Agenda Item 5b. Review and Consider Approval of Other-Aquifer and Non-Relevant Aquifer Availability

During the Region F Water Planning Group meeting held on October 19, 2023, the consultant team presented recommended changes to “non-MAG” availability in Region F to be considered by the RWPG. The RWPG had several comments regarding recommended changes. The consultant team coordinated with RWPG members and other stakeholders to develop revised recommendations to non-MAG availability for Region F. The consultant team will discuss these revised recommendations to non-MAG availability for Region F and the RWPG will consider approval for the 2026 Region F Water Plan.

The current total non-MAG availability for Region F is 132,867 ac-ft/yr in 2030, decreasing to 129,819 ac-ft/yr in 2080. Of this total, 27,926 ac-ft/yr is availability from “other” aquifers, with the remainder being for non-relevant aquifers. In the 2022 State Water Plan, total non-MAG availability in Region F was 147,613 ac-ft/yr in 2030, decreasing to 141,111 ac-ft/yr in 2070. The decrease of of non-MAG availability can primarily be attributed to the reduced availability in the Ogallala Aquifer in Midland and Ector counties, which is partially offset by a significant increase in non-MAG availability in the Dockum Aquifer in Scurry County.

The attachments included with this item summarize the Region F groundwater availability, including recommended non-MAG availabilities and the reasons for the recommended values.

Attachments:

1. Updated Non-MAG Availability Memorandum

Advanced Groundwater Solutions, LLC
www.advancedgw.com

Technical Memorandum

TO: Lissa Gregg, Freese and Nichols, Inc.

FROM: Andrew Donnelly, P.G. and James Beach, P.G.

SUBJECT: Region F Non-MAG Groundwater Availability

DATE: January 24, 2024

Introduction

This memo summarizes non-relevant aquifers within Region F and the 2027 non-MAG groundwater availabilities currently in the DB27 database and recommended changes to these non-MAG availabilities. The reasons and methodology for these recommended changes are described below.

History

In the last round of planning, Region F provided recommendations for changes to non-MAG availabilities that were approved by Region F and the TWDB (Laughlin and Beach, 2018). Although approved by TWDB and used in the 2022 State Water Plan, some of the availability estimates were not incorporated into model runs done by the Groundwater Management Areas (GMAs) while developing desired future conditions (DFCs). Therefore, some estimates have reverted back to estimates that were estimated prior to the 2022 State Water Plan.

Evaluation of Non-MAG Availability

Non-MAG availabilities include the availability in aquifers designated as non-relevant and the availability in "other" aquifers. Portion of aquifers declared non-relevant for this planning cycle are as follows:

GMA 2

- Edwards-Trinity (Plateau) Aquifer in Andrews, Howard, and Martin counties
- Pecos Valley Aquifer in Andrews County

GMA 3

- Ogallala and Igneous aquifers in the entire GMA

GMA 7

- Cross Timbers, Igneous, Lipan, Marble Falls, and Seymour aquifers in the entire GMA
- Edwards-Trinity (Plateau) Aquifer in Concho, Mason, McCulloch, and Tom Green counties
- Ogallala Aquifer in Ector and Midland counties

- Dockum Aquifer in Coke, Crockett, Ector, Glasscock, Irion, Midland, Mitchell, Scurry, Sterling, Tom Green, and Upton counites
- Ellenburger-San Saba Aquifer in Coleman, Concho, and Mason counties
- Hickory Aquifer in Coleman County

GMA 8

- No aquifers within Region F

The major and minor aquifers or portion of these aquifers that have been declared non-relevant are shown in Figures 1 and 2, respectively.

In addition to these non-relevant aquifers, several other aquifers, which are not defined by the TWDB as major or minor aquifers, have non-MAG availability. These "other" aquifers include Cambrian and Permian deposits, the Quartermaster Formation, and the Edwards Aquifer/Antlers Sand, as well as several other smaller, unnamed aquifers that do not have geologic or hydrogeologic description. These aquifers are water-bearing units that may be important locally and therefore have non-MAG availability defined for regional water planning purposes.

The current non-MAG availabilities developed by TWDB for this planning cycle are shown in Table 1. Also shown in Table 1 are the availabilities from the previous (2022) planning cycle and the change from the previous planning cycle availabilities. Note that because the planning period for the previous planning cycle did not extend past 2070, only the availabilities for 2030 through 2070 are included for the previous planning cycle and the differences in Table 1. Also, the availabilities in Table 1 reflect the recommended changes in this memo.

In order to assess the updated non-MAG availabilities and make recommended changes to these availabilities, the following was reviewed.

1. The historic pumping was reviewed for all counties with non-MAG availability to ensure that the 2027 availability and the amount of groundwater currently being produced from the aquifer were reasonable. Counties with availabilities lower than the historic groundwater pumping were evaluated in greater detail. Historic pumping trends were evaluated to determine if recommended availabilities were justified. In a few cases, increased non-MAG availability was recommended based on consistent, or in some cases increasing, historic pumping volumes from an aquifer.
2. The differences between the recommended 2027 availabilities and the 2022 availabilities were assessed. In most cases, the new availability was the same as the previous availability. Where an aquifer's availability changed, the historic pumping was evaluated in greater detail to determine if the recommended availability was justified. Particular attention was paid to counties where the recommended non-MAG availability was lower than the previous availability.

3. The technical memorandum from the previous planning cycle that described the groundwater availability for the region was reviewed. This memorandum contained rationale for previously recommended non-MAG availabilities.

The current total non-MAG availability for Region F is 132,867 ac-ft/yr in 2030, decreasing to 129,819 ac-ft/yr in 2080. Of this total, 27,926 ac-ft/yr is availability from "other" aquifers, with the remainder being for non-relevant aquifers. In the 2022 State Water Plan, total non-MAG availability was 147,613 ac-ft/yr in 2030, decreasing to 141,111 ac-ft/yr in 2070. The decrease of approximately 15,000 ac-ft/yr of non-MAG availability can primarily be attributed to the reduced availability in the Ogallala Aquifer in Midland and Ector counties, which is partially offset by a significant increase in non-MAG availability in the Dockum Aquifer in Scurry County.

Based on our review of the work done in the previous round of planning, a review of new pumping estimates and demands in the region, and input from the planning group, we are recommending several changes in non-MAG availability estimates in this round of planning. Table 2 summarizes the current Region F non-MAG availabilities and the recommended availabilities, along with the reason for the recommended values.

Most of the proposed revisions are for current availabilities that have been reduced or eliminated from those used in the previous planning cycle. These include availabilities in the Dockum Aquifer in Coke, Glasscock, Irion, Tom Green, and Upton counties, the Pecos Valley Aquifer in Andrews County, the Hickory Aquifer in Coleman County, and the Capitan Reef Aquifer in Reeves County. Most of these availabilities were reduced to zero for the current planning cycle. The proposed revision is to change the availability in each of these counties to the amount used in the previous planning cycle. The original rationale for the previous planning cycle availabilities was detailed in the memo dated October 22, 2018, which is included as an attachment to this memo. The recommended availabilities are generally small (less than 1,000 ac-ft/yr) and are mostly based on small amounts of historic pumping which show that a limited amount of groundwater is available in each of these counties for the designated aquifer. These recommendations include:

In addition to these, several proposed revisions to the current availabilities are being made based on recent historic pumping and input from the Region F planning group. These include:

- Lipan Aquifer in Concho County/Colorado Basin- The initial availability is 1,893 ac-ft/yr, which is the same as in the previous planning cycle. However, the historic pumping from the Lipan Aquifer in Concho County has been greater than this amount almost every year since 1984. The average pumping from the Lipan Aquifer in Concho County since 1984 is 2,972 ac-ft/yr, and in several years it has been between 4,000 and 6,000 ac-ft/yr. We recommend an availability of 4,000 ac-ft/yr for the Lipan Aquifer in Concho County based on this historic pumping.

- Edwards-Trinity (Plateau) Aquifer in McCulloch County/Colorado Basin- The initial availability is 148 ac-ft/yr, which is the same as in the previous planning cycle. Recent groundwater pumping from the Edwards-Trinty (Plateau) Aquifer in McCulloch County has been between 150 and 550 ac-ft/yr. We recommend updating the availability of the Edwads-Trinity (Plateau) Aquifer in McCulloch County to 600 ac-ft/yr.
- Dockum Aquifer in Midland County/Colorado Basin- The initial availability is 0 ac-ft/yr. This is less than the availability of 400 ac-ft/yr from the previous planning cycle. Input from the Region F planning group indicated that groundwater production from the Dockum Aquifer in Midland County has increased significantly recently as a supply for fracking operations in the area. We recommend an availability of 1,000 ac-ft/yr for the Dockum Aquifer in Midland County.
- Dockum Aquifer in Mitchell County/Colorado Basin- The initial availability is 13,987 ac-ft/yr in 2030, decreasing to 10,540 ac-ft/yr in 2080. This is less than the availability of 14,018 ac-ft/yr from the previous planning cycle. Historic pumping from the Dockum Aquifer in Mitchell County has been increasing since the late 1990s and has averaged more than 15,000 ac-ft/yr since 2012. We recommend restoring the previous availability of 14,018 ac-ft/yr for the Dockum Aquifer in Mitchell County.
- Dockum Aquifer in Sterling County/Colorado Basin- The initial availability is 27 ac-ft/yr, which is the higher than the availability in the previous planning cycle of 10 ac-ft/yr. However, in 2018 to 2020 there is reported municipal pumping from the Dockum Aquifer in Sterling County of more than 200 ac-ft/yr. We recommend an availability of 300 ac-ft/yr for the Dockum Aquifer in Sterling County.
- Dockum Aquifer in Scurry County/both basins- The non-MAG availability in the Colorado basin in Scurry County was increased from 903 ac-ft/yr in the previous planning cycle to 11,546 to 11,175 ac-ft/yr in the current cycle. However, the non-MAG availability in the Brazos basin decreased from 306 ac-ft/yr in the previous planning cycle to 151 ac-ft/yr in the current cycle, despite the significant presence of irrigation wells producing from the Dockum Aquifer in this basin. Due to the projected irrigation demand in the Brazos basin, we recommend shifting 2,000 ac-ft/yr of non-MAG availability from the Colorado to Brazos basin within Scurry County.

Summary

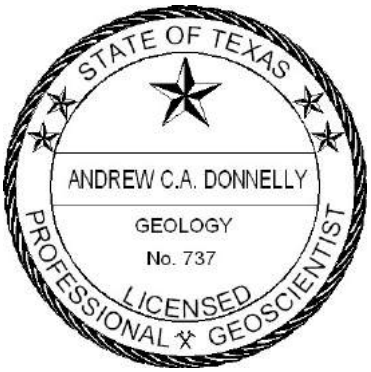
Numerous non-MAG availabilities in Region F were decreased or eliminated in the current planning cycle. In many cases, existing supplies or water management strategies may have been assigned/based on these availabilities. Region F recommends that these non-MAG availabilities be restored to the values from the previous planning cycle.

Historic pumping was also reviewed to ensure that the current non-MAG availabilities were sufficient to allow historic groundwater pumping to be assigned as a supply to the appropriate WUGs in each aquifer. Region F has identified five aquifer/county/basin non-MAG availabilities that should be increased based on the historic pumping. In addition, Region F recommends that 2,000 ac-ft/yr of non-MAG availability in the Colorado basin in Scurry County be shifted to the Brazos basin in order to meet projected irrigation demands in that basin.

References

Laughlin, K., and J. Beach, 2018. *Region F Groundwater Availability Volumes*. Memo to FNI and TWDB dated October 22, 2018.

Geoscientist's Seal:



The seal appearing on this document was authorized by Andrew C.A. Donnelly, P.G. 737 on 1/24/2024.
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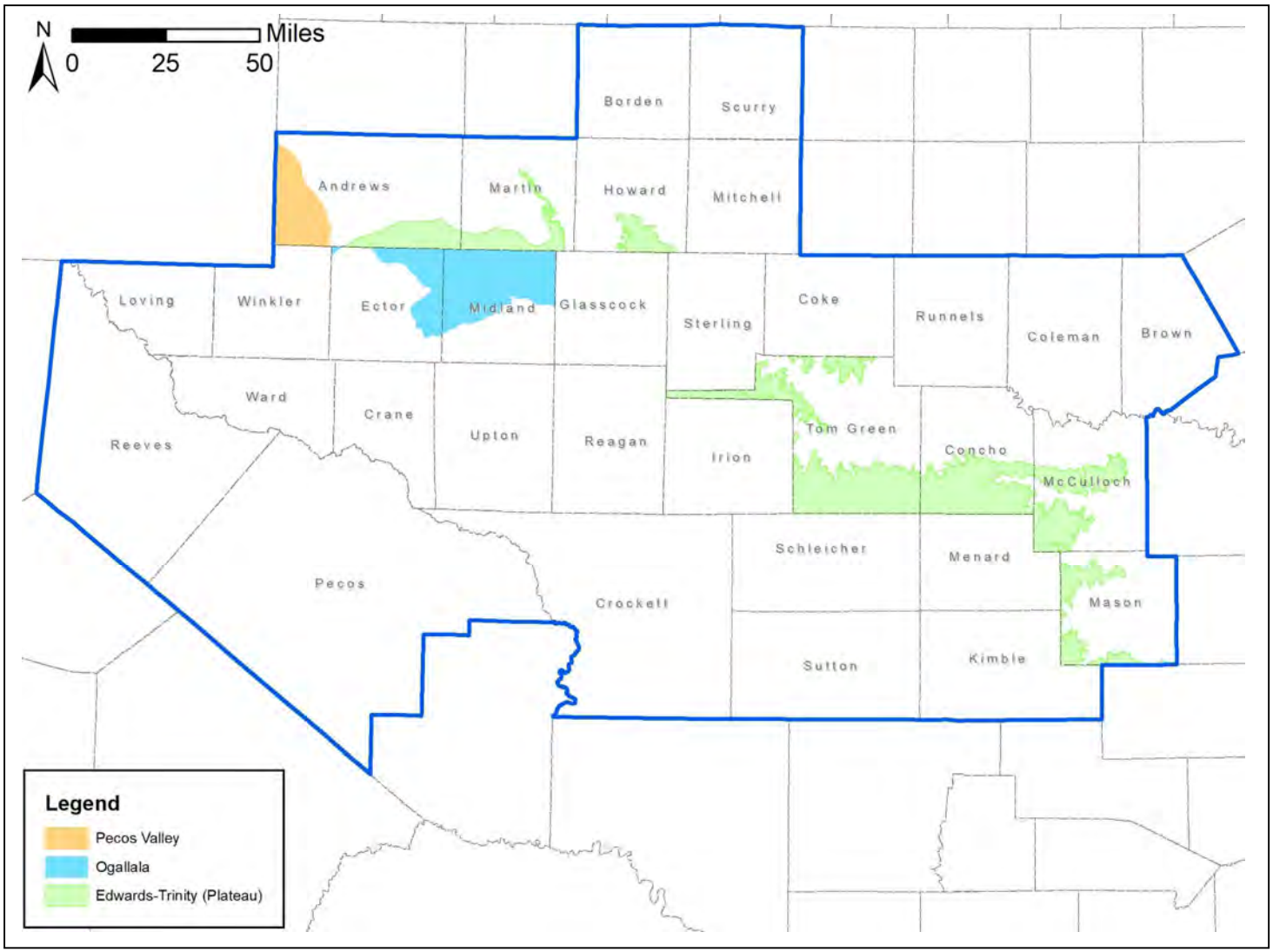

Figure 1. Non-relevant portion of major aquifers in Region F

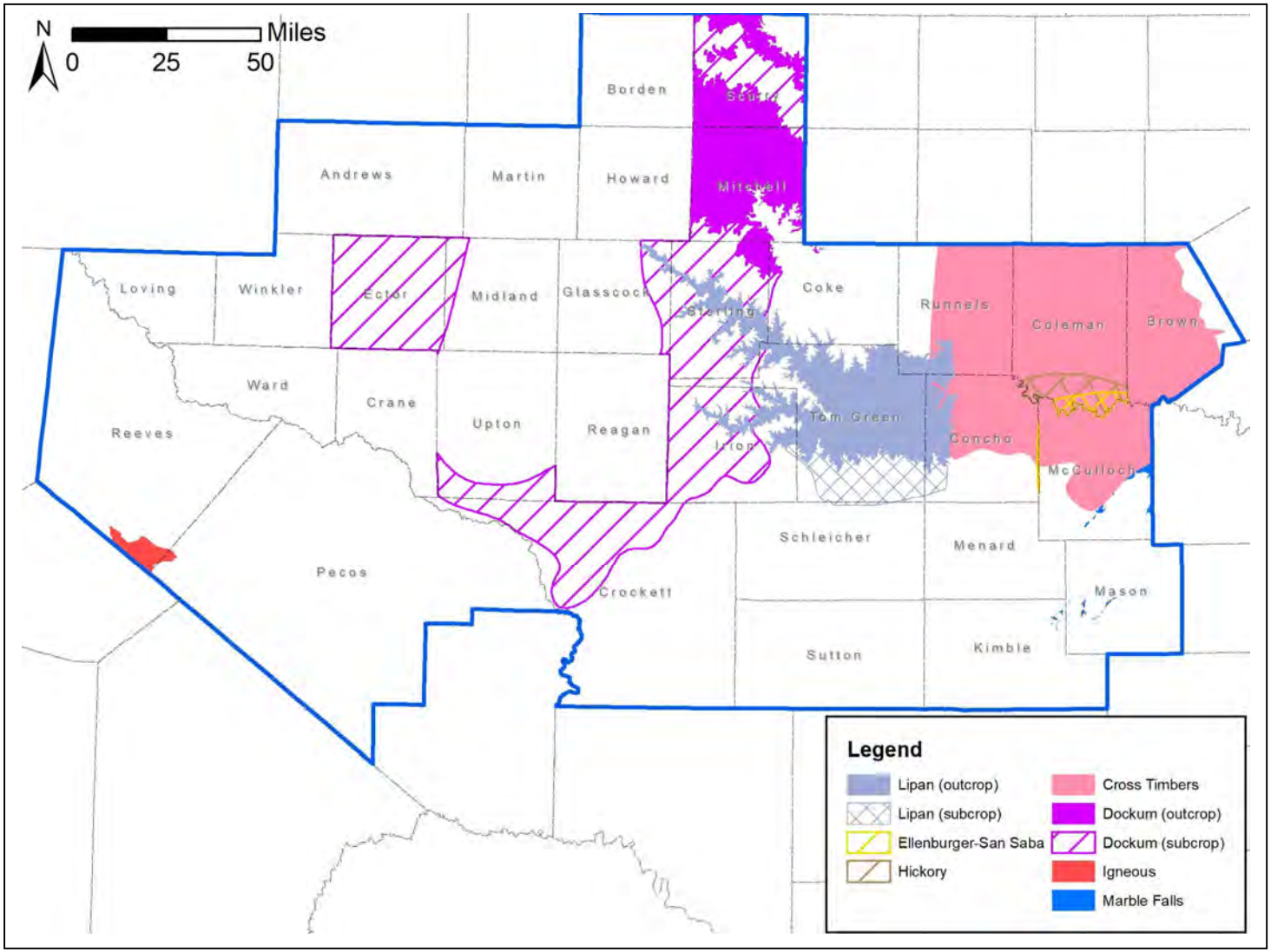

Figure 2. Non-relevant portions of minor aquifer

Table 1. Non-MAG Availabilities in Region F

County	Aquifer	Basin	2027 Non-MAG Availability (ac-ft/yr)						2022 Non-MAG Availability (ac-ft/yr)					Difference in Non-MAG Availability (ac-ft/yr)				
			2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2030	2040	2050	2060	2070
Andrews	Edwards-Trinity-Plateau Aquifer	Colorado	1,198	1,198	1,198	1,198	1,198	1,198	1,198	1,198	1,198	1,198	1,198	0	0	0	0	0
	Pecos Valley Aquifer	Rio Grande	150	150	150	150	150	150	150	150	150	150	150	0	0	0	0	0
Borden	Other Aquifer	Colorado	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598	2,598	0	0	0	0	0
Brown	Cross Timbers Aquifer	Brazos	0	0	0	0	0	0	NA	NA	NA	NA	NA	0	0	0	0	0
		Colorado	993	993	993	993	993	993	993	993	993	993	993	0	0	0	0	0
Coke	Dockum Aquifer	Colorado	100	100	100	100	100	100	100	100	100	100	100	0	0	0	0	0
	Lipan Aquifer	Colorado	160	160	160	160	160	160	160	160	160	160	160	0	0	0	0	0
	Other Aquifer	Colorado	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	0	0	0	0	0
Coleman	Cross Timbers Aquifer	Colorado	108	108	108	108	108	108	108	108	108	108	108	0	0	0	0	0
	Ellenburger-San Saba Aquifer	Colorado	0	0	0	0	0	0	NA	NA	NA	NA	NA	0	0	0	0	0
	Hickory Aquifer	Colorado	500	500	500	500	500	500	500	500	500	500	500	0	0	0	0	0
	Other Aquifer (Edwards Aquifer and Antlers Sand)	Colorado	109	109	109	109	109	109	109	109	109	109	109	0	0	0	0	0
Concho	Cross Timbers Aquifer	Colorado	0	0	0	0	0	0	NA	NA	NA	NA	NA	0	0	0	0	0
	Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers	Colorado	459	459	459	459	459	459	459	459	459	459	459	0	0	0	0	0
	Lipan Aquifer	Colorado	4,000	4,000	4,000	4,000	4,000	4,000	1,893	1,893	1,893	1,893	1,893	2,107	2,107	2,107	2,107	2,107
	Other Aquifer (Cambrian Deposits)	Colorado	5,964	5,964	5,964	5,964	5,964	5,964	5,964	5,964	5,964	5,964	5,964	0	0	0	0	0
Crane	Rustler Aquifer (Outside official TWDB aquifer boundary)	Rio Grande	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	0	0	0	0	0
Crockett	Dockum Aquifer	Colorado	4	4	4	4	4	4	2	2	2	2	2	2	2	2	2	2
		Rio Grande	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0
Ector	Dockum Aquifer	Colorado	28	28	28	28	28	28	13	13	13	13	13	15	15	15	15	15
		Rio Grande	721	721	721	721	721	721	515	515	515	515	515	206	206	206	206	206
	Ogallala Aquifer	Colorado	206	213	218	222	226	226	7,730	7,171	7,135	6,727	6,727	-7,524	-6,958	-6,917	-6,505	-6,501
		Rio Grande	0	0	0	0	0	0	NA	NA	NA	NA	NA	0	0	0	0	0
Glasscock	Dockum Aquifer	Colorado	900	900	900	900	900	900	900	900	900	900	900	0	0	0	0	0
	Lipan Aquifer	Colorado	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Howard	Edwards-Trinity-Plateau Aquifer	Colorado	672	672	672	672	672	672	672	672	672	672	672	0	0	0	0	0
Irion	Dockum Aquifer	Colorado	150	150	150	150	150	150	150	150	150	150	150	0	0	0	0	0
	Lipan Aquifer	Colorado	13	13	13	13	13	13	13	13	13	13	13	0	0	0	0	0
Kimble	Marble Falls Aquifer	Colorado	100	100	100	100	100	100	100	100	100	100	100	0	0	0	0	0
Martin	Edwards-Trinity-Plateau Aquifer	Colorado	242	242	242	242	242	242	242	242	242	242	242	0	0	0	0	0
Mason	Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers	Colorado	18	18	18	18	18	18	18	18	18	18	18	0	0	0	0	0
	Marble Falls Aquifer	Colorado	100	100	100	100	100	100	100	100	100	100	100	0	0	0	0	0

Table 1. Non-MAG Availabilities in Region F

County	Aquifer	Basin	2027 Non-MAG Availability (ac-ft/yr)						2022 Non-MAG Availability (ac-ft/yr)					Difference in Non-MAG Availability (ac-ft/yr)				
			2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2030	2040	2050	2060	2070
	Other Aquifer	Colorado	873	873	873	873	873	873	873	873	873	873	873	0	0	0	0	0
McCulloch	Cross Timbers Aquifer	Colorado	103	103	103	103	103	103	103	103	103	103	103	0	0	0	0	0
	Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers	Colorado	600	600	600	600	600	600	148	148	148	148	148	452	452	452	452	452
	Marble Falls Aquifer	Colorado	50	50	50	50	50	50	50	50	50	50	50	0	0	0	0	0
	Other Aquifer	Colorado	103	103	103	103	103	103	103	103	103	103	103	0	0	0	0	0
Midland	Dockum Aquifer	Colorado	1,000	1,000	1,000	1,000	1,000	1,000	400	400	400	400	400	600	600	600	600	600
	Ogallala Aquifer	Colorado	15,442	14,369	13,732	13,258	12,745	12,745	36,824	34,623	32,693	31,325	31,325	-21,382	-20,254	-18,961	-18,067	-18,580
Mitchell	Dockum Aquifer	Colorado	14,018	14,018	14,018	14,018	14,018	14,018	14,018	14,018	14,018	14,018	14,018	0	0	0	0	0
	Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers	Colorado	0	0	0	0	0	0	NA	NA	NA	NA	NA	0	0	0	0	0
	Other Aquifer (Permian Deposits)	Colorado	789	789	789	789	789	789	789	789	789	789	789	0	0	0	0	0
Pecos	Igneous Aquifer	Rio Grande	80	80	80	80	80	80	80	80	80	80	80	0	0	0	0	0
	Other Aquifer	Rio Grande	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	0	0	0	0	0
Reeves	Capitan Reef Complex Aquifer	Rio Grande	1,007	1,007	1,007	1,007	1,007	1,007	1,007	1,007	1,007	1,007	1,007	0	0	0	0	0
	Igneous Aquifer	Rio Grande	300	300	300	300	300	300	300	300	300	300	300	0	0	0	0	0
Runnels	Cross Timbers Aquifer	Colorado	0	0	0	0	0	0	NA	NA	NA	NA	NA	0	0	0	0	0
	Lipan Aquifer	Colorado	45	45	45	45	45	45	45	45	45	45	45	0	0	0	0	0
	Other Aquifer	Colorado	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	5,001	0	0	0	0	0
Schleicher	Lipan Aquifer	Colorado	0	0	0	0	0	0	NA	NA	NA	NA	NA	0	0	0	0	0
Scurry	Dockum Aquifer	Brazos	2,151	2,151	2,151	2,151	2,151	2,151	306	306	306	306	306	1,845	1,845	1,845	1,845	1,845
		Colorado	9,546	9,546	9,335	9,248	9,175	9,175	903	903	903	903	903	8,643	8,643	8,432	8,345	8,272
	Other Aquifer	Colorado	315	315	315	315	315	315	315	315	315	315	315	0	0	0	0	0
	Other Aquifer (Quartermaster Formation)	Brazos	74	74	74	74	74	74	74	74	74	74	74	0	0	0	0	0
	Seymour Aquifer	Brazos	10	10	10	10	10	10	10	10	10	10	10	0	0	0	0	0
Sterling	Dockum Aquifer	Colorado	300	300	300	300	300	300	10	10	10	10	10	290	290	290	290	290
	Lipan Aquifer	Colorado	850	850	850	850	850	850	850	850	850	850	850	0	0	0	0	0
Tom Green	Dockum Aquifer	Colorado	200	200	200	200	200	200	200	200	200	200	200	0	0	0	0	0
	Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers	Colorado	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	2,797	0	0	0	0	0
	Lipan Aquifer	Colorado	43,568	43,568	43,568	43,568	43,568	43,568	43,568	43,568	43,568	43,568	43,568	0	0	0	0	0
Upton	Dockum Aquifer	Rio Grande	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	0	0	0	0	0
Winkler	Ogallala Aquifer	Rio Grande	40	40	40	40	40	40	40	40	40	40	40	0	0	0	0	0
TOTAL			**132,867**	**131,801**	**130,958**	**130,401**	**129,819**	**129,819**	**147,613**	**144,853**	**142,887**	**141,111**	**141,111**	**-14,746**	**-13,052**	**-11,929**	**-10,710**	**-11,292**

Table 2. Recommended Changes to Non-MAG Availabilities in Region F

County	Aquifer	Basin	Initial Non-MAG Availability (ac-ft/yr)						Recommended Non-MAG Availability (ac-ft/yr)						Methodology
			2030	2040	2050	2060	2070	2080	2030	2040	2050	2060	2070	2080	
Andrews	Pecos Valley Aquifer	Rio Grande	0	0	0	0	0	0	150	150	150	150	150	150	Previous availability, based on historic pumping
Coke	Dockum Aquifer	Colorado	0	0	0	0	0	0	100	100	100	100	100	100	Previous availability, based on estimated rig supply use
Coleman	Hickory Aquifer	Colorado	0	0	0	0	0	0	500	500	500	500	500	500	Previous availability, based on estimated equivalent to Concho County
Concho	Lipan Aquifer	Colorado	1,893	1,893	1,893	1,893	1,893	1,893	4,000	4,000	4,000	4,000	4,000	4,000	Historic pumping
Glasscock	Dockum Aquifer	Colorado	0	0	0	0	0	0	900	900	900	900	900	900	Previous availability
Irion	Dockum Aquifer	Colorado	0	0	0	0	0	0	150	150	150	150	150	150	Previous availability
McCulloch	Edwards-Trinity-Plateau, Pecos Valley, and Trinity Aquifers	Colorado	148	148	148	148	148	148	600	600	600	600	600	600	Recent pumping
Midland	Dockum Aquifer	Colorado	0	0	0	0	0	0	1,000	1,000	1,000	1,000	1,000	1,000	Recent pumping
Mitchell	Dockum Aquifer	Colorado	13,987	12,569	11,521	10,944	10,540	10,540	14,018	14,018	14,018	14,018	14,018	14,018	Recent pumping
Reeves	Capitan Reef Complex Aquifer	Rio Grande	0	0	0	0	0	0	1,007	1,007	1,007	1,007	1,007	1,007	Previous availability
Scurry	Dockum Aquifer	Brazos	151	151	151	151	151	151	2,151	2,151	2,151	2,151	2,151	2,151	Shifting basins within the county to meet irrigation demands
		Colorado	11,546	11,546	11,335	11,248	11,175	11,175	9,546	9,546	9,335	9,248	9,175	9,175	
Sterling	Dockum Aquifer	Colorado	27	27	27	27	27	27	300	300	300	300	300	300	Recent pumping
Tom Green	Dockum Aquifer	Colorado	0	0	0	0	0	0	200	200	200	200	200	200	Previous availability, based on estimated rig supply use
Upton	Dockum Aquifer	Rio Grande	67	67	67	67	67	67	1,000	1,000	1,000	1,000	1,000	1,000	Previous availability, based on well reports for fracking use