REGULAR BOARD MEETING
GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT
MEETING OF THE BOARD OF DIRECTORS

The Directors of the Gonzales County Underground Water Conservation District will meet in a public session on March 11, 2025, scheduled at 5:30 p.m. at the Gonzales County Underground Water Conservation District Office located at 522 Saint Matthew Street, Gonzales, Texas.

Note: Members of the public wishing to comment **must** attend the meeting in-person. However, any person may view or listen to the meeting via audio and video conference call. No participation or public comments will be allowed via video or conference call. The Audio and Video Conference Opens 5 minutes before the 5:30 p.m. beginning of the meeting.

GCUWCD March 11, 2025 Regular Board Meeting
Mar 11, 2025, 5:30 – 7:30 PM (America/Chicago)
Please join my meeting from your computer, tablet or smartphone.
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Access Code: 421-132-581
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POSTED
MAR 05 2025
3:25PM
LONA ACKMAN
COUNTY CLERK, GONZALES COUNTY TEXAS
BY Laura Cook DEPUTY

The agenda is as follows:

1. Call to Order.
2. Public Comments. Limit to 3 minutes per person.
3. Consent Agenda (Note: These items may be considered and approved by one motion of the Board. Directors may request to have any consent item removed from the consent agenda for consideration and possible action as a separate agenda item):
   a. Approval of minutes of February 11, 2025, Regular Board Meeting.
   b. Approval of the Financial Report.
   c. Approval of the District's bills to be paid.
   d. Approval of the Mitigation Fund bills to be paid.
   e. Approval of District Manager, Administrative Staff, Board Member, Field Technician, and Mitigation Manager Expenses.
   f. Approval of Manager's Report (monthly report, transporter usage, drought index).
   g. Approval of Well Mitigation Manager's Report (well mitigation progress).
   h. Approval of Field Technician's Report (well registrations, water levels, water quality).
4. Discuss and possibly take action on any item removed from Consent Agenda.
5. Discuss and possibly take action on annual review and re-adoption of the District's Financial Policy.
6. Presentation of annual audit report from Montemayor Britton Bender PC and possible action on accepting the report.
7. Discuss and possibly take action on setting a Public Hearing for Draft Rules.
8. Discuss and possibly take action on setting the order of presentations by parties, and time limitations for oral presentations for the parties of the contested case hearing.
9. Presentation of the SOAH Administrative Law Judge's Proposal for Decision for the Guadalupe-Blanco River Authority permit amendment application Final Hearing and oral presentations from the parties.
10. Discussion and possible action on the Guadalupe-Blanco River Authority permit amendment application (continuation of Final Hearing).
11. Presentation of legislative/legal updates from legal counsel.

REGULAR BOARD MEETING
GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT
MEETING OF THE BOARD OF DIRECTORS

12. Discussion of other items of interest by the Board and direction to management based on the items set forth above.
13. Adjourn.

The above agenda schedule represents an estimate of the order for the indicated items and is subject to change at any time. These public meetings are available to all persons regardless of disability. If you require special assistance to attend the meeting, please call 830.672.1047 at least 24 hours in advance of the meeting to coordinate any special physical access arrangements.

At any time during the meeting and in compliauce with the Texas Open Meetings Act, Chapter 551, Government Code, Vernon's Texas Codes, Annotated, the Gonzales County Underground Water Conservation District Board may meet in executive session on any of the above agenda items or other lawful items for consultation concerning attorney-client matters (§ 551.071); deliberation regarding real property (§ 551.072); deliberation regarding prospective gift (§ 551.073); personnel matters (§ 551.074); and deliberation regarding security devices (§ 551.076). Any subject discussed in executive session may be subject to action during an open meeting.

POSTED THIS THE 5th DAY OF MARCH 2025 AT _____ O'CLOCK by _____.

Gonzales County Underground Water Conservation District
Minutes of the Board of Directors
February 11, 2025
Board Meeting

The regular meeting of the Board of Directors of the Gonzales County Underground Water Conservation District (the District) was called to order. Present for the meeting were directors: Mr. Bruce Tieken, Mr. Barry Miller, Mr. Mark Ainsworth, and Mr. Mike St. John Mr. Glenn Glass. Also present for the meeting were GCUWCD General Manager Laura Martin and legal counsel Greg Ellis. Other Attendees included: (See Attached List)

Call to Order
The president of the Board of Directors called the meeting to order at 5:34 p.m.

Public Comment: Public comments were received from Ms. Sally Ploeger, landowner, Mr. Ted Boriack, landowner, Mr. Mark Ploeger, landowner, made a public comment on behalf of himself and the Water Protection Association (WPA). A written record of the board meeting and comments received are filed at the District office.

Consent Agenda (Note: These items may be considered and approved by one motion of the Board. Directors may request to have any consent item removed from the consent agenda for consideration and possible action as a separate agenda item):

Approval of minutes of January 14, 2025 Public Hearing Draft Management Plan
Approval of minutes of January 18, 2025 Workshop District Draft Rules.
Approval of the Financial Report.
Approval of the District's bills to be paid.
Approval of the Mitigation Funds bills to be paid.
Approval of District Manager, Administrative Staff, Board Member, Field Technician, and Mitigation Manager Expenses.
Approval of Manager's Report (monthly report, transporter usage, drought index).
Approval of Well Mitigation Manager's Report (well mitigation progress).
Approval of Field Technician's Report (well registrations, water levels, water quality).

Discuss and possibly take action on any item removed from Consent Agenda.
Mr. Mark Ainsworth made a motion to approve the Consent Agenda as presented. Mr. Mike St. John seconded the motion. The motion passed unanimously. With items added to the agenda, an invoice for the RICO copy machine and Alliance Regional Water Authority (ARWA) Production since coming online in September 2024.

Discussion on the District's January 2025 water level report.
Then, the Board and General Manager discussed the District's January water level report along with the trend drawdown line measurements of the Western and Eastern areas of the District. The break down shows all aquifers and the breakdown of each Aquifer from 2012 to current.

Discuss and possibly take action on the District's 2024 annual report.
No action taken. The General Manager provided the 2024 Annual Report to the Board of Directors. The report is also available on the District's website.

Discussion on the Mitigations Program 2024 annual Report.
No action taken. The General Manager provided the Mitigation 2024 Annual Report to the Board of Directors. The report is also available on the District's website.

Presentation of annual audit report by Montemayor Britton Bender PC and possible action on accepting the report.
Ms. Laura Martin, General Manager presented the Fiscal Year 2023-2024 annual audit draft to the Board of

Directors. The were no misrepresentations from the data provided by the District. Next month's Board meeting will have the final report ready for approval. Mr. Barry Miller made a motion to accept the annual audit draft for fiscal year 2023-2024. Mr. St. John seconded the motion. The motion passed unanimously.

Discuss and possibly take action on the purchase of a camera for water wells and boreholes.
This item was tabled for a further date. No action was taken.

Discuss and possibly take action on the purchase of additional rain gauges.
Mr. Miller made a motion to approve the purchase of the rain gauges, Mr. St. John seconded the motion. The motion passed unanimously.

Executive session pursuant to §551.074 Government Code for discussion of personnel matters.
Board members left the meeting and went behind closed doors to hold and Executive session.

Discuss and possibly take action on the Mitigation Management position.
Decision was made to terminate Link Benson as Mitigation Manager, in Executive session. Mr. Miller made a motion to terminate Mr. Link Benson as Mitigation Manager, effective February 28, 2025. Mr. St. John seconded the motion. The motion passed unanimously.

Presentation of legislative/legal updates from legal counsel.
Legal counsel to the District, Mr. Greg Ellis, discussed with the board ongoing legislative and legal updates.

Discussion of other items of interest by the Board and direction to management based on the items set forth above.
No action was taken at this time.

Adjourn:
A motion was made by Mr. Mark Ainsworth to adjourn the meeting, and Mr. Glenn Glass seconded the motion. The motion passed unanimously. The meeting adjourned at 7:38 p.m.

Approved By:

_____
March 11, 2025
TJ

Gonzales County Underground Water Conservation District
Investment Report
March 11, 2025

CD Information - District Funds

Account	Location	Purchase Date	Purchase Value	Interest Rate	Maturity Date	As of	Amount
CD #11	Sage Capital Bank	2/4/2025	$152,818.77	5.15%	2/4/2026	2/28/2025	$184,569.15
CD #365	Randolph Brooks FCU	11/8/2024	$271,523.86	4.50%	5/8/2025	2/28/2025	$313,047.41
CD#49	Sage Capital Bank	8/14/2024	$250,000.00	5.00%	8/14/2025	2/28/2025	$292,763.82
CD#321	SouthStar Bank	2/21/2025	$500,000.00	4.50%	2/21/2025	2/28/2025	$500,728.22
					Total CD's to Date		**$1,291,108.60**
Market Comparisons							
	Tex Pool			4.35%		3/7/2025	
	6 Mo. Treasury Yield			4.23%		3/7/2025	

Banking Information - District Funds

Account	Location	As of	Amount
#59 Money Market	Sage Capital Bank	2/28/2025	$1,137,985.77
#61 Operating	Sage Capital Bank	2/28/2025	$4,509.87
#356 Savings	Randolph Brooks	2/28/2025	$1.00
		Total Cash to Date	**$1,142,496.64**

Banking Information - Western Mitigation Fund

Account	Location	As of	Amount
#35 Money Market	Sage Capital Bank	2/28/2025	$257,505.11
#70 Operating	Sage Capital Bank	2/28/2025	$2,627.86
		Total Cash to Date	**$260,132.97**

Banking Information - Eastern Mitigation Fund

Account	Location	As of	Amount
#64 Money Market	Sage Capital Bank	2/28/2025	$280,382.06
#98 Operating	Sage Capital Bank	2/28/2025	$2,500.00
		Total Cash to Date	**$282,882.06**
			$2,976,620.27

Weighted Average Maturity (WAM)

Using the Current Date and Maturity Date: Weighted Average Maturity (WAM) =

The overall sum of each security's par amount multiplied by its number of days to maturity, divided by the total of all investments.

Security Description	Investment Amount	CD Start Date	Reprting Period Date	Mat. Date	Mat. in Days (DTM)	WAM	CD Term
Sage Capital CD #11	$184,569.15	2/4/2025	2/28/2025	2/4/2026	341	48.747	12 mo
Randolph Brooks CD #365	$313,047.41	11/8/2024	2/28/2025	5/8/2025	69	16.730	18 mo
Sage Capital CD #49	$292,763.82	8/14/2024	2/28/2025	8/14/2025	167	37.868	12 mo
SouthStar Bank CD#321	$500,728.22	2/21/2025	2/28/2025	8/21/2025	174	67.482	6mo
CD Total	**$1,291,108.60**					170.827	
#59 Money Market	$1,137,985.77				1	0.675	
#61 Operating	$4,509.87				1	0.003	
#365 Savings	$1.00				1	0.000	
#35 Money Market	$257,505.11				1	0.153	
#70 Operating	$2,627.86				1	0.002	
#64 Money Market	$280,382.06				1	0.166	
#98 Operating	$2,500.00				1	0.001	
Fund Total	**$1,685,511.67**					1.000	
Grand Totals	**$2,976,620.27**				WAM	**171.827**	

The portfolio of the Gonzales County Underground Water Conservation District is believed to be in compliance with the District's Board approved Investment Policy, State law, and the Investment Strategy.

Signed: _____
Laura Martin, Investment Officer

Dated: 03/07/2025

GCUWCD BILLS TO BE PAID
March 11, 2025

GVTC (Local & Long Distance & Internet)-**Paid**	$235.29
City of Gonzales (Utilities)-**Paid**	$199.47
Ricoh (Copier Rental-February)	TBD
Synergisdic, LLC	$824.00
Verizon (Cell Phone)-**Paid**	$82.48
Hi-Tech (Pest Services)-**Paid**	$95.00
Blue Cross Blue Shield (Employee Health Insurance)-**Paid**	$550.49
GCDA Budget Share (Quarterly Budgetshare Payment)	$766.25
Caldwell Co. Appraisal District (Texas Property Tax)	$49.48
Caldwell Co. Appraisal District (Collection Budget)	$14.95
GoTo Meeting (Monthly Meeting Telephone Charge)-**Paid**	$36.16
State Office of Administrative Hearings (GBRA Contested Case)	$51.98
McElroy Sullivan Miller & Weber LLP (Legal Counsel)	$229.50
Daniel B. Stephenssssss & Associates (Consultant Services)	$8,440.98
Harland Clarke (Checks)-**Paid**	$472.91
Coastal Office Solutions	$138.76
Lockhart Post-Register (Classified Ad)	$160.00
Gonzales Inquirer (Classified Ad)	$273.60
Personal Impresstions (Rain Gauges)	$1,632.22
Walmart (Office Supplies)	$71.16
Walmart (Office Supplies)	$23.81
Walmart (Refund Returned Item)	-$7.12
Wagener's Well Service (Plugging & Abandonment F055)	$4,604.48
Wagener's Well Service (Plugging & Abandonment B155)	$6,811.52
TOTAL	$25,757.37

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 08, 2025
Owner: JB Lester Estate -F055- WESTERN
Well Location: This well is located 2.79 miles SW of Belmont on Capote Rd CR 466.
WELL USE: DOMESTIC

Well Data Collection	**Unit Cost**	**Units**	**No. Units**	**Total**
Well data collection	$190.80	each		$0.00
Diagnostic evaluation (pumping test, water quality)	$286.20	each		$0.00
Equipment and labor to remove/reinstall existing pump	$600.00	each		$0.00
Downhole camera survey	$2.65	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Pump Removal/Installation Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment and labor to remove existing pump	$325.00	each		$0.00
Equipment, labor, and materials to install electric pump to 100 ft.	$2,480.00	each		$0.00
Equipment, labor, and materials to install electric pump to 200 ft.	$4,800.00	each		$0.00
Price per foot over 200ft (includes pipe and wire)	$6.25	per foot		$0.00
Dole flow valve (15gpm)	$116.60	each		$0.00
Pressure relief valve	$67.50	each		$0.00
Pressure switch (control switch)	$57.50	each		$0.00
Pre-pressurized tank (80 gal capacity, includes cement pads)	$950.00	each		$0.00
PVC electrical conduit & misc. fittings (includes wire)	$8.75	per foot		$0.00
Electrical junction box	$53.00	each		$0.00
4 Portable panels to enclose well (5ft tall)	$735.00	total		$0.00
1-1/4 PVC pipe & ditching installed	$4.50	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Solar Pump Installation	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment/ labor to install solar pump and all associated equipment to 200 ft.	$1,475.00	each		$0.00
Solar pump system (11 gpm pump and 2 solar panels)	$7,300.00	each		$0.00
Add additional solar panel	$1,272.00	each		$0.00
Concret	$12.00	each		$0.00
Mobilization/Demobilization ≤ 50 miles roundtrip	$169.60	lump sum		$0.00
			Total	**$0.00**
Water Well Drilling Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment, materials, and labor to install 4-1/2" dia. well to 800 ft.	$42.00	per foot		$0.00
Equipment, materials, and labor to install 5" dia. well to 800 ft.	$32.00	per foot		$0.00
Equipment, materials, and labor to install 6" dia. well to 800 ft.	$35.00	per foot		$0.00
Borehole sealed around casing with palletized bentonite	$12.60	each		$0.00
Construct 4 x 4 concrete well pad	$650.00	each		$0.00
Equipment and labor to develop wells	$1,590.00	each		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$1,500.00	lump sum		$0.00
			Total	**$0.00**

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 08, 2025
Owner: JB Lester Estate -F055- WESTERN
Well Location: This well is located 2.79 miles SW of Belmont on Capote Rd CR 466.
WELL USE: DOMESTIC

Plugging and Abandonment Services				
	Unit Cost	Units	No. Units	Total
Equipment, materials, and labor to plug and abandon a 4" dia. Well to 800 ft.	$8.36	per foot	168	$1,404.48
Equipment, materials, and labor to plug and abandon a 5" dia. Well to 800 ft.	$10.48	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 6" dia. Well to 800 ft.	$12.60	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 8" dia. Well to 800 ft.	$14.60	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$3,200.00	lump sum	1	$3,200.00
			Total	**$4,604.48**

Additional Materials Not Included in Unit Costs	Unit Cost	Units	No. Units	Total
Chlorination	$25.00	per unit		$0.00
Jet Well	$850.00	per unit		$0.00
Surface Casing	$3,000.00			$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
			Total	**$0.00**

Hourly Rate for Work Not Included in Unit Costs	Unit Cost	Units	No. Units	Total
	$150.00	per hour		$0.00
				$0.00
				$0.00
			Total	**$0.00**
			Total Invoice	**$4,604.48**

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 03, 2025
Owner: Jim Parker -B155- WESTERN
Well Location: This well is located 2 mile NE of Ottine between HWY 183&1586. At Benke Lake
WELL USE:LIVESTOCK

Well Data Collection	**Unit Cost**	**Units**	**No. Units**	**Total**
Well data collection	$190.80	each		$0.00
Diagnostic evaluation (pumping test, water quality)	$286.20	each		$0.00
Equipment and labor to remove/reinstall existing pump	$600.00	each		$0.00
Downhole camera survey	$2.65	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Pump Removal/Installation Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment and labor to remove existing pump	$325.00	each		$0.00
Equipment, labor, and materials to install electric pump to 100 ft.	$2,480.00	each		$0.00
Equipment, labor, and materials to install electric pump to 200 ft.	$4,800.00	each		$0.00
Price per foot over 200ft (includes pipe and wire)	$6.25	per foot		$0.00
Dole flow valve (15gpm)	$116.60	each		$0.00
Pressure relief valve	$67.50	each		$0.00
Pressure switch (control switch)	$57.50	each		$0.00
Pre-pressurized tank (80 gal capacity, includes cement pads)	$950.00	each		$0.00
PVC electrical conduit & misc. fittings (includes wire)	$8.75	per foot		$0.00
Electrical junction box	$53.00	each		$0.00
4 Portable panels to enclose well (5ft tall)	$735.00	total		$0.00
1-1/4 PVC pipe & ditching installed	$4.50	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Solar Pump Installation	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment/ labor to install solar pump and all associated equipment to 200 ft.	$1,475.00	each		$0.00
Solar pump system (11 gpm pump and 2 solar panels)	$7,300.00	each		$0.00
Add additional solar panel	$1,272.00	each		$0.00
Concret	$12.00	each		$0.00
Mobilization/Demobilization ≤ 50 miles roundtrip	$169.60	lump sum		$0.00
			Total	**$0.00**
Water Well Drilling Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment, materials, and labor to install 4-1/2" dia. well to 800 ft.	$42.00	per foot		$0.00
Equipment, materials, and labor to install 5" dia. well to 800 ft.	$32.00	per foot		$0.00
Equipment, materials, and labor to install 6" dia. well to 800 ft.	$35.00	per foot		$0.00
Borehole sealed around casing with palletized bentonite	$12.60	each		$0.00
Construct 4 x 4 concrete well pad	$650.00	each		$0.00
Equipment and labor to develop wells	$1,590.00	each		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$1,500.00	lump sum		$0.00
			Total	**$0.00**

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 03, 2025
Owner: Jim Parker -B155- WESTERN
Well Location: This well is located 2 mile NE of Ottine between HWY 183&1586. At Benke Lake
WELL USE:LIVESTOCK

Plugging and Abandonment Services				
	Unit Cost	**Units**	**No. Units**	**Total**
Equipment, materials, and labor to plug and abandon a 4" dia. Well to 800 ft.	$8.36	per foot	432	$3,611.52
Equipment, materials, and labor to plug and abandon a 5" dia. Well to 800 ft.	$10.48	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 6" dia. Well to 800 ft.	$12.60	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 8" dia. Well to 800 ft.	$14.60	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$3,200.00	lump sum	1	$3,200.00
			Total	**$6,811.52**

Additional Materials Not Included in Unit Costs	**Unit Cost**	**Units**	**No. Units**	**Total**
Chlorination	$25.00	per unit		$0.00
Jet Well	$850.00	per unit		$0.00
Surface Casing	$3,000.00			$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
			Total	**$0.00**

Hourly Rate for Work Not Included in Unit Costs	**Unit Cost**	**Units**	**No. Units**	**Total**
	$150.00	per hour		$0.00
				$0.00
				$0.00
			Total	**$0.00**
			Total Invoice	**$6,811.52**

GCUWCD WMF BILLS TO BE PAID
March 11, 2025

Wagner's Well Service (Jim Parker B155)	$40,166.20
Wagner's Well Service (J.B. Lester Trust F055)	$36,806.20
Wagner's Well Service (Bruce Patteson F097)	$18,576.20
TOTAL	$95,548.60

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 03, 2025
Owner: Jim Parker- B155- WESTERN
Well Location: This well is located 2 mile NE of Ottine between HWY 183&1586. At Benke Lake
WELL USE:LIVESTOCK

Well Data Collection	**Unit Cost**	**Units**	**No. Units**	**Total**
Well data collection	$190.80	each		$0.00
Diagnostic evaluation (pumping test, water quality)	$286.20	each		$0.00
Equipment and labor to remove/reinstall existing pump	$600.00	each		$0.00
Downhole camera survey	$2.65	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Pump Removal/Installation Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment and labor to remove existing pump	$325.00	each		$0.00
Equipment, labor, and materials to install electric pump to 100 ft.	$2,480.00	each		$0.00
Equipment, labor, and materials to install electric pump to 200 ft.	$4,800.00	each		$0.00
Price per foot over 200ft (includes pipe and wire)	$6.25	per foot		$0.00
Dole flow valve (15gpm)	$116.60	each		$0.00
Pressure relief valve	$67.50	each		$0.00
Pressure switch (control switch)	$57.50	each		$0.00
Pre-pressurized tank (80 gal capacity, includes cement pads)	$950.00	each		$0.00
PVC electrical conduit & misc. fittings (includes wire)	$8.75	per foot		$0.00
Electrical junction box	$53.00	each		$0.00
4 Portable panels to enclose well (5ft tall)	$735.00	total		$0.00
1-1/4 PVC pipe & ditching installed	$4.50	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Solar Pump Installation	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment/ labor to install solar pump and all associated equipment to 200 ft.	$1,475.00	each	1	$1,475.00
Solar pump system (11 gpm pump and 2 solar panels)	$7,300.00	each	1	$7,300.00
Add additional solar panel	$1,272.00	each	6	$7,632.00
Concret	$12.00	each	30	$360.00
Mobilization/Demobilization ≤ 50 miles roundtrip	$169.60	lump sum	2	$339.20
			Total	**$17,106.20**
Water Well Drilling Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment, materials, and labor to install 4-1/2" dia. well to 800 ft.	$42.00	per foot	460	$19,320.00
Equipment, materials, and labor to install 5" dia. well to 800 ft.	$32.00	per foot		$0.00
Equipment, materials, and labor to install 6" dia. well to 800 ft.	$35.00	per foot		$0.00
Borehole sealed around casing with palletized bentonite	$12.60	each		$0.00
Construct 4 x 4 concrete well pad	$650.00	each	1	$650.00
Equipment and labor to develop wells	$1,590.00	each	1	$1,590.00
Mobilization/Demobilization ≤ 50 miles round-trip	$1,500.00	lump sum	1	$1,500.00
			Total	**$23,060.00**

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 03, 2025
Owner: Jim Parker- B155- WESTERN
Well Location: This well is located 2 mile NE of Ottine between HWY 183&1586. At Benke Lake
WELL USE:LIVESTOCK

Plugging and Abandonment Services				
	Unit Cost	Units	No. Units	Total
Equipment, materials, and labor to plug and abandon a 4" dia. Well to 800 ft.	$8.36	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 5" dia. Well to 800 ft.	$10.48	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 6" dia. Well to 800 ft.	$12.60	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 8" dia. Well to 800 ft.	$14.60	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$3,200.00	lump sum		$0.00
			Total	**$0.00**
Additional Materials Not Included in Unit Costs	**Unit Cost**	**Units**	**No. Units**	**Total**
Chlorination	$25.00	per unit		$0.00
Jet Well	$850.00	per unit		$0.00
Surface Casing	$3,000.00			$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
			Total	**$0.00**

Hourly Rate for Work Not Included in Unit Costs	Unit Cost	Units	No. Units	Total
	$150.00	per hour		$0.00
				$0.00
				$0.00
			Total	**$0.00**
			Total Invoice	**$40,166.20**

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 08, 2025
Owner: JB Lester Estate-F055- WESTERN
Well Location: This well is located 2.79 miles SW of Belmont on Capote Rd Cr 466.
WELL USE:LIVESTOCK/DOMESTIC

Well Data Collection	**Unit Cost**	**Units**	**No. Units**	**Total**
Well data collection	$190.80	each		$0.00
Diagnostic evaluation (pumping test, water quality)	$286.20	each		$0.00
Equipment and labor to remove/reinstall existing pump	$600.00	each		$0.00
Downhole camera survey	$2.65	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Pump Removal/Installation Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment and labor to remove existing pump	$325.00	each		$0.00
Equipment, labor, and materials to install electric pump to 100 ft.	$2,480.00	each		$0.00
Equipment, labor, and materials to install electric pump to 200 ft.	$4,800.00	each		$0.00
Price per foot over 200ft (includes pipe and wire)	$6.25	per foot		$0.00
Dole flow valve (15gpm)	$116.60	each		$0.00
Pressure relief valve	$67.50	each		$0.00
Pressure switch (control switch)	$57.50	each		$0.00
Pre-pressurized tank (80 gal capacity, includes cement pads)	$950.00	each		$0.00
PVC electrical conduit & misc. fittings (includes wire)	$8.75	per foot		$0.00
Electrical junction box	$53.00	each		$0.00
4 Portable panels to enclose well (5ft tall)	$735.00	total		$0.00
1-1/4 PVC pipe & ditching installed	$4.50	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Solar Pump Installation	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment/ labor to install solar pump and all associated equipment to 200 ft.	$1,475.00	each	1	$1,475.00
Solar pump system (11 gpm pump and 2 solar panels)	$7,300.00	each	1	$7,300.00
Add additional solar panel	$1,272.00	each	6	$7,632.00
Concret	$12.00	each	30	$360.00
Mobilization/Demobilization ≤ 50 miles roundtrip	$169.60	lump sum	2	$339.20
			Total	**$17,106.20**
Water Well Drilling Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment, materials, and labor to install 4-1/2" dia. well to 800 ft.	$42.00	per foot	380	$15,960.00
Equipment, materials, and labor to install 5" dia. well to 800 ft.	$32.00	per foot		$0.00
Equipment, materials, and labor to install 6" dia. well to 800 ft.	$35.00	per foot		$0.00
Borehole sealed around casing with palletized bentonite	$12.60	each		$0.00
Construct 4 x 4 concrete well pad	$650.00	each	1	$650.00
Equipment and labor to develop wells	$1,590.00	each	1	$1,590.00
Mobilization/Demobilization ≤ 50 miles round-trip	$1,500.00	lump sum	1	$1,500.00
			Total	**$19,700.00**

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 08, 2025
Owner: JB Lester Estate-F055- WESTERN
Well Location: This well is located 2.79 miles SW of Belmont on Capote Rd Cr 466.
WELL USE:LIVESTOCK/DOMESTIC

Plugging and Abandonment Services				
	Unit Cost	**Units**	**No. Units**	**Total**
Equipment, materials, and labor to plug and abandon a 4" dia. Well to 800 ft.	$8.36	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 5" dia. Well to 800 ft.	$10.48	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 6" dia. Well to 800 ft.	$12.60	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 8" dia. Well to 800 ft.	$14.60	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$3,200.00	lump sum		$0.00
			Total	**$0.00**

Additional Materials Not Included in Unit Costs	Unit Cost	Units	No. Units	Total
Chlorination	$25.00	per unit		$0.00
Jet Well	$850.00	per unit		$0.00
Surface Casing	$3,000.00			$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
			Total	**$0.00**

Hourly Rate for Work Not Included in Unit Costs	Unit Cost	Units	No. Units	Total
	$150.00	per hour		$0.00
				$0.00
				$0.00
			Total	**$0.00**
			Total Invoice	**$36,806.20**

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 12, 2025
Owner: Bruce Patteson-F097- WESTERN
Well Location: Lat: This well is locatd 3 miles N.W. of Smiley on HWY 87
WELL USE:LIVESTOCK

Well Data Collection	**Unit Cost**	**Units**	**No. Units**	**Total**
Well data collection	$190.80	each		$0.00
Diagnostic evaluation (pumping test, water quality)	$286.20	each		$0.00
Equipment and labor to remove/reinstall existing pump	$600.00	each		$0.00
Downhole camera survey	$2.65	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$0.00**
Pump Removal/Installation Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment and labor to remove existing pump	$325.00	each		$0.00
Equipment, labor, and materials to install electric pump to 100 ft.	$2,480.00	each		$0.00
Equipment, labor, and materials to install electric pump to 200 ft.	$4,800.00	each		$0.00
Price per foot over 200ft (includes pipe and wire)	$6.25	per foot		$0.00
Dole flow valve (15gpm)	$116.60	each		$0.00
Pressure relief valve	$67.50	each		$0.00
Pressure switch (control switch)	$57.50	each		$0.00
Pre-pressurized tank (80 gal capacity, includes cement pads)	$950.00	each		$0.00
PVC electrical conduit & misc. fittings (includes wire)	$8.75	per foot		$0.00
Electrical junction box	$53.00	each		$0.00
4 Portable panels to enclose well (5ft tall)	$735.00	total	2	$1,470.00
1-1/4 PVC pipe & ditching installed	$4.50	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$250.00	lump sum		$0.00
			Total	**$1,470.00**
Solar Pump Installation	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment/ labor to install solar pump and all associated equipment to 200 ft.	$1,475.00	each	1	$1,475.00
Solar pump system (11 gpm pump and 2 solar panels)	$7,300.00	each	1	$7,300.00
Add additional solar panel	$1,272.00	each	6	$7,632.00
Concret	$12.00	each	30	$360.00
Mobilization/Demobilization ≤ 50 miles roundtrip	$169.60	lump sum	2	$339.20
			Total	**$17,106.20**
Water Well Drilling Services	**Unit Cost**	**Units**	**No. Units**	**Total**
Equipment, materials, and labor to install 4-1/2" dia. well to 800 ft.	$42.00	per foot		$0.00
Equipment, materials, and labor to install 5" dia. well to 800 ft.	$32.00	per foot		$0.00
Equipment, materials, and labor to install 6" dia. well to 800 ft.	$35.00	per foot		$0.00
Borehole sealed around casing with palletized bentonite	$12.60	each		$0.00
Construct 4 x 4 concrete well pad	$650.00	each		$0.00
Equipment and labor to develop wells	$1,590.00	each		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$1,500.00	lump sum		$0.00
			Total	**$0.00**

Water Well Driller: Wagners' Well Service
Address: 3504 FM 2922, Nixon TX 78140
Invoice Date: February 12, 2025
Owner: Bruce Patteson-F097- WESTERN
Well Location: Lat: This well is locatd 3 miles N.W. of Smiley on HWY 87
WELL USE:LIVESTOCK

Plugging and Abandonment Services				
	Unit Cost	Units	No. Units	Total
Equipment, materials, and labor to plug and abandon a 4" dia. Well to 800 ft.	$8.36	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 5" dia. Well to 800 ft.	$10.48	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 6" dia. Well to 800 ft.	$12.60	per foot		$0.00
Equipment, materials, and labor to plug and abandon a 8" dia. Well to 800 ft.	$14.60	per foot		$0.00
Mobilization/Demobilization ≤ 50 miles round-trip	$3,200.00	lump sum		$0.00
			Total	**$0.00**

Additional Materials Not Included in Unit Costs	Unit Cost	Units	No. Units	Total
Chlorination	$25.00	per unit		$0.00
Jet Well	$850.00	per unit		$0.00
Surface Casing	$3,000.00			$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
				$0.00
			Total	**$0.00**

Hourly Rate for Work Not Included in Unit Costs	Unit Cost	Units	No. Units	Total
	$150.00	per hour		$0.00
				$0.00
				$0.00
			Total	**$0.00**
			Total Invoice	**$18,576.20**

GCUWCD EMF BILLS TO BE PAID
March 11, 2025

TOTAL $0.00

Gonzales County U.W.C.D. Expense Report

Link Benson	From	To	Beginning Mileag	Ending Mileage	Ttl Miles
2/1/2025 Parker Location Set Solar Pump	Home	Ottine	136509	136532	23
2/3/2025 Parker Location Set Solar Panels	Home	Ottine	136635	136658	23
2/3/2025 Lester Location Possible Midigation	Home	Belmont	136670	136712	42
2/4/2025 Lester Location Met Wagners	Home	Belmont	136770	136812	42
2/4/2025 Lester Location Check Progress	Home	Belmont	136851	136893	42
2/5/2025 Lester Location Check Progress	Home	Belmont	136964	137006	42
2/5/2025 Lester Location Check Progress	Home	Belmont	137098	137140	42
2/6/2025 Lester Location Set Casing, Gravel Pack, Seal	Home	Belmont	137188	137230	42
2/6/2025 Lester Location Jet Well	Home	Belmont	137326	137368	42
2/7/2025 Lester Location Wagners	Home	Belmont	137416	137458	42
2/8/2025 Lester Location Set Solar Panels	Home	Belmont	137543	137585	42
2/10/2025 Bruce Patteson Talked About Midigation	Home	Smiley	137658	137718	60
2/11/2025 Patteson Location Met with Wagner	Home	Smiley	137759	137819	60
2/12/2025 Patteson Location Met with Wagner	Home	Smiley	137888	137948	60
2/12/2025 Met Mark Ploeger at well to Discuss Midigation	Home	Oak Forest	137960	137984	24
2/13/2025 Mark Ploeger Location	Home	Oak Forest	138040	138064	24
2/14/2025 Mark Ploeger Location	Home	Oak Forrest	138105	138129	24
2/17/2025 Mark Ploeger Location Discuss Midigation	Home	Oak Forest	138204	138228	24
2/18/2025 Gicon Pumps to discuss Ploeger Well	Home	San Antonio	138265	138409	144
2/21/2025 Ploeger Location Check on Progress	Home	Oak Forrest	138430	138454	24
2/22/2025 Ploeger Location Check on Progress	Home	Oak Forrest	138502	138526	24
2/24/2025 Ploeger Location Friedel Pulling Turbin Pump	Home	Oak Forrest	138578	138602	24
2/25/2025 Ploeger Location Friedel Pulling Turbine Pump	Home	Oak Forrest	138639	138663	24
2/28/2025 Met Wagners Well to discuss Midigation Work	Home	Nixon	138752	138814	62
				Total Miles	1002
				Current Rate X	0.7
					$701.40
Expenses: Phone					$70.00
Period Covered: February 1-28, 2025				**Total Due**	**$771.40**
Approved By:					
Date: March 11, 2025					

Signature of Person Requesting:

Gonzales County Underground Water Conservation District
Field Technician
Expense Report

Frank Agee

Nature of Trip/Date	From	To	Beginning Mileage	Ending Mileage	Total Miles
2/3/25 NE Gonzales/Caldwell	Home	NE Gon. Co./Cald. Co.	200,516	200,594	78
2/4/25 SE/NE Gonzales Co.	Home	SE/NE Gonzales Co.	200,594	200,694	100
2/5/25 N/W Gonzales Co.	Home	N/W Gonzales Co.	200,694	200,772	78
2/6/25 N/W Gonzlaes Co.	Home	N/W Gonzales Co.	200,722	200,823	101
2/10/25 DeWitt Co.	Home	DeWitt Co.	2,001,346	2,001,403	57
2/14/25 NE Gonzales Co.	Home	NE Gon. Co.	2,001,451	2,001,518	67
2/17/25 NE Gonzales Co.	Home	NE Gon. Co.	201,523	201,580	57
2/18/25 SW Gonzales Co.	Home	SW Gon. Co.	201,580	201,614	34
2/21/25 NE Gonzales Co.	Home	NE Gon. Co.	201,863	201,947	84
2/24/25 Gonzales Co. North	Home	Gon. Co. N.	201,950	201,993	43
2/25/25 Gonzales Co. West	Home	Gon. Co. W.	201,993	202,029	36
2/26/25 Central Gonzales Co.	Home	Central Gon. Co.	202,029	202,069	40
2/27/25 North Gonzales Co.	Home	N. Gonzales Co.	202,107	202,158	51
				Total Miles	826
				Current Rate X	0.7
				Mileage Subtotal	**$578.20**
Expenses					
Period Covered: February 1-28, 2025 **Approved By**: **Date**: March 11, 2025				**Total Due**	**$578.20**

Gonzales County Underground Water Conservation District
Manager's Report
February 2025

On February 12th I met with Steve Young, Principal Geoscientist INTERA Incorporated to discuss Evergreen Groundwater District's hydrogeological report findings for Groundwater Management Area 13 (GMA13).

On February 20th I virtually attended the South-Central Texas Regional Water Planning Group (SCTRWPG, Region L) meeting. A copy of the agenda is attached.

On February 28th I met with Kelley Cochran, General Manager Guadalupe County Groundwater District to discuss the GMA 13 model update and public comments. A copy of the GCUWCD public comments is attached.

AQUA's January production was about 38.69 ac-ft which is about 9.28% of the monthly allowable production.

ARWA's February production was 161.38 ac-ft which is about 23.27% of the monthly allowable production.

CRWA's February production was about 494.69 ac-ft which is about 71.35% of the monthly allowable production.

GBRA's February production was 97.69 ac-ft which is 7.82% of the monthly allowable production.

SAWS February production was about 922.13 ac-ft which is about 94.67% of the monthly allowable production.

SSLGC's February production was about 1,028 ac-ft which is about 63.73% of the monthly allowable production.

The Palmer Drought Index, as of February 25, 2025, indicates that the District is currently under severe drought with a small portion of southwestern Gonzales County in moderate drought conditions in the district. Drought conditions have increased in intensity and covers 25% of the state.

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

December 20, 2024

Laura Martin
General Manager
Gonzales County Underground Water Conservation District
P.O. Box 1919
Gonzales, TX 78629

Dear Ms. Martin:

The purpose of this letter is to notify you that the groundwater management plan for the Gonzales County Underground Water Conservation District required by Texas Water Code § 36.1072 is administratively complete in accordance with Texas Water Code § 36.1071(a) and (e). The policies, plans, and opinions in the groundwater management plan represent those of the District and not those of the Texas Water Development Board.

We received the groundwater management plan for the administrative completeness review on November 13, 2024, and it was approved on December 20, 2024. Included with this letter is your District Groundwater Management Plan Certificate of Administrative Completeness.

Thank you for participating in this effort and contributing to the future of groundwater conservation and management in the state of Texas. Your next five-year management plan is due on December 20, 2029.

If you have any questions or concerns, please contact Stephen Allen of our Groundwater Technical Assistance Department at 512-463-7317 or stephen.allen@twdb.texas.gov

Sincerely,

Bryan McMath
Executive Administrator

Enclosure

c w/o enc.: Stephen Allen, P.G., Groundwater
Robert Bradley, P.G., Groundwater
Abiy Berehe, P.G., Texas Commission on Environmental Quality
Peggy Hunka, P.G., Texas Commission on Environmental Quality
Kory Talcott, Texas Commission on Environmental Quality

Recognition of Achievement

Presented to the

Gonzales County
Underground Water Conservation District

in recognition of completing the

District Groundwater Management Plan

approved on December 20, 2024. 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.

Bryan McMath
Executive Administrator

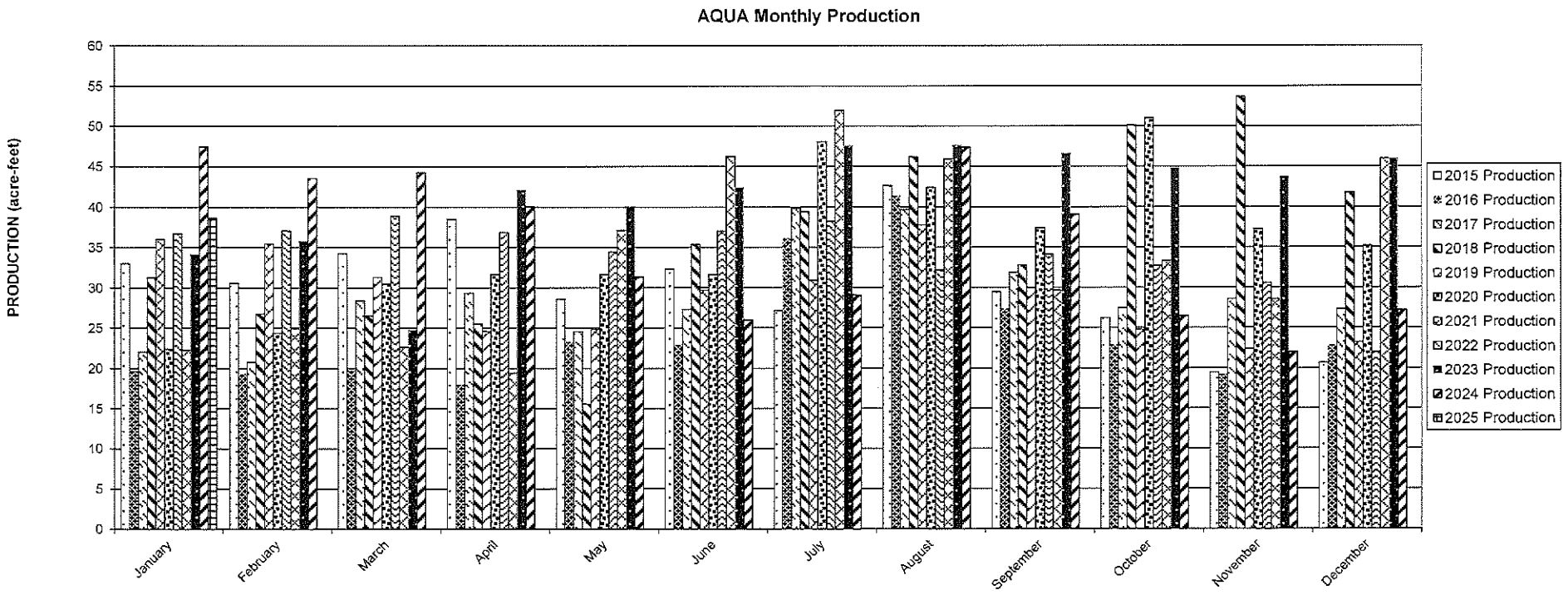
TEXAS WATER DEVELOPMENT BOARD

AQUA Water Supply Corporation
Meter Reading - Usage
2025

Date	F255 Delhi #1 Meter	Usage	Transported	F256 Delhi #2 Meter	Usage	Transported	F257 Hinton Well Meter	Usage	Transported	Fees
January	8,209,864	4,769.20		305,860	7,837.00		0.00	0.00		
	-		4,368.93			7,179.25			0.00	$ 288.70
February							0.00	0.00		
									0.00	$ -
March							0.00	0.00		
									0.00	$ -
April							0.00	0.00		
									0.00	$ -
May							0.00	0.00		
									0.00	$ -
June							0.00	0.00		
									0.00	$ -
July							0.00	0.00		
									0.00	$ -
August							0.00	0.00		
									0.00	$ -
September							0.00	0.00		
									0.00	$ -
October							0.00	0.00		
									0.00	$ -
November							0.00	0.00		
									0.00	$ -
December							0.00	0.00		
									0.00	$ -

Total Gallons*				0	
Total AC/FT	0.00		0.00	0.00	
Current Month Production in AC/FT		38.69			
Percentage of monthly allowable for current month			9.28		
Total AC/FT for year			**Percentage of yearly prod.**	0.00	**Total Dollars** **$288.70**

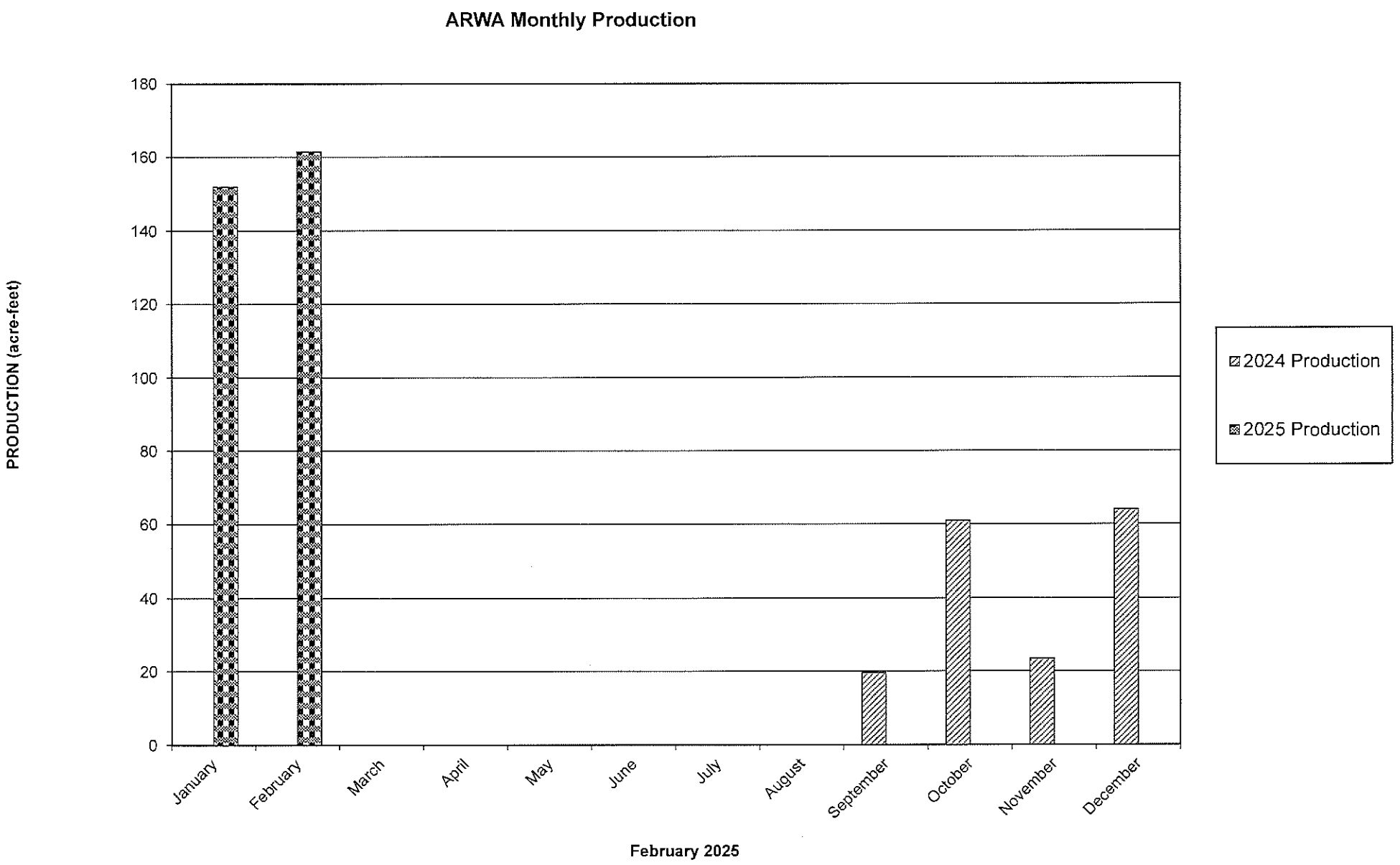
*gallons in thousands


AQUA Monthly Production
PRODUCTION (acre-feet)
60
55
50
45
40
35
30
25
20
15
10
5
0
January
February
March
April
May
June
July
August
September
October
November
December
2015 Production
2016 Production
2017 Production
2018 Production
2019 Production
2020 Production
2021 Production
2022 Production
2023 Production
2024 Production
2025 Production

Alliance Regional Water Authority
Water Meter Reading - Usage
2025

Date	P074 Well #6 ARWA Well Meter	Usage	P075 Well #7 ARWA Well Meter	Usage	P076 Well #8 ARWA Well Meter	Usage	P077 Well #9 ARWA Well Meter	Usage
Jan	59,088,500		36,117,300		13,552,000		8,319,500	
		24,520		22,173		1,131		1,677
Feb	78,043		53,702		20,877		16,995	
		18,995		17,585		7,325		8,681
March								
April								
May								
June								
July								
Aug								
Sept								
Oct								
Nov								
Dec								
Total Gallons*		43514.9		39757.8		8455.9		10358.2
Total AC/FT		133.54		122.01		25.95		31.79

Current Month Production in AC/FT	161.38		
Percentage of monthly allowable for current mo.	23.27		
Total AC/FT for yr	313.29	**Percentage of yearly production**	3.77


ARWA Monthly Production
PRODUCTION (acre-feet)
180
160
140
120
100
80
60
40
20
0
January
February
March
April
May
June
July
August
September
October
November
December
2024 Production
2025 Production
February 2025

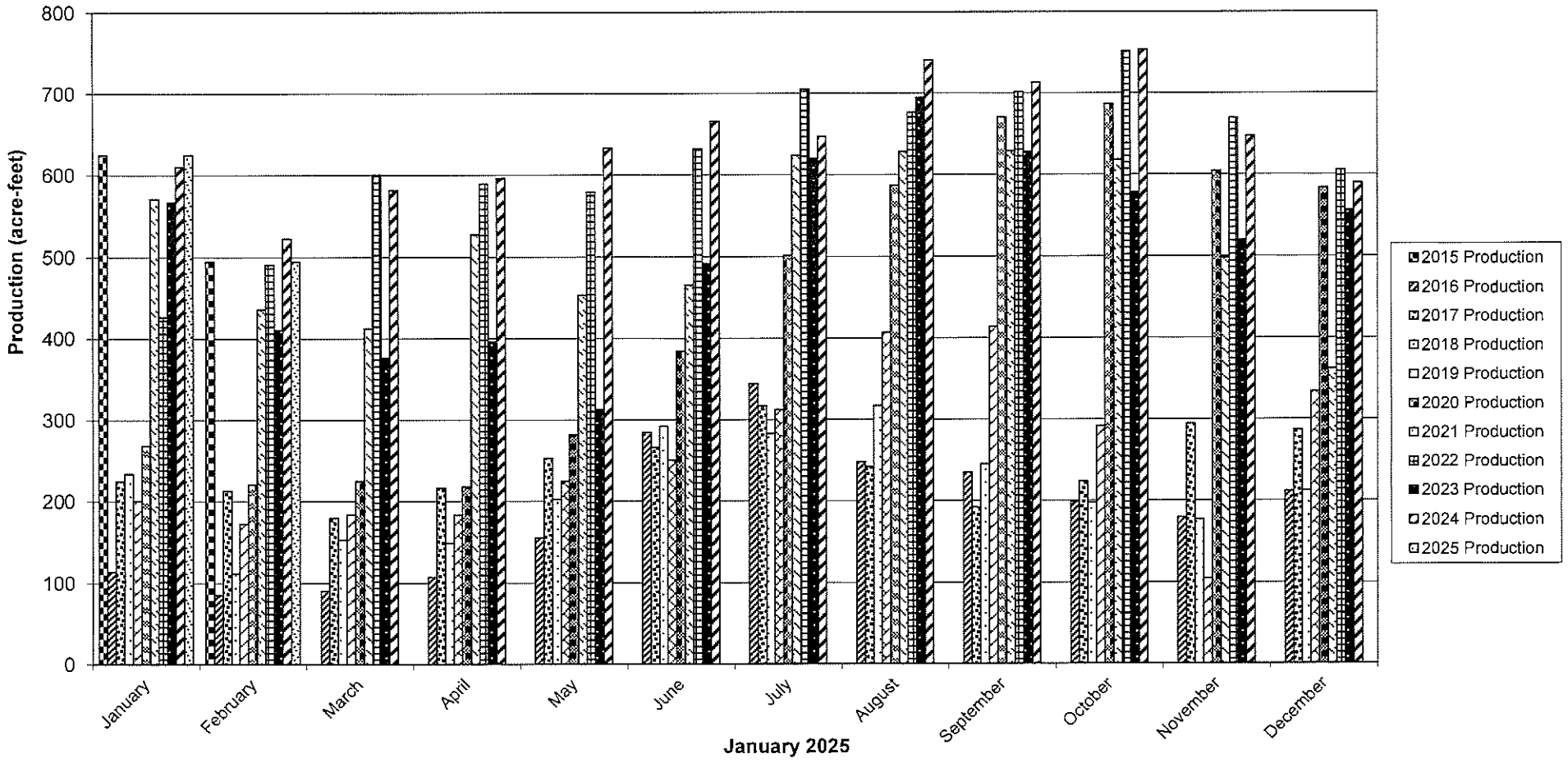
Canyon Regional Water Authority
Wells Ranch Water Meter Reading - Usage
2025

	P030 Well #12 Bultrap Well		P029 Well #11 Coastal Field Well		P028 Well #9 Camp House Well		P027 Well #1 Tommy's Well		P086 Well #8 Chicken House		L188 Well #5 Littlefield		L189 Well #13 Bond West		L190 Well #14 Christian West		L191 Well #15 Bond East		L192 Well #16 Christian East	
Date	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage
Jan	1,509,588		1,760,164		3,263,459		1,762,585		1,001,488		1,355,838		1,189,745		22,396		2,124,224		661,968	
		14,793		17,763		20,124		14,918		21,164		20,568		18,524		20,841		38,605		16,310
Feb	1,536,650		1,792,629		2,400,153		1,779,905		1,039,902		1,393,852		1,226,013		60,612		2,194,649		691,893	
		12,269		14,702		16,573		2,402		17,250		17,446		17,744		17,375		31,820		13,615
March																				
April																				
May																				
June																				
July																				
Aug																				
Sept																				
Oct																				
Nov																				
Dec																				
Total Gallons*		27062		32465		36697		17320		38414		38014		36268		38216		70425		29925
Total AC/FT		83.05		99.63		112.62		53.15		117.89		116.66		111.30		117.28		216.13		91.84

Current Month Production in AC/FT	494.69		
Percentage of monthly allowable for current mo.	71.35		
Total AC/FT for yr	1119.55	Percentage of yearly production	13.46

* gallons in thousands

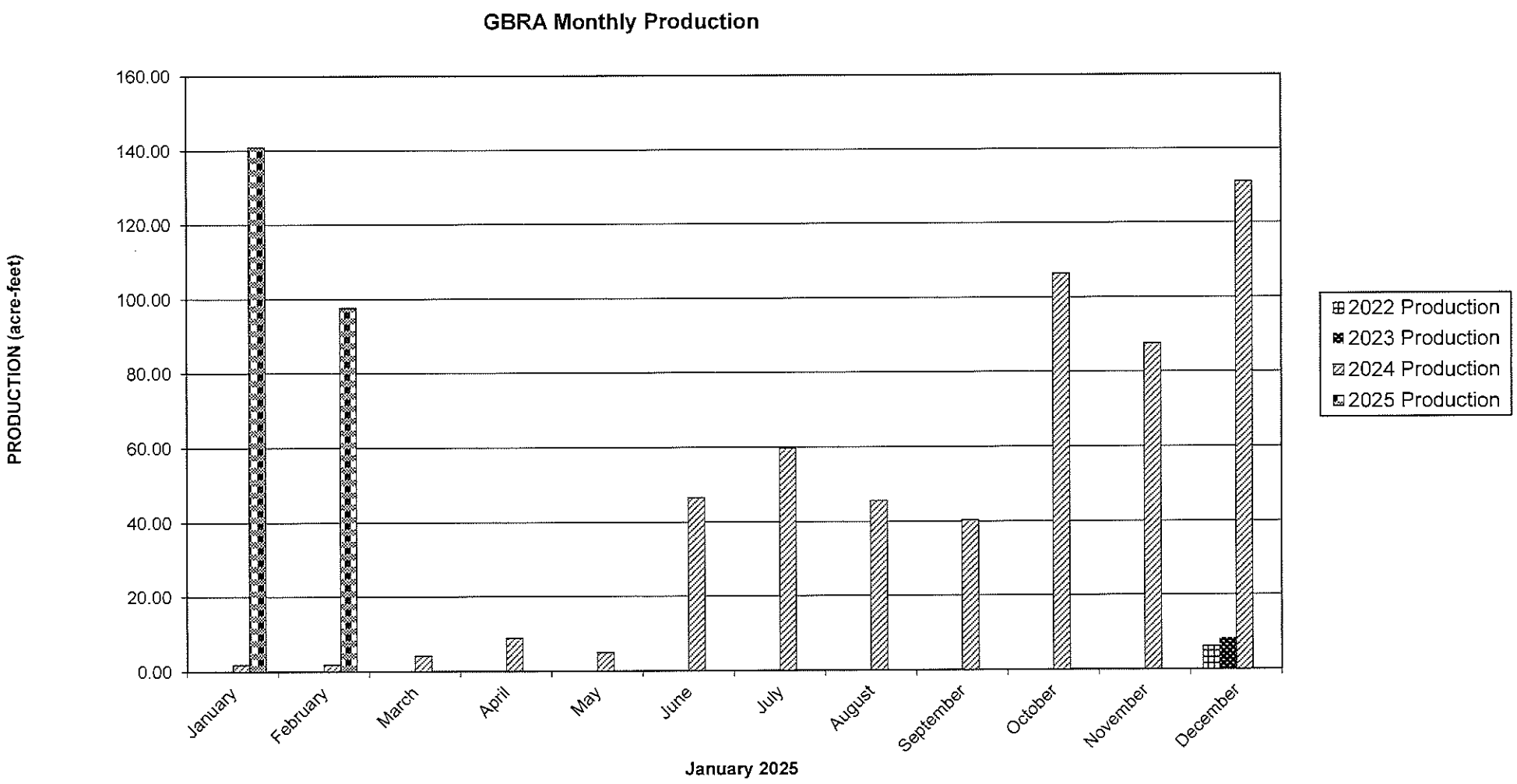
CRWA Monthly Production



Gudalupe-Blanco River Authority
Meter Reading - Usage
2025

Date	P059 Well #1 Meter	P059 Well #1 Usage	P060 Well #2 Meter	P060 Well #2 Usage	P061 Well #3 Meter	P061 Well #3 Usage	P062 Well #4 Meter	P062 Well #4 Usage	P063 Well #5 Meter	P063 Well #5 Usage	P064 Well #6 Meter	P064 Well #6 Usage	P065 Well #7 Meter	P065 Well #7 Usage	B/W
Jan	37,959,600		3,171,200		34,421,800		26,896,300		14,039,700		27,863,100		18,247,600		
		12,233		832		10,315		8,042		126		2,328		12,021	
Feb	42,898,400		4,331,200		43,052,100		32,854,200		14,039,700		33,469,500		23,789,000		
		4,939		1,160		8,630		5,958		0		5,606		5,541	
Mar															
Apr															
May															
June															
July															
Aug															
Sept															
Oct															
Nov															
Dec															
Total Gallons* (kgal)		17,172		1,992		18,945		14,000		126		7,934		17,562	
Total ac/ft		52.70		6.11		58.14		42.96		0.39		24.35		53.90	
Current Mo. Production in ac/ft				97.69											
% of monthly allowable for current mo.						7.82									
Total ac/ft for yr		238.55		% of prod. for year				1.59							

gallons in thousands

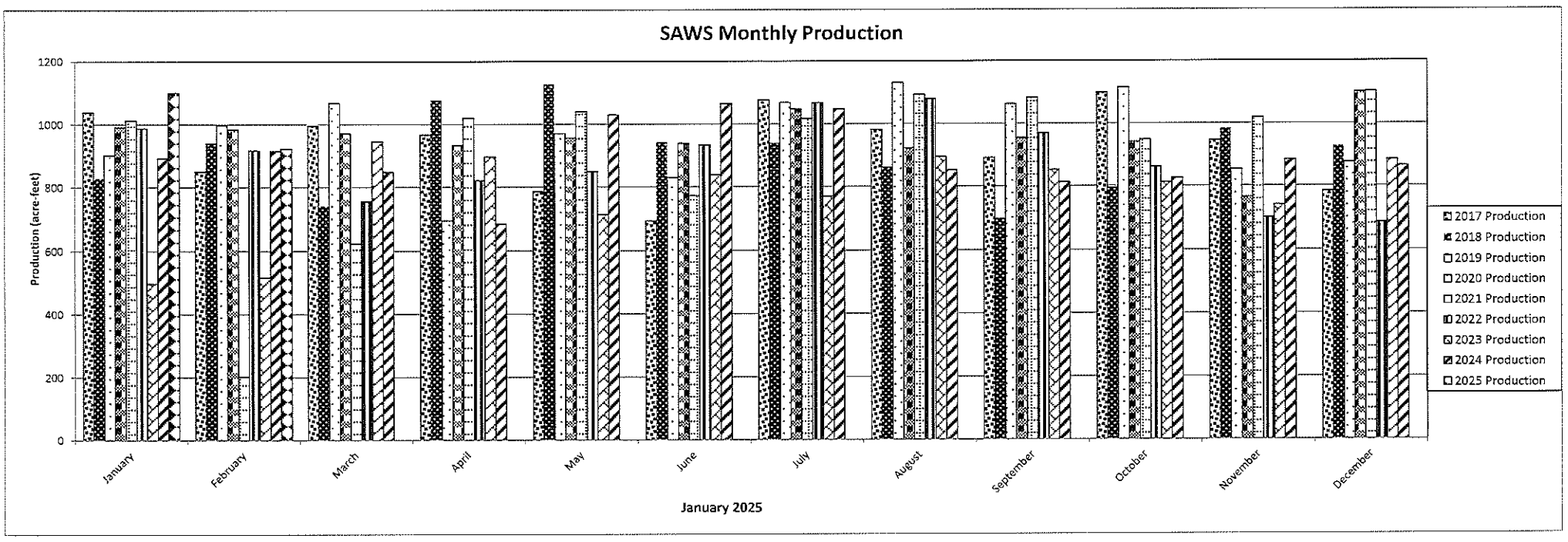

GBRA Monthly Production
PRODUCTION (acre-feet)
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
January
February
March
April
May
June
July
August
September
October
November
December
2022 Production
2023 Production
2024 Production
2025 Production
January 2025

San Antonio Water System
Meter Reading - Usage
2025

Date	P036 Well WG-2 Meter	P036 Well WG-2 Usage	P039 Well WG-5 Meter	P039 Well WG-5 Usage	P040 Well WG-6 Meter	P040 Well WG-6 Usage	P041 Well WG-7 Meter	P041 Well WG-7 Usage	P042 Well WG-8 Meter	P042 Well WG-8 Usage	P043 Well WG-9 Meter	P043 Well WG-9 Usage	P044 Well WG-10 Meter	P044 Well WG-10 Usage	P047 Well WG-14 Meter	P047 Well WG-14 Usage	P048 Well WG-15 Meter	P048 Well WG-15 Usage	B/W	Fees
Jan	340,998	56,324	345,766	28,167	459,678	2	78,166	48,570	443,962	43,423	95,375	56,413	348,033	21,099	512,453	53,068	394,150	51,690	12201	$8,663.88
Feb	342,505	15,003	350,960	51,949	459,681	3	81,769	36,029	447,885	39,226	99,988	46,125	350,433	23,999	516,120	36,668	399,297	51,475	9,707	$7,271.78
Mar																				
Apr																				
May																				
June																				
July																				
Aug																				
Sept																				
Oct																				
Nov																				
Dec																				
Total Gallons*		71,327		80,117		5		84,599		82,648		102,538		45,098		89,736		103,165		659,234
Total ac/ft		218.89		245.87		0.02		259.63		253.64		314.68		138.40		275.39		316.60		2,023.12

Current Month Production in ac/ft 922.13
% of monthly allowable for current month 94.67
Total ac/ft for year 2023.12 % of prod. for year 17.31 Total Dollars $15,935.66

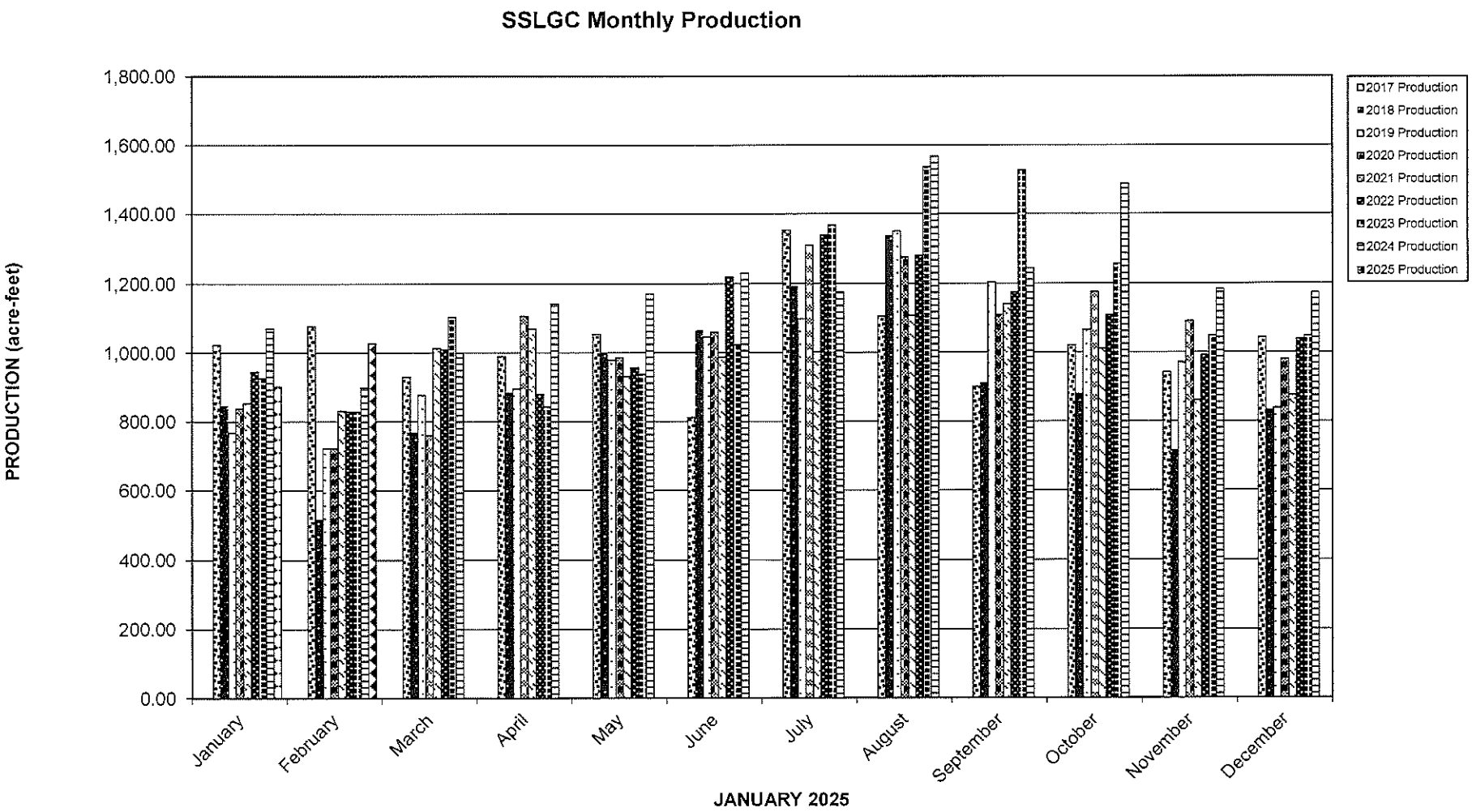
gallons in thousands


SAWS Monthly Production
Production (acre-feet)
0
200
400
600
800
1000
1200
January
February
March
April
May
June
July
August
September
October
November
December
2017 Production
2018 Production
2019 Production
2020 Production
2021 Production
2022 Production
2023 Production
2024 Production
2025 Production
January 2025

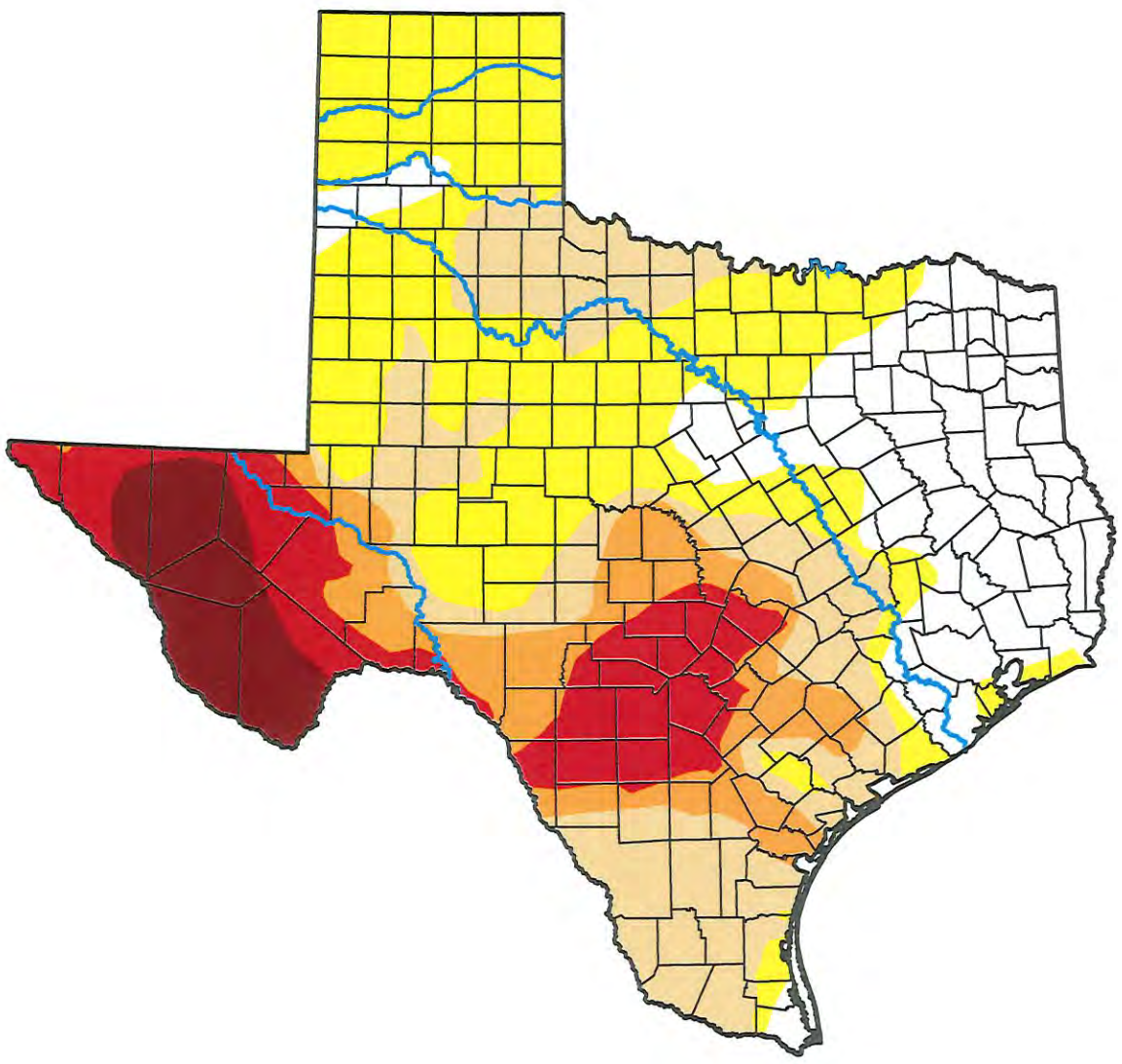
Schertz-Seguin Local Government Corporation
Meter Reading - Usage
2025

	P007 Well #1		P008 Well #2		P009 Well #3		P010 Well #4		P011 Well #5		P012 Well #6		P016 Well #7		P017 Well #8		P031 Well #9		P032 Well #10		P033 Well #11		P034 Well #12			
Date	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	Meter	Usage	B/W	Fees
Jan	1,285,227		148,299		336,399		663,958		518,789		43,664		818,873		75,180		3,489,108		2,574,546		3,348,458		50,755			
		10,757		31,546		33,406		20,491		19,814		13,814		44,996		29,117		41,636		0		0		48,606	10005	$7,104.45
Feb	1,330,659		148,320		355,369		712,341		565,661		62,067		837,724		88,077		3,556,186		2,592,432		3,348,458		5,115,708			
		45,432		21		18,970		48,383		46,872		18,403		18,851		12,897		67,078		17,886		0		40,182	10,817	$8,103.95
Mar																										
Apr																										
May																										
June																										
July																										
Aug																										
Sept																										
Oct																										
Nov																										
Dec																										
Total Gallons*	56,189		31,567		52,376		68,874		66,686		32,217		63,847		42,014		108,714		17,886		0		88,788			629,158
Total ac/ft	172.44		96.88		160.74		211.37		204.65		98.87		195.94		128.94		333.63		54.89		0.00		272.48			1930.82
Current Mo. Production in ac/ft			1028.00																							
% of monthly allowable for current mo.					63.73																					
Total ac/ft for yr	1930.82		% of prod. for year				9.97																		Total Dollars	$15,208.40

gallons in thousands


SSLGC Monthly Production
PRODUCTION (acre-feet)
1,800.00
1,600.00
1,400.00
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
January
February
March
April
May
June
July
August
September
October
November
December
2017 Production
2018 Production
2019 Production
2020 Production
2021 Production
2022 Production
2023 Production
2024 Production
2025 Production
JANUARY 2025

U.S. Drought Monitor
Texas



February 25, 2025
(Released Thursday, Feb. 27, 2025)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	20.06	79.94	49.01	27.76	17.34	6.30
Last Week *02-18-2025*	23.04	76.96	42.52	24.46	16.84	6.30
3 Months Ago *11-26-2024*	33.01	66.99	49.92	21.72	12.99	6.30
Start of Calendar Year *01-07-2025*	36.81	63.19	43.63	21.45	13.26	6.30
Start of Water Year *10-01-2024*	26.09	73.91	34.39	16.62	8.91	3.36
One Year Ago *02-27-2024*	57.31	42.69	22.67	8.94	1.97	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Brian Fuchs
National Drought Mitigation Center

droughtmonitor.unl.edu

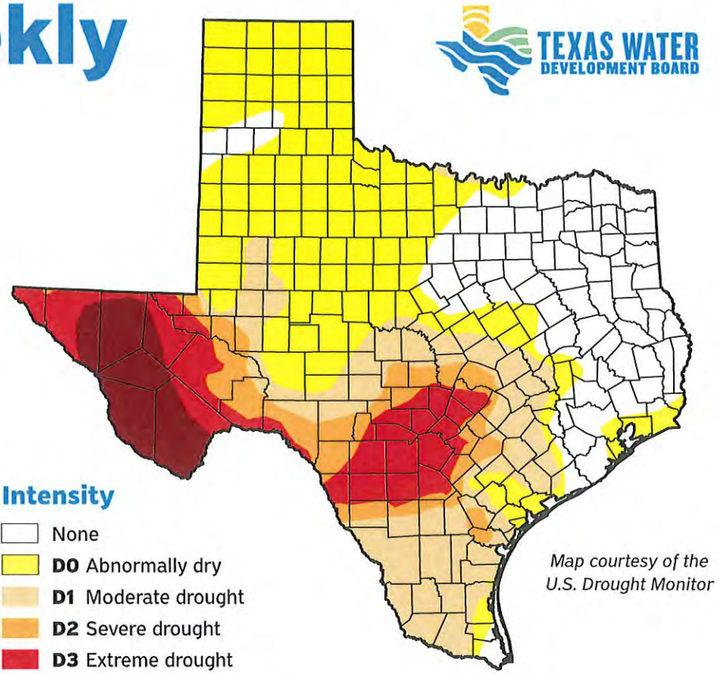
Water Weekly

For the week of **02/24/25**

TEXAS WATER DEVELOPMENT BOARD

Water conditions

The latest drought map for conditions as of February 18 shows a small increase in drought relative to last week. Drought intensity also ticked up. Severe or worse drought now covers almost 25 percent of the state, its largest extent since late-October 2024.



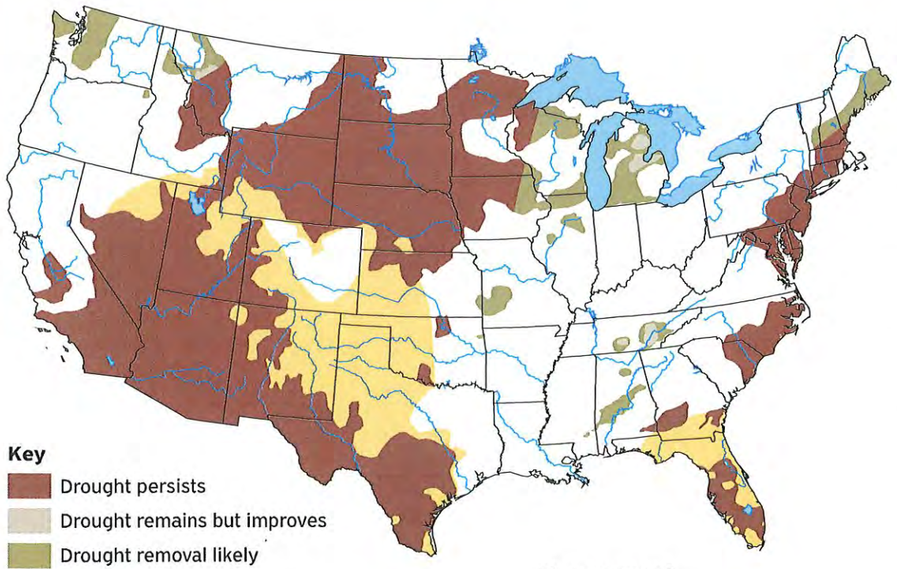
Map courtesy of the U.S. Drought Monitor

Drought conditions

43% now
42% a week ago
49% three months ago
23% a year ago

Intensity

- None
- **D0** Abnormally dry
- **D1** Moderate drought
- **D2** Severe drought
- **D3** Extreme drought
- **D4** Exceptional drought



Key

- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely
- No drought

Map courtesy of NOAA

U.S. seasonal drought outlook

The National Weather Service's most recent seasonal drought outlook is trending more pessimistic for Texas. By the end of May, they anticipate expansion of drought sufficient to cover two-thirds of the state. Only the eastern third of the state is expected to remain drought free.

By Dr. Mark Wentzel, Hydrologist, Office of Water Science and Conservation

Jonathan Mathers, Government Relations | Jonathan.Mathers@twdb.texas.gov | 512-463-7848
Media Relations | MediaRelations@twdb.texas.gov | 512-463-5129

www.twdb.texas.gov

NOTICE OF OPEN MEETING OF THE
SOUTH CENTRAL TEXAS REGIONAL
WATER PLANNING GROUP

TAKE NOTICE that a meeting of the South-Central Texas Regional Water Planning Group (SCTRWPG) as established by the Texas Water Development Board will be held on Thursday, February 20, 2025 at 9:30 AM both in person and virtually. The in-person meeting will be held at the San Antonio Water System's Customer Service Building, Room CR-145, 2800 US Hwy 281 North, San Antonio, TX 78212. You can attend virtually on WebEx at https://saws.webex.com/saws/j.php?MTID=mfdcc516d353889c530b3ba9e2468b8cc. The planning group members will consider and may take action regarding:

1. (9:30 AM) Roll-Call
2. Public Comment (Limited to 3 minutes)
3. Approval of the Minutes from the Previous Meeting of the South-Central Texas Regional Water Planning Group (SCTRWPG)
4. Discussion and Appropriate Action Regarding Filling Existing Vacancies and Vacancies to Result from Future Term Expirations or Resignations
5. Status Reports and Communications by TWDB
6. Status Reports and Communications Related to Regional Water Planning including reports by the Chair, Regional Liaisons, Groundwater Management Area Representatives, and Members of the Planning Group
7. Consideration and Appropriate Action Regarding Presentation by Technical Consultant Regarding Schedule and Progress Update
8. Consideration and Approval Regarding the Initially Prepared Plan (IPP) for the 2026 South Central Texas (Region L) Regional Water Plan
    a. Consideration and Appropriate Action to Adopt the IPP and Authorize the Technical Consultant to Address DB27 Updates, Non-substantive Revisions, and Planning Group Changes Prior to IPP Submittal
    b. Consideration and Appropriate Action to Authorize the Technical Consultant to Submit the IPP Package to the Texas Water Development Board on Behalf of the South-Central Texas (Region L) Regional Water Planning Group by March 3, 2025
    c. Discussion and Appropriate Action to Authorize the San Antonio River Authority to Post Public Notice(s) and Hold Public Hearing(s) on the IPP
9. Discussion and Appropriate Action Regarding the Establishment of Additional Subcommittees
10. Schedule and Potential Agenda Items for the Next Meeting of the SCTRWPG
11. Public Comment (Limited to 3 minutes)
12. Adjourn

Comments and submissions may be submitted through email to ccastillo@sariverauthority.org and include "Region L South Central Texas Water Planning Group Meeting Public Comment" in the subject line of the email. Any written documentation can be sent to Curt Campbell, Chair, South Central Texas Regional Water Planning Group, c/o San Antonio River Authority, Attn: Caye Castillo, 100 E. Guenther Street, San Antonio, TX 78204. Please direct any questions to Caye Castillo at (210) 302-4258, ccastillo@sariverauthority.org.

Gonzales County Underground Water Conservation District

522 Saint Matthew
P.O. Box 1919
Gonzales, Texas 78629
Phone 830.672.1047

February 19, 2025

Daryn Hardwick, Ph.D., CTCM
Manager of Groundwater Modeling
Texas Water Development Board (TWDB)
1700 North Congress Ave.
Austin, Texas 78711

RE: Comments on the Updated Southern Carrizo-Wilcox Groundwater Availability Model

Dear Mr. Hardwick:

The Gonzales County Underground Water Conservation District (GCUWCD), member of Groundwater Management Area 13 (GMA13), has reviewed the draft Updated Groundwater Availability Model (GAM) for the Southern portion of the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers, accepted by GMA13 on September 20, 2024. After consultation with independent consultants, the GCUWCD has concerns with the low specific yield values utilized in the draft Southern Carrizo-Wilcox GAM and the GAM calibration does not include any pumping from the significant well fields in the western part of the GCUWCD.

The calculation of the Modeled Available Groundwater (MAG) from TWDB from the GAM Run 17-027 allocated at 121,307 ac-ft for the 2020 decade in the Carrizo-Wilcox in the GCUWCD, compared to the GAM Run 21-018 allocated at 60,899 ac-ft for the 2020 decade in the Carrizo-Wilcox in the GCUWCD. A reduction of the MAG of 60,408 ac-ft for the 2020 decade between GAMs becomes an unmanageable resource. This change in the MAG reflects the errors in the GAM Run 21-018. We would like to ask that TWDB make transparent how these calculations are determined.

In the GAM Run 21-018 the transmissivity numbers used in the model were higher than local area aquifer tests indicate, which resulted in an under prediction of drawdown. The correction in the GAM Run 21-018 Update has a blanketed reduction of transmissivity cell numbers to a 13.5k amount and not based on any actual pumping data in the areas of concern.

Additionally, the specific yield rates are too low at 0.005 and is resulting in over-prediction of the water table drawdown in the outcrop areas. A hydrogeological evaluation of the Carrizo-Wilcox in the GCUWCD shows that modeled baseline information does not match actual field measurements. In some observed wells the simulated water levels are below the bottom of the model cell in the GAM. Additionally, modeled pumping cell data does not match any of the cell specific data locations provided by GCUWCD.

The current GAM update is an improvement in isolated areas relative to prior GAMs, however, there is a continued need for improvement. As stewards of the aquifers a working accurate model is necessary in the planning process. It is the request of the GCUWCD, as a member of GMA13, to take the next steps to include the following corrections to provide a better working model for all members of the Southern portion of the Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson Aquifers.

Gonzales County Underground Water Conservation District

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Gonzales, Texas 78629
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- Adjust the transmissivity totals in model cells based on actual pumping data.
- Correct the specific yield rates in the outcrop and confined portions of all aquifers.
- Include in the MAG process an evaluation of previous GAM Run MAG amounts.
- Modify the baseline elevations of the aquifers in the model.

As currently configured, this model is not a useful tool for groundwater district management purposes nor regional water management planning.

Sincerely,

Laura Martin
General Manager GCUWCD
GMA 13 Representative

Evergreen Underground Water Conservation District
110 Wyoming Blvd
Pleasanton, TX 78064

Date: February 20, 2025

To: Groundwater Management Area 13

From: Evergreen Underground Water Conservation District

Ref: Review and comment on 2024 GAM Revision

The Evergreen Underground Water Conservation District (EUWCD), a groundwater conservation district (GCD) member of Groundwater Management Area (GMA) 13, independently undertook a robust technical review of the 2024 "Revised" Groundwater Availability Model (GAM) for the Carrizo-Wilcox Aquifer released by the Texas Water Development Board. The review was performed by INTERA, a geoscience and engineering firm, under the guidance of its principal hydrologist, Dr. Steven Young and associate geophysicist Jack Rochet. The review was coordinated with independent consultant Dr. Scott Hamlin, whose work has influenced the development of past groundwater availability models of the Carrizo Aquifer. This review, focused on the model transmissivity values, was completed in February of 2025 and presented to the management of the EUWCD. A copy of the draft summary report is included as an attachment to this letter.

The "Revised Model" was an update from the 2023 TWDB Approved GAM for the Carrizo Aquifer in GMA 13. The purpose of the proposed revision to the 2023 GAM was to accommodate concerns of several member GCDs in GMA 13, including the EUWCD, which identified what appeared to be unrealistically high transmissivity values. Because the GCDs are required to utilize this information within their Management Plans, which are then passed to the Regional Water Planning Groups for consideration in the State Water Planning process, the accuracy of the model and its use of best available science is crucial.

While the use of the GAM within the State Water Planning process is important, the implication of the GAM results present a greater challenge for the GCDs within the administration of a GCD's rules pertaining to Desired Future Conditions (DFCs) and Modeled Available Groundwater estimates (MAGs). Throughout this process, applicants and groundwater property owners expect fair and reasonable treatment, while the GCD relies on reliable simulation results to guide the management of the resource. In short, the EUWCD expectation for the GAM is that it reasonabley represents the aquifer hydraulic properties in order to provide a credible and defensible simulation of impacts caused by Carrizo pumping across most of the EUWCD and particularly in those areas associated with potential large well fields or rapidly expanding municipal or mining ("frac" related) pumping.

Phone: 830-569-4186
Fax: 830-569-4238
Email: info@evergreenuwcd.org
Website: Evergeenuwcd.org

EUWCD

Evergreen Underground Water Conservation District
110 Wyoming Blvd
Pleasanton, TX 78064

The critical findings of the 2025 EUWCD Intera report are centered in the following four areas.

1. The representation of Carrizo and Upper Wilcox as a single layer.
    a. The Carrizo aquifer and the Upper Wilcox are distinct layers, with differences in hydraulic conductivity, sand thickness, and sand percentage. As such, these layers are more appropriately represented as distinct layers.
    b. No evidence was presented in the model or its documentation that supported an assessment that the hydraulic properties, hydraulic heads, and water quality are sufficiently similar as to model these units as a singular homogenous layer.
    c. The Carrizo Aquifer, which is characterized by bed load sand deposit, is overlain and underlain by deposits , characterized by Hamlin as the Upper Wilcox, which consist of deposits significantly more heterogenous and containing significantly more clay than the Carrizo Aquifer. The Upper Wilcox is more appropriately represented as two distinct units, the Late or Upper Wilcox, which lies below the Reklaw; and the Early or Upper Wilcox 2, which sits above the Middle Wilcox (See Figure 1 below).
    d. The significance of the Upper Wilcox and Carrizo divisions is more profound on the southwestern and northeastern edges (along formation strike) of GMA 13.
2. The value and calibration of transmissivity.
    a. The magnitudes and spatial distribution of modeled transmissivity values are inconsistent with observed transmissivity values.
    b. The calibrated values of transmissivity lack correlation and have poor agreement with the observation targets for transmissivity values calculated from aquifer pumping tests.
    c. Furthermore, the calibrated transmissivity values within the model appear to lack correlation with observed sand thickness
3. There is potential inaccuracy in the GAM for up-dip portion of the Carrizo Aquifer. Measured values of transmissivity, in this region of the aquifer are less than 5,000 ft^2/day. However, the model utilizes significantly higher values, thus introducing spatial bias and potential inaccuracy.
4. The specific yield for the Carrizo Aquifer has been parameterized with a value of 0.005. This value, which could be 10 to 40

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EUWCD

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Pleasanton, TX 78064

times lower than the generally accepted values, has the potential to significantly underestimate groundwater availability.

In summary, unless this version of the GAM is revised to accommodate the most critical findings of the attached INTERA review, the EUWCD cannot, with confidence, utilize this GAM and MAG estimates derived from the model developed for the District's planning and permitting considerations related to the Carrizo Aquifer.

The requirements placed on the GCD to utilize such models and the output of the model is at times at odds with the role of the model as a "High Level Planning Tool." Although the TWDB has stated that the model is not intended for application to specific or localized permit applications, the state planning process requires evaluation of specific projects in the context of the modeled available groundwater generated from the GAM within the Regional Water Plan. Thus, a defensible GAM is necessary for the establishment of realistic planning values for modeled available groundwater in order to meet the obligations of the Regional Water Plan.

The Evergreen UWCD looks forward to supporting the adoption of a robust and reliable GAM which incorporates the best available science. The Evergreen UWCD is taking steps to develop its own District model and will share its technical findings and research with all parties.

Sincerely,

Darrell T. Brownlow, PhD
Vice President Evergreen Underground Water Conservation District
District Representative to GMA 13
GMA 13 Representative to Region L

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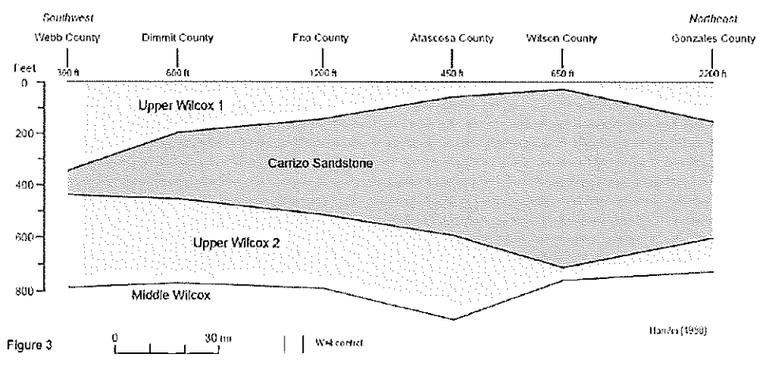
Email: info@evergreenuwcd.org
Website: Evergeenuwcd.org

EUWCD

Evergreen Underground Water Conservation District
110 Wyoming Blvd
Pleasanton, TX 78064

Figure 1:



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Email: info@evergreenuwcd.org
Website: Evergeenuwcd.org

DRAFT REPORT - VERSION 1

Characterization of the Carrizo Aquifer to Evaluate Transmissivity Values in the Groundwater Availability Model for Groundwater Management Area 13

Prepared for:

Evergreen Underground Water Conservation District
110 Wyoming Boulevard
Pleasant, TX 78604

Prepared by:

INTERA Incorporated
9600 Great Hills Trail, Ste 300W
Austin, TX 78759

FEBRUARY 2025

Characterization of the Carrizo Aquifer to Evaluate Transmissivity Values in the Groundwater Availability Model for Groundwater Management Area 13

DRAFT REPORT - VERSION 1

FEBRUARY 2025

Prepared by:

INTERA

Steve Young, Ph.D., P.G., P.E.
Andrew Osborne
Jack Rochat, P.E.

Scott Hamlin, Ph.D., P.G.
Independent Consultant

Geoscientist Seals

This report was prepared by and documents the work of the following Licensed Geoscientists:

Steven C. Young, Ph.D., P.G., P.E.
INTERA Incorporated

Scott Hamlin, Ph.D.
Independent Consultant

Jack Rochet, Geophysicist
INTERA Incorporated

Executive Summary

The Carrizo Aquifer is among the most productive aquifers in Texas and is the most productive aquifer in the Evergreen Underground Water Conservation District (EUWCD). To develop and enforce prudent management strategies and to evaluate production permits in the Carrizo Aquifer, the Evergreen Underground Water Conservation District needs good hydrogeological science and thoroughly vetted tools for prediction of impacts caused by groundwater production. In 2023, the Texas Water Development Board (TWDB) completed an update of the groundwater availability model (GMA) for the Carrizo Aquifer to be used by Groundwater Management Area (GAM) 13. After the GAM was approved by the Texas Water Development Board, several Groundwater Conservation Districts (GCDs) expressed concerns about the GAM, including unrealistically high transmissivity values for the Carrizo Aquifer. In 2024, a revised GAM was submitted to the TWDB and GMA 13 for review.

The report accomplishes two objectives. One objective is to collect and analyze data on the Carrizo Aquifer related to its stratigraphy (tops and bottom surfaces), its lithology (maps of sand thickness and fraction), and transmissivity values in EUWCD. The second objective is to use the results of the data collection and analyses to assess the credibility of the two GAMs recently developed for the Carrizo Aquifer in EUWCD.

The GAMs developed in 2023 and 2024 represent the Carrizo Aquifer and the Upper Wilcox Aquifer as a single model layer. Previous GAMs and other groundwater models had represented the Carrizo Aquifer using a single model layer. Based on a literature review, the Carrizo Aquifer is composed of riverbed-load deposits characterized by very thick, laterally continuous, coarse-grained sandstone, whereas the Upper Wilcox is composed of a mixed alluvial and transgressive sequence of fluvial, deltaic, wave-dominated deltaic deposits and marine-shoreline deposits. The report concludes that the Carrizo Aquifer and the Upper Wilcox Aquifer should be modeled as two separate aquifers because of the differences in their groundwater salinity, hydraulic head, hydraulic conductivity, transmissivity, and storativity.

The primary dataset used to guide the parameterization of the Carrizo transmissivity field for the GAMs was hydraulic conductivity values calculated from specific capacity values. Previous studies have demonstrated that hydraulic conductivity values calculated from specific capacity were significantly overestimated for wells with short screen intervals. Our analysis confirmed that a basis exists for the Carrizo hydraulic conductivity values from wells located in EUWCD. This bias may have contributed to the 2023 GAM's unrealistically high transmissivity values.

Forty-nine Carrizo transmissivity values were tabulated from aquifer pumping. Twenty-six values were obtained from hydrogeologic reports. Twenty-three values were calculated from aquifer pumping test tests performed at Public Water Supply (PWS) wells. In addition, a contour map of transmissivity values generated from numerous pumping tests was used to estimate the range of transmissivity values for the Carrizo Aquifer. The analysis of the data suggests an average transmissivity of about 9,000 ft^2/day and a maximum transmissivity value of about 40,000 ft^2/day. The highest transmissivity values occur in Wilson and Atascosa counties.

In developing the last two GAMs, the groundwater modelers found no useful correlation between sand fraction and hydraulic conductivity. Consequently, neither sand thickness nor sand fraction was used to help guide the parameterization of the transmissivity field. Our investigation using our developed sand maps and transmissivity values demonstrated a strong linear correlation between sand thickness and transmissivity. Our correlation was consistent with results from previous studies in the Carrizo. The

authors and others have leveraged this type of correlation to guide the parameterization of transmissivity fields during model calibration for other GAMs.

Our analysis of the 2023 GAM confirms that it has unrealistically high values for the Carrizo-Upper Wilcox model layer. Transmissivity values assigned to the Carrizo-Upper Wilcox grid cells in EUWCD are as high as 508,938 ft^2/day. Field data suggest that transmissivity values should not exceed 40,000 ft^2/day. Grid cells with transmissivity values above 75,000 ft^2/day occur in all four counties that comprise EUWCD. Based on our review of the 2023 GAM report, we have concluded that the calibration process to parameterize transmissivity is flawed. Among the notable problems with the process is that it 1) relied heavily on all of the transmissivity values developed from specific capacity values, 2) did not consider any relationship between transmissivity and sand thickness, and 3) did not consider an acceptable range for transmissivity based on an evaluation of transmissivity from constant-rate pumping tests.

Our analysis of the 2024 GAM indicates that is development is also flawed as the calibration processes relied on manually adjusting large areas of high transmissivity values but imposing maximum transmissivity values of 100,000 gpd/ft (13,369 ft^2/day) across most of the area where the 2023 GAM has unrealistically high transmissivity values. Our review of the field data suggests that the maximum transmissivity should be doubled, possibly even tripled, the assumed value of 13,369 ft^2/day . No data or explanation was provided for selecting the 13,369 ft^2/day as the maximum value. The resulting transmissivity is highly skewed and is poorly correlated to sand thickness and measured transmissivity values.

Based on the report findings, these deficiencies in the 2024 GAM include:

- A significantly underestimated value for maximum transmissivity for the Carrizo Aquifer
- No listing of transmissivity values determined from aquifer pumping tests to guide the parameterization of Carrizo transmissivity during model calibration
- No consideration of sand thickness in the parameterization of the Carrizo transmissivity values
- Combination of the Carrizo Aquifer and the Upper Wilcox Aquifer into a single model layer

In light of these deficiencies, Hutchison (2024) does not provide any evidence or rational to indicate that the GAM would provide a credible and technically defensible simulation of impacts caused by Carrizo pumping across most of the EUWCD. The District should be particularly concerned with using the GAM to evaluate local-scale impacts from a proposed well field. Our recommendation is that prior to any GAM application, the District should vet the GAM's application at a specific location of interest before using it.

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Acronyms and Abbreviations

%	percent
BRACS	Brackish Resources Aquifer Characterization System
DFC	Desired Future Condition
EUWCD	Evergreen Underground Water Conservation District
famsl	feet above mean sea level
ft	foot/feet
ft/d	Feet per day
ft^2/day	square feet per day
GAM	Groundwater Availability Model
GCD	Groundwater Conservation District
GMA	Groundwater Management Area
gpd	gallons per day
gpm	Gallons per minute
GSI	Geological Strength Index
hrs	Hours
INTERA	INTERA Incorporated
min	Minute(s)
POSGCD	Post Oak Groundwater Conservation District
PWS	Public Water Supply
SDWA	Safe Drinking Water Act
TCEQ	Texas Commission on Environmental Quality
TWC	Texas Water Code
TWDB	Texas Water Development Board

1.0 Introduction

The Carrizo Aquifer is comprised of some of the most productive sands in Texas and is the most productive aquifer in the Evergreen Underground Water Conservation District (EUWCD). As such, the Carrizo-Aquifer will likely become a target for future development of groundwater production to help meet the high demand for water supply in central Texas. To develop and enforce prudent management strategies and to fairly and responsibly evaluate production permits in the Carrizo Aquifer, the EUWCD needs good hydrogeological science. The foundation of good hydrogeologic science is the collection and analysis of reliable field data and the application of thoroughly vetted tools to predict impacts caused by groundwater production.

1.1 Background

The Texas Water Code (TWC) §36.0015 (b) states that groundwater conservation districts (GCDs) are the state's preferred method of groundwater management. They were created to protect property rights, balance the conservation and development of groundwater to meet the needs of the state and use the best available science in the conservation and development of groundwater. Among the hydrogeological tools the Texas legislature funds to assist GCDs and groundwater management areas (GMAs) are groundwater availability models (GAMs). The Texas Water Development Board (TWDB) emphasizes the importance of GAMs to groundwater management through policies and practices that make them an integral part of GCD Management Plans and the GMA joint planning process. As such, GAMs are often considered representative of the best available science until evidence is presented to show otherwise.

In 2023, the TWDB completed an updated of the GMA for the Carrizo Aquifer to be used by Groundwater Management Area 13 (Panday et al., 2023). After the GAM was approved for GMA 13, several GCDs expressed concerns about the reliability of its predictions. Particularly notable were concerns about unrealistically high transmissivity values, which were conveyed to the Texas Water Development Board (TWDB) through a letter from GMA 13 (Cochran, 2022) that states:

> *"...the model showed extremely high transmissivity values for the GMA Layer 7 (Carrizo), which would result in major under-prediction of drawdown."*

After several discussions with the EUWCD, INTERA Incorporated (INTERA) reviewed the GMA 13 GAM (Panday et al., 2023) and discovered two important findings. Firstly, the GAM contained transmissivity values significantly greater than in the previous GAM (Kelley et al., 2004). In Wilson and Atascosa counties, the transmissivity values were greater than 130,000 and 50,000 square feet per day (ft^2/day), respectively. Secondly, these high transmissivity values in the EUWCD were not supported by the aquifer pumping tests reviewed by INTERA and were likely a result of a process to calibrate the GAM that was not inadequately constrained by upper limits for transmissivity values. After presenting these findings to the EUWCD, INTERA submitted a proposal to the EUWCD to prepare this report. This report aims to accomplish the following objectives:

- Provide a dataset describing the magnitude and spatial distribution of transmissivity in the Carrizo that can be used by the EUWCD to help evaluate production permits.
- Determine whether the GAM transmissivity values for the Carrizo are reasonable with respect to available field data and the transmissivity values in the previous GAM.

- Provide recommendations regarding the District's technical approach for evaluating production permits for a Carrizo well field based on the project findings.

After INTERA submitted a proposal to the EUWCD, GMA 13 hired Dr. William Hutchison (2024) to address GMA 13's concerns with the GAM and to improve the GAM representation of the Carrizo transmissivity field. Dr. Hutchison (2024) was one of the coauthors of the GMA 13 GAM (Panday et al., 2013) and currently serves as the hydrogeologic consultant for GMA 13 for the fourth joint planning cycle. As part of this project, INTERA reviewed the revised GAM files developed by Dr. Hutchison.

1.2 Report Organization

The report is organized into chapters, which are outlined below.

Section 2 – Representation of the Carrizo and Upper Wilcox Aquifers in Groundwater Availability Models for GMA 13: This section evaluates the decision by Panday and others (2023) to represent the Carrizo and Upper Wilcox aquifers as a single model layer.

Section 3 – Transmissivity Values Estimated from Pumping Tests: This section presents field data and transmissivity values calculated from field data for the Carrizo Aquifer.

Section 4 – Sand Thickness and Sand Percentages: This section presents data and maps detailing sand thickness and sand percentages for the Carrizo and Upper Wilcox aquifers.

Section S – Evaluation of the Transmissivity Spatial Distribution for the Carrizo and Upper Wilcox Aquifers in Groundwater Availability Models: This section evaluates the magnitude and spatial distribution of transmissivity values used by Panday and others (2023) and Hutchison (2024) to represent the Carrizo Aquifer in the GAM based on the information presented in Sections 2, 3, and 4.

Section 6 – Findings Relevant to Groundwater Management: This section summarizes the report's findings concerning the transmissivity values determined from field data and transmissivity values used by GAMs. The section also discusses the possible implications of the report's findings to groundwater management in the region.

2.0 Representation of the Carrizo and Upper Wilcox Aquifers in Groundwater Availability Models for GMA 13

Deeds and others (2003) developed the first groundwater availability model (GAM) for the southern portion of the Carrizo-Wilcox Aquifer with the purpose of providing a tool for making predictions of groundwater availability through 2050.

In developing the surfaces for the Upper Wilcox, Deeds and others (2003) relied on two major hydrogeologic investigations: one performed by Klemt and others (1976) and the other by Hamlin (1988). Both investigations acknowledge that an upper Wilcox Aquifer and the Carrizo Aquifer could be mapped and that the latter represented thick fluvial bedload deposits. However, Klemt and others (1976) only mapped the sand intervals from the Carrizo Aquifer, while Hamlin (1988) mapped the sand intervals from the Carrizo and upper Wilcox aquifers.

Deeds and others (2003) describe the Carrizo-Wilcox Aquifer:

> *"The Carrizo-Upper Wilcox in the southern GAM area is characterized by three distinct depositional systems, including a mixed alluvial system, a bed-load channel system, and a deltaic system (Hamlin, 1988). The bed-load channel system comprises the massive sand typically associated with the Carrizo aquifer, but also contains some sandy mud. The mixed alluvial system consists of interbedded sand and mud associated with channel sands and abandoned channel fill, levee and crevasse splay, floodplain, lacustrine, and delta plain sediments. The deltaic system consists of delta-front sand, which changes to prodelta mud basinward. This change to marine facies was considered the boundary between the upper and middle Wilcox (Hamlin, 1988). The middle Wilcox includes several transgressive flooding events and consists of various deltaic facies that form a partial hydrologic barrier between the fluvial-deltaic sediments of the lower Wilcox, and the predominant fluvial system of the Carrizo-Upper Wilcox (Galloway et al., 1994)." (p. 4-2)*

To develop a model layer for the Carrizo Aquifer, Deeds and others (2003) relied on a single-layer groundwater model of the Carrizo Aquifer developed by Klemt and others (1976). Klemt and others (1976) lithologically picked the base of the Carrizo aquifer as the top of the Wilcox Group by identifying the base of the major sand units of the Carrizo. According to Deeds and others (2003), the mapped Carrizo Formation correlates with the Carrizo, as mapped in central Texas (Ayers and Lewis, 1985). To develop a model layer for the Upper Wilcox, Deeds and others (2003) used the study by Klemt and others (1976) and Hamlin (1988). The thickness of the Upper Wilcox model layer was represented by the thickness difference between the Carrizo Sand mapped by Klemt and others (1976) and the Carrizo-Upper Wilcox mapped by Hamlin (1988). An acknowledged shortcoming of this approach by Deeds and others (2003) is that across much of the up-dip areas, Hamlin's base of the Upper Wilcox intersects Klemt's base of the Carrizo. To account for the inconsistency among the two data sets, Deeds and others (2003) assumed that in these up-dip areas, the Wilcox thins to a minimum thickness.

Kelley and others (2004) developed the second groundwater availability model (GAM) for the southern portions of the Carrizo-Wilcox Aquifer. This GAM was developed by expanding the Carrizo-Wilcox GAM developed by Deeds and others (2003) to include the Queen City and Sparta Aquifers. The GAM developed by Kelley and others (2004) consisted of eight model layers: the Lower Wilcox Aquifer,

Middle Wilcox Aquifer, Upper Wilcox Aquifer, Carrizo Aquifer, the Reklaw Formation, the Queen City Aquifer, Weches Formation, and the Sparta Aquifer.

Kelley and others (2004) incorporated the physical and hydraulic properties of the upper, middle, and lower Wilcox model layers developed by Deeds and others (2003) without any modifications. **Figure 1-1** shows the thickness of the Upper Wilcox model layer. The thickness of the Upper Wilcox ranges between 20 feet and 1,930 feet, with aquifer thickening in the down dip direction.

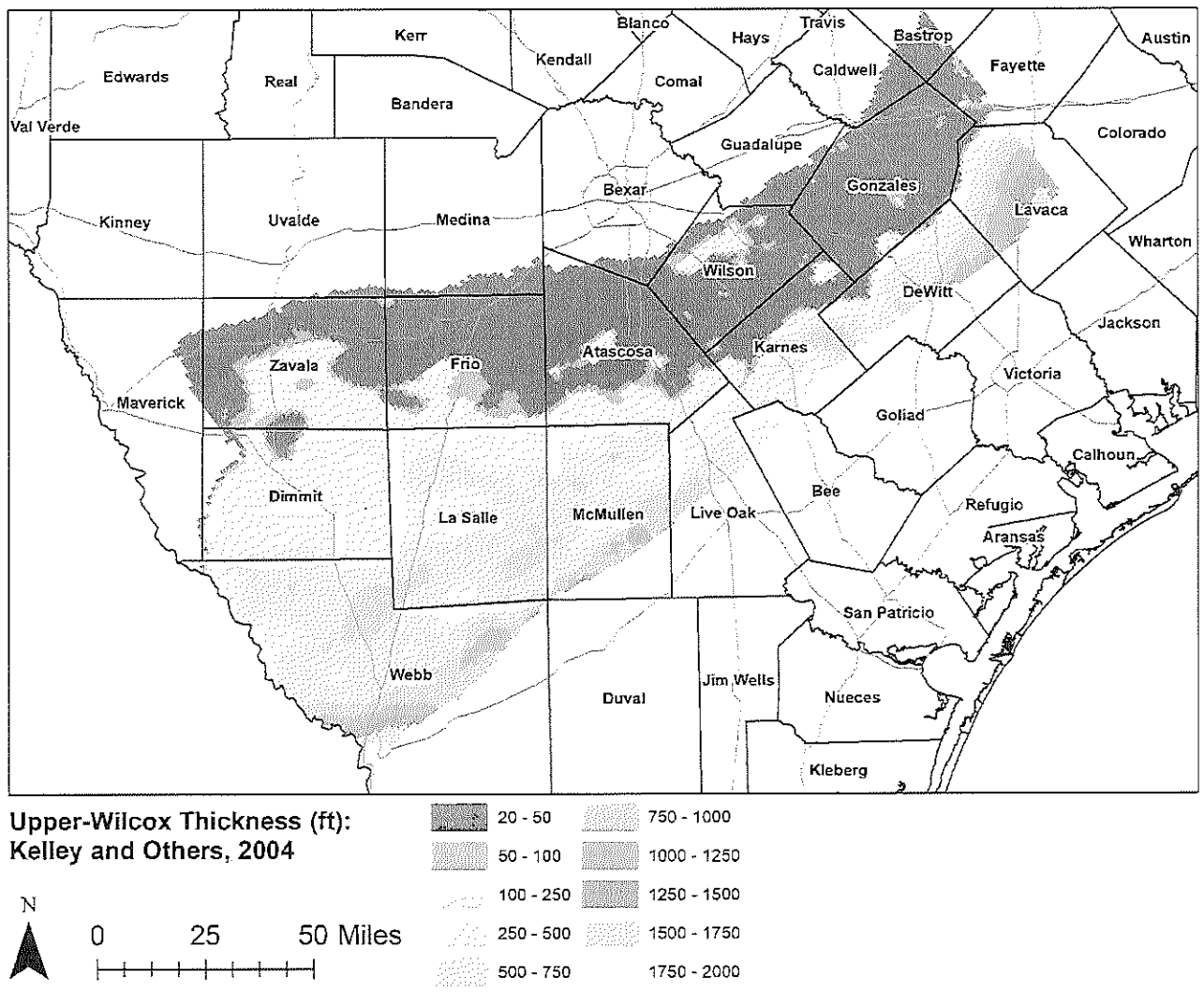

Figure 1-1. Thickness of the model layer representing the Upper Wilcox Aquifer in the groundwater availability model for GMA 13 developed by Kelley and others (2004).

2.1 Representing the Carrizo and Upper Wilcox with One Model Layer

In their update of the GAM developed by Kelley and others (2004), Panday and others (2023) made a significant change in the model layering for the Carrizo-Wilcox Aquifer. Whereas the previous two GAMs (Deeds et al., 2003; Kelley et al., 2004) represented the Upper Wilcox Aquifer and the Carrizo Aquifer as two separate model layers, Panday and others (2023) used a single layer to represent both aquifers. Their rationale for not adopting the previous GAMs layering scheme is provided by Schorr and others (2021):

> *"Deeds and others (2003) did not provide a strong justification that the upper Wilcox interval was distinct from the Carrizo Formation. Deeds and others (2003) note the up-dip limit of the upper Wilcox interval is somewhat artificial due ta using two different interpretations. While reviewing geophysical logs located in the vicinity of the up-dip limit delineated by the previous groundwater availability model, this study noted that the presence of the upper Wilcox interval unit was not consistent and, therefore, would also result in a somewhat artificial limit if implemented in the groundwater availability model update." (p. 35)*

Instead of undertaking a comprehensive analysis of geophysical logs to better define the Upper Wilcox in the up-dip regions, Schorr and others (2021) chose to eliminate the Upper Wilcox layer as a separate model layer and combine it with the Carrizo Aquifer. Schorr and others (2021) justification for combining the Carrizo Aquifer and Upper Wilcox into the single model layer is that:

> *"The inclusion of the upper Wilcox with the Carrizo for this study is consistent with recent studies by Hamlin and others (2019) and Meyers and others (2019, unpublished). These studies based their stratigraphic interpretations on both Bebout and others (1982) and Hargis (1985, 1986, and 2009), who described the Carrizo Formation as the up-dip equivalent of the upper Wilcox, and Hamlin (1988), who related the fluvial systems of the Carrizo Formation ta the deltaic systems of the upper Wilcox." (p. 32)*

2.2 Hydrogeologic Justification for Separating the Carrizo Aquifer and the Upper Wilcox into Separate Model Layers in the GAM

Schorr and others (2021) cite studies (Hamlin et al., 2019; Meyers et al., 2019; Bebout and others, 1982; Hargis, 1985, 1985, 2009; Hamlin, 1988) of aquifer stratigraphy to justify the combing the Carrizo Aquifer and the Upper Wilcox into a single model layer. The goal of these papers is to partition the subsurface deposits into stratigraphic units and not necessarily into groundwater model layers. Stratigraphy is defined by the Webster dictionary (Grove, 1993) as "the branch of geology that deals with the origin, composition, distribution, and succession of strata." Although stratigraphy is an important consideration when developing the layers for a groundwater model, there are often more important factors to be considered, such as hydraulic properties and hydraulic head. Among these stratigraphic studies cited by Schorr and others (2021), Hamlin (1988) provides the most detailed discussion regarding the development of a groundwater model.

- "the Carrizo-Upper Wilcox is a major regressive sequence composed of fluvial, deltaic, and marine shoreline depositional systems bounded above and below by transgressive facies" (Hamlin, 1988, p. 21).

- two distinct fluvial facies assemblages created the Carrizo-Wilcox aquifer system. The Carrizo Aquifer consists of a sand-dominated bed-load system, and the Upper Wilcox consists of a more heterogeneous mixed-load sdd.
- "In the Carrizo-Upper Wilcox stratigraphic interval, hydraulic conductivity is lithofacies dependent" (Hamlin, 1988, pg. 21)
- "channel-fill and crevasse splay sandstone facies of the mixed alluvial system are permeable and transmissive enough to yield water to wells and are referred to collectively in some places as the Wilcox aquifer" (Hamlin, 1988, p. 21)
- "the medium- to coarse-grained sand bodies sand bodies of the bed-load channel fluvial system have higher hydraulic conductivities and transmissivities and are the main pathways for ground-water flow in the Carrizo aquifer" (Hamlin, 1988, p. 23)

As noted by Deeds and others (2003) and Klemt and others (1986), a key criterion for separating deposits into model layers is a difference in hydrogeologic properties. In his discussion of the Carrizo and Upper Wilcox aquifers, Hamlin (1988) notes that the hydrogeologic properties, including groundwater salinity, hydraulic head, conductivity, transmissivity, and storativity vary between the Carrizo and upper Wilcox layers. Salinities are lowest and extend deepest in the Carrizo and commonly increase abruptly across boundaries between the Carrizo and other layers (Hamlin and de la Rocha, 2015). Hydraulic heads are highest in the Carrizo, and the potential exists for cross-formational flow out of the Carrizo layer (Payne, 1972). Hydraulic conductivities are highest in the Carrizo, and transmissivities can be locally 10 times higher relative to the Wilcox layers.

Depositional systems, which are interpreted from geologic data (geophysical logs, core samples, and outcrops), form important controls on subsequent groundwater flow systems. Hamlin (1988) interpreted and mapped two main depositional systems in the Carrizo-Upper Wilcox stratigraphic interval: the Bed-Load Channel system and the Mixed Alluvial system. The sand-dominated (>90% sand) Bed-Load Channel system forms the Carrizo aquifer layer, and the mixed sand/shale (generally <40% sand) Mixed Alluvial system forms the upper Wilcox aquifer/aquitard layers. With the statement "The bed-load channel system is the Carrizo aquifer" in the abstract, Hamlin (1988) makes it clear that the Carrizo Aquifer is distinguishable from the Wilcox Aquifer, which is characterized by depositional environments other than a bed-load channel system.

Hamlin (1988) provides several areal maps and cross-sections of the depositional systems that provide a framework for mapping the Carrizo Aquifer. **Figure 2-1** shows maps developed by Hamlin (1988) that divide the Carrizo-Upper Wilcox stratigraphic interval into three vertical intervals based on "early," "middle," and "late" depositional periods. With regard to developing a groundwater model, the early and late intervals correspond to the deepest and shallowest deposits. For each historical period, the maps show the depositional environments that can be used to define the areal extent of the Carrizo Aquifer and the Upper Wilcox Aquifer. The Carrizo Bed-Load Channel system is best developed in the middle part of the Carrizo-Upper Wilcox stratigraphic interval and the north and northeast geographically. For the upper Wilcox, the Mixed Alluvial system is best developed in the southwest. Stratigraphically (vertically), Carrizo sand is underlain and overlain by upper Wilcox sand and shale.

The data and conclusion from the above studies of the Carrizo-Upper Wilcox stratigraphic interval (Hamlin, 1988; Hamlin et al., 2019; Hamlin and de la Rocha, 2015; Meyers et al., 2019) support dividing the Carrizo-Upper Wilcox GAM layer into as many as three separate model layers. The upper and lower layers would represent the Upper Wilcox deposits, and the middle layer would represent the Carrizo

Aquifer. Regarding aquifer properties, each of the model layers would be internally homogeneous. The Carrizo Aquifer layer would be the most hydraulically transmissive of the three new layers and would contain a majority of the fresh groundwater. Hydrogeologic properties in the upper Wilcox layers would be similar but vary geographically and locally. The Upper Wilcox includes numerous sandstones, but these sandstones are thin, laterally discontinuous, and enclosed in shale. The Upper Wilcox layers will continue to be useful for domestic groundwater production, especially in shallow wells and in the southwest, though most large-scale future groundwater production will likely come from the Carrizo Aquifer.

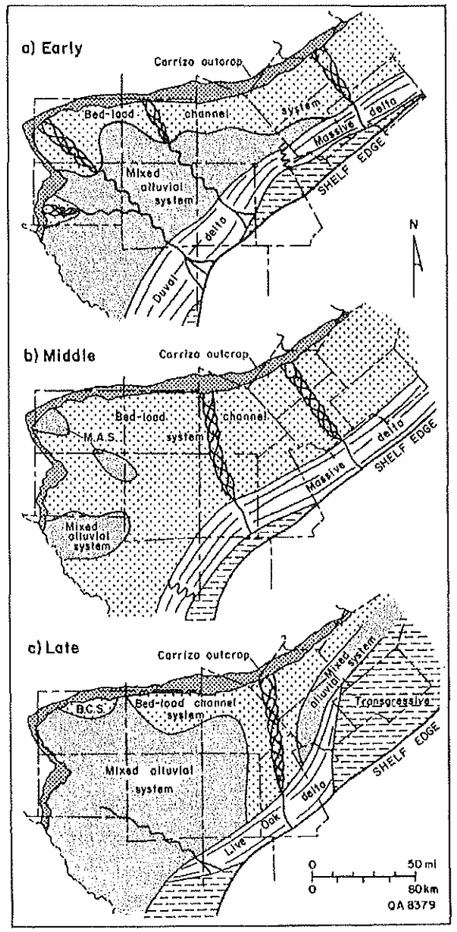

Figure 2-1. The paleogeographic reconstruction shows depositional systems at three levels within the Carrizo-Upper Wilcox interval (Hamlin 1988). Coastal plain systems merge downdip (southeast) with Wilcox deltaic shoreline systems (Bebout et al., 1982). As shown in Figs. 2-3 & 2-4, Carrizo Bed-Load Channel sandstones are thickest and most widespread in the middle part of the interval (b).

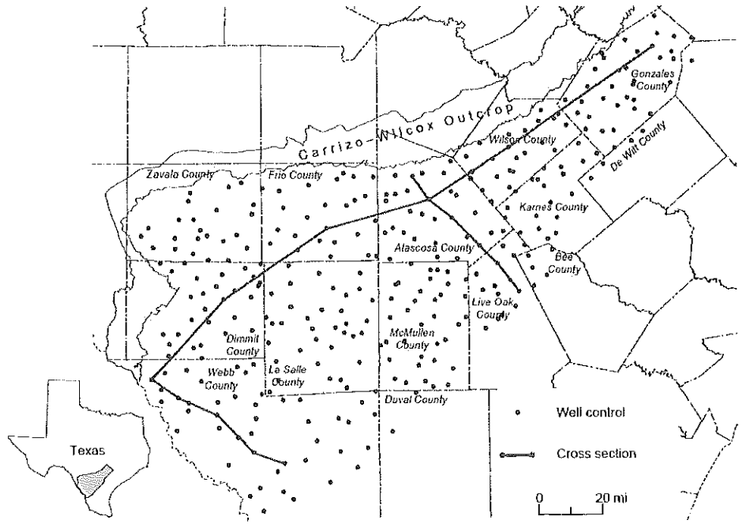

Figure 2-2. Map of the geographic extent of the Carrizo-Wilcox aquifer in South Texas, also showing lines of cross sections (Figs. 2-3, 2-4) and water wells used for groundwater salinity studies (Hamlin and de la Rocha, 2015; Hamlin et al., 2019).

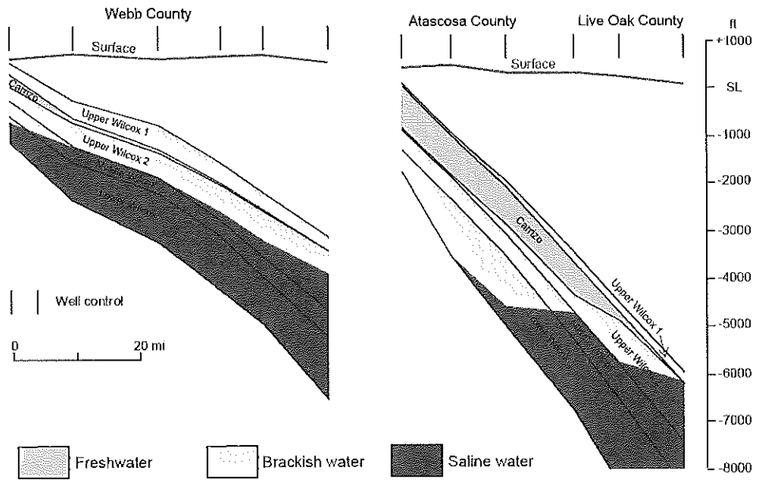

Figure 2-3. Dip-oriented cross-sections showing proposed model layering relative to depth below land surface. Also shown are groundwater salinities in the Carrizo-Wilcox aquifer system (Hamlin and de la Rocha, 2015). The freshwater Carrizo layer is thickest and extends deepest in the northeast. Lines of sections are shown in Figure 2-2.

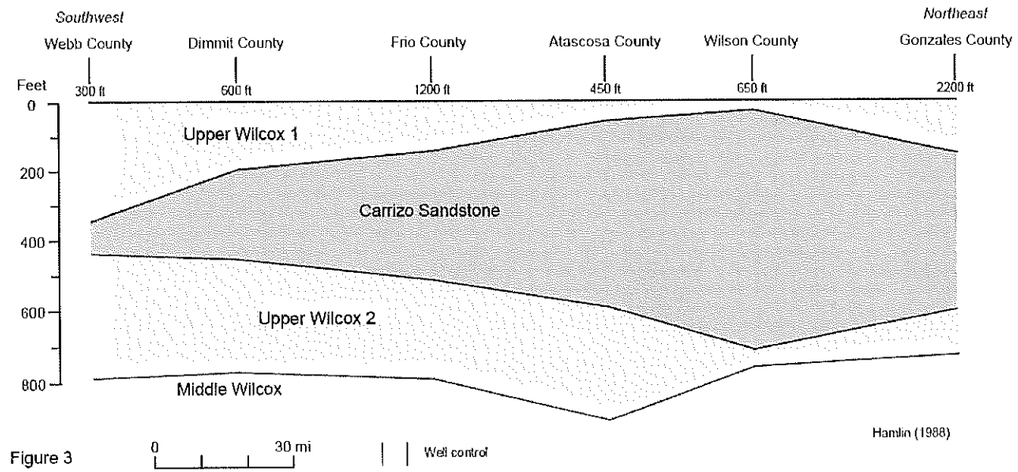

Figure 2-4. Strike-oriented cross-section showing proposed model layering from southwest to northeast (Hamlin, 1988). The cross-section is flattened on the top of the Carrizo-Upper Wilcox interval to emphasize thickness changes. Actual depths below land surface are shown at each well location. The Carrizo layer thickens to the northeast, reaching a maximum in Wilson County. Groundwater salinities are not shown in this cross-section. The line of section is shown in Figure 2-2.

3.0 Transmissivity Values Estimated from Pumping Tests

This section discusses the aquifer pumping and specific capacity tests that were used to develop estimates of transmissivity for the GAMs for the evaluation of the GAMs.

3.1 Aquifer Pumping Tests from Public Water Supply Wells

The Texas Commission on Environmental Quality (TCEQ) is required by the State of Texas to maintain a Public Water Supply Supervision program in order to retain primary enforcement authority (primacy) over Texas public water systems' compliance with the Safe Drinking Water Act (SDWA) and its amendments. As part of this program, TCEQ maintains an electronic database and a set of paper records to manage information regarding the location, construction, borelog lithology, and time-drawdown measurements from a 36-hour aquifer test for each public water supply (PWS) well.

The most common type of aquifer pumping test performed at PWS wells are constant-rate pumping tests, in which the aquifer is pumped at a constant rate. The plots in **Figure 3-1** show an example of the type of data that should be collected from a constant-rate aquifer pumping test. On the left side of **Figure 3-1**, time is plotted on a linear time scale. On the right side of **Figure 3-1**, time is plotted on a logarithmic scale. Plotting time on a logarithmic scale facilitates using the Cooper-Jacob approximation to the Theis nonequilibrium well equation (Cooper and Jacob, 1946) to calculate transmissivity. The Cooper-Jacob analysis method involves fitting a straight line to a logarithmic plot of the drawdown data and using the slope (Δs) of the line to calculate transmissivity. For example, in the righthand plot in **Figure 3-1**, Δs is 19.5 based on the change in drawdown that occurred from 100 to 1,000 minutes. Using a pumping rate of 715 gallons per minute (gpm) and a Δs of 19.5 ft, a transmissivity value of 1,294 square feet per day (ft2/day) is calculated using **Equation 3-1**.

Equation 3-1

$$T = 35.3Q/\Delta s$$

Where:

T = Transmissivity in square feet per day

Q = Flow in gpm

Δs = Change in drawdown in feet over one log cycle

The TCEQ maintains documents for each public water supply (PWS) well. INTERA contacted the TCEQ and requested scanned copies of the documents for each PWS well located in the EUWCD and received data for 75 wells in Atascosa County, 24 wells in Frio County, 34 wells in Karnes County, and 66 wells in Wilson County. 178 of these wells had associated location information and are plotted in **Figure 3-2**. TCEQ aquifer pumping test data should include the measured pumping rates and drawdowns in the pumping well over time. INTERA reviewed the documents and identified 44 PWS wells with sufficient aquifer pumping test data to warrant an application of the Cooper-Jacob straight-line analysis to estimate transmissivity. Out of these wells, 24 were determined to be screened within the Carrizo aquifer (**Figure 3-3**). After the Cooper-Jacob straight-line analysis to estimate transmissivity for each PWS well, the reliability of each calculated transmissivity was assigned a rating from 1 to 5. A Quality

Rating of 1 and 5 are associated with a ranking of highest and lowest reliability, respectively. An additional description of the five rankings is provided below.

- **Category 1**: Pumping test data appears to be highly reliable for estimating transmissivity values. The estimated confidence limit is ±10 % for calculated transmissivity.
- **Category 2**: Pumping test data appears to be reliable for estimating transmissivity values. The estimated confidence limit is ±20 % for calculated transmissivity.
- **Category 3**: Pumping test data appears sufficient to provide a meaningful estimate of transmissivity. The estimated confidence limit is ±40 % for calculated transmissivity.
- **Category 4**: Pumping test data has apparent problems. A range of transmissivity values can be filtered depending on how the data is filtered. Values with this rating will not be used to estimate aquifer properties.
- **Category 5**: Pumping test data is of such low quality that a useable transmissivity value cannot be calculated.

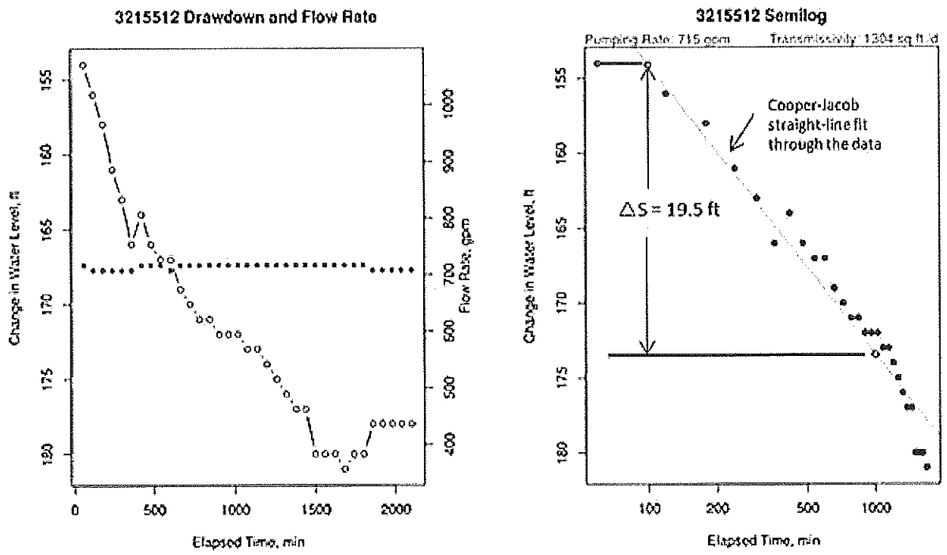

Figure 3-1. Plots showing drawdown and pumping data collected during an aquifer pumping test. The plot on the left shows the measured pumping rate and drawdown values over time. The plot on the right shows a semi-log plot of elapsed water level change over time.

Table 3-1 summarizes the results of the Cooper-Jacob straight-line analyses performed on the 24 Carrizo wells within the EUWCD, and **Figure 3-3** shows the locations of these wells with associated transmissivity values for those wells assigned a Quality Rating of 1 or 2.

Table 3-1. Listing of TCEQ Carrizo Aquifer pump tests of adequate quality for the application of the Cooper-Jacobs straight-line method.

TCEQ_ID	County	Latitude	Longitude	Quality Rating	Length of Test (hrs)	Pumping Rate (GPM)	Transmissivity (ft^2/day)
G0070002A	Atascosa	28.909166	-98.544441	1	3.3	500	9,094
G0070002D	Atascosa	28.929980	-98.519069	4	3.8	1,286	206
G0070002E	Atascosa	28.909779	-98.544748	3	6.0	874	4,242
G0070003K	Atascosa	28.959637	-98.488876	4	1.5	1,161	238
G0070003L	Atascosa	28.977944	-98.501106	4	2.5	1,218	2,658
G0070023F	Atascosa	29.065272	-98.488206	4	0.1	800	3,384
G0070023G	Atascosa	29.001831	-98.414131	1	6.5	2,023	8,090
G0070028A	Atascosa	28.702370	-98.482147	2	22.0	1,043	19,263
G0820001D	Frio	28.656675	-99.190953	4	4.0	541	1,023
G0820002B	Frio	28.896358	-99.085640	1	1.5	760	7,177
G0820002C	Frio	28.898890	-99.108887	3	4.0	1,155	3,874
G0820002K	Frio	28.889075	-99.090147	4	6.7	598	42,797
G2470002C	Wilson	29.070150	-98.084381	1	4.0	337	15,942
G2470003C	Wilson	29.234722	-97.954445	1	2.7	800	23,161
G2470004F	Wilson	29.333283	-98.088994	1	17.0	285	508
G2470005A	Wilson	29.129733	-98.108306	3	11.0	298	1,445
5G2470005F	Wilson	29.131812	-98.107261	1	36.0	285	12,268
G2470015B	Wilson	29.293056	-98.211388	1	35.5	203	402
G2470015H	Wilson	29.300230	-98.052513	1	2.0	963	3,910
G2470015I	Wilson	29.301517	-98.114444	1	20.0	514	1,079
G2470015J	Wilson	29.274858	-98.108492	2	7.0	2,254	4,324
G2470022C	Wilson	29.268842	-98.198770	1	9.7	1,480	4,246
G1280007C	Karnes	29.274858	-98.108492	2	4	770	9,952

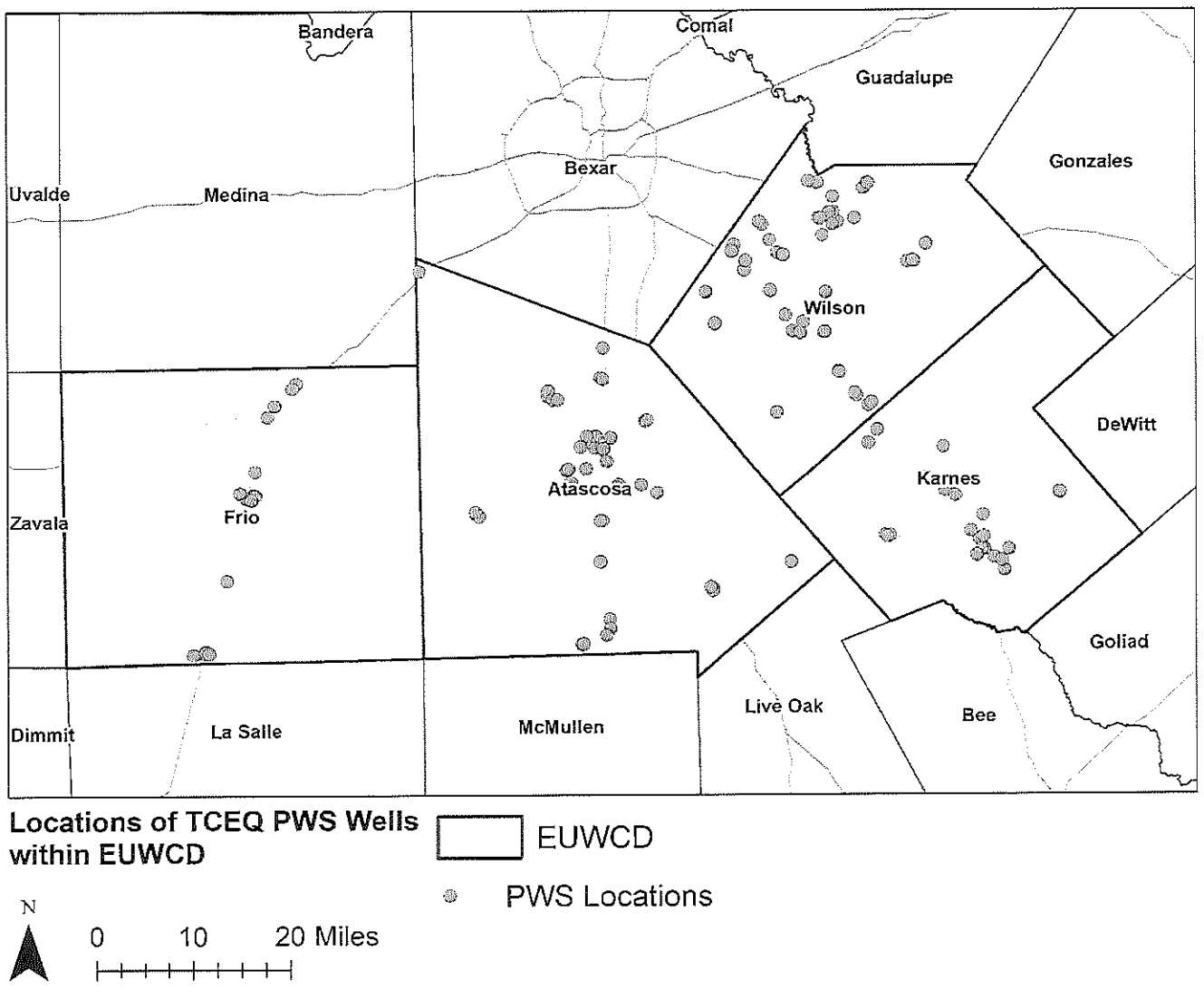

Figure 3-2. The locations of PWS wells for which the TCEQ provided scanned documents.

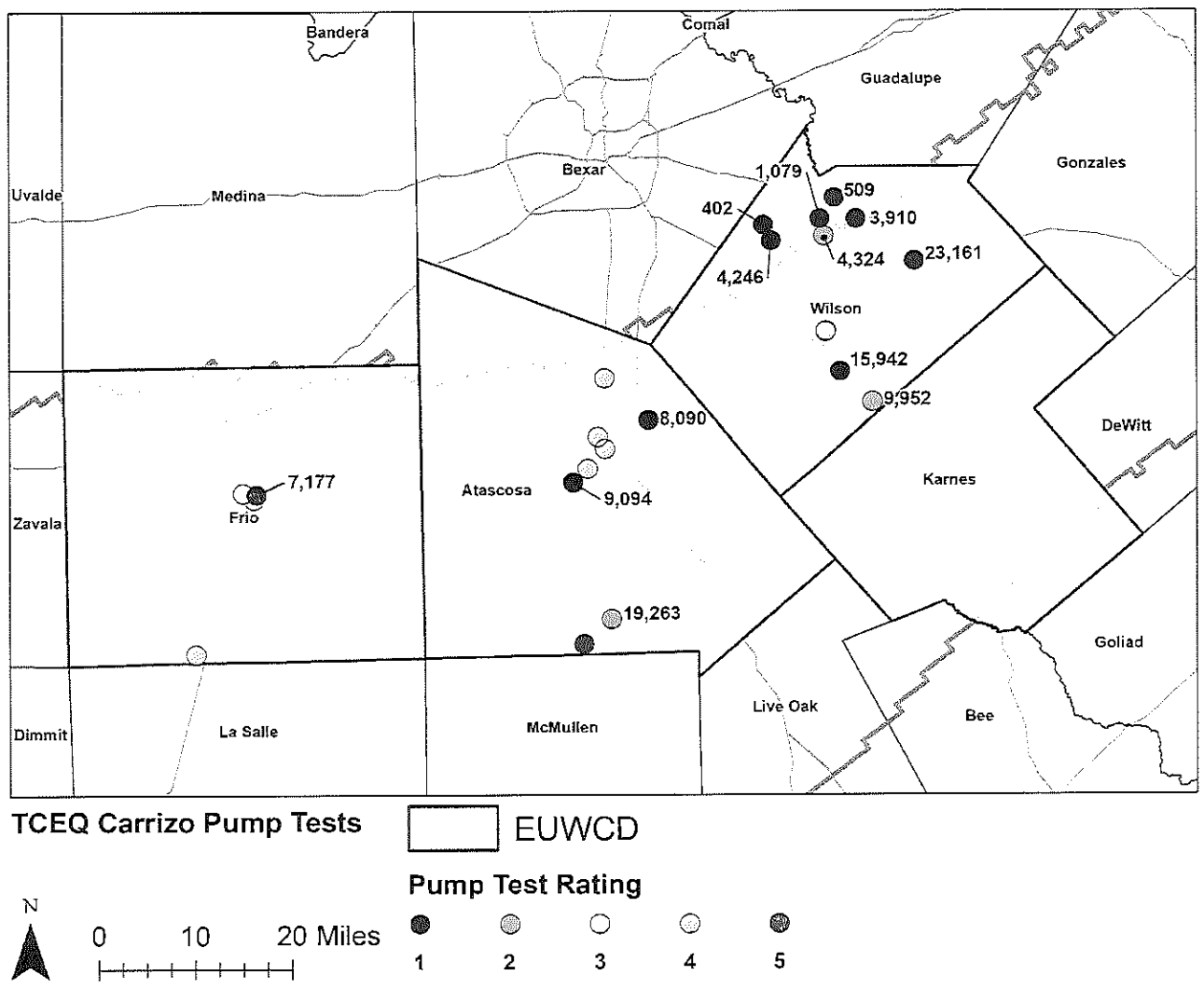

Figure 3-3. The locations of 24 TCEQ pump tests screened in the Carrizo aquifer with associated Quality Ratings and labels of the most reliable transmissivity calculations.

3.2 Aquifer Pumping Tests from Hydrogeologic Reports

INTERA reviewed TWDB reports and consulting reports to identify transmissivity values that were calculated from constant-rate pumping tests using the form of the Theis (1935) equation. **Table 3-2** lists the transmissivity values synthesized from these reports. Myers (1969) and Alex and White (1966) provide 25 of the 26 transmissivity values. The reliability of these values is unknown. For all tests, there are a considerable number of unknowns regarding the performance of the aquifer tests, the data collection, and the data analysis. As a result, we have assigned a rating of 3 to all of the transmissivity values in **Table 3-2**.

In addition to the tests presented in **Table 3-2**, Klemt and others (1976) performed aquifer pumping tests in the Carrizo and analyzed the data to generate a map of transmissivity values in South Texas. **Figure 3-4** shows the contours of these transmissivity values. The map indicates the three counties with the highest transmissivity values are part of the EUWCD: Frio, Atascosa, and Wilson Counties. Atascosa and Wilson counties are the only counties with transmissivities above 30,000 ft^2/day. Based on the contours, the highest transmissivity values in these two counties appear to be about 40,000 ft^2/day. Klemt (1976) provides a brief and very general description of how the tests were performed, but no field data for data analysis was provided.

Table 3-2. List of Transmissivity Values Obtained from Reports

Well ID	County	Source	Report Author	Latitude	Longitude	Quality Rating	Test Date	Pumping Rate (GPM)	Transmissivity (ft^2/day)
AL-68-60-603	Atascosa	Report R98	Myers	29.055833	-98.516667	3	06/14/51	900	20,588
AL-68-60-604	Atascosa	Report R98	Myers	29.048889	-98.524444	3	06/14/51	530	23,262
AL-68-60-904	Atascosa	Report R98	Myers	29.039444	-98.513889	3	06/14/51	530	18,717
AL-68-60-905	Atascosa	Report R98	Myers	29.042222	-98.507778	3	06/14/51	530	17,380
AL-78-04-207	Atascosa	Report R98	Myers	28.997222	-98.553333	3	06/14/51	900	19,251
Al-78-04-803	Atascosa	Report R98	Myers	28.911944	-98.042222	3	04/08/64	500	9,492
AL-78-14-801	Atascosa	Report R98	Myers	28.754444	-98.305556	3	06/27/51	2800	5,013
AL-78-14-802	Atascosa	Report R98	Myers	28.768333	-98.311667	3	03/26/51	2800	4,572
AL-78-22-202	Atascosa	Report R98	Myers	28.826667	-98.310000	3	06/27/51	2800	5,348
KB-77-23-803	Frio	Report R98	Myers	28.658611	-99.169444	3	09/27/62	692	5,401
KR-77-08-715	Frio	Report R98	Myers	28.896667	-99.085000	3	09/28/62	unknown	7,152
Wilson_1	Wilson	Report R98-b	Myers	29.133889	-98.162778	3	02/16/55	374	3,877
Wilson_2	Wilson	Report R98-b	Myers	28.955000	-98.247222	3	02/22/55	unknown	3,877
AL-77-23-803	Atascosa	Report 32	Alex & White	28.662300	-99.161100	3	09/27/62	unknown	4,813
KB-77-08-715	Frio	Report 32	Alex & White	28.905500	-99.106800	3	09/28/62	unknown	8,021
KB-77-07-501	Frio	Report 32	Alex & White	28.932700	-99.171300	3	05/09/56	unknown	9,358
AL-78-04-803	Atascosa	Report 32	Alex & White	28.910000	-98.544000	3	04/08/64	unknown	9,358
AL-78-04-207	Atascosa	Report 32	Alex & White	29.001200	-98.545200	3	06/14/51	unknown	19,786
AL-78-22-202	Atascosa	Report 32	Alex & White	28.980300	-98.571200	3	03/26/51	unknown	5,154
AL-68-60-905	Atascosa	Report 32	Alex & White	29.041400	-98.501000	3	06/14/51	unknown	19,218
AL-68-60-904	Atascosa	Report 32	Alex & White	29.038400	-98.506400	3	06/14/51	unknown	23,529
AL-68-60-603	Atascosa	Report 32	Alex & White	29.057800	-98.647600	3	06/14/51	unknown	19,378
AL-68-60-604	Atascosa	Report 32	Alex & White	29.085200	-98.647200	3	06/14/51	unknown	23,329
AL-78-14-801	Atascosa	Report 32	Alex & White	28.752500	-98.305400	3	06/27/52	unknown	5,348
AL-78-14-802	Atascosa	Report 32	Alex & White	28.768700	-98.309200	3	03/26/51	unknown	4,913
BFPW03	Atascosa	Bigfoot Report	INTERA	29.102472	-98.732548	3	02/05/19	1000	2,750

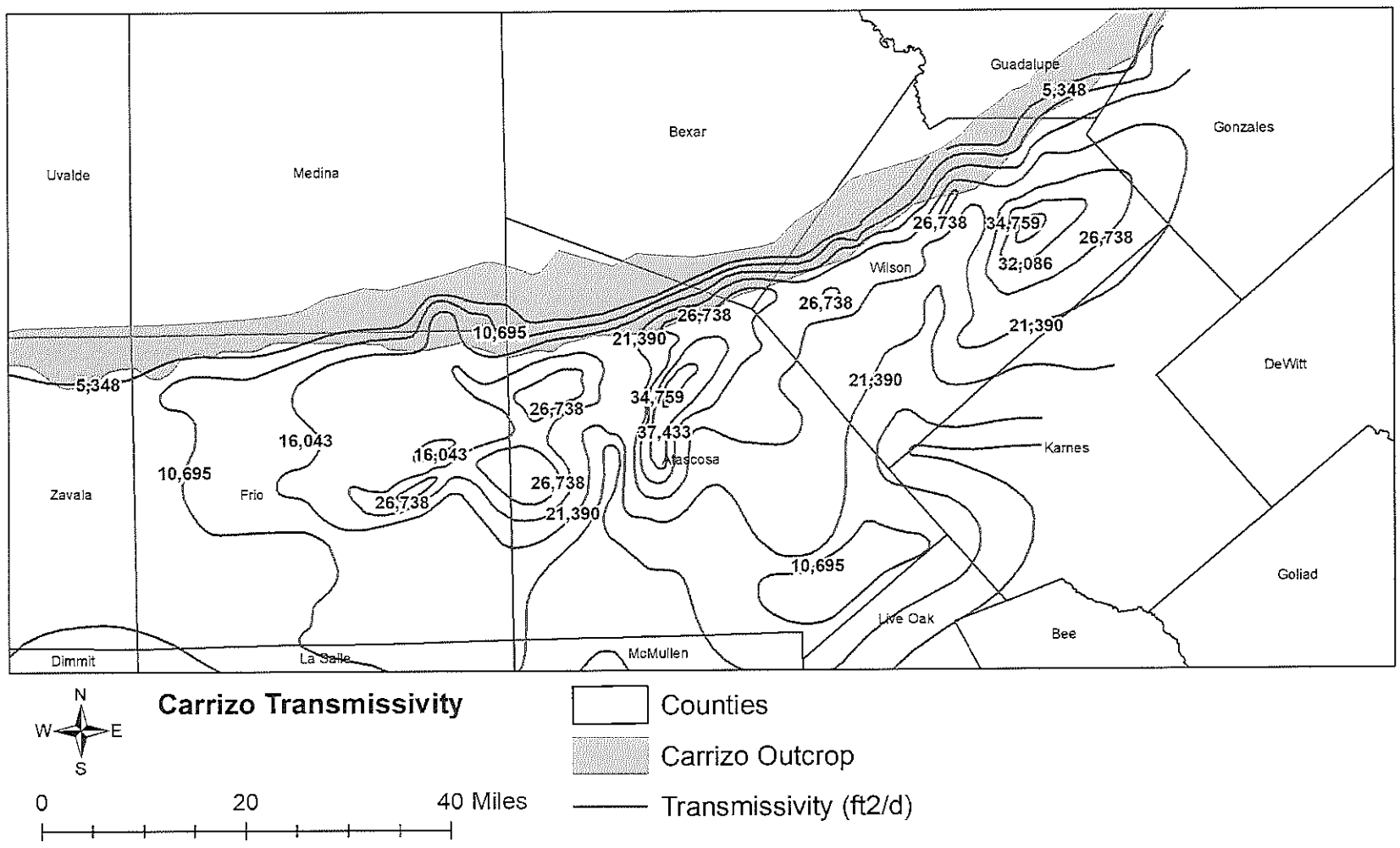

Figure 3-4. Contours of Transmissivity Developed by Klemt (1976) for the Carrizo Aquifer.

3.3 Transmissivity Values Developed from Specific Capacity Values Obtained from Submitted Drillers Reports

A primary source of transmissivity used by Panday and others (2023) and Hutchison (2024) are transmissivity values developed by Mace and others (2002). These transmissivity values were also used by Deeds and others (2003) and Kelley and others (2004) to develop previous GAMs for the Carrizo-Wilcox Aquifer. The transmissivity values developed by Mace and others (2002) for the Carrizo Aquifer are derived by converting specific capacity to transmissivity.

Specific capacity is a measure of the productivity of a well and is calculated by dividing the total pumping rate by the drawdown (**Equation 3-2**). Specific capacity is generally reported as gallons per minute (gpm) per foot. Water-well drillers have historically used specific capacity to quantify the productivity of a well. Mace and others (2002) investigated different approaches and related specific capacities to transmissivity values. They discovered that for the Carrizo-Wilcox aquifer, an empirical relationship could be developed between log-transformed transmissivity values and log-transformed specific capacity calculated from aquifer pumping tests for which transmissivity values could be determined using standard pumping-test analysis. Deeds and others (2003) developed an empirical equation based on the findings of Mace and others (2002) to calculate approximately 450 transmissivity values for the Carrizo Aquifer in the four counties that comprise EUWCD. The locations of these transmissivity values are shown in **Figure 3-5**.

Equation 3.2

$$SC = Q/s$$

Where:

SC = specific capacity (volume of water per time/per length)

Q = discharge (volume of water per time)

s = drawdown (length)

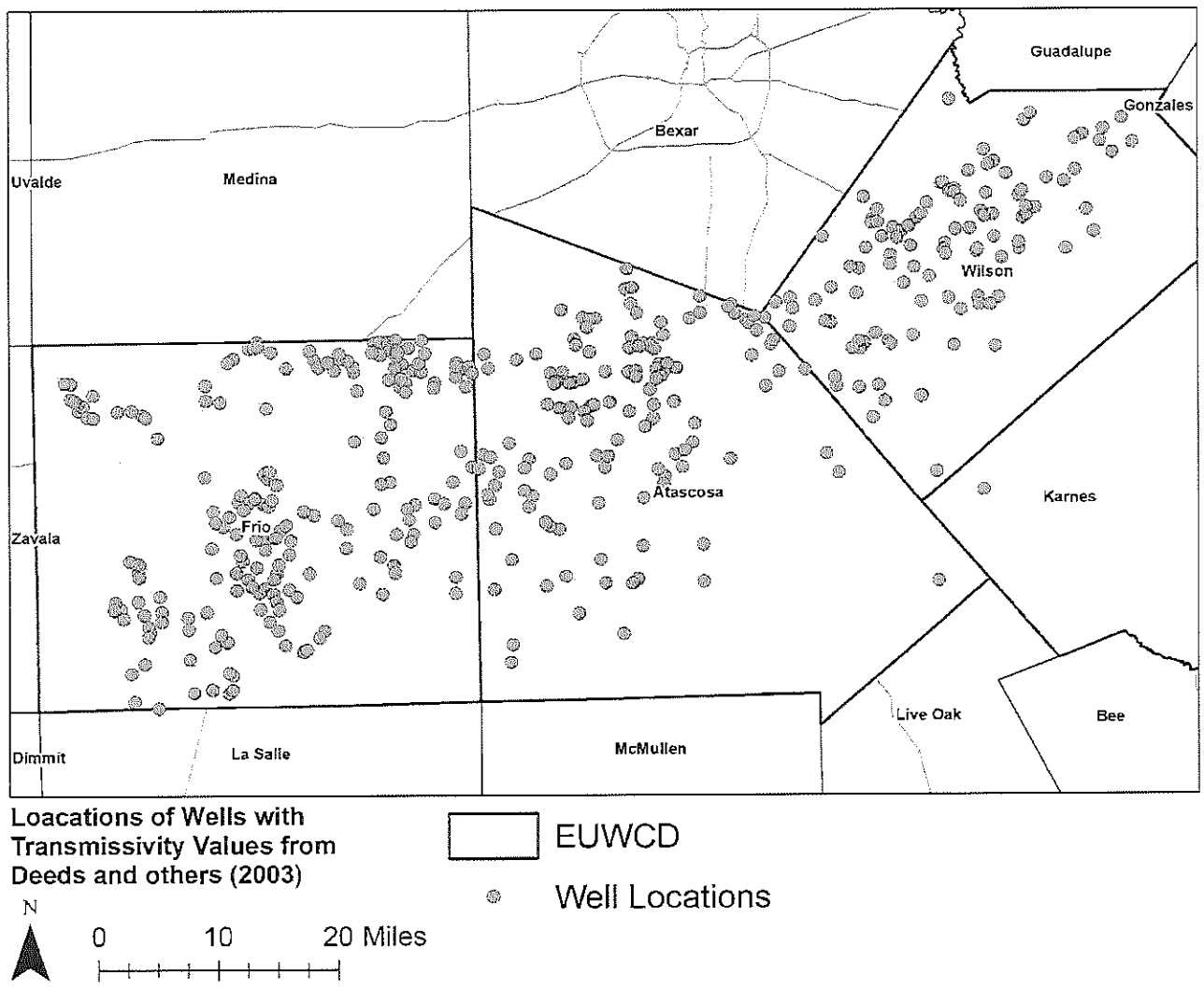

Figure 3-5. The locations of 446 transmissivity values for the Carrizo Aquifer were calculated by Deeds and others (2003) based on the specific capacity dataset developed by Mace and others (2002).

3.4 Use of Transmissivity Values to Constrain the Hydraulic Conductivity Values in the GAM

Panday and others (2023) and Hutchison (2024) used the hydraulic conductivity values determined from transmissivity values to constraint the calibration of the GAM. The hydraulic conductivity values were determined by dividing the transmissivity calculated from an aquifer pumping test by the screen length of the tested well. If a transmissivity of 100 ft^2/day was calculated from an aquifer test at a well with a screen length of 10 ft, the hydraulic conductivity would be 10 ft/day.

Panday and others (2023) and Hutchison (2024) used approximately 1,500 hydraulic conductivity values to calibrate their GAMs. Approximately 90% of the 1,500 hydraulic conductivity values were from a database assembled by Mace (2002). Of the 1,500 values, 738 were associated with the Carrizo-Upper Wilcox model layer. **Table 3-3** provides the minimum, maximum, and geometric means for these values. **Table 3-3** also provides the same metrics for 390 hydraulic conductivity values associated with the Carrizo-Upper Wilcox model layer contained in Frio, Karnes, Wilson, and Atascosa counties from Mace and others (2002) data. As shown in **Table 3-3** and **Figure 3-6**, the values for the EUWCD counties have a narrower distribution than the GMA 14 counties but a similar geometric mean.

Table 3-3. Summary of the estimated hydraulic conductivity values for the Carrizo-Upper Wilcox.

Counties	Well Count	Minimum Conductivity (ft/day)	Maximum Conductivity (ft/day)	Geometric Mean Conductivity (ft/day)	Source
GMA13 Counties	738	0.6	975.0	32.3	Deeds and others (2003), Kelley and others (2004), TWDB Groundwater Database (2019), Panday and others (2023)
EUWCD Counties	390	0.6	581.9	36.0	Deeds and others (2003), Kelley and others (2004)

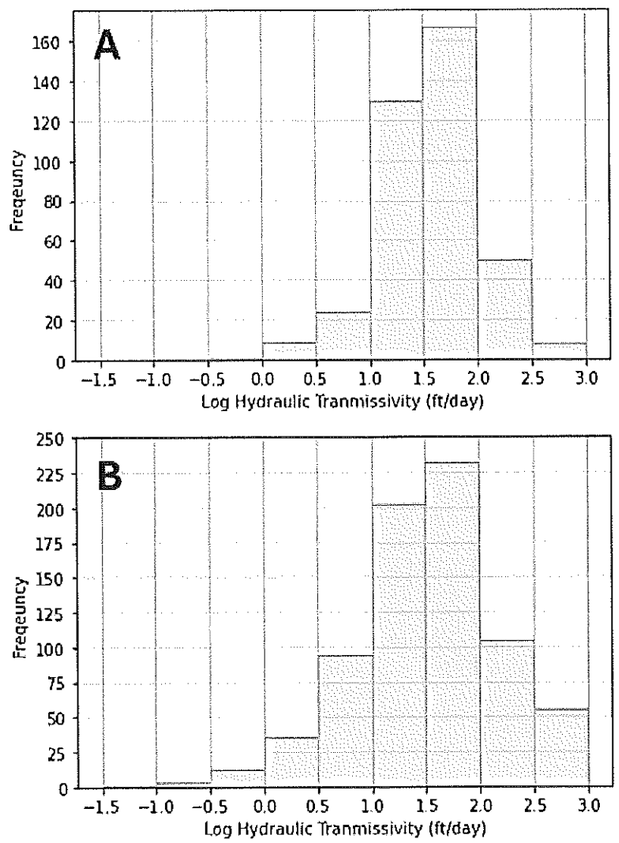

Figure 3-6. Comparison of the distribution of hydraulic conductivity values in the Carrizo-Upper Wilcox aquifer for two data sets: A) from 390 wells located in the EUWCD counties based only on Mace and others (2002) and B) from 738 values located in the GMA 13 counties based on Mace and others (2002) and additional values generated by Panday and others (2023).

Mace (2001) provides a thorough discussion of the assumptions associated with different methods for estimating an aquifer's transmissivity from a specific capacity value. Among the factors that affect how to determine transmissivity values from specific capacity values are unconfined conditions, well construction, well development, the vertical length of overlap between the well screen and the aquifer's top and bottom intervals, the degree to which drilling has disturbed the native aquifer material near the well screen, and measurement error. **Table 3-4** and **Figure 3-7** show the average hydraulic conductivity for different groups of wells based on screen length. The data supports a relationship of decreasing hydraulic conductivity with increasing well screen length. The inverse relationship between the magnitude of hydraulic conductivity and well screen length has been previously identified based on the analysis of transmissivity calculated from aquifer pumping tests and specific capacity tests in other

aquifers as well: the Central Gulf Coast Aquifer System (Young and Kelley, 2006; Young and et al., 2009), in the Northern Trinity Aquifer (Kelley et al., 2014), and in the Yegua-Jackson Aquifer (Deeds et al., 2010).

As discussed by Young and Kelly (2006), two factors are primarily responsible for an inverse relationship between the magnitude of hydraulic conductivity and well screen length. Firstly, short well screens are typically set across zones of relatively high permeability, as drillers preferentially set short screens across the first set of sand beds that will meet the production desired by the well owner. Secondly, groundwater does not only flow horizontally; converging flow will occur toward a short well screen. The result of a converging flow is that deposits above and below the well screen contribute to the flow in such a manner that the portion of the aquifer that accounts for the pumped water is much larger than the vertical length of the well screen.

To account for the effects of this observed bias in previous hydrogeologic studies, the senior author has limited the candidate hydraulic conductivity values to be considered in developing a groundwater model to only those values determined from hydraulic tests performed at a well with a minimum well screen length specific to the formation. A general rule developed from previous studies (Young and Kelley, 2006; Young et al., 2009; Kelley et al., 2014; Deeds and others, 2010) is that the minimum well screen size is greater than about 100 ft or 30% of the formation thickness.

Table 3-4. Dependence of Calculated Hydraulic Conductivity Values with Respect to Screen Length.

Screen Length	Count	Average K (ft/d)	Minimum K (ft/d)	Maximum K (ft/d)
15 - 50	19	179.9	38.8	525.2
50 - 100	38	106.9	5.8	581.9
100 - 150	64	80.6	2.3	351.9
150 - 200	89	58.5	1.8	472.8
200 - 250	83	33.7	0.6	106.2
250 - 300	54	33.5	3.0	180.7
300 - 350	21	44.4	3.9	102.9
350 - 400	9	20.7	12.0	32.2

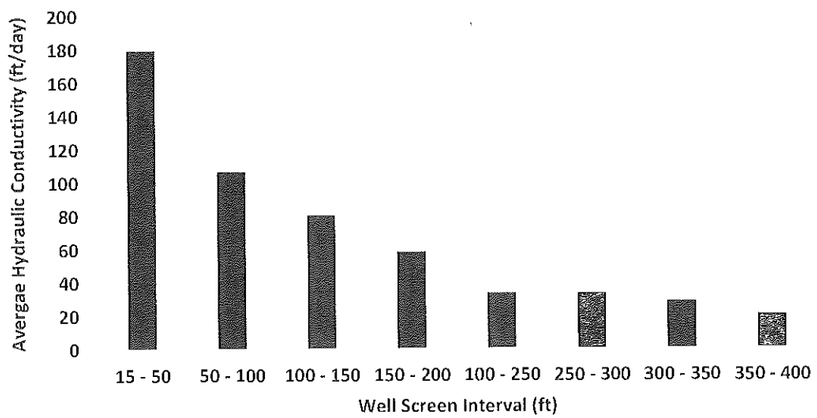

Figure 3-7. The average hydraulic conductivity calculated for different well screen intervals.

4.0 Maps of Sand Thickness and Sand Fraction

This section presents and discusses the maps of total thicknesses, sand thickness, and sand fraction created for the Carrizo Aquifer, the Upper Wilcox Aquifer, and the Wilcox aquifers.

4.1 Sand Thickness Maps Generated By Schorr and others (2021)

In developing the GAM, Panday and others (2023) rely on Schorr and others (2021) for interpreting the geophysical logs to develop the upper and lower boundaries and the sand maps for the Carrizo-Upper Wilcox model layer. Most of the text in this section has been copied from Section 2.5.3 from Schorr and others (2021) with minor modifications. Some changes were made to focus the discussion on the four counties in the EUWCD.

Schorr and others (2021) developed maps for the Carrizo-Wilcox model layer using the lithology data from the TWDB Brackish Resources Aquifer Characterization System (BRACS) Database. The BRACs database includes lithologic interpretations from Hamlin and others (2019), Meyers and others (2019, unpublished), Wise (2014), and Kelley and others (2004). Source data for lithologic intervals from geophysical interpretations were classified using a two-tier system (100 percent sand or 100 percent clay per interpreted interval) or a four-tier system, which provided varied sand percentages. Source data from driller's logs, which inherently vary widely in description, were simplified to a four-tier system by Meyers and others (2019, unpublished). For this study, existing interval data with a four-tier classification were modified to a two-tier system for consistency among sources.

The lithologic interpretations were grouped by hydrostratigraphic unit as determined by existing or updated hydrostratigraphic contact interpretations from borehole electrical logs in the Brackish Resources Aquifer Characterization System Database. Where hydrostratigraphic contact interpretations were not available, the updated model framework raster layers were evaluated in the wells to group the lithologic interpretations by the inferred hydrostratigraphic unit and were included in the net sand analysis where more spatial representation was needed, such as outcrop areas.

For each hydrostratigraphic unit, the net sand analysis prioritized well locations where the lithologic interpretations represented the full hydrostratigraphic interval. **Figure 4-1** shows the thickness of the Carrizo-Upper Wilcox model layer developed by Schorr and others (2021). A two-phased approach was used to select the geophysical logs to generate the sand maps. In the first phase, all geophysical wells that provided full coverage were selected. In the second phase, additional geophysical logs were selected for the lithologic interpretation and represented at least 80% of the thickness of the Carrizo-Upper Wilcox model layer. In a few instances, some locations were disregarded if they did not support the regional trend, particularly from the driller's log source data. **Figure 4-2** shows the location of the logs used by Shorr and others (2023). **Figures 4-3** and **4-4** show the sand thickness and sand percent maps for the Carrizo-Wilcox model layer generated by Schorr and others (2021).

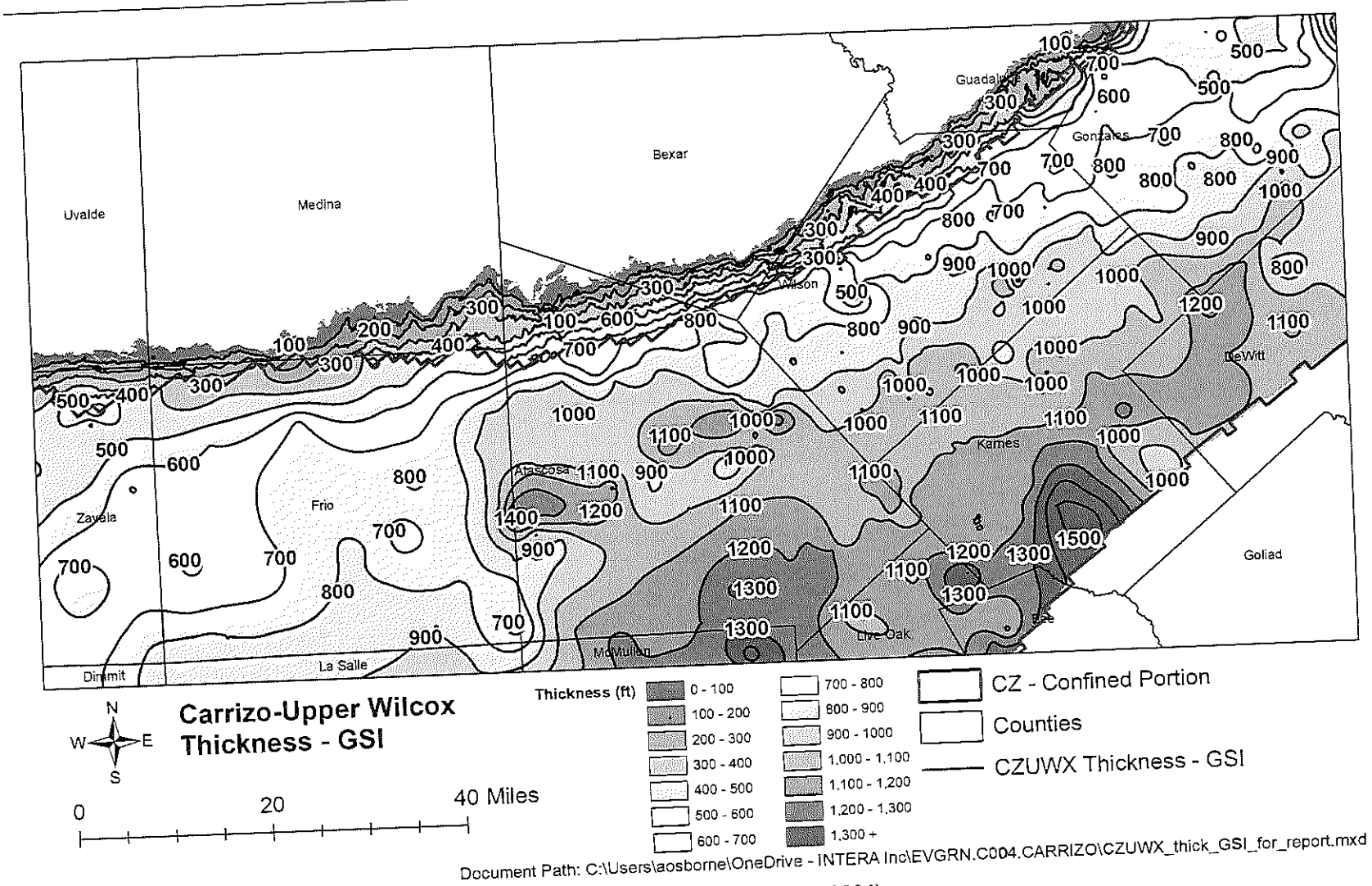

Figure 4-1. The map of Carrizo-Upper Wilcox thickness developed by Schorr and others (2021).

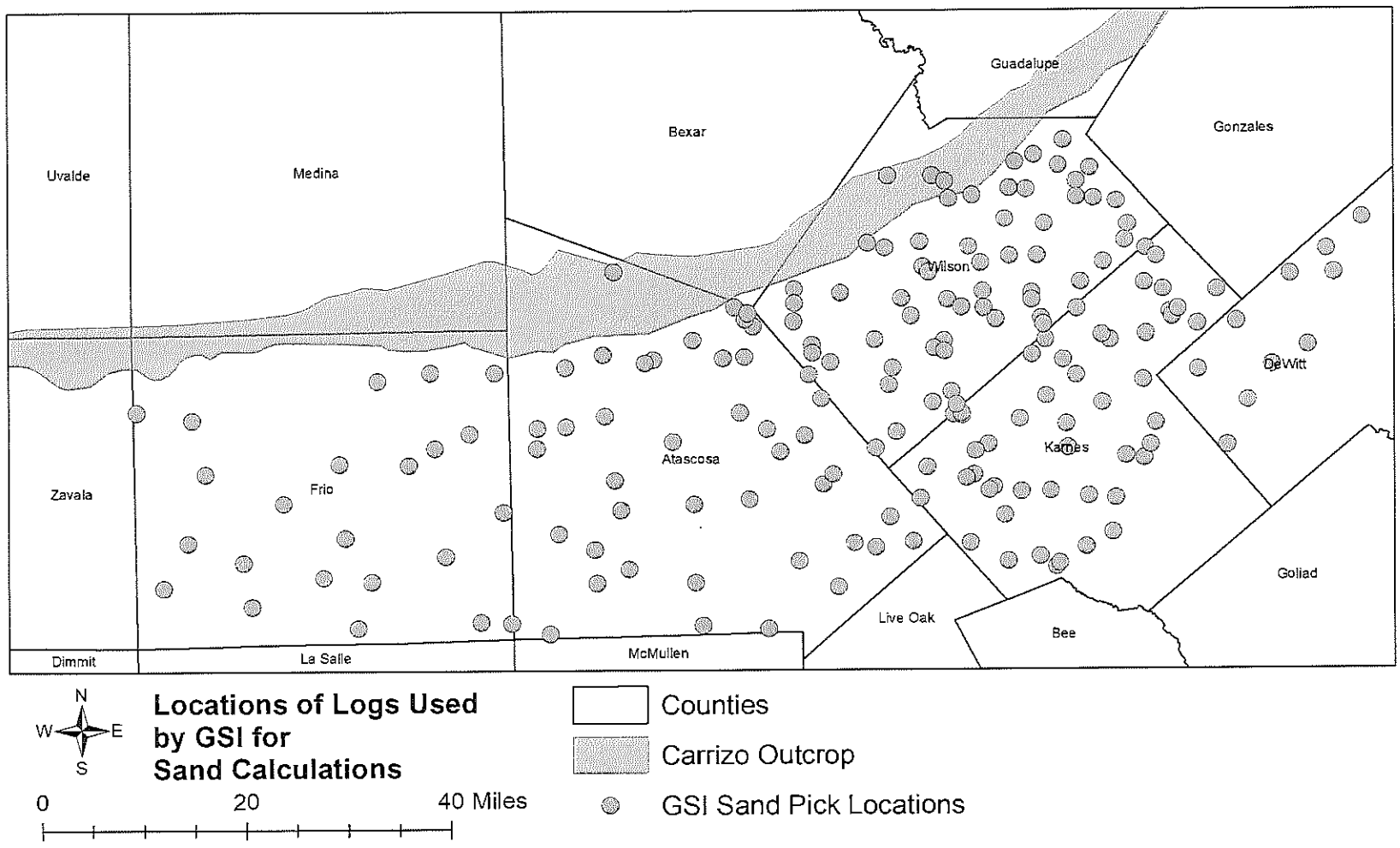

Figure 4-2. The location of geophysical logs used by Shorr and others (2021).

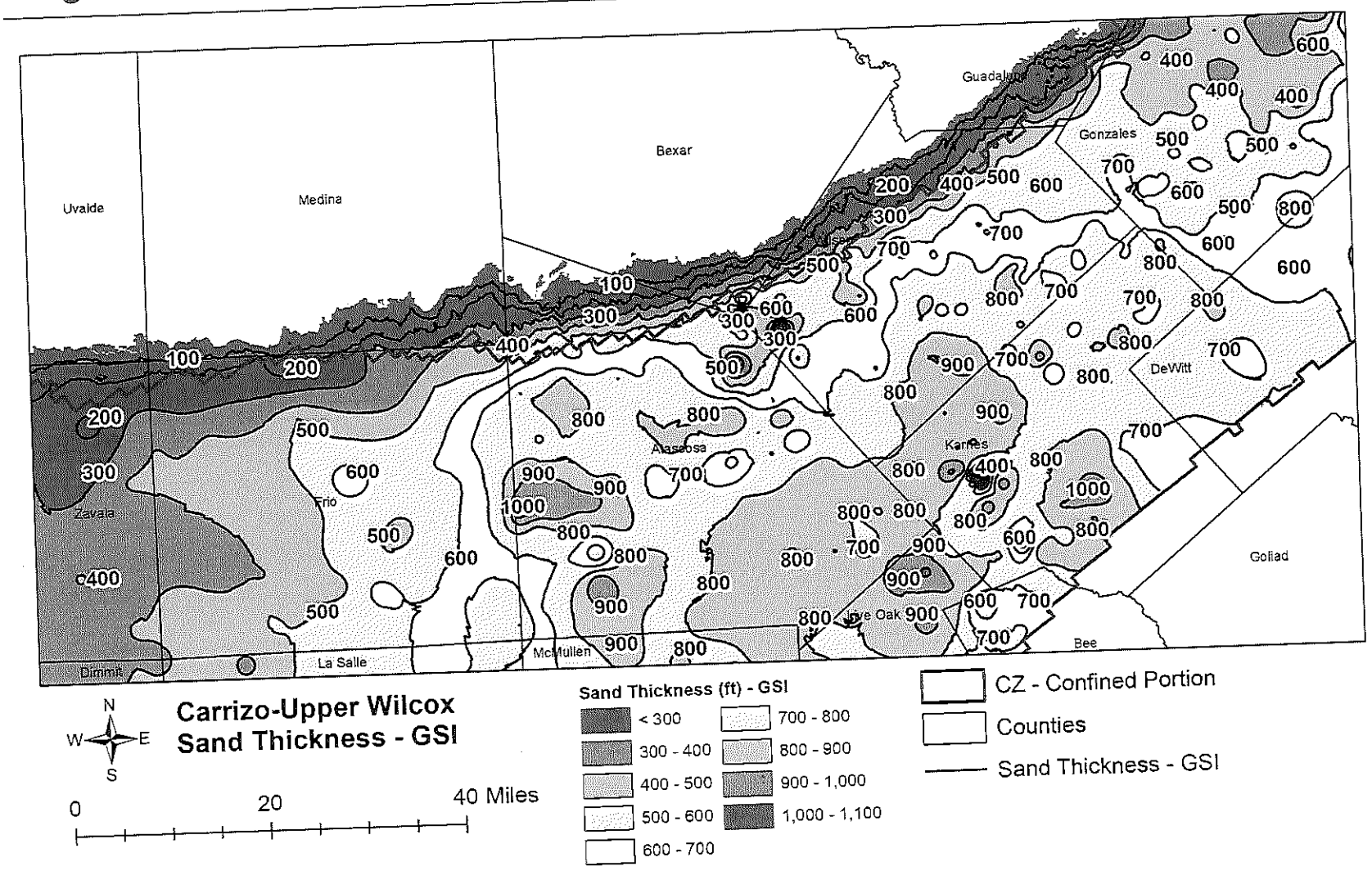

Figure 4-3. The sand thickness of the Carrizo-Upper Wilcox developed by Schorr and others (2021).

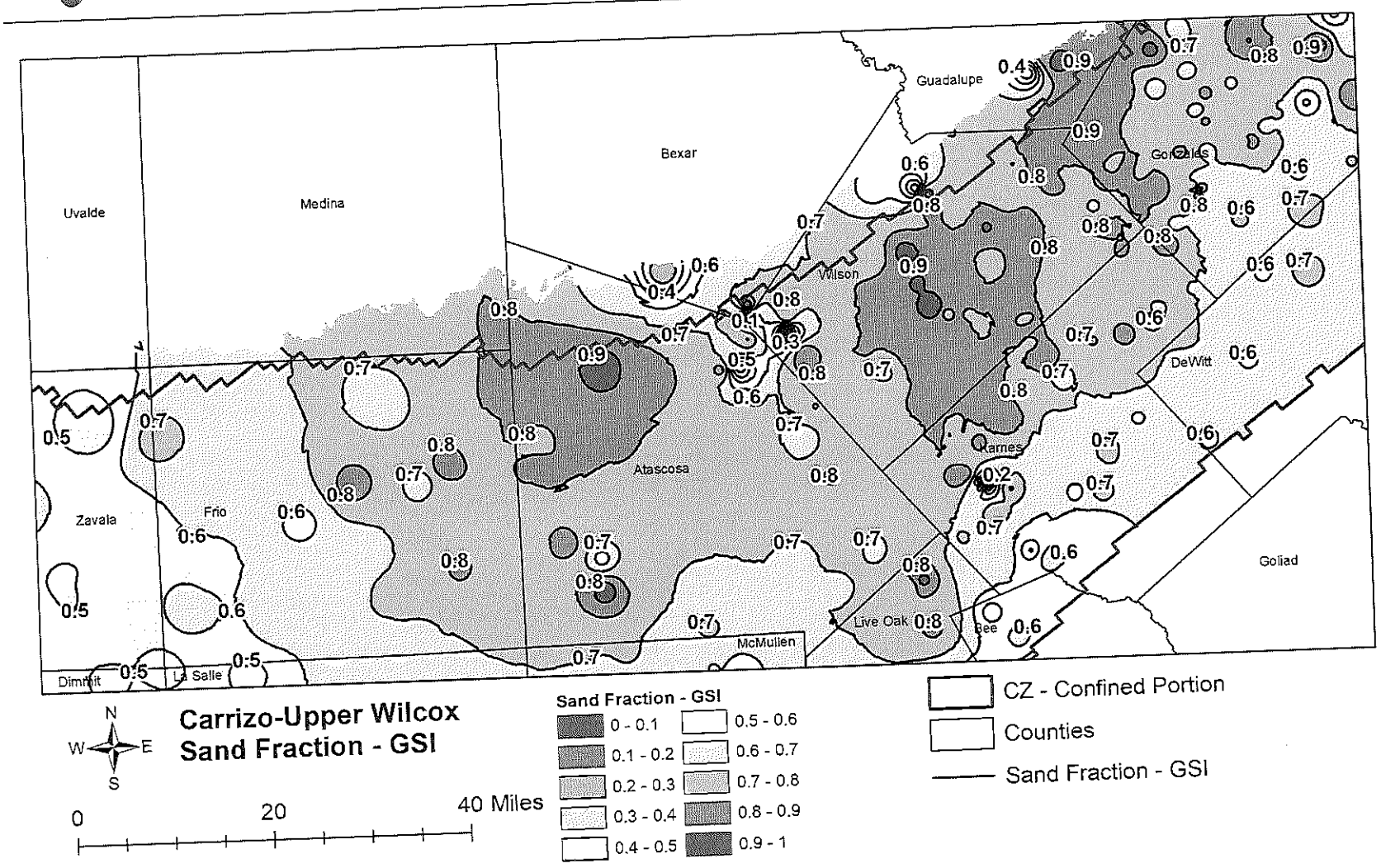

Figure 4-4. The sand fraction of the Carrizo-Upper Wilcox developed by Schorr and others (2021).

4.2 Sand Thickness Maps Generated by INTERA

Figure 4-5 shows the thickness of the Carrizo-Upper Wilcox models layer developed by INTERA. The thickness map was constructed by INTERA using tops and bottoms created by projects completed primarily for EUWCD (Lupton and Young, 2017; Young et al., 2018) and TWDB (Hamlin et al., 2019).

Figure 4-6 shows the location of 236 geophysical logs used by INTERA to construct sand maps. The sand and clay picks from 202 of the logs were from the INTERA database that was developed from previous INTERA projects (Lupton and Young, 2017; Young et al., 2018; Hamlin et al., 2019). For each of these 202 logs, the lithologic intervals were classified using a two-tier system (100% sand or 100% clay), and the log provided coverage for at least 70% of the thickness of the Carrizo-Upper Wilcox model layer. **Figures 4-7** and **4-8** show INTERA maps of sand thickness and sand fraction.

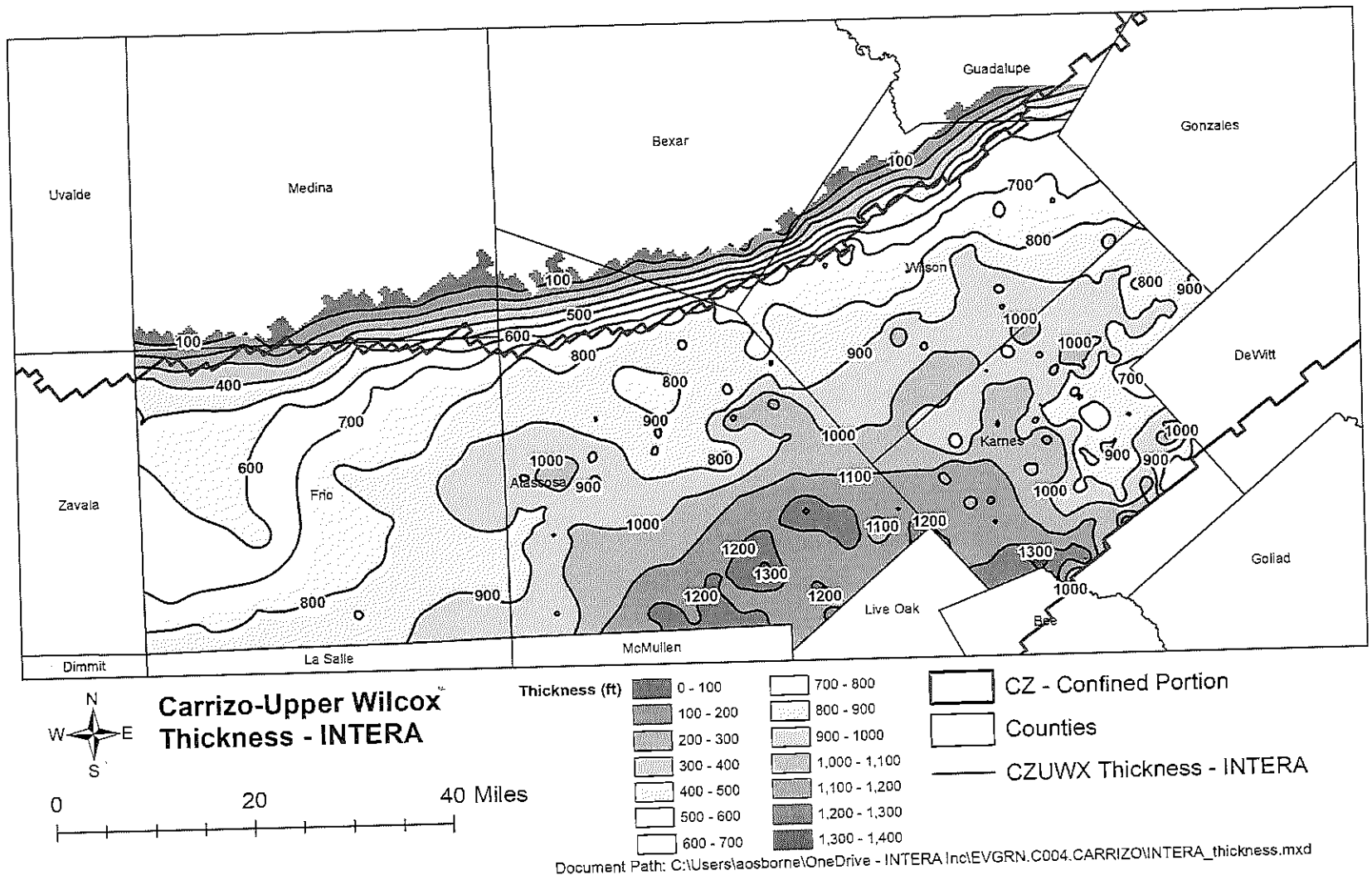

Figure 4-5. The thickness of the Carrizo developed by INTERA for this study.

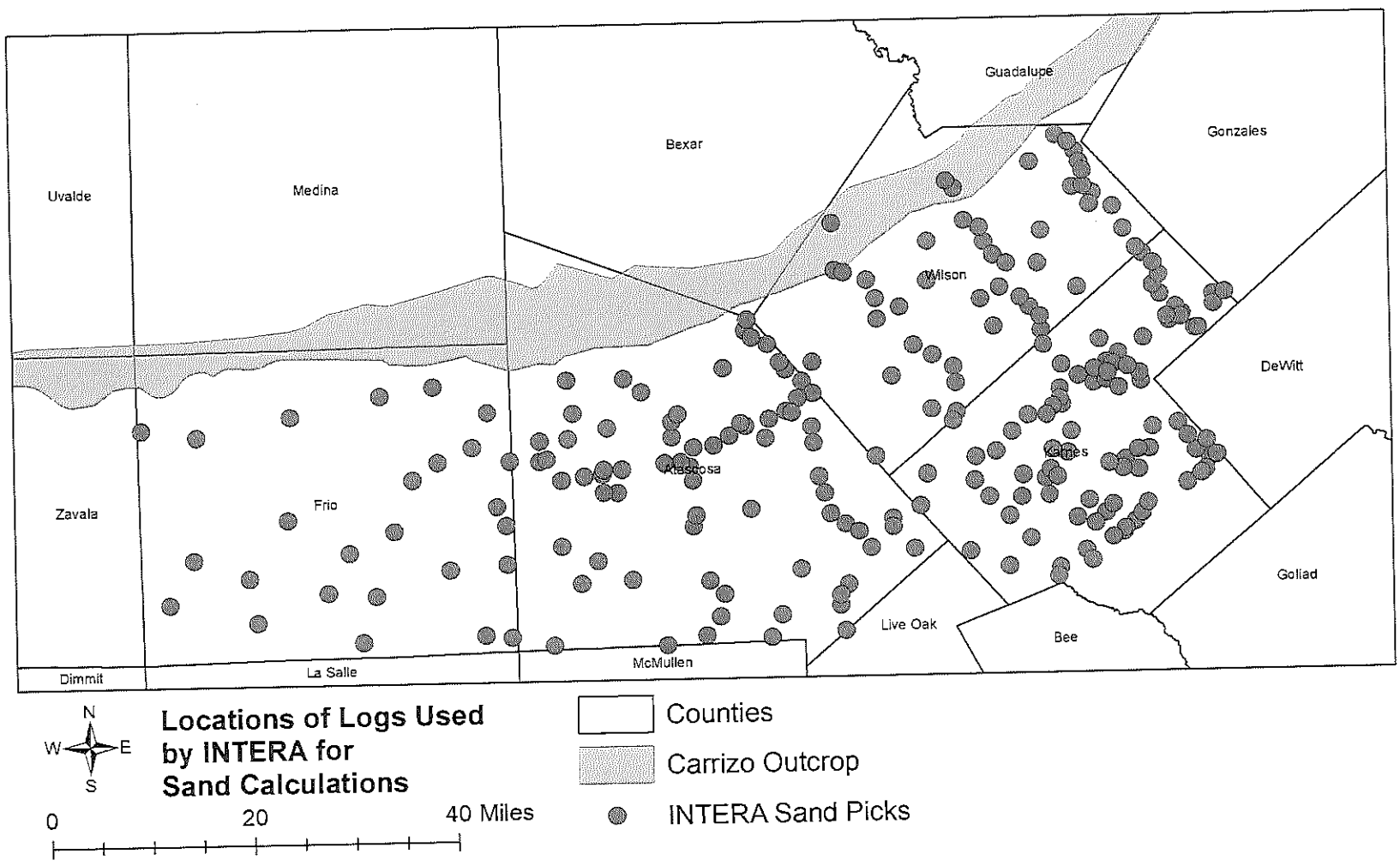

Figure 4-6. Locations of geophysical logs used by INTERA.

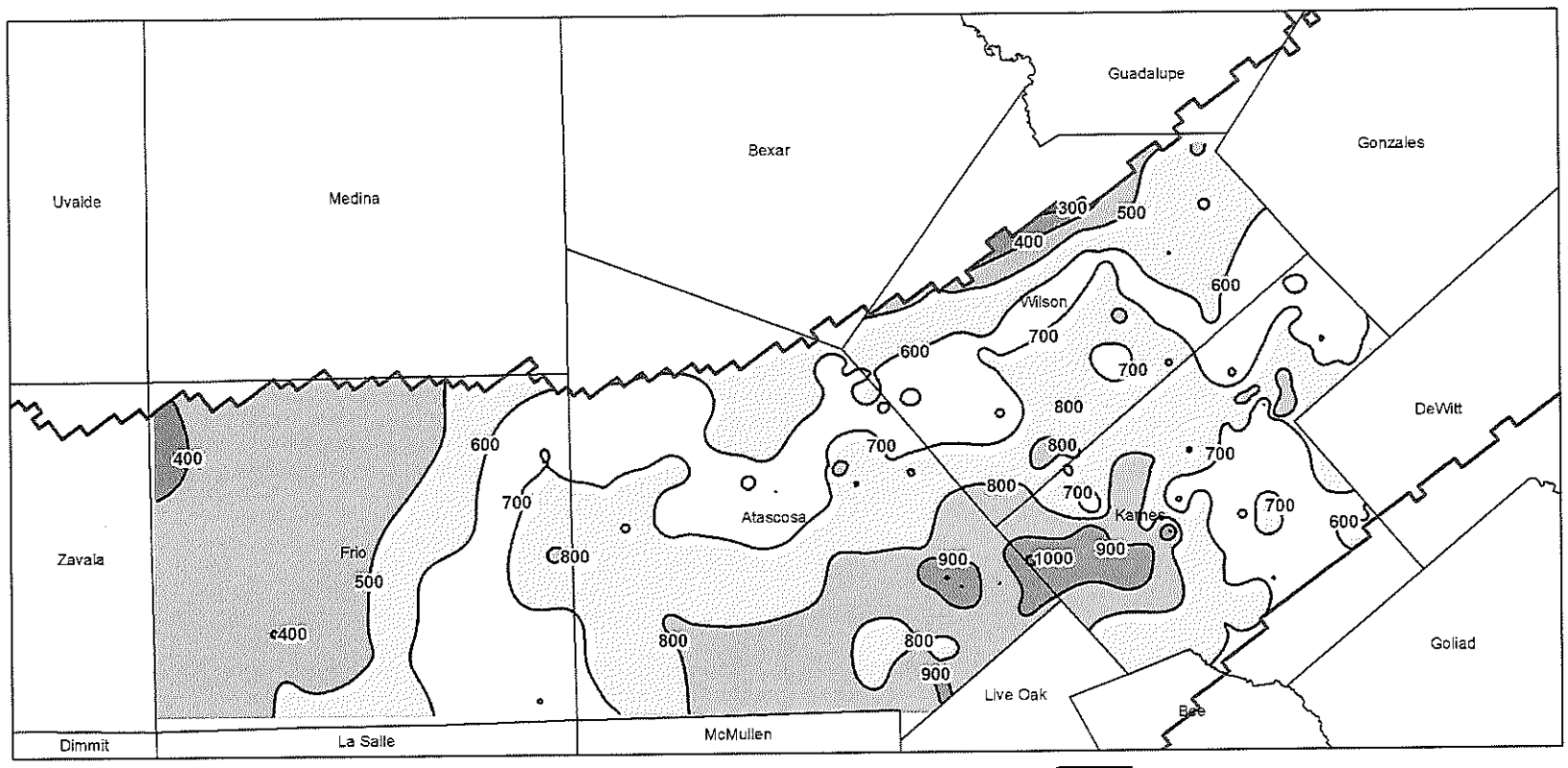

Figure 4-7. The net sand thickness of the Carrizo-Upper Wilcox developed by INTERA for this study.

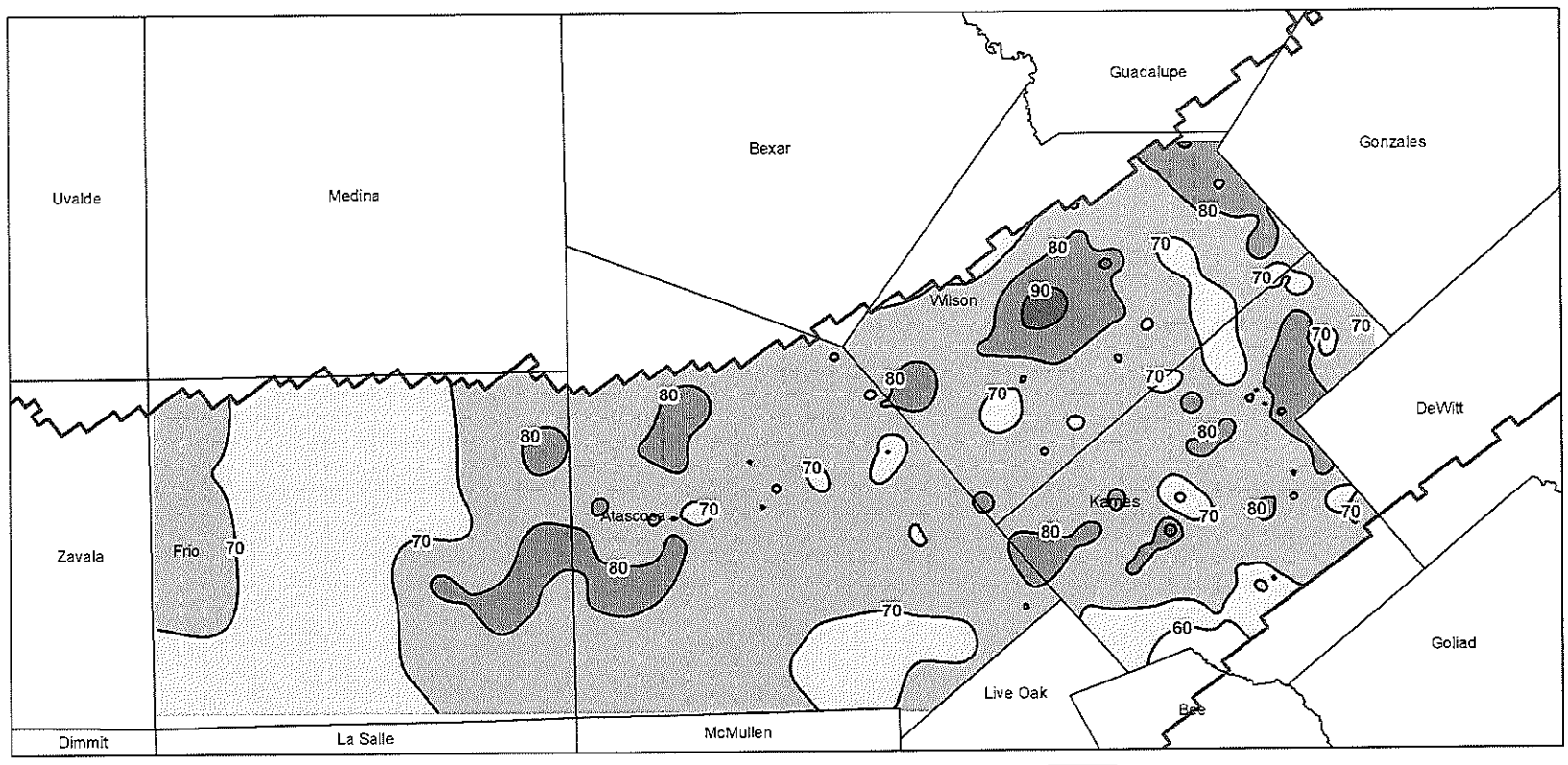

Figure 4-8. The Sand Fraction of the Carrizo-Upper Wilcox developed by INTERA for this study.

5.0 Evaluation of the Transmissivity Spatial Distribution in Groundwater Availability Models

This section discusses the transmissivity values in the GAM models and approaches for evaluating the credibility of the values.

5.1 Modeled Transmissivity Values

Table **5-1** compares the statistics for transmissivity values in the four EUWCD counties between the last three GAMs. Each model is defined by unique transmissivity distributions. Transmissivity values in the models developed by Panday and others (2023) and Hutchison (2024) deviate significantly from the results of the aquifer pumping tests presented in Sections 3.1 and 3.2. The GAM developed by Panday and others (2023) contains a high transmissivity value of 509,000 ft^2/day, and more than 5% of the transmissivity values are greater than 58,000 ft^2/day. The GAM developed by Hutchison (2024) has approximately 25% of its transmissivity values between the narrow range of 13,355 ft^2/day and 13,385 ft^2/day.

Table 5-1. Statistical analysis of the transmissivity values assigned to grid cells located in the EUWCD.

GAM	Average	Min	Percentile							Max
			5th	10th	30th	50th	70th	90th	95th	
Kelly and others (2004)*	14,094	85	2,166	2,861	8,150	11,991	16,808	26,599	33,308	82,455
Panday and others (2023)**	13,768	4	227	533	1,639	4,368	11,098	29,980	57,959	508,938
Hutchison**	7,414	4	330	637	2,222	7,153	13,362	13,374	13,377	28,084

* Carrizo Aquifer model layer ** Carrizo-Upper Wilcox Model Layer

Figure 5-2 shows the transmissivity values developed for the Carrizo model layer in the GAM developed by Kelley and others (2004). The spatial pattern of the transmissivity values is similar to the Carrizo transmissivity values developed by Klemt (1976), as shown in **Figure 3-4**.

Figure 5-3 shows the transmissivity values for the Carrizo-Upper Wilcox model layer from the GAM developed by Panday and others (2023). The distribution of transmissivity values includes significant departures from the pattern exhibited by the Carrizo transmissivity contours in **Figure 3-4** developed by Klemt and others (1976), the sand thickness contours in **Figure 4-1** developed by INTERA, and the sand thickness contours in **Figure 4-3** developed by Schorr and others (2021). These departures, most notably, are the zones of transmissivity values greater than 100,000 ft^2/day in the northeast and southeast.

Figure 5-4 shows the transmissivity values for the Carrizo-Upper Wilcox model layer from the GAM developed by Hutchison. The transmissivity distribution in this model is similar to the distribution in the model developed by Panday and others (2023), though the above-mentioned zones of transmissivity values in exceedance of 100,000 ft^2/day (**Figure 5-3**) are not present. Instead, these same zones contain

values of which a vast majority range between 13,355 ft^2/day and 13,385 ft^2/day. These zones are shown in **Figures 5-6 and 5-7**.

Figure 5-5 compares the transmissivity values for the same grid cell between the GAMs developed by Panday and others (2023) and Hutchison. The plot is primarily composed of sets of markers with straight lines. Where sets of markers create a line on a 45-degree angle, the transmissivity values between the two GAMs are related by a multiplier. Where other sets of markers create a line on a 90-degree angle, the transmissivity values from Panday (2023) have been set to a fixed value by Hutchison. The patterns that exist in **Figure 5-5** indicate that Hutchison (2024) manually adjusted the transmissivity values in groups of cells to eliminate undesirable high transmissivity values.

One of the sets of markers that forms a vertical line in **Figure 5-5** is associated with the zones of Hutchison (2024) transmissivity values between 13,355 ft^2/day and 13,385 ft^2/day. In **Figure 5-6,** there are 944 grid cells in the Hutchison (2024) GAM that are located in EUWCD with transmissivity values that fall within the narrow 30 ft^2/day range. In **Figure 5-7,** there are 3,244 grid cells in the Hutchison (2024) GAM located across GMA 13 with transmissivity values in that same range. Out of the 3,244 grid cells, more than 70% of them had transmissivity values greater than 13,385 ft^2/day in the GAM developed by Panday and others (2023).

Based on our review, we hypothesize that Hutchison (2024) recalibrated the GAM by identifying areas of unrealistically high transmissivity in the GAM developed by Panday and others and limiting transmissivity in these zones to the aforementioned range of 13,355 ft^2/day to 13,385 ft^2/day. There is no evidence that the changes in transmissivity values were guided by spatial patterns in the sand thickness. **Figure 5-8** shows that there is no correlation between sand thickness and the magnitude of transmissivity and that transmissivity values less than 13,500 ft^2/day appear to be randomly associated with sand thicknesses between 400 and 800 feet. In fact, the small correlation that was teased from the data indicates that the transmissivity values are *inversely* proportional to sand thickness. **Figure 5-9** shows that there is also no correlation between the transmissivity values estimated from hydraulic tests by Mace and others (2002) and the transmissivity value in the GAM at the well location.

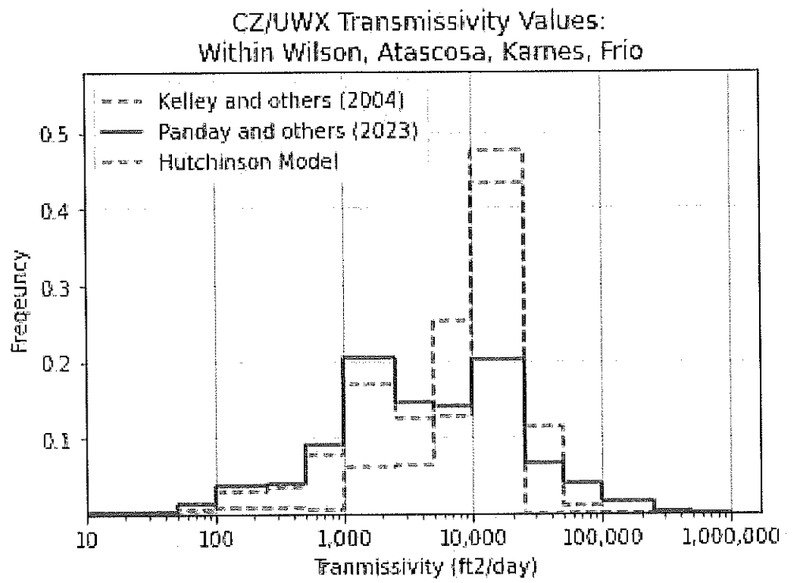

Figure 5-1. Comparison of transmissivity values within EUWCD.

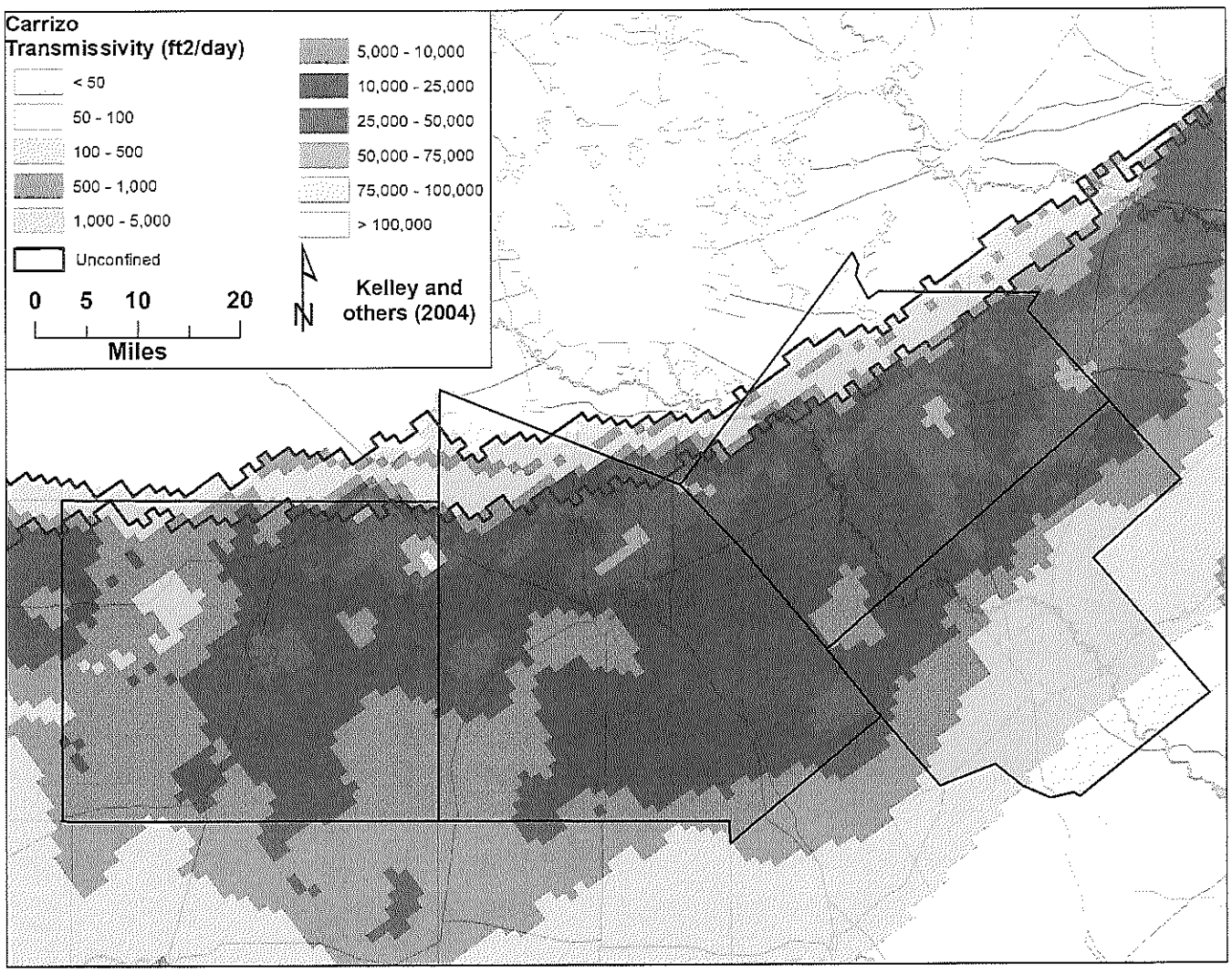

Figure 5-2. Transmissivity values in the model layer are representative of the Carrizo from Kelley and others (2004).

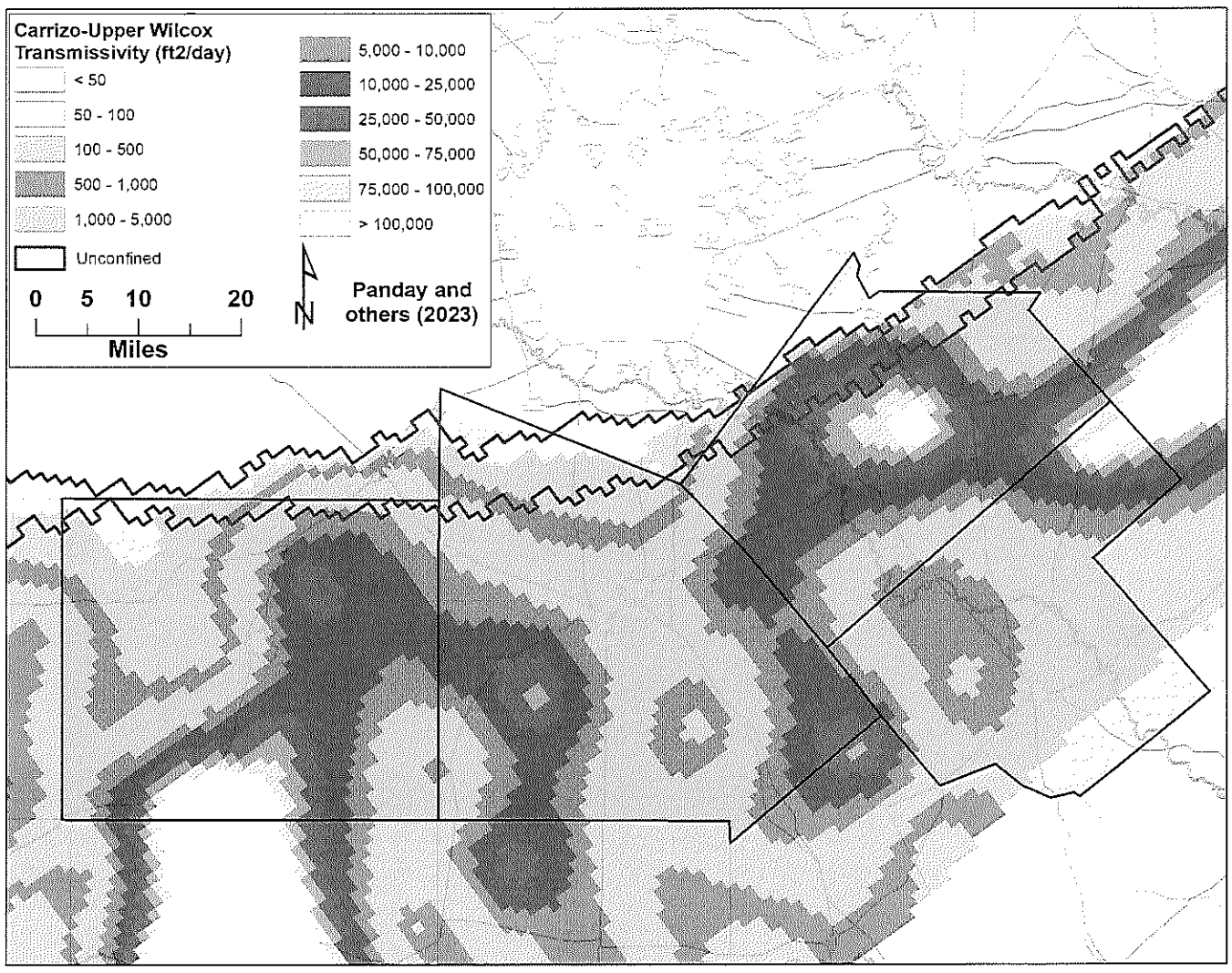

Figure 5-3. Transmissivity values in the model layer are representative of the Carrizo-Upper Wilcox from Panday and others (2023).

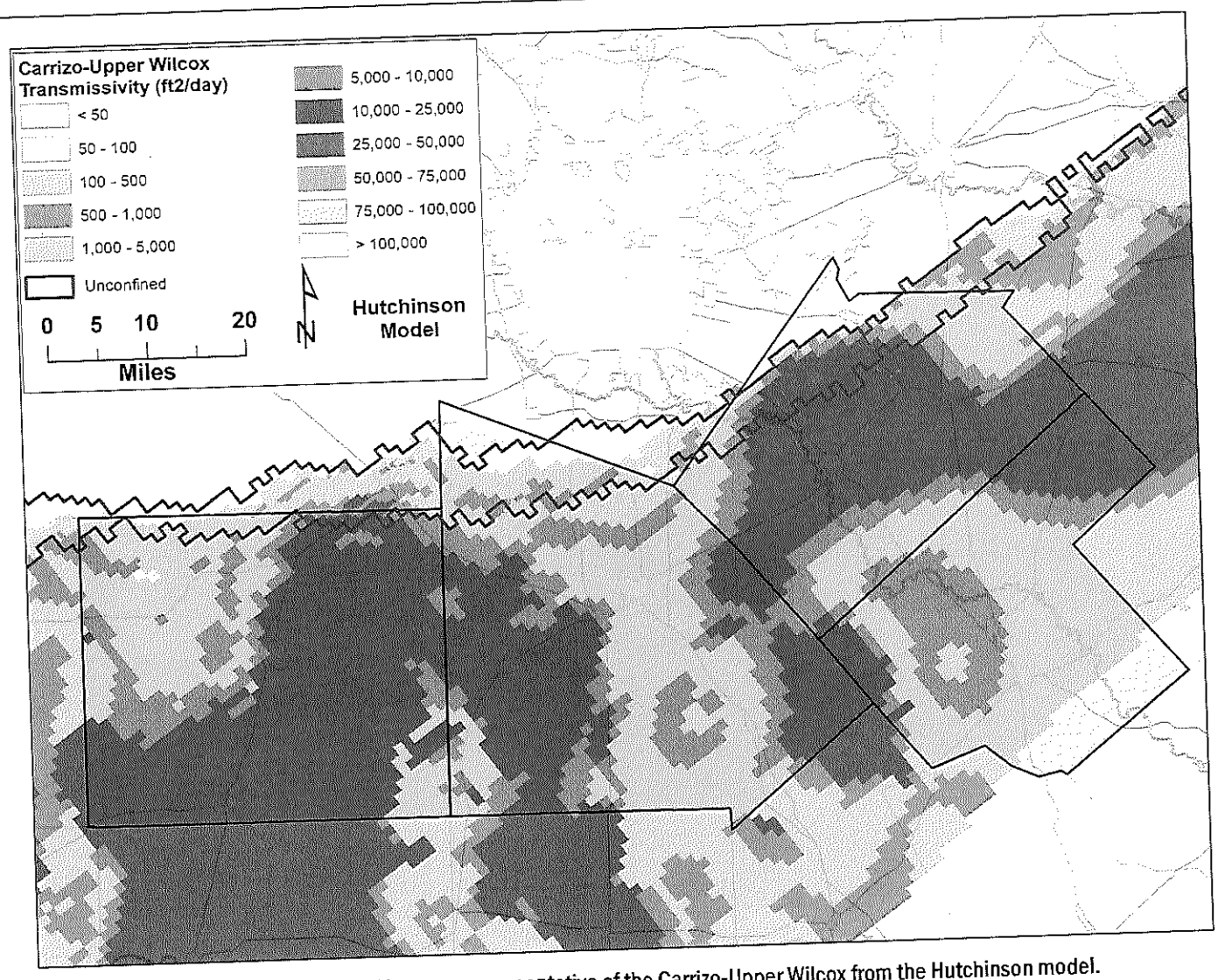

Figure 5-4. Transmissivity values in the model layer are representative of the Carrizo-Upper Wilcox from the Hutchinson model.

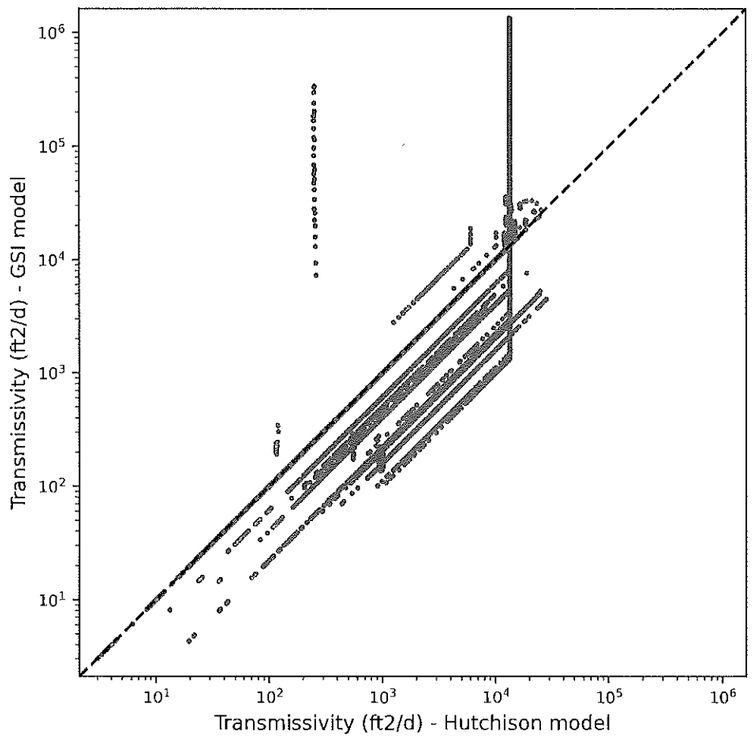

Figure 5-5. Comparison of transmissivity values between the model developed by Panday and others (2023) and the Hutchinson model for all of GMA 13.

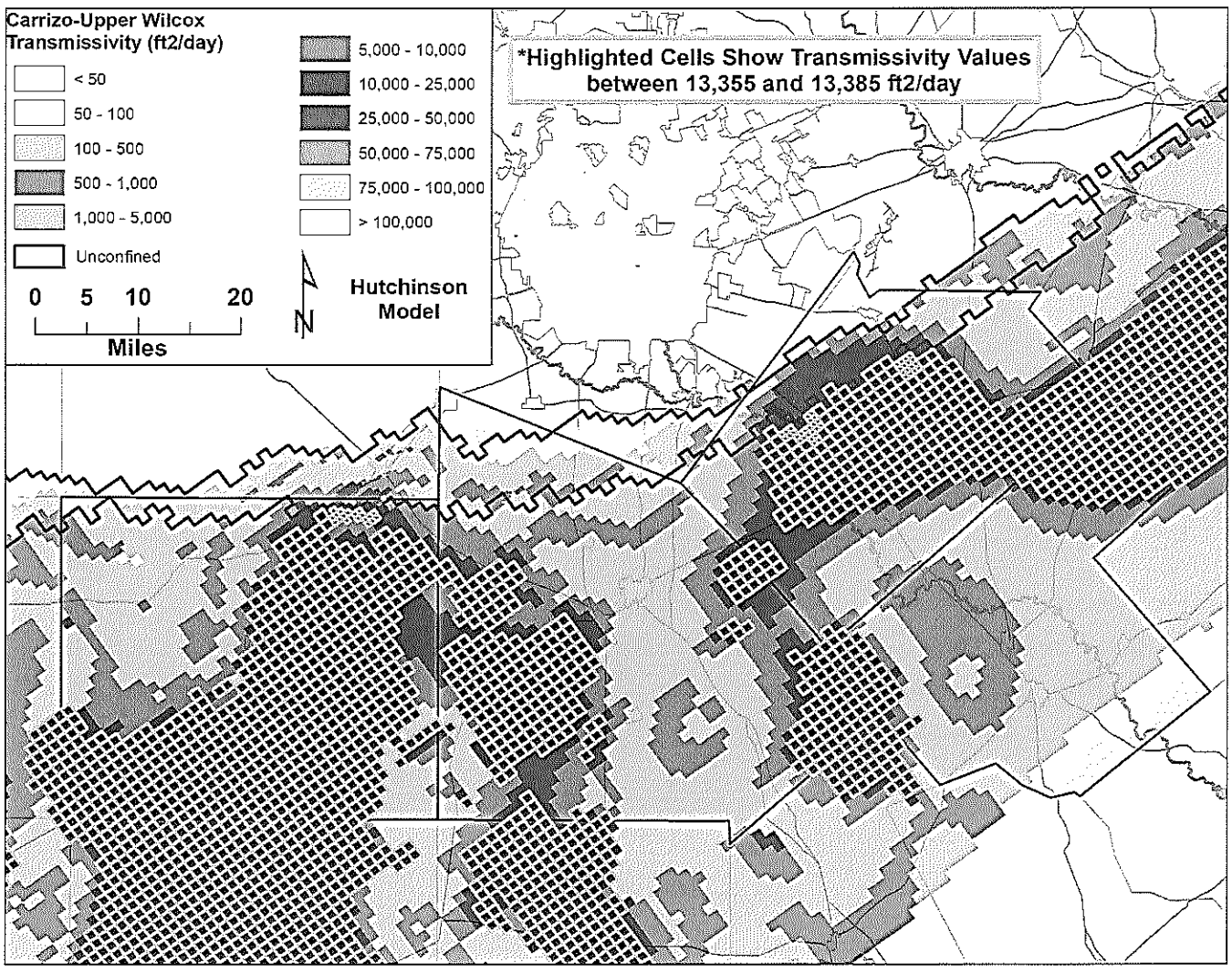

Figure 5-6. Carrizo-Upper Wilcox transmissivity values in the Hutchinson model with values in a narrow range highlighted, focused on EUWCD.

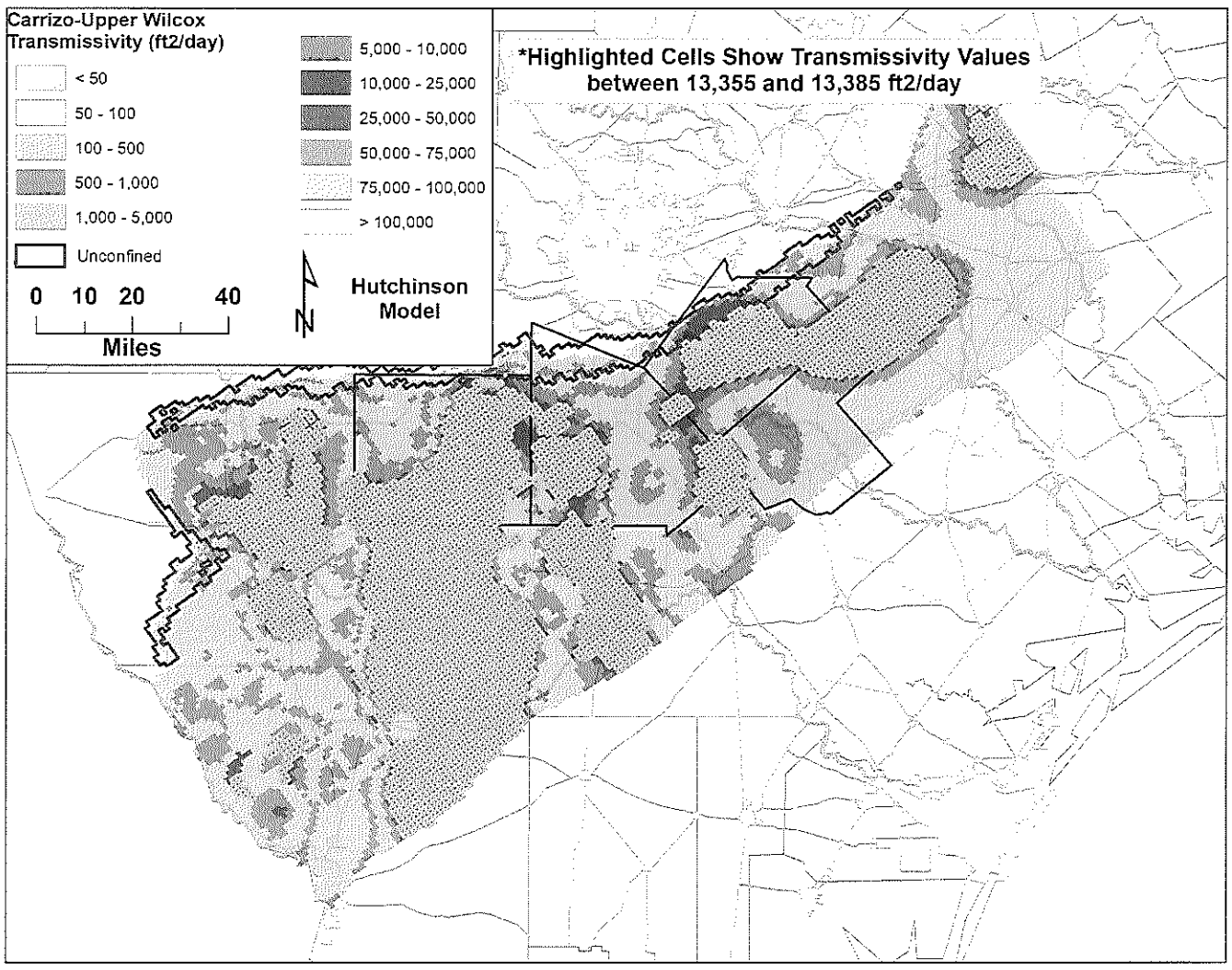

Figure 5-7. Carrizo-Upper Wilcox transmissivity values in the Hutchinson model with values in a narrow range highlighted over the entire model area.

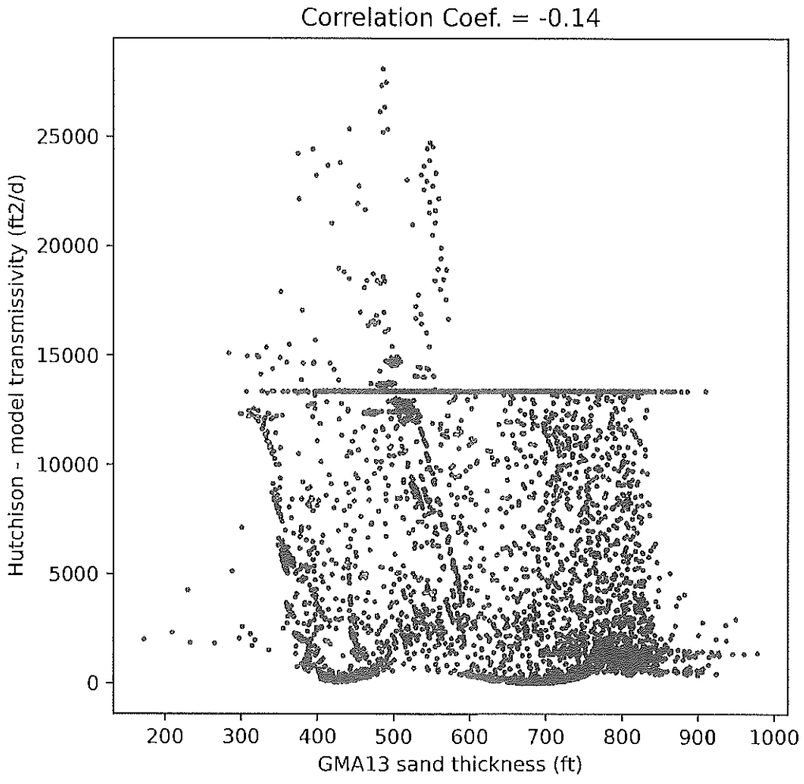

Figure 5-8. Comparison between transmissivity for the Carrizo-Upper Wilcox model layer from the Hutchison (2024) GAM and the sand thickness at the grid cell location based on the GSI sand thickness map for coverage in EUWCD (shown in Figure 4-3).

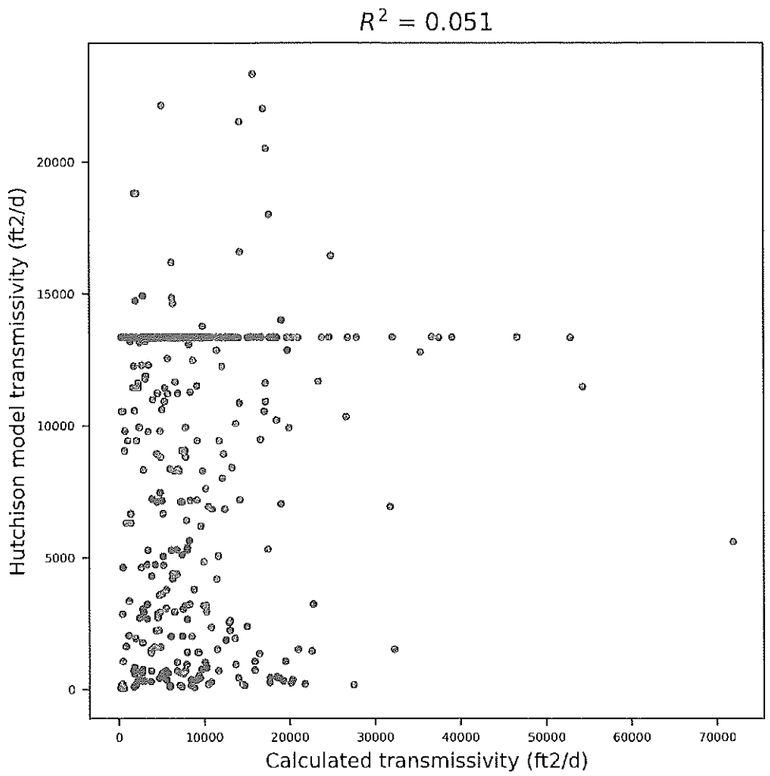

Figure 5-9. Comparison of transmissivity in the Hutchison (2024) GAM to transmissivity values determined from hydraulic tests (Mace et al., 2002) conducted in a well located in the same grid cell located in EUWCD

5.2 Relationship Between Sand Thickness and Aquifer Transmissivity

Maps of sand thickness and sand factions were generated by Panday and others (2023) with the intent that they could be used to help guide the parameterization of the aquifer hydraulic properties during model calibration. However, Panday and others (2023) did not use the sand map as part of their process to calibrate the model. The reason provided by Panday and others (2023) for the failed approach is that:

> *"approach caused issues with the range of hydraulic conductivities that may exist horizontolly and vertically within the Groundwater Management Area 13 aquifer system. This is because the sand fractions did not span a sufficient range to give a sufficiently wide range of hydraulic conductivity values in any aquifer or aquitard unit, while actual hydraulic conductivities could vary by orders of magnitude within the same aquifer on the regional scale."*

It is the authors' opinion that lithology and depositional environments should be used to help constrain and guide the parameterization of hydraulic properties. Examples of successful applications where sand maps have been used to develop the transmissivity of regional groundwater flow models in Texas include Young and Kelley (2006), Kelly and others (2014), and Deeds and others (2006). Similar success has been reported for the Carrizo Aquifer (Payne 1972 and 1975). Fogg and Kreitler (1982) have documented an increase in average hydraulic conductivity with increasing sand thickness in the Carrizo Aquifer. Hamlin (1988) correlates a decrease in thickness of the whole bed-load channel system that defines the Carrizo Aquifer with a corresponding decrease in transmissivities associated with the Carrizo Aquifer.

Panday and others (2023) did not report if they investigated if sand thickness could be used as an indicator of aquifer transmissivity – a finding that was observed by Hamlin (1988). **Figure 5-10** explores the relationship between calculated sand thickness and calculated aquifer transmissivity. The transmissivities used in **Figure 5-10** were obtained from aquifer pumping tests at Public Water Supply (PWS) with a Quality Rating of 1 or 2 wells that were reported in **Table 3-1**. Each transmissivity value was paired with the sand thickness value mapped by INTERA in **Figure 4-7** at the location of the pumping test. The 14 paired values have a correlation coefficient of 0.915, indicating they are highly correlated. **Figure 5-11** shows a similar analysis using the sand thicknesses from the GSI sand thickness map in **Figure 4-3**. The correlation of 0.846 indicates that the two parameters are highly correlated. These results suggest that the Panday and others (2023) and Hutchison (2024) GAMs would likely be improved if the model calibration process had utilized sand thickness as a guide in developing the spatial distribution and magnitudes of transmissivity values.

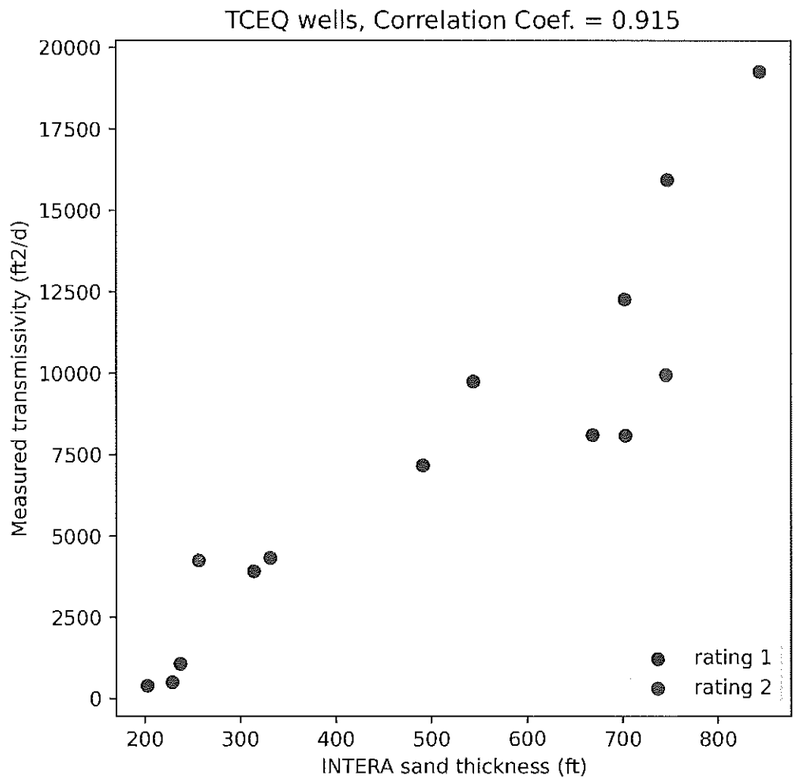

Figure 5-10. The one-to-one plot demonstrates the correlation between the measured transmissivity of the pump tests INTERA designated with Quality Ratings of 1 and 2 and INTERA's calculated sand thickness at the location of the test.

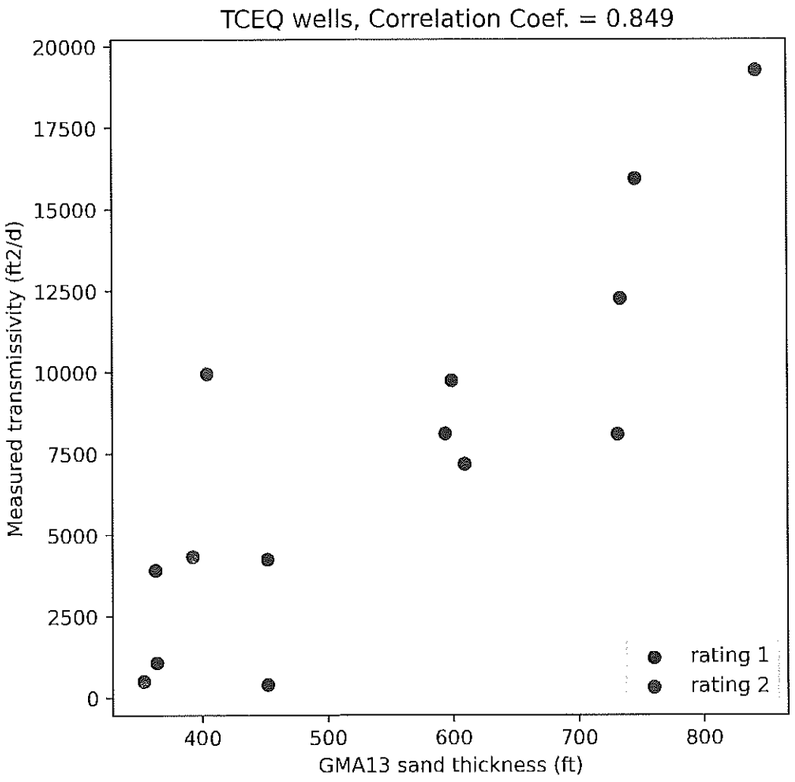

Figure 5-11. The one-to-one plot demonstrates the correlation between the measured transmissivity of the pump tests INTERA designated with Quality Ratings of 1 and 2 and GSI's calculated sand thickness at the location of the test.

5.3 Refinement of the Carrizo and Upper Wilcox Model Layer

Our analyses of geophysical logs, the GAM reports, and the hydrogeologic studies associated with GMA 13 indicate that the Carrizo and Upper Wilcox should not be represented as a single layer. The primary reason for separating the two hydrogeologic units is that they are comprised of deposits characterized by distinctly different hydraulic properties. Deeds and others (2003) and Kelley and others (2004) represented the Upper Wilcox Aquifer and the Carrizo Aquifer as two separate model layers. They justified using two model layers based on studies by Klemt and others (1976) and Hamlin (1988). However, neither Deeds and others (2003) nor Kelley and others (2004) interpreted geophysical logs to identify the boundary between the hydrogeologic units. Kelley and others (2004) relied on the findings

of Deeds and others (2003), who developed an approximate boundary surface based on the work of Klemt and others (1976) and Hamlin (1988).

The paleogeographic reconstruction showing depositional systems at three levels within the Carrizo-Upper Wilcox interval by Hamlin (1988) is the most comprehensive study of the Carrizo and Upper Wilcox that INTERA reviewed for this report (**Figure 2-1).** The findings of this study support dividing the Carrizo-Upper Wilcox model layer as defined by Panday and others (2023) into the three hydrogeologic units listed in **Table 5-2**. The Upper Wilcox 1 in **Table 5-2** is equivalent to the Upper Wilcox layer modeled by Deeds and others (2003) and Kelley and others (2004).

Table 5-2. Division of the Carrizo-Upper Wilcox Model Layer into Three Distinctive Hydrogeologic Units.

Hydrogeologic Unit	Stratigraphic Location	Depositional Environment
Upper Wilcox 1	Above Middle Wilcox & Below Carrizo	Mixed Alluvial Systems: c*haracterized by mixed load channel-fill and crevasse splay sandstones enclosed by fine-grained floodplain deposits*
Carrizo	Above Upper Wilcox 1 & Below Upper Wilcox 2	Riverbed Load Deposits: *characterized by very thick, laterally continuous, coarse-grained sandstone*
Upper Wilcox 2	Above Carrizo & Below Reklaw	Mixed Alluvial Systems & Transgressive Sequence : *composed of fluvial deltaic, wave dominated deltaic deposits, marine-shoreline deposits,*

Deeds and others (2003) reported difficulty with defining the boundary between Upper Wilcox 1 and the Carrizo. In the up-dip areas, the method used by Deeds and others (2003) to determine the thickness of Upper Wilcox 1 produced negative values. To develop a useable thickness for the Upper Wilcox 1, Deeds and others (2003) assigned a minimum thickness of 20 ft, the minimum thickness identified in **Figure 2-1**.

Klemt and others (1976) and Hamlin (1988) define the top of Upper Wilcox 1 as the bottom of the sand unit associated with the Carrizo bed load deposits. Across most of the EUWCD, the boundary between Upper Wilcox 1 and the Carrizo is an erosional surface associated with a large river channel system eroding into underlying, finer-grained Wilcox sediments. The thickest development of the Carrizo Valley fill occurs in Frio, Atascosa, and Wilson counties (Hamlin, 1988). A**ppendix B** shows the locations of the picks for the Upper Wilcox 1-Carrizo boundary. T**able 5-3** shows the thicknesses and the sand fractions associated with Upper Wilcox 1 and Carrizo-Upper Wilcox 2 determined for 26 geophysical logs. The minimum and average Upper Wilcox 1 thickness are 96 ft and 226 ft, respectively.

Some conclusions may be drawn from the results presented in **Table 5-3,** which could have a bearing on the development of additional models for the Carrizo Aquifer in the EUWCD:

1. The boundary between the Upper Wilcox 1 and Carrizo can be identified using conventional stratigraphic methods of analysis.

2. The findings of Deeds and others (2006) were correct in assuming that the Upper Wilcox **1** is present at the location of any of the 26 logs located in the green shaded area in **Figure 1-1**.

The different depositional environments responsible for creating the Carrizo and the Upper Wilcox 1 are evidenced by the difference in lithologies. For every log, the Upper Wilcox 1 has a noticeably lower sand fraction. The average sand fraction for the Carrizo/Wilcox 2 and for the Upper Wilcox 1 is 0.83 and 0.65, respectively.

Table 5.3. Analysis of twenty-six geophysical logs to locate the stratigraphic boundary between the Upper Wilcox 1 Aquifer and the Carrizo Aquifer.

UWI/API	UWI/API	County	Carrizo-Upper Wilcox 2 Thickness (ft)	Upper Wilcox 1 Thickness (ft)	Carrizo-Upper Wilcox 2 Sand Fraction	Upper Wilcox 1 Sand Fraction
8	4201301664	ATASCOSA	675	176	0.87	0.54
7	4201301729	ATASCOSA	736	216	0.87	0.53
10	4201302882	ATASCOSA	844	236	0.80	0.54
11	4201330075	ATASCOSA	502	195	0.89	0.72
9	4201331253	ATASCOSA	889	133	0.81	0.38
12	4201333824	ATASCOSA	845	376	0.84	0.68
4	4216300816	FRIO	727	119	0.82	0.73
5	4216300842	FRIO	843	126	0.88	0.65
6	4216300849	FRIO	842	96	0.85	0.63
1	4216301455	FRIO	531	113	0.79	0.55
3	4216301515	FRIO	672	130	0.86	0.82
2	4216330703	FRIO	622	110	0.80	0.72
20	4225500060	KARNES	850	213	0.90	0.65
25	4225500252	KARNES	725	193	0.72	0.65
23	4225501299	KARNES	867	159	0.80	0.68
26	4225531074	KARNES	582	426	0.80	0.63
24	4225531279	KARNES	714	283	0.74	0.61
22	4225531310	KARNES	470	478	0.82	0.68
21	4225531958	KARNES	534	537	0.83	0.59
19	4249300930	WILSON	698	256	0.81	0.59
15	4249301310	WILSON	596	192	0.83	0.65
13	4249301747	WILSON	855	216	0.88	0.80
17	4249330440	WILSON	543	172	0.85	0.68
14	4249331233	WILSON	766	318	0.91	0.77
18	4249331652	WILSON	566	163	0.84	0.73
16	4249331897	WILSON	794	239	0.86	0.68
		Average	703	226	0.83	0.65

* Portion of Upper Wilcox underlying the Carrizo Aquifer

Figures 5-13 and **5-14** show the thickness of the Carrizo Aquifer and Upper Wilcox in EUWCD. **Figure 5-13** shows a dip section consisting of five logs located in Wilson and Karnes counties. **Figure 5-14** shows a strike section consisting of five logs located in Wilson and Atascosa counties. This strike section was used to develop **Figure 2-4**. **Figures 2-1, 2-3, 2-4, 5-13, 5-14,** and **Table 5.3** demonstrate that there is sufficient information in the geophysical logs located in EUWCD to represent the Carrizo Aquifer as a model layer separate from the Upper Wilcox Aquifer. To accomplish that task, however, the Upper Wilcox would need to be represented by no less than two model layers.

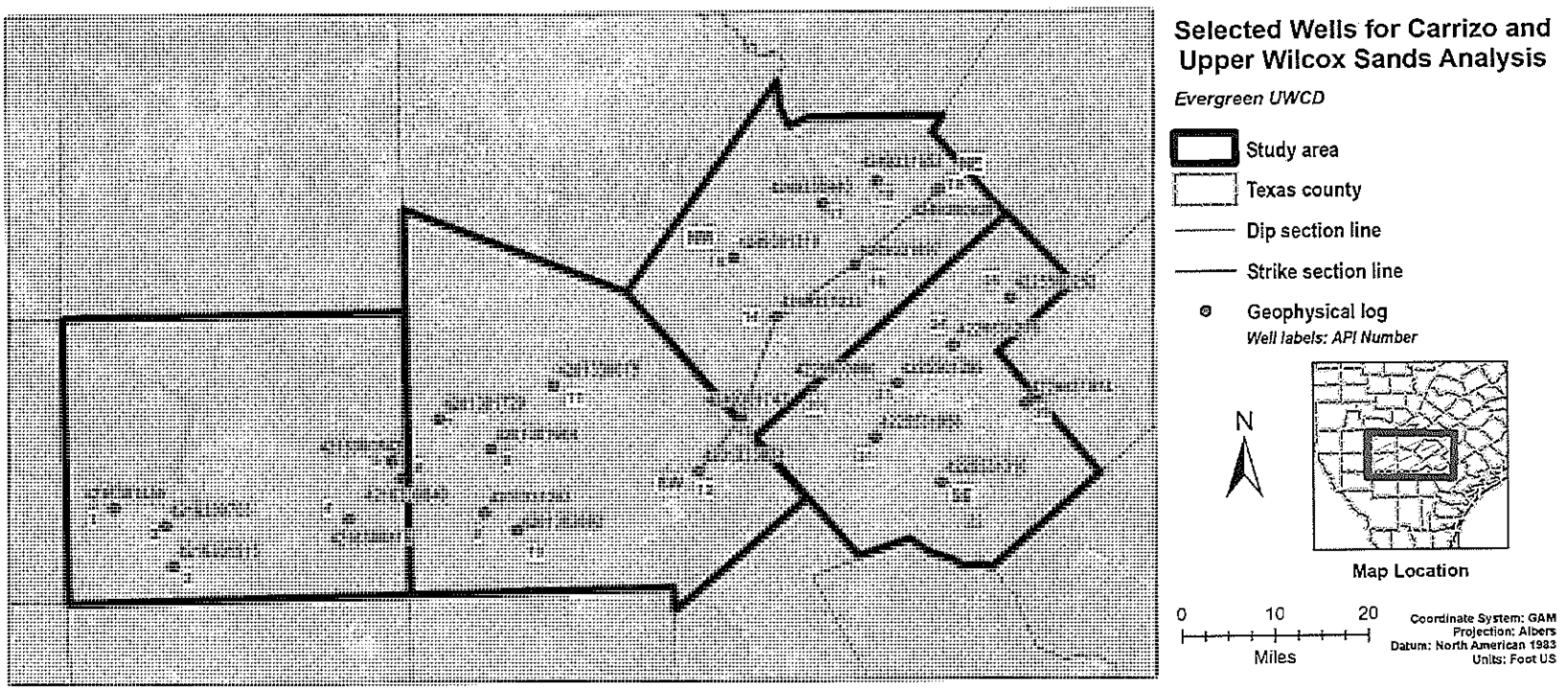

Figure 5-12. The location of geophysical logs that comprise strike and dip sections in Wilson, Karnes, and Atascosa counties.

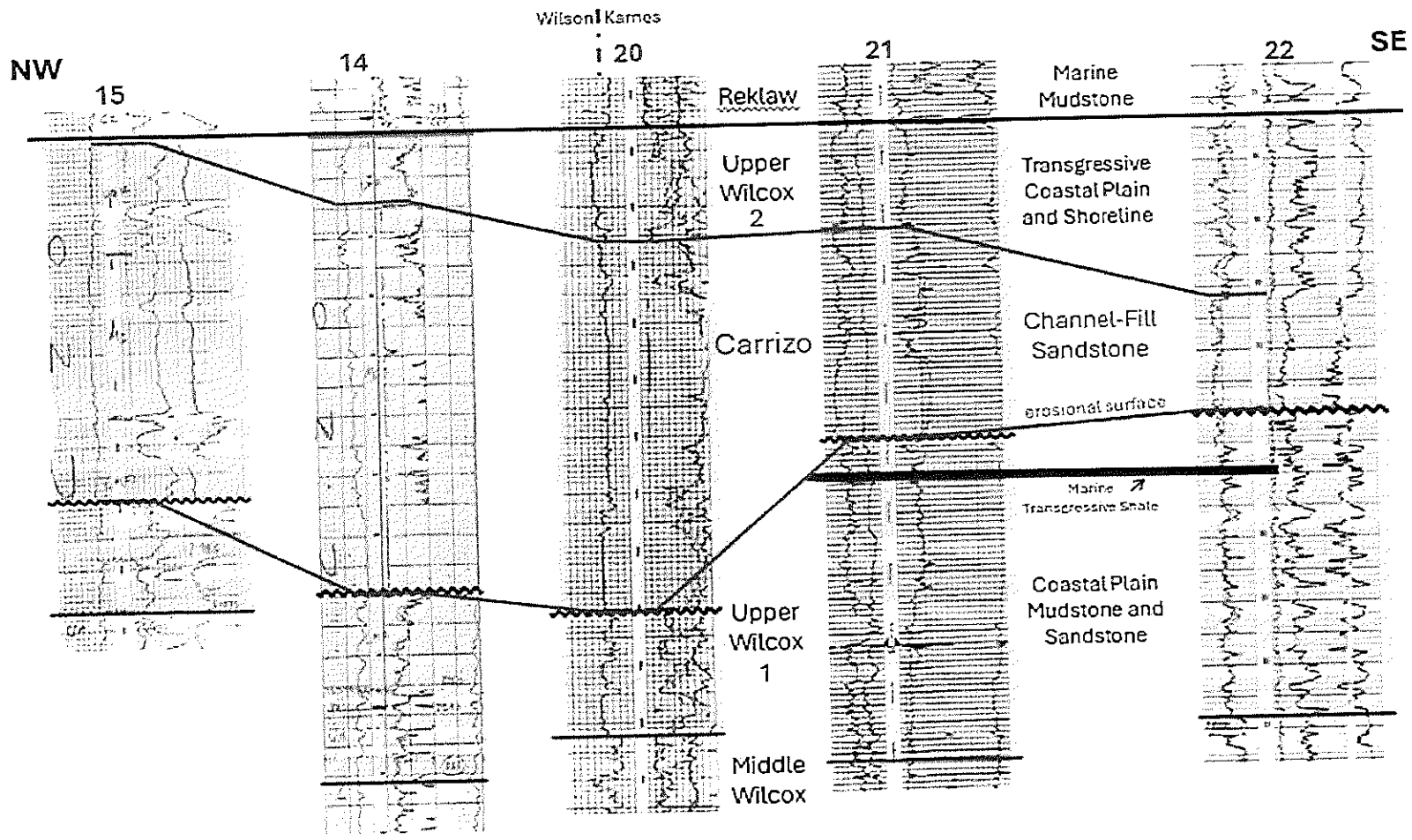

Figure 5-13. The cross-section of the Stratigraphic and lithologic picks on geophysical logs comprise the dip section in Figure 5-12.

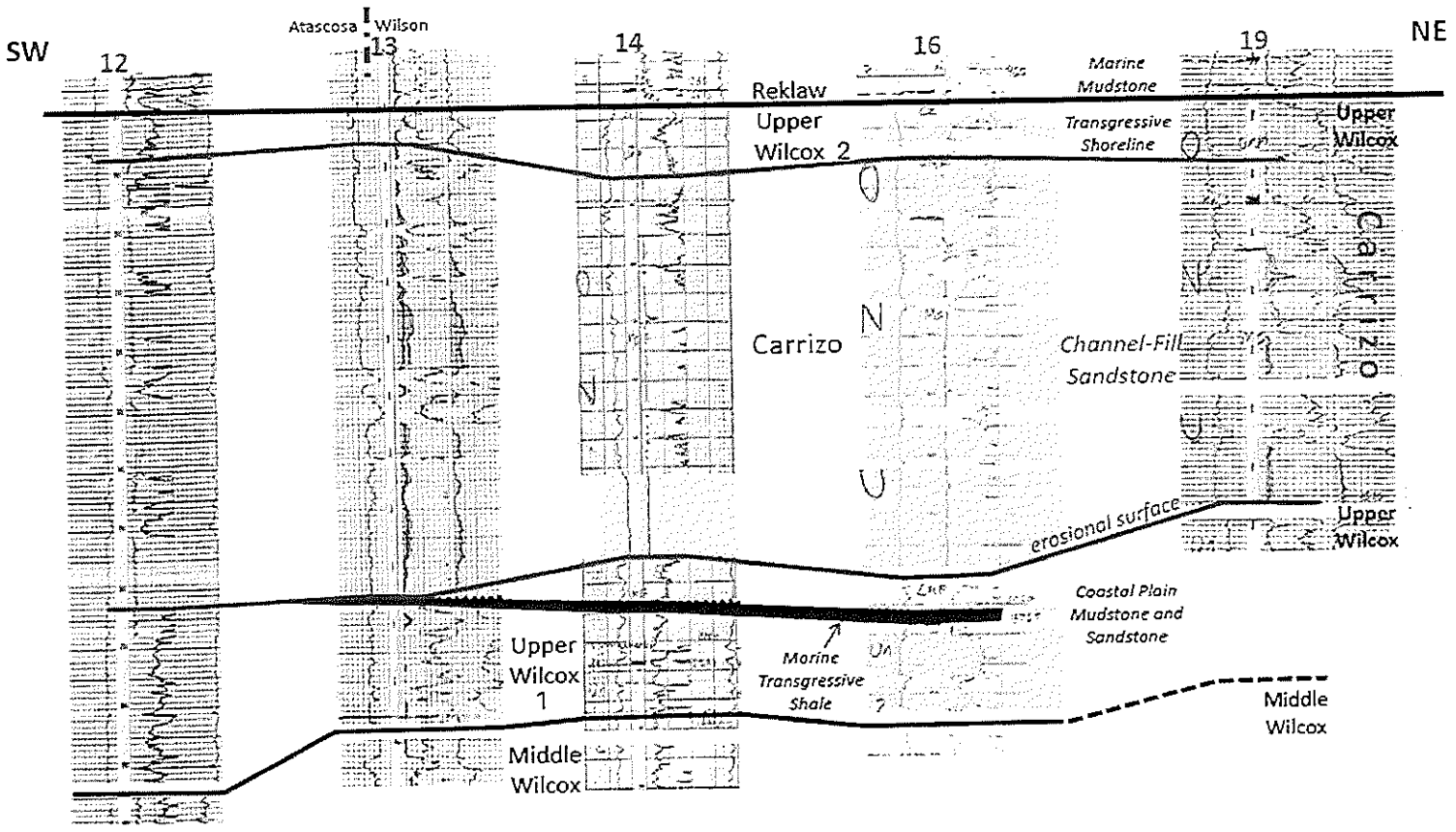

Figure 5-14. The cross-section of the Stratigraphic and lithologic picks on geophysical logs that comprise the strike section in Figure 5-12.

6.0 Findings Relevant to Groundwater Management

This section summarizes the report's findings concerning the transmissivity values determined from field data and transmissivity values used by Panday and others (2023) and Hutchison (2024) to represent the Carrizo-Upper Wilcox in their respective GAMs. The section also discusses the possible implications of the report's findings to groundwater management in the region.

6.1 Aquifer Properties and Model Calibration

6.1.1 Characterization and Modeling of Aquifers and Aquifer Properties

Transmissivity is perhaps the most important aquifer parameter in a groundwater flow model, and it affects its capability to make reliable predictions. Transmissivity is determined by multiplying aquifer thickness by the hydraulic conductivity value. Hydraulic conductivity is largely determined by the lithology and facies of a deposit. This subsection summarizes previous discussions related to the characterization and modeling of the Carrizo Aquifer with an emphasis on transmissivity.

1. Carrizo-Upper Wilcox Stratigraphic Unit - The Carrizo-Upper Wilcox Stratigraphic Unit is a major regressive sequence composed of fluvial, deltaic, and marine shoreline depositional systems that are bounded above and below by transgressive facies. The unit consists of two distinct fluvial facies assemblages. The Carrizo Aquifer consists of a sand-dominated bed-load system, and the Upper Wilcox consists of a more heterogeneous mixed-load system.
2. 3-D Configuration of the Carrizo Deposits - The areal extend of the Carrizo deposits changed over time (and therefore depth). At early times, the Carrizo was eroding the Upper Wilcox deposits, and the Carrizo deposits primarily accumulated near the Carrizo outcrop and along the main stems of the channel stem. The Carrizo deposits attained their maximum coverage during the middle period, covering all of the EUWCD. At late times, the Carrizo deposits covered most of Wilson County, about half of Frio and Atascosa counties, and little of Karnes County. The bed-load channel fluvial system consists of multilateral, multistory channel-fill sandstones that are dominant along the major fluvial axes and form the depositional framework of the interval.
3. 3-D Configuration of the Upper Wilcox Deposits - Across EUWCD, the Upper Wilcox deposits exist atop and below the Carrizo Deposits. Much of the Upper Wilcox is characterized by mixed-load channel fill and crevasse splay sandstones enclosed in a variety of fine-grained floodplain facies. Characteristically, finer-grained floodplain deposits can occur between sandy deposits and hinder vertical groundwater flow.
4. Representation of the Carrizo Aquifer in a Groundwater Model – A single model layer represents both the Carrizo Aquifer and the Upper Wilcox Aquifer. These two aquifers should be represented by different model layers. Hydrogeologic properties that vary between the Carrizo and upper Wilcox layers include groundwater salinity, hydraulic head, conductivity, transmissivity, and storativity (Hamlin, 1988). Salinities are lowest and extend deepest in the Carrizo and commonly increase abruptly across the boundaries between the Carrizo and other layers (Hamlin and de la Rocha, 2015). Hydraulic heads are highest in the Carrizo, and the potential exists for cross-formational flow out of the Carrizo layer (Payne, 1972). Hydraulic conductivities are highest in the Carrizo, and transmissivities are locally 10 times higher relative to the Wilcox layers.

5. Carrizo Transmissivity Values – The most reliable dataset for determining transmissivity values for an aquifer is from the analysis of constant-rate pumping tests. This report assembled and calculated transmissivity values from constant-rate pumping tests submitted to TCEQ and provided in hydrogeologic reports (Myers, 1969; Alexander and White, 1966). Each test was assigned a rating from 1 to 5 based on an evaluation of the field data. Field data deemed highly reliable for estimating transmissivity are assigned a rating of 1. Field data with the lowest quality rating that can be used to produce a meaningful transmissivity are assigned a rating of 3. **Table 6-1** lists 42 transmissivity values with a rating of 3 or better. The values range between 400 ft^2/day and 23,529 ft^2/day, with a mean value of 9,900 ft^2/day and a median value of 7,200 ft^2/day. Another set of transmissivity values that merit consideration are those provided by Klemt and others (1976). We did not assess the field data to review it, but the description of the testing and analysis methods support a rating of 3 or better for all tests. We created a raster from the transmissivity contours provided in **Figure 3-4** and determined a maximum value of 40,300 ft^2/day, a median value of 5,400 ft^2/day, and a mean value of 9,000 ft^2/day.

Table 6-1. Transmissivity Values with a Quality Rating of 3 or better.

Well ID	County	Source	Latitude	Longitude	Quality Rating	Pumping Rate (GPM)	Transmissivity (ft^2/day)
G0070002A	Atascosa	TCEQ	28.9092	-98.5444	1	500	9,094
G0070002E	Atascosa	TCEQ	28.9098	-98.5447	3	874	4,242
G0070023G	Atascosa	TCEQ	29.0018	-98.4141	1	2,023	8,090
G0070028A	Atascosa	TCEQ	28.7024	-98.4821	2	1,043	19,263
G0820002B	Frio	TCEQ	28.8964	-99.0856	1	760	7,177
G0820002C	Frio	TCEQ	28.8989	-99.1089	3	1,155	3,874
G2470002C	Wilson	TCEQ	29.0702	-98.0844	1	337	15,942
G2470003C	Wilson	TCEQ	29.2347	-97.9544	1	800	23,161
G2470005A	Wilson	TCEQ	29.1297	-98.1083	3	298	1,445
G2470005F	Wilson	TCEQ	29.1318	-98.1073	1	285	509
G2470015B	Wilson	TCEQ	29.2931	-98.2114	1	203	402
G2470015H	Wilson	TCEQ	29.3002	-98.0525	1	963	3,910
G2470015I	Wilson	TCEQ	29.3015	-98.1144	1	514	1,079
G2470015J	Wilson	TCEQ	29.2749	-98.1085	2	2,254	4,324
G2470022C	Wilson	TCEQ	29.2688	-98.1988	1	1,480	4,246
G1280007C	Wilson	TCEQ	29.0228	-98.0304	2	770	9,952
AL-68-60-603	Atascosa	R98	29.0558	-98.5167	3	900	20,588
AL-68-60-604	Atascosa	R98	29.0489	-98.5244	3	530	23,262
AL-68-60-904	Atascosa	R98	29.0394	-98.5139	3	530	18,717
AL-68-60-905	Atascosa	R98	29.0422	-98.5078	3	530	17,380
AL-78-04-207	Atascosa	R98	28.9972	-98.5533	3	900	19,251
Al-78-04-803	Atascosa	R98	28.9119	-98.0422	3	500	9,492

Well ID	County	Source	Latitude	Longitude	Quality Rating	Pumping Rate (GPM)	Transmissivity (ft^2/day)
AL-78-14-801	Atascosa	R98	28.7544	-98.3056	3	2800	5,013
AL-78-14-802	Atascosa	R98	28.7683	-98.3117	3	2800	4,572
AL-78-22-202	Atascosa	R98	28.8267	-98.3100	3	2800	5,348
KB-77-23-803	Frio	R98	28.6586	-99.1694	3	692	5,401
KR-77-08-715	Frio	R98	28.8967	-99.0850	3	unknown	7,152
Wilson_1	Wilson	R98-b	29.1339	-98.1628	3	374	3,877
Wilson_2	Wilson	R98-b	28.9550	-98.2472	3	unknown	3,877
AL-77-23-803	Atascosa	R98-b	28.6623	-99.1611	3	unknown	4,813
KB-77-08-715	Frio	R98-b	28.9055	-99.1068	3	unknown	8,021
KB-77-07-501	Frio	R98-b	28.9327	-99.1713	3	unknown	9,358
AL-78-04-803	Atascosa	R98-b	28.9100	-98.5440	3	unknown	9,358
AL-78-04-207	Atascosa	R98-b	29.0012	-98.5452	3	unknown	19,786
AL-78-22-202	Atascosa	R98-b	28.9803	-98.5712	3	unknown	5,154
AL-68-60-905	Atascosa	R98-b	29.0414	-98.5010	3	unknown	19,218
AL-68-60-904	Atascosa	R98-b	29.0384	-98.5064	3	unknown	23,529
AL-68-60-603	Atascosa	R98-b	29.0578	-98.6476	3	unknown	19,378
AL-68-60-604	Atascosa	R98-b	29.0852	-98.6472	3	unknown	23,329
AL-78-14-801	Atascosa	R98-b	28.7525	-98.3054	3	unknown	5,348
AL-78-14-802	Atascosa	R98-b	28.7687	-98.3092	3	unknown	4,913
BFPW03	Atascosa	Bigfoot Report	29.1025	-98.7325	3	1000	2,750

6. Relationship Between Transmissivity and Sand Thickness – Using the transmissivity values with a quality rating of 2 or higher, a strong correlation was found to exist between transmissivity and sand thicknesses mapped by both INTERA and Panday and others (2023). The results suggest that Panday and others (2023) should have used sand thickness to guide the construction of the transmissivity field during model calibration.
7. Hydraulic Conductivity Values Calculated from Specific Capacity - Hydraulic Conductivity values calculated from specific capacity values were discovered to be unreliable and should not be used without an exhaustive check on the field data. Our analysis identified a significant overestimating of hydraulic conductivity calculated from specific capacities from wells with short screen lengths. This bias has been previously documented for several groundwater models.

6.1.2 GAM Developed by Panday and Others (2023)

This subsection summarizes previous discussions related to Panday and others' (2023) representation of the Carrizo Aquifer in the GAM.

1. Representation of Carrizo and Upper Wilcox as a Single Layer – The Carrizo Aquifer and the Upper Wilcox should not have been represented as a single layer. No evidence was presented to demonstrate that the Carrizo and the Upper Wilcox have sufficiently similar hydraulic properties, hydraulic heads, and water quality to be treated as a homogenous unit.
2. Transmissivity Values - Transmissivity values as high as 508,938 ft^2/day are assigned to the Carrizo-Upper Wilcox grid cells in EUWCD. Field data suggest that transmissivity values should not exceed 40,000 ft^2/day. Grid cells with transmissivity values above 75,000 ft^2/day occur in all four counties that comprise EUWCD. Based on the magnitude of the transmissivity for the Carrizo-Upper Wilcox model layer, the current GAM should be avoided when assessing permit evaluations and developing groundwater management policy.
3. Calibration Approach - The calibration process to parameterize transmissivity is flawed. Some notable problems with the process are that it 1) relied heavily on all of the transmissivity values developed from specific capacity values, 2) did not consider any relationship between transmissivity and sand thickness, and 3) did not consider an acceptable range for transmissivity based on an evaluation of transmissivity from constant-rate pumping tests.

6.1.3 GAM Developed by Hutchison (2024)

Hutchison (2024) developed a version of the GAM by updating pumping distributions and adjusting the values for the Carrizo-Wilcox developed by Panday and others (2023). Hutchison's approach to the GAM recalibration of the GAM is summarized as follows:

> *"Calibration of the GMA 13 Model wos completed in two steps: 1) an initial set of parameter adjustments based on an evaluation of the results of the initial run, and 2) four automated parameter adjustments using PEST." (Hutchison, 2024; p.49)*

For the recalibration, Hutchison (2024) used a maximum transmissivity of 100,000 gpd/ft (13,369 ft^2/day) as a comparison standard for the Carrizo-Upper Wilcox (Hutchison, 2024). Hutchison (2024) does not present any data or other justification to select a 13,369 ft^2/day, nor does the report explain what is meant by " a comparison standard." Based on INTERA's analysis of transmissivity values in Section 2, the selection of 13,369 ft^2/day is inappropriate. Out of the 42 transmissivity values in EUWCD documented in **Table 5-1**, 13 values (30%) are greater than Hutchison's maximum value. Evaluation of Klemt and others (1976) transmissivity contours in **Figure 3-4** indicates that approximately 54% of the area in Wilson, Atascosa, and Frio counties have transmissivity values greater than Hutchison's maximum value. Based on the estimated transmissivities in **Table 5-1** and those presented by Klemt and others (1976), the maximum transmissivity should be between 23,000 ft^2/day and 40,000 ft^2/day. The upper range of 40,000 ft^2/day is based on the transmissivity values reported by Klemt and others (1976).

Figure 6-1 shows the transmissivity field generated by Hutchison. The spatial distribution of transmissivity is not supported by the hydrogeological data presented in this report. This hydrogeological data includes maps of sand thickness, estimated thickness of the Upper Wilcox, estimated thicknesses of the Carrizo, measured transmissivity values in **Table 5-1**, and transmissivity contours from Klemt and others (1976).

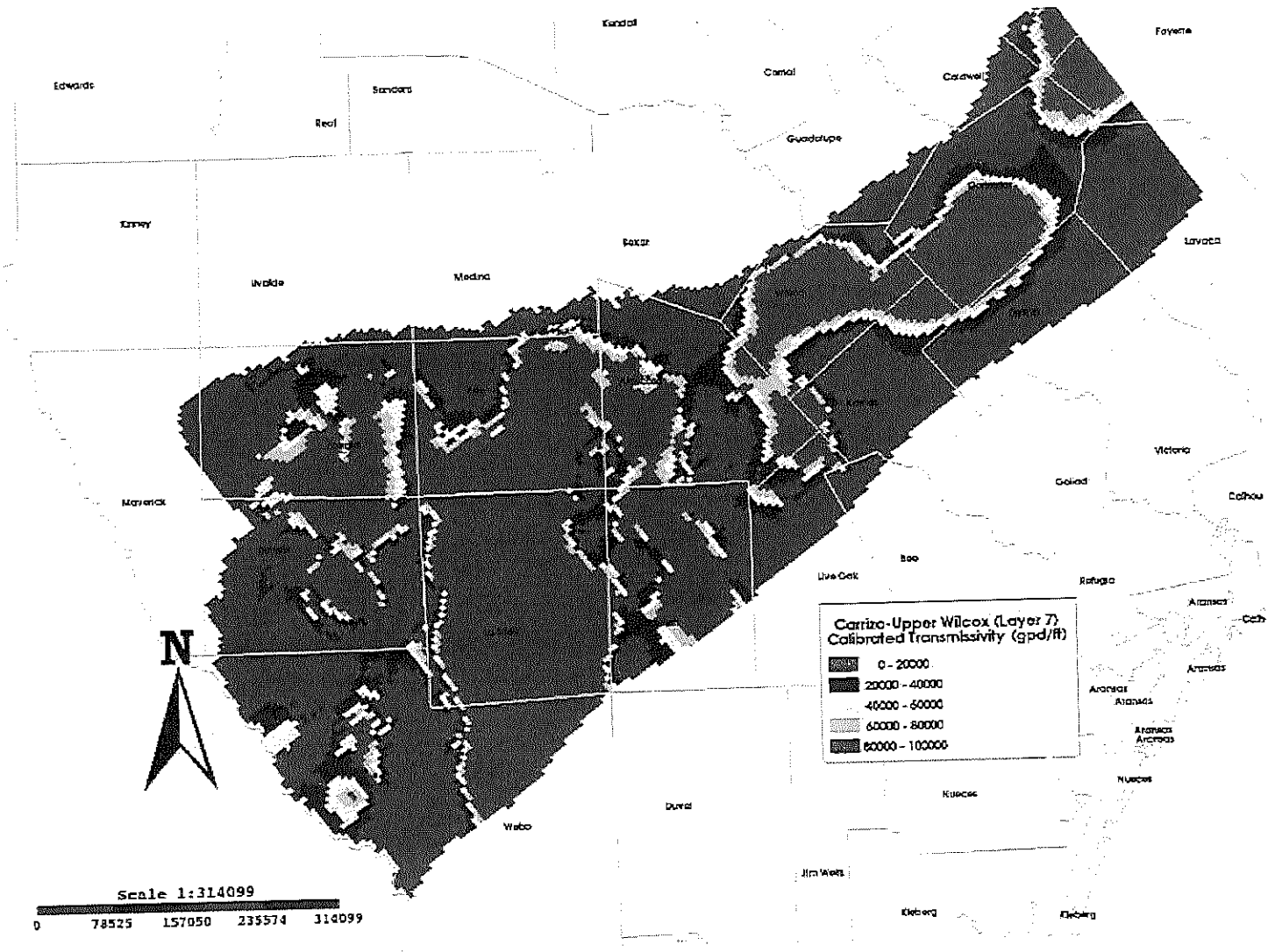

Figure 6-1. The GMA 13 Model Transmissivity for the Carrio-Upper Wilcox Aquifer (Layer 7) from Hutchison (2024).

6.2 Implications for Groundwater Management

The GAM developed by Hutchison (2024) has several notable deficiencies that limit its ability to provide useful predictions of the impacts on groundwater resources caused by pumping the Carrizo Aquifer. Based on the report findings, these deficiencies include:

- A significantly underestimated value for maximum transmissivity for the Carrizo Aquifer.
- No listing of transmissivity values determined from aquifer pumping tests to guide the parameterization of Carrizo transmissivity during model calibration.
- No consideration of sand thickness in the parameterization of the Carrizo transmissivity values.
- A combination of the Carrizo Aquifer and the Upper Wilcox Aquifer is added to a single model layer.

In light of these deficiencies, Hutchison (2024) does not provide any evidence or rationale to indicate that the GAM would provide a credible and technically defensible simulation of impacts caused by Carrizo pumping across most of the EUWCD. The District should be particularly concerned with using the GAM to evaluate local-scale impacts from a proposed well field. We recommend that prior to any GAM application, the District should vet the GAM's application at a specific location of interest before using it.

To illustrate what vetting means, we will perform two examples of a high-level evaluation at the locations of the fourteen aquifer pumping tests in **Table 3-1** that have a quality rating of 1 or 2. **Table 6-2** provides three transmissivity values for each pumping test. The "measured" value was calculated from the field data using the Cooper-Jacob straight line (CJ5L) method. The" simulated" values were calculated using the Cooper-Jacob straight line (CJSL) method applied to the drawdown simulated using a model constructed from the GAM's aquifer hydraulic properties. The "model grid cell" transmissivities are values assigned to the grid cells where the pumping tests are located. **Figure 6-2** plots compare the transmissivity in the GAM at the location of the pumping test to the transmissivity calculated from the aquifer pumping tests. **Figure 6-3** compares the transmissivity calculated from simulating the pumping test using the GAM's hydraulic properties to the transmissivity calculated from the aquifer pumping tests. Both figures show a poor correlation between the two sets of parameters. Among the areas of most concern for the District is where the GAM has significantly higher transmissivity values than those measured in the field. This bias occurs for wells located in the up-dip portion of the Carrizo, where the measured transmissivity is less than 5,000 ft2/day.

Table 6-2. Comparison of Transmissivity Values for Aquifer Pumping Tests Generated from Analysis of Field Data from the Grid Cell that contains the well location and from a model simulation.

Well ID	County	Transmissivity (ft2/day)		
		Measured	Model Grid Cell	Simulated
G0070002A	ATASCOSA	8,109	9,447	3,942
G0070023G	ATASCOSA	8,090	3,504	3,584
G0070028A	ATASCOSA	19,263	3,764	2,599
G0820002B	FRIO	7,177	13,370	6,540
G2470002C	WILSON	15,942	8,958	7,497

Well ID	County	Transmissivity (ft2/day)		
		Measured	Model Grid Cell	Simulated
G2470003C	WILSON	9,742	13,376	9,975
G2470004F	WILSON	508	5,633	7,022
G2470005F	WILSON	12,268	13,364	14,992
G2470015B	WILSON	402	11,725	10,547
G2470015H	WILSON	3,910	13,359	13,317
G2470015I	WILSON	1,079	14,701	15,562
G2470015J	WILSON	4,324	13,385	18,100
G2470022C	WILSON	4,246	22,748	26,273
G1280007C	KARNES	9,952	1,475	1,369

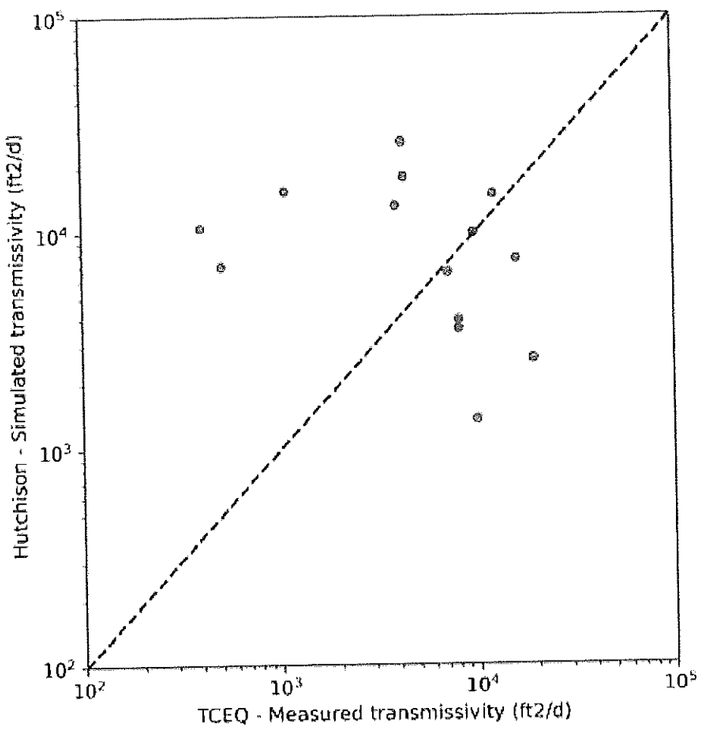

Figure 6-2. Comparison of Transmissivity calculated from Field Data and Transmissivity for Grid Cell where Pumping Test was Performed.

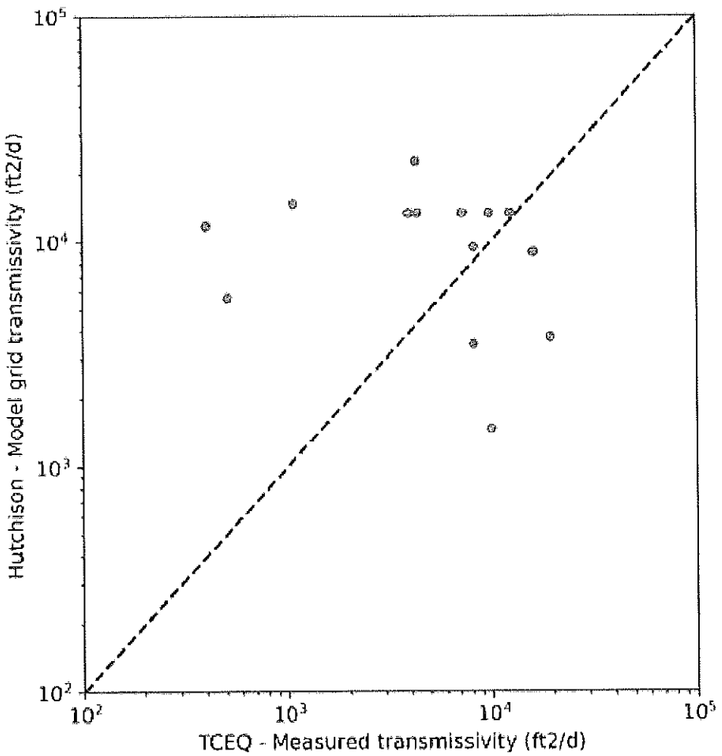

Figure 6-3. The GMA 13 Model Transmissivity for the Carrio-Upper Wilcox Aquifer (Layer 7) from Hutchison (2024).

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APPENDIX A

Stratigraphy and Lithology Picks for the Carrizo-Upper Wilcox Stratigraphic Unit

Table A-1. Stratigraphy and Lithology Picks for the Carrizo-Upper Wilcox Stratigraphic Unit.

API	Latitude	Longitude	Source	KB Elevation (feet)	Top of C2UWX (feet)	Bottom of C2UWX (feet)	C2UWX Thickness (ft)	C2UWX Sand Thickness (ft)	C2UWX Sand Fraction
4249301239	29.16146	-98.1185	INTERA	455	-260	-950	690	685	0.99
4249301427	29.21405	-98.024	INTERA	437	-145	-917	772	735	0.95
4249301921	29.36477	-97.9011	INTERA	515	420	-126	546	509	0.93
4249301236	29.12471	-98.164	INTERA	419	-336	-1083	747	670	0.9
4249301068	29.22543	-97.7961	INTERA	356	-1002	-1767	765	678	0.89
4225500824	28.83911	-98.1406	INTERA	496	-3255	-4417	1162	1029	0.89
4249301641	29.04958	-98.3096	INTERA	440	-608	-1438	830	734	0.88
4225501232	29.03354	-97.9041	INTERA	370	-2935	-3802	867	765	0.88
4225531286	29.13014	-97.7404	INTERA	387	-2845	-3570	725	634	0.87
4225500199	29.06797	-97.7698	INTERA	377	-3461	-4403	942	821	0.87
4225500220	29.14392	-97.7513	INTERA	383	-2559	-3482	923	755	0.82
4249300933	29.2794	-97.8441	INTERA	466	-369	-1024	655	568	0.87
4249300768	29.28902	-97.8763	INTERA	493	-156	-891	735	622	0.85
4249300917	29.34036	-97.8706	INTERA	474	175	-488	663	559	0.84
4225531184	28.82012	-97.9968	INTERA	489	-4331	-5559	1227	998	0.81
4249300943	29.32385	-97.8641	INTERA	459	-86	-691	605	503	0.83
4225500178	29.04782	-97.8112	INTERA	324	-3356	-4386	1030	826	0.8
4225500858	28.87273	-98.0519	INTERA	470	-3614	-4819	1205	997	0.83
4249330534	29.29299	-98.0705	INTERA	480	432	113	319	263	0.82
4225501235	29.00565	-97.8528	INTERA	359	-3829	-4647	818	690	0.84
4201300617	29.09817	-98.4183	INTERA	519	143	-668	811	665	0.82
4249330060	29.13269	-98.0324	INTERA	416	-619	-1515	896	734	0.82
4249301747	28.91208	-98.2104	INTERA	319	-2416	-3457	1041	851	0.82
4225500622	28.84646	-97.9763	INTERA	408	-4412	-5578	1166	950	0.81

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of CZ/WX (ft msl)	Bottom of CZ/WX (ft msl)	CZ/WX Thickness (ft)	CZ/WX Sand Thickness (ft)	CZ/WX Sand Fraction
4249300748	29.35407	-97.8813	INTERA	500	265	-330	595	484	0.81
4249301482	29.19455	-98.0099	INTERA	415	-160	-1097	937	718	0.77
4249301765	28.97654	-98.1171	INTERA	378	-2261	-3322	1061	859	0.81
4249301501	29.10814	-98.2022	INTERA	448	-383	-1264	881	720	0.82
4249301274	29.2175	-98.1158	INTERA	555	147	-490	637	512	0.8
4249300609	29.32715	-97.9449	INTERA	543	385	-316	701	561	0.8
4249301621	29.18036	-98.2686	INTERA	431	324	-392	716	548	0.77
4225500164	29.03529	-97.8309	INTERA	314	-3366	-4420	1054	838	0.8
4249300924	29.29009	-97.8586	INTERA	501	-237	-920	683	553	0.81
4249301551	29.05444	-98.1141	INTERA	371	-1323	-2278	955	756	0.79
4249301920	29.31164	-97.8584	INTERA	462	-134	-806	672	530	0.79
4249330236	29.25872	-97.8123	INTERA	427	-607	-1373	766	600	0.78
4249301889	29.08414	-97.9356	INTERA	364	-1741	-2788	1047	812	0.78
4249301573	29.17697	-98.2543	INTERA	503	286	-388	674	521	0.77
4225500252	29.09144	-97.7269	INTERA	408	-3580	-4482	902	702	0.78
4225530774	29.15796	-97.7406	INTERA	352	-2348	-3258	910	660	0.73
4225500795	28.88391	-98.1282	INTERA	439	-3086	-4165	1079	826	0.77
4225530178	29.07927	-97.6854	INTERA	482	-4128	-5090	962	742	0.77
4249301064	29.18201	-97.9883	INTERA	407	-378	-1208	830	632	0.76
4249330730	29.11884	-97.9537	INTERA	397	-1329	-2272	943	717	0.76
4249330757	29.10465	-97.9371	INTERA	364	-1502	-2513	1012	775	0.77
4225500137	29.02582	-97.8512	INTERA	329	-3287	-4347	1060	791	0.75
4225530239	28.84884	-98.0285	INTERA	451	-3947	-5146	1199	898	0.75
4249301419	29.23512	-98.0304	INTERA	490	137	-630	767	573	0.75
4249301516	29.13786	-98.2033	INTERA	412	-219	-920	701	523	0.75

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of C2UWX (ft msl)	Bottom of C2UWX (ft msl)	C2UWX Thickness (ft)	C2UWX Sand Thickness (ft)	C2UWX Sand Fraction
4249331621	29.03635	-98.0799	INTERA	409	-1676	-2760	1084	805	0.74
4225500719	28.94001	-97.9885	INTERA	299	-3534	-4717	1183	876	0.74
4249330899	29.13265	-97.9678	INTERA	348	-961	-2032	1070	721	0.67
4249301767	28.97103	-98.077	INTERA	359	-2405	-3535	1130	834	0.74
4225500060	28.95854	-98.0836	INTERA	371	-2731	-3653	922	677	0.73
4225500110	29.01737	-97.878	INTERA	333	-3278	-4279	1001	745	0.74
4249331233	29.06961	-98.1437	INTERA	399	-930	-2014	1084	751	0.69
4225530272	28.78664	-97.9637	INTERA	450	-4772	-5925	1153	840	0.73
4225500584	28.79099	-97.8115	INTERA	419	-5682	-6771	1090	748	0.69
4225530202	28.76634	-97.8736	INTERA	489	-5379	-6472	1093	790	0.72
4225531553	28.89334	-97.6683	INTERA	405	-6013	-6881	868	680	0.78
4249300930	29.26324	-97.8493	INTERA	477	-392	-1108	716	511	0.71
4225501245	28.83879	-97.8666	INTERA	324	-5266	-6209	944	708	0.75
4225500226	29.18913	-97.7665	INTERA	350	-1738	-2586	848	601	0.71
4225500874	28.9057	-98.049	INTERA	379	-3373	-4181	808	597	0.74
4225501233	28.99956	-97.9089	INTERA	295	-3251	-4291	1040	739	0.71
4249301054	29.18055	-97.9382	INTERA	468	-619	-1456	837	610	0.73
4225500243	29.12762	-97.6537	INTERA	450	-3627	-4539	911	635	0.7
4225500270	28.85892	-97.7064	INTERA	273	-5970	-6778	808	621	0.77
4225500279	28.8767	-97.6756	INTERA	319	-5982	-6838	856	590	0.69
4225500839	28.77061	-98.0618	INTERA	361	-4138	-5338	1200	824	0.69
4225501373	29.1012	-97.7054	INTERA	457	-3517	-4439	923	632	0.68
4225531471	28.90847	-97.7659	INTERA	277	-5525	-6414	889	615	0.69
4225500634	28.9069	-97.8991	INTERA	344	-4606	-5784	1178	766	0.65
4249330939	29.01298	-98.0773	INTERA	423	-1993	-3054	1061	720	0.68

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of C2UWX (ft msl)	Bottom of C2UWX (ft msl)	C2UWX Thickness (ft)	C2UWX Sand Thickness (ft)	C2UWX Sand Fraction
4225500234	29.17516	-97.7498	INTERA	377	-2093	-2941	848	569	0.67
4249300198	29.30405	-98.0822	INTERA	478	454	194	261	170	0.65
4225530125	28.74723	-97.9997	INTERA	491	-4867	-5958	1091	705	0.65
4249302003	29.19795	-97.7765	INTERA	335	-1385	-2419	1035	650	0.63
4225500276	28.87127	-97.6832	INTERA	301	-6066	-6825	759	549	0.72
4225530241	28.75206	-97.8639	INTERA	479	-5523	-6732	1209	699	0.58
4225530180	29.06283	-97.9328	INTERA	370	-2016	-3195	1179	734	0.62
4225530219	28.74295	-97.9167	INTERA	506	-5185	-6523	1338	787	0.59
4225500282	28.89658	-97.6569	INTERA	370	-6065	-6849	784	588	0.75
4225531617	29.06827	-97.8413	INTERA	336	-2847	-3795	948	576	0.61
4249332275	29.02628	-98.1808	INTERA	434	-1336	-2255	919	580	0.63
4249330907	29.14434	-97.874	INTERA	442	-1550	-2437	887	583	0.66
4225531596	28.80573	-97.7922	INTERA	375	-5739	-6777	1038	591	0.57
4225531505	28.73043	-97.9203	INTERA	472	-5165	-6566	1401	722	0.52
4249301628	29.24804	-98.2706	INTERA	480	444	230	214	62	0.29
4225500244	29.1115	-97.7151	INTERA	439	-3350	-4252	902	594	0.66
4225530641	28.89479	-97.8054	INTERA	281	-5411	-6331	921	770	0.84
4225500168	29.0095	-97.832	INTERA	296	-3797	-4851	1054	786	0.75
4225500169	29.00647	-97.7763	INTERA	335	-4542	-5239	698	558	0.8
4225500256	29.07976	-97.68	INTERA	464	-4189	-5097	908	672	0.74
4225500612	28.81405	-97.8866	INTERA	338	-5200	-6186	986	758	0.77
4225500616	28.84814	-97.9308	INTERA	371	-4757	-5775	1019	769	0.75
4225500617	28.87193	-97.9363	INTERA	418	-4622	-5640	1017	1023	1.01
4225500632	28.88466	-97.9274	INTERA	388	-4582	-5601	1019	740	0.73
4225500643	28.99806	-97.8127	INTERA	272	-4278	-5123	845	619	0.73

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of CZ/WX (ft msl)	Bottom of CZ/WX (ft msl)	CZ/WX Thickness (ft)	CZ/WX Sand Thickness (ft)	CZ/WX Sand Fraction
4249300748	29.35407	-97.8813	INTERA	500	265	-330	595	484	0.81
4249301482	29.19455	-98.0099	INTERA	415	-160	-1097	937	718	0.77
4249301765	28.97654	-98.1171	INTERA	378	-2261	-3322	1061	859	0.81
4249301501	29.10814	-98.2022	INTERA	448	-383	-1264	881	720	0.82
4249301274	29.2175	-98.1158	INTERA	555	147	-490	637	512	0.8
4249300609	29.32715	-97.9449	INTERA	543	385	-316	701	561	0.8
4249301621	29.18036	-98.2686	INTERA	431	324	-392	716	548	0.77
4225500164	29.03529	-97.8309	INTERA	314	-3366	-4420	1054	838	0.8
4249300924	29.29009	-97.8586	INTERA	501	-237	-920	683	553	0.81
4249301551	29.05444	-98.1141	INTERA	371	-1323	-2278	955	756	0.79
4249301920	29.31164	-97.8584	INTERA	462	-134	-806	672	530	0.79
4249330236	29.25872	-97.8123	INTERA	427	-607	-1373	766	600	0.78
4249301889	29.08414	-97.9356	INTERA	364	-1741	-2788	1047	812	0.78
4249301573	29.17697	-98.2543	INTERA	503	286	-388	674	521	0.77
4225500252	29.09144	-97.7269	INTERA	408	-3580	-4482	902	702	0.78
4225530774	29.15796	-97.7406	INTERA	352	-2348	-3258	910	660	0.73
4225500795	28.88391	-98.1282	INTERA	439	-3086	-4165	1079	826	0.77
4225530178	29.07927	-97.6854	INTERA	482	-4128	-5090	962	742	0.77
4249301064	29.18201	-97.9883	INTERA	407	-378	-1208	830	632	0.76
4249330730	29.11884	-97.9537	INTERA	397	-1329	-2272	943	717	0.76
4249330757	29.10465	-97.9371	INTERA	364	-1502	-2513	1012	775	0.77
4225500137	29.02582	-97.8512	INTERA	329	-3287	-4347	1060	791	0.75
4225530239	28.84884	-98.0285	INTERA	451	-3947	-5146	1199	898	0.75
4249301419	29.23512	-98.0304	INTERA	490	137	-630	767	573	0.75
4249301516	29.13786	-98.2033	INTERA	412	-219	-920	701	523	0.75

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of C2UWX (ft msl)	Bottom of C2UWX (ft msl)	C2UWX Thickness (ft)	C2UWX Sand Thickness (ft)	C2UWX Sand Fraction
4225500651	28.93715	-97.8921	INTERA	275	-4349	-5208	859	678	0.79
4225500684	28.97615	-97.9053	INTERA	345	-3722	-4715	994	823	0.83
4225500687	28.98451	-97.9086	INTERA	367	-3565	-4427	862	709	0.82
4225500689	28.97407	-97.9212	INTERA	368	-3735	-4750	1016	783	0.77
4225501350	29.09604	-97.708	INTERA	448	-3601	-4560	959	622	0.65
4225530059	29.11315	-97.6541	INTERA	490	-3900	-4792	892	691	0.77
4225530155	28.87947	-97.7848	INTERA	266	-5559	-6476	917	722	0.79
4225530628	28.9038	-97.6909	INTERA	382	-5647	-6707	1060	682	0.64
4225530813	28.94412	-97.7179	INTERA	422	-5555	-6416	862	730	0.85
4225530900	28.91759	-97.6735	INTERA	390	-5574	-6598	1024	704	0.69
4225531085	29.03196	-97.8208	INTERA	330	-3518	-4490	972	792	0.81
4225531239	28.90845	-97.7848	INTERA	276	-5447	-6349	902	722	0.8
4225531282	29.13024	-97.6347	INTERA	501	-3618	-4646	1028	763	0.74
4225531365	28.81994	-97.8402	INTERA	257	-5482	-6429	947	648	0.68
4225531514	28.88175	-97.8099	INTERA	312	-5474	-6395	921	733	0.8
4225531820	28.9401	-97.7594	INTERA	326	-5353	-6275	922	640	0.69
4225531893	28.91253	-97.9239	INTERA	308	-4426	-5448	1021	576	0.56
4225531967	29.01776	-97.7779	INTERA	342	-4256	-5283	1027	972	0.95
4225532286	28.87349	-97.917	INTERA	421	-4762	-5758	996	716	0.72
4225532942	29.02814	-97.7973	INTERA	312	-3995	-4851	856	586	0.68
4225534507	28.8904	-97.8324	INTERA	392	-5268	-6073	805	571	0.71
HARA10A	29.07734	-98.3821	INTERA	482	-174	-973	799	612	0.77
HARA12A	29.08746	-98.4073	INTERA	494	-2	-841	839	596	0.71
4201337018	29.01437	-98.5898	INTERA	476	-320	-1023	703	513	0.73
HARA197A	29.03444	-98.6179	INTERA	473	-3	-810	806	688	0.85

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of C2UWX (ft msl)	Bottom of C2UWX (ft msl)	C2UWX Thickness (ft)	C2UWX Sand Thickness (ft)	C2UWX Sand Fraction
HARA20A	29.11374	-98.414	INTERA	512	133	-569	702	542	0.77
HARA232A	28.94843	-98.5427	INTERA	437	-701	-1627	927	732	0.79
4201330075	28.97049	-98.5421	INTERA	451	-613	-1389	776	623	0.8
HARA273A	29.04017	-98.3541	INTERA	480	-534	-1444	911	741	0.81
4201332579	29.05135	-98.363	INTERA	465	-556	-1313	757	506	0.67
HARA278A	29.02275	-98.3277	INTERA	512	-808	-1647	839	631	0.75
4201330390	29.00511	-98.3106	INTERA	415	-1051	-1892	841	606	0.72
HARA300A	28.95721	-98.3139	INTERA	377	-1395	-2466	1071	811	0.76
HARA340A	28.90562	-98.5142	INTERA	469	-1213	-2062	849	671	0.79
HARA343A	28.88597	-98.5093	INTERA	419	-1351	-2247	897	649	0.72
4201301771	28.91226	-98.5284	INTERA	476	-1080	-1934	855	689	0.81
4201334162	28.72089	-98.4633	INTERA	311	-2528	-3765	1237	823	0.67
4201330905	28.81998	-98.5108	INTERA	368	-1732	-2775	1043	734	0.7
4201333824	28.83236	-98.2875	INTERA	288	-2501	-3722	1221	972	0.8
4201300947	28.93384	-98.3115	INTERA	405	-1710	-2745	1035	777	0.75
4201302882	28.74518	-98.612	INTERA	465	-1845	-2922	1077	809	0.75
4201300831	28.8621	-98.2958	INTERA	322	-2303	-3428	1125	776	0.69
4201300798	28.7808	-98.2228	INTERA	368	-3149	-4408	1259	899	0.71
4201302348	28.79652	-98.7249	BRACS	436	-1164	-2051	887	734	0.83
4201331097	28.7405	-98.486	INTERA	307	-2357	-3525	1168	843	0.72
4201332980	28.81699	-98.2634	INTERA	294	-2725	-3933	1208	896	0.74
4201331253	28.7737	-98.6673	INTERA	473	-1509	-2531	1022	807	0.79
4201331259	28.74167	-98.6944	INTERA	399	-1536	-2589	1053	786	0.75
4201330230	28.65427	-98.7414	INTERA	412	-1959	-2930	971	697	0.72
4201399999	28.65001	-98.5583	INTERA	360	-2537	-3724	1188	863	0.73

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of C2UWX (ft msl)	Bottom of C2UWX (ft msl)	C2UWX Thickness (ft)	C2UWX Sand Thickness (ft)	C2UWX Sand Fraction
4201330141	28.68889	-98.4708	INTERA	327	-2684	-3928	1243	852	0.68
4201300738	28.82222	-98.1861	INTERA	437	-3056	-4212	1156	847	0.73
4201302924	28.72959	-98.2611	INTERA	318	-3416	-4602	1186	758	0.64
4201302921	28.7	-98.275	INTERA	310	-3570	-4787	1217	926	0.76
4201330114	28.68889	-98.3708	INTERA	301	-3209	-4382	1172	777	0.66
4201333845	28.66359	-98.268	INTERA	241	-3925	-5142	1217	906	0.74
4201333956	28.83597	-98.5055	INTERA	350	-1632	-2657	1025	758	0.74
4201333940	28.88611	-98.3042	INTERA	364	-2094	-3193	1100	767	0.7
4201300804	28.80556	-98.2417	INTERA	339	-2841	-4105	1265	1003	0.79
4201330309	28.99832	-98.3353	INTERA	473	-1058	-1953	895	615	0.69
4201330868	28.96114	-98.4217	INTERA	361	-1061	-2239	1178	906	0.77
4201330161	28.91128	-98.555	INTERA	450	-931	-1850	919	657	0.71
4201301774	28.90415	-98.6251	INTERA	492	-775	-1731	956	622	0.65
HARA439A	28.89849	-98.6566	INTERA	554	-759	-1689	930	645	0.69
HARA415A	28.89623	-98.6865	INTERA	553	-575	-1604	1029	704	0.68
HARA424A	28.8912	-98.723	INTERA	524	-468	-1553	1086	811	0.75
HARA291A	28.98079	-98.3555	INTERA	412	-1032	-2153	1121	804	0.72
HARA322A	28.97028	-98.3832	INTERA	371	-1058	-2131	1072	784	0.73
HARA311A	28.94785	-98.4484	INTERA	397	-1069	-2029	960	619	0.64
HARA305A	28.93504	-98.4743	INTERA	442	-1162	-2014	852	670	0.79
HARA328A	28.93283	-98.5076	INTERA	414	-1006	-1886	880	599	0.68
4201330068	28.96544	-98.4293	BRACS	363	-1060	-1956	896	657	0.73
4201331216	28.90466	-98.6546	INTERA	571	-789	-1679	890	633	0.71
4201332419	28.98094	-98.5318	INTERA	427	-591	-1350	759	571	0.75
4201332467	29.04479	-98.4551	INTERA	428	-270	-1078	808	579	0.72

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of C2UWX (ft msl)	Bottom of C2UWX (ft msl)	C2UWX Thickness (ft)	C2UWX Sand Thickness (ft)	C2UWX Sand Fraction
4201332559	28.98643	-98.7027	INTERA	528	-83	-911	828	665	0.8
4201334208	28.87193	-98.6329	INTERA	491	-938	-1886	948	749	0.79
4216300025	29.01925	-99.0153	BRACS	669	425	-288	713	448	0.63
4216300092	29.0304	-98.929	BRACS	599	429	-338	767	577	0.75
4216300783	28.92052	-98.8064	INTERA	549	-290	-1230	940	715	0.76
4216300849	28.82915	-98.8144	BRACS	538	-840	-1778	938	736	0.78
4216300898	28.77274	-98.8146	INTERA	507	-1182	-2032	850	680	0.8
4216301501	28.72562	-99.364	BRACS	623	-647	-1311	664	438	0.66
4216301582	28.66788	-98.8098	INTERA	494	-1654	-2571	917	673	0.73
4249301000	29.22751	-97.9305	BRACS	535	-267	-1028	761	498	0.65
4249301832	29.09246	-98.0123	BRACS	417	-1400	-2311	911	634	0.7
4201300975	28.97827	-98.3453	INTERA	376	-1123	-2259	1136	651	0.57
4216301662	28.96566	-99.3159	BRACS	621	109	-488	597	416	0.7
4216331938	28.73833	-99.1057	BRACS	531	-844	-1639	795	477	0.6
4201331195	28.8425	-98.4162	BRACS	333	-1924	-3037	1113	825	0.74
4201302496	28.94845	-98.7569	BRACS	532	-249	-1167	918	693	0.75
4201300363	29.03474	-98.7105	INTERA	495	187	-611	798	615	0.77
4201300767	28.77753	-98.1524	INTERA	431	-3644	-4780	1136	914	0.8
4201300806	28.7534	-98.3376	BRACS	282	-2888	-4029	1141	775	0.68
4201301001	28.94282	-98.3898	BRACS	315	-1383	-2359	976	696	0.71
4201301319	28.96427	-98.6476	BRACS	307	-567	-1476	909	744	0.82
4201302606	28.91925	-98.7581	BRACS	502	-382	-1297	915	748	0.82
4201302908	28.6628	-98.494	BRACS	386	-2763	-3952	1189	862	0.73
4201302935	28.71446	-98.2746	BRACS	345	-3514	-4686	1172	795	0.68
4216300529	28.94187	-98.8676	BRACS	593	-106	-1000	894	709	0.79

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of CZ/WX (ft msl)	Bottom of CZ/WX (ft msl)	CZ/WX Thickness (ft)	CZ/WX Sand Thickness (ft)	CZ/WX Sand Fraction
4216300706	28.89809	-98.9659	BRACS	562	-264	-1117	853	545	0.64
4216300729	28.92189	-98.9236	BRACS	506	-265	-1085	820	629	0.77
4216301360	28.79505	-99.0702	BRACS	559	-696	-1482	786	531	0.68
4216301407	28.84508	-99.1691	BRACS	530	-461	-1128	667	430	0.64
4216301437	28.97751	-99.4056	BRACS	768	294	-204	498	376	0.76
4216301455	28.78949	-99.3239	INTERA	562	-515	-1159	644	484	0.75
4216301528	28.66626	-99.0507	BRACS	437	-1145	-1982	837	551	0.66
4216330005	28.99201	-99.1621	BRACS	591	199	-467	666	452	0.68
4216330390	28.73205	-99.0278	BRACS	544	-919	-1754	835	630	0.75
4216330703	28.7613	-99.2338	BRACS	507	-570	-1211	641	394	0.61
4225531614	28.79608	-97.8095	BRACS	440	-5719	-6757	1038	769	0.74
4201300756	28.81051	-98.1865	BRACS	385	-3150	-4266	1116	798	0.72
4201301664	28.87283	-98.6549	INTERA	496	-900	-1755	855	709	0.83
4216300354	28.99136	-98.8416	BRACS	638	121	-721	842	705	0.84
4249331897	29.14862	-98.0013	INTERA	407	-600	-1633	1033	848	0.82
4249330440	29.24594	-98.0552	INTERA		254	-460	714	578	0.81
4201301729	28.92217	-98.7463	INTERA	519	-368	-1321	952	753	0.79
4216330238	28.82465	-98.997	INTERA		-608	-1398	790	654	0.83
4216300842	28.85659	-98.8294	INTERA		-749	-1718	969	827	0.85
4225531958	28.87807	-97.9728	INTERA	473	-4268	-5339	1071	764	0.71
4225530261	28.81759	-97.781	INTERA	332	-5768	-6606	838	660	0.79
4225500903	28.91278	-98.0158	INTERA	409	-3596	-4638	1042	875	0.84
4225500707	28.96294	-97.9618	INTERA	316	-3462	-4495	1034	804	0.78
4249301310	29.16515	-98.2171	INTERA	427	133	-655	788	587	0.75
4225530587	28.78467	-97.8297	INTERA	431	-5584	-6697	1113	744	0.67

API	Latitude	Longitude	Source	KB Elevation (ft msl)	Top of C2UWX (ft msl)	Bottom of C2UWX (ft msl)	C2UWX Thickness (ft)	C2UWX Sand Thickness (ft)	C2UWX Sand Fraction
4225530246	28.83193	-97.7712	INTERA	361	-5763	-6671	908	672	0.74
4225530657	28.83122	-97.8277	INTERA	251	-5534	-6460	926	659	0.71
4225501299	28.96221	-97.9316	INTERA	344	-3764	-4790	1026	737	0.72
4225531074	28.92508	-97.7038	INTERA	370	-5525	-6533	1008	724	0.72
4225531279	29.01973	-97.8302	INTERA	295	-3713	-4710	997	697	0.7
4225531310	28.8056	-97.8576	INTERA	341	-5386	-6335	949	689	0.73
4216301515	28.69766	-99.2213	BRACS	587	-793	-1596	802	509	0.63
4201303114	28.95008	-98.7112	INTERA	565	-283	-1208	925	723	0.78
4201332196	28.6568	-98.3884	BRACS	303	-3295	-4533	1238	847	0.68
4216300816	28.76702	-98.9078	INTERA	488	-1061	-1908	847	687	0.81
4216330520	28.67191	-98.8528	BRACS	500	-1542	-2502	960	702	0.73
4225500245	29.09805	-97.7302	INTERA	453	-3397	-4273	875	736	0.84

APPENDIX B

Annotated Geophysical Logs for Frio, Atascosa, Wilson, and Karnes County Showing Stratigraphic and Lithologic Picks

Frio County

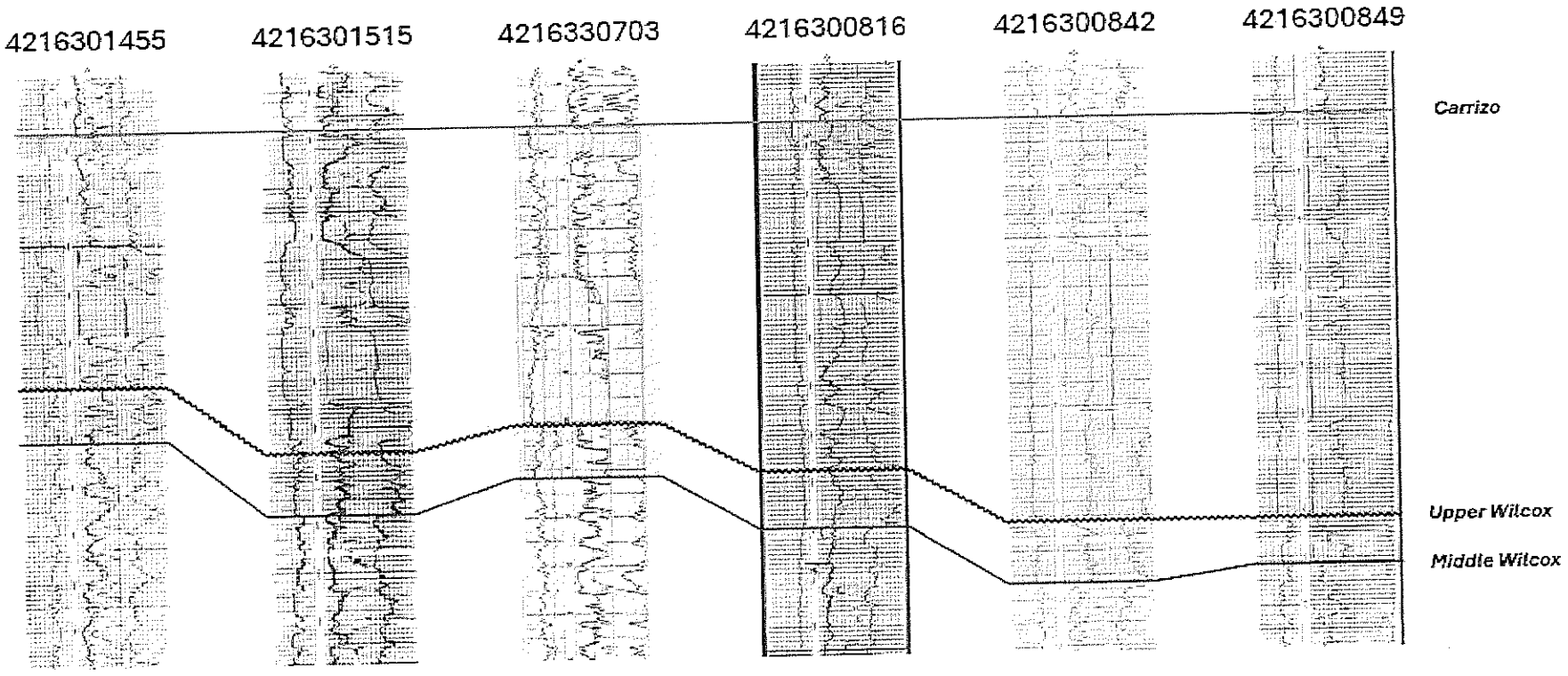


Figure B-1. Annotated Geophysical Logs for Frio County showing stratigraphic and lithologic picks.

Atascosa County

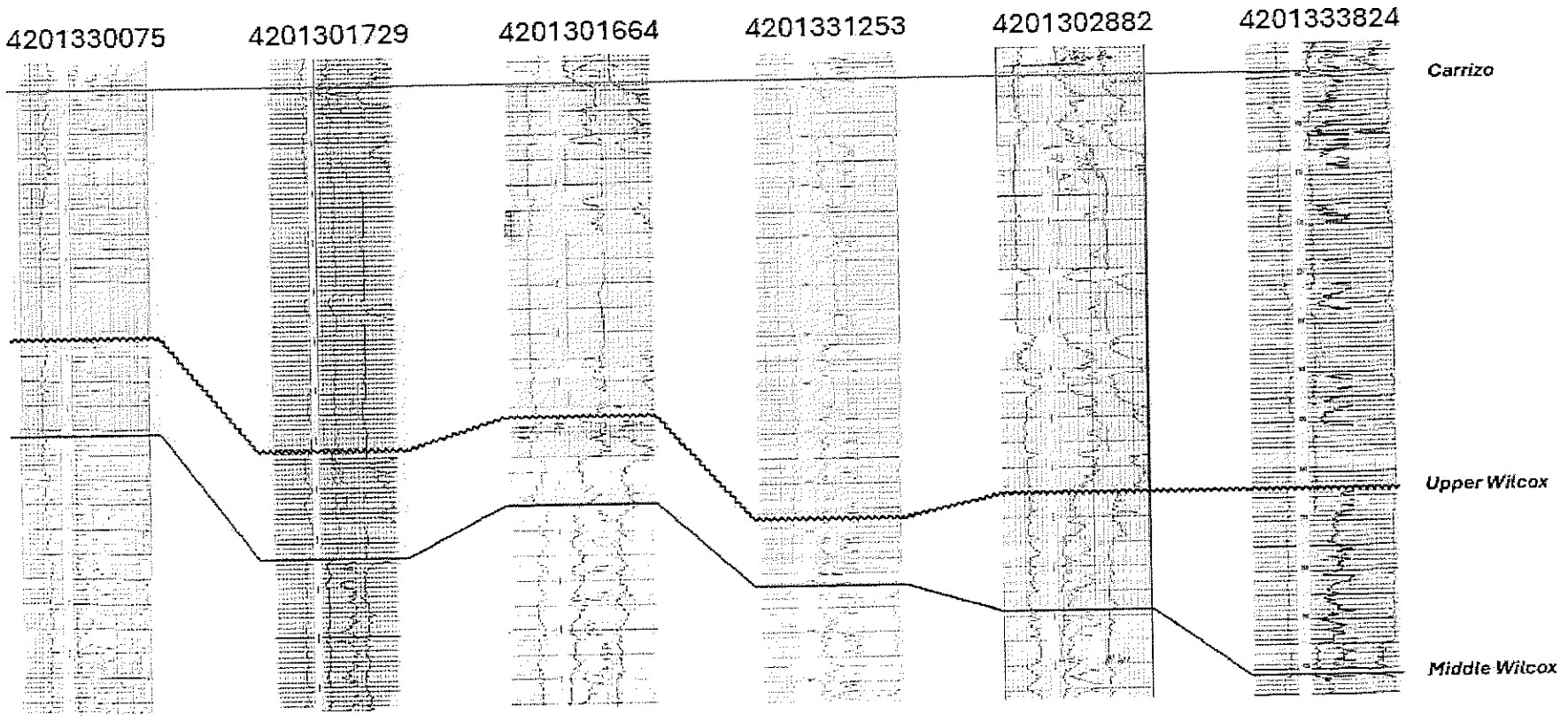


Figure B-2. Annotated Geophysical Logs for Atascosa County showing stratigraphic and lithologic picks.

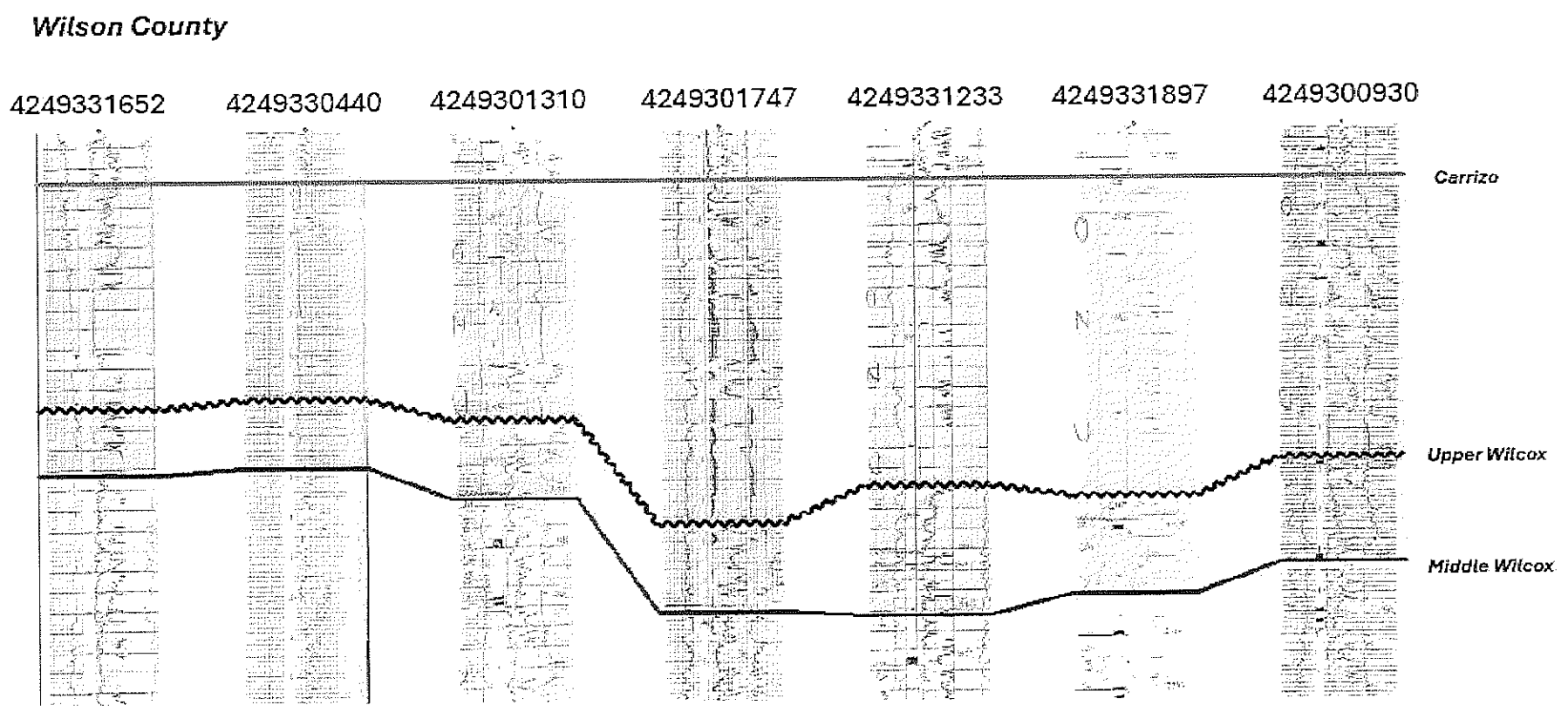


Figure B-3. Annotated Geophysical Logs for Wison County showing stratigraphic and lithologic picks.

Karnes County

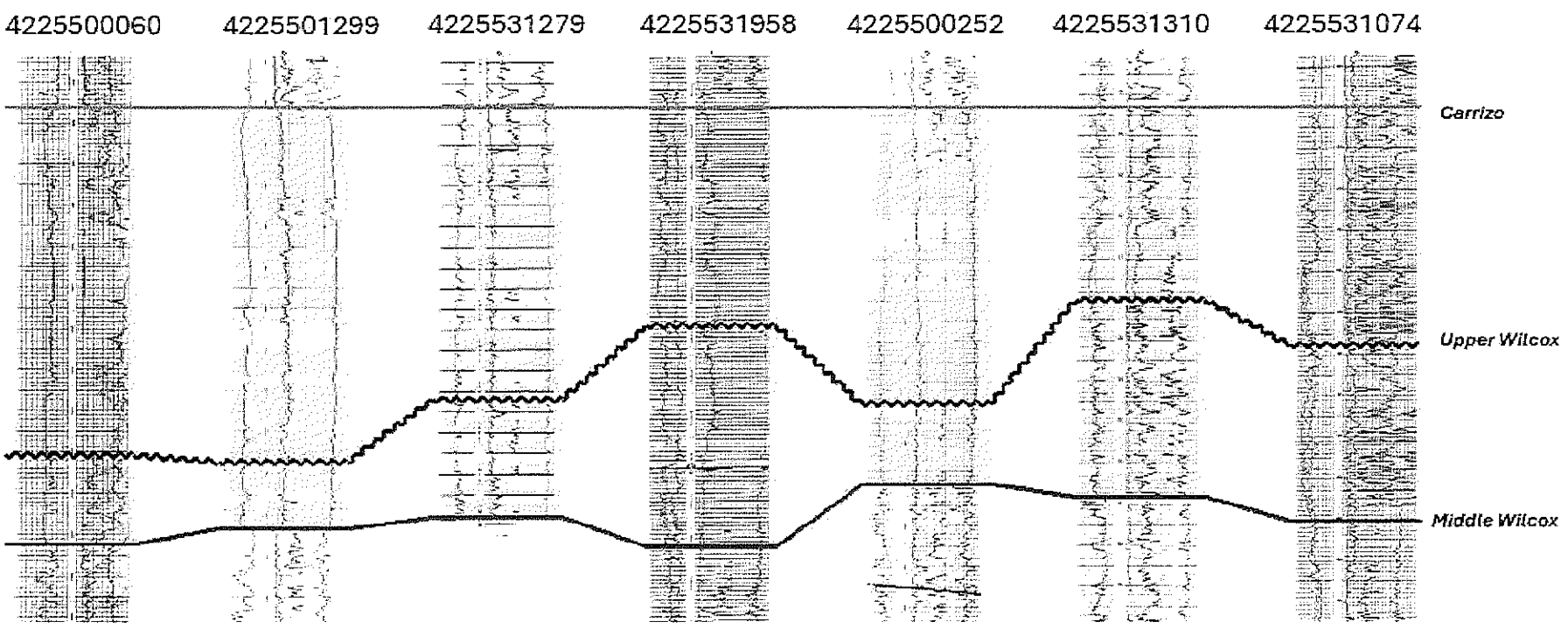


Figure B-4. Annotated Geophysical Logs for Karnes County showing stratigraphic and lithologic picks.

RECEIVED FEB 19 2025

R W HARDEN &ASSOCIATES INC
GROUNDWATER RESOURCE PROFESSIONALS
9009 Mountain Ridge Dr • Suite 100 • Austin Texas 78759 • ph (512) 345-2379

February 18, 2025

Daryn Hardwick, Ph.D., CTCM
Manager of Groundwater Modeling
Texas Water Development Board (TWDB)
1700 North Congress Ave.
Austin, Texas 78711

Re: Comments on the Updated Southern Carrizo-Wilcox Groundwater Availability Model

Dear Mr. Hardwick,

R. W. Harden & Associates, Inc. (RWH&A) has performed a preliminary evaluation of the updated Southern Carrizo-Wilcox-Queen City-Sparta Groundwater Availability Model (GAM). RWH&A provides comments on the model files posted on the TWDB website (https://gw-models.s3.amazonaws.com/Download_GAMs/czwx_s/czwx_s_update_GMA13_ModelFiles.zip). In addition, RWH&A reviewed the report documenting the original version of the model submitted to the TWDB by GSI Environmental and Dr. Hutchinson in 2023, and the report generated by Dr. Hutchinson in 2024 describing the changes made during the recent GAM update:

- **Original GAM Report:** Final Numerical Model Report: Update to the Groundwater Availability Model for the Southern Portion of the Queen City, Sparta, and Carrizo-Wilcox Aquifers (January 2023)
- **Updated GAM Report:** Documentation of GMA 13 Model: Update to Groundwater Availability Model for the Southern Portion of the Carrizo-Wilcox, Queen City, and Sparta Aquifers (September 2024)

RWH&A provided comments on the original version of the GAM in August 2022 that primarily focused on extreme transmissivity values and unreasonably low specific yield values applied to the Carrizo Formation (Carrizo) throughout the model domain. The comments herein focus on four issues: a) inappropriately low specific yield values, b) modeled water level increases during a period of recorded water level decline, c) inappropriate model pumpage assignment, and d) inaccurate transmissivity values applied to the Carrizo in the northeastern portion of the GAM.

UNREASONABLY LOW SPECIFIC YIELD VALUES

The specific yield values applied to the GAM remain unrealistically low. As described in the Updated GAM Report, Dr. Hutchinson increased the specific yield values in portions of some outcrop areas from 0.005 to 0.1 in response to public comments. While this is a modest improvement, a specific yield of 0.1 is still only a fraction of specific yield values documented in numerous hydrogeologic

texts and literature. For example, the Original GAM Report specifically references the following in its discussion of specific yield:

> *Lohman, S. W., 1972, Ground-Water Hydraulics, Geologic Survey Professional Paper 708.*

On page 8, Lohman writes: "the specific yield of most unconfined aquifers ranges from about 0.1 to about 0.3 and averages about 0.2.", which is consistent with other documented values for beds of unconsolidated quartz sand that comprise the majority of the aquifers modeled by the GAM. It should be noted that the highest value of specific yield applied by Dr. Hutchinson corresponds to the minimum value discussed by Lohman, while the majority of the aquifer cells in the GAM are assigned a specific yield of 0.005, which is 1/40th of the average value estimated by Lohman.

On pages 21 and 22 of the Updated GAM Report, Dr. Hutchinson states that a specific yield of 0.1 is appropriate for cells that represent thinner areas of clean sand, while a specific yield of 0.005 is suitable for thicker aquifer beds with a greater potential for interbedded clays. It is unclear how Dr. Hutchinson arrived at this conclusion or the associated specific yield value, but they are incorrect for two reasons:

1. Specific yield expresses a property of the aquifer material itself, not the hydrogeologic structure or environment. The specific yield of clastic (sand-based) aquifer materials is closely related to porosity. The porosity of an aquifer sand is the fraction of the total volume of the material that is comprised of void spaces between the individual sand grains. Assuming that the void spaces are occupied by groundwater, specific yield is the portion of the porosity that can be drained under the influence of gravity (some water will adhere to the sand grains and is not drained). Neither the porosity nor specific yield of aquifer sands changes significantly with the depth or thickness of aquifer beds. While compression of the aquifer skeleton does occur at-depth, and is the primary source of confined (artesian) aquifer storage, the volumes expressed by this effect are orders of magnitude smaller than the volume described by specific yield.
2. A bulk specific yield value of 0.005 is not possible when assuming that the total saturated thickness of an aquifer is made up of interbedded sand and clay layers. As discussed above, numerous sources have stated that an average specific yield of about 0.2 (20%) is appropriate for unconsolidated aquifer sands. The specific yield of clay-rich sediments typically ranges up to about 0.005 to 0.02 (0.5%-2%). Given these values, the only mixture of sand and clay that can result in a bulk aquifer composition represented by a specific yield of 0.005 is to assume that the aquifer is comprised of 100% clay, which is obviously not reasonable.

In short, a specific yield value of 0.005 is not appropriate for any cell in the model unless it is intended to represent a homogenous clay matrix. Neither the Original GAM Report nor the Updated GAM Report discuss how a value of 0.005 was selected, but it may be that Dr. Hutchinson was operating under a common misconception encountered by RWH&A in past discussions with colleagues about the meaning of aquifer storage parameter values derived from pumping test data. The root of the misconception is that calculation of storage coefficient (specific yield – storativity) values from the results of testing of wells completed in semi-confined sands in or near outcrop areas will often result in hybrid values ranging between fully confined (typically ranging from 0.00001 to 0.001) and

unconfined (typically ranging from 0.1 to 0.25). While a hybrid storage coefficient (such as 0.005) may be calculated from pump test data, it is not correct to assume that it describes the properties of the sand beds comprising the aquifer. The hybrid values occur because the cone of depression transmitted outward from the well is interacting with both confined and unconfined portions of the aquifer. The hybrid values are not, as implied by Dr. Hutchinson in the Updated GAM Report, representative of any reduction of the bulk porosity or concomitant specific yield in thicker outcrop zones or in downdip, confined zones.

Figures 1 and 2 show the model conditions associated with the Carrizo and Upper Wilcox (Layer 7). As discussed above, Dr. Hutchinson only applied increased specific yield values (0.1) in updip portions of some outcrop zones; consequently, the GAM uses a specific yield of 0.005 to calculate water table declines in many areas. In the last period (2017 – Stress Period 38) simulated by the GAM, water table declines are calculated using a specific yield value of 0.005 in more than 2,900 model cells covering approximately 650,000 acres. The water table cells in which drawdown values are inappropriately calculated using a specific yield value of 0.005 are shown with red dots on Figures 1 and 2. It is important to note that the number of cells using a specific yield value of 0.005 to calculate water table declines will increase in future versions of the GAM as stress periods and pumpage are added to simulate aquifer responses after 2017.

Also shown on Figures 1 and 2 are a) cells with water levels below the base of the cell, which are essentially "dry" cells and b) cells that contain simulated wells whose pumpage was automatically reduced by MODFLOW in an attempt to prevent water levels from declining below the base of the cell. As shown, there are a significant number of dry cells in the Carrizo outcrop that do not correspond to real-world aquifer desaturation, which suggests that the hydraulic properties applied to the model cells are not appropriate.

MODFLOW calculates changes in water table levels in a model cell by calculating the difference in the volumes input and output from the cell. The volume of water in cells assigned a specific yield of 0.005 is approximately 40 times less than would result when using a reasonable value of specific yield. Consequently, the use of unrealistically low specific yield values results in significant overprediction of water table drawdown.

On pages 22 through 25 of the Updated GAM Report, Dr Hutchinson describes a series of calculations, assumptions, and simulations leading to the conclusion that a forty-fold reduction in specific yield value does not result in a forty-fold reduction in calculated aquifer storage. As discussed above, specific yield is an intrinsic property of the aquifer materials that is not significantly changed by aquifer saturated thickness or depth. It is simply a representation of the drainable portion of the total volume of aquifer materials. Assigning a specific yield that is forty times smaller than a reasonable specific yield value to model cells comprising an aquifer must result in a Total Estimated Recoverable Storage (TERS) volume that is approximately 1/40th of the actual aquifer storage volume. For example, as the GAM is currently configured, the total storage within the Carrizo (Layer 7) in GMA-13 is approximately 31.5 million acre-feet. When a new version of the GAM is run in which the specific yield of the Carrizo is set uniformly to 0.2, the calculated aquifer storage is about 1.17 billion acre-feet, which represents about a 36-fold increase in storage.

WIDESPREAD SIMULATED WATER LEVEL RISE

Over the majority of the model footprint, the GAM predicts rises in Carrizo water levels during the interval between 1981 and 2007, which is not supported by water level measurements. During this interval, simulated water level recovery occurs in about 85% of the cells comprising the Carrizo footprint in the GAM. Water level increases ranging from 10 feet to more than 300 feet occur in approximately 67% of Carrizo model cells. Figure 3 shows the areas with maximum simulated recovery, which occurred in 2007 (Stress Period 28). During the same period, recorded water level measurements are generally either stable or show declines throughout most of the Carrizo in GMA-13. For reference, pages 78-82 of the Original GAM Report include hydrographs of several wells in the model domain that show water level drawdown over the interval during which the GAM simulates extensive recovery.

While it is expected that the accuracy of model results will vary on a site-specific basis, the widespread inconsistency between the generally stable or declining water levels recorded in Carrizo wells and the generally increasing water level trend in the GAM over a 27-year historical period calls into question the reliability of the calibration process and the potential usefulness of the GAM in future regional planning and permitting considerations.

IMPROPER MODELED PUMPAGE ASSIGNMENT

Original GAM Report states that, because the locations and amounts of pumpage were not provided to the modeling team by most of the groundwater conservation districts in GMA-13 at the time of model construction, pumpage was treated as a calibration parameter in the model. In other words, model pumpage locations and amounts were not assigned according to historical pumpage records or, in many cases, actual well locations. Rather, model pumpage was distributed during the calibration process by manual adjustment by the model builder and through the use of automatic model calibration/parameter estimation software.

Treating model pumpage as a parameter to be adjusted during calibration may be justified for some areas of GMA-13 where well information and pumpage records do not exist; however, it is not appropriate to ignore available groundwater use data when assigning pumpage to the GAM or any other groundwater model. This is especially true for areas such as the Gonzales County Underground Water Conservation District (GCUWCD) where large-scale groundwater production has occurred for many years and is expected to increase in the future.

On page 41 of the Updated GAM Report, Dr. Hutchinson states:

> *"All county-layer units had some adjustment except Gonzales County in Carrizo-Upper Wilcox or Middle Wilcox layers for the initial GMA 13 Model pumping estimates. Ms. Laura Martin-Preston, General Manager of Gonzales County UWCD confirmed via email on June 17, 2024 that the "new GAM" pumping estimates in Gonzales County appeared to be correct."*

A cursory review of the distribution of modeled pumpage versus the locations of existing large-scale municipal well fields in Gonzales County reveals that the Carrizo (Layer 7) pumpage in the GAM is not consistent with available data maintained by the TWDB or GCUWCD. Figure 4 shows pumpage

inputs for the GAM in 2017 as red circles, pumpage recorded by the GCUWCD as tan circles, and the locations of registered Carrizo wells as small black triangles. In addition, Figure 4 contains a chart showing the amount of groundwater assigned to the GAM versus the reported production by the three major municipal well fields in 2017:

1. Canyon Regional Water Authority (CRWA)
2. San Antonio Water System (SAWS)
3. Scherz-Seguin Local Government Corporation (SSLGC)

As shown, more than 25,000 acre-feet per year (ac-ft/yr) was produced by the CRWA, SAWS, and SSLGC well fields but only a small amount of GAM Carrizo pumpage is actually assigned to the well field areas. It should also be noted that, in numerous instances, pumpage was added to model cells that do not contain registered Carrizo wells.

Fundamentally, model calibration is the process of adjusting model parameters to obtain better agreement between simulated water levels and measured water levels. Because modeled pumpage generally affects simulated water levels to a greater extent than any other model parameter, a GAM that is "calibrated" using water levels produced by inaccurate pumpage distribution and scheduling will inevitably produce inaccurate results.

INACCURATE TRANSMISSIVITY

The transmissivity applied to the Carrizo aquifer model layer (Layer 7) in/near large municipal well fields in the northeastern portion of the GAM does not accurately reflect available pump test data. Figure 5 plots contours of the distribution of Carrizo transmissivity in the GAM in units of gallons per day per foot (gal/day/ft). In general, the modeled transmissivities are a fraction of the values derived from aquifer tests and result in significant overprediction of drawdown associated with the major pumpage centers in Gonzales, Guadalupe, and Caldwell Counties. Table 1 compares the average transmissivities derived from production well pump testing data to the Carrizo transmissivity applied to the model cells containing wells comprising each well field.

Table 1: Measured versus Modeled (Layer 7) Average Carrizo Transmissivity

Well Field	*Measured Transmissivity (gal/day/ft)*	*Modeled Transmissivity (gal/day/ft)*	*Modeled/ Measured Ratio*	*Potential Over - Prediction*
Alliance Regional Water Authority (ARWA)	72,000	15,500	21.5%	4.6 X
Canyon Regional Water Authority (CRWA)	46,000	4,900	10.7%	9.4 X
Guadalupe Blanco River Authority (GBRA)	90,000	42,000	46.7%	2.1 X
San Antonio Water System (SAWS)	78,000	81,800	104.8%	1.0 X
Scherz-Seguin Local Gov. Corp. (SSLGC)	148,000	28,300	19.1%	5.2 X

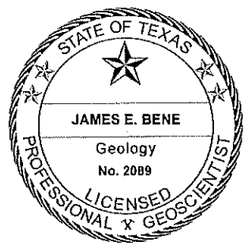
With the exception of the SAWS well field, the modeled transmissivities applied to the major well field areas range from about 11% to 47% of the values calculated from aquifer test data, which results in over-prediction of drawdown due to pumpage from the well fields. The amount of potential overprediction varies by site, with no significant excess drawdown associated with the SAWS well field to more than a nine-fold overprediction of drawdown resulting from the CRWA wells.

RWH&A thanks you for the opportunity to review and provide comments on the draft GAM. A common aphorism states that 'all models are wrong, but some are useful', which essentially means that some models can provide valuable insights even if the results are not entirely accurate. Unfortunately, we believe that the GAM, as currently configured, is unacceptably flawed and is not useful for regulatory and/or state water planning applications.

The GMA-13 stakeholders rely on the expertise of the TWDB modeling staff to identify and enforce the high standards needed to ensure that the GAM can successfully perform the important roles intended for it. We hope that our observations and the feedback you receive from others will help the TWDB focus on the aspects of the GAM that should be modified to improve its potential accuracy and usefulness. Please let us know if you have questions or would like clarification of the issues discussed above.

Sincerely,

James Bené, P.G.
R. W. Harden & Associates, Inc.



The seal appearing on this document was authorized by James E. Bené, P.G. 2089 on February 18, 2025. R.W. Harden & Associates, Inc. TBPG Firm No. 50033.

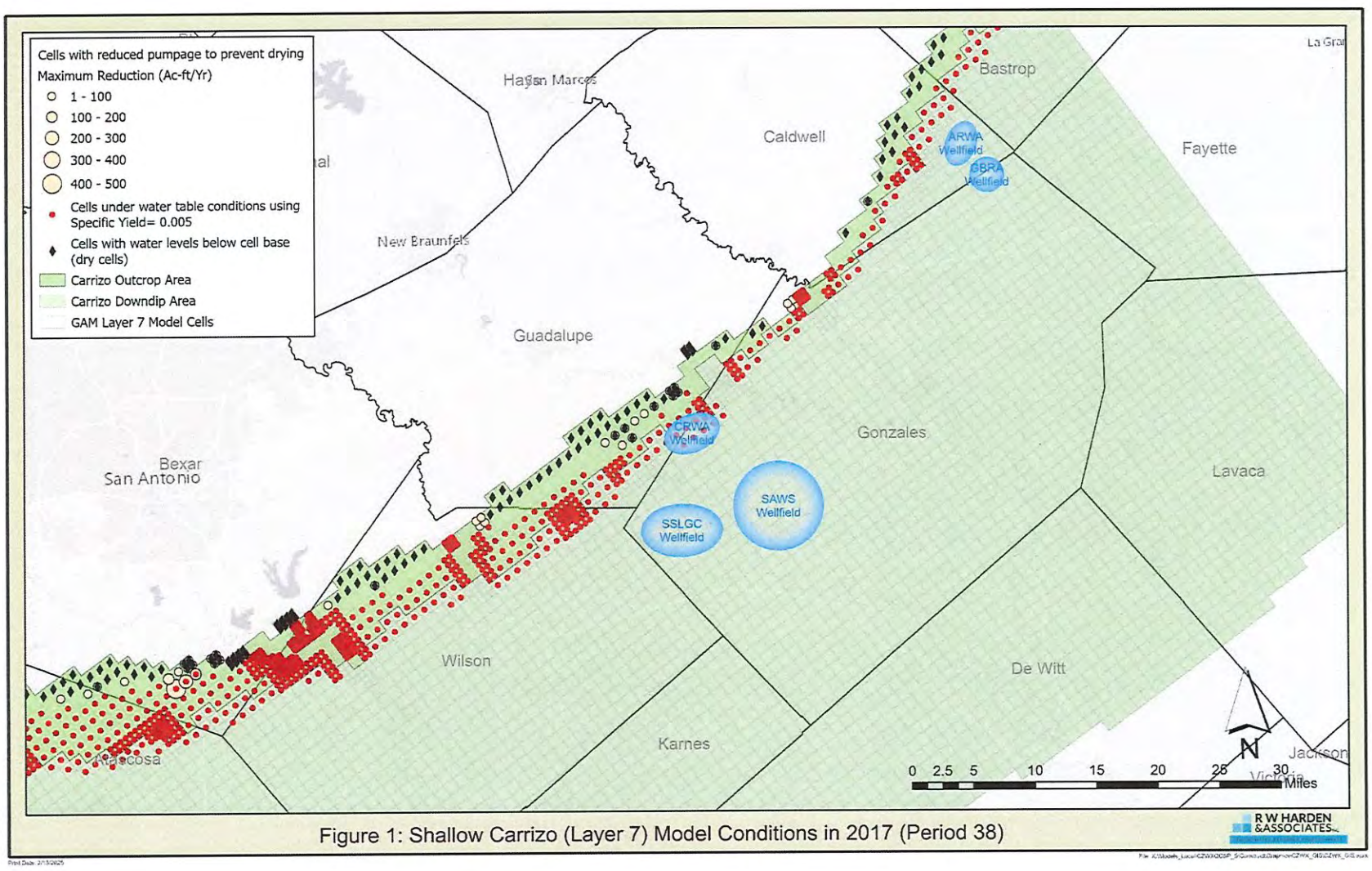


Figure 1: Shallow Carrizo (Layer 7) Model Conditions in 2017 (Period 38)

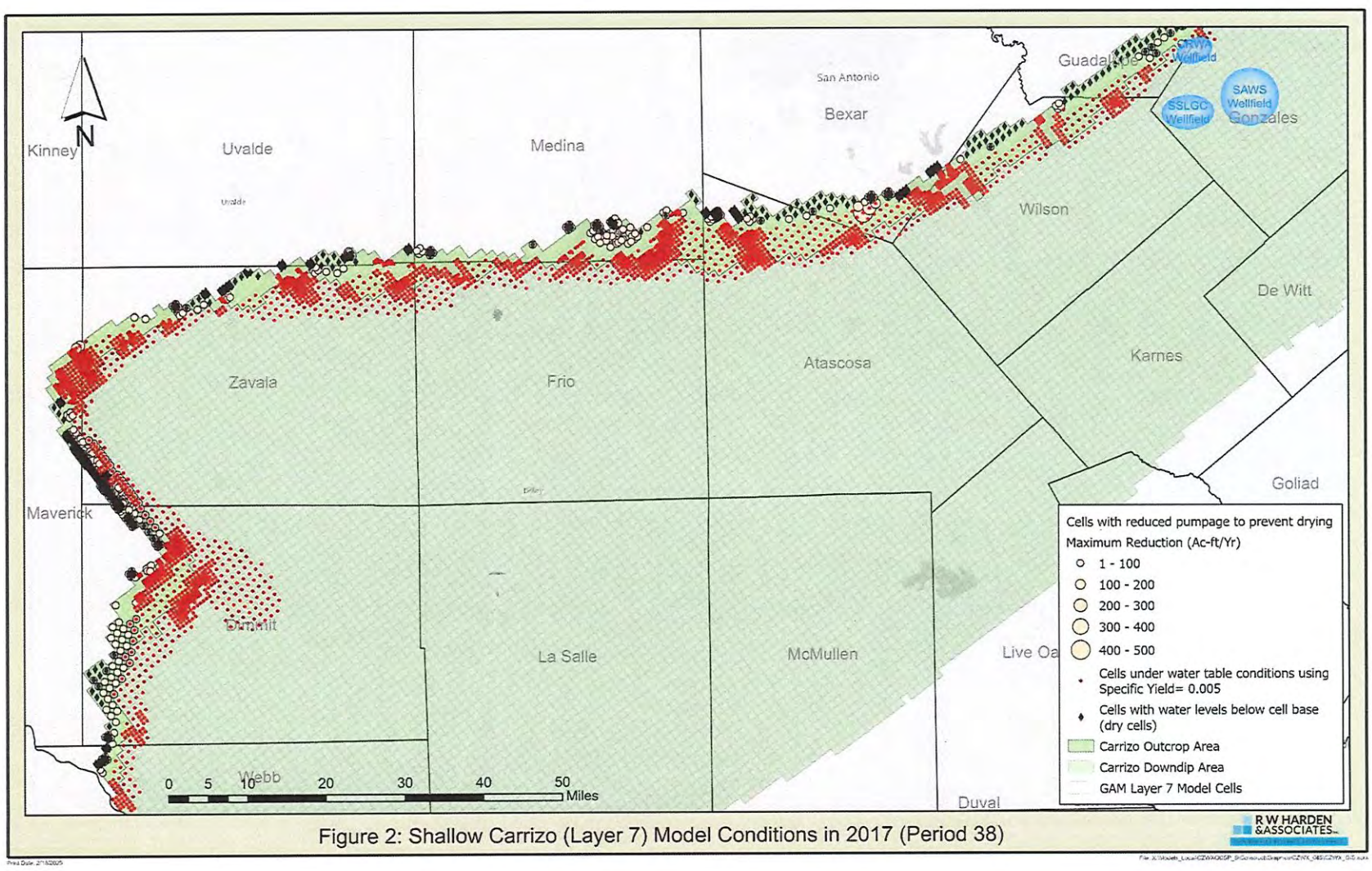


Figure 2: Shallow Carrizo (Layer 7) Model Conditions in 2017 (Period 38)

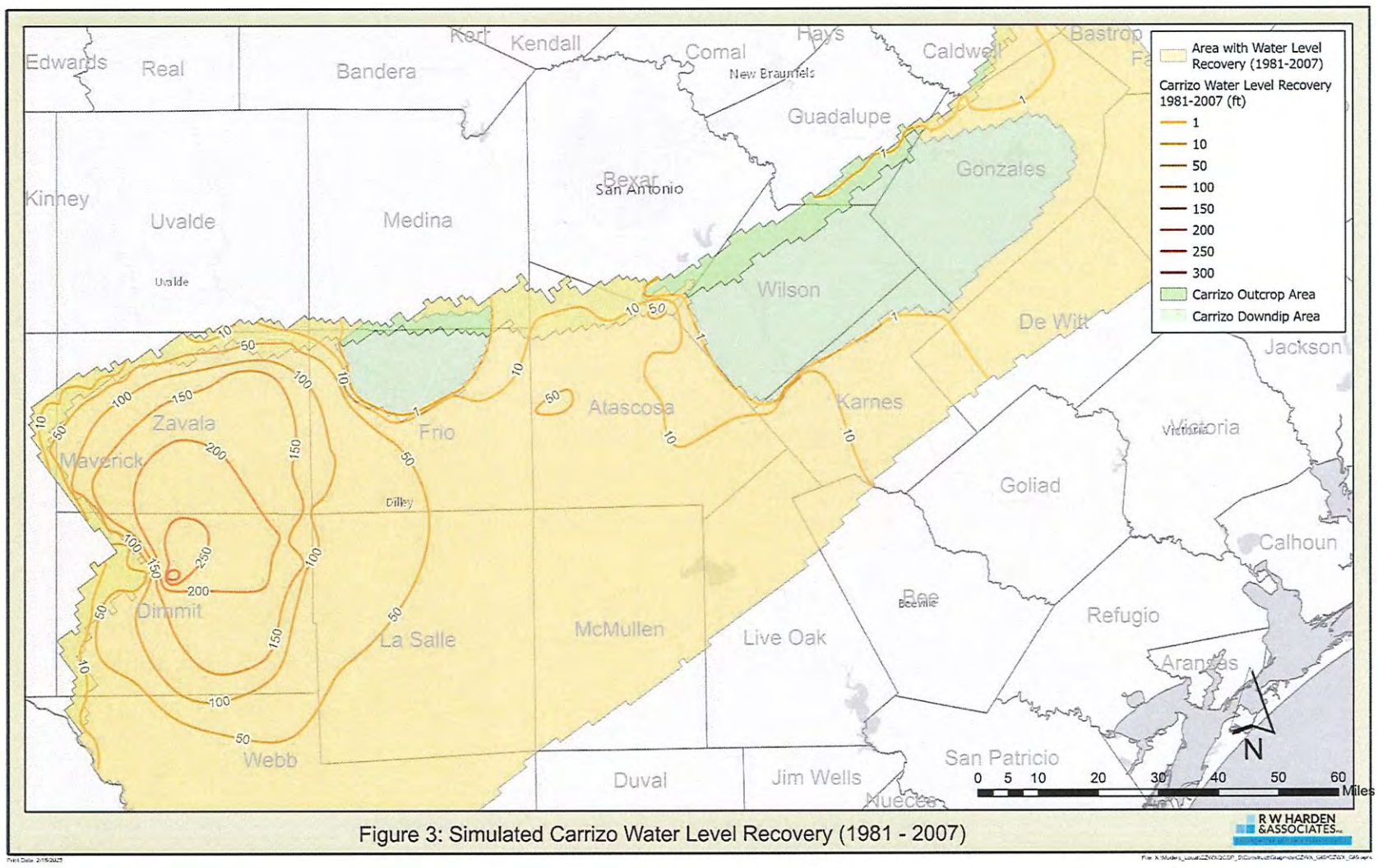


Figure 3: Simulated Carrizo Water Level Recovery (1981 - 2007)

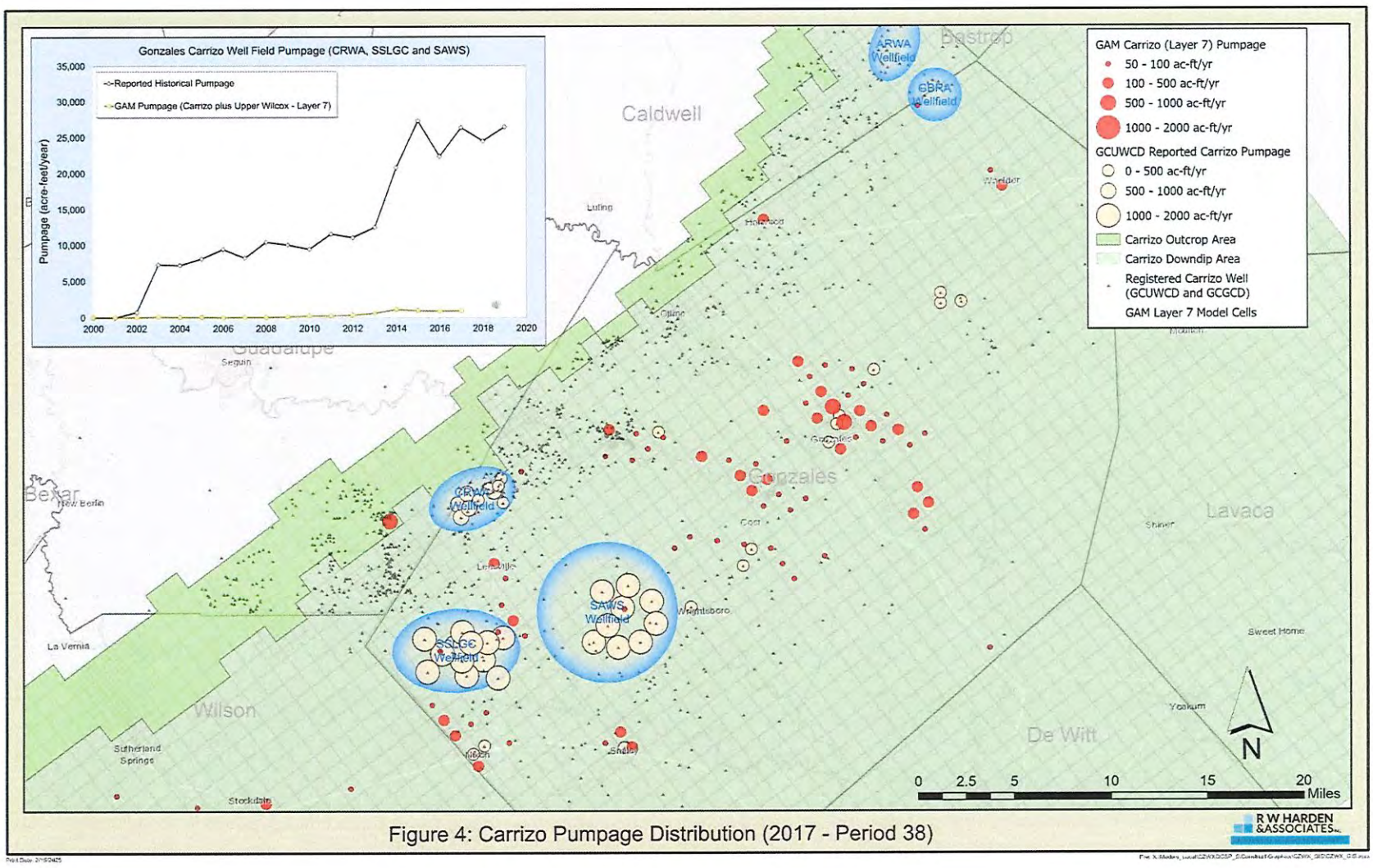


Figure 4: Carrizo Pumpage Distribution (2017 - Period 38)

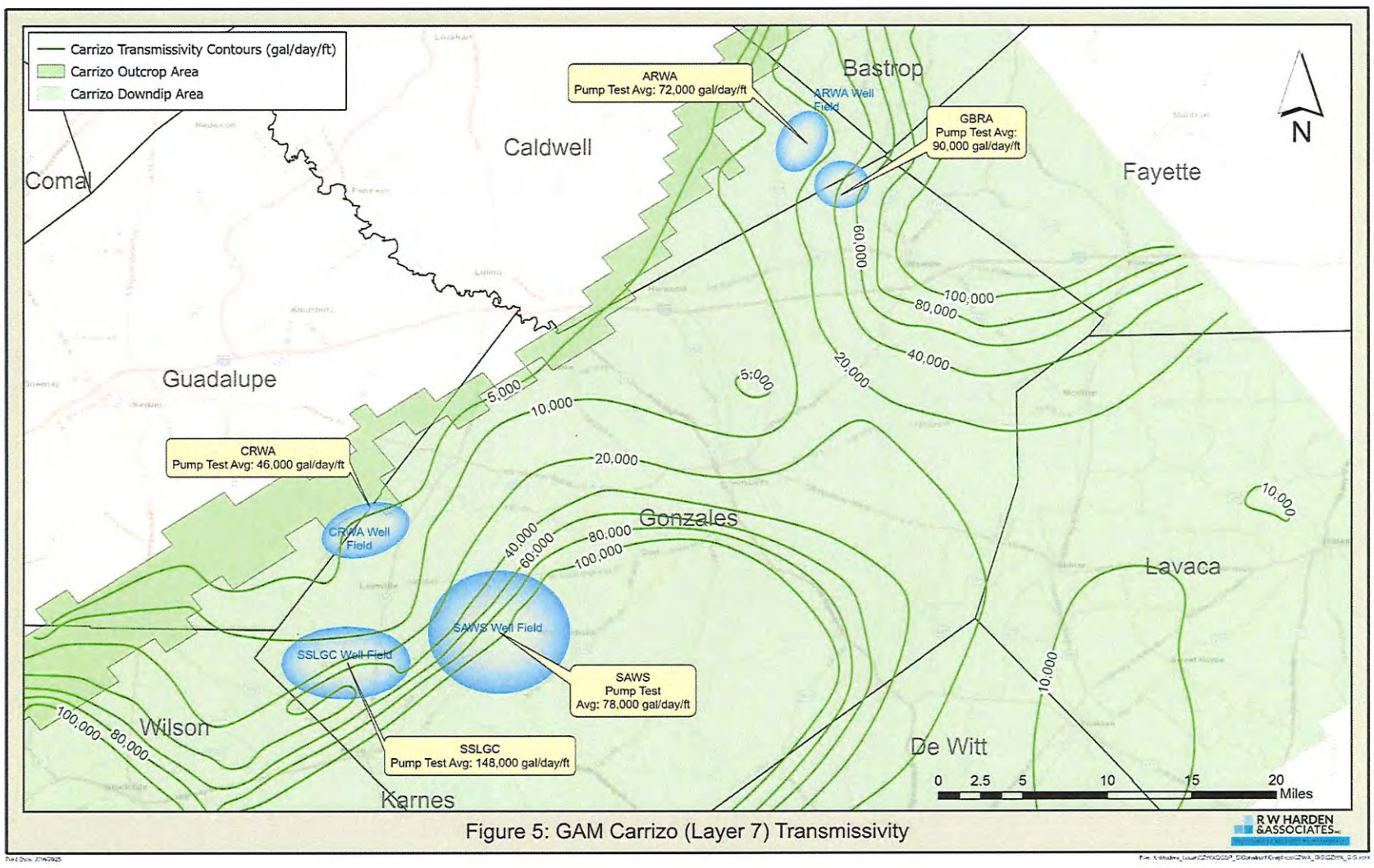


Figure 5: GAM Carrizo (Layer 7) Transmissivity

RECEIVED FEB 25 2025

February 18, 2025

Via Email

Ms. Laura Martin
General Manager
Gonzales County UWCD
522 Saint Matthew Street
Gonzales, Texas 78629

Re: Proposed Revisions to the Gonzales County Underground Water Conservation District Rules

Dear Ms. Martin:

San Antonio Water System (SAWS) appreciates the opportunity to comment on the District's proposed amendments to the District's Rules discussed during the January 18, 2025 workshop. The workshop reviewed draft DFCs simulated based upon the updated Southern Carrizo-Wilcox, Queen City and Sparta Groundwater Availability Model (GAM) for the Gonzales County Underground Water Conservation District. At the workshop, DBS&A provided a technical presentation relating simulated and measured water levels in monitoring wells located in the outcrop of the Carrizo Aquifer.

As concurrent regional water planning efforts are ongoing at this time in both the setting of Desired Future Conditions (DFC's) and the drafting of the 2026 Region L Plan, SAWS believes the District's rules should provide flexibility in the management of the District's water resources.

SAWS has provided previous written comments on the proposed rules dated June 11, 2024 and August 13, 2024. SAWS asks the Gonzales County Underground Water Conservation District (GCUWCD) to consider the following when deliberating Proposed Rule 19 Monitoring and Regulation Under Desired Future Conditions.

Measuring Compliance with the Desired Future Condition

- For the simulations, DBS&A modified GCUWCD pumping for the predictive runs. 2018-2024 pumping was based on pumping reported to the district. No pumping prior to 2018 was changed. Pumping outside of the Gonzales County UWCD was not changed for the predictive runs.

- The presentation noted that the 2017 pumping included in the GAM (from the historic calibration data set) does not reflect reported pumping for the Gonzales County UWCD. DBS&A fixed it for 2018-2024 but noted that the pumping data that was poorly incorporated in the calibration period may result in issues during the predictive runs. It should be noted that if the calibration incorporated inaccurate pumping data, the calibration may also be compromised to some degree.

- Existing permitted pumping such as SAWS and SSLGC would be included in Scenario 1 if they were appropriately included in the historic calibration pumping file, and therefore should be included in all model runs, presumably at 2024 pumping levels.

- The significant increases in pumping Scenario 3 (compared to Scenario 1) were GBRA (15,000 afy), ARWA (16,000+ afy), Gonzales (3,000 afy), Aqua (5,000 afy), Nixon (3,000 afy) and EOG (2,000 afy).

- DBS&A compared the model results to water levels measured in the 10 monitoring wells located in Guadalupe and Gonzales Counties that were installed in the outcrop to monitor water levels for comparison to DFCs. A 2012 water level was generated for each of these monitor wells, even though the wells did not exist in 2012. It is unclear how the 2012 water levels were developed.

- DBS&A ran three pumping scenarios:
  1. 2024 pumping annually through 2080;
  2. Scenario 1 + Canyon Regional full permitted amount; and
  3. Scenario 1 + full permitted amounts for all permits. Note that DBS&A assumed no "ramp up" of pumping for the permitted volumes.

- In some wells, the simulated water levels in the model were below the bottom of the model cell in the GAM.

- The measured water levels are often significantly different from the water levels simulated by the GAM. This is not a surprise given the nature of a GAM cell vs. observed data in an individual well.

- Scenario 3 results indicate the largest impact to simulated water levels in the northern portion of Gonzales County north due to permitted pumping in that area.

- Generally, the GAM does reasonably well for simulating observed water levels in monitor wells 1, 3, 5, 7, and 9.

- The GAM does reasonably well with the trend, but not the absolute value of the water level for monitor wells 2, 6, 8, and 10.

- Monitor Well 4 is very poorly simulated.

- Simulated water levels are always at or lower than measured water levels. They are not higher.

- The base elevation of the Carrizo in the GAM is significantly different from the measured data for wells 1, 4, 6, 8, and 9.

- Much of the lower portion and even some of the shallow portion of the Carrizo outcrop has a specific yield of 0.005, including cells that include the outcrop monitoring wells MWCZ-5, MWCZ-6, and MWCZ-9. Using a specific yield of 0.005 will yield only a fraction of the groundwater as when a more typical value of 0.15 is used. This results in higher simulated impacts in the outcrop due to pumping. This dynamic is shown clearly in Scenario 3 in the wells near the GBRA and ARWA projects where a significantly lower specific yield will result in increased predicted drawdowns.

- All simulated water levels fall below the DFC by 2080 for Scenario 3 (full permits).

- The presentation concluded saying that the new GAM is an improvement but a lot more improvements could be done.

Observations and Recommendations

1. The impact of low specific yield values assumed in the updated GAM should be reviewed more closely, especially in areas where significant water level declines are expected to occur.

2. GAM nodes that contain a specific yield of 0.005 should be assessed to determine if the nodes convert from confined to unconfined conditions during predictive simulations. The relatively low specific yield may have significant impacts on water level declines in those areas.

3. The structure of the Carrizo Aquifer in the outcrop areas should be reviewed to ensure that it is relatively consistent with the hydrogeologic data near the outcrop monitoring wells. If the model will be used to simulate impacts in the outcrop, significant refinement and re-calibration may be required.

4. The current GMA 13 DFC for the Carrizo-Wilcox Aquifer is: 75 percent of saturated thickness in the outcrop at the end of 2012 remains at the end of 2080. The presentation by DBS&A did not provide any observed water level data in the Wilcox Aquifer nor were the simulated water levels discussed. Compliance with Carrizo-Wilcox Aquifer outcrop DFCs should be determined by assessing observed water levels in monitoring wells in the outcrop of the Carrizo and the Wilcox aquifer units.

5. The GAM documentation should include a discussion of the limitations of using the GAM to simulate outcrop water level declines that are outside the range of outcrop water levels observations used to calibrate the GAM.

6. Prior to making far-reaching policy decisions based on the simulation results in the outcrop of the Carrizo-Wilcox Aquifer using the GAM 13 GAM, the GAM should be further verified. The structure and hydraulic properties in the GAM should be more refined in the outcrop zone of the Carrizo and Wilcox aquifer layers in the model.

Thank you for the opportunity to provide these comments.

Sincerely,

Donovan Burton
Sr. Vice President
Water Resources & Governmental Relations

cc: Hope Wells, Vice President, Legislative & Regulatory Affairs
Linda Bevis, Director, Water Resources
Steven Siebert, Manager, Water Resources
Jennifer Windscheffel, Senior Corporate Counsel

Public Comment on Documentation of GMA 13 Model dated September 23, 2024

Submitted to: Texas Water Development Board (TWDB) and Groundwater Management Area 13 (GMA 13)

Date: February 20, 2025

I submit this public comment on the GAM Update for GMA 13 – Final.pdf ("GAM Update") as a deeply frustrated landowner within the Gonzales County Underground Water Conservation District (GCUWCD). My family farm at 2984 FM1296, Waelder, TX, is encircled by massive groundwater production projects, including the Guadalupe-Blanco River Authority (GBRA) well field in the District's northeast corner. Despite protests from myself and other local landowners, the District has permitted these projects, threatening our aquifers, family farms, ranches, and small towns. The GAM Update, while part of regional planning, is grossly inadequate in addressing these crises and fails to protect those it should serve. Below, I detail its shortcomings, the District's reckless permitting, and the broader failures of the TWDB and GCUWCD, drawing from my experiences and correspondence.

1. Irresponsible Permitting Amid GAM Revision

   It is unconscionable that the GCUWCD has approved permits for such vast volumes of groundwater to be transported—over half the District's Modeled Available Groundwater (MAG)—while the GAM remains in a state of revision. The GAM Update reflects ongoing refinements to modeling assumptions, yet the District has issued permits to transporters like GBRA (15,000 acre-ft/yr, plus a requested 9,000 more) and the Alliance Regional Water Authority (ARWA, 11,620 acre-ft/yr) with reckless abandon, not the caution this uncertainty demands. Historically, the District has rubber-stamped transporter permits without regard for sustainability, a practice that must end. The GAM Update should address this glaring problem and provide a model that is proven reliable and ensures that permitted volumes align with actual aquifer capacity rather than outdated, speculative or experimental MAGs.

2. Failure to Address Localized Impacts of Concentrated Well Fields

   The GAM Update's broad, regional approach—averaging drawdowns across GMA 13—obscures the severe local impacts of concentrated well fields like GBRA's near my farm. Over half the District's MAG is extracted from less than 1% of its area, with GBRA's 7 wells and ARWA's permits causing deep drawdowns that reach across unleased properties like mine. The GAM Update's reliance on averages is a sham, hiding "hot spots" where aquifers face detrimental impacts due to heavy pumping by transporters. My emails (e.g., February 18, 2025) cite the Daniel B. Stephens study showing Carrizo aquifer drawdowns exceeding Desired Future Conditions (DFCs) soon, not decades away. The GAM Update must include localized modeling of well fields to expose and mitigate these impacts, not mask them.

3. No Modeling for Subsidence Risks

   The GAM Update lacks subsidence modeling for heavily pumped areas. TWDB's Natalie Ballew (December 4, 2024) claims no resources exist for monitoring and subsidence isn't expected in GMA 13. This is a cop-out. With projected drawdowns of 183 feet near GBRA's well field (per prior studies I've submitted), the risk is real, yet no baseline or predictive data is provided. Subsidence threatens land stability for farms like mine, and the GAM Update's omission leaves us defenseless. Subsidence modeling and monitoring must be mandated for major well fields.

4. No Assessment of Water Quality Degradation

   The GAM Update ignores potential water quality degradation from excessive pumping. TWDB's Groundwater Quality Program is too broad to address project-specific impacts (Ballew, December 4, 2024), and while Gonzales District Rule 20 requires permit holders to assess quality, enforcement is doubtful. Heavy Carrizo aquifer pumping near my farm could degrade water for drinking and irrigation, yet the GAM Update offers no analysis or protections. Project-specific water quality modeling is essential and must be included.

5. Inadequate Mitigation Planning and Funding

   The GAM Update fails to model future well mitigation needs for impacted landowners and towns. TWDB points to the Gonzales District's mitigation fund (Ballew, December 4, 2024), but the mitigation fund has major shortcomings such as lack of funds, significantly limited scope such as excluding small towns in the Gonzales District, and an unfair priority system that puts agriculture wells at the bottom of the list. With permits exceeding the MAG, the Gonzales District has not shown to have a plan or funds to aid locals facing deeper wells or water loss. The GAM Update must require detailed mitigation modeling, not just provide a document to support pumping more groundwater out of rural areas to the cities.

6. The Unaddressed "Taking" of Groundwater from Uncompensated Landowners

   The GAM Update sidesteps the "taking" of groundwater from unleased properties like mine, where GBRA's pumping causes significant drawdowns without compensation. GBRA profits by selling our water, yet we bear the burden. My February 18, 2025 email notes heavier drawdowns on unleased lands than leased ones—a fundamental inequity. The GAM Update must quantify this extraction and propose compensation, not enable this theft with state funds being used to install yet more pipe and facilities to pump our the rural areas.

7. Permitting Beyond the MAG and Stranded Infrastructure Risks

   The Gonzales District's approval of permits far exceeding the MAG—evidenced by the Stephens study and my correspondence—is unsustainable but not addressed in the GAM. The GAM Update accepts this overreach without critique, despite TWDB's claim that MAGs are just "one consideration" (Ballew, December 4, 2024). This has led to outrageous permitted volumes that the Carrizo aquifer cannot support long-term. Assets built to transport this water—funded by state resources—risk becoming underutilized or stranded, leaving Texas taxpayers with worthless investments akin to California's groundwater mismanagement debacles. The GAM Update must cap permits to the transporters at sustainable yields and assess infrastructure viability to prevent this fiscal and environmental disaster. The local water end users that live within

the Gonzales District should not have to buy their own water back from the transporters such as GBRA, SAWS, CRWA and others so they can supply their own farms and ranches or towns within the district.

8. No Socioeconomic Impact Analysis

   The GAM Update excludes socioeconomic studies of impacts on family farms, ranches, and towns. My November 20, 2024 email asked for such analysis, only to be told it's not TWDB's role. This is indefensible when state funds support projects draining rural areas for urban gain. The GAM Update should quantify costs—lost well productivity, mitigation expenses, and property value declines—and propose protections.

9. Bureaucratic Failures and Lack of Transparency

   My emails document a bureaucracy dodging accountability. I requested GMA 13 and Region L comment period notices (February 18, 2025), finding none online, suggesting opacity. TWDB responses (e.g., Ballew's delays and deflections) evade substantive answers, pointing me to open records requests or the District. The GAM Update process must enhance transparency and responsiveness.

Conclusion

The GAM Update is a superficial tool that fails to protect Gonzales County's aquifers and residents. Its regional lens hides local devastation, and its omissions—subsidence, water quality, mitigation, and groundwater "takings"—abandon us to unsustainable pumping. The Gonzales District's reckless permitting amid GAM revisions and the risk of stranded infrastructure amplify this crisis. The TWDB and GMA 13 along with the Gonzales County Underground Water Conservation District should revise the GAM Update to address the concerns that I have raised.

Sincerely,

Ted Boriack

2984 FM1296

Waelder, TX 78959

361-443-2547

tedboriack@gmail.com

Attachments:

- Boriack email exchanges with TWDB on groundwater modeling
- DRAFT Jan 18 Work Shop Presentation.pdf (Daniel B. Stephens study)
- Wells to Plug.pdf (Gonzales County Underground Water Conservation District wells to inspect for possible plugging)
- GBRA well logs 1 thru 7 GCUWCD.pdf

Fwd: Public Comment Period on GMA 13 and State Water Plan

1 message

Ted Boriack <tedboriack@gmail.com> Tue, Feb 18, 2025 at 3:42 PM
To: kimberly.rhodes@twdb.texas.gov

fyi -- hopefully email correct this time

---------- Forwarded message ---------
From: **Ted Boriack** <tedboriack@gmail.com>
Date: Tue, Feb 18, 2025 at 3:40 PM
Subject: Public Comment Period on GMA 13 and State Water Plan
To: Kelley@GCGCD.org <kelley@gcgcd.org>, General Manager <generalmanager@gcuwcd.org>, Gregory M. Ellis <greg@gmellis.law>, Natalie Ballew <Natalie.Ballew@twdb.texas.gov>, john.dupnik@twdb.texas.gov <John.Dupnik@twdb.texas.gov>, <billhutch@texasgw.com>, <kimberley.rhodes@twdb.texas.gov>
Cc: Michael Vallee <Michael.Vallee@senate.texas.gov>, <john.wenske@house.texas.gov>

Hi All,

Please receive this as public comment to GMA13, Regional L, and any other state planning process that would include Gonzales County Underground Water Conservation District (GCUWCD).

Kelley -- we talked the other day about the public comment period for GMA13. You mentioned that public comment was open on the latest round of GMA13 study.
I have looked at the GCUWCD website, the GMA13 website, the RegionL website, and the TWDB website -- I can't find any public notice for GMA13 material being open for public comment.
To avoid any confusion -- I am asking that somebody please send me the official public notice for the current round of applicable GMA13 materials, and a copy of the GMA13 material which is now available for public comment.
I would also like to have the current materials open for public comment for Region L or any other TWDB planning materials that would include the Gonzales County Underground Water Conservation District, along with the public comment period info.

I want to raise concern about the massive permitting of Carrizo groundwater by the GCUWCD -- see attached news articles that I wrote.

https://gonzalesinquirer.com/stories/wpa-urges-better-efforts-to-preserve-groundwater,124284?

https://gonzalesinquirer.com/stories/water-protection-association-fighting-to-protect-gonzales-countys-groundwater-surface-water,121652?

Attached is a groundwater modeling study that the GCUWCD recently had performed by Daniel B Stephens -- it shows Carrizo aquifer permits well in excess of the MAG. It also shows simulated drawdowns below the DFCs occurring in the near future, not decades away.

The GCUWCD at the same time issued a hefty list of wells to be inspected for possible plugging -- with no written explanation from GCUWCD as to who is behind this or what the plan is. It appears the GCUWCD is underway to plug as many local-use wells as possible to free up permit capacity for their transporter friends, will see how all that plays out, but usually the locals lose and the transporters win. The GCUWCD has no mitigation plan or funds for the public supply wells that serve the small towns located within the GCUWCD boundary.

To make a bad situation worse, GBRA is now requesting another 3 wells and 9,000 acre-ft/yr from the Carrizo aquifer, in addition to the 7 wells and 15,000 acre-ft/yr already permitted. Further, ARWA already has 11,620 acre-ft/yr permitted in the same area as GBRA. This means more than half the district's MAG is produced by two concentrated well fields in an area less than 1% of the district area. This is a disaster for the family farms and ranches around this area, the drawdowns are deep and reach far across unleased farms and ranches. There are many properties that have not leased to GBRA which have much heavier drawdowns due to GBRA pumps than the drawdowns on the GBRA leased

properties. This is not right -- the pumping effects should be felt by those getting paid. Further, the Carrizo wells of the leased landowners should be plugged to avoid production and local use of water that has been sold for transport. The GBRA groundwater project is not fair to the landowners of Gonzales County, but apparently that didn't stop it from being pushed forward by GBRA.

I don't see how any legitimate groundwater plan can allow for such massive permitting in excess of the MAG, with no subsidence study, no socioeconomic impact study of the family farms and ranches impacted by the transporter well fields, no well mitigation study or plan for the impacted towns, no modeling of potential impacts on groundwater quality, and no analysis on the volumes taken from the unleased properties. The TWDB needs to explain why state funds are being used to fund this massive taking of groundwater from family farms and ranches in Gonzales county. It would seem to be a fundamental requirement that state funds would only be used for legitimate projects that are sustainable and not based on taking groundwater from farms and ranches without compensation. Further, the TWDB needs to stop trying to mask the impacts of the groundwater pumping by applying only average drawdown, but also look at the local impacts and limit drawdowns at individual wells. Averaging extremely concentrated pumping across a large area is not kidding anyone, the drawdowns are way too severe and need to be reduced and spread out.

I ask the TWDB state water planning bureaucracy and GCUWCD to work on water conservation and sustainability -- instead of the same old drain the family farm without paying approach.

Sincerely,

Ted Boriack
2984 FM1296
Waelder TX 78959
361-443-2547

3 attachments

DRAFT Jan 18 Work Shop Presentation.pdf
1307K

Wells to Plug.pdf
168K

GBRA well logs 1 thru 7 GCUWCD.pdf
3466K

Re: Groundwater modeling in Gonzales County

1 message

Natalie Ballew <Natalie.Ballew@twdb.texas.gov> Wed, Dec 4, 2024 at 12:46 PM
To: Ted Boriack <tedboriack@gmail.com>

Hi Mr. Boriack,

Thank you for your patience with my response. I learned more about the GBRA and Alliance Regional Water Authority's partnership on this project and its funding history at the TWDB from our Regional Water Project Development team for my own awareness. If you would like to see any of the project documents we have on file, such as the engineering feasibility studies, please send an open records request to publicinfo@twdb.texas.gov. A tip on these requests is to include enough description and detail of the requested information so we can accurately identify and locate the requested items.

Regarding your list of questions, they are mostly outside the purview of the TWDB Groundwater Division and the TWDB generally and are more appropriate for the district, but here are some responses, nonetheless.

- Subsidence monitoring:
  - The TWDB does not currently have the resources to install or maintain subsidence monitoring equipment due to lack of resources
- Water quality monitoring:
  - Our Groundwater Quality Program cycles through sampling sites across the state every four years and is intended to characterize the natural quality of groundwater and any changes that may have occurred broadly over time. We do not specifically monitor impacts from large production projects, though changes may be captured in the sites we monitor.
  - Gonzales County UWCD collects water samples annually and keeps an eye on any changes that may warrant further investigation (according to their website).
  - Additionally, according to Gonzales County UWCD's rules (Rule 20), they require permit holders for large well field projects to provide water quality assessments from at least two production wells to assess changes in water quality that may be attributed to the large-scale pumping project. And the district may restrict production if that well field is responsible for degrading water quality, among other actions. Please consult with the district on the applicability of this rule for this specific project.
- Modeling assessments vs. observed drawdown:
  - Your questions related to assessing project-specific modeled drawdown vs. observed drawdown, repercussions for exceeding any project-specific modeled drawdown, and assessing impacts to adjacent wells and land are outside the scope of TWDB Groundwater programs. The TWDB has no regulatory authority. However, if any new data is acquired, such as water levels after the project comes online or transmissivity data from pump tests during project development, we will incorporate that where we can in our regional groundwater availability model.
  - For large well fields, Gonzales County UWCD's Rule 10, Section E requires a model assessment based on a TWDB groundwater availability model from an applicant and the district engages a qualified and independent third party to confirm the modeling. Please consult with the district on the applicability of this rule for this specific project and how they assess observed vs. any modeled drawdowns.
- Socioeconomic impact studies:
  - To my knowledge, the TWDB has not performed any specific socioeconomic impact studies related to this project. As you know, socioeconomic impacts are one of the considerations for districts during desired future conditions development. A few districts in Texas have contracted specific socio-economic impact studies to assess similar situations.
- Mitigation measures:
  - Any mitigation measures are implemented by districts, and Gonzales County UWCD has a mitigation fund.
- Permitted production vs. MAGs
  - MAGs are just one permit consideration for districts, in addition to production from exempt wells, actual production, and seasonal precipitation and production patters. It is up to the district to manage groundwater production on a long term basis to achieve adopted desired future conditions.

-Natalie

From: Natalie Ballew <Natalie.Ballew@twdb.texas.gov>
Sent: Monday, November 25, 2024 8:27 AM
To: Ted Boriack <tedboriack@gmail.com>
Subject: RE: Groundwater modeling in Gonzales County

Mr. Boriack,
As I stated before, I would like to consult with some other program areas at the TWDB who may be more familiar with this specific project than Daryn or I are before providing a full response to your questions. I offered the public info email as another avenue for you to get documents

related to your questions faster than I will be able to formulate responses to your questions.

I will loop in Daryn when necessary. Many of your questions are out of the scope of his team's duties, which, as you know, is to develop regional groundwater models for use by groundwater conservation districts in their future planning.

-Natalie

From: Ted Boriack <tedboriack@gmail.com>
Sent: Friday, November 22, 2024 12:37 PM
To: Daryn Hardwick <Daryn.Hardwick@twdb.texas.gov>; Natalie Ballew <Natalie.Ballew@twdb.texas.gov>
Subject: Fwd: Groundwater modeling in Gonzales County

Daryn -- you need to be in the loop on these issues, don't try to punt away this groundwater disaster in the making.
Ted Boriack
361-443-2547

---------- Forwarded message ---------
From: **Ted Boriack** <tedboriack@gmail.com>
Date: Fri, Nov 22, 2024 at 12:34 PM
Subject: Re: Groundwater modeling in Gonzales County
To: Natalie Ballew <Natalie.Ballew@twdb.texas.gov>

Natalie,

Appears to be a bureaucratic delay tactic -- no useful info in your reply.

Ted Boriack
361-443-2547

On Fri, Nov 22, 2024 at 11:55 AM Natalie Ballew <Natalie.Ballew@twdb.texas.gov> wrote:

> Mr. Boriack,
> If you need a response in a shorter timeframe than what I will be able to provide, please submit your public information request to publicinfo@twdb.texas.gov.
>
> Cheers,
> Natalie
>
> **Natalie Ballew**, P.G. (she/her)
> Groundwater Director
> Email: natalie.ballew@twdb.texas.gov
> Phone: 512-463-2779
> Cell: 512-765-0532
>
> Texas Water Development Board
> 1700 N. Congress Ave.
> Austin, Texas 78701
>
> **From:** Ted Boriack <tedboriack@gmail.com>
> **Sent:** Thursday, November 21, 2024 4:02 PM
> **To:** Natalie Ballew <Natalie.Ballew@twdb.texas.gov>
> **Cc:** Daryn Hardwick <Daryn.Hardwick@twdb.texas.gov>
> **Subject:** Re: Groundwater modeling in Gonzales County
>
>

Natalie,

Thanks for your reply -- I really need some answers on this massive pumping in Gonzales county in such a concentrated area -- there is no way this is in any way a good approach to managing the aquifer resource.

Get back to me as soon as you can, to ignore is to provide a "don't really care" response.

Meanwhile I will be exploring other options for analyzing this tragic project -- I think the days of state geoscientists stamping such horrendous projects as if they couldn't be questioned is coming to an end with AI and much greater knowledge.

If the TWDB is going to include such projects in the region or state plan, it should be fully evaluated, not included then pointing the finger to the conservation district to do the detailed analysis -- that's a joke, it doesn't work.

Looking forward to your reply with some meaningful responses -- thanks,

Ted Boriack
361-443-2547

On Thu, Nov 21, 2024 at 3:52 PM Natalie Ballew <Natalie.Ballew@twdb.texas.gov> wrote:

> Hi Mr. Boriack,
> Thanks for reaching out to us again. I would like to consult with some other program areas at the TWDB who may be more familiar with this specific project than Daryn or I are before providing a full response to your questions. It may take a bit of time to collect those responses, but I wanted to acknowledge your email.
>
> Please stay tuned for a follow up email. I'll do my best to get you something before Tuesday next week, but it may be after the Thanksgiving holiday.
>
> Cheers,
> Natalie
>
> **Natalie Ballew**, P.G. (she/her)
> Groundwater Director
> Email: natalie.ballew@twdb.texas.gov
> Phone: 512-463-2779
> Cell: 512-765-0532
>
> Texas Water Development Board
> 1700 N. Congress Ave.
> Austin, Texas 78701
>
> **From:** Ted Boriack <tedboriack@gmail.com>
> **Sent:** Wednesday, November 20, 2024 2:43 PM
> **To:** Daryn Hardwick <Daryn.Hardwick@twdb.texas.gov>
> **Subject:** Re: Groundwater modeling in Gonzales County
>
> External: Beware of links/attachments.
>
> Daryn,
>
> I am following up on my earlier questions about groundwater modeling in Gonzales County.
>
> Neither the GCUWCD or GBRA or their experts have performed the detailed groundwater modeling to assess potential subsidence, decline in water quality, potential damage to the aquifer.
>
> Since the GBRA project is apparently in the state water plan and receiving state funding -- does the TWDB actually intend to move forward with the GBRA project in the state water plan even though the various groundwater models and technical assessments have not yet been performed?

Does the TWDB plan to install subsidence monitoring to establish a baseline and then monitor the impacts of the GBRA pumping? if not then why not?

Does the TWDB plan to monitor the impacts on water quality from the GBRA pumping? if not then why not?

Does the TWDB plan to perform groundwater modeling assessment by comparing the actual drawdown vs the modeled GBRA drawdown?

If the actual drawdown exceeds the GBRA modeled water drawdown then what will the TWDB do about it?

Also, has the TWDB performed any socio-economic impacts studies on the family farms and ranches in Gonzales county that will have their land pumped out by GBRA per the state plan? I am referring to the impact on the landowners, family farms and ranches -- not the benefit to the cities for enjoying the cheap water taken from the agriculture lands without payment.

Has the TWDB modeled the number of agriculture water wells that will require mitigation due to the GBRA project?

What is the cost of the well mitigation that will be required due to the GBRA project?

How much water will the GBRA project take from land that is not leased to the GBRA project?

The GCUWCD has permitted well over the MAG amount by now -- what is the impact of permitting ground water in excess of the MAG?

What will be the impact on the Carrizo aquifer in the area of highest drawdown? Can the TWDB guarantee that the aquifer and landowners adjacent to this pumping will not be damaged?

If the GBRA pumping results in damage to the aquifer, subsidence, well mitigation, reduction in water quality, etc -- then what will the state do with the facilities that caused the damage?

Does the state water plan include compensation to all the landowners that are having their groundwater taken by the state?

Please let me know,

Sincerely,

Ted Boriack
2984 FM1296
Waelder TX 78959
361-443-2-547

On Thu, Aug 3, 2023 at 3:44 PM Ted Boriack <tedboriack@gmail.com> wrote:

> Hi Daryn,
>
> Thanks for your prompt reply, much appreciated.
>
> Regards,
>
> Ted
>
> On Wed, Jul 26, 2023 at 2:05 PM Daryn Hardwick <Daryn.Hardwick@twdb.texas.gov> wrote:
>
> > Hi Ted,
> >
> > Please see my responses in blue below:
> >
> > Daryn Hardwick, Ph.D.
> > Manager of Groundwater Modeling
> > Texas Water Development Board
> > E: daryn.hardwick@twdb.texas.gov
> > P: (512) 475-0470

From: Ted Boriack <tedboriack@gmail.com>
Sent: Wednesday, July 26, 2023 6:43 AM
To: Daryn Hardwick <Daryn.Hardwick@twdb.texas.gov>
Subject: Groundwater modeling in Gonzales County

Hi Daryn,

Attached is an extract from a groundwater project planned for Gonzales county -- the maps show large wells and closely spaced. The last page of the attachment shows future drawdown of 183ft.

Has the TWDB run any models to ensure the proposed pumping will not impact the aquifer recharge capacity and future groundwater availability? I am not referring to average drawdown across the entire district which shows a relatively minor impact, I am referring to modeling the wellfield at the permitted pumping rates to evaluate the local impact on the aquifer where the pumping is occurring. The concern is local damage to the aquifers at the pumping locations.
No. The TWDB does not perform model runs to assess local impacts of wells or well fields. We only run models at a regional scale as part of the joint groundwater planning process and at a district-level to provide average annual water budget information. If Gonzales County GCD accounted for this project's planned pumping during the 2021 round of joint planning for GMA 13, then those pumping values would be incorporated into the predictive modeling scenarios and the desired future condition explanatory report. That report and model files can be found here: https://www.twdb.texas.gov/groundwater/dfc/2021jointplanning.asp. Because the TWDB takes the pumping inputs (distribution and volume) provided by districts during joint planning, we are unable to say whether this specific project was included in their assessment of desired future conditions.

If such modeling is outside TWDB's scope, then what entity is responsible for running such models to ensure the aquifers are not damaged by excessive pumping?
Groundwater conservation districts are required to consider whether a proposed use of water unreasonable affects existing groundwater and surface water resources or existing permit holders (Texas Water Code Section 36.113(d)(2)). Districts perform this assessment in different ways. For large well fields, Gonzales County GCD's Rule 10, Section E requires a model assessment based on a TWDB groundwater availability model from an applicant and the district engages a qualified and independent third party to confirm the modeling. Please consult with the district on the applicability of this rule for this specific project.

Has the TWDB run any models on subsidence for these areas? If not then what is TWDB's criteria for evaluating or even considering subsidence? If the TWDB is not the entity responsible for running subsidence models, then who is?
No, we have not run any models on subsidence in this area. Subsidence has not been documented in this area. According to the GMA 13 explanatory report, subsidence isn't expected to become an issue in GMA 13 given the predicted water level declines associated with desired future conditions, the aquifer characteristics in the area, and the tools available to assess subsidence impacts.

During development of the southern portion of the Queen City, Sparta and Carrizo-Wilcox aquifers groundwater availability model, an assessment of subsidence was not conducted because the model did not indicate large groundwater drawdowns from increased pumping. Most all groundwater availability models are not equipped to model subsidence due to a lack of data to calibrate the model to.

GCDs are required create management objectives and standards to control and prevent subsidence in their groundwater management plan. When Gonzales County GCD updates its 5-year plan, they will need to

reference TWDB Subsidence Study that analyzed the vulnerability of aquifers to subsidence and document how their management strategies address the risk factor of their aquifers. If the district determines this is not an applicable goal, they will explain why in their management plan.

Does TWDB take into account the impact of degrading water quality from the aquifers over time due to high pumping rates and dropping aquifer levels? As the water quality degrades over time due to high pumping rates, will the TWDB reduce the MAG to stop degradation of water quality? If the TWDB is not the entity responsible for evaluation of water quality, then who is?
The TWDB does not model changes to water quality due to future pumping. By statute, TWDB groundwater availability models must quantify: 1) the amount of groundwater being used within the district on an annual basis; 2) the annual amount of recharge from precipitation, if any, to the groundwater resources within the district; 3) the annual volume of water that discharges from the aquifer to springs and any surface water bodies, including lakes, streams, and rivers, for each aquifer; and 4) the annual volume of flow into and out of the district within each aquifer and between aquifers in the district. MAG values are derived from the GAM based on the desired future conditions of the aquifer defined by the districts within a GMA.

According to Gonzales County GCD's rules (Rule 20), they require permit holders for large well field projects to provide water quality assessments from at least two production wells to assess changes in water quality that may be attributed to the large-scale pumping project. And the district may restrict production if that well field is responsible for degrading water quality, among other actions. Please consult with the district on the applicability of this rule for this specific project.

I would appreciate the opportunity to discuss when you get a chance.

Best regards,

Ted Boriack
2984 FM1296
Waelder TX 78959
361-443-2547

Gonzales County Underground Water Conservation District
Mitigation Report
February 2025

On February 1st, 2025, I went to the Parker Location in Ottine to set solar pump

On February 3rd, 2025, I went to Parler Location in Ottine to set solar panels

On February 3rd, 2025, I met Lesters in Belmont at well location for possible mitigation

On February 4th, 2025, Met Wagner well at Lesters location in Belmont

On February 4th, 2025, Lester well location in Belmont to check progress of drilling

On February 5th, 2025, Lester well location in Belmont to check progress of drilling

On February 5th, 2025, Lester well location in Belmont to check progress of drilling

On February 6th, 2025, Lester well location in Belmont set casing, gravel pack, seal well

On February 6th, 2025, Lester well location in Belmont to Jet Well

On February 7th, 2025, I went to Lester Location, Wagner's set solar Panels

On February 8th, 2025, I went to Lester Location, Wagner's set solar Panels

On February 10th, 2025, I met Bruce Patteson, at Smiley Well Location, possible well mitigation

On February 11th, 2025, I met Wagner's Well at Bruce Patteson location in Smiley set solar pump

On February 12th, 2025, I met Wagner's Well at Bruce Patteson location in Smiley set solar panel

On February 12th, 2025, Met mark Ploeger at well location in Oak Forest to discuss mitigation

On February 13th, 2025, Met mark Ploeger at well location in Oak Forest

On February 14th, 2025, Met Mark Ploeger at well location in Oak Forest

On February 17th, 2025, Met Mark Ploeger & Matt Friedel at Belmont to discuss well mitigation

On February 18th, 2025, Went to Gicon Pump in San Antonion to discuss Ploeger pump options

On February 21st, 2025, Went to Ploeger Well in Belmont to check on well work progress

On February 22nd, 2025, Went to Ploeger Well in Belmont to check on well work progress

On February 24th, 2025, Went to Ploeger Well in Belmont Friedel Pulling Turbin Pump

On February 25th, 2025, Went to Ploeger Well in Belmont Friedel Pulling Turbin Pump

On February28th, 2025, Met Wagner's Well to discuss mitigation work

Gonzales County Underground Water Conservation District
Field Technician Report
February 2025

On February 3rd, 2025, I found a water well in the pasture of 3412 CR 42, Wealder, took measurements

On February 4th, 2025, I visited Conoco-Phillips wells in Gonzales

On February 4th, 2025, I found an inactive well at 21021 Hwy 80, in Gonzales, took measurements

On February 4th, 2025, I found an inactive well in a pasture on the East side of HWY 80, Gonzales, took measurements

On February 5th, 2025, I went to the Joe Perez well in Leesville and took measurements

On February 6th, 2025, I found an open, hand dug well at 20121 Hwy 80 approximately 48" in diameter and 78' deep. No water evident, took measurements

On February 6th, 2025, I went to Timm/Deharde well at Lot #19 Flash Circle in Patriot Settlement on Hwy 80, took measurements. Also found a hand dug well 36" in diameter covered

On February 6th, 2025, I found an inactive well on the West side of Hwy 80, took measurements

On February 6th, 2025, Inactive Well in pump house on West side of Hwy 80, took measurements

On February 14th, 2025, I visited new well work at J-BAR-B plant Waelder took coordinates

On February 17th, 2025, I took measurements at windmill well in pasture on East side of FM 1296 Waelder, took measurements

On February 17th, 2025, I found an inactive Well in a pasture on the North side of CR 444, Wealder and took measurements

On February 17th, 2025, I found an inactive Well in a pasture on the East side of CR 444, Wealder and took measurements

On February 17th, 2025, I found an inactive Well in pasture at end of CR 444, Wealder and took measurements

On February 18th, 2025, I visited Well#1 East Bowman (Southern Livestock), took measurements

On February 18th, 2025, I visited Well#2 West, took measurements

On February 18th, 2025, I visited Talley Ranch, 1781 FM 466 N. inactive pasture well, took measurements

Gonzales County Underground Water Conservation District
Field Technician Report
February 2025

On February 21st, 2025, Obtained Well Stats at 4207 CR 444 Waelder, Rawlings Well, took measurements. Attended weekly meeting at GCUWCD

On February 24th, 2025, I visited Wilbur Benes at 223 CR 242 and took Water Levels

On February 24th, 2025, I visited Vaughn residence well, 4023 CR 421 Gonzales, took measurements

On February 24th, 2025, I visited CR 412, Gonzales, Hand Dug well in pasture on N. side open top, took measurements

On February 24th, 2025, I found an inactive well on W. side of Hwy 97 North, took measurements

On February 25th, 2025, I took measurements at well on corner of PR 4681 and HWY 90A

On February 25th, 2025, I took measurements at Arron Arnold Well on Hwy 90A

On February 25th, 2025, I took measurements at pump house well on W. side 387 CR 468 Gonzales

On February 25th, 2025, I took measurements from pump house well on S. side PR 213

On February 25th, 2025, I took measurements on a well house on the W. side of the N. end of CR 258

On February 26th, 2025, I collected water quality samples along North Central Gonzales Co.

On February 27th, 2025, I collected water quality samples along North Central Gonzales Co.

On February 28th, 2025, attended weekly meeting at GCUWCD

GONZALES COUNTY
UNDERGROUND WATER CONSERVATION DISTRICT

Investment Policy

Original Adopted: September 1997

Revision 1.0 Adopted: September 13, 2011

Re-adopted: July 11, 2017

Re-adopted: July 10, 2018

Re-adopted: July 09, 2019

Re-adopted: July 14, 2020

Re-adopted: March 09, 2021

Re-adopted: March 08, 2022

Re-adopted: March 14, 2023

Re-adopted: March 12, 2024

TABLE OF CONTENTS

1.0 POLICY

It is the policy of the Gonzales County Underground Water Conservation District (District), through the District's Board of Directors (Board), that after allowing for the anticipated cash flow requirements of the District and giving due consideration to the safety and risk of investment, all available funds shall be invested in conformance with these legal and administrative guidelines seeking to optimize interest earnings.

Effective cash management is recognized as essential to good fiscal management. Investment interest is a source of revenue to District funds. The District's investment portfolio shall be designed and managed in a manner designed to optimize this revenue source, to be responsive to public trust, and to be in compliance with legal requirements and limitations.

Investments shall be made with the primary objectives of:

- Safety and preservation of principal;
- Maintenance of sufficient liquidity to meet operating needs;
- Public trust from prudent investment activities; and
- Optimization of interest earnings on the portfolio.

2.0 PURPOSE

The purpose of this investment policy is to comply with Chapter 36, Water Code, and Chapters 2256 and 2257, Government Code, ("Public Funds Investment Act" and "Public Funds Collateral Act," respectively), which requires each District to adopt a written investment policy regarding the investment of its funds and funds under its control. The Investment Policy addresses the methods, procedures and practices that must be exercised to ensure effective and judicious fiscal management of the District funds.

3.0 SCOPE

This Investment Policy shall govern the investment of all financial assets of the District. These funds are accounted for in the District's Comprehensive Annual Financial Report (CAFR) and include:

- General Fund
- Western Mitigation Fund
- Any new fund created by the District, unless specifically exempted from this Policy by the Board or by law.

Investment income will be allocated to the various funds based on their respective participation.

This Investment Policy shall apply to all transactions involving the financial assets and related activity for all the foregoing funds. This policy does not apply to the assets administered for the benefit of the District by outside agencies under deferred compensation programs.

4.0 INVESTMENT OBJECTIVES

The District shall manage and invest its cash with four primary objectives, listed in order of priority: safety, liquidity, public trust, and yield, expressed as optimization of interest earnings. The safety of the principal invested always remains the primary objective. All investments shall be designed and managed in a manner responsive to the public trust and consistent with state and local law.

The District shall maintain a comprehensive cash management program, which includes collection of account receivables, vendor payments in accordance with invoice terms, and prudent investment of available cash. Cash management is defined as the process of managing monies in order to insure maximum cash availability and maximum earnings on short-term investment of idle cash.

Safety [*PFIA 2256.005(b)(2)*]

Safety of principal is the foremost objective of the investment program. Investments shall be undertaken in a manner that seeks to ensure the preservation of capital in the overall portfolio. The objective will be to mitigate credit and interest rate risk.

- Credit Risk and Concentration of Credit Risk – The District will minimize credit risk, the risk of loss due to the failure of the issuer or backer of the investment, and concentration of credit risk, the risk of loss attributed to the magnitude of investment in a single issuer, by:

    - Limiting investments to the safest types of investments;
    - Pre-qualifying the financial institutions and broker or dealers with which the District will do business; and
    - Diversifying the investment portfolio so that potential losses on individual investments will be minimized.

- Interest Rate Risk – the District will manage the risk that the interest earnings and the market value of investments in the portfolio will fall due to changes in general interest rates by limiting the maximum weighted average maturity of the investment portfolio to 365 days. The District will, in addition,:

    - Structure the investment portfolio so that investments mature to meet cash requirements for ongoing operations, thereby avoiding the need to liquidate investments prior to maturity.
    - Invest operating funds primarily in certificates of deposit, shorter-term securities, money market mutual funds, or local government investment pools functioning as money market mutual funds.

- Diversify maturities and staggering purchase dates to minimize the impact of market movements over time.

Liquidity [*PFIA 2256.005(b)(2)*]

The investment portfolio shall remain sufficiently liquid to meet all operating requirements that may be reasonably anticipated. This is accomplished by structuring the portfolio so that investments mature concurrent with cash needs to meet anticipated demands. Because all possible cash demands cannot be anticipated, a portion of the portfolio will be invested in rolling maturities on certificates of deposits, shares of money market mutual funds, money market funds, and/or local government investment pools that offer same-day liquidity. In addition, a portion of the portfolio may consist of securities with active secondary or resale markets.

Public Trust

All participants in the District's investment process shall seek to act responsibly as custodians of the public trust. Investment officers must avoid any transaction that might impair public confidence in the District's ability to govern effectively.

Yield (Optimization of Interest Earnings) [*PFIA 2256.005(b)(3)*]

The investment portfolio shall be designed with the objective of attaining a market rate of return throughout budgetary and economic cycles, taking into account the investment risk constraints and liquidity needs. Return on investment is of secondary importance compared to the safety and liquidity objectives described above.

5.0 RESPONSIBILITY AND CONTROL

Delegation of Authority [*PFIA 2256.005(f)*]

In accordance with Chapter 36.1561, Water Code, and the Public Funds Investment Act, the Board designates the General Manager as the District's Investment Officer. The Investment Officer is authorized to execute investment transactions on behalf of the District. No person may engage in an investment transaction or the management of District funds except as provided under the terms of this Investment Policy as approved by the Board. The investment authority granted to the investing officer is effective until rescinded by the Board or immediately upon the Investment Officer's employment termination.

Quality and Capability of Investment Management [*PFIA 2256.005(b)(3)*]

The District shall provide periodic training in investments for the designated Investment Officers and other investment personnel through courses and seminars offered by professional organizations, associations, and other independent sources in order to ensure the quality and capability of investment management in compliance with the Public Funds Investment Act.

Training Requirement (*Chapter 36.1561*)

The Investment Officer of the District shall attend a training session of at least six hours of instruction relating to investment responsibilities under Chapter 2256, Government Code, not later than the first anniversary of the date the officer takes office or assumes the officer's duties. The Investment Officer shall attend at least four hours of additional investment training on or before the second anniversary of the last training session the officer attended. The investment training session shall be provided by an independent source approved by the Board. For purposes of this policy, an "independent source" from which investment training shall be obtained shall include a professional organization, an institution of higher education or any other sponsor other than a business organization with whom the District may engage in an investment transaction. The following organizations are specifically authorized as independent sources for training:

- Texas Alliance of Groundwater Districts
- Texas Water Conservation Association
- Association of Water Board Directors
- University of North Texas, Center for Public Management
- William P. Hobby Center for Public Service at Texas State University

Training under this section must include education in investment controls, security risks, strategy risks, market risks, diversification of investment portfolio, and compliance with Chapters 2256 and 2257, Government Code.

Internal Controls (*Best Practice*)

The General Manager is responsible for establishing and maintaining an internal control structure designed to ensure that the assets of the entity are protected from loss, theft, or misuse. The internal control structure shall be designed to provide reasonable assurance that these objectives are met. The concept of reasonable assurance recognizes that (1) the cost of a control should not exceed the benefits likely to be derived; and (2) the valuation of costs and benefits requires estimates and judgments by management.

Accordingly, the District's General Manager shall establish a process for annual independent review by an external auditor to assure compliance with policies and procedures. The internal controls shall address the following points:

- Control of collusion.
- Separation of transactions authority from accounting and record keeping.
- Custodial safekeeping.
- Avoid physical delivery of securities.
- Clear delegation of authority to subordinate staff members.
- Written confirmation for telephone (voice) transactions for investments and wire transfers.
- Development of a wire transfer agreement with the depository bank or third party custodian.

Prudence (*PFIA 2256.006*)

The standard of prudence to be applied by the Investment Officer shall be the "prudent investor" rule:

> "Investments shall be made with judgment and care, under circumstances then prevailing, which persons of prudence, discretion and intelligence exercise in the management of their own affairs, not for speculation, but for investment, considering the probable safety of their capital as well as the probable income to be derived."

In determining whether an Investment Officer has exercised prudence with respect to an investment decision, the determination shall be made taking into consideration:

- The investment of all funds, or funds under the District's control, over which the officer had responsibility rather than a consideration as to the prudence of a single investment; and
- Whether the investment decision was consistent with the written approved investment policy of the District.

Indemnification (*Best Practice*)

The Investment Officer may not be held personally responsible for a specific investment's credit risk or market price changes as long as the officer acted in accordance with written procedures and exercised due diligence, provided that the officer reports these deviations immediately and the appropriate action is taken to control adverse developments.

Ethics and Conflicts of Interest [*PFIA 2256.005(i)* and *Water Code 36.061(a)(1)*]

Officers and employees involved in the investment process shall refrain from personal business activity that would conflict with the proper execution and management of the investment program, or that would impair their ability to make impartial decisions. Employees and Investment Officers shall disclose any material interests in financial institutions with which they conduct business. They shall further disclose any personal financial or investment positions that could be related to the performance of the investment portfolio. Employees and officers are prohibited from undertaking personal investment transactions with the same person with whom business is conducted on behalf of the District.

An Investment Officer of the District who has a personal business relationship with an organization seeking to sell an investment to the District shall file a statement disclosing that personal business interest. An Investment Officer who is related within the second degree by affinity or consanguinity to an individual seeking to sell an investment to the District shall file a statement disclosing that relationship. A statement required under this subsection must be filed with the Texas Ethics Commission and the District Board.

6.0 SUITABLE AND AUTHORIZED INVESTMENTS

Portfolio Management

The District has a "buy and hold" portfolio strategy. Maturity dates are matched with cash flow requirements and investments are purchased with the intent to be held until maturity. However, investments may be liquidated prior to maturity for the following reasons:

- An investment with declining credit may be liquidated early to minimize loss of principal.
- Cash flow needs of the District require that the investment be liquidated.

Authorized Investments [*PFIA 2256.005(b)(4)(A)*]

District funds governed by this policy may be invested in the instruments described below, all of which are authorized by Chapter 2256 of the Government Code (Public Funds Investment Act). Investment of District funds in any instrument or security not authorized for investment under the Act is prohibited.

- Obligations of the United States of America, its agencies and instrumentalities.

- Certificates of Deposit issued by a depository institution that has its main office or a branch office in Texas. The certificate of deposit must be guaranteed or insured by the Federal Deposit Insurance Corporation or the National Credit Union Share Insurance Fund. Any funds held in excess of the amount insured shall be secured by obligations in a manner and amount as provided by law.

- Certificates of Deposit obtained through a depository institution or broker that has its main office or a branch office in Texas and that contractually agrees to place the funds in federally insured depository institutions in accordance with the conditions prescribed in Section 2256.010(b) of the Public Funds Investment Act.

- Money Market Mutual funds that: 1) are registered and regulated by the Securities and Exchange Commission, 2) have a dollar weighted average stated maturity of 90 days or less, 3) seek to maintain a net asset value of $1.00 per share, and 4) are rated AAA by at least one nationally recognized rating service.

- Local government investment pools, which 1) meet the requirements of Chapter 2256.016 of the Public Funds Investment Act, 2) are rated no lower than AAA or an equivalent rating by at least one nationally recognized rating service, and 3) are authorized by Board resolution.

- A local government investment pool created to function as a money market mutual fund if the pool 1) marks its portfolio to the market daily and, 2) to the extent reasonably possible, stabilizes at $1.00 net asset value.

- Money Market Funds

All prudent measures will be taken to liquidate an investment that is downgraded to less than the required minimum rating. (*PFIA 2256.021*) The Investment Officer shall, at least quarterly, review the credit quality rating of instruments in the District's portfolio using published resources from at least one nationally recognized rating service. (*PFIA 2256.005(b)(4)(F))*

7.0 INVESTMENT PARAMETERS

Maximum Maturities [*PFIA 2256.005(b)(4)(B)*]

It is the District's policy to concentrate its investment portfolio in shorter-term securities in order to limit principal risk caused by changes in interest rates.

The District attempts to match its investments with anticipated cash flow requirements. Unless matched to a specific cash flow, the District will not directly invest in securities maturing more than one (1) year from the date of purchase; however, the above described obligations, certificates, or agreements may be collateralized using longer dated investments. Because no secondary market exists for repurchase agreements, the maximum maturity shall be 120 days. For flexible repurchase agreement for bond proceeds, the maximum maturity shall be determined in accordance with project cash flow projections and the requirements of the governing bond ordinance.

The composite portfolio will have a weighted average maturity of 365 days or less. This dollar-weighted average maturity will be calculated using the stated final maturity dates of each security. [PFIA 2256.005(b)(4)(C)]

Diversification [*PFIA 2256.005(b)(3)*]

The District recognizes that investment risks can result from issuer defaults, market price changes or various technical complications leading to temporary illiquidity. Risk is controlled through portfolio diversification that shall be achieved by the following general guidelines:

- Limiting investments to avoid overconcentration in investments from a specific issuer or business sector;
- Limiting investments that have higher credit risks (example: commercial paper);
- Investing in investments with varying maturities; and
- Continuously investing a portion of the portfolio in readily available funds such as local government investment pools (LGIPs), money market funds or overnight repurchase agreements to ensure that appropriate liquidity is maintained in order to meet ongoing obligations.

The following maximum limits, by instrument, are established for the District's total portfolio:

- U.S. Treasury Securities 100%
- Agencies and Instrumentalities 85%

- Certificates of Deposit 100%
- Money Market Funds 100%
- Money Market Mutual Funds 50%
- Authorized Pools 50%
- Repurchase Agreements* 20%

*Excluding flexible repurchase agreements for bond proceeds investments.

8.0 SELECTION OF BANKS AND DEALERS

Depository (*Water Code 49.156*)

At least every five years a Depository shall be selected through the District's banking services procurement process, which shall include a formal request for proposal (RFP). The selection of a depository will be determined by competitive bid and evaluation of bids will be based on the following selection criteria:

- The ability to qualify as a depository for public funds in accordance with state law.
- The ability to provide requested information or financial statements for the periods specified.
- The ability to meet all requirements in the banking RFP.
- Complete response to all required items on the bid form
- Lowest net banking service cost, consistent with the ability to provide an appropriate level of service.
- The credit worthiness and financial stability of the bank.

Authorized Brokers/Dealers (*PFIA 2256.025*)

The District or the District's Investment Committee, shall annually review, revise, and adopt a list of qualified brokers or dealers and financial institutions authorized to engage in securities transactions with the District. Those firms that request to become qualified bidders for securities transactions will be required to provide: 1) a completed broker or dealer questionnaire that provides information regarding creditworthiness, experience and reputation; and 2) a certification stating the firm received, read and understood the District's investment policy and agrees to comply with that policy. Authorized firms may include primary dealers or regional dealers that qualify under Securities & Exchange Commission Rule 15C3-1 (Uniform Net Capital Rule), and qualified depositories. All investment providers, including financial institutions, banks, money market mutual funds, and local government investment pools, must sign a certification acknowledging that the organization has received and reviewed the District's investment policy and that reasonable procedures and controls have been implemented to preclude investment transactions that are not authorized by the District's policy. [*PFIA 2256.005(k-l)*]

Competitive Bids (*Best Practice*)

It is the policy of the District to require competitive bidding for all individual security purchases and sales except for: 1) transactions with money market mutual funds and local

government investment pools; and 2) treasury and agency securities purchased at issue through an approved broker or dealer or financial institution. The General Manager shall develop and maintain procedures for ensuring competition in the investment of the Entity's funds.

Delivery vs. Payment [*PFIA 2256.005(b)(4)(E)*]

Securities shall be purchased using the "delivery vs. payment" method with the exception of investment pools and mutual funds. Funds will be released after notification that the purchased security has been received.

9.0 CUSTODIAL CREDIT RISK MANAGEMENT

Safekeeping and Custodian Agreements (*Best Practice*)

The District shall contract with a bank or banks for the safekeeping of securities either owned by the District as part of its investment portfolio or held as collateral to secure demand or time deposits. Securities owned by the District shall be held in the District's name as evidenced by safekeeping receipts of the institution holding the securities.

Collateral for deposits will be held by a third party custodian designated by the District and pledged to the District as evidenced by safekeeping receipts of the institution with which the collateral is deposited. Original safekeeping receipts shall be obtained. Collateral may be held by the depository bank's trust department, a Federal Reserve bank or branch of a Federal Reserve bank, a Federal Home Loan Bank, or a third party bank approved by the District.

Collateral Policy (*PFCA 2257.023*)

Consistent with the requirements of the Public Funds Collateral Act, it is the policy of the District to require full collateralization of all District investments and funds on deposit with a depository bank, other than investments, which are obligations of the U.S. government and its agencies and instrumentalities. In order to anticipate market changes and provide a level of security for all funds, the collateralization level will be 102% of market value of principal and accrued interest on the deposits or investments less an amount insured by the FDIC. At its discretion, the District may require a higher level of collateralization for certain investment securities. Securities pledged as collateral shall be held by an independent third party with which the District has a current custodial agreement. The General Manager is responsible for entering into collateralization agreements with third party custodians in compliance with this Policy. The agreements are to specify the acceptable investment securities for collateral, including provisions relating to possession of the collateral, the substitution or release of investment securities, ownership of securities, and the method of valuation of securities. A clearly marked evidence of ownership (safekeeping receipt) must be supplied to the District and retained. Collateral shall be reviewed at least monthly to assure that the market value of the pledged securities is adequate.

Collateral Defined

The District shall accept only the following types of collateral:

- Obligations of the United States or its agencies and instrumentalities.
- Direct obligations of the state of Texas or its agencies and instrumentalities.

- Collateralized mortgage obligations directly issued by a federal agency or instrumentality of the United States, the underlying security for which is guaranteed by an agency or instrumentality of the United States.
- Obligations of states, agencies, counties, cities, and other political subdivisions of any state rated as to investment quality by a nationally recognized rating firm not less than A or its equivalent with a remaining maturity of ten (10) years or less.
- A surety bond issued by an insurance company rated as to investment quality by a nationally recognized rating firm not less than A.
- A letter of credit issued to the District by the Federal Home Loan Bank.

Subject to Audit

All collateral shall be subject to inspection and audit by the General Manager or the District's independent auditors.

10.0 PERFORMANCE

Performance Standards [*Water Code 36.061(a)(3)(B)*]

The District's investment portfolio will be managed in accordance with the parameters specified within this policy. The portfolio shall be designed with the objective of obtaining a rate of return through budgetary and economic cycles, commensurate with the investment risk constraints and the cash flow requirements of the District.

Performance Benchmark (*Best Practice*)

It is the policy of the District to purchase investments with maturity dates coinciding with cash flow needs. Through this strategy, the District shall seek to optimize interest earnings utilizing allowable investments available on the market at that time. Market value will be calculated on a quarterly basis on all securities owned and compared to current book value. The District's portfolio shall be designed with the objective of regularly meeting or exceeding the average rate of return on U.S. Treasury Bills at a maturity level comparable to the District's weighted average maturity in days.

11.0 REPORTING (*PFIA 2256.023*)

Methods

The Investment Officer shall prepare an investment report on at least a quarterly basis that summarizes investment strategies employed in the most recent reporting period and describes the portfolio in terms of investment securities, maturities, and shall explain the total investment return for the reporting period.

The investment report shall include a summary statement of investment activity prepared in compliance with generally accepted accounting principals. This summary will be prepared in a manner that will allow the District to ascertain whether investment activities during the reporting period have conformed to the Investment Policy. The report will be provided to the Board. The report will include the following:

- A listing of individual securities held at the end of the reporting period.
- Unrealized gains or losses resulting from appreciation or depreciation by listing the beginning and ending book and market value of securities for the period.
- Additions and changes to the market value during the period.
- Average weighted yield to maturity of portfolio as compared to applicable benchmark.
- Listing of investments by maturity date.
- Fully accrued interest for the reporting period
- The percentage of the total portfolio that each type of investment represents.
- Statement of compliance of the District's investment portfolio with state law and the investment strategy and policy approved by the Board.

An independent auditor will perform a formal annual review of the investment reports with the results reported to the Board. [*PFIA 2256.023(d)*]

Marking to Market [*PFIA 2256.005(b)(4)(D)*]

Market value of all securities in the portfolio will be determined on at least a quarterly basis. These values will be obtained from a reputable and independent source and disclosed to the governing body quarterly in a written report.

12.0 INVESTMENT POLICY ADOPTION [*PFIA 2256.005(e)*]

The District's investment policy shall be adopted by resolution of the Board. It is the District's intent to comply with state laws and regulations. The District's investments policies shall be subject to revisions consistent with changing laws, regulations, and needs of the District. The Board shall review the policy annually and approve any changes or modifications.

Montemayor Britton Bender PC

CERTIFIED PUBLIC ACCOUNTANTS

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

INDEPENDENT AUDITOR'S REPORT
AND
FINANCIAL STATEMENTS

30 SEPTEMBER 2024

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

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Montemayor Britton Bender PC
CERTIFIED PUBLIC ACCOUNTANTS

Arturo Montemayor III CPA, President & CEO | Stacy Britton CPA, Shareholder | Sean Bender CPA, Shareholder
Danielle Guerrero, Shareholder | Sara Carey CPA, Shareholder

Board of Directors and Management
Gonzales County Underground Water Conservation District

INDEPENDENT AUDITOR'S REPORT

Opinions

We have audited the accompanying financial statements of the governmental activities and each major fund of Gonzales County Underground Water Conservation District (District) as of and for the year ended 30 September 2024, and the related notes to the financial statements, which collectively comprise the District's basic financial statements as listed in the table of contents.

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the governmental activities and each major fund of the District, as of 30 September 2024, and the respective changes in financial position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinions

We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of the District, and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the District's ability to continue as a going concern for twelve months beyond the financial statement date, including any currently known information that may raise substantial doubt shortly thereafter.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from

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material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinions. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with generally accepted auditing standards will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with generally accepted auditing standards, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the District's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the District's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control related matters that we identified during the audit.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis on pages 3-6, and the general fund, eastern mitigation fund and western mitigation fund budgetary comparison schedules on pages 18-20 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Montemayor Britton Bender PC

11 February 2025
Austin, Texas

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

STATEMENT OF NET POSITION

30 SEPTEMBER 2024

	Governmental Activities
ASSETS	
Cash	$2,641,898
Export fees receivable	17,528
Property taxes receivable, net of allowance of $5,080	17,837
	2,677,263
Capital assets, net of accumulated depreciation	358,076
	3,035,339
LIABILITIES	
Accounts payable	11,278
Accrued expenses	2,230
Unearned mitigation revenue	477,846
	491,354
NET POSITION	
Net investment in capital assets	358,076
Unrestricted	2,185,909
	$2,543,985

The accompanying notes are an integral part of this financial statement presentation.

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

STATEMENT OF ACTIVITIES

YEAR ENDED 30 SEPTEMBER 2024

Functions/Programs Primary government:	Expenses	Program Revenues Charges for Services	Net (Expenses) Revenue and Changes in Net Position Primary Government Governmental Activities
Government activities:			
Conservation of underground water	$606,419	$516,246	($90,173)
General revenues:			
Property taxes			143,904
Interest			51,324
Miscellaneous income			9,184
			204,412
Change in net position			114,239
Net position- beginning			2,429,746
Net position- ending			$2,543,985

The accompanying notes are an integral part of this financial statement presentation.

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

GOVERNMENTAL FUNDS BALANCE SHEET

30 SEPTEMBER 2024

	General Fund	Eastern Mitigation Fund	Western Mitigation Fund	Total Governmental Funds
ASSETS				
Cash	$2,139,210	$283,446	$219,242	$2,641,898
Export fees receivable	17,528	0	0	17,528
Property taxes receivable, net of allowance of $5,080	17,837	0	0	17,837
	$2,174,575	$283,446	$219,242	$2,677,263
LIABILITIES				
Accounts payable	$11,278	$0	$0	$11,278
Accrued expenses	1,376	0	854	2,230
Unearned mitigation revenue	0	264,258	213,588	477,846
	12,654	264,258	214,442	491,354
DEFERRED INFLOWS OF RESOURCES				
Unavailable revenue – property taxes	21,831	0	0	21,831
FUND BALANCES				
Unassigned fund balance	2,140,090	19,188	4,800	2,164,078
	$2,174,575	$283,446	$219,242	$2,677,263

The accompanying notes are an integral part of this financial statement presentation.

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

RECONCILIATION OF GOVERNMENTAL FUNDS BALANCE SHEET
TO STATEMENT OF NET POSITION

30 SEPTEMBER 2024

Total Fund Balances - Governmental Funds	$2,164,078
Amounts reported for governmental activities in the statement of net position are different because:	
Capital assets used in governmental activities are not financial resources and, therefore, are not reported in the funds. At the beginning of the year, the cost of these assets was $815,936 and the accumulated depreciation was $443,634. The net effect of this increases net position by $372,302.	372,302
Depreciation expense is not reflected in the governmental funds, but is recorded in the government-wide financial statements as an expense and an increase to accumulated depreciation.	(14,226)
Property taxes to be received more than 60 days after year end are unavailable to be spent and thus are deferred inflows in the fund financial statements.	21,831
Net Position of Governmental Activities	$2,543,985

The accompanying notes are an integral part of this financial statement presentation.

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT
GOVERNMENTAL FUNDS STATEMENT OF REVENUE, EXPENDITURES AND CHANGES IN FUND BALANCES
YEAR ENDED 30 SEPTEMBER 2024

	General Fund	Eastern Mitigation Fund	Western Mitigation Fund	Total Governmental Funds
REVENUE				
Negotiated fees	$264,044	$0	$0	$264,044
Export fees	206,466	0	0	206,466
Property taxes	143,904	0	0	143,904
Interest earned	51,324	0	0	51,324
Well mitigation fees	0	42,867	2,869	45,736
Other	1,606	5,215	2,363	9,184
	667,344	48,082	5,232	720,658
EXPENDITURES				
Professional services	230,694	2,867	2,867	236,428
Personnel	214,681	0	0	214,681
Well mitigation	0	40,000	0	40,000
Consultant	17,501	0	0	17,501
Projects	11,608	0	0	11,608
Office computer system	10,360	0	0	10,360
Published notices	6,568	0	0	6,568
Vehicle mileage	6,137	0	0	6,137
Database hosting	5,500	0	0	5,500
Building repair	5,304	0	0	5,304
Software maintenance	4,511	0	0	4,511
Insurance	4,509	0	0	4,509
Other	29,086	0	0	29,086
	546,459	42,867	2,867	592,193
Net change in fund balance	120,885	5,215	2,365	128,465
Beginning fund balance	2,019,205	13,973	2,435	2,035,613
Ending fund balance	$2,140,090	$19,188	$4,800	$2,164,078

The accompanying notes are an integral part of this financial statement presentation.

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

RECONCILIATION OF STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCES OF GOVERNMENTAL FUNDS TO THE STATEMENT OF ACTIVITIES

YEAR ENDED 30 SEPTEMBER 2024

Net Change in Fund Balances - Governmental Funds	$128,465
Amounts reported for governmental activities in the statement of activities are different because:	
Depreciation expense is not reflected in the governmental funds, but is recorded in the government-wide financial statements as an expense and an increase to accumulated depreciation. The net effect of the current year depreciation expense of $14,226 is to decrease the change in net position.	(14,226)
Change in Net Position of Governmental Activities	$114,239

The accompanying notes are an integral part of this financial statement presentation.

NOTES TO FINANCIAL STATEMENTS

NOTE 1: REPORTING ENTITY

The Gonzales County Underground Water Conservation District (the District) is a political subdivision of the State of Texas. On 19 November 1993, the Texas Natural Resource Conservation Commission (the TNRCC) approved the petition for the creation of the District pursuant to Chapter 52 of the Texas Water Code, which was later changed to Chapter 36. The TNRCC no longer exists and the Texas Commission on Environmental Quality has assumed the responsibilities of the agency.

The District was formed to protect and regulate the Carrizo-Wilcox, Sparta, Queen City and Yegua-Jackson aquifers from pollution and from damage from overproduction. The boundaries of the District include all parts of Gonzales and Caldwell counties that are over these reservoirs.

Since the District's only responsibility is to provide groundwater control and it operates under Chapter 36 of the Texas Water code, it is not required to prepare and present the supplemental schedules described in the "Annual Audit Report Requirements for Texas Water Districts and Authorities."

NOTE 2: SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The accounting and reporting policies of the District conform to U.S. generally accepted accounting principles applicable to state and local governments promulgated by the Governmental Accounting Standards Board (GASB) and the American Institute of Certified Public Accountants (AICPA) and by the Financial Accounting Standards Board (when applicable). The following is a summary of the significant accounting policies.

GOVERNMENT-WIDE FINANCIAL STATEMENTS

The Statement of Net Position and the Statement of Activities are government-wide financial statements. They report information on all of the District's activities with the interfund activities removed. Governmental activities include programs supported primarily by taxes and fees charged to purveyors.

The Statement of Activities presents a comparison between direct expenses and program revenues for each function of the District's government activities. Direct expenses are those that are specifically associated with a program or function and, therefore, are clearly identifiable to a particular function. The District does not allocate indirect expenses in the Statement of Activities. Program revenues include (a) fees, fines, and charges paid by the recipients of goods or services offered by the programs and (b) grants and contributions that are restricted to meeting the operational or capital requirements of a particular program. Revenues that are not classified as program revenues, including all taxes, are presented as general revenues.

RESTRICTED RESOURCES AND FUND BALANCE SPENDING

When both restricted and unrestricted resources are available for use, it is the District's policy to use restricted resources first and then unrestricted resources as they are needed.

FUND FINANCIAL STATEMENTS

The District segregates transactions related to certain functions or transactions in separate funds in order to aid financial management and to demonstrate legal compliance. Separate statements are presented for governmental activities. Major funds are determined by criteria specified by GASB.

Governmental funds are those funds through which most governmental functions typically are financed. The measurement focus of governmental funds is on the sources, uses, and balance of current financial resources.

Governmental Fund Types:

Major Funds:

General Fund- the General Fund is the main operating fund of the District. This fund is used to account for all financial resources not accounted for in other funds. All general tax revenues and other receipts that are not restricted by law or contractual agreement to some other fund are accounted for in this fund. General operating expenditures, fixed charges and capital improvement costs that are not paid through other funds are paid from the General Fund.

Eastern Mitigation Fund- the District established this fund to investigate, evaluate, and, if necessary, to implement mitigation plans. Mitigation consists of alleviating or lessening the effects of large scale pumping projects on existing permitted wells in the eastern part of the District's jurisdiction. Funding comes from large water exporters and is administered by the District. Cash received for this fund is considered unearned until a service is provided. At anytime, if this fund is deemed unnecessary, the cash will be returned to the contributing purveyors.

Western Mitigation Fund- the Western Mitigation Fund was established to investigate, evaluate, and if necessary, to implement mitigation plans. Mitigation consists of alleviating or lessening the effects of large scale pumping projects on existing permitted wells in the western part of the District's jurisdiction. Funding comes from large water exporters and is administered by the District. Cash received for this fund is considered unearned until a service is provided. At anytime, if this fund is deemed unnecessary, the cash will be returned to the contributing purveyors.

MEASUREMENT FOCUS AND BASIS OF ACCOUNTING

The government-wide financial statements are reported using the flow of economic resources measurement focus and the full accrual basis of accounting. Revenues are recorded when earned and expenses are recorded when a liability is incurred, regardless of the timing of related cash flows. Taxes are recognized as revenues in the year for which they are levied.

Governmental fund financial statements use the modified accrual basis of accounting. This basis of accounting recognizes revenues in the period in which they become susceptible to accrual, i.e. both measurable and available. Revenues are considered to be available when they are collectible, within the current period or soon enough thereafter to pay liabilities of the current period (defined by the District as collected within 60 days of year end). Expenditures are generally recognized under the modified accrual basis of accounting when the related fund liability is incurred. The reported fund balance of governmental funds is considered a measure of available spendable resources.

The revenues susceptible to accrual are property taxes, charges for services, and interest income. All other governmental revenues are recognized when received, as they are deemed immaterial.

NOTES TO FINANCIAL STATEMENTS

PROPERTY TAXES

The District's property taxes are levied each October 1, and are payable before the first day of February, on 100% of assessed value listed for all real and personal property located in the District. Assessed values are established by the Caldwell County and the Gonzales County Tax Appraisal Districts and are certified by the Caldwell County and Gonzales County Tax Appraisal Districts. Property taxes attach as an enforceable lien on property as of January 1 of each year.

BUDGET

The District adopts annual budgets for the General, Eastern Mitigation, and Western Mitigation Funds. The District amends the budgets as needed during the year. All annual appropriations lapse at fiscal year-end.

ESTIMATES

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities of the financial statements and the reported amounts of revenues and expenses during the reported period. Actual results could differ from those estimates.

COMPENSATED ABSENCES

It is the District's policy that upon separation from District employment, employees forfeit all accumulated sick leave. Earned vacation time is generally required to be used within one year of accrual. A maximum of forty hours can be carried forward.

TRANSACTIONS BETWEEN FUNDS

Short-term advances between funds are accounted for in the appropriate interfund receivable and payable accounts. Transactions between funds that would be treated as revenues, expenditures or expenses if they involved organizations external to the government unit are accounted for as revenues, expenditures or expenses in the funds involved. Transactions which constitute reimbursement for expenditures or expenses initially made from a fund which are properly applicable to another fund are recorded as expenditures or expenses in the reimbursing fund, and as reductions of the expenditures or expenses in the fund that is reimbursed.

DEPOSITS, SECURITIES, AND INVESTMENTS

The District has adopted an investment policy to comply with Chapter 36, Water Code, and Chapter 2256 and 2557, Texas Government Code, the Public Funds Investment Act and Public Funds Collateral Act. The District's investment objectives are to pursue the safety and preservation of principal, maintenance of sufficient liquidity to meet operating needs, ensure public trust, and to optimize interest earnings on the portfolio.

The District is authorized to invest in:

A) Certificates of Deposit issued by a depository institution that has its main office or a branch office in Texas. The certificate of deposit must be guaranteed or insured by the Federal Deposit Insurance Corporation or the National Credit Union Share Insurance Fund. Any funds held in

excess of the amount insured shall be secured by obligations in a manner and amount as provided by law.

B) Certificates of Deposit obtained through a depository institution or broker that has its main office or a branch office in Texas and that contractually agrees to place the funds in federally insured depository institutions in accordance with the conditions prescribed in Section 2256.010(b) of the Public Funds Investment Act.

C) Money Market Mutual funds that: 1) are registered and regulated by the Securities and Exchange Commission, 2) have a dollar weighted average stated maturity of 90 days or less, 3) seek to maintain a net asset value of $1.00 per share, and 4) are rated AAA by at least one nationally recognized rating service.

D) Local government investment pools, which 1) meet the requirements of Chapter 2256.016 of the Public Funds Investment Act, 2) are rated no lower than AAA or an equivalent rating by at least one nationally recognized rating service, and 3) are authorized by Board resolution.

E) A local government investment pool created to function as a money market mutual fund if the pool 1) marks its portfolio to the market daily and, 2) to the extent reasonably possible, stabilizes at $1.00 net asset value.

F) Money Market Funds.

CAPITAL ASSETS

All capital assets are recorded at historical cost or estimated historical cost if actual historical cost is not available. Donated capital assets are recorded at their estimated fair value at the date of the donation. Repairs and maintenance are recorded as expenditures or expenses; renewals and betterments are capitalized. Depreciation has been calculated on each class of depreciable property using the straight-line method over their estimated useful lives ranging from 2 to 50 years.

NET POSITION

Net position represents the difference between assets, liabilities, and deferred inflows. Net position invested in capital assets consists of capital assets, net of accumulated depreciation. Net position is reported as restricted when there are limitations imposed on their use either through the enabling legislation adopted by the District or through external restrictions imposed by creditors, grantors or laws or regulations of other governments.

NOTE 3: DEPOSITS WITH FINANCIAL INSTITUTIONS

The District has deposits in excess of FDIC coverage of $2,155,834. $2,134,310 is collateralized by securities held by the pledging financial institution and $21,524 is uncollateralized. The District has not experienced any losses due to this credit risk.

NOTE 4: CONCENTRATION

The District earned 64% of its revenue from five water exporters.

NOTE 5: CAPITAL ASSETS

	Beginning Balance	Additions	Deletions	Ending Balance
Capital assets not being depreciated:				
Land	$17,200	$0	$0	$17,200
Capital assets being depreciated:				
Equipment	42,405	0	0	42,405
Wells	613,437	0	0	613,437
Database	37,500	0	0	37,500
Building	22,800	0	0	22,800
Building improvements	82,594	0	0	82,594
Accumulated depreciation:				
Equipment	(39,591)	(383)	0	(39,974)
Wells	(368,153)	(5,654)	0	(373,807)
Database	(17,857)	(5,357)	0	(23,214)
Building	(3,776)	(456)	0	(4,232)
Building improvements	(14,257)	(2,376)	0	(16,633)
	$372,302	($14,226)	$0	$358,076

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

GENERAL FUND BUDGETARY COMPARISON SCHEDULE

YEAR ENDED 30 SEPTEMBER 2024

	Original Budget	Final Budget	Actual	Variance Favorable (Unfavorable)
REVENUE				
Negotiated fees	$247,187	$247,187	$264,044	$16,857
Export fees	186,314	186,314	206,466	20,152
Property taxes	142,942	142,942	143,904	962
Other	90,500	10,500	52,930	42,430
	666,943	586,943	667,344	80,401
EXPENDITURES				
Professional services	63,000	223,000	230,694	(7,694)
Personnel	253,348	258,133	214,681	43,452
Consultant	30,000	25,000	17,501	7,499
Projects	210,000	123,000	11,608	111,392
Office computer system	11,000	11,000	10,360	640
Published notices	500	5,000	6,568	(1,568)
Vehicle mileage	15,000	13,700	6,137	7,563
Database hosting	5,500	5,500	5,500	0
Building repair	0	5,350	5,304	46
Software maintenance	2,800	3,400	4,511	(1,111)
Employee insurance	3,500	4,550	4,509	41
Other	72,652	69,252	29,086	40,166
	667,300	746,885	546,459	200,426
Net change in fund balance	($357)	($159,942)	$120,885	$280,827

See independent auditor's report.

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

EASTERN MITIGATION FUND BUDGETARY COMPARISON SCHEDULE

YEAR ENDED 30 SEPTEMBER 2024

	Original and Final Budget	Actual	Variance Favorable (Unfavorable)
REVENUE			
Well mitigation fees	$0	$42,867	$42,867
Other	1,500	5,215	3,715
	1,500	48,082	46,582
EXPENDITURES			
Well mitigation	310,000	40,000	270,000
Professional services	5,500	2,867	2,633
Capital outlay	3,500	0	3,500
Groundwater testing	2,500	0	2,500
	321,500	42,867	278,633
Net change in fund balance	($320,000)	$5,215	$325,215

See independent auditor's report.

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

WESTERN MITIGATION FUND BUDGETARY COMPARISON SCHEDULE

YEAR ENDED 30 SEPTEMBER 2024

	Original and Final Budget	Actual	Variance Favorable (Unfavorable)
REVENUE			
Well mitigation fees	$165,489	$2,869	($162,620)
Other	200	2,363	2,163
	165,689	5,232	(160,457)
EXPENDITURES			
Professional services	5,500	2,867	2,633
Well mitigation	300,000	0	300,000
Capital Outlay	3,500	0	3,500
Groundwater testing	2,500	0	2,500
	311,500	2,867	308,633
Net change in fund balance	($145,811)	$2,365	$148,176

See independent auditor's report.

Montemayor Britton Bender PC
CERTIFIED PUBLIC ACCOUNTANTS

Arturo Montemayor III CPA, President & CEO | Stacy Britton CPA, Shareholder | Sean Bender CPA, Shareholder
Danielle Guerrero, Shareholder | Sara Carey CPA, Shareholder

Board of Directors and Management
Gonzales County Underground Water Conservation District

COMMUNICATIONS WITH THOSE CHARGED WITH GOVERNANCE

We have audited the financial statements of Gonzales County Underground Water Conservation District (District) for the year ended 30 September 2024, and have issued our report thereon dated 11 February 2025. Professional standards require that we provide you with information about our responsibilities under generally accepted auditing standards, as well as certain information related to the planned scope and timing of our audit. We have communicated information related to the planned scope and timing of our audit in our letter to you dated 18 October 2024. Professional standards also require that we provide you with the following information related to our audit.

Accounting Policies

Management is responsible for the selection and use of appropriate accounting policies. The significant accounting policies used by the District are described in Note 2 to the financial statements. No new accounting policies were adopted and the application of existing policies was not changed during fiscal year 2024. We noted no transactions entered into by the District during the year for which there is a lack of authoritative guidance or consensus. All significant transactions have been recognized in the financial statements in the proper period.

Accounting Estimates

Accounting estimates are an integral part of the financial statements prepared by management and are based on management's knowledge and experience about past and current events and assumptions about future events. Certain accounting estimates are particularly sensitive because of their significance to the financial statements and because of the possibility that future events affecting them may differ significantly from those expected. The most sensitive estimate affecting the District's financial statements was:

> Management's estimates of the useful lives of fixed assets, and the related estimate of depreciation expense are based on general knowledge of the assets involved and customary lives used by other organizations for similar assets. We evaluated the key factors and assumptions used to develop the estimated useful lives of fixed assets (and related accumulated depreciation), in determining that they are reasonable in relation to the financial statements taken as a whole.

Difficulties Encountered in Performing the Audit

We encountered no significant difficulties in dealing with management in performing and completing our audit.

Uncorrected Misstatements

Professional standards require us to accumulate all known and likely misstatements identified during the audit, other than those that are clearly trivial, and communicate them to the appropriate level of management. The attached schedule summarizes uncorrected misstatements of the financial statements. Management has determined that their effects are immaterial, both individually and in the aggregate, to the financial statements taken as a whole. The uncorrected misstatements or the matters underlying them could potentially cause future period financial statements to be materially misstated, even though, in our judgment, such uncorrected misstatements are immaterial to the financial statements under audit.

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Disagreements with Management
For purposes of this letter, professional standards define a disagreement with management as a financial accounting, reporting, or auditing matter, whether or not resolved to our satisfaction, that could be significant to the financial statements or the auditor's report. We are pleased to report that no such disagreements arose during the course of our audit.

Management Representations
We have requested certain representations from management that are included in the management representation letter dated 11 February 2025.

Management Consultations with Other Independent Accountants
In some cases, management may decide to consult with other accountants about auditing and accounting matters, similar to obtaining a "second opinion" on certain situations. If a consultation involves application of an accounting principle to the governmental unit's financial statements or a determination of the type of auditor's opinion that may be expressed on those statements, our professional standards require the consulting accountant to check with us to determine that the consultant has all the relevant facts. To our knowledge, there were no such consultations with other accountants.

Other Audit Findings or Issues
We generally discuss a variety of matters, including the application of accounting principles and auditing standards, with management. However, these discussions occurred in the normal course of our professional relationship and our responses were not a condition to our retention.

Other Matters
We applied certain limited procedures to the management's discussion and analysis, and the general fund, eastern mitigation fund and western mitigation fund budgetary comparison schedules, which are required supplementary information (RSI) that supplements the basic financial statements. Our procedures consisted of inquiries of management regarding the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We did not audit the RSI and do not express an opinion or provide any assurance on the RSI.

Restriction on Use
This information is intended solely for the nse of the Board of Directors and management and is not intended to be and should not be used by anyone other than these specified parties.

Montemayor Britton Bender PC

11 February 2025
Austin, Texas

GONZALES COUNTY UNDERGROUND WATER CONSERVATION DISTRICT

UNCORRECTED MISSTATEMENTS

30 SEPTEMBER 2024

Account	Debit	Credit
Net position/fund balance	12,550	
Operational Expenses - Legal: GBRA		12,550

SOAH Docket No. 968-23-20832 Suffix: GCUWCD

BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

APPLICATION OF GUADALUPE-BLANCO RIVER AUTHORITY FOR AMENDMENT TO PRODUCTION PERMIT NO. 11-16-17 AND EXPORT PERMIT NO. 01-13-01

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SOAH Docket No. 968-23-20832 Suffix: GCUWCD

BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

APPLICATION OF GUADALUPE-BLANCO RIVER AUTHORITY FOR AMENDMENT TO PRODUCTION PERMIT NO. 11-16-17 AND EXPORT PERMIT NO. 01-13-01

TABLE OF ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Meaning
AFY	acre-feet per year
ALJ	Administrative Law Judge
ARWA	Alliance Regional Water Authority
Breitschopf	Phil Breitschopf, Jason Breitschopf, and A.P. Breitschopf and Sons, Inc.
DBS&A	Daniel B. Stephens & Associates, Inc.
DFC	Desired Future Condition

Abbreviation/Acronym	Meaning
Export Permit	Export Permit No. 01-13-01
District	Gonzales County Underground Water Conservation District
GAM	Groundwater Availability Model
GCD	Groundwater Conservation District
GM	General Manager of the District
GMA	Groundwater Management Area
GBRA	Guadalupe-Blanco River Authority
MAG	Modeled Available Groundwater
Operating Permit	Production Permit No. 11-16-17
PFD	Proposal for Decision
Rule	District Rule
SOAH	State Office of Administrative Hearings
TWA	Texas Water Alliance
TWDB	Texas Water Development Board
WPA	Mark Ploeger, Sally Ploeger, Mary Menning, and Water Protection Association
Protestants	WPA, Ted Boriack, and Breitschopf

SOAH Docket No. 968-23-20832 Suffix: GCUWCD

BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

APPLICATION OF GUADALUPE-BLANCO RIVER AUTHORITY FOR AMENDMENT TO PRODUCTION PERMIT NO. 11-16-17 AND EXPORT PERMIT NO. 01-13-01

PROPOSAL FOR DECISION

The Guadalupe-Blanco River Authority (GBRA) filed applications to amend Production Permit No. 11-16-17 (Operating Permit) and Export Permit No. 01-13-01 (Export Permit) (collectively, Applications) with Gonzales County Underground Water Conservation District (the District). The Administrative Law Judge (ALJ) recommends granting the application to amend the Operating Permit and denial of the application to amend the Export Permit.

I. BACKGROUND

GBRA conducted a study to evaluate sources of supply to meet growing demands. The consulting engineers who performed the study determined that

production of groundwater supplies from the Carrizo Aquifer from a wellfield with leases owned by Texas Water Alliance (TWA) would be a cost-effective and technically feasible solution to meet demands in GBRA's statutory district.[1] GBRA purchased from TWA 165 groundwater leases with landowners in Gonzales and Caldwell counties. Under these leases, GBRA makes annual payments to the landowners in exchange for the right to produce groundwater from the Carrizo Aquifer beneath the leased properties.[2]

GBRA has existing groundwater production and export permits with the District that authorize GBRA to pump a maximum of 15,000 acre-feet per year (AFY) from the Carrizo Aquifer from seven groundwater wells and to export the produced water outside of the District's boundaries.[3] GBRA has fully allocated the 15,000 AFY of currently permitted groundwater. GBRA now seeks to develop additional groundwater supply to serve growth within the region.[4]

II. PROCEDURAL HISTORY, NOTICE, AND JURISDICTION

1. Applications

On May 10, 2022, GBRA filed its application to amend its Operating Permit, seeking authorization to produce an additional 9,000 AFY of groundwater, to add

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[1] GBRA Ex. 1 at 7-9.

[2] GBRA Ex. 1 at 9; *see* GBRA Exs. 3, 4.

[3] GBRA Ex. 1 at 9; *see* GBRA Exs. 5, 5a. GBRA's existing permits are under a "stair-step program" in which GBRA may produce 5,000 AFY in 2018 to 2022; 10,000 AFY in 2023 to 2027; and the full 15,000 AFY in 2028 and beyond. Transcript of Hearing on the Merits (Tr.) Volume (Vol.) 3.

[4] GBRA Ex. 1 at 10, 16.

three additional wells, and to revise the capacities of the existing seven wells.[5] On the same date, GBRA filed its application to amend its Export Permit to allow GBRA to export the additional 9,000 AFY of groundwater out of the District to Caldwell, Hays, and Guadalupe Counties.[6] After GBRA provided the District with additional information, the District declared the Applications administratively complete on August 17, 2022.[7]

2. Procedural History

On June 5, 2023, the District referred the Application to the State Office of Administrative Hearings (SOAH). On August 9, 2023, SOAH ALJ Linda Brite held a preliminary hearing via Zoom videoconference. At the preliminary hearing, the ALJ admitted the following as parties: GBRA; the District General Manager (GM); Gonzales County Water Supply Corporation; Mark Ploeger, Sally Ploeger, Mary Ann Menning, and Water Protection Association (aligned, and collectively WPA); Phil Breitschopf, Jason Breitschopf, and A.P. Breitschopf and Sons, Inc. (aligned, and collectively Breitschopf); and Ted Boriack. By Order No. 3 on January 3, 2024, Gonzales County Water Supply Corporation was dismissed as a party from this proceeding.

The hearing on the merits was held on June 5-7, 2024, before ALJ Brite at the Gonzales County Courthouse and the District Office, in Gonzales, Texas. GBRA

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[5] GBRA Ex. 1 at 12-13; GBRA Ex. 7.

[6] GBRA Ex. 1 at 13-14; GBRA Ex. 8.

[7] GBRA Ex. 1 at 16; GBRA Ex. 14; GM Ex. 100 at 7, 11.

appeared and was represented by attorney Emily Rogers. The GM appeared and was represented by attorney Adam Friedman. WPA appeared and was represented by attorney Lawrence Dunbar. Breitschopf appeared and was represented by Phil Breitschopf. Ted Boriack appeared and represented himself. The record closed on October 21, 2024, after the filing of written briefs.

All witnesses prefiled direct testimony and testified at the hearing. Applicant presented the testimony of Charles M. Hickman, P.E. and James A. Beach, P.G. The GM presented the testimony of Laura Martin-Preston and T. Neil Blandford, P.G. WPA presented the testimony of Mark Ploeger. Breitschopf presented the testimony of Phil Breitschopf. Mr. Boriack testified on his own behalf.

3. Notice

Notice of the SOAH hearing was uncontested and is addressed solely in the findings of fact and conclusions of law.

Upon receipt of the Notice of Permit Application, the applicant must publish the Notice of Permit Application in the newspaper of largest circulation within Gonzales County and Caldwell County at the earliest available publication date after receipt of the Notice from the General Manager.[8] The applicant must mail the Notice of Permit Application to adjacent property owners (as shown on the County Tax Rolls as of the date the application is filed) and all existing and registered permitted

[8] District Rule (Rule) 24.A.

well owners within one-half mile of the proposed water well (as shown in the records of the District).[9]

Mr. Boriack posits that he did not receive notice of the Applications from GBRA, despite experiencing drawdown over his property and his participation in a contested case hearing for previous wells. Mr. Boriack contends that because the landowner list originally provided to him by the District does not match the list later produced in February 2024, he is not convinced that notice complied with the District rules (Rules).[10]

GBRA asserts that it published notice of the Applications and mailed notices to the landowners per the Rules.[11] The landowner list produced by GBRA included more landowners than the list provided by the District.[12]

GBRA produced the landowner list to which notice of the application was provided. Mr. Boriack did not show any error or noncompliance within GBRA's landowner list. The ALJ finds that notice of the Applications was provided in conformance with Rules 10 and 24.A.

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[9] Rules 10.D.10, .11, 24.A.

[10] *See* Boriack Exs. 15, 16.

[11] GBRA Ex. 1 at 16; GBRA Exs. 15, 16; GBRA Ex. 27 at 2-3; GBRA Ex. 28; *see* Rule 24.A.

[12] *See* GBRA Ex. 30.

4. Jurisdiction

Mr. Boriack challenges SOAH's jurisdiction on the basis that the applications are not administratively complete. The administrative completeness and jurisdictional arguments are addressed in section IV.A of this Proposal for Decision (PFD).

III. Applicable Law

In Texas, a landowner owns the groundwater below the surface of his or her land as real property and is entitled to drill for and produce that water, subject to a groundwater conservation district's (GCD's) well spacing and production restrictions, so long as the drilling and production does not cause waste or malicious drainage of other property, or negligently cause subsidence.[13] GCDs shall provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions, consistent with the objectives of Texas Constitution Section 59, Article XVI.[14] GCDs are the state's preferred method of groundwater management in order to protect property rights, balance conservation and development of groundwater to meet the needs of this state, and use the best available science in the conservation and development of groundwater through rules developed, adopted,

[13] Tex. Water Code § 36.002(a), (b), (d).

[14] Tex. Water Code § 36.0015(b).

and promulgated by a district in accordance with the provisions of Texas Water Code chapter 36.[15]

A GCD shall require a permit for the drilling, equipping, operating, or completing of wells or for substantially altering the size of wells or well pumps. A GCD may require that a change in the withdrawal or use of groundwater during the term of a permit may not be made unless the district first approves a permit amendment authorizing the change.[16]

As the party seeking the permit amendments, GBRA has the burden of proof by a preponderance of the evidence.[17]

IV. DISCUSSION

A. REQUIREMENTS OF TEXAS WATER CODE CHAPTER § 36.113(D)(1) AND DISTRICT RULES

1. Signed and Sworn to (Tex. Water Code § 36.113(b))

Before granting or denying a permit amendment, the district shall consider whether the application conforms to the requirements prescribed by this chapter and

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[15] Tex. Water Code § 36.0015(b).

[16] Tex. Water Code § 36.113(a).

[17] 1 Tex. Admin. Code § 155.427; *Granek v. Texas St. Bd. of Med. Exam'rs*, 172 S.W.3d 761, 777 (Tex. App.—Austin 2005, no pet.).

is accompanied by the prescribed fees.[18] A district shall require that an application for permit or a permit amendment be in writing and sworn to.[19] Any person seeking amendment of a permit must complete, sign, and submit an application to the general manager.[20] An application is administratively complete if it contains the information set forth under Texas Water Code sections 36.113 and 36.1131.[21]

The GM asserts that her role in reviewing applications for groundwater export permits and production permits is limited to whether the applications are administratively complete. On August 17, 2022, the GM deemed the Applications administratively complete. The GM has not conducted a technical review and takes no position on whether the Applications meet technical requirements.

Neither application was initially "sworn to" when submitted in May 2022, and the application forms were not signed until they were resubmitted in February 2024.[22] The two resubmitted Applications were signed. However, the application form for the Operating Permit does not include "sworn to" language (stating the application was true and correct to the best of their knowledge), and the GM testified that she would look into amending the forms.[23] Protestants contend that neither application was administratively complete in May 2022, and only the Export

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[18] Tex. Water Code § 36.113(d)(1).

[19] Tex. Water Code § 36.113(b).

[20] Rule 10.C.

[21] Tex. Water Code § 36.114(h).

[22] GBRA Exs. 7, 8; GM Ex. 102; *see* Transcript (Tr.) Volume (Vol.) 3 at 496-99.

[23] Tr. Vol. 3 at 499-500; *see* GM Ex. 102.

Permit application was "sworn to" in February 2024. The Operating Permit application remains unsworn.

GBRA applied for amendments to its Operating Permit and Export Permit on the forms prescribed by the District.[24] The GM considered the cover letter signed by GBRA's General Manager to be part of the application package.[25] The Operating Permit application was not sworn before a notary, and the District did not require it.[26] The GM deemed the Applications administratively complete on August 17, 2022.[27]

The ALJ considers GBRA's signed cover letter to be sufficient to fulfill the signature requirement. The District did not require the Applications to be sworn, as provided by the Texas Water Code.[28] In February 2024, GBRA submitted a sworn Export Permit application. The ALJ next addresses the significance of the Operating Permit application not being "sworn to."

Courts are generally "reluctant to conclude that a statutory requirement affects a court's subject-matter jurisdiction absent clear legislative intent to that effect."[29] "The purpose of a contested-case hearing is not to verify whether the

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[24] GBRA Exs. 7, 8.

[25] GBRA Exs. 7, 8; GM Ex. 102; Tr. Vol. 3 at 497-98.

[26] Tr. Vol. 3 at 586.

[27] GM Ex. 100 at 7.

[28] Tex. Water Code § 36.113(b); *see* Rule 24.C.1.

[29] *Matter of D.M.*, 679 S.W.3d 864, 869 (Tex. App.—Houston [1st Dist.] 2023, pet. denied).

application is administratively and technically complete, but rather to determine whether the substance of the information provided in the application can fulfill the statutory purpose."[30] Here, there is no indication that the sworn requirement is jurisdictional, and the requirement does not affect the substance of the information provided in the Applications. Therefore, Mr. Boriack's challenge to jurisdiction based on administrative completeness is denied.

When a statutory provision has mandatory language, but is not jurisdictional, and does not have an explicit or logically necessary consequence, the court presumes the provision was intended as a direction rather than a mandate.[31] Here, no consequence for a lack of sworn application is provided in the statute or rules. Therefore, the ALJ concludes that the requirement is directory rather than mandatory. As such, it is sufficient that the GM deemed the Applications administratively complete.

2. Mitigation Plan (Rule 10.E.3)

The District shall require a mitigation plan, acceptable to the District, to be included in the application to mitigate the effects of the drawdown of artesian pressure or the level of the water table upon registered or permitted well owners potentially affected by the water well or wells.[32] The plan shall include but not be limited to:

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[30] *Citizens Against Landfill Location v. Texas Comm'n on Env't Quality*, 169 S.W.3d 258, 272 (Tex. App. – Austin 2005, pet. denied).

[31] *See AC Interests, L.P. v. Texas Comm'n on Env't Quality*, 543 S.W.3d 703, 714 (Tex. 2018).

[32] Rule 10.E.3.

a. The actions and procedures to be taken by the holder of the drilling and operating permit in the event that pumping causes the water level in a registered or permitted well to drop to an unacceptable level.

b. The actions and procedures to be taken by the holder of the drilling and operating permit in the event that the pumping from the permitted well causes the water to become objectionable or renders the water unusable to a registered or permitted well owner.

c. The actions and procedures to be taken by the holder of the drilling and operating permit in the event that pumping causes the well casing or equipment to be damaged so that the recorded quality or quantity of water cannot be produced by the registered or permitted well owner.

d. Measures to be taken in cases where the reduction of artesian pressure causes an emergency to arise which may threaten human or animal health safety or welfare.

e. A specifically enumerated time schedule for the execution of the mitigation plan.[33]

According to GBRA, the mitigation plan is addressed via the Participation Agreement in the Eastern Gonzales County Dedicated Mitigation Fund, by and between TWA (as predecessor in interest to GBRA) and the District.[34] The Participation Agreement states the parties' intention to contractually adopt principles contained in the District rules relating to a well owner's responsibility to mitigate adverse impacts upon other water well users.[35] GBRA agreed to contribute payments into the Mitigation Fund to be used by the District for the purpose of investigating and evaluating mitigation claims and implementing mitigation

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[33] Rule 10.E.3.

[34] GBRA Ex. 5 at PDF 4; *see* GBRA Ex. 24 at 17-18.

[35] GBRA Ex. 5 at Bates 727.

measures for qualifying wells in eastern Gonzales County.[36] The GM testified that the Participation Agreement meets the requirements of the District Rule pertaining to a mitigation plan.[37]

Protestants contend that the Applications lack mitigation plans that contain the provisions listed in the rule. The GM was unable to answer whether the District's Mitigation Fund provides the items listed in Rule 10.E.3.[38]

The GM credibly testified that GBRA's participation in the Mitigation Fund complies with the District rule requirement. As such, the ALJ finds that GBRA provided a sufficient mitigation plan in compliance with Rule 10.E.3.

3. Export Permit Requirements (Rule 15.C)

District Rule 15.C requires, *inter alia*, the following information to be provided to the GM with an application for a permit to export water: the availability of water in the District and in the proposed receiving area during the period for which the water supply is requested; and the projected effect of the proposed transfer on aquifer conditions, depletion, subsidence, or effects on existing permit holders or other groundwater users within the District.[39] The provided information related to these topics is substantively discussed in sections IV.L (availability), IV.M (aquifer conditions, depletion), IV. I (subsidence), and IV.E of the PFD.

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[36] GBRA Ex. 1 at 9.

[37] Tr. Vol. 3 at 595-96.

[38] *See* Tr. Vol. 511-12.

[39] Rule 15.C.10, .11.

The ALJ finds that GBRA provided the information required by Rule 15.C.

B. Required Information Under Rule 10 and Prescribed Fees (Rule 11.A.1)

Protestants contend that the Production Permit Application does not contain all of the information required under Rule 11.A.1, as described in section IV.A of this PFD.

Mr. Boriack asserts that it was unclear whether GBRA paid the cost of the independent third-party modeling review as required in Rule 10.E. The GM testified that the third-party modeling was paid by GBRA via the application fee.[40]

Mr. Beach opined that the applications meet the requirements of Rule 10.[41] GBRA asserts that the record establishes compliance with the various requirements of Rule 10.[42]

The record establishes that GBRA paid the cost of the independent third-party modeling review through its application fee. The ALJ finds that GBRA provided the information required under Rule 10 and prescribed fees.

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[40] Tr. Vol. 3 at 503-04.

[41] GBRA Ex. 24 at 12 (Bates 1381), 13 (Bates 1382), 24 (Bates 1393).

[42] *See* GBRA Closing Brief at 14-15; GM Ex. 100 at 3-4.

C. Conformance with Well Spacing Requirements and Production Requirements (Rules 11.A.2, 18.A, 18.B)

The District's spacing requirement is based on the proposed permitted production rate of each proposed well, the target aquifer, and the minimum distance to the property line of the nearest tract of land that is not included in the applicant's property.[43] Mr. Beach opined that the proposed wells meet the well spacing and production requirements in Rules 11 and 18.[44] The existing and proposed wells are or will be offset from the property lines between 1,965 feet to 2,790 feet.[45]

The maximum permitted production for a tract of land may not exceed a total of one AFY of water per surface acre of land owned from the Carrizo Aquifer.[46] GBRA has secured groundwater leases on approximately 42,000 acres of land.[47] GBRA is requesting authorization for 9,000 AFY in addition to its existing Operating Permit authorizing the production of 15,000 AFY of water, for a total of 24,000 AFY.[48]

No party contested the conformance of the Applications with the well spacing requirements and production requirements under Rules 11.A.2, 18.A, and 18.B.

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[43] Rules 18.A, 11.A.2.

[44] GBRA Ex. 24 at 15, 18, 19, 20.

[45] GBRA Ex. 7, Figures 1 and 2 (Bates 779-80).

[46] Rule 18.B.1.

[47] GBRA Ex. 1 at 8-9; GBRA Exs. 3, 4.

[48] GBRA Ex. 1 at 12; GBRA Ex. 5 at Bates 719-48.

However, Mr. Boriack contends that the spacing rules do not fairly protect landowners.

It is not the ALJ's role to determine whether a rule is effective in accomplishing any regulatory objective. Only the District Board may adopt and revise rules through the rulemaking process. The ALJ finds that the Applications comply with the well spacing and production requirements of District Rules 11.A.2, 18.A, and 18.B.

D. MODELING RESULTS AND PRODUCTION LIMITS (RULE 11.A.3)

Before granting or denying a permit, the District shall consider whether the proposed use of water unreasonably affects existing groundwater or surface water resources or existing permit holders.[49] The District uses the 2004 Southern Groundwater Availability Models for Queen City and Sparta Aquifers (Carrizo-Wilcox GAM), which is a regional groundwater model, to assess groundwater availability and future aquifer conditions.[50] GBRA used the Carrizo-Wilcox GAM to assess the effects of the pumping of an additional 9,000 AFY and included those results in the Applications.[51] The impact of the proposed additional 9,000 AFY of water is predicted to be up to 40 feet of additional drawdown occurring in and around GBRA's proposed three new wells.[52] GBRA

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[49] Rule 11.A.3.

[50] GBRA Ex. 24 at 13-14 (Bates 1382-83).

[51] GBRA Ex. 7, Figure 2 (Bates 780); GBRA Ex. 24 at 19 (Bates 1388).

[52] GM Ex. 202 at 11 (Bates 447).

asserts that the modeling results do not deviate from production limits, as required by Rule 11.A.3.[53]

Mr. Boriack contested the modeling results in relation to the production limits under Rule 11.A.3. Mr. Boriack asserts that there have been several MODFLOW software upgrades that were not applied to the GBRA permit modeling. Mr. Boriack contends that the Daniel B. Stephens & Associates, Inc. (DBS&A) modeling (performed for the GM) was not calibrated.

According to Mr. Beach and Mr. Blandford, the MODFLOW updates would not materially affect the results.[54] In the modeling report, DBS&A determined that that due to the relatively small number of cells where the aquifer properties were changed and because the changes were restricted to the immediate well field area, the differences in predicted water levels between the original and updated aquifer properties was small.[55]

The preponderant evidence establishes that the modeling results do not significantly deviate from the production limitations of Rule 18.B.

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[53] GBRA Ex. 24 at 18-20 (Bates 1387-89).

[54] Tr. Vol. 2 at 362; GM Ex. 200 at 6-7.

[55] GM Ex. 202 at 2-4.

E. Effect of the Proposed Use of Water on Groundwater and Surface Water Resources and Existing Permit Holders (Rule 11.A.4; Tex. Water Code § 36.113(d)(2))

The District shall consider whether the proposed use of water unreasonably affects existing groundwater or surface water resources or existing permit holders.[56]

Protestants argue that the GBRA's proposed water use will have an adverse impact on groundwater and surface water resources and existing permit holders. Mr. Beach testified that water can move across confining layers of the Carrizo Aquifer both above and below into adjacent aquifers.[57] Protestants assert that this will impact existing permit holders, such as Mr. Boriack who has a well in the Queen City Aquifer. Mr. Boriack expressed concern that the drawdown effects of the whole District would be concentrated in the area of the GBRA and Alliance Regional Water Authority (ARWA) wells. Existing permit holders may not qualify to receive mitigation by the District because they are not within the Carrizo Aquifer from which GBRA would pump.[58]

Protestants also allege adverse impacts to the surface water resources, since the modeled drawdown due to the proposed pumping will include drawdown in the Carrizo outcrop.[59] Drawdown in the outcrop adversely impacts surface water

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[56] Rule 11.A.4.

[57] Tr. Vol. 1 at 185.

[58] Tr. Vol. 3 at 509-10.

[59] The outcrop is generally the portion of the aquifer that is exposed to the air or environment. Tr. Vol. 1 at 182.

resources. Mr. Beach testified that the groundwater modeling showed that with the expected production of groundwater in the District over time, there would be increase in water coming from surface water resources into the Carrizo Aquifer.[60] According to Mr. Beach, drawdown in the Carrizo Aquifer will also cause groundwater inflow from other counties and GCDs, including ones outside of Groundwater Management Area (GMA) 13.[61]

Mr. Beach opined that the pumping of an additional 9,000 AFY of water will not have unreasonable effects on groundwater and surface water resources and existing permit holders.[62] Water level declines are normal and expected impacts from the production of groundwater.[63] The Carrizo-Wilcox GAM showed that the estimated long-term effect of an additional 9,000 AFY was up to 40 feet of additional drawdown occurring in and around GBRA's proposed three new wells in the year 2072.[64] The maximum simulated water level decline from GBRA's proposed and existing wells (24,000 AFY) was about 121 feet in the GBRA well field. The thickness of the Carrizo Aquifer in this location varies from 300 to 400 feet.[65] Mr. Blandford considered those predicted drawdowns to be relatively conservative predictions.[66]

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[60] Tr. Vol. 2 at 313-14.

[61] Tr. Vol. 2 at 315-16.

[62] GBRA Ex. 24 at 17.

[63] GBRA Ex. 24 at 17.

[64] GBRA Exs. 7, 13; GBRA Ex. 24 at 14-15; GM Ex. 202 at 11.

[65] GBRA Ex. 24 at 9; GBRA Ex. 26.

[66] GM Ex. 202 at 14.

Mr. Beach opined that an additional 9,000 AFY will not have an unreasonable effect on surface water resources.[67] Mr. Beach explained that shallow wells located in or close to the aquifer outcrop would be more likely to affect surface water resources because the water level decline from pumping of those wells has a greater impact on the water table, which may impact rivers, streams, and other surface water resources. Because GBRA's wells are located about 8 to 10 miles downdip from the outcrop of the Carrizo Aquifer and are between 1,225 to 1,400 feet deep, the water level decline will have limited effect in the outcrop and limit the potential effects on surface water resources. Also, the District has monitoring wells located in the outcrop updip from the GBRA well field and will be able to evaluate impacts in the outcrop from the combined pumping in the Carrizo Aquifer.[68]

Additionally, GBRA points out that the District has implemented well spacing requirements, maximum production allocations, a monitoring program, and a mitigation plan to help protect the groundwater resources and other existing users from unreasonable effects.[69]

The ALJ notes that the consideration factor is "whether the proposed use of water would *unreasonably* affect existing groundwater or surface water resources or existing permit holders."[70] This contemplates that for any use of water, there will be expected and normal effects associated with its pumping. The greater weight of the

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[67] GBRA Ex. 24 at 19.

[68] GBRA Ex. 24 at 19.

[69] GBRA Ex. 24 at 17-18.

[70] Rule 11.A.4 (emphasis added).

evidence shows that the proposed additional 9,000 AFY of pumping will not unreasonably affect existing groundwater, surface water resources, or existing permit holders.

F. Beneficial Use (Rule 11.A.5; Tex. Water Code § 36.113(d)(3))

The District shall consider whether the proposed use of water is dedicated to a beneficial use.[71]

GBRA has committed the use of the 9,000 AFY of additional groundwater to public supply purposes and has executed treated water supply contracts with customers accordingly.[72] These customers need the additional water supply beginning in 2024, and are projected to use the entire amounts under these water supply agreements by 2032.[73] The agreements require customers to limit the use of water provided by GBRA to municipal and industrial uses, and prohibit the use of water for irrigation of golf courses.[74]

Mr. Boriack contends that not all of the water produced by GBRA will be put to beneficial use due to leaks in piping systems and that GBRA has not provided water loss audits.

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[71] Rule 11.A.5; Tex. Water Code § 36.113(d)(3).

[72] GBRA Ex. 1 at 18, 22; *see* GBRA Exs. 17-20.

[73] GBRA Ex. 1 at 18.

[74] GBRA Ex. 1 at 24.

No evidence of water leaks was presented. No requirement of a water loss audit was established. The ALJ finds that the proposed use of water is dedicated to a beneficial use.

G. Consistency with District's Management Plan (Rule 11.A.6; Tex. Water Code §§ 36.113(d)(4), .122(f)(3))

The District shall consider whether the proposed use of water is consistent with the District's approved water management plan.[75] The District Management Plan's goals and the Texas Water Code outline these goals:

1. providing the most efficient use of groundwater;
2. controlling and preventing waste of groundwater;
3. controlling and preventing subsidence;
4. addressing conjunctive surface water management issues;
5. addressing natural resource issues;
6. addressing drought conditions;
7. addressing conservation, recharge enhancement, rainwater, precipitation enhancement, or brush control, where appropriate and cost-effective;
8. addressing the desired future conditions adopted by the District under section 36.108 of the Texas Water Code; and
9. accurate accounting of the water transported from the District.[76]

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[75] Rule 11.A.6; Tex. Water Code § 36.113(d)(4), .122(f)(3).

[76] WPA Ex. 3 at PDF 79-80; Tex. Water Code § 36.1071(a). The District Management Plan includes "accurate accounting of the water transported from the District," which is not included in Texas Water Code section 36.1071(a). Section 36.1071(a) includes "controlling and preventing subsidence," which is not included in the District Management Plan.

According to GBRA, the proposed water use is consistent with the District's Management Plan.[77] To address the Management Plan's goals, GBRA: has implemented water conservation and drought contingency plans, which implement conservation measures; will prevent waste of groundwater by metering the water at various locations, which will allow detection of leaks; requires customers to conserve water, and to design, operate, and maintain facilities in a manner that will prevent waste; and has limited the use of water to municipal and industrial uses and prohibits the use of the water to irrigate golf courses.[78]

Protestants contend that GBRA's proposed use of water is not consistent with the District's approved Management Plan, because the proposed 9,000 AFY will result in a further exceedance of the applicable Modeled Available Groundwater (MAG) as contained in the District's management plan.

The record shows that GBRA has incorporated measures to comply with the District's Management Plan. To the extent Protestants' contentions relate to the desired future conditions (DFCs), those issues will be addressed in sections IV.K and IV.L below.

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[77] GBRA Ex. 24 at 21.

[78] GBRA Ex. 24 at 21; *see* Tex. Water Code § 36.1071(a). Subsidence and DFCs are addressed below in sections IV.I and IV.K, respectively, of the PFD.

H. AVOID WASTE AND ACHIEVE WATER CONSERVATION (RULE 11.A.7; TEX. WATER CODE § 36.113(D)(6))

The District shall consider whether the applicant has agreed to avoid waste and achieve water conservation.[79]

GBRA asserts that it will avoid waste and achieve water conservation. GBRA implements conservation through a Wholesale Water Conservation Plan and a Drought Contingency Plan for its wholesale operations and adopts similar plans for its retail systems.[80] The Water Conservation Plan promotes practices to reduce water waste and increase water efficiency. The Drought Contingency Plan outlines criteria to initiate and terminate drought and emergency stages in response to water supply conditions. GBRA enforces these Plans by requiring contracts with customers providing to the "maximum extent possible" the conservation of water, and that facilities will be designed, constructed, operated, and maintained in a manner to prevent waste of water.[81] GBRA is preventing waste by including measuring equipment at each well pump, the point of delivery, and the water treatment plant to measure and account for diverted water and identify any system losses prior to delivery. This will monitor for any leaks in the raw water transmission system.[82]

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[79] Rule 11.A.7; Tex. Water Code § 36.113(d)(6).

[80] GBRA Ex. 1 at 22.

[81] GBRA Ex. 1 at 23-24.

[82] GBRA Ex. 1 at 24.

GBRA will transport groundwater by pipeline as required by Rule 11.E.2.c. and will monitor the pipeline closely for potential leaks.[83]

Protestants express concern that GBRA's customers are asked to "avoid waste and achieve water conservation" without any assurance that this will be achieved or enforced. Mr. Hickman testified that GBRA passes this requirement to its customers who have their own conservation plans and drought contingency plans.[84] On cross-examination, he could not think of an example "cutting back" a customer for wasting water.[85]

GBRA's Wholesale Water Conservation Plan promotes practices to reduce water waste and increase water efficiency, and the Drought Contingency Plan provides criteria for drought and emergency stages in response to water supply conditions. Under the statute and rule, the consideration factor simply addresses whether the applicant has agreed to avoid waste and achieve water conservation, without any express requirements related to achieving or enforcing these measures.[86] The record establishes that GBRA has agreed to avoid waste and achieve water conservation.

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[83] GBRA Ex. 24 at 22.

[84] Tr. Vol. 1 at 118-19.

[85] Tr. Vol. 1 at 118.

[86] Rule 11.A.7; Tex. Water Code § 36.113(d)(6).

I. SUBSIDENCE (RULE 11.A.8)

The District shall consider whether the proposed use of the water will result in significant subsidence.[87]

Protestants express concern that the proposed production will result in significant subsidence, especially in the outcrop area of the Carrizo Aquifer. This portion of GMA 13 has been identified as having a "moderate" risk of subsidence by the Texas Water Development Board (TWDB).[88] Neither the District nor GBRA have collected data to confirm whether there is subsidence occurring in the District from previous pumping. No analysis or modeling of subsidence was performed for these Applications.

GBRA and the District assert that subsidence is not a problem. According to Mr. Beach, the District's management plan indicates that the rigid geologic framework of the aquifer is such that subsidence is not an issue.[89] Mr. Blandford testified that subsidence has not been an issue and is not expected to become an issue within GMA13 during the 50-year water management planning period.[90]

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[87] Rule 11.A.8.

[88] Tr. Vol. 2 at 331. Although Mr. Boriack included a chart in his closing arguments indicating tbat the Carrizo-Wilcox Aquifer has high subsidence risk, the chart has not been admitted into evidence. *See* Boriack Closing Brief at 26.

[89] GBRA Ex. 24 at 18; Tr. Vol. 2 at 330.

[90] GM Ex. 200 at 12.

Two expert witnesses opined that subsidence is not expected to occur as a result of the proposed pumping. Therefore, the greater weight of the evidence establishes that the proposed pumping will not result in significant subsidence.

J. GROUNDWATER QUALITY AND WELL PLUGGING (RULE 11.A.9; TEX. WATER CODE § 36.113(D)(7))

The District shall consider whether the applicant has agreed that reasonable diligence will be used to protect groundwater quality and that the applicant will follow well plugging guidelines at the time of well closure.[91]

GBRA asserts it will use reasonable diligence to protect groundwater quality and follow well plugging guidelines.[92]

Protestants expressed concern that the proposed pumping would adversely impact groundwater quality. Protestants assert that water quality testing at various wells across the District indicate that water quality in the Carrizo Aquifer has been declining.[93] No groundwater quality studies were performed for these Applications.[94]

The ALJ finds that GBRA has agreed that reasonable diligence will be used to protect groundwater quality and that the applicant will follow well plugging

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[91] Rule 11.A.9; Tex. Water Code § 36.113(d)(7).

[92] GBRA Ex. 1 at 25; *see* Rules 11.A.9, .E.1.g, .E.2.h, 12.

[93] WPA Ex. 3 at PDF 22.

[94] Tr. Vol. 1 at 115.

guidelines at the time of well closure. No requirement for groundwater quality studies as part of the application process was established.

K. Water Permitted, Water Produced, and Aquifer Condition to Achieve the DFC (Rule 11.A.10)

The District shall consider whether the amount of existing water permitted, amount of existing water being produced, and the condition of the aquifer (average water pressure decline/water table decline) at the time the permit application is filed in order to achieve the DFC.[95]

1. Background on DFCs

The Texas Legislature created GMAs "[i]n order 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, consistent with Section 59, Article XVI, Texas Constitution."[96] The District is a member of GMA 13, which along with other GCDs, voted to approve DFCs for the major aquifers within the District, including the Carrizo Aquifer.[97]

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[95] Rule 11.A.10.

[96] Tex. Water Code § 35.001.

[97] *See* Tex. Water Code §§ 36.001(30), .108.

The DFC is a quantitative description of a desired condition of the groundwater resources in a management area at one or more specified future times.[98] Each GCD shall ensure that its management plan contains goals and objectives consistent with achieving the DFC of the relevant aquifers as adopted during the joint planning process.[99] A district, to the extent possible, shall issue permits up to the point that the total volume of exempt and permitted groundwater production will achieve an applicable DFC.[100]

Two DFCs were selected for GMA 13 for the Carrizo-Wilcox Aquifer: (1) 75 percent of the saturated thickness in the outcrop at the end of 2012 remains in 2080; and (2) an average drawdown of 48 feet for all of GMA 13 from the end of 2012 conditions to the year 2080. The second DFC was used to produce the MAG for the aquifers.[101] MAG means the amount of water that may be produced on an average annual basis to achieve a DFC.[102] A management objective of GMA 13 is to estimate total annual groundwater production for each aquifer and compare the production estimates to the MAG. [103]

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[98] Tex. Water Code § 36.001(30); *see* Tex. Water Code § 36.108(d-2).

[99] Tex. Water Code § 36.1085.

[100] Tex. Water Code § 36.1132(a).

[101] Boriack Ex. 8 at 6; GBRA Ex. 24 at 21-22; WPA Ex. 3 at PDF 330. Other parts of the record indicate a DFC drawdown of 49 feet. *See* WPA Ex. 3, LM-1 at PDF 10, 87, 299). This minor discrepancy would not result in any substantive change in the ALJ's analysis.

[102] Tex. Water. Code § 36.001(25).

[103] WPA Ex. 3, LM-1 at PDF 87.

2. Drawdown

There has been significant drawdown of the Carrizo Aquifer. The drawdown tends to be most dramatic in and around the well fields where pumping is occurring. However, the drawdown impacts most of the land within the District.[104] The largest drawdown is about 80 feet around the Schertz-Seguin Local Government Corporation and San Antonio Water Systems well fields, but drawdowns up to 60 feet have been occurring throughout much of the southern portion of the District.[105] Approximately 30 feet of drawdown has occurred in the northern portion of the District.[106] Additional drawdown is expected from the pumping of GBRA and ARWA well fields under their current permits.

Based on GBRA's modeling, the proposed additional 9,000 AFY of pumping from the GBRA well field would result in up to approximately 40 feet of additional drawdown in 2070. The total drawdown in 2070 from the proposed GBRA well field producing 24,000 AFY would be over 100 feet. The total drawdown in 2070 from the proposed GBRA well field producing 24,000 AFY plus the ARWA well field producing 11,620 AFY would be over 145 feet. In all three scenarios, the maximum additional drawdown occurs around the producing well fields.[107] The adverse impacts from permits issued to major producers/exporters (GBRA, ARWA, and Aqua) have not been realized yet because they have not yet produced any

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[104] WPA Ex. 3, LM-1, Appendix 4; *see* WPA Ex. 3 at PDF 264.

[105] Tr. Vol. 3 at 480.

[106] Tr. Vol. 3 at 481.

[107] GM Ex. 202 at 450.

groundwater to export out of the District.[108] According to Mr. Beach, what constitutes an "unreasonable impact" is a policy decision of the District.[109] He stated, "an unreasonable effect on groundwater resources would be if the groundwater level would be so low that a landowner couldn't access groundwater in that aquifer."[110]

The DFC for 2080 is 48 feet of drawdown over GMA 13, as compared to the modeled drawdown of 100 feet by 2070 for GBRA's production of 24,000 AFY. It is notable that the DFC drawdown is averaged across the entire GMA 13 area, not specifically the District, and applies to both the Carrizo Aquifer and Wilcox Aquifer.[111]

The ALJ finds that the 100 feet of modeled drawdown by 2070 from GBRA's production of 24,000 AFY (the permitted 15,000 AFY, plus the requested additional 9,000 AFY) exceeds the GMA's DFC for 2080, which is only 48 feet of drawdown. Although the drawdowns associated with GBRA's pumping may be reasonable and expected for the given quantity of pumping, GBRA's production—in conjunction with all other production in the aquifer—is predicted to exceed the DFCs in the coming decades, absent intervening measures.

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[108] See WPA Ex. 3 at PDF 124.

[109] Tr. Vol. 1 at 208.

[110] Tr. Vol. 1 at 208.

[111] Tr. Vol. 1 at 171-72.

3. MAG

Protestants contend that the proposed amendment would cause the amount of existing water permitted, the amount of existing water produced, and the condition of the Carrizo Aquifer to not achieve the DFCs. MAGs are further discussed below in section IV.L.

L. Availability of Water (Rule 15.D.1; Tex. Water Code § 36.122(f)(1))

For export permits, the District shall consider the availability of water in the District and in the proposed receiving area during the period for which the water supply is requested.[112]

Mr. Hickman and Mr. Beach testified about the need for additional water in Caldwell and Hays Counties, which would receive the additional groundwater supplies.[113] These customers need the additional water supply beginning in 2024 and are projected to use the entire amounts under these agreements by 2032.[114]

1. Applicable MAGs

GBRA asserts that the MAGs included in the 2018 District's Management Plan are applicable, because that plan was in effect when the Applications were first submitted on May 10, 2022. Protestants contend that the MAGs in TWDB's

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[112] Rule 15.D.1; Tex. Water Code § 36.233(f)(1).

[113] GBRA Ex. 1 at 18; GBRA Ex. 8 at PDF 3-4, PDF 9 (Table 5); GBRA Ex. 24 at 23.

[114] GBRA Ex. 1 at 18.

July 25, 2022 report are applicable, because they are the MAGs that were in effect when the Applications became administratively complete. The MAGs (in AFY) are compared below.

MAG / Decade	2020	2030	2040	2050	2060	2070	2080
11/13/2018 District Management Plan[115]	83,284	83,284	84,026	84,390	84,390	81,607	81,615
7/25/2022 TWDB Report[116]	47,584	61,365	71,628	81,327	86,278	87,238	79,692

Under Rule 11.A.10, the District shall consider the amount of water permitted, the amount of existing water being produced, and the condition of the aquifer at the time the permit application is filed in order to achieve the DFC. While the rule specifies that the timing (at the time of application) of the amounts of water permitted and produced and aquifer conditions is to be considered, the timing of the DFCs (and consequent MAGs) is not specified. Under Texas Water Code section 36.1132(b)(1), in issuing permits, the District shall consider the MAG determined by the executive administrator. Again, no timing is specified for the applicable MAG.

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[115] Boriack Ex. 8 at 7.

[116] Carrizo Aquifer amount totals for Caldwell County and Gonzales County. WPA Ex. 3, LM-3 at PDF 323.

GBRA asserts that under Local Government Code section 245.002(a)(1), the MAGs at the time the original application for permit was filed are applicable.[117] That section applies to a "regulatory agency," which means the governing body of, or a bureau, department, division, board, commission, or other agency of, a political subdivision.[118] GCDs are political subdivisions under Texas Water Code section 36.001(15).

The MAGs are a planning tool and consideration factor for the District rather than a procedural requirement. Moreover, the District must use the best available science in the conservation and development of groundwater.[119] Using the best available science includes using the latest planning tools of the District. The MAGs are based on the DFC and MODFLOW pumping simulation.[120] In a field which relies heavily on modeling, estimates, and predictions, it is prudent to apply the more recent MAGs to incorporate the most updated and accurate information available. Therefore, the ALJ finds that the MAGs from the 2022 TWDB Report should be considered in assessing GBRA's Applications.

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[117] Tex. Local Gov't Code § 245.002(a)(1) ("Each regulatory agency shall consider the approval, disapproval, or conditional approval of an application for a permit solely on the basis of any orders, regulations, ordinances, rules, expiration dates, or other properly adopted requirements in effect at the time [] the original application for the permit is filed for review for any purpose, including review for administrative completeness[.]")

[118] Tex. Local Gov't Code § 245.001(4).

[119] Tex. Water Code § 36.0015(b).

[120] WPA Ex. 3 at 300.

2. Availability of Water and MAGs

The 2022 total production of Carrizo groundwater from both permitted and exempt wells was approximately 44,309 AFY.[121] The District has issued groundwater permits totaling approximately 91,285 AFY.[122]

Protestants argue that the requested amount exceeds the MAG for this decade, as well as for any period from now until 2080. When asked what the District would do if all the permittees decided to produce their permitted amounts, the GM testified that "the District would look at that and take appropriate action with policy changes," such as "making it so that no additional permits were granted, requesting that drought measures be taken and cutbacks occur for everybody."[123]

WPA points out that GBRA already has permits issued by the District to produce and export up to 15,000 AFY from its seven wells.[124] GBRA has not exported or produced any of the permitted water but seeks an additional 9,000 AFY and expanding its well field to a total of ten wells.[125] Protestants assert that GBRA's request for an additional 9,000 AFY will cause the existing water permitted (about 92,000 AFY) to further exceed the MAG (approximately 60,000 AFY for the decade

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[121] Tr. Vol. 2 at 401-02.

[122] WPA Ex. 3, LM-1 at PDF 124-28.

[123] Tr. Vol. 2 at 420-21.

[124] Tr. Vol. 1 at 60.

[125] *See* WPA Ex. 3 at PDF 124.

starting 2030) set by TWDB for this District.[126] The amendment would also cause the amount of water expected to be produced in the near future to be about 90,000 AFY, also exceeding the District's MAG for this aquifer.[127] Protestants criticize that GBRA did not model the cumulative impact of all projected pumping in the Carrizo Aquifer.[128]

GBRA and the GM emphasize (and ultimately all parties agree) that the MAG is not a cap on how much groundwater may be permitted.[129] The MAG is an average annual estimate of what may be pumped over a planning horizon (usually 50 years) that will allow a district to comply with the DFC.[130] According to TWDB, "in the regional water planning process, total anticipated groundwater production in any planning decade may not exceed the MAG volume in any county-aquifer location."[131]

The District's 2022 total production amount from the Carrizo, approximately 44,309 acre-feet, is less than the MAG for the decade of 2020, which is 47,584 AFY.[132] The simple addition of GBRA's requested 9,000 AFY to the 2022 total production would exceed the MAG for this decade. The GM estimated that

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[126] Tr. Vol. 3 at 527-28; Boriack Ex. 8 at 7.

[127] Boriack Ex. 8 at 7.

[128] Tr. Vol. 1 at 194-95.

[129] Tr. Vol. 1 at 224; Tr. Vol. 3 at 526-27.

[130] GBRA Ex. 29 at 4-5.

[131] Texas Water Development Board, South Central Texas Regional Water Planning Group, 2021 Region L Water Plan at 3-4, *available at* https://www.twdb.texas.gov/waterplanning/rwp/plans/2021/ (accessed November 2024). The ALJ takes official notice of the 2021 Region L Water Plan.

[132] WPA Ex. 3 at PDF 89, 323.

within 10 years, 80 to 90 percent of the permitted amounts would be producing on an annual basis.[133] While Schertz-Seguin Local Government Corporation has been producing only about two-thirds of its permitted amount of 19,362 AFY, if it begins to produce close to its permitted amount, that would bring the amount of Carrizo production up to about 50,000 AFY.[134] If GBRA and ARWA's expected production under their permits (totaling 26,620 AFY) are added, that would bring the expected Carrizo production to more than 75,000 AFY. This amount would exceed the MAG until 2050.

The preponderance of evidence shows that groundwater production is expected to exceed the MAG for the Carrizo Aquifer in the next decade, absent intervening measures from the District.

M. Effects of Transfer on Aquifer Conditions, Depletion, Existing Permit Holders, or Other Groundwater Users in the District (Rule 15.D.2; Tex. Water Code § 36.122(f)(2))

For export permits, the District shall consider the projected effect of the proposed transfer on aquifer conditions, depletion, subsidence, or effects on existing permit holders or other groundwater users within the District.[135]

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[133] Tr. Vol. 3 at 627.

[134] Tr. Vol. 2 at 408; WPA Ex. 3 at PDF 124.

[135] Rule 15.D.2; Tex. Water Code § 36.122(f)(2).

According to Mr. Beach, the simulated impacts show that the proposed pumping will not reduce water levels in the aquifer to an extent that precludes a well owner from accessing groundwater.[136] The impacts of exporting the water are expected to be the same normal impacts from groundwater production.[137]

The simulated impacts show that the proposed pumping will not reduce water levels in the aquifer to an extent that precludes a well owner from accessing groundwater. The well spacing requirements, production limits, monitoring program, and mitigation program will further protect against unreasonable effects on existing groundwater and surface water resources, existing permit holders, and other groundwater users.[138] The effects of the pumping and transfer on aquifer conditions was discussed in sections IV.K and IV.L as it relates to DFCs and MAGs.

N. REGIONAL WATER PLAN AND DISTRICT'S MANAGEMENT PLAN (RULE 15.D.3; TEXAS WATER CODE 36.122(F)(3))

For export permits, the District shall consider the approved regional water plan and certified District management plan.[139]

According to Protestants, GBRA's proposed amendment to its groundwater production and export project as contained in its permit applications is not included in the approved regional water plan covering this District. Mr. Hickman testified that

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[136] GBRA Ex. 24 at 17-18.

[137] GBRA Ex. 24 at 23.

[138] GBRA Ex. 24 at 17-18.

[139] Rule 15.D.3; Tex. Water Code § 36.122(f)(3).

the 2021 Region L Water Plan does not mention the additional 9,000 AFY beyond the 15,000 AFY that is associated with the GBRA Mid-Basin Project (Phase 1).[140] Protestants therefore contend that the proposed amendment is not consistent with the District's approved management plan.

However, the 2021 Region L Water Plan projects an additional water need of approximately 78,000 AFY by the year 2030 in the portion of GBRA's statutory district that falls within Region L. This projected water need increases to approximately 152,000 AFY by the year 2070.[141] Whereas the 2021 Region L Water Plan identified GBRA's originally permitted 15,000 AFY as part of GBRA's Mid-Based Project (Phase 1), it is silent on the additional 9,000 AFY requested by GBRA.

The regional water plan does not mention the expansion to the Phase 1 project or GBRA's requested 9,000 AFY. As such, the Applications are neither consistent nor inconsistent with the regional water plan. The Applications' consistency with the District Management Plan is generally discussed in section IV.G, except that matters related to the DFCs are discussed in sections IV.K and IV.L.

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[140] 2021 Region L Water Plan, Section 5.2.12.1.

[141] GBRA Ex. 1 at 21; GBRA Ex. 21 at Bates 1252-81.

O. ANALYSIS AND CONCLUSIONS

1. Operating Permit

In Texas, a landowner owns the groundwater below the surface of the landowner's land as real property.[142] GCDs provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater.[143] GCDs protect property rights and balance interests in conservation and development to meet the needs of this state.[144]

When GBRA's requested 9,000 AFY is added to the District's 2022 total Carrizo production of approximately 44,300 acre-feet, that equals 53,300 AFY of projected production, which exceeds the applicable MAG of 47,584 AFY for the current decade. And this does not even contemplate the production of GBRA's previously permitted but not yet produced 15,000 AFY. The GM estimated that within a decade, 80 to 90 percent of the permitted amount would be produced, which equals approximately 73,000 to 82,000 AFY; this exceeds the MAGs for the 2030 and 2040 decades of 61,365 and 71,628 AFY, respectively. GBRA's production, in addition to production over the whole District, is predicted to exceed the DFCs within a decade and continue exceeding the DFCs until 2050, absent intervening measures.

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[142] Tex. Water. Code § 36.002; *see Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 832-34 (Tex. 2012).

[143] Tex. Water Code § 36.0015(b).

[144] Tex. Water Code § 36.0015(b).

The Texas Supreme Court has held landowners own the groundwater in place as real property, similar to oil and gas.[145] Accordingly, a landowner's interest in groundwater cannot be taken for public use without adequate compensation.[146] And a landowner's lessees of the groundwater ownership are entitled to the same rights.[147]

Currently, there is no statute, rule, or case law which gives priority to existing users of groundwater in this District.[148] Regardless of whether the landowner has a permit or not, landowners own the groundwater below the surface as real property.[149] These property rights in groundwater are protected not only for existing users, but also landowners who will be applying to use groundwater in the future. Therefore, a permit applicant will be treated evenhandedly by the District regardless of when they apply for the permit.

Predicted future exceedances of the DFCs must be managed through District rule amendments and/or policy decisions. Texas Water Code section 36.116 provides several methods the District may utilize to minimize the drawdown of the water table. Denial of permit applications that otherwise meet applicable requirements is not a listed method.

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[145] *Day*, 369 S.W.3d at 831-32.

[146] *Day*, 369 S.W.3d at 838.

[147] *See* Tex. Water Code § 36.002(c).

[148] *Compare to* Tex. Water Code § 11.027 ("As between appropriators, the first in time is the first in right," in snrface water rights).

[149] Tex. Water. Code § 36.002; *see Day*, 369 S.W.3d at 832-34.

For these reasons, the ALJ recommends that GBRA's application to amend its Operating Permit be granted.

2. Export Permit

With respect to the proposed amendment to the Export Permit, the district shall consider: (1) the availability of water in the district and the proposed receiving area during the period for which the water supply is requested; (2) the projected effect of the proposed transfer on aquifer conditions, depletion, subsidence, or effects on existing permit holders or other groundwater users within the district; and (3) the approved regional water plan and approved district management plan.[150]

There are several consideration factors that weigh against exporting groundwater out of the District. The availability of water in the District is limited. The projected effect of the proposed production and export on aquifer conditions and the DFCs is not favorable. The proposed production and export of water does not comport with the approved district management plan to the extent that the plan incorporates the DFCs as objectives. No statute, rule, or caselaw has been presented establishing any vested property right related to a landowner's interest in exporting groundwater.

Therefore, the ALJ recommends denial of GBRA's application to amend its Export Permit.

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[150] Tex. Water Code § 36.122(f); Rule 15.D.

V. ALLOCATION OF COSTS

The party requesting the hearing before SOAH shall pay all costs associated with the contract for the hearing and shall, before the hearing begins, deposit with the district an amount sufficient to pay the contract amount.[151] District Rule 10.E.1 provides that the "District shall engage a qualified and independent third party to confirm all inputs of the model," and the "cost of the independent third party review shall be paid by the applicant."

Mr. Boriack requests compensation from the District and GM for his legal efforts representing himself in this matter. "[A] party must be represented by an attorney to secure an award of attorney's fees."[152] Generally, loss of time and expenses incurred in a suit are not recoverable as costs or damages unless recovery of those items is expressly provided for by statute.[153] As Mr. Boriack's claim to compensation lacks any legal basis, the request for compensation is denied.

The GM urges that the Applicant be ordered to pay the District's transcript costs, the attorney fees of the GM, and the cost of the independent third-party review.[154] The GM contends that the transcript costs and her attorney fees and costs are associated with the SOAH contract for hearing. Additionally, the GM asserts that

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[151] Tex. Water Code § 36.416(c); Rule 25.E.5.

[152] *Rohrmoos Venture v. UTSW DVA Healthcare, LLP*, 578 S.W.3d 469,488 (Tex. 2019).

[153] *See Shenandoah Assocs. v. J & K Properties, Inc.*, 741 S.W.2d 470, 486 (Tex. App. – Dallas 1987, writ denied).

[154] With her reply brief, the GM submitted a declaration of costs incurred for transcripts, attorney's fees and costs, and District's third-party hydrogeologist. However, the evidentiary record was closed upon conclnsion of the hearing on June 7, 2024. The dollar amounts submitted by the GM are not considered for the purposes of this PFD.

GBRA has not paid the District for the costs of Neil Blandford's services as an independent hydrogeologist. WPA requests that the GM's legal fees be paid by GBRA, if the Applications are denied or found to be not administratively complete.

The ALJ finds that the GM's attorney fees and costs are not considered "costs associated with the contract for hearing" under Texas Water Code section 36.416(c) and Rule 25.E.5. Similarly, the costs for Mr. Blandford's expert witness services are not considered "costs associated with the contract for hearing." The GM remains responsible for paying her own attorney fees and costs to represent herself in the contested case hearing.

The District engaged DBS&A for the independent third-party review required by District Rule 10.E.1. According to the GM's testimony during the hearing, GBRA's application fee covered the costs of DBS&A's independent review.[155] Neither the Texas Water Code nor the District Rules require applicant GBRA to pay the GM's costs associated with another independent hydrogeologist, expert witness Mr. Blandford. Similarly, no statute or rule addresses which party pays the transcript costs of a SOAH hearing.

As such, the ALJ concludes that the GM shall bear her own costs for attorney fees, Mr. Blandford's services, and transcript costs. As the party requesting the SOAH hearing, GBRA bears the cost for services under the SOAH contract.

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[155] Tr. Vol. 3 at 503-04; *see* Rule 10.E.1.

VI. RECOMMENDATION

After consideration of the applicable law and evidenced presented, the ALJ concludes that: (1) GBRA's application to amend its Operating Permit should be granted because it meets the substantive requirements of the Texas Water Code and District rules; and (2) GBRA's application to amend its Export Permit should be denied because the consideration factors weighed against issuance of the export permit amendment.

The GM bears the costs for her attorney fees, expert witness services, and transcript costs; and GBRA bears the cost for services under the SOAH contract. In support of these recommendations, the ALJ proposes the following Findings of Fact and Conclusions of Law.

VII. FINDINGS OF FACT

Background and Procedural History

1. The Gonzales County Underground Water Conservation District (District) is one of many groundwater conservation districts (GCDs) created by the Texas Legislature to manage groundwater resources within each district's boundaries.

2. The Guadalupe-Blanco River Authority (GBRA) is a conservation and reclamation district established by the Texas Legislature that serves as a regional water supplier, supplying treated and untreated water to people, cities, businesses, farmers, and industries.

3. GBRA purchased 165 leases on approximately 42,000 acres of land in Gonzales and Caldwell counties for the right to produce groundwater supplies out of the Carrizo Aquifer beneath the leased property.

4. GBRA's existing Operating Permit for Public Water Supply Permit No. 11-16-17 (Operating Permit) and Export Permit No. 01-13-01 (Export Permit) authorize GBRA to pump a maximum of 15,000 acre-feet per year (AFY) of groundwater from the Carrizo Aquifer through seven wells that each have a defined maximum pumping rate and export the produced water outside of the District's boundaries.

5. On May 10, 2022, GBRA filed its application to amend its Operating Permit, seeking to produce an additional 9,000 AFY of groundwater, to add three additional wells, and to revise the capacities of the existing seven wells.

6. On May 10, 2022, GBRA files its application to amend its Export Permit, seeking to export the additional 9,000 AFY out of the District to Caldwell, Hays, and Guadalupe Counties.

7. After GBRA provided the District with additional information, the District declared GBRA's applications administratively complete on August 17, 2022.

8. GBRA published notice of the applications and mailed notices to adjacent landowners and well owners within one-half mile of the proposed water wells.

9. On September 13 and October 11, 2022, the District's Board of Directors (Board) held public hearings on GBRA's applications.

10. On November 8, 2022, the Board referred the consideration of the contested case hearing requests to Judge Stephen Abel. Judge Abel considered the hearing requests on February 16, 2023 and on February 28, 2023, recommended that the Board issue an order naming Gonzales County Water Supply Corporation, the Water Protection Association, Mark Ploeger, Sally Ploeger, Mary Ann Menning, Ted Boriack, and Phil and Jason Breitschopf and A.P. Breitschopf and Sons, Inc. as parties.

11. On March 9, 2023, GBRA requested that GBRA's applications be referred to the State Office of Administrative Hearings (SOAH). The Board named the parties and referred the case to SOAH on March 14, 2023.

12. On August 9, 2023, SOAH Administrative Law Judge (ALJ) Linda Brite held the preliminary hearing via video conference and named GBRA, General Manager (GM) of the District, Gonzales County Water Supply Corporation,

the Water Protection Association, Mark Ploeger, Sally Ploeger, Mary Ann Menning, Ted Boriack, and Phil and Jason Breitschopf, and A.P. Breitschopf and Sons, Inc. as parties.

13. On December 21, 2023, Gonzales County Water Supply Corporation filed a motion to withdraw as a party, which was granted by SOAH Order No. 3 on January 3, 2024.

14. The hearing on the merits was held in-person on June 5-7, 2024, at the Gonzales County Courthouse and District office in Gonzales, Texas. The record closed on October 21, 2024, with the filing of written briefs.

Administrative Completeness

15. GBRA applied for amendments to its Operating Permit and its Export Permit on the forms prescribed by the District.

16. The District does not require that the applications be sworn before a notary.

17. The original Applications included a cover letter signed by GBRA's general manager.

18. The Applications were resubmitted in February 2024 with signatures on the Application forms.

19. The Applications were accompanied by the prescribed fees.

20. The Export Permit application contains the information required by District Rule (Rule) 15.C.

21. The GM deemed the Applications administratively complete on August 17, 2022.

Rule 10

22. The third-party modeling required by Rule 10.E.1 was paid by GBRA via the application fee.

23. GBRA entered into a Participation Agreement in the Eastern Gonzales County Dedicated Mitigation Fund (Mitigation Fund), by and between Texas Water Alliance (as predecessor in interest to GBRA) and the District.

24. Participation in the Mitigation Fund fulfills the mitigation plan requirements of Rule 10.E.3.

25. The Applications contain the information required by Rule 10.

Well Spacing and Production Requirements

26. GBRA has secured groundwater leases on approximately 42,000 acres of land.

27. GBRA's existing Operating Permit authorizes the production of 15,000 AFY. GBRA seeks an amendment to the Operating Permit that would authorize an additional 9,000 AFY for a total of 24,000 AFY of water.

28. GBRA has sufficient land acreage under its control to comply with the District's production limits.

29. The existing and proposed wells are or will be offset from the property lines between 1,965 feet to 2,790 feet.

30. The Applications meet the production and spacing requirements of Rules 11 and 18.

Modeling Results and Production Limits

31. GBRA's proposed production conforms with the District's production limit of one AFY per acre of land.

32. The District uses the 2004 Southern Groundwater Availability Models for the Queen City and Sparta Aquifers (the Carrizo-Wilcox GAM), which is a regional groundwater model used to assess groundwater availability and future aquifer conditions.

33. GBRA used the Carrizo-Wilcox GAM to assess the effects of the use of an additional 9,000 AFY on the groundwater resources. No modeling of the cumulative drawdown including all District production was performed.

34. The impact of the proposed use of the additional 9,000 AFY is predicted to be up to 40 feet of additional drawdown occurring in and around GBRA's proposed three new wells.

35. The modeling results of GBRA's proposed use of the produced groundwater does not deviate from the production limits.

Groundwater and Surface Water Resources and Existing Permit Holders

36. The modeling results using the Carrizo-Wilcox GAM provided an estimate of the long-term water level decline in the Carrizo Aquifer.

37. The maximum simulated water level decline from the existing and proposed wells was about 121 feet in the GBRA well field.

38. The overall thickness of the Carrizo Aquifer in this location is about 300 to 400 feet.

39. This water level decline represents about 15 to 20 percent reduction in the potentiometric surface above the top of the Carrizo Aquifer at the GBRA well field. The percent reduction in the potentiometric surface away from the GBRA well field will be less.

40. All pumping wells cause some level of water level decline. The water level declines indicated by the modeling by GBRA and the District are normal impacts from production of groundwater wells.

41. The simulated impacts show that the proposed pumping will not reduce water levels in the aquifer to an extent that precludes a well owner from accessing groundwater.

42. The District's well spacing and production limits help protect the groundwater resources and other existing users from unreasonable effects.

43. The District has a monitoring program. GBRA has an agreement with the District whereby GBRA has provided funding for monitoring wells.

44. GBRA is participating in the District's Mitigation Program, which helps address issues like water level decline or water quality degradation.

45. The proposed additional 9,000 AFY of pumping will not have an unreasonable effect on groundwater resources or existing permit holders.

46. Shallow wells located in or close to the aquifer outcrop are more likely to affect surface water resources because the water level decline from pumping of those wells has a greater impact on the water table, which may also result in more impact to rivers, streams, and other surface water resources.

47. The existing GBRA wells are located about 8 to 10 miles downdip from the outcrop of the Carrizo Aquifer and range from 1,225 to 1,400 feet deep.

48. Water level decline from the proposed pumping will have limited effect in the outcrop and limited potential effects on surface water resources.

49. The proposed additional 9,000 AFY of pumping will not have an unreasonable effect on surface water resources.

Beneficial Use

50. GBRA has executed treated water supply contracts with customer entities to provide the requested 9,000 AFY of groundwater as a public water supply.

51. These customers will need the water beginning in 2024 and are projected to use the entire amounts under these agreements by 2032.

52. The proposed use of groundwater is dedicated to a beneficial use.

District Management Plan

53. GBRA addresses efficient use of groundwater, prevents waste, and addresses conservation and drought conditions by implementing and enforcing its water conservation and drought contingency plans, which implement conservation measures to the maximum extent practicable.

54. GBRA will prevent waste of groundwater by metering the water at various locations, which will allow GBRA to detect leaks.

55. GBRA, through its water supply contracts, also requires its customers to conserve water, and to design, operate, and maintain facilities in a manner that will prevent waste.

56. GBRA has contractually limited the use of the water to municipal and industrial uses and prohibited use of the water to irrigate golf courses.

57. Because of the rigid geologic framework of the aquifer, subsidence is not a relevant issue in permitting within the District.

58. The proposed pumping will not result in significant subsidence.

59. The District's monitoring program, along with those of other GCDs in GMA 13, will be used to monitor, track, and comply with the desired future conditions (DFCs).

60. GBRA's contributions to the District's groundwater monitoring program will help the District monitor the aquifer to ensure compliance with the DFC.

61. Except for goals relating to the DFCs, GBRA's Applications are consistent with the District's Management Plan.

Avoid Waste and Achieve Water Conservation

62. GBRA's water Conservation Plan promotes practices to reduce water waste and increase water use efficiency.

63. GBRA's Drought Contingency Plan outlines criteria to initiate and terminate drought and emergency stages in response to water supply conditions and includes water supply or demand measures that should be implemented during each emergency stage to conserve water supply and/or protect the integrity of water supply facilities.

64. GBRA enforces its Water Conservation and Drought Contingency plans by requiring contract provisions that customers provide to the "maximum extent possible" for the conservation of water, that facilities will be designed, constructed, and operated, and maintained in a manner to prevent waste of water, and that the customer adopt a plan consistent with GBRA's plans.

65. The treated water supply contracts for the 9,000 AFY limit the use of water provided by GBRA to municipal and industrial uses, prohibit the use of water for irrigation of golf courses, and allow for the direct reuse of water.

66. GBRA will prevent waste in the proposed wellfield and transmission system by including measuring equipment at each well pump, the point of delivery, and the water treatment plant to measure and account for diverted water and identify any system losses prior to delivery. This measuring equipment will be regularly calibrated and will monitor for any leaks in the raw water transmission system.

67. Alliance Regional Water Authority (ARWA) will own the water treatment and treated water system infrastructure, and GBRA has an agreement with ARWA that obligates ARWA to install and maintain a similar metering system to monitor for leaks between the water treatment facilities and customer delivery points.

68. The groundwater will be transported via pipeline as required by Rule 11.E.2.c.

69. GBRA has agreed to and has undertaken measures to avoid waste and achieve water conservation.

Subsidence

70. The District Management Plan states that subsidence is not a relevant issue in permitting by the District due to the rigid geologic framework of the Carrizo Aquifer.

71. The proposed pumping will not result in significant subsidence.

Groundwater Quality and Well Plugging

72. GBRA will use reasonable diligence to protect groundwater quality and follow well plugging guidelines in accordance with state law and District rules.

Water Permitted, Water Produced, and Aquifer Conditions to Achieve the DFCs

73. A DFC for the Carrizo-Wilcox Aquifer in Groundwater Management Area (GMA) 13 is an average drawdown of 48 feet for all of GMA 13 calculated from the end of 2012 conditions through the year 2080.

74. In the Carrizo-Wilcox outcrop, the GMA 13 DFC is to maintain 75 percent of the saturated thickness in the outcrop at the end of 2012 through the year 2080.

75. GBRA's proposed additional 9,000 AFY of pumping would result in up to approximately 40 feet of additional drawdown in 2070.

76. The modeled impact of GBRA's permitted 15,000 AFY plus the proposed 9,000 AFY is over 100 feet of drawdown in 2070.

77. The 100 feet of modeled drawdown by 2070 from GBRA's production of 24,000 AFY exceeds GMA 13's DFC of 48 feet of drawdown in the Carrizo for 2080.

Availability of Water

78. The applicable MAGs are those included in the Texas Water Development Board July 25, 2022 Report.

79. The applicable MAGs for the District are:

Decade	**2020**	**2030**	**2040**	**2050**	**2060**	**2070**	**2080**
MAG (in AFY)	47,584	61,365	71,628	81,327	86,278	87,238	79,692

80. The 2022 total production of Carrizo groundwater from both permitted and exempt wells was approximately 44,309 AFY.

81. Adding GBRA's requested 9,000 AFY to the 2022 total production of approximately 44,300 acre-feet equals 53,300 AFY of projected production, which exceeds the applicable MAG of 47,584 AFY for the current decade.

82. GBRA is not yet producing its previously permitted 15,000 AFY.

83. The District has issued groundwater permits totaling approximately 91,285 AFY.

84. Within a decade, 80 to 90 percent of the permitted amount for municipal suppliers Schertz-Seguin Local Government Corporation and Aqua Water Supply Corporation is expected to be produced, which amounts to a 6,305 to 8,741 AFY increase in estimated production.

85. Absent intervening measures, GBRA's production, in addition to production over the whole District, is predicted to exceed the MAGs within a decade—which would prevent the District from achieving the DFC.

86. The District's monitoring program and policy decisions will be used to monitor and comply with the DFCs.

87. GBRA's contributions to the District's groundwater monitoring program will help the District monitor the aquifer to ensure compliance with the DFC.

Effects of Transfer on Aquifer Conditions, Depletion, Existing Permit Holders, or Other Groundwater Users in the District

88. The production and transport of an additional 9,000 AFY of water will not have an unreasonable effect on depletion, or existing permit holders or other groundwater users in the District.

89. The maximum simulated water level decline from the permitted 15,000 AFY and proposed 9,000 AFY is modeled to be about 121 feet in the GBRA well field.

90. The overall thickness of the Carrizo Aquifer in this location is around 400 to 500 feet.

91. This water level decline represents about 15 to 20 percent reduction in the potentiometric surface above the top of the Carrizo Aquifer at the GBRA well field. The percent reduction in the potentiometric surface away from the GBRA well field will be less.

92. The water level declines indicated by modeling are normal impacts from production of groundwater wells.

93. The simulated impacts show that the proposed pumping will not reduce water levels in the aquifer to an extent that precludes a well owner from accessing groundwater.

94. The production and transport of 9,000 AFY of water has an unreasonable effect on aquifer conditions to the extent it is predicted to contribute to any failure to achieve the DFCs.

Regional Water Plan and District Management Plan

95. The 2021 Region L Water Plan includes the ARWA/GBRA Project (Phase 1) water management strategy as a recommended strategy. This includes GBRA's previously permitted 15,000 AFY.

96. The 2021 Region L Water Plan projects an additional water need of approximately 78,000 AFY by the year 2030 in the portion of GBRA's statutory district that falls within Region L. This projected water need increases to approximately 152,000 AFY by the year 2070.

97. GBRA's requested production and transport of 9,000 AFY is an expansion of a recommended water management strategy of the Region L Water Plan.

98. The Region L Water Plan does not mention the expansion of the Phase 1 project with the additional 9,000 AFY requested by GBRA.

99. The regional water plan is silent on GBRA's proposed use and transport of an additional 9,000 AFY.

100. Aside from predicted effects on achieving the DFCs, GBRA's proposed use and transport of water is consistent with the District's management plan.

Allocation of Costs

101. Mr. Boriack represented himself in this matter.

102. GBRA's application fee paid for Daniel B. Stephens & Associates, Inc.'s independent third-party review.

103. Costs associated with the SOAH contract for hearing do not include the GM's attorney fees or expert witness services.

104. The GM hired Neil Blandford as an expert witness.

105. GBRA requested the SOAH hearing.

VIII. Conclusions of Law

1. The District has jurisdiction to decide the issues raised by GBRA's Applications. Tex. Water Code ch. 36.

2. SOAH has jurisdiction in this proceeding, including the authority to issue a proposal for decision with proposed findings of fact and conclusions of law. Tex. Water Code §§ 36.416, .4165.

3. As the party seeking the permit amendments, GBRA has the burden of proof by a preponderance of the evidence. 1 Tex. Admin. Code § 155.427; *Granek v. Texas St. Bd. of Med. Exam'rs*, 172 S.W.3d 761, 777 (Tex. App.—Austin 2005, no pet.).

4. Notice was accomplished in accordance with chapter 36 of the Texas Water Code and the District Rules.

5. The District did not require that the Applications be sworn to, as provided by Texas Water Code section 36.113(b).

6. The requirement that applications be sworn is directory, rather than mandatory. *See AC Interests, L.P. v. Texas Comm'n on Env't Quality*, 543 S.W.3d 703, 714 (Tex. 2018).

7. Aside from the requirement that an application be sworn, the Applications conform to the requirements prescribed by Texas Water Code chapter 36 and the Rules. Tex. Water Code §§ 36.113(b), (c), and (d)(1), .122; Rules 10, 11.A.1, and 15.

8. GBRA's proposed wells conform with the well spacing and production requirements. Rules 11.A.2, 18.A, 18.B.

9. The modeling results of GBRA's proposed use of water does not significantly deviate from the production limits. Rule 11.A.3.

10. There will not be an unreasonable effect of the proposed use of water on groundwater and surface water resources and existing permit holders. Tex. Water Code §§ 36.113(d)(2) and (f), .116, .122(f)(2); Rules 11.A.4 and 15.D.2.

11. The proposed use of water is dedicated to a beneficial use. Tex. Water Code § 36.113(d)(3); Rule 11.A.5.

12. The proposed use of water is consistent with the District's management plan. Tex. Water Code §§ 36.113(d)(4), .122(f)(3); Rule 11.A.6.

13. GBRA will avoid waste and achieve water conservation. Tex. Water Code §§ 36.113(d)(6), (f), .122(f)(2); Rule 11.A.7.

14. The proposed use will not result in significant subsidence. Tex. Water Code §§ 36.113(f), .122(f)(2); Rules 11.A.8, 15.D.2.

15. GBRA will use reasonable diligence to protect groundwater quality and follow well plugging guidelines. Tex. Water Code § 36.113(d)(7); Rule 11.A.9.

16. The amount of existing water permitted, amount of existing water produced, and the condition of the aquifer will prevent the achievement of the DFC within a decade, absent intervening measures. Tex. Water Code § 36.1132(b); Rule 11.A.10.

17. There is limited water availability in the District for transport. Tex. Water Code § 36.122(f)(1); Rule 15.D.1.

18. There is a need for water in the proposed receiving area during the period for which the water supply is requested. Tex. Water Code § 36.122(f)(1); Rule 15.D.1.

19. The proposed transport of the water will not have an unreasonable effect on depletion, existing permit holders, or other groundwater users in the District. Tex. Water Code § 36.122(f)(2); Rule 15.D.2.

20. The proposed transport of the water is expected to have unreasonable effects on aquifer conditions as it relates to achieving DFCs. Tex. Water Code § 36.122(f)(2); Rule 15.D.2.

21. GBRA's proposed transport of the water is neither consistent nor inconsistent with the regional water plan. Tex. Water Code § 36.122(f)(3); Rules 10.E.4.d, 15.D.3.

22. Aside from predicted effects on achieving the DFCs, GBRA's proposed transport of the water is consistent with the approved District management plan. Tex. Water Code § 36.122(f)(3); Rule 15.D.3.

23. A landowner owns the groundwater below the surface of the landowner's land as real property. Tex. Water Code § 36.002(a).

24. Generally, loss of time and expenses incurred in a suit are not recoverable as costs or damages unless recovery of those items is expressly provided for by statute. *See Shenandoah Assocs. v. J & K Properties, Inc.*, 741 S.W.2d 470, 486 (Tex. App. - Dallas 1987, writ denied).

25. Mr. Boriack is not entitled to recover costs associated with his efforts representing himself in this matter.

26. "Costs associated with the contract for hearing" do not include the GM's attorney fees and expert witness fees. Tex. Water Code § 36.416(c); Rule 25.E.5.

27. The GM bears her own costs for attorney fees, expert witness services, and transcript costs.

28. As the party requesting the SOAH hearing, GBRA bears the cost for services under the SOAH contract. Tex. Water Code § 36.416(c); Rule 25.E.5.

Signed December 18, 2024

ALJ Signature:

Linda Brite

Linda Brite
Presiding Administrative Law Judge

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Filing Description: PROPOSAL FOR DECISION
Status as of 12/18/2024 2:15 PM CST

Associated Case Party: Gonzales County Underground Water Conservation District

Name	BarNumber	Email	TimestampSubmitted	Status
Gregory Ellis		greg@gmellis.law	12/18/2024 2:10:16 PM	SENT
Laura Martin		generalmanager@gcuwcd.org	12/18/2024 2:10:16 PM	SENT

Associated Case Party: Mary AnnMenning

Name	BarNumber	Email	TimestampSubmitted	Status
Lawrence G.Dunbar		ldunbar@dunbarlawtx.com	12/18/2024 2:10:16 PM	SENT

Associated Case Party: TedBoriack

Name	BarNumber	Email	TimestampSubmitted	Status
Ted Boriack		tedboriack@gmail.com	12/18/2024 2:10:16 PM	SENT

Associated Case Party: A.P. Breitschopf and Sons, Inc.

Name	BarNumber	Email	TimestampSubmitted	Status
Phil Breitschopf		apbsons@gvec.net	12/18/2024 2:10:16 PM	SENT
Jason Breitschopf		jason@gvec.net	12/18/2024 2:10:16 PM	SENT

Associated Case Party: Guadalupe-Blanco River Authority

Name	BarNumber	Email	TimestampSubmitted	Status
Emily WillmsRogers		erogers@bickerstaff.com	12/18/2024 2:10:16 PM	SENT

Associated Case Party: LauraMartin

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Associated Case Party: LauraMartin

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Adam Friedman		afriedman@msmtx.com	12/18/2024 2:10:16 PM	SENT

Associated Case Party: Water Protection Association

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Associated Case Party: MarkPloeger

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