Identification of a New Deep Fresh Water Aquifer in Maverick County, Texas

Texas RRC
Groundwater Advisory Unit
September 2021









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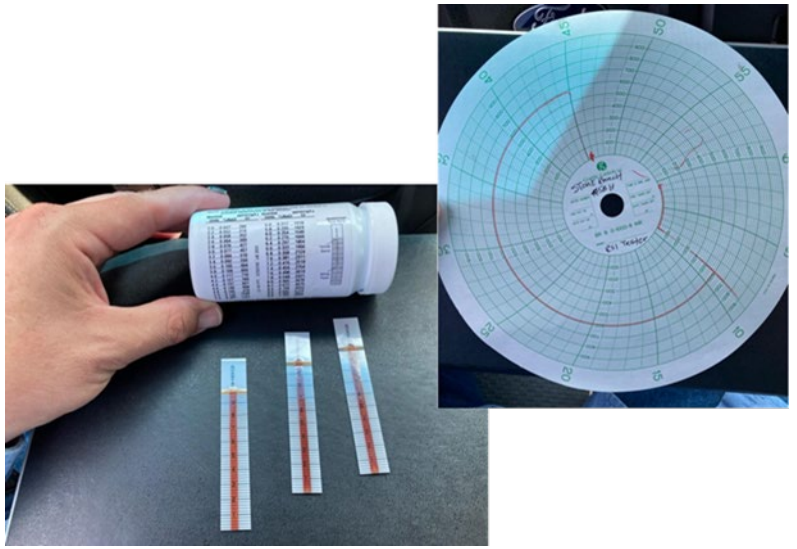
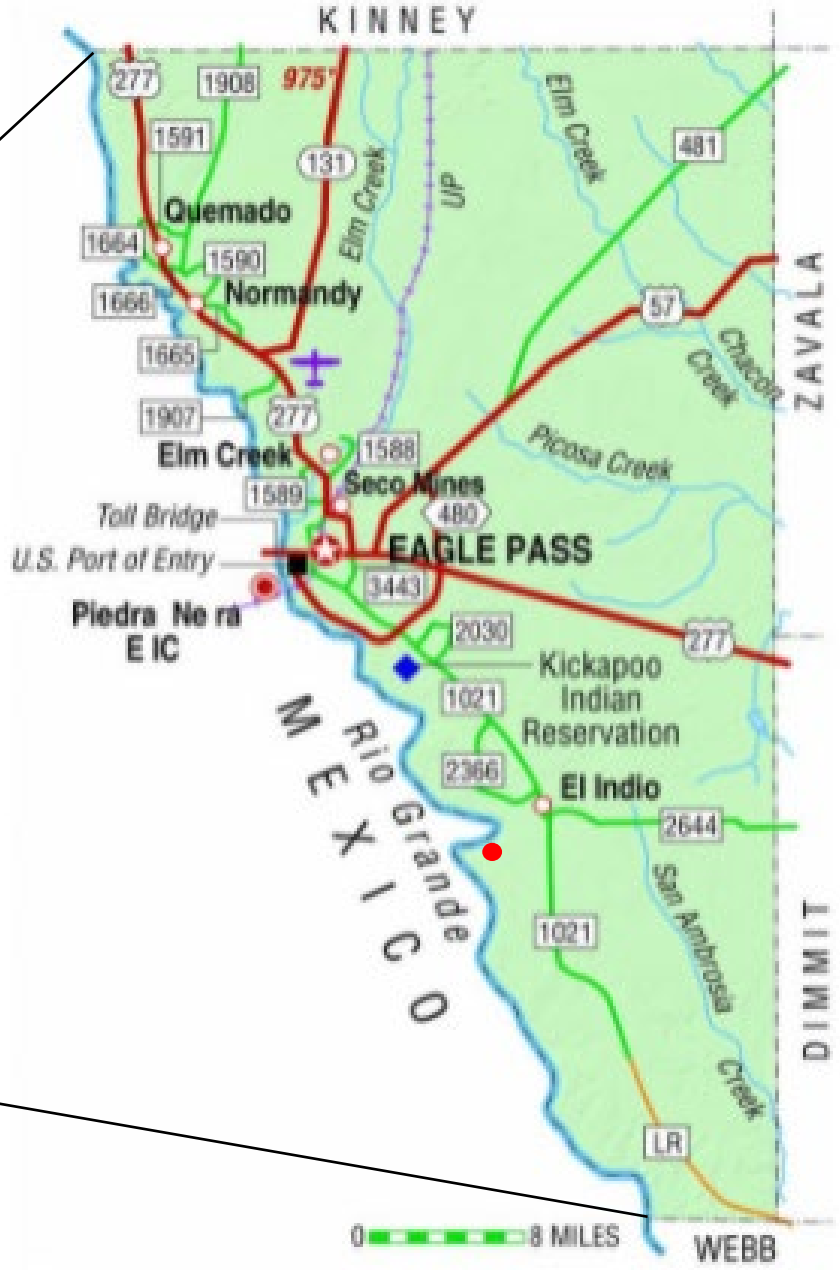



MAVERICK
COUNTY,
TEXAS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277
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1591
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Quemado
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Normandy
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1665
1907
277
Elm Creek
1588
Seco Mines
1589
Toll Bridge
U.S. Port of Entry
480
EAGLE PASS
3443
Piedra Negra
E IC
2030
277
Kickapoo
Indian
Reservation
1021
2366
El Indio
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LR
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Elm Creek
Chacon Creek
Picosa Creek
San Ambrosia Creek
Rio Grande
MEXICO
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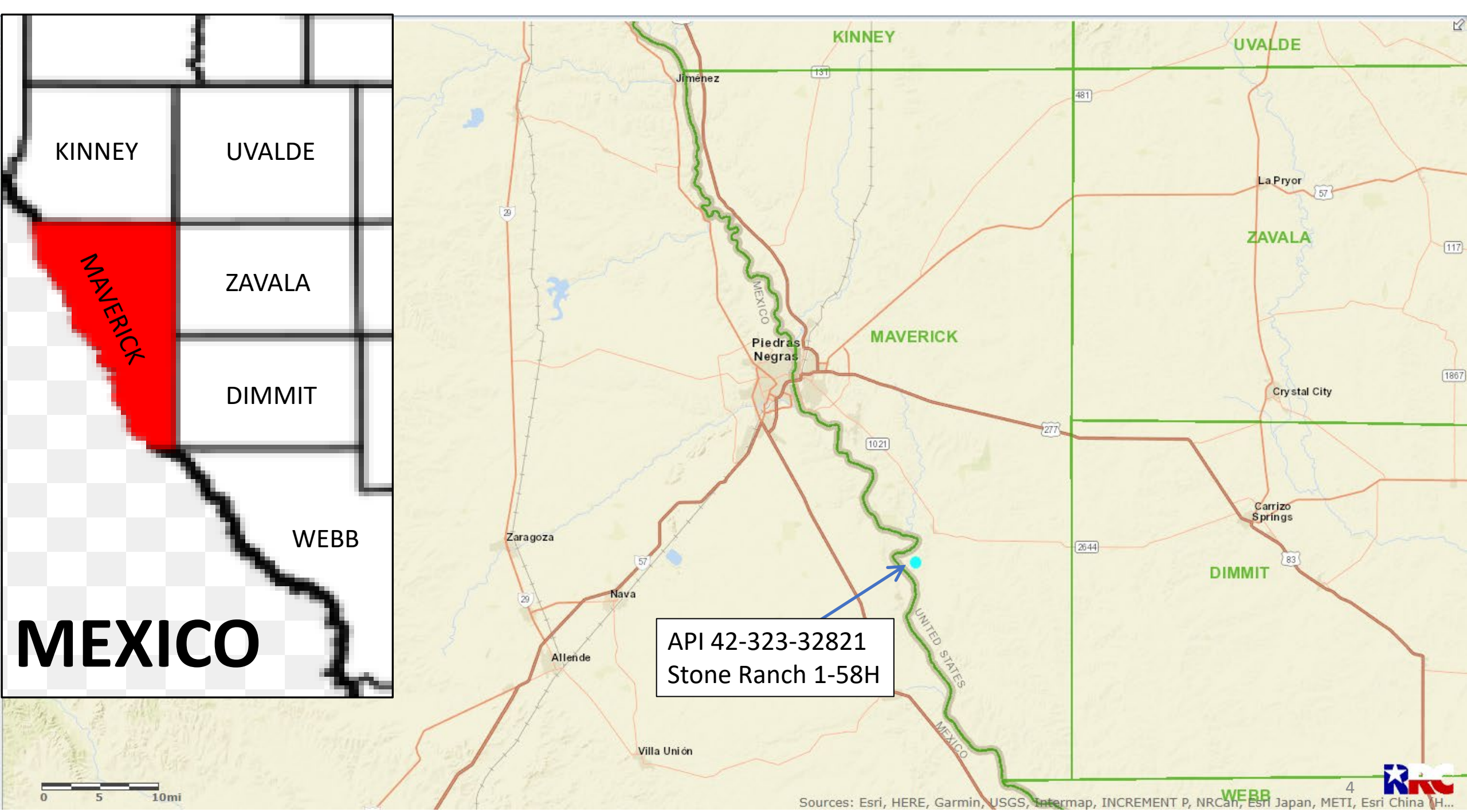
8 MILES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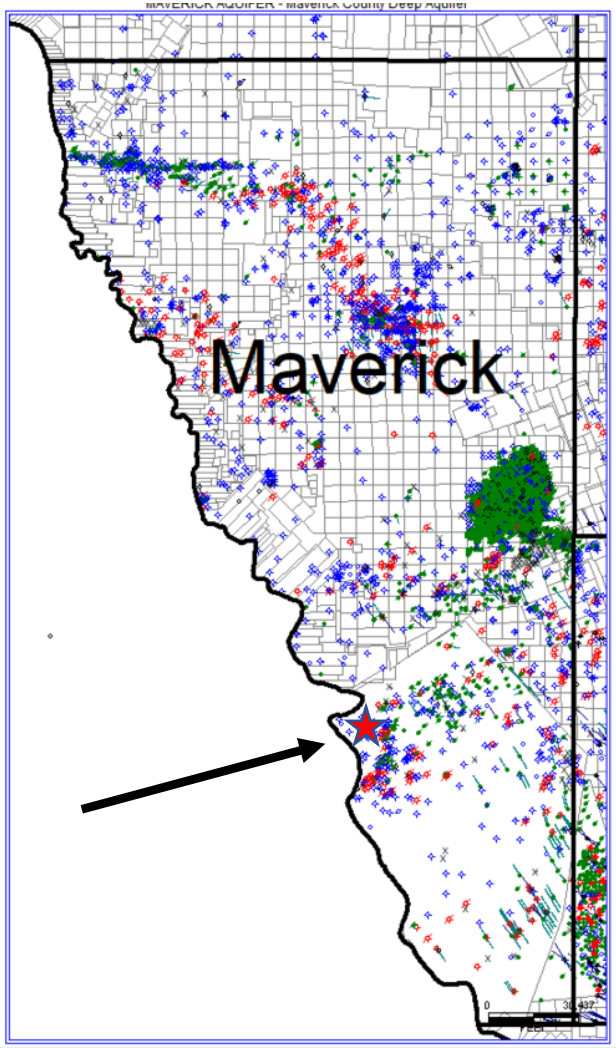
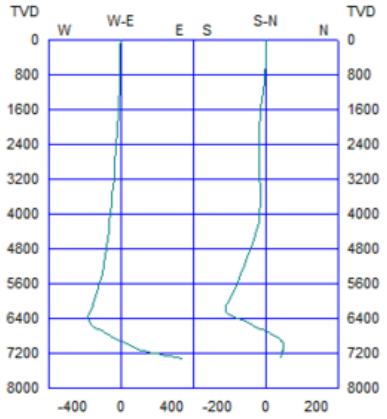
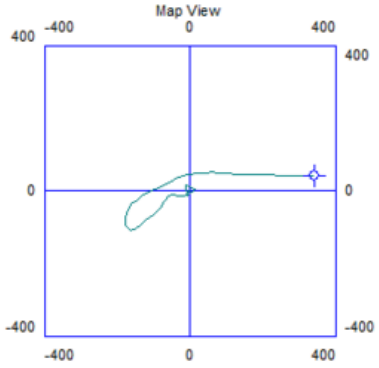
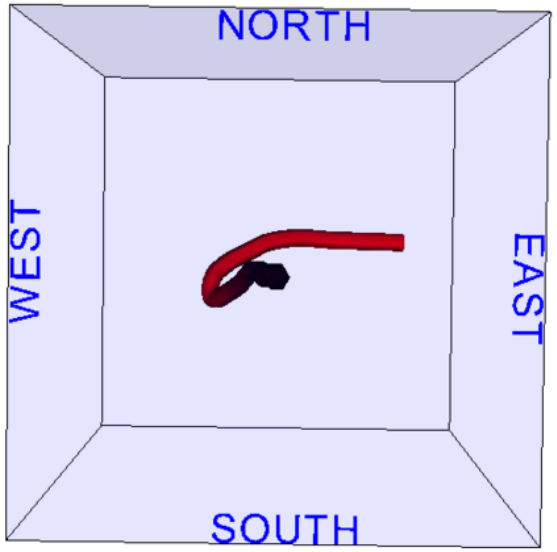
ZAVALA
117
MEXICO
Piedras Negras
MAVERICK
1867
Crystal City
277
1021
Carrizo Springs
2644
83
DIMMIT
Zaragoza
57
29
Nava
Allende
UNITED STATES
MEXICO
Villa Unión
API 42-323-32821
Stone Ranch 1-58H
0
5
10mi
WEBB
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (H...

42-323-32821 Stone Ranch 1-58H, Joint Resources
Maverick County, Texas => P13 Pending

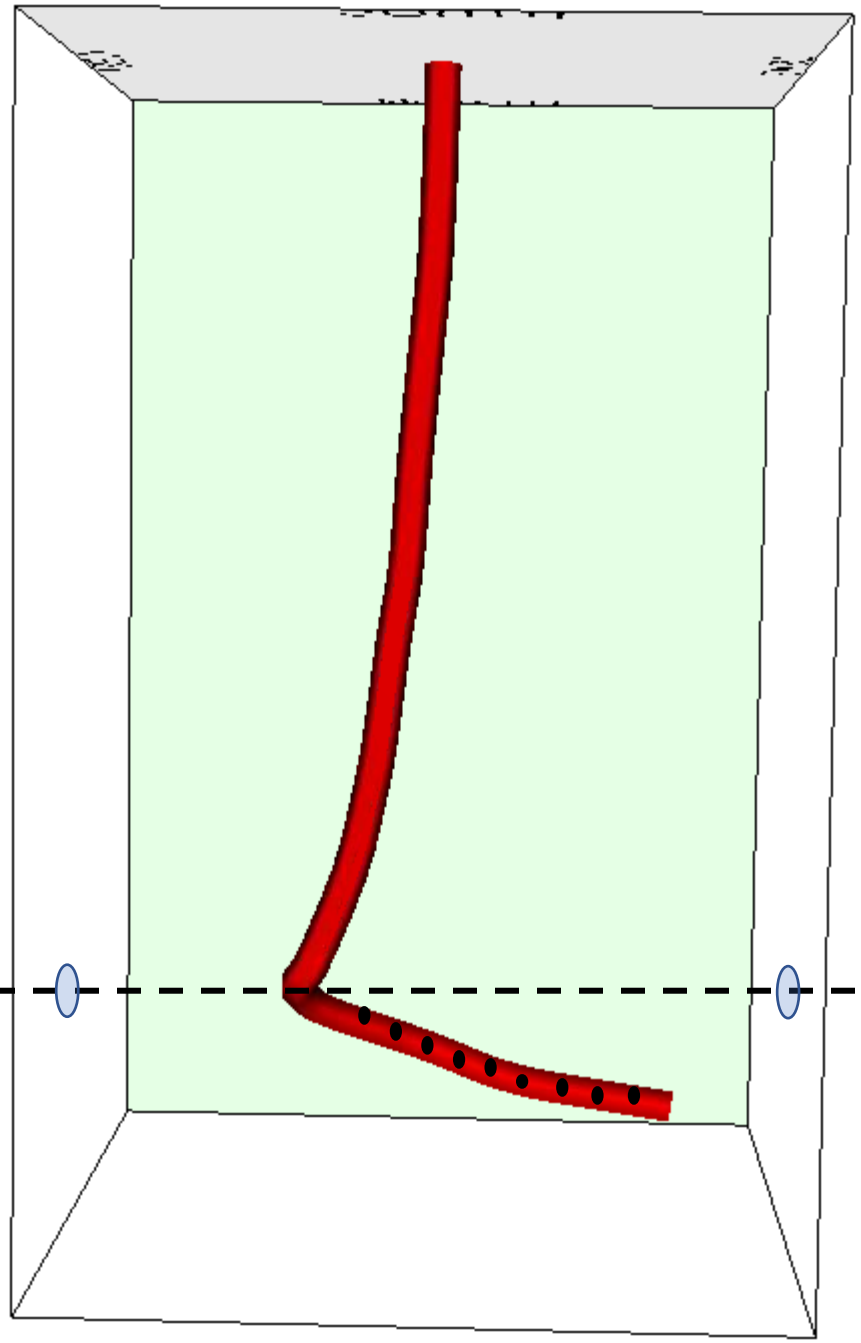








Glen Rose Formation



LATEST UPDATE FROM CHUY ARREDONDO ON CONVERSION OF THE STONE RANCH 1-58H WELL : 10/6/2021

⇒ On Stand-by; Currently waiting for approval of the P-13 to convert oil well to water well.

⇒ As soon as signed/approved P-13 is received, Chuy will send a copy of the P-13 and the W-3 Plugging Report to District 1 Office (Travis Baer).

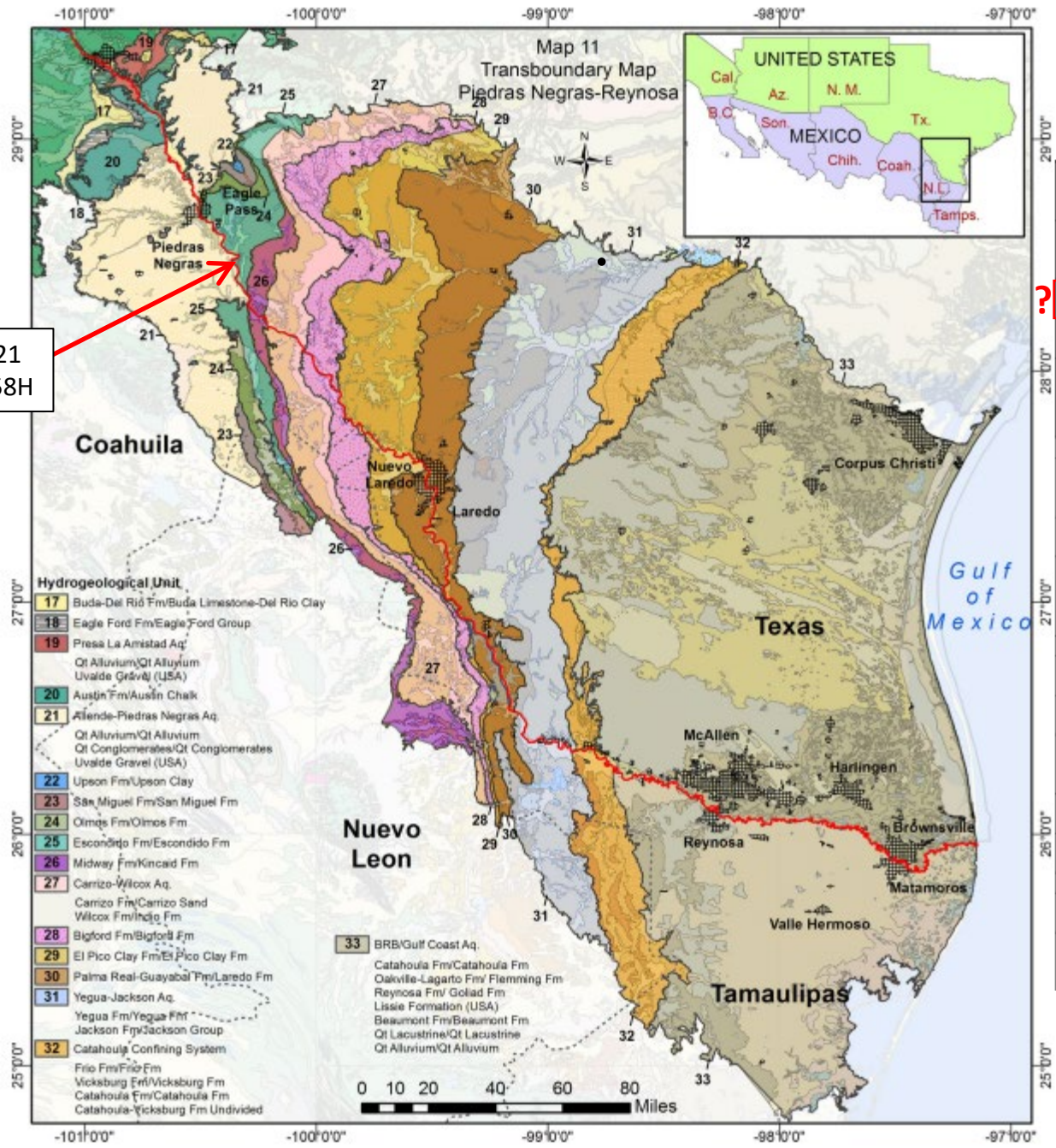
⇒Planning to drill-out the remaining plug, then run 2-7/8” tubing with an air-set packer to isolate the water bearing interval around 6000 feet.

⇒Will flow several wellbore volumes to surface, and then connect to an oil separator / filtration before discharging into a surface stock tank.

Transboundary Aquifers between Chihuahua, Coahuila, Nuevo Leon and Tamaulipas, Mexico, and Texas, USA: Identification and Categorization - R. Sanchez, Rodriguez, L., Tortajada, C.

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

API 42-323-32821
Stone Ranch 1-58H



BOUNDARY FORMATIONS	TRANSBOUNDARY FORMATIONS	AQUIFER NAME	AQUIFER POTENTIAL	HYDROGEOLOGIC FEATURES	WATER QUALITY	TDS (ppm)	ID
Loma de Plata Fm/Espy Limestone	Loma de Plata Fm/Espy Limestone.		Aquitard.		Unknown.		D4
? Aurora Fm/Glen Rose Fm.	Aurora Fm/Glen Rose Fm.		Good.		Moderately to highly saline.	1000 to > 3000	A3
Edwards Fm.	Edwards Fm.	Edwards Aq.	Good.	T=0.15-25100 K=0.0009-221	Predominantly fresh.	< 1000	A1
West Nueces Fm.	Upper West Nueces Fm.		Good.		Unknown.		A4
	Lower West Nueces Fm.		Aquitard.		Unknown.		D4
McKnight Fm.	McKnight Fm.		Aquitard.		Unknown.		D4
Salmon Peak Fm/Salmon Peak Limestone.	Lower Salmon Peak		Poor.		Unknown.		C4
	Upper Salmon Peak.		Good.		Fresh to Saline.		A1-A3
Devils River Limestone (USA).			Good.	n=3% to 15%	Fresh to Saline.		A1-A3
Santa Elena Fm/Santa Elena Limestone	Santa Elena Fm/Santa Elena Limestone.		Moderate.		Unknown.		B4
	Santa Elena Fm/Santa Elena Limestone.	Cretaceous-Terlingua	Poor.		Poor.	1130–1303	C2
Pen Fm.	Pen Fm.		Moderate.		Moderate.	2173	B2
Javelina Fm. (USA)			Poor.		Moderately saline.		C3
Aguja Fm.	Aguja Fm.		Poor.		Poor (saline and hard).	5287	C3
Kiamichi Fm.			Poor.		Slightly saline to moderately saline.		C2
Cox Sandstone (USA)			Unknown.		Unknown.		E4
La Pena Fm/Yucca Formation			Unknown.		Unknown.		E4
Benevides Fm.			Unknown.		Unknown.		E4
Boquillas Fm.	Boquillas Fm.		Poor.		Fresh to slightly saline.		C1-C2
Eagle Ford Fm/Eagle Ford Group.	Eagle Ford Fm/Eagle Ford Group.		Aquitard.		Unknown.		D4

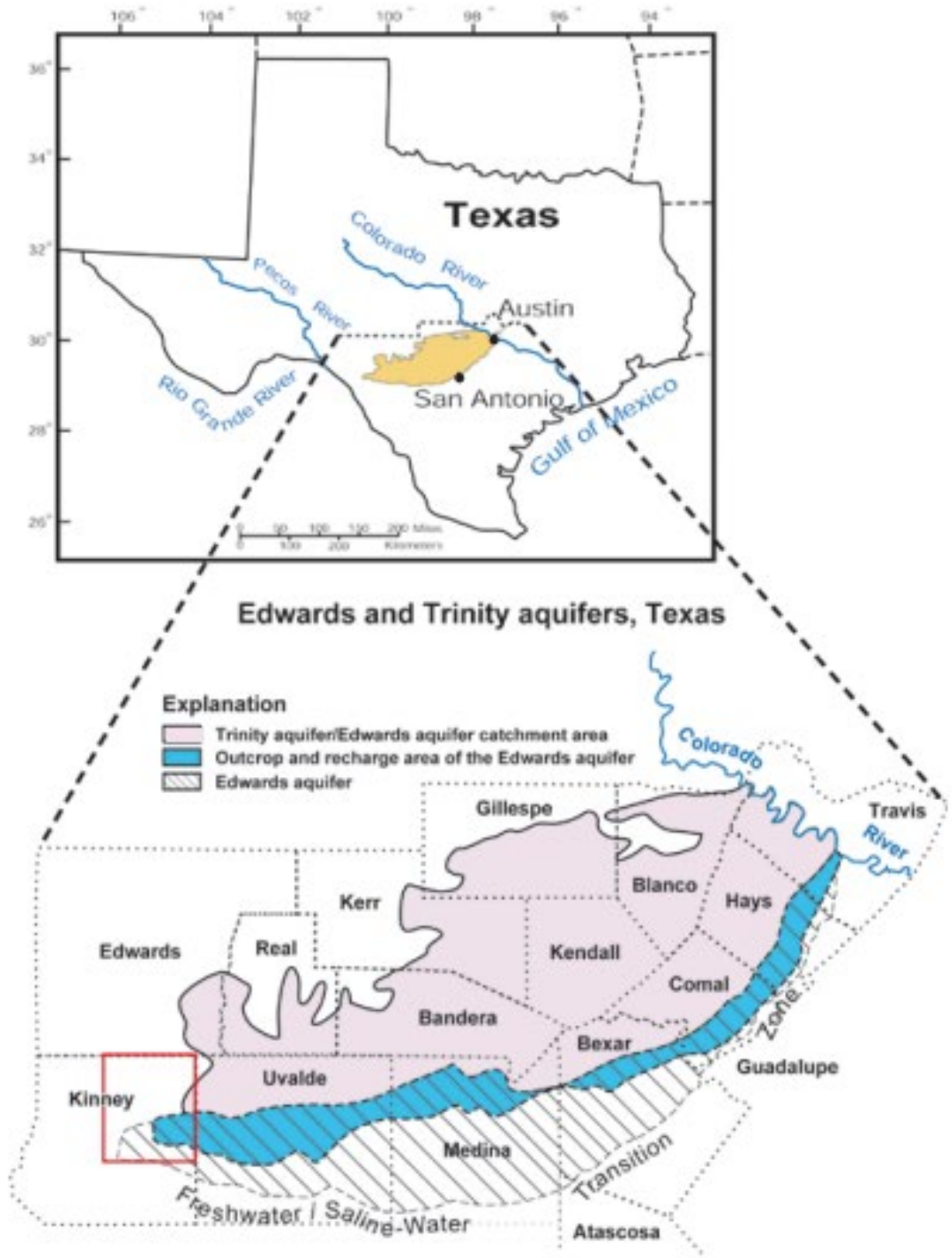
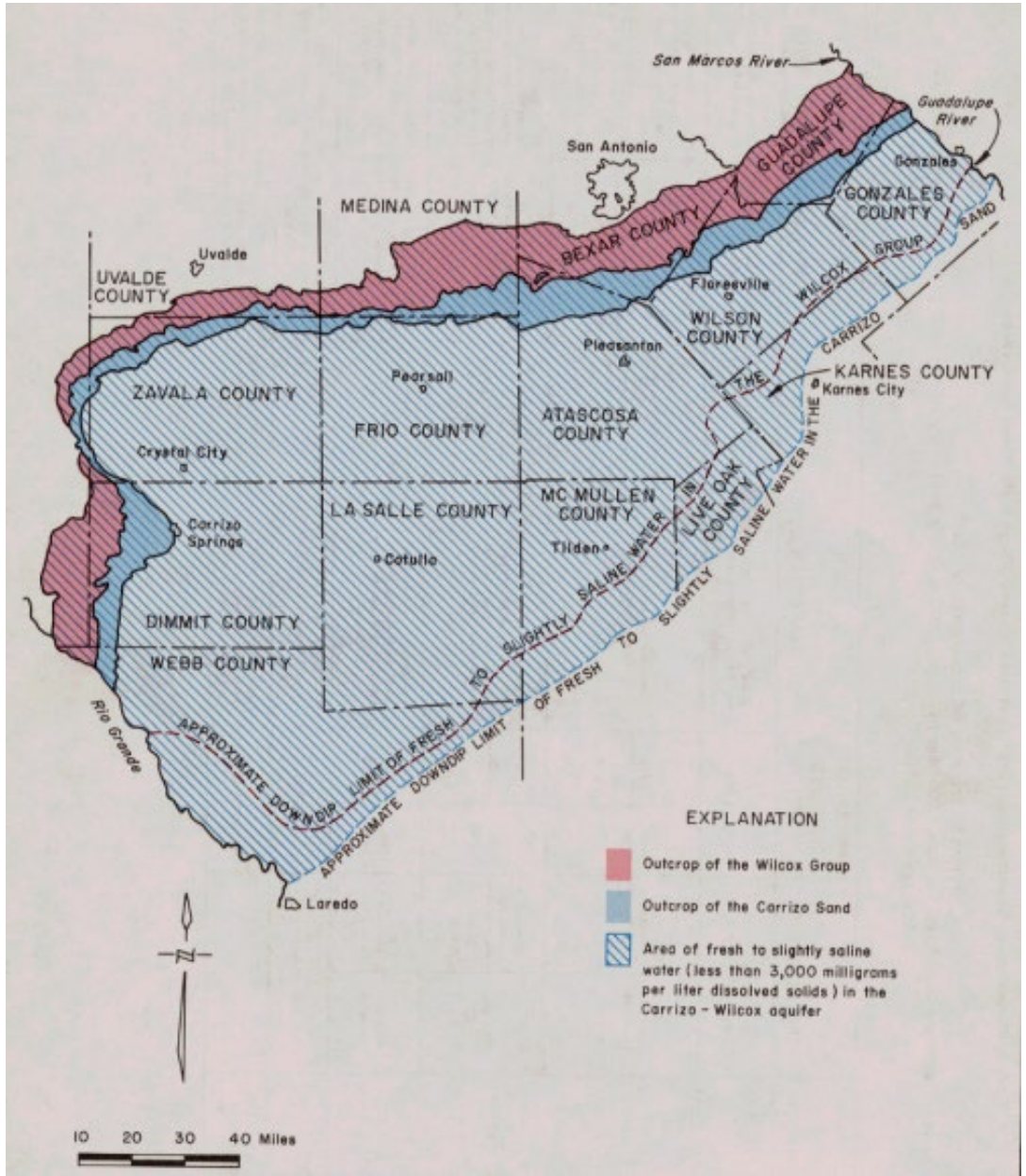


Figure 1. Area of Edwards aquifer; extent of geologic map shown by red box.

Map From Texas Water Development Board - Report 210 - Ground-Water Resources of the Carrizo Aquifer in the Winter Garden Area of Texas

STONE RANCH
1-58H
P-13 WELL



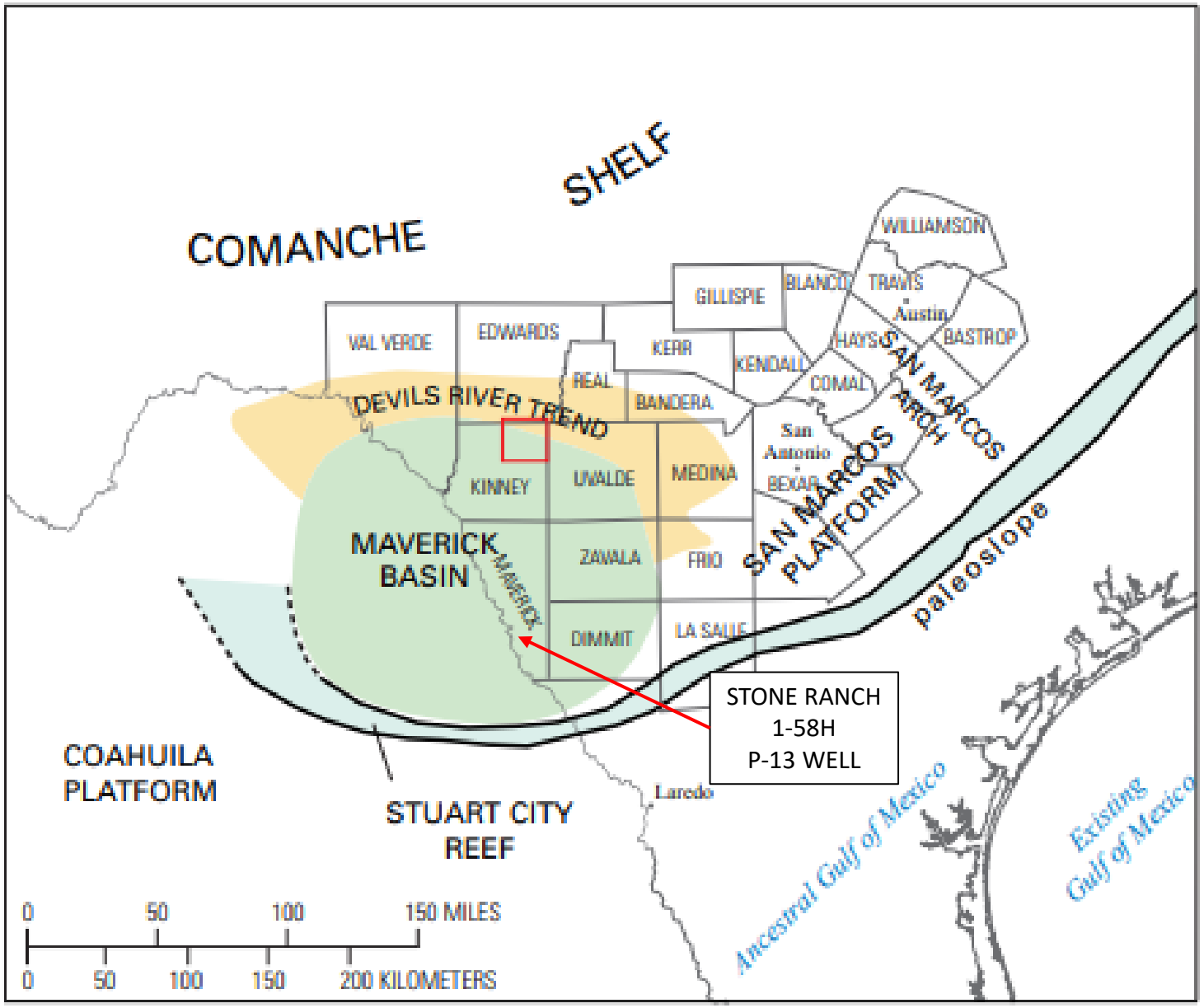
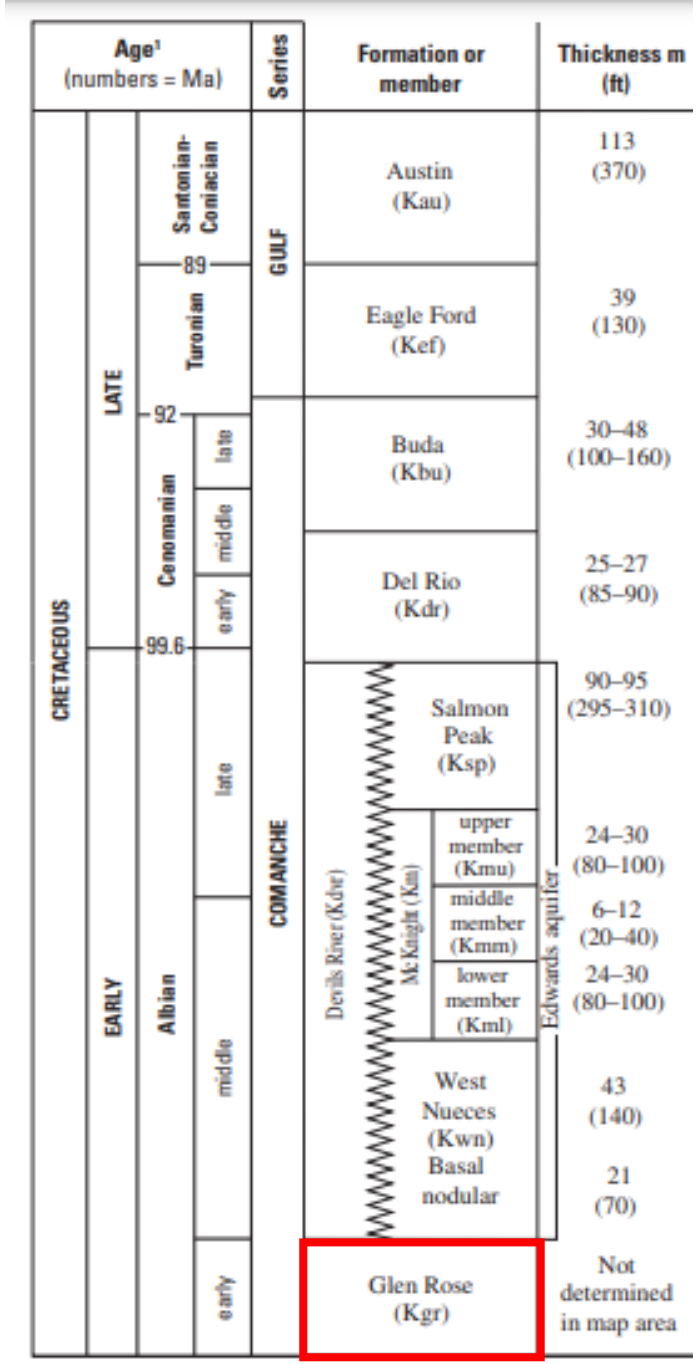
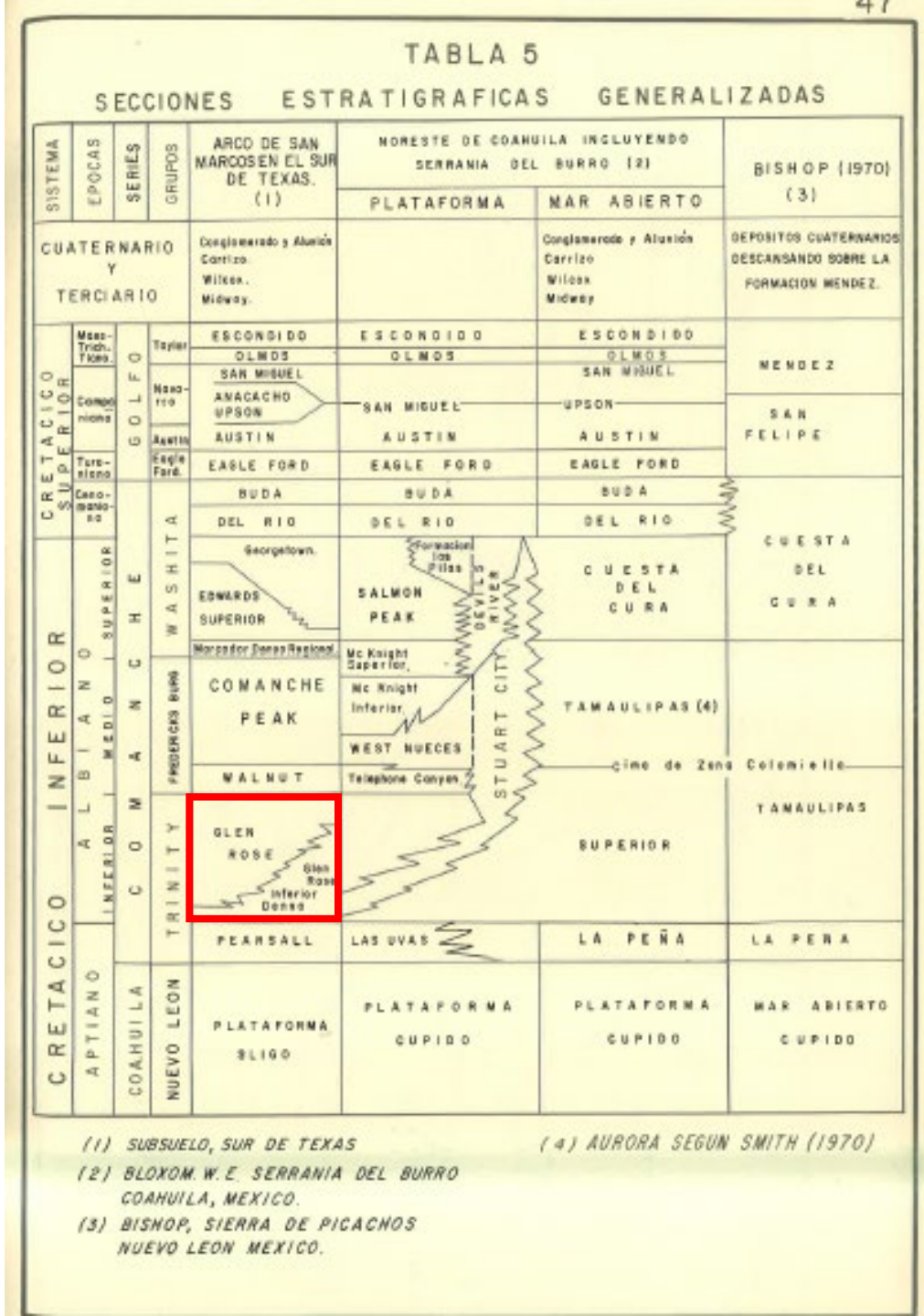


Figure 3. Paleogeography (regional depositional setting) of Comanchean and Gulfian rocks. Present-day counties and selected cities are shown. Red box locates the geologic map. Modified from Rose (1972).



¹For discussion of placement of the boundaries between Comanc
²From Clark (2003).

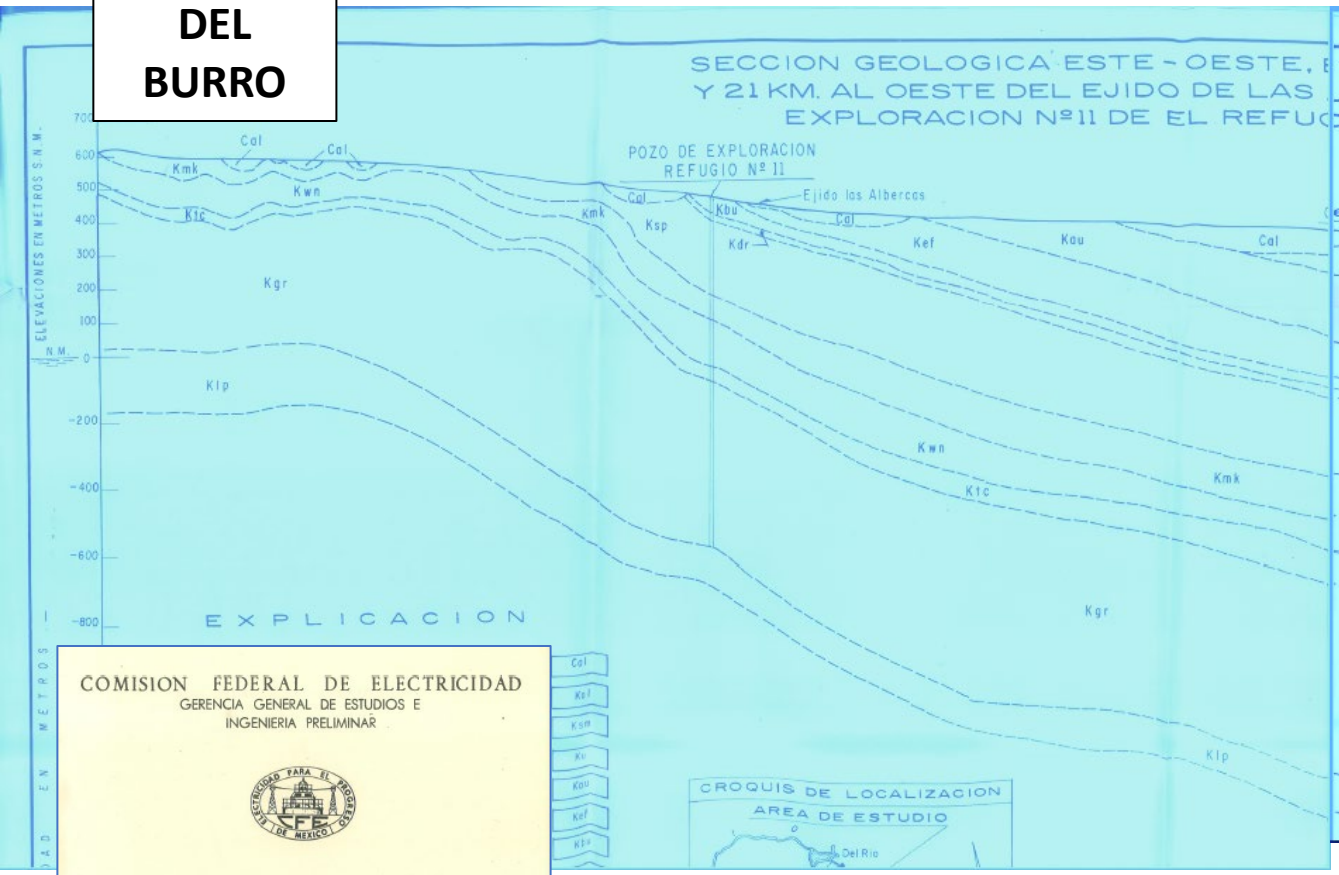


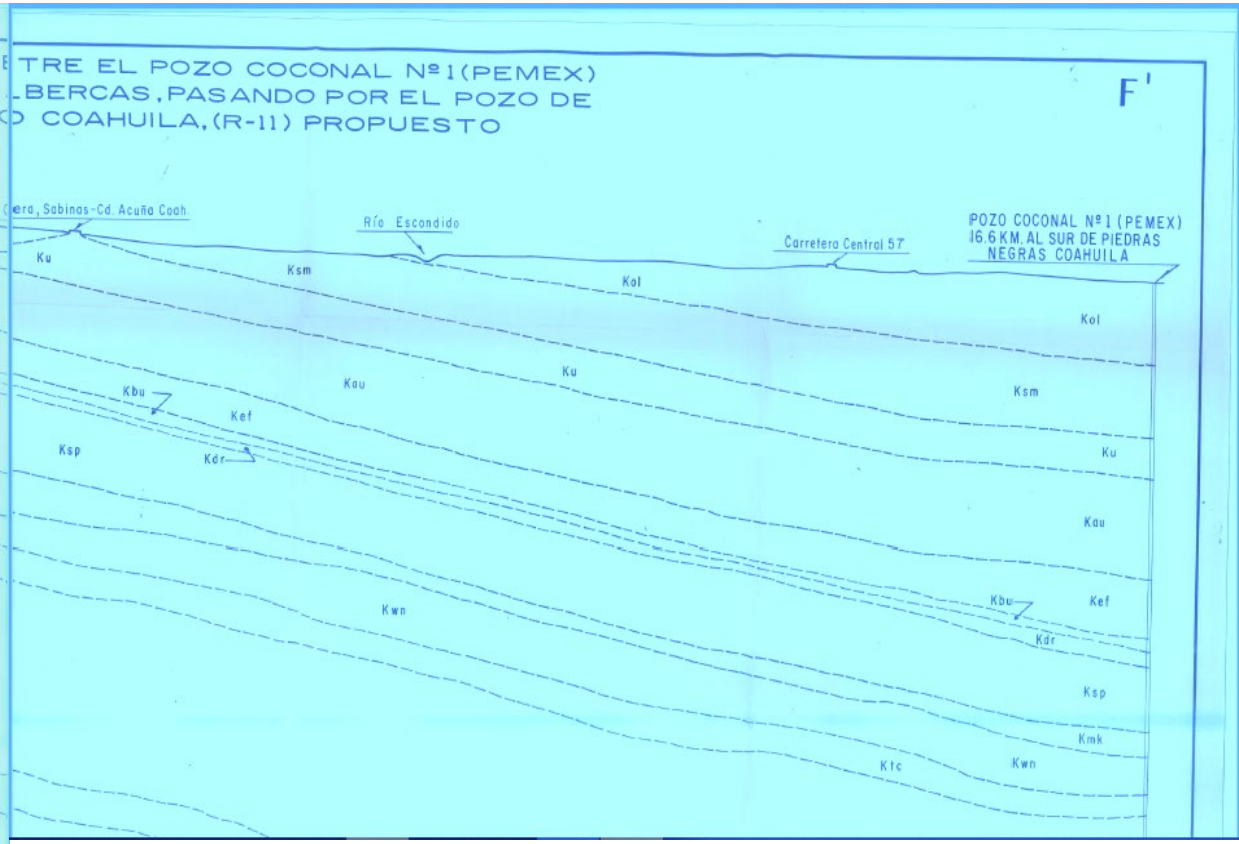
ROCK FORMATIONS AND THEIR WATER-BEARING PROPERTIES

CRETACEOUS SYSTEM

The San Miguel, Olmos, and Escondido formations, all of Late Cretaceous age, crop out in a small section in the northwestern part of Zavala County and in the eastern part of Maverick County. These formations are described briefly on page 25–26; no further description is given here because none of the formations are known to yield water to wells in the Winter Garden district. None of the formations of Cretaceous age that underlie the San Miguel formation are known to yield water to wells in the Winter Garden district. It is reported that no water was obtained from the Edwards limestone of Early Cretaceous age in a test well (H8–75), 7½ miles north of La Pryor drilled to a depth of 3,065 feet.

SERRANIA DEL BURRO



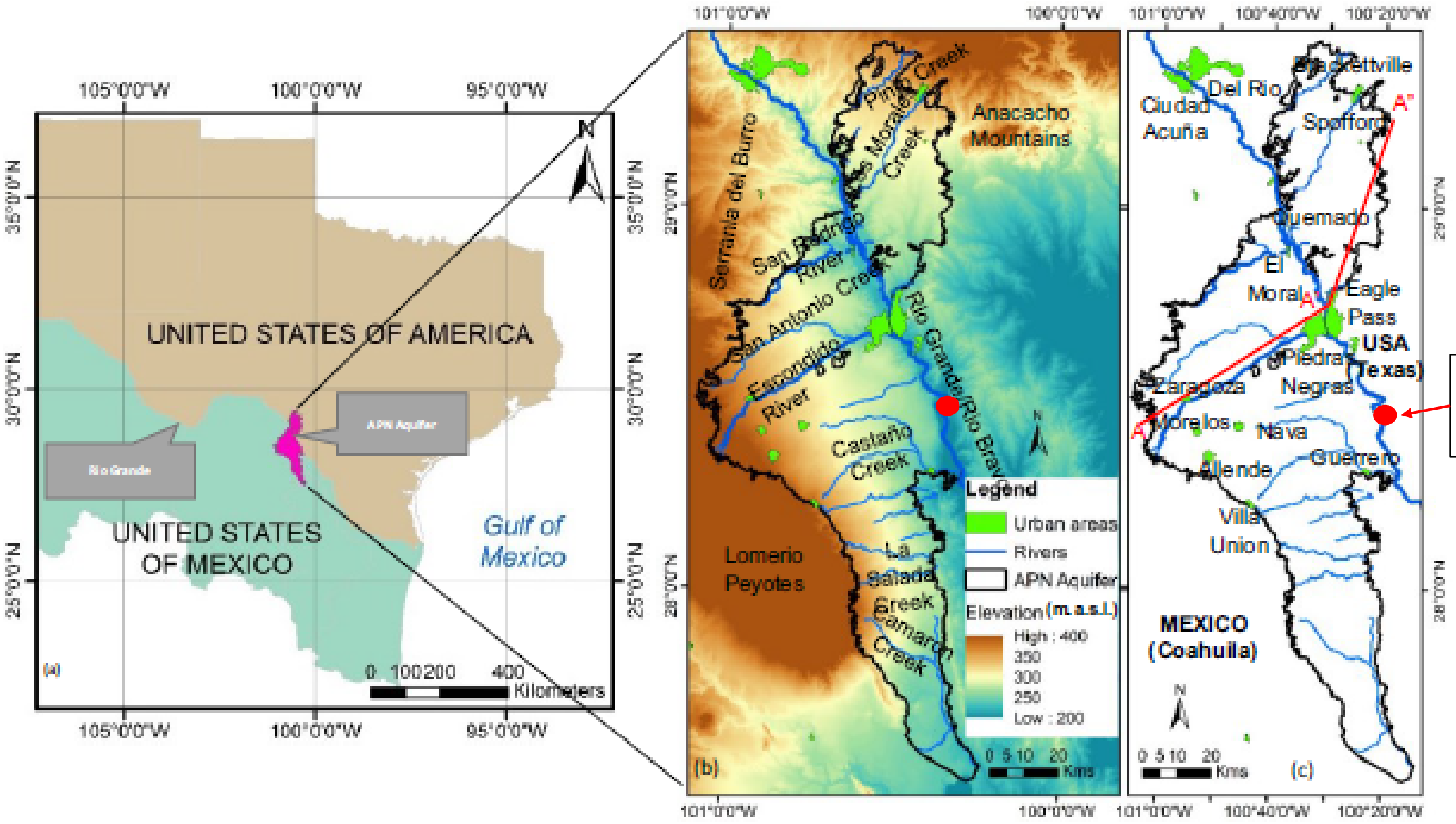


COMISION FEDERAL DE ELECTRICIDAD
GERENCIA GENERAL DE ESTUDIOS E
INGENIERIA PRELIMINAR

GEOLOGIA BASICA REGIONAL DE LA
SUB-CUENCA HIDROLOGICA
ACUÑA-LAREDO

SERIES TECNICAS DE C F E
No. 2

ABRIL DE 1979
ASESORIA GENERAL DEL DEPARTAMENTO
DE GEOLOGIA Y MINERIA



STONE RANCH
1-58H
P-13 WELL

FIGURE 1. Limits of the Allende–Piedras Negras (APN) aquifer, with (a) general location, (b) main topographic features and surface drainage, and (c) urban areas shown.

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. 2020

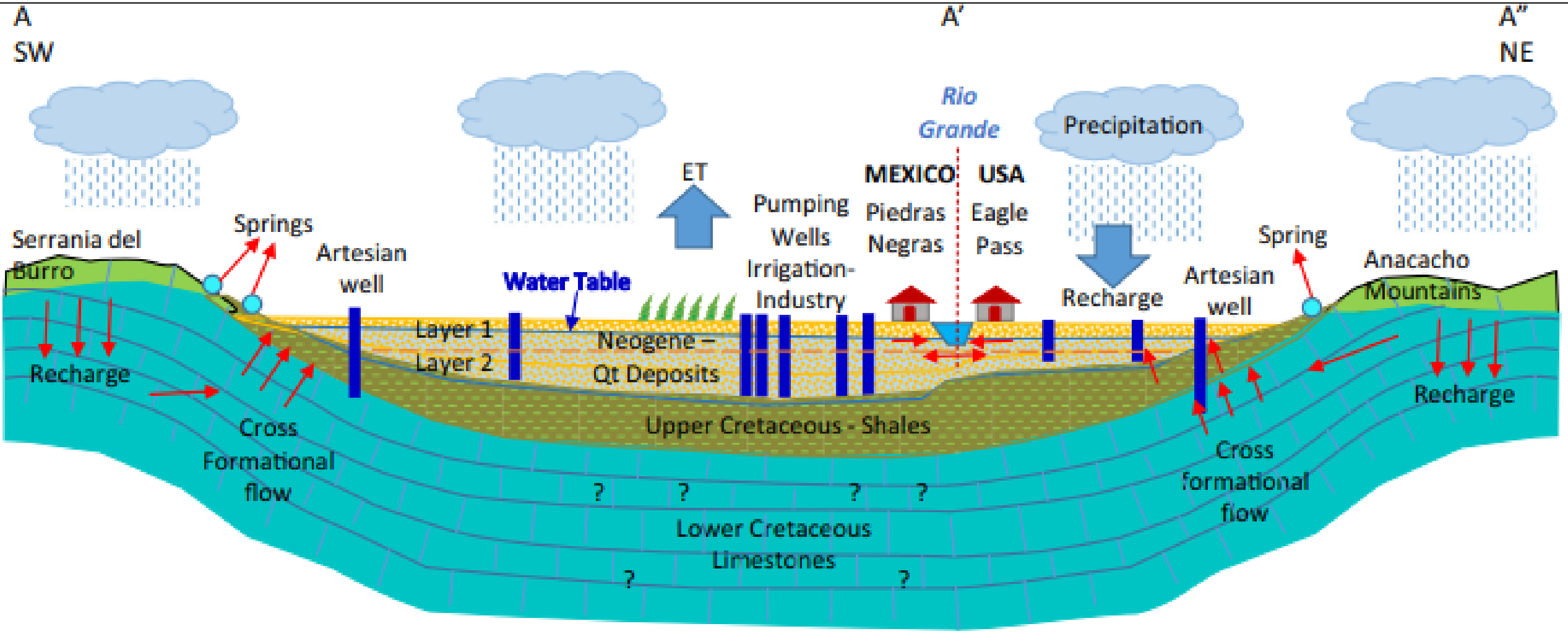


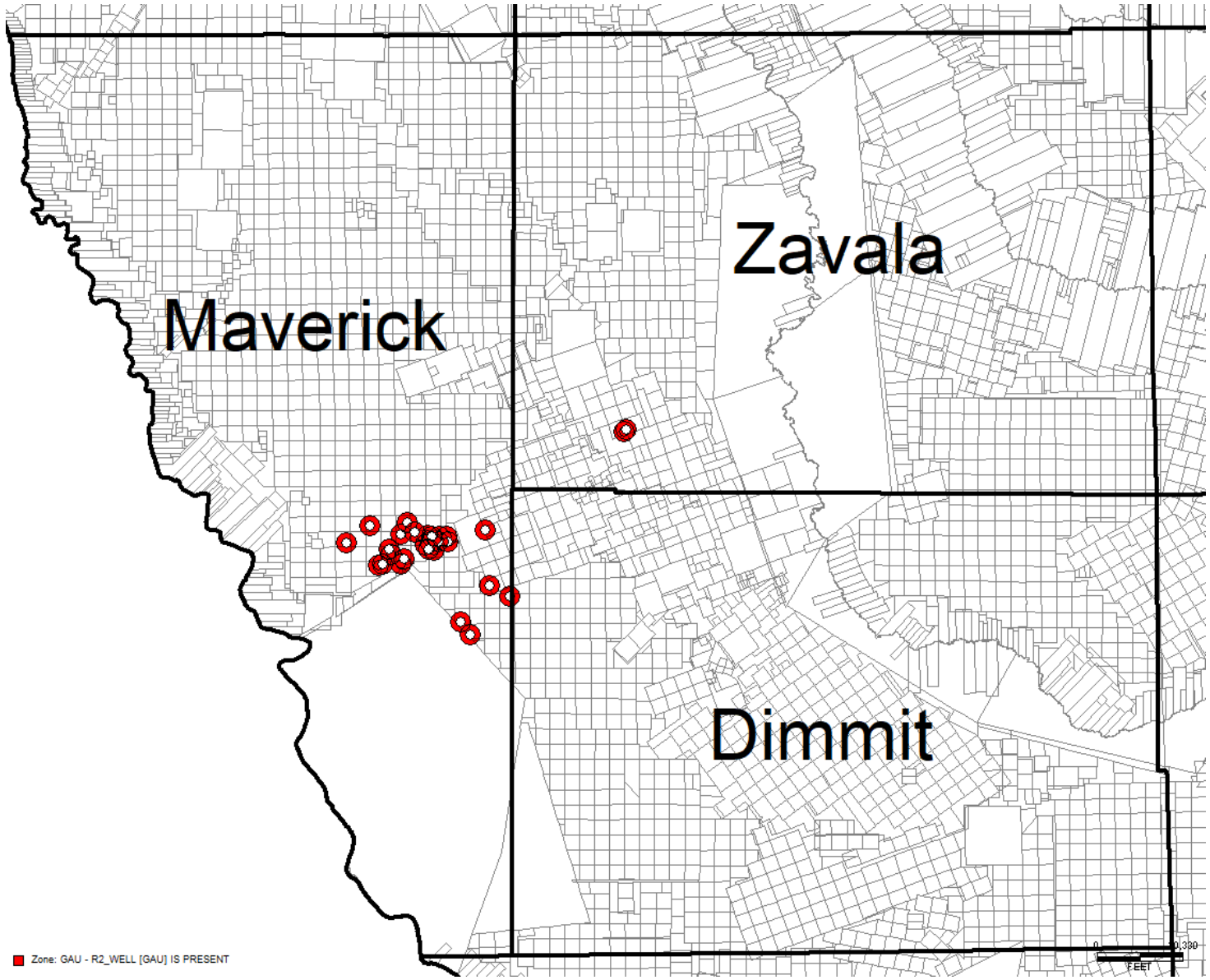
FIGURE 4. Hydrogeological conceptual model of the APN aquifer. The red arrows symbolize the general directions of groundwater flow.


Sierra Madre Occidental
Sierra Madre Oriental
Sierra Madre del Sur

DATA THAT RRC CURRENTLY HAS AVAILABLE AND STATUS OF RRC EVALUATION WORK

- Map of Existing R2 (Surface Discharge Locations) from wells completed in the Deep Glen Rose Aquifers
- Surface Discharge Data (Water Volumes versus Time)
- P-13 Water Production Data – Example of Water Production by Lease
- Map of Existing P13 Wells (Oil Well to Water Well Conversion)
- Map of Existing Well Tests in or thru the Glenn Rose (tentative list) in Zavala Co. (from TWDB interactive)
- PETRA Database including Log Data, Formation Top Picks, Exportable Surface Grids / Depth Structure Maps, Aquifer Reconnaissance Cross-Sections – **Contact Cris Astorga**

R2 Wells Locations (Surface H2O Discharge)



R2 Wells – Water Discharge Data

WSN	UWI (APINum)	Well Number	Well Name	Operator	Sym Code	County	Surf X	Surf Y	WELL TD
85	4232333032	S106H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2949003.5	2034479.8	6775
90	4232332625	1-44	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2924504.8	2059445.7	6723
99	4232332731	2039H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2936107.7	2064076.8	7709
103	4232332947	1013H	COMANCHE RANCH	CMR ENERGY LP	PLUGOIL	MAVERICK	2945648.2	2039277.6	7087
113	4232332807	2113H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2924438.2	2069821.3	6833
123	4232332654	3-111H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2938029.8	2068985.4	10300
128	4232332844	1108H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2926723.5	2073824.0	7658
142	4232332627	2111	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2934029.6	2069579.2	6616
143	4232333103	1025H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2962731.3	2047973.0	7228
153	4232333474	S103	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2955587.8	2051743.9	6858
164	4232332669	4-111 H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2935544.3	2067270.8	10710
175	4232332666	1581	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2954080.6	2071478.7	6665
186	4232332617	1013	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2921265.9	2062509.0	7720
257	4232332944	205H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2916836.8	2059077.1	7574
266	4232332733	1106H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2913575.5	2072696.3	6439
279	4232332918	2117H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2905325.2	2066941.1	7485
298	4232332891	4013H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2920607.5	2064441.5	7669
301	4232333495	3044	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2918332.1	2059128.3	6588
314	4232333324	302H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2940750.4	2068981.1	7441
317	4232332969	1040H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2940859.9	2067113.9	9192
328	4232332812	3112H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2929536.8	2070366.4	6477
329	4232332686	2112H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2933222.7	2066026.8	10738
331	4232332599	1	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2937595.3	2067028.5	6731
332	4232332798	5111	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2935412.5	2068969.5	6784
335	4232332960	4014H	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2925770.4	2061289.3	8543
336	4232332618	1-39	COMANCHE RANCH	CMR ENERGY LP	OIL	MAVERICK	2934473.2	2064484.6	8225
16652	4250732718	1		RIO-TEX INC	PLUGOIL	ZAVALA	3002648.4	2105764.1	8160
16675	4250732743	2		RIO-TEX INC	OIL	ZAVALA	3003456.7	2106357.1	8002

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

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

Avg Water=95.44 BBLs/Day =Avg 4008.48 Gallons/Day

Water Quality Reports

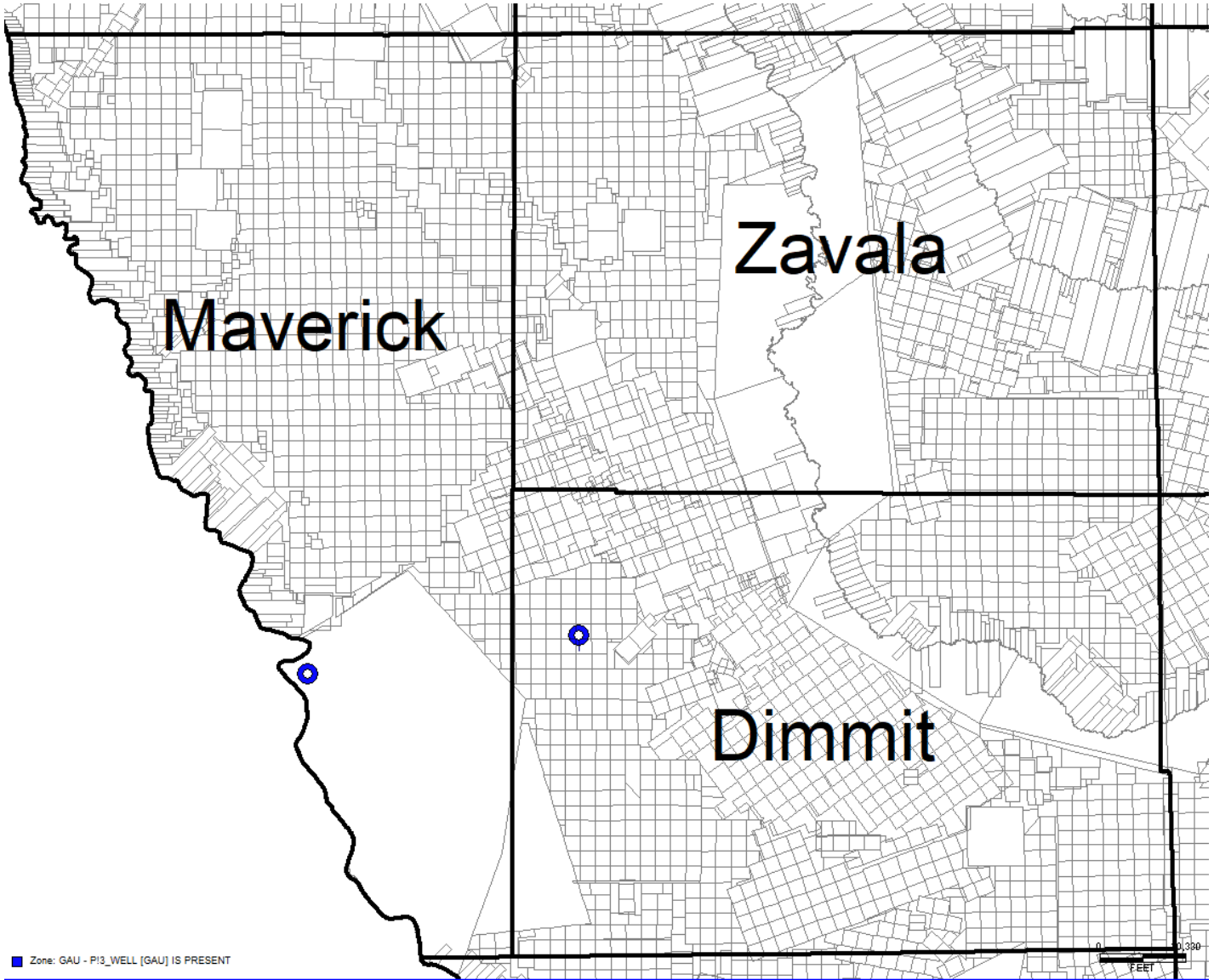
- Comanche Ranch Produced Water Surface Discharge Water Quality

SAN ANTONIO TESTING LABORATORY

CMR ENERGY , L.P.
1375 Enclave Parkway
Houston ,Texas 77077

Permits & Well # 's		7/28/2020 Jul-20		8/4/2020 Aug-20		9/10/2020 Sep-20	
Comanche Ranch Well #	Permit #	Chlorides (mg/l)	Oil In Water (ppm)	Chlorides (mg/l)	Oil In Water (ppm)	Chlorides (mg/l)	Oil In Water (ppm)
2-5H	01078	365	<5.0	356	<5.0	339	<5.0
2-117	01031	93	<5.0	96	<5.0	76	<5.0
1-40H	01073			309	<5.0	206	<5.0
4-111H	01041	345	<5.0	731	<5.0	671	<5.0
3-2H, 1-111, 1-39	01034	267	<5.0	277	<5.0	255	<5.0
2-111, 5-111H	01033	81	<5.0	87	<5.0	73	<5.0
2-112H, 2-113H, 3-112H	01044	106	<5.0	137	<5.0	68	<5.0
1-44H, 4-14H	01051	229	<5.0	249	<5.0	354	13.50
S103	01124	353	10.90	374	6.81	327	<5.0
3044	01130	125	<5.0	79	5.53	75	<5.0
1-108H	01131	220	<5.0	231	<5.0	200	<5.0
S106H	01129	137	5.50	129	<5.0	113	<5.0

P13 Wells (Oil Well to Water Well Conversion)

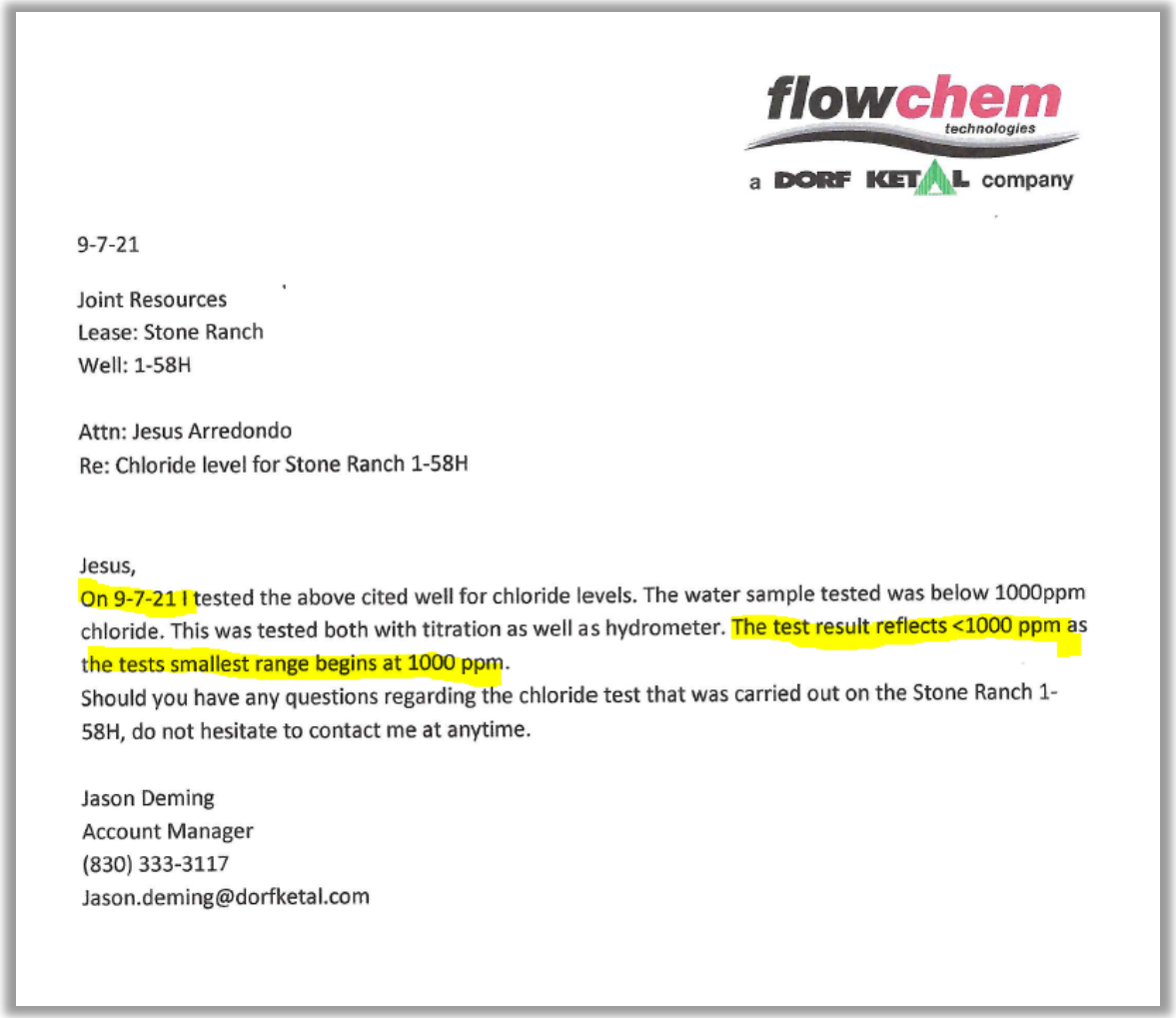


P13 Data

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 FEE (JREDRANCH)	HAMILTON J R	WTRSUP	DIMMIT	2986582.9	2034568.2	8100

Water Quality Reports Continued

- Stone Ranch P-13 Application Maverick County - Packer set at 5,800 Ft.



flowchem technologies
a DORF KETAL company

9-7-21

Joint Resources
Lease: Stone Ranch
Well: 1-58H

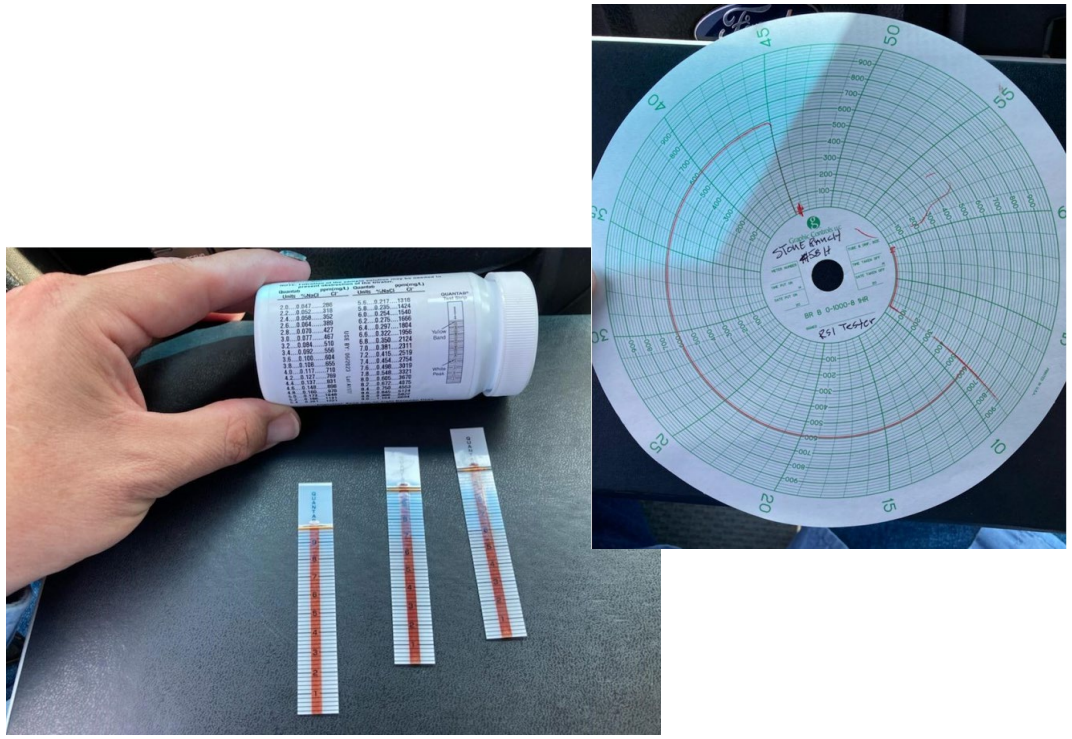
Attn: Jesus Arredondo
Re: Chloride level for Stone Ranch 1-58H

Jesus,
On 9-7-21 I tested the above cited well for chloride levels. The water sample tested was below 1000ppm chloride. This was tested both with titration as well as hydrometer. The test result reflects <1000 ppm as the tests smallest range begins at 1000 ppm.
Should you have any questions regarding the chloride test that was carried out on the Stone Ranch 1-58H, do not hesitate to contact me at anytime.

Jason Deming
Account Manager
(830) 333-3117
Jason.deming@dorfketal.com

Water Quality Reports Continued

- Stone Ranch P-13



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'.

Water Quality Reports Concluded:

- Hamilton Fee P-13 Application Dimmit Co. is currently in violation of SWR 18
- Cert Letter Sent out Oct. 2021

Debbie Farmer, General Manager

Mailing Address:
P. O. Box 1433, Carrizo Springs, TX 78834

Physical Address:
2881 Hwy. 277 West, Carrizo Springs, TX 78834

Fax: 830-876-3782
Email: wgcd@wgcd.net

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): WILDCAT
2. Field No.: W/C
3. RRC District No.: 1
4. Operator Name (as shown on P-5): J R HAMILTON
5. Operator P-5 No.:
6. County: DIMMIT
7. Lease Name: HAMILTON FEE J RED RANCH LTD
8. RRC Lease/Gas ID No.: N/A
9. API No.: 42-127-33754
10. Well No.: 67
11. Location (Section, Block, and Survey): T & N RR SURVEY 34-389 650' FSL 650' FWL
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: NO
13. If the well has been worked over, provide the former Field name (and reservoir name) and number: NA
14. Is this an Abandoned Producer or a Dry Hole? ☑ YES ☐ 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: E LOG
16. Completion date of the well: 8-12-19
17. Proposed Plug-Back Depth of well for fresh water production (ft): 8000
18. Base of Usable Quality Water (ft.): 8217
19. Date of TCEQ letter: TCEQ File No.: SC-
20. FOR COMPLETION BY LANDOWNER: *Information concerning groundwater conservation districts may be found at www.texasgroundwater.org.*
- ☐ I have permitted the well as a water well with the _____ Groundwater Conservation District.
- ☐ I have registered the water well with the _____ Groundwater Conservation District.
- ☐ The _____ Groundwater Conservation District does not require that the water well be permitted or registered.
- ☐ 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: J.R. Hamilton	Date: 8-12-19
Signature of Landowner: J.R. Hamilton	Signature of Operator or Authorized Representative: J R Hamilton
Name of Landowner: (type or print) J R HAMILTON	Name of Person and Title: (type or print) J R HAMILTON OPERATOR
Street Address or P. O. Box: Box 516	Street Address or P. O. Box: Box 516
City, State, Zip Code: CARRIZO SPRINGS, TX 78834	City, State, Zip Code: CARRIZO SPRINGS, TEXAS 78834
Telephone (830) 876-5541	Telephone (830) 876-5541

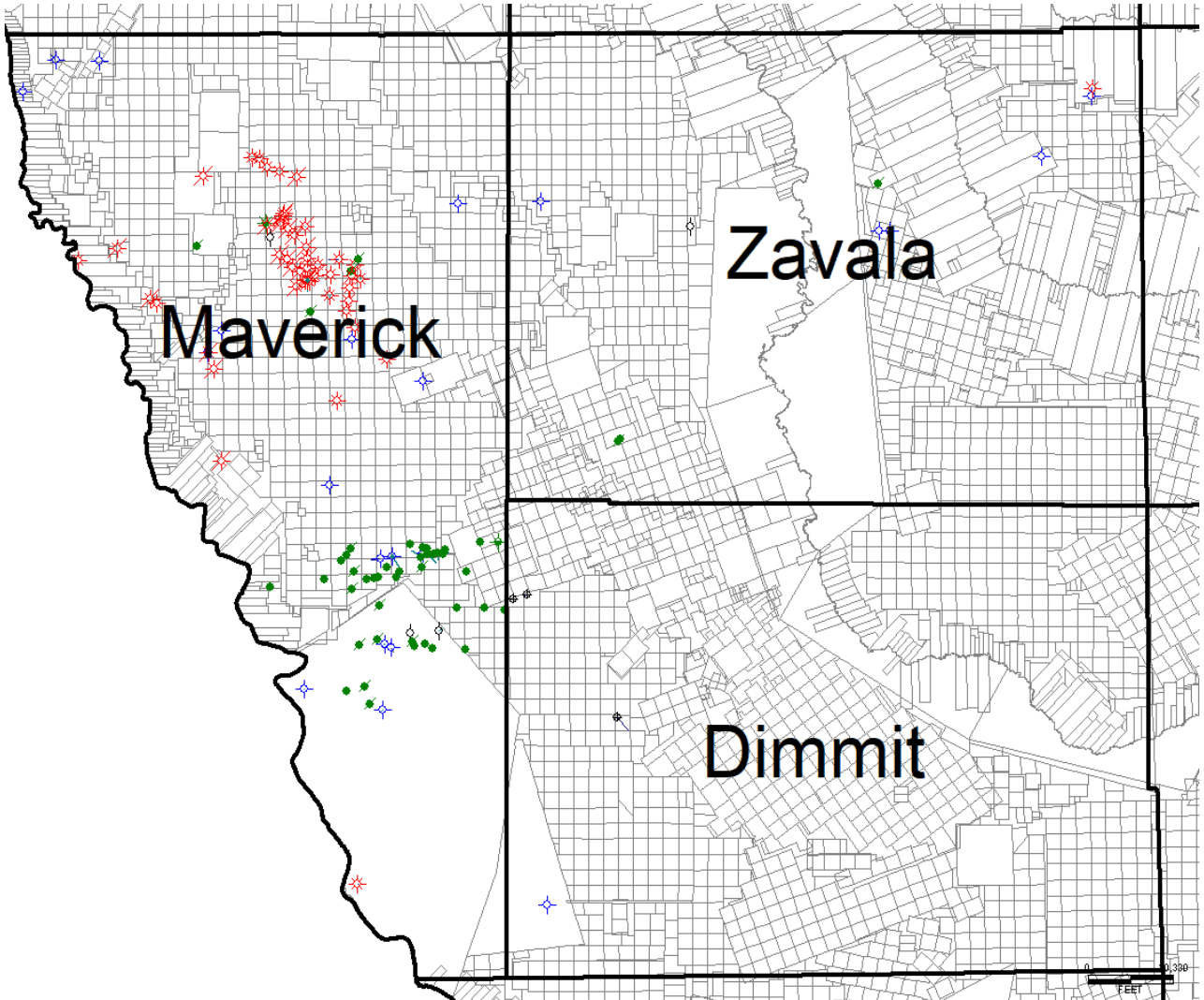
FILING INSTRUCTIONS

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.

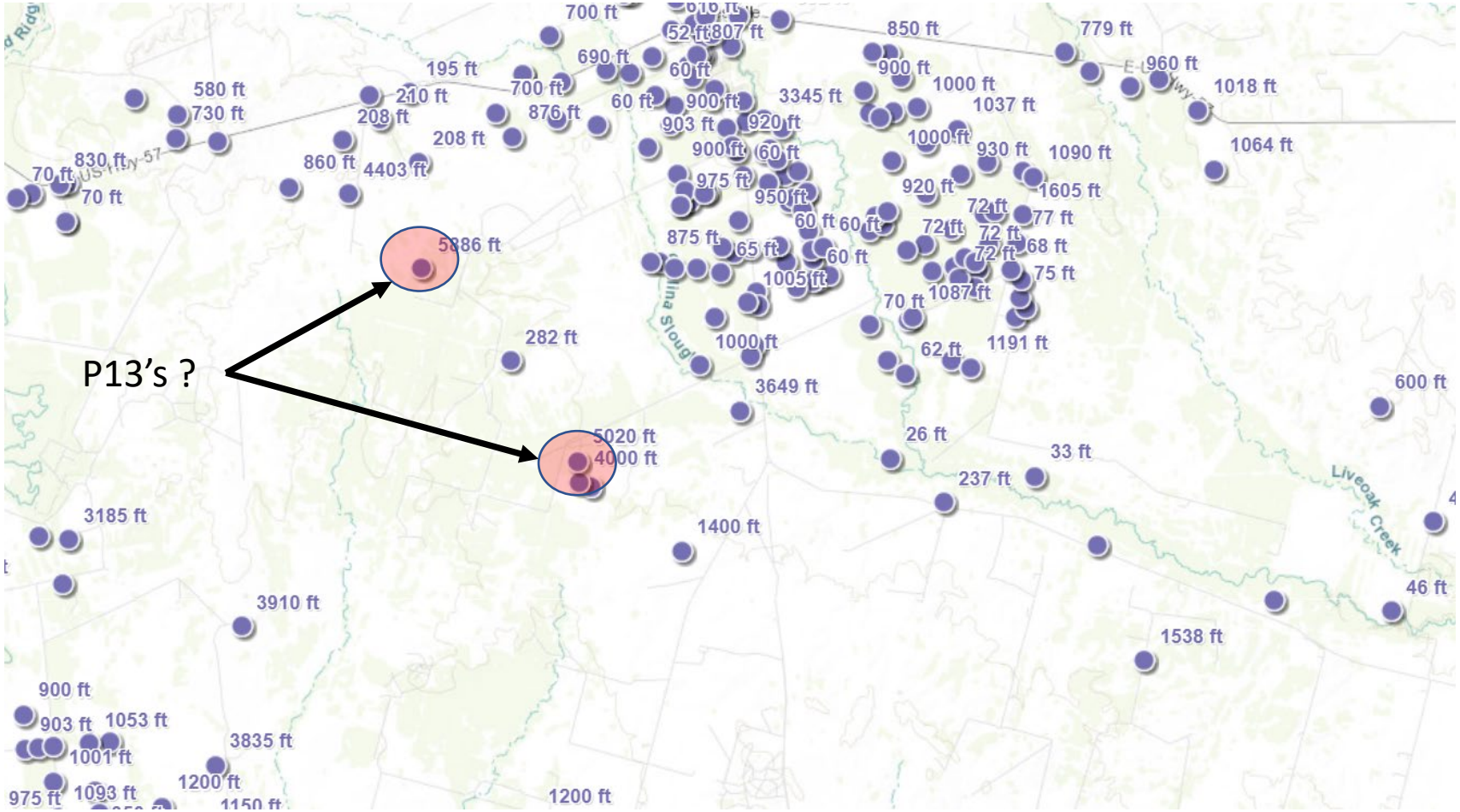
RAILROAD COMMISSION APPROVAL: _____ **DATE OF APPROVAL:** _____
(Signature of RRC Representative)

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.

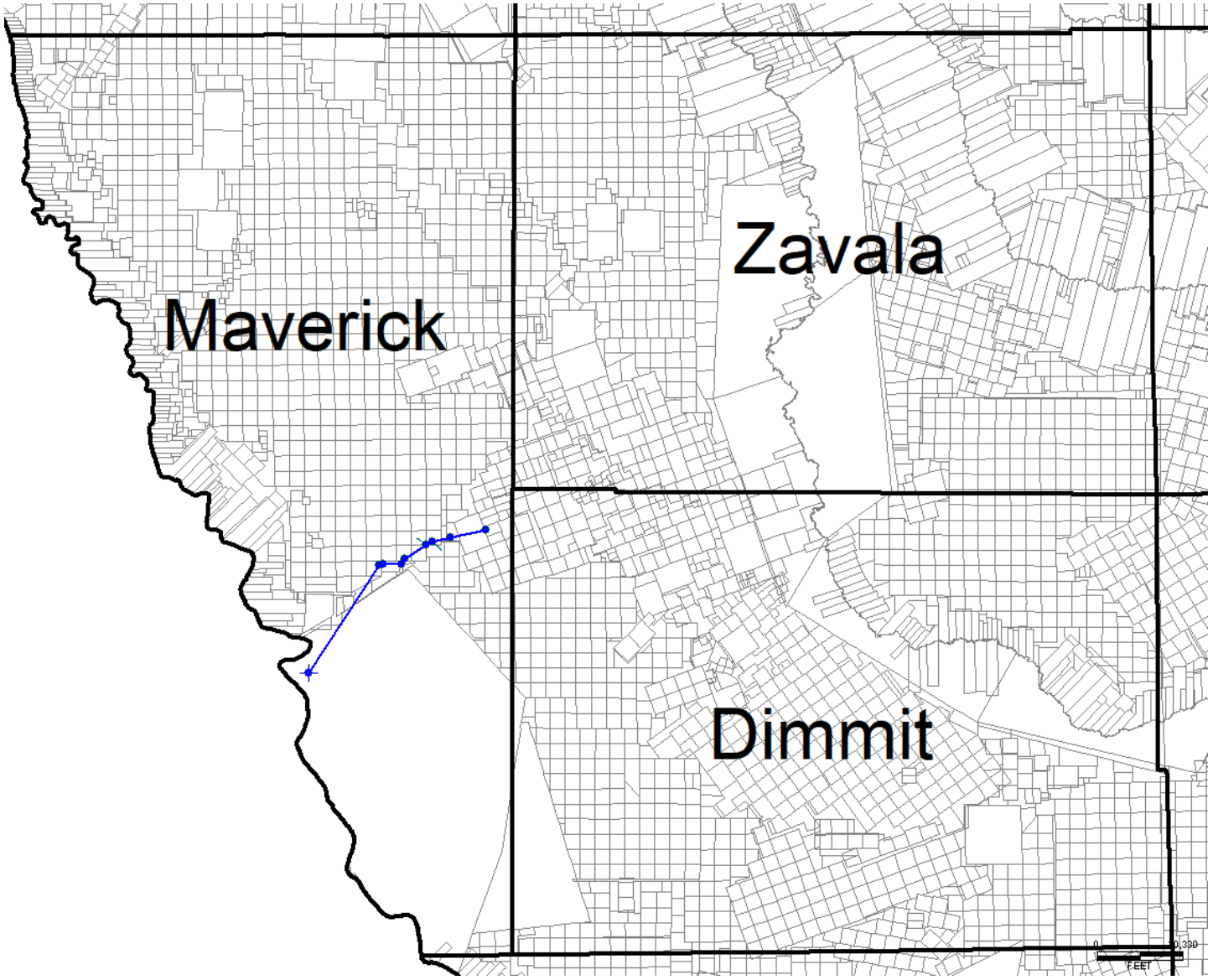
Well Tests in or thru the Glenn Rose (tentative list)



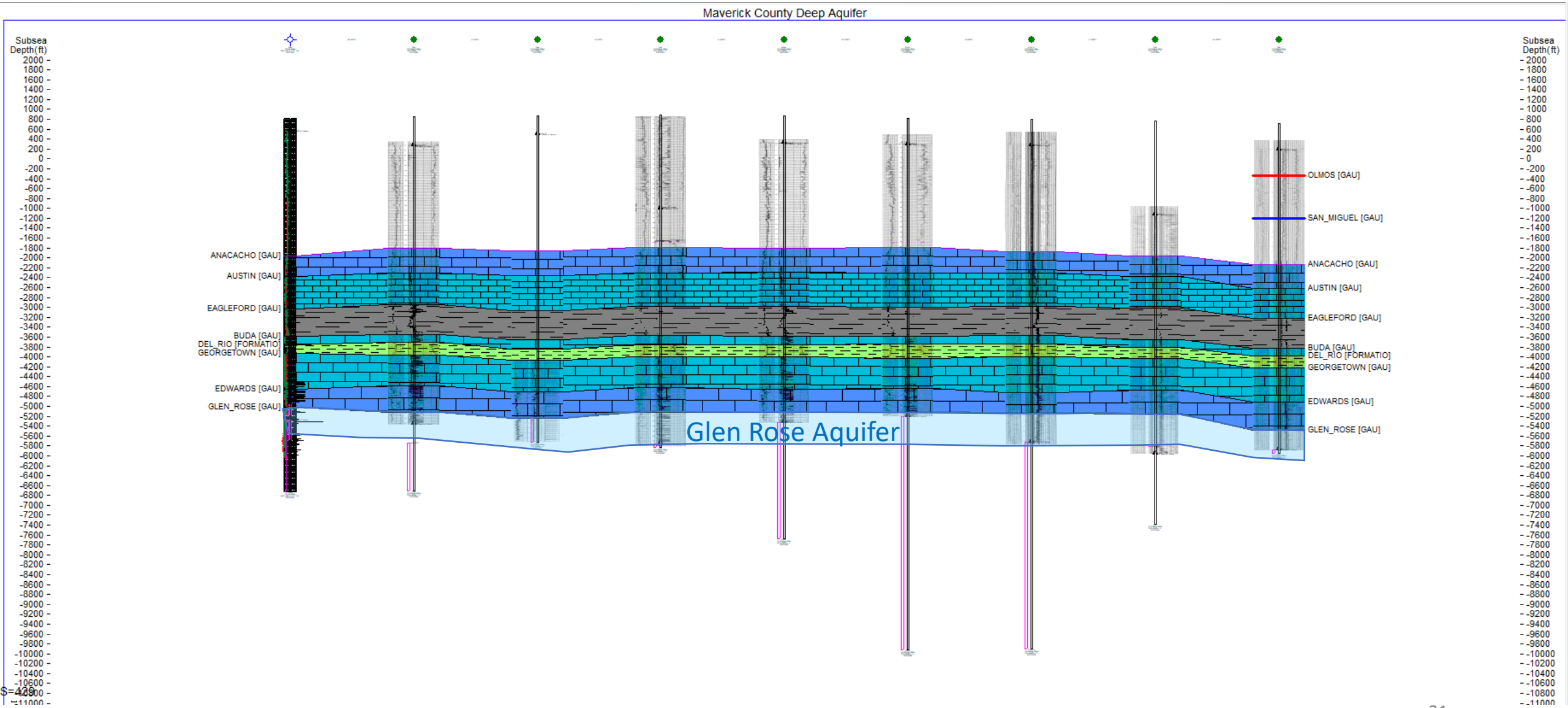
Well Tests in or thru the Glenn Rose (tentative list) Zavala Co. TWDB interactive



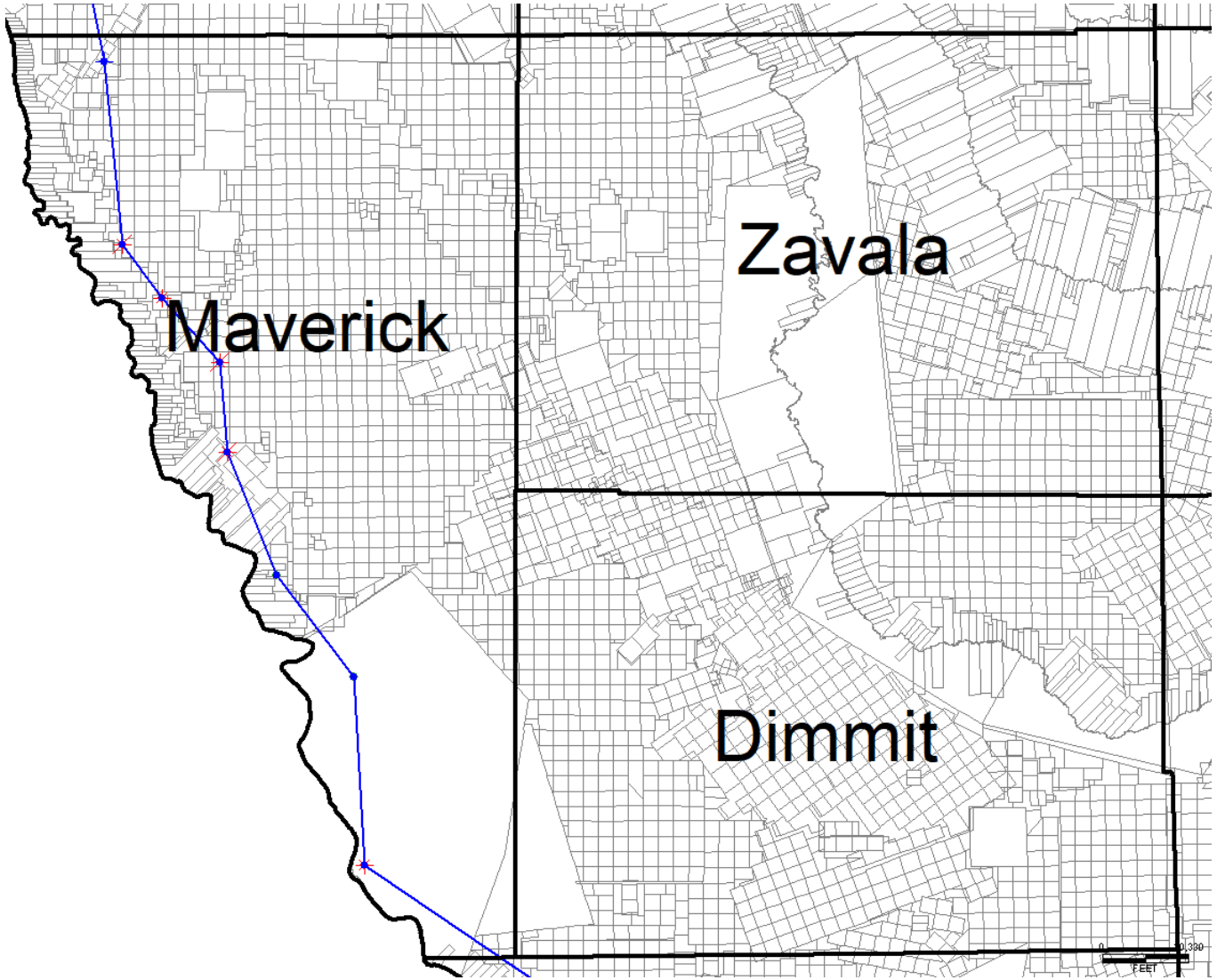
Southwest to Northeast Cross Section



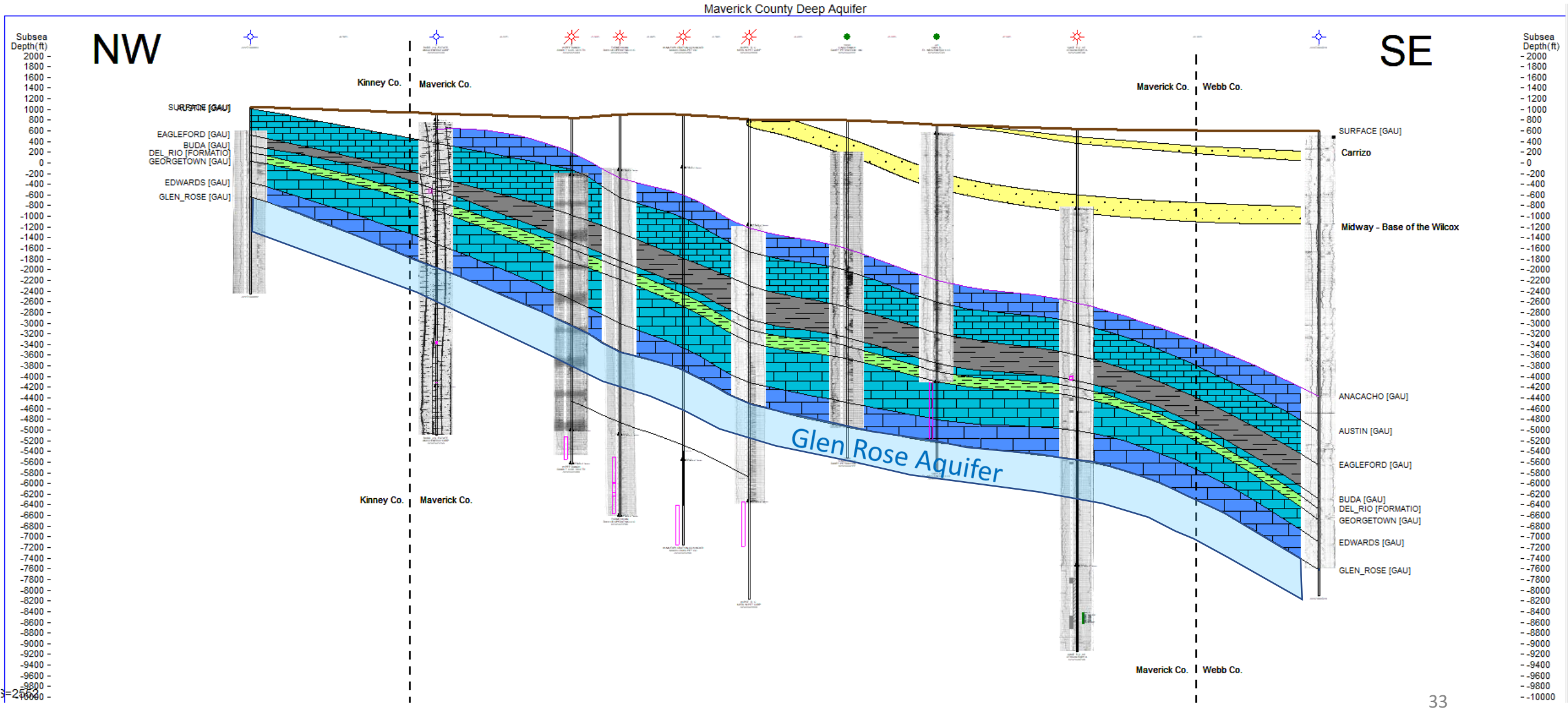
Southwest to Northeast Cross Section



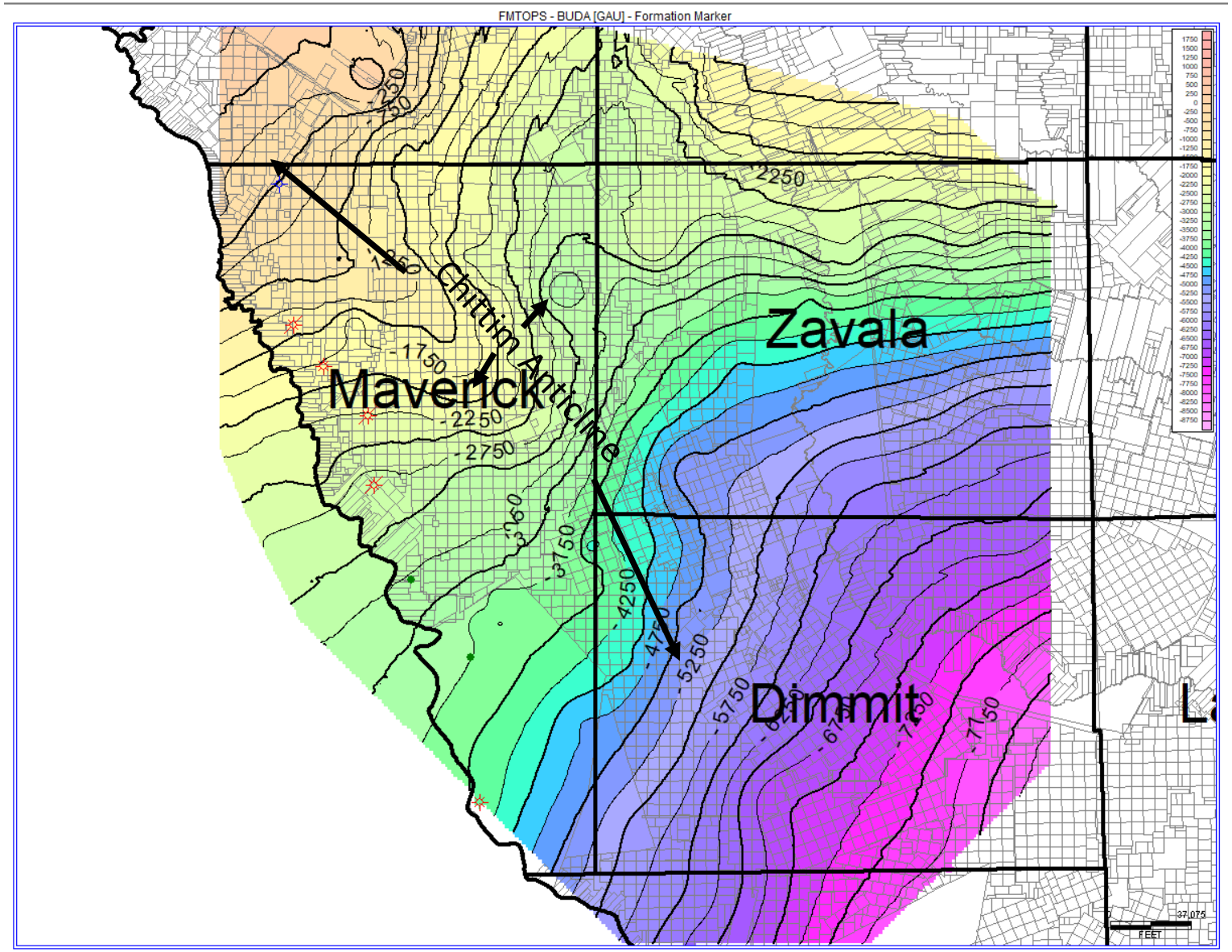
Northwest to Southeast Cross Section



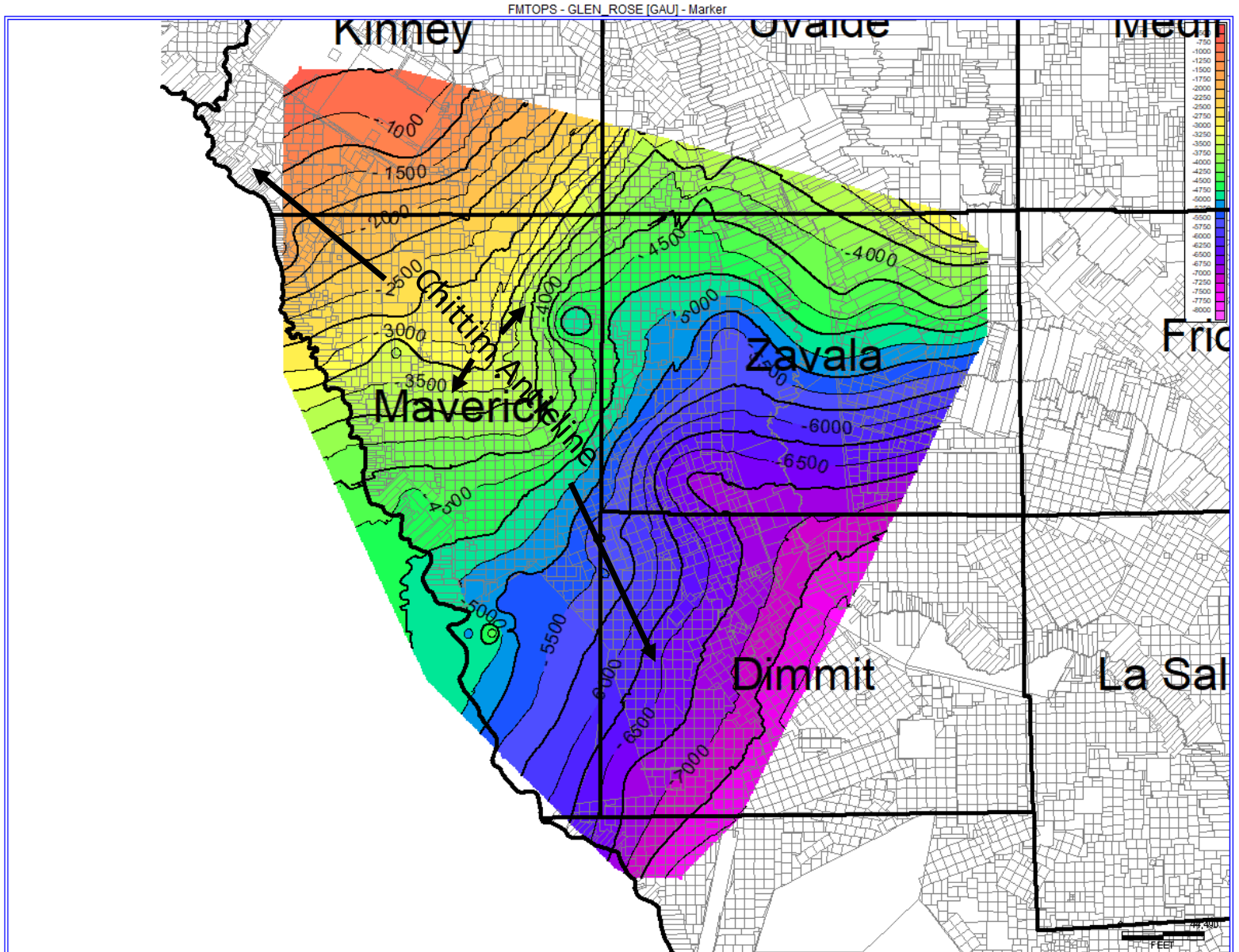
Northwest to Southeast Cross Section



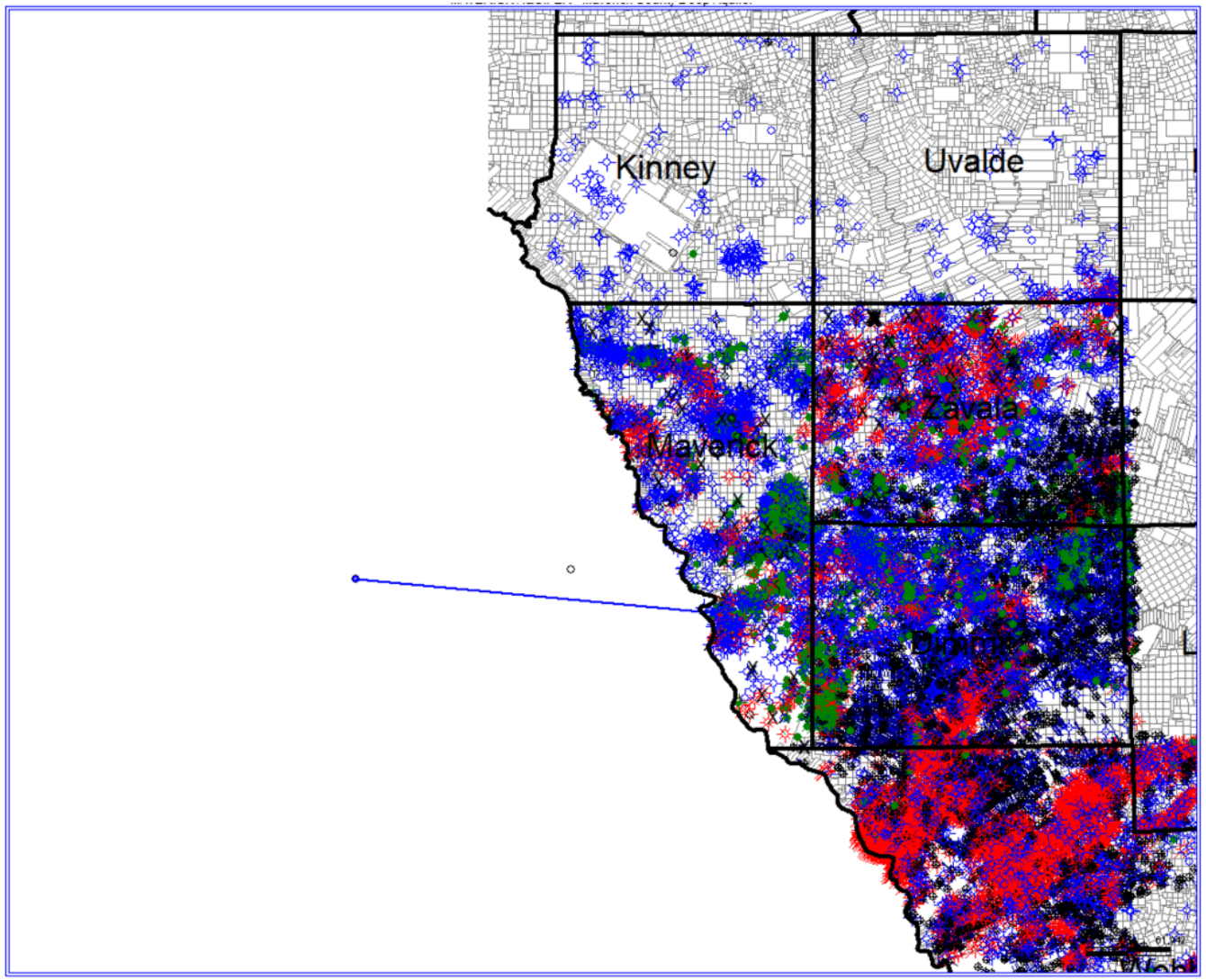
Buda Limestone Structure



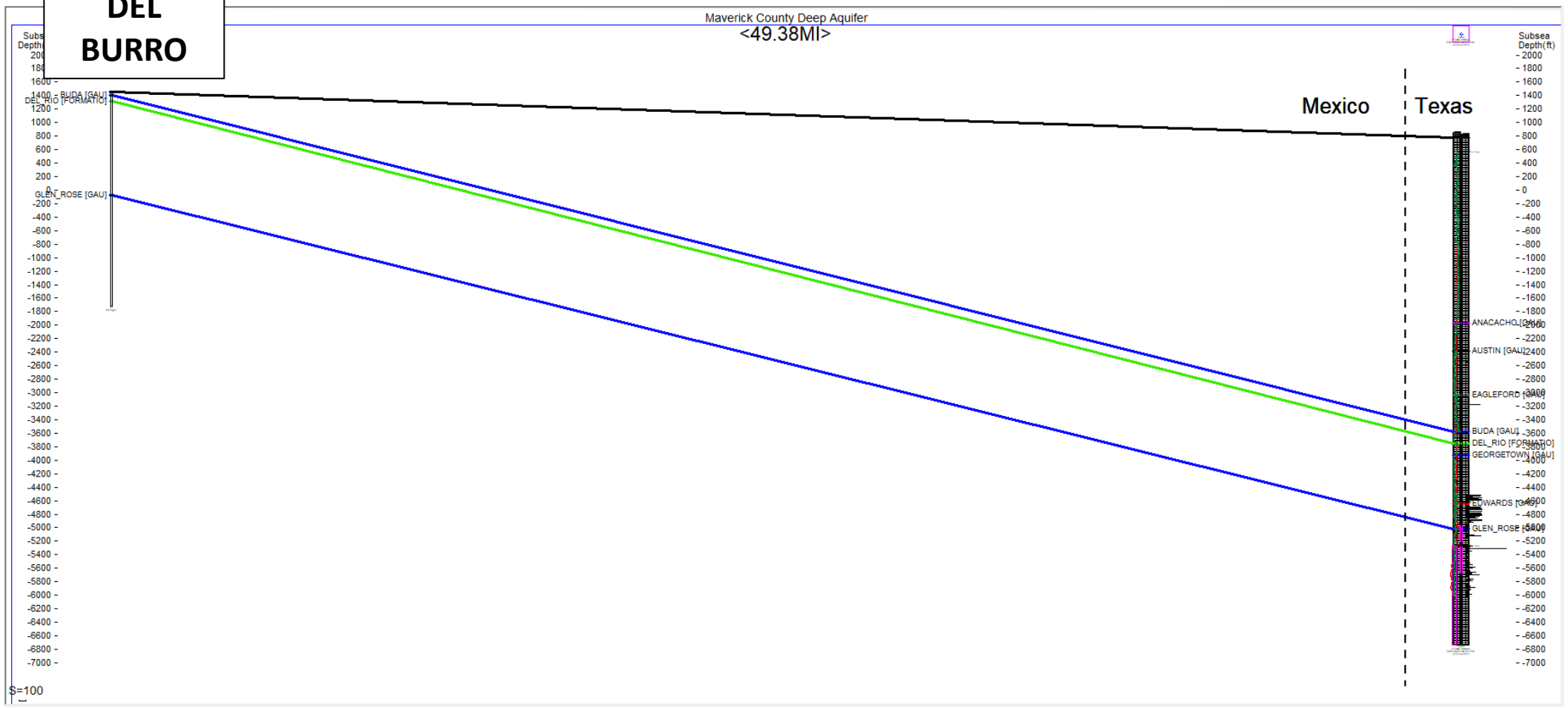
Glen Rose Structure



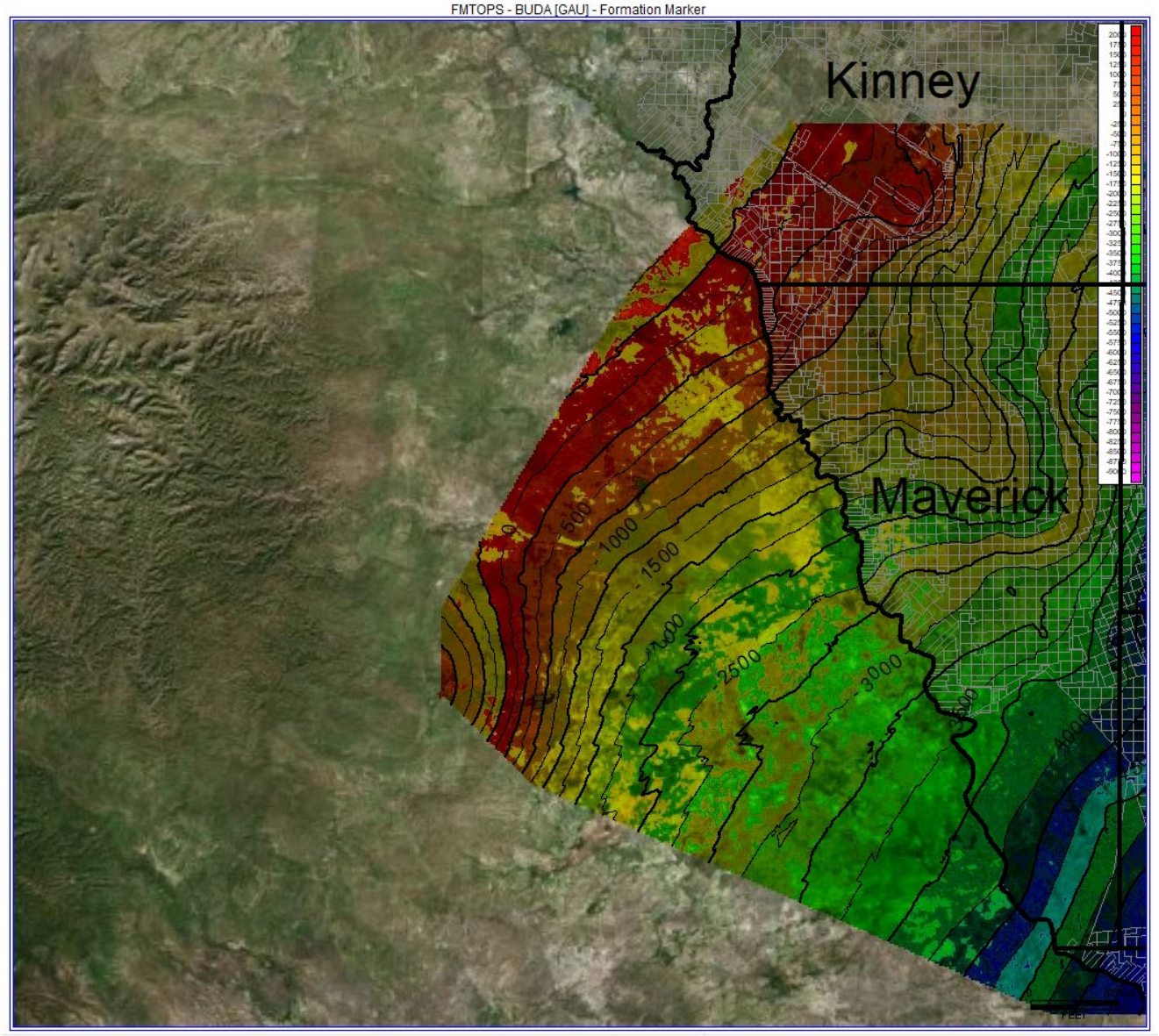
Mexico/Texas



Cross Section Mexico to Texas



Buda Limestone Through Mexico



PROJECT CONTACTS OUTSIDE THE RRC

JESUS 'CHUY' ARREDONDO
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Joint Resources Company

Debbie Farmer, General Manager

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P. O. Box 1433, Carrizo Springs, TX 78834

Physical Address:
2881 Hwy. 277 West, Carrizo Springs, TX 78834

Fax: 830-876-3782
Email: wgcd@wgcd.net

Maps and Technical Reports from the Texas Water Resources Institute
Example: Surface Formation Out-Crop Maps of Transboundary Aquifer Area

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

Contents lists available at ScienceDirect

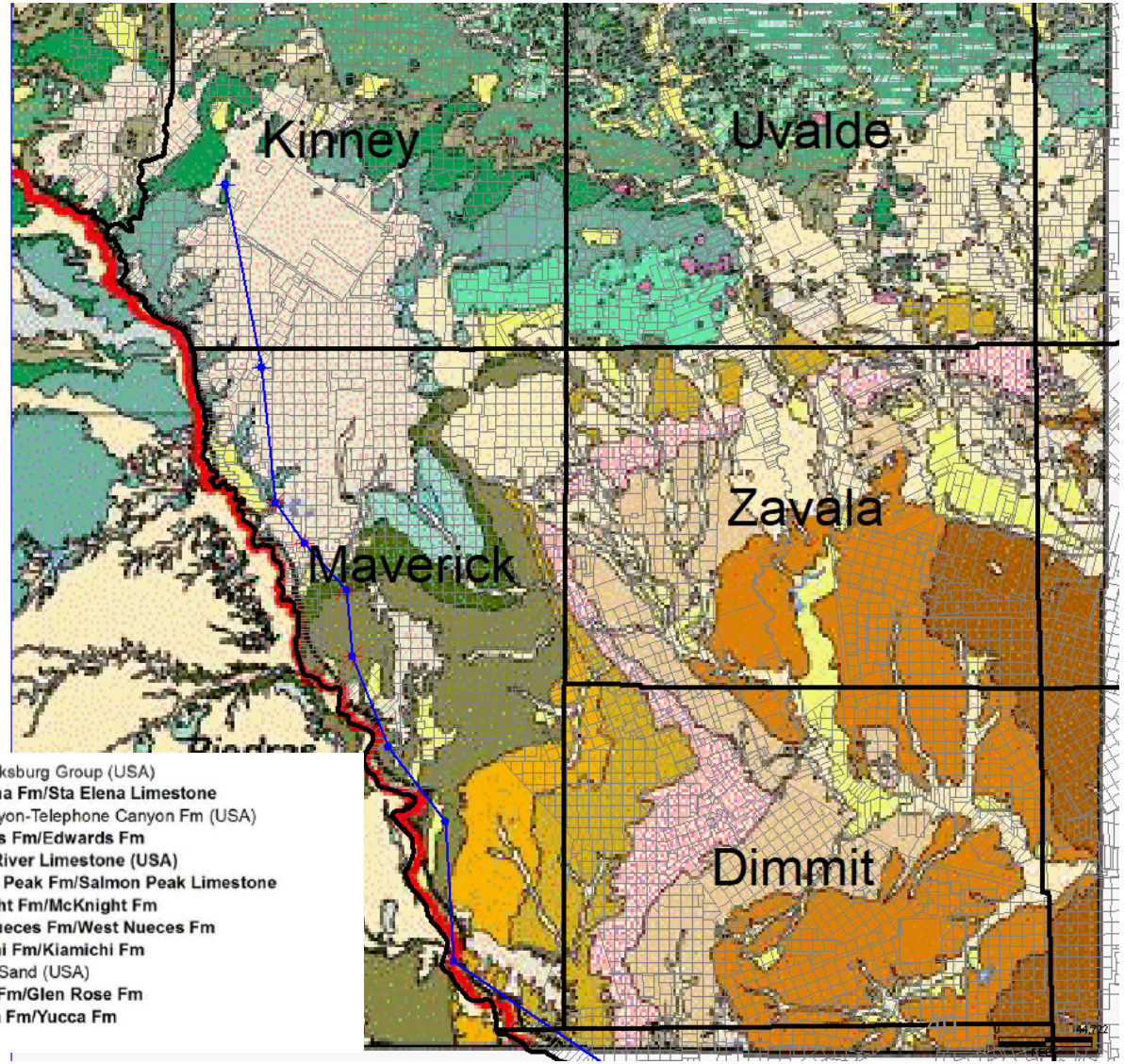
Journal of Hydrology: Regional Studies

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

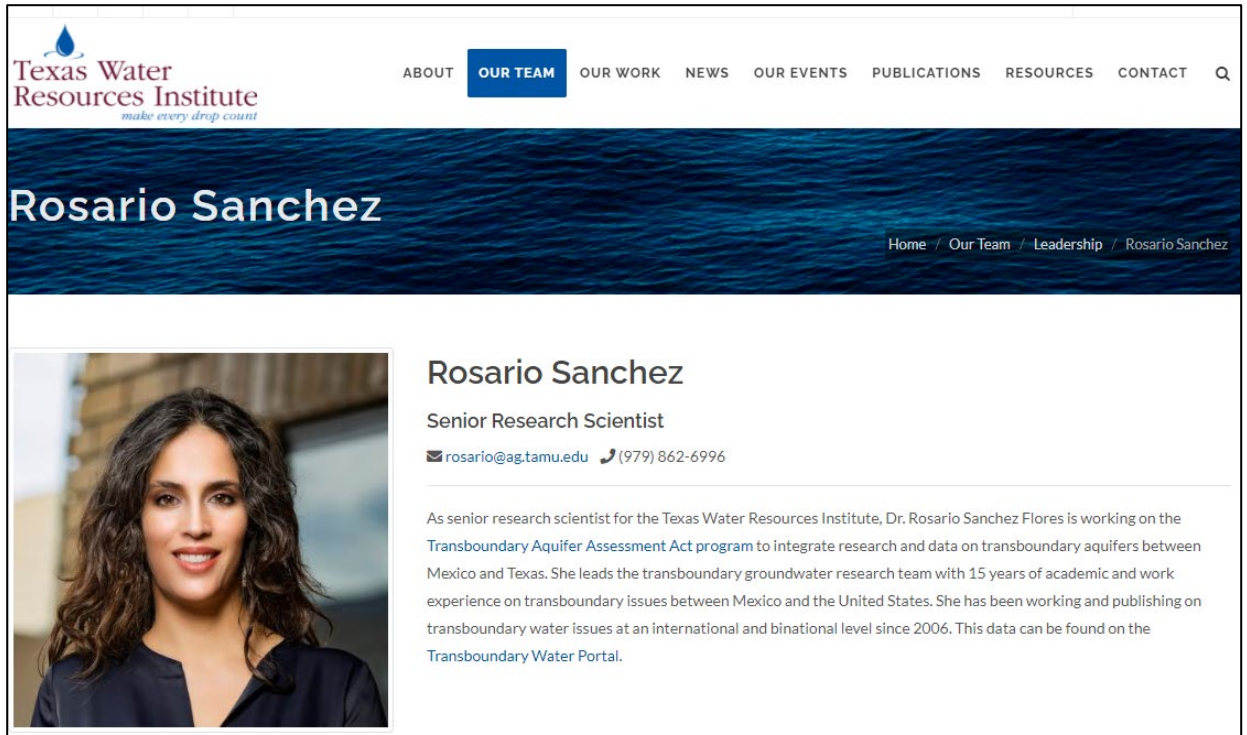


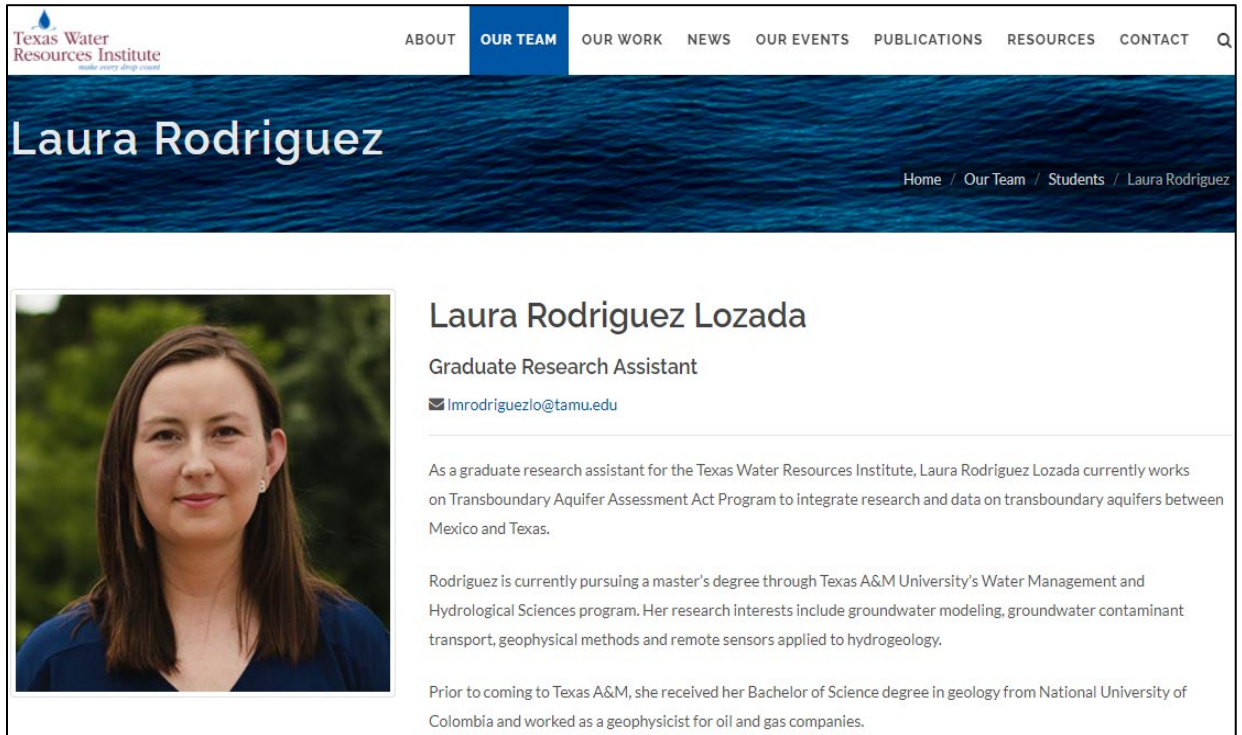
A Significant Amount of Research Into This Aquifer and Others in the Transborder Area is Ongoing at the Texas Water Resources Institute (College Station, Texas)

- Maps and technical reports from the Texas Water Resources Institute are available at:

  Texas A&M University – https://twri.tamu.edu/

  Transboundary Water Portal - https://transboundary.tamu.edu/





NEXT STEPS: HAND-OFF TECHNICAL EVALUATION OF THESE DEEP SUPERIOR QUALITY WATER AQUIFERS TO TWDB & BEG

- The RRC Groundwater Advisory Unit will now include these deep aquifers in all Groundwater Determinations in relevant areas going forward.

- We would like to have the BEG Casing Estimator updated to include these deep aquifers in Casing Depth Recommendations for the Transborder Area Counties in Texas.

- We will be protecting these Deep Glen Rose Aquifers in UIC recommendations going forward, and taking a second look at existing deep W-14 Injection Permits in the South Texas Area in general, and the Transboundary Counties specifically.