

The Nuts and Bolts of Groundwater Management Plans



&



Robert G. Bradley, P.G., C.T.C.M
Groundwater Technical Assistance
Texas Water Development Board

Texas Groundwater Summit
Texas Alliance of Groundwater Districts
San Antonio, Texas
August 31, 2022

Not a new nut to crack:



1949 – Plans required

1989 – Comprehensive &
public participation

Not a new nut to crack:



1949 – Plans required

1989 – Comprehensive plan
with
public participation

Current crop :



1997 – Plans required (again)
Certified by TWDB
RWP consistency

2001 – Use TWDB GAM data

2005 – Approved by TWDB
DFC goal
RWPGs to use plans

Current crop :



1997 – Plans required (again)
Certified by TWDB
RWP consistency

2001 – Use TWDB GAM data

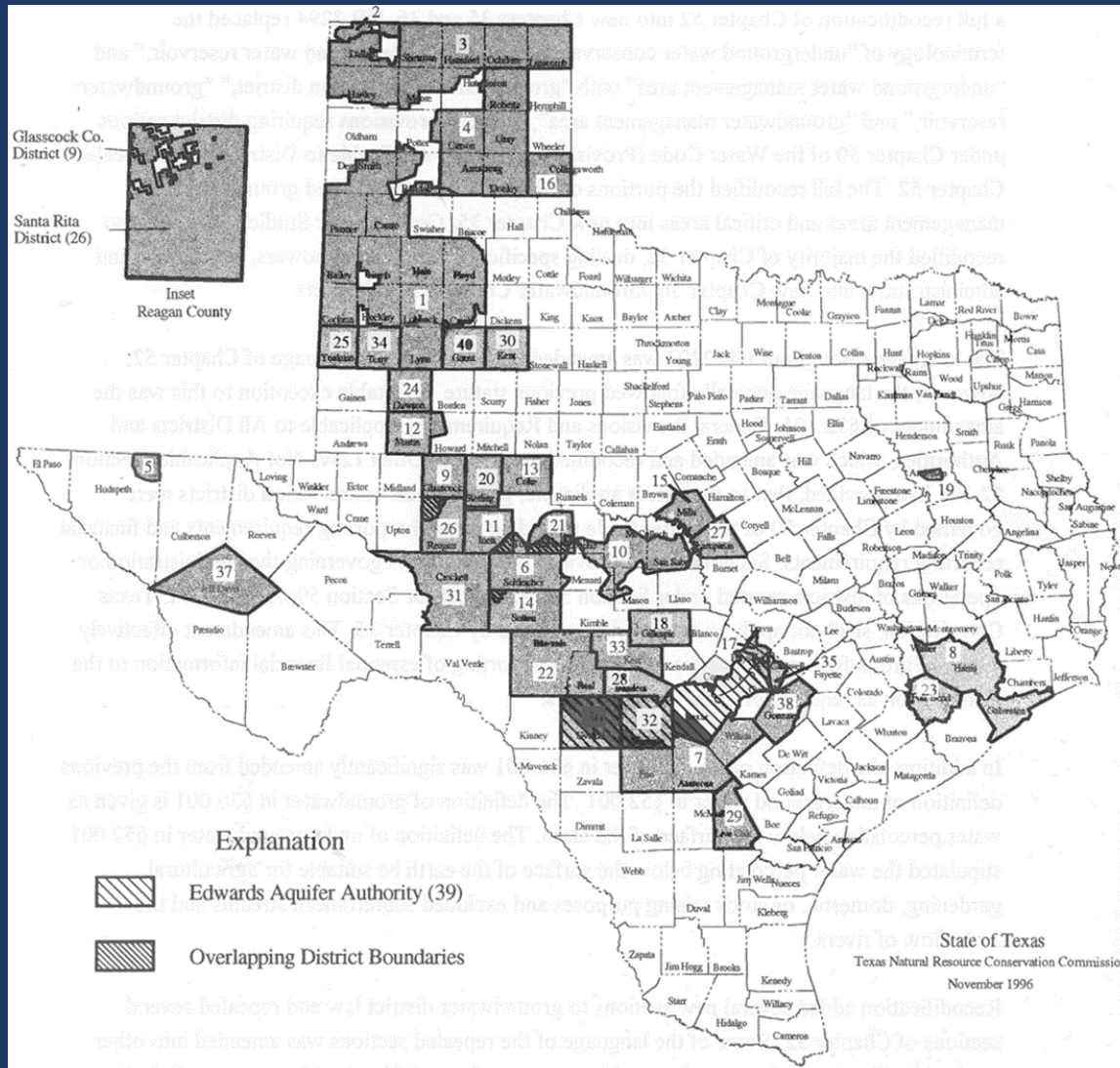
2005 – Approved by TWDB
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Current crop :



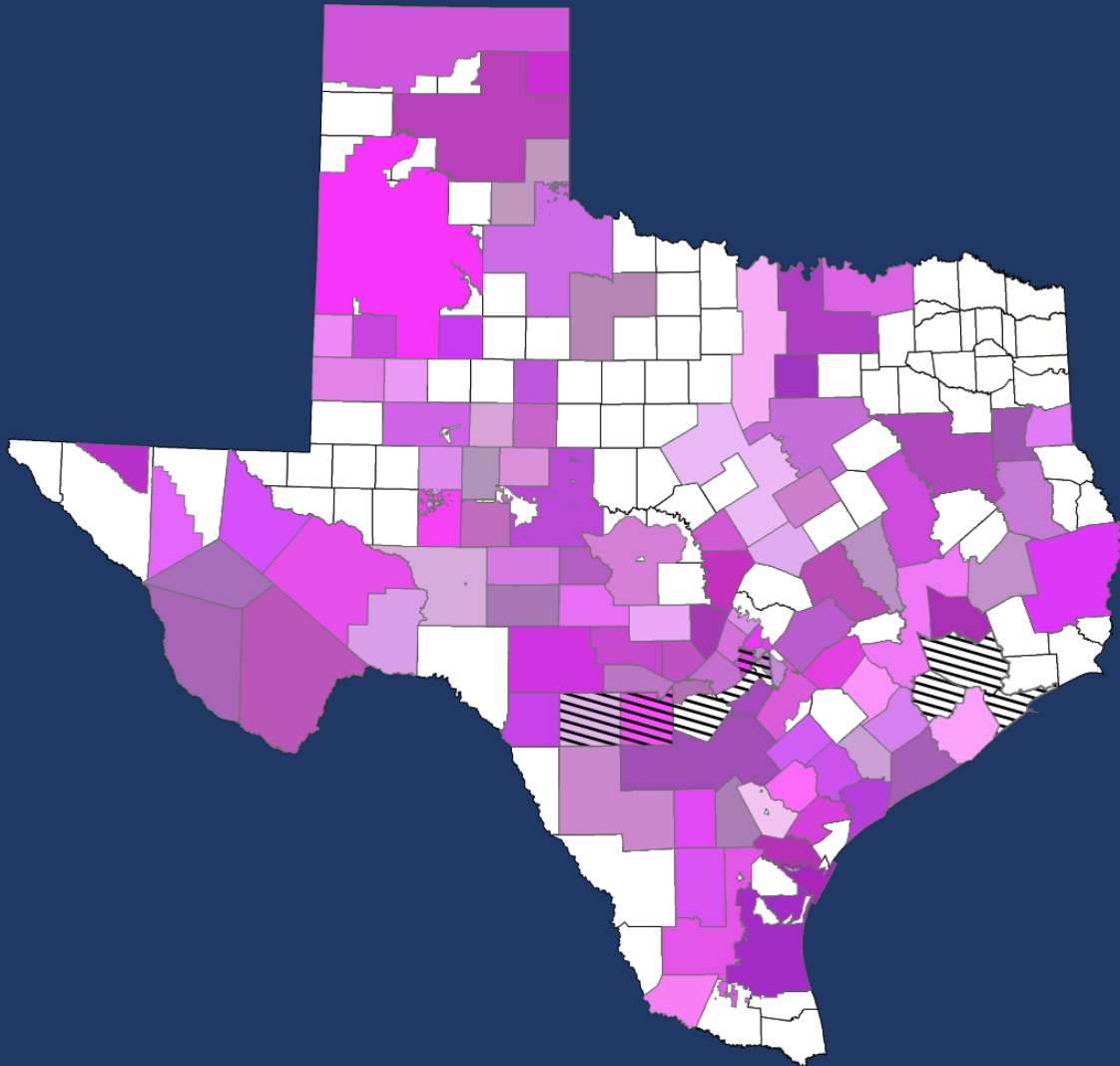
- 1997 – Plans required (again)
Certified by TWDB
RWP consistency
- 2001 – Use TWDB GAM data
- 2005 – Approved by TWDB
DFC goal
RWPGs to use plans

GCDs Then:



1996 – 40 GCDs

GCDs Now:



Now – 98 GCDs

More GCDs means:



More reviews!

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Quick stats:



10 – more than 90 days late
5 – less than 90 days late
8 – met the deadline (35%)

Quick stats:



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Management plan myths:



[This Photo](#) by Unknown Author is licensed under [CC BY](#)

Not important
Just for decoration
Can be done last minute

Management plan myths:



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Not important
Just for decoration
Can be done last minute

Management plan myths:



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Not important
Just for decoration
Can be done last minute

Management plans should be:



Highest importance

Basis of everything

Thoughtfully planned

Management plans should be:



Highest importance
Basis of everything
Thoughtfully planned

Management plans should be:



Most important
Basis of everything
Thoughtfully planned

Relax, everything can be smooth



Notice of plan due

Data provided by TWDB

Pre-reviews

Recommendations

Required/optional

Relax, everything can be smooth



Notice of plan due

Data provided by TWDB

Pre-reviews

Recommendations

Required/optional

Relax, everything can be smooth



Notice of plan due
Data provided by TWDB

Pre-reviews

Recommendations

Required/optional

Timeline (minimum)



Nine months out

- Notification of plan due from TCEQ

Six to nine months out

- notification of plan due and data packet sent from TWDB

Six to three months out

- Send in a well-written, proofread, formatted, following the checklist and guidelines draft plan for pre-review.

Timeline (minimum)



Three months out

- Adopt plan at public hearing

Two months

- Submit final adopted plan

TWDB sends approval letter within 60 days

- Cool certificate included!

Recipe for a successful plan:



Follow TWDB guidelines
& TWDB Checklist

Use most recent data

Proofread your plan

Recipe for a successful plan:



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& TWDB Checklist

Use most recent data

Proofread your plan

Recipe for a successful plan:



Follow TWDB guidelines
& TWDB Checklist

Use most recent data

Proofread your plan!

TWDB supplied data

Estimated Historical Water Use And 2022 State Water Plan Datasets:

Clearwater Underground Water Conservation District

by Stephen Allen
Texas Water Development Board
Groundwater Division
Groundwater Technical Assistance Section
stephen.allen@twdb.texas.gov
(512) 463-7317
June 15, 2022

GROUNDWATER MANAGEMENT PLAN DATA:

This package of water data reports (part 1 of a 2-part package of information) is being provided to groundwater conservation districts to help them meet the requirements for approval of their five-year groundwater management plan. Each report in the package addresses a specific numbered requirement in the Texas Water Development Board's groundwater management plan checklist. The checklist can be viewed and downloaded from this web address:

<http://www.twdb.texas.gov/groundwater/docs/GCD/GMPChecklist0113.pdf>

The five reports included in this part are:

1. Estimated Historical Water Use (checklist item 2)
from the TWDB Historical Water Use Survey (WUS)
2. Projected Surface Water Supplies (checklist item 6)
3. Projected Water Demands (checklist item 7)
4. Projected Water Supply Needs (checklist item 8)
5. Projected Water Management Strategies (checklist item 9)
from the 2022 Texas State Water Plan (SWP)

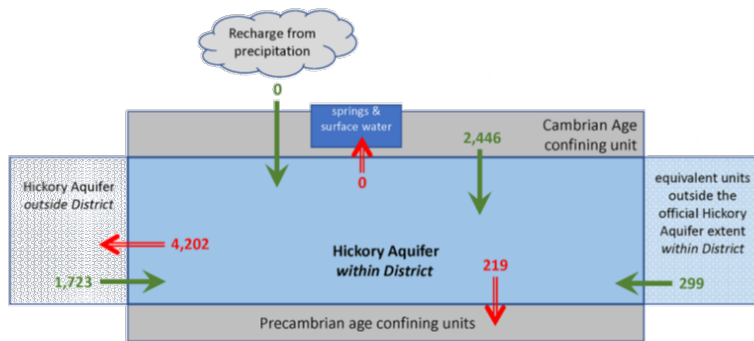
Part 2 of the 2-part package is the groundwater availability model (GAM) report for the District (checklist items 3 through 5). The District should have received, or will receive, this report from the Groundwater Availability Modeling Section. Questions about the GAM can be directed to Dr. Shirley Wade, shirley.wade@twdb.texas.gov, (512) 936-0883.

Historical water use Surface water supply Demands, needs, strategies

TWDB supplied data

GAM RUN 21-004: MENARD COUNTY UNDERGROUND WATER DISTRICT MANAGEMENT PLAN

Shirley Wade, Ph.D., P.G.
Texas Water Development Board
Groundwater Division
Groundwater Modeling Department
(512) 936-0883
October 8, 2021



Caveat: This diagram only includes the water budget items provided in Table 1. A complete water budget would include additional inflows and outflows. If the District requires values for additional water budget items, please contact TWDB.

Water budget

TWDB supplied data

**GAM RUN 21-010 MAG: MODELED
AVAILABLE GROUNDWATER FOR THE
AQUIFERS IN GROUNDWATER MANAGEMENT
AREA 4**

Radu Boghici, P.G. and Robert G. Bradley, P.G.
Texas Water Development Board
Groundwater Division
(512) 463-5808
January 21, 2022

Modeled Available Groundwater

Groundwater Conservation District	County	2020	2030	2040	2050	2060
Brewster County GCD	Brewster	2,587	2,587	2,586	2,583	2,582
Culberson County GCD	Culberson	99	99	99	99	99
Jeff Davis County UWCD	Jeff Davis	4,585	4,585	4,585	4,585	4,585
Presidio County UWCD	Presidio	4,065	4,065	4,065	4,065	4,065
Total		11,336	11,336	11,335	11,332	11,331

TWDB supplied data

Estimated Historical Water Use And 2022 State Water Plan Datasets:

Clearwater Underground Water Conservation District

by Stephen Allen
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June 15, 2022

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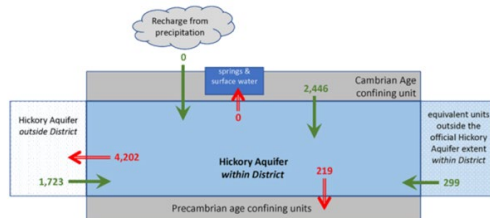
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(512) 936-0883
October 8, 2021

Groundwater Conservation District	County
Brewster County GCD	Brewster
Culberson County GCD	Culberson
Jeff Davis County UWCD	Jeff Davis
Presidio County UWCD	Presidio
Total	



Caveat: This diagram only includes the water budget items provided in Table 1. A complete water budget would include additional inflows and outflows. If the District requires values for additional water budget items, please contact TWDB.

Attach all three as appendices

Management plan checklist

Texas Water Development Board						
Groundwater Conservation District Management Plan Checklist, effective December 6, 2012						
District name:		<input type="checkbox"/> Official review <input type="checkbox"/> Preview				
Date plan received:						
Date plan reviewed:						
A management plan shall contain, unless explained as not applicable, the following elements, 31 TAC §356.52(a):						
	Citation of rule	Citation of statute	Present in plan and administratively complete	Source of data	Evidence that best available data was used	Notes
Is a paper hard copy of the plan available?	31 TAC §356.53(a)(1)					
Is an electronic copy of the plan available?	31 TAC §356.53(a)(2)					
1. Is an estimate of the modeled available groundwater in the District based on the desired future condition established under Section 36.108 included?	31 TAC §356.53(a)(3)(A)	TWC §36.1071(a)(3)(A)				
2. Is an estimate of the amount of groundwater being used within the District on an annual basis for at least the most recent five years included?	31 TAC §356.53(a)(3)(B)	TWC §36.1071(a)(3)(B)				
For sections 3-6 below, each district must use the groundwater availability modeling information provided by the TWDB in conjunction with available site-specific information provided by the district when developing the required estimates, 31 TAC §356.52(c):						
3. Is an estimate of the annual amount of recharge from precipitation, if any, to the groundwater resources within the District included?	31 TAC §356.53(a)(3)(C)	TWC §36.1071(a)(3)(C)				
4. For each aquifer in the district, is an estimate of the annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams and rivers, included?	31 TAC §356.53(a)(3)(D)	TWC §36.1071(a)(3)(D)				
5. Is an estimate of the annual volume of flow						
a) into the District within each aquifer,						
b) out of the District within each aquifer,	31 TAC §356.53(a)(3)(E)	TWC §36.1071(a)(3)(E)				
c) and between aquifers in the District,						
If a groundwater availability model is available, included?						
6. Is an estimate of the projected surface water supply within the District according to the most recently adopted state water plan included?	31 TAC §356.53(a)(3)(F)	TWC §36.1071(a)(3)(F)				
7. Is an estimate of the projected total demand for water within the District according to the most recently adopted state water plan included?	31 TAC §356.53(a)(3)(G)	TWC §36.1071(a)(3)(G)				
8. Did the District consider and include the water supply needs from the adopted state water plan?		TWC §36.1071(a)(4)				
9. Did the District consider and include the water management strategies from the adopted state water plan?		TWC §36.1071(a)(4)				
10. Did the district include details of how it will manage groundwater supplies in the district	31 TAC §356.53(a)(4)					
11. Are the actions, procedures, performance, and avoidance necessary to effectuate the management plan, including specifications and proposed rules, all specified in as much detail as possible, included in the plan?		TWC §36.1071(a)(5)				
12. Was evidence that the plan was adopted, after notice and hearing, included? Evidence includes the posted agenda, meeting minutes, and copies of the notice printed in the newspaper(s) and/or copies of certified receipts from the county courthouse(s).	31 TAC §356.53(a)(5)	TWC §36.1071(a)				
13. Was evidence that, following notice and hearing, the District coordinated in the development of its management plan with regional surface water management entities?	31 TAC §356.54	TWC §36.1071(a)				
14. Has any available site-specific information been provided by the district to the executive administrator for review and comment before being used in the management plan when developing the estimates, required in subsections 31 TAC §356.53(a)(3)(C), (D), and (E)?	31 TAC §356.53(a)	TWC §36.1071(a)				

Mark an affirmative response with YES
Mark a negative response with NO
Mark a non-applicable checklist item with N/A

Use the checklist
Follow the checklist
Make use of the checklist

Management plan checklist

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Use the checklist
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Make use of the checklist

Modeled available groundwater

GAM RUN 21-010 MAG: MODELED AVAILABLE GROUNDWATER FOR THE AQUIFERS IN GROUNDWATER MANAGEMENT AREA 4

Radu Boghici, P.G. and Robert G. Bradley, P.G.
Texas Water Development Board
Groundwater Division
(512) 463-5808
January 21, 2022

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Culberson County GCD	Culberson	99	99	99	99	99
Jeff Davis County UWCD	Jeff Davis	4,585	4,585	4,585	4,585	4,585
Presidio County UWCD	Presidio	4,065	4,065	4,065	4,065	4,065
Total		11,336	11,336	11,335	11,332	11,331

1

Provided by TWDB
Use right MAG

Estimate of groundwater being used

2

Estimated Historical Water Use TWDB Historical Water Use Survey (WUS) Data

Groundwater and surface water historical use estimates are currently unavailable for calendar year 2020. TWDB staff anticipates the calculation and posting of these estimates at a later date.

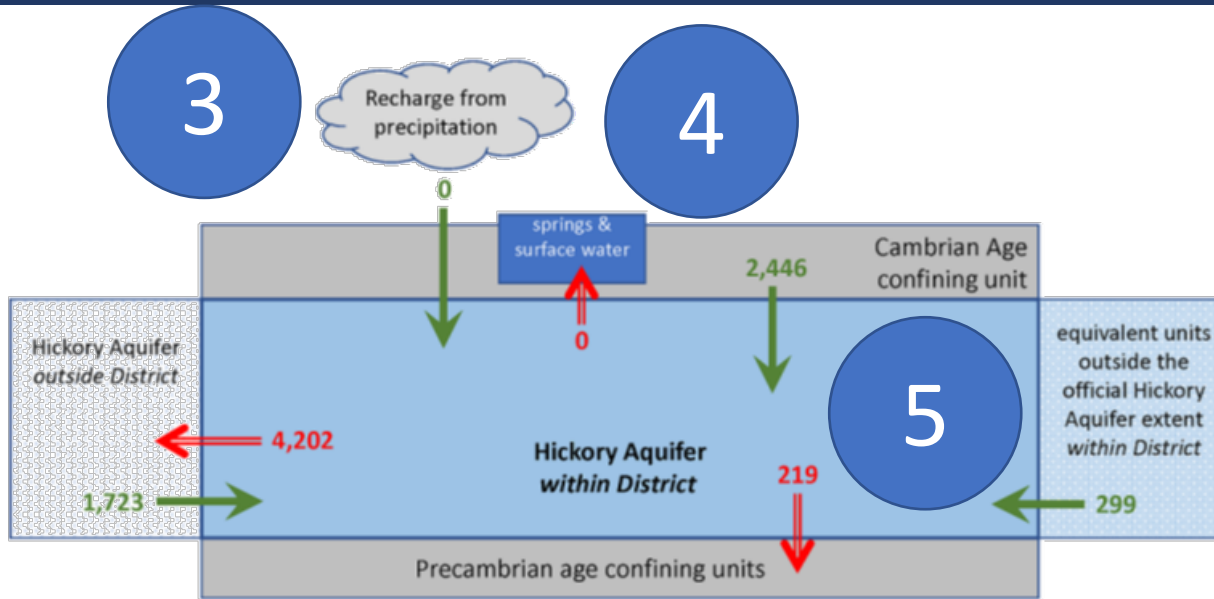
BELL COUNTY

All values are in acre-feet

Year	Source	Municipal	Manufacturing	Mining	Steam Electric	Irrigation	Livestock	Total
2019	GW	2,378	19	53	0	850	226	3,526
	SW	52,939	553	268	0	2,364	528	56,652
2018	GW	2,776	12	10	0	932	226	3,956
	SW	51,249	564	0	0	3,249	528	55,590
2017	GW	2,663	13	11	0	817	220	3,724
	SW	50,719	604	0	0	2,653	514	54,490
2016	GW	2,490	2	11	0	585	261	3,349
	SW	48,391	618	0	0	2,210	608	51,827
2015	GW	2,411	2	10	0	839	251	3,513
	SW	48,857	769	0	565	1,002	586	51,779

Provided by TWDB
Water use survey

Groundwater availability modeling information



Caveat: This diagram only includes the water budget items provided in Table 1. A complete water budget would include additional inflows and outflows. If the District requires values for additional water budget items, please contact TWDB.

Provided by TWDB
Use latest one

Projected surface water supply

6

Projected Surface Water Supplies TWDB 2022 State Water Plan Data

BELL COUNTY

All values are in acre-feet

RWPG	WUG	WUG Basin	Source Name	2020	2030	2040	2050	2060	2070
G	439 WSC	Brazos	Brazos River Authority Little River Lake/Reservoir System	1,624	1,624	1,624	1,624	1,624	1,624
G	Armstrong WSC	Brazos	Brazos River Authority Little River Lake/Reservoir System	256	95	0	0	0	0
G	Bell County WCID 2	Brazos	Brazos River Authority Little River Lake/Reservoir System	323	323	323	323	323	323
G	Bell County WCID 3	Brazos	Brazos River Authority Little River Lake/Reservoir System	1,207	1,601	2,176	2,552	2,840	3,125
G	Bell Milam Falls WSC	Brazos	Brazos River Authority Little River	1,009	1,011	1,019	1,027	1,023	1,022

Provided by TWDB
Most recent SWP

Projected water demand

Projected Water Demands TWDB 2022 State Water Plan Data

Please note that the demand numbers presented here include the plumbing code savings found in the Regional and State Water Plans.

BELL COUNTY

All values are in acre-feet

WUG	RWPG	WUG Basin	2020	2030	2040	2050	2060	2070
G	439 WSC	Brazos	1,407	1,656	1,917	2,191	2,483	2,785
G	Armstrong WSC	Brazos	464	486	507	530	558	586
G	Bartlett	Brazos	158	181	205	230	256	282
G	Bell County WCID 2	Brazos	305	335	367	402	438	474
G	Bell County WCID 3	Brazos	1,207	1,601	2,176	2,552	2,840	3,125
G	Bell Milam Falls WSC	Brazos	337	354	371	389	410	
G	Belton	Brazos	3,791	4,353	4,951	5,568	6,198	
G	Central Texas College District	Brazos	12	12	11	11	1	
G	County-Other, Bell	Brazos	453	483	523	567	1,190	
G	Dog Ridge WSC	Brazos	724	821	924	1,036	1,152	

7

Provided by TWDB
Most recent SWP

Water supply needs and water management strategies

*Yep, we
considered 'em.
– Anonymous*



8

9

Consideration!
Discuss needs in district
Discuss strategies
(groundwater strategies)

Details of how you will manage groundwater supplies



Give details

Actions, procedures, performance, and avoidance



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Provide a link to rules
or provide copy of rules

Plan adoption after notice and hearing



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Posted agendas
Minutes
Copy of notice

Coordination with Surface Water Management Entities



13

Political subdivisions

Store, take, divert, or supply

Directly or by contract

Coordination with Surface Water Management Entities



13

Political subdivisions

Store, take, divert, or supply

Directly or by contract

Coordination with Surface Water Management Entities



13

Political subdivisions

Store, take, divert, or supply

Directly or by contract

Goals: Management Objectives and performance standards



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Time based
Quantifiable
Can be not applicable

Goals:



Management objectives
Performance standards
Time-based and quantifiable

Goal example:



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“the district will measure the water levels in *ten* wells *twice per year* and submit *A report* of the water levels to the Board of Directors *every September.*”

Goals:



Efficient use of groundwater

Goals:



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Controlling and preventing
waste of groundwater

Goals:



Controlling and
preventing subsidence

Goals:



Addressing conjunctive surface
water management issues

Goals:



Addressing drought conditions

Goals:



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Addressing

- a) conservation,
- b) recharge enhancement,
- c) rainwater harvesting,
- d) precipitation enhancement, and
- e) brush control

Goals:



Addressing the desired future
conditions established
under TWC §36.108.31

A few bolts to consider:



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Updating plan
MAG – 2 years
Late letter from TCEQ ☹️

A few bolts to consider:



Adopting a final without pre-review
Not posting properly
Rejection by TWDB ☹️
- but gives additional time

When you make it through (and you will):

Recognition of Achievement

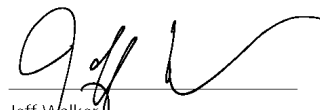
Presented to the

San Patricio County Groundwater Conservation District

in recognition of completing the

District Groundwater Management Plan

approved on August 17, 2022. A review of the management plan has documented that the plan is administratively complete and in compliance with Texas Water Code §36.1071 and 31 TAC 356.


Jeff Walker
Executive Administrator

Texas Water 
Development Board

Questions?

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