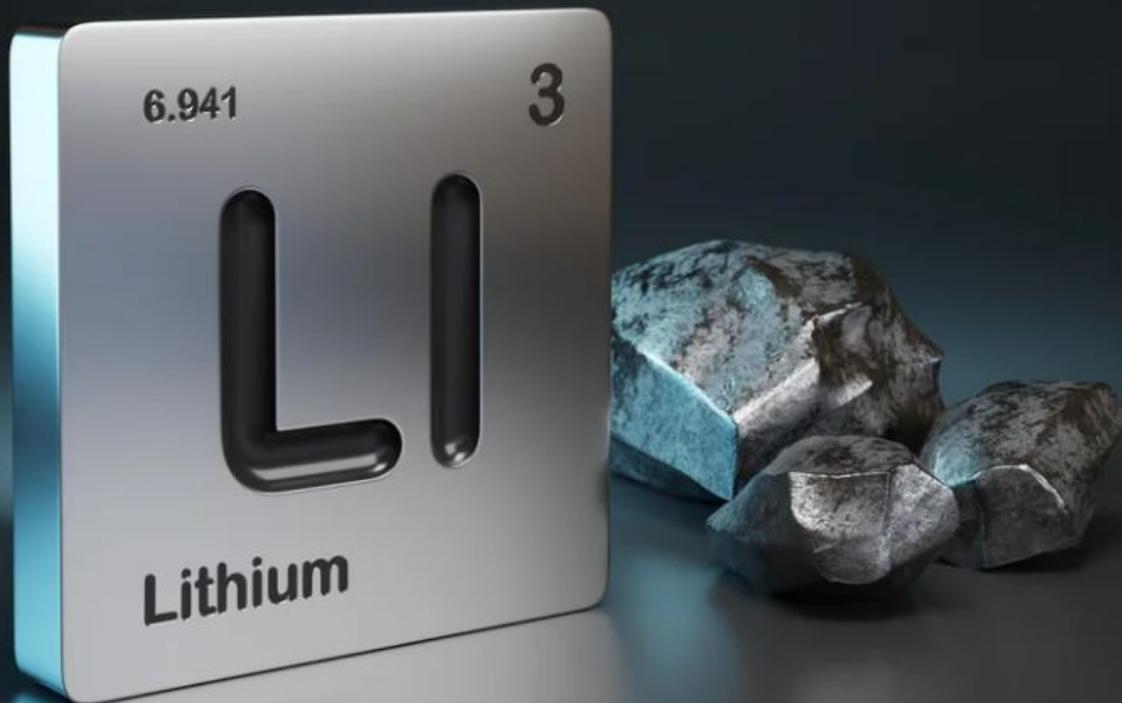


Lithium Mining in Willcox Playa

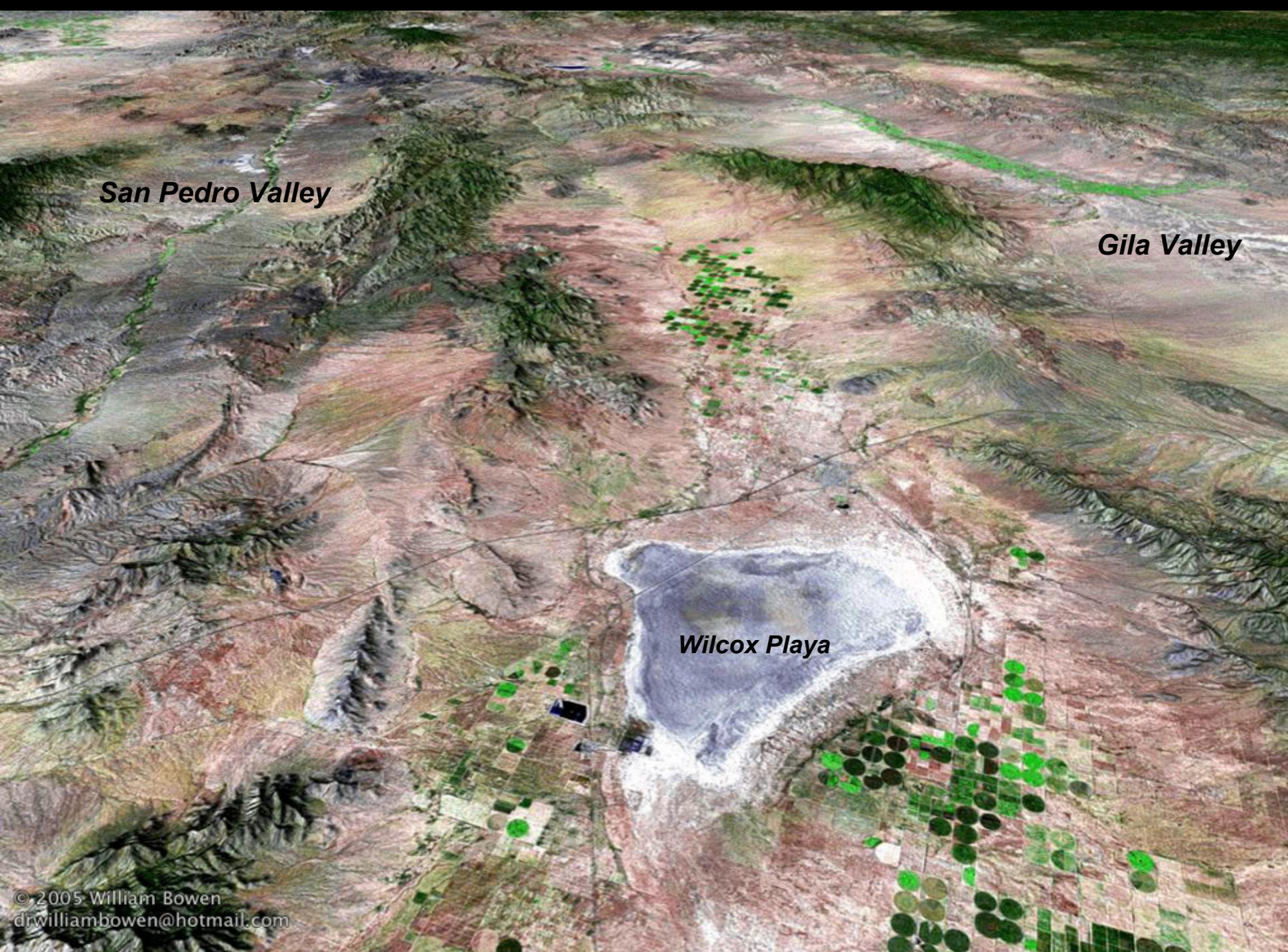
Kristine Uhlman, RG



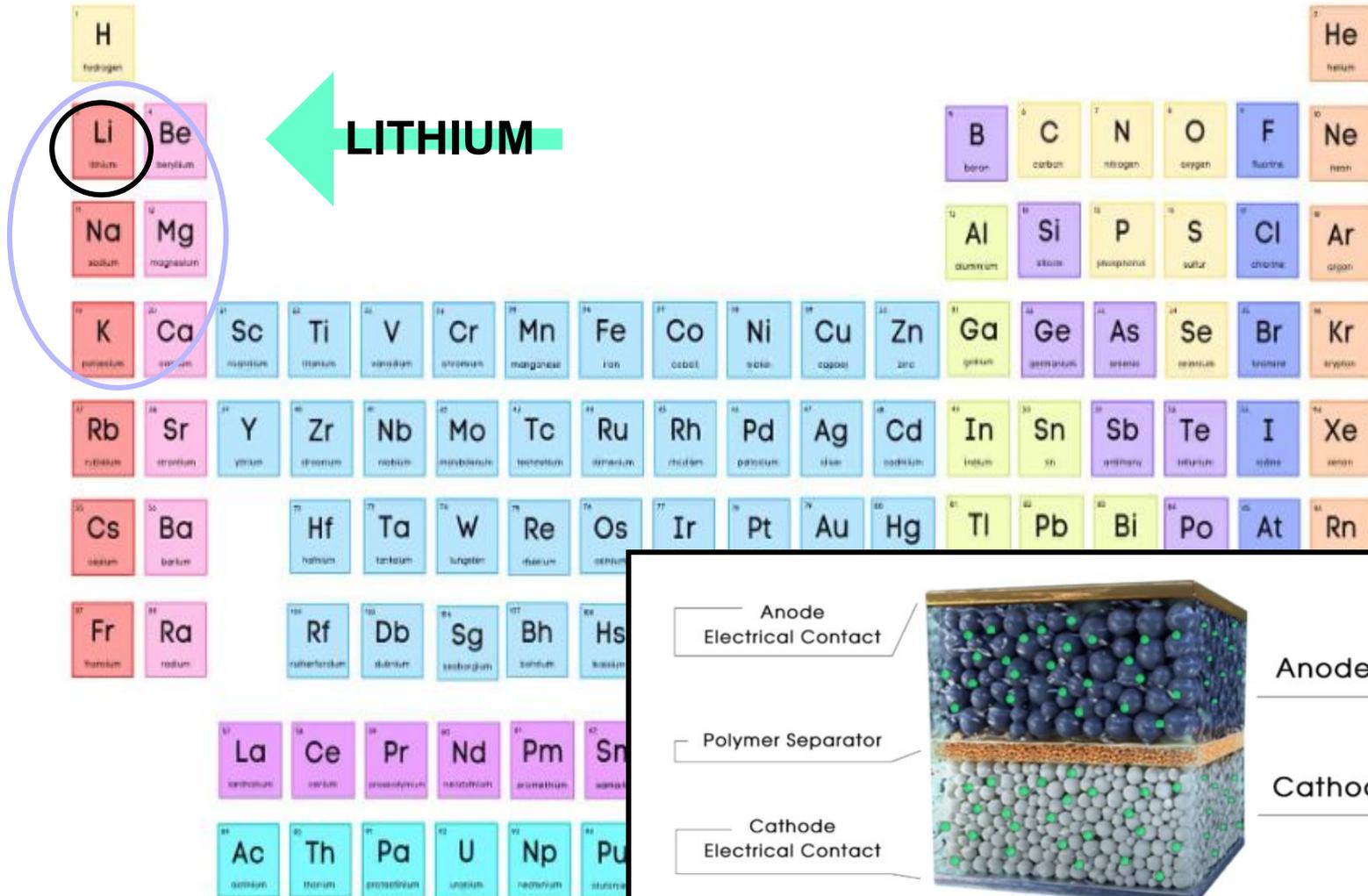
San Pedro Valley

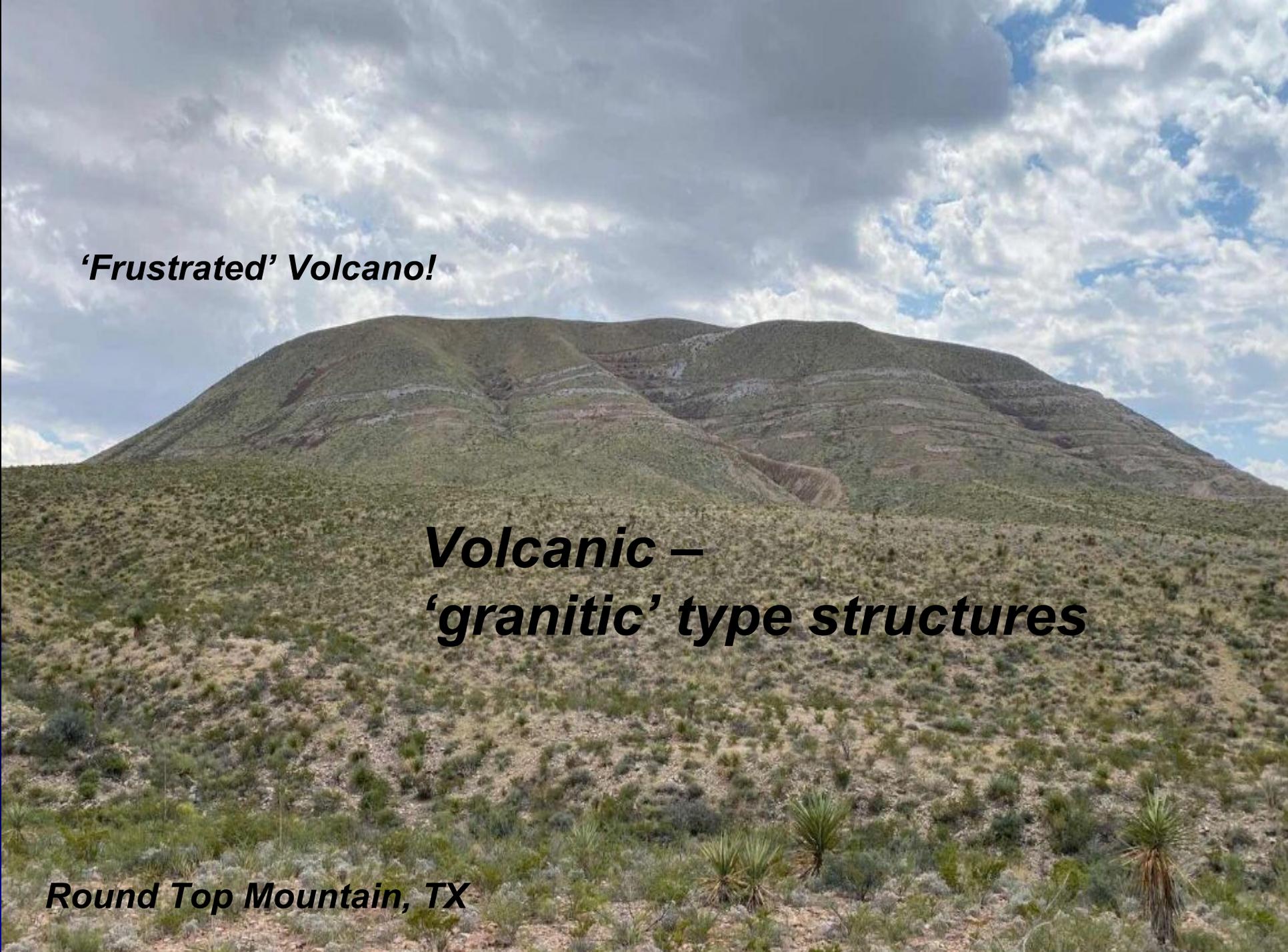
Gila Valley

Wilcox Playa



Periodic Table of Elements





'Frustrated' Volcano!

***Volcanic –
'granitic' type structures***

Round Top Mountain, TX

Turkey Creek Caldera

Volcanic – Ash, clay

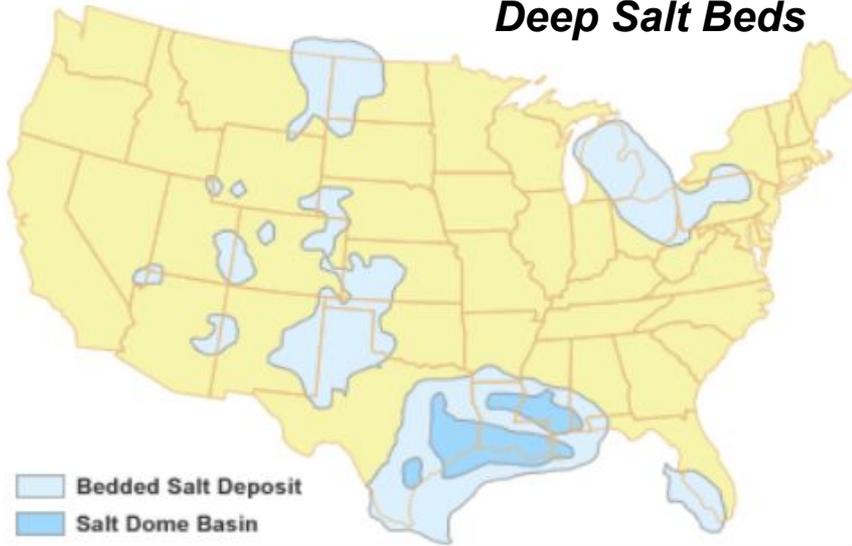
Chiricahua, AZ



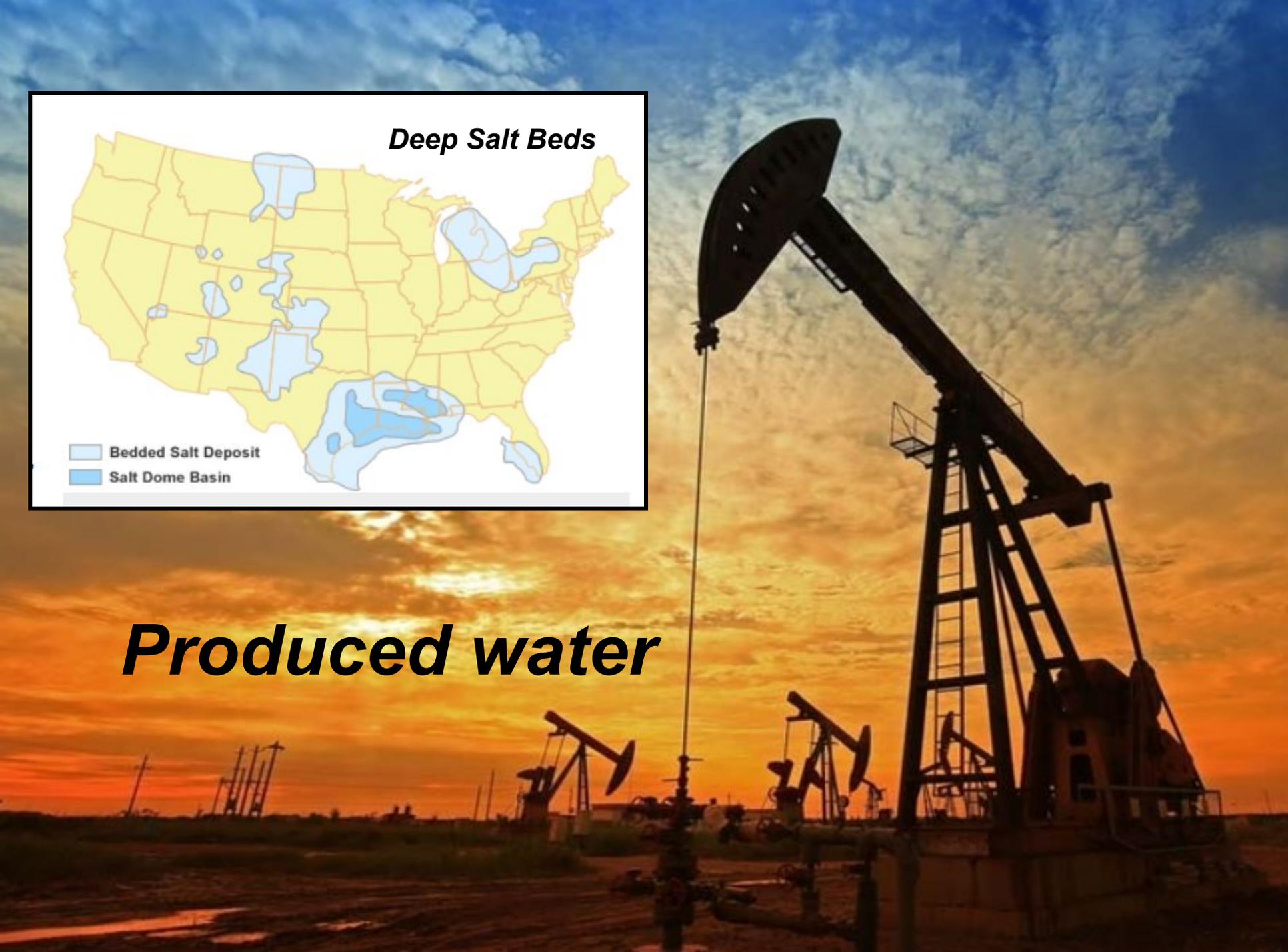
***Volcanic – Pegmatite
Spodumene***

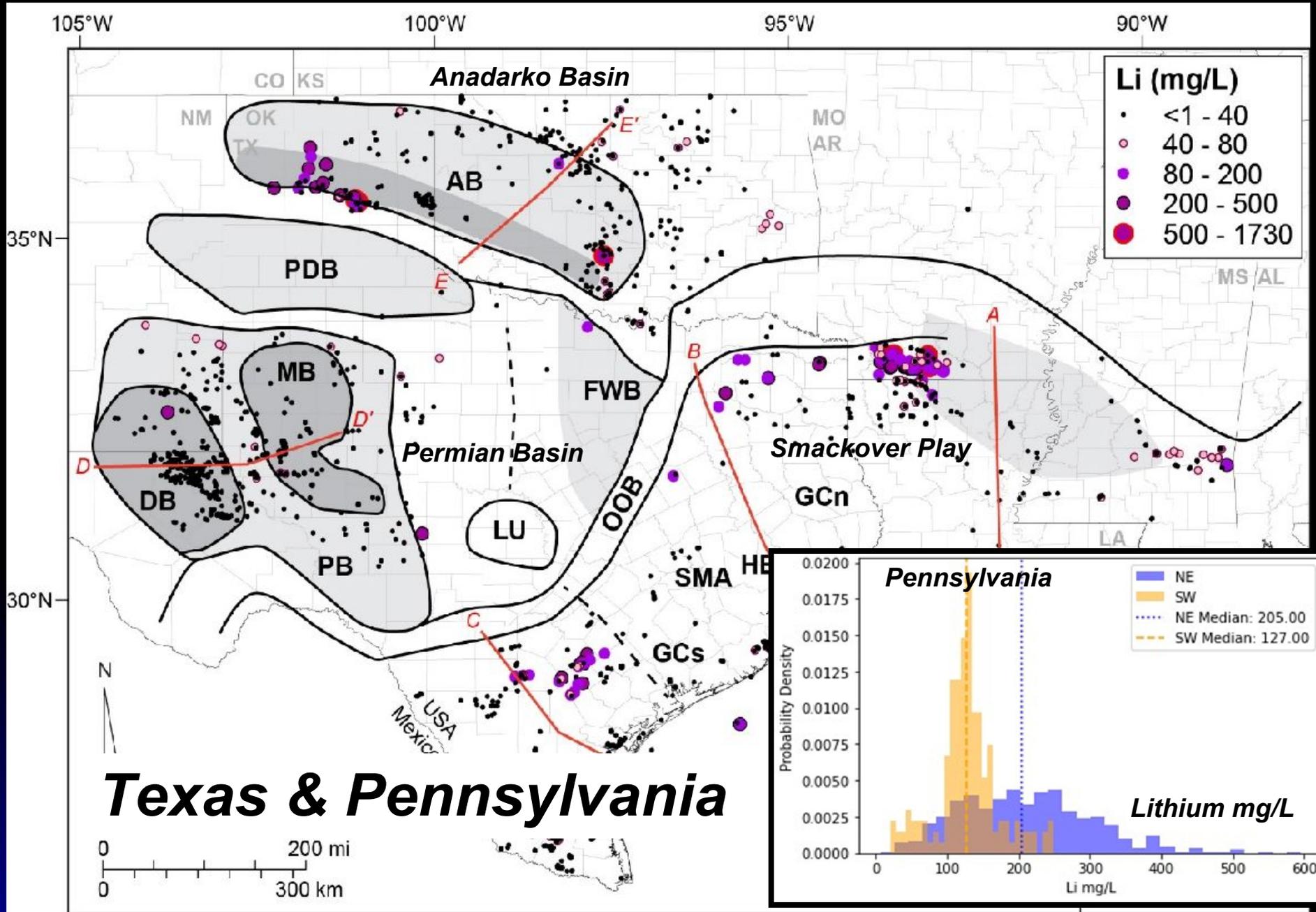
Pilbara, Western Australia

Deep Salt Beds



Produced water



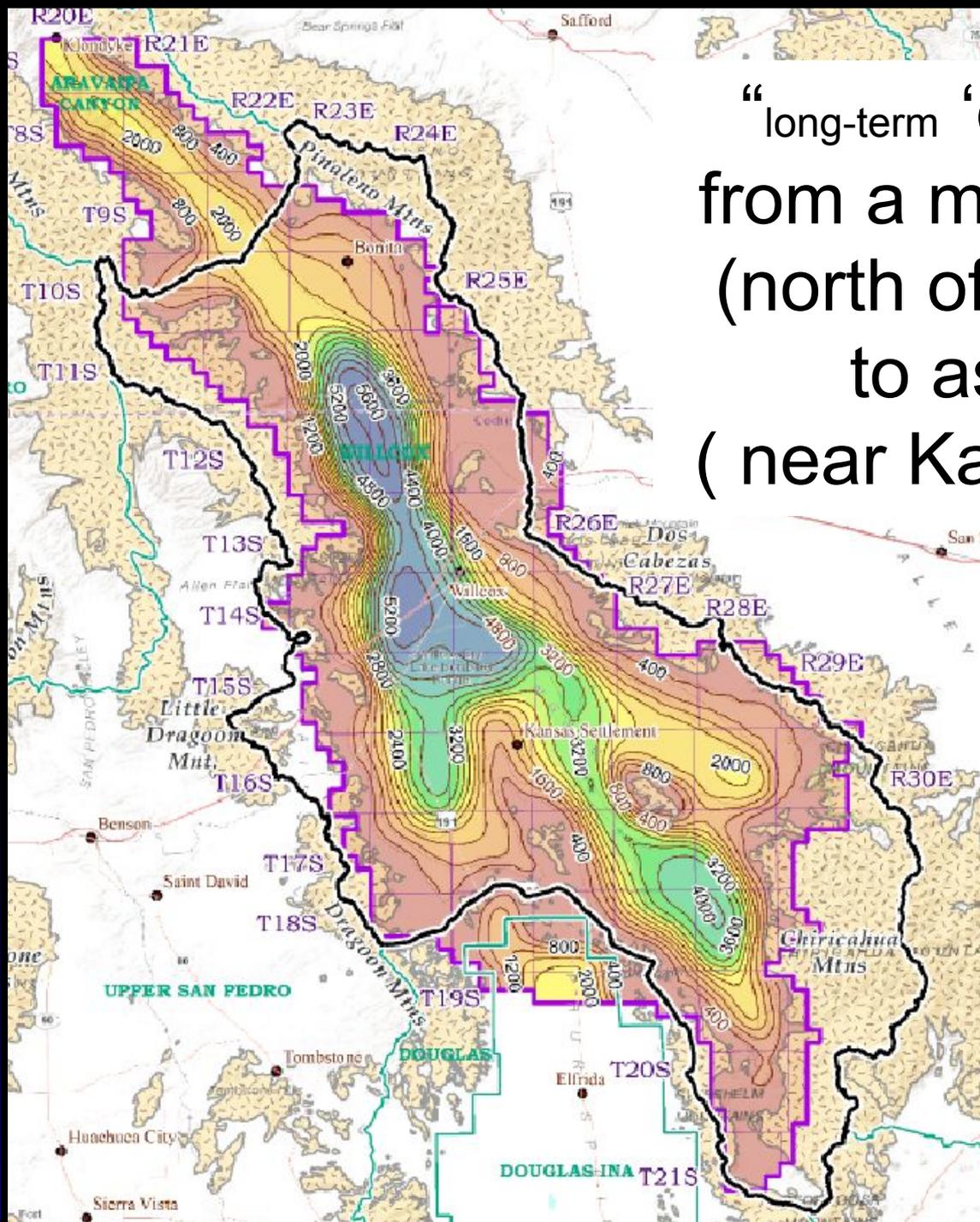




400 mg/L Lithium

**Salton Sea, CA
Geothermal Power + Lithium**

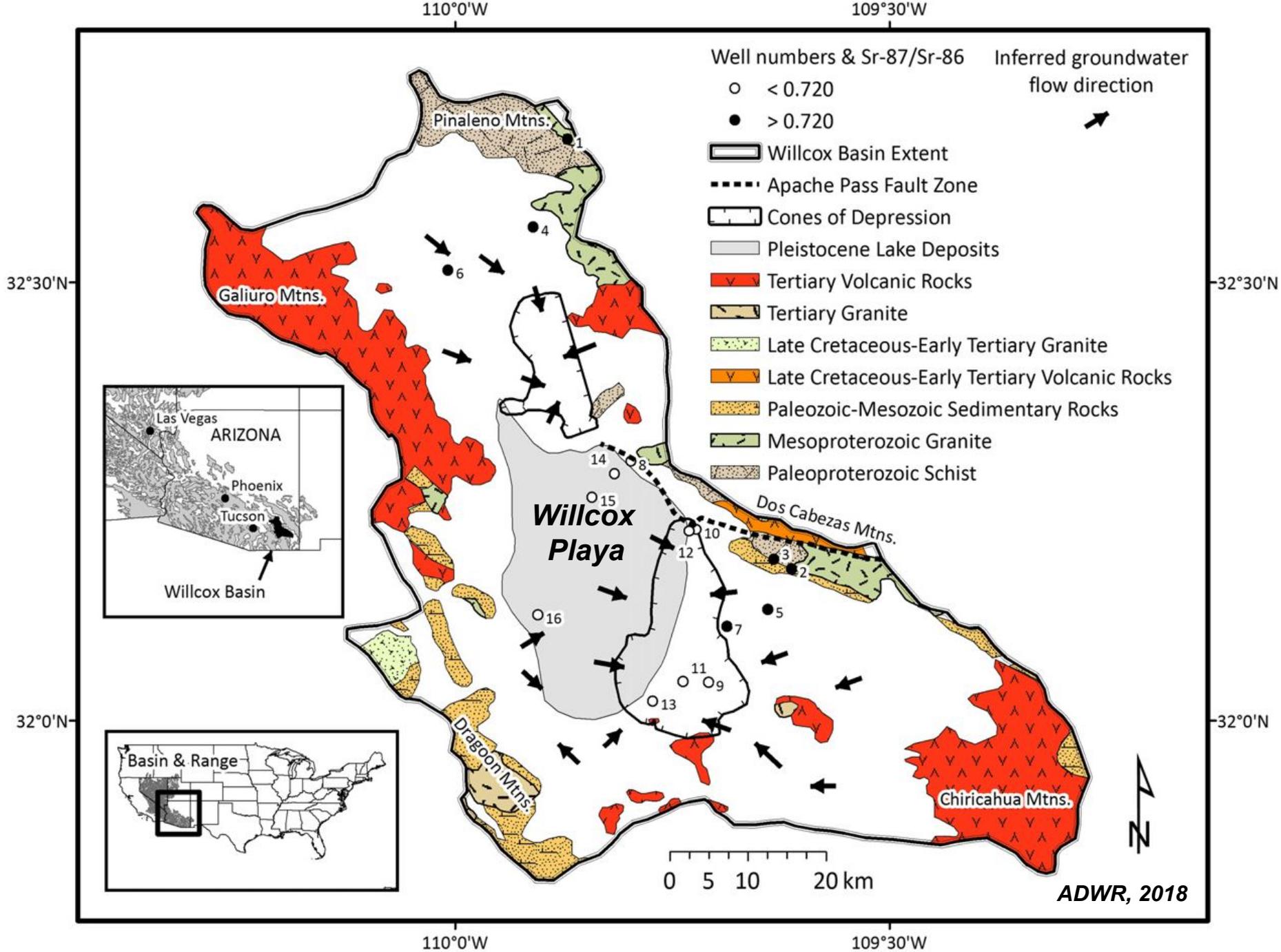
“long-term ‘draw down’ ranges from a minimum of 354 feet (north of the Willcox Playa) to as much as 917 feet (near Kansas Settlement)”.



**Arizona Department of
Water Resources
Groundwater Flow Model
Of the Willcox Basin**

July 16, 2018

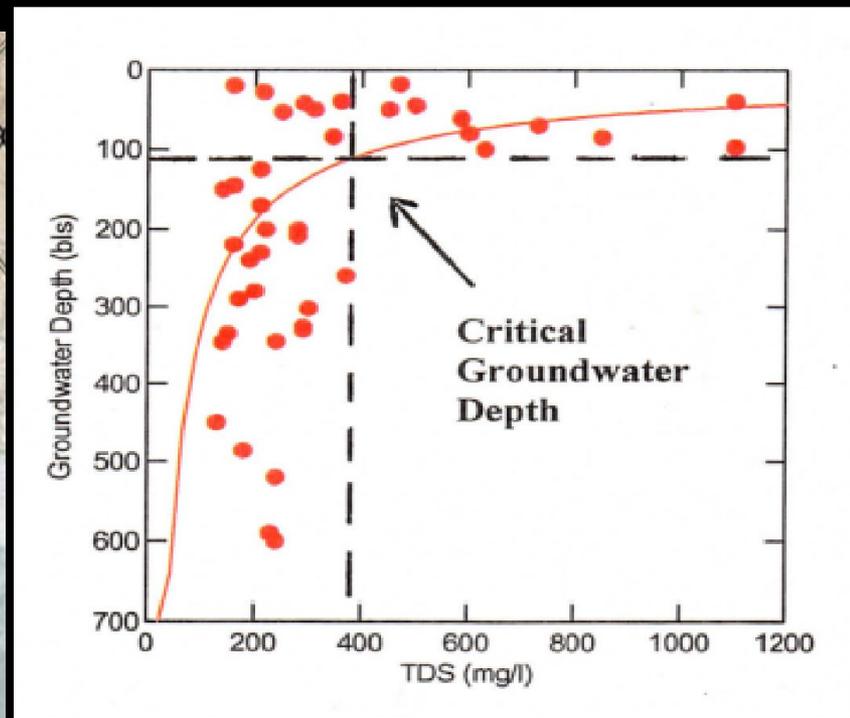
Before Riverview



Map of Willcox Basin showing the basin's extent, hydrogeology in the mountain blocks, well numbers, and $^{87}\text{Sr}/^{86}\text{Sr}$ ratios. Geological types derived from Dick



**TDS = Total Dissolved Solids
= Salts – may include Lithium**



Salty on top!

**Fresh water
at depth**

**Lake Cochise:
~ 14,000 to
8,900 years**



The above photo in Figure 2 is claystone drill core from Willcox Playa hole WP-23-01 (assays pending).
MaxPower core

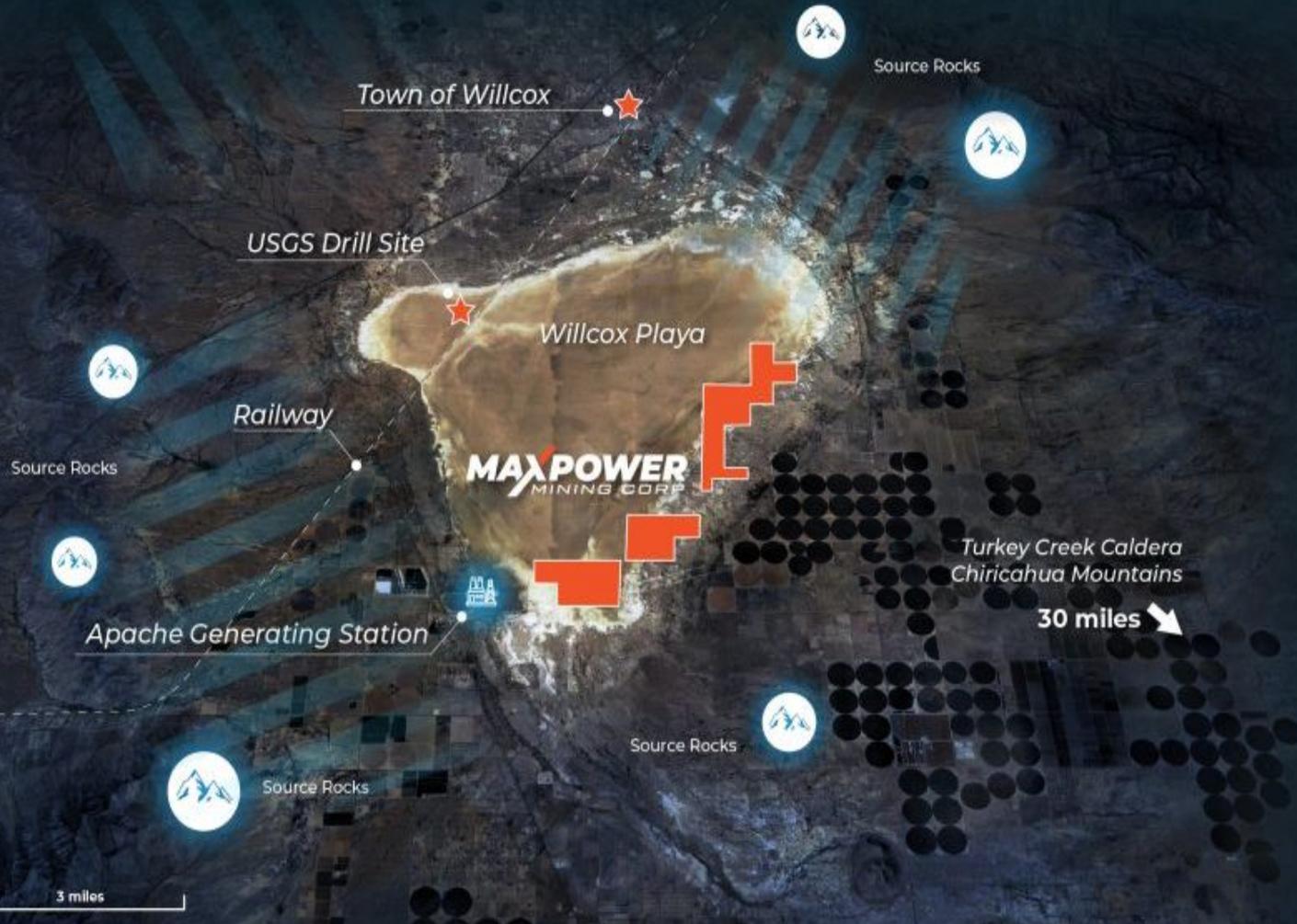
The Willcox Playa

Arizona, USA



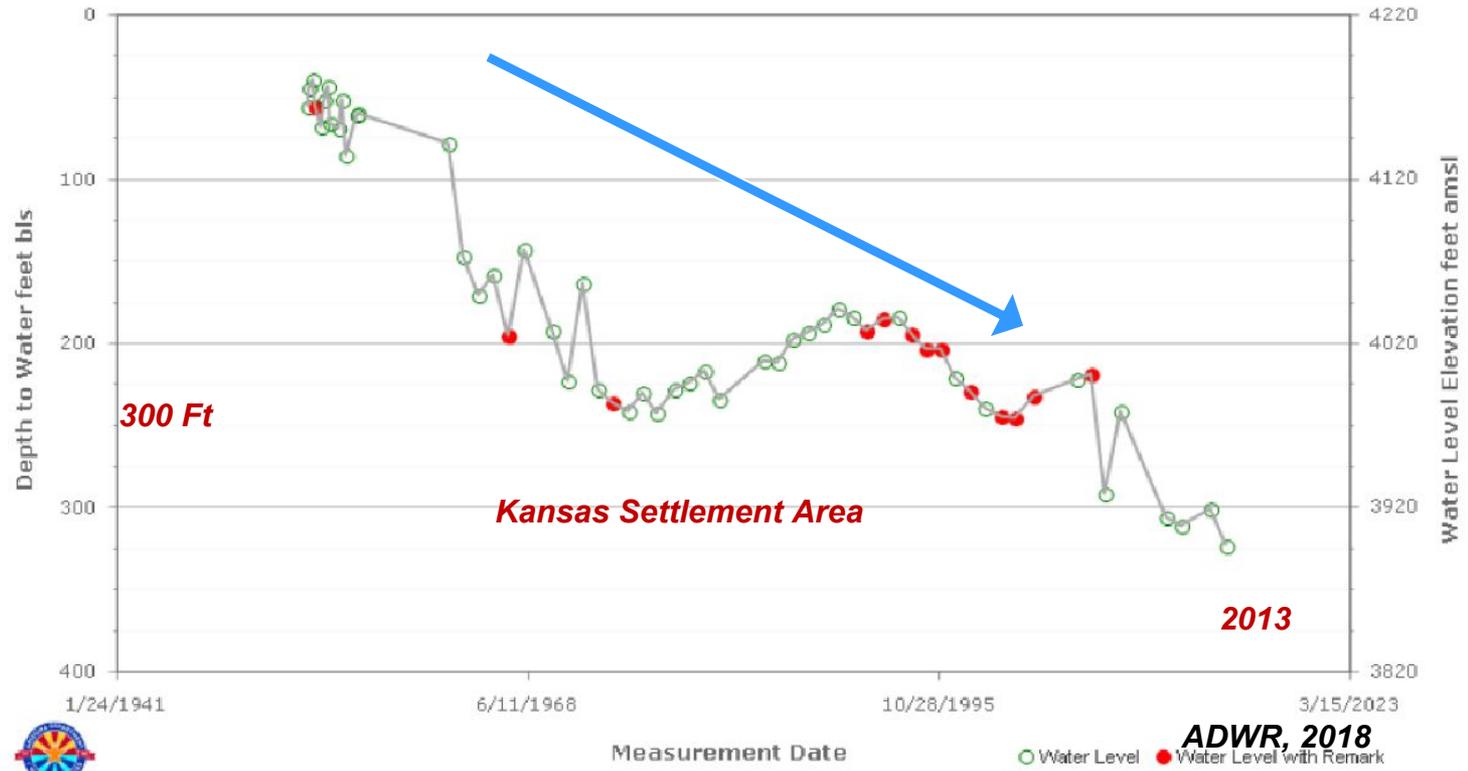
First-Ever Willcox Playa Systematic Diamond Drilling Has Commenced

"Bringing the Supply Chain Home to America"



Arizona GroundWater Monitoring Site Hydrograph

Local ID	Site ID	Registry ID	Latitude NAD27	Longitude NAD27	Alt. (ft amsl)	Water Use	Well Depth (ft)	Case Dia. (in)	Drill Date	Latest WL Date	DTW (ft)	WL Elev. (ft)
D-15-25 25GDD1	320542109443901		32° 5' 43.0"	109° 44' 51.2"	4220	IRRIGATION	566	14		12/2/2014	323.3	3896.7



GWSI is ADWR's technical database of well locations, construction data, and water levels.

Created on 9/25/2015

Figure 4 Hydrograph of Irrigation Well (Kansas Settlement Area – South of Willcox Playa)

182,200 acre-feet/year total (2014 estimate)

•Domestic + Municipal = 2,300 acre-feet/year

•Apache Generating Station = 5,500 acre-feet/year

Land Subsidence

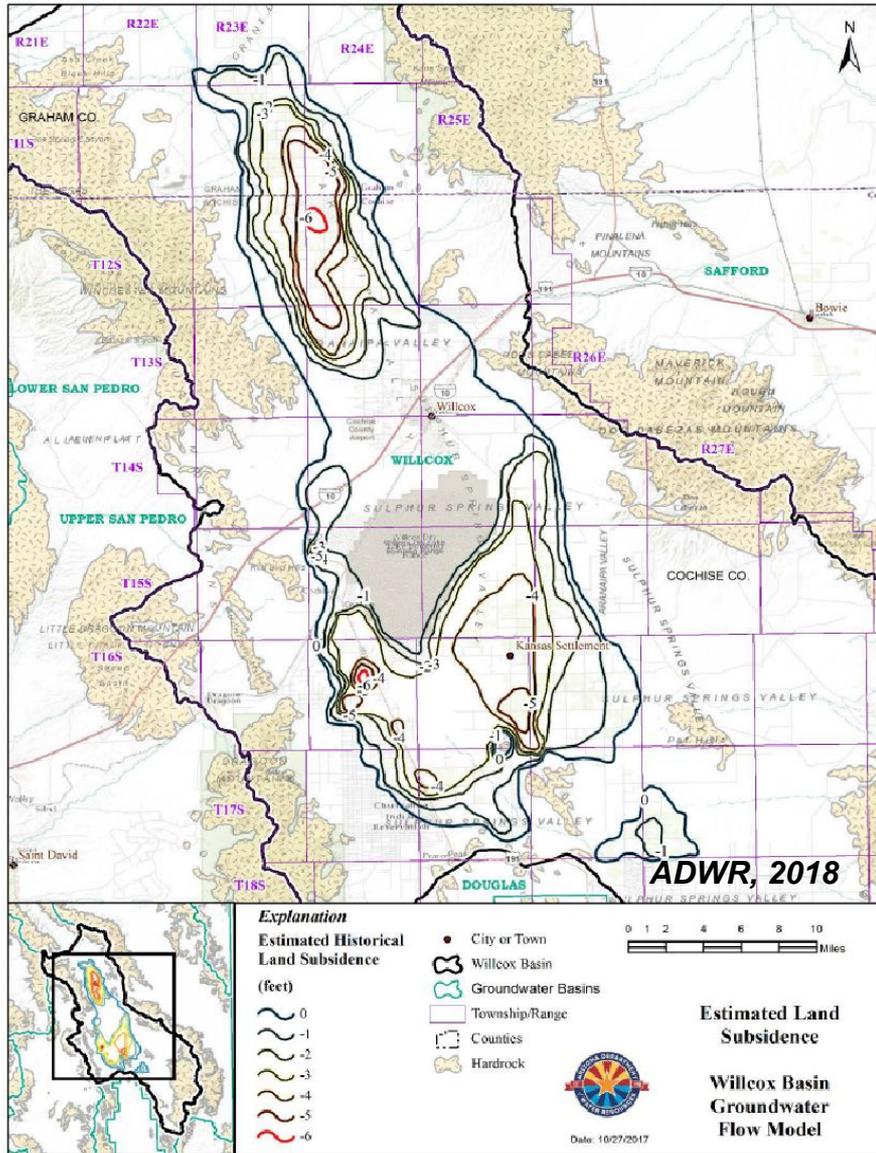


Figure 7 Estimated Land Subsidence in the Willcox Model Area

Max 6 foot subsidence – ADWR 2018

Managed Aquifer Recharge: Cienega Ranch

Slow Runoff to Enhance Groundwater Recharge & Storage

Gabions and Leaky Wiers



Gabion Detention n

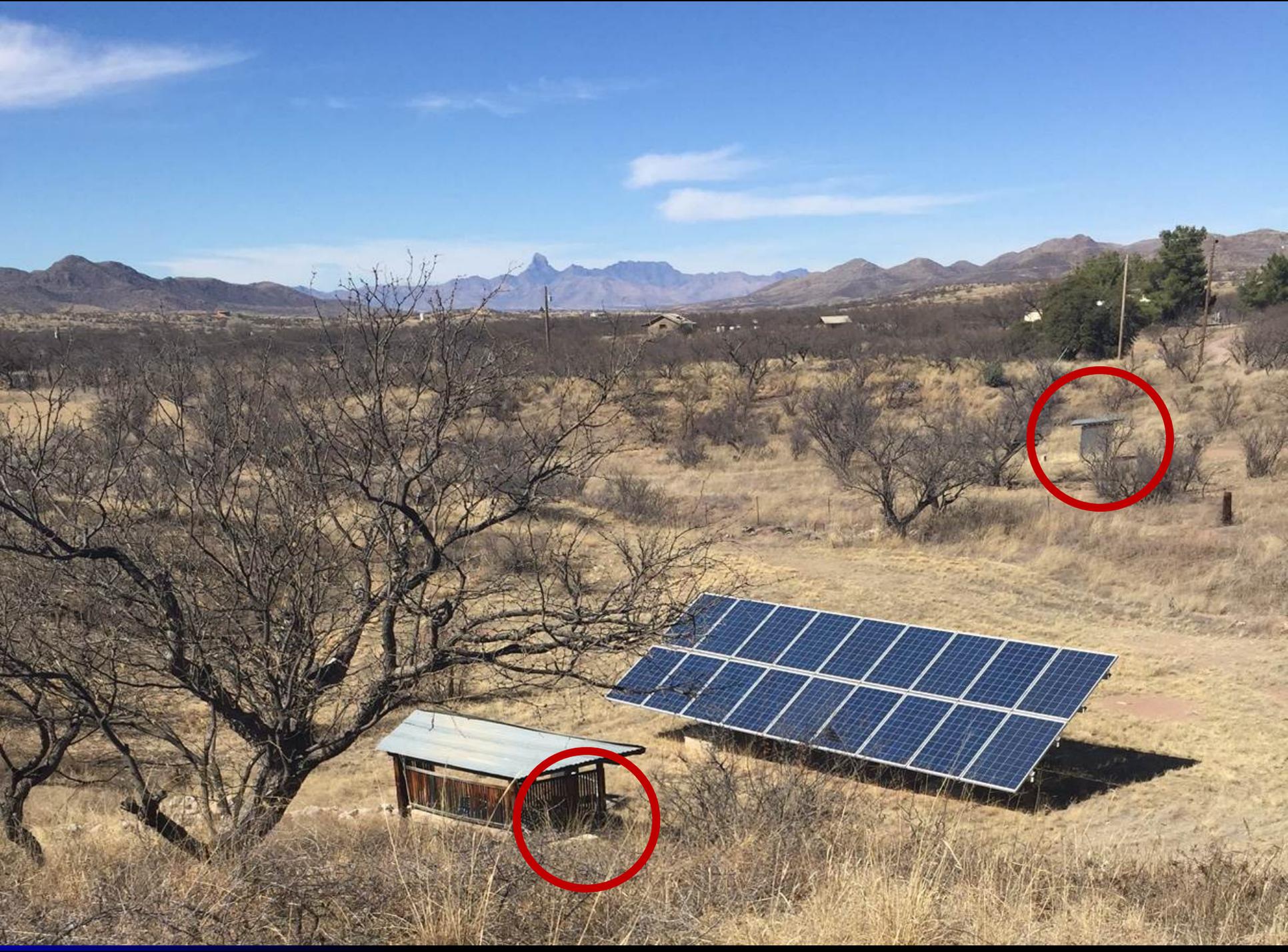
Dams

Arivaca, Arizona

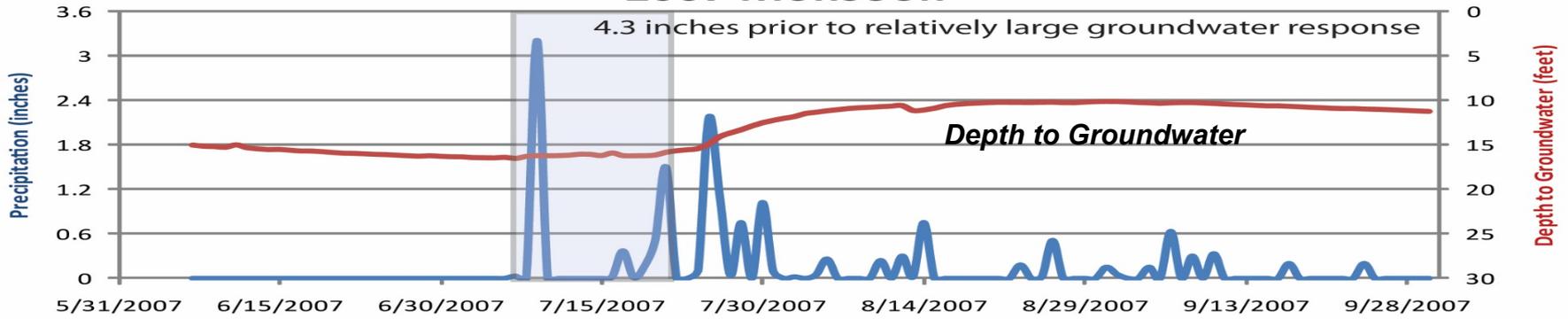




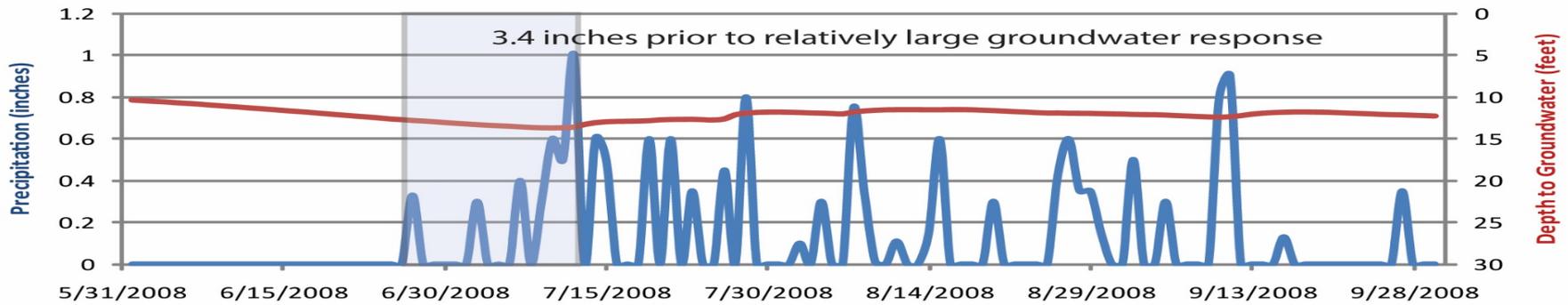
07.25.2014 14:54



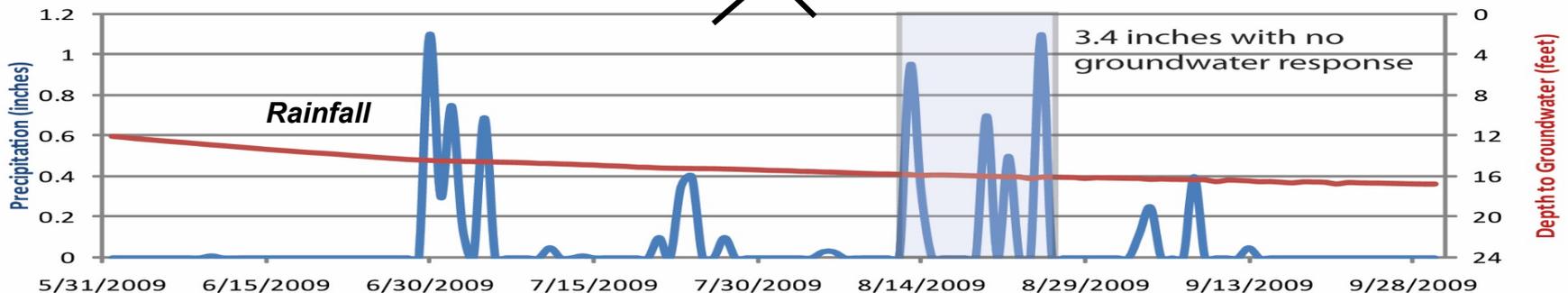
2007 Monsoon



2008 Monsoon



~~2009 Monsoon~~ NONsoon!



Groundwater Age

- *11,000 to 12,000 years old - San Pedro River Valley*
- *10,000 to 12,000 years old - Phoenix Basin*
- *4,600 to 24,400 years old - Rio Grande River Valley*
- *300 to 10,000 years old - Tucson Basin.*
- *5,000 to 10,000 years old - Willcox Basin*

C₁₄ Isotope Studies

A photograph of a person's shadow cast on a rocky, sandy ground. The shadow is dark and clearly shows the person's arms raised in a 'V' shape, suggesting a gesture of gratitude or triumph. The background consists of dry, scrubby vegetation and a mix of sand and small rocks.

Thank You!!

Kristine Uhlman, RG