Town of Patagonia Water Supply

August 14, 2014

CLEAR CREEK ASSOCIATES

Practical Solutions in Groundwater Science

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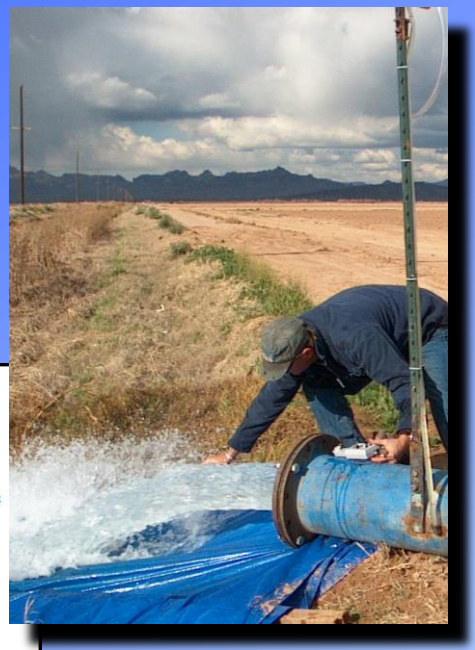
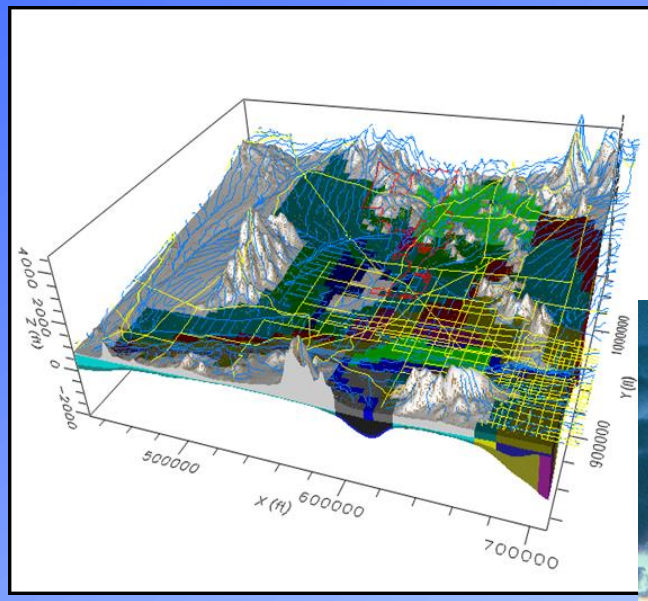


- **Permitting**
- **Hydrogeologic Investigations**
- **Groundwater Development**
- **Groundwater Modeling**
- **Environmental Services**
- **Groundwater Recharge**

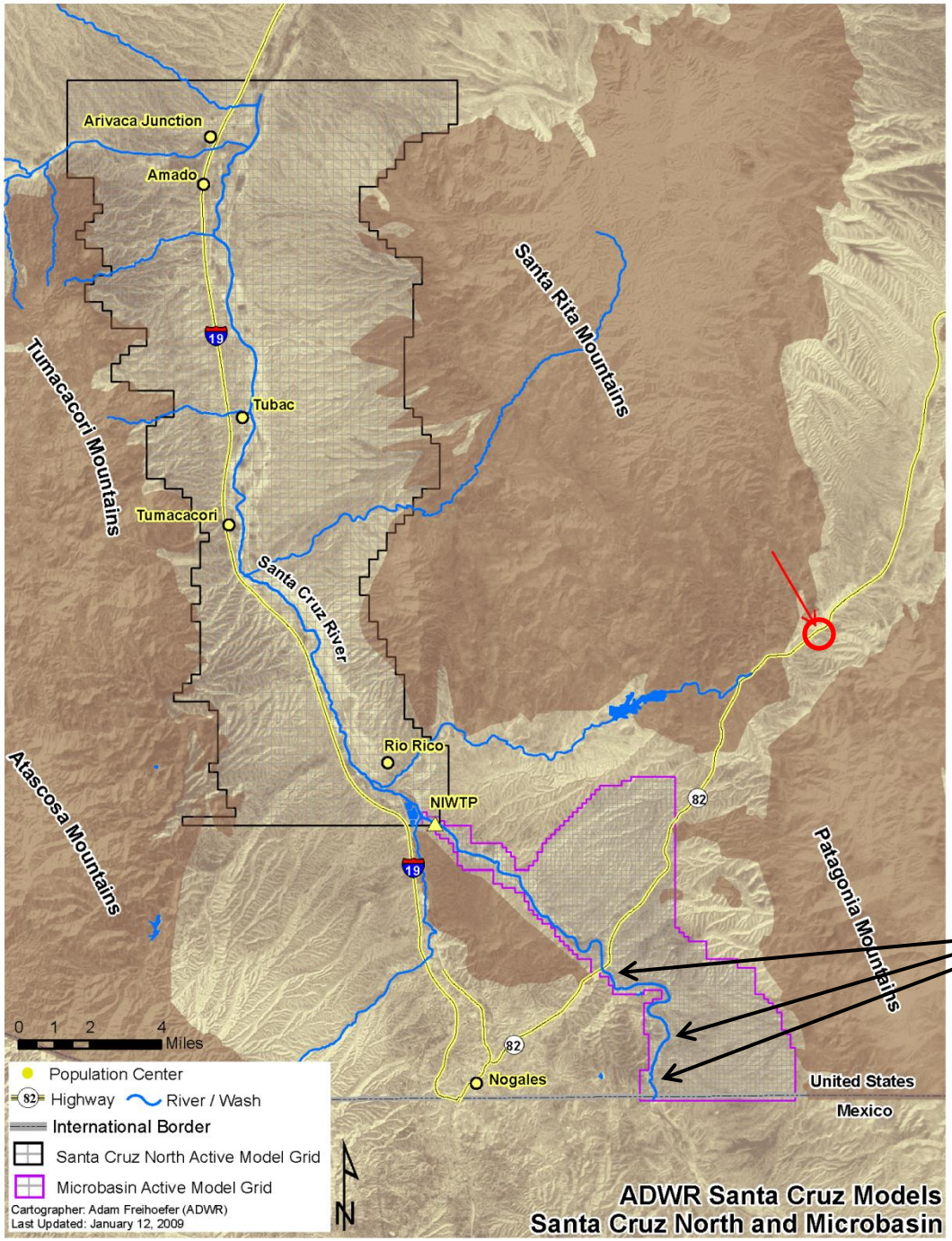


Patagonia is in the Basin and Range Area of the Southwest.

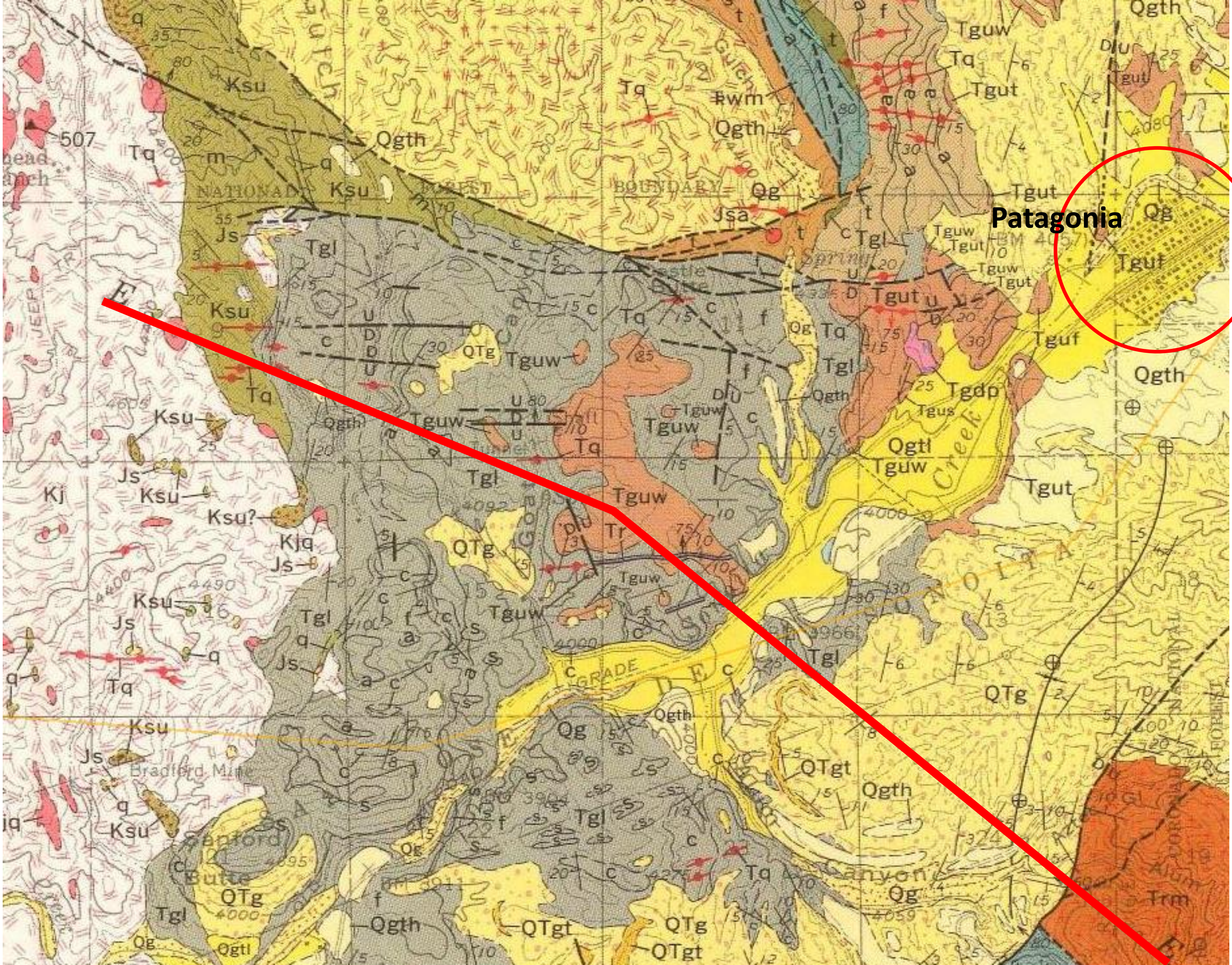
Characterized by mountains separated by valleys, bound and intersected by multiple faults and fractures.

Result of extension.

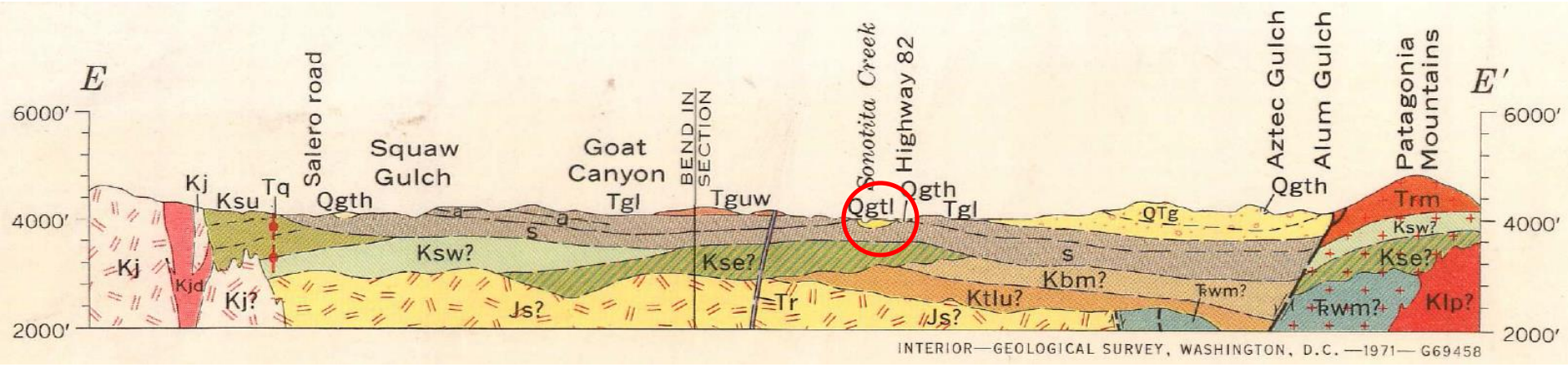
http://az.statetopomap.com/



Microbasins

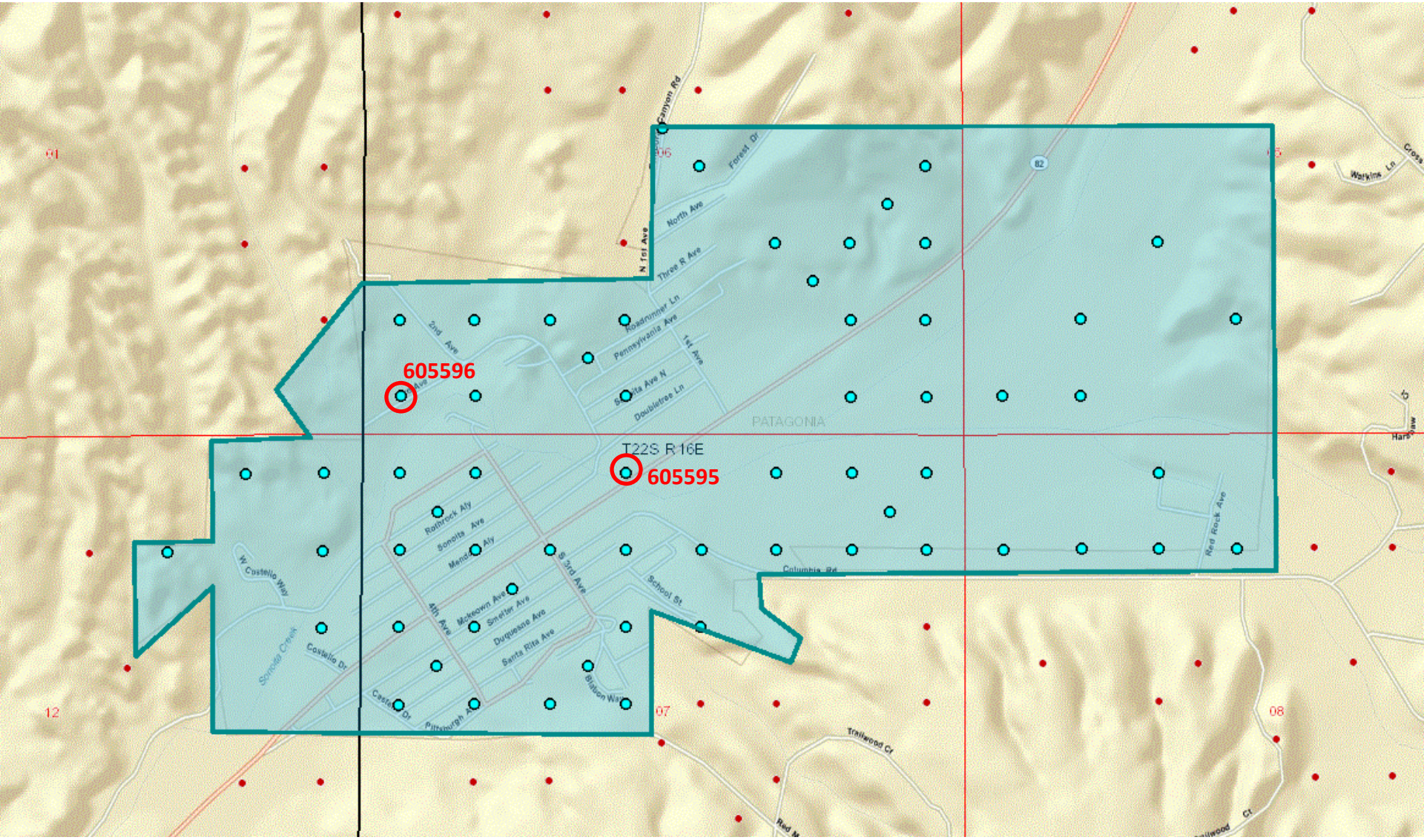

Patagonia
Qgth
Tguw
Tq
Tgut
Ksu
507
Tgl
QTg
Tguf
Tgdp
Tgus
Qgtl
Creek
Tr
Qg
Kj
Js
Kjq
Ksu?
QTgt
Trm
Bradford Mine
Canyon
NATIONAL
FOREST
BOUNDARY
Jsa
GRADE

Town of Patagonia sits along Sonoita Creek.

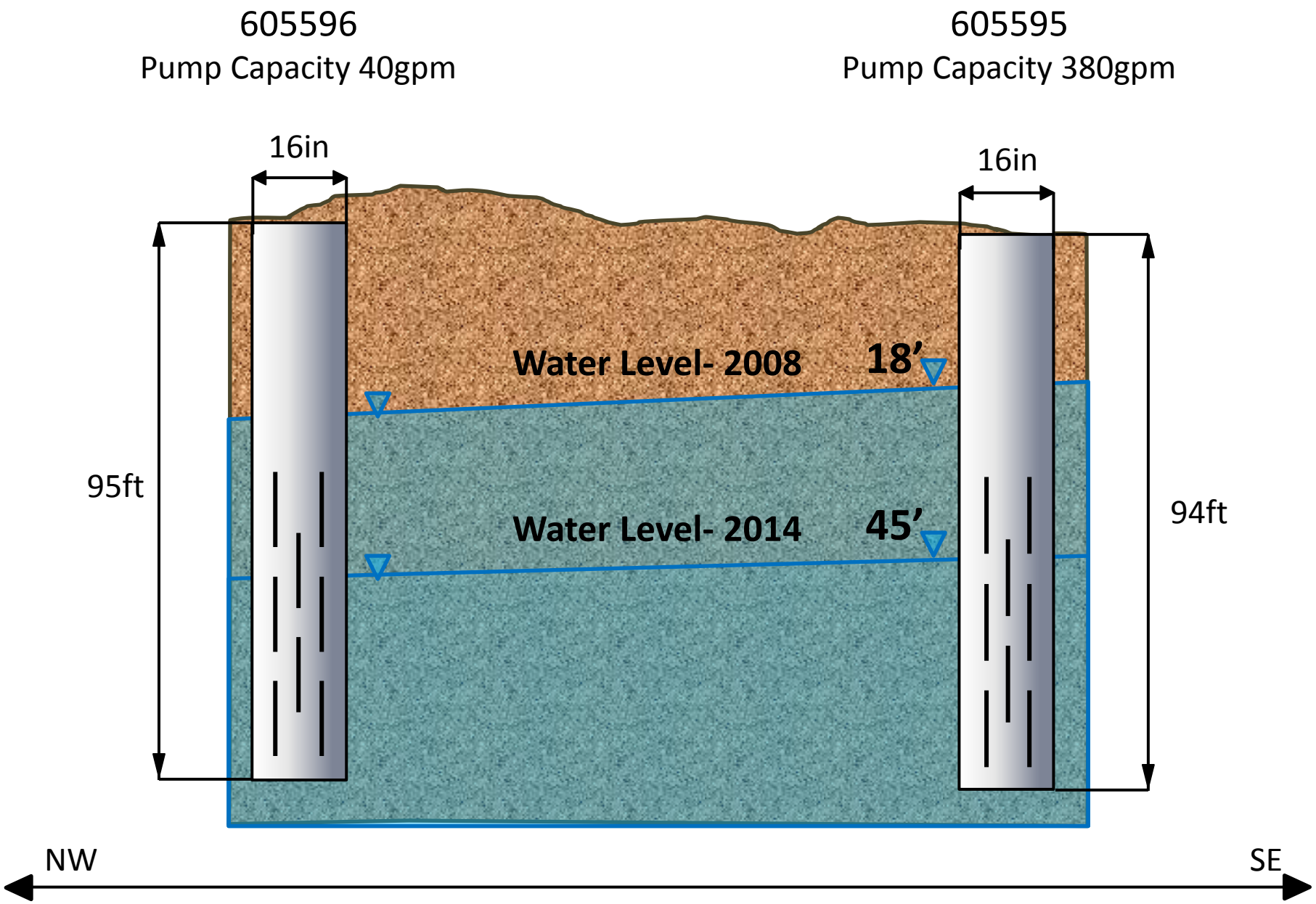


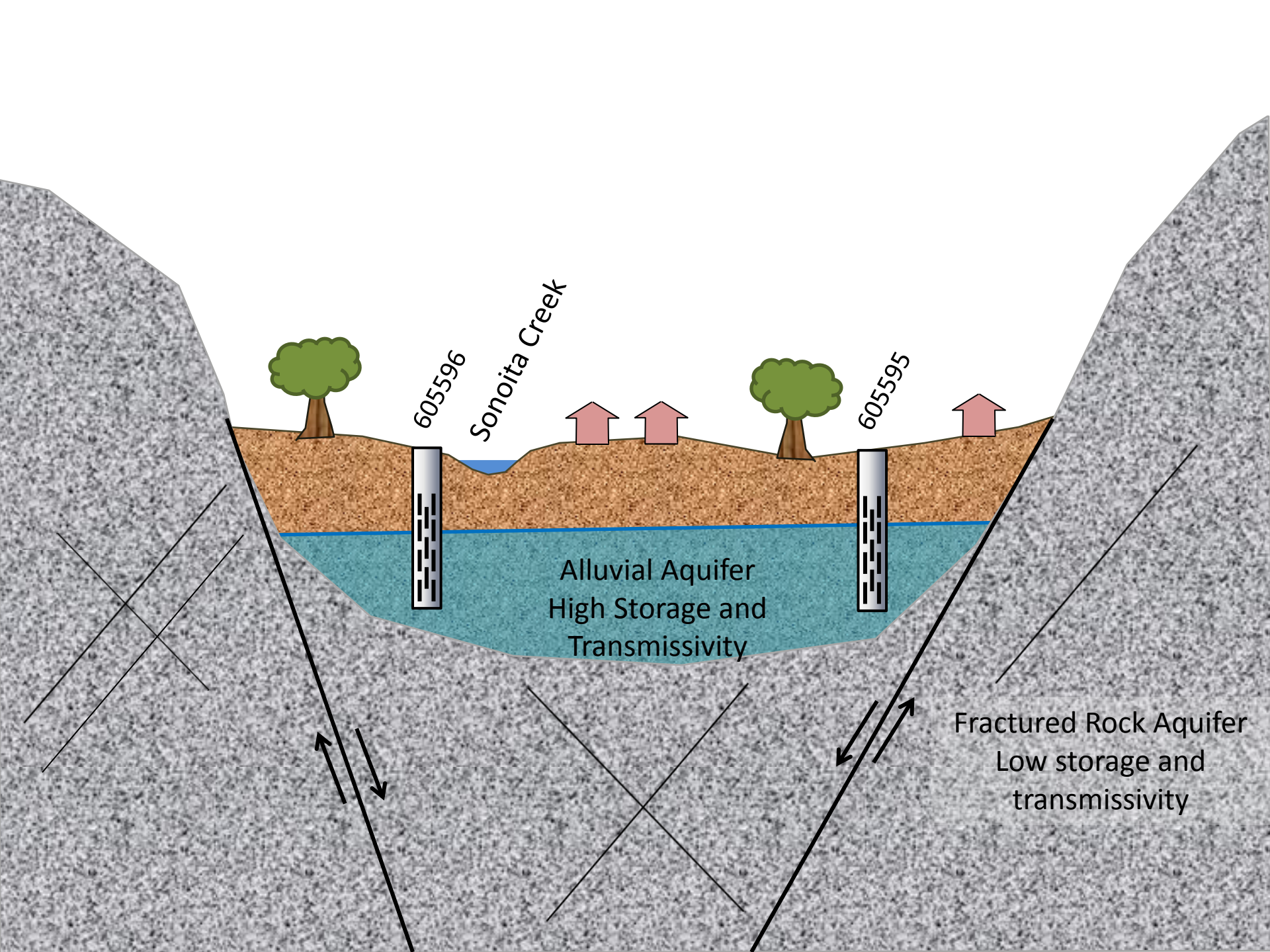
Alluvium drawn to depth of 200 feet. Actual depth not known

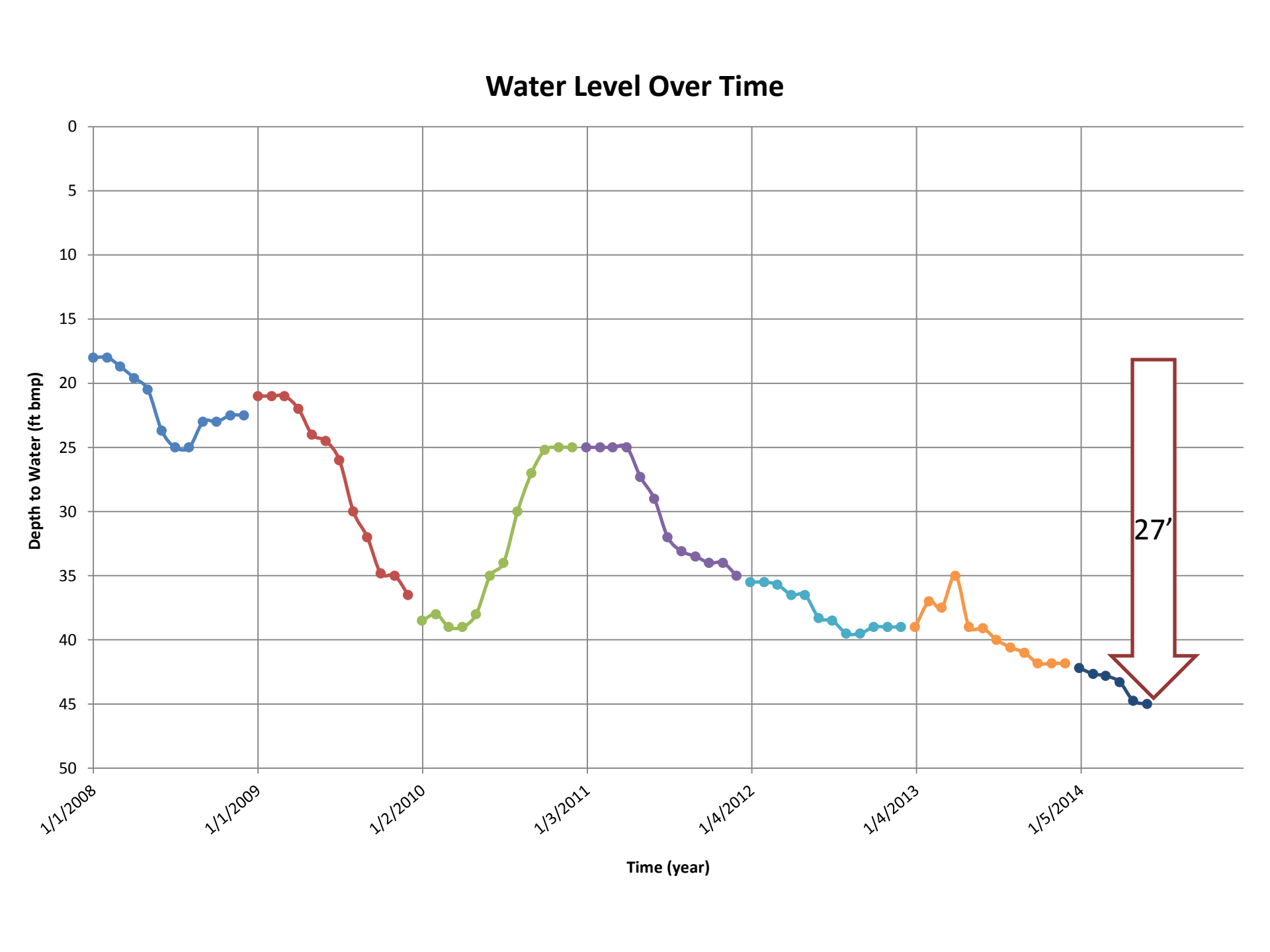
143 wells



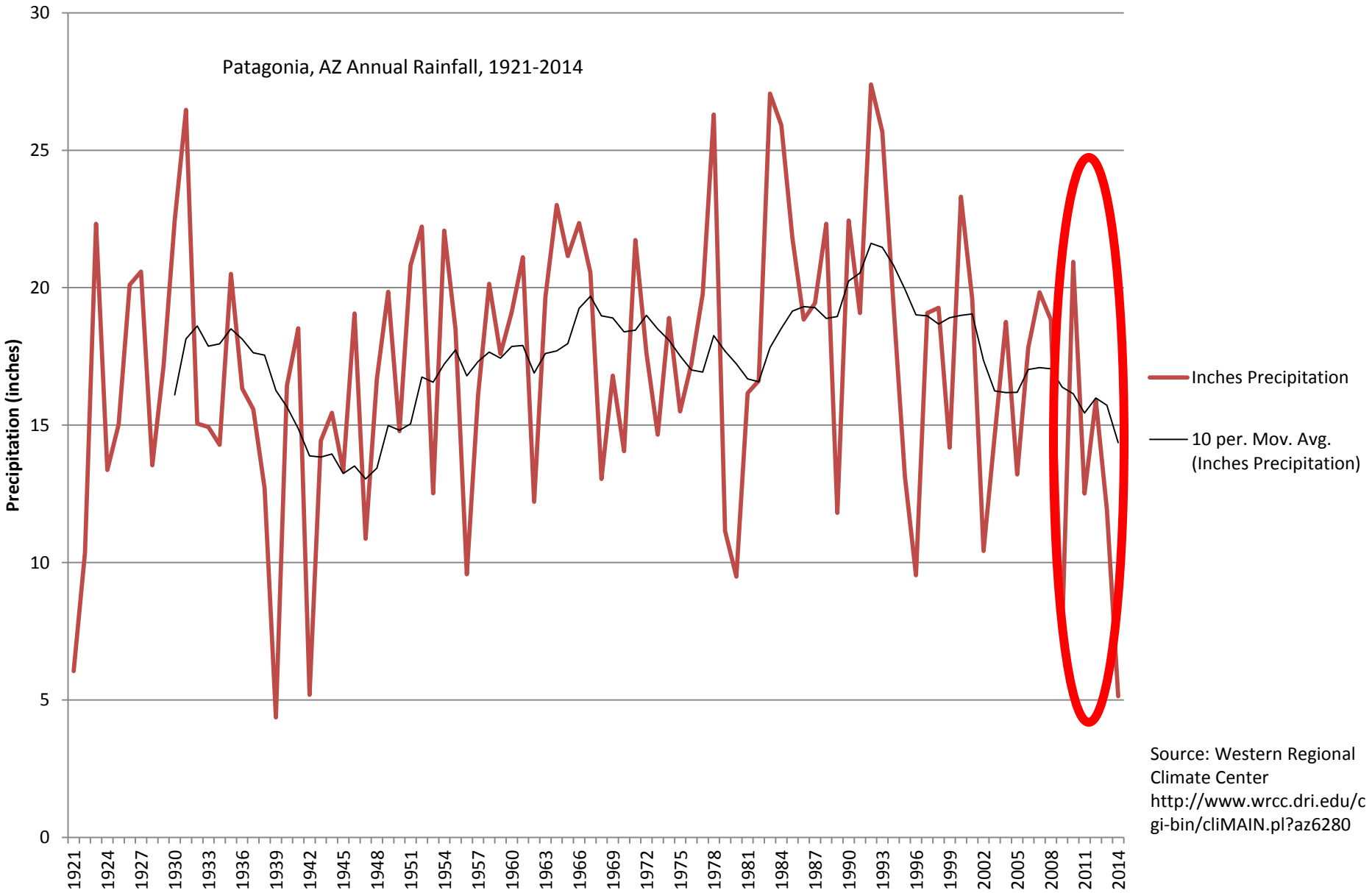
1mi


605596
Pump Capacity 40gpm
605595
Pump Capacity 380gpm
16in
16in
Water Level- 2008
18’
Water Level- 2014
45’
95ft
94ft
NW
SE

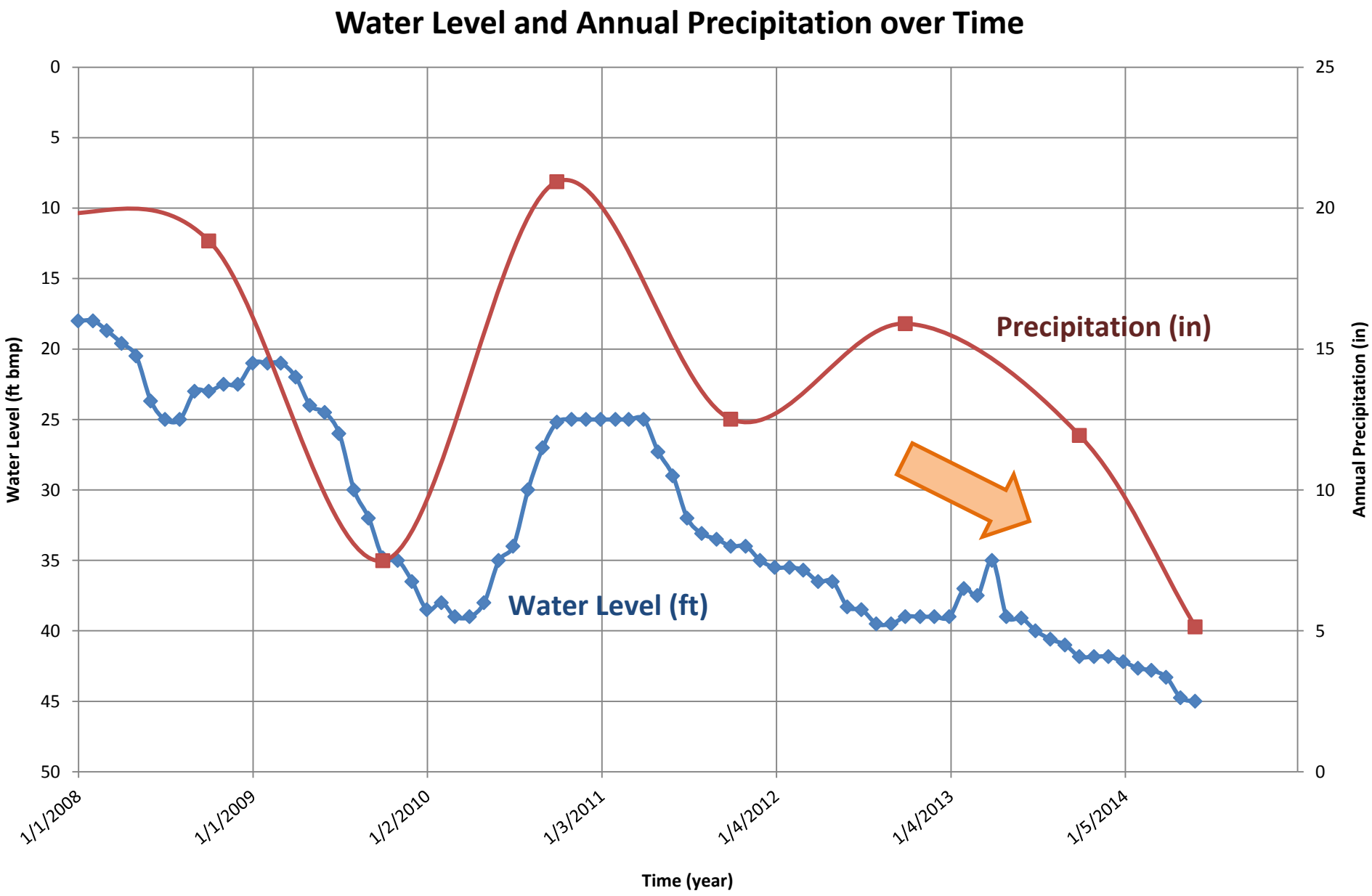

605596
Sonoita Creek
605595
Alluvial Aquifer
High Storage and
Transmissivity
Fractured Rock Aquifer
Low storage and
transmissivity

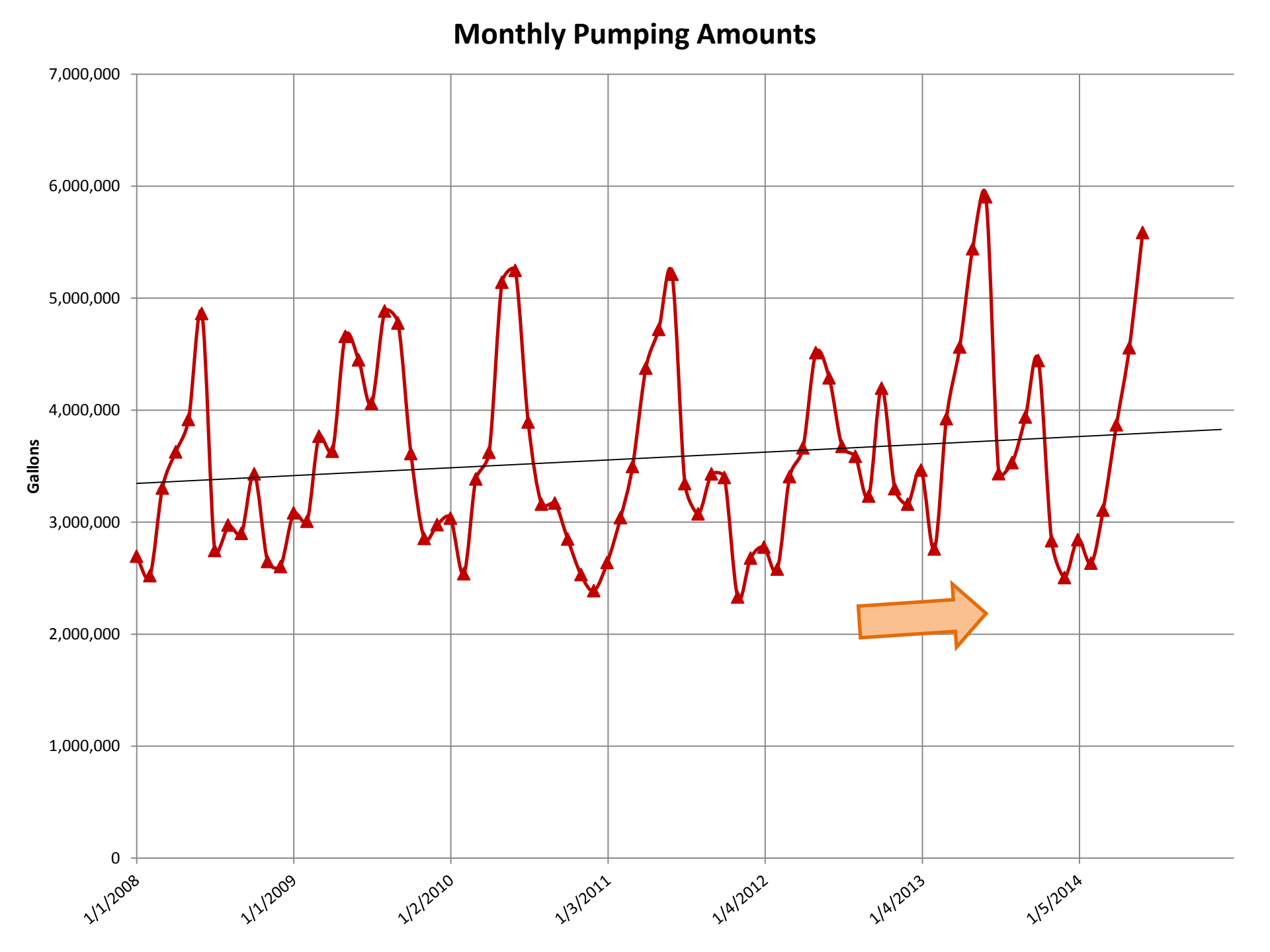

Water Level Over Time
Depth to Water (ft bmp)
0
5
10
15
20
25
30
35
40
45
50
1/1/2008
1/1/2009
1/2/2010
1/3/2011
1/4/2012
1/4/2013
1/5/2014
Time (year)
27’

Inches Precipitation



Source: Western Regional Climate Center http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?az6280


Water Level and Annual Precipitation over Time
Water Level (ft bmp)
Annual Precipitation (in)
Time (year)
Precipitation (in)
Water Level (ft)
0
5
10
15
20
25
30
35
40
45
50
25
20
15
10
5
0
1/1/2008
1/1/2009
1/2/2010
1/3/2011
1/4/2012
1/4/2013
1/5/2014


Monthly Pumping Amounts
Gallons
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1/1/2008
1/1/2009
1/2/2010
1/3/2011
1/4/2012
1/4/2013
1/5/2014

CONCLUSIONS

- Patagonia's wells are installed in an alluvial aquifer of limited extent. The alluvium follows the course of Sonoita Creek.
- The alluvium is surrounded by fractured bedrock, similar to the "microbasins area" of Nogales.
- The alluvial aquifer is recharged mostly by stormwater flow events.
- Patagonia's 10-year moving average of annual precipitation is approaching historic lows.
- Water levels have declined 27 feet in one of the Town's water supply well since 2008
- Increasing withdrawals + decreasing deposits = <u>overdraft</u>