Safe Yield

The Political Issue Behind Cedar Valley Water Issues

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State Engineer Presentation 08 December 2016

Utah Code Section 73-5-15

- (1) As used in this section:
  - (a) “Critical management area” means a groundwater basin in which the groundwater withdrawals consistently exceed the safe yield.
  - (b) “Safe yield” means the amount of groundwater that can be withdrawn from a groundwater basin over a period of time without exceeding the long-term recharge of the basin or unreasonably affecting the basin’s physical and chemical integrity.

- (2)(b) The objectives of a groundwater management plan are to:
  - (i) limit groundwater withdrawals to safe yield;
  - (ii) protect physical integrity of the aquifer; and
  - (iii) protect water quality

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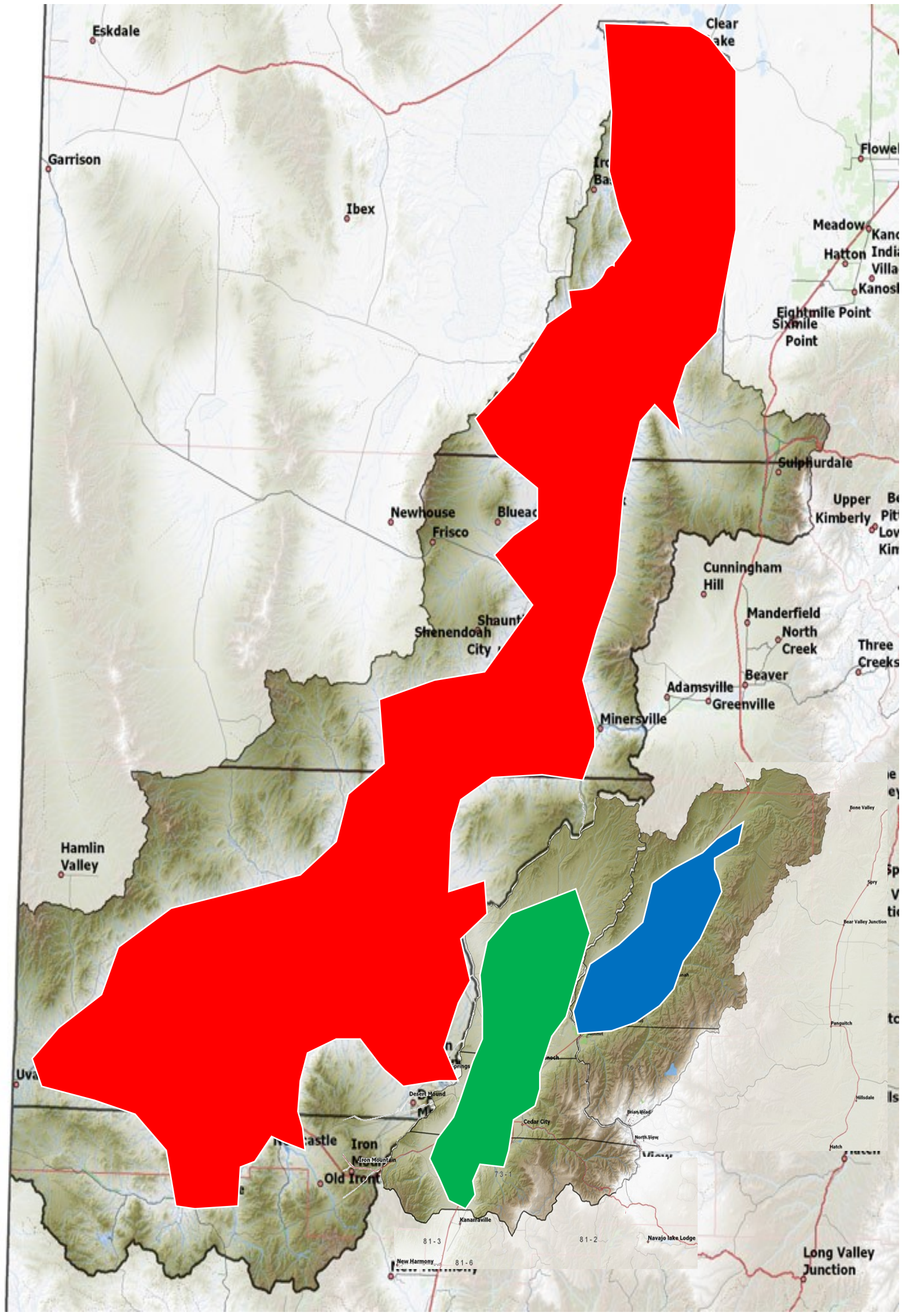
Safe Yield

- Safe Yield: 21,000 AF/yr
- Current Well Depletion: 28,000 AF/yr
- Potential (approved) Well Depletion: 50,000 AF/yr

Sub Basins

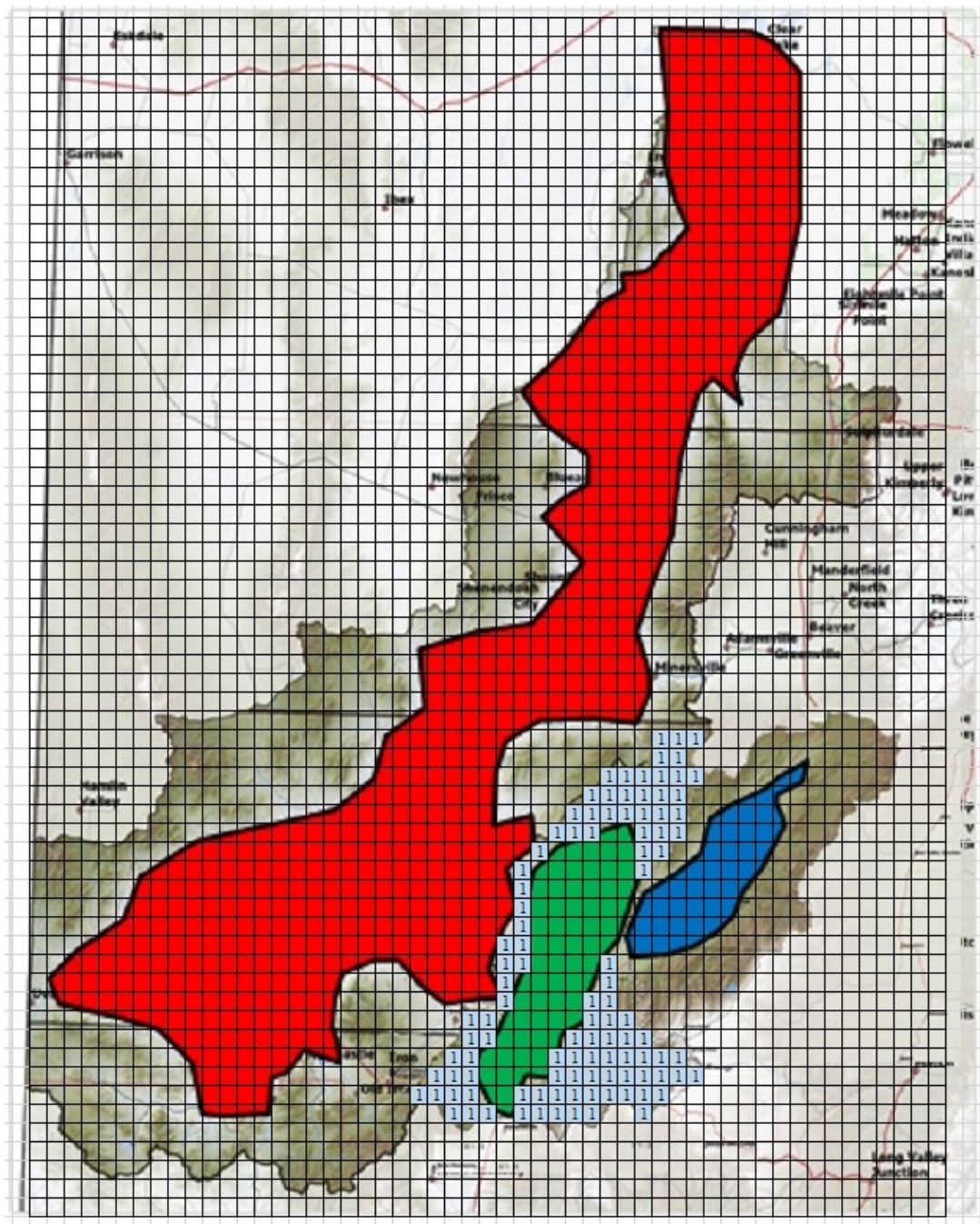
- Should valley be split into smaller sub-basins for safe yield?
- What boundaries could be used?
- What would the safe yield amounts for those sub-basins be?

Valley Fill Aquifers vs. Surrounding Bedrock Aquifers



- There is a geologic difference between Valley Fill Aquifers and surrounding Bedrock Aquifers.
- Valley Fill Aquifers are composed of unconsolidated sediments, consisting of clay, silt, sand, cobbles, and boulders.
- When water is removed from these aquifers the aquifers collapse, and once they collapse, they cannot be refilled with water.
- Bedrock Aquifers do not collapse in the same way.
  - The rock forms the matrix, which is stable if water is extracted.
  - In addition, fractures support the aquifer, and in non-permeable rocks, like quartz monzonite, the fractures are the aquifer.

Iron County Aquifers & Specifically Cedar Valley Fill Aquifer vs. Surrounding Bedrock Aquifers



104	60.47%		Cedar Bedrock Aquifers
68	39.53%		Cedar Valley Fill Aquifers
172			

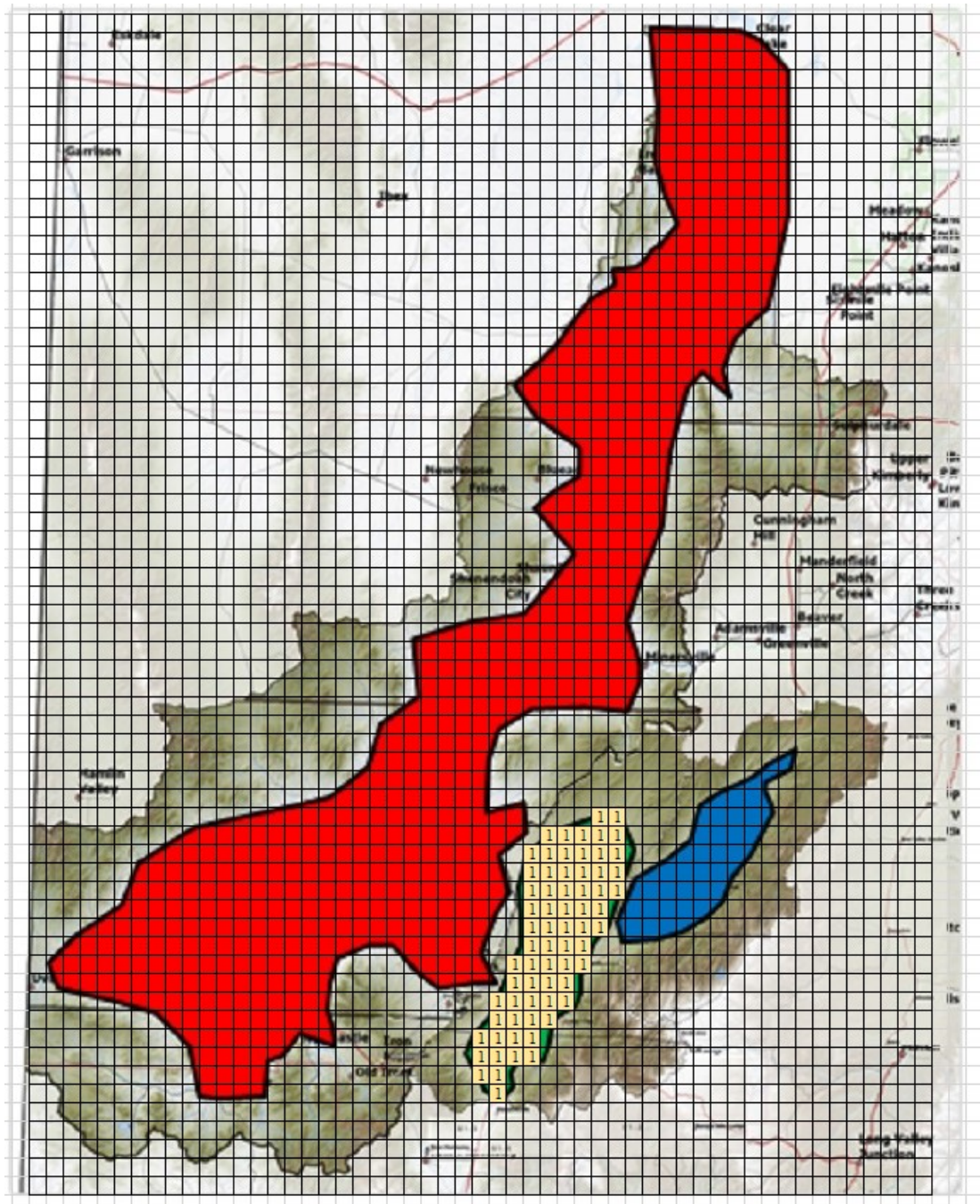
552	47.83%		Escalante Bedrock Aquifers
602	52.17%		Escalante Valley Fill Aquifers
1154			Total Area

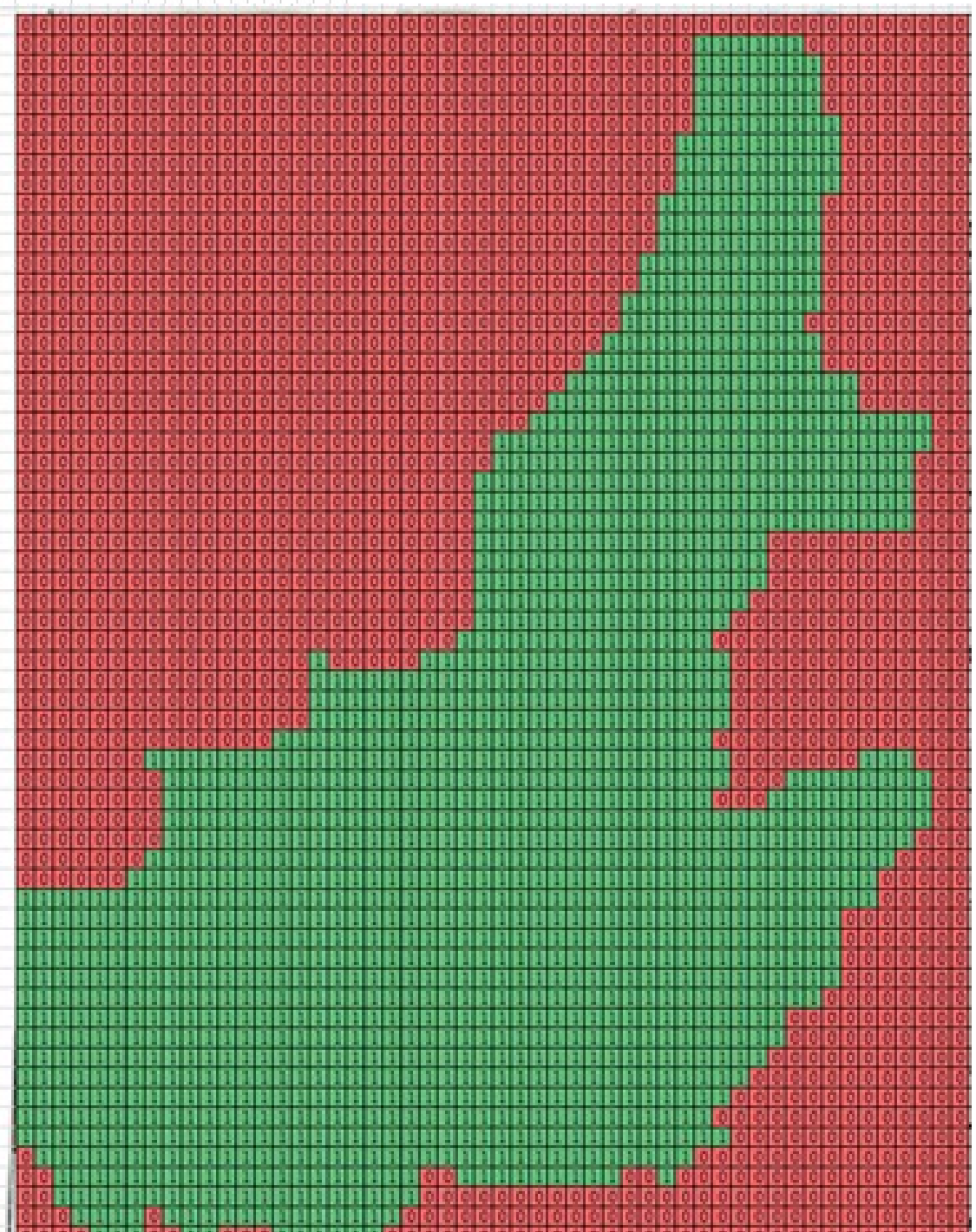
113	74.34%		Parowan Bedrock Aquifers
39	25.66%		Parowan Valley Fill Aquifers
152			

Iron County Aquifers.

1154	78.08%		Total Escalante
172	11.64%		Total Cedar
152	10.28%		Total Parowan
1478			Total Aquifers

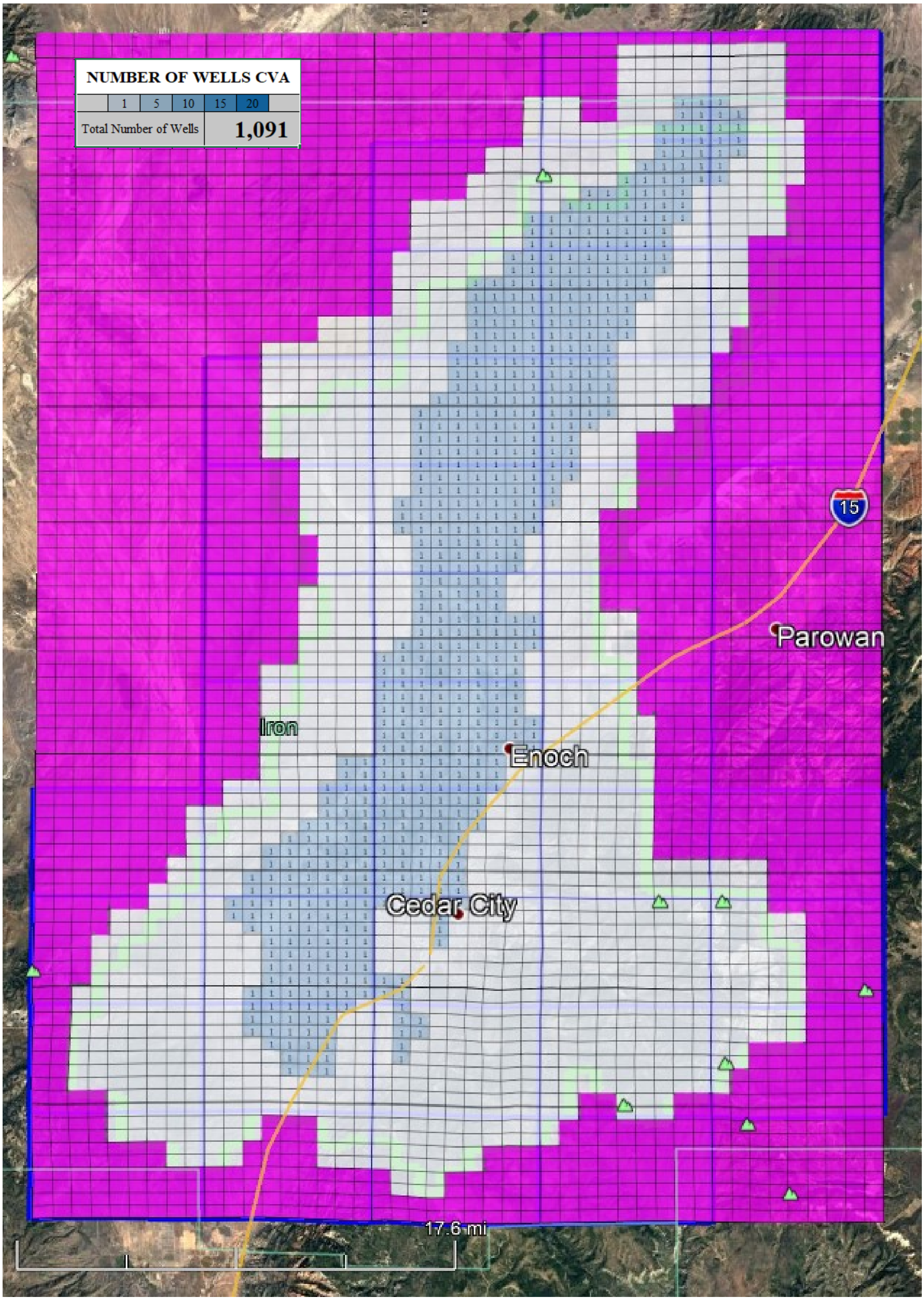
E-Bedrock | E_Valley | C-Bedrock | C_Valley | P-Bedrock | P_Valley | Totals



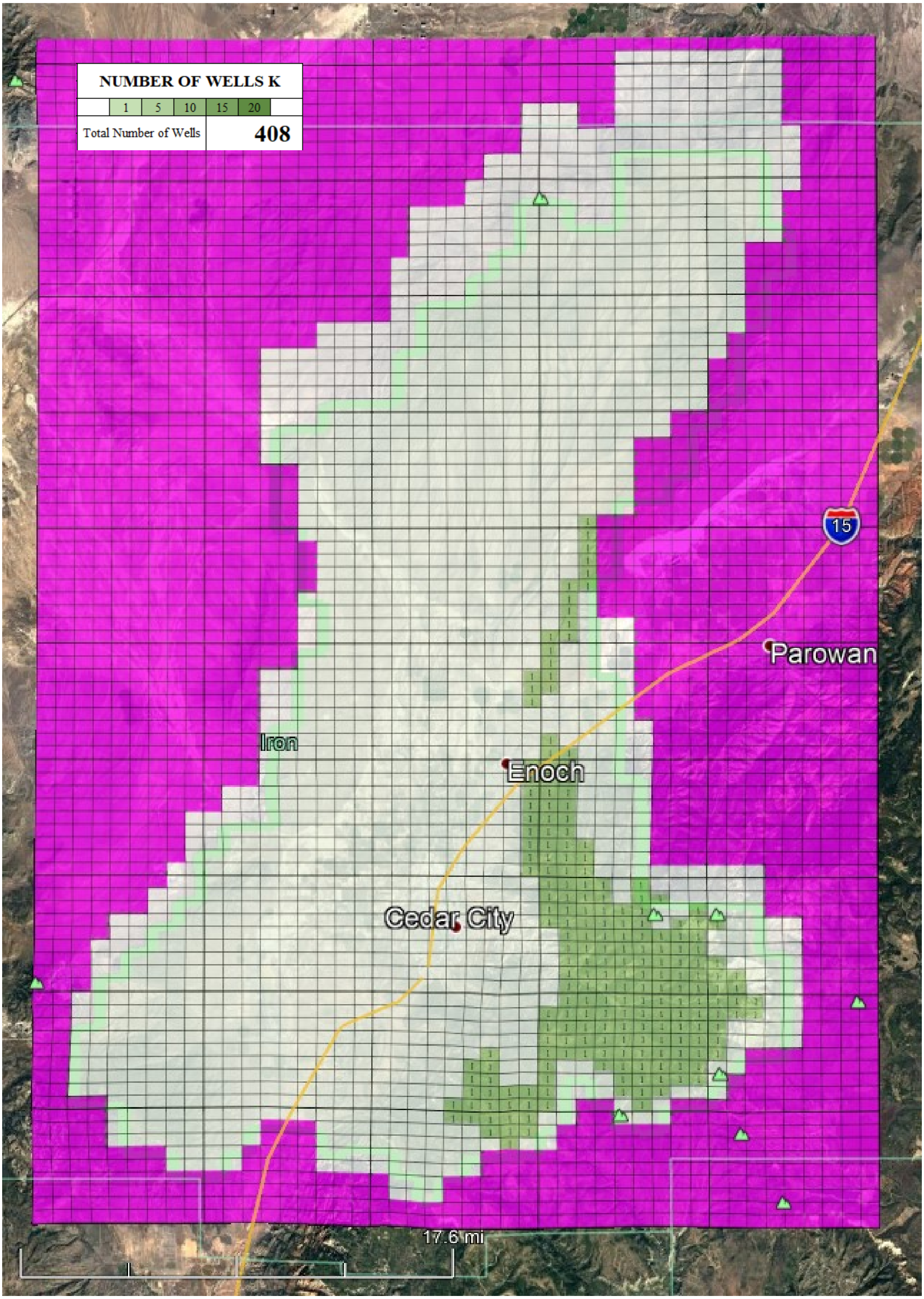


E-Bedrock | E_Valley | C-Bedrock | C_Valley | P-Bedrock | P_Valley | Totals

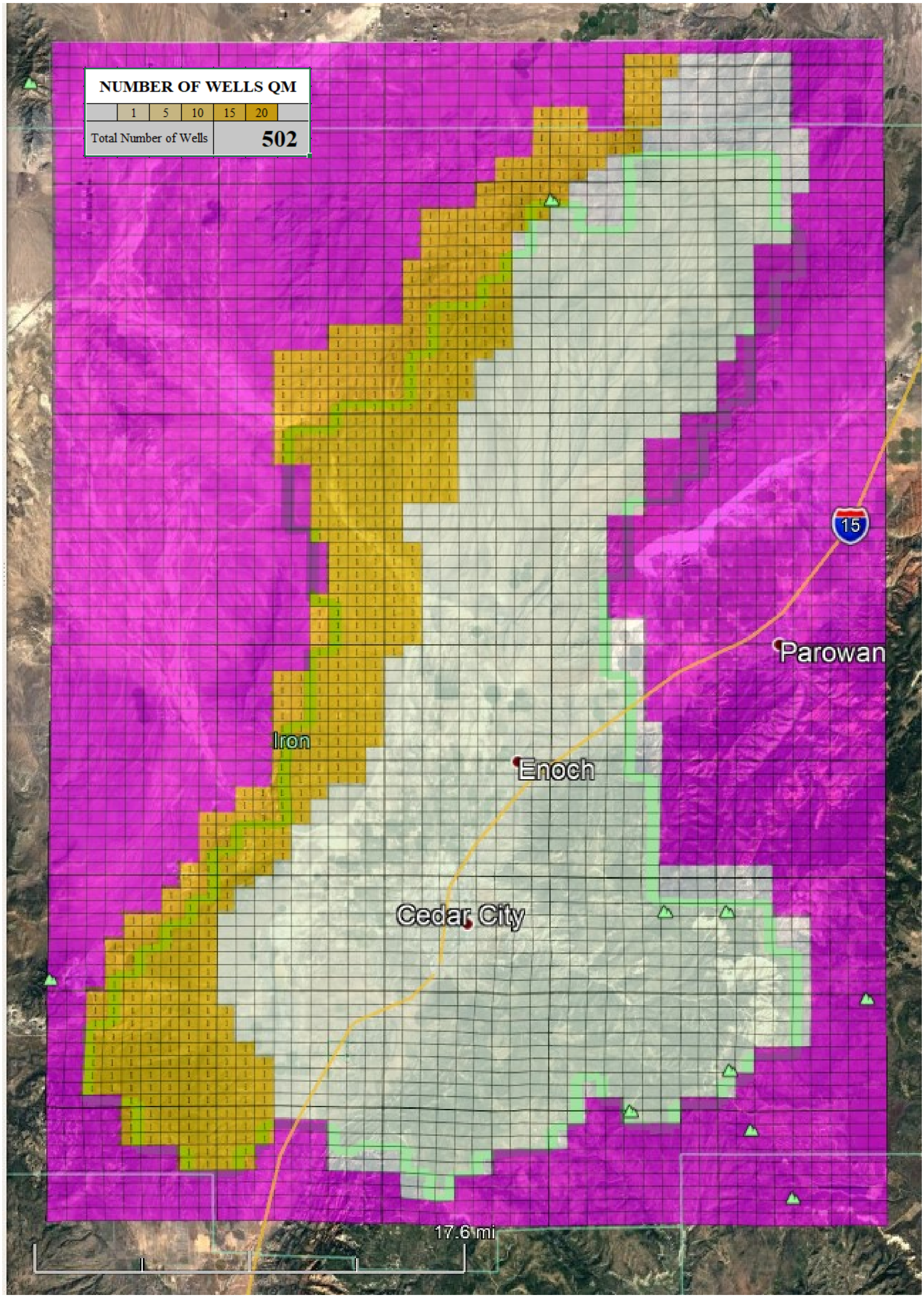
Cedar Valley Alluvial Fill Aquifer



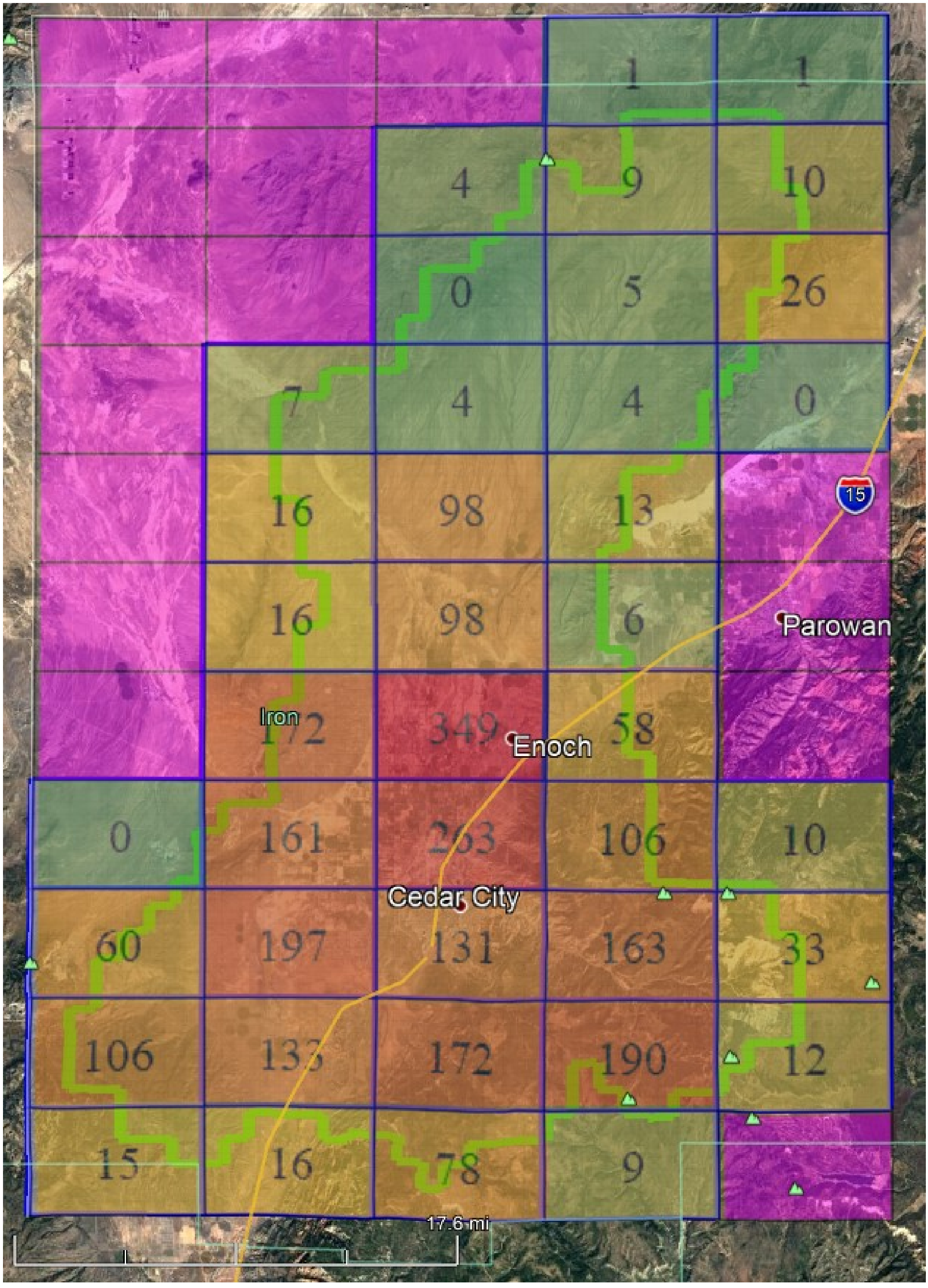
Cretaceous (K) Aquifer



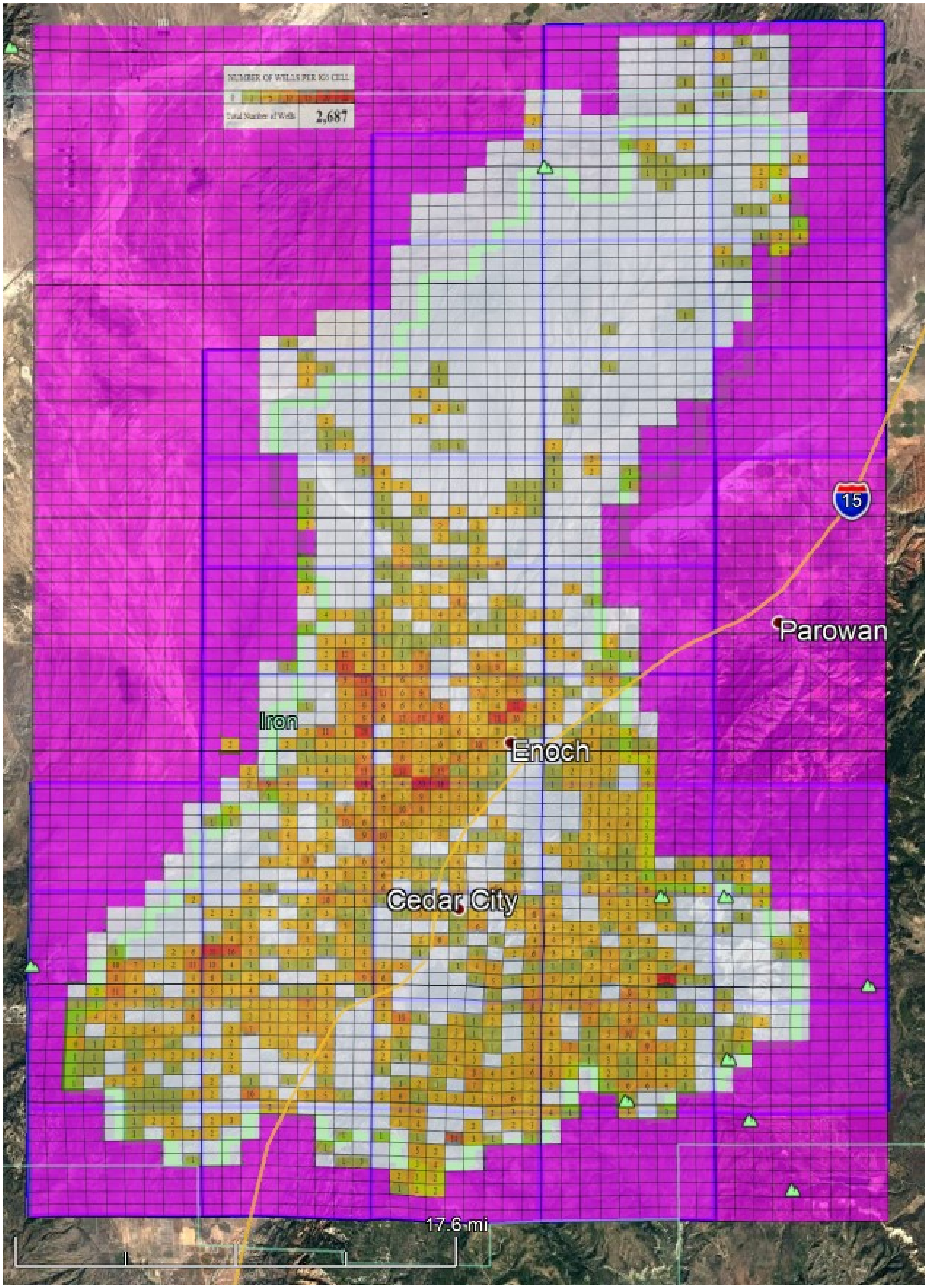
Quartz Monzonite Aquifer



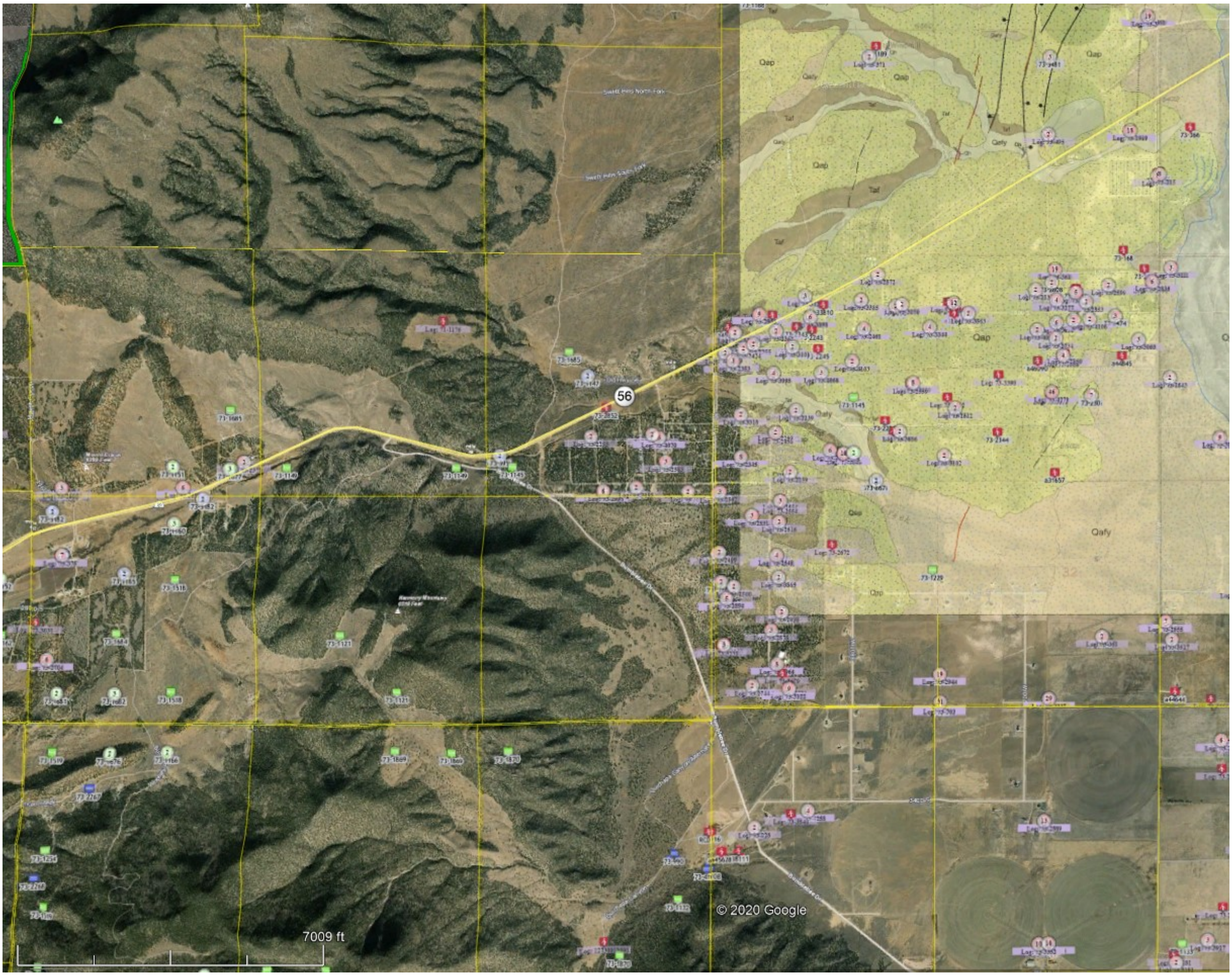
Number of Wells in IG4 Cells



Number of Wells in IG5 Cells



There are a lot of wells drilled in this part of the Valley



https://maps.waterrights.utah.gov/EsriMap/map.asp

Valley Fill Aquifers vs. Surrounding Bedrock Aquifers

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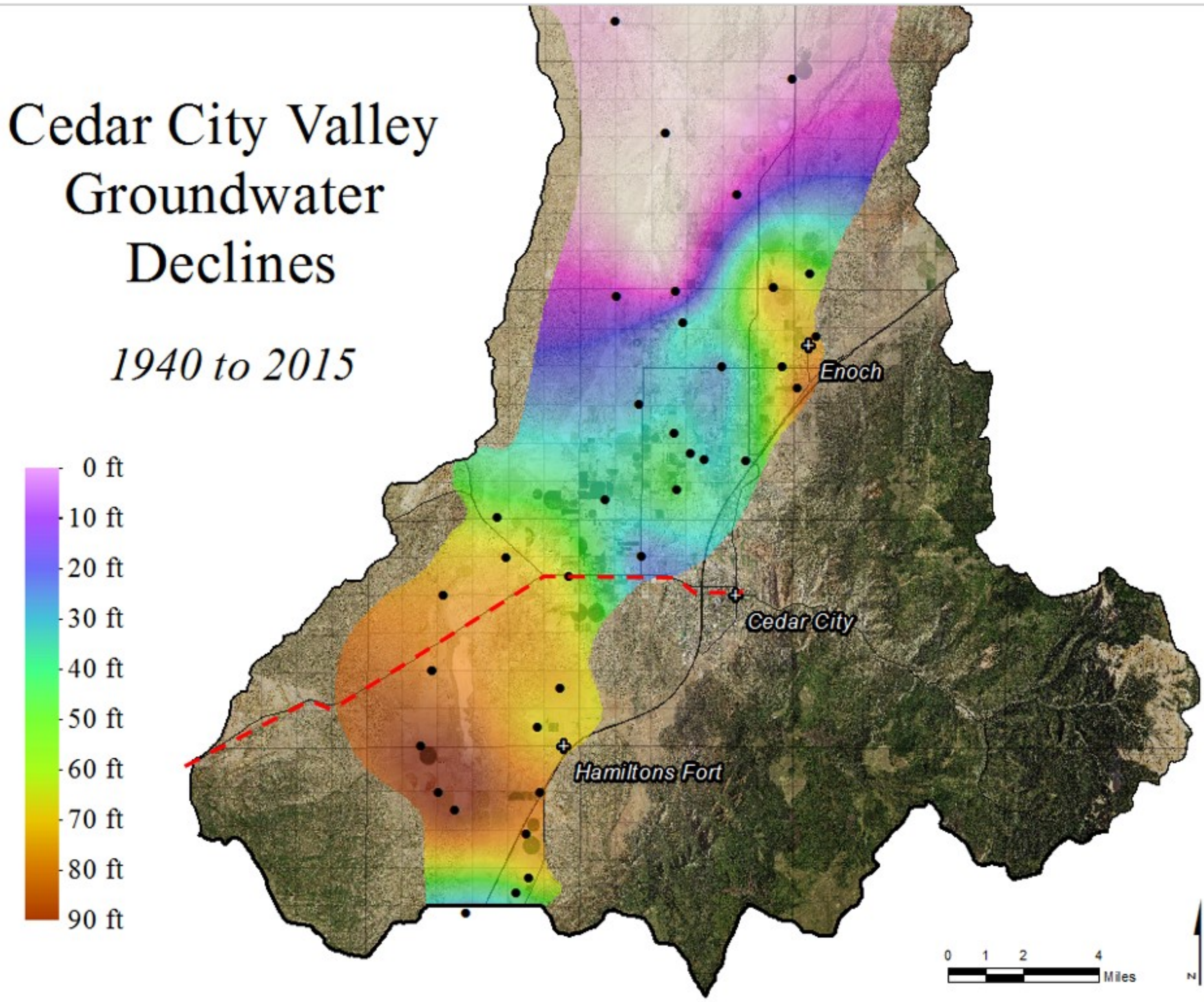
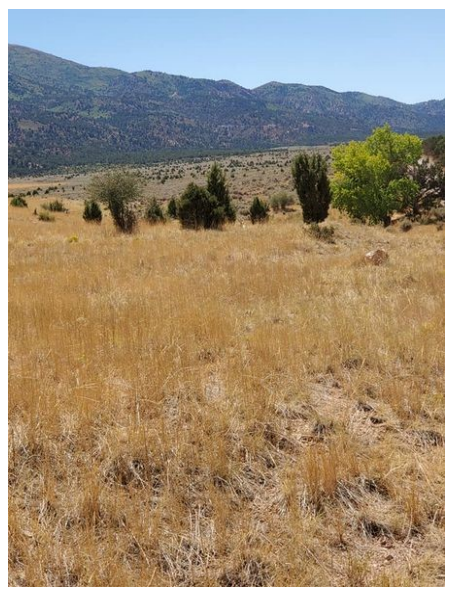


The Numbers The State Engineer Uses Need to be Vetted

- Safe Yield: 21,000 Acre Feet per Year
  - Recharging the Aquifer
  - Condensation
- Current Well Depletion: 28,000 Acre Feet per Year
  - Measurement
  - Monitoring
- Approved Well Depletion: 50,000 Acre Feet per Year
  - Check All Records
  - Match with Owners Records

Facebook Conversation:

- The land that we are considering in Cedar City...
- A hot, very sunny day...bleached out the pictures a bit, but these photos show parts of the land that were not visible on the last set.



- What is the average annual rain fall?
- 9-12 Inches.
- Similar to San Pete County where I am looking. Gabions, 100% roof catchment and some shaded ponds. Its beautiful how all of this can be calculated to give us confidence of how much water can be stored and soaked during a single event. I love the desert! Interesting facts for dry lands... 80% of precipitation is from condensation... i.e., tree drip lines, rocks, etc. creating micro climates for condensation and letting the native vegetation take the lead. 🙂 So much fun to be had! Hope you are well!

https://www.facebook.com/groups/GracefulTransition/permalink/2788208401429944

Thank You