

**Explanatory Report for the Adopted Desired Future Conditions
of the Western Fresh Edwards (Balcones Fault Zone) Aquifer
Groundwater Management Area 10**

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Abbreviations

DFC	Desired Future Conditions
GCD	Groundwater Conservation District
GMA	Groundwater Management Area
MAG	Modeled Available Groundwater
TWDB	Texas Water Development Board

1. Groundwater Management Area 10

Groundwater Management Areas (GMA) were created by the Texas Legislature to provide for the conservation, preservation, protection, recharging, and prevention of waste of the groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions. Each GMA is charged with facilitating joint planning efforts in the GMAs within its jurisdiction.

GMA 10 was created to oversee the Edwards (Balcones Fault Zone) and Trinity aquifers. Other aquifers include the Leona Gravel, Buda Limestone, Austin Chalk, and the saline Edwards (Balcones Fault Zone) aquifers. The jurisdiction of GMA 10 includes all or parts of Bexar, Caldwell, Comal, Guadalupe, Hays, Kinney, Medina, Travis, and Uvalde counties. GCDs in GMA 10 include Barton Springs/Edwards Aquifer Conservation District, Southwestern Travis County GCD, Comal Trinity GCD, Edwards Aquifer Authority, Kinney County GCD, Medina County GCD, Plum Creek Conservation District, and Uvalde County Underground Water Conservation District (UWCD) (Figure 1).

As mandated in Texas Water Code § 36.108, districts are required to submit DFCs of the groundwater resources in their GMA to the executive administrator of the Texas Water Development Board (TWDB), unless that aquifer is deemed to be non-relevant. According to Texas Water Code § 36.108 (d-3), the district representatives shall produce a DFCs Explanatory Report for the management area and submit to the TWDB a copy of the Explanatory Report.

The fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer located within Kinney County is a major aquifer. The extent of this aquifer includes the fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer located within Kinney County (Figure 1). This document is the Explanatory Report for the fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer located within Kinney County.

2. Aquifer Description

For jurisdictional purposes, the fresh-water portion of the San Antonio segment of the Edwards (Balcones Fault Zone) Aquifer is defined as the fresh water portion of the Edwards (Balcones Fault Zone) Aquifer located within Kinney County. The boundaries of the western fresh-water Edwards (Balcones Fault Zone) Aquifer were determined using the Digital Geologic Atlas of Texas (U.S. Geological Survey, 2005; Stoesser et al., 2005) and the GMA 10 boundary. The geographic extent of the fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer located within Kinney County is available at the TWDB website:

http://www.twdb.texas.gov/groundwater/models/gam/ebfz_s/ebfz_s.asp (Figure 2). As illustrated, the jurisdiction is limited to the eastern portion of Kinney County. The western fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer is located entirely within the Regional Water Planning Area J and the Kinney County GCD. The geographic extent of the western fresh-water Edwards (Balcones Fault Zone) Aquifer in the Kinney County GCD is illustrated in Figures

1

and

2.

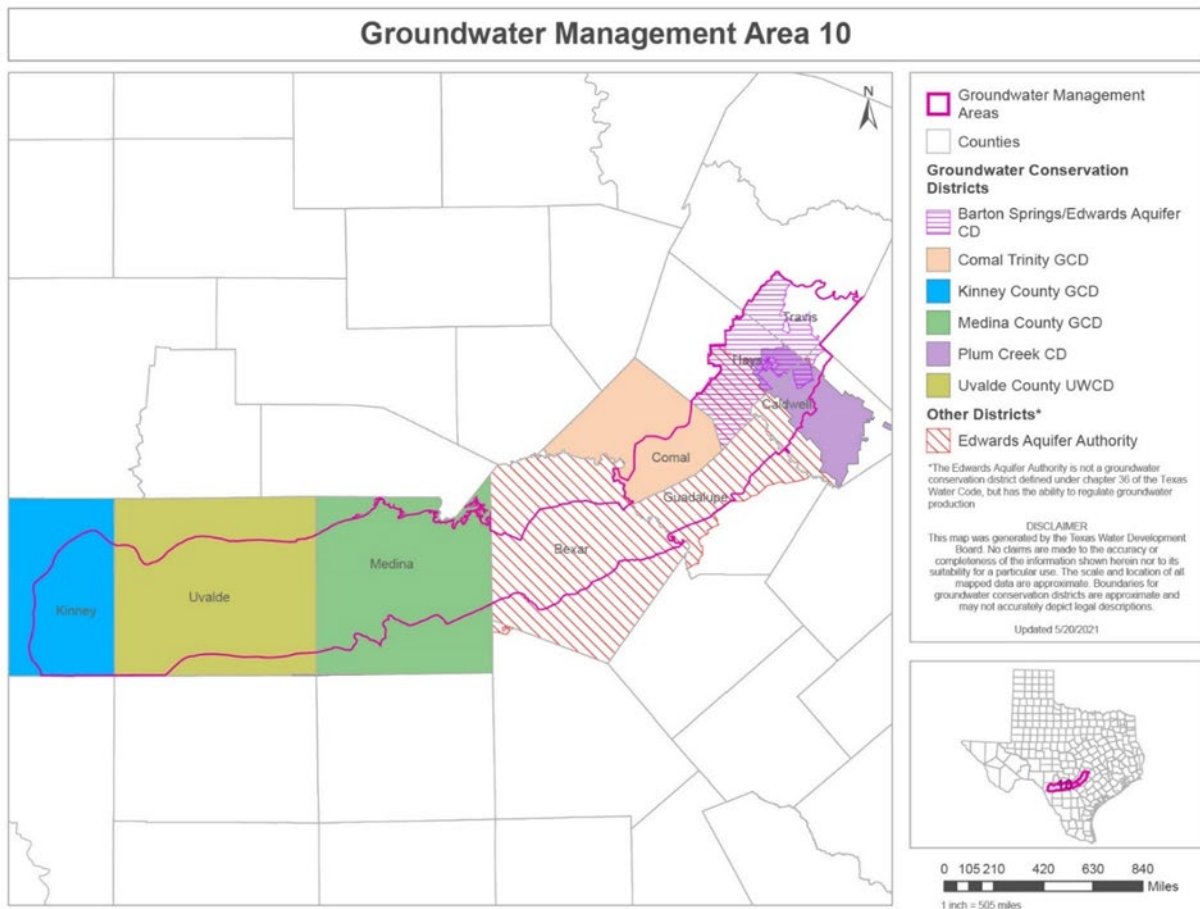


Figure 1. Map of the administrative boundaries of GMA 10 and GCDs in GMA (From TWDB website).

3. Desired Future Conditions

GMA 10 incorporated information from the Kinney County GCD Groundwater Management Plan and analyses from the TWDB during development of the proposed DFCs. The first cycle of the Desired Future Condition for the western fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County in GMA 10 was that the water level in well 70-38-902 shall not fall below 1,184 ft mean sea level (Table 1). This Desired Future Condition was described in Resolution No. 2010-11 and adopted August 23, 2010 by the GCDs in GMA 10.

The second cycle of the Desired Future Condition for the western fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County in GMA 10 remained the same as during the first cycle of DFCs, that the water level in well 70-38-902 shall not fall below 1,184 ft mean sea level (Table 1). The second cycle of the DFCs was adopted by the GCDs in GMA 10 on March 14, 2016.

The third cycle of the Desired Future Conditions for the western fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County GMA 10 remained the same as during the second cycle of DFCs, that the water in well 70-38-902 shall not fall below 1,184 ft mean sea level (Table 1). The third cycle of the DFC’s was adopted by the GCDs in GMA 10 on October 26, 2021.

Table 1. DFCs for the western fresh Edwards (Balcones Fault Zone) Aquifer in GMA 10

Aquifer	Desired Future Condition Summary	Date Desired Future Condition Adopted
Edwards (Kinney County)	Water level in well number 70-38-902 shall not fall below 1,184 feet mean sea level	8/23/2010
Edwards (Kinney County)	Water level in well number 70-38-902 shall not fall below 1,184 feet mean sea level	3/14/2016
Edwards (Kinney)	Water level in well number 70-38-902 shall not fall below 1,184 feet mean sea level	10/26/2021

4. Policy Justification

The Desired Future Condition for the San Antonio segment of the fresh-water Edwards (Balcones Fault Zone) Aquifer in Kinney County was adopted after considering factors identified in Texas Water Code §36.108 (d):

- A. Aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another;
 - i. for each aquifer, subdivision of an aquifer, or geologic strata and
 - ii. or each geographic area overlying an aquifer
- B. The water supply needs and water management strategies included in the state water plan;
- C. Hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge;
- D. Other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;
- E. The impact on subsidence;
- F. Socioeconomic impacts reasonably expected to occur;
- G. The impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002;
- H. The feasibility of achieving the desired future condition; and,
- I. Any other information relevant to the specific DFCs.

These factors are discussed in detail in appropriate sections in this Explanatory Report.

5. Technical Justification

Technical justification for selection of the Desired Future Condition for the fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer in Kinney County was provided by simulations generated by a groundwater flow model developed for the Edwards (Balcones Fault Zone) Aquifer in Kinney County (Hutchison et al., 2011). The Kinney County groundwater model was developed by Hutchison et al. (2011) for use in management plan data analysis. The model was calibrated to water-level and spring discharge data collected from 1950 to 2005; however, data were extracted only for the period from 1980 to 2005 for the Kinney County GCD Groundwater Management Plan (Kinney County GCD Groundwater Management Plan, 2013). These dates were used to avoid skewing the data as a result of the drought of the 1950s. The period from 1980 to 2005 includes both drought and wet climatic conditions.

Kinney County has two DFCs, one for GMA 7, which includes the western half of Kinney County, and one for GMA 10, which includes the eastern half of Kinney County. The two DFCs for Kinney County are separate, but both were specified for the same intent, to protect flow at Las Moras Springs. GMA 7, which includes western Kinney County and Las Moras Springs, designated as its Desired Future Condition that drawdown for the Edwards-Trinity Aquifer in western Kinney County be consistent with maintaining flow at Las Moras Springs at an annual average flow of 23.9 cfs and a median flow of 23.9 cfs. GMA 10, which does not include Las Moras Springs, used the Kinney County groundwater flow model developed by Hutchison et al. (2011) to specify as its Desired Future Condition that the water level at Well No. 70-38-902 be maintained at or above an elevation of 1,184 feet msl.

These two DFCs are essentially synonymous because Las Moras Springs discharge is well correlated with groundwater elevation at Well No. 70-38-902 (Figure 2). The Desired Future Condition of 1,184 ft msl at Well No. 70-38-902 was chosen by GMA 10 based on an assessment by TWDB that correlated groundwater elevation of 1,184 ft msl at Well No. 70-38-902 to discharge of approximately 24 cfs at Las Moras Springs. Well No. 70-38-902 is alternatively identified as the Tularosa Well or the Tularosa Monitoring Well.

The DFCs for Kinney County were chosen to protect Las Moras Springs. The GMA Desired Future Condition of an annual average flow of 23.9 cfs and a median flow of 23.9cfs discharge from the Las Moras Springs was chosen to represent pre-development conditions when the springs did not go dry, or at least did not go dry as often as they did during the period during which the number of irrigated acres were greatest. The GMA 10 Desired Future Condition which specifies that the water level at Well No. 70-38-902 be maintained at or above an elevation of 1,184 ft msl was chosen for the same reasoning. The elevation of 1,184 ft msl has been determined to correlate directly with Las Moras Springs discharge rate of 24.4 cfs.

The Modeled Available Groundwater (MAG) for the fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer was calculated by the TWDB (Shi et al., 2012) and provided in GAM Run 12-002 MAG (Shi, 2012). The new model run is identified as an update of Scenario 3 of Groundwater Availability Modeling (revised) Task 10-027 (Hutchison, 2011). The model runs were based on the MODFLOW-2000 model developed by the TWDB to assist with the joint planning process regarding the Kinney County GCD (Hutchison et al., 2011). In both model runs, the total pumping in Kinney County was maintained at approximately 77,000 acre-feet per year to achieve the Desired Future Condition. The MAG for the GMA 10 portion of Kinney County is 6,321 acre-ft/yr (Table 2). Details regarding this model run are summarized in Shi et al. (2012).

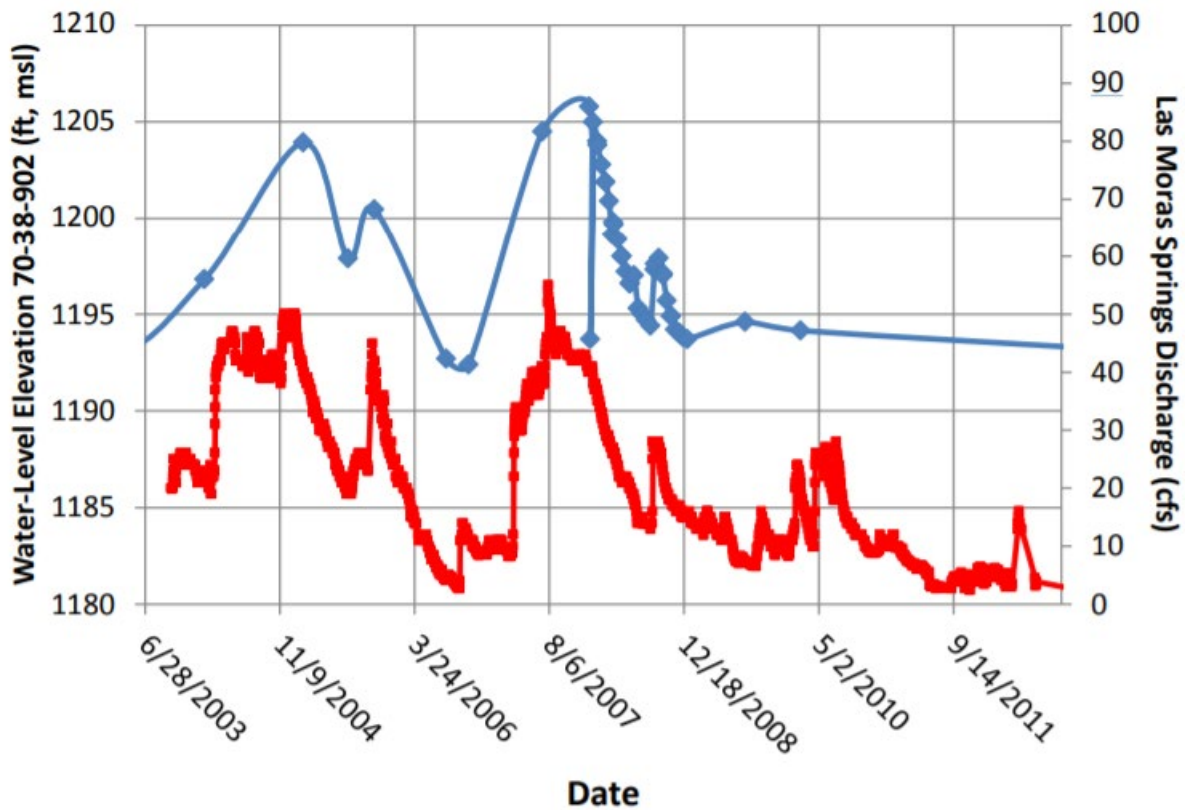


Figure 2. Discharge at Las Moras Springs (cfs) (red line) compared to water levels in the Well No. 70-38-902 (ft, mean sea level) (blue line). Spring discharge data are taken from the U.S. Geological Survey. Water elevation data are taken from the TWDB.

Table 2. MAG for the Edwards (Balcones Fault Zone) Aquifer in GMA 10 in Kinney County. Results are in acre-ft/yr and designated by river basin (Bradley and Boghici, 2018).

River Basin	Year				
	2030	2040	2050	2060	2070
Nueces	6,319	6,319	6,319	6,319	6,319
Rio Grande	2	2	2	2	2
Total	6,321	6,321	6,321	6,321	6,321

6. Consideration of Designated Factors

According to Texas Water Code § 36.108 (d-3), the district representatives shall produce a Desired Future Condition Explanatory Report. The report must include documentation of how factors identified in Texas Water Code §36.108 (d) were considered prior to proposing a Desired Future Condition, and how the proposed Desired Future Condition impacts each factor. The following sections of the Explanatory Report summarize the information that Kinney County GCD used in its deliberations and discussions.

6.1 Aquifer Uses or Conditions

6.1.1 Description of Factors in the Western Fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County

The information in this section was prepared by the Groundwater Technical Assistance Section of the Groundwater Resources Division at the TWDB (Allen, 2013). This information is also included as an appendix in the Kinney County Conservation District Groundwater Management Plan (Kinney County Conservation District, 2013). Groundwater use within the Kinney County Conservation District is comprised primarily of pumpage and use from the fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer with a much smaller component of pumpage coming from the Trinity Aquifer. The estimated historical surface-water and groundwater use in Kinney County for the period 2006-2007 is presented in Table 3.

Table 3. Estimated historical water use. TWDB historical water use survey data (Texas Water Development Board (TWDB)) (acre-ft/yr).

Year	Source	Municipal	Manu- facturing	Steam Electric	Irrigation	Mining	Live- stock	Total
2006	GW	1,126	0	0	4,776	0	238	6,410
	SW	0	0	0	0	0	60	60
Total		1,126	0	0	4,776	0	298	6,470
2007	GW	906	0	0	1,641	0	217	2,764
	SW	0	0	0	0	0	55	55
Total		906	0	0	1,641	0	272	2,819
2008	GW	1,101	0	0	2,043	0	294	2,438
	SW	0	0	0	0	0	73	73
Total		1,101	0	0	2,043	0	367	2,511
2009	GW	1,164	0	0	895	0	338	2,397
	SW	0	0	0	0	0	84	84
Total		1,164	0	0	895	0	422	2,481
2010	GW	1,026	0	0	1,258	0	184	2,468
	SW	0	0	0	0	0	46	46
Total		1,026	0	0	1,258	0	230	2,514
2011	GW	565	0	0	2,357	0	63	2,985
	SW	0	0	0	0	0	46	46
Total		565	0	0	2,357	0	109	3,031
2012	GW	562	0	0	1,144	0	57	1,763
	SW	0	0	0	0	0	42	42
Total		562	0	0	1,144	0	99	1,805
2013	GW	519	0	0	1,292	0	57	1,868
	SW	0	0	0	0	0	42	42
Total		519	0	0	1,292	0	99	1,910
	GW	509	0	0	1,264	0	66	1,839

2014	SW	0	0	0	0	0	49	49
Total		509	0	0	1,264	0	115	1,888
2015	GW	434	0	0	1,109	0	57	1,600
	SW	0	0	0	0	0	31	31
Total		434	0	0	1,109	0	88	1,631
2016	GW	457	0	0	1,118	0	58	1,633
	SW	0	0	0	0	0	43	43
Total		457	0	0	1,118	0	101	1,676
2017	GW	368	0	0	1,326	0	57	1,751
	SW	0	0	0	0	0	42	42
Total		368	0	0	1,326	0	99	1,793
2018	GW	658	0	0	1,359	0	28	2,045
	SW	0	0	0	0	0	45	45
Total		658	0	0	1,359	0	73	2,090
2019	GW	1,114	0	0	4,269	0	192	5,575
	SW	0	0	0	0	0	48	48
Total		1,114	0	0	4,269	0	240	5,623

6.1.2 DFC Considerations

The dominant use of the aquifer by pumping is public water supply, and the sustainability of that supply, especially for users who have no alternative supply physically or economically available and/or who are in vulnerable locations, must be protected to the extent feasible (Texas Water Code §36). The primary concern with sustainability of this karst aquifer groundwater supply is drought, notably extreme drought that stresses the entire aquifer. The DFCs supports and is, in fact, the linchpin of a drought-management program to promote long-term sustainability of both springflow and water supplies.

6.2 Water-Supply Needs

6.2.1 Description of Factors in the Western Fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County

The information in this section was prepared by the Groundwater Technical Assistance Section of the Groundwater Resources Division at the TWDB (Allen, 2013). This information is also included as an appendix in the Kinney County Conservation District Groundwater Management Plan (Kinney County Conservation District, 2013). The TWDB provides water-supply needs estimates by decade as well as by water-user group. Summaries of the projected water-supply demands and needs in acre-ft/yr are provided by decade in the Table 4 and 5 for each water-user group.

Table 4. Projected water demands. TWDB 2022 State Water Plan data (acre-ft/yr).

WUG	2020	2030	2040	2050	2060	2070
Irrigation	3,713	3,713	3,713	3,713	3,713	3,713
Livestock	224	224	224	224	224	224
County-other	64	63	62	62	61	61
Brackettville	608	602	594	593	592	592
Fort Clark Springs MUD	618	616	612	610	609	609
Total	5,227	5,218	5,205	5,202	5,199	5,199

Table 5. Projected water supply needs. TWDB 2022 State Water Plan data (acre- ft/yr).

WUG	2020	2030	2040	2050	2060	2070
Irrigation	0	0	0	0	0	0
Livestock	27	27	27	27	27	27
County-other	0	0	0	0	0	0
Brackettville	0	0	0	0	0	0
Fort Clark Springs Mud	0	0	0	0	0	0
Total	27	27	27	27	27	27

6.2.2 DFC Considerations

The dominant use of the Edwards (Balcones Fault Zone) Aquifer within the Kinney County GCD in GMA 10 by pumping is domestic use and irrigation, and the sustainability of that supply, especially for users who have no alternative supply physically or economically available and/or who are in vulnerable locations, must be protected to the extent feasible (Texas Water Code §36). The primary concern with sustainability of this karst aquifer groundwater supply is drought, notably extreme drought that stresses both aquifers. The DFC supports and is, in fact, the primary concern with sustainability of this karst aquifer groundwater supply is drought, notably extreme drought that stresses both aquifers. The DFC supports and is, in fact, the linchpin of a drought management program to promote long-term sustainability of water supplies.

6.3 Water-Management Strategies

6.3.1 Description of Factors in the Western Fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County

The following information is from The Texas Water Development Board State Water Plan 2022. (TWDB State Water Plan.2022). A major component of the State Water Plan 2022 is to show data on the quantities of water used by municipalities and the different water-use categories. It also shows expected water-supply needs based on today's ability to access, treat, and distribute the supply. The implementation of water-management strategies recommended in the Texas Water Development Board State Water Plan is designed to help conserve the different water resources that are currently available and to inform the different users.

The data presented in this section are provided by the Texas Water Development Board State Water Plan 2022 (TWDB State Water Plan.2022). Recommended water- management strategies data, to meet anticipated drought-induced shortages are presented in the Texas Water Development Board State Water Plan 2022. . Table 6 lists the projected water supply shortages in for livestock consumption in Kinney County.. Table 7 lists source water available after known demands are subtracted. Table 8 identifies water-use categories where no water supply is available to meet its total need. Table 9 provides a listing of all recommended and alternative water management strategies in the Texas Water Development Board State Water Plan 2022.

Table 6. Projected water-supply shortages in Kinney County. (TWDB State Water Plan.2022) (acre-ft/yr)

WUG/WWP	Basin	2020	2030	2040	2050	2060	2070
Livestock	Rio Grande	27	27	27	27	27	27

Table 7. Source water available after known demands are subtracted (TWDB State Water Plan.2022) (acre-ft/yr)

Groundwater	WUG	2020	2030	2040	2050	2060	2070
Edwards (Balcones Fault Zone) Aquifer	Fort Clark Springs MUD	0	620	620	620	620	620
Edwards (Balcones Fault Zone) Aquifer	City of Brackettville	0	6	6	6	6	6

Table 8. Water-use categories where no water supply is available to meet its total need. These data are not currently available in the Texas Water Development Board State Water Plan 2022 (TWDB State Water Plan.2022) (acre-ft/yr)

WUG/WWP	Basin	2020	2030	2040	2050	2060	2070
-	-	-	-	-	-	-	-

Table 9. Recommended and alternative water-management strategies that if implemented may assist in meeting supply shortages (TWDB State Water Plan.2022)

Water Utility Group	Water Management Strategy	Strategy Supply (acre-ft/yr)						Total Capital Cost
		2020	2030	2040	2050	2060	2070	
City of Brackettville	Increase supply to Spoford with new water line	0	6	6	6	6	6	\$4,271,000
	Increase storage facility	0	0	0	0	0	0	\$1,272,000
Fort Clark Springs MUD	Increase storage facility	0	620	620	620	620	620	\$1,501,000
	Water Loss Audit & Main Line Repair	79	79	79	79	79	79	\$1,531,000

6.3.2 DFC Considerations

The DFC under consideration here is specific to the Edwards (Balcones Fault Zone) Aquifer within the Kinney County GCD in GMA 10. The DFC for the Edwards (Balcones Fault Zone) Aquifer within the Kinney County GCD in GMA 10, as described above, underpins an aquifer-responsive drought management program that encourages both full-time water conservation and further temporary curtailments in pumping during drought periods that increase with drought severity.

6.4 Hydrological Conditions

6.4.1 Description of Factors in the Western Fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County

6.4.1.1 Total Estimated Recoverable Storage

Texas statute requires that the total estimated recoverable storage of relevant aquifers be determined. Total estimated recoverable storage is a calculation provided by the TWDB. Texas Administrative Code Rule §356.10 (Texas Administrative Code, 2011) defines the total estimated recoverable storage as the estimated amount of groundwater within an aquifer that accounts for recovery scenarios that range between 25 percent and 75 percent of the porosity-adjusted aquifer volume. As described in GAM Task 13-033 (Jones et al., 2013), the total recoverable storage estimated for the Edwards (Balcones Fault Zone) Aquifer within the Kinney County GCD in GMA 10 is listed in Table 10. Total estimated recoverable storage values may include a mixture of water-quality types, including fresh, brackish, and saline groundwater, because the available data and the existing Groundwater Availability Models do not permit the differentiation between different water-quality types. The total estimated recoverable storage values do not take into account the effects of land surface subsidence, degradation of water quality, or any changes to surface-water/groundwater interaction that may occur due to pumping.

Table 10. Total estimated recoverable storage for the fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer within Kinney County. Estimates are rounded within two significant numbers (Jones et al., 2013).

Total Storage (acre-ft)	25 percent of Total Storage (acre-ft)	75 percent of Total Storage (acre-ft)
3,100,000	775,000	2,325,000

6.4.1.2 Average Annual Recharge

Shi and Wade (2013) calculated the average annual recharge of the Edwards (Balcones Fault Zone) Aquifer in Kinney County using the Kinney County alternative Groundwater Availability Model (Hutchison et al., 2011). The alternative Groundwater Availability Model encompassed all of Kinney County, thus the analysis included both GMAs 7 and 10 in Kinney County. As presented in Table 11, recharge to the Edwards (Balcones Fault Zone) Aquifer in Kinney County was calculated to be 17,674 acre-ft/yr.

Table 11. Summarized information for the Edwards (Balcones Fault Zone) Aquifer that is needed for Kinney Count GCD’s Groundwater Management Plan. All values are approximate and reported in acre-ft/yr (Hutchison et al., 2011).

Management Plan requirement	Aquifer and other units	TWDB Kinney GCD Model (1980 – 2005)
Estimated annual amount of recharge from precipitation to the district	Edwards (Balcones Fault Zone) Aquifer	17,674
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Edwards (Balcones Fault Zone) Aquifer	514
Estimated annual volume of flow into the district within each aquifer in the district	Edwards (Balcones Fault Zone) Aquifer	268
Estimated annual volume of flow out of the district within each aquifer in the district	Edwards (Balcones Fault Zone) Aquifer	12,346
Estimated net annual volume of flow between each aquifer in the district	From Upper Cretaceous Units to Edwards (Balcones Fault Zone) Aquifer	15,597
	From Edwards-Trinity (Plateau) Aquifer to Edwards (Balcones Fault Zone) Aquifer	11,514
	From Edwards (Balcones Fault Zone) Aquifer to Edwards-Trinity Units	33,598

6.4.1.3 Inflows

Shi and Wade (2013) calculated inflows to the Edwards (Balcones Fault Zone) Aquifer in Kinney County using the Kinney County alternative Groundwater Availability Model (Hutchison et al., 2011). The alternative Groundwater Availability Model encompassed all of Kinney County, thus the analysis included both GMAs 7 and 10 in Kinney County. As presented in Table 11, inflows to the Edwards (Balcones Fault Zone) Aquifer in Kinney County were calculated to be 268 acre-ft/yr.

6.4.1.4 Discharge

Shi and Wade (2013) calculated inflows to the Edwards (Balcones Fault Zone) Aquifer in Kinney County using the Kinney County alternative Groundwater Availability Model (Hutchison et al., 2011). The alternative Groundwater Availability Model encompassed all of Kinney County, thus the analysis included both GMAs 7 and 10 in Kinney County. As presented in Table 11, the estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers from the Edwards (Balcones Fault Zone) Aquifer in Kinney County was calculated to be 514 acre-ft/yr. the estimated annual volume of flow out of the district within each aquifer in the district from the Edwards (Balcones Fault Zone) Aquifer in Kinney County was calculated to be 12,346 acre-ft/yr.

6.4.1.5 Other Environmental Impacts Including Springflow and Groundwater/Surface-Water Interaction

Shi and Wade (2013) calculated inflows to the Edwards (Balcones Fault Zone) Aquifer in Kinney County using the Kinney County alternative Groundwater Availability Model (Hutchison et al., 2011). The alternative Groundwater Availability Model encompassed all of Kinney County, thus the analysis included both GMAs 7 and 10 in Kinney County. As presented in Table 11, the net annual volume of flow between each aquifer in the district the Edwards (Balcones Fault Zone) Aquifer in Kinney County was calculated to be: (i) 15,597 acre-ft/yr from Upper Cretaceous Units to Edwards (Balcones Fault Zone) Aquifer; (ii) 11,514 acre-ft/yr from Edwards-Trinity (Plateau) Aquifer to Edwards (Balcones Fault Zone) Aquifer; and (iii) 33,598 acre-ft/yr from Edwards (Balcones Fault Zone) Aquifer to Edwards-Trinity Units.

6.4.2 DFC Considerations

The DFC is proposed on the basis that Edwards (Balcones Fault Zone) Aquifer in Kinney County is hydrologically a classic karst aquifer, with temporally variable inflows from various recharge sources and major natural discharge points at Las Moras, Pinto, and Mud springs that are also temporally variable with aquifer conditions. This hydrologic condition denotes that it is highly vulnerable to drought, and water supplies are substantially adversely affected by drought. Additionally, the geologic strata that form the aquifer dip regionally to the south, such that both the saturated thickness in the unconfined zone and the artesian pressure head in the confined zone are larger to the south. However, while faulted, the aquifer is well-integrated hydrologically and has a common potentiometric surface throughout the subdivision.

Springflows at Las Moras, Pinto, and Mud springs are directly and essentially solely related to the elevation of the potentiometric surface, regardless of the different thickness and depth of groundwater that exists in various parts of the subdivision or other hydrologic conditions, except as

they affect the potentiometric surface. Preservation of minimal springflows at Las Moras, Pinto, and Mud springs are expressly designed to provide that level of environmental and ecological protection.

7. Subsidence Impacts

Subsidence has historically not been an issue with the Western Fresh Edwards Aquifer in GMA 10. The aquifer matrix in the northern subdivision is well-indurated and the amount of pumping does not create compaction of the host rock and/or subsidence of the land surface. Hence, the proposed DFCs are not affected by and do not affect land-surface subsidence or compaction of the aquifer. Additionally, LRE Water LLC hydrologists have built a Subsidence Prediction Tool (SPT) that takes individual well characteristics and calculates a potential subsidence risk in a localized area.

GMA 10 recognizes that the general reports from the SPT indicate that subsidence is not a concern for GMA 10 at this time.

8. Socioeconomic Impacts Reasonably Expected to Occur

8.1. Description of Factors in the Western Fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance [§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted a report in support of the Plateau Region Water Planning Group (Region J). The report "Socioeconomic Impacts of Projected Water Shortages for the (Region J)" was prepared by the TWDB 2022 State Water Plan.

The report on socioeconomic impacts summarizes the results of the TWDB analysis and discusses the methodology used to generate the results for Region J. The socioeconomic impact report for Water Planning Group J is included in Appendix A.

8.2. DFC Considerations

The TWDB State Water Plan 2022 water-management strategies involve changes in the current use of the western fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County, as described in Section 6.3, the proposed DFCs have a differential socioeconomic impact. They are supportive of the TWDB State Water Plan 2022 and

9. Private Property Impacts

9.1 Description of Factors in the Western Fresh Edwards (Balcones Fault Zone) Aquifer in Kinney County

The impact on the interests and rights in private property, including ownership and the rights of GMA landowners and their lessees and assigns in groundwater is recognized under Texas Water Code Section 36.002. The legislature recognizes that a landowner owns the groundwater below the surface of the landowner's land as real property. Nothing in this code shall be construed as granting the authority to deprive or divest a landowner, including a landowner's lessees, heirs, or assigns, of the groundwater ownership and rights described by this section.

Texas Water Code Section 36.002 does not: (1) prohibit a district from limiting or prohibiting the drilling of a well by a landowner for failure or inability to comply with minimum well spacing or tract size requirements adopted by the district; (2) affect the ability of a district to regulate groundwater production as authorized under Section 36.113, 36.116, or 36.122 or otherwise under this chapter or a special law governing a district; or (3) require that a rule adopted by a district allocate to each landowner a proportionate share of available groundwater for production from the aquifer based on the number of acres owned by the landowner.

9.2 DFC Considerations

The DFC is designed to protect the sustained use of the aquifer as a water supply for all users in aggregate. The DFC does not prevent use of the groundwater by landowners either now or in the future, although ultimately total use of the groundwater in the aquifer is restricted by the aquifer condition, and that may affect the amount of water that any one landowner could use, either at particular times or all of the time.

10. Feasibility of Achieving the DFCs

The feasibility of achieving a Desired Future Condition directly relates to the ability of the Kinney County GCD and GMA 10 to manage the fresh-water portion of the Edwards (Balcones Fault Zone) Aquifer in Kinney County to achieve the DFCs. The feasibility of achieving this goal is limited by the finite nature of the resource and how it responds to drought and the pressures placed on this resource by economic and population growth within the area served by this resource and the potential that water is exported out of the Kinney County GCD. Texas State law provides GCDs and GMAs with the responsibility and authority to conserve, preserve, and protect these resources and to insure for the recharge and prevention of waste of groundwater and control of subsidence in the management area. The feasibility of achieving these goals could be altered if state law is revised or interpreted differently than is currently the case.

11. Discussion of Other DFCs Considered

No other Desired Future Condition of the western fresh Edwards (Balcones Fault Zone) Aquifer was considered.

12. Discussion of Other Recommendations

12.1 Advisory Committees

An Advisory Committee for GMA 10 has not been established.

12.2 Public Comments

GMA 10 approved its proposed DFCs on In accordance with requirements in Chapter 36.108(d-2), each GCD then had 90 days to hold a public meeting at which stakeholder input was documented. This input was submitted by the GCD to the GMA within this 90-day period. The dates on which

each GCD held its public meeting is summarized in Table 12. Public comments for GMA 10 are included in Appendix B.

Table 12. Dates on which each GCD held a public meeting allowing for stakeholder input on the DFCs.

GCD	Date
Barton Springs/Edwards Aquifer Conservation District	June 10, 2021
Comal Trinity GCD	May 17, 2021
Kinney County GCD	June 10, 2021
Medina County GCD	June 16, 2021
Plum Creek Conservation District	June 30, 2021
Uvalde County UWCD	May 19, 2021

Under Texas Water Code, Ch. 36.108(d-3)(5), GMA 10 is required to “discuss reasons why recommendations made by advisory committees and relevant public comments were or were not incorporated into the desired future conditions” in each DFC Explanatory Report.

Numerous comments on the GMA 10’s proposed DFCs were received from stakeholders. All individual public comments and the detailed GMA 10 responses to each are included in Appendix B of this Explanatory Report and are incorporated into the discussion herein by reference. Some comments did not designate which aquifer’s DFC was being addressed but were considered by the GMA, where possible and pertinent, to be applicable to all DFCs. And some comments were not DFC recommendations *per se*, rather general observations on joint groundwater planning.

However, there were no comments specifically addressing the Western Edwards Aquifer DFC.

13. Any Other Information Relevant to the Specific DFCs

No additional information relevant to the specific DFCs has been identified.

14. Provide a Balance Between the Highest Practicable Level of Groundwater Production and the Conservation, Preservation, Protection, Recharging, and Prevention of Waste of Groundwater and Control of Subsidence in the Management Area

This DFC is designed to balance the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area. This balance is demonstrated in (a) how GMA 10 has assessed and incorporated each of the nine factors used to establish the DFC, as described in Chapter 6 of this Explanatory Report, and (b) how GMA 10 responded to certain public comments and concerns expressed in timely public meetings that followed proposing the DFC, as described more specifically in Appendix B of this Explanatory Report. Further, this approved DFC will enable current and future Management Plans and regulations of those GMA 10 GCDs charged with achieving this DFC to balance specific local risks arising from protecting the aquifer while maximizing groundwater production.

15. References

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