MEMORANDUM

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TO: Region F Water Planning Group

CC: File

FROM: Lissa Gregg, P.E., Jordan Skipwith, P.E., Kevin Perez

SUBJECT: Region F DRAFT Population and Municipal Demand Revision Requests

DATE: 7/14/2023

PROJECT: CMD21867

In January 2023, the 2026 draft municipal population and water demand projections were released by the Texas Water Development Board (TWDB) for Regional Water Planning Groups for review and comment. Freese and Nichols Inc (FNI) developed a survey to seek local input on the draft projections. The survey was sent in April 2023 and multiple follow up attempts were made via email. Follow-up phone calls were made for any entity with a population of over 5,000 people. Additionally, meetings were held with some of the Major Water Providers in the region. Meetings included Brown County Water Improvement District (BCWID) No. 1, the Colorado River Municipal Water District (CRMWD), Midland, Odessa, and San Angelo. Based on the feedback from WUGs and FNI's review, several revisions are proposed for the Region F Water Planning Group (RWPG) consideration.

Population

The TWDB provided two population scenarios for RWPG consideration: the 1.0 migration scenario, which assumes migration equal to that of the last decade (2010-2020) continues through 2080, and the 0.5 migration scenario, which assumes migration equal to half that of the last decade (2010-2020). TWDB requested that regions select a consistent scenario on a county-wide basis, but the scenarios can vary across the region. Of Region F's 32 counties, it is recommended to use the 1.0 scenario for 14 (44%) of the counties and the 0.5 migration scenario for the remaining 18 (56%) of the counties. In general, the higher populations (or more conservative) of the two scenarios are recommended. The two major exceptions to this are Midland and Ector counties where the lower 0.5 migration scenario is recommended based on feedback from the cities of Midland, Odessa, and the RWPG. Because migration in these counties was very high from 2010 to 2020 due to heavy oil and gas development, it may not be reasonable to assume the same rate of growth for the full 50-year planning horizon. The requested scenario by county is shown in Table 1.

Table 1. Requested Population Scenarios by County

County	Scenario	County	Scenario
ANDREWS	1.0	MCCULLOCH	0.5
BORDEN	1.0	MENARD	0.5
BROWN	1.0	MIDLAND	0.5
COKE	1.0	MITCHELL	0.5
COLEMAN	0.5	PECOS	0.5
CONCHO	0.5	REAGAN	0.5
CRANE	1.0	REEVES	1.0

County	Scenario	County	Scenario
CROCKETT	0.5	RUNNELS	0.5
ECTOR	0.5	SCHLEICHER	0.5
GLASSCOCK	0.5	SCURRY	0.5
HOWARD	1.0	STERLING	1.0
IRION	0.5	SUTTON	0.5
KIMBLE	0.5	TOM GREEN	1.0
LOVING	1.0	UPTON	0.5
MARTIN	1.0	WARD	1.0
MASON	1.0	WINKLER	1.0

Population Change Requests

The following sections outline the recommended population revision requests by water user group (WUG).

Bangs

Bangs water use in 2022 was 354 acre-feet. This is significantly higher than the TWDB draft projection of dry year use in 2030 of 253 acre-feet, suggesting that the population and/or gpcd are underestimated. In Bangs' 2021 TWDB water use survey, they report a population of 2,739 full time residents. This is higher than the 1.0 scenario 2030 estimated population of 2,122. Based on this, an increase in population in 2030 of 2,776 is recommended. The growth from the 1.0 scenario is then recommended to be maintained but with a new base population in 2030. The recommended population revisions for Bangs are shown in Table 2.

Table 2. Bangs Recommended Population Revisions

Bangs	2030	2040	2050	2060	2070	2080
TWDB Draft Population (1.0 Scenario)	2,122	2,159	2,162	2,169	2,177	2,185
Proposed Population	2,776	2,824	2,828	2,837	2,848	2,858

Early

Similar to Bangs, Early's water use in 2022 was 460 acre-feet. This is significantly higher than the TWDB draft projection of dry year use in 2030 of 233 acre-feet, suggesting that the population and/or gpcd are underestimated. In Early's 2021 TWDB water use survey, they report a population of 3,296 full time residents served by their system. The 2022 census place estimate of population for Early is 3,200 people. Both estimates are much higher than the 2,418 people in the draft projections for 2030. Based on this, we recommend an increase in population to 3,352 people in 2030. The growth from the 1.0 scenario is then maintained but with a new base population in 2030. Table 3 shows the recommended population revisions for Early.

Table 3. Early Recommended Population Revisions

Early	2030	2040	2050	2060	2070	2080
TWDB Draft Population (1.0 Scenario)	2,418	2,459	2,461	2,470	2,479	2,488
Proposed Population	3,352	3,409	3,412	3,424	3,437	3,449

Brown County Other

In order to maintain the county total, a corresponding decrease in population is requested from Brown County Other to offset the requested changes in population for Bangs and Early. This is shown in Table 4.

Table 4. Brown County Other Population Revisions

Brown County Other	2030	2040	2050	2060	2070	2080
TWDB Draft Population (1.0 Scenario)	4,630	4,708	4,716	4,732	4,749	4,769
Proposed Population	3,042	3,093	3,099	3,110	3,120	3,135

Eden

The City of Eden requested the inclusion of the Eden Detention Center population in its total population projections. In the development of the 2021 RWP, Region F recommended reducing Eden's population by 1,558 people across all decades as a result the closure of Eden Correctional Facility which housed 1,558 inmates. In 2019, the Eden Detention Center was reopened under a different contract with the U.S. Immigration and Customs Enforcement (ICE) for 660 beds and the United States Marshals Service for 844 beds. This population should again be included for Eden in the 2026 regional water plan. Even though the number of beds total 1,504, the City of Eden estimates the prison population will be about 700. The increase of 700 people is applied to all decades as this population is expected to remain constant over the planning horizon. Since the prison population includes detainees/prisoners for federal agencies (ICE and U.S. Marshals), this increase in population will also be applied to the county. The recommended adjustment for the City of Eden is shown in Table 5.

Table 5. Eden Recommended Population Revisions

Eden	2030	2040	2050	2060	2070	2080
TWDB Draft Population (0.5 Scenario)	1,090	1,052	1,014	977	949	931
Proposed Population	1,790	1,752	1,714	1,677	1,649	1,631

Concho County Total

As discussed above, the reopening of the Eden Detention Center results in an increase of Concho County's total population by 700 people. This change is shown in Table 6.

Table 6. Concho County Total Recommended Population Revisions

Concho County Total	2030	2040	2050	2060	2070	2080
TWDB Draft Population (0.5 Scenario)	3,205	3,110	3,018	2,929	2,836	2,738
Proposed Total Population	3,905	3,810	3,718	3,629	3,536	3,438

Odessa

The City of Odessa completed a water master plan in 2019. The plan projects water demands based on 2016 water use and projected land use. Using the 2016 per capita use of 144 gpcd, the population was estimated from the projected demands. This results in an estimated population of 115,278 people in 2028, 133,958 people in 2038 and 145,694 people in 2043. Using the projected growth, FNI developed decadal population estimates through 2050 (the master plan does not project past 2043). Given the projected slowdown in mining activity later in the planning cycle, it is anticipated that growth in the Odessa area may also slow. Based on this, half the rate of growth of the early decades is used to project the population from 2050 to 2080. This methodology was discussed with the City of Odessa and they concur with this approach.
Table 7 shows the recommended population revisions for the City of Odessa.

Table 7. Odessa Recommended Population Revisions

Odessa	2030	2040	2050	2060	2070	2080
TWDB Draft Population (0.5 Scenario)	120,350	128,024	135,216	140,648	146,435	152,592
Proposed Population	119,014	138,653	162,125	173,861	185,597	197,333

Ector County Other

In order to maintain the county total, a corresponding adjustment in population is requested from Ector County Other to offset the requested changes in population for Odessa. This is shown in Table 8.

Table 8. Ector County Other Recommended Population Revisions

Ector County Other	2030	2040	2050	2060	2070	2080
TWDB Draft Population (0.5 Scenario)	40,351	50,880	60,445	67,367	74,533	81,962
Proposed Population	41,687	40,251	33,536	34,154	35,371	37,221

Pecos County Fresh Water

Pecos County Fresh Water, located in Fort Stockton, requested an increase in population served to 675 based on the existing meter/connection count. The baseline (2020) estimated population for Pecos County FW is 462, which is nearly the same as the 0.5 migration scenario 2030 value of 461. Thus, FNI proposes adopting a new near term 2030 population of 675 and then applying decadal growth rates from the initial draft projections. The recommended revisions for Pecos County Fresh Water are shown in Table 9.

Table 9. Pecos County Fresh Water Recommended Population Revisions

Pecos County Fresh Water	2030	2040	2050	2060	2070	2080
TWDB Draft Population (0.5 Scenario)	461	436	430	484	544	615
Proposed Population	675	638	630	709	797	900

Pecos County Other

In order to maintain the county total, a corresponding decrease in population is requested from Pecos County Other to offset the requested changes in population for Pecos County Fresh Water. This is shown in Table 10.

Table 10. Pecos County Other Recommended Population Revisions

Pecos County Other	2030	2040	2050	2060	2070	2080
TWDB Draft Population (0.5 Scenario)	2,664	2,957	3,106	2,970	2,803	2,595
Proposed Population	2,450	2,755	2,906	2,745	2,550	2,310

Summary of Population Change Request

The TWDB provided two population growth scenarios: the 0.5 migration scenario and the 1.0 migration scenario. The 0.5 migration scenario results in a 2080 regional population of about 1 million people. The 1.0 scenario results in a 2080 population of about 1.27 million. RWPGs may select scenarios at an individual county level but the TWDB has requested that the county total be maintained. Based on the recommended scenarios by county and the adjustments recommended in the previous sections, the Region F 2080 projected population is 1.07 million people. As seen in Figure 1, this tracks closely with (though slightly lower than) the 2021 Region F population projections. Table 11 provides a summary of the population revision requests.

Figure 1: Region F Population Projection Recommended Revisions

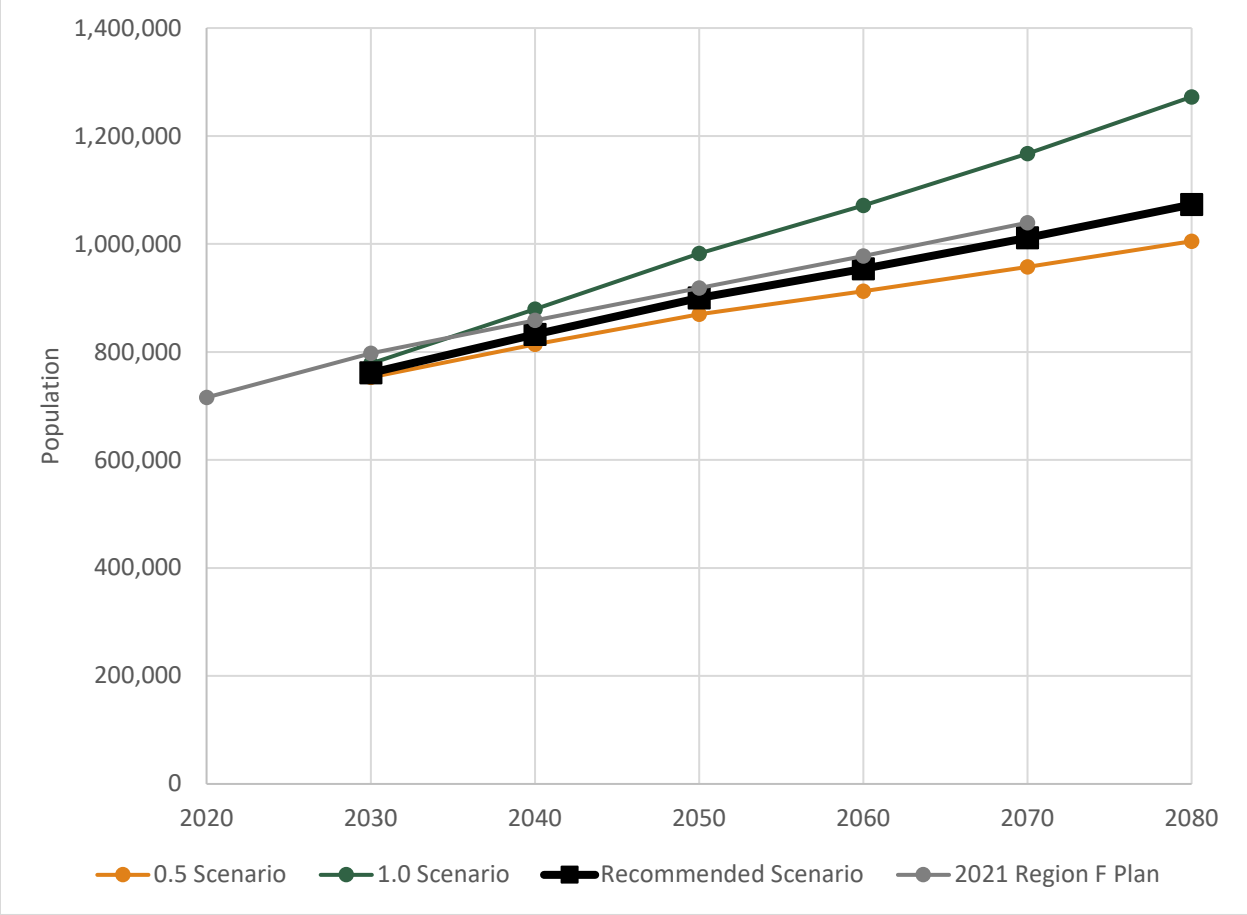

Table 11: Region F Population Projection Recommended Revisions

Region F	Population 2030	Population 2040	Population 2050	Population 2060	Population 2070	Population 2080
TWDB Draft Total (0.5 Scenario)	753,007	814,011	869,738	912,716	957,820	1,005,152
TWDB Draft Total (1.0 Scenario)	778,553	879,271	982,649	1,071,087	1,167,487	1,272,561
Proposed Total Based on Selected Scenario by County	760,582	831,888	899,122	953,188	1,010,859	1,072,394
Proposed Total Based on Selected Scenario by County and all Population Revisions	761,282	832,588	899,822	953,888	1,011,559	1,073,094
Numerical Difference	700	700	700	700	700	700

Demand Change Requests

Upon review, several entities in Region F had higher per capita water use in a more recent year in the provided TWDB data (2015-2020). This is more appropriate to use as the baseline year because it is more representative the water use under dry year conditions. The baseline gpcd was updated to the more recent high year use and then the plumbing code savings were prorated based on the year the historical maximum occurred to calculate the 2030 value. TWDB plumbing code savings were maintained from 2030 to 2080. The recommended revisions to the GPCD based on the TWDB gpcd historical data are shown in Table 12.

Table 12: Region F GPCD Revsion Recommendations

WUG	TWDB Baseline GPCD	Max Historical GPCD	Year Max Historical Occurred	Baseline GPCD	Revised GPCD Request					
					2030	2040	2050	2060	2070	2080
Airline Mobile Home Park Ltd	92	144	2015	139	135	134	134	134	134	134
Ballinger	160	181	2019	180	175	175	175	175	175	175
Balmorhea	352	430	2018	428	423	423	423	423	423	423
Barstow	285	524	2020	524	519	519	519	519	519	519
Big Lake	195	237	2015	231	227	226	226	226	226	226
Big Spring	190	225	2020	225	220	220	220	220	220	220
Borden County Water System	355	566	2016	566	562	561	561	561	561	561
Bronte	226	281	2018	279	274	274	274	274	274	274
Brookesmith SUD	134	170	2020	170	165	165	165	165	165	165
Coahoma	188	346	2020	346	341	341	341	341	341	341
Coleman	153	190	2019	189	184	183	183	183	183	183
Coleman County SUD	112	240	2016	236	231	230	230	230	230	230
Concho Rural Water	78	116	2020	116	112	111	111	111	111	111
Corix Utilities Texas Inc	144	170	2020	170	165	165	165	165	165	165
Crockett County WCID 1	353	396	2020	396	391	391	391	391	391	391
Eden	147	336	2020	336	331	331	331	331	331	331
Grandfalls	283	515	2018	513	508	508	508	508	508	508
Greenwood Water	191	231	2020	231	226	226	226	226	226	226
Iraan	305	319	2020	319	314	314	314	314	314	314
Loraine	104	293	2017	290	285	285	285	285	285	285

WUG	TWDB Baseline GPCD	Max Historical GPCD	Year Max Historical Occurred	Baseline GPCD	Revised GPCD Request					
					2030	2040	2050	2060	2070	2080
Madera Valley WSC	259	394	2020	394	390	389	389	389	389	389
McCamey	334	367	2020	367	362	362	362	362	362	362
Millersview-Doole WSC	130	177	2017	174	169	169	169	169	169	169
North Runnels WSC	95	111	2018	109	105	104	104	104	104	104
Pecos	278	351	2019	350	346	345	345	345	345	345
Pecos County Fresh Water	241	339	2019	338	334	333	333	333	333	333
Pecos County WCID 1	114	250	2020	250	245	245	245	245	245	245
Rankin	289	320	2018	318	313	313	313	313	313	313
Richland SUD	210	470	2020	470	465	465	465	465	465	465
Sonora	334	441	2015	436	431	431	431	431	431	431
Southwest Sandhills WSC	87	141	2020	141	137	136	136	136	136	136
Tom Green County FWSD 3	103	157	2020	157	153	152	152	152	152	152
U and F WSC	148	160	2019	160	155	154	154	154	154	154
Wickett	364	392	2019	391	386	386	386	386	386	386
Wink	303	391	2017	388	383	383	383	383	383	383
Winters	74	140	2020	140	135	135	135	135	135	135
Zephyr WSC	74	131	2020	131	126	126	126	126	126	126

Bangs

Bangs water use in 2022 was 354 acre-feet. This is significantly higher than the TWDB draft projection of dry year use in 2030 of 253 acre-feet, suggesting that the population and/or gpcd are underestimated. A revision to the population of Bangs is recommended in the previous section. However, that adjustment alone does not fully account for the higher water use experienced in 2022. The Bangs 2022 gpcd was recalculated based on the reported 2021 population (most recently available) of 2,739 people. This results in a gpcd of 115, which is slightly higher than the baseline gpcd of 111. Based on this, it is recommended that the Bangs GPCD be revised. The plumbing code estimate of savings between 2020 and 2030 were prorated to account for the baseline GPCD occurring in 2022. The TWDB plumbing code estimates were then used for the remainder of the planning horizon. The revision requests for Bangs are summarized below in Table 13.

Table 13: Bangs Recommended Per Capita Demand Revisions

Bangs	Base	2030	2040	2050	2060	2070	2080
Population (Revision Requested Above)		2,776	2,824	2,828	2,837	2,848	2,858
Proposed GCPD (2026 RWP)	115	111	111	111	111	111	111
Proposed Water Demand (ac-ft./yr.)		346	350	351	352	353	354

Brownwood

The City of Brownwood Requested for an increase to baseline GPCD to 177 to reflect historical use based on year 2022. This was based on data provided by the City of Brownwood that showed a net use of 3,741 acre-feet in 2022 and a population of 18,870 people. Since 2022 was a dry year and resulted in a per capita demand greater than any other year from 2010-2020, revising the baseline to 2022 per capita is a conservative and appropriate adjustment so that future dry year demands are not underestimated. The plumbing code estimate of savings between 2020 and 2030 were prorated to account for the baseline GPCD occurring in 2022. The TWDB plumbing code estimates were then used for the remainder of the planning horizon. The requested revisions for Brownwood are included below in Table 14.

Table 14: Brownwood Recommended Per Capita Demand Revisions

Brownwood	Base	2030	2040	2050	2060	2070	2080
Population (1.0 Scenario)		19,751	20,081	20,120	20,189	20,265	20,350
Proposed GCPD (2026 RWP)	177	173	172	172	172	172	172
Proposed Water Demand (ac-ft./yr.)		3,827	3,877	3,884	3,897	3,912	3,928

Early

Similar to Bangs, Early's water use in 2022 was 460 acre-feet. This is significantly higher than the TWDB draft projection of dry year use in 2030 of 233 acre-feet, suggesting that the population and/or gpcd are underestimated. A revision to the population of Early is recommended in the previous section. However, that adjustment alone does not fully account for the higher water use experienced in 2022. The Early 2022 gpcd was recalculated based on the reported 2021 population (most recent available) of 3,296 people. This results in a gpcd of 125, which is higher than the TWDB baseline gpcd of 91. Based on this, it is recommended that the Bangs GPCD be revised. The plumbing code estimate of savings between 2020 and 2030 were prorated to account for the baseline GPCD occurring in 2022. The TWDB plumbing code estimates were then used for the remainder of the planning horizon. The recommended revisions for Early are summarized in Table 15 below.

Table 15: Early Recommended Per Capita Demand Revisions

Early	Base	2030	2040	2050	2060	2070	2080
Population (Revision Requested Above)		3,352	3,409	3,412	3,424	3,437	3,449
Proposed GCPD (2026 RWP)	125	121	120	120	120	120	120
Proposed Water Demand (ac-ft./yr.)		452	457	457	459	461	462

Midland

The City of Midland reported that their water use in 2022, which is a dry year and appropriate for planning purposes was 142 GPCD. This is lower than the TWDB baseline which is based on 2011 with estimated plumbing code savings. Midland significantly raised water rates after 2011 and has experienced a decline in per capita use as a result. Even if the weather conditions of 2011 were repeated, Midland does not anticipate per capita use reaching this level again and requests a revision. Because the use occurred so recently, Midland requested that plumbing code savings not be applied from 2022 to 2030. TWDB estimates of plumbing code savings from 2030 to 2080 are applied. The revisions requested for Midland are summarized below in Table 16.

Table 16: Midland Recommended Per Capita Demand Revisions

Midland	Base	2030	2040	2050	2060	2070	2080
Population (0.5 Scenario)		145,256	158,703	173,777	192,755	214,523	239,562
Proposed GCPD (2026 RWP)	142	142	141	141	141	141	141
Proposed Water Demand (ac-ft./yr.)		23,104	25,066	27,446	30,444	33,882	37,836

Summary of Demand Change Request

Based on recommended changes to the population and the per capita water use per person described in the previous sections, the Region F municipal water demand is 2,000 to nearly 9,000 acre-feet higher

across the planning horizon. This represents a 1.5 to 4.3 percent increase over the TWDB draft total based on the selected migration scenario for each county. As shown in Figure 2, this is between the two initial draft scenarios provided by the TWDB. It is also very close to the 2021 Region F municipal water demand. Table 17 summarizes the requested revisions to the municipal demands for the 2026 Region F Water Plan.

Figure 2: Region F Demand Projection Recommended Revisions

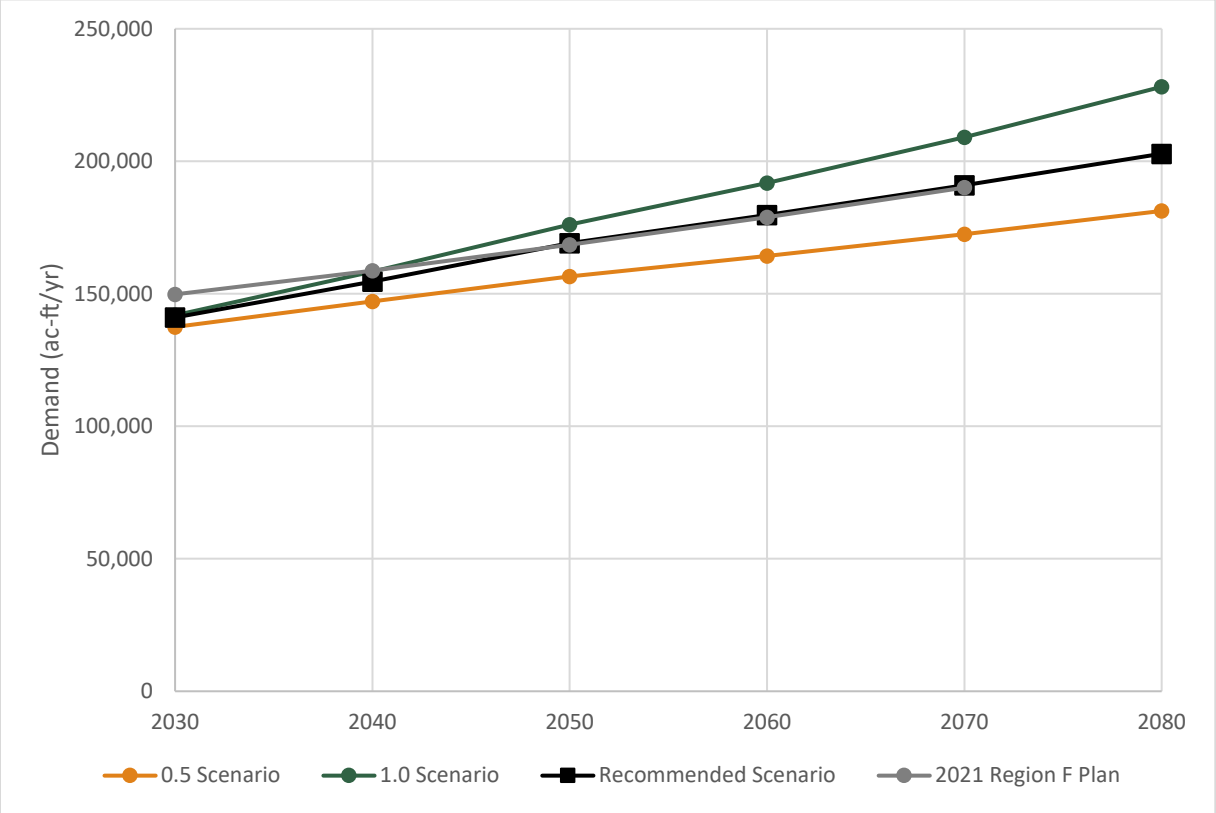

Table 17: Region F Population Projection Recommended Revisions

Region F	Demand 2030	Demand 2040	Demand 2050	Demand 2060	Demand 2070	Demand 2080
TWDB Draft Total (0.5 Scenario)	137,487	147,083	156,492	164,243	172,492	181,268
TWDB Draft Total (1.0 Scenario)	141,892	158,386	176,109	191,835	209,103	228,114
Proposed Total Based on Selected Scenario by County	138,909	150,474	162,119	172,021	182,693	194,218
Revised Total	141,063	154,668	169,107	179,701	190,931	202,860
Numerical Difference	2,154	4,194	6,988	7,680	8,238	8,642
Percent Increase	1.5%	2.7%	4.1%	4.3%	4.3%	4.3%