

San Augustin Plain Groundwater Presentation

**Water is Life, control the one
and you control the other!**

*Whiskey is for drinking and water is for
fighting over.*

NOT attributed to Mark Twain

By Dennis Inman

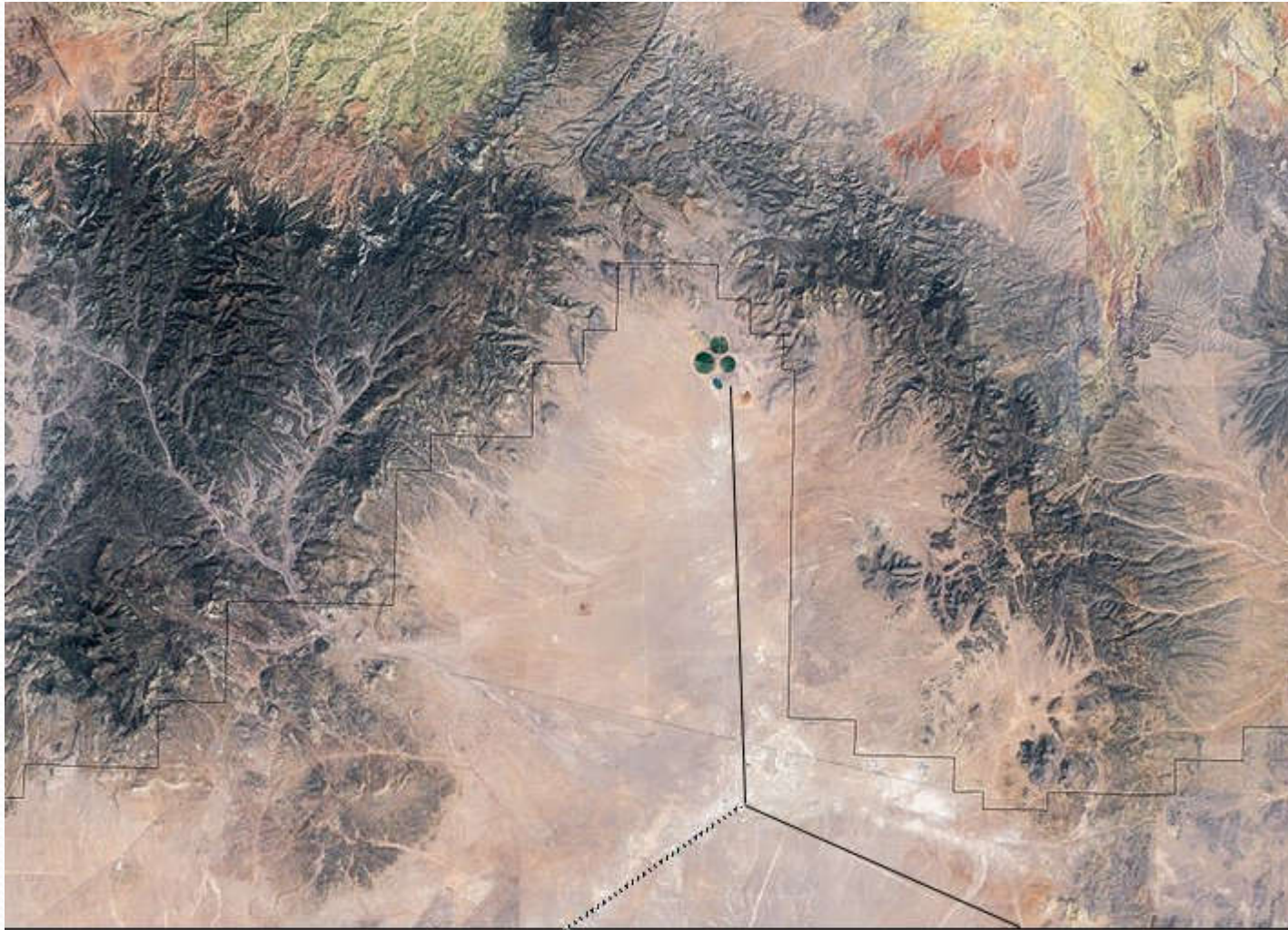
Problem

The Augustine Plains Ranch, LLC wants to pump 54,000 acre feet of water from the Plains of San Augustin or 17.5 billion gallons per year.

The whole watershed currently has in excess of 9,327 acre feet of water allocated by permit with over 1,025 records in the database and this does not account for all of the wells that predated the data base. Also the LLC has a figure in its proposal that indicates that they think the watershed is leaking about 92,610 AF of water per year.

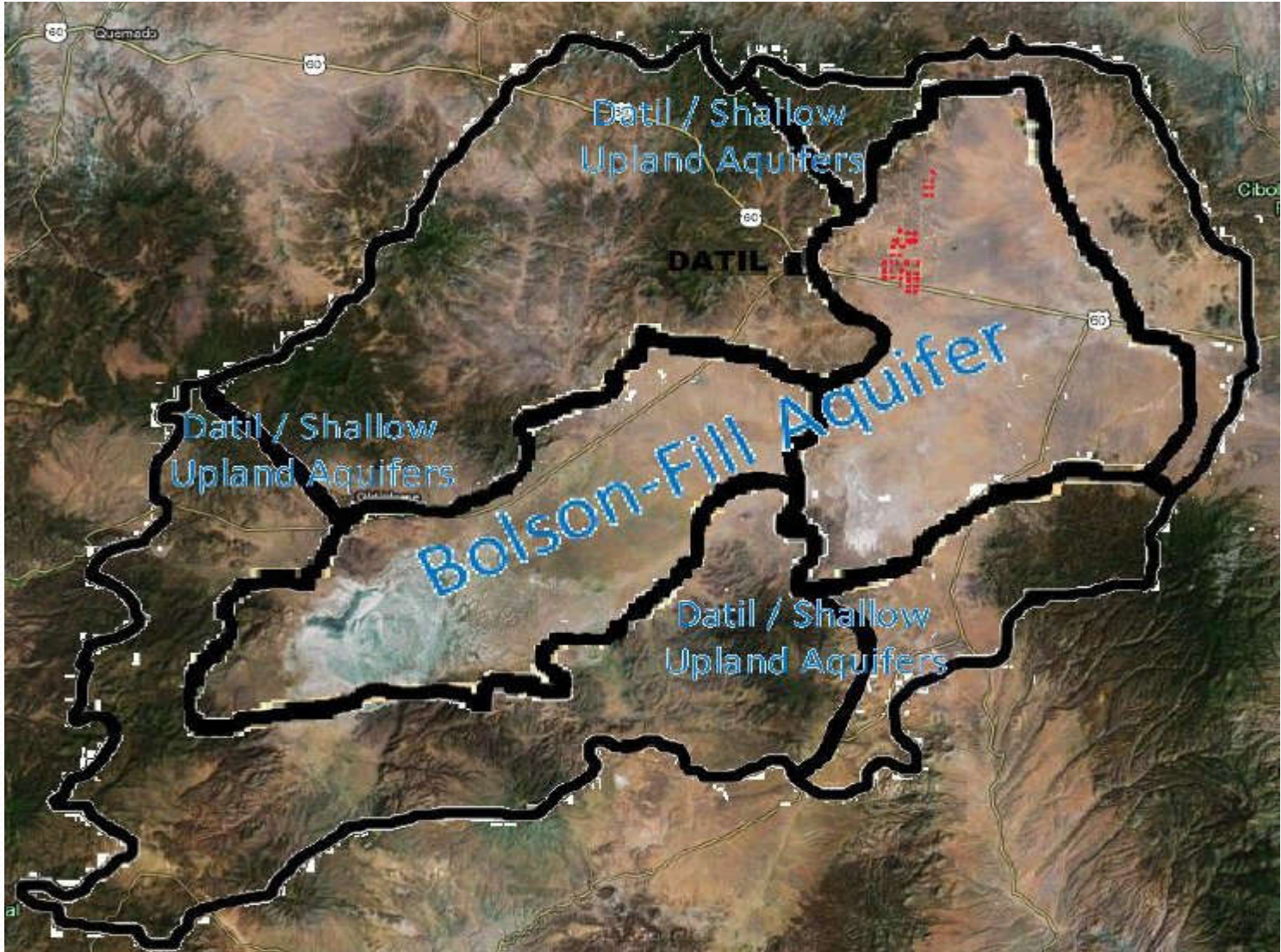
This is as of 2013

North plain of the San Augustin Plains with the VLA



The big triangle is the Vary Large Array

San Augustin Plains watershed showing the proposed well field with red dots.



Groundwater Flow

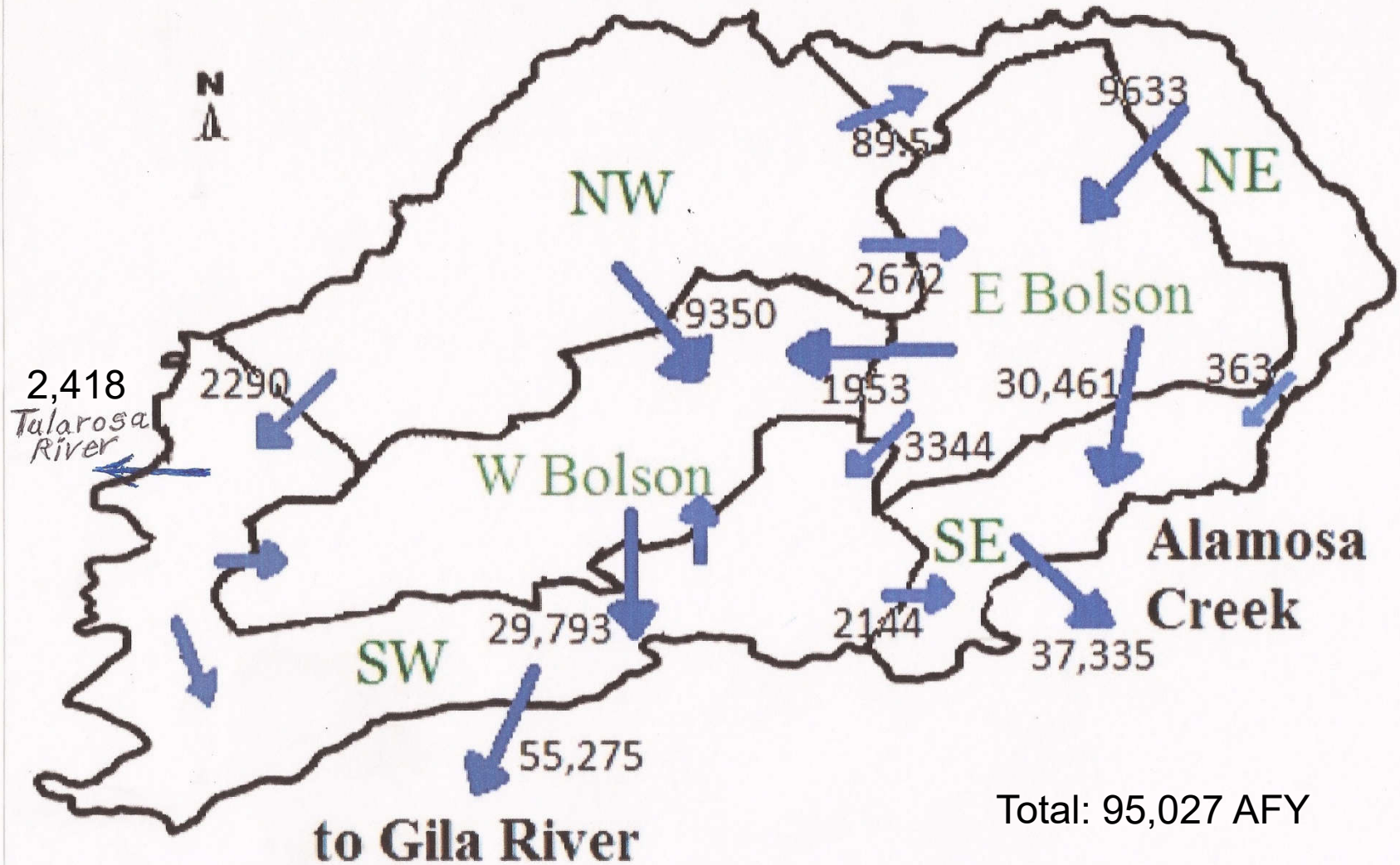


Figure 10. Initial groundwater directions and flow (AFY).

1994

***Geohydrology of the San Agustin Basin,
Alamosa Creek Basin upstream from
Monticello Box, and upper Gila
Basin in parts of Catron, Socorro, and
Sierra Counties, New Mexico***

By
R.G. Myers, J.T. Everheart, and C.A. Wilson

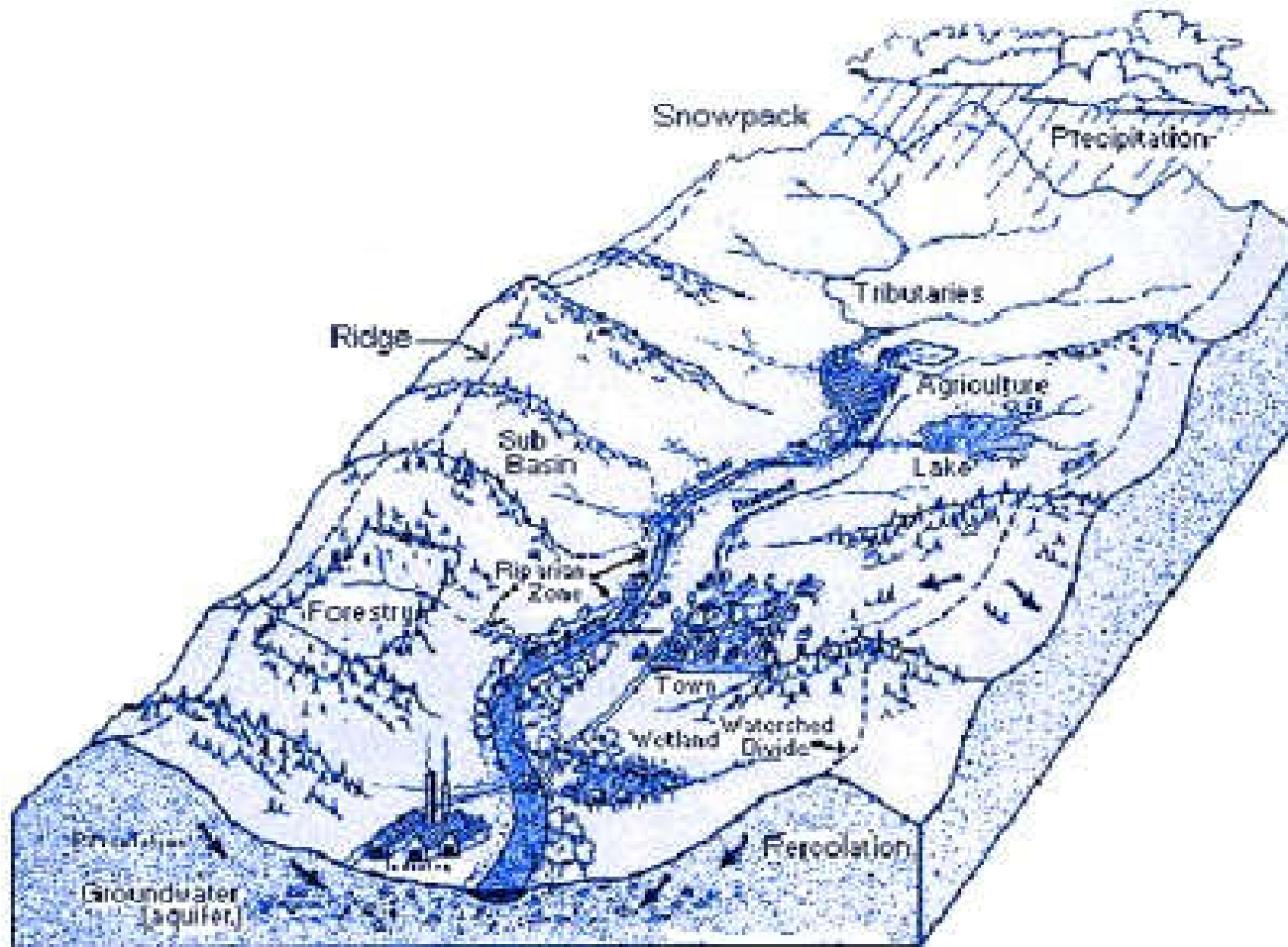
U.S. GEOLOGICAL SURVEY
WATER-RESOURCES INVESTIGATIONS REPORT 94-4125

Prepared in cooperation with the
NEW MEXICO STATE ENGINEER OFFICE



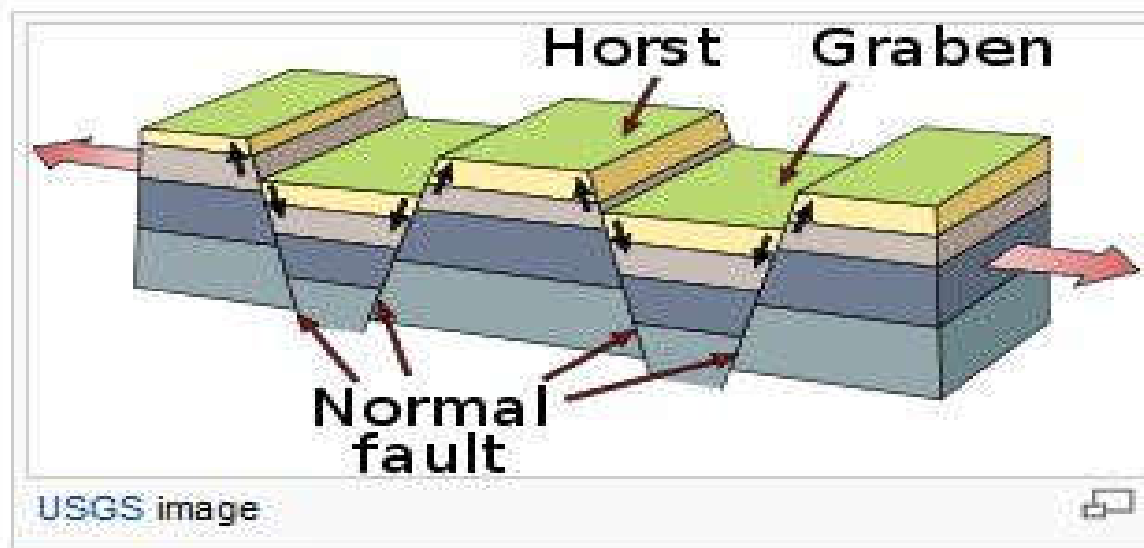
Albuquerque, New Mexico
1994

A watershed showing a topographic divide and outlet.

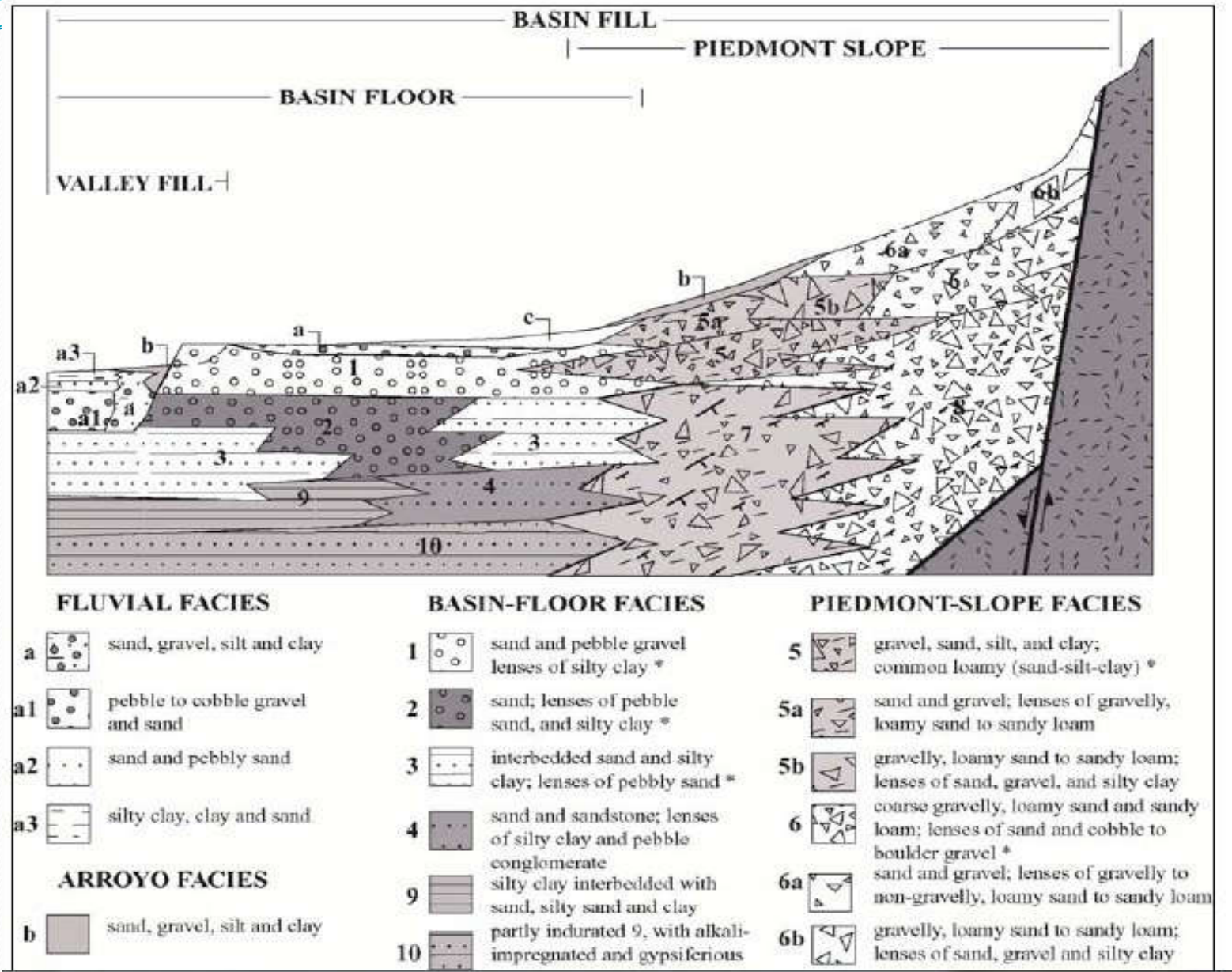


Produced by Lane Council of Governments

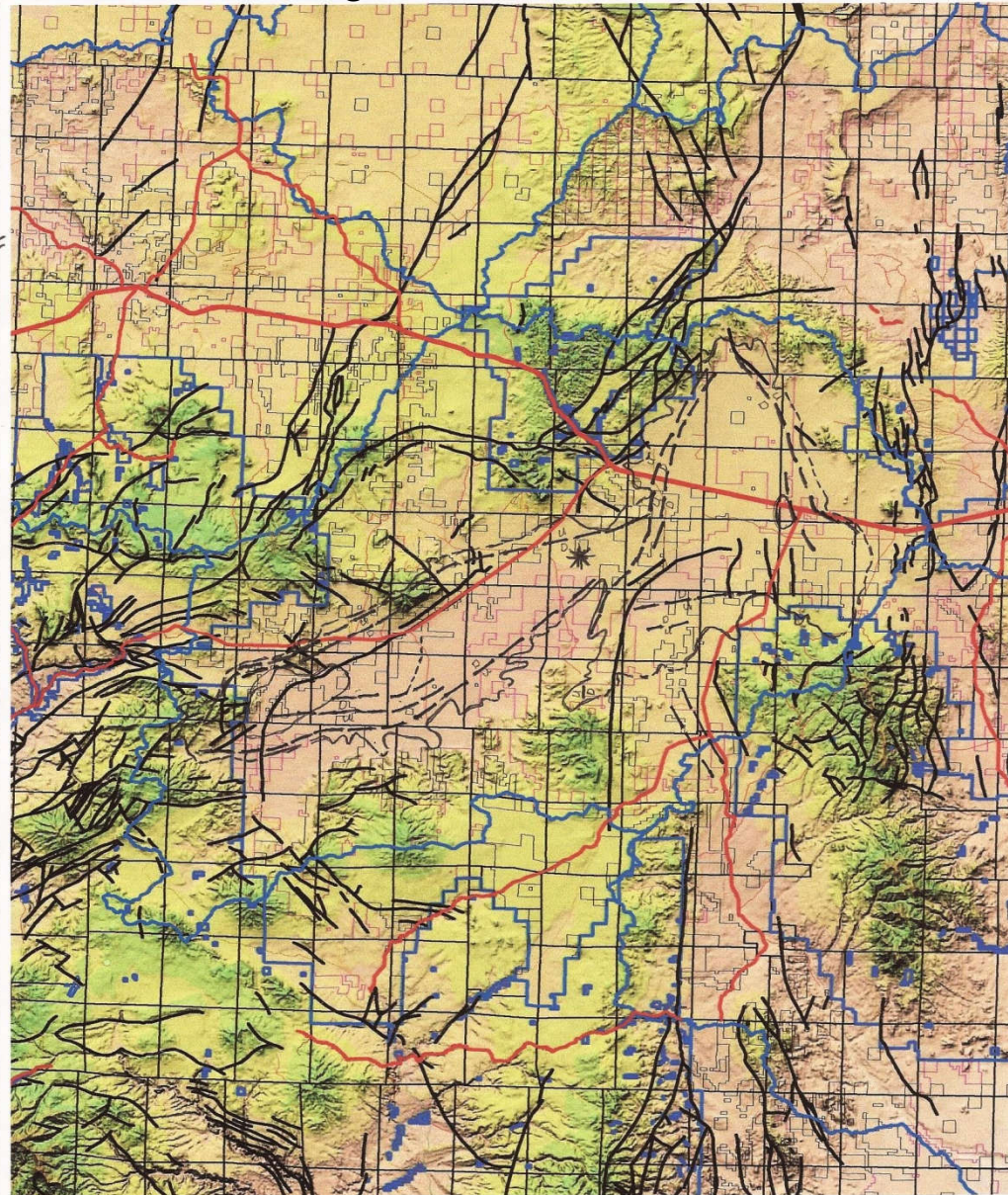
A block diagram of a typical Graben Fault



A typical sediment distribution diagram

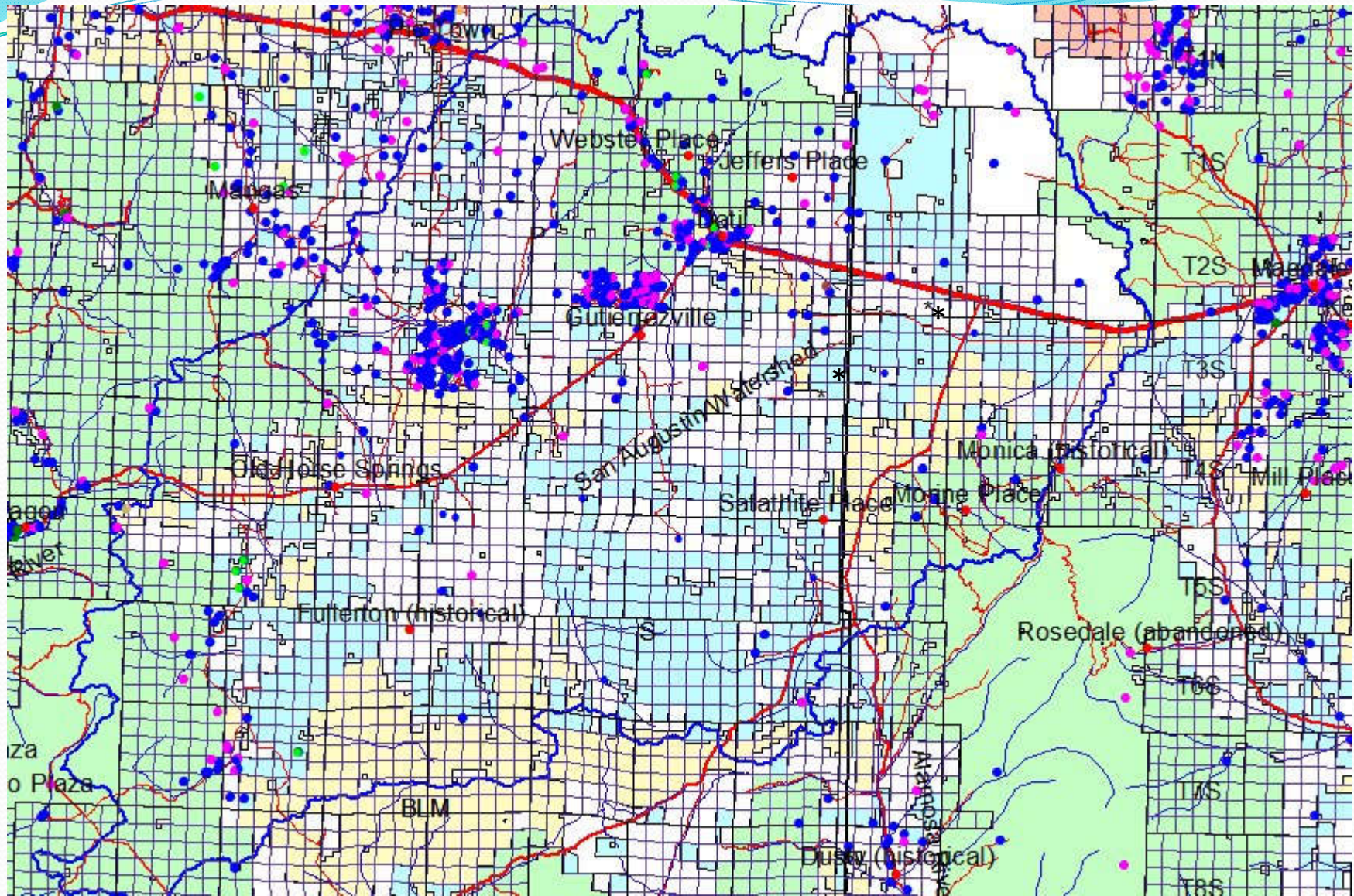


San Augustin Watershed faults



Pencil lines from Figure 9 Myers, Everheart, & Wilson WRI Report 94-4125

San Augustin Watershed with wells & land ownership



OSE database as of July 2011

San Augustin Watershed Ownership

	ACRES	SQUARE MILES	PERCENT
Watershed Size	1,275,319.7	1992	
Socorro County	281,294.9	441	22%
Catron County	991,143.0	1,551	78%
BLM	142,313.6	222.4	11%
FS	280,803.4	438.8	22%
Private	531,621.4	830.7	42%
State	320,581.4	500.1	25%

APR, LLC

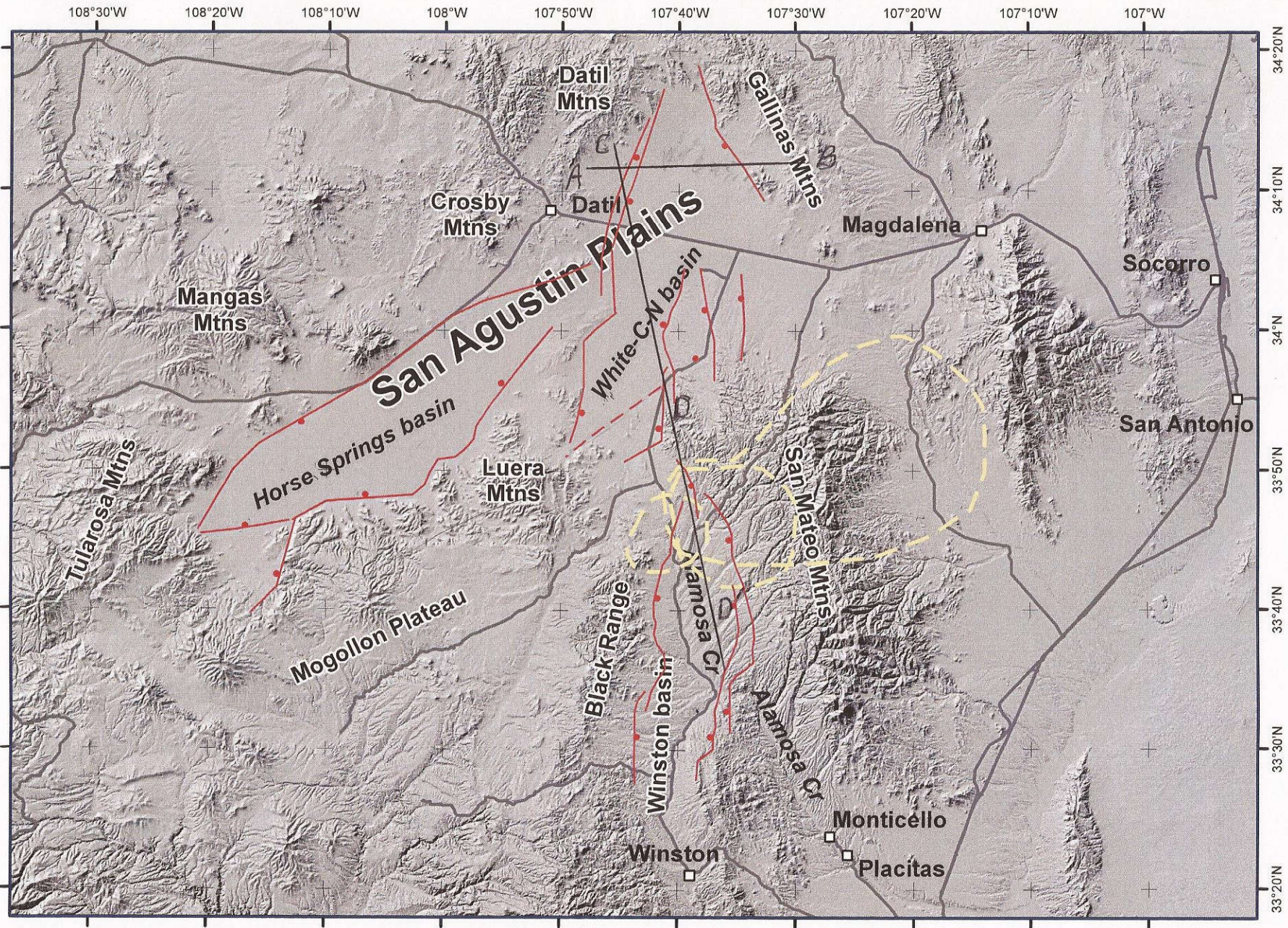
≈ **18,000.0**

28.1

1.4%

1.4% of the private land.
0.01% of the entire basin.

Figure 1



1:720,000



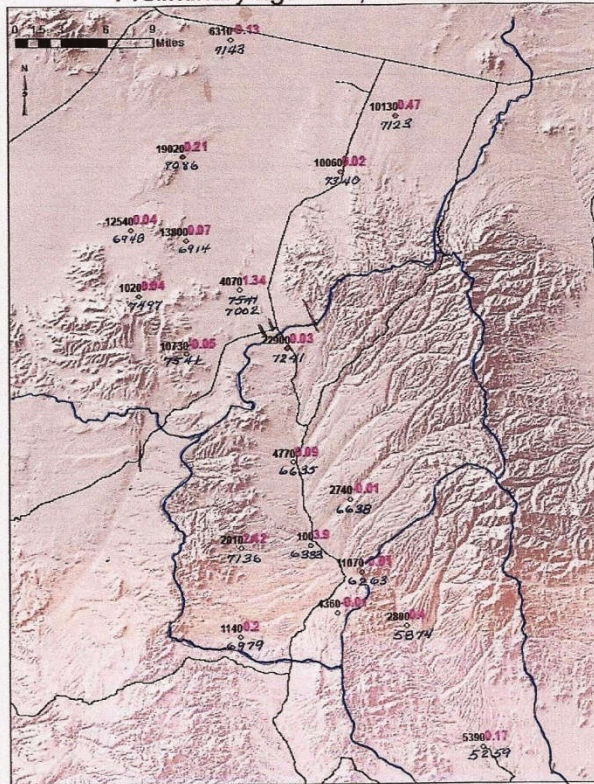
Figure 2

Generalized Cross Sections



Figure 3

Preliminary age data, Nov. 2014



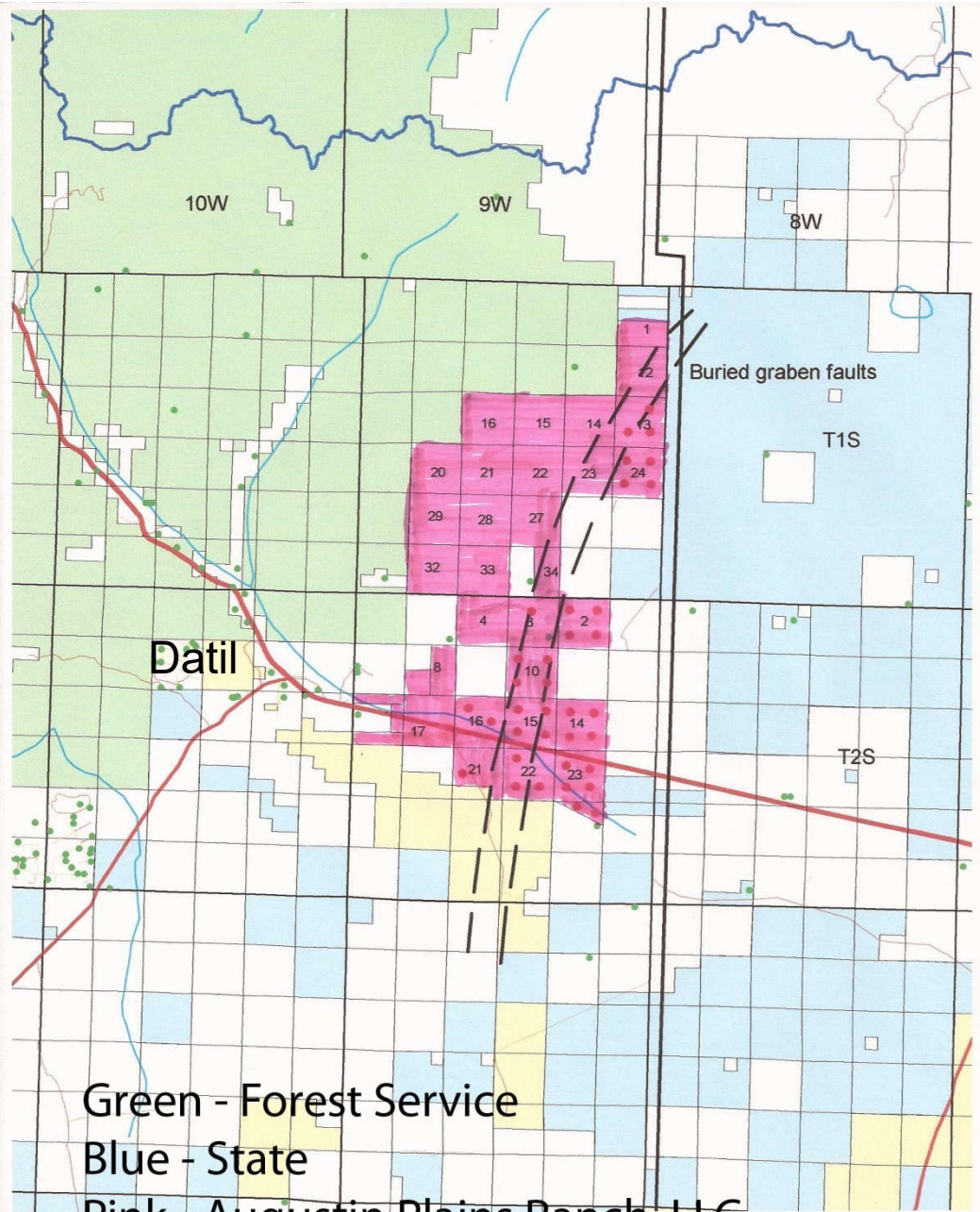
Results of tritium measurements in pink; units are Tritium Units.
Results of carbon-14 in black text; units are uncorrected carbon-14 dates in years. Preliminary data - do not publish. For internal uses only.

Contact Stacy Timmons 575-835-6951 for more information.
New Mexico Bureau of Geology and Mineral Resources, NMI Tech
Blue - Elevation

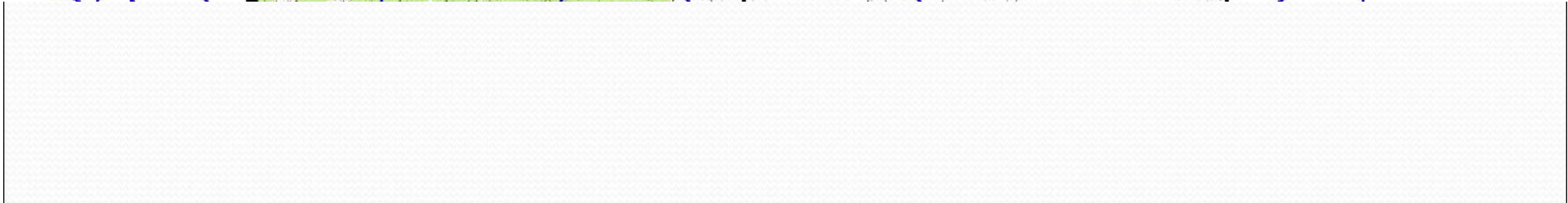
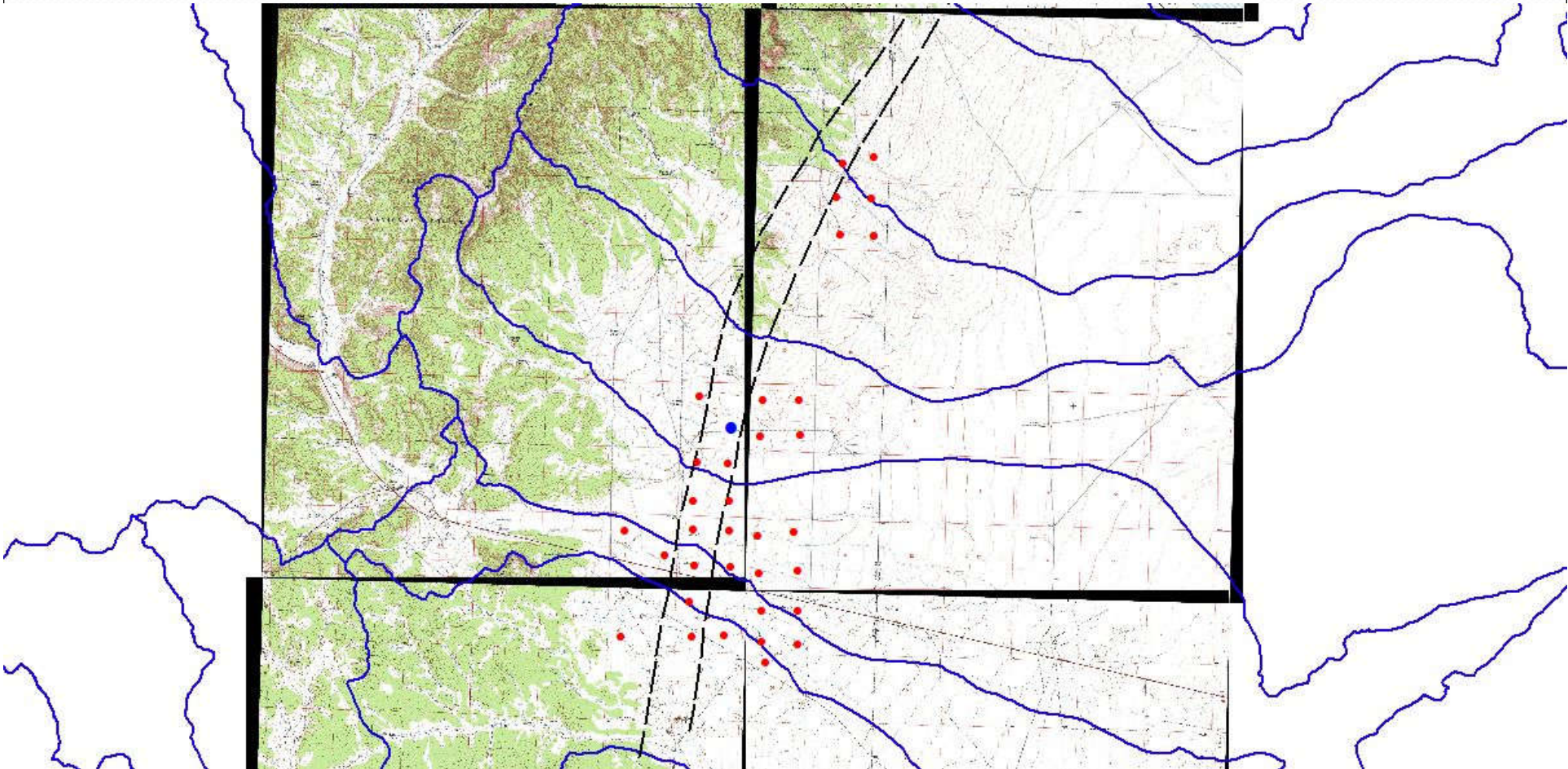
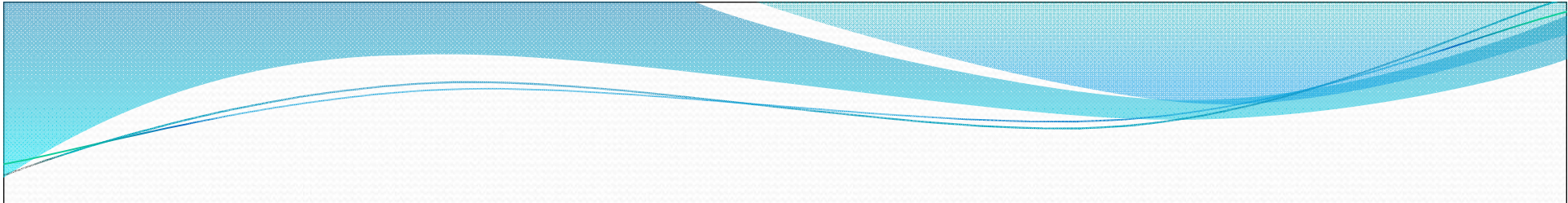
San Augustin / Alamosa Water Well Age Dates

Point ID	Watershed	Elevation	Date Collected	Type	C14 % to moder carbon	C14- years	
SA-0103	A	6618		well	58.11	4,360	
SA-0128	A	6638		well	71.1	2,740	
SA-0068	A	6635		well	55.22	4,770	
SA-0135	A	5259		well	51.12	5,390	Avg. age 2,914 yrs.
SA-0156	A	6333		well	98.76	100	
SA-0164	A	7136		well	77.86	2,010	
SA-0211	A	5874		well	70.57	2,800	
SA-0217	A	6979		well	86.77	1,140	
SA-1010	A	6263		spring	25.21	11,070	<i>Monticello Box</i>
SA-0017	SA	7143		well	45.59	6,310	
SA-0027	SA	7123		well	28.34	10,130	
SA-0043	SA	6914		well	17.94	13,800	
SA-0084	SA	7340		well	28.58	10,060	Avg. age 12,173 yrs.
SA-0124	SA	6948		well	20.99	12,540	
SA-0195	SA	7241		well	5.78	22,900	<i>Divide Well</i>
SA-0205	SA	7541		well	26.3	10,730	
SA-0209	SA	7002		well	60.25	4,070	
SA-0210	SA	7086		well	9.37	19,020	
SA-1016	SA	7497		spring	88.08	1,020	<i>Palona Mtn.</i>

The lower the % of C14 to modern carbon the older the water.



Green - Forest Service
Blue - State
Pink - Augustin Plains Ranch, LLC
WHITE - Private



First LLC. Well RG-89943 POD 38 finished 10/04/2008

5. SEAL AND PUMP	TYPE OF PUMP: <input type="checkbox"/> SUBMERSIBLE <input type="checkbox"/> JET <input checked="" type="checkbox"/> NO PUMP - WELL NOT EQUIPPED						
	<input type="checkbox"/> TURBINE <input type="checkbox"/> CYLINDER <input type="checkbox"/> OTHER - SPECIFY: 2008 NOV 19 PM 3:08						
	ANNULAR SEAL AND GRAVEL PACK	DEPTH (FT)		BORE HOLE DIA. (IN)	MATERIAL TYPE AND SIZE	AMOUNT (CUBIC FT)	METHOD OF PLACEMENT
		FROM	TO				
	0	3500	7-7/8	neat cement	1134	tremie pipe	
6. GEOLOGIC LOG OF WELL	DEPTH (FT)		THICKNESS (FT)	COLOR AND TYPE OF MATERIAL ENCOUNTERED (INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES)	WATER BEARING?		
	FROM	TO			<input type="checkbox"/> YES	<input type="checkbox"/> NO	
	0	2026	2026	sand and silty sand	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
	2026	2469	443	silt and sandy silt	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
	2469	2656	187	silty sand with sand and clay stringers	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
	2656	2846	190	sandy silt with clay	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
	2846	2909	63	silty sand	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
	2909	3003	94	sandy silt	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
	3003	3066	63	silty sand	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
	3066	3500	434	sandy silt	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
					<input type="checkbox"/> YES	<input type="checkbox"/> NO	
				sands were volcanoclastic with a variety of colors, roundness	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
				and grain sizes	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
					<input type="checkbox"/> YES	<input type="checkbox"/> NO	
				silts were light brown to brown	<input type="checkbox"/> YES	<input type="checkbox"/> NO	
				<input type="checkbox"/> YES	<input type="checkbox"/> NO		
			clays were light brown and medium stiff	<input type="checkbox"/> YES	<input type="checkbox"/> NO		
				<input type="checkbox"/> YES	<input type="checkbox"/> NO		
				<input type="checkbox"/> YES	<input type="checkbox"/> NO		

Location: Sec. 26, Twn 2 S, Rng 9 W

Second LLC. well



New Mexico Office of the State Engineer Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

POD Number	Q64 Q16 Q4 Sec Tws Rng	X	Y
RG 89943 POD39	1 4 4 03 02S 09W	246075	3783159

Driller License: WDC EXPLORATION & WELLS

Driller Name: BRYAN NYDOSKE

Drill Start Date: 08/20/2009

Drill Finish Date: 10/21/2009

Plug Date:

Log File Date: 03/31/2010

PCW Rcv Date:

Source: Shallow

Pump Type:

Pipe Discharge Size:

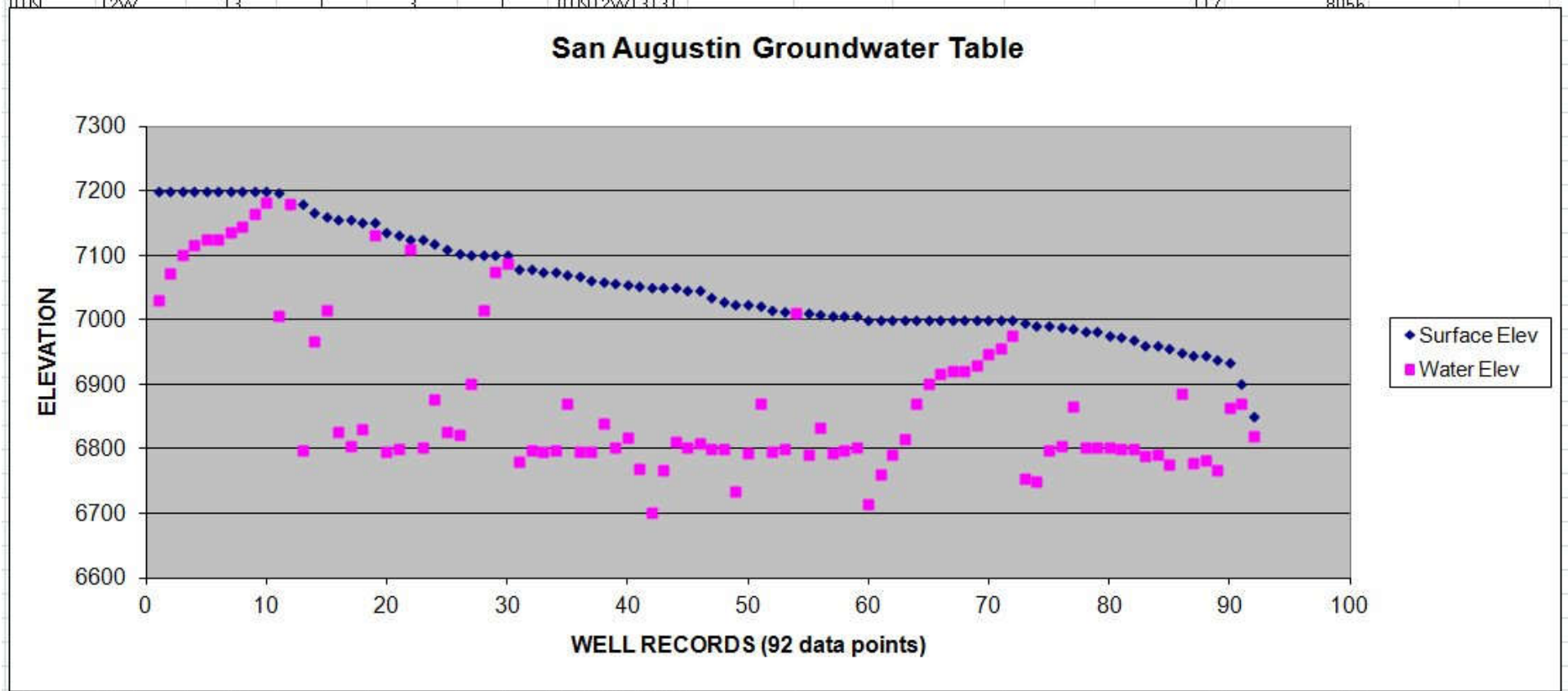
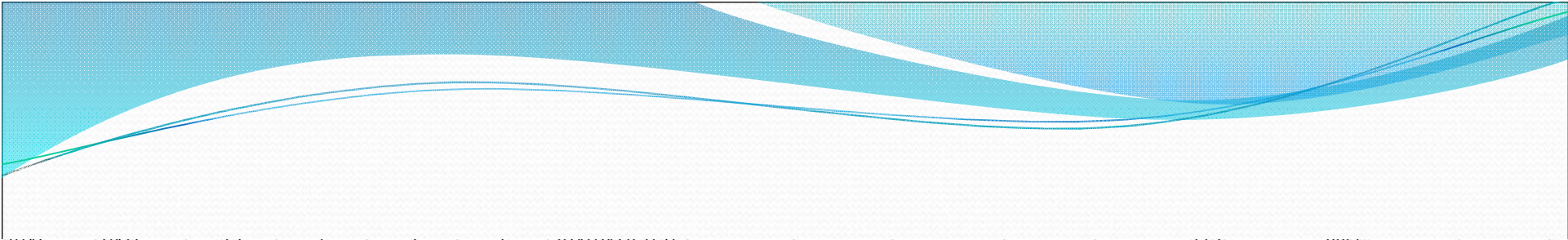
Estimated Yield:

Casing Size: 16.00

Depth Well: 1510 feet

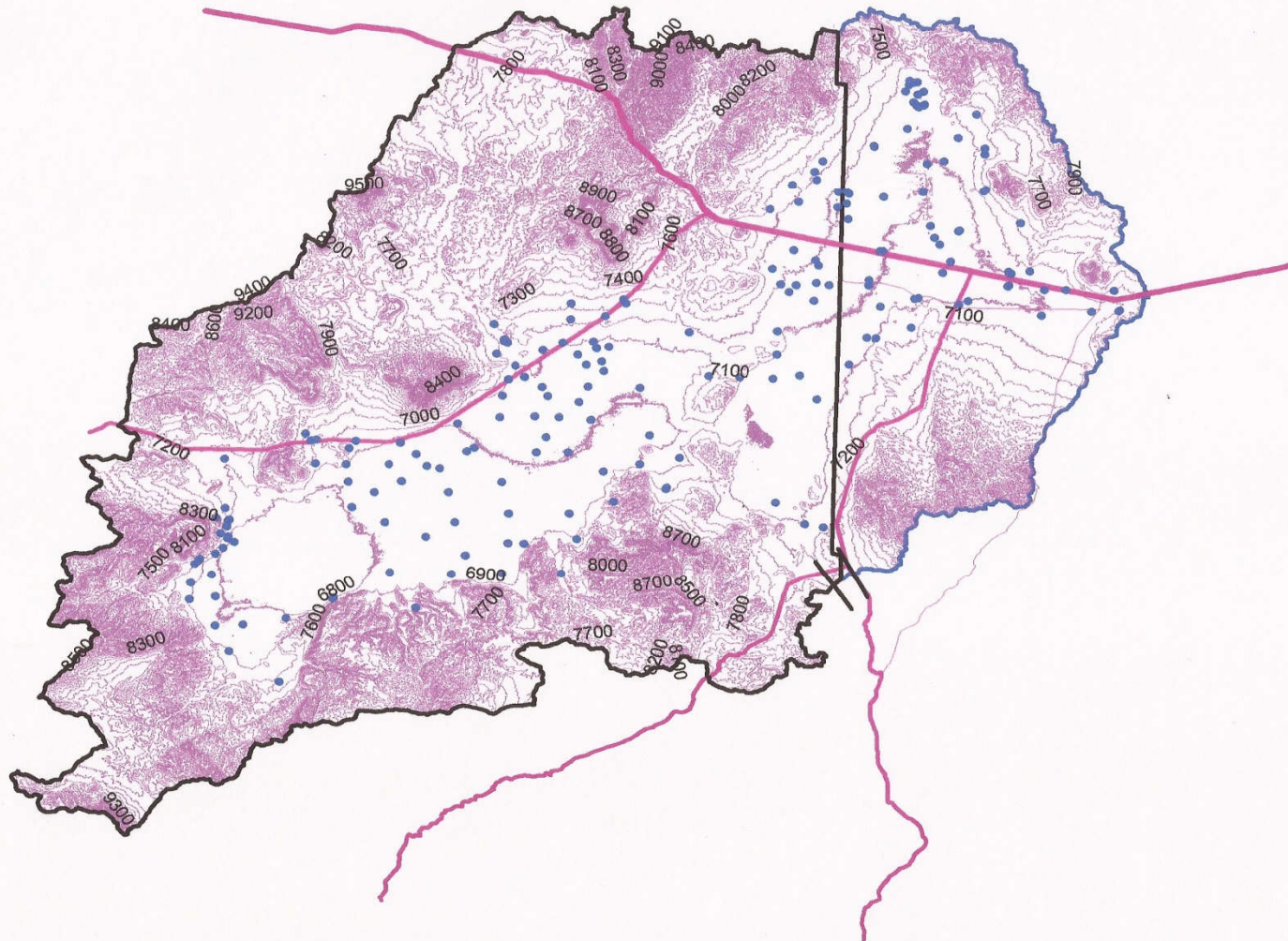
Depth Water: 510 feet

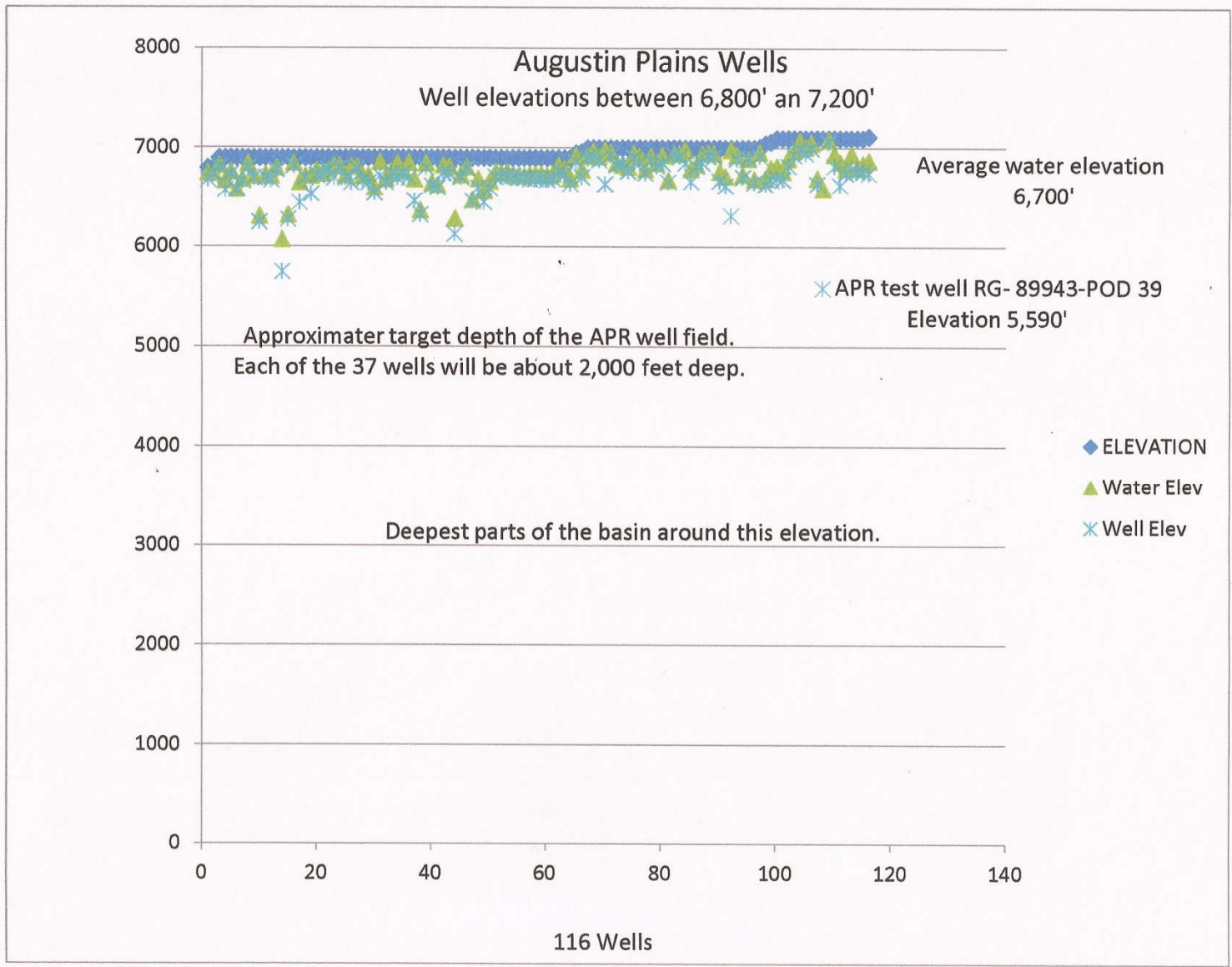
Water Bearing Stratifications:	Top	Bottom	Description	Thickness
	510	800	Shallow Alluvium/Basin Fill	290'
	800	920	Basalt/Rhyolite/Tuff	120'
	920	1290	Shallow Alluvium/Basin Fill	370'
	1290	1510	Basalt/Rhyolite/Tuff	220'



San Augustin Land Elevations

Plains wells below 7,150' elevation

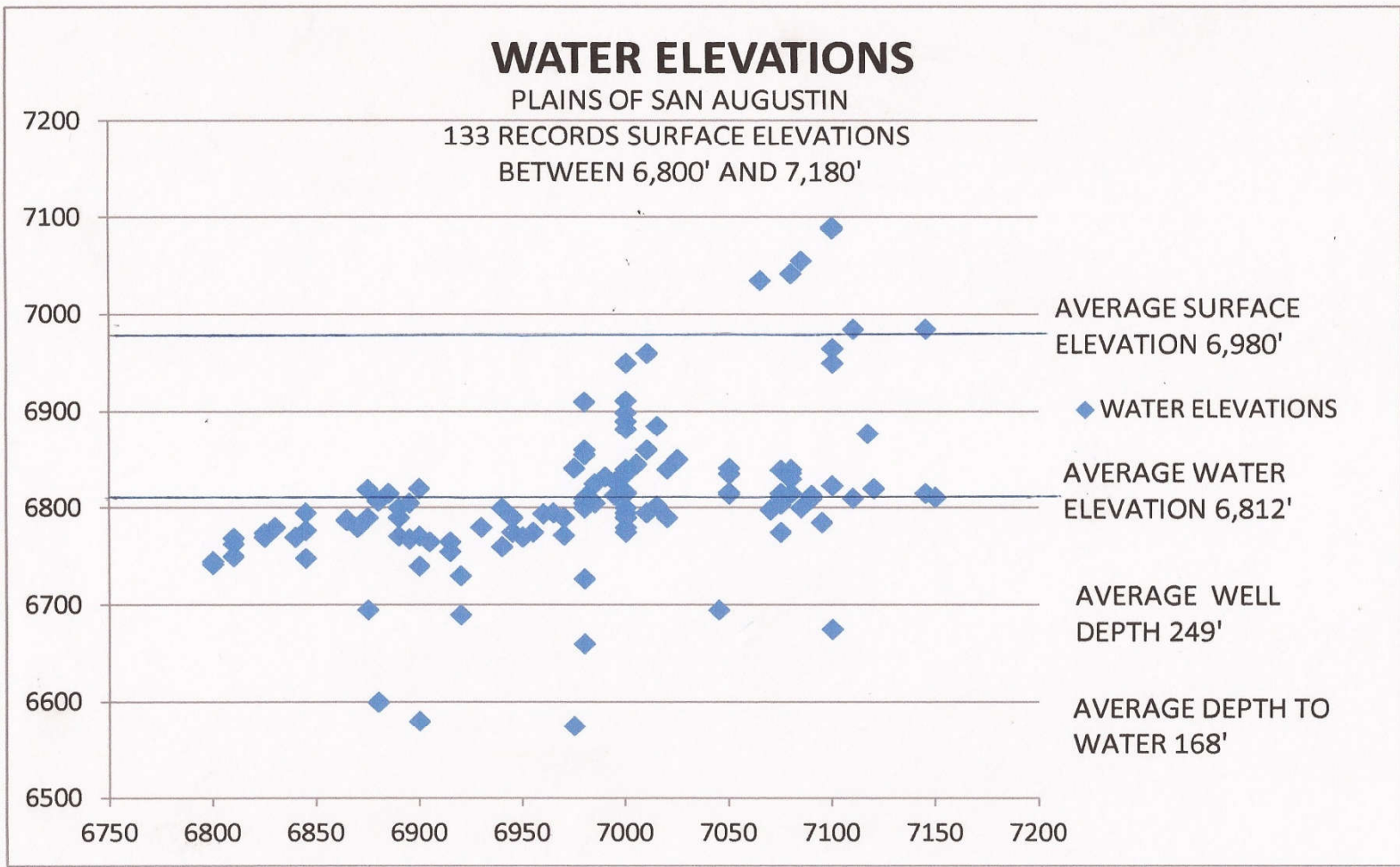




WATER ELEVATIONS

PLAINS OF SAN AUGUSTIN

133 RECORDS SURFACE ELEVATIONS
BETWEEN 6,800' AND 7,180'



good



What's at risk?

1. Depletion of the groundwater aquifer
2. Collapse of the sediments in North Plains so that recharge will not be as great as it is now.
3. Differential settlement within the north basin.
4. Probable damage to roads and utilities as well as structures.
5. Devaluation of adjacent land properties.
6. Economic loss to Datil and Catron County as well Magdalena and Socorro County.

Areas of Subsidence

Arizona		Nevada		California		Texas	
Eloy	15 feet	Las Vegas	6 feet	Lancaster	6 feet	El Paso	1 foot
West of Phoenix	18 feet	New Mexico		Southwest of Mendota	29 feet	Houston	9 feet
Tucson	<1 foot	Albuquerque	"<" 1 foot	Davis	4 feet		
		Mimbres Basin	2 feet	Santa Clara Valley	12 feet		
				Ventura	2 feet		

East Phoenix tension crack due to subsidence.

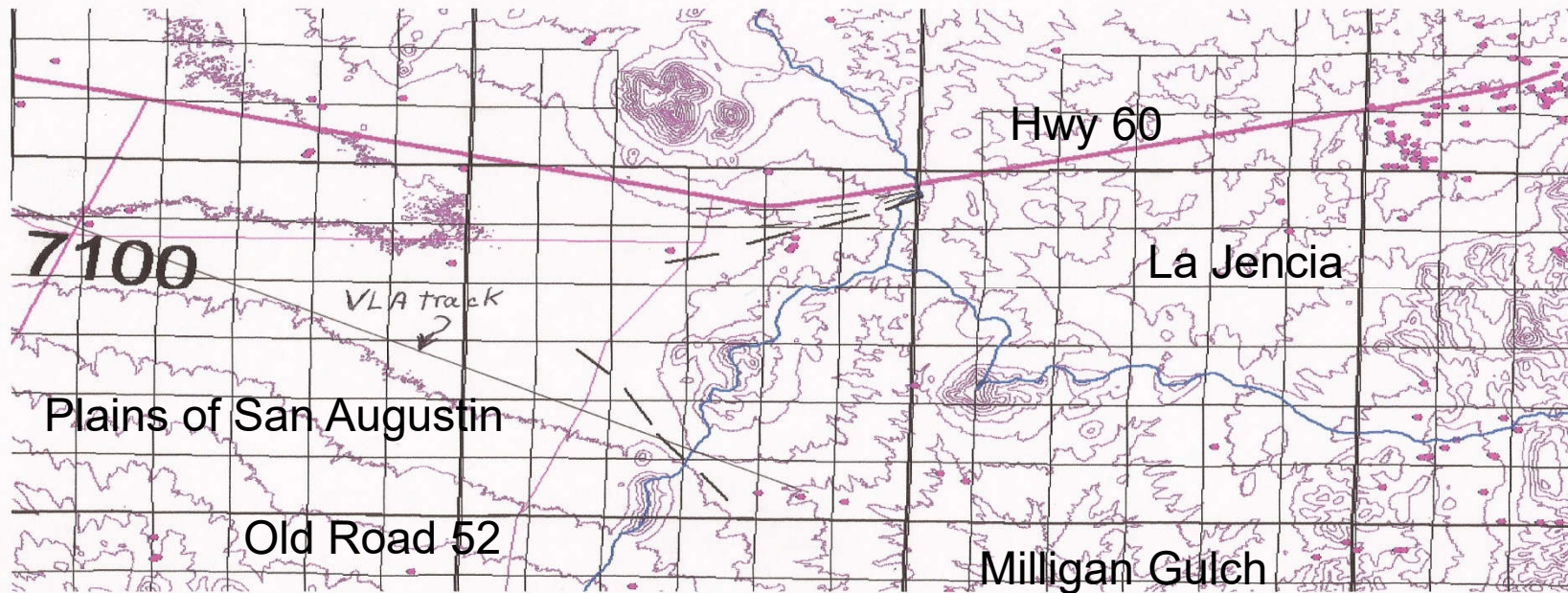




Fig. 8 - Earth fissure damage to residence in Nevada (photo by John Bell)

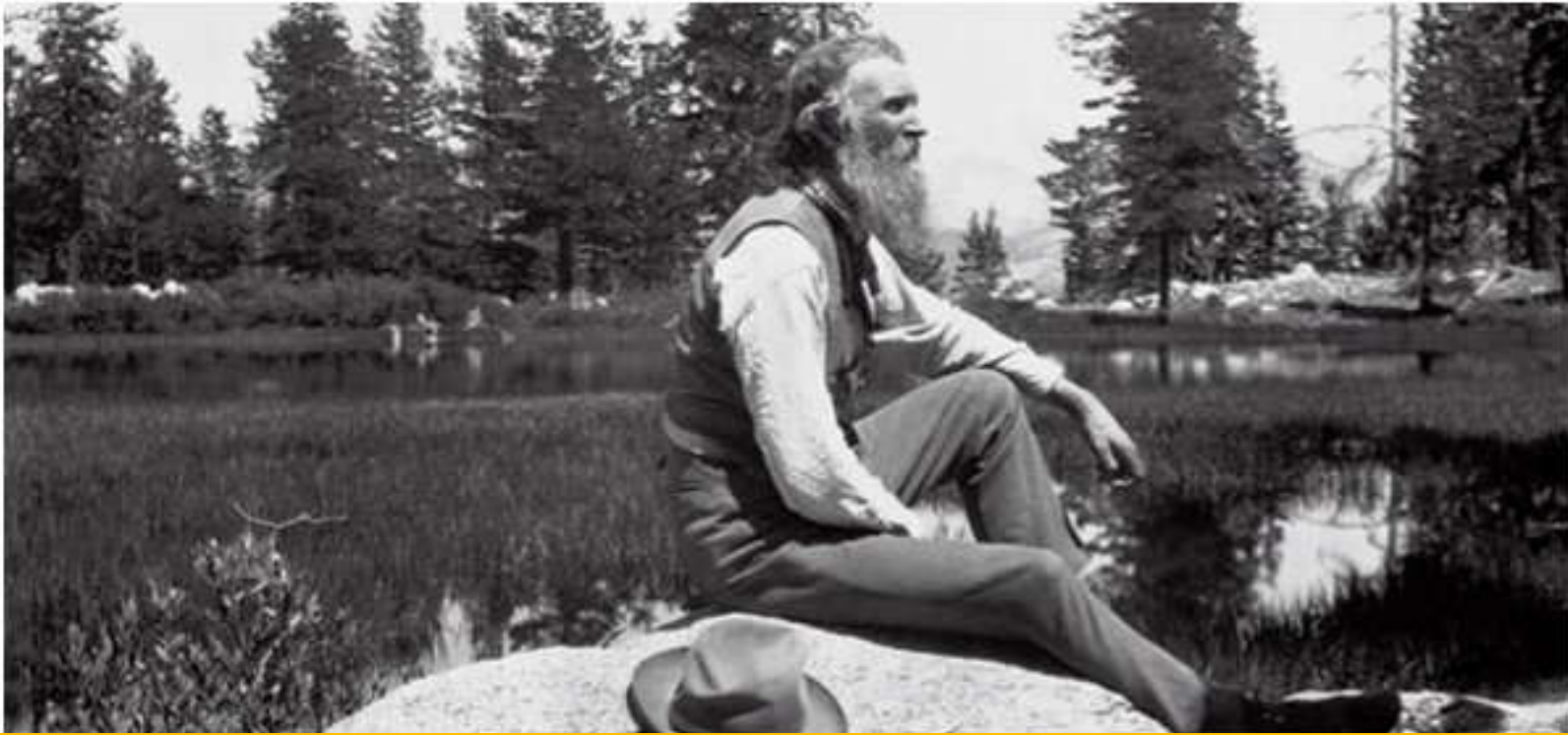


Why people in Magdalena should be worried.



Dashed lines are fault/fractures.

A Thought



“When you tug at a single thread of nature, you will find it attached to the rest of the world”

John Muir