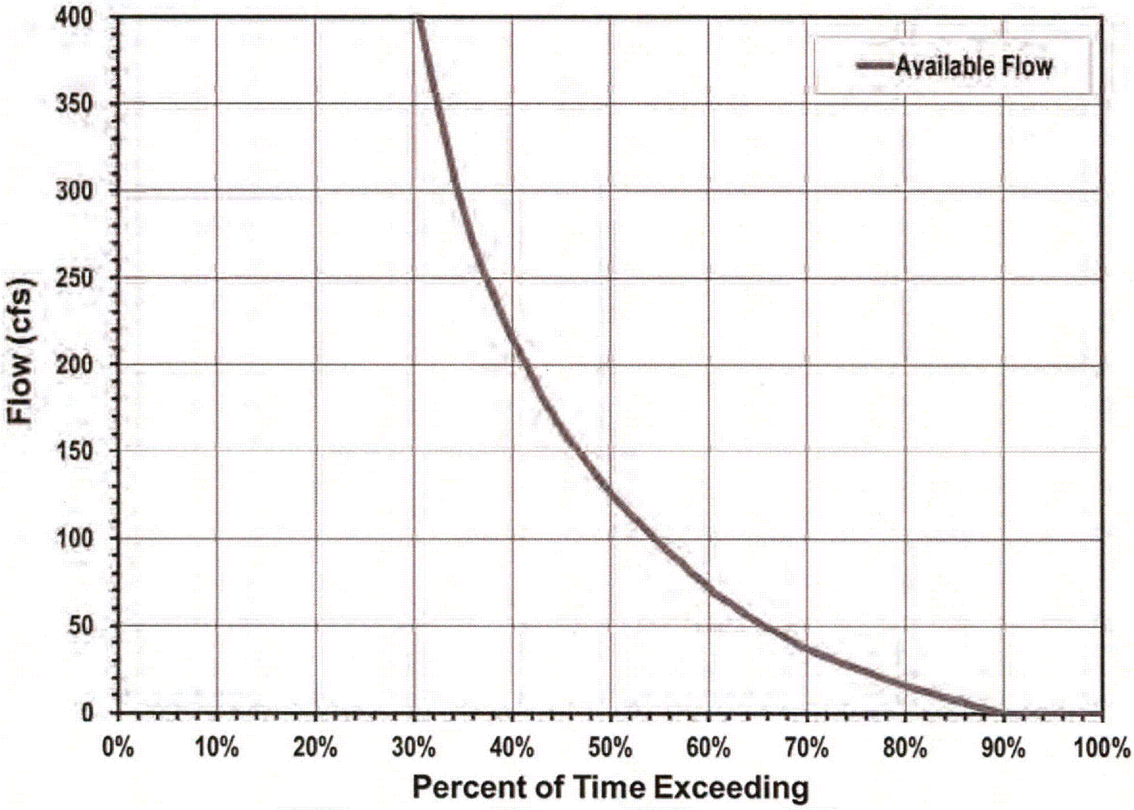
7.6.3 Environmental Issues

Table 7.6-1 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of these conditions and further study would be needed in any feasibility or permitting effort to address these potential concerns with the respective regulatory agencies.

Habitat

The vegetation near the river ranges from bald-cypress dominated swamps to mixed pine-hardwood stands depending on local river flooding and floodplain topography. River and transmission infrastructure would be located to avoid conflicts with the Neches River National Wildlife Refuge (NRNWR) and ecologically significant stream segments upstream of the proposed intake site. There is currently no designated critical habitat in the project area.

Figure 7.6-2. Streamflow Available for Diversion near SH 21



The proposed pipeline route will cross a Texas Parks and Wildlife Department designated ecologically significant stream segment, and areas of U.S. Fish and Wildlife Service (USFWS) Priority 1 bottomland hardwoods. A large portion of the pipeline route occurs within forested areas, but it also crosses areas of agricultural use including crops and pasture. Impacts to preferred habitats will be minimized by utilizing the agricultural areas which have been previously disturbed. Wooded riparian areas also commonly occur along and adjacent to stream and river areas that will be affected by the pipeline corridor. These areas are commonly utilized by many different species and would be avoided as much as reasonably possible. The pipeline route would also cross wetland areas which will be disturbed by construction activities. The use of best management practices (BMPs) during construction activities would help to minimize potential impacts to these areas.

However, specific project components such as pipelines generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats. As a result any impacts to existing habitat are anticipated to be low.

Environmental Water Needs

Implementation and operation of the Upper Neches Project will comply with TCEQ environmental flow standards and will leave adequate flows in the Neches River to sustain a healthy eco-system.

Bays and Estuaries

Similarly, the Upper Neches Project will have very limited effects on freshwater inflow to the Sabine Lake and Sabine Lake Estuary with long-term average freshwater inflows to the Sabine Lake Estuary being reduced less than 1.0 percent.

Threatened and Endangered Species

The species included in Table 7.6-1 represent all species federally or state listed as threatened or endangered, and federal candidate species in the counties for which the project will be located. The project area includes twenty six species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipeline to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area. The numbers of listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

Although a number of wetlands occur along the proposed pipeline corridor flexibility in the pipeline siting would be used to minimize or avoid potential impacts to the majority of these areas.

Table 7.6-1. Environmental Factors for Upper Neches Project

Environmental Factors	Comment(s)	Level of Concern
Habitat	No presence of critical or unique habitat in project area	Low
Environmental Water Needs	Minimal Impact	Low
Bays and Estuaries	Minimal Impact	Low
Threatened and Endangered Species	Minimal impact American peregrine falcon ST, bald eagle ST, Bachman's sparrow ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, white-faced ibis ST, whooping crane LE and SE, wood stork ST, creek chubsucker ST, paddlefish ST, black bear ST, Louisiana black bear, FT and ST, red wolf FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, Louisiana pine snake C and ST, northern scarlet snake ST, Neches River rose-mallow FT, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, and Texas pigtoe ST	Low
Wetlands	Minimal Impact	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered. ST = State Listed as Threatened. C = Candidate for Federal Listing

7.6.4 Planning Cost Estimate

The Upper Neches Project requires a channel dam and river intake facilities on the Neches River and a transmission pipeline with a booster pump station to deliver the supplies to the Lake Palestine IPL pump station. The channel dam will create a suitable pool depth near the intake and pump station to ensure submergence of the intake for reliable operations. Most of the length of this channel dam will function as an overflow spillway for passing inflows. The main channel of the Neches River near the intake location ranges between 85 and 200 feet wide.

The 141 cfs (91 MGD) intake and pump station will be located on the east side of the Neches River near SH 21. A 42 mile, 72-inch diameter transmission pipeline will deliver water to the IPL pump station site near Lake Palestine.

A summary of project and annual costs for the Neches run-of-river strategy with delivery to the Joe Pool area through the IPL is listed in Table 7.6-2. Total project costs are $226.8 million with energy costs for delivery of supplies through the IPL estimated to cost about $160,000 per MGD (or $143/acft-yr). Annual costs for the project assume a 30-year debt service with a 5.5 percent interest rate and are estimated to be $28,967,000 per year. The unit cost of water for this project to deliver water to the Joe Pool area (via the IPL) would be about $613 per acft or $1.88 per 1,000 gallons. After debt service, the unit cost of water is decreased to $283 per acft or $0.87 per 1,000 gallons.

7.6.5 Permitting and Implementation Issues

The Upper Neches Project would pose several permitting challenges along with the typical challenges associated with a new project. Similar to other new water projects in Texas, a surface water permit for the channel dam and river diversion from the Neches River would be required from TCEQ and would need to include an inter-basin transfer authorization. In addition to the surface water permit, a Section 404 permit from the USACE for impacts to a waterway from construction activities would be needed for the construction of the diversion facilities and pipeline. The potential permitting requirements are shown in Table 7.6-3.

7.6.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict. The Upper Neches Project is susceptible to performance risk associated with a worse drought of record. This is mitigated somewhat by the conjunctive system operation with Lake Palestine. However, a drought worse than the drought of record could impact the ability of this project to perform to the level presented in this section.

Alternative variations of this project have been identified that could help address the potential risks. In addition to the run of the river strategy described above which utilizes water stored in Lake Palestine to firm up the Neches run-of-the-river water, other alternative strategies were evaluated. One utilized a potential off channel reservoir (OCR) to firm up the run-of-the-river water and another used local groundwater from the Queen City, Carrizo and Wilcox aquifers to firm up run-of-the-river water. Additional information on these alternatives can be found in the Upper Neches River Water Supply Project Feasibility Study (HDR, 2014).

Table 7.6-2. Cost Estimate Summary for Upper Neches Project

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities
CAPITAL COST	
Intake, Pump Station and Channel Dam	$26,750,000
Transmission Pipeline	$118,007,000
Transmission Pump Station	$15,206,000
TOTAL COST OF FACILITIES	**$159,963,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$50,087,000
Environmental & Archaeology Studies and Mitigation	$1,086,000
Land Acquisition and Surveying (299 acres)	$817,000
Interest During Construction (4% for 2 years with a 1% ROI)	$14,837,000
TOTAL COST OF PROJECT	**$226,790,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$15,604,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$2,174,000
Pumping Energy Costs (kW-hr @ 0.08 $/kW-hr)	$4,439,000
Delivery through IPL ($160,000 per MGD)	$6,750,000
TOTAL ANNUAL COST	**$28,967,000**
Available Project Yield (acft/yr)	**47,250**
Annual Cost of Water ($ per acft)	**$613**
Annual Cost of Water ($ per 1,000 gallons)	**$1.88**
Annual Cost of Water after Debt Service ($ per acft)	**$283**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.87**

Table 7.6-3. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right Permit	TCEQ	Will require authorization for the channel dam, diversion of water and an inter-basin transfer to the Trinity Basin.
404	USACE	Required for construction activities in waters of the US.

7.6.7 Agricultural and Natural Resources

Construction activities associated with the project pipeline will impact an estimated 17 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because these areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.6.8 References

UNRMWA. Upper Neches River Water Supply Project Feasibility Study. HDR 2014.

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7.7 Lake Columbia

Lake Columbia is a proposed reservoir project (previously known as Lake Eastex) of the Angelina and Neches River Authority (ANRA) and is a recommended strategy in the 2011 East Texas Regional Water Plan (Region I RWP). ANRA has been granted a water right permit (Permit No. 4228) by the TCEQ to impound 195,500 acft in a new reservoir and to divert 76.3 MGD (85,507 acft/yr) for municipal and industrial purposes. ANRA estimates that after considering local needs, approximately 50 MGD of supply would be available to Dallas.

The reservoir would be connected to Dallas' western system via a pipeline from Lake Columbia to the proposed IPL pump station at Lake Palestine. Water would then be delivered to the Lake Joe Pool area via the IPL. As currently planned, Dallas' capacity in the IPL is 150 MGD and, after considering Dallas' Lake Palestine supply of 102 MGD, the IPL will initially have available excess capacity of about 48 MGD. Considering the potential for Dallas to manage pumping rates from both Lakes Palestine and Columbia, it is reasonable for Dallas to potentially contract for up to 50 MGD of supply from Lake Columbia. For purposes of this study, the assumption was made that Dallas will be responsible for 70 percent of the dam, reservoir land acquisition, and relocations, and the local entities involved in the project will be responsible for the remaining 30 percent of these costs. This cost split is subject to change during future negotiations between Dallas and ANRA.

7.7.1 Strategy Description

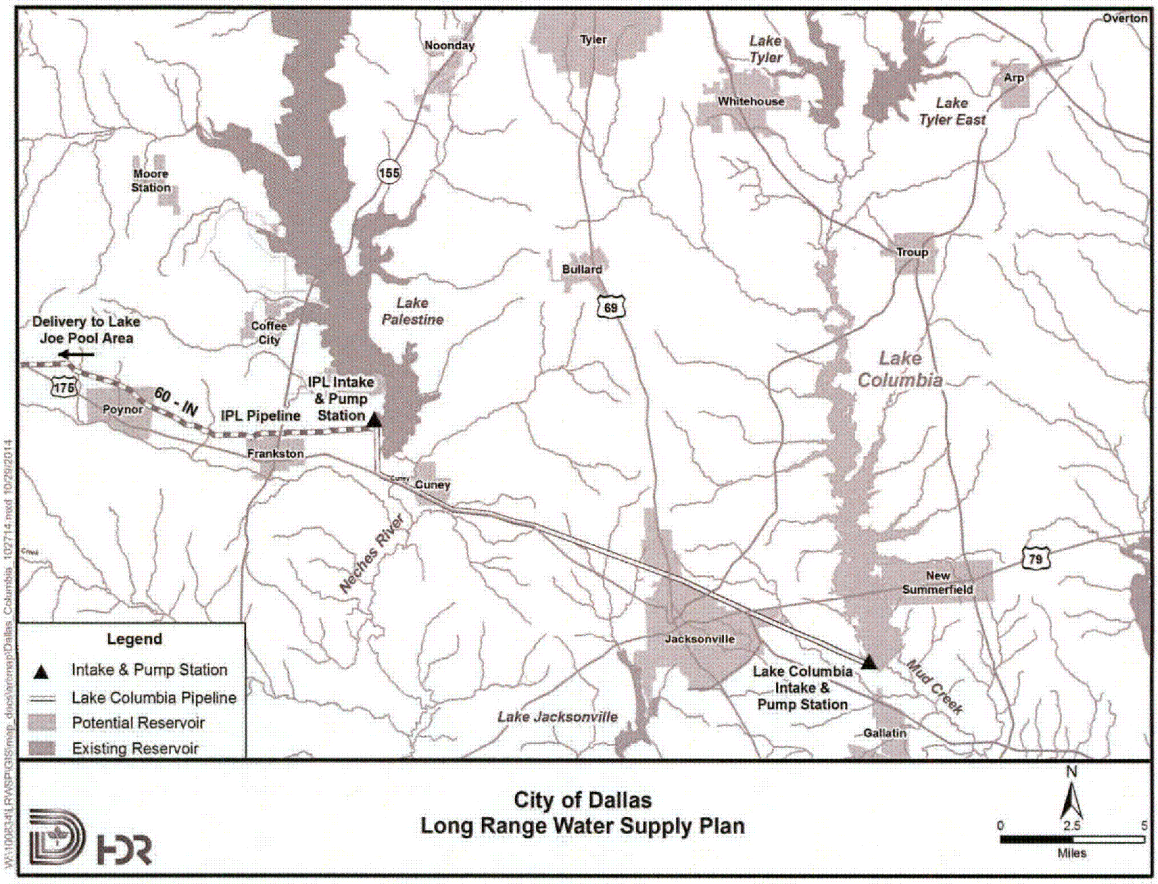
The Lake Columbia dam site is located on Mud Creek, approximately three miles downstream of U.S. Highway 79 in Cherokee County, Texas. Figure 7.7-1 provides the location of the project and the preliminary route of the 20 mile, 42-inch diameter pipeline to the proposed IPL pump station at Lake Palestine. The proposed dam site has a contributing drainage area of 384 square miles of which 107 square miles is controlled by the existing Tyler lakes in the upper portion of the watershed. At the authorized conservation pool capacity of 195,500 acft, Lake Columbia's conservation pool would have a water surface elevation of 315 ft-msl and inundate 10,133 acres with its flood pool affecting an additional 1,367 acres.

7.7.2 Water Availability

A water availability analysis was performed for Lake Columbia using streamflows from Dallas' Water Supply model for the 1907 to 2007 period as translated from the Lake Palestine watershed to the Lake Columbia watershed using a drainage area ratio. Reservoir pass-throughs for downstream senior water rights were conservatively estimated to be the 90th percentile of monthly historical pass-throughs occurring in the TCEQ Water Availability Model (WAM) from 1940 to 1996. Operations of the Tyler lakes were included in the water availability analysis considering their senior priority date to Lake Columbia and other authorized diversions.

Dallas does not anticipate connecting to Lake Columbia supplies until 2070 and therefore, for purposes of this study, yields for Lake Columbia were estimated using permitted storage and 2070 conditions for net evaporation considering a +7 degree

Figure 7.7-1. Lake Columbia Project



Fahrenheit (F) increase from historical conditions. Yields were calculated for four critical drought periods which include the 1908 drought, the 1950's drought, the 1960's drought, and the more recent 2006 drought. For Lake Columbia, the 1908, 1960's and 2006 droughts were all more severe than the 1950's drought.

Table 7.7-1 summarizes Lake Columbia firm yields for 2070 conditions for the four previous droughts and the resulting percentages considering Dallas' potential purchase of 50 MGD (56,000 acft/yr). For the 101 year period of record, the 1908 drought proved to be the critical drought for Lake Columbia. The results show that for 2070 conditions, the firm yield of Lake Columbia does not drop below Dallas' proposed contract amount of 50 MGD.

The 2011 Region I Water Plan estimates a firm yield supply of 67.5 MGD (75,700 acft/yr) for Lake Columbia which agrees closely to the 1950's firm yield calculated during this study of 67.3 MGD (75,400 acft/yr) as shown in Table 7.7-1.

Table 7.7-1. Lake Columbia Firm Yield Summary for 2020 Conditions

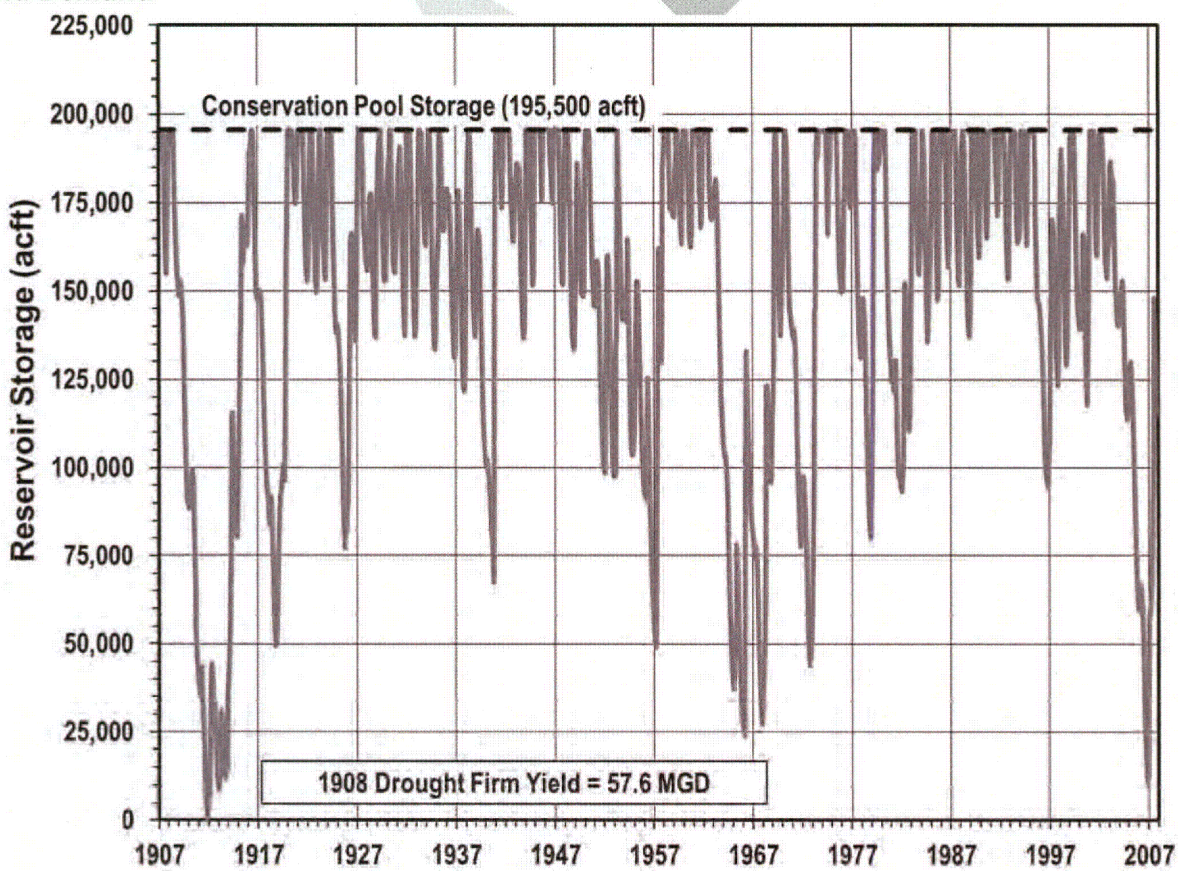
Units: MGD

Drought	Firm Yield 2070 Conditions[a]	DWU's Percentage of 2070 Firm Yield
1908	57.6	87%
1950s	67.3	74%
1960s	63.2	79%
2006	59.7	84%

[a]2070 firm yields assume permitted storage and +7°F increase in temperature.

Figure 7.7-2 presents the Lake Columbia storage trace for 2070 conditions under the 1908 firm yield demand of 57.6 MGD (64,600 acft/yr). The storage trace shows that the 1950's drought reservoir drawdown is less severe than the 1908, 1960s and 2006 droughts.

Figure 7.7-2. Lake Columbia Storage Trace for 2020 Conditions and 1908 Drought Firm Yield Demand



7.7.3 Environmental Issues

Table 7.7-2 provides a summary of known environmental factors that have previously been considered in the draft environmental impact study (EIS). These categories provide a general summary of these factors; further details pertaining to environmental issues will be available when the EIS is finalized by the U.S. Army Corps of Engineers (USACE).

Habitat

The footprint of Lake Columbia would affect approximately 5,751 acres of wetlands and 5,579 acres of bottomland hardwoods and includes a unique habitat area consisting of an herbaceous seepage bog. The proposed pipeline route will cross one Texas Parks and Wildlife Department designated ecologically significant stream segment. A portion of the pipeline route occurs within forested areas, but it also crosses areas of agricultural use including crops and pasture. Impacts to preferred habitats will be minimized by utilizing the agricultural areas which have been previously disturbed. Wooded riparian areas also commonly occur along and adjacent to stream and river areas that will be crossed by the pipeline corridor. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. The pipeline route will also cross wetland areas which will be disturbed by construction activities. The use of best management practices (BMPs) during construction activities will help to minimize potential impacts to these areas.

However, specific project components such as pipelines generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats.

Environmental Water Needs

Implementation and operation of the Lake Columbia project will comply with TCEQ Permit No. 4228 which does not currently require instream flow releases and the project could have a significant impact on daily flows on Mud Creek. For Dallas to import water supplies from Lake Columbia, an amendment to Permit No. 4228 would be required to allow the interbasin transfer of water to the Trinity River Basin and could make Lake Columbia subject to recently adopted TCEQ instream flow standards.

Bays and Estuaries

The Lake Columbia project will have a minimal effect on freshwater inflow to Sabine Lake and the Sabine Lake Estuary. Lake Columbia, as permitted, would have less than a 2 percent impact to inflows to Sabine Lake and the Sabine Lake Estuary. This impact would be further reduced if instream flow releases are required when Permit No. 4228 is amended for interbasin transfers.

Threatened and Endangered Species

The species included in Table 7.7-2 represent all species federally or state listed as threatened or endangered, and federal candidate species in the counties for which the project will be located. The project area includes twenty nine species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipeline to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the pipeline portion of the project area. The numbers of listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

The large footprint of the project will have significant impact to wetlands located in the area. Approximately 5,751 acres of wetlands are present in the reservoir footprint that will require mitigation before for the 404 permit is granted.

Although a number of wetlands occur along the proposed pipeline corridor, flexibility in the pipeline placement would be used to minimize or avoid potential impacts to the majority of these areas.

Table 7.7-2. Environmental Factors for Lake Columbia Project

Environmental Factors	Comment(s)	Level of Concern
Habitat	Unique habitat is located in project area (herbaceous seepage bog), habitat removed from reservoir area.	High
Environmental Water Needs	Medium Impact	Medium
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Low impact American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, red-cockaded woodpecker LE and SE, Sprague's pipit C, white-faced ibis ST, wood stork ST, creek chubsucker ST, blackside darter ST, paddlefish ST, black bear ST, Louisiana black bear, FT and ST, red wolf FE and SE, Rafinesque's big-eared bat ST, alligator snapping turtle ST, Louisiana pine snake C and ST, northern scarlet snake ST, Texas horned lizard ST, timber rattlesnake ST, earth fruit LT and ST, Neches River rose-mallow FT, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, and Texas pigtoe ST.	Low
Wetlands	5,751 acres of potential wetlands and 5,579 acres of potential bottomland hardwoods	High

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered. ST = State Listed as Threatened. C = Candidate for Federal Listing

7.7.4 Planning Cost Estimate

Table 7.7-3 provides a planning level cost estimate for Dallas' portion of the Lake Columbia project to deliver 50 MGD (56,000 acft/yr) to the Joe Pool area. This estimate is based on Dallas being responsible for 70 percent of the cost for the dam, relocations, and reservoir land acquisition and fully responsible for costs associated with transmission facilities.

Capital costs for the dam and relocations were extracted from the 2011 Region I RWP and updated to reflect September 2013 dollars. Included in the relocation costs are estimates for four state highways and one railway that would be impacted by the reservoir. Annual costs for the project assume a 30 year debt service with 5.5% interest rate.

Table 7.7-3. Cost Estimate Summary for Lake Columbia Project (Dallas' Share)

table units: September 2013 Dollars

Item	Estimated Cost for Dallas' Share of Facilities
CAPITAL COST	
Dallas Portion of Dam and Reservoir (70% of Total Dam and Reservoir Cost)	$33,711,000
Intake and Pump Station	$15,470,000
Transmission Pipeline	$42,531,000
Dallas Portion of Relocations (70% of Total Relocations Cost)	$68,328,000
TOTAL COST OF FACILITIES	**$160,040,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$53,888,000
Environmental & Archaeology Studies and Mitigation	$22,948,000
Land Acquisition and Surveying (8,176 acres)	$24,335,000
Interest During Construction (4% for 2 years with a 1% ROI)	$27,429,000
TOTAL COST OF PROJECT	**$288,640,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$19,860,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$812,000
Dam and Reservoir	$506,000
Pumping Energy Costs to IPL Pump Station (0.08 $/kW-hr)	$3,375,000
Delivery through IPL ($160,000 per MGD)	$7,996,000
TOTAL ANNUAL COST	**$32,549,000**
Available Project Yield (acft/yr)	**56,000**
Annual Cost of Water ($ per acft)	**$581**
Annual Cost of Water ($ per 1,000 gallons)	**$1.78**
Annual Cost of Water after Debt Service ($ per acft)	**$227**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.70**

Transmission costs include the transport of supplies to the IPL pump station at Lake Palestine via a 42-in pipeline and also include energy costs to deliver the water to the Joe Pool area through the IPL. These costs do not include treatment and distribution costs once the water is delivered to the Joe Pool area. It was assumed that Dallas would be responsible for 70 percent of the operation and maintenance of the dam and fully responsible for operation and maintenance costs of the transmission facilities.

An annual cost of $32.5 million is estimated to deliver 50 MGD of supplies from Lake Columbia at a unit cost of $581 per acft or $1.78 per 1,000 gallons. After the debt service is retired, the unit cost of water would be reduced to $227 per acft or $0.70 per 1,000 gallons.

7.7.5 Permitting and Implementation Issues

In January 2010, ANRA released a draft EIS for Lake Columbia. The EIS underwent public comment in the first half of 2010. Currently, the Lake Columbia project is subject to completion of the EIS and issuance of the §404 permit from the U. S. Army Corps of Engineers, as well as completion of a Source Water Assessment. According to the April 27, 2011 statement from USACE, a new Draft EIS is necessary before a new EIS can be finalized. The consideration of the Draft EIS by USACE will likely involve additional studies and compliance with the USACE Mitigation Manual. The potential permitting requirements are shown in Table 7.7-4.

At this time, the proposed Lake Columbia project is in the Pre-Construction Phase, and has several potential local participants. According to the ANRA, those participating in the Pre-Construction Phase will have a right of first refusal to enter into contracts for the next phases of construction and operation of Lake Columbia. At this time, the Texas Water Development Board is a 47% participant with a right of first refusal to 35.9 MGD (40,188 acft/yr) of supplies. The Construction Phase is scheduled to begin after the issuance of the §404 Permit from the U. S. Army Corp of Engineers.

Permit No. 4228 granted by the TCEQ does not include the right to use Lake Columbia supplies outside of the Neches River basin. If Dallas were to participate in the Lake Columbia project, an interbasin transfer (IBT) amendment would be necessary. If ANRA amends the Lake Columbia permit to authorize an IBT from the Neches to the Trinity River Basin, then the authorized diversion of 76.3 MGD (85,507 acft/yr) of Lake Columbia could be subject to the environmental flow standards of Texas Administrative Code, Chapter 298, Subchapter C. These standards in combination with the requirements to mitigate environmental impacts associated with the completion of the EIS and the issuance of the Section 404 permit, would likely result in a reduction in the yield of Lake Columbia. .

Table 7.7-4. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right Permit Amendment	TCEQ	Requires an inter-basin transfer authorization for Dallas to transport and use the water in the Trinity River Basin.
404	USACE	Required for construction activities in waters of the US and will require completion of the current EIS process.

7.7.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict. The Lake Columbia Project is susceptible to performance risk associated with a worse drought of record, storage losses from sedimentation and potential future increases in temperature resulting in increased reservoir evaporation.

Permitting and mitigation risks are considered high for the Lake Columbia project. The challenges associated with finalizing the EIS and obtaining the 404 permit along with the likelihood of additional environmental flow requirements being imposed as a result of the IBT amendment to the existing TCEQ permit, results in a relatively high degree of risk for a project participant located outside of the Neches River basin, such as Dallas, to participate in the project.

7.7.7 Agricultural and Natural Resources

Lake Columbia would permanently impact an estimated 124 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. This represents less than 1 percent of the total prime farmland soils found in the project counties. Construction activities associated with the project pipeline would impact an additional 9 acres of prime farmland soils. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because the pipeline areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.7.8 References

Dallas Water Utilities. Dallas LRWSP. Lake Columbia Due Diligence, HDR 2013.

Dallas Water Utilities. Dallas LRWSP. Lake Columbia Due Diligence – Water Right Permitting Issues, Webb & Webb 2013.

7.8 Direct Non-Potable Reuse

In recent years, DWU has developed plans to reclaim wastewater and reuse this water source for direct non-potable and indirect potable purposes. The use of reclaimed water has become a key strategy in meeting the City's future water demands. Direct reuse is the conveyance of treated effluent from a wastewater treatment facility directly to a water user via pipelines, storage tanks, and other infrastructure for beneficial use. Potential users of future direct non-potable reuse in the City include parks, golf courses, and landscaping at multi-family residential facilities, commercial, and education facilities. Potential industrial uses of reclaimed water may include cooling water, process water, and general washdown water.

The City currently owns and operates one direct non-potable reclaimed water system known as the Cedar Crest Pipeline which delivers reclaimed water to multiple customers in the Cedar Crest Service Area. Plans are also in the development phase to potentially provide a demand of 60 MGD to the Trinity River Corridor Project (TRCP) for direct non-potable reuse to recreational lakes to be located in the Trinity River floodplain. In addition, the City has evaluated proposed projects that could provide additional recycled water to the TRCP and nearby downtown area.

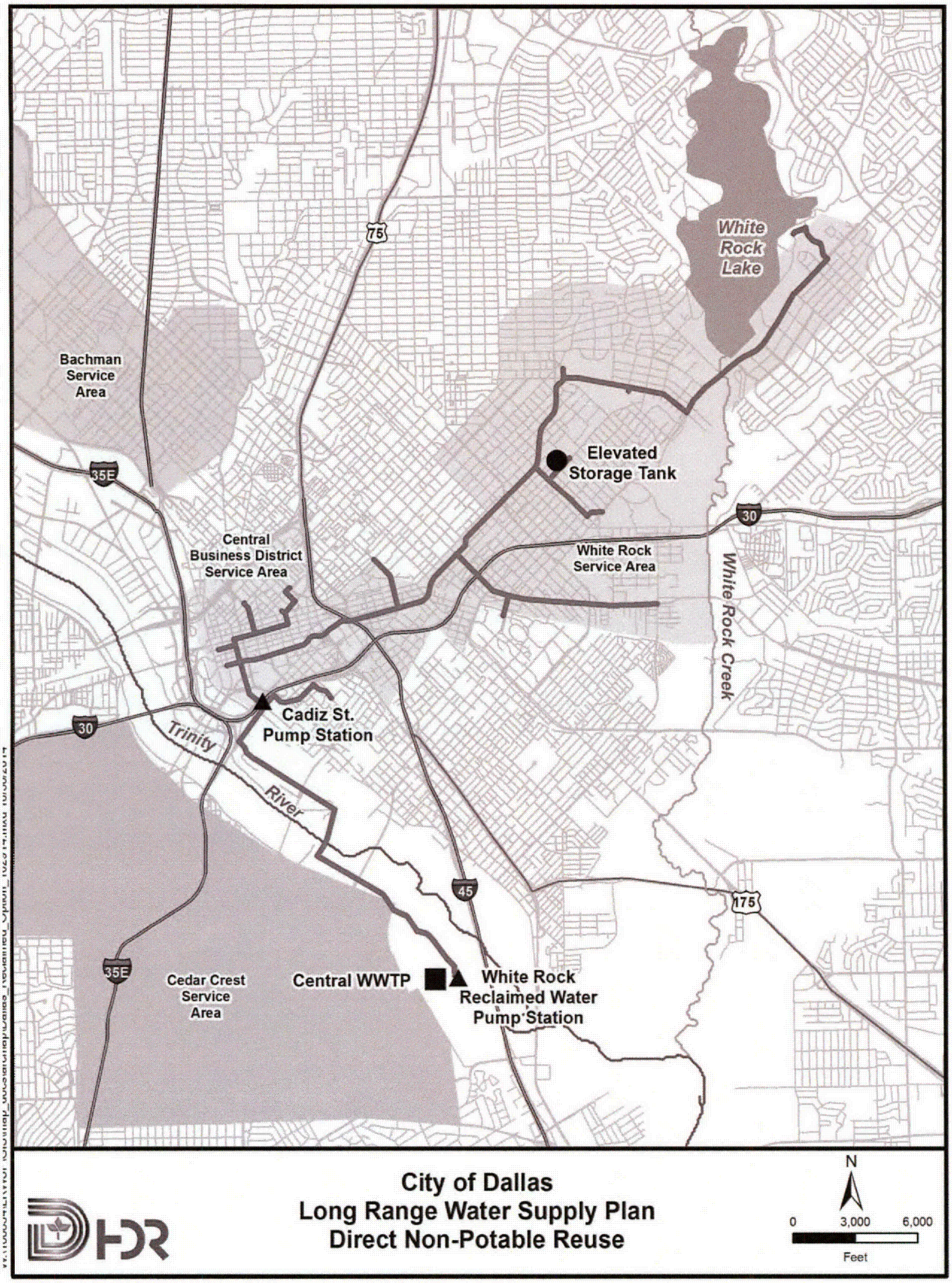
7.8.1 Strategy Description

The Direct Non-potable Reuse Project includes providing reclaimed water from Dallas' Central Wastewater Treatment Plant (CWWTP) to both the Central Business District (CBD) and the White Rock Service Areas (Figure 7.8-1). The system layout maximizes potential customers and associated demands for reclaimed water. Demands are estimated at 2.23 MGD with a 3.0 peaking factor. The CBD Service Area, generally known as Downtown Dallas, is the area bounded to the north by Woodall Rodgers Parkway, to the south by I-30, and the west and east by I-35 and I-45, respectively. Potential reclaimed water users is this area include a number of hotels, office buildings, city parks, and commercial developments. The White Rock Service Area includes the area from White Rock Lake to the CBD. Potential reclaimed water users in this area include the Dallas Arboretum, Lakewood Towers, Baylor Healthcare, Lakewood Country Club, Schepps, Fair Park, Randall Park, and Samuel Grand Park.

Recycled water from the CWWTP will be pumped from a proposed White Rock Reclaimed Water Pump Station through an existing 60-inch forcemain which will require some improvements. The existing forcemain terminates at the Cadiz Street Pump Station where a connection will be made to the CBD Service Area Pipeline.

To serve the CBD area, a connection to the existing 60-inch line at Cadiz Street Pump Station would be made. Nearly 12 miles of new reclaimed water pipeline will be required. In addition a 500,000 gallon elevated storage tank will be required to sustain system pressures.

Figure 7.8-1. Strategy for Direct Non-Potable Reuse



7.8.2 Water Availability

DWU owns and operates two WWTPs that serve the City of Dallas and eleven wholesale wastewater customer cities. The CWWTP is permitted to produce Type I and Type II reclaimed water and is located on the west bank of the Elm Fork of the Trinity River, four miles south of downtown. The annual average flow permitted capacity of CWWTP is 150 MGD and the permitted peak-hour flow is 350 MGD. Under Dallas' existing water rights there is sufficient water available from the CWWTP to supply this reuse strategy.

7.8.3 Environmental Issues

Table 7.8-1 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of these conditions; further detailed studies would need to be performed during permitting to address these potential concerns with the respective regulatory agencies.

Habitat

Because the project area is within a highly urbanized area it is unlikely that this project would adversely affect any listed threatened and endangered species in Dallas County. In addition there is no designated critical habitat within the vicinity of the project.

Environmental Water Needs

Implementation and operation of the Direct Non-Potable Reuse Project relies on the use of previously permitted return flows and will leave adequate flows in the Trinity River to meet required TCEQ environmental flow requirements.

Bays and Estuaries

Similarly, since the Direct Non-Potable Reuse Project relies on the use of previously permitted return flows, it will have very limited effects on freshwater inflow to the Trinity Bay.

Threatened and Endangered Species

The species included in Table 7.8-1 represent all species federally or state listed as threatened or endangered, and federal candidate species in the county for which the project will be located. The project area includes sixteen species that meet these criteria. Due to the limited amount of disturbance associated with this project and the disturbed nature of the habitat that is contained, no impacts to any of these species are anticipated. The listed species are not expected to be a significant challenge that could render the project not feasible.

Wetlands

Possible wetlands may be located along the area of the Trinity River, however it is likely the project could be sited in a way to minimize these potential impacts or avoid them altogether.

Table 7.8-1. Environmental Factors for Non-Potable Direct Reuse

Environmental Factors	Comment(s)	Level of Concern
Habitat	No designated critical habitat in project area. Area highly urbanized.	Low
Environmental Water Needs	Minimal Impact	Low
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Minimal impact American peregrine falcon ST, bald eagle ST, black-capped vireo FE and SE, golden-cheeked warbler FE and SE, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, white-faced ibis ST, whooping crane FE and SE, wood stork ST, Texas heelsplitter ST, Texas pigtoe ST, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST.	Low
Wetlands	Minimal Impact	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered. ST = State Listed as Threatened. C = Candidate for Federal Listing

7.8.4 Planning Cost Estimate

Required infrastructure will include 12 miles of new reclaimed water pipeline, construction costs to slip line the existing 60-inch diameter forcemain, a new pump station and an elevated storage tank. The new pump station would consist of three vertical turbine pumps discharging into a common header connected to the slip lined 54-inch forcemain.

A summary of project and annual costs for the Direct Non-Potable Reuse strategy is listed in Table 7.8-2. Total project costs are $36.6 million. Considering that up to 25% of the project could be funded by the Bureau of Reclamation, Dallas' portion of the total project cost is $27.4 million. Dallas annual costs for the project assume a 30-year debt service with a 5.5 percent interest rate and delivery of 2.2 MGD are estimated to be $1,828,000 per year. The unit cost of water for this project would be about $731 per acft or $2.24/1,000 gallons. After debt service is retired, the unit cost of water is decreased to $102 per acft or $0.31/1,000 gallons.

Table 7.8-2. Cost Estimate Summary for Non-Potable Reuse

Table Units: September 2013 Dollars

Item	Estimated Cost for Facilities[a]
CAPITAL COST	
Mobilization	$1,194,000
Transmission Pipeline	$8,257,000
Transmission Pipeline (30 in dia., 54 in dia., Slipline Pipe)	$10,938,000
Transmission Pump Station	$3,446,000
Elevated Storage Tank	$1,592,000
TOTAL COST OF FACILITIES	**$25,427,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$11,151,000
Bureau of Reclamation Funding (25% of total project cost)	($9,145,000)
TOTAL COST OF PROJECT	**$27,433,000**
ANNUAL COST	
Debt Service (4 percent, 30 years)	$1,572,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$203,000
Pumping Energy Costs (kW-hr @ 0.08 $/kW-hr)	$53,000
TOTAL ANNUAL COST	**$1,828,000**
Available Project Yield (acft/yr)	**2,501**
Annual Cost of Water ($ per acft)	**$731**
Annual Cost of Water ($ per 1,000 gallons)	**$2.24**
Annual Cost of Water after Debt Service ($ per acft)	**$102**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.31**

[a]Costs are direct from the December 2013 DWU Feasibility Study and are not based on the TWDB costing tool

7.8.5 Permitting and Implementation Issues

The CWWTP is permitted to produce Type I and Type II reclaimed water and is permitted by TCEQ to convey and distribute reclaimed water to its customers (Authorization No. R10030-001). Reclaimed water facilities must be designed and constructed in accordance with TCEQ criteria and monitored so as to assure compliance with water quality standards, to promote beneficial use of reclaimed water, and to provide adequate notice to users and the public. Reclaimed water permits also require approval of facilities, and of contracts for beneficial use between the users and the providers.

Additionally, any pipeline crossings associated with waters of the United States will need to be considered in the Section 404 permitting process. The potential permitting requirements are shown in Table 7.8-3.

Table 7.8-3. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
210	TCEQ	Required to reuse domestic wastewater.
404	USACE	Required for construction activities in waters of the US.

7.8.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can include permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict. The Direct Non-Potable Reuse Project is susceptible to performance risks associated with public perception affecting customer demand for project and distribution system challenges.

The proposed service areas are all highly developed areas which will create challenges getting easements and will create impacts to business and street traffic during construction The CBD, in general, will be difficult and expensive for utility construction and careful consideration of feasibility and the demand for reclaimed water in downtown should be made before making the commitment to invest in infrastructure to deliver reclaimed water to the area.

7.8.7 Agricultural and Natural Resources

The project will not impact any prime farmland in Dallas County. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

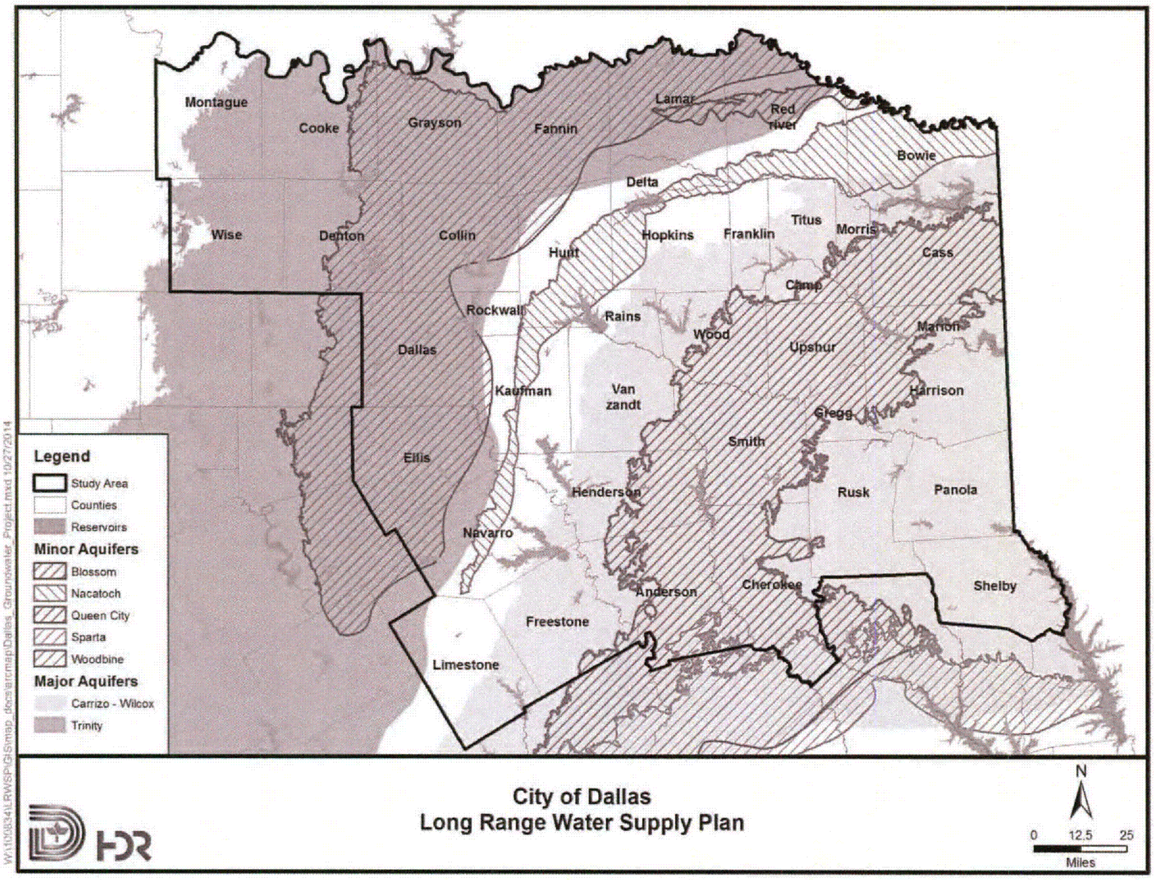
7.8.8 References

Dallas Water Utilities. Dallas Reclaimed Water Delivery System Feasibility Study, HDR 2013.

7.9 Carrizo-Wilcox Groundwater

Based on current and future estimates of groundwater use within Wood, Upshur and Smith counties (Figure 7.9-1) there is significant available groundwater with good water quality that could be developed by Dallas to meet long term water demands. An initial estimate of potentially available groundwater was determined by comparing projected groundwater demands in these counties to modeled available groundwater (MAG) amounts developed by the TWDB for each county. The results of that analysis indicated that up to 92 MGD (102,930 acft/yr) of groundwater is potentially available for development in the Carrizo-Wilcox and the Queen City aquifers in the three counties. These counties are located east of Lake Fork where Dallas has recently installed the new Lake Fork Pump Station and transmission system which has the capacity to transfer 212 MGD to the Lake Tawakoni area. Considering that the estimated 2070 firm yield of Lake Fork available to Dallas is about 90 MGD, there is currently about 122 MGD of available capacity for additional water supplies in the Lake Fork transmission system. Additionally, after the planned 144 inch diameter pipeline from Lake Tawakoni to the Eastside WTP is constructed, this pipeline segment will have an available excess capacity of 216 MGD.

Figure 7.9-1. Major and Minor Aquifers Evaluated



7.9.1 Strategy Description

The Carrizo-Wilcox Groundwater strategy (Groundwater project) will provide 27 MGD (30,000 acft/yr) of new supply using new well fields in Wood, Upshur and Smith counties. Many of the wells will be co-located on the same site to produce groundwater from both the Carrizo-Wilcox and Queen City aquifers.

The Carrizo Formation is composed of relatively permeable sandstone about 100 to 200 feet thick. The underlying Wilcox Group has a maximum thickness of about 1,000 feet and consists of a sequence of interbedded sand, silt, clay, and some lignite. Well yields for the Carrizo Formation and Wilcox Group are estimated to average 450 gpm (0.65 MGD) per well with well depths in the study area ranging between 500 and 1,100 feet. The water quality in the Carrizo and Wilcox is very good.

The Queen City Aquifer is composed of fluvial to deltaic sand deposits which outcrop over much of the area, which means a thinner saturated thickness and a reduction in well yields. Well yields for the Queen City aquifer are estimated to average 150 gpm (0.22 MGD) with typical well depths in the study area ranging between 200 and 400 feet. Water quality in the Queen City wells may have high Iron and Manganese concentrations but considering that this water will be blended with other supplies, this is not a significant concern.

Figure 7.9-2. Groundwater Project

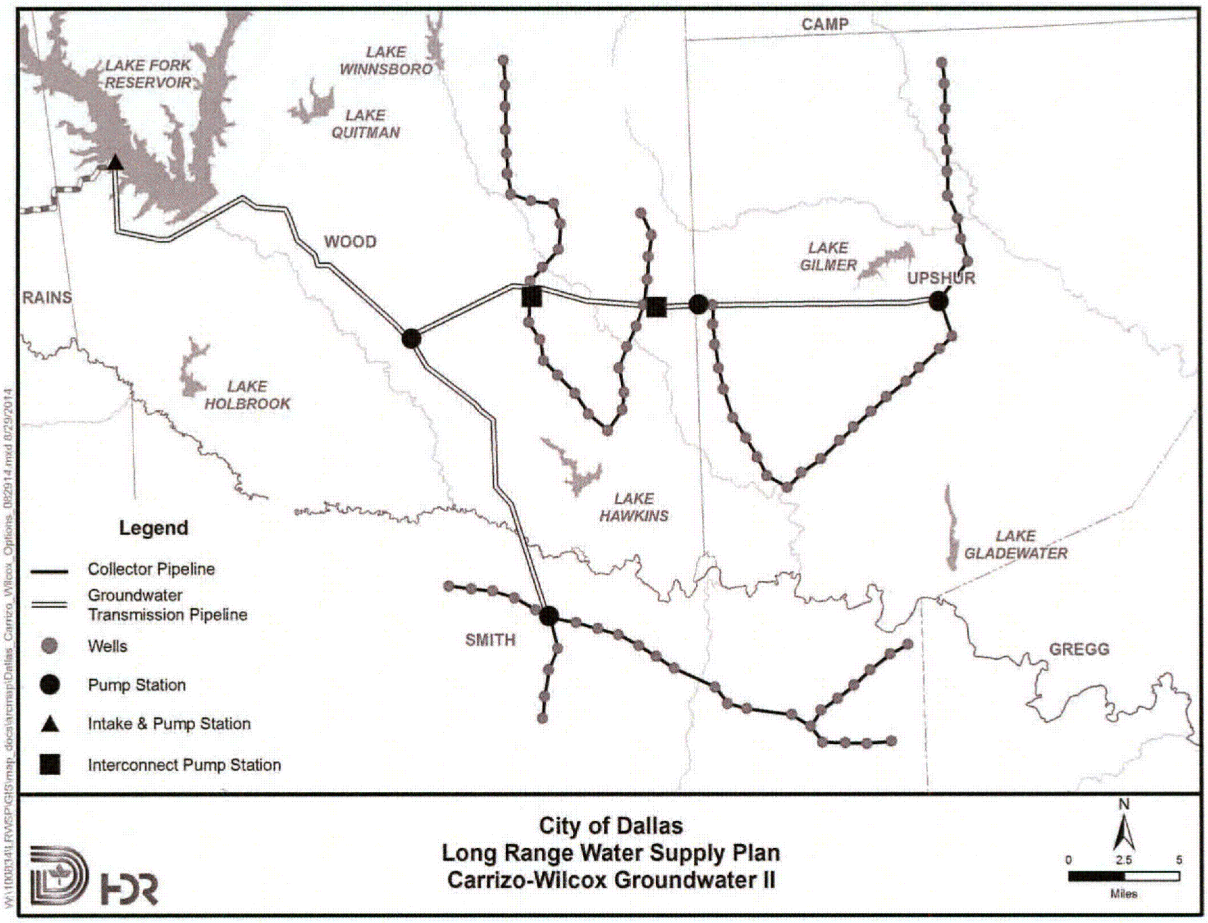


Figure 7.9-2 provides the locations of the well fields, transmission pipelines and pump stations for this strategy. The well fields have a combined maximum pumping capacity of 27 MGD (30,000 acft/yr). Groundwater from the well fields is pumped through a 58 mile transmission system to the existing intake and pump station at Lake Fork (Figure 7.9-2). The Lake Fork and Tawakoni transmission pipelines will be used to convey supplies from this strategy to DWU's Eastside WTP.

7.9.2 Water Availability

Available groundwater in the Carrizo-Wilcox and Queen City aquifers was estimated in Smith, Upshur and Wood counties after comparing current and future estimated groundwater demands with the modeled available groundwater (MAG) amounts for each county as estimated by the TWDB. Table 7.9-1 summarizes groundwater availability for each aquifer by county and shows that up to 102,930 acft/yr (92 MGD) of groundwater is potentially available.

Table 7.9-1. Target Counties and Available Groundwater

County	Available Queen City Groundwater (acft/yr)	Available Carrizo-Wilcox Groundwater (acft/yr)	Total Available Groundwater (acft/yr)
Smith	52,136	0	52,136
Upshur	24,480	2,206	26,689
Wood	9,845	14,260	24,105

A Groundwater Availability Model (GAM) was used to calculate aquifer response to the proposed groundwater project. The GAM was initially used to simulate future groundwater pumping by local entities without DWU's demand. This simulation was used to establish a baseline to compare against a second scenario that included both local and DWU pumping. Based on a comparison of these modeling scenarios, it was determined that up to 27 MGD (30,000 acft/yr) could be developed by DWU in these three counties with groundwater level declines of not much more than 100 feet. This level of development represents about 29% of the total available groundwater for these aquifers in these three counties.

Table 7.9-2 includes a summary of production from the three aquifers by county for the 27 MGD (30,000 acft/yr) Groundwater project. The Queen City aquifer will provide 60 percent of the total production and remaining 40 percent would be pumped from the Carrizo-Wilcox Aquifer.

Table 7.9-2. Production for Groundwater Project

Aquifer	Smith (acft/yr)	Wood (acft/yr)	Upshur (acft/yr)	Total (acft/yr)
Queen City	6,000	6,000	6,000	18,000
Carrizo	0	6,000	0	6,000
Wilcox	0	6,000	0	6,000
TOTAL	**6,000**	**18,000**	**6,000**	**30,000**

7.9.3 Environmental Issues

Table 7.9-3 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of these conditions; further study would be included in any feasibility or permitting efforts to address these potential concerns with the respective regulatory agencies.

Habitat

The well fields and transmission infrastructure would be located to avoid conflicts with environmentally sensitive areas when feasible. Although, not finalized, the proposed transmission pipeline route would cross sections of the Old Sabine Bottom Wildlife Management Area and Little Sandy National Wildlife Refuge, one Texas Parks and Wildlife Department designated ecologically significant stream segment, and areas of U.S. Fish and Wildlife Service (USFWS) Priority 1 and 2 bottomland hardwoods. The majority of the pipeline route occurs within post oak and pine forested areas, but it also crosses areas of agricultural use including crops and pasture. Impacts to preferred habitats will be minimized by utilizing the agricultural areas which have been previously disturbed. Wooded riparian areas also commonly occur along and adjacent to stream and river areas that will be crossed by the pipeline corridor. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. The pipeline route will also cross wetland areas which will be disturbed by construction activities. The use of best management practices (BMPs) during construction activities will help to minimize potential impacts to these areas. Collector pipelines, pump stations and well areas do not present a substantial impact to existing habitat due to their small areas of disturbance.

Specific project components such as pipelines and wells generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats. As a result any impacts to existing habitat are anticipated to be medium to low.

Environmental Water Needs

Implementation and operation of the Groundwater Project will not have any impact to stream flows as the source of supply is groundwater.

Bays and Estuaries

Similarly, the Groundwater Project will not have any impact on freshwater inflow to the Sabine Lake and Sabine Lake Estuary.

Threatened and Endangered Species

The species included in Table 7.9-3 represent all species federally or state listed as threatened or endangered, and federal candidate species in the counties for which the project will be located. The project area includes twenty six species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipelines and wells to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area. The numbers of listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

Although a number of wetlands occur along the proposed pipeline corridors and wellfield areas, flexibility in the pipeline and well siting would be used to minimize or avoid potential impacts to the majority of these areas.

Table 7.9-3. Environmental Factors for Groundwater Project

Environmental Factors	Comment(s)	Level of Concern
Habitat	No designated critical habitat in project area. Includes areas of bottomland hardwoods.	Low
Environmental Water Needs	Minimal Impact	Low
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Low impact American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, wood stork ST, creek chubsucker ST, blackside darter ST, bluehead shiner ST, paddlefish ST, black bear ST, Louisiana black bear, FT and ST, red wolf FE and SE, Rafinesque's big-eared bat ST, alligator snapping turtle ST, Louisiana pine snake C and ST, northern scarlet snake ST, Texas horned lizard ST, timber rattlesnake ST, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, and Texas pigtoe ST.	Low
Wetlands	Minimal Impact	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered.
ST = State Listed as Threatened. C = Candidate for Federal Listing

7.9.4 Planning Cost Estimate

The Groundwater project requires several wellfields as shown in Figure 7.9-2. These wellfields include 90 Queen City wells, 10 Carrizo wells and 10 Wilcox wells. Delivery of water from the wellfields to the Lake Fork pump station requires 58-miles of pipeline ranging in diameter between 18 and 42 inches. Two interconnect pump stations are located along the transmission line to deliver Wood County groundwater with several additional booster stations required to deliver groundwater to the Lake Fork Pump Station.

A summary of total project and annual costs for this strategy with delivery to the Eastside WTP is listed in Table 7.9-4. Total project costs are $161.1 million with energy costs for delivery of supplies through DWU's East Side Transmission system estimated at $60,000 per MGD (or $54/acft-yr). Annual costs for the project total $17,606,000 and assume a 30-year debt service with a 5.5 percent interest rate. Groundwater leases are estimated to be $1,500,000 per year or $50 per acft. The unit cost of water for this project would be about $587 per acft or $1.80 per 1,000 gallons. After debt service, the unit cost of water is decreased to $217 per acft or $0.67 per 1,000 gallons.

Table 7.9-4. Cost Estimate Summary for Groundwater Project

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities
CAPITAL COST	
Transmission Pipeline	$57,078,000
Transmission Pump Station(s) & Storage Tank(s)	$15,605,000
Wellfield (Wells, Pumps and Piping)	$37,212,000
TOTAL COST OF FACILITIES	**$109,895,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$35,609,000
Environmental & Archaeology Studies and Mitigation	$3,858,000
Land Acquisition and Surveying (435)	$1,164,000
Interest During Construction (4% for 2 years with a 1% ROI)	$10,537,000
TOTAL COST OF PROJECT	**$161,063,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$11,082,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$1,287,000
Pumping Energy Costs (kW-hr @ 0.08 $/kW-hr)	$2,130,000
Delivery through Eastside Supply Pipeline ($60,000 per MGD)	$1,607,000
Groundwater Leases (30,000 acft @ $50/acft)	$1,500,000
TOTAL ANNUAL COST	**$17,606,000**
Available Project Yield (acft/yr)	**30,000**
Annual Cost of Water ($ per acft)	**$587**
Annual Cost of Water ($ per 1,000 gallons)	**$1.80**
Annual Cost of Water after Debt Service ($ per acft)	**$217**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.67**

7.9.5 Permitting and Implementation Issues

Currently, there are no local groundwater conservation districts in the three counties and consequently no pumping permits would be required. To pump the groundwater, DWU would need to either purchase the land for the wells or enter into lease agreements with land owners to construct wells and access the groundwater.

A Section 404 permit from the USACE for impacts to a waterway from construction activities would be needed for the construction of the transmission facilities, Table 7.9-5.

Table 7.9-5. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
404	USACE	Required for construction activities in waters of the US.

7.9.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and / or risks associated with various types of conflict.

The biggest challenge to groundwater development is the relatively low well yields of the Queen City aquifer where groundwater is available. The low well yields require a large number of wells to be drilled and maintained to recover a relatively small amount of groundwater. Further, required spacing of the large number of wells to minimize long-term interference between wells creates the need for long conveyance pipelines.

Without a groundwater conservation district, the rule of capture applies and there is not a regulatory framework to protect financial investment of a well producer. However, it is likely that if DWU were to move forward with the Groundwater Project, that one or more groundwater districts would be created that could potentially limit the amount of groundwater that an entity like DWU would be allowed to develop and export.

7.9.7 Agricultural and Natural Resources

Construction activities associated with the project transmission pipeline will impact an estimated 85 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because these areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.9.8 References

Broom, M. E., Ground-Water Resources of Wood County, Texas, prepared by the U.S. Geological Survey (USGS) Texas in cooperation with the Texas Water Development Board, TWDB Report 79, August 1968.

Broom, M. E., Ground-Water Resources of Gregg and Upshur Counties, prepared by the U.S. Geological Survey (USGS) Texas in cooperation with the Texas Water Development Board, TWDB Report 101, October 1969.

Dillard, Joe W., Availability and Quality of Ground Water in Smith County, Texas, Texas Water Commission in cooperation with the Tyler Chamber of Commerce, May 1963.

Intera Incorporated (Intera), Groundwater Availability Models for the Queen City and Sparta Aquifers, October 2004.

Intera Incorporated (Intera) and Parsons, Final Report, Groundwater Availability Model for the Carrizo-Wilcox, prepared for the Texas Water Development Board, January 31, 2003.

7.10 Sabine Conjunctive Use Project

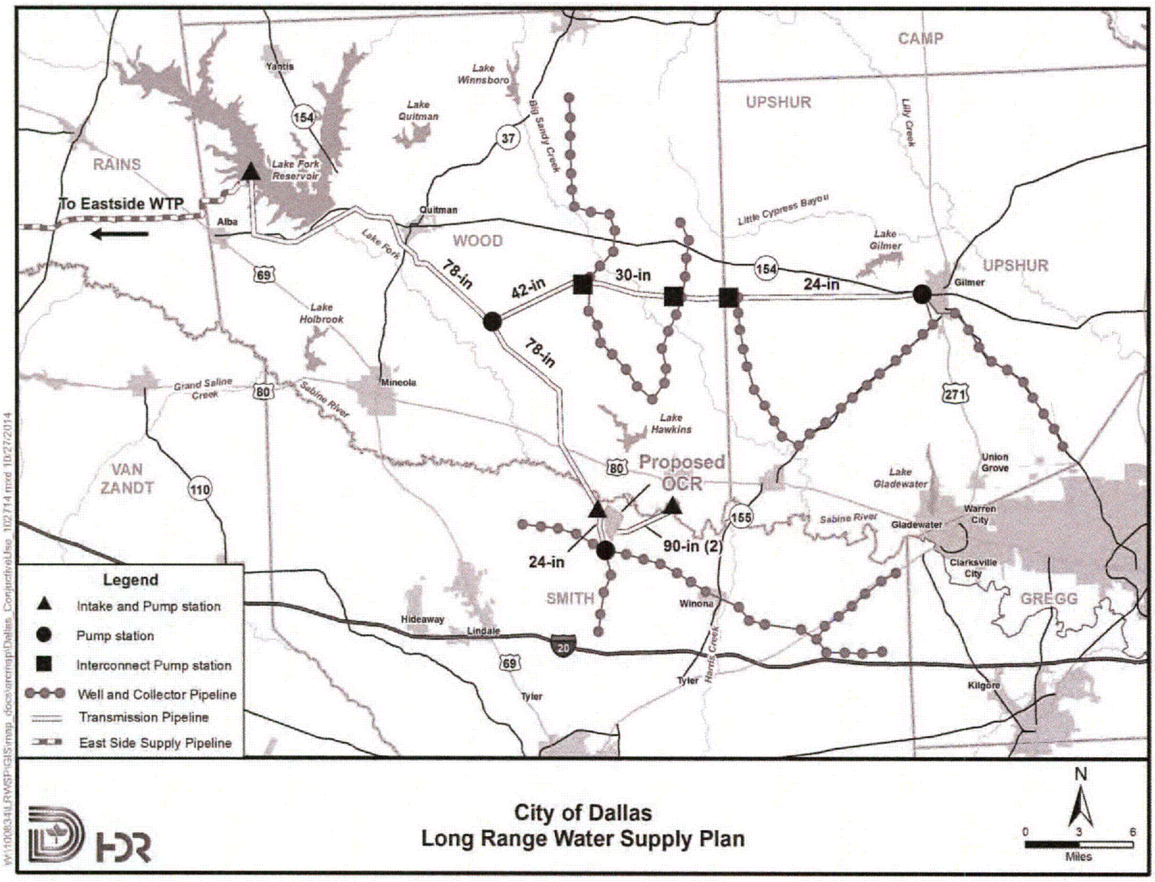
The Sabine conjunctive use project combines groundwater supplies from the Groundwater project as described in Section 7.9 with an off-channel reservoir (OCR) in Smith County that impounds surface water diverted from the Sabine River. The combination of the two projects has the potential to provide a significantly larger volume of water to Dallas.

7.10.1 Strategy Description

The two projects selected for the combined operations are the Smith 1B off-channel reservoir (OCR) with a storage capacity of 67,200 acft and the Carrizo-Wilcox Groundwater project. The OCR stores streamflow diverted from the Sabine River using a 400 cfs (258 MGD) intake and pump station and two 90-inch diameter transmission pipelines. Water in the OCR is subsequently diverted at a maximum rate of 93 MGD to the Lake Fork pump station through a 78 inch diameter pipeline.

The groundwater component includes 90 wells that pump water from the Queen City and Carrizo-Wilcox aquifers in Wood, Upshur, and Smith counties for delivery to the Lake Fork pump station. Figure 7.10-1 shows the locations of the OCR, well fields, transmission pipelines and diameters, and pump stations for this strategy.

Figure 7.10-1. Sabine Conjunctive Use Project



The groundwater well field has a maximum pumping capacity of 40 MGD (44,500 acft/yr). The location of the most eastern arm of the well field in Upshur County was adjusted from the well field layout presented in Section 7.9 because aquifer characteristics southeast of the City of Gilmer are more suitable for pumping to meet peaking demands needed for conjunctive use operations as opposed to a constant pumping rate required for the stand alone constant supply Groundwater project.

The OCR was chosen because of its close proximity to the groundwater well fields and provided the largest amount of supply of the OCRs evaluated in this area. Supplies from the OCR and well fields are both delivered to the Lake Fork pump station as shown in Figure 7.10-1 for subsequent delivery to DWU's Eastside WTP via the Eastside pipeline.

7.10.2 Water Availability

The Sabine conjunctive use project is operated with the primary source being surface water from the OCR. During wet periods the OCR is over-drafted when available stream flow is abundant. The groundwater supplies are used to backup the surface water supplies when surface water becomes limited. This operating plan uses groundwater to help meet demands during drought periods and minimizes the use of the groundwater when surface water is plentiful. The OCR was the component selected to be over-drafted, or drained at a faster rate than it can be replenished, because of its ability to quickly refill as compared to the longer recharge times of groundwater aquifers.

A daily timestep spreadsheet model was created to optimize the operations of the two components in order to deliver the maximum amount of supplies without shortages for the 1940 to 1998 simulation period. Scenarios were simulated with varying OCR storage trigger levels to signal when groundwater pumping would commence. A groundwater analysis was performed and determined the maximum pumping capacity from the well fields was 40 MGD (44,500 acft/yr). By assuming this maximum pumping capacity in the conjunctive use model, an optimal OCR trigger level was selected to begin groundwater pumping. This level was determined to be 80 percent of conservation storage.

The conjunctive use system is able to provide a firm yield of 93 MGD (104,200 acft/yr). This was the maximum yield achievable without wells going dry or the OCR reduced to zero storage. If the OCR component and groundwater component are not operated as a system, they have a combined yield of 87 MGD (97,200 acft/yr) with 60 MGD from the OCR and 27 MGD from groundwater. By operating the two strategies as a system, the combined yield is increased by about 6 MGD (7,000 acft/yr) or about 7 percent.

Figure 7.10-2 shows the storage trace of the OCR for the demands and trigger levels previously described as applied during the 1940 to 1998 simulation period. During the critical drought of the 1950s, storage levels are nearly reduced to zero. However, the OCR storage levels remain over half full 94 percent of the time. This demonstrates the reliability of the surface water supply and the selection of the OCR as the optimal component of the system to overdraft.

Figure 7.10-3 shows the annual supply amounts from both surface water and groundwater for the simulation period. The figure shows that groundwater is relied upon the most during the 1950s drought. Figure 7.10-4 shows a frequency of annual supply from the OCR and groundwater. The maximum annual groundwater supply of 40 MGD is needed in only 3 years of the simulation or about 5 percent of the time. On average, only

Figure 7.10-2. Off-Channel Reservoir Storage Trace for 1940 to 1998 Simulation Period

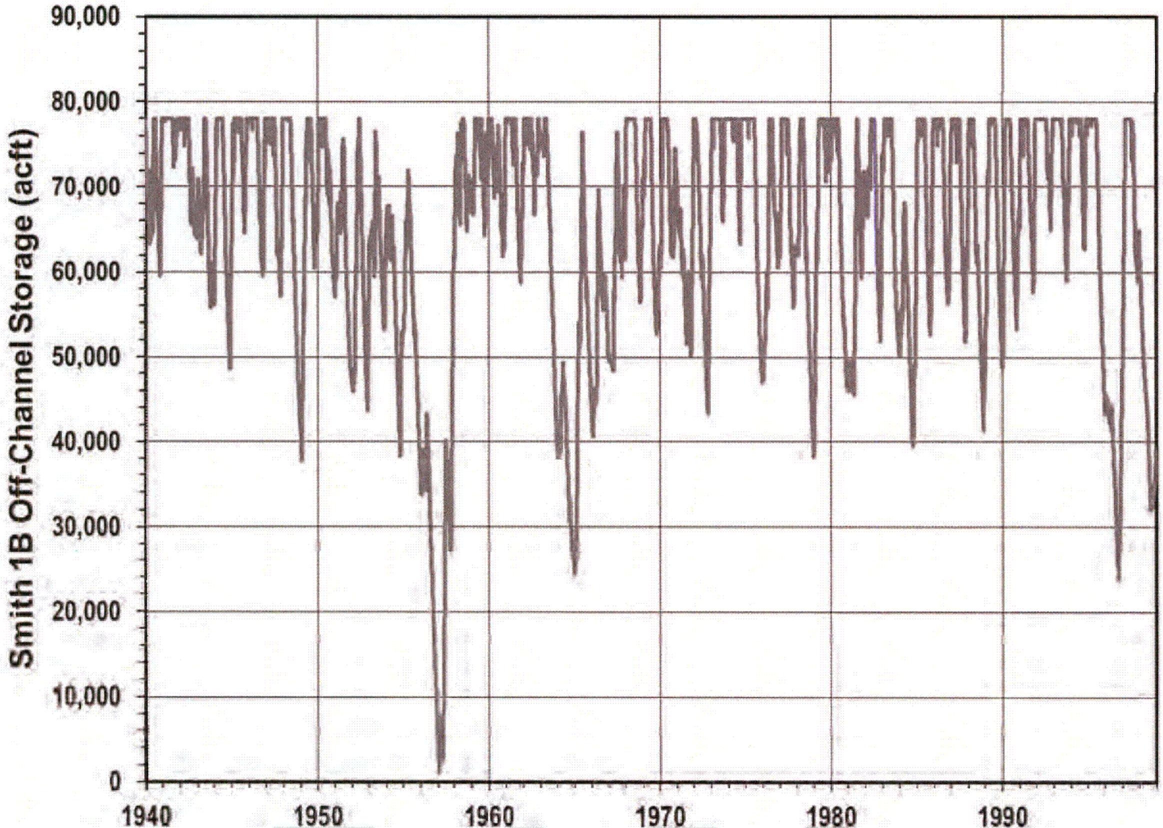


Figure 7.10-3. Sabine Conjunctive Use Supply Sources (1940 to 1998)

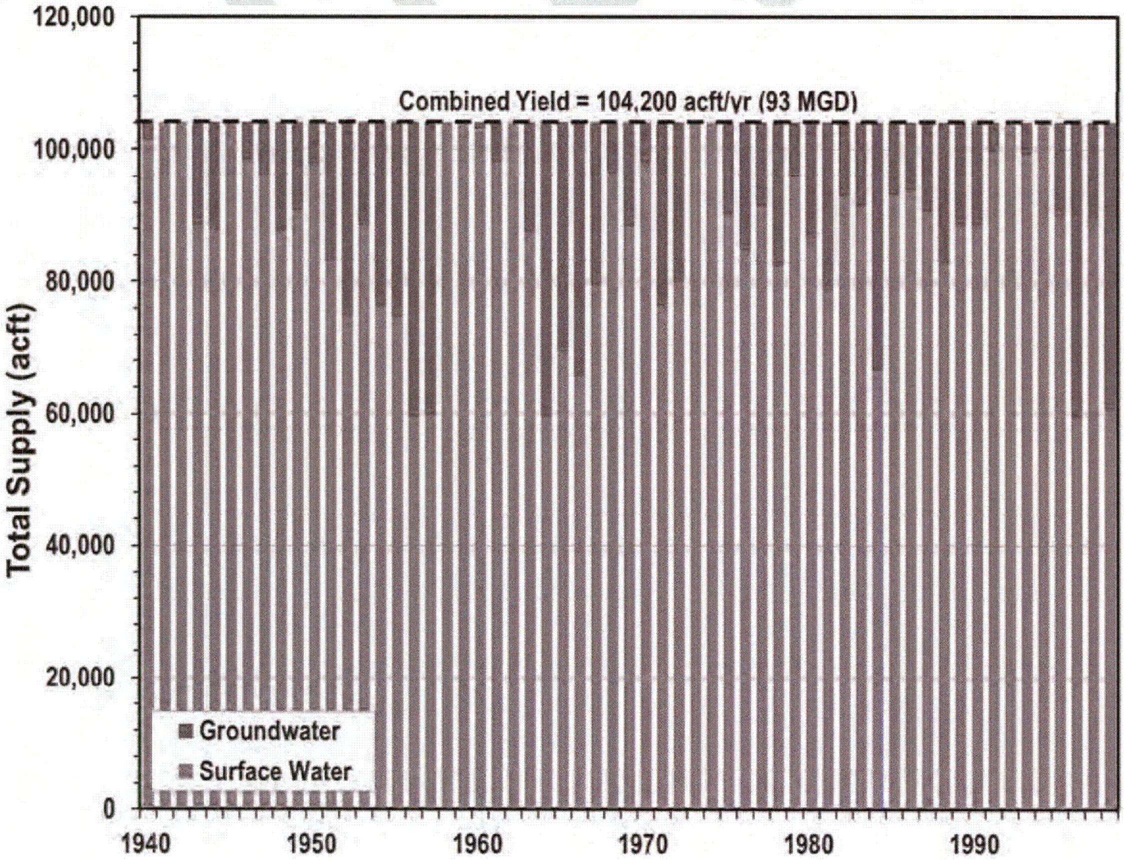
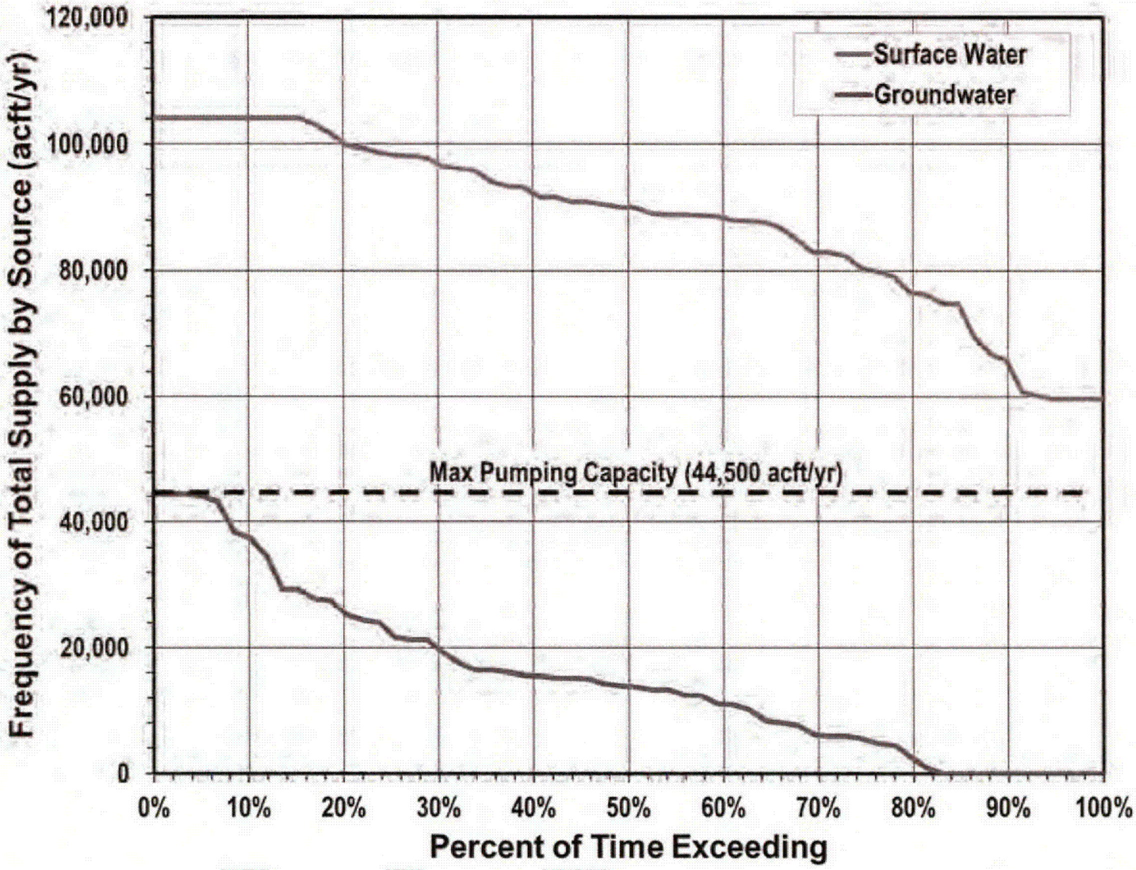


Figure 7.10-4. Frequency of Use for Sabine Conjunctive Use Supply Sources (1940 to 1998)



14 MGD or 15,666 acft/yr of supplies come from groundwater (or about 52 percent of the 30,000 acft/yr required for the stand-alone Groundwater project described in Section 7.9). In 10 years of the simulation or about 17 percent of the time, the entire supply comes from surface water.

7.10.3 Environmental Issues

Table 7.10-1 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of conditions and further study would be needed during feasibility or permitting efforts to address these potential concerns with the respective regulatory agencies.

Habitat

The well fields, OCR and transmission infrastructure would be located to avoid conflicts with environmentally sensitive areas when feasible. Although, not finalized, the proposed pipeline route will cross sections of the Old Sabine Bottom Wildlife Management Area and Little Sandy National Wildlife Refuge, one Texas Parks and Wildlife Department designated ecologically significant stream segment, and areas of U.S. Fish and Wildlife Service (USFWS) Priority 1 and 2 bottomland hardwoods. The majority of the pipeline route occurs within post oak and pine forested areas, but it also crosses areas of agricultural use including crops and pasture. Impacts to preferred habitats could be minimized by utilizing the agricultural areas which have been previously disturbed. Wooded riparian areas also commonly occur along and adjacent to stream and river areas that will be crossed by the pipeline corridor. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. The pipeline route will also cross wetland areas which will be disturbed by construction activities. The use of best management practices (BMPs) during construction activities will help to minimize potential impacts to these areas. Collector pipelines, pump stations and well areas do not present a substantial impact to existing habitat due to their small areas of disturbance.

Specific project components such as pipelines and wells generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats. As a result any impacts to existing habitat are anticipated to be medium to low.

Environmental Water Needs

Implementation and operation of the well fields will not have any impact stream flows as the source of supply is groundwater. While Sabine River diversions will periodically reduce Sabine River streamflows, this new diversion will need to be permitted by TCEQ and therefore will comply with applicable TCEQ environmental flow standards.

Bays and Estuaries

As a result of the distance and the large intervening drainage area between the diversion site and Sabine Lake and the Sabine Lake Estuary, the conjunctive use project will have very limited effects on freshwater inflows.

Threatened and Endangered Species

The species included in Table 7.10-1 represent all species federally or state listed as threatened or endangered, and federal candidate species in the counties for which the project will be located. The project area includes twenty six species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipeline to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area. The listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

Although a number of wetlands occur along the proposed pipeline corridors and well field areas, flexibility in the pipeline routing and well siting would be used to minimize or avoid potential impacts to the majority of these areas.

Approximately 77 acres of potential wetlands occur within the OCR footprint and would be inundated by the project. Coordination with the USACE will be required during the 404 permitting process and mitigation would be necessary for these areas.

Table 7.10-1. Environmental Factors for Upper Neches Project

Environmental Factors	Comment(s)	Level of Concern
Habitat	Medium to Low Impact	Low
Environmental Water Needs	Minimal Impact	Low
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Low impact American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, wood stork ST, creek chubsucker ST, blackside darter ST, bluehead shiner ST, paddlefish ST, black bear ST, Louisiana black bear, FT and ST, red wolf FE and SE, Rafinesque's big-eared bat ST, alligator snapping turtle ST, Louisiana pine snake C and ST, northern scarlet snake ST, Texas horned lizard ST, timber rattlesnake ST, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, and Texas pigtoe ST.	Low
Wetlands	Medium to Low Impact	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered.
ST = State Listed as Threatened. C = Candidate for Federal Listing

7.10.4 Planning Cost Estimate

Project costs are summarized in Table 7.10-2. The assumed cost of leasing groundwater is $50 per acft. The conjunctive use strategy is estimated to provide 93 MGD (104,200 acft/yr) at a unit cost of $740/acft or $2.27 per 1,000 gallons. If the OCR and groundwater were operated as separate, stand alone projects, they would provide 87 MGD (97,200 acft/yr) at a unit cost of $812/acft or $72/acft (or 10 percent) more than the unit cost of the conjunctive use strategy. The benefit of the projects being operated as one system is their ability to share the transmission pipeline from the well field and the OCR to the Lake Fork pump station. While the pipeline and pump stations for the conjunctive system are larger than the stand-alone projects, there are some costs savings associated with the shared facilities. This results in an increase in total water supply of 7 percent and a reduction in unit costs of about 10 percent when comparing the stand-alone projects to the conjunctive use project.

Table 7.10-2. Cost Estimate Summary for Sabine Conjunctive Use Project

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities
CAPITAL COST	
Off-Channel Reservoir	$284,471,000
Intake, Pump Station and Channel Dam	$48,835,000
Transmission Pipelines	$140,992,000
Transmission Pump Stations and Storage Tanks	$19,648,000
Well Fields (Wells, Pumps, and Piping)	$37,212,000
TOTAL COST OF FACILITIES	**$531,158,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$178,856,000
Environmental & Archaeology Studies and Mitigation	$6,466,000
Land Acquisition and Surveying (440 acres)	$3,714,000
Interest During Construction (4% for 2 years with a 1% ROI)	$75,621,000
TOTAL COST OF PROJECT	**$795,815,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$54,756,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$3,423,000
Dam and Reservoir	$4,267,000
Pumping Energy Costs (0.08 $/kW-hr)	$8,308,000
Delivery through Eastside Pipeline ($160,000 per MGD)	$5,582,000
Groundwater Leasing (@ $50/acft)	$783,000
TOTAL ANNUAL COST	**$77,119,000**
Available Project Yield (acft/yr)	**104,200**
Annual Cost of Water ($ per acft)	**$740**
Annual Cost of Water ($ per 1,000 gallons)	**$2.27**
Annual Cost of Water after Debt Service ($ per acft)	**$215**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.66**

7.10.5 Permitting and Implementation Issues

Implementation of the Sabine River diversion and OCR will require permits from both state and federal agencies as shown in Table 7.10-3. Currently, there are no local groundwater conservation districts in the three counties and consequently no pumping permits would be required. To pump the groundwater, DWU would need to either purchase the land for the wells or enter into lease agreements with land owners to construct wells and access the groundwater.

A Section 404 permit from the USACE for impacts to a waterway from construction activities would be needed for the construction of the OCR and transmission facilities.

Table 7.10-3. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right Permit	TCEQ	Will require an inter-basin transfer authorization to transfer water to the Trinity River Basin.
404	USACE	Required for construction activities in waters of the US.

7.10.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and / or risks associated with various types of conflict.

The OCR component of the project is susceptible to performance risk associated with a worse drought of record and future upstream impoundments.

The biggest challenge to groundwater development is the relatively low well yields of the Queen City aquifer where groundwater is available. The low well yields require a large number of wells to be drilled and maintained to recover a relatively small amount of groundwater. Further, required spacing of the large number of wells to minimize long-term interference creates the need for long conveyance pipelines.

Without a groundwater conservation district, the rule of capture applies and there is not a regulatory framework to protect financial investment of a well producer. However, it is likely that if DWU were to move forward with the Groundwater project, that a district would be created that could potentially limit the amount of groundwater that an entity like DWU would be allowed to develop.

7.10.7 Agricultural and Natural Resources

The OCR would permanently impact an estimated 149 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. This represents less than 1 percent of the total prime farmland soils found in Smith County. Construction activities associated with the project transmission pipeline would impact an additional 86 acres of prime farmland soils. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because the pipeline areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of state are included in Environmental Impacts section above.

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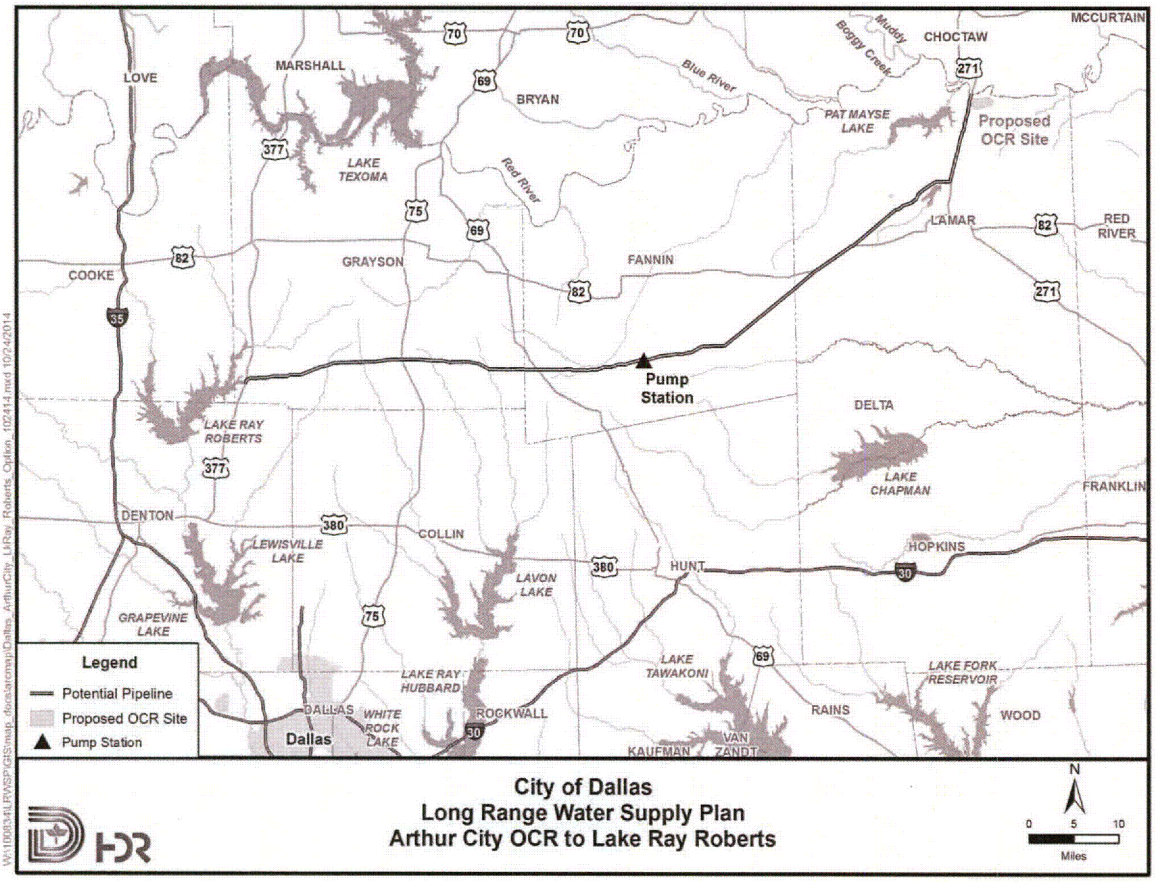
7.11 Red River Off-Channel Reservoir

The Red River Off-Channel Reservoir (OCR) project has the potential to generate a significant amount of supply for Dallas and potentially other regional partners. However, several key issues would need to be overcome to make the project feasible. These issues include bank stability for the intake structure along the Red River, water quality and sediment control, invasive species, and regulatory and permitting issues considering the Red River Compact (RRC).

7.11.1 Strategy Description

The Red River OCR project includes a 162 MGD (250 cfs) intake and pump station on the Red River at Arthur City, TX immediately downstream of the Highway 271 bridge (Figure 7.11-1). This diversion site provides better bank stability because it is immediately downstream of the bridge abutment. The location also allows for streamflow from the Blue River and Muddy Boggy River watersheds to contribute to flow released from Lake Texoma resulting in improved water quality.

Figure 7.11-1. Red River Off-Channel Reservoir Project



Diversions from the Red River would be pumped approximately 2 miles via an 84-in pipeline to three OCRs in series. The first OCR consists of a 2,500 acft basin for purposes of initial sediment settling and subsequent removal. The next OCR would consist of a 5,300 acft basin for water quality improvement and additional sediment removal. Finally, a third OCR would consist of a 32,000 acft storage basin to allow for extended pumping during those times when flow in the Red River is extremely low or water quality is impaired.

Water would then be diverted from the third OCR by a 129 MGD (200 cfs) intake and pump station and would transport, on average, about 102 MGD (114,000 acft/yr) via an 84-in transmission pipeline to Lake Ray Roberts for subsequent blending and use by Dallas. The delivery system was designed with a 1.25 peaking factor to allow for over pumping to compensate for delivery shortages during periods when diversions from the OCR are not available.

Figure 7.11-2 provides further detail of the OCR layout and flow of water through the three OCRs. Diversions from the Red River would be discharged into the upper OCR with a conservation pool elevation of 525 ft-msl, a storage capacity of 2,500 acft and a surface area of 76 acres. Overflow from this basin would pass through an uncontrolled spillway and gravity flow to the middle OCR with a conservation pool elevation of 515 ft-msl for further sedimentation and water quality improvement. The middle OCR would have a storage capacity of 5,300 acft with a surface area of 189 acres. Discharges through the uncontrolled spillway of the middle OCR would then be gravity fed to the final OCR with a conservation pool elevation of 505 ft-msl before being diverted for delivered to Lake Ray Roberts.

The third and largest OCR storage basin was designed with an embankment height of 70 ft. The top 5 ft would be designated for freeboard and the bottom 5 ft is allocated for dead pool storage, thus leaving a conservation pool depth of 60 ft and a surface area of 533 acres. This OCR storage basin will have an active conservation pool capacity of 32,000 acft which was determined to be adequate to achieve the desired 102 MGD (114,000 acft/yr) yield based on the Red River main-stem pump station and OCR pump station capacities and the use of storage in the largest OCR.

7.11.2 Water Availability

A yield analysis was completed using monthly available flow at Arthur City extracted from the TCEQ Red River WAM. The TCEQ WAM only models the Texas portion of the Red River basin and includes only a portion of the instream flow requirements stipulated in the RRC. Figure 7.11-3 provides the annual available flow calculated in the TCEQ WAM for the 1948 to 1998 period of record. The WAM estimates that, on average, almost 5 million acft/yr is available for diversion by Texas entities at Arthur City.

The monthly available flow was disaggregated to daily flows using the daily gaged flow pattern from the USGS gage at Arthur City. Diversions from the river were calculated on a daily time-step to provide a more accurate estimate of water availability from the project. Figure 7.11-4 shows frequency curves of both the daily flow available for diversion at Arthur City compared to gaged flow. Figure 7.11-5 shows the same frequency for lower flows at the site. The figures reveal that the 129 MGD (250 cfs) river diversion would be able to be exercised approximately 94% of the time without consideration of days with poor water quality.

Figure 7.11-2. Red River Off-Channel Reservoir Layout

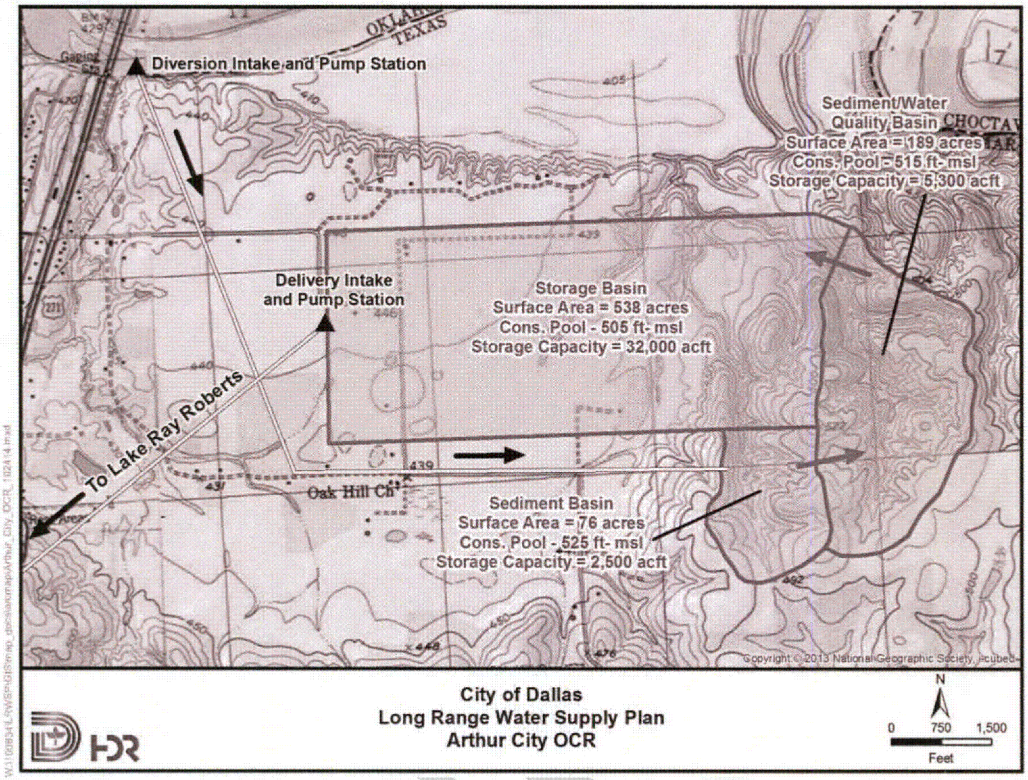


Figure 7.11-3. TCEQ WAM Annual Available Streamflow for Texas Entities at Arthur City Diversion Site

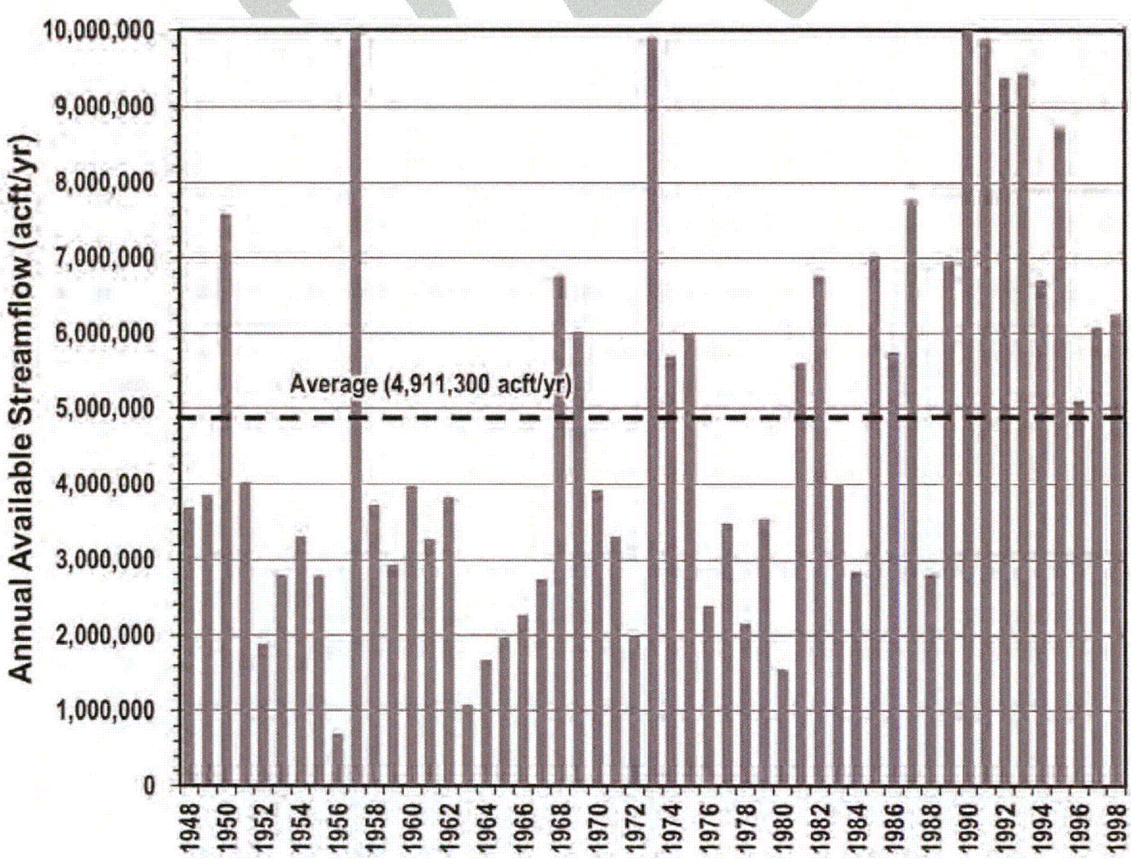


Figure 7.11-4. Frequency of Daily Available Streamflow at Arthur City Diversion Site

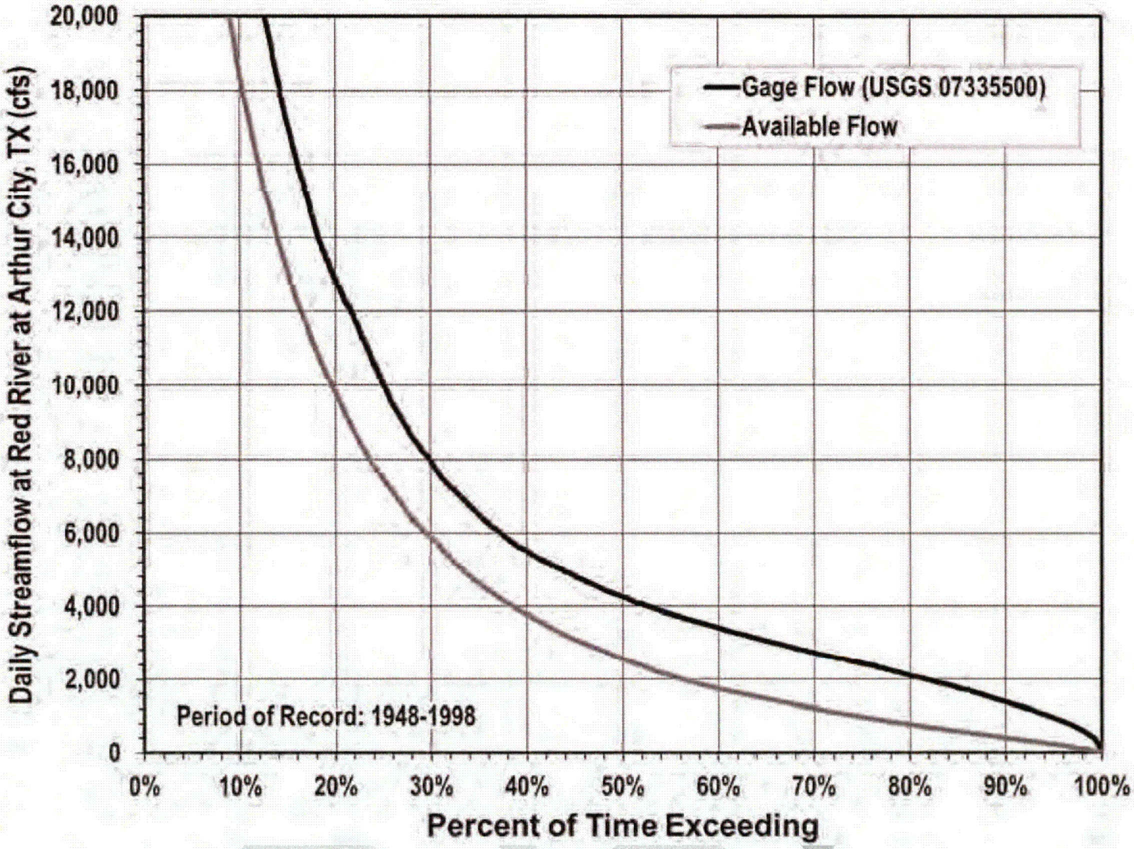


Figure 7.11-5. Frequency of Daily Available Low Flows at Arthur City Diversion Site

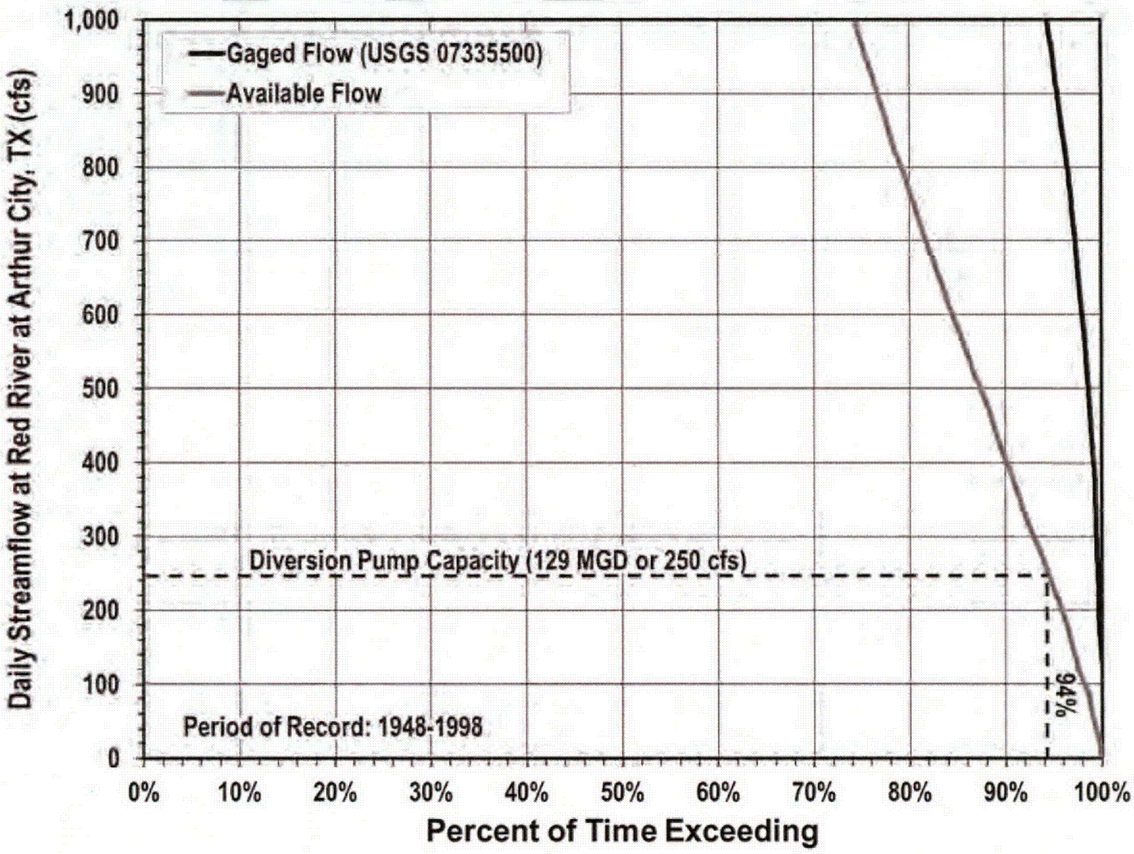


Figure 7.11-6 and Figure 7.11-7 provide time series and frequency plots of storage of the 32,000 acft OCR. For the yield analysis, the storage capacities of the two smaller OCR sedimentation basins were not considered. The storage frequency indicates that the 32,000 acft OCR would remain full almost 90 percent of the time. During the critical drought of the 1960's, the OCR reaches dead pool levels for several days. However, since the delivery pump station capacity is sized with a 1.25 peaking factor, shortages during these periods were overcome with the additional delivery capacity in the following days to keep the annual reliability at 100 percent.

Additional yield estimates were performed using higher diversion rates and indicate that an expansion of the facilities would be able to provide upwards of 535 MGD (600,000 acft/yr) of regional supply with a high level of reliability. The project could provide supplies to multiple potential regional partners including NTMWD (Lake Lavon, Lake Chapman, Lower Bois d'Arc Reservoir), City of Irving (Lake Chapman delivery to Lake Lewisville) and UTRWD (Lake Ralph Hall or Lewisville Lake). Additionally, the pipeline could be extended further west to potentially supply water to the TRWD system at either Lake Bridgeport or Eagle Mountain Reservoir and potentially to the Brazos River Basin to a location near Possum Kingdom Reservoir for use by west Texas entities that are currently experiencing one of the worst historical droughts. Supplies could also be delivered to a tributary of Lake Tawakoni where they could be blended with water in Dallas' eastern supply system.

Figure 7.11-6. Daily Storage of Red River OCR

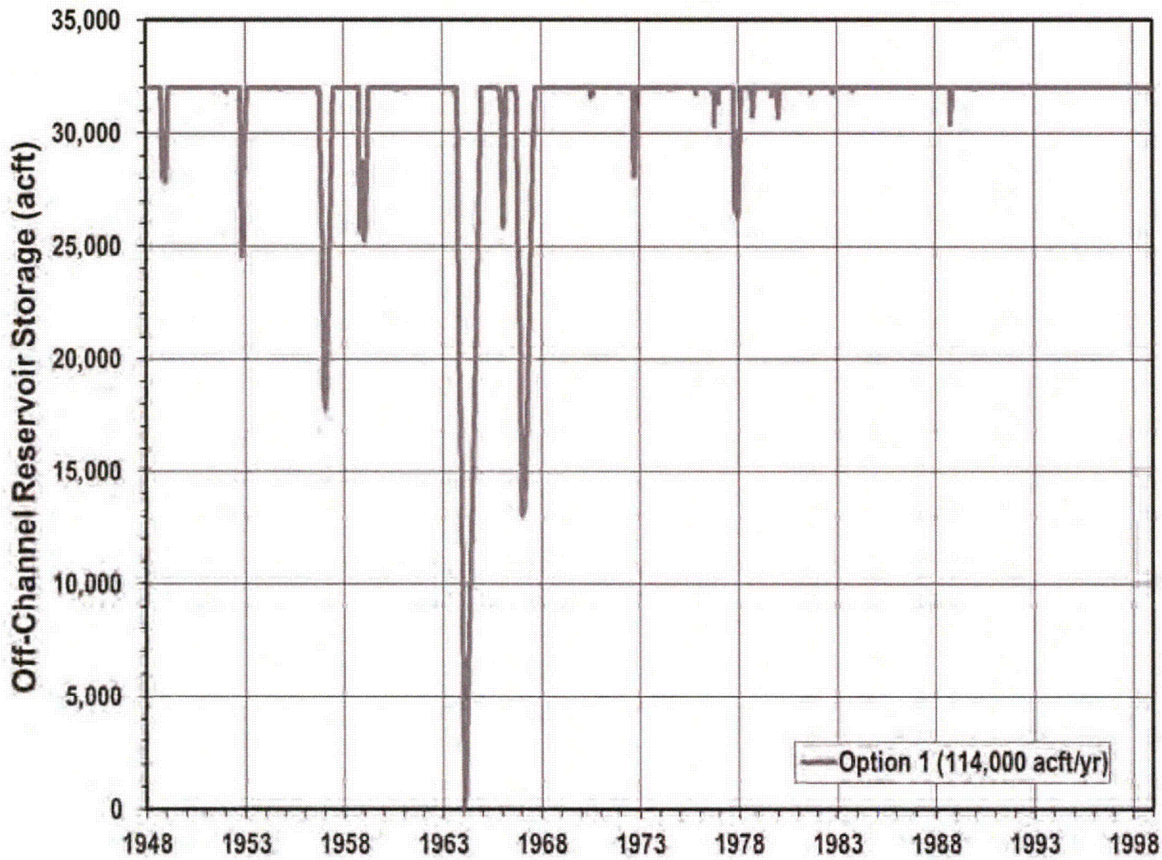
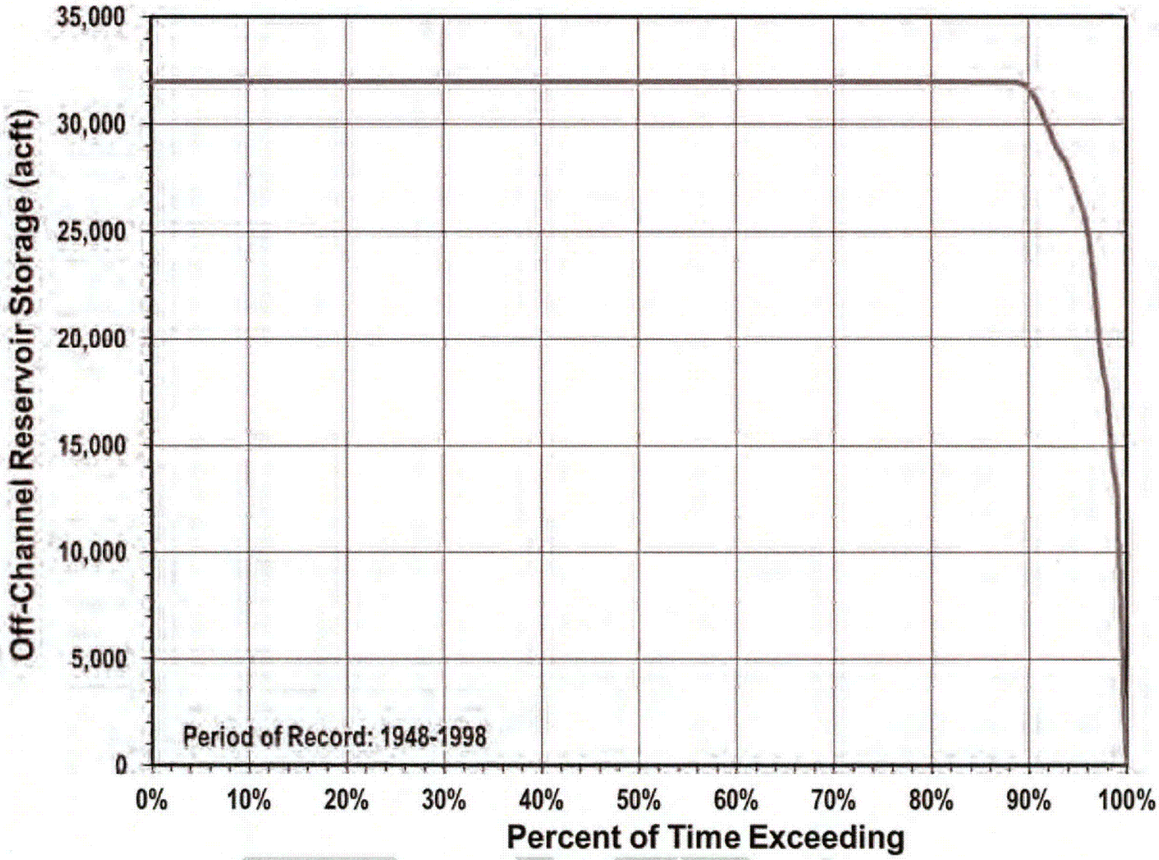


Figure 7.11-7. Frequency of Daily Storage of Red River OCR



7.11.3 Environmental Issues

Table 7.11-1 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of conditions that would need further study in feasibility or permitting efforts to address potential concerns with respective regulatory agencies.

Habitat

River and transmission infrastructure would be located to avoid conflicts with environmentally sensitive areas where feasible. There are currently no areas of designated critical habitat within the project area. The OCR site primarily contains pasture areas with the eastern portion of the site including some forested areas. The majority of the pipeline route crosses areas of agricultural use including crops and pasture. Impacts to preferred habitats will be minimized by utilizing these areas which have been previously disturbed. The pipeline route also crosses through the Ray Robert Lake State Park and the Ray Robert Wildlife Management Area. Wooded riparian areas commonly occur along and adjacent to stream and river crossings that will be crossed by the pipeline corridor. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. The pipeline route may also cross wetland areas which will be disturbed during construction. The use of best management practices (BMPs) during construction activities will help to minimize potential impacts to these areas.

Specific project components such as pipelines generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats. As a result impacts to existing habitat from this project are anticipated to be low.

Table 7.11-1. Environmental Factors for Red River OCR

Environmental Factors	Comment(s)	Level of Concern
Habitat	No presence of critical or unique habitat in project area.	Low
Environmental Water Needs	Low Impact	Low
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Low Impact American peregrine falcon ST, bald eagle ST, Bachman's sparrow ST, Eskimo curlew FE and SE, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, whooping crane FE and SE, wood stork ST, blackside darter ST, blue sucker ST, creek chubsucker ST, paddlefish ST, shovelnose sturgeon ST, American burying beetle FE, black bear ST, red wolf FE and SE, Ouachita rock pocketbook FE, Texas heelsplitter ST, alligator snapping turtle ST, Texas horned lizard ST, and timber rattlesnake ST.	Low
Wetlands	Low Impact	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered.
ST = State Listed as Threatened. C = Candidate for Federal Listing

Environmental Water Needs

Implementation and operation of the Red River OCR project will have a limited impact on daily flows in the Red River since average gaged streamflow from 1998 to 2013 have been over 13 million acft/yr (Table 7.11-1), and the 162 MGD intake facility would divert less than 2 percent of the flows on average.

Bays and Estuaries

The Red River OCR Project will not affect an estuary system as it eventually flows into the Mississippi River system.

Threatened and Endangered Species

The species included in Table 7.11-1 represent all species federally or state listed as threatened or endangered, and federal candidate species in the counties for which the project will be located. The project area includes twenty three species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipeline to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area.

The listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

Although a number of wetlands occur along the proposed pipeline corridor, flexibility in the pipeline siting would be used to minimize or avoid potential impacts to the majority of these areas. Impacts to wetlands associated with this project are anticipated to be low.

7.11.4 Planning Cost Estimate

The Red River OCR Project requires a 162 MGD river intake and pumping facility to be constructed on the Red River and a 2 mile, 84-in transmission pipeline to deliver the supplies to three OCRs. A 129 MGD OCR intake facility and a 100 mile, 84-in transmission pipeline would need to be constructed to deliver supplies to Lake Ray Roberts.

A summary of project and annual costs for the Red River OCR strategy with delivery to Lake Ray Roberts is presented in Table 7.11-2. Annual costs include estimates for periodic dredging of the sedimentation basins and chemical addition for zebra mussel control. The costs presented in Table 7.11-2 do not include delivery or treatment of the supplies from Lake Ray Roberts as this is operated by Dallas as a gravity supply system.

Total project costs are estimated to be $853 million with annual costs for the project assuming a 30-year debt service estimated at $84.2 million per year. The unit cost of water for this project to deliver water to Lake Ray Roberts would be about $738 per acft or $2.27 per 1,000 gallons. After debt service, the unit cost of water would decrease to $224 per acft or $0.69 per 1,000 gallons.

7.11.5 Permitting and Implementation Issues

The Red River OCR project would pose several unique permitting challenges along with the typical challenges associated with a new project. Similar to other new water projects in Texas, Dallas would need to obtain a water rights permit for the river diversion from the TCEQ including an interbasin transfer authorization. In addition to the water rights permit, Dallas would need to obtain a 404 permit from the USACE for impacts to a waterway from construction activities.

Diversions from the Red River would potentially need to comply with provisions of the Lacey Act which prohibits the transport of non-native species across state boundaries, and in this case, zebra mussels. The state boundary of Texas is defined as the southern bank of the main channel of the Red River, and therefore, the intake and pump station facilities would need to be constructed within the Texas state boundary to avoid having to comply with the provisions of the Lacey Act. However, if this is not possible, it may be possible to obtain special legislation allowing the diversion similar to efforts undertaken by NTMWD which allowed for the transfer of Lake Texoma water into the Trinity River Basin.

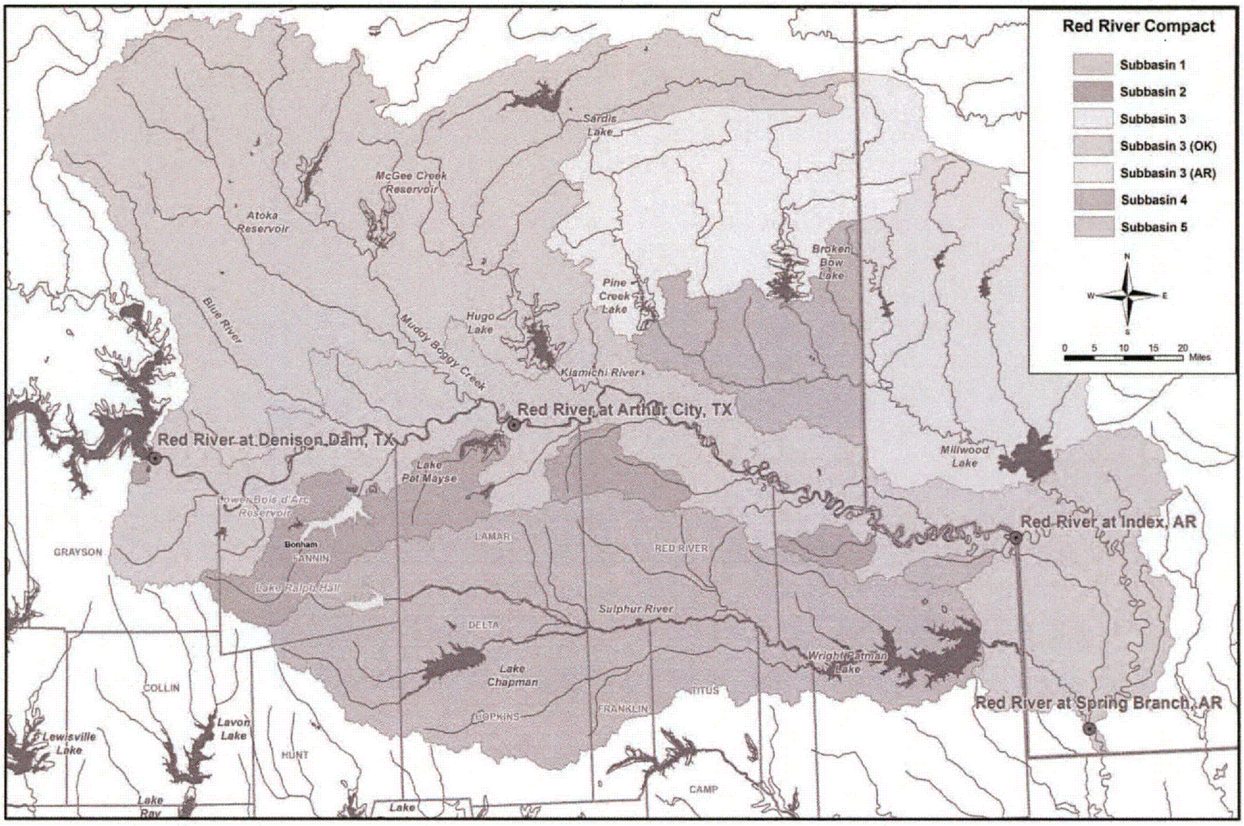
Table 7.11-2. Cost Estimate Summary for Red River Off-Channel Reservoir

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities
CAPITAL COST	
Off-Channel Storage Reservoir	$127,951,000
Red River Intake, Pump Station and Channel Dam	$22,367,000
Transmission Pipeline from Red River to Off-Channel Reservoir	$8,012,000
Off-Channel Reservoir Intake and Pump Station	$27,541,000
Transmission Pipeline from Off-Channel Reservoir to Lake Ray Roberts	$366,413,000
Transmission Pump Station and Storage Tank	$20,026,000
TOTAL COST OF FACILITIES	**$572,310,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$181,587,000
Environmental & Archaeology Studies and Mitigation	$ 5,284,000
Land Acquisition and Surveying (3,286 acres)	$ 12,752,000
Interest During Construction (4% for 2 years with a 1% ROI)	$ 81,054,000
TOTAL COST OF PROJECT	**$ 852,987,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$ 58,690,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$ 5,493,000
Dam and Reservoir	$1,919,000
Zebra Mussel Treatment	$2,697,000
Pumping Energy Costs (0.08 $/kW-hr)	$13,470,000
Sediment Dredging	$1,919,000
TOTAL ANNUAL COST	**$84,188,000**
Available Project Yield (acft/yr)	**114,000**
Annual Cost of Water ($ per acft)	**$738**
Annual Cost of Water ($ per 1,000 gallons)	**$2.27**
Annual Cost of Water after Debt Service ($ per acft)	**$224**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.69**

Diversion from the Red River would also need to comply with all provisions included in the Red River Compact (RRC)[1]. The diversion at Arthur City would be located in Reach II, Subbasin 5 of the RRC. Under Section 5.05 of the Compact, the main stem of the Red River within Reach II (i.e. subbasin 5) is defined as "that portion of the Red River, together with its tributaries, from Denison Dam down to the Arkansas-Louisiana State boundary, excluding all tributaries included in the other four subbasins of Reach II". Figure 7.11-8 provides the Reach II associated subbasin boundaries as defined by the RRC. In addition, Figure 7.11-8 shows the location of the USGS Gage at Arthur City where the proposed diversion would be located.

Figure 7.11-8. Reach II and Associated Subbasins of the Red River Compact



Section 5.05 defines how water is allocated within subbasin 5. Subsection 5.05(b) (1) states that "The Signatory States shall have equal rights to the use of runoff originating in subbasin 5 and undesignated water flowing into subbasin 5, so long as the flow of the Red River at the Arkansas-Louisiana state boundary is 3,000 cfs or more, provided no state is entitled to more than 25 percent of the water in excess of 3,000 cfs." Table 7.11-3 provides the average and minimum annual flow at USGS Gage 07344370 on the Red River at Spring Bank, AR near the Arkansas-Louisiana boundary for the 1998 to 2013 gage period of record. Table 7.11-3 also provides the approximate portion of available flows of subbasin 5 that Texas is entitled to. On average, Texas is entitled to almost 3 million acft/yr of the available flow in subbasin 5. For comparison purposes,

[1] http://www.statutes.legis.state.tx.us/Docs/WA/htm/WA.46.htm

Texas currently has 517,094 acft/yr of permitted diversions in all of Reach II including the Sulphur River basin. In the minimum year of the gage period of record (2006) there was 675,039 acft of available flow to Texas in subbasin 5.

This amount of available flow is about 2 million acft/yr less than the average annual available flow calculated in the TCEQ WAM. The discrepancy in available flow is a result of the TCEQ including only a portion of the RRC stipulations and not including inflows into the main stem of the Red River from Oklahoma tributaries or Oklahoma water rights and reservoirs. In addition, the TCEQ WAM and gaged flows used to estimate values in Table 7.11-3 do not have similar periods of record. The gaged flows at the Arkansas-Louisiana boundary were only available after the WAM period of record and contain several drought periods including the current drought.

Table 7.11-3. Gaged Flow and Texas Portion of Available Flow in Reach II, Subbasin 5 of RRC

Table units: acft

YEAR	Gaged Streamflow	Texas Portion of Available Streamflow
1998	18,705,114	4,133,343
1999	9,553,978	1,868,701
2000	11,895,008	2,437,119
2001	25,022,248	5,712,587
2002	19,431,282	4,315,728
2003	7,117,028	1,246,452
2004	10,018,705	1,961,627
2005	8,135,381	1,543,259
2006	4,550,219	675,039
2007	23,151,954	5,245,014
2008	16,569,036	3,603,697
2009	24,721,633	5,637,433
2010	12,581,983	2,640,430
2011	6,896,069	1,248,024
2012	8,900,326	1,790,473
2013	6,993,001	1,222,829
Average	**13,390,185**	**2,830,110**
Min (2006)	**4,550,219**	**675,039**

7.11.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict. The Red River OCR project possesses a high level of risk associated with permitting as discussed in Section 7.11.5.

In addition, this project is susceptible to performance risk associated with a worse drought of record and future upstream impoundments. A significant portion of the available flow to the project originates in the Blue and Muddy Boggy River watershed located in Oklahoma. If large reservoirs are constructed in these watersheds, then available flow to the project could be reduced.

7.11.7 Agricultural and Natural Resources

The OCR would permanently impact an estimated 399 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. This represents less than 1 percent of the total prime farmland soils found in Lamar County. Construction activities associated with the project pipeline would impact an additional 323 acres of prime farmland soils. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because the pipeline areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.12 Sulphur River Basin Project

The 2014 LRWSP is relying on the Joint Committee for Planning for Program Development (JCPD) Sulphur Basin Study results for this water management strategy. As of the writing of this report, the Sulphur Basin Study has not produced a report with a final recommendation. The recommendation included in this write up was recommended at a JCPD meeting in September of 2014. Freese and Nichols, the consultant on the study, provided data and strategy evaluations to DWU who passed them on to HDR for inclusion in the 2014 LRWSP. The information presented herein is the most up to date, but not yet finalized from the Sulphur Study. This strategy is included as a placeholder and an alternative strategy for Dallas to participate in if the Sulphur basin study continues to move forward.

Due to the abundance of water in the basin, the Sulphur River Basin has been the focus of numerous studies for potential development of new water supply projects. From the eastern state line of Texas, the Sulphur River flows into Arkansas and joins with the Red River, a tributary of the Mississippi River. The US Army Corps of Engineers (USACE) owns and operates Wright Patman Lake, known at one time as Texarkana Lake. Wright Patman Lake is located on the Sulphur River in Bowie and Cass Counties as shown in Figure 7.12-1 and was authorized as part of a comprehensive plan to reduce flood damages downstream of the reservoir.

A water supply planning study known as the Sulphur Basin Study (Sulphur study) is being conducted for the Joint Committe for Planning for Program Development (JCPD) which includes Dallas Water Utilities (DWU), Tarrant Regional Water District (TRWD), North Texas Municipal Water District (NTMWD), Upper Trinity Regional Water District (UTRWD), and the City of Irving, along with in-basin users represented by the Sulphur River Basin Authority (SRBA).

7.12.2 Strategy Description

As part of the Sulphur study, options being studied for developing potential additional water supply included reallocating flood storage in Wright Patman and a potentially downsized Marvin Nichols Reservoir. The Sulphur River Basin project, if constructed, would be shared between the JCPD members.

As currently operated, Wright Patman Lake provides over 2.5 million acre-feet of storage for floodwaters. Prior studies have suggested that significant additional water supply yield could be generated if a portion of the flood storage in Wright Patman Lake were reallocated to municipal use. The City of Texarkana has contracted with the USACE for storage in the lake and holds a water right permit to use up to 180,000 acre-feet per year (161 MGD) from the lake.

Reallocation options include increasing the capacity of the conservation pool by either raising the maximum conservation elevation and/or lowering the minimum conservation elevation. Table 7.12-1 summarizes the increases in firm yield by adjusting the conservation pool elevations.

Figure 7.12-1. Sulphur River Basin Project

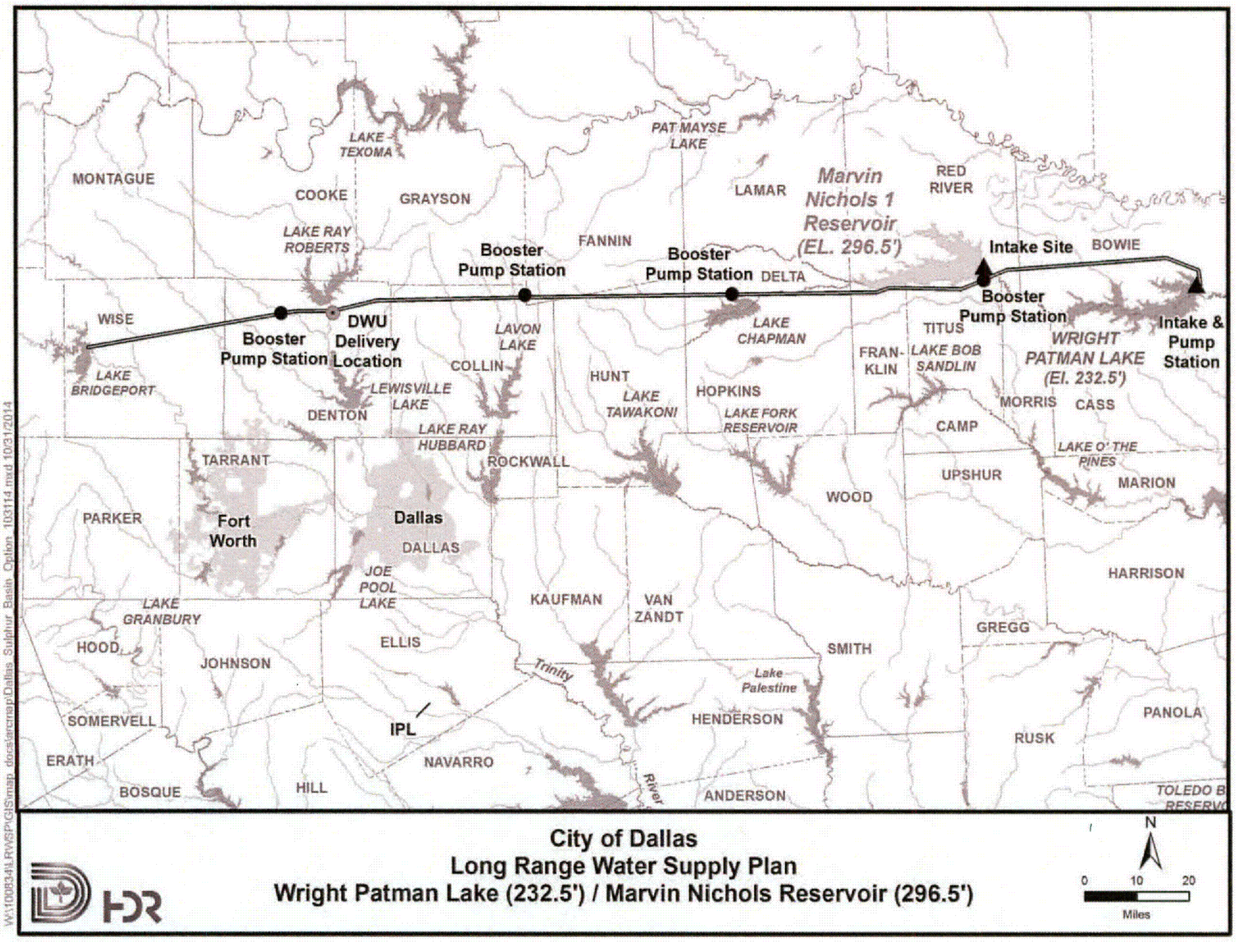


Table 7.12-1. Summary of Wright Patman Firm Yields for Various Conservation Pools

Max Conservation Pool Elevation	Min Conservation Pool Elevation	Sediment Condition	Firm Yield (acft/yr)
232.5	223	Current	385,753
232.5	220	Current	460,963
232.5	217.5	Current	505,873
232.5	232.5	Current	557,353

A reservoir at the Marvin Nichols 1A site (refer to Figure 7.12-1) is a recommended strategy for North Texas Municipal Water District, the Upper Trinity Regional Water District, and Tarrant Regional Water District in the 2006 and 2011 Region C Regional Water Plan and an alternative strategy for Dallas Water Utilities and the City of Irving in the 2011 RCP. The Marvin Nichols 1A site is designated as a unique reservoir site by the Texas legislature and is included as an alternative in this analysis.

The Marvin Nichols 1A project would be located on the Sulphur River in Red River and Titus counties approximately halfway between the cities of Clarksville and Mount

Pleasant. At this location, the reservoir would have a total drainage area of 1,889 square miles (of which 479 square miles are above Lake Chapman.) For the selected strategy for the 2014 LRWSP, the reservoir has been downsized and the top of the conservation pool has been lowered 31.5 feet from elevation 328 ft-msl to 296.5 feet-msl NGVD.

Supplies from Wright Patman and Marvin Nichols would be pumped into a common transmission pipeline and delivered to the JCPD members with DWU receiving their portion of the supply near Lake Ray Roberts as indicated in Figure 7.12-1 and Table 7.12-2.

Table 7.12-2. Delivery Locations and Peaking Rates for Delivery of Sulphur River Supplies

	TRWD	DWU	NTMWD	UTRWD	Irving	SRBA
Peaking	1.25	1.5	1.4	1.25	1.25	1.25
Delivery Location	Lake Bridgeport	Trinity River & Lake Ray Roberts	NWTP & Wylie WTP	Trinity River & Lake Ray Roberts	Trinity River & Lake Ray Roberts	Unspecified
Raw Water Ownership	23.918%	23.918%	23.358%	4.807%	4%	20%
Metroplex JCPD Sections	29.897%	29.897%	29.197%	6.009%	5%	0%

7.12.3 Water Availability

There is currently only one water right owner in Wright Patman Lake (i.e. the City of Texarkana, Texas). Texarkana has the right to impound 386,900 acre-feet of water in Wright Patman Lake and is permitted to use 180,000 ac-ft./yr (161 MGD). However, the TCEQ WAM model for the Sulphur River Basin suggests that the reliable supply from Wright Patman Lake under current conditions is approximately 46,000 ac-ft./yr (41 MGD).

Based on the data from the Sulphur Basin Study, combined yield associated with reallocating Wright Patman to 232.5 ft-msl and construction of Marvin Nichols with a conservation pool at 296.5 ft-msl, and considering environmental flows results in a combined project yield of 543,197 acft/yr (485 MGD).

The 2011 RCP estimated a yield of Marvin Nichols Reservoir of 612,300 acft/yr (547 MGD) assuming that the proposed Lake Ralph Hall is in place as a senior water right and that releases are made for downstream water rights and the environmental as required by TWDB environmental flow criteria. The 2011 yield analysis assumes that the reservoir will be operated as a system with Wright Patman Lake, protecting Wright Patman Lake's senior water right.

7.12.4 Environmental Issues

Table 7.12-3 provides a summary of known environmental factors that would need to be considered during the permitting of these projects. These categories provide a general summary of these conditions and further study would be needed during permitting to address these potential concerns with the respective regulatory agencies.

Habitat

The footprints of both the Wright Patman and Marvin Nichols projects contain heavily forested areas, and agricultural areas including crops and pasture. Impacts to preferred habitats within the reservoir areas will be minimized to some extent by utilizing the agricultural areas which have been previously disturbed. No designated critical habitat currently occurs within these project areas. The Wright Patman project area includes a significant amount of wetland and bottomland hardwood areas. The Sulphur Basin Study data reported that 12,525 acres of Waters of the U.S. (WOTUS) would be impacted by Wright Patman. In addition Atlanta State Park and White Oak Creek Wildlife Management Area are located within the proposed project area. This project area also includes a Texas Parks and Wildlife Department designated ecologically significant stream segment of the Sulphur River, and barren areas which are considered to be a unique habitat type.

Marvin Nichols Reservoir as proposed includes several thousand acres of wetland vegetation, bottomland hardwood vegetation and barren areas which cover approximately one half of the project area. The Sulphur Basin Study reported that 12,151 acres of impacted WOTUS occur within Marvin Nichols Reservoir. Three cemeteries exist within this project area which would require coordination with the Texas Historical Commission to relocate.

Environmental Water Needs

Implementation and operation of the Sulphur Basin project could have a significant impact on daily flows in the Sulphur River below each reservoir.

Bays and Estuaries

The Sulphur Basin Project will not affect an estuary system as it eventually flows into the Mississippi River system.

Threatened and Endangered Species

The species included in Table 7.12-3 represent all species federally or state listed as threatened or endangered, and federal candidate species in the affected counties. These projects include twenty six species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Considering the numbers of listed species and the large number of acres affected by these two projects the impacts to species would be considered medium.

Wetlands

Data provided by the Sulphur Basin study for the Wright Patman reservoir indicates that 12,525 acres of potential wetland areas. The Marvin Nichols project area includes 12,151 acres of potential wetland areas. These areas would be mitigated in accordance with required federal regulations as administered through the US Army Corps of Engineers section 404 permitting process.

Table 7.12-3. Environmental Factors for Sulphur Basin Project

Environmental Factors	Comment(s)	Level of Concern
Habitat	Bottomland hardwood areas present.	High
Environmental Water Needs	Medium Impact	Medium
Threatened and Endangered Species	Medium impact American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, wood stork ST, blackside darter ST, bluehead shiner ST, creek chubsucker ST, paddlefish ST, shovelnose sturgeon ST, American burying beetle FE, black bear ST, Louisiana black bear FT and ST, Rafinesque's bit-eared bat ST, red wolf FE and SE, Louisiana pigtoe ST, Ouachita rock pocketbook FE, Southern hickorynut ST, Texas pigtoe ST, alligator snapping turtle ST, Northern scarlet snake ST, Texas horned lizard ST, and timber rattlesnake ST.	Medium
Wetlands	Wetland areas are present within both project areas.	High

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered.
ST = State Listed as Threatened. C = Candidate for Federal Listing

7.12.5 Planning Cost Estimate

The Sulphur River Basin project will be shared between the JCPD members. The total cost to construct Marvin Nichols reservoir, reallocate storage in Wright Patman and construct transmission system to deliver 543,197 acft/yr (485 MGD) is $4.8 billion. Annual costs are $403 million including debt service, operation and maintenance and pumping costs.

Costs are shown in Table 7.12-4 for Dallas' portion of costs for the Sulphur River Basin project to deliver 102 MGD (114,000 acft/yr) of supply to the Trinity River Basin near Lake Ray Roberts based on November 2013 prices. (Note: These costs come from Sulphur Basin Study data provided in July of 2014 which contains the latest opinion of probable cost. Although comparable to costs developed in the Unified Costing Model for other Dallas projects, differing assumptions are used for calculating interest during construction (6% less 4% return), debt service period (40 years) and cost of energy ($0.07/kwhr). The decision was made to report the cost of this project based on the Sulphur study and not convert the prices using the Unified Costing Model.)

Total project costs to DWU are estimated to be $1,003 million (about 21% of the total project costs as compared to DWU's 23.9% ownership share as shown in Table 7.12-2.) with annual costs for the project assuming a 40-year debt service estimated at $84.6 million per year. The unit cost of water for this project would be about $742 per acft or $2.28 per 1,000 gallons. After debt service, the unit cost of water would decrease to $194 per acft or $0.60 per 1,000 gallons.

Table 7.12-4. Cost Estimate Summary for Dallas Portion of Selected Sulphur River Basin Projects

Table units: November 2013 Dollars from Sulfur Basin Study Estimate

Item	Estimated Cost for DWU Portion of Facilities
CAPITAL COST	
Reservoirs	$36,775,000
Transmission Pipeline	$378,483,000
Transmission Pump Station(s) & Storage Tank(s)	$85,040,000
Relocations	$11,738,000
TOTAL COST OF FACILITIES	**$512,036,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$227,799,000
Environmental & Archaeology Studies and Mitigation	$71,706,000
Land Acquisition and Surveying	$10,948,000
Interest During Construction (4% for 2 years with a 1% ROI)	$180,654,000
TOTAL COST OF PROJECT	**$1,003,143,000**
ANNUAL COST	
Non Reservoir Debt Service (5.5 percent, 40 years)	$51,965,000
Reservoir Debt Service (5.5 percent, 40 years)	$10,553,000
Operation and Maintenance	
Reservoir	1018000
Intake, Pipeline, Pump Station	$7,766,000
Pumping Energy Costs (kW-hr @ 0.07 $/kW-hr)	$13,335,000
TOTAL ANNUAL COST	**$84,637,000**
Available Project Yield (acft/yr)	**114,000**
Annual Cost of Water ($ per acft)	**$742**
Annual Cost of Water ($ per 1,000 gallons)	**$2.28**
Annual Cost of Water after Debt Service ($ per acft)	**$194**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.60**

7.12.6 Permitting and Implementation Issues

The Sulphur Basin project would pose several unique permitting challenges along with the typical challenges associated with a new project. Similar to other new water projects in Texas, Dallas and the other project partners would need to obtain a water rights permit for the river diversion from the TCEQ including interbasin transfer authorizations. In addition to the water rights permit, Dallas and the other project partners would need to obtain a 404 permit from the USACE for impacts to a waterway from construction activities, summarized in Table 7.12-5.

Table 7.12-5. Summary of Required Major Permits for Suphur River Basin Projects

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right Permit	TCEQ	Will require an inter-basin transfer authorization.
404	USACE	Required for construction activities in waters of the US.

7.12.7 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict. The Sulphur Basin project possesses a high level of risk associated with permitting as discussed in Section 7.12.5. In addition, this project is susceptible to performance risk associated with a worse drought of record and future increases in reservoir evaporation from increasing temperature.

7.12.8 Agricultural and Natural Resources

The project would permanently impact an estimated 10,824 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. This area represents less than 1.5 % of the total prime farmland in Red River, Franklin, Titus, Bowie, Cass and Morris counties. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.12.9 References

JCPD, Sulphur River Basin Feasibility Study. Cost Rollup Report. FNI. July 2014

Corps of Engineers. Sulphur River Basin Overview. January 2014

TWDB. Region C Water Plan. October 2010

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7.13 Toledo Bend to West System

In the 1960s, the Sabine River Authority of Texas (SRA Texas) and the Sabine River Authority of Louisiana (SRA Louisiana) constructed Toledo Bend Reservoir (Toledo Bend) on the Texas-Louisiana border. The reservoir has a conservation capacity of 4.477 million acft and has a yield of approximately 1.5 million acft/yr. SRA Texas holds a Texas water right to divert 750,000 acft/yr (670 MGD) from Toledo Bend. Up to 700,000[1] acft/yr is being considered for transport from Toledo Bend to other lakes in Texas.

7.13.1 Strategy Description

DWU, TRWD, NTMWD, and SRA Texas have been collaborating for many years on a potential transfer of water form Toledo Bend Reservoir to the upper Sabine River basin and to the Dallas-Fort Worth (DFW) Metroplex. Though the details of the potential transfer have changed over time, it is assumed for purposes of this analysis that a total of 700,000 acft/yr could be purchased with 100,000 acft/yr (89 MGD) being transferred to the upper Sabine River Basin and 600,000 acft/yr (536 MGD) being transferred to the DFW Metroplex. The 700,000 acft/yr (625 MGD) is assumed to be divided between the project partners as follows:

- Dallas Water Utilities – 200,000 acft/yr (179 MGD)
- NTMWD – 200,000 acft/yr (179 MGD)
- TRWD – 200,000 acft/yr (179 MGD)
- SRA Texas – 100,000 acft/yr (89 MGD)

A shared 225 mile pipeline would be needed to deliver supplies between the reservoir and DWU with deliveries to DWU being assumed to be to the Joe Pool Lake area and other lakes along the route (Figure 7.13-1).

7.13.2 Water Availability

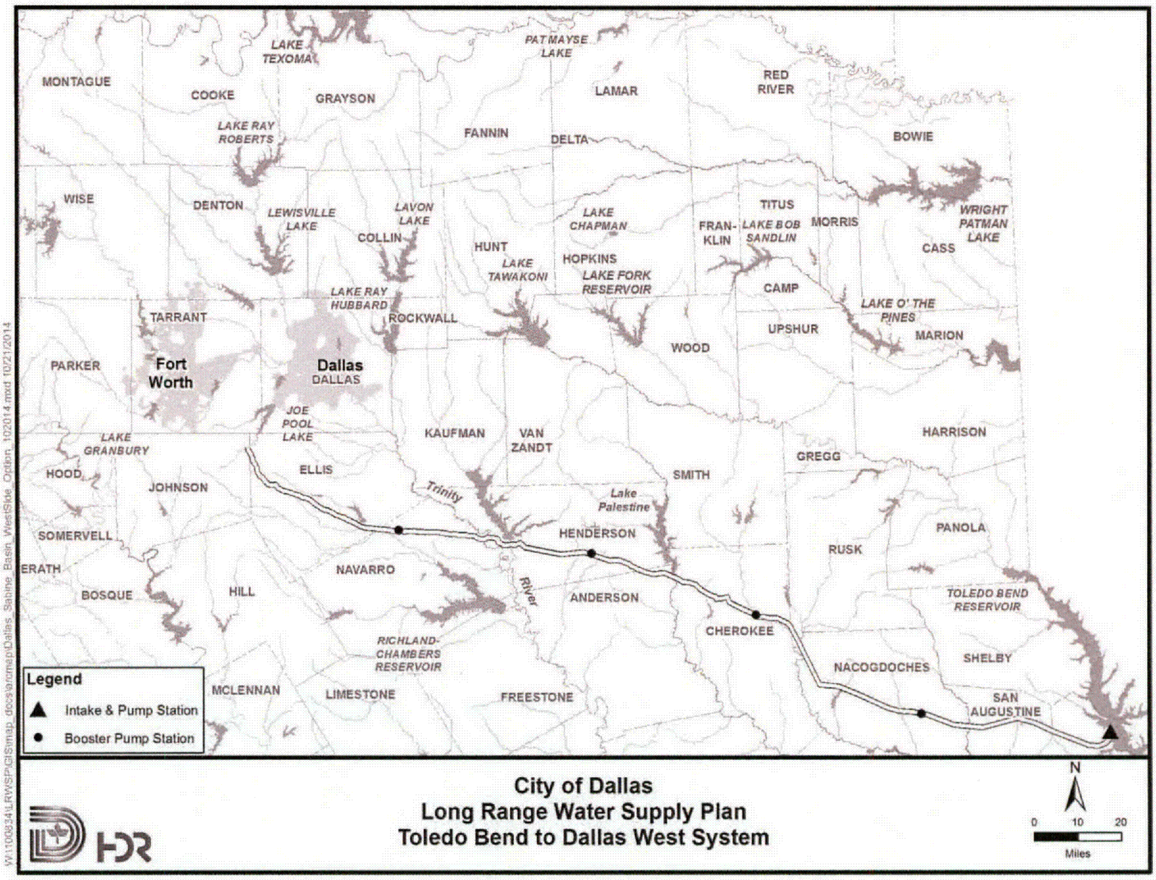
SRA Texas holds a Texas water right permit to divert 750,000 acft/yr (670 MGD) from Toledo Bend Reservoir and is seeking the right to divert an additional 293,300 acft/yr (262 MGD). For purposes of this analysis, up to 700,000 acft/yr is being considered for transport to DWU and other entities in the DFW Metroplex. This project would provide 200,000 acft/yr to DWU.

7.13.3 Environmental Issues

Table 7.13-1 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of conditions and further study would be needed in any feasibility or permitting effort to address these potential concerns with the respective regulatory agencies.

[1] 2011 Region C Water Plan

Figure 7.13-1. Toledo Bend Reservoir to DWU's Western System



Since the reservoir is an existing source of water, impacts to the environment are limited to the pipeline route, environmental flows downstream of Toledo Bend and transmission facilities to the various water bodies.

Habitat

Although, not finalized, the proposed pipeline route will cross sections of the Sabine National Forest, three Texas Parks and Wildlife Department designated ecologically significant stream segments, an area of U.S. Fish and Wildlife Service (USFWS) Priority 1 bottomland hardwoods, and USFWS designated critical habitat areas for the endangered Texas golden gladecress. The pipeline route crosses portions of ten counties which include numerous state and federally listed endangered or threatened species, and federal candidate species that use these various habitats. However, specific project components such as pipelines generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to these geographically limited environmental sites resulting in medium to low impacts.

Depending on the ultimate design, the transfer of water between water bodies could result in potential environmental impacts due to altered biodiversity, competition between introduced and native species, additional distribution of invasive species and changes to water quality.

Environmental Water Needs

Implementation and operation of this strategy could have a medium impact on daily flows in the Sabine River due to the amount of supply diverted from storage that might have been previously passed downstream. However, it will leave adequate flows in the Sabine River to meet required TCEQ environmental flow requirements.

Bays and Estuaries

Transporting of supplies out of the basin will impact flows to Sabine Lake and its estuary downstream of Toledo Bend Reservoir. Freshwater stream flows are critical to the health of the Sabine estuary system. Quantifying that impact will require additional detailed analysis.

Threatened and Endangered Species

The species included in Table 7.13-1 represent all species federally or state listed as threatened or endangered, and federal candidate species in the counties for which the project will be located. The project area includes forty one species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipeline to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area. The numbers of listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

Although a number of wetlands occur along the proposed pipeline corridor, flexibility in the pipeline siting would be used to minimize or avoid potential impacts to the majority of these areas.

7.13.4 Planning Cost Estimate

Shared project facilities will include a 781 MGD intake and pump station at Toledo Bend Reservoir, 225 miles of parallel 144-inch diameter and 108-inch diameter transmission pipeline, and 4 booster pump stations. The route parallels the Integrated Pipeline (IPL) route between Lake Palestine and Joe Pool Lake.

A summary of DWU's portion of project and annual costs for the Toledo Bend pipeline is listed in Table 7.13-2. Total project costs are $2.3 billion. Annual costs for the project assume a 30 year debt service with a 5.5 percent interest rate are estimated to be $204,486,000 per year. The raw water purchase cost from SRA of Texas is estimated at $22/acft/yr. The unit cost of water for this project is $1,022 per acft or $3.14 per 1,000 gallons. After debt service, the unit cost of water would decrease to $236 per acft or $0.72 per 1,000 gallons.

Table 7.13-1. Environmental Factors for Toledo Bend to West System

Environmental Factors	Comment(s)	Level of Concern
Habitat	Low to Medium Impact	Low to Medium
Environmental Water Needs	Medium Impact	Medium
Bays and Estuaries	Medium Impact	Medium
Threatened, Endangered and Candidate Species	Low impact Swallow-tailed kite ST, American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, red-cockaded woodpecker FE and SE, white-faced ibis ST, whooping crane FE and SE, wood stork ST, blue sucker ST, golden-cheeked warbler FE and SE, black-capped vireo FE and SE, sharpnose shiner FE, smalleye shiner FE, gray wolf FE and SE, black bear ST, Louisiana black bear, FT and ST, red wolf FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, earth fruit LT and ST, creek chubsucker ST, paddlefish ST, Rafinesque's big eared bat ST, Louisiana pine snake C and ST, northern scarlet snake ST, Neches River rose mallow FT, Brazos water snake ST, Texas golden gladecress FE, white bladderpod FE and SE, Texas fawnsfoot C and ST, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, Texas pigtoe ST, and triangle pigtoe ST.	Low
Wetlands	Medium to Low Impact	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered. ST = State Listed as Threatened. C = Candidate for Federal Listing

7.13.5 Permitting and Implementation Issues

The Toledo Bend Pipeline project would pose several permitting challenges along with the typical challenges associated with a new project, summarized in Table 7.13-3. Water supply from Toledo Bend will require a contract with the SRA Texas, who may need to secure additional water from Louisiana's allocation or may need to permit additional water from the unallocated portion of the Reservoir.

The water rights permit will need to be amended to include an inter-basin transfer authorization to allow the water to be used in the Trinity River Basin. A Section 404 permit from the USACE for impacts to a waterway will be needed for construction of the diversion facilities and pipeline.

Table 7.13-2. Cost Estimate for DWU Portion of Toledo Bend Pipeline to West System

Table units: September 2013 Dollars

Item	Estimated Portion of DWU's Cost of Facilities
CAPITAL COST	
Intake Pump Station	$32,863,000
Transmission Pipeline	$1,252,108,000
Transmission Pump Station(s) & Storage Tank(s)	$118,403,000
TOTAL COST OF FACILITIES	**$1,403,374,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$428,576,000
Environmental & Archaeology Studies and Mitigation	$2,258,000
Land Acquisition and Surveying (7,385 acres)	$5,201,000
Interest During Construction (4% for 7 years with a 1% ROI)	$450,656,000
TOTAL COST OF PROJECT	**$2,290,065,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$157,346,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$15,671,000
Pumping Energy Costs (0.08 $/kW-hr)	$27,069,000
Purchase of Water (200,000 acft/yr @ 22 $/acft)	$4,400,000
TOTAL ANNUAL COST	**$204,486,000**
Available Project Yield (acft/yr)	**200,000**
Annual Cost of Water ($ per acft)	**$1,022**
Annual Cost of Water ($ per 1,000 gallons)	**$3.14**
Annual Cost of Water after Debt Service ($ per acft)	**$236**
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	**$0.72**

Table 7.13-3. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right Permit	TCEQ	Will require water rights permit amendment to allow for an inter-basin transfer to the Trinity River Basin.
404	USACE	Required for construction activities in waters of the US.

7.13.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can include permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict. The Toledo Bend project is susceptible to permitting risk and competition. Supply volumes are not fixed until a contract is signed and current negotiations between SRA Texas and other entities in Southeastern Texas could reduce DWU, NTMWD, TRWD proposed portion of supply, unless SRA Texas can secure additional water. SRA Texas is seeking the right to divert an additional 293,300 acft/yr from TCEQ. Without sufficient supply, the project could become cost prohibitive.

7.13.7 Agricultural and Natural Resources

Construction activities associated with the project transmission pipeline will impact an estimated 438 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils within 10 counties. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because these areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.13.8 References

2011 Region C Water Plan. Vol 1-3. October 2010

Freese and Nichols, Inc.; Alan Plummer Associates, Inc.; CP&Y, Inc.; and Cooksey Communications, Inc. 2010. "Volume 1 of 3, Main Report." 2011 Region C Water Plan. Prepared for Region C Water Planning Group.

http://www.twdb.texas.gov/waterplanning/rwp/plans/2011/C/Region_C_2011_RWPV1.pdf

Schaumburg and Polk, Inc.; Freese and Nichols, Inc.; and Alan Plummer Associates, Inc. 2009. "East Texas Region, Special Study No. 1: Inter-Regional Coordination on the Toledo Bend Project." Final Report. Prepared for East Texas Regional Water Planning Group.

http://www.twdb.texas.gov/publications/reports/contracted_reports/doc/0704830694_RegionI/Special%20StudyNo1.pdf

7.14 Lake Texoma Pipeline and Advanced Water Treatment Plant

Lake Texoma is an 89,000 acre US Army Corps of Engineers (USACE) reservoir constructed in 1944 and located on the Red River on the border between Texas and Oklahoma approximately 50 miles north of the DFW Metroplex. It is authorized for flood control, hydropower, water supply and recreation and has a conservation pool capacity of 2,516,232 acft.

Under the terms of the Red River Compact, the yield of Lake Texoma is divided equally between Texas and Oklahoma. The firm yield of the storage amount allocated to Texas is 316,550 acft/yr (283 MGD) and has already been fully permitted by the TCEQ to other Texas entities. According to the USACE an additional supply of 220,000 acft/yr (196 MGD) could potentially be made available to Texas entities if the U.S. Congress authorizes the reallocation of hydropower storage in Lake Texoma to municipal water supply. Additionally, available supply from Oklahoma's portion of the municipal supply could be purchased by DWU if Oklahoma entities were willing to sell some part of their allocation.

7.14.1 Strategy Description

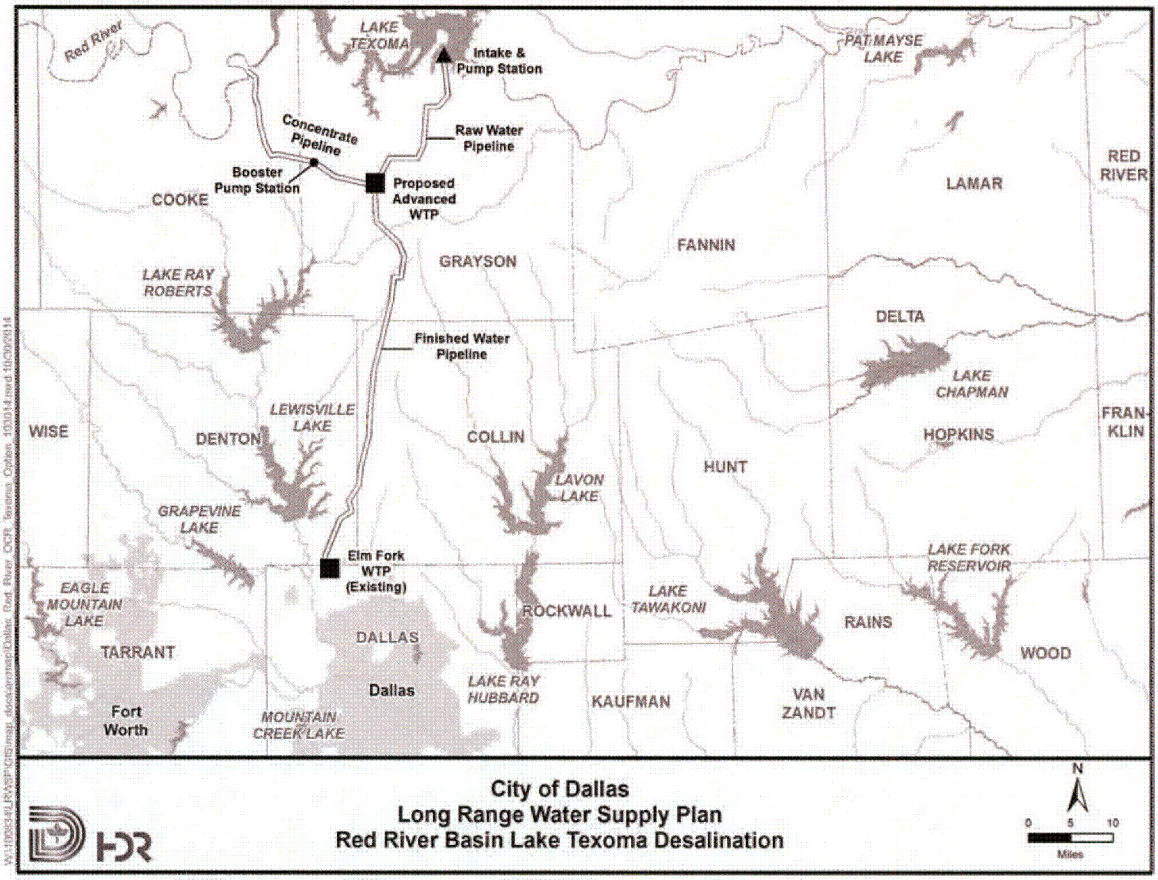
Up to 162,271 acft/yr of Oklahoma's share of the Lake Texoma water supply may be available if Oklahoma entities were willing to sell some part of their allocation. This would require a contract or permit between Oklahoma entities and DWU.

Lake Texoma has elevated levels of dissolved solids, chlorides and sulfates, and the water must be either blended with higher quality water or desalinated for municipal use. To utilize this supply would require a raw water intake and transmission line to a treatment facility, a treatment and desalination facility to pre-treat the entire supply and desalinate 50 percent of the supply, disposal of concentrate back upstream of the lake into the Red River (where stream standards allow for higher concentrations of dissolved minerals), and then pump the treated water to the clear wells at DWU's Elm Fork WTP. Figure 7.14-1 shows Lake Texoma's location in relation to the Dallas system, along with the proposed pipeline routes, and proposed location of the treatment facility.

7.14.2 Water Availability

Although the potential water supply capability of Lake Texana is very large, none of its unutilized yield is currently available to Texas entities. Potentially, up to 162,271 acft/yr (145 MGD) of Oklahoma's share of Lake Texoma could be made available if Oklahoma entities were willing to sell all or a portion of their allocation to Texas. This would require a contract or permit between Oklahoma entities and DWU. Additionally, an additional supply of 220,000 acft/yr (196 MGD) could potentially be made available to Texas entities if the U.S. Congress would authorize the reallocation of hydropower storage in to municipal water supply.

Figure 7.14-1. Lake Texoma Desalination



7.14.3 Environmental Issues

Table 7.14-1 provides a summary of known environmental factors that would need to be considered during the permitting and implementation of this project. These categories provide a general summary of conditions that would need further study in feasibility or permitting efforts to address these potential concerns with the respective regulatory agencies.

Since the reservoir is an existing source of water, impacts to the environment are limited to the pipeline route, changes in the levels of dissolved minerals in the river from return of the desalination concentrate, and environmental flows downstream of Lake Texoma.

A draft supplemental environmental assessment completed in April 2009 indicated that the storage reallocation authorized by Sec 838 for 150,000 acre-feet or 300,000 acre-feet of storage would have no significant adverse effects on the natural or human environment.

Habitat

The proposed pipelines will cover nearly 100 miles through five counties which include 24 state and federally listed endangered or threatened, or federal candidate species which use the various area habitats. The majority of the pipeline route follows existing road right-of-ways or crosses areas of agricultural use including crops and pasture. Impacts to preferred habitats will be minimized by utilizing these areas which have been previously disturbed. Wooded riparian areas commonly occur along and adjacent to stream and river crossings that will be crossed by the pipeline corridor. These areas are commonly utilized by many different species and should be avoided as much as reasonably possible. The pipeline route will also cross wetland areas which will be disturbed during construction. The use of best management practices (BMPs) during construction activities will help to minimize potential impacts to these areas.

However, specific project components such as pipelines generally have sufficient design flexibility to avoid most impacts, or significantly reduce potential impacts to geographically limited environmental habitats. As a result any impacts to existing habitat are anticipated to be low.

Environmental Water Needs

Implementation and operation of the Lake Texoma project could have a medium impact on daily flows in the Red River due to the amount of supply diverted from storage that might have been previously passed downstream especially if the reallocation of hydropower use to municipal use were to occur. If the source of the water comes from the purchase of Oklahoma's share of Lake Texoma, then impacts would likely be low.

Bays and Estuaries

The Lake Texoma project will not affect an estuary system as the Red River eventually flows into the Mississippi River system.

Threatened and Endangered Species

The species included in Table 7.14-1 represent all species federally or state listed as threatened or endangered, and federal candidate species in the counties for which the project will be located. The project area includes twenty four species that meet these criteria. These species would need to be considered and potentially mitigated for during project permitting and implementation. Siting of the pipeline to avoid specific habitat types and the use of best management practices (BMPs) during design and construction activities are anticipated to minimize potential impacts to species within the project area. The numbers of listed species which occur within the project area counties are not expected to present a significant challenge to the feasibility of the project.

Wetlands

Although a number of wetlands occur along the proposed pipeline corridor, flexibility in the pipeline siting would be used to minimize or avoid potential impacts to the majority of these areas. Impacts to wetlands associated with this project are anticipated to be low.

Table 7.14-1. Environmental Factors for Lake Texoma Pipeline

Environmental Factors	Comment(s)	Level of Concern
Habitat	Low	Low
Environmental Water Needs	Low Impact if Water is from Oklahoma share of Texoma Medium Impact if Water is from Hydro-power Reallocation	Low to Medium
Bays and Estuaries	Low Impact	Low
Threatened and Endangered Species	Medium Low impact American peregrine falcon ST, bald eagle ST, black-capped vireo FE and SE, eskimo curlew FE and SE, golden-cheeked warbler FE and SE, interior least tern LE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, whooping crane FE and SE, white-faced ibis ST, wood stork ST, Texas heelsplitter ST, Louisiana pigtoe ST, Texas pigtoe ST, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, blue sucker ST, creek chubsucker ST, paddlefish ST, shovelnose sturgeon ST, red wolf FE and SE, and gray wolf FE and SE.	Low
Wetlands	Low Impact	Low

LE = Federally Listed as Endangered. LT = Federally Listed as Threatened. SE = State Listed as Endangered. ST = State Listed as Threatened. C = Candidate for Federal Listing

7.14.4 Planning Cost Estimate

Project facilities for raw water delivery and treatment will include a 181 MGD intake and pump station at Lake Texoma, 23 miles of 90-inch diameter raw water transmission pipeline to a proposed 90 MGD reverse osmosis WTP and a 163 MGD conventional WTP, 25 miles of 30-inch diameter pipeline for concentrate disposal. Finished water will be pumped another 50 miles through an 84-inch diameter pipeline to the Elm Fork WTP clearwells for distribution within the DWU system.

A summary of DWU's portion of project and annual costs is listed in Table 7.14-2. Many of the DWU supply options are based on delivering raw water to the city and assumptions of WTP expansions. However, due to the impaired water quality at Lake Texoma, treatment costs are included in order to produce a potable supply. Therefore, to appropriately compare this strategy to other strategies (which only include costs associated with delivering raw water to one of the Dallas WTPs), the cost that Dallas would avoid associated with the expansion of an existing conventional treatment plant is subtracted from the total cost.

Total project costs are $1.3 billion which includes avoided costs of $205 Million to expand one of Dallas' WTPs. Annual costs for the project assume a 30 year debt service and a 5.5 percent interest rate are estimated to be $173,313,000 per year. The unit cost of water for this project to deliver water to the Elm Fork WTP would be about

$1,187 per acft or $3.64 per 1,000 gallons. After debt service, the unit cost of water is decreased to $614 per acft or $1.89 per 1,000 gallons.

Table 7.14-2. Cost Estimate Summary for Lake Texoma Pipeline and Advanced WTP

Table units: September 2013 Dollars

Item	Estimated Cost for Facilities
CAPITAL COST	
Intake Pump Stations (181 MGD)	$55,157,000
Transmission Pipeline (90 in dia, 25 mi; 30 in dia, 27 mi; 84 in dia, 55 mi)	$318,022,000
Transmission Pump Station(s) & Storage Tank(s)	$4,739,000
Water Treatment Plant (Level 3 & Level 4: RO treatment @ 90.6 MGD, peak + a new conventional plant @ 162.9 MGD, peak)	$582,752,000
TOTAL COST OF FACILITIES	**$960,670,000**
OTHER PROJECT COSTS	
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$320,334,000
Environmental & Archaeology Studies and Mitigation	$2,926,000
Land Acquisition and Surveying (1,905 acres)	$7,537,000
Interest During Construction (4% for 5 years with a 1% ROI)	$226,007,000
Avoided Cost (Less cost of expansion @ 162.9 MGD)	($205,297,000)
TOTAL COST OF PROJECT	**$1,312,177,000**
ANNUAL COST	
Debt Service (5.5 percent, 30 years)	$104,127,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	$4,661,000
Water Treatment Plant	$72,840,000
Pumping Energy Costs (kW-hr @ 0.08 $/kW-hr)	$9,003,000
Purchase of Water (146,000 acft/yr @ 22 $/acft)	$3,212,000
Avoided Annual Cost (Less O&M, Debt Service for 162.9 MGD)	($20,530,000)
TOTAL ANNUAL COST	**$173,313,000**
Available Project Yield (acft/yr)	146,000
Annual Cost of Water ($ per acft)	$1,187
Annual Cost of Water ($ per 1,000 gallons)	$3.64
Annual Cost of Water after Debt Service ($ per acft)	$614
Annual Cost of Water after Debt Service ($ per 1,000 gallons)	$1.89

7.14.5 Permitting and Implementation Issues

Dallas would require a contract with some entity in Oklahoma that has permitted rights to Oklahoma's share of the yield through the OWRB. The Oklahoma legislature would also need to approve this out-of-state transfer unless the contract is with a Native American tribe. However, any sale from the Native American tribes will first require a quantification of Indian water rights either by the Federal courts or as mediated by the Department of the Interior. For hydropower storage in Lake Texoma to be reallocated to municipal water supply, Federal legislation by the U.S. Congress would be needed.

As shown in Table 7.14-3, coordination with the TCEQ will be required to determine if stream standards will allow for the discharge of the concentrate into the Red River upstream of Lake Texoma. In addition, an inter-basin transfer authorization will be required from TCEQ as well as a Section 404 permit from the USACE for impacts to a waterway from construction activities.

Table 7.14-3. Potential Permitting Requirements

Permit	Lead Regulatory Agency	Comments / Challenges
Water Right Permit	TCEQ	Will require an inter-basin transfer authorization.
404	USACE	Required for construction activities in waters of the US.
TPDES	TCEQ	Required for discharge of concentrate into Red River upstream of Lake Texoma.

7.14.6 Project Risk and Alternatives

As with any project, there are inherent risks to eventual implementation and development. These risks can be permitting risks, mitigation risks, performance risks, and/or risks associated with various types of conflict.

Pursuing additional Texas supplies from Lake Texoma has associated permitting risks since the Oklahoma legislature will also have to approve this out-of-state transfer unless the contract is with a Native American tribe. However, any sale from the Native American tribes will first require a quantification of Indian water rights either by the Federal courts or as mediated by the Department of the Interior. Alternatively, Dallas could pursue reallocation of hydropower storage to municipal water supply which has been studied; however, the U.S. Congress would have to approve this strategy and it would require coordination with power interests.

Previous strategies considered by Dallas included desalination of a portion of the Lake Texoma water supply and then conveying the water to Lake Ray Roberts for blending. However, the transfer of Lake Texoma water directly to other reservoirs is prohibited by the Lacey Act due to the presence of zebra mussels and therefore the current strategy delivers supplies directly to the Elm Fork WTP.

7.14.7 Agricultural and Natural Resources

Construction activities associated with the project transmission pipeline will impact an estimated 243 acres of soils identified by the U.S. Department of Agriculture (USDA) as prime farmland soils. Some agricultural activities within these areas may be disturbed during pipeline construction. However, because these areas will be allowed to return to their original land uses after construction is completed; no long-term impacts to these areas are anticipated from the project. This strategy is consistent with long-term protection of the state's water resources, agricultural resources, and natural resources. Impacts to natural resources of the state are included in the Environmental Impacts section above.

7.14.8 References

2011 Region C Water Plan. Vol 1-3. October 2010

Freese and Nichols, Inc.; Alan Plummer Associates, Inc.; CP&Y, Inc.; and Cooksey Communications, Inc. 2010. "Volume 1 of 3, Main Report." 2011 Region C Water Plan. Prepared for Region C Water Planning Group.

http://www.twdb.texas.gov/waterplanning/rwp/plans/2011/C/Region_C_2011_RWPV1.pdf

OWRB, 2012. "Lower Washita Watershed Planning Region Report." Oklahoma Comprehensive Water Plan.
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Cost Estimate Summary
Water Supply Project Option
41518 Prices
Trinity PS

Cost based on ENR CCI 9552 for 41518 and a PPI of 187 for 41518

Item	*Estimated Costs for Facilities*
	90 MGD operation
CAPITAL COST	
Dam and Reservoir (Conservation Pool acft, acres)	$0
Off-Channel Storage/Ring Dike (Conservation Pool acft, acres)	$0
Channel Dam	$9,354,000
Intake, Pump Station and Channel Improvements	$22,145,000
Transmission Pipeline (72 in dia., 14 miles)	$32,546,000
TOTAL COST OF FACILITIES	**$54,691,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$17,515,000
Environmental & Archaeology Studies and Mitigation	$374,000
Land Acquisition and Surveying (91 acres)	$353,000
Interest During Construction (4% for 1 years with a 1% ROI)	$2,553,000
TOTAL COST OF PROJECT	**$75,486,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$6,317,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$879,000
Pumping Energy Costs (28114318 kW-hr @ 0.08 $/kW-hr)	$2,249,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$9,445,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	100,800
Annual Cost of Water ($ per acft)	$94
Annual Cost of Water ($ per 1,000 gallons)	$0.29

Peter Newell *4/2/2015*

Cost Estimate Summary
Water Supply Project Option
September 2013 Prices
Ellis1C OCR (5b) from SE intake to Joe Pool

Cost based on ENR CCI 9552 for September 2013 and a PPI of 187

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool acft, acres)	$0
Off-Channel Storage/Ring Dike (Conservation Pool 300000 acft, 4337 acres)	$199,834,000
Terminal Storage (Conservation Pool acft, acres)	$0
Intake Pump Stations (102 MGD)	$21,041,000
Transmission Pipeline (120 in dia & 90 in dia., 40 miles)	$163,304,000
Transmission Pump Station(s) & Storage Tank(s)	$44,023,000
Storage Tanks (Other Than at Booster Pump Stations)	$0
Water Treatment Plant (0 MGD)	$0
Integration, Relocations, & Other	$5,761,000
TOTAL COST OF FACILITIES, based on a Peaking Factor of 1.25	**$433,963,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$143,722,000
Environmental & Archaeology Studies and Mitigation	$16,263,000
Land Acquisition and Surveying (4584 acres)	$16,425,000
Interest During Construction (4% for 3 years with a 1% ROI)	$64,090,000
TOTAL COST OF PROJECT	**$674,463,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$28,653,000
Reservoir Debt Service (5.5 percent, 40 years)	$20,694,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$3,098,000
Dam and Reservoir (1.5% of Cost of Facilities)	$2,998,000
Pumping Energy Costs (154804577 kW-hr @ 0.08 $/kW-hr)	$12,384,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$67,827,000**
Available Project Yield (acft/yr)	114,337
Annual Cost of Water ($ per acft)	$593
Annual Cost of Water ($ per 1,000 gallons)	$1.82

Note: One or more cost element has been calculated externally

P. Newell *4/2/2015*

Cost Estimate Summary
Water Supply Project Option
September 2013 Prices
UNWSP - East Route (E3) - Scenario 1 (SW)

Cost based on ENR CCI 9552 for September 2013 and a PPI of 186.5 for July 2013

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Dam and Reservoir (Conservation Pool acft, acres)	$0
Off-Channel Storage/Ring Dike (Conservation Pool acft, acres)	$0
Terminal Storage (Conservation Pool acft, acres)	$0
Intake Pump Stations (91.1 MGD)	$26,750,000
Transmission Pipeline (72 in dia., 42 miles)	$118,007,000
Transmission Pump Station(s) & Storage Tank(s)	$15,206,000
Well Fields (Wells, Pumps, and Piping)	$0
Storage Tanks (Other Than at Booster Pump Stations)	$0
Water Treatment Plant (0 MGD)	$0
Integration, Relocations, & Other	$0
TOTAL COST OF FACILITIES	**$159,963,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$50,087,000
Environmental & Archaeology Studies and Mitigation	$1,086,000
Land Acquisition and Surveying (266 acres)	$817,000
Interest During Construction (4% for 2 years with a 1% ROI)	$14,837,000
TOTAL COST OF PROJECT	**$226,790,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$17,839,000
Reservoir Debt Service (5.5 percent, 40 years)	$0
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$2,174,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant (2.5% of Cost of Facilities)	$0
Pumping Energy Costs (55481745 kW-hr @ 0.08 $/kW-hr)	$4,439,000
Delivery through IPL ($160,000 per MGD)	$6,750,000
Purchase of Water (acft/yr @ $/acft)	$0
TOTAL ANNUAL COST	**$31,202,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1.56	47,250
Annual Cost of Water ($ per acft)	$660
Annual Cost of Water ($ per 1,000 gallons)	$2.03

P. Newell *4/2/2015*

Cost Estimate Summary
Water Supply Project Option
September 2013 Prices
ANRA - Lake Columbia

Cost based on ENR CCI 9552 for September 2013 and a PPI of 186.5 for July 2013

Item	Estimated Costs for Facilities
Dam and Reservoir (Conservation Pool 195500 acft, 11500 acres)	$33,711,000
Intake Pump Stations (52.6 MGD)	$15,470,000
Transmission Pipeline (54 in dia., 20 miles)	$42,531,000
Integration, Relocations, & Other	$68,328,000
TOTAL COST OF FACILITIES	**$160,040,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$53,888,000
Environmental & Archaeology Studies and Mitigation	$22,948,000
Land Acquisition and Surveying (8538 acres)	$24,335,000
Interest During Construction (4% for 3 years with a 1% ROI)	$27,429,000
TOTAL COST OF PROJECT	**$288,640,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$15,759,000
Reservoir Debt Service (5.5 percent, 40 years)	$6,252,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$812,000
Dam and Reservoir (1.5% of Cost of Facilities)	$506,000
Pumping Energy Costs (0.08 $/kW-hr)	$11,371,000
TOTAL ANNUAL COST	**$34,700,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	56,000
Annual Cost of Water ($ per acft)	$620
Annual Cost of Water ($ per 1,000 gallons)	$1.90

Note: One or more cost element has been calculated externally

Z. Stein *4/2/2015*

Cost Estimate Summary
Water Supply Project Option
September 2013 Prices
Dallas LRWSP Groundwater Level 2 - Rte2

Cost based on ENR CCI 9552 for September 2013 and a PPI of 186.5 for July 2013

Item	***Estimated Costs for Facilities***
CAPITAL COST	
Dam and Reservoir (Conservation Pool acft, acres)	$0
Off-Channel Storage/Ring Dike (Conservation Pool acft, acres)	$0
Terminal Storage (Conservation Pool acft, acres)	$0
Intake Pump Stations (5.6 MGD)	$7,931,000
Transmission Pipeline (24 in dia., 58 miles)	$57,078,000
Transmission Pump Station(s) & Storage Tank(s)	$7,674,000
Well Fields (Wells, Pumps, and Piping)	$37,212,000
Storage Tanks (Other Than at Booster Pump Stations)	$0
Water Treatment Plant (0 MGD)	$0
Integration, Relocations, & Other	$0
TOTAL COST OF FACILITIES	**$109,895,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$35,609,000
Environmental & Archaeology Studies and Mitigation	$3,858,000
Land Acquisition and Surveying (435 acres)	$1,164,000
Interest During Construction (4% for 2 years with a 1% ROI)	$10,537,000
TOTAL COST OF PROJECT	**$161,063,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$13,478,000
Reservoir Debt Service (5.5 percent, 40 years)	$0
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$1,287,000
Dam and Reservoir (1.5% of Cost of Facilities)	$0
Water Treatment Plant (2.5% of Cost of Facilities)	$0
Pumping Energy Costs (26618908 kW-hr @ 0.08 $/kW-hr)	$2,130,000
Delivery through Eastside Supply Pipeline ($ 60000/ MGD)	$1,607,000
Purchase of Water (30000 acft/yr @ 50 $/acft)	$1,500,000
TOTAL ANNUAL COST	**$20,002,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	30,000
Annual Cost of Water ($ per acft)	$667
Annual Cost of Water ($ per 1,000 gallons)	$2.05

P. Newell *4/2/2015*

Cost Estimate Summary
Water Supply Project Option
September 2013 Prices
Dallas LRWSP Groundwater -- Conjunctive Use

Cost based on ENR CCI 9552 for September 2013 and a PPI of 186.5 for July 2013

Item	***Estimated Costs for Facilities***
Off-Channel Storage/Ring Dike (Conservation Pool acft, acres)	$284,471,000
Intake Pump Stations (8.5 MGD)	$48,835,000
Transmission Pipeline (24 in dia., 65 miles)	$140,992,000
Transmission Pump Station(s) & Storage Tank(s)	$19,648,000
Well Fields (Wells, Pumps, and Piping)	$37,212,000
TOTAL COST OF FACILITIES	**$531,158,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$178,856,000
Environmental & Archaeology Studies and Mitigation	$6,466,000
Land Acquisition and Surveying (440 acres)	$3,714,000
Interest During Construction (4% for 3 years with a 1% ROI)	$75,621,000
TOTAL COST OF PROJECT	**$795,815,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$29,885,000
Reservoir Debt Service (5.5 percent, 40 years)	$26,756,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$3,423,000
Dam and Reservoir (1.5% of Cost of Facilities)	$4,267,000
Pumping Energy Costs (103846155 kW-hr @ 0.08 $/kW-hr)	$8,308,000
Delivery through Eastside Supply Pipeline ($ 60000/ MGD)	$5,582,000
Purchase of Water (15666 acft/yr @ 50 $/acft)	$783,000
TOTAL ANNUAL COST	**$79,004,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	104,200
Annual Cost of Water ($ per acft)	$758
Annual Cost of Water ($ per 1,000 gallons)	$2.33

Note: One or more cost element has been calculated externally

Z. Stein *4/2/2015*

Cost Estimate Summary
Water Supply Project Option
41518 Prices
DWU - Red River Diversion

Cost based on ENR CCI 9552 for 41518 and
a PPI of 187 for 41518

Item	***Estimated Costs for Facilities***
Off-Channel Storage/Ring Dike (Conservation Pool 32000 acft, 800 acres)	$127,951,000
Intake Pump Stations (127.2 MGD)	$49,908,000
Transmission Pipeline (84 in dia., 100 miles)	$374,425,000
Transmission Pump Station(s) & Storage Tank(s)	$20,026,000
TOTAL COST OF FACILITIES	**$572,310,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$181,587,000
Environmental & Archaeology Studies and Mitigation	$5,284,000
Land Acquisition and Surveying (3286 acres)	$12,752,000
Interest During Construction (4% for 3 years with a 1% ROI)	$81,054,000
TOTAL COST OF PROJECT	**$852,987,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$54,931,000
Reservoir Debt Service (5.5 percent, 40 years)	$12,248,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$5,493,000
Dam and Reservoir (1.5% of Cost of Facilities)	$1,919,000
Zebra Mussel Treatment	$2,697,000
Pumping Energy Costs (168371790 kW-hr @ 0.08 $/kW-hr)	$13,470,000
Sediment Basin Dredging	$1,919,000
TOTAL ANNUAL COST	**$92,677,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1.25	114,000
Annual Cost of Water ($ per acft)	$813
Annual Cost of Water ($ per 1,000 gallons)	$2.49

Note: One or more cost element has been calculated externally

Z. Stein *4/2/2015*

Table A-3. Water Supply Cost Estimate - Lake Texoma

Cost Estimate Summary
Water Supply Project Option
Sep 2013 Prices
DWU - Lake Texoma

Item	*Estimated Costs for Facilities*
CAPITAL COST	
Intake Pump Stations (181.1 MGD)	$55,157,000
Transmission Pipeline (90 in dia, 25 mi; 30 in dia, 27 mi; 84 in dia, 55 mi)	$318,022,000
Transmission Pump Station(s) & Storage Tank(s)	$4,739,000
Water Treatment Plant (Level 3 & Level 4: RO treatment @ 90.6 MGD, peak + a new conventional plant @ 162.9 MGD, peak)	$582,752,000
TOTAL COST OF FACILITIES	**$960,670,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$320,334,000
Environmental & Archaeology Studies and Mitigation	$2,926,000
Land Acquisition and Surveying (1905 acres)	$7,537,000
Interest During Construction (4% for 5 years with a 1% ROI)	$226,007,000
Avoided Cost (Less cost of expansion @ 162.9 MGD)	($205,297,000)
TOTAL COST OF PROJECT	**$1,312,177,000**
	x
ANNUAL COST	x
Debt Service (5.5 percent, 20 years)	$126,637,000
Operation and Maintenance	x
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$4,661,000
Water Treatment Plant (2.5% of Cost of Facilities)	$72,840,000
Pumping Energy Costs (112531872 kW-hr @ 0.08 $/kW-hr)	$9,003,000
Purchase of Water (146000 acft/yr @ 22 $/acft)	$3,212,000
Avoided Annual Cost (Less O&M, Debt Service for 162.9 MGD expansion)	($20,530,000)
TOTAL ANNUAL COST	**$195,823,000**
	x
Available Project Yield (acft/yr)	146,000
Annual Cost of Water ($ per acft)	$1,341
Annual Cost of Water ($ per 1,000 gallons)	$4.12

Note: One or more cost element has been calculated externally

L. Starosta *4/2/2015*

Appendix M

APPENDIX M

SELECTION OF KEY WATER QUALITY PARAMETERS AND BASELINE WATER QUALITY CONDITIONS

Appendix M

Selection of Key Water Quality Parameters and Baseline Water Quality Conditions

M.1 Key Water Quality Parameters Selection

Regional Water Planning Groups are charged with selecting key water quality parameters that are important to water uses in the region, and assessing impacts of water management strategies on these parameters. This appendix provides the parameter selection process and establishes baseline water quality conditions for the selected parameters.

In order to provide some basis for selection of parameters and for quantitative comparisons between different water bodies within the region, regulatory standards and screening levels are referenced throughout this memorandum. <u>However, it is not the intent of this memorandum to evaluate regulatory compliance of any water body within the region.</u> These regulatory standards are only used as "yardsticks" for relative comparisons of water quality within the region.

M.1.1 Process of Selecting Key Water Quality Parameters

Selection of key water quality parameters for surface water and groundwater involved a two-stage process. The first stage included a compilation of potential water quality parameters from various sources. These sources are described below:

a) Parameters regulated by the Texas Commission on Environmental Quality (TCEQ) in the Texas Surface Water Quality Standards (TSWQS);
b) Parameters considered for the TCEQ Water Quality Inventory in evaluation of whether water body uses are supported, not supported, or have water quality concerns. The designated water body uses included in the Water Quality Inventory are:
    i. Aquatic life use
    ii. Contact recreation use
    iii. General use
    iv. Fish consumption use
    v. Public water supply use;
c) Parameters that may impact suitability of water for irrigation; and
d) Parameters that may impact treatability of water for municipal or industrial supply.

Categories a and b above were selected to represent environmental water quality parameters, and Categories c and d were selected to be representative of water quality as related to irrigation uses and treatability for municipal or industrial supplies.

For the second stage of the process, key water quality parameters were selected from this compiled list of potential parameters based on general guidelines which were established in Appendix P of the 2006

Region C Plan. The general guidelines used to further develop a manageable and meaningful list of key water quality parameters are described below.

a) Selected parameters should be representative of water quality conditions that may be impacted on a regional scale and that are likely to be impacted by multiple water management strategies within the region. Water quality issues associated with localized conditions (such as elevated levels of a toxic material within one water body) will be addressed as necessary within the environmental impact evaluations of the individual water management strategies for each water user group. In addition, water quality parameters that could impact specific advanced treatment processes (e.g., membranes or ozone) will be addressed as necessary during pilot testing and/or preliminary design.
b) Sufficient data must be available for a parameter in order to include it as a key water quality parameter. If meaningful statistical summaries cannot be carried out on the parameter, it should not be designated as a key water quality parameter.

M.1.2 Selection of Parameters for the 2016 Plan

Potential key water quality parameters were assessed for the Region C planning area according to the process described above. Little has changed since 2011 in terms of parameters that may impact suitability for irrigation, municipal, or industrial purposes. Since development of the 2011 Plan, the TCEQ has added Surface Water Quality Standards for the following parameters:

- Toxics:
  - Nonylphenol and diazinon standards for all segments.
  - Site-specific copper and aluminum standards for various segments.
- Site-specific dissolved oxygen standards for various classified and unclassified segments.
- Site-specific chlorophyll-a standards for various reservoirs.
- Site-specific E. coli standards for various unclassified segments.

Any entity that proposes to discharge treated wastewater must show that the discharge will not cause a violation of the Surface Water Quality Standards to obtain a discharge permit. In addition, most of the new standards only apply to a few segments/locations in Region C. Therefore, with the exception of chlorophyll-a, it has been assumed that the newly regulated parameters will be addressed as necessary for each water user group within the environmental impact evaluations of the individual water management strategies or during preliminary wastewater treatment design.

Therefore, the first stage in the process of selecting key water quality parameters yielded the same candidate parameters as those in the 2006 and 2011 Region C Water Plans. In addition, baseline conditions are not anticipated to have changed significantly in the years since the 2006 Plan development and were not re-assessed in this round of planning. Due to similar baseline conditions and unchanged assessment criteria, the key surface water quality parameters selected for the 2016 Plan are the same as those assessed in the 2011 Plan. Further information on specific candidate parameters and basis for selection, is available in Appendix P of the 2006 Plan.

Similarly, key water quality parameters were identified for groundwater based on an evaluation of the parameters regulated by drinking water standards and those known to be potential problems for groundwater in Region C.

The following key water quality parameters were selected to assess impacts from water management strategies:

- Surface Water:
  - Ammonia-nitrogen
  - Nitrate-nitrogen
  - Total phosphorous
  - Chlorophyll-a
  - Total dissolved solids (TDS)
- Groundwater
  - TDS

M.2.0 Baseline Water Quality Conditions

Baseline water quality conditions were evaluated using data obtained from the Texas Surface Water Quality Monitoring Database. Water quality data for reservoirs and streams located within Region C were evaluated, as well as sources located outside of Region C that are currently being considered for use or are in use as raw water sources for the region. Statistical analyses were conducted to determine the number of data points (count), mean, median, 75th percentile, maximum, and minimum for each water body assessed. Data from 1/1/1998 through 12/31/2009 were assessed for each parameter. Statistical summaries for each surface water parameter are presented in Section 3.0 of this document.

To further demonstrate baseline water quality conditions in Region C, each water body was placed in categories based on parameter concentration. The lowest bin (Bin 1) constitutes levels that are less than regulatory or literature levels of concern. The second bin (Bin 2) represents parameter levels that are approaching regulatory standards or levels of concern (nominally 80 percent of regulated standard). The highest bin (Bin 3) represents parameter levels that exceed the stated regulatory standards, levels of concern, or screening criteria. Screening levels for nutrient parameters were based on the TCEQ *2008 Guidance for Assessing and Reporting Surface Water Quality in Texas*. For surface water assessment of TDS, screening levels were based on National Secondary Drinking Water Standards. For the groundwater TDS assessment, screening limits were based on the State of Texas Secondary Drinking Water Standard.

It is important to note that placement in Bins 2 or 3 does not necessarily indicate a violation of a water quality standard or the need for additional treatment levels. As mentioned earlier, the data presented here are summarized over the entire surface water segment (at all depths and all stations located in the main water body) or the entire aquifer/county area. In many cases, regulatory application of the standard or level of concern is performed on a different group of data than are summarized here (e.g., for lake mixed layer samples only). The bin designations, while derived from regulatory standards, are only provided as a "yardstick" for assessing water quality conditions and as a basis for comparisons between water bodies. The bin designations are not to be used to evaluate whether conditions within a given water body are in compliance with regulatory standards. Tables M-1 and M-2 demonstrate baseline surface water and groundwater quality bins by parameter.

For TDS, the median value is used for comparison with the numerical regulatory standard or level of concern, but for nutrients and chlorophyll-a (parameters subject to the TCEQ secondary screening levels), the 75th percentile is used. This value was used for comparison because the TCEQ secondary screening levels are applied such that a source water is "of concern" when more than 25 percent of the samples taken exceed the numerical screening limit.

M.2.1 Surface Water Baseline Conditions

The following sections summarize the baseline water quality conditions for each key surface water quality parameter. As discussed earlier, this review of baseline conditions is not intended to provide an evaluation of compliance with regulatory standards. When referenced, regulatory standards are only used as a means of making relative comparisons between water bodies.

With respect to nutrients, it should be noted that the impact of nutrients on chlorophyll-a concentrations is site-specific and can vary significantly between water bodies. Therefore, high levels of nutrients are not necessarily indicative of poor water quality in any given water body.

Ammonia Nitrogen

Ammonia Nitrogen levels were measured from 26 reservoirs between 1998 and 2008. Of the 26 reservoirs sampled, six demonstrated 75th percentile ammonia nitrogen concentrations ranging between 0.088 and 0.11 mg/L and fell into Bin 2. Lakes with screening levels exceeding 0.11 mg/L fell into Bin 3 and included Lake Ray Hubbard (Segment 820), Lake O' the Pines (Segment 403), Benbrook Lake (Segment 830), Lewisville Lake (Segment 823), and Ray Roberts Lake (Segment 840). Lake Palestine (Segment 605), which is located on the Neches River in East Texas also had screening levels categorized as Bin 3. Fourteen other reservoirs fell into Bin 1 with screening levels less than 0.088 mg/L.

Of the twenty streams sampled for ammonia nitrogen, all but one stream fell below screening levels and were categorized as Bin 1. One stream exceeded the screening level of 0.33 mg/L and fell into Bin 3 and was the East Fork Trinity River (Segment 819). This contrasts with the 2006 Plan, where an analysis of samples collected between 1993 and 2004 yielded four streams that exceeded a similar screening level and fell into Bin 3.

Table M-1: Definition of Baseline Surface Water Quality Bins by Parameter

Parameter	Statistic Used for Comparison	Lower Bound of Bin 3	Basis of Lower Bound, Bin 3	Lower Bound of Bin 2	Basis of Lower Bound, Bin 2
Total Dissolved Solids	Median	500 mg/L	National Secondary Drinking Water Standard	400 mg/L	80 percent of secondary standard
Ammonia-Nitrogen (as N)	75th percentile	0.11 mg/L (reservoir) 0.33 mg/L (stream)	TCEQ 2008 Guidance for Assessing and Recording Surface Water Quality in Texas	0.088 mg/L (reservoir) 0.26 mg/L (stream)	80 percent of screening level
Nitrate-Nitrogen (as N)	75th percentile	0.37 mg/L (reservoir) 1.95 mg/L (stream)	TCEQ 2008 Guidance for Assessing and Recording Surface Water Quality in Texas	0.30 mg/L (reservoir) 1.56 mg/L (stream)	80 percent of screening level
Total Phosphorus (as P)	75th percentile	0.20 mg/L (reservoir) 0.69 mg/L (stream)	TCEQ 2008 Guidance for Assessing and Recording Surface Water Quality in Texas	0.16 mg/L (reservoir) 0.55 mg/L (stream)	80 percent of screening level
Chlorophyll-a	75th percentile	26.7 μg/L (reservoir) 14.1 μg/L (stream)	TCEQ 2008 Guidance for Assessing and Recording Surface Water Quality in Texas	21.4 μg/L (reservoir) 11.3 μg/L (stream)	80 percent of screening level

Table M-2: Definition of Baseline Groundwater Quality Bins by Parameter

Parameter	Statistic Used for Comparison	Lower Bound of Bin 3	Basis of Lower Bound, Bin 3	Lower Bound of Bin 2	Basis of Lower Bound, Bin 2
Total Dissolved Solids	Median	1000 mg/L	State of Texas Secondary Drinking Water Standard	500 mg/L	National Secondary Drinking Water Standard

Nitrate Nitrogen

Twenty-three reservoirs were sampled for nitrate nitrogen concentrations in the Region C planning area. Nine of the 23 reservoirs demonstrated 75th percentile concentrations exceeding the Bin 3 screening criteria of 0.37 mg/L. Four reservoirs fell in Bin 2 (0.30 to 0.37 mg/L) and included Eagle Mountain Reservoir (Segment 809), Richland-Chambers Reservoir (Segment 836), Joe Pool Lake (Segment 838), and Cedar Creek Reservoir (Segment 818).

Of the 15 streams sampled for nitrate nitrogen concentrations, eleven fell below screening criteria and were classified into Bin 1 (< 1.56 mg/L). Four streams exceeded the screening criteria of 1.95 mg/L and were placed in Bin 3. Streams categorized as Bin 3 included Elm Fork Trinity River above Ray Roberts Lake (Segment 824), Upper Trinity River (Segment 805), Lower West Fork Trinity River (Segment 841), and East Fork Trinity River (Segment 819). There were no streams that fell within Bin 2 with concentrations ranging between 1.56 and 1.95 mg/L.

Total Phosphorous

None of the 26 reservoirs sampled for total phosphorous in Region C exhibited 75th percentile concentrations that exceed the TCEQ screening level of 0.20 mg/L to be placed into Bin 3. One reservoir was found to approach screening levels and was placed into Bin 2 (0.16 to 0.20 mg/L). Wright-Patman Lake (Segment 302) demonstrated a 75th percentile concentration of 0.17 mg/L.

The same streams that fell into Bin 3 for elevated nitrate nitrogen concentrations demonstrated 75th percentile total phosphorous concentrations above the TCEQ screening level. In addition to these four streams, the Trinity River above Lake Livingston (Segment 804) exceeded screening levels (≥ 0.69 mg/L) and was placed into Bin 3. Fourteen out of twenty streams sampled for total phosphorous were below the screening criteria and fell in Bin 1. One stream, Clear Fork Trinity River below Lake Weatherford (Segment 831) fell within Bin 2 with a 75th percentile concentration of 0.63 mg/L.

Chlorophyll-a

Of the 25 reservoirs sampled for chlorophyll-a, fourteen fell into Bins 2 or 3, demonstrating 75th percentile concentrations approaching or exceeding screening levels. Five reservoirs fell into Bin 2 with concentrations ranging from 21.4 to 26.7 µg/L, and nine exceeded 26.7 µg/L and fell into Bin 3. Bin 2 reservoirs included Lake Texoma (Segment 203), Lake Fork (Segment 512), Grapevine Lake (Segment 826), Bardwell Reservoir (Segment 815), and Lewisville Lake (Segment 823).

Ten out of nineteen streams that were sampled for chlorophyll-a exceeded screening criteria of 14.1 µg/L and fell into Bin 3. Two streams were categorized in Bin 2 with concentrations ranging from 11.3 to 14.1 µg/L. Bin 2 streams included Clear Fork Trinity River above Lake Weatherford (Segment 833) and West Fork Trinity River above Bridgeport Reservoir (segment 812).

Total Dissolved Solids

In general, concentrations of TDS in surface water for sampled water bodies were relatively low. Eight of 45 reservoirs and streams in the area approached or exceeded screening levels for TDS. Three water bodies were categorized into Bin 2 with median concentrations ranging from 400-500 mg/L. Bin 2 water bodies included the Upper Trinity River (Segment 805), Clear Fork Trinity River below Lake Weatherford (Segment 831), and the Lower West Fork Trinity River (Segment 841). Five water bodies demonstrated median concentrations above 500 mg/L and included East Fork Trinity River (Segment 819), Clear Fork Trinity River above Lake Weatherford (Segment 833), Red River above and below Lake Texoma (Segments 202 and 204), and Lake Texoma (Segment 203).

M.2.2 Groundwater Baseline Conditions

The sole key water quality parameter selected for groundwater in Region C was TDS. Baseline conditions for TDS in groundwater have changed very little since development of the 2006 Plan and were not re-assessed in this round of planning. The groundwater quality data summary table may be found in Appendix P of the 2006 Plan. The following is a summary of data found in Appendix P of the 2006 Plan.

With the exception of the Carrizo-Wilcox Aquifer, most groundwater sources in Region C report median TDS concentrations greater than 500 mg/L, the secondary drinking water standard. The Trinity Aquifer beneath these counties generally reports median concentrations between 500 mg/L and 1,000 mg/L, with the majority of the wells reporting greater than 1,000 mg/L located in Wise, Denton, Collin, Tarrant, Dallas, and Ellis Counties. TDS concentrations in the Woodbine Aquifer are even greater, with the highest median concentrations occurring in the most urban counties and those counties immediately down-gradient (Dallas, Tarrant, Ellis, and Navarro). The southern portion of the Woodbine Aquifer in Dallas, Ellis, and Navarro Counties contains median TDS levels greater than 1,000 mg/L. Limited data were available for the Nacatoch Aquifer, and no data were available for the Queen City Aquifer.

M.3.0 Surface Water Quality Data Summary

Tables M-3 through M-7 summarize surface water quality data by segment and parameter.

Region C Surface Water Quality Summary by Segment and Parameter

Data collected 1/1/1998 – 12/31/2009 (Source: TCEQ Water Quality Monitoring Database)

Table M-3: Ammonia Nitrogen, Total (mg/L as N)									
Segment ID	**Segment Description**	**Water Body Type**	**Count**	**Average**	**Median**	**75th Percentile**	**Max**	**Min**	**Bin**
819	East Fork Trinity River	Stream	86	0.185	0.327	0.438	2.04	0.02	3
605	Lake Palestine	Lake	71	0.05	0.175	0.28	1.13	0.01	3
840	Ray Roberts Lake	Lake	116	0.07	0.184	0.193	1.62	0.02	3
822	Elm Fork Trinity River Below Lewisville Lake	Stream	248	0.1	0.139	0.16	1.42	0.02	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	9	0.05	0.090	0.16	0.24	0.02	1
831	Clear Fork Trinity River Below Lake Weatherford	Stream	44	0.085	0.245	0.153	3.13	0.02	1
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	121	0.08	0.215	0.15	6.74	0.02	1
823	Lewisville Lake	Lake	78	0.042	0.198	0.15	2.92	0.006	3
805	Upper Trinity River	Stream	287	0.09	0.118	0.14	1.81	0.02	1
825	Denton Creek	Stream	35	0.09	0.186	0.135	1.53	0.05	1
833	Clear Fork Trinity River Above Lake Weatherford	Stream	20	0.06	0.084	0.133	0.17	0.02	1
830	Benbrook Lake	Lake	321	0.05	0.085	0.13	0.89	0.02	3
806	West Fork Trinity River Below Lake Worth	Stream	128	0.05	0.083	0.12	0.4	0.02	1
841	Lower West Fork Trinity River	Stream	162	0.06	0.104	0.12	1.52	0.02	1
403	Lake O' the Pines	Lake	296	0.053	0.126	0.113	6	0.01	3
820	Lake Ray Hubbard	Lake	108	0.05	0.086	0.11	0.49	0.02	3
804	Trinity River Above Lake Livingston	Stream	99	0.05	0.076	0.105	0.44	0.02	1
202	Red River Below Lake Texoma	Stream	41	0.05	0.061	0.1	0.13	0.02	1
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	26	0.055	0.079	0.1	0.22	0.02	[illegible]
203	Lake Texoma	Lake	132	0.07	0.069	0.1	0.21	0.01	2
302	Wright-Patman Lake	Lake	329	0.05	0.078	0.1	0.409	0.02	2
815	Bardwell Reservoir	Lake	41	0.05	0.082	0.1	0.43	0.03	2
818	Cedar Creek Reservoir	Lake	781	0.05	0.087	0.1	1.69	0.02	2
838	Joe Pool Lake	Lake	50	0.03	0.065	0.095	0.31	0.02	2
821	Lake Lavon	Lake	9	0.07	0.081	0.09	0.23	0.03	2
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	44	0.05	0.077	0.0825	0.211	0.02	1
204	Red River Above Lake Texoma	Stream	27	0.05	0.070	0.08	0.3	0.021	1
303	Sulphur/South Sulphur River	Stream	136	0.05	0.083	0.08	0.508	0.040	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	47	0.05	0.069	0.08	0.2	0.05	1
809	Eagle Mountain Reservoir	Lake	740	0.05	0.073	0.08	0.85	0.02	1
836	Richland-Chambers Reservoir	Lake	651	0.05	0.099	0.08	2.62	0.02	1
835	Chambers Creek Below Richland-Chambers Reservoir	Stream	4	0.05	0.073	0.073	0.14	0.05	1
816	Lake Waxahachie	Lake	31	0.05	0.085	0.07	0.47	0.05	1
832	Lake Weatherford	Lake	24	0.05	0.064	0.07	0.17	0.05	1
307	Chapman/Cooper Lake	Lake	68	0.05	0.062	0.0625	0.13	0.05	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	16	0.05	0.060	0.060	0.11	0.05	1
507	Lake Tawakoni	Lake	103	0.05	0.048	0.06	0.22	0.001	1
817	Navarro Mills Lake	Lake	39	0.05	0.063	0.06	0.2	0.02	1
827	White Rock Lake	Lake	2	0.055	0.055	0.058	0.06	0.05	1
837	Richland Creek Above Richland-Chambers Reservoir	Stream	8	0.05	0.055	0.053	0.08	0.05	1
504	Toledo Bend Reservoir	Lake	157	0.05	0.080	0.05	2.36	0.001	1
512	Lake Fork	Lake	98	0.05	0.060	0.05	1	0.001	1
807	Lake Worth	Lake	95	0.02	0.034	0.05	0.16	0.02	1
811	Bridgeport Reservoir	Lake	436	0.02	0.042	0.05	0.6	0.02	1
828	Lake Arlington	Lake	184	0.03	0.053	0.05	1.1	0.02	1
826	Grapevine Lake	Lake	128	0.02	0.036	0.04	0.21	0.02	[illegible]

Region C Surface Water Quality Summary by Segment and Parameter

Data collected 1/1/1998 – 12/31/2009 (Source: TCEQ Water Quality Monitoring Database)

Table M-4: Nitrate Nitrogen, Total (mg/L as N)

Row Labels	Segment Description	Water Body Type	Count	Median	Mean	75th Percentile	Max	Min	Bin
819	East Fork Trinity River	Stream	16	9.97	10.189	13.25	17.8	4.9	3
841	Lower West Fork Trinity River	Stream	16	9.21	8.018	11.25	12.9	1.53	3
805	Upper Trinity River	Stream	35	7.7	6.723	9.505	13.1	0.07	3
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	35	4.38	4.659	7.45	12.82	0.18	3
817	Navarro Mills Lake	Lake	6	0.075	1.000	1.915	3.23	0.05	3
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	5	0.8	0.868	1.24	2.1	0.05	1
825	Denton Creek	Stream	9	0.58	0.704	0.96	1.25	0.3	1
806	West Fork Trinity River Below Lake Worth	Stream	13	0.23	0.500	0.83	1.4	0.02	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	7	0.55	0.669	0.825	1.32	0.17	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	8	0.51	0.539	0.748	1.09	0.05	1
822	Elm Form Trinity River Below Lewisville Lake	Stream	74	0.5	0.582	0.745	1.73	0.003	1
840	Ray Roberts Lake	Lake	112	0.285	0.633	0.733	5.36	0.003	3
815	Bardwell Reservoir	Lake	6	0.15	0.333	0.663	0.8	0.05	3
821	Lake Lavon	Lake	10	0.46	0.796	0.585	4.57	0.07	3
826	Grapevine Lake	Lake	42	0.255	0.313	0.56	1.15	0.003	3
816	Lake Waxahachie	Lake	6	0.2	0.320	0.545	0.81	0.05	3
820	Lake Ray Hubbard	Lake	95	0.19	0.273	0.455	0.96	0.003	3
823	Lewisville Lake	Lake	64	0.12	0.444	0.423	7.13	0.003	3
828	Lake Arlington	Lake	7	0.36	0.360	0.375	0.4	0.3	3
818	Cedar Creek Reservoir	Lake	54	0.245	0.292	0.365	0.82	0.01	2
838	Joe Pool Lake	Lake	5	0.25	1.350	0.36	5.72	0.2	2
809	Eagle Mountain Reservoir	Lake	131	0.19	0.239	0.34	0.93	0.01	2
836	Richland-Chambers Reservoir	Lake	48	0.245	0.284	0.34	0.79	0.01	2
829	Clear Fork Trinity River Below Benbrook Lake	Stream	8	0.275	0.296	0.335	0.54	0.17	1
811	Bridgeport Reservoir	Lake	24	0.19	0.235	0.29	0.5	0.14	1
830	Benbrook Lake	Lake	18	0.24	0.239	0.25	0.32	0.18	1
303	Sulphur/South Sulphur River	Stream	24	0.065	0.198	0.228	1.44	0.05	1
307	Chapman/Cooper Lake	Lake	20	0.105	0.153	0.218	0.36	0.05	1
507	Lake Tawakoni	Lake	255	0.06	0.132	0.21	1.99	0.003	1
504	Toledo Bend Reservoir	Lake	618	0.05	0.090	0.09	3.12	0.02	1
202	Red River Below Lake Texoma	Stream	1	0.09	0.090	0.09	0.09	0.09	1
512	Lake Fork	Lake	238	0.04	0.067	0.07	0.36	0.02	1
403	Lake O' the Pines	Lake	34	0.05	0.099	0.058	0.56	0.05	1
302	Wright-Patman Lake	Lake	139	0.05	0.060	0.05	0.487	0.01	1
832	Lake Weatherford	Lake	6	0.05	0.057	0.05	0.09	0.05	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	6	0.05	0.050	0.05	0.05	0.05	1
203	Lake Texoma	Lake	4	0.02	0.048	0.048	0.13	0.02	1
804	Trinity River Above Lake Livingston	Stream	1	0.03	0.030	0.03	0.03	0.03	1

Region C Surface Water Quality Summary by Segment and Parameter

Data collected 1/1/1998 – 12/31/2009 (Source: TCEQ Water Quality Monitoring Database)

Table M-5: Phosphorous Total, Wet Method (mg/L as P)

Row Labels	Segment Description	Water Body Type	Count	Median	Mean	75th Percentile	Max	Min	Bin
819	East Fork Trinity River	Stream	89	1.7	1.838	2.88	4.82	0.03	3
805	Upper Trinity River	Stream	455	1.15	1.191	1.725	4.17	0.04	3
804	Trinity River Above Lake Livingston	Stream	98	1.08	1.179	1.605	3.3	0.05	3
841	Lower West Fork Trinity River	Stream	156	0.995	1.031	1.415	2.5	0.05	3
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	111	0.16	0.763	0.93	4.12	0.02	3
831	Clear Fork Trinity River Below Lake Weatherford	Stream	108	0.155	0.608	0.625	7.39	0.02	2
204	Red River Above Lake Texoma	Stream	28	0.205	0.329	0.5	0.99	0.09	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	16	0.28	0.312	0.443	0.58	0.06	1
825	Denton Creek	Stream	36	0.195	0.264	0.303	0.94	0.04	1
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	137	0.1	0.268	0.3	2.4	0.01	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	44	0.14	0.179	0.22	0.69	0.05	1
837	Richland Creek Above Richland-Chambers Reservoir	Stream	8	0.095	0.145	0.193	0.35	0.06	1
303	Sulphur/South Sulphur River	Stream	142	0.124	0.147	0.19	1.1	0.01	1
833	Clear Fork Trinity River Above Lake Weatherford	Stream	38	0.095	0.145	0.18	0.72	0.01	1
835	Chambers Creek Below Richland-Chambers Reservoir	Stream	4	0.105	0.125	0.18	0.24	0.05	1
302	Wright-Patman Lake	Lake	377	0.12	0.149	0.172	1.65	0.01	2
202	Red River Below Lake Texoma	Stream	33	0.11	0.163	0.17	1.037	0.037	1
822	Elm Form Trinity River Below Lewisville Lake	Stream	223	0.12	0.137	0.15	2.87	0.01	1
840	Ray Roberts Lake	Lake	111	0.06	0.099	0.14	0.5	0.01	1
307	Chapman/Cooper Lake	Lake	73	0.08	0.106	0.13	0.383	0.05	1
818	Cedar Creek Reservoir	Lake	830	0.09	0.119	0.13	1.33	0.01	1
823	Lewisville Lake	Lake	76	0.065	0.190	0.12	2.5	0.01	1
806	West Fork Trinity River Below Lake Worth	Stream	153	0.08	0.099	0.11	0.7	0.02	1
403	Lake O' the Pines	Lake	306	0.06	0.158	0.1	8.34	0.01	1
512	Lake Fork	Lake	117	0.06	0.095	0.1	0.54	0.02	1
605	Lake Palestine	Lake	72	0.07	0.106	0.1	0.68	0.05	1
809	Eagle Mountain Reservoir	Lake	742	0.08	0.087	0.1	0.4	0.01	1
836	Richland-Chambers Reservoir	Lake	640	0.056	0.083	0.099	0.69	0.01	1
203	Lake Texoma	Lake	132	0.072	0.085	0.098	0.457	0.02	1
807	Lake Worth	Lake	95	0.079	0.084	0.095	0.241	0.042	1
507	Lake Tawakoni	Lake	92	0.07	0.079	0.09	0.28	0.01	1
830	Benbrook Lake	Lake	337	0.07	0.074	0.09	0.269	0.02	1
828	Lake Arlington	Lake	184	0.065	0.085	0.085	1.288	0.03	1
817	Navarro Mills Lake	Lake	39	0.06	0.065	0.075	0.25	0.02	1
811	Bridgeport Reservoir	Lake	468	0.05	0.065	0.073	0.664	0.01	1
820	Lake Ray Hubbard	Lake	107	0.06	0.076	0.07	1.5	0.01	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	47	0.06	0.062	0.07	0.12	0.02	1
832	Lake Weatherford	Lake	24	0.06	0.062	0.07	0.1	0.04	1
827	White Rock Lake	Lake	3	0.06	0.064	0.066	0.072	0.06	1
504	Toledo Bend Reservoir	Lake	113	0.06	0.069	0.06	0.19	0.06	1
815	Bardwell Reservoir	Lake	47	0.05	0.052	0.06	0.25	0.01	1
816	Lake Waxahachie	Lake	31	0.06	0.067	0.06	0.25	0.02	1
826	Grapevine Lake	Lake	128	0.05	0.061	0.06	0.58	0.01	1
838	Joe Pool Lake	Lake	118	0.04	0.058	0.06	0.4	0.01	1
821	Lake Lavon	Lake	10	0.05	0.065	0.058	0.22	0.04	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	6	0.035	0.035	0.04	0.06	0.01	1

Region C Surface Water Quality Summary by Segment and Parameter

Data collected 1/1/1998 – 12/31/2009 (Source: TCEQ Water Quality Monitoring Database)

Table M-6: Chlorophyll-a, Spectrophotometric Acid. Method (µg/L)

Segment ID	Segment Description	Water Body Type	Count	Median	Mean	75th Percentile	Max	Min	Bin
507	Lake Tawakoni	Lake	216	33.5	35.71	50	124	1	3
605	Lake Palestine	Lake	28	27.6	37.38	48.45	143	1	3
828	Lake Arlington	Lake	183	27.6	30.25	40	95.4	3.6	3
818	Cedar Creek Reservoir	Lake	821	23.8	26.75	36	112.3	1	3
302	Wright-Patman Lake	Lake	239	17	25.56	34.85	150	1	3
830	Benbrook Lake	Lake	339	21.4	23.66	34.7	65.4	1.6	3
820	Lake Ray Hubbard	Lake	49	25	25.22	34	49.8	1	3
807	Lake Worth	Lake	95	21	22.91	32	50.7	1	3
806	West Fork Trinity River Below Lake Worth	Stream	147	19	21.67	29.15	94	0.9	3
809	Eagle Mountain Reservoir	Lake	741	21.4	22.04	28.5	67.4	1.8	3
835	Chambers Creek Below Richland-Chambers Reservoir	Stream	4	10	25.83	25.825	73.3	10	3
823	Lewisville Lake	Lake	38	19.8	26.71	25.75	150.1	6.2	2
815	Bardwell Reservoir	Lake	34	14	17.35	24	52.1	1	2
826	Grapevine Lake	Lake	102	15.95	17.60	23.45	58.4	3.8	2
512	Lake Fork	Lake	319	15	16.72	21.5	73.2	1	2
203	Lake Texoma	Lake	132	14.25	17.51	21.45	155	2.88	2
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	73	10.7	20.30	21.4	163	1	3
836	Richland-Chambers Reservoir	Lake	653	12.7	15.64	21.1	83.7	0.7	1
804	Trinity River Above Lake Livingston	Stream	91	12	16.92	20.45	98.6	0.01	3
832	Lake Weatherford	Lake	17	10	14.72	19.8	35.2	1	1
202	Red River Below Lake Texoma	Stream	33	10	15.35	19.5	73.4	1	3
204	Red River Above Lake Texoma	Stream	13	8.01	14.14	19.2	81.4	1	3
822	Elm Form Trinity River Below Lewisville Lake	Stream	176	11.55	15.85	18.25	81	0.2	3
504	Toledo Bend Reservoir	Lake	283	11	14.85	18	204	1	1
307	Chapman/Cooper Lake	Lake	46	12.15	17.15	17.85	130	10	1
838	Joe Pool Lake	Lake	59	8	16.00	17.65	170	0.003	1
821	Lake Lavon	Lake	5	6	11.86	16	30.3	1	1
805	Upper Trinity River	Stream	300	10.25	12.37	15.6	50.5	0.2	3
841	Lower West Fork Trinity River	Stream	150	10	12.24	15.175	58	0.9	3
816	Lake Waxahachie	Lake	20	10	13.10	14.7	41.4	1	1
819	East Fork Trinity River	Stream	54	10	13.27	14.225	45.6	5	3
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	11	10	12.77	12.5	32	3.2	2
840	Ray Roberts Lake	Lake	31	8	10.19	12.05	37.4	3	1
833	Clear Fork Trinity River Above Lake Weatherford	Stream	31	10	18.98	12	222	0.82	2
403	Lake O' the Pines	Lake	265	10	9.82	11.8	63.4	0.01	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	31	10	10.74	10.7	41.6	1	1
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	13	10	9.55	10.7	19.6	1.33	1
817	Navarro Mills Lake	Lake	33	10	8.79	10.7	22.4	0.0002	1
303	Sulphur/South Sulphur River	Stream	105	10	9.90	10	45.4	1	1
825	Denton Creek	Stream	23	10	8.68	10	13.9	1	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	33	10	9.64	10	30	1	1
831	Clear Fork Trinity River Below Lake Weatherford	Stream	93	3.69	5.61	9.3	38.4	0.2	1
811	Bridgeport Reservoir	Lake	470	5.9	6.52	8	37.9	1	1
837	Richland Creek Above Richland-Chambers Reservoir	Stream	7	1.25	3.24	2.805	12.8	1	1

Region C Surface Water Quality Summary by Segment and Parameter

Data collected 1/1/1998 – 12/31/2009 (Source: TCEQ Water Quality Monitoring Database)

Table M-7: Total Dissolved Solids (mg/L as N) as Residue, Total Filtrable (dried at 180°)									
Segment ID	**Segment Description**	**Water Body Type**	**Count**	**Average**	**Median**	**75th Percentile**	**Max**	**Min**	**Bin**
204	Red River Above Lake Texoma	Stream	28	2415	2421.21	3347.5	4740	666	3
203	Lake Texoma	Lake	132	986.5	981.95	1166.25	1640	395	3
202	Red River Below Lake Texoma	Stream	42	888.5	870.07	1045	2364	45	3
833	Clear Fork Trinity River Above Lake Weatherford	Stream	21	550	564.29	596	874	398	3
819	East Fork Trinity River	Stream	64	542	548.02	648	1300	214	3
841	Lower West Fork Trinity River	Stream	70	448	430.40	486	662	220	2
831	Clear Fork Trinity River Below Lake Weatherford	Stream	68	428	454.49	493.5	968	234	2
805	Upper Trinity River	Stream	85	414	393.21	455	1080	73	2
804	Trinity River Above Lake Livingston	Stream	20	399	361.75	444	490	71	1
824	Elm Fork Trinity River Above Ray Roberts Lake	Stream	114	392	423.98	488.75	1310	144	1
814	Chambers Creek Above Richland-Chambers Reservoir	Stream	87	348	385.44	458.5	964	162	1
838	Joe Pool Lake	Lake	65	344	409.15	386	2260	175	1
810	West Fork Trinity River Below Bridgeport Reservoir	Stream	44	316	350.30	413	760	170	1
812	West Fork Trinity River Above Bridgeport Reservoir	Stream	18	283	578.06	620	3450	109	1
829	Clear Fork Trinity River Below Benbrook Lake	Stream	45	282	276.36	314	690	28	1
821	Lake Lavon	Lake	10	281	276.30	289.25	372	222	1
822	Elm Form Trinity River Below Lewisville Lake	Stream	178	250	257.18	285	708	69	1
832	Lake Weatherford	Lake	25	244	239.40	257	288	166	1
835	Chambers Creek Below Richland-Chambers Reservoir	Stream	4	232	224.25	243	270	163	1
827	White Rock Lake	Lake	2	231	231.00	254.5	278	184	1
825	Denton Creek	Stream	54	228.5	243.27	265.5	354	185	1
837	Richland Creek Above Richland-Chambers Reservoir	Stream	24	227	365.90	426	1010	160	1
815	Bardwell Reservoir	Lake	30	223	222.97	247.5	342	75	1
809	Eagle Mountain Reservoir	Lake	711	222	224.18	236	376	52.2	1
807	Lake Worth	Lake	95	213	217.31	234.5	287	157	1
826	Grapevine Lake	Lake	149	210	201.04	223	258	92	1
823	Lewisville Lake	Lake	127	207	252.46	240	730	67	1
817	Navarro Mills Lake	Lake	28	203.5	207.21	226	256	154	1
830	Benbrook Lake	Lake	331	195	197.26	209	306	153	1
839	Elm Fork Trinity River Below Ray Roberts Lake	Stream	23	195	196.00	204.5	241	169	1
303	Sulphur/South Sulphur River	Stream	149	192	219.72	284	620	76	1
820	Lake Ray Hubbard	Lake	159	192	197.02	210.5	835	118	1
828	Lake Arlington	Lake	184	184	192.66	200	461	114	1
811	Bridgeport Reservoir	Lake	436	184	188.60	206	276	142	1
816	Lake Waxahachie	Lake	29	180	185.45	208	286	64	1
840	Ray Roberts Lake	Lake	176	179	183.84	194	344	38	1
836	Richland-Chambers Reservoir	Lake	654	164	167.99	178	284	59.1	1
605	Lake Palestine	Lake	63	137	142.17	164	250	84	1
307	Chapman/Cooper Lake	Lake	72	134.5	148.03	150	420	101	1
302	Wright-Patman Lake	Lake	339	132	140.69	159.5	536	44	1
818	Cedar Creek Reservoir	Lake	784	121	128.58	134	804	55	1
403	Lake O' the Pines	Lake	178	107.5	118.21	123	376	54	1
507	Lake Tawakoni	Lake	116	107.5	108.84	118	150	78	1
512	Lake Fork	Lake	54	103	130.96	116.25	1300	75	1
504	Toledo Bend Reservoir	Lake	3	77	77.67	81	85	71	1

Appendix N

APPENDIX N

SOCIO-ECONOMIC IMPACTS

Socioeconomic Impacts of Projected Water Shortages

for the Region C Regional Water Planning Area

Prepared in Support of the 2016 Region C Regional Water Plan

Texas Water Development Board

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Executive Summary

Evaluating the social and economic impacts of not meeting identified water needs is a required part of the regional water planning process. The Texas Water Development Board (TWDB) estimates those impacts for regional water planning groups, and summarizes the impacts in the state water plan. The analysis presented is for the Region C Regional Water Planning Group.

Based on projected water demands and existing water supplies, the Region C planning group identified water needs (potential shortages) that would occur within its region under a repeat of the drought of record for six water use categories. The TWDB then estimated the socioeconomic impacts of those needs—if they are not met—for each water use category and as an aggregate for the region.

The analysis was performed using an economic modeling software package, IMPLAN (Impact for Planning Analysis), as well as other economic analysis techniques, and represents a snapshot of socioeconomic impacts that may occur during a single year during a drought of record within each of the planning decades. For each water use category, the evaluation focused on estimating income losses and job losses. The income losses represent an approximation of gross domestic product (GDP) that would be foregone if water needs are not met.

The analysis also provides estimates of financial transfer impacts, which include tax losses (state, local, and utility tax collections); water trucking costs; and utility revenue losses. In addition, social impacts were estimated, encompassing lost consumer surplus (a welfare economics measure of consumer wellbeing); as well as population and school enrollment losses.

It is estimated that not meeting the identified water needs in Region C would result in an annually combined lost income impact of approximately $2.6 billion in 2020, increasing to $34.6 billion in 2070 (Table ES-1). In 2020, the region would lose approximately 12,400 jobs, and by 2070 job losses would increase to approximately 373,000.

All impact estimates are in year 2013 dollars and were calculated using a variety of data sources and tools including the use of a region-specific IMPLAN model, data from the TWDB annual water use estimates, the U.S. Census Bureau, Texas Agricultural Statistics Service, and Texas Municipal League.

Table ES-1: Region C Socioeconomic Impact Summary

Regional Economic Impacts	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$2,581	$2,846	$6,063	$11,751	$21,216	$34,607
Job losses	12,443	15,763	48,570	109,337	219,614	373,009
Financial Transfer Impacts	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Tax losses on production and imports ($ millions)*	$314	$220	$424	$845	$1,556	$2,598
Water trucking costs ($ millions)*	-	-	$6	$27	$12	$50
Utility revenue losses ($ millions)*	$284	$811	$1,360	$1,913	$2,230	$3,145
Utility tax revenue losses ($ millions)*	$5	$15	$26	$35	$40	$55
Social Impacts	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**
Consumer surplus losses ($ millions)*	$26	$96	$431	$851	$1,404	$2,475
Population losses	2,285	2,894	8,917	20,074	40,321	68,484
School enrollment losses	423	535	1,650	3,714	7,459	12,670

***** *Year 2013 dollars, rounded. Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000.*

1 Introduction

Water shortages during a repeat of the drought of record would likely curtail or eliminate certain economic activity in businesses and industries that rely heavily on water. Insufficient water supplies could not only have an immediate and real impact on existing businesses and industry, but they could also adversely and chronically affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages could disrupt activity in homes, schools and government and could adversely affect public health and safety. For these reasons, it is important to evaluate and understand how water supply shortages during drought could impact communities throughout the state.

Administrative rules (31 Texas Administrative Code §357.33 (c)) require that regional water planning groups evaluate the social and economic impacts of not meeting water needs as part of the regional water planning process, and rules direct the TWDB staff to provide technical assistance upon request. Staff of the TWDB's Water Use, Projections, & Planning Division designed and conducted this analysis in support of the Region C Regional Water Planning Group.

This document summarizes the results of the analysis and discusses the methodology used to generate the results. Section 1 summarizes the water needs calculation performed by the TWDB based on the regional water planning group's data. Section 2 describes the methodology for the impact assessment and discusses approaches and assumptions specific to each water use category (i.e., irrigation, livestock, mining, steam-electric, municipal and manufacturing). Section 3 presents the results for each water use category with results summarized for the region as a whole. Appendix A presents details on the socioeconomic impacts by county.

1.1 Identified Regional Water Needs (Potential Shortages)

As part of the regional water planning process, the TWDB adopted water demand projections for each water user group (WUG) with input from the planning groups. WUGs are composed of cities, utilities, combined rural areas (designated as county-other), and the county-wide water use of irrigation, livestock, manufacturing, mining and steam-electric power. The demands are then compared to the existing water supplies of each WUG to determine potential shortages, or needs, by decade. Existing water supplies are legally and physically accessible for immediate use in the event of drought. Projected water demands and existing supplies are compared to identify either a surplus or a need for each WUG.

Table 1-1 summarizes the region's identified water needs in the event of a repeat of drought of the record. Demand management, such as conservation, or the development of new infrastructure to increase supplies are water management strategies that may be recommended by the planning group to meet those needs. This analysis assumes that no strategies are implemented, and that the identified needs correspond to future water shortages. Note that projected water needs generally increase over time, primarily due to anticipated population and economic growth. To provide a general sense of proportion, total projected needs as an overall percentage of total demand by water use category are presented in aggregate in Table 1-1. Projected needs for individual water user groups within the aggregate vary greatly, and may reach 100% for a given WUG and water use category. Detailed water needs by WUG and county appear in Chapter 4 of the 2016 Region C Regional Water Plan.

Table 1-1 Regional Water Needs Summary by Water Use Category

Water Use Category		2020	2030	2040	2050	2060	2070
Irrigation	Water Needs (acre-feet per year)	460	484	509	526	539	548
	% of the category's total water demand	1%	1%	2%	2%	2%	2%
Livestock	Water Needs (acre-feet per year)	1	1	1	1	1	1
	% of the category's total water demand	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%
Manufacturing	Water Needs (acre-feet per year)	2,649	11,322	20,899	29,076	36,699	44,370
	% of the category's total water demand	3%	13%	22%	28%	34%	39%
Mining	Water Needs (acre-feet per year)	6,204	5,756	7,089	9,635	12,198	15,957
	% of the category's total water demand	16%	16%	21%	26%	31%	36%
Municipal	Water Needs (acre-feet per year)	113,529	326,635	547,140	759,653	990,752	1,238,082
	% of the category's total water demand	8%	19%	29%	36%	42%	48%
Steam-electric power	Water Needs (acre-feet per year)	9,006	30,361	36,336	44,038	55,098	67,549
	% of the category's total water demand	13%	32%	34%	39%	44%	50%
Total water needs (acre-feet per year)		**131,849**	**374,559**	**611,974**	**842,929**	**1,095,287**	**1,366,507**

2 Economic Impact Assessment Methodology Summary

This portion of the report provides a summary of the methodology used to estimate the potential economic impacts of future water shortages. The general approach employed in the analysis was to obtain estimates for income and job losses on the smallest geographic level that the available data would support, tie those values to their accompanying historic water use estimate (volume), and thereby determine a maximum impact per acre-foot of shortage for each of the socioeconomic measures. The calculations of economic impacts were based on the overall composition of the economy using many underlying economic "sectors." Sectors in this analysis refer to one or more of the 440 specific production sectors of the economy designated within IMPLAN (Impact for Planning Analysis), the economic impact modeling software used for this assessment. Economic impacts within this report are estimated for approximately 310 of those sectors, with the focus on the more water intense production sectors. The economic impacts for a single water use category consist of an aggregation of impacts to multiple related economic sectors.

2.1 Impact Assessment Measures

A required component of the regional and state water plans is to estimate the potential economic impacts of shortages due to a drought of record. Consistent with previous water plans, several key variables were estimated and are described in Table 2-1.

Table 2-1 Socioeconomic Impact Analysis Measures

Regional Economic Impacts	Description
Income losses - value added	The value of output less the value of intermediate consumption; it is a measure of the contribution to GDP made by an individual producer, industry, sector, or group of sectors within a year. For a shortage, value added is a measure of the income losses to the region, county, or WUG and includes the direct, indirect and induced monetary impacts on the region.
Income losses - electrical power purchase costs	Proxy for income loss in the form of additional costs of power as a result of impacts of water shortages.
Job losses	Number of part-time and full-time jobs lost due to the shortage.
Financial Transfer Impacts	**Description**
Tax losses on production and imports	Sales and excise taxes (not collected due to the shortage), customs duties, property taxes, motor vehicle licenses, severance taxes, other taxes, and special assessments less subsidies.
Water trucking costs	Estimate for shipping potable water.
Utility revenue losses	Foregone utility income due to not selling as much water.
Utility tax revenue losses	Foregone miscellaneous gross receipts tax collections.
Social Impacts	**Description**
Consumer surplus losses	A welfare measure of the lost value to consumers accompanying less water use.
Population losses	Population losses accompanying job losses.
School enrollment losses	School enrollment losses (K-12) accompanying job losses.

2.1.1 Regional Economic Impacts

Two key measures were included within the regional economic impacts classification: income losses and job losses. Income losses presented consist of the sum of value added losses and additional purchase costs of electrical power. Job losses are also presented as a primary economic impact measure.

Income Losses - Value Added Losses

Value added is the value of total output less the value of the intermediate inputs also used in production of the final product. Value added is similar to Gross Domestic Product (GDP), a familiar measure of the productivity of an economy. The loss of value added due to water shortages was estimated by input-output analysis using the IMPLAN software package, and includes the direct, indirect, and induced monetary impacts on the region.

Income Losses - Electric Power Purchase Costs

The electrical power grid and market within the state is a complex interconnected system. The industry response to water shortages, and the resulting impact on the region, are not easily modeled using traditional input/output impact analysis and the IMPLAN model. Adverse impacts on the region will occur, and were represented in this analysis by the additional costs associated with power purchases from other generating plants within the region or state. Consequently, the analysis employed additional power purchase costs as a proxy for the value added impacts for that water use category, and these are included as a portion of the overall income impact for completeness.

For the purpose of this analysis, it was assumed that power companies with insufficient water will be forced to purchase power on the electrical market at a projected higher rate of 5.60 cents per kilowatt hour. This rate is based upon the average day-ahead market purchase price of electricity in Texas from the recent drought period in 2011.

Job Losses

The number of jobs lost due to the economic impact was estimated using IMPLAN output associated with the water use categories noted in Table 1-1. Because of the difficulty in predicting outcomes and a lack of relevant data, job loss estimates were not calculated for the steam-electric power production or for certain municipal water use categories.

2.1.2 Financial Transfer Impacts

Several of the impact measures estimated within the analysis are presented as supplemental information, providing additional detail concerning potential impacts on a sub-portion of the economy or government. Measures included in this category include lost tax collections (on production and imports), trucking costs for imported water, declines in utility revenues, and declines in utility tax revenue collected by the state. Many of these measures are not solely adverse, with some having both positive and negative impacts. For example, cities and residents would suffer if forced to pay large costs for trucking in potable water. Trucking firms, conversely, would benefit from the transaction. Additional detail for each of these measures follows.

Tax Losses on Production and Imports

Reduced production of goods and services accompanying water shortages adversely impacts the collection of taxes by state and local government. The regional IMPLAN model was used to estimate reduced tax collections associated with the reduced output in the economy.

Water Trucking Costs

In instances where water shortages for a municipal water user group were estimated to be 80 percent or more of water demands, it was assumed that water would be trucked in to support basic consumption and sanitation needs. For water shortages of 80 percent or greater, a fixed cost of $20,000 per acre-foot of water was calculated and presented as an economic cost. This water trucking cost was applied for both the residential and non-residential portions of municipal water needs and only impacted a small number of WUGs statewide.

Utility Revenue Losses

Lost utility income was calculated as the price of water service multiplied by the quantity of water not sold during a drought shortage. Such estimates resulted from city-specific pricing data for both water and wastewater. These water rates were applied to the potential water shortage to determine estimates of lost utility revenue as water providers sold less water during the drought due to restricted supplies.

Utility Tax Losses

Foregone utility tax losses included estimates of uncollected miscellaneous gross receipts taxes. Reduced water sales reduce the amount of utility tax that would be collected by the State of Texas for water and wastewater service sales.

2.1.3 Social Impacts

Consumer Surplus Losses of Municipal Water Users

Consumer surplus loss is a measure of impact to the wellbeing of municipal water users when their water use is restricted. Consumer surplus is the difference between how much a consumer is willing and able to pay for the commodity (i.e., water) and how much they actually have to pay. The difference is a benefit to the consumer's wellbeing since they do not have to pay as much for the commodity as they would be willing to pay. However, consumer's access to that water may be limited, and the associated consumer surplus loss is an estimate of the equivalent monetary value of the negative impact to the consumer's wellbeing, for example, associated with a diminished quality of their landscape (i.e., outdoor use). Lost consumer surplus estimates for reduced outdoor and indoor use, as well as residential and commercial/institutional demands, were included in this analysis. Consumer surplus is an attempt to measure effects on wellbeing by monetizing those effects; therefore, these values should not be added to the other monetary impacts estimated in the analysis.

Lost consumer surplus estimates varied widely by location and type. For a 50 percent shortage, the estimated statewide consumer surplus values ranged from $55 to $2,500 per household (residential use), and from $270 to $17,400 per firm (non-residential).

Population and School Enrollment Losses

Population losses due to water shortages, as well as the related loss of school enrollment, were based upon the job loss estimates and upon a recent study of job layoffs and the resulting adjustment of the labor market, including the change in population.[1] The study utilized Bureau of Labor Statistics data regarding layoffs between 1996 and 2013, as well as Internal Revenue Service data regarding migration, to model an estimate of the change in the population as the result of a job layoff event. Layoffs impact both out-migration, as well as in-migration into an area, both of which can negatively affect the population of an area. In addition, the study found that a majority of those who did move following a layoff moved to another labor market rather than an adjacent county. Based on this study, a simplified ratio of job and net population losses was calculated for the state as a whole: for every 100 jobs lost, 18 people were assumed to move out of the area. School enrollment losses were estimated as a proportion of the population lost.

2.2 Analysis Context

The context of the economic impact analysis involves situations where there are physical shortages of surface or groundwater due to drought of record conditions. Anticipated shortages may be nonexistent in earlier decades of the planning horizon, yet population growth or greater industrial, agricultural or other sector demands in later decades may result in greater overall demand, exceeding the existing supplies. Estimated socioeconomic impacts measure what would happen if water user groups experience water shortages for a period of one year. Actual socioeconomic impacts would likely become larger as drought of record conditions persist for periods greater than a single year.

2.2.1 IMPLAN Model and Data

Input-Output analysis using the IMPLAN (Impact for Planning Analysis) software package was the primary means of estimating value added, jobs, and taxes. This analysis employed county and regional level models to determine key impacts. IMPLAN is an economic impact model, originally developed by the U.S. Forestry Service in the 1970's to model economic activity at varying geographic levels. The model is currently maintained by the Minnesota IMPLAN Group (MIG Inc.) which collects and sells county and state specific data and software. The year 2011 version of IMPLAN, employing data for all 254 Texas counties, was used to provide estimates of value added, jobs, and taxes on production for the economic sectors associated with the water user groups examined in the study. IMPLAN uses 440 sector-specific Industry Codes, and those that rely on water as a primary input were assigned to their relevant planning water user categories (manufacturing, mining, irrigation, etc.). Estimates of value added for a water use category were obtained by summing value added estimates across the relevant IMPLAN sectors

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[1] Foote, Andrew, Grosz, Michel, Stevens, Ann. "Locate Your Nearest Exit: Mass Layoffs and Local Labor Market Response." University of California, Davis. April 2015. http://paa2015.princeton.edu/uploads/150194

associated with that water use category. Similar calculations were performed for the job and tax losses on production and import impact estimates.

Note that the value added estimates, as well as the job and tax estimates from IMPLAN, include three components:

- *Direct effects* representing the initial change in the industry analyzed;
- *Indirect effects* that are changes in inter-industry transactions as supplying industries respond to reduced demands from the directly affected industries; and,
- *Induced effects* that reflect changes in local spending that result from reduced household income among employees in the directly and indirectly affected industry sectors.

2.2.2 Elasticity of Economic Impacts

The economic impact of a water need is based on the relative size of the water need to the water demand for each water user group (Figure 2-1). Smaller water shortages, for example, less than 5 percent, were anticipated to result in no initial negative economic impact because water users are assumed to have a certain amount of flexibility in dealing with small shortages. As a water shortage deepens, however, such flexibility lessens and results in actual and increasing economic losses, eventually reaching a representative maximum impact estimate per unit volume of water. To account for such ability to adjust, an elasticity adjustment function was used in estimating impacts for several of the measures. Figure 2-1 illustrates the general relationship for the adjustment functions. Negative impacts are assumed to begin accruing when the shortage percentage reaches the lower bound b1 (10 percent in Figure 2-1), with impacts then increasing linearly up to the 100 percent impact level (per unit volume) once the upper bound for adjustment reaches the b2 level shortage (50 percent in Figure 2-1 example).

Initially, the combined total value of the three value added components (direct, indirect, and induced) was calculated and then converted into a per acre-foot economic value based on historical TWDB water use estimates within each particular water use category. As an example, if the total, annual value added for livestock in the region was $2 million and the reported annual volume of water used in that industry was 10,000 acre-feet, the estimated economic value per acre-foot of water shortage would be $200 per acre-foot. Negative economic impacts of shortages were then estimated using this value as the maximum impact estimate ($200 per acre-foot in the example) applied to the anticipated shortage volume in acre-feet and adjusted by the economic impact elasticity function. This adjustment varied with the severity as percentage of water demand of the anticipated shortage. If one employed the sample elasticity function shown in Figure 2-1, a 30% shortage in the water use category would imply an economic impact estimate of 50% of the original $200 per acre-foot impact value (i.e., $100 per acre-foot).

Such adjustments were not required in estimating consumer surplus, nor for the estimates of utility revenue losses or utility tax losses. Estimates of lost consumer surplus relied on city-specific demand curves with the specific lost consumer surplus estimate calculated based on the relative percentage of the city's water shortage. Estimated changes in population as well as changes in school enrollment were indirectly related to the elasticity of job losses.

Assumed values for the bounds b1 and b2 varied with water use category under examination and are presented in Table 2-2.

Figure 2-1 Example Economic Impact Elasticity Function (as applied to a single water user's shortage)

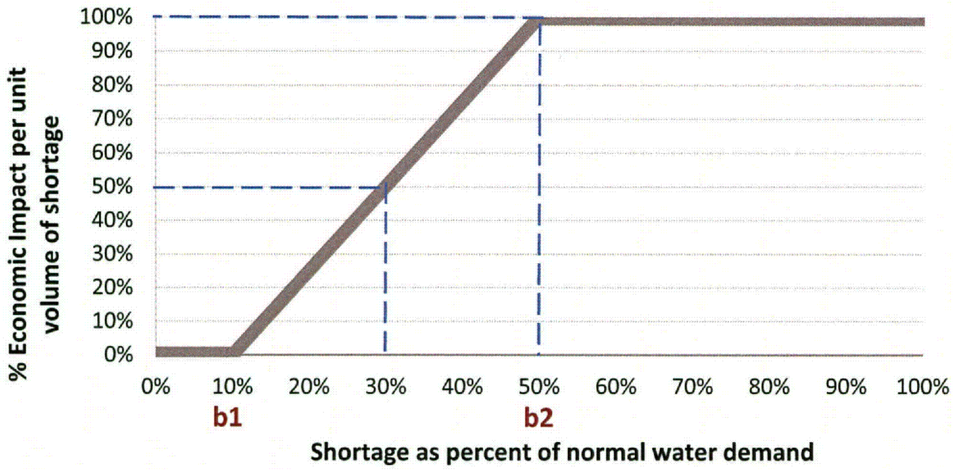

Table 2-2 Economic Impact Elasticity Function Lower and Upper Bounds

Water Use Category	Lower Bound (b1)	Upper Bound (b2)
Irrigation	5%	50%
Livestock	5%	10%
Manufacturing	10%	50%
Mining	10%	50%
Municipal (non-residential water intensive)	50%	80%
Steam-electric power	20%	70%

2.3 Analysis Assumptions and Limitations

Modeling of complex systems requires making assumptions and accepting limitations. This is particularly true when attempting to estimate a wide variety of economic impacts over a large geographic area and into future decades. Some of the key assumptions and limitations of the methodology include:

1. The foundation for estimating socioeconomic impacts of water shortages resulting from a drought are the water needs (potential shortages) that were identified as part of the regional water planning process. These needs have some uncertainty associated with them, but serve as a reasonable basis for evaluating potential economic impacts of a drought of record event.

2. All estimated socioeconomic impacts are snapshot estimates of impacts for years in which water needs were identified (i.e., 2020, 2030, 2040, 2050, 2060, and 2070). The estimates are independent and distinct "what if" scenarios for each particular year, and water shortages are assumed to be temporary events resulting from severe drought conditions. The evaluation assumed that no recommended water management strategies are implemented. In other words, growth occurs, future shocks are imposed on an economy at 10-year intervals, and the resulting impacts are estimated. Note that the estimates presented were not cumulative (i.e., summing up expected impacts from today up to the decade noted), but were simply an estimate of the magnitude of annual socioeconomic impacts should a drought of record occur in each particular decade based on anticipated supplies and demands for that same decade.

3. Input-output models such as IMPLAN rely on a static profile of the structure of the economy as it appears today. This presumes that the relative contributions of all sectors of the economy would remain the same, regardless of changes in technology, supplies of limited resources, and other structural changes to the economy that may occur into the future. This was a significant assumption and simplification considering the 50-year time period examined in this analysis. To presume an alternative future economic makeup, however, would entail positing many other major assumptions that would very likely generate as much or more error.

4. This analysis is not a cost-benefit analysis. That approach to evaluating the economic feasibility of a specific policy or project employs discounting future benefits and costs to their present value dollars using some assumed discount rate. The methodology employed in this effort to estimate the economic impacts of future water shortages did not use any discounting procedures to weigh future costs differently through time.

5. Monetary figures are reported in constant year 2013 dollars.

6. Impacts are annual estimates. The estimated economic model does not reflect the full extent of impacts that might occur as a result of persistent water shortages occurring over an extended duration. The drought of record in most regions of Texas lasted several years.

7. Value added estimates are the primary estimate of the economic impacts within this report. One may be tempted to add consumer surplus impacts to obtain an estimate of total adverse economic impacts to the region, but the consumer surplus measure represents the change to the wellbeing of households (and other water users), not an actual change in the flow of dollars through the economy. The two categories (value added and consumer surplus) are both valid impacts but should not be summed.

8. The value added, jobs, and taxes on production and import impacts include the direct, indirect and induced effects described in Section 2.2.1. Population and school enrollment losses also indirectly include such effects as they are based on the associated losses in employment. The remaining measures (consumer surplus, utility revenue, utility taxes, additional electrical power purchase costs, and potable water trucking costs), however, do not include any induced or indirect effects.

9. The majority of impacts estimated in this analysis may be considered smaller than those that might occur under drought of record conditions. Input-output models such as IMPLAN only capture "backward linkages" on suppliers (including households that supply labor to directly affected industries). While this is a common limitation in these types of economic impact modeling efforts, it is important to note that "forward linkages" on the industries that use the outputs of the directly affected industries can also be very important. A good example is impacts on livestock operators. Livestock producers tend to suffer substantially during droughts, not because there is not enough water for their stock, but because reductions in available pasture and higher prices for purchased hay have significant economic effects on their operations. Food processors could be in a similar situation if they cannot get the grains or other inputs that they need. These effects are not captured in IMPLAN, which is one reason why the impact estimates are likely conservative.

10. The methodology did not capture "spillover" effects between regions – or the secondary impacts that occur outside of the region where the water shortage is projected to occur.

11. The model did not reflect dynamic economic responses to water shortages as they might occur, nor does the model reflect economic impacts associated with a recovery from a drought of record including:
    a. The likely significant economic rebound to the landscaping industry immediately following a drought;
    b. The cost and years to rebuild liquidated livestock herds (a major capital item in that industry);
    c. Direct impacts on recreational sectors (i.e., stranded docks and reduced tourism); or,
    d. Impacts of negative publicity on Texas' ability to attract population and business in the event that it was not able to provide adequate water supplies for the existing economy.

12. Estimates for job losses and the associated population and school enrollment changes may exceed what would actually occur. In practice, firms may be hesitant to lay off employees, even in difficult economic times. Estimates of population and school enrollment changes are based on regional evaluations and therefore do not accurately reflect what might occur on a statewide basis.

13. The results must be interpreted carefully. It is the general and relative magnitudes of impacts as well as the changes of these impacts over time that should be the focus rather than the absolute numbers. Analyses of this type are much better at predicting relative percent differences brought about by a shock to a complex system (i.e., a water shortage) than the precise size of an impact. To illustrate, assuming that the estimated economic impacts of a drought of record on the manufacturing and mining water user categories are $2 and $1 million, respectively, one should be more confident that the economic impacts on manufacturing are twice as large as those on mining and that these impacts will likely be in the millions of dollars. But one should have less confidence that the actual total economic impact experienced would be $3 million.

3 Analysis Results

This section presents a breakdown of the results of the regional analysis for Region C. Projected economic impacts for six water use categories (irrigation, livestock. municipal, manufacturing, mining, and steam-electric power) are also reported by decade.

3.1 Overview of the Regional Economy

Table 3-1 presents the 2011 economic baseline as represented by the IMPLAN model and adjusted to 2013 dollars for Region C. In year 2011, Region C generated about $400 billion in gross state product associated with 4 million jobs based on the 2011 IMPLAN data. These values represent an approximation of the current regional economy for a reference point.

Table 3-1 Region C Economy

Income ($ millions)*	Jobs	Taxes on production and imports ($ millions)*
$394,016	3,974,130	$30,150

[1]*Year 2013 dollars based on 2011 IMPLAN model value added estimates for the region.*

The remainder of Section 3 presents estimates of potential economic impacts for each water use category that could reasonably be expected in the event of water shortages associated with a drought of record and if no recommended water management strategies were implemented.

3.2 Impacts for Irrigation Water Shortages

Three of the 16 counties in the region are projected to experience water shortages in the irrigated agriculture water use category for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 3-2. Note that tax collection impacts were not estimated for this water use category. IMPLAN data indicates a negative tax impact (i.e., increased tax collections) for the associated production sectors, primarily due to past subsidies from the federal government. Two factors led to excluding any reported tax impacts: 1) Federal support (subsidies) has lessened greatly since the year 2011 IMPLAN data was collected, and 2) It was not considered realistic to report increasing tax revenue collections for a drought of record.

Table 3-2 Impacts of Water Shortages on Irrigation in Region

Impact Measure	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$0	$0	$0	$0	$0	$0
Job losses	1	1	1	1	1	1

Year 2013 dollars, rounded. Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000.

3.3 Impacts for Livestock Water Shortages

One of the 16 counties in the region is projected to experience water shortages in the livestock water use category for one or more decades within the planning horizon. Estimated impacts to this water use category appear in Table 3-3. Note that tax impacts are not reported for this water use category for similar reasons that apply to the irrigation water use category described above.

Table 3-3 Impacts of Water Shortages on Livestock in Region

Impact Measures	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	-	-	-	-	-	-
Jobs losses	-	-	-	-	-	-

Year 2013 dollars, rounded. Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000

3.4 Impacts for Municipal Water Shortages

All 16 counties in the region are projected to experience water shortages in the municipal water use category for one or more decades within the planning horizon. Impact estimates were made for the two subtypes of use within municipal use: residential, and non-residential. The latter includes commercial and institutional users. Consumer surplus measures were made for both residential and non-residential demands. In addition, available data for the non-residential, water-intensive portion of municipal demand allowed use of IMPLAN and TWDB Water Use Survey data to estimate income loss, jobs, and taxes. Trucking cost estimates, calculated for shortages exceeding 80 percent, assumed a fixed cost of $20,000 per acre-foot to transport water for municipal use. The estimated impacts to this water use category appear in Table 3-4.

Table 3-4 Impacts of Water Shortages on Municipal Water Users in Region

Impact Measures	2020	2030	2040	2050	2060	2070
Income losses[1] ($ millions)*	$66	$345	$1,299	$3,679	$9,032	$16,621
Job losses[1]	994	5,172	19,495	55,232	135,628	249,590
Tax losses on production and imports[1] ($ millions)*	$5	$24	$91	$257	$630	$1,160
Consumer surplus losses ($ millions)*	$26	$96	$431	$851	$1,404	$2,475
Trucking costs ($ millions)*	-	-	$6	$27	$12	$50
Utility revenue losses ($ millions)*	$284	$811	$1,360	$1,913	$2,230	$3,145
Utility tax revenue losses ($ millions)*	$5	$15	$26	$35	$40	$55

[1] Estimates apply to the water-intensive portion of non-residential municipal water use.
** Year 2013 dollars, rounded. Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000.*

3.5 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the region are projected to occur in 14 of the 16 counties in the region for at least one decade of the planning horizon. Estimated impacts to this water use category appear in Table 3-5.

Table 3-5 Impacts of Water Shortages on Manufacturing in Region

Impacts Measures	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	-	$490	$2,492	$4,817	$7,417	$10,506
Job losses	-	4,318	22,269	43,192	66,471	93,933
Tax losses on production and Imports ($ millions)*	-	$29	$152	$295	$454	$644

** Year 2013 dollars, rounded. Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000.*

3.6 Impacts of Mining Water Shortages

Mining water shortages in the region are projected to occur in 11 of the 16 counties in the region for at least one decade of the planning horizon. Estimated impacts to this water use type appear in Table 3-6.

Table 3-6 Impacts of Water Shortages on Mining in Region

Impact Measures	2020	2030	2040	2050	2060	2070
Income losses ($ millions)*	$2,229	$1,206	$1,310	$2,116	$3,408	$5,750
Job losses	11,448	6,272	6,805	10,911	17,513	29,484
Tax losses on production and Imports ($ millions)*	$310	$167	$182	$293	$472	$795

**** Year 2013 dollars, rounded. Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000.***

3.7 Impacts of Steam-Electric Water Shortages

Steam-electric water shortages in the region are projected to occur in 12 of the 16 counties in the region for at least one decade of the planning horizon. Estimated impacts to this water use category appear in Table 3-7.

Note that estimated economic impacts to steam-electric water users:

- Are reflected as an income loss proxy in the form of the estimated additional purchasing costs for power from the electrical grid that could not be generated due to a shortage;
- Do not include estimates of impacts on jobs. Because of the unique conditions of power generators during drought conditions and lack of relevant data, it was assumed that the industry would retain, perhaps relocating or repurposing, their existing staff in order to manage their ongoing operations through a severe drought.
- Does not presume a decline in tax collections. Associated tax collections, in fact, would likely increase under drought conditions since, historically, the demand for electricity increases during times of drought, thereby increasing taxes collected on the additional sales of power.

Table 3-7 Impacts of Water Shortages on Steam-Electric Power in Region

Impact Measures	2020	2030	2040	2050	2060	2070
Income Losses ($ millions)*	$286	$806	$962	$1,140	$1,358	$1,729

**** Year 2013 dollars, rounded. Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000.***

3.8 Regional Social Impacts

Projected changes in population, based upon several factors (household size, population, and job loss estimates), as well as the accompanying change in school enrollment, were also estimated and are summarized in Table 3-8.

Table 3-8 Region-wide Social Impacts of Water Shortages in Region

Impact Measures	2020	2030	2040	2050	2060	2070
Consumer surplus losses ($ millions)*	$26	$96	$431	$851	$1,404	$2,475
Population losses	2,285	2,894	8,917	20,074	40,321	68,484
School enrollment losses	423	535	1,650	3,714	7,459	12,670

**** Year 2013 dollars, rounded. Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000.***

Appendix A - County Level Summary of Estimated Economic Impacts for Region C

County level summary of estimated economic impacts of not meeting identified water needs by water use category and decade (in 2013 dollars, rounded). Values presented only for counties with projected economic impacts for at least one decade.

**** Entries denoted by a dash (-) indicate no economic impact. Entries denoted by a zero ($0) indicate income losses less than $500,000***

		Income losses (Million $)*						Job losses						Consumer Surplus (Million $)*					
County	Water Use Category	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070
COLLIN	MANUFACTURING	-	$101	$219	$339	$497	$712	-	787	1,713	2,653	3,887	5,567	-	-	-	-	-	-
COLLIN	MUNICIPAL	-	$236	$854	$1,481	$1,760	$2,036	-	3,545	12,827	22,234	26,417	30,563	$1	$42	$259	$443	$566	$698
COLLIN	STEAM ELECTRIC POWER	-	$0	$1	$2	$4	$5	-	-	-	-	-	-	-	-	-	-	-	-
COLLIN Total		**-**	**$337**	**$1,075**	**$1,822**	**$2,261**	**$2,753**	**-**	**4,332**	**14,539**	**24,886**	**30,304**	**36,129**	**$1**	**$42**	**$259**	**$443**	**$566**	**$698**
COOKE	IRRIGATION	$0	$0	$0	$0	$0	$0	-	-	-	-	-	-	-	-	-	-	-	-
COOKE	MANUFACTURING	-	-	-	-	-	$33	-	-	-	-	-	474	-	-	-	-	-	-
COOKE	MINING	$1,047	$34	$28	$112	$224	$376	5,299	171	142	569	1,132	1,903	-	-	-	-	-	-
COOKE	MUNICIPAL	-	-	-	-	$0	$23	-	-	-	-	-	341	-	$0	$0	$0	$0	$5
COOKE Total		**$1,047**	**$34**	**$28**	**$112**	**$224**	**$431**	**5,299**	**172**	**142**	**569**	**1,133**	**2,718**	**-**	**$0**	**$0**	**$0**	**$0**	**$5**
DALLAS	MANUFACTURING	-	$132	$834	$1,562	$2,178	$2,689	-	1,103	6,977	13,066	18,210	22,490	-	-	-	-	-	-
DALLAS	MUNICIPAL	-	$2	$75	$204	$380	$627	-	30	1,124	3,057	5,698	9,411	$3	$13	$37	$66	$115	$186
DALLAS Total		**-**	**$134**	**$909**	**$1,766**	**$2,557**	**$3,316**	**-**	**1,133**	**8,101**	**16,123**	**23,908**	**31,901**	**$3**	**$13**	**$37**	**$66**	**$115**	**$186**
DENTON	MANUFACTURING	-	$34	$128	$260	$351	$420	-	329	1,237	2,501	3,380	4,046	-	-	-	-	-	-
DENTON	MINING	-	-	$90	$595	$1,274	$2,397	-	-	459	3,015	6,459	12,152	-	-	-	-	-	-
DENTON	MUNICIPAL	-	$22	$172	$1,303	$4,559	$7,643	-	323	2,580	19,565	68,436	114,731	$1	$10	$73	$187	$340	$568
DENTON Total		**-**	**$56**	**$391**	**$2,158**	**$6,184**	**$10,460**	**-**	**652**	**4,276**	**25,081**	**78,275**	**130,929**	**$1**	**$10**	**$73**	**$187**	**$340**	**$568**
ELLIS	MANUFACTURING	-	-	-	-	$17	$62	-	-	-	-	200	733	-	-	-	-	-	-
ELLIS	MUNICIPAL	-	$0	$1	$8	$248	$1,385	-	1	22	114	3,725	20,788	$0	$1	$4	$11	$42	$172
ELLIS	STEAM ELECTRIC POWER	-	-	$67	$156	$236	$342	-	-	-	-	-	-	-	-	-	-	-	-
ELLIS Total		**-**	**$0**	**$68**	**$163**	**$501**	**$1,788**	**-**	**1**	**22**	**114**	**3,925**	**21,521**	**$0**	**$1**	**$4**	**$11**	**$42**	**$172**
FANNIN	MINING	$1	$1	$1	$1	$1	$1	5	5	5	5	5	5	-	-	-	-	-	-

		Income losses (Million $)*						Job losses						Consumer Surplus (Million $)*					
County	Water Use Category	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070
FANNIN	MUNICIPAL	-	-	$4	$9	$68	$311	-	-	66	132	1,020	4,669	-	$0	$3	$8	$17	$54
FANNIN	STEAM ELECTRIC POWER	-	$79	$94	$113	$138	$165	-	-	-	-	-	-	-	-	-	-	-	-
FANNIN Total		**$1**	**$80**	**$99**	**$123**	**$207**	**$477**	**5**	**5**	**71**	**138**	**1,025**	**4,674**	**-**	**$0**	**$3**	**$8**	**$17**	**$54**
FREESTONE	MINING	$965	$913	$944	$951	$967	$1,017	5,010	4,742	4,899	4,939	5,020	5,281	-	-	-	-	-	-
FREESTONE	MUNICIPAL	-	-	-	-	$11	$115	-	-	-	-	172	1,731	$0	$0	$0	$0	$3	$28
FREESTONE	STEAM ELECTRIC POWER	-	-	-	-	$34	$198	-	-	-	-	-	-	-	-	-	-	-	-
FREESTONE Total		**$965**	**$913**	**$944**	**$951**	**$1,012**	**$1,330**	**5,010**	**4,742**	**4,899**	**4,939**	**5,192**	**7,013**	**$0**	**$0**	**$0**	**$0**	**$3**	**$28**
GRAYSON	MANUFACTURING	-	-	-	-	$133	$489	-	-	-	-	899	3,304	-	-	-	-	-	-
GRAYSON	MINING	-	-	-	-	$1	$11	-	-	-	-	8	58	-	-	-	-	-	-
GRAYSON	MUNICIPAL	-	$5	$51	$145	$457	$1,083	-	82	770	2,179	6,867	16,256	$4	$5	$8	$15	$51	$182
GRAYSON	STEAM ELECTRIC POWER	-	$146	$146	$146	$146	$146	-	-	-	-	-	-	-	-	-	-	-	-
GRAYSON Total		**-**	**$152**	**$197**	**$291**	**$738**	**$1,729**	**-**	**82**	**770**	**2,179**	**7,773**	**19,618**	**$4**	**$5**	**$8**	**$15**	**$51**	**$182**
HENDERSON	MANUFACTURING	-	-	-	-	$0	$11	-	-	-	-	3	79	-	-	-	-	-	-
HENDERSON	MINING	-	-	-	-	$0	$2	-	-	-	-	1	11	-	-	-	-	-	-
HENDERSON	MUNICIPAL	-	-	-	$2	$27	$96	-	-	-	25	409	1,435	$0	$0	$1	$2	$7	$27
HENDERSON	STEAM ELECTRIC POWER	$3	$102	$147	$194	$243	$281	-	-	-	-	-	-	-	-	-	-	-	-
HENDERSON Total		**$3**	**$102**	**$147**	**$196**	**$271**	**$390**	**-**	**-**	**-**	**25**	**413**	**1,526**	**$0**	**$0**	**$1**	**$2**	**$7**	**$27**
JACK	MINING	$216	$258	$248	$255	$263	$284	1,134	1,354	1,299	1,337	1,380	1,489	-	-	-	-	-	-
JACK	MUNICIPAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$0	$0
JACK	STEAM ELECTRIC POWER	-	-	-	$6	$15	$27	-	-	-	-	-	-	-	-	-	-	-	-
JACK Total		**$216**	**$258**	**$248**	**$261**	**$278**	**$311**	**1,134**	**1,354**	**1,299**	**1,337**	**1,380**	**1,489**	**-**	**-**	**-**	**-**	**$0**	**$0**
KAUFMAN	MINING	-	-	$0	$2	$4	$7	-	-	-	14	34	59	-	-	-	-	-	-
KAUFMAN	MUNICIPAL	-	-	$0	$33	$257	$609	-	-	-	499	3,854	9,141	$0	$1	$3	$11	$31	$95
KAUFMAN Total		**-**	**-**	**$0**	**$35**	**$261**	**$616**	**-**	**-**	**1**	**512**	**3,888**	**9,200**	**$0**	**$1**	**$3**	**$11**	**$31**	**$95**
NAVARRO	MANUFACTURING	-	$28	$42	$65	$89	$108	-	284	428	655	903	1,095	-	-	-	-	-	-
NAVARRO	MUNICIPAL	-	-	-	-	$20	$90	-	-	-	-	295	1,356	-	$1	$2	$3	$6	$13
NAVARRO	STEAM ELECTRIC POWER	$283	$476	$476	$476	$476	$476	-	-	-	-	-	-	-	-	-	-	-	-
NAVARRO Total		**$283**	**$504**	**$518**	**$540**	**$585**	**$674**	**-**	**284**	**428**	**655**	**1,198**	**2,451**	**-**	**$1**	**$2**	**$3**	**$6**	**$13**

County	Water Use Category	Income losses (Million $)*						Job losses						Consumer Surplus (Million $)*					
		2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070	2020	2030	2040	2050	2060	2070
PARKER	MANUFACTURING	-	-	-	-	$79	$150	-	-	-	-	835	1,574	-	-	-	-	-	-
PARKER	MUNICIPAL	$5	-	-	-	$269	$1,092	76	-	-	-	4,041	16,394	$3	$3	$3	$8	$43	$161
PARKER	STEAM ELECTRIC POWER	-	-	-	-	$0	$1	-	-	-	-	-	-	-	-	-	-	-	-
PARKER Total		**$5**	**-**	**-**	**-**	**$349**	**$1,243**	**76**	**-**	**-**	**-**	**4,876**	**17,968**	**$3**	**$3**	**$3**	**$8**	**$43**	**$161**
ROCKWALL	MANUFACTURING	-	$0	$1	$2	$2	$3	-	6	14	23	33	47	-	-	-	-	-	-
ROCKWALL	MUNICIPAL	-	-	-	-	-	$0	-	-	-	-	-	4	$0	$1	$2	$3	$7	$13
ROCKWALL Total		**-**	**$0**	**$1**	**$2**	**$2**	**$3**	**-**	**6**	**14**	**23**	**33**	**51**	**$0**	**$1**	**$2**	**$3**	**$7**	**$13**
TARRANT	MANUFACTURING	-	$157	$1,111	$2,249	$3,493	$4,954	-	1,501	10,655	21,560	33,484	47,492	-	-	-	-	-	-
TARRANT	MUNICIPAL	$61	$38	$22	$153	$481	$839	918	575	329	2,310	7,263	12,683	$12	$17	$33	$73	$135	$213
TARRANT	STEAM ELECTRIC POWER	-	$2	$31	$42	$52	$62	-	-	-	-	-	-	-	-	-	-	-	-
TARRANT Total		**$61**	**$197**	**$1,165**	**$2,445**	**$4,026**	**$5,855**	**918**	**2,076**	**10,984**	**23,870**	**40,747**	**60,175**	**$12**	**$17**	**$33**	**$73**	**$135**	**$213**
WISE	IRRIGATION	$0	$0	$0	$0	$0	$0	1	1	1	1	1	1	-	-	-	-	-	-
WISE	MANUFACTURING	-	$38	$155	$341	$577	$876	-	308	1,246	2,736	4,637	7,034	-	-	-	-	-	-
WISE	MINING	-	-	-	$200	$674	$1,655	-	-	-	1,030	3,472	8,524	-	-	-	-	-	-
WISE	MUNICIPAL	-	$41	$118	$341	$495	$672	-	616	1,776	5,117	7,433	10,087	$1	$2	$5	$21	$42	$61
WISE	STEAM ELECTRIC POWER	-	-	-	$4	$14	$26	-	-	-	-	-	-	-	-	-	-	-	-
WISE Total		**$0**	**$79**	**$273**	**$886**	**$1,761**	**$3,229**	**1**	**925**	**3,023**	**8,885**	**15,543**	**25,647**	**$1**	**$2**	**$5**	**$21**	**$42**	**$61**
Regional Total		**$2,581**	**$2,846**	**$6,063**	**$11,751**	**$21,216**	**$34,607**	**12,443**	**15,763**	**48,570**	**109,337**	**219,614**	**373,009**	**$26**	**$96**	**$431**	**$851**	**$1,404**	**$2,475**

Appendix O

APPENDIX O

POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES

Table O.1
Potentially Feasible Water Management Strategies for Regional Wholesale Water Providers

Water Management Strategies	DWU	TRWD	NTMWD	TRA	UTRWD	DCPCMUD	GTUA	Fort Worth	Corsicana
Conservation*:	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management:									
Implementation of Drought Contingency Plans/Measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse:									
Main Stem Pump Station	PF		PF						
Main Stem Balancing Reservoir	PF								
Direct Reuse	PF			PF	PF			PF	
Cedar Creek Reuse (Wetlands)		PF							
Reuse for Steam Electric Power				PF					
Ennis Indirect Reuse				PF					
Joe Pool Reuse				PF					
Reuse from TRA Central Regional WWTP		PF		PF					
Existing Supplies:									
Expansion of Treatment and Delivery System	PF	PF	PF	PF	PF		PF	PF	PF
IPL Connection to Bachman	PF								
Lake Texoma Desalination	PF		PF				PF		
Toledo Bend	PF	PF	PF		PF				
Carrizo-Wilcox Groundwater from Upshur, Wood, Smith Counties	PF								
IPL Connect to Lake Palestine	PF								
IPL Connection of Existing Supplies (Cedar Creek and Richland-Chambers)		PF							
Oklahoma		PF	PF		PF				
Removal of Chapman Silt Barrier			PF		PF				
Dredge Lake Lavon			PF						
Add'l measure to access full Lavon yield			PF						
Chapman Booster Pump Station			PF						
Lake Texoma blending			PF		PF				
Lake O' the Pines			PF						
Freestone/Anderson Co Groundwater (Forestar)			PF						
Purchase of Additional Supplies from current provider					PF				
Renew Contract for Supplies from current provider					PF				
Lake Texoma Raw water for SEP							PF		
Navarro Mills (additional)									PF
Conjunctive Use:									
Conjunctive use of Ground & Surface water	PF								
Development of New Supplies:									
Lower Bois d'Arc Reservoir (New IBT)			PF						
Sulphur Basin Supplies (New IBT)	PF	PF	PF		PF				
Marvin Nichols Reservoir (New IBT)		PF	PF		PF				
Ralph Hall Reservoir (New IBT)					PF				
George Parkhouse North Lake (New IBT)			PF		PF				
George Parkhouse South Lake (New IBT)			PF		PF				
Lake Columbia (New IBT)	PF								
Lake Tehuacana		PF							
Neches Run-of-River Diversions (IBT)	PF								
Red River Off Channel Reservoir (New IBT)	PF				PF				
Sabine Off Channel Reservoir (New IBT)	PF								
Richland-Chambers Reservoir for SEP									PF
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities:**									
Fannin County Water Supply Project			PF						
Fannin County Water Supply Project							PF		
Collin-Grayson Municipal Alliance							PF		
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements):									
Interim Purchase from DWU		PF							
Emergency Transfer of Water (Section 11.139):									
System Optimization, Subordination, Leases, Enhancement of Yield, Improvement of Water Quality									
System Operation	PF	PF	PF						
Desalination:									
Desalination Plant - Northeast Grayson, Sherman, Denison							PF		

Blanks Indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered)
PF = considered 'potentially feasible' and therefore evaluated

* Note: Specific Conservation Strategies are listed in a separate analysis.
** Note: All strategies for wholesale water suppliers could be considered as "Development of Regional Water Supply"
IBT denotes a Permitted Interbasin Transfer.
New IBT denotes an Interbasin Transfer requiring a new IBT permit.

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Table O.2
Potentially Feasible Water Management Strategies for Local Wholesale Water Providers

Water Management Strategies	Arlington	Argyle WSC	Athens MWA	Cross Timbers WSC	Denison	Denton	ECCFWSD	Ennis	Forney	Gainesville	Garland	Grand Prairie	Lake Cities MUA	Mansfield	Midlothian	Mustang SUD	North Richland Hills	Princeton	Rockett SUD	Rockwall	Seagoville	Sherman	Terrell	Walnut Creek SUD	Waxahachie	Weatherford	WCCMUD	Wise Co. WSD
Conservation*:	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management:																												
Implementation of Drought Contingency Plans as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse:																												
Athens Indirect Reuse			PF																									
Indirect Reuse to Lake Weatherford/Sunshine																										PF		
Reallocation/Management of Existing Supplies:																												
Expansion of Treatment and Delivery System			PF	PF	PF	PF	PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	PF
Expansion of Raw Water Supply System																									PF			
Conjunctive Use:																												
Acquisition of Available Existing Supplies:																												
Purchase of Additional Supplies from current provider	PF	PF		PF		PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Additional Lake Texoma					PF																							
Begin Purchasing from Arlington												PF																
Development of New Supplies:																												
New Wells in Carrizo-Wilcox			PF																									
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities:**																												
Infrastructure to deliver to Cooke County WUGS										PF																		
Grayson County Water Supply Project					PF																	PF						
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements):																												
Emergency Transfer of Water (Section 11.139):																												
System Optimization, Subordination, Leases, Enhancement of Yield, Improvement of Water Quality																												
System Operation																												
Desalination:																												
Desalination Plant					PF																	PF						

Blanks Indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered)
PF = considered 'potentially feasible' and therefore evaluated

* Note: Specific Conservation Strategies are listed in a separate analysis.
** Note: All strategies for wholesale water suppliers could be considered as "Development of Regional Water Supply"

Table O.3 - Potentially Feasible Water Management Strategies for Collin County Municipal WUGs*

Water Management Strategies	Allen	Anna	Blue Ridge	Caddo Basin SUD	Celina	Copeville SUD	County Other	Culleoka WSC	East Fork SUD	Fairview	Farmersville	Frisco	Josephine	Lavon	Lavon WSC	Lowry Crossing	Lucas	Marilee SUD	McKinney	Melissa	Murphy	Nevada	New Hope	North Collin WSC	Parker	Plano	Princeton	Prosper	Saint Paul	Seis Lagos UD	Weston	Wylie	Wylie Northeast SUD	Irrigation	Manufacturing	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	
Drought Management																																				
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse												PF																								
Reallocation/ Management of Existing Supplies																																				
Expansion of Treatment and Delivery System			PF						PF											PF					PF			PF			PF		PF			
Conjuctive Use																																				
Acquisition of Available Existing Supplies																																				
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF		PF	PF
Begin Purchasing from NTMWD					PF																										PF					
Grayson County Water Supply Project		PF																PF																		
New wells																															PF				PF	
Development of New Supplies																																				
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																																				
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																																				
Emergency Transfer of Water (Section 11.139)																																				
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality																																				
Desalination																																				
Aquifier Storage and Recovery																																				

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)

PF = considered 'potentially feasible' and therefore evaluated

*If a WUG is located in Multiple Counties, it is only shown on the Appendix O table for the County in which the majority of the WUG is located. WUG that are also WWPs are not listed here. See Tables O.1 and O.2

Table O.4 - Potentially Feasible Water Management Strategies for Cooke County Municipal WUGs*

Water Management Strategies	County Other	Lake Kiowa SUD	Lindsay	Mountain Springs WSC	Muenster	Two Way WSC	Valley View	Woodbine WSC	Irrigation	Manufacturing	Mining	
Conservation	PF	PF	PF	PF	PF	PF	PF	PF		PF		
Drought Management												
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	
Reuse												
Reallocation/ Management of Existing Supplies												
Expansion of Treatment and Delivery System												
Conjuctive Use												
Acquisition of Available Existing Supplies												
Additional Supplies from current provider									PF	PF		26
Connect to and purchase from Gainesville	PF	PF	PF	PF	PF	PF	PF	PF			PF	
Development of New Supplies												
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities												
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)												
Emergency Transfer of Water (Section 11.139)												
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality												
Desalination												
Aquifier Storage and Recovery												
Other												
Treatment facilities for additional supply					PF							
Lake Muenster					PF							

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)
PF = considered 'potentially feasible' and therefore evaluated
*If a WUG is located in Multiple Counties, it is only shown on the Appendix O table for the County in which the majority of the WUG is located. WUG that are also WWPs are not listed here. See Tables O.1 and O.2

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Table O.5 - Potentially Feasible Water Management Strategies for Dallas County Municipal WUGs*

Water Management Strategies	Addison	Balch Springs	Cedar Hill	Cockrell Hill	Coppell	County Other	De Soto	Duncanville	Farmers Branch	Glenn Heights	Highland Park	Hutchins	Irving	Lancaster	Mesquite	Richardson	Rowlett	Sachse	Seagoville	Sunnyvale	University Park	Wilmer	Irrigation	Manufacturing	Mining	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management																										
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse																										
Irving Indirect Reuse													PF													
Las Colinas Direct Reuse																							PF			
TRA Reuse for SEP																										PF
Reallocation/ Management of Existing Supplies																										
Expansion of Treatment and Delivery System										PF			PF							PF		PF				
Removal of Chapman Silt Barrier													PF													
Conjuctive Use																										
Acquisition of Available Existing Supplies																										
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Additional Supplies from current provider through Lancaster																						PF				
Additional Supplies from current provider-direct connection																						PF				
Development of New Supplies																										
Sulphur Basin Supplies													PF													
Marvin Nichols Reservoir													PF													
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																										
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																										
Emergency Transfer of Water (Section 11.139)																										
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality																										
Desalination																										
Aquifier Storage and Recovery																										

Blanks indicate nPF = determined 'not potentially feasible' (may include WMSs that were initially considered or identified as potentially feasible)

PF = considered 'potentially feasible' and therefore evaluated

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Table O.6 - Potentially Feasible Water Management Strategies for Denton County Municipal WUGs*

Water Management Strategies	Argyle	Aubrey	Bartonville	Bolivar WSC	Carrollton	Copper Canyon	Corinth	County Other	Cross Roads	Denton Co FWSD#1A	Denton Co. FWSD #7	Denton Co. FWSD #10	Double Oak	Flower Mound	Hackberry	Hickory Creek	Highland Village	Justin	Krugerville	Krum	Lake Dallas	Lakewood Village	Lewisville	Little Elm	Northlake	Oak Point	Paloma Creek	Pilot Point	Ponder	Providence Village	Roanoke	Sanger	Shady Shores	The Colony	Trophy Club	Irrigation	Manufacturing	Mining
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	
Drought Management																																						
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse																																						
Direct Reuse from UTRWD																																				PF		
Reallocation/ Management of Existing Supplies																																						
Expansion of Treatment and Delivery System															PF								PF												PF			
Conjuctive Use																																						
Acquisition of Available Existing Supplies																																						
New Well(s) in Trinity Aquifer							PF	PF										PF		PF								PF									PF	
New Well(s) in Woodbine Aquifer								PF																														
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF	PF	PF	PF			PF	PF	PF	PF	PF	PF	PF	PF	PF
Begin Purchasing from Gainesville				PF																																		
Begin Purchasing from UTRWD																						PF						PF	PF									
Development of New Supplies																																						
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																																						
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																																						
Emergency Transfer of Water (Section 11.139)																																						
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality																																						
Desalination																																						
Aquifier Storage and Recovery																																						

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Table O.7 - Potentially Feasible Water Management Strategies for Ellis County Municipal WUGs*

Water Management Strategies	Bardwell	Buena Vista-Bethel SUD	County Other	Ferris	Files Valley WSC	Garrett	Italy	Maypearl	Milford	Mountain Peak SUD	Oak Leaf	Ovilla	Palmer	Pecan Hill	Red Oak	Rice WSC	Sardis-Lone Elm WSC	Venus	Manufacturing	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management																				
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse																				
TRA Reuse for SEP																				PF
Reallocation/ Management of Existing Supplies																				
Expansion of Treatment and Delivery System				PF	PF							PF	PF			PF	PF			
Conjuctive Use																				
Acquisition of Available Existing Supplies																				
New Well(s) in Trinity Aquifer																				
New Well(s) in Woodbine Aquifer										PF										
New Well(s) in Carrizo-Wilcox Aquifer																				
Additional Supplies from current provider	PF	PF	PF	PF		PF	PF	PF		PF	PF		PF		PF	PF	PF	PF	PF	PF
Connecto Waxahachie					PF															
Connecto Midlothian																	PF			
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																				
TRA Ellis County Water Supply Project	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF		PF		PF	PF	PF	PF	PF	PF
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																				
Emergency Transfer of Water (Section 11.139)																				
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality																				
Desalination																				
Aquifier Storage and Recovery																				

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Table O.8 - Potentially Feasible Water Management Strategies for Fannin County Municipal WUGs*

Water Management Strategies	Bonham	Ector	County Other	Hickory Creek SUD	Honey Grove	Ladonia	Leonard	North Hunt WSC	Savoy	SW Fannin Co SUD	Trenton	Mining	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management													
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse													
Reallocation/ Management of Existing Supplies													
Expansion of Treatment and Delivery System						PF							
Conjuctive Use													
Acquisition of Available Existing Supplies													
New Well(s) In Trinity or Woodbine Aquifer										PF	PF		
Begin Purchasing from NTMWD	PF	PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	
Fannin County Water Supply Project	PF	PF	PF	PF	PF		PF	PF	PF	PF	PF	PF	
Lake Ralph Hall Supply						PF							
Grayson County Water Supply Project			PF										
Lake Texoma (GTUA)													PF
Development of New Supplies													
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities													
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)													
Emergency Transfer of Water (Section 11.139)													
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality													
Desalination													
Aquifier Storage and Recovery													

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Table O.9 - Potentially Feasible Water Management Strategies for Freestone County Municipal WUGs*

Water Management Strategies	County Other	Fairfield	Flo Community WSC	Oakwood	Teague	Wortham	SEP
Conservation	PF	PF	PF		PF	PF	
Drought Management							
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF
Reuse							
TRA Reuse for SEP							PF
Reallocation/ Management of Existing Supplies							
Expansion of Treatment and Delivery System	PF	PF					
Conjuctive Use							
Acquisition of Available Existing Supplies							
New Well(s) in Carrizo-Wilcox Aquifer			PF				
New Well(s) in Trinity Aquifer (Navarro County)					PF		
Additional Supplies from current provider	PF					PF	PF
Begin Purchasing from TRWD	PF	PF					
Development of New Supplies							
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities							
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)							
Emergency Transfer of Water (Section 11.139)							
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality							
Desalination							
Aquifier Storage and Recovery							

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Table O.10 - Potentially Feasible Water Management Strategies for Grayson County Municipal WUGs*

Water Management Strategies	Bells	Collinsville	County Other	Gunter	Howe	Kentucky Town WSC	Luella WSC	Marilee SUD	Pottsboro	South Grayson WSC	Southmayd	Tioga	Tom Bean	Two Way WSC	Van Alstyne	Whitesboro	Whitewright	Woodbine WSC	Irrigation	Manufacturing	Mining	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management																						
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF	PF
Reuse																						
Direct Reuse from Sherman																					PF	PF
Reallocation/ Management of Existing Supplies																						
Expansion of treatment and delivery system															PF							
Conjuctive Use																						
Acquisition of Available Existing Supplies																						
New Well(s) In Trinity Aquifer				PF																	PF	
New Well(s) In Woodbine Aquifer	PF										PF											
Additional Supplies from current provider								PF	PF	PF					PF					PF		
Development of New Supplies																						
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																						
Cooke County Water Supply Project																						
Fannin County Water Supply Project																						
Grayson County Water Supply Project	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF	PF	PF		PF	PF	PF
Collin Grayson Municipal Alliance					PF					PF					PF					PF		
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																						
Emergency Transfer of Water (Section 11.139)																						
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality																						
Desalination																						
Aquifier Storage and Recovery																						

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Table O.11 - Potentially Feasible Water Management Strategies for Henderson County Municipal WUGs*

Water Management Strategies	Bethel-Ash WSC	County Other	Eustace	Gun Barrel City	Log Cabin	Malakoff	Payne Springs	Seven Points	Tool	Trinidad	Virginia Hills WSC	Manufacturing	Mining	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management														
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse														
Indirect Reuse (Athens MWA) (Interbasin Transfer)														
Reallocation/ Management of Existing Supplies														
Expansion of treatment and delivery system														
Conjuctive Use														
Acquisition of Available Existing Supplies														
New Well(s) in Carrizo-Wilcox Aquifer			PF				PF							
Additional Supplies from current provider		PF		PF		PF	PF	PF	PF			PF	PF	
Purchase TRWD water from Cedar Creek Lake														PF
Development of New Supplies														
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities														
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)														
Emergency Transfer of Water (Section 11.139)														
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality														
Desalination														
Aquifier Storage and Recovery														

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Table O.12 - Potentially Feasible Water Management Strategies for Jack County Municipal WUGs*

Water Management Strategies	Bryson	County-Other	Jacksboro	Mining	SEP
Conservation	PF	PF	PF		
Drought Management					
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF
Reuse					
Indriect Reuse from Jacksboro				PF	
Reallocation/ Management of Existing Supplies					
Expansion of treatment and delivery system					
Conjuctive Use					
Acquisition of Available Existing Supplies					
Purchase water from Walnut Creek SUD		PF			
Purchase water from Jacksboro		PF			
Purchase water from TRWD				PF	PF
Development of New Supplies					
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities					
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)					
Emergency Transfer of Water (Section 11.139)					
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality					
Desalination					
Aquifier Storage and Recovery					

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Table O.13 - Potentially Feasible Water Management Strategies for Kaufman County Municipal WUGs*

Water Management Strategies	Ables Springs WSC	College Mound WSC	Combine	County Other	Crandall	Forney Lake WSC	Gastonia-Scurry WSC	High Point WSC	Kaufman	Kemp	Mabank	MacBee SUD	Oak Grove	Post Oak Bend City	Rose Hill SUD	Scurry	Talty	Talty WSC	West Cedar Ck MUD	Irrigation	Manufacturing	Mining	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		
Drought Management																							
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse																							
TRA Reuse for SEP																							PF
Reallocation/ Management of Existing Supplies																							
Expansion of Treatment and Delivery System		PF			PF		PF					PF											
Conjuctive Use																							
Acquisition of Available Existing Supplies																							
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF		PF
Begin Purchasing from Seagoville (DWU); construct facilities							PF																
Begin Purchasing from TRWD																							
Begin Purchasing from NTWMD																						PF	
New Wells																						PF	
Development of New Supplies																							
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																							
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																							
Emergency Transfer of Water (Section 11.139)																							
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality																							
Desalination																							
Aquifier Storage and Recovery																							

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Table O.14 - Potentially Feasible Water Management Strategies for Navarro County Municipal WUGs*

Water Management Strategies	Blooming Grove	Brandon Irene WSC	Chatfield WSC	Corbet WSC	County Other	Dawson	Frost	Kerens	M E N WSC	Navarro Mills WSC	Rice	Irrigation	Manufacturing	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management														
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse														
Reallocation/ Management of Existing Supplies														
Expansion of Treatment and Delivery System									PF					
Conjuctive Use														
Acquisition of Available Existing Supplies														
New Wells in Woodbine Aquifer										PF				
New Wells in Trinity Aquifer	PF		PF											
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	
Raw Water from Corsicana for SEP														PF
Raw Water from TRWD for SEP														PF
Development of New Supplies														
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities														
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)														
Emergency Transfer of Water (Section 11.139)														
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality														
Desalination														
Aquifier Storage and Recovery														

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Table O.15 - Potentially Feasible Water Management Strategies for Parker County Municipal WUGs*

Water Management Strategies	Aledo	Annetta	Annetta North	Annetta South	County-Other	Cresson	Hudson Oaks	Mineral Wells	Parker County SUD	Reno	Springtown	Willow Park	Manufacturing	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	
Drought Management														
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse														
Reallocation/ Management of Existing Supplies														
Expansion of Treatment and Delivery System	PF				PF				PF		PF	PF		
Conjuctive Use														
Acquisition of Available Existing Supplies														
New Well(s) in Trinity Aquifer					PF	PF			PF		PF			
Additional Supplies from current provider	PF				PF		PF		PF	PF	PF		PF	PF
Begin Purchasing from Ft Worth (TRWD)/Connect to Ft Worth												PF		
Begin Purchasing from Weatherford (TRWD)		PF	PF	PF	PF							PF		
Begin Purchasing from TRWD					PF									
Development of New Supplies														
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities														
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)														
Emergency Transfer of Water (Section 11.139)														
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality														
Desalination														
Aquifier Storage and Recovery														

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Table O.16 - Potentially Feasible Water Management Strategies for Rockwall County Municipal WUGs*

Water Management Strategies	Blackland WSC	Cash SUD	County-Other	Fate	Heath	McLendon-Chisholm	Mt Zion WSC	Rockwall	Royse City	Irrigation	Manufacturing
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management											
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse											
Reallocation/ Management of Existing Supplies											
Expansion of Treatment and Delivery System	PF	PF		PF							
Conjuctive Use											
Acquisition of Available Existing Supplies											
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Development of New Supplies											
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities											
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)											
Emergency Transfer of Water (Section 11.139)											
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality											
Desalination											
Aquifier Storage and Recovery											

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Table O.17 - Potentially Feasible Water Management Strategies for Tarrant County Municipal WUGs*

Water Management Strategies	Azle	Bedford	Benbrook	Bethesda WSC	Blue Mound	Burleson	Colleyville	Community WSC	County-Other	Crowley	Dalworth. Gardens	Edgecliff	Euless	Everman	Forest Hill	Grapevine	Haltom City	Haslet	Hurst	Johnson Co SUD	Keller	Kennedale	Lake Worth	Lakeside	Pantego	Pelican Bay	Richland Hills	River Oaks	Saginaw	Sansom Park Village	Southlake	Watauga	Westlake	Westover Hills	Westworth Village	White Settlement	Irrigation	Manufacturing	Mining	SEP
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management																																								
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse																																								
Purchase Reuse water from DCPCMUD (Lake Grapevine)																PF																								
Direct Reuse																																								PF
Reallocation/ Management of Existing Supplies																																								
Expansion of Treatment and Delivery System	PF		PF	PF		PF				PF										PF	PF	PF			PF	PF					PF	PF								
Conjuctive Use																																								
Acquisition of Available Existing Supplies																																								
New Well(s) in Trinity Aquifer																																								
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF			PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Begin Purchasing from Arlington (TRWD)				PF																		PF			PF															
Begin Purchasing from Azle (Ft Worth)																										PF														
Begin Purchasing from Fort Worth (TRWD)																									PF															
Begin Purchasing from Grand Prairie																				PF																				
Development of New Supplies																																								
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																																								
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																																								
Emergency Transfer of Water (Section 11.139)																																								
System Optimization, Subordination, Leases, Enhancement of Yield Improvement of Water Quality																																								
Desalination																																								
Aquifier Storage and Recovery																																								
Other																																								
Purchase water system					PF																																			

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Table O.18 - Potentially Feasible Water Management Strategies for Wise County Municipal WUGs*

Water Management Strategies	Alvord	Aurora	Boyd	Bridgeport	Chico	County-Other	Decatur	New Fairview	Newark	Rhome	Runaway Bay	West Wise SUD	Irrigation	Manufacturing	Irrigation	Manufacturing
Conservation	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Drought Management																
Implement Drought Contingency Plan/measures as needed	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF
Reuse																
Reallocation/ Management of Existing Supplies																
Expansion of Treatment and Delivery System				PF	PF			PF	PF		PF	PF				
Conjuctive Use																
Acquisition of Available Existing Supplies																
Additional Supplies from current provider	PF	PF	PF	PF	PF	PF	PF			PF	PF	PF	PF	PF	PF	PF
New Well(s) in Trinity Aquifer														PF		
Begin Purchasing from Rhome								PF	PF							
Development of New Supplies																
Development of Regional Water Supply or Providing Regional Management of Water Supply Facilities																
Voluntary Transfer of Water (incl. regional water banks, sales, leases, options, subordination agreements, and financing agreements)																
Emergency Transfer of Water (Section 11.139)																
System Optimazation, Subordination, Leases, Enhancement of Yield Improvement of Water Quality																
Desalination																
Aquifier Storage and Recovery																

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Appendix P

APPENDIX P

WATER MANAGEMENT STRATEGY EVALUATION

APPENDIX P

WATER MANAGEMENT STRATEGY EVALUATION

The information contained in this appendix details the Strategy Evaluation for Water Management Strategies in Region C. These strategies are listed below. For additional information on the Marvin Nichols Reservoir (both the recommended configuration for the Sulphur Basin Supplies strategy and the alternative configuration at 328 feet, msl), please see the full reports in Appendix Y.

Strategy Evaluations:

- Carrizo-Wilcox Aquifer
- Conservation - General
- Cypress Basin Supplies
- George Parkhouse North
- George Parkhouse South
- Groundwater – General
- Gulf of Mexico
- Increase Delivery Infrastructure – General
- Integrated Pipeline (TRWD and DWU)
- Irving Lake Hugo
- Irving Reuse
- Lake Columbia
- Lake Palestine
- Lake Ralph Hall and Reuse
- Lake Tehuacana
- Lake Texoma Desal and Blending
- Lower Bois d'Arc Creek Reservoir
- Main Stem Trinity River Pump Station
- Marvin Nichols Reservoir
- Neches Run-of-River Diversions
- Oklahoma

- Red River Off-Channel Reservoir
- Reuse – General
- Sulphur Basin Supplies Strategy
- Toledo Bend
- TRWD Wetlands
- Water Treatment Plants – General

In accordance with TWDB rules and guidelines, the Region C Water Planning Group has adopted a standard procedure for providing an equitable comparison of potential water management strategies. This procedure classifies the strategies using the TWDB's standard categories developed for regional water planning. The overall strategy evaluations can be found in Tables P.3 and P.4 and a write-up on each strategy can be found beginning on page P.9. Below is a description of the evaluation process.

All strategies are compared based upon the following categories:

- Quantity
- Reliability
- Cost
- Environmental Factors
- Agricultural Resources/Rural Areas
- Other Natural Resources
- Key Water Quality Parameters
- Third Party Social & Economic Factors

Each category is quantitatively assessed. If quantitative values were not available, a ranking from 1 to 5 was assigned. Table P.1 shows the correlation between the category and the ranking of the non-environmental categories where quantitative values were not available. (The Environmental Factors are discussed in the next section.)

Table P.1
Evaluation Matrix Category Ranking Correlation

Rank	Reliability	Remaining Strategy Impacts [a]
1	Low	High
2	Low to Medium	Medium High
3	Medium	Medium
4	Medium to High	Medium Low
5	High	Low or None

[a] Includes impacts on agricultural resources, other natural resources, key water quality parameters, and third party impacts.

Impacts to Agricultural Resources are quantified based on the permanent impacts to water supplies to irrigation users or direct impacts to irrigated acreage. Projects with only temporary impacts, such as pipeline projects, would be classified as low impacts. Specific assumptions include:

- If the location of the strategy is known and data is available, actual impacts to agricultural lands will be used.
- If a strategy impacts more than 5,000 acres of agricultural land, the impacts are classified as "high". If a strategy impacts less than 1,000 acres of agricultural lands, the impacts are classified as "low".
- If actual impact data was not available for a new reservoir, impacts of medium high were assumed.

More detailed information regarding the scoring for key water quality parameters is included in Chapter 6. Key water quality parameters were scored according to the "remaining strategy impacts" ranking listed in Table P.1.

Environmental Matrix

The Environmental Matrix (Table P.4) is used to determine the score of the 'Environmental Factors' category on the Evaluation Matrix (Table P.3).

The Environmental Matrix (Table P.4) takes into consideration the following categories:

- Total Acres Impacted
- Total Wetland Acres Impacted
- Environmental Water Needs
- Habitat
- Threatened and Endangered Species
- Cultural Resources

- Bays & Estuaries

Each category is quantitatively assessed. If quantitative values were not available, a ranking from 1 to 5 was assigned. Table P.2 shows the correlation between the ranking assigned within each category.

Table P.2
Environmental Matrix Category Ranking Correlation

Rank	Habitat	All Remaining Categories
1	Greater than 30,000 Acres	High Impact
2	20,000-30,000 Acres	Medium High Impact
3	7,000-20,000 Acres	Medium Impact
4	5,000-7,000 Acres	Medium Low Impact
5	0-5,000 Acres (or 'varies')	Low Impact or n/a

Acres Impacted

Acres Impacted refers to the total amount of area that will be impacted due to the implementation of a strategy.

The following conservative assumptions were made (unless more detailed information was available):

- Each well or storage tank will impact approximately 2 acres of land.
- The acres impacted for pipelines is equivalent to the right of way easements required.
- Reservoirs will impact an area equal to their surface area.
- A conventional water treatment plant will impact 5 acres.
- Conservation strategies will have no impact on acres.

Wetland Acres Impacted

Wetland Acres refers to how many acres that are classified as wetlands are impacted by implementation of the strategy.

The following conservative assumptions were made (unless more detailed information was available):

- For pipelines and groundwater wells, it was assumed wetlands would be avoided as feasible and would therefore have low impacts.

Environmental Water Needs

Environmental Water Needs refers to how the strategy will impact the area's overall environmental water needs. Water is vital to the environmental health of a region, and so it is important to take into account how strategies will impact the amount of water that will be available to the environment.

The following conservative assumptions were made (unless more detailed information was available):

- The majority of the strategies will have a low impact on environmental water needs.
- Reuse will have a medium impact if the effluent was previously used for irrigation or discharged back into the water system. This will decrease the overall amount of water that is available to the environment by diverting the effluent and using it for another purpose.

Habitat

Habitat refers to how the strategy will impact the habitat of the local area. The more area that is impacted due to the implementation of the strategy, the more the area's habitat will be disrupted. The ranges used for this ranking are in Table P.2, unless more detailed information was available.

Threatened and Endangered Species

Threatened and endangered species refers to how the strategy would potentially impact those species in the area once implemented.

The following conservative assumptions were made (unless more detailed information was available):

- Only applicable to strategies implementing infrastructure
- Rankings were based on the amount of threatened and endangered species located within the county. This amount was found using the Texas Parks and Wildlife Database located at http://tpwd.texas.gov/gis/rtest/ and the U.S. Fish and Wildlife Service Database located at http://www.fws.gov/endangered/ .
- This ranking only includes threatened and endangered species as defined in the TWDB guidelines and does not include species without official protection such as those proposed for listing or species that are considered rare or otherwise of special concern.

Cultural Resources

Cultural Resources refers to how the strategy will impact cultural resources located within the area. Cultural resources are defined as the collective evidence of the past activities and accomplishments of people. Locations, buildings and features with scientific, cultural or historic value are considered to be cultural resources.

The following conservative assumptions were made (unless more detailed information was available):

- Only applicable to strategies implementing infrastructure
- All strategies requiring only a pipeline or groundwater wells will have low impacts.
- New reservoirs will have medium high impacts.

Bays and Estuaries

Region C is located too far away from any bays or estuaries to have a quantifiable impact. It was assumed that the only strategies that could have potential impacts to bays and estuaries are the Gulf of Mexico and Toledo Bend strategies. These were given a ranking of medium low impacts.

Entity	County Used	Basin Used	Strategy	Quantity (Ac-Ft/Yr)	Reliability	Cost ($/Ac-Ft)	Impacts of Strategy on: Agricultural Resources/ Rural Areas (Acres)	Agricultural Resources/ Rural Areas Score	Other Natural Resources	Key Water Quality Parameters	Third Party Social & Economic Factors	Implementation Issues	Comments
NTMWD	Multiple	Multiple	Carrizo-Wilcox Aquifer	42,000	5	$605	Low	5	2	4	3	Requires coordination with local groundwater districts. Competing uses for water.	
DWU	Dallas	Trinity	Carrizo-Wilcox Aquifer	30,267	5	$670	Low	5	2	3	3	Requires coordination with local groundwater districts. Competing uses for water.	
Multiple	Multiple	Multiple	Conservation - General	135,992	5	Varies	Low	5	5	5	5		
NTMWD	Multiple	Multiple	Cypress Basin Supplies	87,900	5	$541	Low	5	5	4	4	Requires IBT, renegotiating existing contracts, and contract with NETMWD.	
NTMWD	Multiple	Multiple	George Parkhouse North	118,960	5	$572	11,344[c]	1	3	4	3	Requires new water rights permit and IBT.	
UTRWD	Multiple	Multiple	George Parkhouse North	35,000	5	$916	11,344[c]	1	3	4	3	Requires new water rights permit and IBT.	
NTWMD	Multiple	Multiple	George Parkhouse South	108,480	5	$684	16,120[c]	1	3	4	3	Requires new water rights permit and IBT.	
UTRWD	Multiple	Multiple	George Parkhouse South	35,000	5	$994	16,120[c]	1	3	4	3	Requires new water rights permit and IBT.	
Multiple	Multiple	Multiple	Groundwater - General	Varies	5	Varies	Low	5	5	5	5		
DWU, NTMWD and TRWD	Multiple	Multiple	Gulf of Mexico	Unlimited	5	$2,724	Low	5	4	4	5	Technology is still developing for this application at this scale. May require state water right permit and IBT.	Strategy was costed to central location. Capital cost was based on one supplier. Supply is treated water.
Multiple	Multiple	Multiple	Increase Delivery Infrastructure - General	0[a]	5	Varies	Low	5	5	5	5		
Irving	Dallas	Trinity	Irving Lake Hugo	25,000	5	$1,022	Low	5	5	4	3		
Irving	Dallas	Trinity	Irving Reuse	28,000	5	$497	Low	5	5	3	5		
DWU	Dallas	Trinity	Lake Columbia	56,050	5	$914	135	5	3	3	3	Requires contract with ANRA and IBT.	
DWU	Dallas	Trinity	Lake Palestine	110,670	5	$1,524	Low	5	5	3	4	DWU has IBT permit.	
UTRWD	Multiple	Multiple	Lake Ralph Hall and Reuse	52,437	5	$584	High	1	4	4	4	Requires new water right and IBT.	
TRWD	Multiple	Trinity	Lake Tehuacana	41,600	5	$1,381	Medium high	2	3	4	3	Requires new water rights permit.	
NTMWD, DWU and UTRWD	Multiple	Multiple	Lake Texoma Desalination and Blending	308,073	5	$2,604	Low	5	3	3	4	Requires IBT, state water right, Congressional authorization, and contract with USACE.	Delivers treated water.
NTMWD	Multiple	Multiple	Lower Bois d'Arc Creek Reservoir	120,200	5	$506	2,045	3	3	4	3	Requires new water rights permit and IBT.	
DWU and NTMWD	Multiple	Multiple	Main Stem Trinity River Pump Station	87,839	5	$153	Low	5	5	3	5	Requires water right permit amendment.	
NTMWD, TRWD, UTRWD	Multiple	Multiple	Marvin Nichols Reservoir	489,000	5	$970	61,770	1	2	4	1	Requires new water rights permit and IBT. Known public opposition.	
DWU	Dallas	Trinity	Neches Run-of-River Diversions	47,250	5	$697	Low	5	4	4	4	Requires new water rights permit and IBT.	
NTMWD, TRWD, and UTRWD	Multiple	Multiple	Oklahoma	115,000	5	$694	Low	5	5	4	4	Oklahoma has moratorium for export of water out of state.	
DWU	Multiple	Multiple	Red River Off-Channel Reservoir	114,342	5	$825	Low	5	5	4	5		
Multiple	Multiple	Multiple	Reuse - General	355,118	5	Varies	Low	5	5	4	4		
DWU	Multiple	Multiple	Sabine Conjunctive Use	104,253	5	$707	Low	5	5	5	4		
NTMWD, UTRWD, TRWD, Dallas and Irving	Multiple	Multiple	Sulphur Basin Supplies Strategy	489,800	5	$964	41,308	1	2	4	1	Known opposition to Marvin Nichols Reservoir	Marvin Nichols portion of WMS
							Medium High	2	3	4	2		Wright Patman portion of WMS
								1.5	2.5	4	1.5		Average score of Marvin Nichols and Wright Patman scores
NTMWD, DWU, TRWD, and UTRWD	Multiple	Multiple	Toledo Bend	648,659	5	Varies	Low	5	5	4	4	Requires IBT and agreements with multiple users.	Costs vary depending on entity implementing the strategy.
TRWD	Multiple	Trinity	Integrated Pipeline	179,000	5	$1,084	Low	5	5	5	4		Pipeline delivers existing supplies.
TRWD	Multiple	Multiple	TRWD Wetlands	88,059	5	$0	Low	5	5	3	5	TRWD has permit for reuse.	
Multiple	Multiple	Multiple	Water Treatment Plants - General	0[a]	5	Varies	Low	5	5	5	5		

[a] Does not create new supply, but is necessary to utilize the supplies created by other strategies.
[b] Strategies with quantities of "varies" were assigned a score of 3 with the exception of conservation which was assigned a 5 because it delays the need for development of other water supplies through demand reductions.
[c] Includes grassland and row crops. Bottomland and Upland Forests and forested wetlands were not considered a potential agricultural resource for these reservoirs.

Table P.4
Environmental Quantification Matrix

Entity	County	Basin	Strategy	Environmental Factors: Acres Impacted	Wetland Acres Impacted	Envir Water Needs	Envir Water Needs Score	Habitat[a]	Habitat Score	Threat and Endanger Species	Cultural Resources	Cultural Resources Score	Bays & Estuaries	Bays & Estuaries Score	Comments
NTMWD	Multiple	Multiple	Carrizo-Wilcox Aquifer	724	0	n/a	5	Low	5	26	Low	5	n/a	5	
DWU	Dallas	Trinity	Carrizo-Wilcox Aquifer	813	0	n/a	5	Low	5	26	Low	5	n/a	5	
Multiple	Multiple	Multiple	Conservation - General	0	0	n/a	5	n/a	5	n/a	n/a	5	n/a	5	
NTMWD	Multiple	Multiple	Cypress Basin Supplies	337	0	Low	5	Low	5	30	Low	5	n/a	5	
NTMWD	Multiple	Multiple	George Parkhouse North	15,359	1,235	Medium High	2	Medium	3	21	Medium High	2	n/a	5	
UTRWD	Multiple	Multiple	George Parkhouse North	15,359	1,235	Medium High	2	Medium	3	21	Medium High	2	n/a	5	For the purposes of environmental impacts, the same reservoir footprint was assumed for UTRWD despite planning to use less than the total supply made available from this source.
NTWMD	Multiple	Multiple	George Parkhouse South	28,362	6,197	Medium High	2	Medium High	2	17	Medium High	2	n/a	5	
UTRWD	Multiple	Multiple	George Parkhouse South	28,362	6,197	Medium High	2	Medium High	2	17	Medium High	2	n/a	5	For the purposes of environmental impacts, the same reservoir footprint was assumed for UTRWD despite planning to use less than the total supply made available from this source.
Multiple	Multiple	Multiple	Groundwater - General	2[b]	0	n/a	5	Low	5	n/a	Low	5	n/a	5	
DWU, NTMWD and TRWD	Multiple	Multiple	Gulf of Mexico	7,135	0	Medium Low	4	Medium	3	>40	Low	5	Medium Low	4	
Multiple	Multiple	Multiple	Increase Delivery Infrastructure - General	Varies	Varies	n/a	5	Low	5	Varies	Low	5	n/a	5	
Irving	Dallas	Trinity	Irving Lake Hugo	2,249	0	Low	5	Low	5	24[d]	Low	5	n/a	5	
Irving	Dallas	Trinity	Irving Reuse	12	0	Medium Low	4	Low	5	17	Low	5	n/a	5	
DWU	Dallas	Trinity	Lake Columbia	11,500	5,751	Medium	3	High	1	0	Medium High	2	n/a	5	
DWU	Dallas	Trinity	Lake Palestine	1,629	27	Low	5	Medium Low	4	33	Low	5	n/a	5	
UTRWD	Multiple	Multiple	Lake Ralph Hall and Reuse	8,060	0	Medium	3	Medium	3	17	Low	5	n/a	5	
TRWD	Multiple	Trinity	Lake Tehuacana	14,845	4,000	Medium	3	Medium	3	32	Medium High	2	n/a	5	
NTMWD, DWU and UTRWD	Multiple	Multiple	Lake Texoma Desalination and Blending	1,212	0	Medium	3	Low	5	24	Low	5	n/a	5	
NTMWD	Multiple	Multiple	Lower Bois d'Arc Creek Reservoir	17,068	5,874	Medium	3	Medium	3	5	Medium Low	4	n/a	5	
DWU and NTMWD	Multiple	Multiple	Main Stem Trinity River Pump Station	173	0	Low	5	Low	5	17	Low	5	n/a	5	
NTMWD, TRWD, UTRWD	Multiple	Multiple	Marvin Nichols Reservoir	66,103	24,093	Medium	3	High	1	23	Medium High	2	n/a	5	
DWU	Dallas	Trinity	Neches Run-of-River Diversions	5,336	0	Low	5	Low	5	26	Low	5	n/a	5	
NTMWD, TRWD, and UTRWD	Multiple	Multiple	Oklahoma	2,249	0	Low	5	Low	5	24[d]	Low	5	n/a	5	
DWU	Multiple	Multiple	Red River Off-Channel Reservoir	800	0	Low	5	Low	5	23	Low	5	n/a	5	
Multiple	Multiple	Multiple	Reuse - General	Varies	Varies	Low	5	Low	5	Varies	Low	5	n/a	5	
DWU	Multiple	Multiple	Sabine Conjunctive Use	2,000	77	Low	5	Low	5	26	Low	5	n/a	5	
NTMWD, UTRWD, TRWD, Dallas and Irving	Multiple	Multiple	Sulphur Basin Supplies Strategy	41,722	19,899	Medium	3	High	1	23	Medium High	2	n/a	5	Marvin Nichols at elevation 313.5' portion of WMS
				9,429	5,576	Medium	3	High	1	23	Medium	3	n/a	5	Wright Patman at elevation 232.5' portion of WMS
				51,151	25,475	Medium	3	High	1	26[c]	Med. to Med. High	2.5	n/a	5	Total impacts of Sulphur Basin Supply WMS
NTMWD, DWU, TRWD, and UTRWD	Multiple	Multiple	Toledo Bend	2,727	0	Medium Low	4	Low	5	41	Low	5	Medium Low	4	
TRWD	Multiple	Trinity	Integrated Pipeline	356	0	Low	5	Low	5	0	Low	5	n/a	5	
TRWD	Multiple	Multiple	TRWD Wetlands	243	0	Low	5	Low	5	5	Low	5	n/a	5	
Multiple	Multiple	Multiple	Water Treatment Plants - General	320	0	n/a	5	n/a	5	n/a	n/a	5	n/a	5	

[a] Impacts for DWU non-partnership strategies are from Dallas' Long Range Water Supply Plan
[b] 2 acres per well
[c] This is the net of the species potentially impacted. It does not count species twice if they are potentially impacted by both reservoirs.
[d] Texas counties only

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Carrizo-Wilcox Groundwater Well Fields
WMS Type:	New Groundwater Source
Potential Supply Quantity (Rounded):	Varies ac-ft/yr (Varies mgd)
Implementation Decade:	Unknown
Strategy Capital Cost:	There are multiple strategies for this source. See Appendix Q.
Unit Water Cost (Rounded):	There are multiple strategies for this source. See Appendix Q.

STRATEGY DESCRIPTION

The Carrizo-Wilcox aquifer covers a large area of east, central, and south Texas. Organizations and individuals have been studying the development of water supplies from this aquifer for export. Metroplex water suppliers have been approached as possible customers for the water.

Carrizo-Wilcox groundwater is not a recommended strategy for any Region C supplier. It is an alternative strategy for the North Texas Municipal Water District and Dallas Water Utilities.

STRATEGY ANALYSES

The DWU strategy is summarized below from DWU's Long Range Water Supply Plan.

"The Carrizo-Wilcox Groundwater strategy will provide 27 MGD (30,000 acft/yr) of new supply using new well fields in Wood, Upshur, and Smith counties. Many of the wells will be co-located on the same site to produce groundwater from both the Carrizo-Wilcox and Queen City aquifers."

"Groundwater from the well fields is pumped through a 58 mile transmission system to the existing intake and pump station at Lake Fork. The Lake Fork and Tawakoni transmission pipelines will be used to convey supplies from this strategy to DWU's Eastside WTP."

A detailed analysis of the alternative groundwater strategy for NTMWD has not been completed. NTMWD has been approached by Forestar, an entity with groundwater holdings in East Texas. If NTMWD were to pursue this water at some point, it could be through a partnership with Forestar.

SUPPLY DEVELOPMENT

Supply availability was estimated using the modeled available groundwater (MAG) amounts as estimated by the TWDB.

ENVIRONMENTAL CONSIDERATIONS

The environmental impacts from this strategy are expected to be low. A complete list of the environmental considerations can be seen in Table P.4. The twenty-six threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, wood stork ST, creek chubsucker ST, blackside darter ST, bluehead shiner ST, paddlefish ST, black bear ST, Louisiana black bear FT and ST, red wolf FE and SE, Rafineaque's big-eared bat ST, alligator snapping turtle ST, Louisiana pine snake C and ST, northern scarlet snake ST, Texas horned lizard ST, timber rattlesnake ST, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST and Texas pigtoe ST.

PERMITTING AND DEVELOPMENT

Development of this source could require pumping permits from local groundwater conservation districts.

COST ANALYSIS

For the Region C cost analysis, planning level opinions of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Carrizo-Wilcox supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Carrizo-Wilcox Groundwater strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Carrizo-Wilcox Groundwater strategy was evaluated for NTWMD and DWU.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
CONSERVATION

WMS Name:	Conservation
WMS Type:	Conservation
Potential Supply Quantity	131,108 ac-ft/yr Municipal 4,884 ac-ft/yr Non-Municipal
Implementation Decade:	Multiple
Strategy Capital Cost:	$420,878,859 (Sept. 2013)
Unit Water Cost:	$Varies per 1,000 gallons (during loan period) See Table Q-10, Q-11, Q-208, Q-209, & Q-212 $Varies per 1,000 gallons (after loan period) See Table Q-10 Q-11, Q-208, Q-209, & Q-212

STRATEGY DESCRIPTION

More detailed information on this strategy can be found in Appendix K. This strategy is to proactively reduce water demands through water conservation efforts. In Region C this strategy was assessed for municipal, manufacturing, and irrigation users. This strategy represents a compilation of a myriad of actions that may include but are not limited to, public education and outreach, reducing water waste, conservation oriented rate structures, limiting of outdoor water use, and the increasing efficiency of manufacturing and irrigation processes.

Two Cities (Bedford and Fort Worth) have developed significant water loss control programs with large capital costs. Detailed cost estimates for those programs are in Tables Q-208, Q-209, & Q-212, and a description of those programs are below.

Cost Estimate Q-208 - The City of Bedford is experiencing high levels of water loss and anticipates even higher losses with the addition of a second pressure plane. The city has identified critical line replacements that will provide substantial savings of lost water in the system. It is the city's intention to replace 150 miles of water distribution main over the next 10 years. In addition the city plans to upgrade their outdated water meters with new state-of-the-art Automatic Meter Readers (AMR) which will alter the city and ultimately the customer, to expedite repairs and curtail water loss.

Cost Estimate Q-209 - The City of Fort Worth plans to develop an Advanced Metering Infrastructure system comprised of state-of-the-art electronic/digital metering hardware and software, which combine interval data measurement with continuously available remote communications. The AMI system will enable measurement of detailed, time-based information and frequent collection and transmittal of such information to various parties. AMI or Advanced Metering Infrastructure typically refers to the full measurement and collection system that includes meters at the customer site, communication networks between the customer and service provider, such as the City's Water Department, and data reception and management systems that make the information available to the service provider and customer. A major component of this strategy will be automatic leak detection, which will assist the city in identifying leaks in real time both in the distribution system and on the customer side of the meter, allowing for savings of water that would otherwise be lost.

Cost Estimate Q-212 - The City of Fort Worth has completed its first phase of Water Conservation and Condition Assessment Program (WCCAP). This program inventoried the 3,400+ miles of water line in Fort Worth's distribution system and identified water lines that are a major source of water leakage, particularly those that have had multiple breaks in recent years or that due to age, pipe material, and condition are expected to have major breaks. This is a 10-year program to replace the most critical sources of current water losses and prevent the most likely potential water losses.

SUPPLY DEVELOPMENT

This strategy delays the need for development of other water supplies through demand reductions of users. High levels of conservation have already been achieved in Region C to date.

ENVIRONMENTAL CONSIDERATIONS

This strategy is expected to have no adverse environmental impacts. Rather, it is anticipated to positively impact the environment by delaying the need for other projects that potentially have more impacts.

AGRICULTURAL AND RURAL IMPACTS

No adverse agricultural and rural impacts are expected from the conservation strategy. In some cases, it may make more water available to agricultural and rural users.

COST ANALYSIS

Cost estimates were prepared for each individual WUGs conservation strategy. These cost estimates are contained in Appendix Q, Table Q-10 and Q-11.

WATER MANAGEMENT STRATEGY EVALUATION

Conservation was applied to all municipal water user groups and most irrigation and manufacturing water user groups. Based on the analysis provided above, the conservation strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Cypress Basin Supplies (Lake O' the Pines)
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	87,900 ac-ft/yr (78 mgd)
Implementation Decade:	Unknown
Strategy Capital Cost:	$361,876,000 (Sept. 2013) Q-29
Unit Water Cost (Rounded):	$1.66 per 1,000 gallons (during loan period) $0.74 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

Lake O' the Pines is an existing Corps of Engineers reservoir, with Texas water rights held by the Northeast Texas Municipal Water District. The lake is on Cypress Creek in the Cypress Basin in Senate Bill One water planning Region D, the North East Texas Region. Some Metroplex water suppliers have explored the possibility of purchasing supplies in excess of local needs from the Cypress Basin for use in the Metroplex. There could be as much as 89,600 acre-feet per year available from the basin. However, based on information from the 2016 Region D Plan, Lake O' the Pines may be fully utilized by local demands and may not be available for use in Region C.

Lake O' the Pines is about 120 miles from the Metroplex, and the distance and limited supply make this a relatively expensive water management strategy. Obtaining water from the Cypress River Basin is not a recommended strategy for any Region C supplier. It is an alternative strategy for the North Texas Municipal Water District.

STRATEGY ANALYSES

A detailed strategy analysis for Cypress Basin Supplies (Lake O' the Pines) is not included as it is not a recommended strategy for any of the major water providers in Region C. This strategy will be evaluated in detail at later stages.

SUPPLY DEVELOPMENT

Supply Availability was determined using the Cypress Basin WAM.

ENVIRONMENTAL CONSIDERATIONS

Since the Lake O' the Pines water management strategy obtains water from an existing source, the environmental impacts are expected to be low.

The thirty threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: white faced ibis ST, wood stork ST, bald eagle

ST FR, peregrine falcon ST, American peregrine falcon ST, Arctic peregrine falcon ST, whooping crane SE FE, piping plover ST FT, red knot ST, interior least tern SE, Bachman's, sparrow ST, paddlefish ST, bluehead shiner ST, creek chubsucker ST, blackside darter ST, rafinesque's big-eared bat ST, red wolf SE, black bear ST, alligator snapping turtle ST, Texas horned lizard ST, Northern scarlet snake ST, Louisiana pine snake ST, timber rattlesnake ST, Texas pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Louisiana pigtoe ST, Texas heelsplitter ST, Louisiana black bear FT and least tern FE.

PERMITTING AND DEVELOPMENT

Development of this source would require contracts with the Northeast Texas Municipal Water District and other Cypress River Basin suppliers with excess supplies, and an interbasin transfer permit.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the recommended and alternative strategies for Cypress Basin supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Cypress Basin Supplies (Lake O' the Pines) strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Cypress Basin Supplies (Lake O' the Pines) strategy was evaluated for NTWMD and customers.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	George Parkhouse Lake (North)
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	Up to 118,960 ac-ft/yr (106 mgd)
Implementation Decade:	Unknown
Strategy Capital Cost:	There are multiple strategies for this source. See Appendix Q.
Unit Water Cost (Rounded):	There are multiple strategies for this source. See Appendix Q.

STRATEGY DESCRIPTION

George Parkhouse Lake (North) is a potential reservoir located in Region D on the North Sulphur River in Lamar and Delta Counties. The yield of the reservoir would be reduced substantially by development of Lake Ralph Hall or Marvin Nichols Reservoir. George Parkhouse Lake (North) would provide an inexpensive source of supply for Region C.

George Parkhouse Lake (North) is not a recommended water management strategy for any Region C water supplier. It is an alternative strategy for the North Texas Municipal Water District and the Upper Trinity Regional Water District.

STRATEGY ANALYSES

If NTMWD were to develop the supply it would be for 118,960 acre-feet per year with a capital cost of $618 million. If UTRWD were to develop the supply it would be for 35,000 acre-feet per year with a capital cost of $230 million. The dam costs were prorated for the UTRWD option to account for the smaller supply needed from this source for that strategy.

SUPPLY DEVELOPMENT

The supply availability was determined using the Sulphur Basin Water Availability Model and assuming that Lake Ralph Hall was in place.

ENVIRONMENTAL CONSIDERATIONS

The George Parkhouse Lake (North) would inundate 15,359 acres. Ninety percent of the land impacted is cropland or pasture. There are no designated bottomland hardwoods located within or adjacent to the site.

Landcover Classification	Acreage[a]	Percent
Bottomland hardwood forest	208	1.4%
Seasonally flooded shrubland	170	1.1%
Swamp	31	0.2%
Evergreen forest	9	0.0%
Upland deciduous forest	4,003	26.0%
Grassland	7,605	49.5%
Shrubland	672	4.4%
Agricultural land	2,424	15.8%
Urban/developed land	45	0.3%
Open water	200	1.3%
Total	15,367	100.0%

[a]Acreage based on approximate GIS coverage rather than calculated elevation-area-capacity relationship.

*Table from Reservoir Site Protection Study, TWDB, July 2008

The twenty-one threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: American burying beetle F, least tern F and S, piping plover F and S, American peregrine falcon S, Bachman's sparrow S, bald eagle, S, wood stork S, whooping crane S, eskimo curlew S, peregrine falcon S, blackside darter, creek chubsucker S, paddlefish S, blue sucker S, shovelnose sturgeon S, black bear S, red wolf S, alligator snapping turtle S, Texas horned lizard S, and Timber rattlesnake S.

PERMITTING AND DEVELOPMENT

Development of the George Parkhouse Lake (North) would require a water right permit and an interbasin transfer permit.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the George Parkhouse Lake (North) supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the George Parkhouse Lake (North) strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The George Parkhouse Lake (North) strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. George Parkhouse Lake (North) was considered for the large WWPs.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

WMS Name:	George Parkhouse Lake (South)
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	Up to 108,480 ac-ft/yr (97 mgd)
Implementation Decade:	Unknown
Strategy Capital Cost:	There are multiple strategies for this source. See Appendix Q.
Unit Water Cost (Rounded):	There are multiple strategies for this source. See Appendix Q.

STRATEGY DESCRIPTION

George Parkhouse Lake (South) is a potential reservoir located in Region D on the South Sulphur River in Hopkins and Delta Counties. It is located downstream from Jim Chapman Lake and would yield 135,600 acre-feet per year (with 108,480 acre-feet per year available for Region C). Its yield would be reduced substantially by the development of Marvin Nichols Reservoir.

George Parkhouse Lake (South) is not a recommended water management strategy for any Region C water supplier. It is an alternative strategy for the North Texas Municipal Water District (NTMWD) and the Upper Trinity Regional Water District (UTRWD).

STRATEGY ANALYSES

If NTMWD were to develop the supply it would be for 108,480 acre-feet per year with a capital cost of $758 million. If UTRWD were to develop the supply it would be for 35,000 acre-feet per year with a capital cost of $309 million. The dam costs were prorated for the UTRWD option to account for the smaller supply needed from this source for that strategy.

SUPPLY DEVELOPMENT

Supply availability was determined using the Sulphur Basin Water Availability Model.

ENVIRONMENTAL CONSIDERATIONS

George Parkhouse Lake (South) would inundate 28,362 acres. Ninety percent of the land impacted is cropland or pasture. There are no designated priority bottomland hardwoods located within or adjacent to the site.

Landcover Classification	Acreage[a]	Percent
Bottomland hardwood forest	10,379	36.8%
Marsh	4,566	16.2%
Seasonally flooded shrubland	584	2.1%
Swamp	83	0.3%
Upland deciduous forest	2,428	8.6%
Grassland	4,611	16.4%
Shrubland	211	0.7%
Agricultural land	4,470	15.9%
Urban/developed land	5	0.0%
Open water	848	3.0%
Total	28,185	100.0%

[a]Acreage based on approximate GIS coverage rather than calculated elevation-area-capacity relationship

*Table from Reservoir Site Protection Study, TWDB, July 2008

The seventeen threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: Least tern F and S, piping plover F and S, American peregrine falcon S, Bachman's sparrow S, bald eagle S, wood stork S, whooping crane S, peregrine falcon S, blackside darter S, creek chubsucker S, paddlefish S, black bear S, red wolf S, Louisiana pigtoe S, alligator snapping turtle S, Texas horned lizard S, and timber rattlesnake S.

PERMITTING AND DEVELOPMENT

Development of George Parkhouse Lake (South) would require a water right permit and an interbasin transfer permit.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the George Parkhouse Lake (South) supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the George Parkhouse Lake (South) strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The George Parkhouse Lake (South) strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. George Parkhouse Lake (South) was considered for the large WWPs.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
GROUNDWATER

WMS Name:	Additional Groundwater and New Wells
WMS Type:	New Groundwater Source
Potential Supply Quantity (Rounded):	7,422 ac-ft/yr (6.6 mgd)
Implementation Decade:	Multiple
Strategy Capital Cost:	There are multiple strategies for this source. See Appendix Q.
Unit Water Cost (Rounded):	There are multiple strategies for this source. See Appendix Q.

STRATEGY DESCRIPTION

This strategy is to develop groundwater through the drilling of a new well(s). It also includes the construction of all associated transmission and treatment that may be required.

SUPPLY DEVELOPMENT

This strategy was developed in accordance with Modeled Available Groundwater (MAG) values for the appropriate aquifer and county. As such, it is considered to be reliable supply that will not compromise the Desired Future Conditions (DFCs) as established by the Groundwater Management Area (GMA).

ENVIRONMENTAL CONSIDERATIONS

The right of way for the wells and transmission lines may temporarily affect the environment during construction. Additional study and mitigation may be required before construction of the well and transmission pipeline. It may be possible to route the pipeline to avoid environmentally sensitive areas.

AGRICULTURAL AND RURAL IMPACTS

The right of way for the transmission line may temporarily affect a small amount of agricultural acreage during construction. To the extent that this strategy is recommended for a rural user, the increased water supply may enhance the vitality of the community.

PERMITTING AND DEVELOPMENT

All recommended groundwater strategies comply within the Modeled Available Groundwater (MAG) values for their respective counties and aquifers. As such, these strategies should have no adverse effects on the Desired Future Conditions of the aquifers.

Athens MWA's alternative strategy for new groundwater wells exceeds the MAG (which is why it is an alternative rather than a recommended strategy), but Athens WMA has already received the permits for these wells from the Groundwater Conservation District covering the area.

COST ANALYSIS

Cost estimates were prepared for each individual groundwater strategy. These cost estimates are contained in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Additional Groundwater and New Wells strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Additional Groundwater and New Wells strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Gulf of Mexico Desalination
WMS Type:	Existing Surface Water Source
Potential Supply Quantity (Rounded):	Unlimited - costs for 200,000 ac-ft/yr (Unlimited – costs for 178 mgd)
Implementation Decade:	None
Strategy Capital Cost:	$4,311,027,000 (Sept. 2013)
Unit Water Cost (Rounded):	$8.36 per 1,000 gallons (during loan period) $2.82 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The cost of desalination has been decreasing in recent years, and some municipalities in Florida and California have been developing desalinated seawater as a supply source. The State of Texas has sponsored initial studies of potential seawater desalination projects, and this is seen as a potential future supply source for the state. Because the cost of desalination and the distance to the Gulf of Mexico, seawater desalination is not a particularly promising source of supply for Region C. However, seawater desalination has been mentioned through public input during the planning process, and it was evaluated in response to that input.

The supply from seawater desalination is essentially unlimited, but the cost is a great deal higher than the cost of the other water management strategies for Region C. Developing water from the Gulf of Mexico with desalination is not a recommended or alternative strategy for any water supplier in Region C.

STRATEGY ANALYSES

The supply from the Gulf of Mexico will be delivered by means of 78-inch or larger pipelines and intake pump stations and multiple booster pump stations. Significant treatment will be required to desalinate the water with water treatment plants retrofitted by reverse osmosis treatment trains. The reject stream from the treatment process will be disposed in a water body.

SUPPLY DEVELOPMENT

The potential source of supply is readily available but would require significant treatment and transmission to be usable for the Metroplex customers.

ENVIRONMENTAL CONSIDERATIONS

There are several environmental considerations associated with the large quantities of brine water in the reject stream and the potential impact to the water quality of the release streams. There are also potential issues associated with blending highly saline water with other water bodies for the purpose of blending water supplies.

PERMITTING AND DEVELOPMENT

Technology for desalination is still developing for this application at this scale. This strategy may require a state water right permit and interbasin transfer (IBT).

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Gulf of Mexico supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Gulf of Mexico desalination strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Gulf of Mexico desalination strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. Gulf of Mexico desalination was considered for the large WWPs.

REFERENCES

Texas Water Development Board, Large-Scale Demonstration Seawater Desalination in Texas, Report of Recommendations for the Office of Governor Rick Perry, Austin, [Online], Available URL: http://www.twdb.state.tx.us/Desalination/FINAL%2012-16-02.pdf, May 2005.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
INCREASE DELIVERY INFRASTRUCTURE

WMS Name:	Increase delivery infrastructure
WMS Type:	Various
Potential Supply Quantity (Rounded):	0 ac-ft/yr This strategy does not create new supply, but is essential for transporting supplies to end users.
Implementation Decade:	Multiple
Strategy Capital Cost:	There are multiple strategies for increase delivery infrastructure. See table on following pages.
Unit Water Cost (Rounded):	There are multiple strategies for increase delivery infrastructure. See table on following pages.

STRATEGY DESCRIPTION

This strategy is to develop new transmission facilities or increase the size of existing water supply transmission pipelines and pump stations. In many cases this represents the connection of an entity to a wholesale provider or the expansion of an existing transmission system. In other cases, the transmission supply is to connect existing supplies to the end users. This strategy may also include some infrastructure needed to take delivery of water from another provider such as ground storage.

SUPPLY DEVELOPMENT

While this strategy does not create supply, it is vital to making existing and future supplies usable to those with needs. This transmission infrastructure enables the entity to receive the water.

ENVIRONMENTAL CONSIDERATIONS

The right of way for the transmission lines may temporarily affect the environment during construction. Additional study and mitigation may be required before construction of the transmission pipeline. The pipeline may be able to be routed to avoid environmentally sensitive areas.

AGRICULTURAL AND RURAL IMPACTS

The right of way for the transmission line may temporarily affect a small amount of agricultural acreage during construction. To the extent that this strategy is recommended for a rural user, the increased water supply may enhance the vitality of the community.

PERMITTING AND DEVELOPMENT

Construction of the pipeline can likely be done under a nationwide permit. If the pipeline is part of another larger supply development strategy, there may be additional permitting requirements. Those requirements are considered with the appropriate larger supply development strategy.

COST ANALYSIS

Cost estimates were prepared for each individual water treatment strategy. These cost estimates are contained in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the increase delivery infrastructure strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Increase delivery infrastructure strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the current capacity of delivery infrastructure and the ultimate needed capacity of delivery infrastructure.

Entity	Recommended Strategy	Capital Cost	Cost Estimate Number	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost ($/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost ($/acre-foot/year)
Collin County								
Blue Ridge	Connection to NTMWD	$2,403,656	Q-69	2020	109	$678	2,242	$590
Blue Ridge	Upsize connection to NTMWD	$1,036,000	Q-70	2020	895	$603	3,080	$603
Celina	Connect to NTWMD	$16,314,144	Q-71	2020	1,500	$345	5,000	$72
East Fork SUD	Increase delivery infrastructure from NTWMD	$3,500,000	Q-181	2020	74	$795	1,624	$616
Melissa	Treated water supply line from NTMWD	$2,124,324	Q-75	2020	44	$877	237	$127
Parker	Increase delivery infrastructure from	$1,651,000	Q-76	2030	3,810	$44	5,309	$18
Prosper	Increase delivery infrastructure from NTWMD	$3,786,108	Q-77 & Q-78	2020	2,385	$72	10,874	$13
Weston	Connect to NTMWD and supplies	$27,130,000	Q-79	2020	829	$173	18,237	$49
Wylie Northeast SUD	Increase delivery infrastructure from NTWMD	$4,250,000	Q-80	2020	37	$437	979	$75
Cooke County								
None								

Entity	Recommended Strategy	Capital Cost	Cost Estimate Number	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost ($/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost ($/acre-foot/year)
Dallas County								
Glenn Heights	Increase delivery infrastructure from DWU	$2,374,000	Q-86	2060	289	$137	1,925	$137
Irving	Lake Chapman Booster Pump Station	$8,546,000	Q-24	2020	0	NA	0	NA
Rowlett	Increase delivery infrastructure from NTWMD	$3,519,000	Q-214	2020	695	$678	4,125	$609
Sunnyvale	Additional pipeline from DWU	$22,408,000	Q-93	2020	142	$1,414	2,279	$593
Wilmer	New Connection to Dallas (via Lancaster)	$4,504,300	Q-95	2020	207	$564	800	$91
Wilmer	Direct Connection to Dallas 36" Transmission Line	$15,999,500	Q-94	2040	382	$528	2,859	$59
Denton County								
Hackberry	Increase delivery infrastructure from	$1,731,000	Q-103	2050	70	$502	348	$85
Trophy Club	Phase I-Increase delivery infrastructure	$2,273,000	Q-197	2020	896	$162	2,560	$13
Trophy Club	Phase II-Increase delivery infrastructure from Ft Worth; 24" line	$7,292,600	Q-198	2020	896	$260	2,560	$22
Ellis County								
Ferris	Increase delivery infrastructure from Rockett SUD in future	$2,578,000	Q-109	2060	394	$202	1,395	$202
Files Valley WSC	Connect to Waxahachie (TRWD through TRA)	See Waxahachie in Section 5C.2		2030	55	$0	72	$0
Ovilla	Increase delivery infrastructure from DWU	$8,136,000	Q-92	2070	1,494	$573	1,494	$573
Palmer	Increase delivery infrastructure from Rockett SUD	$6,628,000	Q-113	2020	10	$694	940	$104
Rice WSC	Increase delivery infrastructure from Corsicana	$6,983,000	Q-114	2040	156	$675	1,038	$114
Sardis-Lone Elm WSC	Increase delivery Infrastructure from Rockett SUD	$1,992,000	Q-118	2020	548	$138	1,318	$13
Sardis-Lone Elm WSC	Connect to Midlothian	$255,200	Q-117	2020	1,121	$21	1,121	$2
Fannin County								
Ladonia	Lake Ralph Hall supply	$12,134,600	Q-129	2030	34	$14,204	133	$6,629

Entity	Recommended Strategy	Capital Cost	Cost Estimate Number	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost ($/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost ($/acre-foot/year)
Leonard	Water System Improvements	$2,567,600	Q-207	2020	148	$1,153	273	$366
Freestone County								
Freestone County Other	Increase delivery infrastructure from Corsicana	$5,550,000	Q-133	2020	40	$2,053	266	$306
Grayson County								
Van Alstyne	Water System Improvements	$2,180,800	Q-142	2030	14	$766	1,370	$632
Henderson County								
None								
Jack County								
None								
Kaufman County								
College Mound WSC	Increase delivery from Terrell	$5,348,000	Q-153	2020	55	$525	1,028	$88
Gastonia-Scurry SUD	Connect to Seagoville (DWU)	$4,577,500	Q-155	2020	39	$238	1,799	$26
Mabank	Increase delivery infrastructure from Cedar Creek Lake	$262,000	Q-143	2060	1,447	$11	2,434	$11
Kaufman County Mining	Connect to NTWMD	$4,098,000	Q-156	2060	3	$2,317	171	$2,317
Navarro County								
MEN WSC	Increase delivery infrastructure from Corsicana (Upsize Lake Halbert Connection)	$2,521,800	Q-166	2030	173	$632	408	$114
Parker County								
Aledo	Parallel pipeline and pump station from Fort Worth	$7,710,500	Q-169	2040	67	$2,664	269	$336
Annetta	Connect to Weatherford (TRWD)	$2,077,600	Q-171	2030	25	$2,216	196	$1,326
Annetta North	Connect to Weatherford (TRWD)	$59,400	Q-171	2040	7	$1,395	38	$1,264
Annetta South	Connect to Weatherford (TRWD)	$1,183,300	Q-171	2040	5	$6,136	22	$1,636
Springtown	Infrastructure improvements at Lake intake	$280,200	Q-175	2020	67	$119	236	$25

Entity	Recommended Strategy	Capital Cost	Cost Estimate Number	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost ($/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost ($/acre-foot/year)
Willow Park	Connect to Weatherford (TRWD)	$588,100	Q-171	2030	137	$1,444	1,562	$1,284
Rockwall County								
Blackland WSC	Direct Connection to NTMWD	$3,295,550	Q-179	2020	48	$407	356	$65
Cash SUD	Increase delivery infrastructure from NTWMD	$6,654,700	Q-180	2020	1,165	$531	1,042	$53
Fate	Increase delivery infrastructure from NTMWD	$15,075,000	Q-182	2060	390	$528	2,982	$528
Tarrant County								
Bethesda WSC	Connection to Arlington	$18,698,000	Q-184	2020	1,416	$704	2,614	$104
Burleson	Increase delivery infrastructure from Fort Worth	$21,780,000	Q-186	2040	967	$401	5,541	$72
Crowley	Increase delivery infrastructure from Fort Worth	$11,558,000	Q-187	2030	184	$394	3,028	$75
Johnson County SUD	Connect to Grand Prairie	$86,140,000	Q-188	2020	6,726	$1,248	6,726	$176
Keller	Increase delivery infrastructure from Fort Worth	$17,535,000	Q-189	2030	2,170	$196	5,679	$49
Kennedale	Increase delivery infrastructure from Ft Worth	$3,685,000	Q-191	2040	188	$1,284	277	$192
Kennedale	Connect to Arlington	$1,720,000	Q-190	2020	280	$619	280	$104
Pantego	Connect to Arlington	$778,000	Q-192	2030	27	$2,778	24	$345
Pantego	Connect to Fort Worth	$831,000	Q-193	2030	27	$3,001	24	$385
Pelican Bay	Azle (TRWD)	$956,000	Q-194	2030	11	$7,332	12	$714
Southlake	Increase delivery infrastructure from Ft Worth	$43,035,000	Q-195	2020	141	$479	8,349	$46
Watauga	Increase delivery infrastructure North Richland Hills/Fort Worth	$1,874,676	Q-199	2020	980	$69	1,225	$9
Westlake	Increase delivery infrastructure from Ft Worth; joint project with Ft Worth, Westlake, Trophy Club	$2,961,000	Q-197	2020	42	$162	3,335	$13

Entity	Recommended Strategy	Capital Cost	Cost Estimate Number	First Decade of Water Strategy	First Decade Water Supply Volume (acre-feet/year)	First Decade Estimated Annual Average Unit Cost ($/acre-foot/year)	Year 2070 Water Supply Volume (acre-feet/year)	Year 2070 Estimated Annual Average Unit Cost ($/acre-foot/year)
Wise County								
Bridgeport	Expand Capacity of Lake intake and Pump Station	$766,100	Q-200	2050	40	$50	1,610	$11
Chico	Increase delivery capacity from West Wise SUD	$3,610,000	Q-201	2050	140	$942	369	$124
New Fairview	Connect to Rhome (TRWD through Walnut Creek SUD)	$3,662,000	Q-202	2030	34	$1,619	221	$238
Newark	Connect to Rhome (TRWD through Walnut Creek SUD)	$2,548,000	Q-203	2030	51	$371	646	$42
Runaway Bay	Increase capacity of lake intake	$52,500	Q-204	2070	100	$51	100	$51

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

WMS Name:	Integrated Pipeline
WMS Type:	Existing Surface Water Source
Potential Supply Quantity (Rounded):	270,000 ac-ft/yr (240 mgd)
Implementation Decade:	2020
Strategy Capital Cost:	$2,120,666,000 (Sept. 2013) Q-48
Unit Water Cost (Rounded):	$2.60 per 1,000 gallons (during loan period) $0.65 per 1,000 gallons (after loan period) Note: This is Overall Unit cost. Individual unit costs are different for TRWD and DWU.

STRATEGY DESCRIPTION

The Tarrant Regional Water District (TRWD) and Dallas Water Utilities (DWU) are cooperating to construct the Integrated Pipeline, which will deliver water to Tarrant and Dallas Counties from Lake Palestine, Cedar Creek Lake, and Richland-Chambers Reservoir. The pipeline will have a capacity of about 350 mgd, with about 200 mgd for TRWD and 150 mgd for Dallas. Dallas's share of the project will deliver water from Lake Palestine. TRWD's share will deliver about 179,000 acre-feet per year from Cedar Creek Lake and Richland-Chambers Lake (assuming a 1.25 peaking factor). The project is a recommended water management strategy for TRWD and DWU and the total capital cost is $2.7 billion.

SUPPLY DEVELOPMENT

This strategy provides access to current TRWD supplies in Cedar Creek Lake and Richland-Chambers Reservoirs. It also secures access to Dallas' supplies in Lake Palestine.

ENVIRONMENTAL CONSIDERATIONS

There are no significant environmental considerations associated with the strategy.

PERMITTING AND DEVELOPMENT

There are no permitting issues associated with the strategy.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Integrated Pipeline supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the TRWD Integrated Pipeline strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The TRWD Integrated Pipeline strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. It is expected to serve TRWD and DWU's customers in the Dallas/Fort Worth area.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

WMS Name:	Lake Hugo
WMS Type:	Existing Surface Water Source
Potential Supply Quantity (Rounded):	25,000 ac-ft/yr (22.3 mgd)
Implementation Decade:	Unknown
Strategy Capital Cost:	$177,686,000 (Sept. 2013) Q-91
Unit Water Cost (Rounded):	$3.14 per 1,000 gallons (during loan period) $1.31 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

This is a strategy to utilize Irving's existing contract with the city of Hugo, Oklahoma for water from Lake Hugo. Costs include construction of a transmission system as well as a commodity cost per the contract of $0.24/1,000 gallons and treatment costs estimated at $0.58/1,000 gallons. This is an alternative strategy for Irving.

SUPPLY DEVELOPMENT

Supply availability is based an existing 2008 contract between Irving and Hugo which reserves Irving's right to purchase an initial increment of 25,000 acre-feet per year from Lake Hugo.

ENVIRONMENTAL CONSIDERATIONS

Water is already impounded and additional environmental impacts at the source would be negligible. Pipeline routing can/will avoid significant resources.

The twenty-four threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: wood stork ST, bald eagle ST and FR, peregrine falcon ST, American peregrine falcon ST, whooping crane SE, piping plover ST and FT, eskimo curlew SE, red knot ST, interior least tern SE, Bachman's sparrow ST, shovelnose sturgeon ST, paddlefish ST, blue sucker ST, creek chubsucker ST, blackside darter ST, red wolf SE, black bear ST, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, American burying beetle SE and FE, Ouachita rock pocketbook SE, least tern FE and Louisiana black bear FT.

PERMITTING AND DEVELOPMENT

The City of Hugo holds the rights to water from Lake Hugo and has executed a contract with Irving for a portion of those rights. However, the City's legal right to transport that water to an out of state customer under current Oklahoma law is not clear. Implementation planning allows ten years for the legal issues to be settled. Once the interstate issues have been clarified/addressed, remaining permitting issues should be minor. It is expected that the pipeline can be permitted under a Nationwide Permit under Section 404 of the Clean Water Act.

COST ANALYSIS

Initial costs include a 26.8 MGD pump station and intake structure at Lake Hugo, as well as improvements to the existing Chapman and Princeton pump stations, a new 42" pipeline between Hugo and Lake Chapman, and upgrades to the existing Chapman delivery system. As noted above, Irving's contract with Hugo specifies a commodity cost for the water of $0.24/1,000 gallons and treatment costs are estimated at $0.58/1,000 gallons.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Lake Hugo strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Lake Hugo strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

REFERENCES

Irving Long Range Water Supply Strategy (unpublished); FNI, 2015

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

WMS Name:	Irving Reuse Project
WMS Type:	Reuse
Potential Supply Quantity (Rounded):	28,000 ac-ft/yr (25 mgd)
Implementation Decade:	2020
Strategy Capital Cost:	$39,960,000 (September 2013) Q-90
Unit Water Cost (Rounded):	$1.52 per 1,000 gallons (during loan period) $1.16 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

Irving has contracted with TRA for 25 MGD from the TRA Central Plant discharge effluent. This reuse project is a recommended strategy for City of Irving. The recommended strategy consists of infrastructure for pre-treatment of the TRA Central discharge (25 MGD) and transmission to the Dallas Bachman Treatment Plant.

Alternative methods for pretreatment and transmission routes have not been determined. The cost estimate reflects the most expensive form of treatment potentially required. Key variables will be refined as additional studies are performed.

SUPPLY DEVELOPMENT

This strategy allows development of potable supply from currently discharged wastewater effluent.

ENVIRONMENTAL CONSIDERATIONS

The water source for the recommended strategy is reuse water from the TRA Central Plant. No new reservoir or other storage mechanism would be required. It should be noted that the 25 MGD is currently flowing down the Trinity River and will cease to do so when this project is completed. Transmission impacts are limited to the very short distance (approximately 6 miles) between the Central and Bachman Plants. This area is highly disturbed/urbanized and environmental impacts would be minor. The "worst case" analysis for pre-treatment methodology (reverse osmosis) would engender a waste stream requiring disposal.

The seventeen threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: white-faced ibis ST, wood stork ST, bald eagle ST, peregrine falcon ST, American peregrine falcon ST, whooping crane FE and SE, piping plover FT and ST, red knot ST, interior least tern FE and SE, black-capped vireo FE and SE, golden-cheeked warbler FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, Texas pigtoe ST, Louisiana pigtoe ST, and Texas heelsplitter ST.

PERMITTING AND DEVELOPMENT

Depending on the specific approach to transmission between the TRA Central Plant and Bachman

Treatment Plant, this strategy may require a minor modification to the TRA discharge permit from the Central Plant. This change would include a permit for discharge into water of the State (Fishing Hole Lake), and/or a "bed and banks" permit. A Section 404 permit for the pipeline (most probably a Nationwide Permit rather than an individual permit) and possibly Section 408 approval from the Corps of Engineers may also be required. This project does not require a new State water right.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

The cost of this strategy is highly dependent on pre-treatment methods (natural wetlands/ultraviolet disinfection/reverse osmoses) required during the permitting process as well as exact transmission route. Costs are also highly dependent on whether or not Irving partners with Dallas in the implementation of their Joe Pool to Bachman water management strategy. These discussions are ongoing. A planning level cost estimate for this strategy is included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Irving Reuse strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Irving Reuse strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. This strategy was only evaluated for Irving.

REFERENCES

Irving Long Range Water Supply Plan (FNI, 2015) interim work product

Dallas Long Range Water Supply Plan (HDR, 2014) interim work product

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Lake Columbia
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	56,050 ac-ft/yr (50 mgd)
Implementation Decade:	2070
Strategy Capital Cost:	$327,187,000 (Sept. 2013) Q-39
Unit Water Cost (Rounded):	$2.80 per 1,000 gallons (during loan period) $1.48 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The project description for the Lake Columbia Strategy is based on the information provided by Angelina and Neches River Authority (ANRA) and summarized in the October 2014 Draft Dallas Long Range Water Supply Plan. Angelina Neches River Authority is the sponsor for the Lake Columbia project on Mud Creek in Cherokee and Rusk Counties. Lake Columbia is a recommended strategy in the 2011 East Texas Regional Water Plan (ETRWP). Angelina Neches River Authority has been granted a water right permit (Permit No. 4228) by the TCEQ to impound 195,500 acre feet per year and to divert 85,507 acre feet per year (76.3 MGD) for municipal and industrial purposes. Angelina Neches River Authority currently has contracted with customers for 53 percent of the 85,507 ac-ft per year permit of the proposed Lake Columbia reservoir. Lake Columbia is identified as a recommended WMS for Dallas Water Utilities (DWU). After considering the local needs in the East Texas Region, Dallas' projected share of the proposed Lake Columbia project is 56,000 ac-ft per year by 2070. This water management strategy for Angelina Neches River Authority was developed to address the total current contracted and potential future customer demand through the construction of Lake Columbia. Angelina Neches River Authority holds the water right for the supply source and will be the project sponsor. It was specified in the 2014 Draft Dallas Long Range Supply Plan that Dallas will be responsible for 70 percent of the dam, reservoir land acquisition, and relocations, and Angelina Neches River Authority will be responsible for the remaining 30 percent of the reservoir construction and land acquisitions costs. This cost split is subject to change during the potential negotiations between Dallas and Angelina Neches River Authority. The Lake Columbia dam site is located two to three miles downstream of Highway 79 on Mud Creek in Cherokee County. The contributing drainage area for the reservoir is approximately 384 square miles. The total conservation pool volume is 195,500 acre feet per year and the top of conservation pool is at the elevation of 315 ft MSL. The conservation pool covers an area of approximately 10,133 acres and the flood pool covers an additional area of 1,367 acres.

STRATEGY ANALYSES

The Lake Columbia strategy is a recommended strategy for DWU. The water would be transported via pipeline to the proposed IPL pump station at Lake Palestine.

SUPPLY DEVELOPMENT

The firm yield for Lake Columbia was determined by means of the water availability analysis using the Neches Basin Water Availability Model (WAM). This model was downloaded from TCEQ website in 2009. The firm yield of the Lake was estimated to be 75,600 acre feet per year in 2020 and reducing to 75,350 acre feet per year in 2070. It should be noted that the water management strategies for the reservoir development and the transmission connections were all based on the firm supplies available from Lake Columbia. The firm yield reported in the October, 2014 Draft Dallas Long Range Water Supply Plan is very similar to the firm yield generated using the WAM models.

ENVIRONMENTAL CONSIDERATIONS

The summary of environmental considerations was developed based on the known environmental factors that have been discussed in the Draft Environmental Impact Study (DEIS).

Habitat – The footprint of Lake Columbia will impact approximately 5,746.5 acres of waters of the U.S., including 3,689 acres of forested wetlands and the remainder comprised of shrub and emergent wetlands (144 and 1,518 acres, respectively), open water, streams and a hillside bog.

Environmental Flows – The current TCEQ Permit No. 4228 allowing the construction and operation of Lake Columbia does not require any instream flow releases. However, if Dallas wants to move water from Lake Columbia in Neches Basin to Trinity River Basin, an amendment to the Permit is required to allow interbasin transfers. Bays and Estuaries – Lake Columbia project is over 280 river miles upstream from the Neches estuary at Sabine Lake and is therefore expected to have no measureable effect on the fresh water inflows into Sabine Lake and Sabine Lake estuary. Recognizing the diminishing effect of upstream distance on bay and estuary inflows, the Texas Water Code (Section 11.147) requires consideration of such effects only if a proposed project is within 200 river miles of the coast.

Threatened and Endangered Species - The Lake Columbia project area includes six federally listed species, five of which are also listed by the state. The state lists fourteen additional species within Smith and Cherokee Counties where the lake would be developed.

Table S-1 Comparison of Environmental Features Impacted by the Toledo Bend Pipeline Alternative and the Proposed Lake Columbia

ENVIRONMENTAL FEATURE	TOLEDO BEND ALT. [a]			L. COLUMBIA [b]		
	Miles [f]	Acres [c]	Number	Miles	Acres	Number
Upland Forest	41.5	502.4	-	-	2,247	-
Shrub Upland + Grassland (Non-forested Land)	28.8	348.8	-	-	2,616	-
Bottomland Hardwood Forest (Deciduous Forested Wetland)	0.9	10.7	-	-	3,689	-
Herbaceous Wetland	0.5	5.5	-	-	1,518	-
Shrub Wetland	ND	ND	-	-	144	-
Hillside Bog	-	-	-	-	0.5	-
Minor Streams [g]	-	-	73	39	47	-
Major Streams [g]	-	-	21	70	255	-
Lacustrine (Pond/Lake)			1	-	63	-
New Channel	-	-	-	3	30	-
State Parks	0	0	-	-	0	0
State Wildlife Management Areas	0	0	-	-	0	0
National Forests	13.1	159.2	1	-	0	0
Federal Wildlife Management Areas	0	0	-	-	0	0
Number of Federal T/E Species Potentially Occurring [d]	-	-	4	-	-	5
Number of State T/E Species Potentially Occurring [d]	-	-	19	-	-	19
Urban	7.8	94.6	-	-	14	-
High Probability For Cultural Resources Sites [e]	70.0	843.9	-	-	1,272	-

NOTE: For Toledo Bend Pipeline alternative, terminal storage reservoir of several hundred acres not included. Location of such a reservoir has not been determined.

a = Based on USGS Topographic Map review.
b = Data largely taken from FNI, 2003a except for Minor/Major Streams and Lacustrine Habitat taken from USGS Topographic Map review.
c = Acreage calculations assume a 100-foot construction ROW along 86 miles of pipeline.
d = Based on TPWD county records. The potential occurrence of federally listed species in the Permit Area has been ruled out based on either the availability of habitat and/or site-specific surveys of potential habitat (i.e., Red-cockaded woodpecker - FNI, 2003a).
e = High probability areas were assessed as all areas within 400 meters (125 feet) of extant waterways/drainages commonly accepted by the Texas Historical Commission. Because of the presence of waterways and drainages along the entire length, the majority of the proposed pipeline length is considered to be High Probability.
f = Miles of pipeline route traversing indicated feature.
g = For pipeline route, number of streams crossed; for L. Columbia, minor = intermittent, major = perennial jurisdictional streams.
ND = Non-discernable from USGS Topographic Map review.
T/E = Threatened or endangered species.

*Table from Lake Columbia Draft EIS, USACE, January 2010

Table S-2 Impact Summary and Alternatives Comparison

Resource/Impact Issue	Lake Columbia Proposed Action Impact	No Action Alternative Impact	Toledo Bend Pipeline Alternative Impact
Physiography and Topography			
Modification of topography in the Permit Area	Topography would be altered by construction of dam and inundation of valley.	No modification of topography.	Construction of intake structure and pump station at Toledo Bend. Construction of several hundred-acre terminal reservoir near proposed reservoir site.
Geology			
Alteration of strata	10,133 acres would be inundated and sediment would slowly accumulate in the reservoir. Downstream channel scoured near the dam to expose deeper layers.	No changes to geology.	Strata would be altered to depth of pipeline and terminal reservoir construction. Lignite deposits in southern Rusk County could not be extracted where pipeline runs.
Soils			
Loss of prime farmland soils	135 acres of prime farmland soils would be lost.	No impact on prime farmland soils.	Minimal impacts to prime farmland soils anticipated, except unknown at terminal reservoir site.
Increase in erosion from disturbance	Erosion would occur during construction activities, but erosion control measures would be used.	Existing soils would not be disturbed.	Erosion would occur during construction activities, but erosion control measures would be used.
Groundwater			
Declining groundwater levels	Switch from groundwater to surface water would reduce groundwater drawdown.	Groundwater drawdown would increase from increasing withdrawals.	Switch from groundwater to surface water would reduce groundwater drawdown.
Surface Water			
Sediment delivery	Sediment delivery to Mud Creek increased during construction, but reduced during operation.	No impacts on sediment.	Sediment delivery to various streams crossed by the pipeline route and at terminal reservoir site increased during construction.
Water quality	Water releases would increase base flows, raise dissolved oxygen, reduce turbidity.	Water quality would be unchanged.	Short-term effects at stream crossings. Inter-basin transfer would cause slight decrease in flows in Sabine Basin and slight increase in Neches Basin.
Loss of waters of U.S. including wetlands	5,746.5 acres of waters of U.S. would be impacted. To be compensated by mitigation plan.	No change in waters of U.S.	Temporary construction impacts, and loss of waters of U.S. at pump station/intake at Toledo Bend. Some conversion of forested wetlands along pipeline route. Unknown potential impacts at terminal reservoir site.
Downstream hydrologic & fluvial geomorphic impacts	Flood peaks reduced. Approximate 16 percent decrease in 100-year floodplain. Some channel scouring below dam site.	No downstream impacts.	No downstream impacts in Mud Creek. Short-term impacts on other streams crossed. Potential impacts associated with terminal reservoir.
Hydropower	Negligible change in Sam Rayburn hydropower production (0.01%).	No impact on hydropower.	Negligible change in Toledo Bend hydropower production.
Climatology/Air Quality			
Potential exceedance of ambient air quality standards. Climate changes.	Fugitive dust emissions would likely increase particulate concentrations during construction. Slight local increase in relative humidity and moderation of temperatures with lake.	No impact on climatology/air quality.	Fugitive dust emissions over larger area during construction of pipeline and terminal reservoir.
Noise			
Increase in noise levels	Some increase during construction. Boat traffic would generate noise on the lake.	No impact on noise.	Some increase in noise over a larger area during construction of pipeline and terminal reservoir. Pump stations noise during operation.
Vegetation			
Impacts to vegetation, including wetland and riparian vegetation	5,351.5 acres of wetlands would be impacted and mostly converted to open water—to be compensated by Mitigation Plan. Development around lake would impact vegetation—to be addressed by Water Quality Regulations. 1,195 acres of wetlands established around water's edge.	No impact on vegetation.	Wetland vegetation impacted primarily at stream crossings and intake pump station. Other vegetation impacts at several hundred-acre terminal reservoir site and along entire ROW, including approximately 160 acres through Sabine National Forest. Potential conversion of forested wetlands along pipeline route.
Threatened or endangered (T/E) species	T/E species (Neches River rose-mallow) not known to exist within Permit Area.	No impact on T/E species.	T/E species may exist within counties traversed by pipeline.
Fish and Wildlife			
Threatened or endangered species	T/E species not known to exist within Permit Area.	No impact on T/E species.	T/E species may exist within counties traversed by pipeline, particularly red-cockaded woodpeckers in Sabine National Forest.

Resource/Impact Issue	Lake Columbia Proposed Action Impact	No Action Alternative Impact	Toledo Bend Pipeline Alternative Impact
Habitat alteration	Terrestrial and stream habitat converted to open water habitat. All terrestrial and some aquatic species displaced.	No direct impact on habitat. Trend of conversion of forest to pasture and timber plantations likely to continue.	Habitat cleared along pipeline route and terminal reservoir. Timber removal in Sabine National Forest may require EIS.
Downstream impacts	Floodplain size and flood magnitude decreased. Increased base flows result in increased stream aquatic habitat.	No downstream impacts.	No downstream impacts in Mud Creek. Short-term impacts on other streams crossed.
Cultural Resources			
Impacts to cultural resources	1,272 acres of high probability areas for cultural resources within Permit Area. Inundation of 23 known archaeological sites; 13 sites located on or adjacent to shoreline. Additional surveying necessary to inventory all sites.	No impact to cultural resources.	No surveys conducted, but approximately 70 miles of high probability areas for cultural resources could be impacted, plus several hundred-acre terminal reservoir site.
Impacts to historic structures	Eight historic structures potentially impacted. NRHP eligibility unknown.	No impact to historic structures, except site looting could continue.	No surveys conducted, but historic structures unlikely, except potentially in cities.
Socioeconomics			
Population change	Population increases may exceed projections because of available water and presence of lake.	Projected population increases may not occur because of insufficient water supply.	Population increases likely to meet projections.
Employment and income change	Temporary increase of 2,000 jobs during construction. Permanent increase of 32 jobs from operation. 361 jobs generated from recreational spending prompted by the lake.	Employment and income would not change.	Temporary increase of jobs during construction. Permanent increase of jobs from operation. Higher cost of water equivalent to outflow of $46M per year from the local area.
Land Use and Recreation			
Conversion of land use	Approximately 11,000 acres of existing agricultural and forested land converted to lake and residential use.	No impact on land use.	Approximately 1,000 acres affected along ROW, including timber removal in 13-mile reach through Sabine National Forest, plus several hundred-acre terminal reservoir site.
Recreation supply and demand	Private land made available for recreation with opportunities for water sports and camping. New demand from new residents and visitors.	No impact on recreation. Reduced potential for opening private lands for public recreation at Lake Columbia site.	No impact on recreation. Reduced potential for opening private lands for public recreation at Lake Columbia site.
Aesthetics			
Change in landscape character	Forested and agricultural area converted to lake view.	No impact on aesthetics.	Loss of timber and other vegetation along pipeline corridor and at terminal reservoir site.
Environmental Justice			
Low income or minority population disproportionately affected	No disproportionality identified.	No disproportionality identified.	No disproportionality identified.
Cost			
Estimated cost of alternatives	$191M capital; $15M annual; $0.53 per 1,000 gallons	None	$398M capital, $46M annual; $1.65 per 1,000 gallons

*Table from Lake Columbia Draft EIS, USACE, January 2010

According to the draft EIS for Lake Columbia, no known threatened or endangered species are known to exist in the Permit Area. Project components such as pipelines are expected to have sufficient design flexibility to avoid any known threatened or endangered species along the route from Lake Columbia to the proposed Lake Palestine pump station.

PERMITTING AND DEVELOPMENT

Lake Columbia would require a contract with ANRA and an interbasin transfer permit.

Angelina Neches River Authority has a water right for Lake Columbia and is currently seeking a 404 permit for construction. A draft environmental impact study (DEIS) has been prepared for Lake Columbia by the USACE. The DEIS was published on January 29, 2010 and public and agency comments were provided on March 30, 2010. Currently, the Lake Columbia project is subject to completion of the EIS and issuance of a 404 permit from the U.S Army Corps of Engineers (USACE).

Lake Columbia is in the permitting phase, and has contracts with several local participants. According to

Angelina Neches River Authority, the participants have the right of first refusal to contract for water in the next phase of the project. The Texas Water Development Board is a 47% participant and has the right of refusal for 35.9 MGD (40,188 acre feet per year) of supply. Process for water contracts will be initiated after the issuance of the Section 404 permit from the USACE.

If Dallas were to participate in the Lake Columbia project, the current permit no. 4228 has to be amended for an interbasin transfer from the Neches to the Trinity basin. There is a potential that the authorized diversions from Lake Columbia project may be subject to some reductions due to the environmental flow standards that may be applied during the amendment process.

Permit	Regulatory Entity	Potential Challenges
Water Right Permit Amendment	TCEQ	May require interbasin transfer authorization for Dallas to transfer water from Neches to Trinity basin.
404	USACE	Required to proceed with construction in waters of the US.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Lake Columbia supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Lake Columbia strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Lake Columbia strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the

WUGs served. This strategy was only evaluated for Dallas.

REFERENCES

Draft October 2014 Dallas Long Range Water Supply Plan.

Columbia Prospectus, 2012.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Lake Palestine Pipeline
WMS Type:	Existing Surface Water Source
Potential Supply Quantity (Rounded):	110,670 ac-ft/yr (100 mgd)
Implementation Decade:	2030
Strategy Capital Cost:	$900,817,000 (Sept. 2013) Q-36, Q-37, & Q-48
Unit Water Cost (Rounded):	$4.68 per 1,000 gallons (during loan period) $2.56 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

Dallas Water Utilities has a contract with the Upper Neches River Municipal Water Authority for 114,337 acre-feet per year of water from Lake Palestine and an interbasin transfer permit allowing the use of water from the lake in the Trinity River Basin. DWU's share of the yield of Lake Palestine will provide a supply of 110,670 acre-feet per year in 2020, decreasing to 106,239 acre-feet per year in 2070 due to sedimentation. Lake Palestine is located in East Texas Region on the Neches River. Lake Palestine is a recommended strategy for Dallas Water Utilities.

STRATEGY ANALYSES

Dallas Water Utilities plans to connect Lake Palestine to its water supply system as part of the Integrated Pipeline Project (IPL) being developed jointly with Tarrant Regional Water District. Development of a supply from Lake Palestine provides water at a low cost and with a low environmental impact, and it is a recommended water management strategy for Dallas Water Utilities. The capital cost for the pipeline connecting Lake Palestine to the IPL is $470 million. There are additional costs associated with transporting this water for use by Dallas. Those costs are summarized in the Integrated Pipeline technical memorandum.

SUPPLY DEVELOPMENT

The supply available from Lake Palestine for use by DWU was obtained using the Neches Basin Water Availability Model (WAM Run 3).

ENVIRONMENTAL CONSIDERATIONS

In general, the pipeline corridor does not have any major environmental issues that cannot be avoided.

The thirty-three threatened and endangered species that could be potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, white-faced ibis ST, whooping crane FE and SE, wood stork ST, golden-cheeked warbler FE and SE, black-capped vireo FE and

SE, sharpnose shiner FE, smalleye shiner FE, paddlefish ST, shovelnose sturgeon ST, gray wolf FE and SE, black bear ST, Louisiana black bear FT and ST, red wolf FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, northern scarlet snake ST, earth fruit LT and ST, Brazos water snake ST, Texas fawnsfoot C and ST, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, and Texas pigtoe ST.

PERMITTING AND DEVELOPMENT

Permits have already been obtained.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Lake Palestine supplies are included in Appendix Q).

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Lake Palestine strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Lake Palestine strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. This was only considered for Dallas and customers.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Lake Ralph Hall and Reuse
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	50,121 ac-ft/yr (45 mgd)
Implementation Decade:	2030
Strategy Capital Cost:	$316,160,000 (Sept. 2013) Q-52
Unit Water Cost (Rounded):	$1.79 per 1,000 gallons (during loan period) $0.25 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The Upper Trinity regional Water District has applied for a water right permit for he proposed Lake Ralph Hall, located on the North fork of the Sulphur River in Fannin County in Region C. The yield of the reservoir would be 34,050 acre-feet per year, and Upper Trinity Regional Water District plans to apply for the right to reuse return flows from water originating from the project, providing an additional 16,071 acre-feet per year by 2070 (reuse of return flow is expected to increase after 2070 up to the anticipated permit amount of 18,387 acre-feet per year). Developing Lake Ralph Hall and the related reuse is a recommended strategy for the Upper Trinity Regional Water District.

STRATEGY ANALYSES

The strategy includes construction of the Lake Ralph Hall, a 48-inch, 30-mile transmission pipeline from the reservoir to Upper Trinity Regional Water District's balancing reservoir, a 2,400 HP pump station, and land acquisition of the reservoir site and transmission system easements.

SUPPLY DEVELOPMENT

The supply available from Lake Ralph Hall was determined using the Sulphur Basin WAM.

ENVIRONMENTAL CONSIDERATIONS

The USFWS lists three endangered or threatened species and the TPWD lists an additional 14 endangered or threatened species as occurring or potentially occurring within Fannin County. The likelihood of the endangered or threatened species to be located within the Lake Ralph Hall area is extremely unlikely. There are no federal listed endangered or threatened plant species within the Lake Ralph Hall project vicinity.

Based on a survey conducted by AR Consultants, Inc. in 2005, the Lake Ralph Hall area has low archaeological potential.

The Lake Ralph Hall reservoir would inundate approximately 7,605 acres at conservation pool.

Landcover Classification	Acreage*	Percent
Swamp	3	0.0%
Upland deciduous forest	1,873	23.4%
Grassland	3,874	48.5%
Shrubland	771	9.6%
Agricultural land	1,436	18.0%
Urban/developed land	19	0.2%
Open water	21	0.3%
Total	7,997	100.0%

*Acreage based on approximate GIS coverage rather than calculated elevation-area-capacity relationship.

*Table from Reservoir Site Protection Study, TWDB, July 2008

Land Use Cover Type	Area (acres)
Grasses	1,435
Pasture	2,192
Partially Wooded Areas	516
Young Forest	1,299
Forest	602
Cropland	1,720
Stream Channels	252
Roads and Houses	44
Total Assessment Area	**8,060**

*Table from Draft Environmental Information Document Lake Ralph Hall, Alan Plummer Associates, Inc. & Chiang, Patel & Yerby, Inc., October 2006

The seventeen threatened and endangered species potentially impacted in the counties covered by this WMS are: bald eagle FT, interior least tern FE, Louisiana black bear FT, American peregrine falcon SE, Arctic peregrine falcon ST, Bachman's sparrow ST, eskimo curlew SE, wood stork ST, black bear ST, red wolf SE, alligator snapping turtle ST, Texas horned lizard ST, timber/canebrake rattlesnake ST, blue sucker ST, creek chubsucker ST, paddlefish ST, and shovelnose sturgeon ST.

PERMITTING AND DEVELOPMENT

The Lake Ralph Hall and Reuse strategy would require a new water right and an interbasin transfer permit.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Ralph Hall supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Lake Ralph Hall and Reuse strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Lake Ralph Hall and Reuse strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. This strategy was only considered for UTRWD and customers.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Tehuacana Reservoir
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	41,600 ac-ft/yr (37 mgd)
Implementation Decade:	2040
Strategy Capital Cost:	$742,730,000 (Sept. 2013) Q-50
Unit Water Cost (Rounded):	$4.24 per 1,000 gallons (during loan period) $0.46 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

Lake Tehuacana is a recommended strategy for Tarrant Regional Water District. Lake Tehuacana is a proposed water supply project on Tehuacana Creek within the Trinity River Basin. Tehuacana Creek is a tributary of the Trinity River and lies immediately south and adjacent to Richland Creek on which the existing Richland-Chambers Reservoir is located. Tehuacana Reservoir may/will connect to Richland-Chambers Reservoir by a 9,000-foot channel and be operated as an integrated extension of that reservoir. The project will inundate approximately 15,000 acres. The existing spillway for Richland-Chambers Reservoir was designed to provide enough discharge capacity to accommodate the increased flood flows from Tehuacana Reservoir for the probable maximum flood event. Therefore, the dam for Tehuacana Reservoir can be constructed without a spillway and can function as merely an extension of Richland-Chambers Reservoir. Developing this site will require obtaining a new water right and constructing the dam and reservoir. The estimated safe yield of Lake Tehuacana is 41,600 acre-feet per year, and the estimated firm yield is 81,600 acre-feet per year. This yield analysis was performed with the environmental flows for the Trinity Water Availability Model.

STRATEGY ANALYSES

Tehuacana Reservoir is a proposed reservoir on Tehuacana Creek in Freestone County, a tributary to the Trinity River, immediately south and adjacent to Richland-Chambers Reservoir. Tehuacana Reservoir would inundate approximately 15,000 acres adjacent to Richland-Chambers Reservoir and the two would be hydraulically connected with a small channel. Water from Tehuacana would be transported from Richland-Chambers Reservoir into TRWD transmission facilities.

Tehuacana Reservoir has been part of the TRWD water supply portfolio since the 1950's, but mineral issues in the reservoir footprint have made the project expensive to develop.

The existing spillway for Richland-Chambers Reservoir has capacity to handle Probable Maximum Flood flows from the additional storage created by Tehuacana Reservoir. The Tehuacana Reservoir dam can be constructed without an additional spillway and can function as an extension of Richland-Chambers Reservoir.

SUPPLY DEVELOPMENT

The supply available for Lake Tehuacana was developed using the Trinity Basin Water Availability Model (WAM). Environmental flow requirements are included in the WAM model and significantly impact the supply available to the Lake Tehuacana water right.

ENVIRONMENTAL CONSIDERATIONS

Tehuacana Reservoir would flood about 15,000 acres adjacent to Richland-Chambers Reservoir and would have a safe yield of 41,600 acre-feet per year. There are no priority bottomland hardwoods within the site.

Landcover Classification	Acreage[a]	Percent
Bottomland hardwood forest	1,213	8.2%
Marsh	285	1.9%
Evergreen forest	65	0.4%
Upland deciduous forest	8,605	58.0%
Grassland	2,992	20.1%
Shrubland	427	2.9%
Agricultural land	1,136	7.7%
Open water	122	0.8%
Total	14,845	100.0%

[a]Acreage based on approximate GIS coverage rather than calculated elevation-area-capacity relationship

*Table from Reservoir Site Protection Study, TWDB, July 2008

The thirty-two threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: Bald Eagle ST FDM, Least Tern FE, Large-fruited sand-verbena SE FE, Navasota Ladies Tresses SE FE, Whooping Crane SE FE, Alligator Snapping Turtle ST, American Peregrine Falcon ST, Arctic Peregrine Falcon ST, Bachman's Sparrow ST, Chapman's Yellow-Eyed Grass SR, Creeper (squawfoot) SR, Fawnsfoot SR, Henslow's Sparrow SR, Houston toad SE, Interior Least Tern SE , Least Tern FE, Little Spectaclecase SR, Louisiana Pigtoe SR, Peregrine Falcon ST, Plains Spotted Skunk SR, Red Wolf SE, Rough Stem Aster SR, Sandbank Pocketbook SR, Southeastern Myotis Bat SR, Sprague's Pipit, Texas Garter Snake SR, Texas Heelsplitter SR, Texas Horned Lizard ST, Texas Pigtoe SR, Timber/Canebrake Rattlesnake ST, Wabash Pigtoe SR, and Wood Stork ST.

PERMITTING AND DEVELOPMENT

Development of Tehuacana Reservoir would require a new water right permit, construction of the reservoir, and upsizing TRWD's third pipeline to deliver that water to Tarrant County.

Environmental flow requirements may have significant impact on yield during the permitting process.

Cost uncertainty is fairly significant due to potential future development of lignite resources in reservoir footprint.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Lake Tehuacana supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Tehuacana Reservoir strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Tehuacana Reservoir strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. This strategy was only evaluated for TRWD and customers.

REFERENCES

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *Region C Water Plan*, prepared for the Region C Water Planning group, Fort Worth, January 2001.

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2006 Region C Water Plan*, prepared for the Region C Water Planning group, Fort Worth, January 2006.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

WMS Name:	Lake Texoma
WMS Type:	Existing Surface Water Source
Potential Supply Quantity (Rounded):	220,000 ac-ft/yr (Costs for 113,000 ac-ft/yr) (196 mgd (Costs for 101 mgd))
Implementation Decade:	2040
Strategy Capital Cost:	Multiple Strategies, Costs Listed in the Text Below
Unit Water Cost (Rounded):	Multiple Strategies, Costs Listed in the Text Below

STRATEGY DESCRIPTION

Lake Texoma is an existing Corps of Engineers reservoir on the Red River on the border between Texas and Oklahoma. Under the terms of the Red River Compact, the yield of Lake Texoma is divided equally between Texas and Oklahoma. Lake Texoma is used for water supply, hydropower generation, flood control, and recreation. In Texas, the North Texas Municipal Water District, the Greater Texoma Utility Authority, the City of Denison, TXU, and the Red River Authority have contracts with the Corps of Engineers and Texas water rights allowing them to use water from Lake Texoma.

The U.S. Congress has passed a law allowing the Corps to reallocate an additional 300,000 acre-feet storage in Lake Texoma from hydropower use to water supply, 150,000 acre-feet for Texas and 150,000 acre-feet for Oklahoma. The North Texas Municipal Water District is purchasing 100,000 of the 150,000 acre-feet of storage for Texas and has received a Texas water right to divert an additional 113,000 acre-feet per year from Lake Texoma. The remaining 50,000 acre-feet storage was reserved by Congress for the Greater Texoma Utility Authority, which is purchasing storage and has received a Texas water right for the supply.

Further reallocation of hydropower storage to water supply in Lake Texoma would provide additional yield. According to the Corps of Engineers, the firm yield of Lake Texoma with all hydropower storage reallocated to water supply would be 1,088,500 acre-feet per year. Texas' share would be 544,250 acre-feet per year, leaving about 220,000 acre-feet per year of additional supply available to Texas by the reallocation of more hydropower storage to municipal use (beyond the supplies already contracted for the currently authorized reallocation). Further reallocation would require a new authorization by Congress.

Lake Texoma is only about 50 miles from the Metroplex. The lake has elevated levels of dissolved solids, and the water must be blended with higher quality water or desalinated for municipal use. The elevated dissolved solids in Lake Texoma would have some environmental impacts whether the water is used by blending or desalination. Use for most Region C needs will require an interbasin transfer permit. Blending water from Lake Texoma with water from other sources provides an inexpensive supply for Region C. Desalination provides treated water but is a more expensive strategy, and there are uncertainties in the long-term costs.

The estimated costs for desalination of water from Lake Texoma are based on current cost information for large desalination facilities. However, they are more uncertain than other cost estimates in this plan of a couple of reasons. There is not an established track record of success in the development of large brackish water desalination facilities. Most of the large desalination facilities built to date are located on or near the coast. If a 100 million gallon per day or larger plant were to bed developed for Lake Texoma water, it would be the largest inland desalination facility in the world. In addition, the method and cost of brine disposal for such a facility are uncertain. Brine disposal has the potential to significantly increase the estimated cost for desalination. Detailed studies to solidify the cost estimates will be required if this strategy is pursued.

Lake Texoma is a recommended source of additional water supply for the North Texas Municipal Water District (113,000 acre-feet per year) and the Greater Texoma Utility Authority (56,500 acre-feet per year). It is an alternative source of supply for Dallas Water Utilities, Upper Trinity Regional Water District, and North Texas Municipal Water District (desalination).

STRATEGY ANALYSES

The strategy analyses for Lake Texoma

The following strategies are included in the 2016 Region C Water Plan.

1) Blending of Texoma Supplies with Lower Bois d'Arc supplies
    a. Recommended Strategy for NTMWD – 39,571 acre-feet per year.
    b. Capital Cost - $174,179,000 (Q-25)
    c. Unit Cost before Amortization - $1.59
    d. Unit Cost after Amortization - $0.46
    e. Authorized Supply
2) Blending of Texoma Supplies with potential Sulphur Basin Supplies
    a. Recommended Strategy for NTMWD – 58,267 acre-feet per year.
    b. Capital Cost - $347,596,000 (Q-26)
    c. Unit Cost before Amortization - $1.97
    d. Unit Cost after Amortization - $0.44
    e. Authorized Supply
3) Desalination of Texoma Supplies at Sherman WTP
    a. Alternative Strategy for NTMWD – 39,235 acre-feet per year.
    b. Capital Cost - $622,592,000 (Q-30)
    c. Unit Cost before Amortization - $7.20
    d. Unit Cost after Amortization - $2.96
    e. Authorized Supply
4) Desalination of Texoma Supplies for Dallas Water Utilities
    a. Alternative Strategy for Dallas Water Utilities – 146,000 acre-feet per year.

b. Capital Cost - $1,517,474,000 (Q-46)
c. Unit Cost before Amortization - $4.57
d. Unit Cost after Amortization - $1.91
e. Not yet Authorized

5) Blending of Texoma Supplies with Sulphur Basin Supplies
a. Alternative Strategy for Upper Trinity Regional Water District– 25,000 acre-feet per year.
b. Capital Cost - $197,198,000 (Q-26A)
c. Unit Cost before Amortization - $2.76
d. Unit Cost after Amortization - $0.74
e. Not yet Authorized

6) Desalination of Texoma Supplies for municipal supply
a. Recommended Strategy for Greater Texoma Utility Authority– 25,528 acre-feet per year.
b. Capital Cost - $92,840,000 (Q-64)
c. Unit Cost before Amortization - $2.58
d. Unit Cost after Amortization - $1.64
e. Authorized

7) Lake Texoma Supplies for steam electric power (raw water)
a. Recommended Strategy for Greater Texoma Utility Authority– 15,548 acre-feet per year.
b. Capital Cost - $49,382,000 (Q-63 and Q-128)
c. Unit Cost before Amortization - $2.07
d. Unit Cost after Amortization - $0.40
e. Authorized

SUPPLY DEVELOPMENT

All the recommended and alternative strategies for North Texas Municipal Water District represent the authorized amounts of the Lake Texoma supplies. The strategies for Dallas Water Utilities and Upper Trinity Regional Water District are yet to be authorized.

ENVIRONMENTAL CONSIDERATIONS

Transference of zebra mussels from Lake Texoma to the water body where it is blended is a significant environmental issue. The recommended Lake Texoma strategy proposes the transfer Lake Texoma water directly to the water treatment plant for blending to avoid the transfer of zebra mussels from one water body to another. The total dissolved solids of the wastewater are an environmental consideration with this method. When considering desalination, disposal of the brine and the potential high costs of treatment should be taken into account.

The twentyfour threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: American peregrine falcon ST, bald eagle ST, black-capped vireo FE and SE, eskimo curlew FE and SE, golden-cheeked warbler FE and SE, interior least tern LE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, whooping crane FE and SE, white-faced ibis ST, wood stork ST, Texas heelsplitter ST, Louisiana pigtoe ST, Texas pigtoe ST, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, blue sucker ST, creek chubsucker ST, paddlefish ST, shovelnose sturgeon ST, red wolf FE and SE, and gray wolf FE and SE.

PERMITTING AND DEVELOPMENT

The Lake Texoma strategy would require an interbasin transfer (IBT), state water right, Congressional authorization, and contract with USACE.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the recommended and alternative strategies for Texoma supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Lake Texoma strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Lake Texoma strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. This strategy was evaluated for NTWMD, GTUA, and Dallas (and customers of all of these

WWPs).

REFERENCES

Freese and Nichols, Inc. *Report in Support of Amending Permit 5003*, prepared for the North Texas Municipal Water District, Fort Worth, February 2005.

U.S. Army Corps of Engineers, Tulsa District, *Draft Environmental Assessment, Lake Texoma Storage Reallocation Study, Lake Texoma, Oklahoma and Texas,* Tulsa, January 2005.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Lower Bois d'Arc Creek Reservoir
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	120,200 ac-ft/yr (107 mgd)
Implementation Decade:	2020
Strategy Capital Cost:	$625,610,000 (Sept. 2013) Q-23
Unit Water Cost (Rounded):	$1.55 per 1,000 gallons (during loan period) $0.22 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The proposed Lower Bois d'Arc Creek Reservoir was a recommended strategy for the North Texas Municipal Water District (NTMWD) in the 2001, 2006, 2011 *Region C Water Plans.* The project is located in Region C on Bois d'Arc Creek in Fannin County, northeast of the City of Bonham.

Lower Bois d'Arc Creek Reservoir is a recommended water management strategy for the North Texas Municipal Water District (NTMWD) and would have a capital cost of $625,610,000, including water transmission facilities.

STRATEGY ANALYSES

This strategy includes construction of Lower Bois d'Arc Creek Reservoir, transmission facilities to NTMWD's North Water Treatment Plant, and terminal storage facilities.

SUPPLY DEVELOPMENT

The supply available from the Lower Bois d'Arc Creek Reservoir was obtained using the Red River Water Availability Model with the instream flow requirements specified in the water right.

ENVIRONMENTAL CONSIDERATIONS

The Lower Bois d'Arc Creek Reservoir (LBCR) project would inundate 16,358 acres. A jurisdictional determination was conducted for the LBCR in 2007. Based on this study, there are 5,874 acres of wetlands and 651,024 linear feet of streams within the project site. For the forested wetlands, the Habitat Suitability Index was calculated at 0.25 on a scale of 0 to 1. Habitat evaluation studies confirmed the poor quality of these wetlands. The 1984 Fish and Wildlife Service *Texas Bottomland Hardwood Preservation Program* report classified the Bois d'Arc Creek bottoms in the reservoir area as Priority 4 bottomland hardwoods, which are "moderate quality bottomlands with minor waterfowl benefits."

There are no federally listed threatened and endangered species potentially impacted by the LBCR. Of the state listed species potentially located in Fannin County, five species could potentially be impacted by construction of LBCR.

Habitat Type	Acreage
Evergreen Forest	228
Upland/Deciduous Forest	2,216
Riparian Woodland/Bottomland Hardwood/Forested Wetland (Total for HEP Purposes) *Riparian Woodland/Bottomland Hardwood* *Forested Wetland*	6,330 *1,728* *4,602*
Shrubland	63
Shrub Wetland	49
Grassland/Old Field	4,761
Emergent/Herbaceous Wetland	1,223
Cropland	1,757
Riverine	219
Lacustrine	87
Tree Savanna	132
Shrub Savanna	4
Grand Total	**17,068**

*From Supporting Report for Section 404 Permit Application, June 2008

NTMWD had developed a mitigation plan to mitigate for impacts associated with the LBCR. This plan has been accepted by the state and is under review by the USACE.

PERMITTING AND DEVELOPMENT

NTMWD has been granted a water right permit and an interbasin transfer permit. NTMWD has applied for a Federal Section 404 permit for the project and a Draft Environmental Impact Statement has been prepared.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Lower Bois d'Arc Creek Reservoir supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Lower Bois d'Arc Creek Reservoir strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Lower Bois d'Arc strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to where the water can be used based on the IBT permit. No customers outside of the Red and Trinity Basins, and Sulphur Basin within Fannin County, were assigned supply from this strategy. Water from LBCR will be used as part of NTMWD's system and will meet the needs of NTMWD customers.

REFERENCES

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *Region C Water Plan,* prepared for the Region C Water Planning Group, Fort Worth, January 2001.

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2006 Region C Water Plan,* prepared for the Region C Water Planning Group, Fort Worth, January 2006.

U.S. Fish and Wildlife Service: Department of the Interior Final Concept Plan, *Texas Bottomland Hardwood Preservation Program,* Albuquerque, 1984.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

WMS Name:	Main Stem Trinity River Pump Station
WMS Type:	Existing Surface Water Source
Potential Supply Quantity (Rounded):	87,886 ac-ft/yr (90 mgd)
Implementation Decade:	2020
Strategy Capital Cost:	$116,224,000 (Sept. 2013) (Q-22 & Q-34)
Unit Water Cost (Rounded):	$0.47 per 1,000 gallons (during loan period) $0.14 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The Main Stem Trinity River Pump Station will divert water from the Trinity River for delivery to the North Texas Municipal Water District (NTMWD) East Fork Wetlands. NTMWD is developing an agreement with the Trinity River Authority to purchase to up 56,050 acre-feet per year of return flows from the main stem of the Trinity River that originate from TRA's Central Regional Wastewater System. Initially this pump station will deliver up to 56,050 acre-feet per year, but use of this pump station will diminish over time as more of NTWMD's own return flow is available from their wastewater plants located on the East Fork of the Trinity River. This is a recommended strategy for NTMWD. The capital cost of a 90 MGD plant that will supply to both NTMWD and DWU is approximately $116 million.

STRATEGY ANALYSES

"In December 2008, Dallas and the North Texas Municipal Water District (NTMWD) entered into an agreement (swap agreement) for the exchange of return flows. The swap agreement allows Dallas to use NTMWD return flows discharged into Lake Ray Hubbard in exchange for NTMWD utilizing a portion of Dallas' return flows from the main-stem of the Trinity River. Under the swap agreement Dallas and NTMWD will cooperate in the construction of a pump station (Main Stem Pump Station) and transmission pipeline to deliver return flows (from Dallas and other entities) from a location on the main stem of the Trinity River to an agreed "point of delivery" near the NTMWD wetlands located near the East Fork of the Trinity River and Hwy 175 near Seagoville." When the swap agreement is implemented, Dallas will have the right to utilize all NTMWD water discharged into Lake Ray Hubbard. Until the swap agreement is implemented, Dallas has agreed to pass NTMWD's discharges from Lake Ray Hubbard. The project to be constructed under the swap agreement includes the construction of a Main Stem Pump Station and a pipeline to transport water to the NTMWD wetlands. The Main Stem Pump Station provides access to 50 MGD or (56,050 acre-feet per year) of supplies for North Texas Municipal Water District and 31 MGD (or 34,751 acre-feet per year) for Dallas Water Utilities.

SUPPLY DEVELOPMENT

This strategy restores access to existing supplies. No new supplies are accessed with this strategy.

ENVIRONMENTAL CONSIDERATIONS

There are no significant environmental considerations associated with this strategy.

The seventeen threatened and endangered species potentially impacted by this strategy, based on the species listed in the county(ies) in which this WMS is located, are: American peregrine falcon ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, white-faced ibis ST, red wolf FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, Louisiana pigtoe ST, sandbank pocketbook ST, Texas heelsplitter ST, and Texas pigtoe ST.

PERMITTING AND DEVELOPMENT

The Main Stem Trinity River Pump Station would require a water right permit amendment.

COST ANALYSIS

For the Region C cost analysis, Planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Main Stem supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Main Stem Trinity River Pump Station strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Main Stem Trinity River Pump Station strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. This strategy was developed to meet the needs of existing and future customers of NTMWD and DWU.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM*

*A detailed report analyzing and quantifying impacts of the Marvin Nichols Reservoir at elevation 328 feet, msl is included in Appendix Y of this report.

WMS Name:	Marvin Nichols Reservoir (elevation 328 feet, msl)
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	489,800 ac-ft/yr (Region C portion) (437 mgd)
Implementation Decade:	Unknown
Strategy Capital Cost:	$4,321,909,000 (Sept. 2013)
Unit Water Cost (Rounded):	$2.98 per 1,000 gallons (during loan period) $0.74 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The configuration of the Marvin Nichols Reservoir described in this technical memorandum is at elevation 328 msl and is an alternative strategy for TRWD, NTWMD, UTRWD, and Irving. It is not a recommended water management strategy for any wholesale providers. (See Sulphur Basin Supplies technical memorandum for the recommended strategy involving a different configuration of this reservoir).

Region C is retaining the original configuration of Marvin Nichols Reservoir (at elevation 328 msl, as detailed in Appendix Y) as an alternative water management strategy for the *2016 Region C Water Plan*. The proposed Marvin Nichols Reservoir is located on the Sulphur River in the Sulphur River Basin in Senate Bill One Planning Region D, the North East Texas Region. The proposed reservoir is about 115 miles from the Metroplex. Development of Marvin Nichols Reservoir was a recommended strategy for Region C in the 2001 and 2006 Region C Water Plans. Using the Sulphur River Basin Water Availability Model and assuming that the proposed Lake Ralph Hall is in place as a senior water right, the estimated yield of Marvin Nichols Reservoir is 590,000 acre-feet per year after allowing for downstream water rights and environmental releases as required by the Texas Water Development Board's environmental flow criteria.

This original configuration of Marvin Nichols at 328 msl is being retained as an alternative strategy because Region C recognizes that there are inherent risks and impacts associated with the Sulphur Basin Supplies strategy (combination of Marvin Nichols at 313.5 msl and reallocation of Wright Patman), particularly the reallocation of flood storage at Wright Patman Lake. Reallocation of storage at Wright Patman Lake at the scale envisioned for the Sulphur Basin Supplies strategy will require a recommendation by the Corps of Engineers/Department of the Army and approval by the United States Congress. Wright Patman reallocation may also be constrained by Dam Safety considerations. As more detailed studies seek to develop an understanding of the tradeoffs between the environmental impacts at Wright Patman in comparison with the predicted impacts of new storage at the Marvin Nichols site, the risk exists that the Wright Patman reallocation alternative may be constrained by either policy or environmental issues, or both. Should the reallocation of Wright Patman not be achieved, Region C could choose to substitute the alternative Marvin Nichols Reservoir strategy (elevation 328 msl) in place of the Sulphur Basin Supplies recommended strategy.

Assuming that 20 percent of the yield is used to provide water in Region D and 80 percent is made available to Region C, Marvin Nichols Reservoir will provide 489,000 acre-feet per year of additional water supply for Region C.

STRATEGY ANALYSES

The Marvin Nichols strategy is an alternative strategy for TRWD, NTMWD, UTRWD, and Irving. This strategy could replace any recommended strategy for these entities that is unable to be implemented in the timeframe it is needed.

SUPPLY DEVELOPMENT

The supply is not yet developed and the project sponsor will have to go through the permitting process and construction of the reservoir to develop this supply. The supply availability reported in the 2016 Region C Water Plan is based on the yield estimated from the Sulphur Basin Water Availability Model.

ENVIRONMENTAL CONSIDERATIONS

As a major reservoir project, Marvin Nichols Reservoir will have significant environmental impacts. The reservoir would inundate about 66,000 acres. The 1984 U.S. Fish and Wildlife Service *Bottomland Hardwood Preservation Program* classified some of the land that would be flooded as a Priority 1 bottomland hardwood site, which is "excellent quality bottomlands of high value to key waterfowl species." The proposed new location of the dam will reduce but not eliminate the impact on bottomland hardwoods and will slightly increase the acreage required for the reservoir. Permitting the project and developing appropriate mitigation for the unavoidable impacts will require years, and it is important that water suppliers start that process will in advance of the need for water from the project. Development of the Marvin Nichols Reservoir will require an interbasin transfer permit to bring the water from the Sulphur River Basin to the Trinity River Basin. The project will include a major water transmission system to bring the new supply to the Metroplex. The project will make a substantial water supply available to the Metroplex, and the unit cost is less than that of most other major water management strategies.

Landcover Classification	Acreage[a]	Percent
Bottomland hardwood forest	26,309	39.2%
Marsh	6,259	9.3%
Seasonally flooded shrubland	1,198	1.8%
Swamp	565	0.8%
Evergreen forest	27	0.0%
Upland deciduous forest	13,667	20.4%
Grassland	13,069	19.5%
Shrubland	1,027	1.5%
Agricultural land	3,169	4.7%
Urban/developed land	8	0.0%
Open water	1,847	2.8%
Total	67,145	100.0%

*Table from Reservoir Site Protection Study, TWDB, July 2008

The twenty-three threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: American burying beetle F, least tern F and S, piping plover F and S, American peregrine falcon S, Bachman's sparrow S, bald eagle S, wood stork S, whooping crane S, peregrine falcon S, blackside darter S, creek chubsucker S, paddlefish S, shovelnose sturgeon S, black bear, S, Rafinesque's big-eared bat, red wolf S, Louisiana pigtoe S, southern hickorynut S, Texas pigtoe S, alligator snapping turtle S, northern scarlet snake S, Texas horned lizard S, and timber rattlesnake S.

PERMITTING AND DEVELOPMENT

The Marvin Nichols Reservoir would require new water rights permit and interbasin transfer (IBT). It should be noted that there is known public opposition to this strategy.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Planning level cost estimates for the Marvin Nichols strategy is included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Marvin Nichols Reservoir strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Marvin Nichols Reservoir strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

REFERENCES

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey communications, Inc.: *Region C Water Plan,* prepared for the Region C Water Planning Group, Fort Worth, January. 2001.

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2006 Region C Water Plan,* prepared for the Region C Water Planning Group, Fort Worth, January 2006

R.J. Brandes Company, *Final Report – Water Availability Modeling for the Sulphur River Basin,* prepared for the Texas Water Development Board, Austin, June 1999.

U.S. Fish and Wildlife Service: Department of the Interior Final Concept Plan, *Texas Bottomland Hardwood Preservation Program,* Albuquerque, 1984.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

WMS Name:	Neches River Run-of-River Diversion
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	47,250 ac-ft/yr (42 mgd)
Implementation Decade:	2060 (2060)
Strategy Capital Cost:	$226,790,000 (Sept. 2013)
Unit Water Cost (Rounded):	$2.14 per 1,000 gallons (during loan period) $0.91 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

Lake Fastrill was a recommended water management strategy in the approved *2006 Region C Water Plan* and the *2007 State Water Plan* and was designated by the Texas Legislature as a unique site for reservoir development. The lake was intended to meet projected water supply needs for the Dallas and water user groups in Anderson, Cherokee, Henderson, and Smith counties in Region I. A decision of the United States Supreme Court on February 22, 2010 not to hear the appeals of the State of Texas and Dallas has effectively supported the creation of the Neches River National Wildlife Refuge (NRNWR) and rendered the development of Lake Fastrill extremely unlikely. The Neches Run-of-the-River Diversion strategy is one potential alternative to Lake Fastrill. It would involve run-of-the-river diversions from the Neches River downstream of Lake Palestine and the Neches River National Wildlife Refuge and upstream of the Weches Dam site.

Dallas and UNRMWA are long-term partners on Lake Palestine with their initial water sale contract being in place since 1972.

STRATEGY ANALYSES

"The selected Upper Neches Project strategy includes a new river intake and pump station for a run-of-river diversion from the Neches River near the SH 21 crossing. Water would be delivered through a 42-mile, 72-inch diameter pipeline to Dallas' pump station at Lake Palestine for delivery to Dallas through the IPL. Facilities include a small diversion dam on the Neches River, a river intake and pump station, and a transmission pipeline and booster pump station with delivery to the IPL pump station site near Lake Palestine." It is anticipated that this project will be online by 2060.

Using the run-of-river diversions operated as a system with Lake Palestine is the recommended strategy. However, run-of-river diversions operated as a system with off-channel tributary storage and as conjunctive use along with groundwater are proposed as alternative strategies in the 2014 feasibility study. These are not considered as strategies in the *2016 Region C Water Plan*. All the potentially feasible WMSs for UNRMWA and City of Dallas are discussed in the 2014 Report *Upper Neches River Water Supply Project Feasibility Study.*

SUPPLY DEVELOPMENT

"The Upper Neches Project includes a run-of-river diversion from Neches River backed up by storage in Lake Palestine when streamflows are not available due to drought conditions, senior water rights calls, and/or TCEQ environmental flow restrictions. Water available at this diversion point was computed based on a maximum diversion rate of 141 cfs (91 MGD). The firm yield of this strategy is about 42 MGD (47,250 acft/yr), assuming conjunctive system operations with Lake Palestine. This firm yield was calculated using the TCEQ's Neches River Basin Water Availability Model..."

"Implementation and operation of the Upper Neches Project will comply with TCEQ environmental flow standards and will leave adequate flows in the Neches River to sustain a healthy eco-system."

ENVIRONMENTAL CONSIDERATIONS

Relating to habitat, there is no presence of critical or unique habitat in the project area. The impacts to environmental water needs, bays and estuaries and wetlands are expected to be minimal.

The twenty-six threatened and endangered species potentially impacted by the WMS, based on the species listed in the county(ies) in which this WMS is located, are: American peregrine falcon ST, bald eagle ST, Bachman's sparrow ST, interior least tern FE and SE, peregrine falcon ST, piping plover ST and ST, Sprague's pipit C, white-faced ibis ST, whooping crane LE and SE, wood stork ST, creek chubsucker ST, paddlefish ST, black bear ST, Louisiana black bear FT and ST, red wolf FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, Louisiana pine snake C and ST, northern scarlet snake ST, Neches River rose-mallow FT, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, and Texas pigtoe ST.

PERMITTING AND DEVELOPMENT

The Neches River Run-of-the-River Diversion would require a new water rights permit and an interbasin transfer permit.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. Cost estimates for the Neches Run-of-River supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Neches River Run-of-the-River Diversion strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Neches River Run-of-the-River Diversion strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

REFERENCES

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2006 Region C Water Plan*, prepared for the Region C Water Planning Group, Fort Worth, January 2006.

HDR Engineering, Inc., Webb & Webb, CDM-Smith, Todd Groundwater, JQ Infrastructure, AZB Engineers & Surveyors, K Strategies, Inc., TAS & Associates, and MS Dallas: *2014 Dallas Long Range Water Supply Plan to 2070 and Beyond (Draft)* Dallas Water Utilities, City of Dallas, April 2015.

HDR Engineering, Inc.: "Neches River Run-of-the-River Diversions Project Preliminary Technical Information for 2011 Region C Regional Water Plan," Austin, March 2010.

HDR Engineering, Inc. and Todd Groundwater: *Upper Neches River Water Supply Project Feasibility Study*, Upper Neches River Municipal Water Authority, February 2015.

Texas Water Development Board: *Water for Texas 2007.* [Online] Available URL: http://www.twdb.state.tx.us/wrpi/swp/swp.htm, April 2006.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

WMS Name:	Water from Oklahoma
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	Up to 50,000 ac-ft/yr (45 mgd)
Implementation Decade:	Varies
Strategy Capital Cost:	There are multiple strategies for this source. See Appendix Q.
Unit Water Cost (Rounded):	There are multiple strategies for this source. See Appendix Q.

STRATEGY DESCRIPTION

Several wholesale water providers in the Metroplex have been pursuing the purchase of water from Oklahoma. At the present time, the Oklahoma Legislature has established a moratorium on the export of water from the state. Since the 2011 Plan, the Tarrant Regional Water District pursued a case in Federal Court to determine whether this moratorium could be overturned, and the Supreme Court subsequently ruled in favor of Oklahoma. For the long term, Oklahoma remains a potential source of water supply for Region C.

STRATEGY ANALYSES

Water from Oklahoma is a recommended strategy for North Texas Municipal Water District (50,000 acre-feet per year). This recommended strategy is expected to be online beginning in 2070. It is identified as an alternative strategy for the Tarrant Regional Water District (50,000 acre-feet per year) and the Upper Trinity Regional Water District (15,000 acre-feet per year).

SUPPLY DEVELOPMENT

Supply availability is based on the evaluation of the supplies available in Lake Hugo.

ENVIRONMENTAL CONSIDERATIONS

Raw water from Oklahoma would have a relatively low environmental impact because of the use of existing sources. A complete list of the environmental considerations can be seen in Table P.4.

The twenty-four threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: wood stork ST, bald eagle ST and FR, peregrine falcon ST, American peregrine falcon ST, whooping crane SE, piping plover ST and FT, eskimo curlew SE, red knot ST, interior least tern SE, Bachman's sparrow ST, shovelnose sturgeon ST, paddlefish ST, blue sucker ST, creek chubsucker ST, blackside darter ST, red wolf SE, black bear ST, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, American burying beetle SE and FE, Ouachita rock pocketbook SE, least tern FE and Louisiana black bear FT.

PERMITTING AND DEVELOPMENT

Oklahoma has moratorium for export of water out of state.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Oklahoma supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the water from Oklahoma strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The water from Oklahoma strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

REFERENCES

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2006 Regional C Water Plan,* prepared for the Region C Water Planning Group, Fort Worth, January 2006.

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2011 Regional C Water Plan*, prepared for the Region C Water Planning Group, Fort Worth, January 2011.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Red River Off-Channel Reservoir (OCR)
WMS Type:	New Surface Water Source
Potential Supply Quantity (Rounded):	114,342 acre/feet per year (127.5 MGD)
Implementation Decade:	2060
Strategy Capital Cost:	$852,987,000 (Sept. 2013)
Unit Water Cost (Rounded):	$2.53 per 1,000 gallons (during loan period) $0.73 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The project description for the Red River OCR strategy is based on the information summarized in the October 2015 Draft Dallas Long Range Water Supply Plan (LRWSP). According to the LRWSP, *"The Red River OCR project includes a 162 MGD (250 cfs) intake and pump station on the Red River at Arthur City, TX immediately downstream of Highway 271 bridge...This location allows for streamflow from the Blue River and Muddy Boggy River watersheds to contribute to flow released from Lake Texoma resulting in improved water quality."*

"Diversions from the Red River would be pumped approximately 2 miles via an 84-in pipeline to three OCRs in series. The first OCR consists of a 2,500 acft basin for purposes of initial sediment settling and subsequent removal. The next OCR would consist of a 5,300 acft basin for water quality improvement and additional sediment removal. Finally, a third OCR would consist of a 32,000 acft storage basin to allow for extended pumping during those times when flow in the Red River is extremely low or water quality is impaired."

"Water would then be diverted from the third OCR by a 129 MGD (200 cfs) intake and pump station and would transport, on average, about 102 MGD (114,000 acft/yr) via an 84-in transmission pipeline to Lake Ray Roberts for subsequent blending and use by Dallas. The delivery system was designed with a 1.25 peaking factor to allow for over pumping to compensate for delivery shortages during periods when diversions from the OCR are not available."

SUPPLY DEVELOPMENT

"A yield analysis was completed using monthly available flow at Arthur City extracted from the TCEQ Red River WAM." The flows were adjusted to account for instream flow requirements in the Red River Compact (RRC). The available yield from this supply, as an alternative strategy for Dallas, is limited by the proposed infrastructure to approximately 102 MGD.

ENVIRONMENTAL CONSIDERATIONS

The environmental impacts from this strategy are expected to be low.The twenty-three threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: American peregrine falcon ST, bald eagle ST, bachman's sparrow ST, Eskimo curlew FE and SE, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, sprague's pipit C, whopping crane FE and SE, wood stork ST, blackside darter ST, blue sucker ST, creek chubsucker ST, paddlefish ST, shovelnose sturgeon ST, American burying beetle FE, black bear ST, red wolf FE and SE, Ouachita rock pocketbook FE, Texas heelsplitter ST, alligator snapping turtle ST, Texas horned lizard ST, and timber rattlesnake ST.

PERMITTING AND DEVELOPMENT

"Dallas would need to obtain a water rights permit for the river diversion from the TCEQ including an interbasin transfer authorization. In addition to the water rights permit, Dallas would need to obtain a 404 permit from the USACE for impacts to a waterway from construction activities."

"Diversions from the Red River would potentially need to comply with provisions of the Lacey Act..." depending on where the intake and pump station facilities are constructed. Diversions would also need to comply with the RRC.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP (a more detailed cost was provided by Dallas as part of their LRWSP). In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for alternative strategy for Red River supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Red River OCR strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Region Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Red River OCR strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served. This strategy is included as an alternative strategy for Dallas in the *2016 Region C Water Plan.*

REFERENCES

HDR, Inc.: "Draft Dallas Long Range Water Supply Plan," Austin, October 2014.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
REUSE

WMS Name:	Reuse
WMS Type:	Reuse
Potential Supply Quantity (Rounded):	355,118 ac-ft/yr in 2070 (317 mgd)
Implementation Decade:	Multiple
Strategy Capital Cost:	$1,312,165,948 (Sept. 2013)
Unit Water Cost (Rounded):	Varies per 1,000 gallons (during loan period) See table below Varies per 1,000 gallons (after loan period) See table below

STRATEGY DESCRIPTION

This strategy is to develop projects that reuse treated wastewater effluent, either directly or indirectly. It includes the construction of all associated transmission that may be required. Further description of individual reuse projects is in the tables that follow.

SUPPLY DEVELOPMENT

The supply amounts for this strategy were developed based on estimates of water use and related return flows to specific wastewater treatment plants. Where applicable, consideration was given for specific minimum by-pass flow requirements where required by water rights.

ENVIRONMENTAL CONSIDERATIONS

Direct reuse projects will reduce the volume of treated wastewater effluent that is returned to natural waterways. The right of way for transmission lines may temporarily affect the environment during construction, for which there would be mitigation. Additional studies and mitigation may be required before the construction of transmission pipelines. Pipelines may be able to be routed to avoid environmentally sensitive areas.

Indirect reuse projects will reduce the volume of flow in natural waterways in certain areas, but only to the extent that they remove flows returned by upstream wastewater treatment plants. No naturalized stream flow (naturally occurring runoff from precipitation) will be removed from waterways as part of any reuse projects. It should be noted that some return flow water rights dictate the allowable use of return flow and minimum by-pass requirements in order to protect the environment.

AGRICULTURAL AND RURAL IMPACTS

The right of way for the transmission line may temporarily affect a small amount of agricultural acreage during construction.

PERMITTING AND DEVELOPMENT

All recommended indirect reuse strategies that are currently permitted have been structured to comply with the terms of the associated water right. All recommended reuse strategies (both direct and indirect) that are not currently permitted are anticipated to apply for and obtain any necessary permits from TCEQ including but not limited to reuse water right permits and Section 210 permits.

COST ANALYSIS

Cost estimates were prepared for each reuse strategy (except the five projects listed below). These cost estimates are contained in Appendix Q. There are five reuse projects that do not have associated capital costs. Those projects are below along with the explanation of why they do not have capital costs:

Athens Fish Hatchery – The Texas Freshwater Fisheries Center in Athens ("Fish Hatchery") has a contract with Athens MWA for 3,023 acre-feet per year from Lake Athens. After using the water in its facility, the Fish Hatchery discharges almost all of that water back into Lake Athens. Athens MWA has an agreement that allows them to use this return flow. Since Athens MWA already has existing pumping and treatment facilities on the lake, there are no additional facilities needed and thus no capital costs.

Cooke County Mining Reuse – On-site recycling – Currently mining operations discharge their process water. The strategy presented in this plan is to recirculate process water within the facility rather than discharging. No capital costs were included since any infrastructure needed would be internal to the mining operation site, similar to distribution system costs, which are not allowed to be included in regional planning.

Jacksboro/Jack County Mining – Currently mining (mostly oil and gas) companies obtain water from the City of Jacksboro. Currently oil/gas water tanker trucks get water from a water tank located at Jacksboro's water treatment plant. Jacksboro has recently obtained a permit to allow reuse of some of its wastewater. This strategy will now involve oil/gas water tanker trucks getting water from a non-potable water tank located at Jacksboro's wastewater treatment plant.

UTRWD Indirect Reuse of Lake Ralph Hall Water – UTRWD has a water right permit for Lake Ralph Hall which also grants the right to reuse a portion of this water. Once Lake Ralph Hall is constructed and water is being used by UTRWD customers, this water is returned to UTRWD wastewater plants which then discharge into Lake Lewisville. UTRWD already has water treatment plant facilities on Lake Lewisville which can make use of this returned Ralph Hall water. There are no additional transmission facilities needed to utilize this Ralph Hall reuse.

Wise County Mining Reuse –Currently mining operations discharge their process water. The strategy presented in this plan is to recirculate process water within the facility rather than discharging. No capital costs were included since any infrastructure needed would be internal to the mining operation site, similar to distribution system costs, which are not allowed to be included in regional planning.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the reuse strategies were evaluated across eleven different criteria to facilitate a quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The reuse strategy was evaluated on several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

Recommended Reuse Projects in Region C*

- Values in Acre-Feet per Year -

Provider	Recipient/ User	Project Name	Type	County [a]	2020	2030	2040	2050	2060	2070	Capital Cost	Cost Table	Unit Cost 1st Decade ($/ac-ft)	Unit Cost 2070 ($/ac-ft)	Acres Affected	Acres of Wetland
Athens MWA	Athens & customers	Athens Fish Hatchery	indirect	Henderson	2,872	2,872	2,872	2,872	2,872	2,872	$0	None	$33	$33	0	0
Cooke County Irrigation/Gainesville	Cooke Co Irrigation	Direct Reuse	direct	Cooke	70	70	70	70	70	70	$1,669,000	Q-81	$2,330	$342	7	0
Cooke County Mining	Cooke County Mining	Mining Reuse – On-site recycling	direct	Cooke	99	67	71	74	77	80	$0	None	$163	$163	0	0
DWU	DWU & Customers	DWU Main Stem Pump Station	indirect	Dallas	34,751	34,751	34,751	34,751	34,751	34,751	$44,481,000	Q-34	$153	$46	0	0
DWU	DWU & Customers	DWU Main Stem Balancing Reservoir (Ellis County Off-Channel)	Indirect	Ellis	0	0	0	84,075	102,011	114,342	$674,463,000	Q-35	$607	$175	4,428	<10
Ennis	Ennis & Customers	Indirect Reuse	indirect	Ellis	0	0	2,034	2,969	3,696	3,696	$39,456,900	Q-108	$1,374	$481	17	0
Fort Worth	Fort Worth (non-potable irrigation & industrial demand included in Fort Worth Municipal Use)	Fort Worth Future Direct Reuse	direct	Tarrant	2,688	6,934	8,166	8,166	8,166	8,166	$129,976,000	Q-67	$1,363	$268	165	0
Frisco	Frisco (non-potable irrigation demand included in Frisco Municipal Use)	Collin/Denton County Direct Reuse	direct	Collin/Denton	2,240	3,360	5,650	5,650	5,650	5,650	$34,882,048	Q-74	$740	$222	83	0
Jacksboro	Jack Co Mining	Indirect Reuse (Jack County mining)	indirect	Jack	330	342	348	351	356	359	$0	None	$3	$3	0	0
Irving/TRA	Irving	Irving Direct for Municipal Use	indirect	Dallas	28,025	28,025	28,025	28,025	28,025	28,025	$39,960,000	Q-90	$497	$377	17	0
NTMWD/TRA	NTWMD customers	Central Reuse for East Fork Wetlands	indirect	Dallas/Kaufman	53,088	37,913	25,366	13,599	3,235	0	$71,743,000	Q-22	$153	$46	10	0
WWTP in Tarrant Co	Tarrant County SEP	Tarrant County SEP	direct	Tarrant	0	1,528	2,360	2,360	2,360	2,360	$13,080,000	Q-196	$560	$94	25	0
TRA/Fort Worth	Fort Worth (non-potable irrigation & industrial demand included in Fort Worth Municipal Use)	Alliance Corridor Direct Reuse	direct	Tarrant/Denton	3,921	3,921	11,537	11,537	11,537	11,537**	$16,083,000	Q-68	$161	$20	20	0
TRA	Dallas County SEP (2,000 af/y) & future undetermined customer	Dallas County Indirect Reuse	indirect	Dallas	0	5,000	6,750	6,750	6,750	6,750	$8,661,000	Q-59	$590	$228	20	0
TRA	Unspecified future customers	Joe Pool Lake Indirect Reuse	indirect	Dallas	1,914	2,835	4,041	4,368	4,368	4,368	N/A***	None	N/A	N/A	0	0
TRA	Ellis Co SEP	Ellis County Direct Reuse	direct	Ellis	0	0	0	0	2,200	4,700	$17,958,000	Q-60	$557	$235	25	0
TRA	Freestone Co SEP	Freestone County Indirect Reuse	indirect	Freestone	0	0	0	6,760	6,760	6,760	$30,593,000	Q-61	$613	$235	37	0
TRA	Kaufman Co SEP	Kaufman County Indirect Reuse	indirect	Kaufman	1,000	1,000	1,000	1,000	1,000	1,000	$8,763,000	Q-62	$935	$283	37	0
TRA	Dallas Co Irrigation	Additional Las Colinas Direct Reuse	direct	Dallas	7,000	7,000	7,000	7,000	7,000	7,000	$15,017,000	Q-58	$392	$212	20	0

TRWD	TRWD customers	Trinity River Indirect Reuse - Cedar Creek	indirect	Henderson/ Kaufman	0	37,163	63,204	82,860	88,059	88,059	$139,078,000	Q-49	$182	$50	243	wetlands will be created
UTRWD	UTRWD customers	Indirect Reuse of Lake Ralph Hall Water	indirect	Fannin	4,744	9,733	14,967	15,335	15,703	16,071	$0	None	$0	$0	0	0
UTRWD	Denton Co Irrigation	Direct Reuse	direct	Denton	0	560	1,121	2,240	2,240	2,240	$13,213,000	Q-53	$590	$94	25	0
Weatherford	Weatherford & customers	Lake Weatherford Indirect Reuse	indirect	Parker	2,240	2,240	2,240	2,240	2,240	2,240	$13,089,000	Q-177	$580	$91	15	0
Wise County Mining Reuse	Wise Co Mining	Wise County Mining Reuse	direct	Wise	0	0	87	1,234	2,401	4,022	$0	None	$316	$316	0	0
Total					**144,982**	**185,314**	**211,660**	**324,286**	**341,527**	**355,118**	**$1,312,165,948**				5,198	<10

a) County reflects location of reuse project.
* NOTE: Lists recommended reuse strategies for Region C and does not include existing reuse projects.
** Cost estimate is only for the portion of this project that Fort Worth will develop, which will be 7,841 acre-feet per year. The remainder of the volume available from this project has not been assigned to a specific user.
*** There is no cost to get return flow water into Lake Joe Pool (effluent is currently returned to the lake). This supply is available but it not currently assigned to a specific WUG as a recommended strategy. Capital costs and purchase costs to utilize this return flow will be determined as specific WUGs develop this supply.

Description of Recommended Reuse Projects in Region C

DB17 Project ID	Project Name	DB17 Source ID	Description
See Region I Plan	Athens Fish Hatchery	See Region I Plan	Source will be existing return flow from Athens Fish Hatchery into Lake Athens. City of Athens already has facilities in place to be able to utilize this flow so there are no capital costs.
1011	Direct Reuse	1922	Source is City of Gainesville WWTP. End-user is Cooke County Irrigation for direct reuse.
None	Mining Reuse	1962	Source will be City of Gainesville's WWTP to be used for Cooke County MINING WUG. Project will provide water through direct reuse. There is no infrastructure related to this strategy since Mining operations fill tanker trucks with treated effluent directly from WWTP. (This is separate from the potable water that the City of Gainesville as a WWP provides to Cooke County MINING WUG.)
833	DWU Main Stem Pump Station	2235	See detailed information in Appendix L. (*Source will be some of NTMWD WWTP's discharges to the Lake Ray Hubbard watershed to be used by DWU from Lake Ray Hubbard diversion point. This will be in exchange for some of DWU's return flows in Main Stem of Trinity River which would be diverted to NTMWD's East Fork Wetlands and used by NTMWD from Lake Lavon diversion point.*)
834	DWU Main Stem Balancing Reservoir (Ellis County Off-Channel)	277	See detailed information in Appendix L. Source is return flows from the City of Dallas' Central and Southside WWTPs. A 300,000 acre-foot off channel reservoir in Ellis County would store return flows. Stored flows would be pumped back to DWU's system to augment DWU supply through indirect reuse.
1038	Indirect Reuse	1965	Source will be City of Ennis' WWTP (located in Ellis County) return flows. Current return flows go into the stream downstream of Lake Bardwell. Infrastructure would be built to route return flow directly into Lake Bardwell, augmenting the city's supply in Lake Bardwell through indirect reuse. Water right already allows for use of return flow.
997	Fort Worth Future Direct Reuse	1966	Source will be the City of Fort Worth's Village Creek WRP for future City of Fort Worth direct reuse opportunities.
1004	Collin/Denton County Direct Reuse	1920	Source is NTMWD's Stewart Creek West WWTP to be used by City of Frisco to irrigate parks and schools for direct reuse.
None	Indirect Reuse (Jackson County Mining)	1967	Source will be Jacksboro WWTP return flows to replace existing City of Jacksboro potable water supply sales to Jack County MINING WUG. There is no infrastructure related to this strategy since Mining operations fill tanker trucks with treated effluent directly from WWTP.
1020	Irving Direct for Municipal Use	1980	Source will be TRA's Central RWS for direct reuse by the City of Irving. Irving plans to develop a project to use this reuse source within five years.

DB17 Project ID	Project Name	DB17 Source ID	Description
954	NTMWD Main Stem Pump Station	277	Reuse for East Fork Wetlands. There will be 2 sources of reuse supply: water purchased from TRA from TRA's Central Regional WWTP and water traded with DWU from DWU's Central and Southside WWTPs. Water from these 2 sources will flow down the Main Stem of the Trinity River to a location near NTMWD's existing East Fork Wetlands system. This effluent will be diverted via the Main Stem Pump Station into the East Fork Wetlands and subsequently pumped back to Lake Lavon for use by NTMWD.
1127	Tarrant County SEP	1968	Source is a WWTP in Tarrant County (unspecified at this time due to uncertainty in location of future SEP facility). END-USER is an unknown FUTURE TARRANT COUNTY SEP facility for use as cooling water. The direct reuse project(s) may be located anywhere in Tarrant County, depending on the development of SEP generation facilities and/or the occurrence of other opportunities to meet SEP water needs with reuse water.
998	Alliance Corridor Direct Reuse	1982	Source will be TRA's Denton Creek RWS. TRA has been in discussions with potential water users (TRA customers) in the area for irrigation and municipal use in Denton and Tarrant counties. It would most likely be a joint project between TRA; City of Fort Worth; and large land developer, Hillwood Corporation
989	Dallas County Indirect Reuse	1970	Source will be TRA's Central RWS return flows to augment TRA Mountain Creek Lake supplies. (To be used by Dallas Co SEP as cooling water (& other possible Dallas Co. WUGs)). The indirect reuse project(s) may be located anywhere in Dallas County, depending on the development of SEP generation facilities and/or the occurrence of other opportunities to meet SEP water needs with reuse water.
None	Joe Pool Lake Indirect Reuse	1971	Source will be TRA's Mountain Creek RWS, to augment TRA's supply in Joe Pool Lake for indirect reuse. This supply is available but it not currently assigned to a specific WUG as a recommended strategy. Capital costs and purchase costs to utilize this return flow will be determined as specific WUGs develop this supply.
990	Ellis County Direct Reuse	1972	Sources will be TRA's Red Oak, Mountain Creek, & Ten Mile Creek RWS return flows diverted from the Trinity River to Ellis County SEP for use as cooling water (& other possible Ellis Co WUGs). The direct reuse project(s) may be located anywhere in Ellis County, depending on the development of SEP generation facilities and/or the occurrence of other opportunities to meet SEP water needs with reuse water.

DB17 Project ID	Project Name	DB17 Source ID	Description
991	Freestone County Indirect Reuse	1973	Source will be TRA's return flows diverted from the Trinity River to Freestone Co. SEP for use as cooling water. The indirect reuse project(s) may be located anywhere in Freestone County, depending on the development of SEP generation facilities and/or the occurrence of other opportunities to meet SEP water needs with reuse water.
992	Kaufman Count Indirect Reuse	1974	Source will be return flows from TRA's RWSs diverted from the Trinity River to Kaufman Co. SEP for use as cooling water. The indirect reuse project(s) may be located anywhere in Kaufman County, depending on the development of SEP generation facilities and/or the occurrence of other opportunities to meet SEP water needs with reuse water
988	Additional Las Colinas Direct Reuse	1975	Source will be the TRA Central RWS for additional direct reuse by Las Colinas, including irrigation and augmentation of water features (canals, etc.) within the development. TRA sells the water to Dallas County Utility and Reclamation District (DCURD), who then distributes the water to the Las Colinas development.
979	Trinity River Indirect Reuse – Cedar Creek	1976	Source will be return flows from TRA's Central RWS & Denton RWS; as well as the Fort Worth Village Creek WRP, which will be diverted to new TRWD Cedar Creek wetlands, then diverted to Cedar Creek Reservoir to augment TRWD supplies through indirect reuse.
992	Indirect Reuse of Lake Ralph Hall Water	1977	Source will be UTRWD WWTPs' return flows, which will augment UTRWD's Lake Ralph Hall supplies through indirect reuse. Lake Ralph Hall is a recommended WMS for UTRWD. There is no real cost for the reuse as all cost is associated with Lake Ralph Hall which provides water to users which is then discharged by UTRWD's WWTPs.
983	Direct Reuse	1978	Source will be various UTRWD WWTPs to provide direct reuse water for this project. Recipient is Denton County Irrigation WUG.
1107	Lake Weatherford Indirect Reuse	2209	Source will be City of Weatherford's WWTP return flows conveyed to a tributary of Lake Weatherford, which will augment the city's lake supplies through indirect reuse.
None	Wise County Mining Reuse	1958	Source is recycling of mining operations wastewater. Available reclaimed water supply based on estimated available for Wise Co. oil/gas mining and sand/gravel mining as reported in Bureau of Economic Geology: Oil & Gas Water Use in Texas: Update to the 2011 Mining Water Use Report, prepared for the Texas Oil & Gas Association, Austin, September 2012. Project will utilize direct reuse for reclaimed water. No cost has been included for this on-site recycling

REGION C WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM*

*A detailed report analyzing and quantifying impacts of the Marvin Nichols (313.5 msl) portion of the Sulphur Basin Supplies is included in Appendix Y.

WMS Name: Sulphur Basin Supplies

WMS Type: New Surface Water Source

Potential Supply Quantity (Rounded):

Yield of the Sulphur Basin Supplies is detailed below

(Values in Acre-feet per year)	Total Available Yield	Region C Portion (80%)	Region D Portion (20%)
Wright Patman pool raise (232.5)	158,900	127,120	31,780
Marvin Nichols (313.5)	469,050	375,240	93,810
Total	627,950	502,360	125,590

Implementation Decade: 2050 for Wright Patman portion; 2070 for Marvin Nichols portion

Strategy Capital Cost: $4,516,545,000 (September 2013) Q-18

Unit Water Cost (Rounded): $2.96 per 1,000 gallons (during loan period)
$0.73 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The Sulphur Basin Supplies strategy involves development of new surface water supplies from the Sulphur River Basin through a reallocation of storage at Wright Patman Lake from its current purpose, flood control, to water conservation storage, in combination with new storage at the Marvin Nichols IA site. The supply quantity and cost identified above are for a specific to reallocation of Wright Patman at elevation 232.5'NGVD and conservation storage at the Marvin Nichols site at elevation 313.5' NGVD. At those conservation pool elevations, the Marvin Nichols component would inundate an estimated 41,722 acres, while the pool raise at Wright Patman Lake would inundate an additional 9,429 acres over and above the current "average" conservation pool elevation. Of that additional acreage at Wright Patman, the Corps of Engineers has estimated that 7,126 acres are not currently owned by the U.S. Government in a fee title interest and would require purchase.

Studies are currently underway to optimize the specific combination of Wright Patman and Marvin Nichols in terms of cost, environmental, and social impacts, and the final strategy may differ somewhat in terms of specific elevation at either or both components of the project.

The Sulphur Basin Supplies strategy is a recommended water management strategy for NTMWD, UTRWD, and TRWD. It is also an alternative strategy for Dallas and the City of Irving. Approximately 80 percent of the water supplied from the Sulphur Basin Supplies strategy is expected to serve customers of wholesale water providers in Region C and approximately 20 percent would serve water needs in Region D.

STRATEGY ANALYSES

Previously recommended or alternative Water Management Strategies from the Sulphur River Basin in past Region C Plans include: Marvin Nichols Reservoir, Wright Patman Lake (including reallocation of flood storage), Lake George Parkhouse North, and Lake George Parkhouse South. All of these reservoirs are located in the Region D (North East Texas) Regional Water Planning Area. Marvin Nichols Reservoir would be located on the Sulphur River upstream from its confluence with White Oak Creek. The dam would be in Titus and Red River counties and would also impound water in Franklin County. Wright Patman Lake is an existing reservoir on the Sulphur River, about 150 miles from the Metroplex. It is owned and operated by the U.S. Army Corps of Engineers, and the City of Texarkana has contracted with the Corps of Engineers for storage in the lake and holds a Texas water right to use up to 180,000 acre-feet per year from the lake.

The Region C entities that are interested in development of Sulphur Basin Supplies (NTMWD, TRWD, Dallas, UTRWD, and Irving) have formed a Joint Committee on Program Development (JCPD). Since 2001, the JCPD has provided more than $5 million to the Sulphur River Basin Authority (SRBA) to further investigate the development of potential water supply sources in the Sulphur River Basin. Ongoing Sulphur Basin Feasibility studies are being conducted by the U.S. Army Corps of Engineers, SRBA and the JCPD. At the direction of SRBA and the JCPD, these ongoing studies are seeking to address concerns from Region D entities regarding the protection of natural resources, environmental impacts, and the socio-economic impacts of developing water supply within Region D and the Sulphur Basin. As a result, these ongoing studies have identified additional options for water supply in the Sulphur Basin that may address concerns from Region D and would also develop supply needed for Region C and Region D entities.

As identified in the 2014 Sulphur River Basin studies [14], this 2016 Region C Plan recommends a combined strategy of Marvin Nichols Reservoir with the reallocation of flood storage to conservation storage in Wright Patman Lake. This combination is referred to in the report as the Sulphur Basin Supplies strategy. The combination strategy may enable the Marvin Nichols Reservoir to be developed with a smaller footprint. The proposed Sulphur Basin Supplies strategy would yield around 600,000 acre-feet per year (calculated using TCEQ WAM models, assuming Lake Ralph Hall is senior, and accounting for environmental flows).

These 2014 Sulphur River Basin studies [14] evaluated a total of sixty combinations of alternative scales and locations of new surface water development in the Sulphur Basin. Based on these analyses, ongoing strategy optimization is focused on reallocated storage at Wright Patman between elevation 232.5 and elevation 242.5 in combination with new storage at the Nichols site ranging between conservation pool elevations of 296.5 and 313.5. For the purpose of the 2016 Region C Plan, the Sulphur Basin Supplies Strategy assumes the reallocation of Wright Patman to 232.5 and new storage at Marvin Nichols site for a conservation pool elevation of 313.5.

As discussed in Section 5C, the Sulphur Basin Supplies is a recommended strategy for the North Texas Municipal Water District (174,800 acre-feet per year), the Tarrant Regional Water District (280,000 acre-feet per year), and Upper Trinity Regional Water District (35,000 acre-feet per year). It is an alternative strategy for Dallas Water Utilities and the city of Irving. The Region C capital cost for the recommended strategy is $4.5 billion. The capital cost for the alternative strategy is approximately $4.8 billion. Studies conducted by SRBA, the Corps of Engineers, and Region C providers between 2011 and 2014 evaluated a total of sixty combinations of alternative scales and locations of new surface water development in the Sulphur Basin. Based on these analyses, strategy optimization is focused on reallocated storage at Wright Patman between elevation 232.5 and elevation 242.5 in combination with new storage at the Nichols site ranging between conservation pool elevations of 296.5 and 313.5. The anticipated division of yield of the Sulphur Supplies between the three WWPs for which this is a recommended strategy is shown below. NOTE: This division is shown for the purpose of this regional plan and DB17 ONLY and is not intended to be used as a constraint in permitting or operation of these supply reservoirs.

(Values in Acre-feet per year)	TOTAL Region C Portion (80% of total yield)	Tarrant Regional WD	North Texas Municipal WD	Upper Trinity Regional WD	Unassigned Region C Portion
Wright Patman pool raise (available in 2050)*	127,120	72,670	45,367	9,083	0
Marvin Nichols (313.5) (available in 2070)*	375,240	207,330	129,433	25,917	12,560
Total	502,360	280,000	174,800	35,000	12,560
* NOTE: The division between supplies shown in this table is for the purpose of this regional plan and DB17 only and is not intended to be used as a constraint in permitting or operation of these supply reservoirs.					

SUPPLY DEVELOPMENT

The amount of supply available from Marvin Nichols Reservoir and Wright Patman was developed using the Sulphur Basin Water Availability Model, assuming that Lake Ralph Hall was in place and senior to Sulphur Basin Supplies, and accounting for environmental flows).

ENVIRONMENTAL CONSIDERATIONS

Both reallocated storage and new storage would permanently inundate agricultural, silvicultural, and natural resources. Based on a "desktop" analysis using remotely-sensed data, approximately 32,601 acres potentially subject to Section 404 jurisdiction would be affected within the footprint of the combined project. The unit costs shown above reflect the yield reduction predicted after application of anticipated environmental flow requirements, imposed to mitigate downstream impacts.

As with most major reservoir projects, the Sulphur Basin Supplies strategy will have significant environmental impacts. At the conservation pool elevations mentioned above, the Marvin Nichols component would inundate an estimated 41,722 acres, while the pool raise at Wright Patman Lake would inundate an additional 9,459 acres over and above the current "average" conservation pool elevation. Of that additional acreage, the Corps of Engineers has estimated that 7,126 acres are not currently owned by the U.S. Government in a fee title interest and would require purchase. Studies are currently underway to optimize the combination in terms of cost, environmental, and social impacts, and the final strategy may differ somewhat in terms of specific elevation at either or both components of the project.

The twenty-six threatened and endangered species potentially impacted by this WMS, based on the species listed in the county(ies) in which this WMS is located, are: American peregrine falcon ST, Bachman's sparrow ST, bald eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, wood stork ST, blackside darter ST, bluehead shiner ST, creek chubsucker ST, paddlefish ST, shovelnose sturgeon ST, American burying beetle FE, black bear ST, Louisiana black bear FT and ST, Rafinesque's big-eared bat ST, red wolf FE and SE, Louisiana pigtoe ST, Ouachita rock pocketbook FE, southern hickorynut ST, Texas pigtoe ST, alligator snapping turtle ST, northern scarlet snake ST, Texas horned lizard ST, and timber rattlesnake ST.

PERMITTING AND DEVELOPMENT

Reallocation at Wright Patman Lake on the scale envisioned in this strategy would require approval of the U.S. Congress. The new storage impoundment would require an individual Section 404 permit, as would the transmission system. A new State water right and inter-basin transfer approval would be required from TCEQ in order to implement the strategy.

The 1984 U.S. Fish and Wildlife Service Bottomland Hardwood Preservation Program classified some of the land that would be flooded as a Priority 1 bottomland hardwood site, which is "excellent quality bottomlands of high value to key waterfowl species." The proposed location/size of the Marvin Nichols Reservoir will reduce but not eliminate the impact on bottomland hardwoods compared to the location originally proposed. Permitting the project and developing appropriate mitigation for the unavoidable impacts will require years, and it is important that water suppliers start that process well in advance of the need for water from the project. Development of the Sulphur Basin Supplies will require interbasin transfer permits to bring the water from the Sulphur River Basin to the Trinity River Basin. The project will include a major water transmission system to bring the new supply to the Metroplex.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the Sulphur Basin Supplies are included in Appendix Q.

The project will make a substantial water supply available to the Metroplex, and the unit cost is less than that of most other major water management strategies. Cost shown are for the specific alternative identified above and are likely to change somewhat as the project is optimized. The estimated capital cost includes the storage component, which includes the embankment and spillway at the Marvin

Nichols site, updated storage costs and required dam safety modifications at Wright Patman Lake, as well as conflicts, real estate, mitigation, and permitting at both sites. The remaining first costs account for the extensive transmission system required for this strategy.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Sulphur Basin Supply strategy was evaluated across a number of different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Sulphur River Basin strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

This strategy was considered for Dallas Water Utilities, Tarrant Regional Water District, City of Irving, Upper Trinity Regional Water District, North Texas Municipal Water District, and various Region D WUG's.

REFERENCES

Sulphur River Basin Feasibility Study, Cost Rollup Report, Sulphur Basin Group, December 2014

Sulphur River Basin Comparative Assessment – Environmental Evaluation Interim Report, FNI, June 2013

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	Toledo Bend Reservoir
WMS Type:	Existing Surface Water Source
Potential Supply Quantity (Rounded):	Varies Recommended WMS for NTWMD of 100,000 ac-ft/yr
Implementation Decade:	Varies (2060 for NTWMD)
Strategy Capital Cost:	$Varies (Sept. 2013) Recommended WMS for NTWMD $1,248,461,000 (Q-57)
Unit Water Cost (Rounded):	$Varies per 1,000 gallons (during loan period) Recommended WMS for NTWMD $4.07 per 1,000 gallons $Varies per 1,000 gallons (after loan period) Recommended WMS for NTWMD $0.95 per 1,000 gallons

STRATEGY DESCRIPTION

Toledo Bend Reservoir is an existing impoundment located in the Sabine River Basin on the border between Texas and Louisiana. It was built in the 1960s by the Sabine River Authority of Texas (SRA) and the Sabine River Authority of Louisiana. The yield of the project is split equally between the two states, and Texas' share of the yield is slightly over 1,000,000 acre-feet per year. The SRA holds a Texas water right to divert 750,000 acre-feet per year from Toledo Bend and is seeking the right to divert an additional 293,000 acre-feet per year.

The Metroplex water suppliers have been investigating the possibility of developing substantial water supplies from Toledo Bend Reservoir, with up to 400,000 acre-feet per year delivered to Region C. (Toledo Bend Reservoir is located in Region I, the East Texas Region.) The development of this supply will require an agreement among the SRA and Metroplex suppliers, an interbasin transfer permit from the Sabine River Basin to the Trinity River Basin, and development of water transmission facilities. Because Toledo Bend Reservoir is so far from Region C (about 200 miles), this is a relatively expensive source of supply for the Region. However, it does offer a substantial water supply, and environmental impacts will be limited because it is an existing source.

STRATEGY ANALYSES

Supply from Toledo Bend is identified as a recommended and alternative strategy for North Texas Municipal Water District (NTMWD) and as an alternative strategy for Dallas, Tarrant Regional Water District (TRWD), and Upper Trinity Regional Water District (UTRWD). The recommended strategy for the North Texas Municipal Water District is for 100,000 acre-feet per year. The entity hopes to connect to Toledo Bend Reservoir by 2070. The alternative strategies for Dallas, Tarrant Regional Water District, North Texas Municipal Water District, and the Upper Trinity Regional Water District is to develop a total supply of approximately 548,660 acre-feet per year.

This strategy would require a contract between Metroplex water providers and SRA for the potential supply quantity. The purchase rate for the raw water will be determined based on the negotiations between SRA and the Metroplex providers. Because of the prohibitive distance and terrain involved in transferring water from Toledo Bend, this strategy is expensive with respect to the capital investment and annual maintenance.

SUPPLY DEVELOPMENT

SRA is currently authorized for 750,000 acre-feet per year of supplies from Toledo Bend Reservoir and 147,000 acre-feet per year from Sabine run-of-river supplies. There are some current customers using these sources of supply but most of this supply amount is available as a surplus for other potential customers. The supply is already developed by SRA and this strategy would require a voluntary transfer between SRA in Region I and Region C water providers. The amount required for the recommended strategy can be met with the current authorizations available from Toledo Bend. However, if then entire potential quantity proposed for the alternative water management strategies is sought, then SRA will have to secure the water right amendment to access the additional 293,300 acre-feet per year supplies from Toledo Bend Reservoir. The application of this water right permit is already administratively complete and SRA is working with TCEQ to secure this permit.

ENVIRONMENTAL CONSIDERATIONS

There are minimal environmental issues associated with the supplies currently available at SRA's Toledo Bend Reservoir location and the run-of-river diversion points. However, SRA's permit application for additional supplies from Toledo Bend may potentially be subject to environmental flow requirements established for the Sabine basin, when the permit application is considered for approval.

The fortyone threatened and endangered species potentially impacted by the WMS, based on the species listed in the county(ies) in which this WMS is located, are: Swallow-tailed kite ST, American peregrine falcon ST, Bachman's sparrow ST, blad eagle ST, interior least tern FE and SE, peregrine falcon ST, piping plover FT and ST, Sprague's pipit C, red-cockaded woodpecker FE and SE, white-faced ibis ST, whooping crane FE and SE, black-capped vireo FE and SE, sharpnose shinerFE, smalleye shiner FE, gray wolf FE and SE, black bear ST, Louisiana black bear FT and ST, red wolf FE and SE, alligator snapping turtle ST, Texas horned lizard ST, timber rattlesnake ST, earth fruit FT and ST, creek chubsucker ST, paddlefish ST, Rafinesque's big eared bat ST, Louisiana pine snake C and ST, northern scarlet snake ST, Neches River rose mallow FT, Brazos water snake ST, Texas golden gladecress FE, white bladderpod FE and SE, Texas fawnsfoot C and ST, Louisiana pigtoe ST, sandbank pocketbook ST, southern hickorynut ST, Texas heelsplitter ST, Texas pigtoe ST and triangle pigtoe ST.

PERMITTING AND DEVELOPMENT

The Toledo Bend Reservoir strategy will require an interbasin transfer permit (IBT) and agreements with multiple users.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the recommended and alternative strategies for Toledo Bend supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the Toledo Bend Reservoir strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Toledo Bend Reservoir strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

Currently this source of supply can be used to meet local needs in East Texas Regional Water Planning Area (ETRWPA) region along with the needs of other regions such as Region C and Region H. Toledo Bend Reservoir is a reliable source of supply for WUGs in all the regions and the quality of the water is superior. However, the unit cost could be prohibitive for WUGs located in other regions because of the distance from the source location.

REFERENCES

Brown and Root, Inc., *Yield Study Toledo Bend Reservoir*, prepared for the Sabine River Authority of Texas and the Sabine River Authority of Louisiana, Houston, July 1991.

Freese and Nichols, Inc., Alan Plummer Associates, Inc., Chiang, Patel & Yerby, Inc., and Cooksey Communications, Inc.: *2011 Region C Water Plan,* prepared for the Region C Water Planning Group, Fort Worth, January 2011

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
TECHNICAL MEMORANDUM

WMS Name:	TRWD Wetlands
WMS Type:	Reuse
Potential Supply Quantity (Rounded):	88,059 ac-ft/yr (79 mgd)
Implementation Decade:	2030
Strategy Capital Cost:	$139,078,000 (Sept. 2013) (Q-49)
Unit Water Cost (Rounded):	$0.56 per 1,000 gallons (during loan period) $0.15 per 1,000 gallons (after loan period)

STRATEGY DESCRIPTION

The Tarrant Regional Water District has water rights allowing the diversion of return flows of treated wastewater from the Trinity River. TRWD has already developed a reuse project at Richland-Chambers Reservoir, and a portion of the supply from this project is included in the currently available supply. The water is pumped from the Trinity River into the constructed George W. Shannon Wetlands for treatment and then pumped into Richland-Chambers Reservoir. TRWD will be developing a similar reuse project at Cedar Creek Reservoir in the near future. In November 2014, TRWD's certificates of adjudication for these reuse projects were amended to increase the total permitted reuse diversion to 188,524 acre-feet per year, including 100,465 acre-feet per year at Richland-Chambers and 88,059 acre- feet per year at Cedar Creek Reservoir. The available supply for the Cedar Creek reuse project as calculated by Region C is 88,059 acre-feet per year by 2070.

This is a relatively inexpensive source of new supply for the Tarrant Regional Water District, and the environmental impacts are low. It is a recommended strategy for the Tarrant Regional Water District

SUPPLY DEVELOPMENT

Supply availability was evaluated by the Region C Consultants and summarized in the 2015 Draft Memorandum "Region C Reuse Calculations".

ENVIRONMENTAL CONSIDERATIONS

There are no significant environmental considerations associated with this strategy. The quality of the effluent and the impact on the wetlands will be evaluated and the wetlands will be designed to treat the return flows appropriately.

There are no federally listed threatened and endangered species at the proposed Cedar Creek wetlands site. The state listed species that could potentially be impacted are the Texas Pigtoe, Sandbank Pocketbook, Southern Hickorynut, Louisiana Pigtoe, and Texas Heelsplitter. A survey would need to be conducted to confirm the presence of any of these species at the site.

PERMITTING AND DEVELOPMENT

Tarrant Regional Water District has already secured permits to develop the wetlands on Cedar Creek and Richland-Chambers.

COST ANALYSIS

For the Region C cost analysis, planning level opinion of costs have been developed using the TWDB's costing tool, except where more detailed cost analysis has been provided by the WUG or WWP. In accordance with TWDB Guidance, the analysis of costs for recommended and alternative WMSs includes capital costs, debt service, and annual operating and maintenance expenses over the planning horizon.

Costs include expenses associated with infrastructure needed to convey water from sources and treat water for end user requirements. Capital costs consist of construction, engineering, contingencies, financial, legal, administration, environmental, permitting and mitigation, land acquisition and easements, and interest on loans.

The annual costs for operation and maintenance infrastructure are generally based on percentages of estimated construction cost of the infrastructure. In addition, purchased water costs, power costs are included. It should be noted that the purchase water costs are planning level estimates and actual purchase costs will be finalized based on negotiations between the suppliers.

Cost estimates for the TRWD Cedar Creek Wetlands supplies are included in Appendix Q.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the TRWD Wetlands strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The TRWD Wetlands strategy was evaluated on a basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the proximity of the project to identified needs, the volume of the supply made available, the quality of the water provided, and the unit cost of the strategy as well as other factors that may relate to the suitability of the strategy to the WUGs served.

REGION C WATER MANAGEMENT STRATEGY ANALYSIS
WATER TREATMENT PLANTS

WMS Name:	Water Treatment Plants
WMS Type:	Various
Potential Supply Quantity (Rounded):	0 ac-ft/yr. This strategy does not create new supply, but it is necessary to utilize the supplies created by other strategies.
Implementation Decade:	Multiple
Strategy Capital Cost:	See tables Q-12 and Q-13
Unit Water Cost (Rounded):	See tables Q-12 and Q-13

STRATEGY DESCRIPTION

This strategy is to develop required water treatment capacity to use raw water supplies developed as part of other strategies. In some cases, this strategy involves the construction of a new facility and in other instances it is an expansion of existing facilities.

SUPPLY DEVELOPMENT

This strategy is to develop required water treatment capacity to use raw water supplies developed as part of other strategies. While this strategy does not explicitly create supply, it is necessary to utilize the supplies as drinking water.

ENVIRONMENTAL CONSIDERATIONS

The construction of the treatment plant may temporarily impact the environment during construction. Additional study and mitigation may be required before construction of the water treatment plant. The plant may be able to be located to avoid environmentally sensitive areas.

AGRICULTURAL AND RURAL IMPACTS

No agricultural and rural impacts are expected from the construction of the treatment facilities.

PERMITTING AND DEVELOPMENT

Wastewater discharge permits may be necessary for new facilities. Further evaluation and study will be needed to determine the impact of discharges on receiving water bodies. This will be performed as part of the permitting process.

COST ANALYSIS

Cost estimates were prepared using the TWDB Costing Tool.

WATER MANAGEMENT STRATEGY EVALUATION

Based on the analysis provided above, the water from water treatment plants strategy was evaluated across eleven different criteria for the purpose of quick comparison against alternative strategies that may be incorporated into the Regional Water Plan. The evaluation results can be found in Tables P.3 and P.4.

WATER USER GROUP APPLICATION

The Water Treatment Plant strategy was evaluated on the basis of several criteria to determine the Water User Groups (WUGs) to which it may be applied. Consideration was given to the quality of the water from another strategy to the WUGs served.

ENTITIES WITH WATER TREAMENT PLANT STRATEGIES

See Tables Q-12 and Q-13.