

TO: Region F Water Planning Group

CC: File, Texas Water Development Board

FROM: Simone Kiel

SUBJECT: Region F Preliminary Draft Need Analysis

DATE: September 13, 2013

PROJECT: SAN11472

NEEDS SUMMARY

Freese and Nichols has conducted a preliminary assessment of potential water needs for Region F. This initial assessment will be refined over the next several months through coordination with the wholesale water providers and groundwater conservation districts. It is likely that some water supply allocations and water needs will change for some water user groups; however, these changes are not expected to be significantly different from the findings of this initial assessment.

Tables showing the projected water needs for Region F are attached. Table 1 shows the projected water need by major use type: municipal, manufacturing, irrigation, livestock, mining and steam electric power. Table 1 also shows the difference in the projected needs from the 2011 Region F water plan. Table 2 is a summary of the projected water needs by county. Table 3 shows the projected water needs by water user group.

As shown on Table 1, the projected water needs for Region F range from about 212,000 af/y in 2020 to 254,000 by 2070. This represents an increase of about 11,000 to 22,000 af/y in projected water needs for the region from the 2011 Region F Water Plan. Some of this increase in need is associated with increased demands. Some is associated with changes in groundwater supplies. The surface water supplies generally stayed the same for the allocations.

MAJOR FINDINGS:

1. MAGs have both limited and expanded the current supplies to water users.
 - a. The counties with significant limitations due to MAGs include: Andrews, Concho, Howard, Martin, McCulloch, and Scurry. Supplies to users were limited and projected needs are higher. Aquifers with the greatest limitations include the Hickory, Ogallala and Dockum.
 - b. The counties with increased groundwater supplies that resulted in reduced needs include Glasscock, Reagan, and Upton.
 - c. There are several areas that were deemed non-relevant by the GMAs but DFC-compatible MAGs were not developed by the TWDB. This includes the Edwards-Trinity

Aquifer in Andrews, Martin and Howard counties and the Hickory Aquifer in Concho County. While little water is used from Edwards-Trinity Aquifer in Andrews and Martin counties, between 2,000 to 4,000 af/y have been reportedly used from this source in Howard County. We are in the process of developing estimates of reliable supplies for these areas, which will be incorporated into this needs analysis at a later date.

2. Municipal water needs are projected to exceed 110,000 af/y by 2070. This represents an additional 50,000 af/y of water needs for municipal use from the 2011 Region F plan. This additional need in conjunction with expected lower supplies from subordination will result in significant new strategies for municipal water users.
3. While there have been several major new municipal projects implemented, the impact on needs is not significant: San Angelo's Hickory well field is limited by the MAG to less than 4,000 af/y; CRMWD's Ward County expansion does not provide new supplies but maintains existing supply levels; Midland's T-Bar supply provides additional water in 2020 but cannot meet the projected need after the expiration of the City's contract with CRMWD.

A summary of the major differences between the 2011 Region F Water Plan and DRAFT projected needs for 2016 Region F Plan is discussed below.

Comparing the last plan to the draft findings, we find that with the new allocations:

- Irrigation demands increased by over 20,000 af/y on a regional basis but the need decreased by about 30,000 af/y. This represents a difference of about 50,000 af/y.
 - Greater groundwater availability in some counties: Glasscock Co.;
 - Shifts in basin split of groundwater supplies, allowing more water available for irrigation use: Upton Co.;
 - Lower demands in some counties that previously had large shortages: Tom Green and Ward Co.
- Municipal/manufacturing needs increased between 36,000 and 46,000 af/y. The estimated need for municipalities is over 110,000 af/y by 2070.
 - Constraints by the MAGs resulted in increased needs and/or new needs:
 - City of Andrews' need is estimated at nearly 7,500 af/y by 2070. In the last plan, the need was less than 1,000 af/y. Andrews' demands are also higher. The demands for water from the Ogallala in Andrews County exceeded supplies by 70% by 2060.
 - New needs for municipal users in Concho and McCulloch Counties. The Hickory Aquifer has a MAG value of 1 af/y for Concho Co. In McCulloch County, the demand for water from the Hickory exceeded the supplies by about 40%.
 - The needs for the larger municipalities (Big Spring, Odessa, Midland and San Angelo) remained about the same as from the last plan. This is because most of the water currently supplied to these entities is from CRMWD's sources, which have not changed due to the MAGs or WAM. The CRMWD Big Spring reuse project is now online, but that supply is less than 2,000 af/y. However, the expected supplies from subordination will change. On a regional basis, the subordination supplies are expected to be about 40,000 af/y less than planned for in the 2011 Region F plan. For CRMWD's sources, the reduction in safe yield is over 30,000 af/y. This means that additional new strategies will be needed for CRMWD and other municipalities.

- There is an increase in mining needs this round of planning, which is primarily due to the increased demands. More information is needed on current supplies for mining. Generally, supplies were held at historical use levels to identify mining needs that will need to be met through a new water management strategy.

Table 1
 DRAFT Projected Water Needs for Region F

Needs by Type	2016 REGION F PLAN						DIFFERENCES FROM 2011 REGION F PLAN				
	N2020	N2030	N2040	N2050	N2060	N2070	N2020	N2030	N2040	N2050	N2060
Municipal	70,655	78,983	83,306	90,159	99,805	110,307	39,380	42,883	39,600	43,648	50,186
Manufacturing	687	933	1,107	1,300	1,526	1,783	-3,451	-2,814	-3,296	-3,407	-3,626
Irrigation	122,887	120,873	117,740	116,193	113,981	111,763	-32,068	-32,057	-31,732	-30,802	-30,295
Livestock	1,375	1,405	1,389	1,415	1,437	1,431	1,375	1,405	1,389	1,415	1,437
Mining	6,309	5,963	4,714	3,617	2,679	1,955	5,649	5,934	4,571	3,385	2,304
Steam Electric Power	10,262	12,467	15,105	18,367	-2,452	26,869	422	1,087	1,811	2,020	1,879
	212,175	220,624	223,361	231,051	241,880	254,108	11,307	16,438	12,343	16,259	21,885

Note:

1. For the comparison to the 2011 Region F plan, a positive number indicates the need for the 2016 plan is greater than the need in the 2011 plan. A negative number indicates the new needs are less than the projected need in the 2011 plan.
2. Some manufacturing needs for the 2016 plan may be incorporated into the municipal needs. This may be the case for cities that supply manufacturing water use but are not wholesale water providers. Any manufacturing shortages associated with the Cities of Odessa and San Angelo are shown as manufacturing shortages. Both of these cities are wholesale water providers.

Table 2
DRAFT Projected Water Needs by County – 2016 Region F Water Plan

	N2020	N2030	N2040	N2050	N2060	N2070
Andrews	33,119	34,653	35,686	37,231	39,963	40,522
Borden	3,315	3,308	3,303	3,296	3,292	3,289
Brown	554	527	498	466	430	395
Coke	875	858	857	886	944	981
Coleman	2,062	2,046	2,007	1,987	1,974	1,966
Concho	5,692	5,643	5,544	5,449	5,365	5,288
Crane	0	0	0	0	0	0
Crockett	1,659	1,770	1,188	609	134	162
Ector	9,575	7,533	9,933	15,331	21,501	28,402
Glasscock	2,172	1,850	1,133	428	0	0
Howard	8,016	6,141	6,739	7,586	8,418	9,212
Irion	2,116	2,281	1,347	411	0	0
Kimble	2,494	2,428	2,358	2,289	2,247	2,215
Loving	0	0	0	0	0	0
Martin	29,557	28,467	26,242	25,654	24,418	23,583
Mason	463	381	148	8	0	0
McCulloch	5,715	4,971	4,539	4,363	4,246	4,160
Menard	572	549	424	298	188	186
Midland	1,050	11,461	16,062	19,585	23,033	26,601
Mitchell	6,459	6,367	6,027	5,655	5,303	5,069
Pecos	331	709	713	502	313	275
Reagan	0	0	0	0	0	0
Reeves	38,383	38,726	37,869	36,634	35,436	34,424
Runnels	2,126	2,013	1,968	1,947	1,929	1,931
Schleicher	461	572	402	232	81	0
Scurry	7,605	6,938	6,937	6,927	6,937	6,999
Sterling	1,149	1,281	1,099	768	476	308
Sutton	0	0	0	0	0	0
Tom Green	42,710	44,653	45,687	46,992	48,463	50,193
Upton	1,537	934	173	0	0	0
Ward	1,721	2,527	3,181	3,935	4,906	5,743
Winkler	0	104	190	282	357	421
TOTAL	211,488	219,691	222,254	229,751	240,354	252,325

Table 3
DRAFT Projected Needs by Water User Group – 2016 Region F Water Plan

WUG Name	County	N2020	N2030	N2040	N2050	N2060	N2070
Andrews	Andrews	1,634	2,379	3,182	4,445	6,202	7,490
County - Other	Andrews	209	263	306	364	461	493
Irrigation	Andrews	28,394	29,212	29,598	30,185	31,512	31,197
Livestock	Andrews	100	118	129	143	168	168
Mining	Andrews	2,782	2,681	2,471	2,094	1,620	1,174
Manufacturing	Andrews	0	0	0	0	0	0
Steam Electric Power	Andrews	0	0	0	0	0	0
COUNTY-OTHER	Borden	0	0	0	0	0	0
Irrigation	Borden	3,315	3,308	3,303	3,296	3,292	3,289
Livestock	Borden	0	0	0	0	0	0
Mining	Borden	0	0	0	0	0	0
Manufacturing	Borden	0	0	0	0	0	0
Steam Electric Power	Borden	0	0	0	0	0	0
Brown County WCID #1	Brown	0	0	0	0	0	0
Bangs	Brown	0	0	0	0	0	0
Brookesmith SUD	Brown	0	0	0	0	0	0
Santa Anna	Brown	0	0	0	0	0	0
Coleman County SUD	Brown	0	0	0	0	0	0
Brownwood	Brown	0	0	0	0	0	0
County-Other	Brown	0	0	0	0	0	0
Early	Brown	0	0	0	0	0	0
Zephyr WSC	Brown	0	0	0	0	0	0
Irrigation	Brown	554	527	498	466	430	395
Livestock	Brown	0	0	0	0	0	0
Mining	Brown	0	0	0	0	0	0
Manufacturing	Brown	0	0	0	0	0	0
Steam Electric Power	Brown	0	0	0	0	0	0
Bronte	Coke	123	123	123	122	122	122
Robert Lee	Coke	53	0	0	20	48	74
County - Other	Coke	0	0	0	0	0	0
Irrigation	Coke	172	170	169	169	169	169
Livestock	Coke	0	0	0	0	0	0
Manufacturing	Coke	0	0	0	0	0	0
Mining	Coke	280	276	226	174	128	88
Steam Electric Power	Coke	247	289	339	401	477	528
Coleman	Coleman	789	781	763	761	759	759

Table 3 (Continued)

WUG Name	County	N2020	N2030	N2040	N2050	N2060	N2070
COLEMAN COUNTY SUD	Coleman	394	388	377	370	369	369
County-Other	Coleman	24	23	23	23	22	22
Manufacturing	Coleman	9	9	9	9	9	9
Irrigation	Coleman	739	739	739	739	739	739
Livestock	Coleman	0	0	0	0	0	0
Mining	Coleman	107	106	96	85	76	68
Steam Electric Power	Coleman	0	0	0	0	0	0
Eden	Concho	459	457	449	445	444	444
County - Other	Concho	0	0	0	0	0	0
Irrigation	Concho	5,021	4,980	4,941	4,905	4,869	4,833
Livestock	Concho	0	0	0	0	0	0
Manufacturing	Concho	0	0	0	0	0	0
Mining	Concho	212	206	154	99	52	11
Steam Electric Power	Concho	0	0	0	0	0	0
Crane	Crane	0	0	0	0	0	0
Irrigation	Crane	0	0	0	0	0	0
Livestock	Crane	0	0	0	0	0	0
Manufacturing	Crane	0	0	0	0	0	0
Mining	Crane	0	0	0	0	0	0
Steam Electric Power	Crane	0	0	0	0	0	0
Crockett WCID #1	Crockett	0	0	0	0	0	0
County-Other	Crockett	0	0	0	0	0	0
Irrigation	Crockett	0	0	0	0	0	0
Livestock	Crockett	0	0	0	0	0	0
Manufacturing	Crockett	0	0	0	0	0	0
Mining	Crockett	1,659	1,770	1,188	609	134	0
Steam Electric Power	Crockett	0	0	0	0	0	162
Odessa	Ector	4,171	0	313	3,471	6,797	10,422
County-Other	Ector	0	0	0	0	0	0
Irrigation	Ector	0	0	0	0	0	0
Livestock	Ector	0	0	0	0	0	0
Manufacturing	Ector	60	0	0	30	72	109
Mining	Ector	1,008	1,454	1,504	1,225	923	727
Steam Electric Power	Ector	4,336	6,079	8,116	10,605	13,709	17,144
County-Other	Glasscock	0	0	0	0	0	0
Irrigation	Glasscock	0	0	0	0	0	0
Livestock	Glasscock	0	0	0	0	0	0
Manufacturing	Glasscock	0	0	0	0	0	0
Mining	Glasscock	2,172	1,850	1,133	428	0	0

Table 3 (Continued)

WUG Name	County	N2020	N2030	N2040	N2050	N2060	N2070
Steam Electric Power	Glasscock	0	0	0	0	0	0
Big Spring	Howard	1,760	0	471	1,191	1,834	2,450
County-Other	Howard	538	574	569	567	567	567
Irrigation	Howard	4,423	4,599	4,521	4,444	4,388	4,312
Livestock	Howard	112	127	127	127	128	128
Manufacturing	Howard	1,183	841	1,051	1,257	1,501	1,755
Mining	Howard	0	0	0	0	0	0
Steam Electric Power	Howard	0	0	0	0	0	0
Mertzon	Irion	0	0	0	0	0	0
County-Other	Irion	0	0	0	0	0	0
Irrigation	Irion	0	0	0	0	0	0
Livestock	Irion	0	0	0	0	0	0
Manufacturing	Irion	0	0	0	0	0	0
Mining	Irion	2,116	2,281	1,347	411	0	0
Steam Electric Power	Irion	0	0	0	0	0	0
Junction	Kimble	640	632	622	617	616	616
County-Other	Kimble	0	0	0	0	0	0
Irrigation	Kimble	1,155	1,046	934	822	717	616
Livestock	Kimble	0	0	0	0	0	0
Manufacturing	Kimble	699	750	802	850	914	983
Mining	Kimble	0	0	0	0	0	0
Steam Electric Power	Kimble	0	0	0	0	0	0
County-Other	Loving	0	0	0	0	0	0
Irrigation	Loving	0	0	0	0	0	0
Livestock	Loving	0	0	0	0	0	0
Manufacturing	Loving	0	0	0	0	0	0
Mining	Loving	0	0	0	0	0	0
Steam Electric Power	Loving	0	0	0	0	0	0
Stanton	Martin	529	569	595	625	648	666
County-Other	Martin	213	224	219	236	242	247
Irrigation	Martin	25,340	24,738	23,307	23,441	22,855	22,259
Livestock	Martin	402	399	376	390	386	382
Manufacturing	Martin	26	26	25	26	28	29
Mining	Martin	3,047	2,511	1,720	936	259	0
Steam Electric Power	Martin	0	0	0	0	0	0
Mason	Mason	0	0	0	0	0	0
County-Other	Mason	0	0	0	0	0	0
Irrigation	Mason	0	0	0	0	0	0

Table 3 (Continued)

WUG Name	County	N2020	N2030	N2040	N2050	N2060	N2070
Livestock	Mason	0	0	0	0	0	0
Manufacturing	Mason	0	0	0	0	0	0
Mining	Mason	463	381	148	8	0	0
Steam Electric Power	Mason	0	0	0	0	0	0
Brady	McCulloch	814	846	814	816	815	815
Richland SUD	McCulloch	76	77	74	73	72	72
Millersview-Doole WSC	McCulloch	181	0	58	53	75	95
County-Other	McCulloch	37	39	37	37	37	37
Irrigation	McCulloch	2,181	2,142	2,068	2,007	1,956	1,909
Livestock	McCulloch	454	454	451	449	449	448
Manufacturing	McCulloch	215	233	243	252	272	293
Mining	McCulloch	1,757	1,180	794	676	570	491
Steam Electric Power	McCulloch	0	0	0	0	0	0
Menard	Menard	45	37	31	30	30	30
County-Other	Menard	0	0	0	0	0	0
Irrigation	Menard	0	0	0	0	0	0
Livestock	Menard	156	156	156	156	156	156
Manufacturing	Menard	0	0	0	0	0	0
Mining	Menard	371	356	237	112	2	0
Steam Electric Power	Menard	0	0	0	0	0	0
Midland	Midland	0	10,886	16,062	19,585	23,033	26,601
County-Other	Midland	0	0	0	0	0	0
Irrigation	Midland	0	0	0	0	0	0
Livestock	Midland	0	0	0	0	0	0
Manufacturing	Midland	0	0	0	0	0	0
Mining	Midland	1,050	575	0	0	0	0
Steam Electric Power	Midland	0	0	0	0	0	0
Colorado City	Mitchell	0	0	0	0	0	0
Loraine	Mitchell	0	0	0	0	0	0
County-Other	Mitchell	0	0	0	0	0	0
Irrigation	Mitchell	1,358	1,299	1,243	1,187	1,131	1,075
Livestock	Mitchell	0	0	0	0	0	0
Manufacturing	Mitchell	0	0	0	0	0	0
Mining	Mitchell	254	398	291	151	32	0
Steam Electric Power	Mitchell	4,847	4,670	4,493	4,317	4,140	3,994
Fort Stockton	Pecos	0	0	0	0	0	86
Iraan	Pecos	0	0	0	0	0	24
Pecos County WCID #1	Pecos	0	0	0	0	0	0
County-Other	Pecos	0	0	0	0	0	0

Table 3 (Continued)

WUG Name	County	N2020	N2030	N2040	N2050	N2060	N2070
Irrigation	Pecos	0	0	0	0	0	0
Livestock	Pecos	0	0	0	0	0	0
Manufacturing	Pecos	0	0	0	0	0	0
Mining	Pecos	331	709	713	502	313	165
Steam Electric Power	Pecos	0	0	0	0	0	0
Big Lake	Reagan	0	0	0	0	0	0
County-Other	Reagan	0	0	0	0	0	0
Irrigation	Reagan	0	0	0	0	0	0
Livestock	Reagan	0	0	0	0	0	0
Manufacturing	Reagan	0	0	0	0	0	0
Mining	Reagan	0	0	0	0	0	0
Steam Electric Power	Reagan	0	0	0	0	0	0
Pecos	Reeves	0	0	0	0	0	0
Madera Valley WSC	Reeves	0	0	0	0	0	0
County-Other	Reeves	156	178	198	212	223	232
Irrigation	Reeves	38,074	37,294	36,512	35,732	34,959	34,192
Livestock	Reeves	0	0	0	0	0	0
Manufacturing	Reeves	0	0	0	0	0	0
Mining	Reeves	153	1,254	1,159	690	254	0
Steam Electric Power	Reeves	0	0	0	0	0	0
Ballinger	Runnels	495	398	415	445	473	500
Miles	Runnels	113	127	122	120	119	119
Winters	Runnels	355	346	336	335	334	334
County-Other	Runnels	0	0	0	0	0	0
Irrigation	Runnels	1,068	1,050	1,032	1,014	996	978
Livestock	Runnels	0	0	0	0	0	0
Manufacturing	Runnels	0	0	0	0	0	0
Mining	Runnels	95	92	63	33	7	0
Steam Electric Power	Runnels	0	0	0	0	0	0
Eldorado	Schleicher	0	0	0	0	0	0
County-Other	Schleicher	0	0	0	0	0	0
Irrigation	Schleicher	0	0	0	0	0	0
Livestock	Schleicher	0	0	0	0	0	0
Manufacturing	Schleicher	0	0	0	0	0	0
Mining	Schleicher	461	572	402	232	81	0
Steam Electric Power	Schleicher	0	0	0	0	0	0
Snyder	Scurry	574	0	169	454	740	1,035
County-Other	Scurry	378	352	398	459	525	592
Irrigation	Scurry	6,321	6,078	5,835	5,599	5,373	5,153

Table 3 (Continued)

WUG Name	County	N2020	N2030	N2040	N2050	N2060	N2070
Livestock	Scurry	95	95	94	94	94	93
Manufacturing	Scurry	2	2	2	2	2	2
Mining	Scurry	235	411	439	319	203	124
Steam Electric Power	Scurry	0	0	0	0	0	0
Sonora	Sterling	0	0	0	0	0	0
County-Other	Sterling	0	0	0	0	0	0
Irrigation	Sterling	433	392	351	310	270	232
Livestock	Sterling	56	56	56	56	56	56
Manufacturing	Sterling	0	0	0	0	0	0
Mining	Sterling	660	833	692	402	150	20
Steam Electric	Sterling	0	0	0	0	0	0
Sonora	Sutton	0	0	0	0	0	0
County-Other	Sutton	0	0	0	0	0	0
Irrigation	Sutton	0	0	0	0	0	0
Livestock	Sutton	0	0	0	0	0	0
Manufacturing	Sutton	0	0	0	0	0	0
Mining	Sutton	0	0	0	0	0	0
Steam Electric	Sutton	0	0	0	0	0	0
San Angelo	Tom Green	5,286	7,150	8,132	9,421	10,815	12,438
Concho Rural WSC	Tom Green	0	0	0	0	0	0
County-Other	Tom Green	213	251	319	381	439	495
Irrigation	Tom Green	36,048	35,819	35,590	35,358	35,129	34,901
Livestock	Tom Green	0	0	0	0	0	0
Manufacturing	Tom Green	687	933	1,107	1,300	1,526	1,783
Mining	Tom Green	476	500	539	532	554	576
Steam Electric	Tom Green	0	0	0	0	0	0
McCamey	Upton	0	0	0	0	0	0
Rankin	Upton	0	0	0	0	0	0
County-Other	Upton	0	0	0	0	0	0
Irrigation	Upton	0	0	0	0	0	0
Livestock	Upton	0	0	0	0	0	0

Table 3 (Continued)

WUG Name	County	N2020	N2030	N2040	N2050	N2060	N2070
Manufacturing	Upton	0	0	0	0	0	0
Mining	Upton	1,537	934	173	0	0	0
Steam Electric	Upton	0	0	0	0	0	0
Monahans	Ward	0	0	0	0	0	0
County-Other	Ward	0	0	0	0	0	0
Irrigation	Ward	0	0	0	0	0	0
Livestock	Ward	0	0	0	0	0	0
Manufacturing	Ward	0	0	0	0	0	0
Mining	Ward	642	809	685	490	303	174
Steam Electric	Ward	1,079	1,718	2,496	3,445	4,603	5,569
Kermit	Winkler	0	0	0	0	0	0
Wink	Winkler	0	0	0	0	0	0
County Other	Winkler	0	104	190	282	357	421
Irrigation	Winkler	0	0	0	0	0	0
Livestock	Winkler	0	0	0	0	0	0
Mining	Winkler	0	0	0	0	0	0
Steam Electric	Winkler	0	0	0	0	0	0