



Identification of a Deep Superior Quality Aquifer in Several Transboundary Counties of Texas

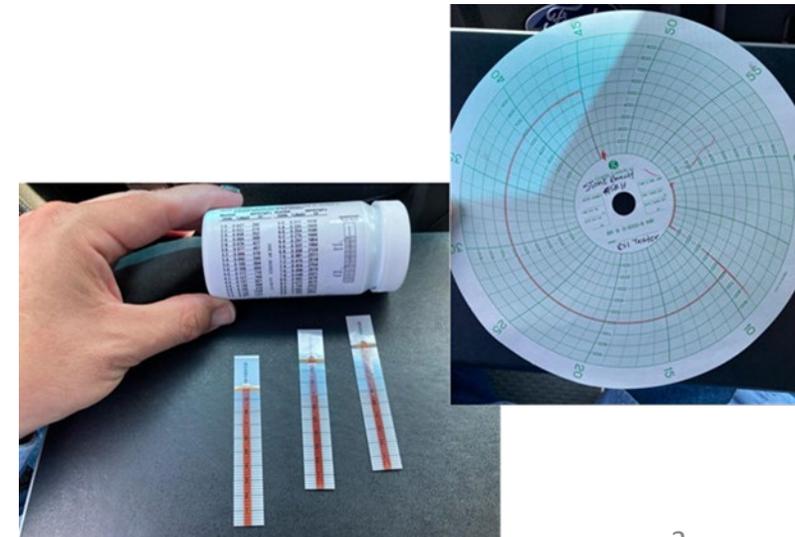
Texas RRC
Groundwater Advisory Unit
November 2021



Table of Contents

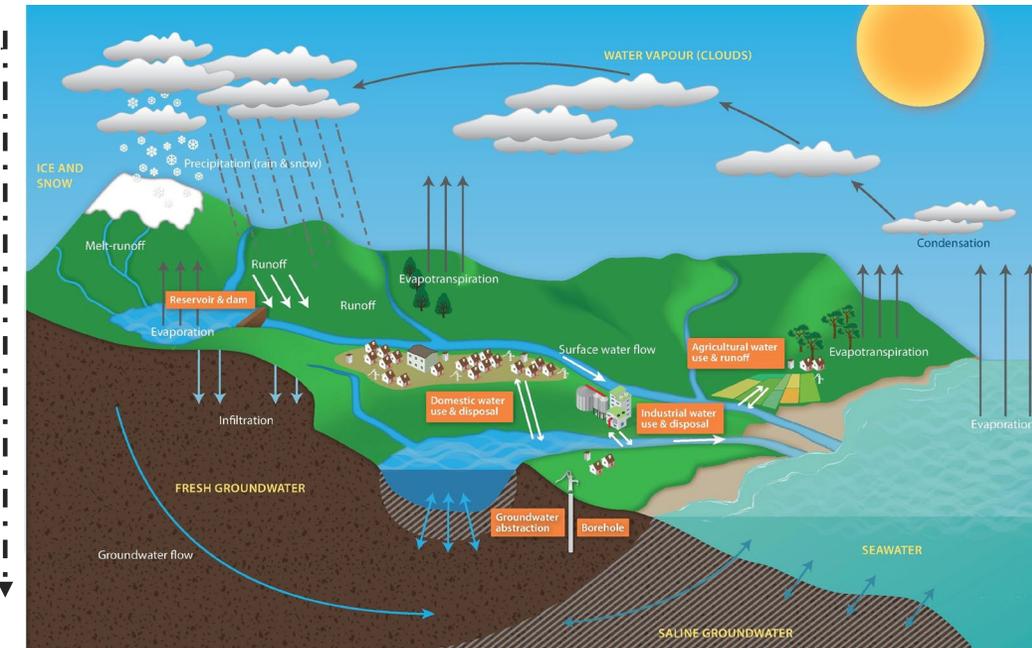
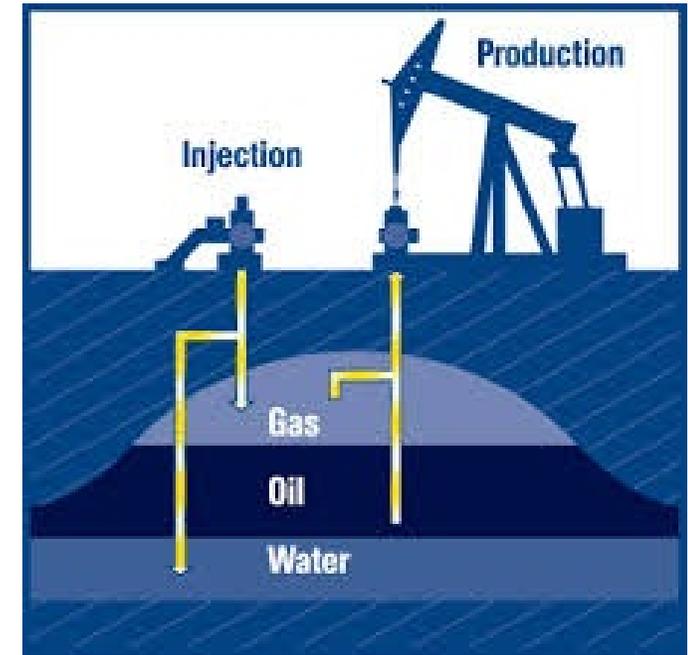


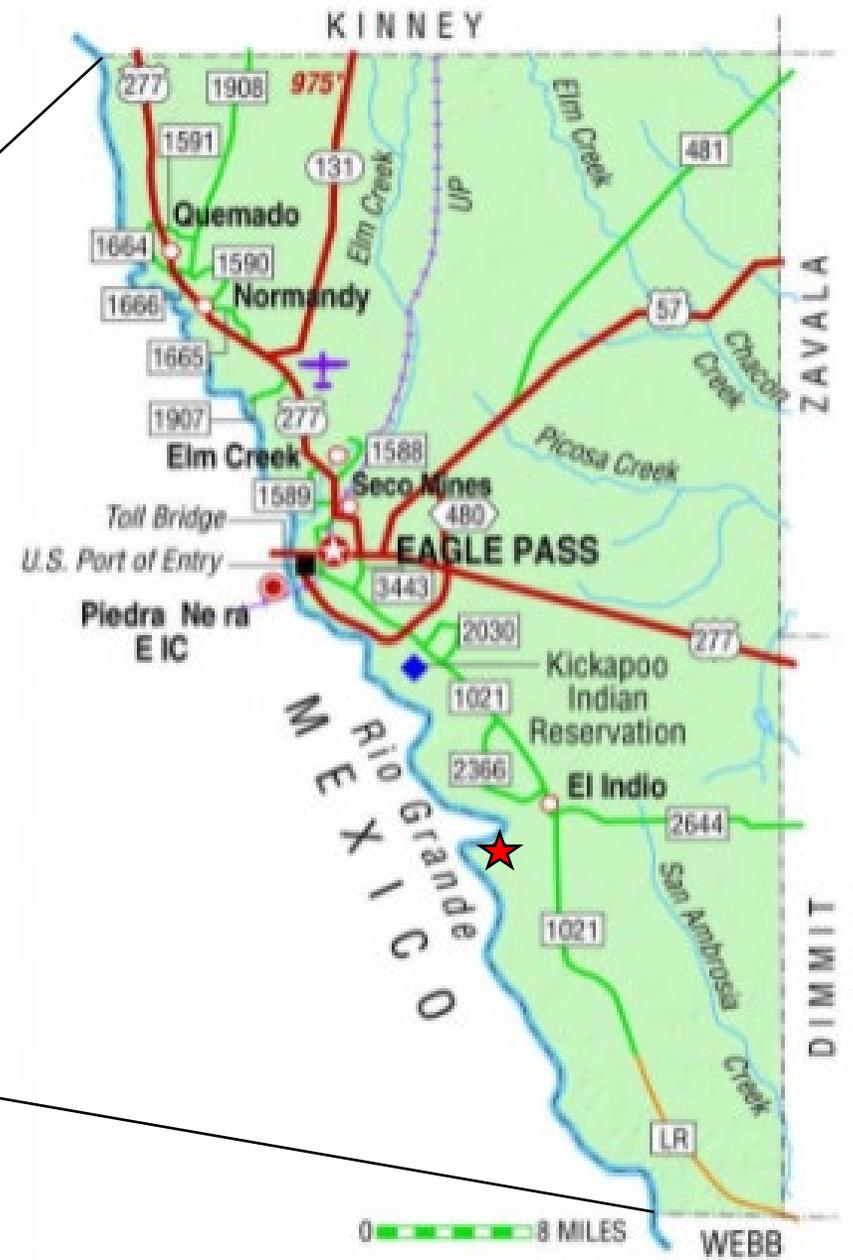
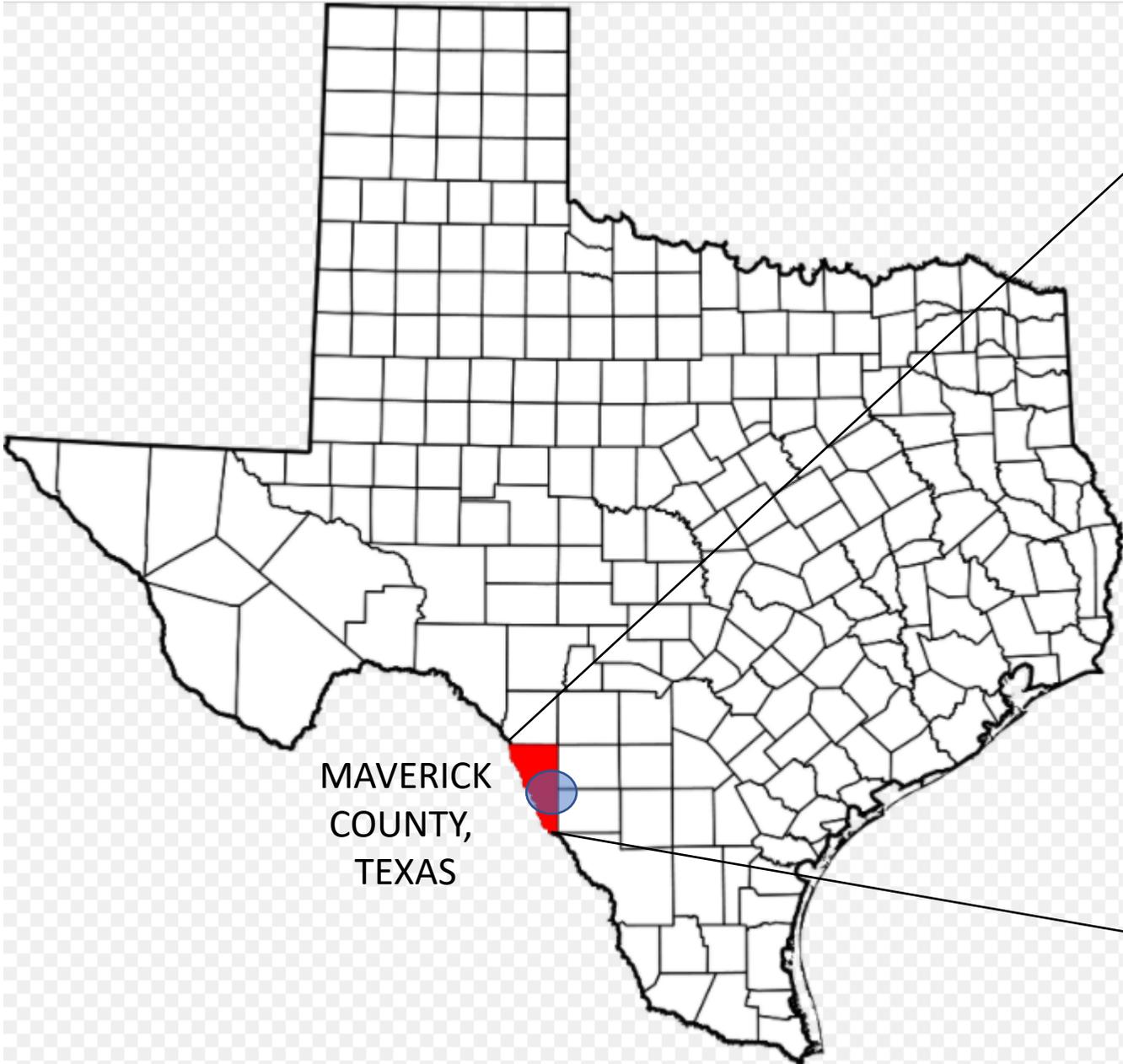
- Approximate Geographic Location of Aquifer/Reservoir
- Present the Data and Geologic Maps as Discovered in Chronological Order
- Define the Extent of the Aquifer and Quantify Certainty and Uncertainty
- Identify the Probable Source of the Superior Quality Water
- Discuss Risk and Benefit's associated with an Aquifer/Reservoir
- Discuss Hypothetical Options for reducing Uncertainty
- Next Steps
- Questions



Key Oil Field Terms & Concepts

- Aquifer's contain economic quantities of Groundwater
 - Deep or remote fresh groundwater may not qualify
- Reservoir's contain Oil & Gas and *Produced Water*
 - Produced Water is not typically reported to the State
 - Produced Water is an Expense and Nuisance to Operators
 - Aquifers can Transition to Reservoirs & Vice Versa
- Oil and Gas wells are Water Excluders
 - Optimized to Keep Water Out
 - Produced Water Production Biased 10 to 1 over Oil
 - Water always occurs below oil and gas
- Only Natural Source of Fresh Water is Rain
- Groundwater is typically Fresh at Surface Increasing in Salinity with Depth & Age



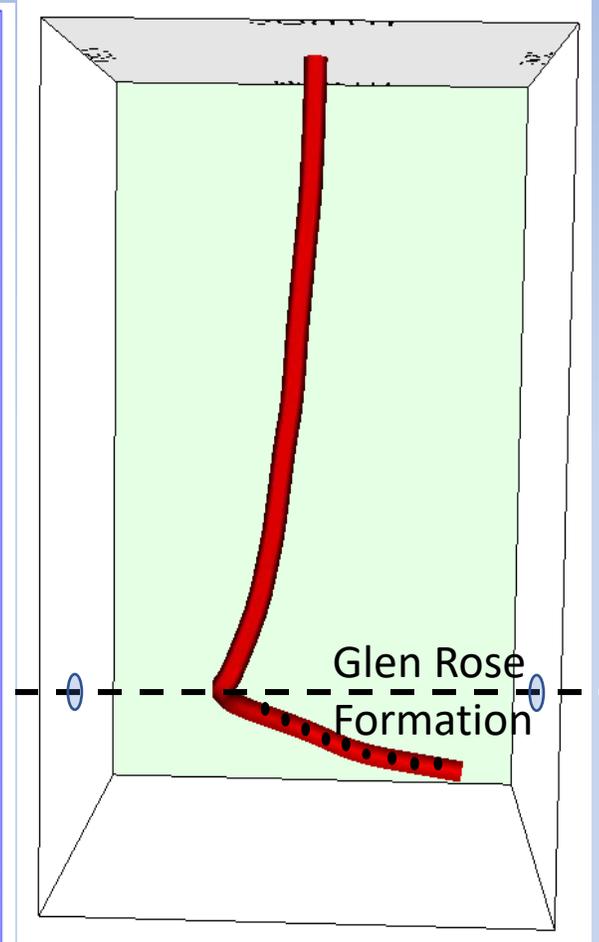
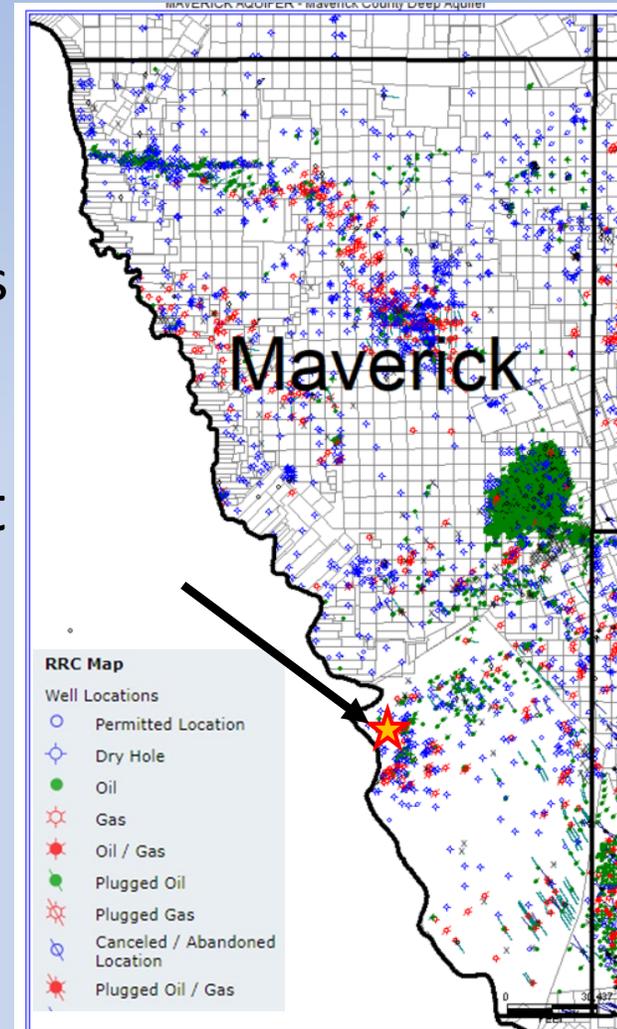


New Aquifer Detection Incident

Background

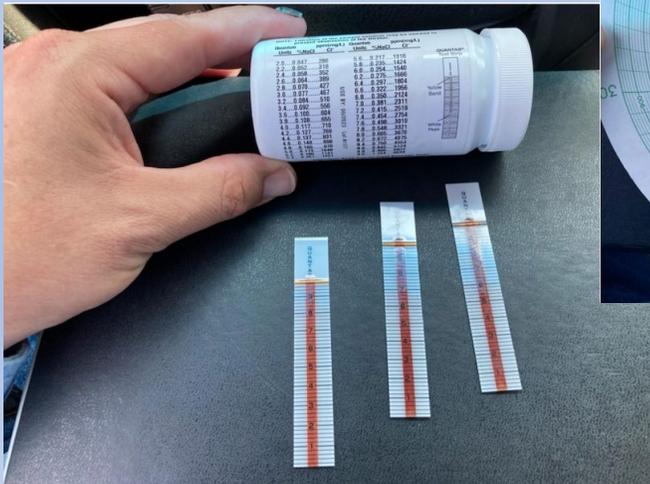
- Maverick County > 1,000 Oil & Gas wells
 - Different depths, Zones, & Formations
 - GAU Groundwater Maps 100'–250' bls
 - Occasional reports of deep superior quality produced water since mid 1990's in Oil Field
 - Reports of a High Temperature Gradient
- August 2021 Driller applies to convert a 6,200' Oil well to a Water Well
 - ✓ Reports Artesian Flow <500 TDS
 - ✓ P-13 Application lists **drilling not plugging**
- Skeptical GAU Investigation Begins
 - ✓ Target zone Glen Rose Fm.

API # 42-323-32821
Oil Well: Stone Ranch 1-58H
Maverick County



P-13 Permit Water Quality Results

- Dispatched RRC Outrider with Test Equipment to P-13 well in **Maverick** County
- Pressure Tested Well Casing
- Formation Water < 500 TDS
- Artesian Flow, High Temperature





Railroad Commission of Texas
Oil and Gas Division
Field Operations

Inspection Report
Industry Activity, Notification ID 270179
Inspection ID 822558

Operator	JOINT RESOURCES COMPANY (440742)	Drilling Permit	_____
Lease/Facility	STONE RANCH [01-14774]	Pit Permit	_____
Field	WILDCAT [00002001]	UIC Number	_____
County	MAVERICK		
Complainant	_____		
GPS Coordinates	GPS Location Coordinates Not Recorded		

Statewide Rules Inspected

Lease Level Inspection

SWR Rule	Compliance	Compliance Description
SWR 2(a), Access to Property	Compliant	
SWR 3(1), Entrance Sign	Compliant	
SWR 3(3), Battery Sign, Commingling Permit	N/A	
SWR 8(d)(1), Unpermitted Disposal of Oil and Gas Wastes	N/A	
SWR 36(c)(5)(B), Storage Tank Warning Sign	N/A	
SWR 91(d)(1), Remediation of Soil	N/A	

Well Level Inspection	158H	API 32332821
------------------------------	------	--------------

SWR Rule	Compliance	Compliance Description
SWR 3(2), Well Sign	Compliant	
SWR 8(d)(1), Unpermitted Disposal of Oil and Gas Wastes	Compliant	
SWR 13(a)(6)(A), Surface Control of Well	Compliant	
SWR 14(b)(2), Inactive Unplugged Well	Compliant	
SWR 17(a), Bradenhead Requirements	N/A	
SWR 91(d)(1), Remediation of Soil	N/A	

Comments

Tested water with salinity meter. The meter read 0.5ppt and 33c on temp. Tested with test strips and strips read equivalent to meter. Conducted H15 and well tested at 600psi for 30min. See attachments. End of tubing / Packer at 5800'.

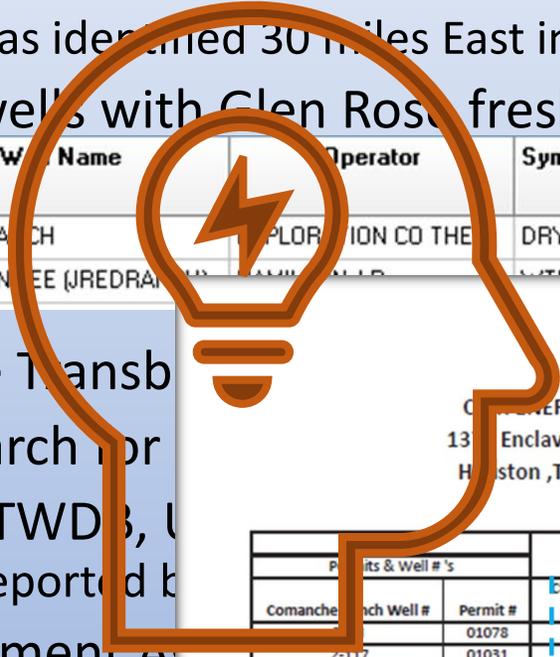
WOW!

Are there other freshwater O&G wells nearby?

- We checked the P-13 Data base and contacted Wintergarden GCD
 - ✓ An additional P-13 well was identified 30 miles East in **Dimmit** in the Glen Rose Fm.
- Inventoried all Oil & Gas wells with Glen Rose freshwater discharge permits in region

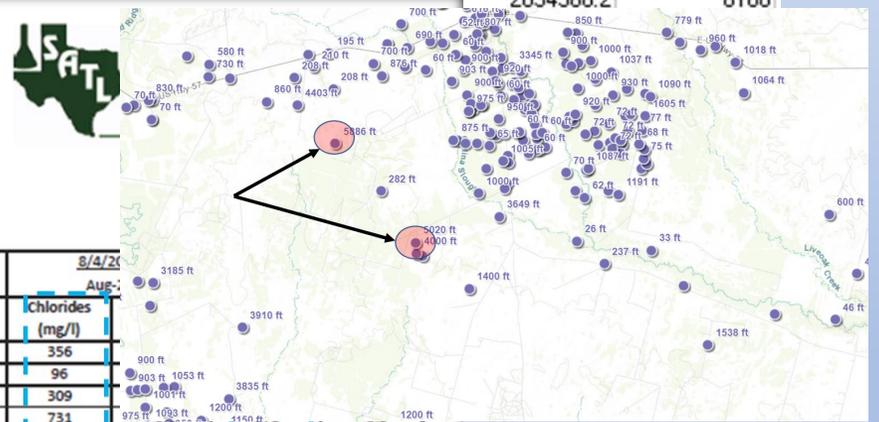
WSN	UWI (APINum)	Well Number	Well Name	Operator	Sym Code	County	Surf X	Surf Y	WELL TD
369	4232332821	158H	STONE RANCH	EXPLORATION CO THE	DRY	MAVERICK	2891951.4	2021033.5	7534
10155	4212733754	1G	HAMILTON CREEK (JREDRA)	AMERICAN OIL	OUTCROP	DIMIT	2008503.8	2034568.2	8100

- Inventoried all wells in the Transb
- Conducted a literature search for
- Enquired with colleagues TWD3, U
 - ✓ Some Shallow Aquifer's reported b
- Searched Mexican Government A
 - ✓ Found several geotechnical publica
 - ✓ Found a Pemex well log 50 miles to



ENERGY, L.P.
13 Enclave Parkway
Houston, Texas 77077

Permits & Well #'s	7/28/2020		8/4/2020	
	Permit #	Chlorides (mg/l)	Oil in Water (ppm)	Chlorides (mg/l)
Comanche Ranch Well #	01078	365	<5.0	356
2-117	01031	93	<5.0	96
1-40H	01073			309
4-111H	01041	345	<5.0	731
3-2H, 1-111, 1-39	01034	267	<5.0	277
2-111, 5-111H	01033	81	<5.0	87
2-112H, 2-113H, 3-112H	01044	106	<5.0	137
1-44H, 4-14H	01051	229	<5.0	249
5103	01124	353	10.90	374
3044	01130	125	<5.0	79
1-108H	01131	220	<5.0	231
5106H	01129	137	5.50	129



- Hamilton Fee P-13 Application Dimmit Co.

- Currently in violation of SWR 18

- Cert Letter Sent out Oct. 2021



RAILROAD COMMISSION OF TEXAS OIL AND GAS DIVISION		APPLICATION OF LANDOWNER TO CONDITION AN ABANDONED WELL FOR FRESH WATER PRODUCTION		FORM P-13 EFF 10/04	
1. Field Name (as per RRC Records or Wildcat): <i>WIDEAR</i>		2. Field No.: <i>W/C</i>		3. RRC District No.: <i>1</i>	
4. Operator Name (as shown on P-5): <i>J R HAMILTON</i>		5. Operator P-5 No.:		6. County: <i>DIMIT</i>	
7. Lease Name: <i>HAMILTON FEE OPERATING</i>		8. RRC Lease/Gas ID No.:		9. API No.: <i>42-127-33754</i>	
11. Location (Section, Block, and Survey): <i>T 4 N R R SURVEY 3 A - 38 9 6 50 F S L 6 50 F W L</i>		10. Well No.:		<i>61</i>	
12. If the Operator has changed within the last 60 days, provide the name, the P-5 No., and the address of the former Operator: <i>NO</i>					
13. If the well has been worked over, provide the former Field name (and reservoir name) and number: <i>NA</i>					
14. Is this an Abandoned Producer or a Dry Hole? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO If this is a Dry Hole, or if the Operator did not file current completion data, ATTACH casing and cement data for casings penetrating groundwater depths.					
15. Type of Electric or other Log run: <i>ELOG</i>		16. Completion date of the well: <i>8-12-19</i>		19. Date of TCEQ letter:	
17. Proposed Plug-Back Depth of well for fresh water production (ft.): <i>8000</i>		18. Base of Usable Quality Water (ft.): <i>8217</i>		TCEQ File No.: SC-	
20. FOR COMPLETION BY LANDOWNER: Information concerning groundwater conservation districts may be found at www.texasgroundwater.org .					
<input type="checkbox"/> I have permitted the well as a water well with the _____ Groundwater Conservation District. <input type="checkbox"/> I have registered the water well with the _____ Groundwater Conservation District. <input type="checkbox"/> The _____ Groundwater Conservation District does not require that the water well be permitted or registered. <input type="checkbox"/> There is no groundwater conservation district for the area in which the well is located.					
The undersigned Operator and Landowner hereby make application for the Operator to be authorized to plug the above well in such a manner that the well bore be left open to the above depth so that the Landowner may condition and equip such well bore to that depth for production of fresh water.					
The undersigned Landowner further obligates himself, his heirs, successors, and assignees, as a condition to the Commission's approval of this application, to complete the plugging of the well if and when it is abandoned as a fresh water well, or when, because of the condition of the well is found to constitute a menace to any oil, gas, or fresh water strata in that area, such plugging is ordered by the Commission.					
Under §89.011, Tex. Nat. Res. Code, the duty to properly plug the well ends only when the well has been properly plugged in accordance with Commission requirements up to the base of usable quality water stratum; the Commission has approved the application to condition the well for usable quality water production operations; and the landowner has registered the well with, or has obtained a permit for the well from, the groundwater conservation district, if applicable.					
The authority to complete this well in the manner prescribed shall not be construed as authority for any party to produce fresh water from the well.					
CERTIFICATION					
I declare under penalties prescribed in §91.143, Tex. Nat. Res. Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that data and facts stated therein are true, correct, and complete, to the best of my knowledge.					
LANDOWNER			OPERATOR		
Date: <i>J.R. Hamilton</i>			Date: <i>8-12-19</i>		
Signature of Landowner: <i>J.R. Hamilton</i>			Signature of Operator or Authorized Representative: <i>J.R. Hamilton</i>		
Name of Landowner: <i>J R HAMILTON</i>			Name of Person and Title: <i>J R HAMILTON OPERATOR</i>		
Street Address or P. O. Box: <i>Box 516</i>			Street Address or P. O. Box: <i>Box 516</i>		
City, State, Zip Code: <i>CARRIZO SPRINGS, TX 78834</i>			City, State, Zip Code: <i>CARRIZO SPRINGS, TEXAS 78834</i>		
Telephone: <i>(830) 876-5541</i>			Telephone: <i>(830) 876-5541</i>		
FILING INSTRUCTIONS					
1. The completed original of this form must be recorded in the county in which the well is located. SEE the back of this form.					
2. Form P-13 showing the recording data, along with the Notice of Intent to Plug and Abandon (Form W-3A) must be filed in the appropriate Commission District Office, along with a copy of the TNRCC/TCEQ Surface Casing MC 151 letter (or other acceptable equivalent letter).					
3. After plugging back the well, the Operator shall file one copy of the Commission-approved Form P-13 with the original and one copy of Form W-3 (Plugging Record), in the appropriate Commission District Office.					
RAILROAD COMMISSION APPROVAL: _____			DATE OF APPROVAL: _____		
(Signature of RRC Representative)					
DISTRIBUTION: The Commission will mail a copy of the approved form to the: (1) Landowner; (2) Operator; (3) Texas Commission on Environmental Quality (TCEQ); (4) Ground Water Conservation District, if applicable; (5) Texas Department of Licensing and Regulation (TDLR); and (5) Commission District Office.					

Communications with Surface Discharge Lease Operator

- All wells in Lease flowing to surface (Artesian Flow)
- Production Formation Exhibits Primary, Karst, and Fractur Porosity
- Formation Pressure relatively constant throughout production history
- Initial Oil Production Tests Yield Produced Water with > 80K TDS
- Production Quickly Waters Out to Fresh
 - Major clue to the aquifer and reservoir system
- Geophysical Information was Provided
- Produced Water Quantity and History was Provided

Teresa,

We currently have most of the information we need to issue more accurate and up to date GW-2's (Waterboard letters) in Maverick, Dimmit, and Zavalla Counties. We don't anticipate the updated GAU groundwater maps and letters will have any impact on current or future casing and cementing programs nor existing permitted UIC operations. We think it will have a positive impact on the issuance of P-13's going forward from the stand point of Operators and land owners. I have included a set of questions/wish list below, it's strictly voluntary and not required that you provide the GAU with this information. We want to be respectful of your time and business confidentiality so please do not include any information that is proprietary unless we discuss its handling in advance.

- Are the Glen Rose wells in question on pumps? If so what type of pumps are used and what is the current pressure gradient (.48 Lbs./Ft. etc.) ? [The wells are all flowing wells.](#)
- Could we get current standing fluid level readings for the wells? [Surface](#)
- Do you have any porosity logs (or snippets of porosity logs for just the Glen Rose interval) from any wells in the Maverick, Dimmit, Zavalla Counties and/or surrounding area? [Comanche Ranch 1-39 attached](#)
- Does the water production performance seem to indicate rock volume allowing water flow through dissolution (vuggy / karstic) porosity developed in the Glen Rose Limestone, or does porosity appear to occur as bedding plane or vertical fractures in the limestone? [Consensus is all of the above](#)
- Has any pressure transient or other engineering analysis been conducted to determine if there is pressure / fluid communication in the Glen Rose? [Possibly prior to CMR](#)
- Has any engineering assessment of permeability been made for the Glen Rose from the limited production data (using Rate Transient Analysis or ONEPT (Holditch radial flow equations method))
- Are there any water production data (production volume in barrels versus time) for the Glen Rose well tests that have watered-out to low TDS fresh water. [CR 1-111 attached. If opened today +99% WC but would make some oil but considered watered-out](#)
- Has the geophysical consultant been able to map-out or otherwise visualize the occurrence

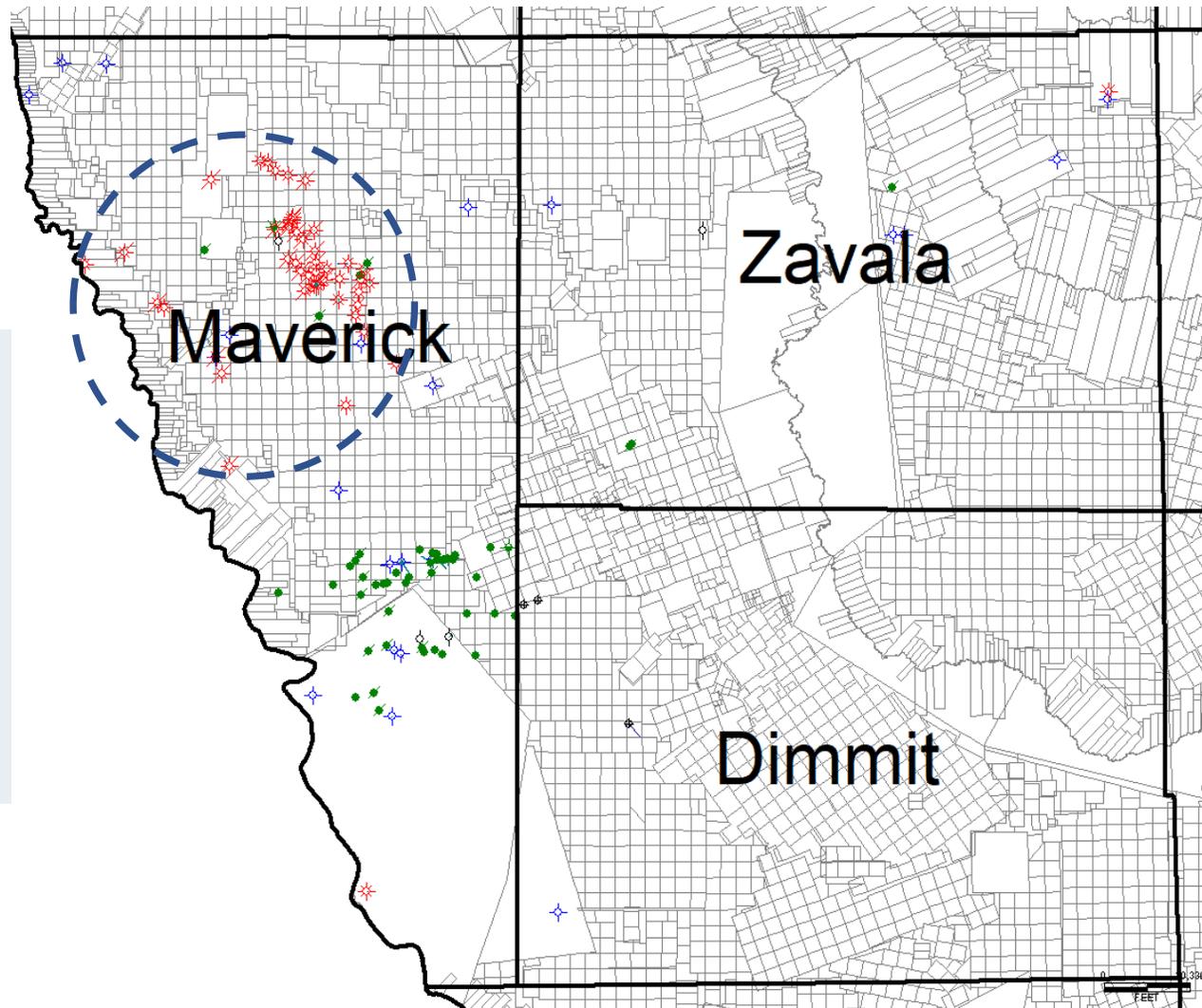
Water Production Volumes From the Glen Rose Formation (Example from a Single Lease BBL's)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0	0											
2002							480.43	1071.74	445.17	301.61	267.74	224.52
2003	227.13	249.57	349.3	396.64	596.87	595.92	374.49	347.84	351.1	398.05	670.57	697.51
2004	830.53	859.57	1068.22	1067.27	1076.74	844.99	1160.9	1224.45	1338.65	975.34	1136.29	868.73
2005	838.69	1753.1	1441.25	1321.92	1092.96	1233.47	1263.16	1288.49	1457.42	1537.01	1583.01	1032.04
2006	1209.01	1189.32	1310.29	1278.65	1724.65	2200.99	1662.53	1555.45	1640.43	1854.6	2072.61	1422.83
2007	1485.97	1382.25	2351.6	2396.35	2064.82	1224.79	1385.48	1429.88	1661.99	1384.27	1048.49	1494.47
2008	1465.87	1619.51	1466.94	1919.44	1903.27	1900.3	1539.23	1768.56	2081.26	2234.42	2141.38	2431.6
2009	2287.3	2196.69	2299.21	2274.57	2685.65	4000.83	3793.1	3823.84	3277.51	3543.09	3659.81	4031.61
2010	4655.08	4458.48	5948.97	5504.08	4682.88	5011	3925.36	3709.99	3632.66	3826.49	3486.36	3557.4
2011	3471.36	3109.55	4484.43	4605.92	3657.88	5300.96	4799.81	5297.23	4737.79	4572.87	4483.05	3859.97
2012	4505.06	4819.65	4748.75	4275.17	4499.25	3984.23	4924	4456.69	4412.26	2981.1	3491.95	3415.94
2013	3271.6	2774.86	3221.08	3229.18	3539.94	3586.4	3621.08	3809.65	3766.79	4589.57	3623.35	4103.1
2014	4265.26	3835.19	4333.77	4369.55	4637.82	4744.95	4823.14	5050.92	4845.61	3992.44	4701.14	5143.51
2015	5517.77	4765.57	5459.75	5155.17	4943.09	5166.12	5005.81	4416.49	4019.83	2754.65	2757.42	3432.86
2016	3808.74	3802.82	4322.21	4526.18	4625.69	4811.9	4629.58	4415.1	3328.42	4146.6	4244.38	4453.25
2017	4077.9	2895.01	3333.13	2987.42	3459.43	3069.66	2672.03	2689.69	2642.18	2784.19	2999.6	2960.44
2018	2696.69	2149.68	2577.88	2828.78	2808.81	2813.13	3001.86	2554.7	2393.75	2855.47	2739.49	2809.25
2019	2965.09	2956.55	3619.14	3539.19	3960.81	3768.74	3407.04	4019.62	3592.49	3759.65	3536.31	3973.97
2020	3565.14	3551.26	3509.25	1340.39	654.39	2729.35	5432.05	4288.91	3457.26	3381.19	3040.14	2636.05
2021	2699.9	2252.64	3779.7	4382.53	3357.74	3525.05						

Water Production From the Glen Rose Formation



All Well Tests in or thru the Glenn Rose (Potential solution set >100 Wells)



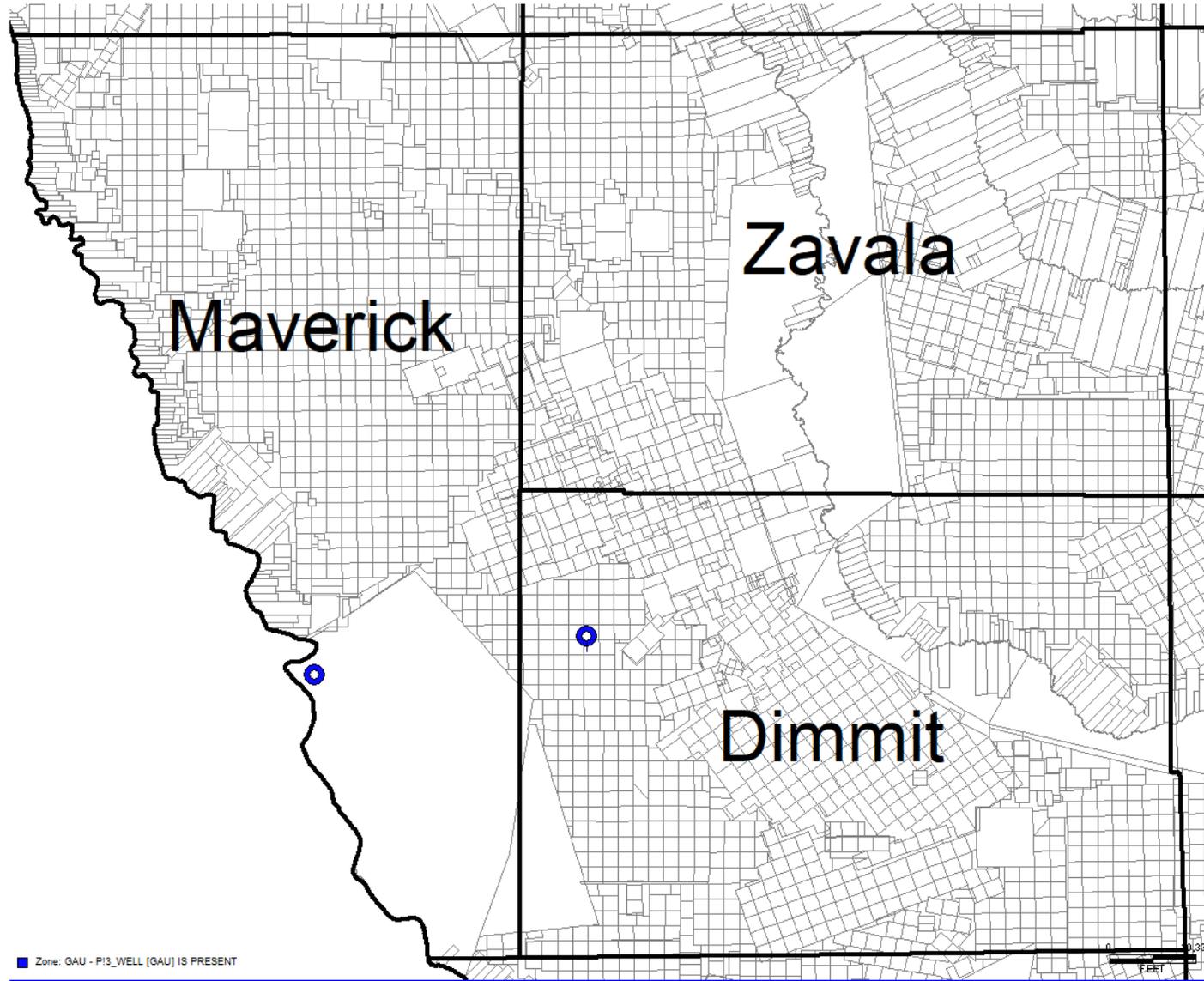
RRC Map

Well Locations

- Permitted Location
- ⊕ Dry Hole
- Oil
- ⊕ Gas
- ⊕ Oil / Gas
- Plugged Oil
- ⊕ Plugged Gas
- ⊕ Canceled / Abandoned Location
- ⊕ Plugged Oil / Gas

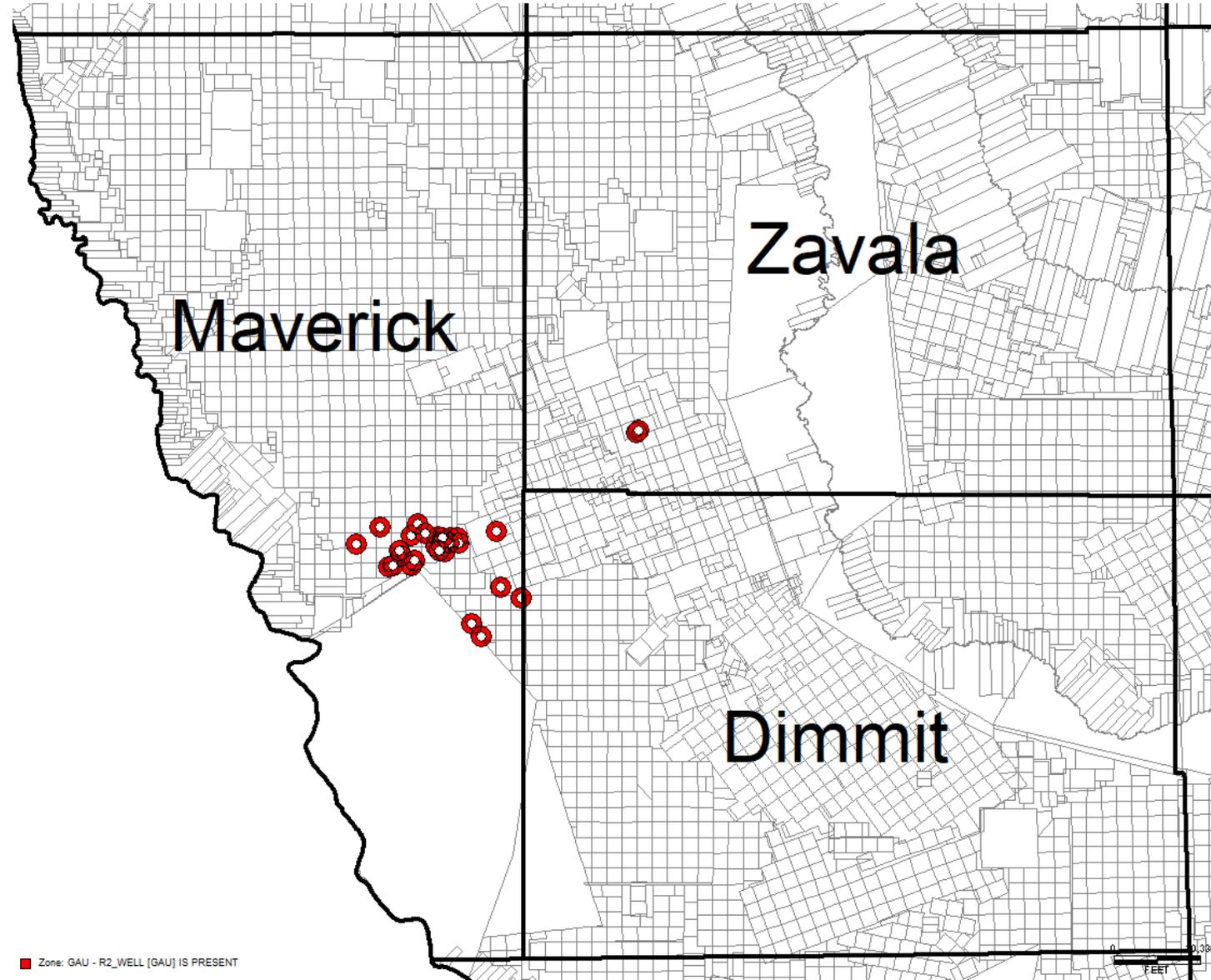
P13 Wells (Oil Well to Water Well Conversion)

Direct Evidence 2 wells, 30 mi/apart



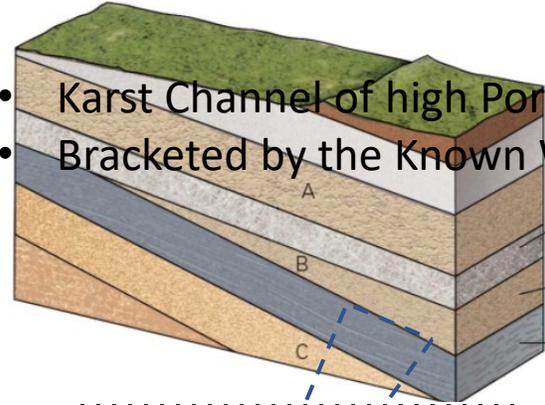
Produced Water Surface Discharge Well Locations

Direct Evidence 28 Wells, 30 x 25 Mi apart



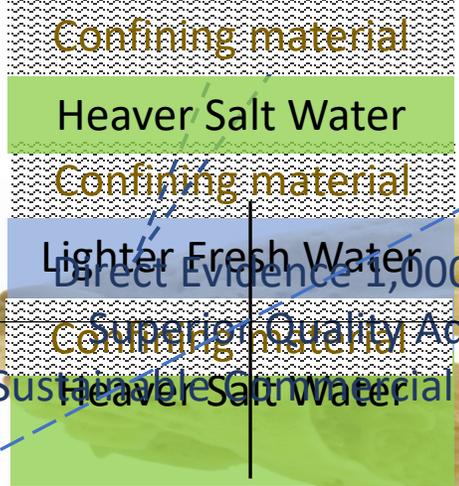
Deep Glen Rose Fm. Aquifer

Direct vs. Speculative Evidence

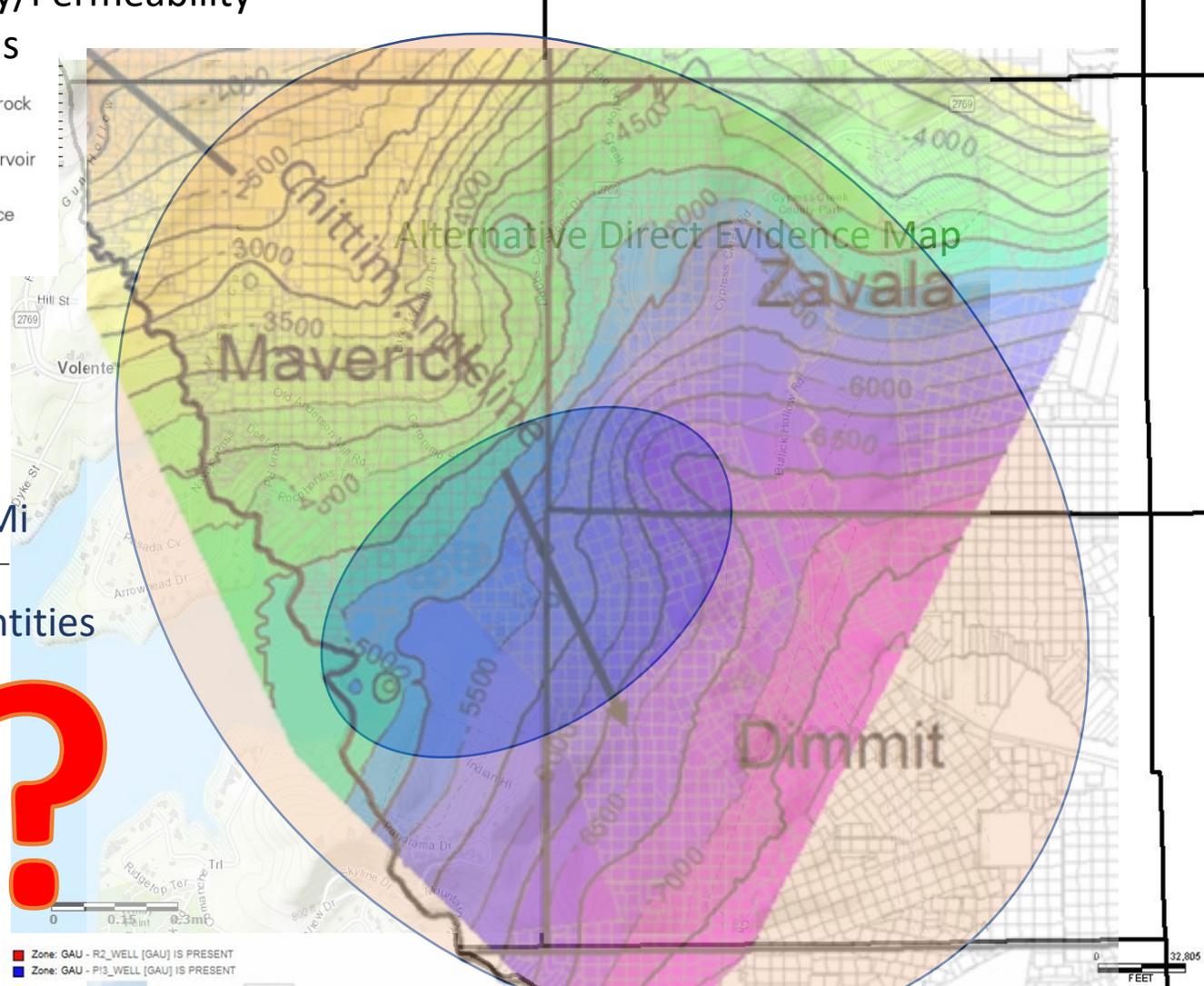


- Karst Channel of high Porosity/Permeability
- Bracketed by the Known Wells

Seal rock
Reservoir rock
Source rock

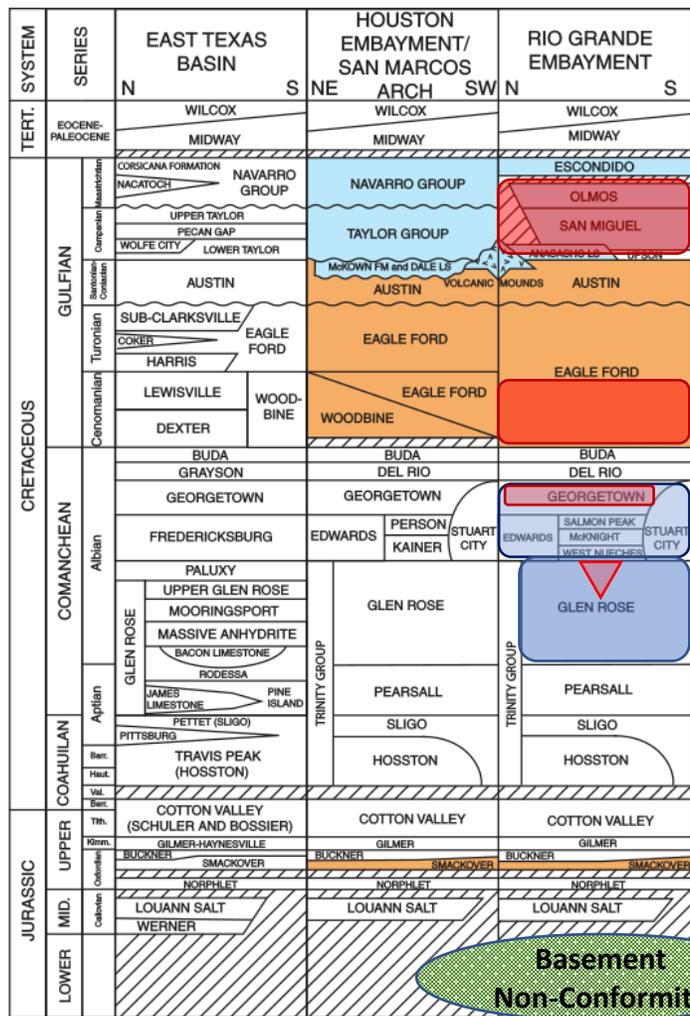


Direct Evidence 1,000 Sq Mi
Superior Quality Aquifer
Sustains Heaver Salt Water Quantities



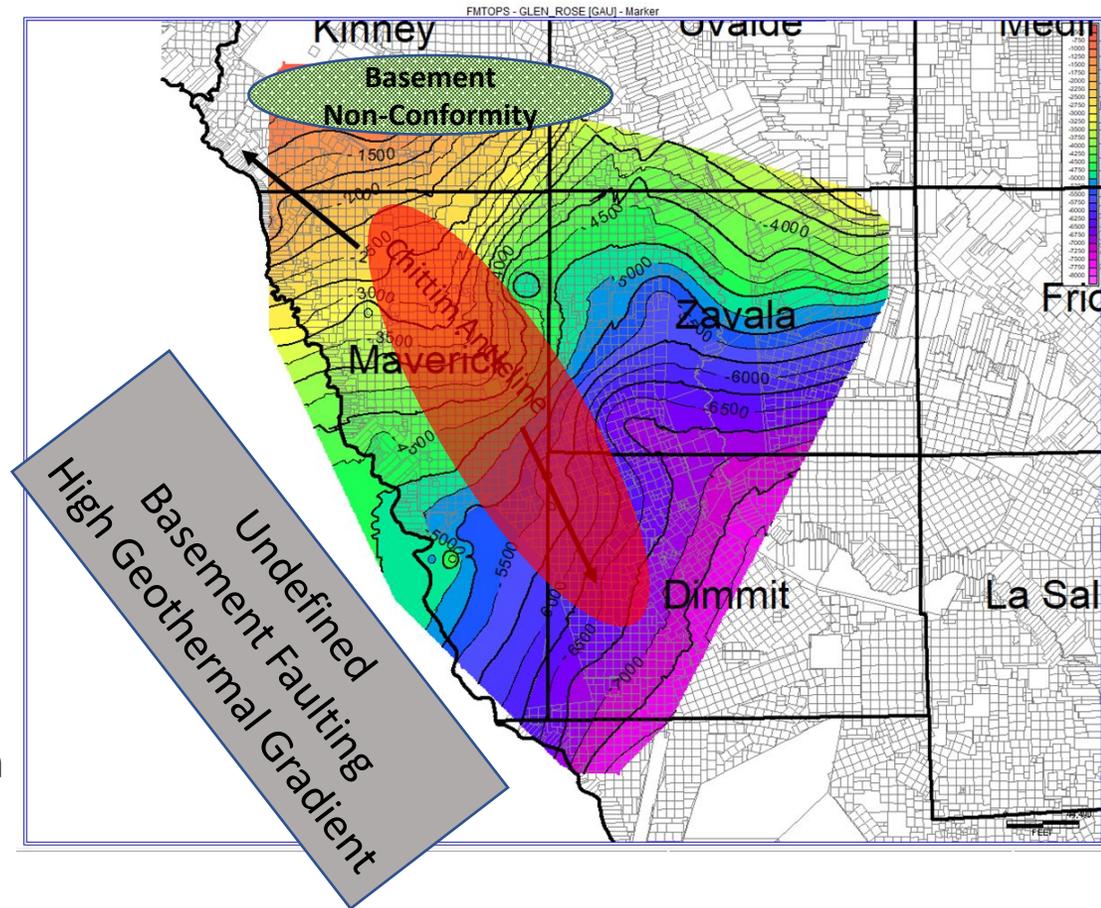
Finding the Source

Vertical Cross Section of Production & Injection Zones



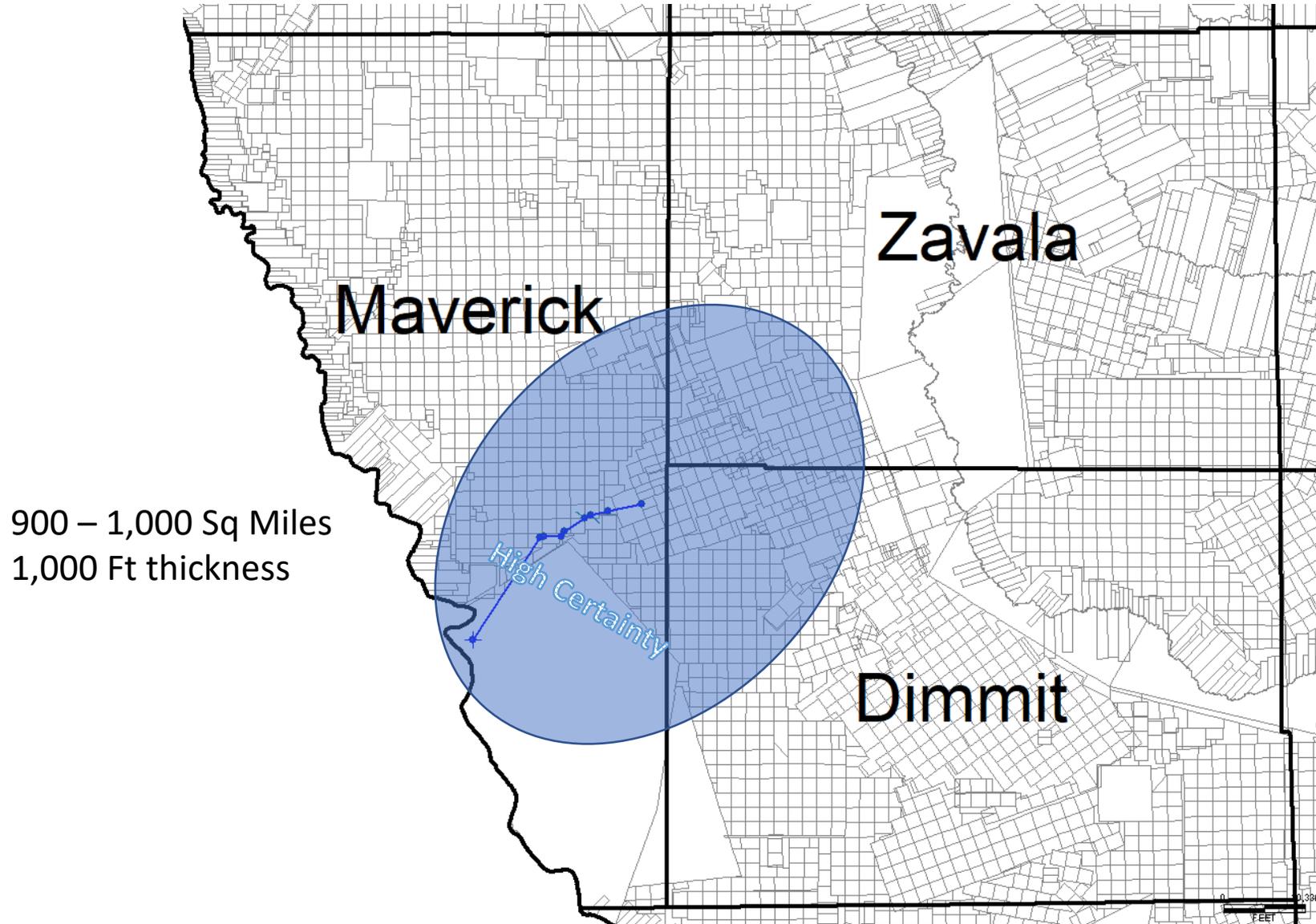
- Majority of Production and Injection in Region
- Minor Production Unconventional
- Minor Production
- Fresh water source
- No Injection taking place
- Groundwater data in Kinney County
- Some Production in Maverick

Glen Rose Structure



Southwest to Northeast Cross Section

7 Wells Direct Evidence

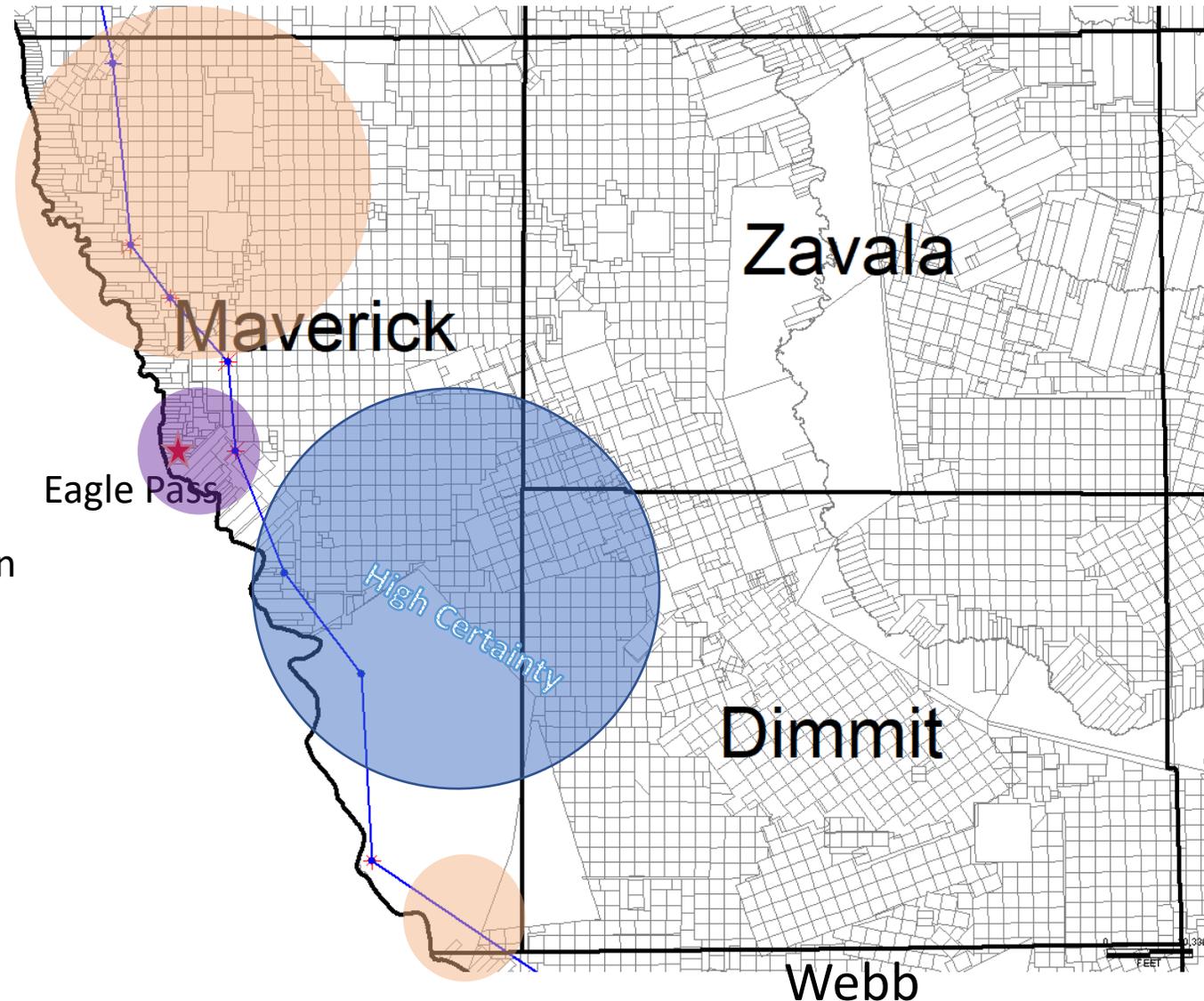


Northwest to Southeast Cross Section

3 Wells out of 10 have Direct Evidence

Currently gathering direct water quality analytics from gas cap wells in the North

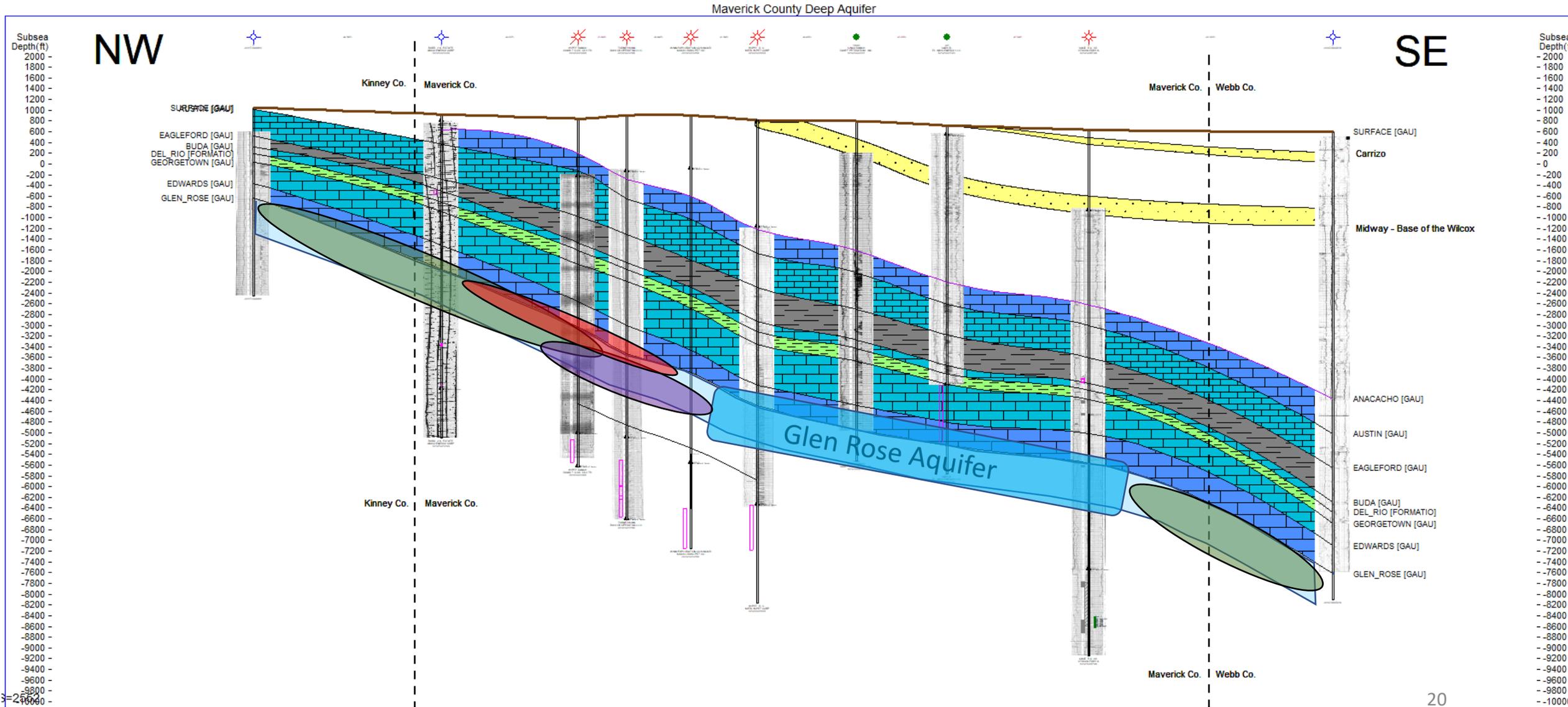
Interest in gathering direct water quality analytics from orphan wells in the North



Northwest to Southeast Cross Section

Direct Evidence of 1,000 Sq. Mi.

Potential for 3,000 Sq. Mi.



Finding the Source Should Improve Certainty!

Transboundary Aquifer Area Maps and Technical Reports Texas Water Resources Institute

Journal of Hydrology: Regional Studies 20 (2018) 74–102

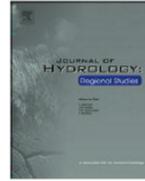


ELSEVIER

Contents lists available at ScienceDirect

Journal of Hydrology: Regional Studies

journal homepage: www.elsevier.com/locate/ejrh



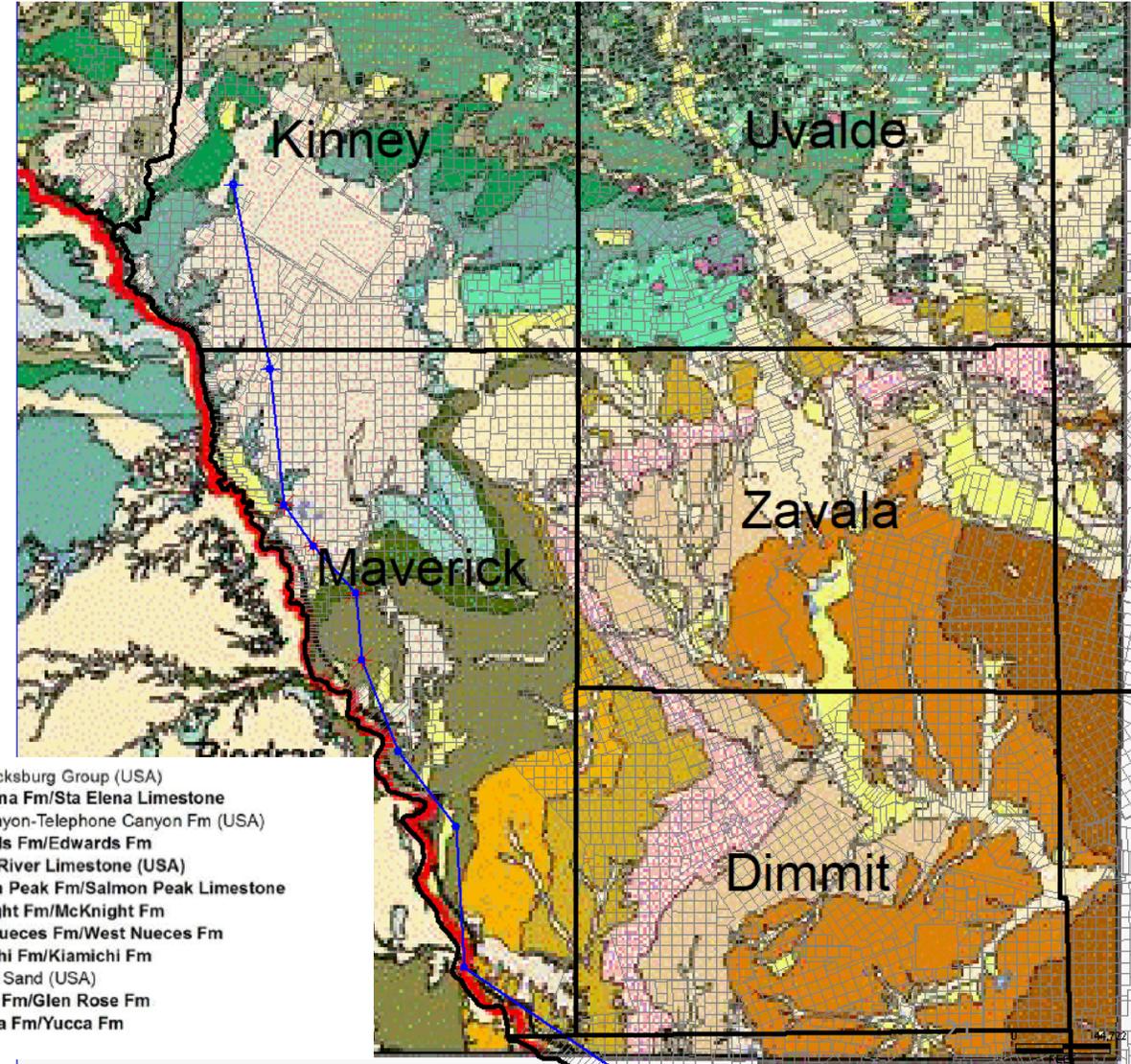
Transboundary aquifers between Chihuahua, Coahuila, Nuevo Leon and Tamaulipas, Mexico, and Texas, USA: Identification and categorization

Rosario Sanchez^{a,*}, Laura Rodriguez^b, Cecilia Tortajada^c

^a Texas Water Resources Institute, Texas A&M University, MS 2260 TAMU, College Station, TX, 77845, United States

^b Water Management and Hydrological Sciences Program, Texas A&M University, College Station, TX, 77845, United States

^c Institute of Water Policy, Lee Kuan Yew School of Public Policy, National University of Singapore, Singapore



Mexico/USA Geologic Units

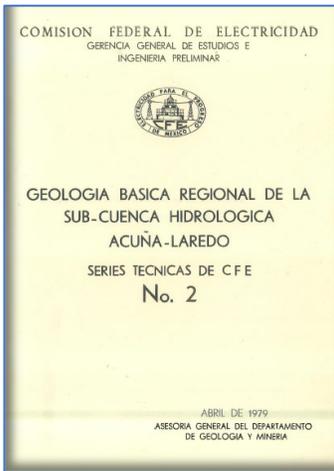
- Water
- Country Border
- CENOZOIC**
- Modern Alluvium (USA)
- Sand Sheet/Sand Sheet
- Qt Alluvium/Qt Alluvium
- Qt Colluvium/Qt Colluvium
- Qt Conglomerates/Qt Conglomerates
- Qt to Tertiary Clay and Mud (USA)
- Reynosa Fm/Goliad Fm
- Uvalde Gravel (USA)

- Playa deposits (USA)
- Tertiary Igneous Rocks/ Tertiary Igneous Rocks
- Extrusive Igneous Rocks (USA)
- Tertiary Basalts/Tertiary Basalts
- Andesitic Porphyry (Mex)
- Granodiorite-Monzonite (Mex)
- Bigford Fm/Bigford Fm
- Carrizo Fm/Carrizo Sand
- Wilcox Fm/Indio Fm
- Midway Fm/Kincaid Fm

MESOZOIC

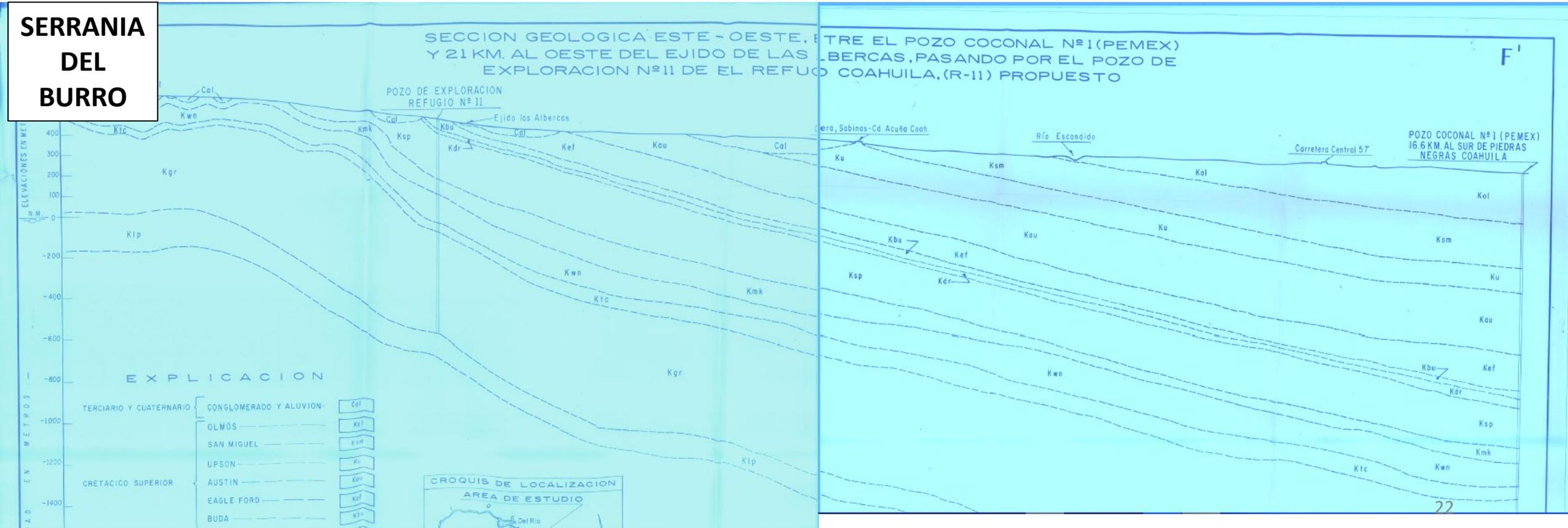
- Escondido Fm/Escondido Fm
- Olmos Fm/Olmos Fm
- San Miguel Fm/San Miguel Fm
- Upson Fm/Upson Clay
- Aguja Fm/Aguja Fm
- Pen Fm/Pen Fm
- Austin Fm/Austin Chalk
- Boquillas Fm/Boquillas Fm
- Eagle Ford Fm/Eagle Ford Group
- Buda-Del Rio Fm/ Buda Limestone-Del Rio Clay

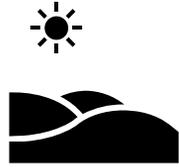
- Fredericksburg Group (USA)
- Sta Elena Fm/Sta Elena Limestone
- Del Canyon-Telephone Canyon Fm (USA)
- Edwards Fm/Edwards Fm
- Devils River Limestone (USA)
- Salmon Peak Fm/Salmon Peak Limestone
- McKnight Fm/McKnight Fm
- West Nueces Fm/West Nueces Fm
- Kiamichi Fm/Kiamichi Fm
- Hensell Sand (USA)
- Aurora Fm/Glen Rose Fm
- La Pena Fm/Yucca Fm



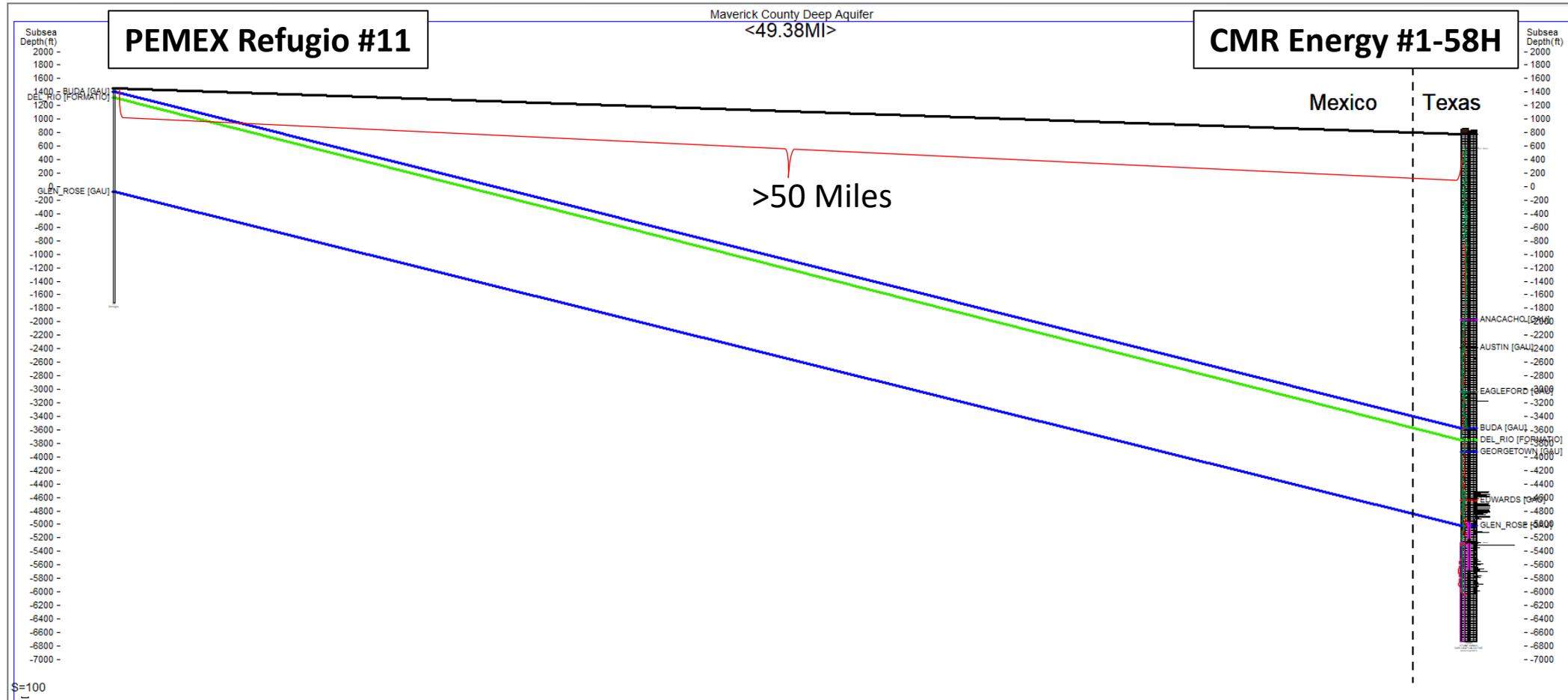
Name	Date modified	Type	Size
69_H14-10_GM.pdf	10/11/2021 9:05 AM	Adobe Acrobat D...	4,830 KB
20170821 - Perforación dentro de CCC.pdf	10/11/2021 9:05 AM	Adobe Acrobat D...	5,398 KB
GEOLOGIA BASICA REGIONAL.pdf	10/11/2021 9:05 AM	Adobe Acrobat D...	9,569 KB
Sección Litológica de la región.pdf	10/11/2021 9:05 AM	Adobe Acrobat D...	793 KB

SERRANIA DEL BURRO

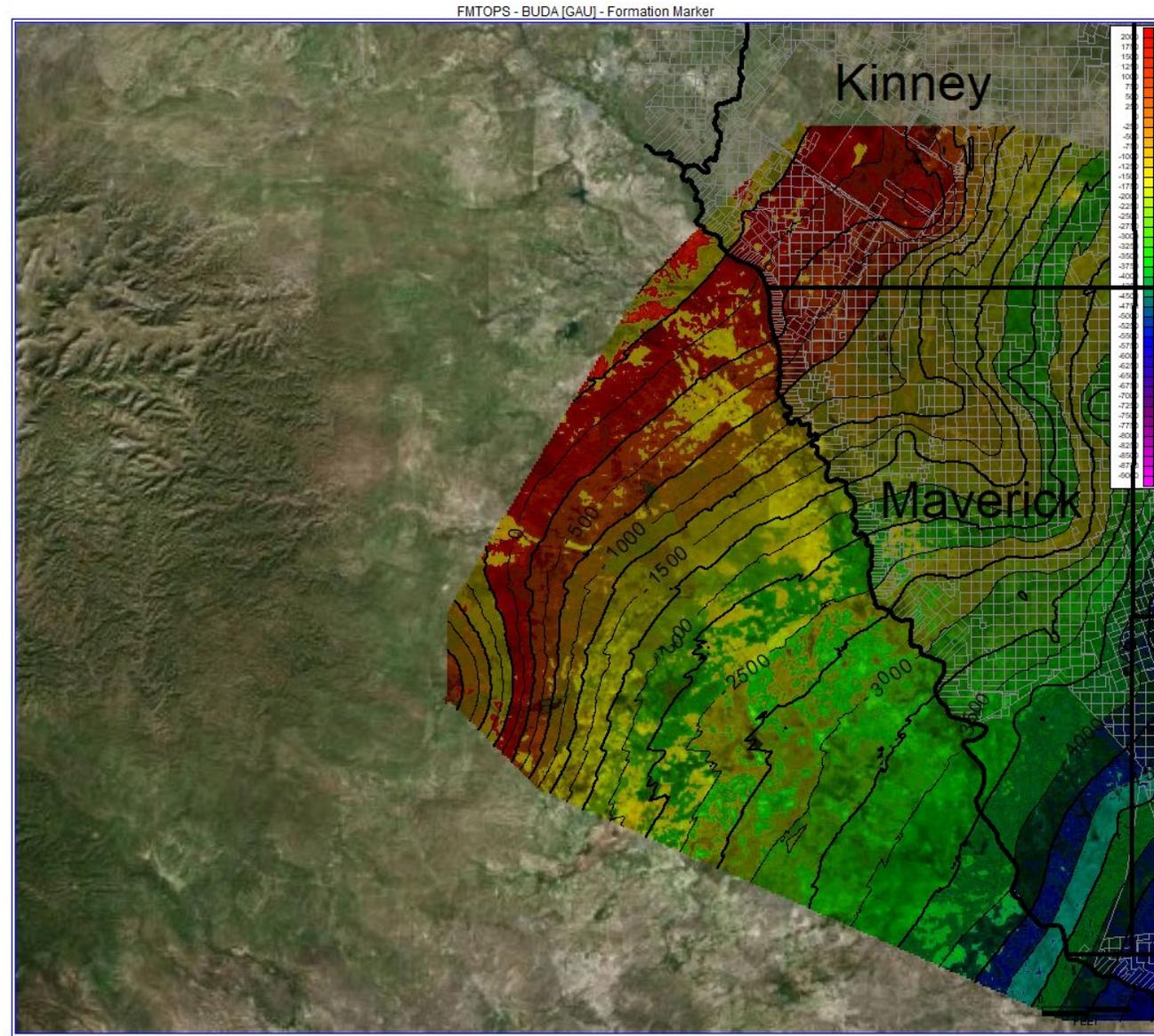




Cross Section Mexico to Texas



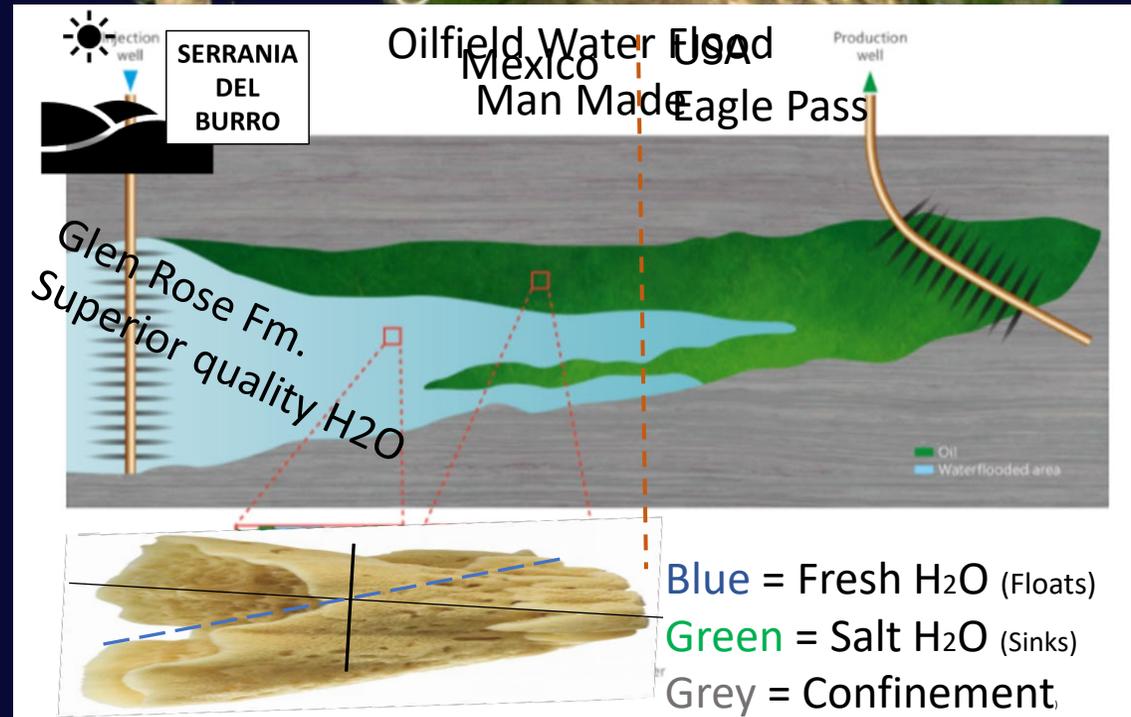
Buda Limestone Through Mexico



- ✓ Deep Superior Quality Aquifer
- ✓ Karst Outcrop Glen Rose Fm. [Intake Zone ~ Well Head]
- ✓ Drainage & High Peak Elevation 12,000 [H2O Supply & Pump]
- ✓ Plunging Fm./Faults to Basement [Conduit ~ Well Bore]



Extremely Unusual Natural Fresh Water Reservoir Flood



From “The Transboundary Nature of the Allende-Piedras Negras Aquifer Using a Numerical Model Approach” –
 Laura Rodriguez, Rosario Sanchez, Hongbin Zhan, and Peter S.K. Knappett – Jour. of the American Water Resources Assoc.

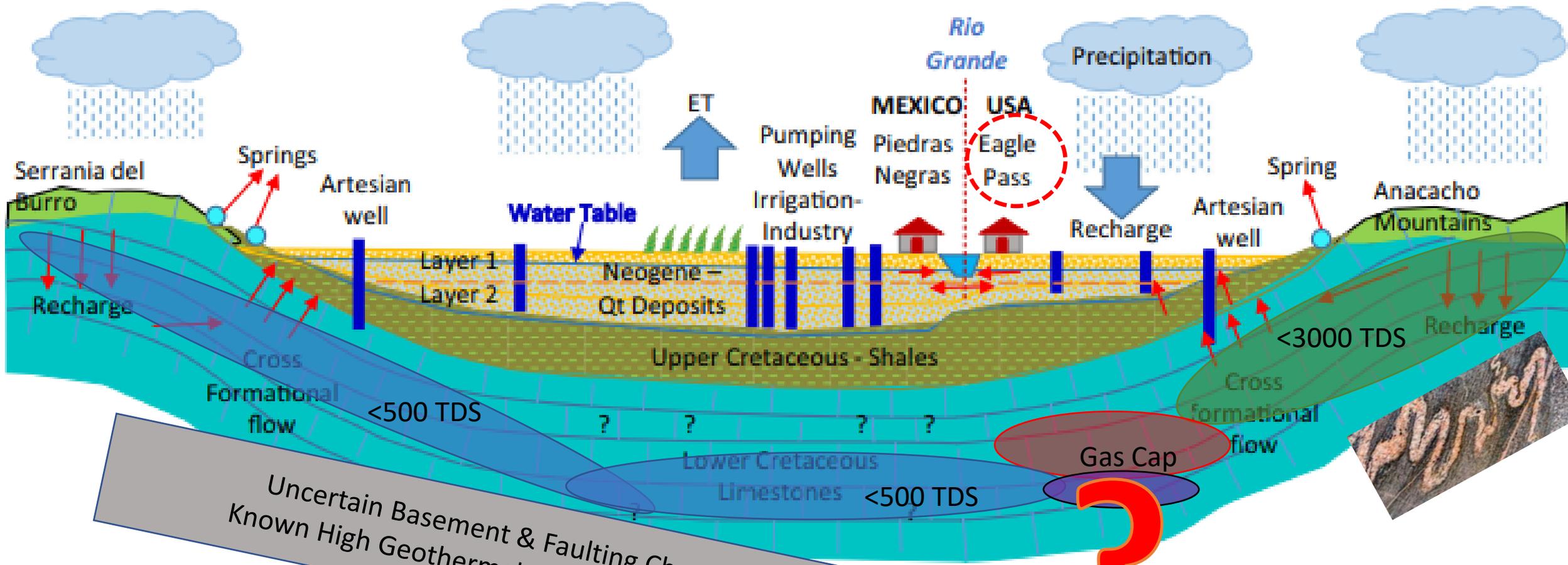
A2020

SW

A'

A''

NE



Uncertain Basement & Faulting Character
 Known High Geothermal Gradient & Seismicity

FIGURE 4. Hydrogeological conceptual model of the Allende-Piedras Negras Aquifer system. Red arrows symbolize the general directions of groundwater flow.

Risk Benefit

Oil & Gas Reservoir/Superior Quality Aquifer

Risks

- Injection into USDW waters
 - ✓ No Injection Permits Issued into Glen Rose
 - ✓ Some into Georgetown Fm.
- Status Quo Change to Casing and Cementing Operations
 - ✓ Nominal impact processing as is mainly simple and immediate
- P-13's renewed production risk
 - ✓ Operators leave separators on site
 - ✓ Several Fee Simple Operators
- Water production capabilities derived from oilfield data
- All Existing Wells Completed as Oil and Gas Wells
 - ✓ Completed as Water Excluders
 - ✓ Future Wells require Oil Field Drilling Technology and Skills
 - ✓ GAU has oil and gas well performance measurements and water production estimation information
- Recent minor seismic activity in the vicinity

Benefits

- Get information out sooner rather than later
 - Keep GCD's and Municipalities informed
- Wells are deep but artesian so low cost to operate
- Operators reduce plugging costs using the P-13
 - Existing P-13's offer affordable water well \$20K
- Beneficial Economic Source of Water (conditional)
 - Provable 1,000 Sq Mi 1,000' average thickness
 - Probable 3,000 Sq Mi
- Potential for Drilling Deep Water Wells
 - ✓ Could cost upwards of \$800K require Oil Field Tech.
- The high temperature of waters may lend themselves to geothermal potential
 - ✓ Reports of > 200°F; water boils at 212°F

NEXT STEPS:

- The RRC is protecting the Maverick Basin Aquifer
 - ✓ No injection currently taking place
- BEG Casing Estimator Site updated with Maverick Aquifer
- Working with San Antonio District Office & Operators GSD'
 - ✓ minimize impact to the Aquifer and Oil Field's
- Presented GAU findings to TWDB Technical Staff in October
- RRC Published High Level Public Interest Article in November
- Sharing Geo Technical Information with interested Stake Holders
 - ✓ City of Eagle Pass Department of Water Works
 - ✓ Private Mining and Energy Businesses



Questions?

James Harcourt
512-463-2980

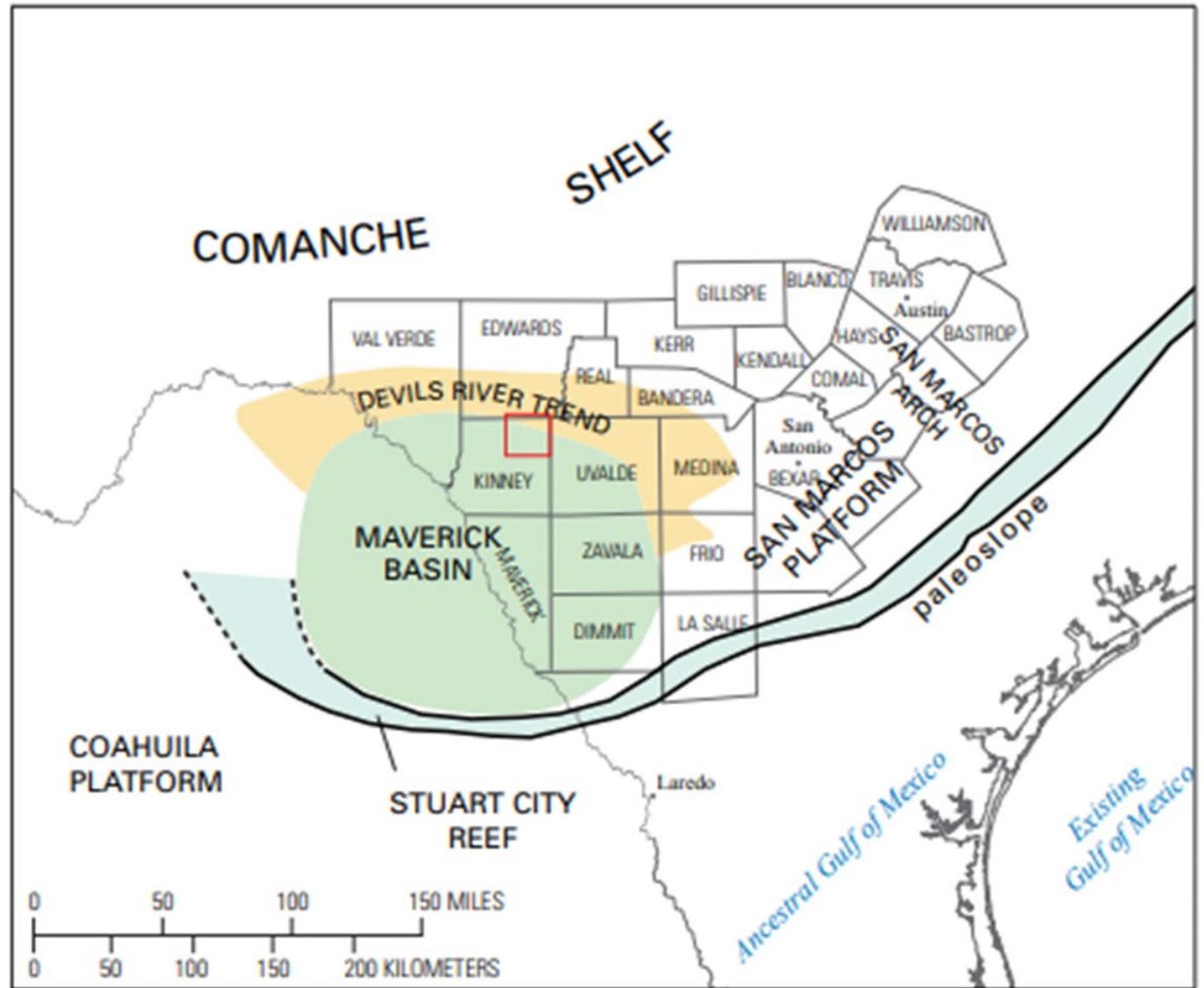


Figure 3. Paleogeography (regional depositional setting) of Comanchean and Gulfian rocks. Present-day counties and selected cities are shown. Red box locates the geologic map. Modified from Rose (1972).