The Cedar Valley Aquifer
and
The Cedar Valley Drainage Basin

11 July 2016

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Kenny Lake Ventures, LLC

BEDROCK AQUIFERS SURROUNDING CEDAR VALLEY IN IRON COUNTY, UTAH

INTRODUCTION

Our prolific Cedar Valley aquifer systems are bounded on the east, west, and south by high mountains containing thick, porous sandstones and fractured volcanic and granitic bedrock. Most of the precipitation in the county falls directly on these mountains, as shown by measured amounts of rain and water content of snow. For example, average annual accumulation at Midway, near the summit of Highway 14, is about 40 inches, compared to about nine to12 inches on the valley floors. Precipitation on Stoddard Mountain, Iron Mountain, and the Harmony Mountains exceeds 20 inches, twice the amount that falls in the valleys.

GROUNDWATER UNDER THE MARKAGUNT PLATEAU

Cretaceous sedimentary rocks east of Cedar City contain prolific aquifers that are now virtually untapped. The amount of water in those rocks available for development is much greater than the groundwater resources now developed by springs south of Highway 14 in Right Hand Canyon and Shurtz Canyon. Estimates of the groundwater resources north of Cedar Canyon suggest that about 80,000 acre-feet of groundwater are present within 1,000 feet of ground level within each 640 acre section.

More than 10,000,000 acre-feet of groundwater are stored, awaiting development in the mountains north of Coal Creek and along Crow Creek. Recharge into these rocks near Cedar Canyon exceeds 10,000 acre-feet each year.

Aquifers in the Cretaceous sandstones east of Cedar City and west of Cedar Breaks National Monument occur in rocks with high "matrix porosity." Twenty to twenty five percent of the rock volume is empty space between the sand grains, and that space is filled with groundwater. Fractures will locally increase the productivity of individual wells, but the high matrix porosity and precipitation assure that long term water production will be limited only by water rights, access to drill sites, and budgetary constraints.

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PROLIFIC AQUIFER SYSTEMS WEST OF CEDAR VALLEY

Studies of fracture systems inside and outside of Quichapa Canyon have confirmed that both Quichapa Right Hand and Quichapa Left Hand creeks occur along major sets of fractures.

All geological and hydrological data observed north and west of Quichapa Canyon, including a well drilled to 702 feet in 2011, show that the volcanic rocks are underlain by fractured granitic rocks saturated with groundwater from near the surface to great depths. Flows from the springs and surface flow in Quichapa Left Hand Canyon suggest that properly located wells drilled near the mouth of Quichapa Canyon are likely to be prolific.

Immense volumes of young, potable water are present in a previously untapped aquifer discovered below 500 feet vertical depth at the Quichapa Creek No. 1 well. The aquifer consists of high quality water confined in fractured quartz monzonite--an intrusive, granitic rock. The same rocks also occur at ground level at The Three Peaks, Granite Mountain, Iron Mountain, Harmony Hills, and the Pine Valley Mountains. Rocks now discovered in the Quichapa Creek No. 1 well are the same intrusive rocks seen in the mountains west of Cedar Valley and at The Three Peaks. Therefore, the granitic rocks are likely to be present under at least 200 square miles of hills and mountains in Iron County.

If the rocks have as little as three (3) percent fracture porosity, then the following quantity of water may be available in the first 1,000 vertical feet of the aquifer:

Area in sections: 200 square miles
Area in acres: 200 X 640 = 128,000 acres
Aquifer Thickness: 1,000 feet
Gross Rock Volume = 128,000,000 acre-feet
Likely Fracture Porosity = .03

Potential Quantity of Water Stored in Fractured Quartz Monzonite Aquifer =

3,840,000 acre-feet.

Test pumping of several prolific quartz monzonite (granitic) aquifer wells near Sawyer Spring, south of New Harmony on the eastern flank of the Pine Valley Mountains, proved that three (3) percent is a reasonable estimate for fracture porosity in the granitic rocks. However, only one (1) percent fracture porosity would still hold about 1.3 million acre feet of water in place west of Quichapa Lake.

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Annual recharge to the granitic aquifer in mountains west of Cedar City in Iron County, assuming 20 inches (1.67 feet) average precipitation and 10 percent infiltration into 200 square miles of outcrops would be:

Area in sections: 200 square miles
Area in acres: 200 X 640 = 128,000 acres
Average Precipitation = 1.67 feet
Likely Infiltration = 10 percent of precipitation
Annual Recharge = 200 X 640 acres X 1.67 feet X 0.1

Probable Annual Recharge to the Fractured Quartz Monzonite Aquifer =

21,333 acre-feet per year

The granitic aquifer of the Pine Valley Mountains is now partially developed in Washington County by high capacity wells west of New Harmony Valley. Groundwater in similar rocks west of Cedar Valley remains virtually untested near Cedar City.

Respectfully Submitted:

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Utah Professional Geologist No. 5280804-2250

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Water Issues

- Water is THE big deal in Iron County!
- Access to water means the difference between growth and stagnation!
- On Jan 7th of this year Kent Jones, State Water Engineer, announced probable regulation of water rights in Cedar Valley, as is starting to be implemented in Beryl Valley, beginning with most recently issued water rights!
- Cedar Valley has somewhere between 50-76,000 acre-feet of water rights, (this is a 34%-52% error in known water rights) and needs to be reduced to the 20-24,000 acre-feet "safe yield" that goes back into the aquifer each year!
- James Greer: "Unfortunately the list of existing water rights has inaccuracies" (People who do not know what rights are issued will regulate precisely?)!
- The CICWCD has been working to find ways to import water to the valley (Not including tapping resources within the Cedar Valley Drainage Basin)!

Presentation Outline

1. The value of water in Iron County.
2. Sources of water for Iron County.
3. The age of water in the Cedar Valley Drainage Basin.

4.-6. Three Distinct Aquifers in the Cedar Valley Drainage Basin.

7. The regulation of water in Iron County.

1. The value of water in Iron County.

- 5 gallons of water in 80 8 fluid ounce bottles costs $3.84
- At 325,000 gallons per acre-foot - a factor of 65,000 - the cost is $249,600 per acre-foot

Home > United States > Utah > Southwest Utah > Iron County > Enoch >

1 acres in Iron County, Utah

Water Rights - $4000 - 1 AF, Enoch, Utah 84721 - Iron County

This property is no longer available.

Search for Available Property.

Details for Water Rights - $4000 - 1 AF

County:	Iron	Type:	River Property	Acres:	1
Address:	Water Rights - $4000 - 1 AF	City:	Enoch	State:	Utah
Zip:	84721	Price:	Inactive	Status:	Unavailable

Property ID: 935205

Description of Water Rights - $4000 - 1 AF

THESE ARE WATER RIGHTS!!! Great deal for water rights, priced at only $4000 for a full 1 acre foot of water, evidenced by water right # 73-2552 which includes a domestic right and .137 irrigation water. This right is for water use West of Cedar City and North of Hwy 56. TITLE INSURANCE FOR WATER IS AVAILABLE IF BUYER DESIRES TO INCLUDE IT, IT WILL BE AT THE BUYERS OWN EXPENSE! SELLER WILL NOT PAY FOR OR PROVIDE TITLE INS.

Water sells for
$4,000 to $10,000 per acre foot

Enoch, Iron County, Utah Land For Sale - 35.98 Acres

PHOTOS

Property type:	Land
Parcel Size:	35.98 Acres
Price:	$480,050
MLS or other ID:	16-175426

Check your free credit score

Agent: DANIEL S ROBERTS

Email DANIEL S ROBERTS

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35.98 acres located just North of Dairy Glen Subdivision. This land will become Dairy Glen Phase II. Purchase price includes 45 AF Underground Water Right. Prime residential development property annexed into city with city water, natural gas, electric, and sewer. Sewer trunk goes through subject property and diagonals to the West through adjacent 80 acre parcel to the North.

45 ac-ft water + 35.98 acres for $480,060

@$10,000/ac-ft this values the land at $835/acre

2. The Importing of Water into Iron County
a. Kolob Reservoir Water

First Inter-Basin Transfer Attempt formalized in 1984 was a 50 year agreement:

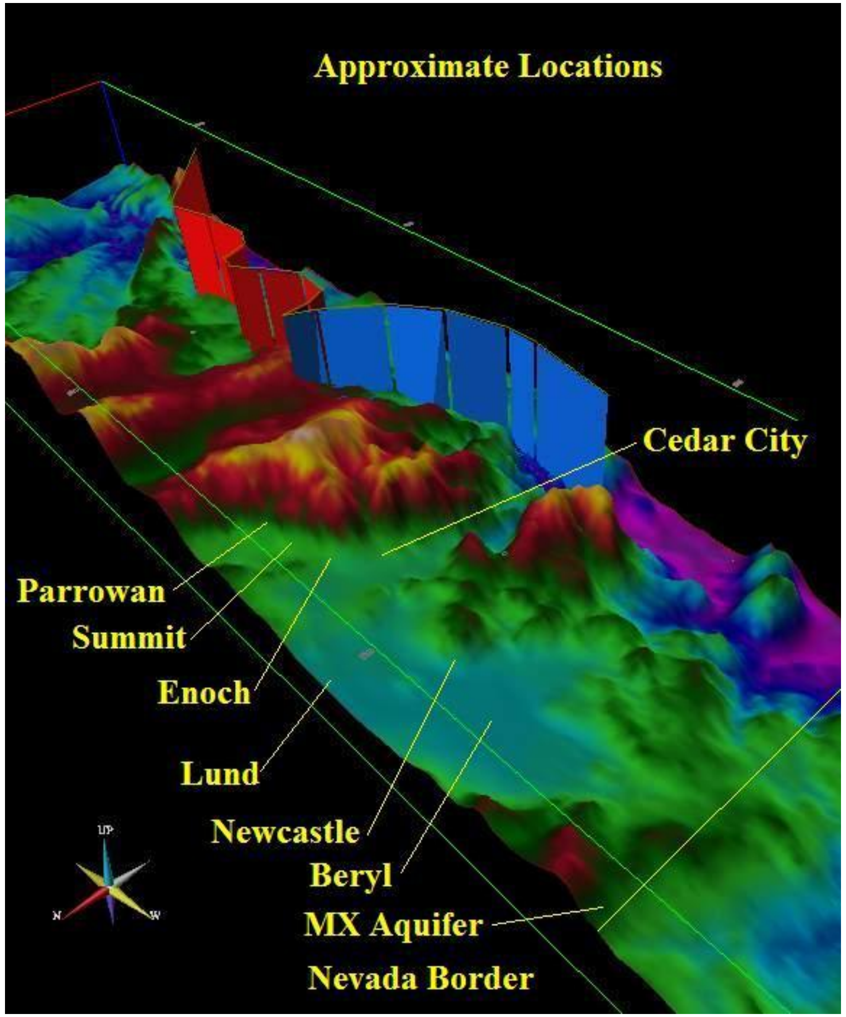
“Cedar City Corporation had an interest in water in Kolob Reservoir and had made investments and yearly payments to the tune of $142,000 a year to keep their interest. Mayor Harold Shirley and others made the decision in the mid-1990s to allow the water rights to go to Washington County after the high cost of getting the water to Cedar City residents, and the inevitable impending court battle of taking water from a main tributary of Zion Canyon, deemed the water too expensive and even impossible to utilize. … In addition, it was reported in the “Deseret News” in 1994 that the costs to transfer the water from the Kolob Basin to Cedar City could reach $25 million.” 26 Oct 2011 Iron County Today

2 . The Importing of Water into Iron County
b. Lake Powell Pipeline

Second Inter-Basin Transfer Attempt :

“Cozzens said the project was simply not financially feasible for Iron County. It was estimated that Lake Powell Pipeline water would cost around $20,000 per acre-foot, require construction of a treatment plant and have the added cost of power to pump it uphill from Washington County, he said. Over 50 years, the cost was estimated at around $1 billion just for the Cedar Valley.” 15 Feb 2015 Iron County Today

Map provided to Eldon Schmutz of CICWCD in 2006, just before the CICWCD filed for West Desert Water



- Cost of pumping water from the Lake Powell Pipeline 3,400+ feet up the Black Ridge to Cedar City did not make sense.
- The MX-Missile site preparation included mapping extensive aquifers in the West Desert Basins.
- The map to the left was provided to Eldon and the CICWCD in 2006 to stress the difference in cost in pumping water up from Lake Powell vs. pumping water 700 feet down from proposed West Desert wells.

2 . The Importing of Water into Iron County
c. West Desert Water

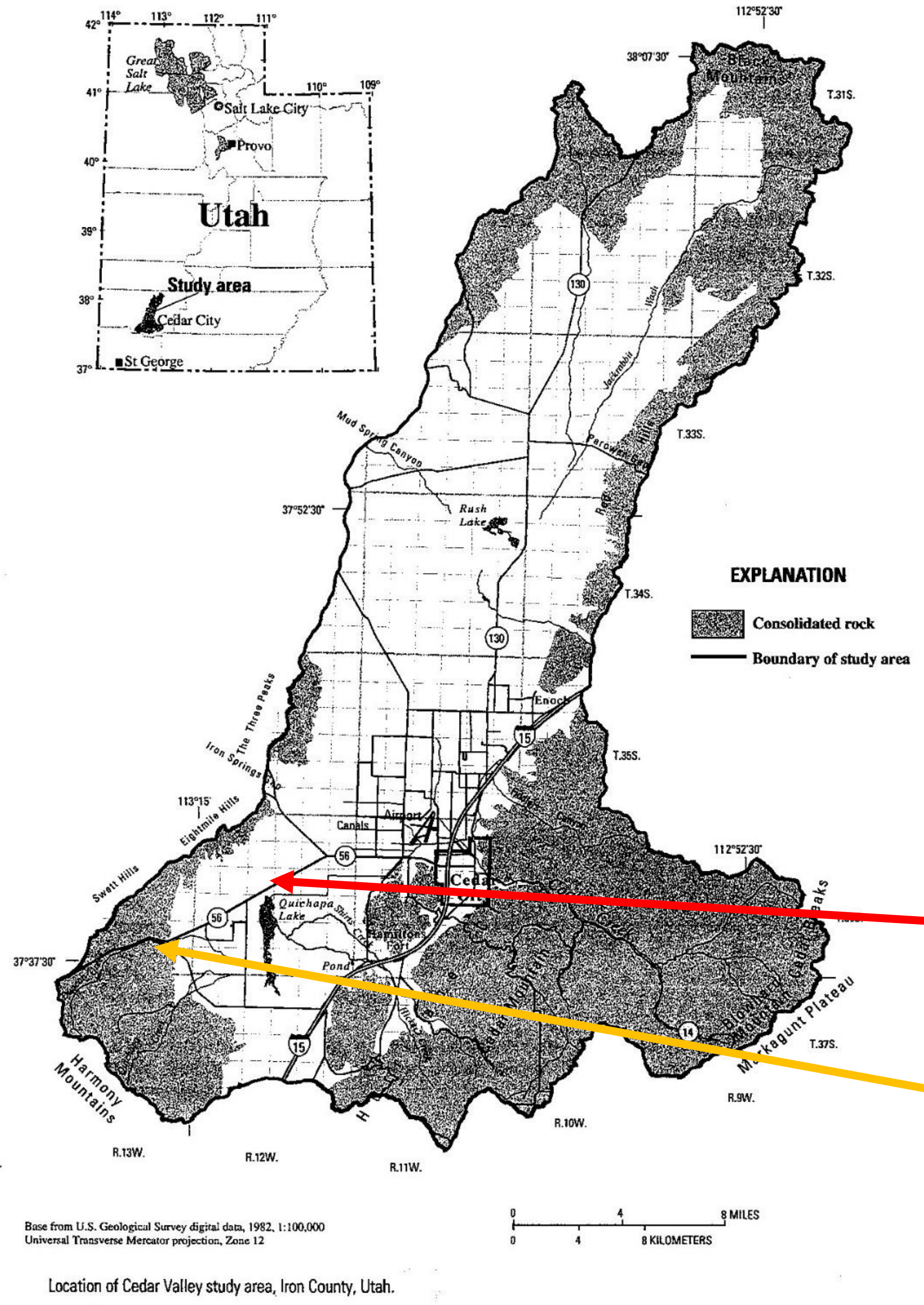
Third Inter-Basin Transfer Attempt :

“After rejecting the Lake Powell Pipeline project because of its high cost estimates, the district placed most of its hope for balancing the aquifer and providing for future growth on water rights applications filed in 2006 in three valleys – Pine (for 15,000 acre-feet), Wah Wah (for 12,000 acre-feet) and Hamlin (for 10,000 acre-feet).” 29 Jan 2015 Iron County Today

“The cost to bring water from Pine Valley is estimated at $150 million, with the Wah Wah water tying into that later at maybe around one-third the cost, Crane said. Most funding available would be for a 40- to 50-year period.” 04 Mar 2015 Iron County Today

The West Desert Pipeline Summary.

- Seven Years until first water.
- The pipeline initially provides 9,000 acre-feet of water to match current overdraft of water from Cedar Valley.
- At $10,000 per acre-foot, this is worth $90 million.
- The Pipeline is expected to cost $150 million, and will most likely be at least $200 million.
- If the pipeline does cost $200 million, it means the water is worth $22,222 per acre-foot, which is more than Lake Powell Pipeline water and does not match current market prices.
- Note the water could be sold to the mines without all the pipeline cost.



3. The age of water in the Cedar Valley Drainage Basin.

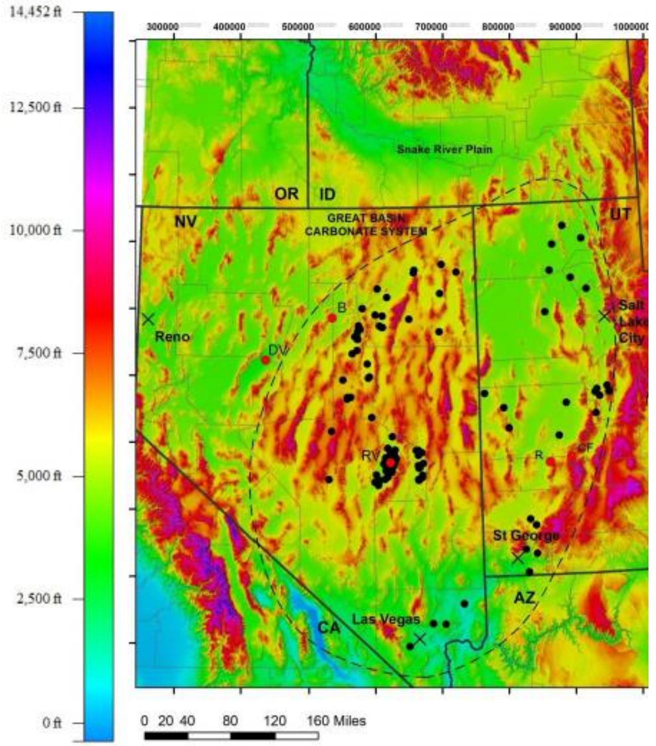
- The map to the left shows the extent of the Cedar Valley Drainage Basin.
- The Cedar Valley Aquifer is basically the white portions of this map.
- This is where the valley fill has been for eons.

- Water in the Cedar Valley Aquifer dates back 16,000 years to the time of Lake Bonneville.
- Water up the canyon dates back 500 years ago, twice as far back in time as Father Escalante's expedition through Southern Utah.

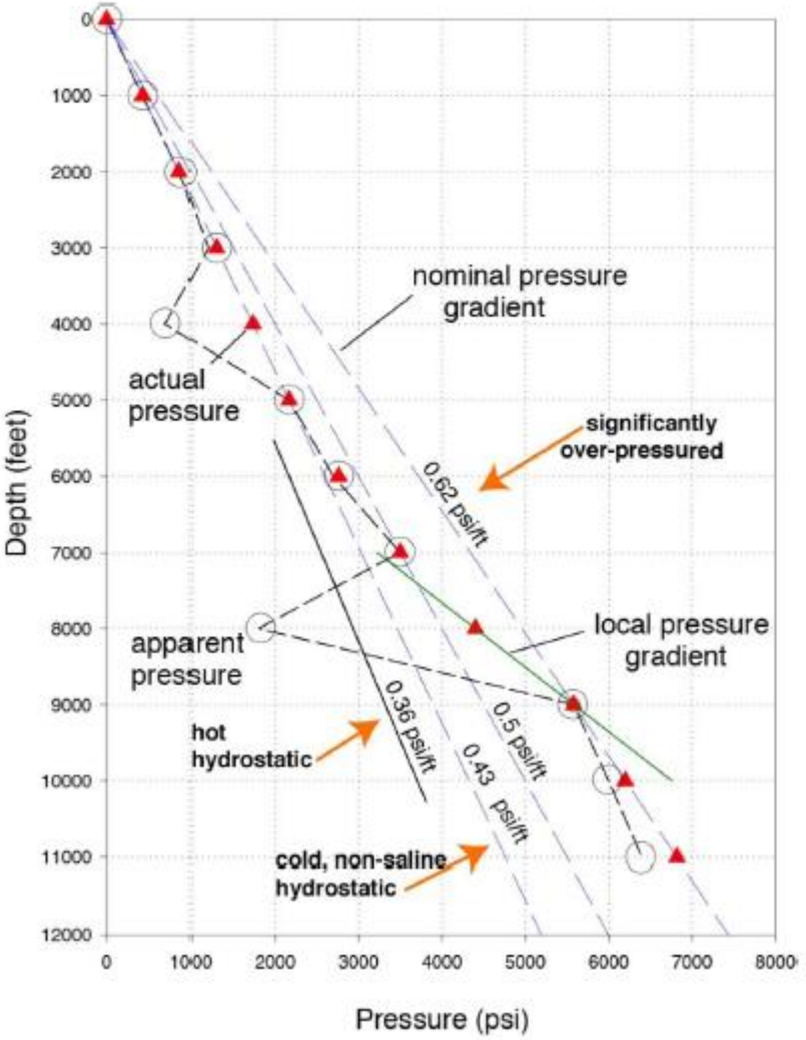
Knowledge of the Age of Water is Important

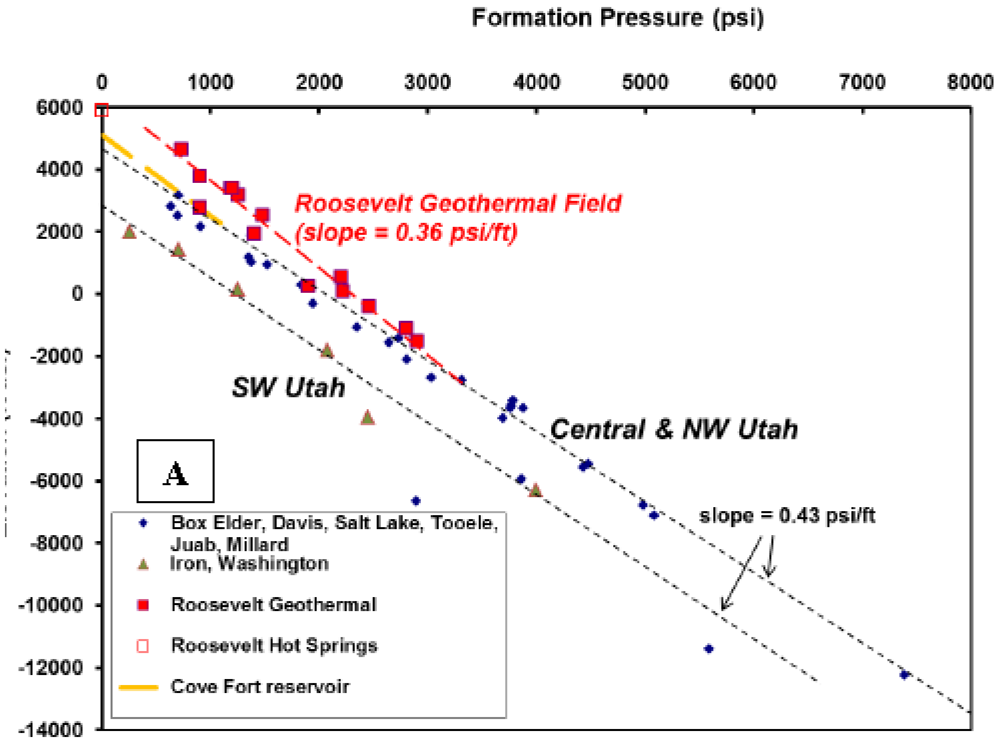
- Water in the springs west of Quichapa entered the geology in the 1500’s.
- Water falling on Cedar mountains today will not reach the Grand Canyon or other outlets for thousands of years.
- Science and proper planning imply it would be good to determine the age of the water for all water sources in the Cedar Valley Drainage Basin and to monitor new water production on an on-going basis in order to build a better map of aquifers.

Iron County and the Entire Southern Great Basin: lower than normal hydrostatic pressure



A. Map of wells in Southern Great Basin





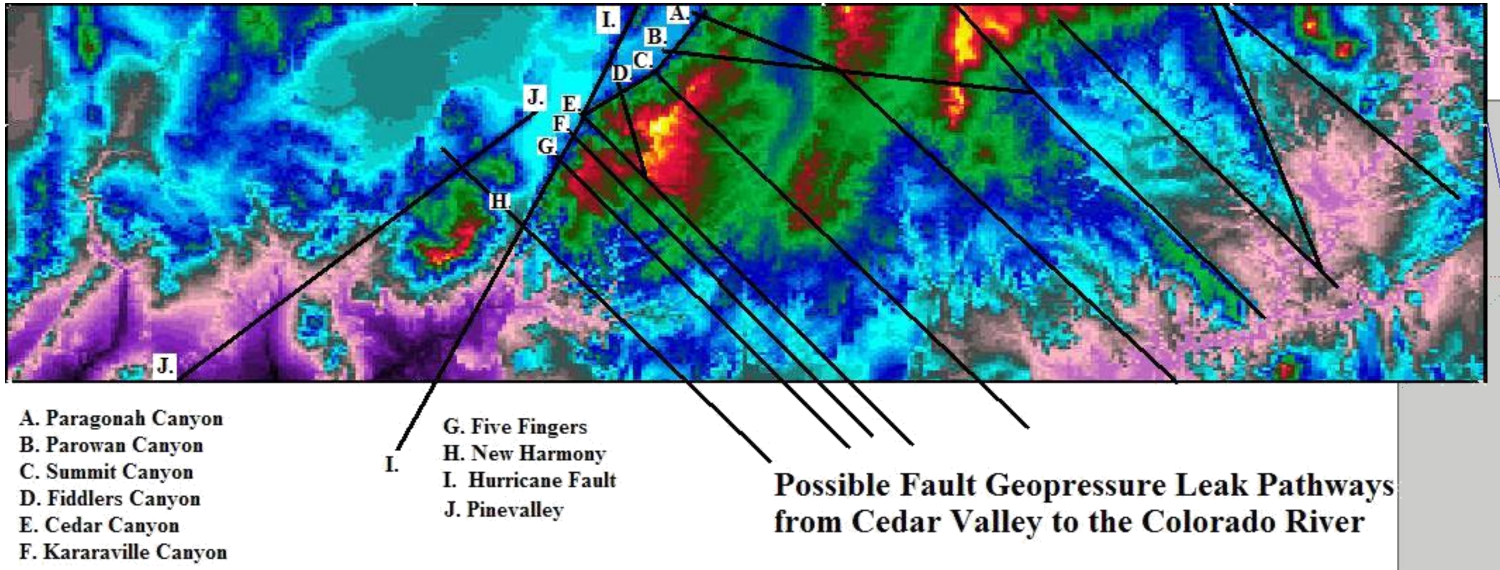
Formation Pressure as a Potential Indicator of High Stratigraphic Permeability

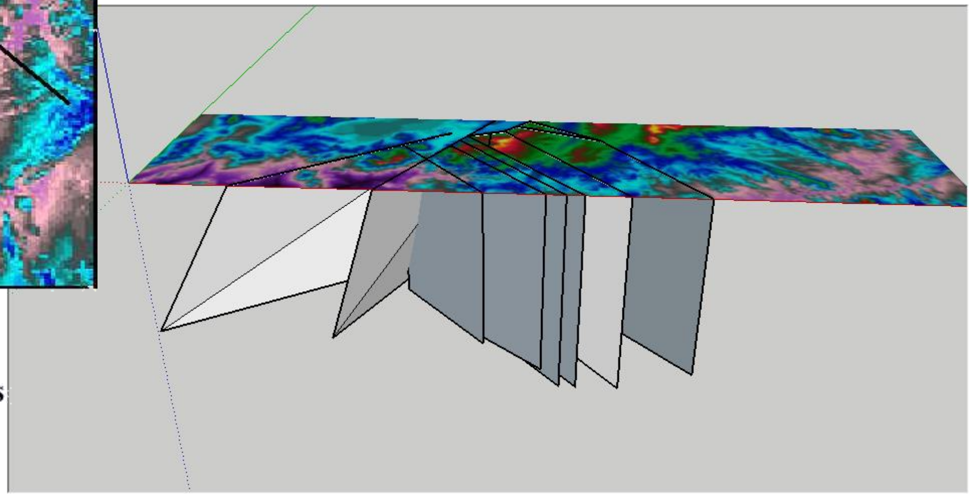
Rick Allis

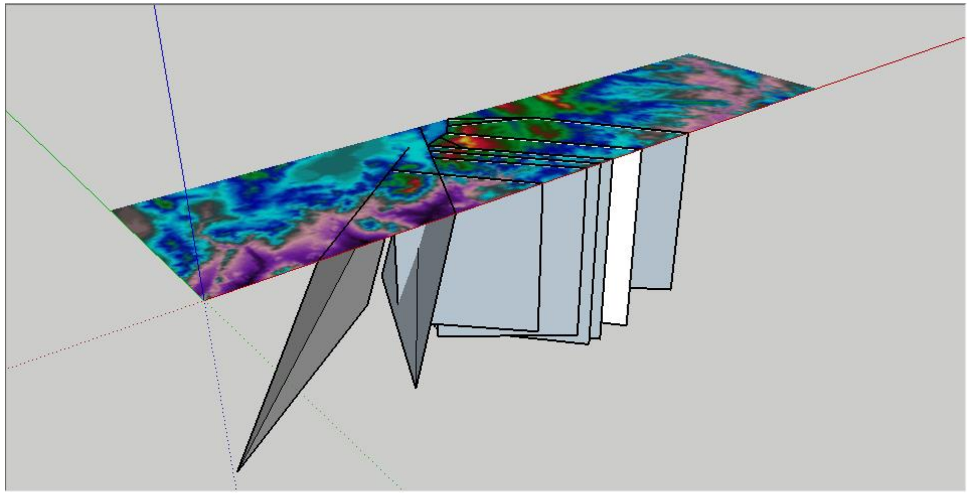
Utah Geological Survey

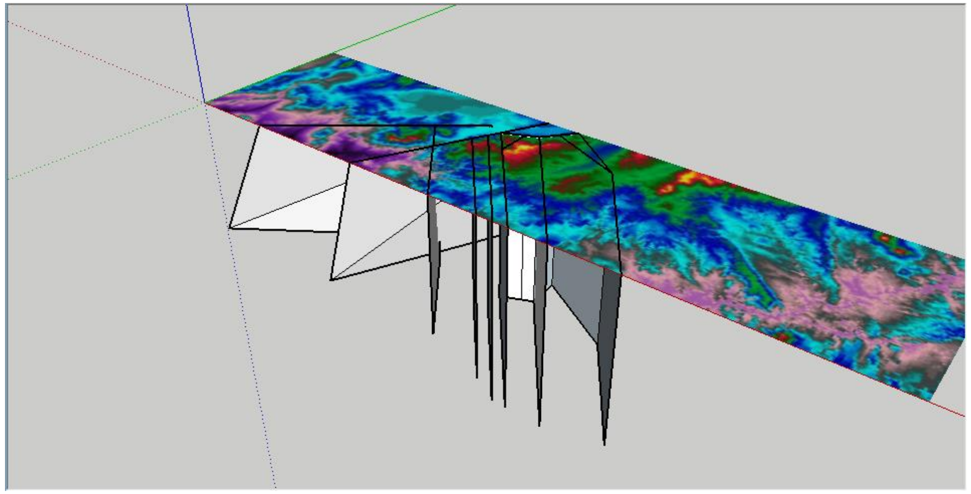
B (left) C (above). Depth versus Pressure Plots for Iron and Washington Counties, where wells have lower than normal hydrostatic pressure.

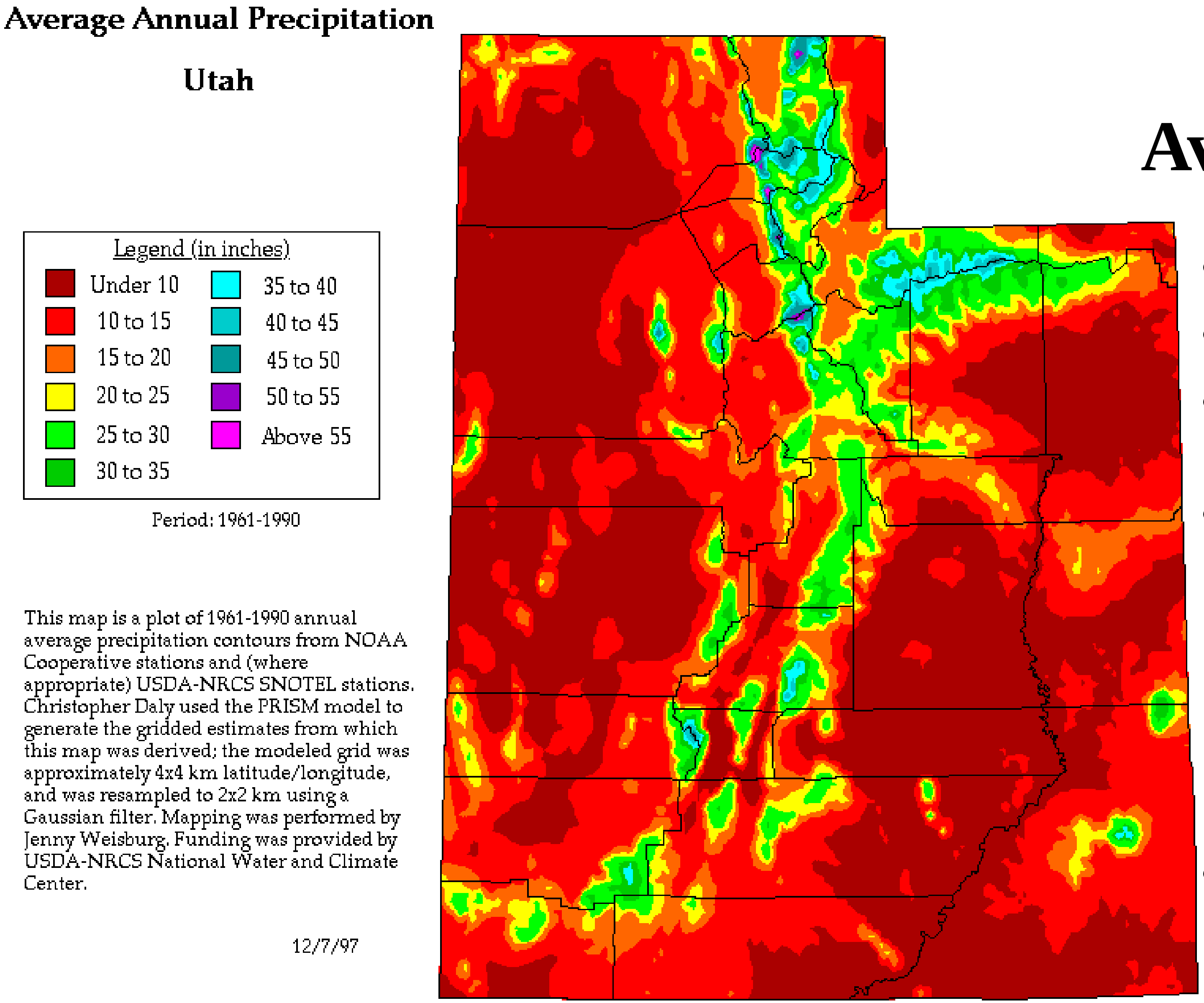
Large Fracture Systems Draining to Grand Canyon Create Lower Hydrostatic Pressure





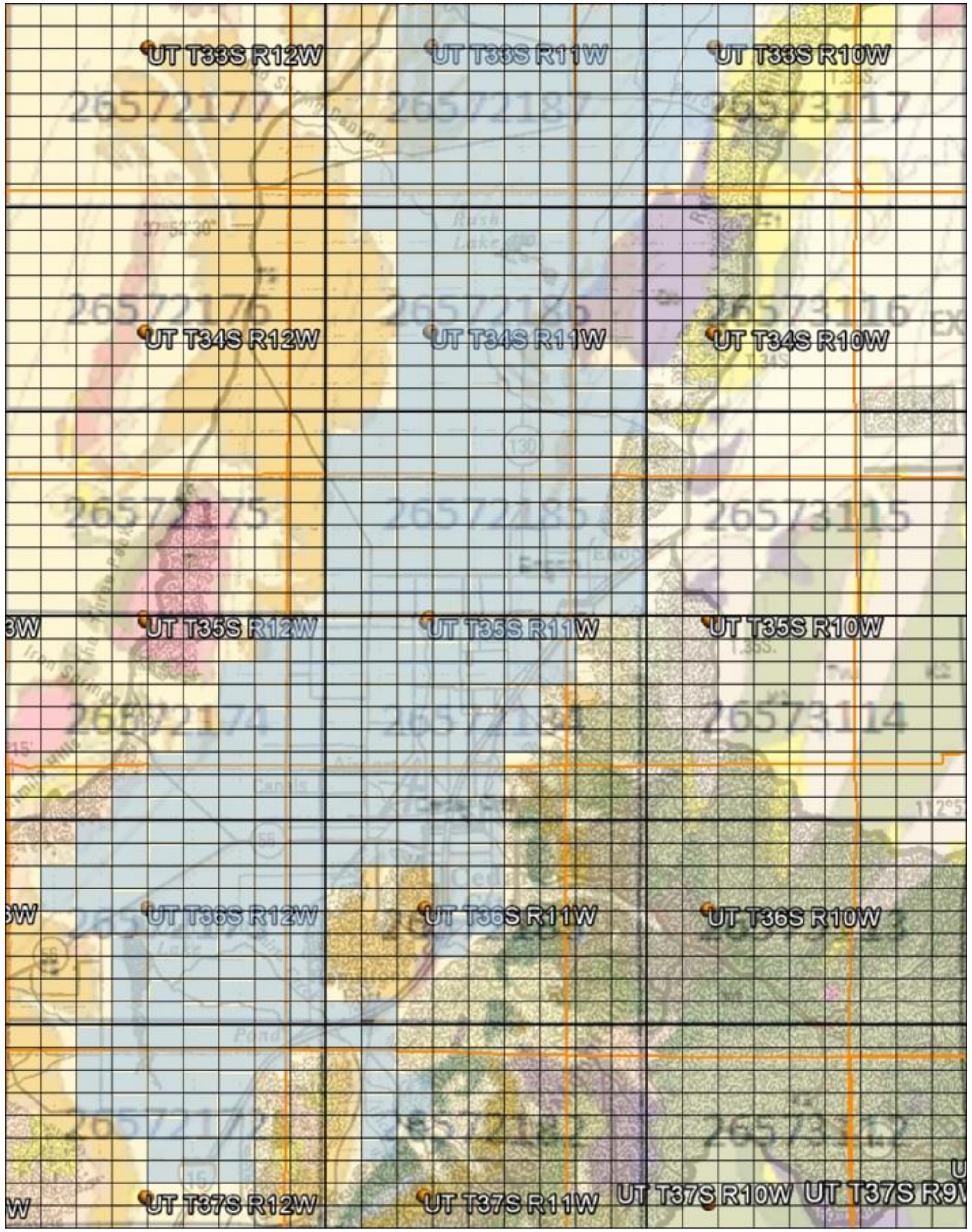






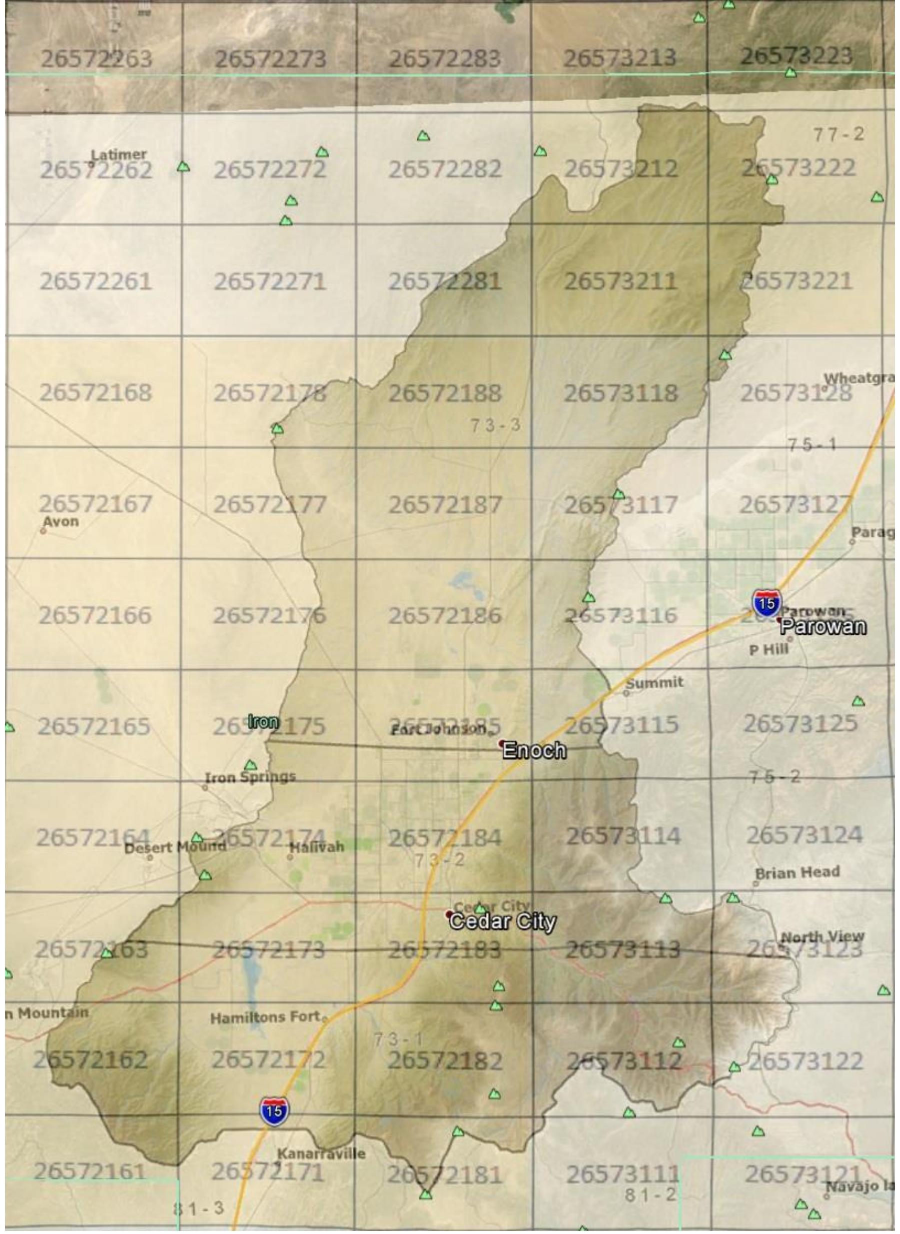
Average Annual Precipitation

- 1 foot in the valley annually
- 3 feet in the mountains
- A good well produces 800 to 3,200 acre-feet of water per year.
- With no drawdown, and a 10% infiltration rate this implies
  - In the valley 12.5 sq mi surface area needed to produce 800 ac-ft , and 50 sq mi needed to produce 3,200 ac-ft; and
  - In the mountain 3.2 sq mi needed to produce 800 ac-ft and 16.3 sq mi needed to produce 3,200 ac-ft in the mountains.
- Much of the recent annual precipitation escapes Cedar valley through large transform faults.



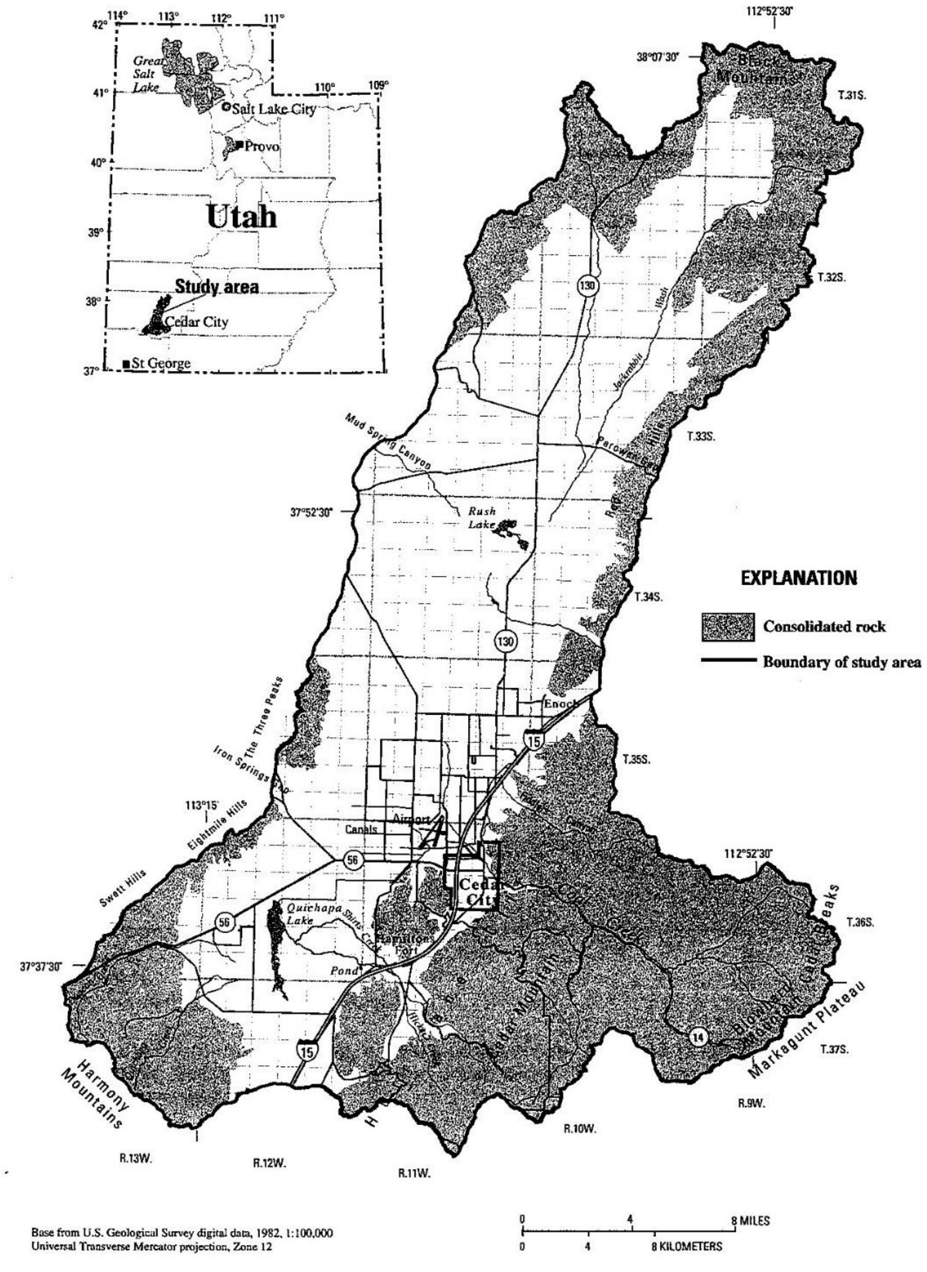
4. The water in the Cedar Valley Aquifer.

- The Cedar Valley Aquifer is shown by the blue colored squares on this map.
- Each colored square is an IG-5 cell and is about ~0.36 square miles in size. There are 421 IG5 cells covering the Cedar Valley Aquifer, or 152 sq. miles.
- This is ~97,000 acres, with an average of 12 inches of precipitation per year, implying an average of 10,000 acre-feet of recharge in the aquifer per year with a 10% infiltration rate.



Cedar Valley Drainage Basin

- Water for Cedar Valley is available from anyplace in the Cedar Valley Drainage Basin.
- There are consolidated rocks on either side of the Cedar Valley Aquifer, within the Cedar Valley Drainage Basin, which hold tremendous volumes of water:
  - On the west are fractured quartz monzonite rocks, which have excellent water production in New Harmony;
  - On the east are 20-30% porosity Cretaceous rocks, which have excellent water production at Brian Head.
- These are separate aquifers, isolated from the Cedar Valley Aquifer by faults and clays.

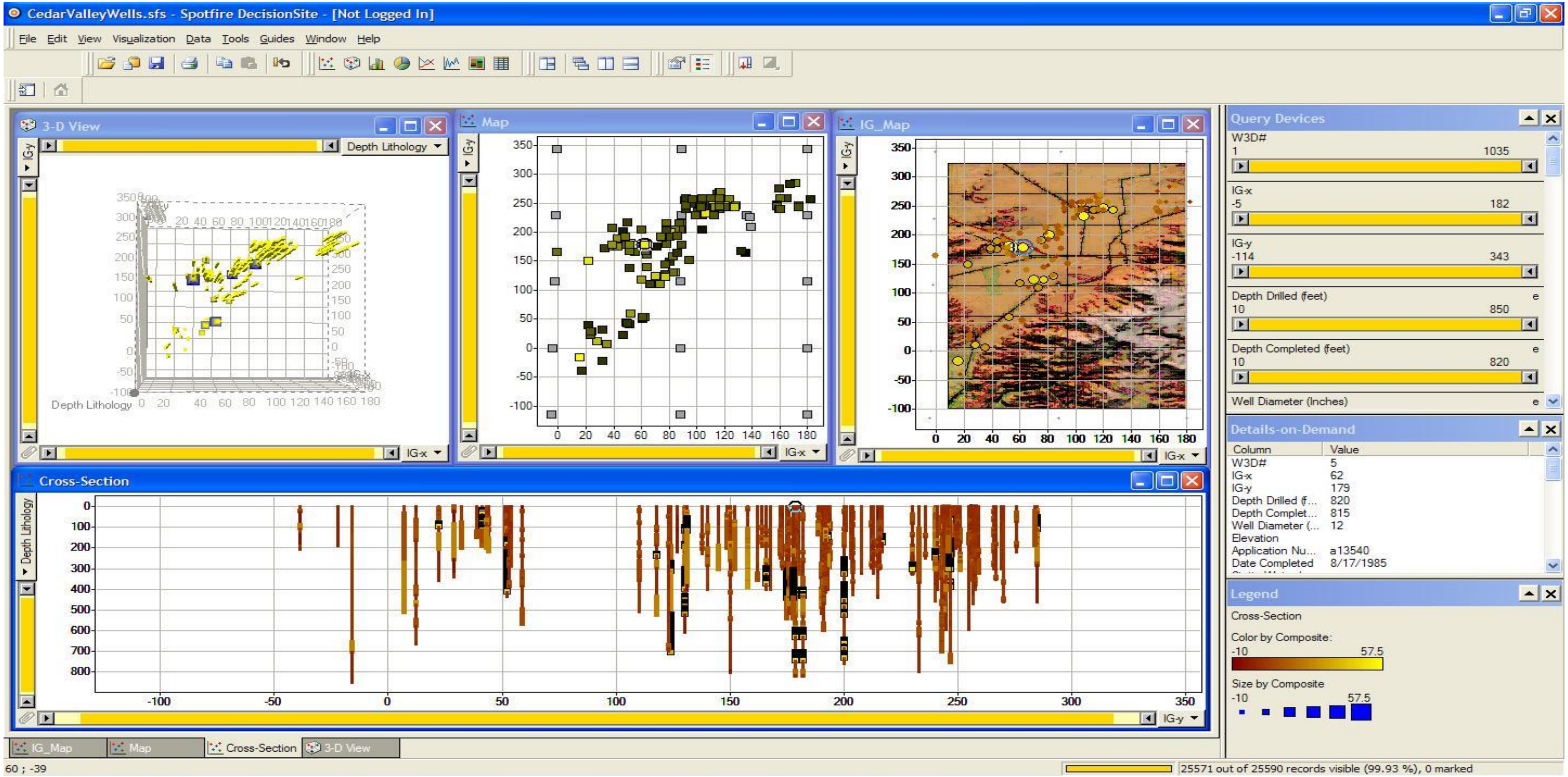


Location of Cedar Valley study area, Iron County, Utah.

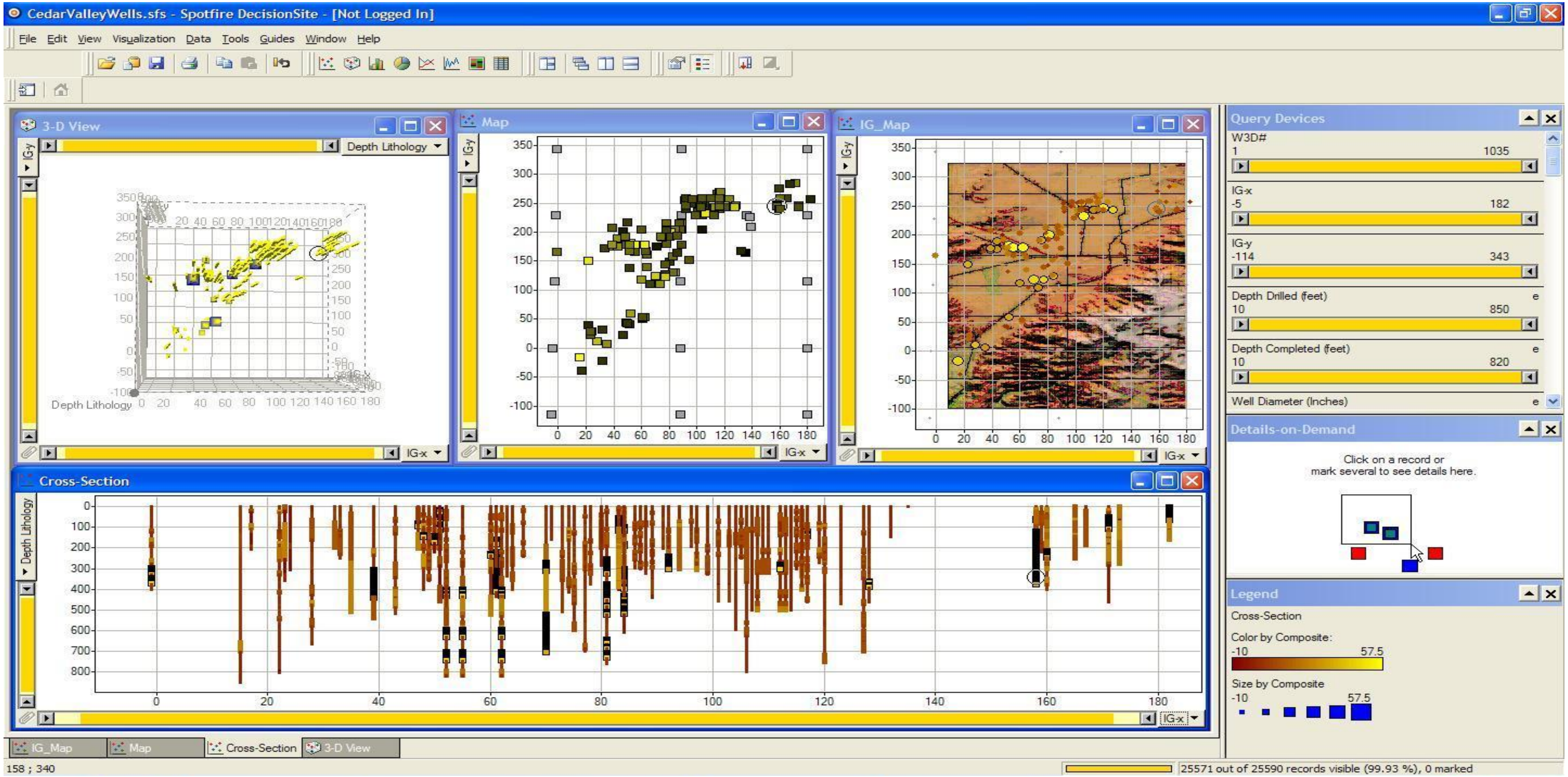
Cedar Valley Aquifer

- The Cedar Valley Aquifer, the aquifer being overproduced, is where sediments have been deposited in the valley (white), which sediments cover consolidated rock (black).
- Other than Coal Creek water, the water in the Cedar Valley Aquifer is isolated from water in the Cedar Valley Drainage Basin by the Hurricane Fault on the east and basal clay sediments at the base of basin fill.
- This is shown by the age of the water being produced dating to Lake Bonneville; i.e. the water has been in the Cedar Valley Aquifer for on the order of 17,500 years.

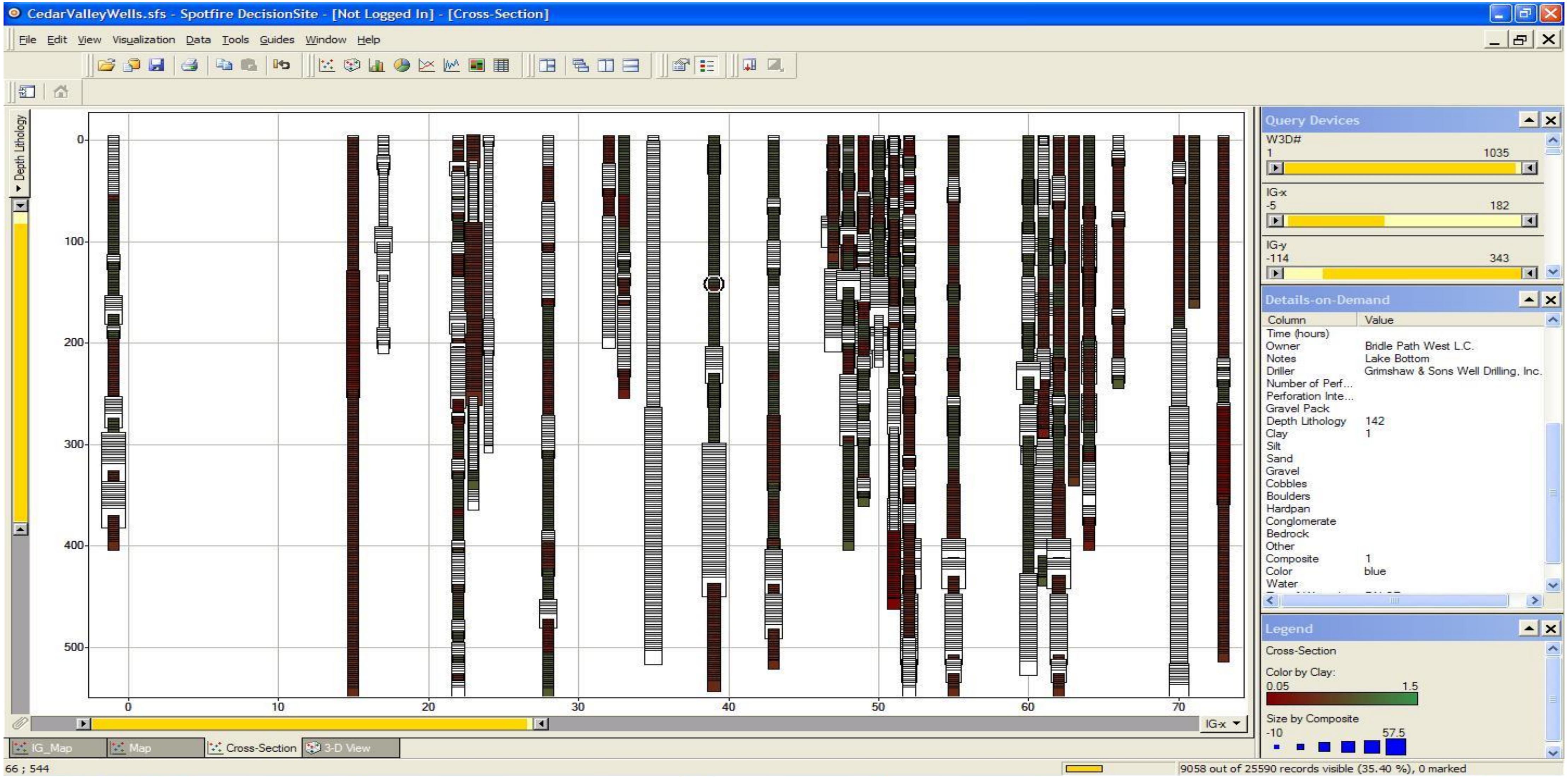
North-to-South cross-section showing wells in the Cedar Valley Aquifer



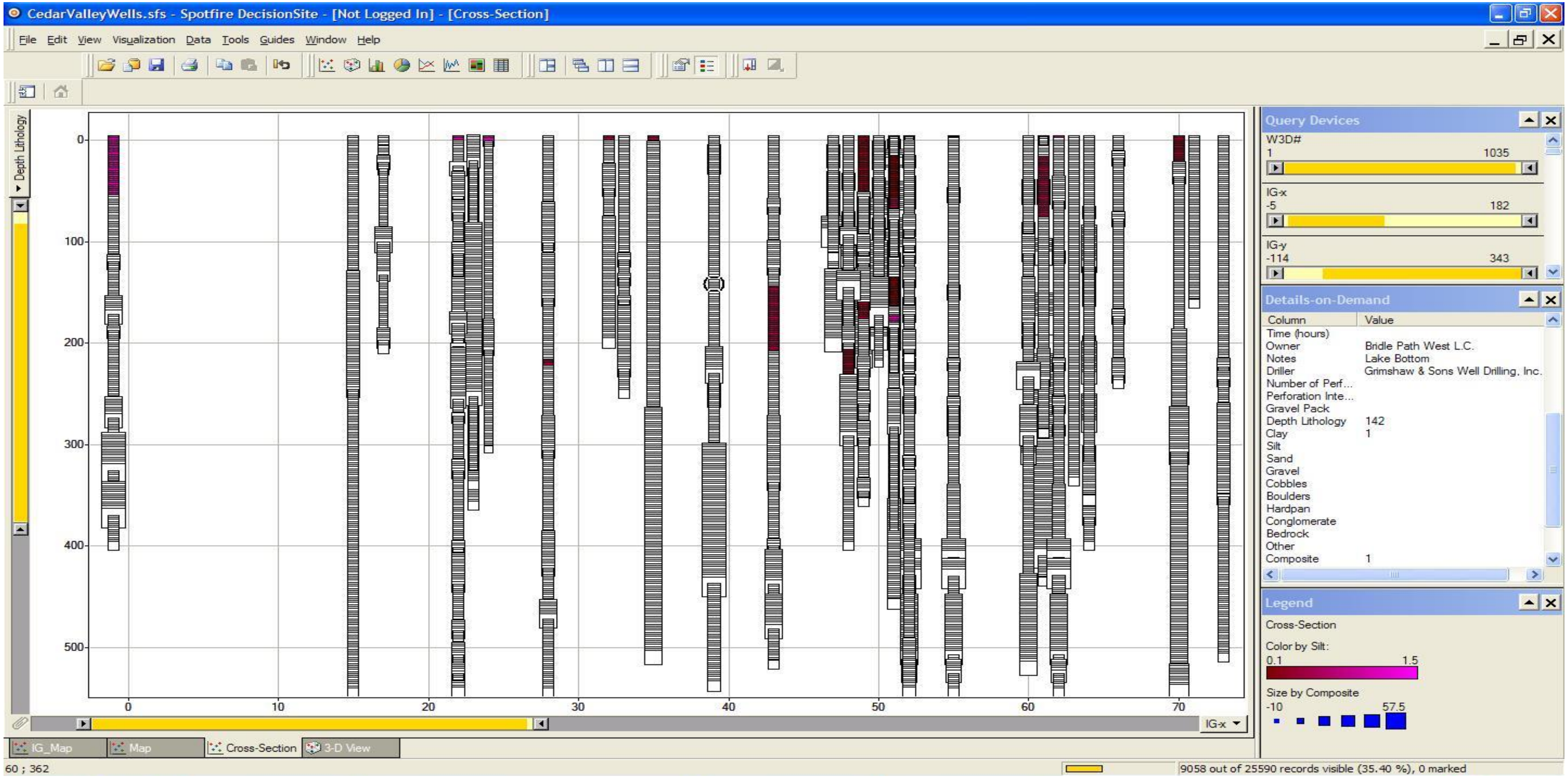
West-to-East cross-section showing wells in the Cedar Valley Aquifer



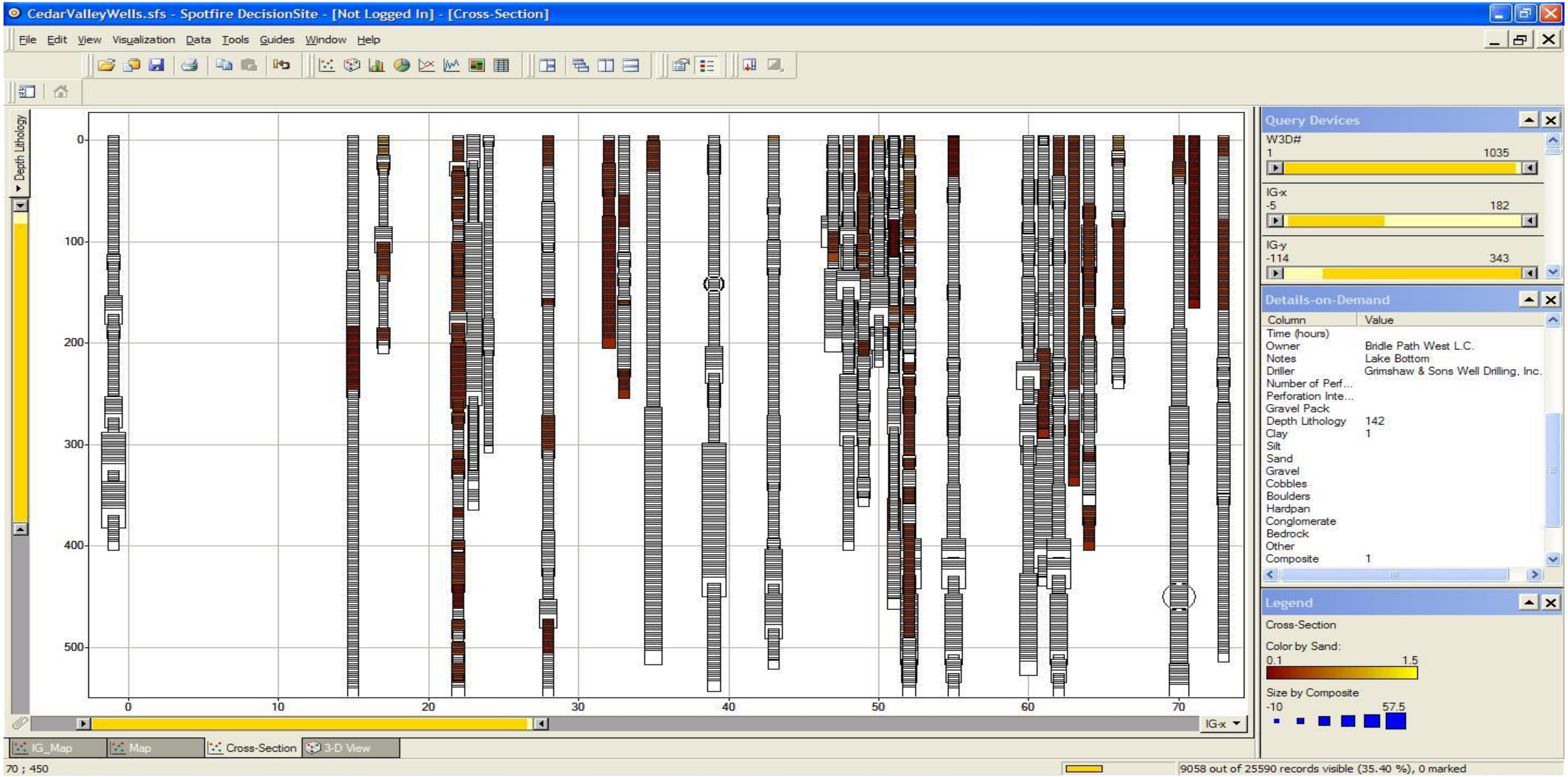
Clay on the west end of the West-to-East cross-section through the Cedar Valley Aquifer



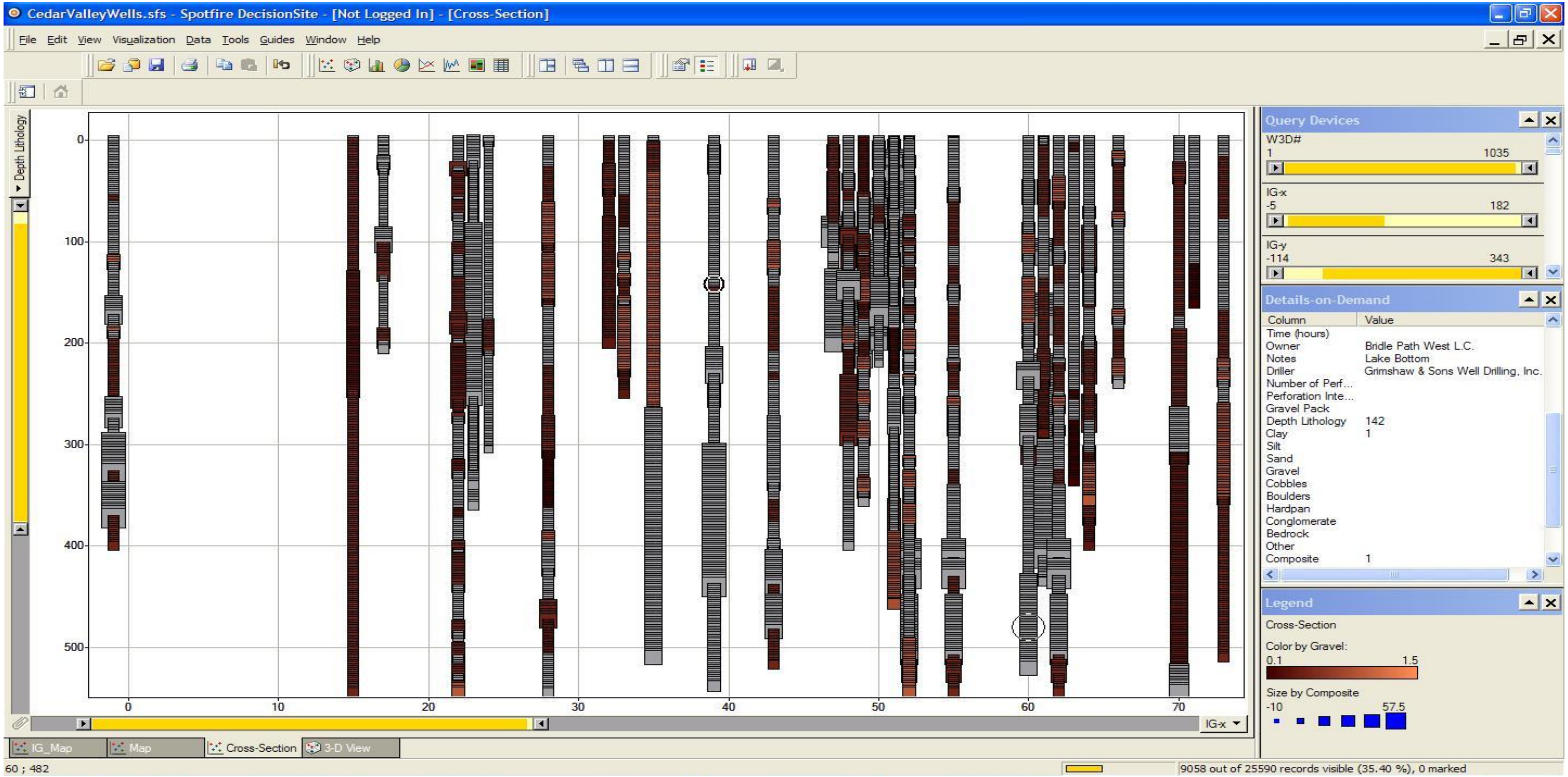
Silt on the west end of the West-to-East cross-section through the Cedar Valley Aquifer



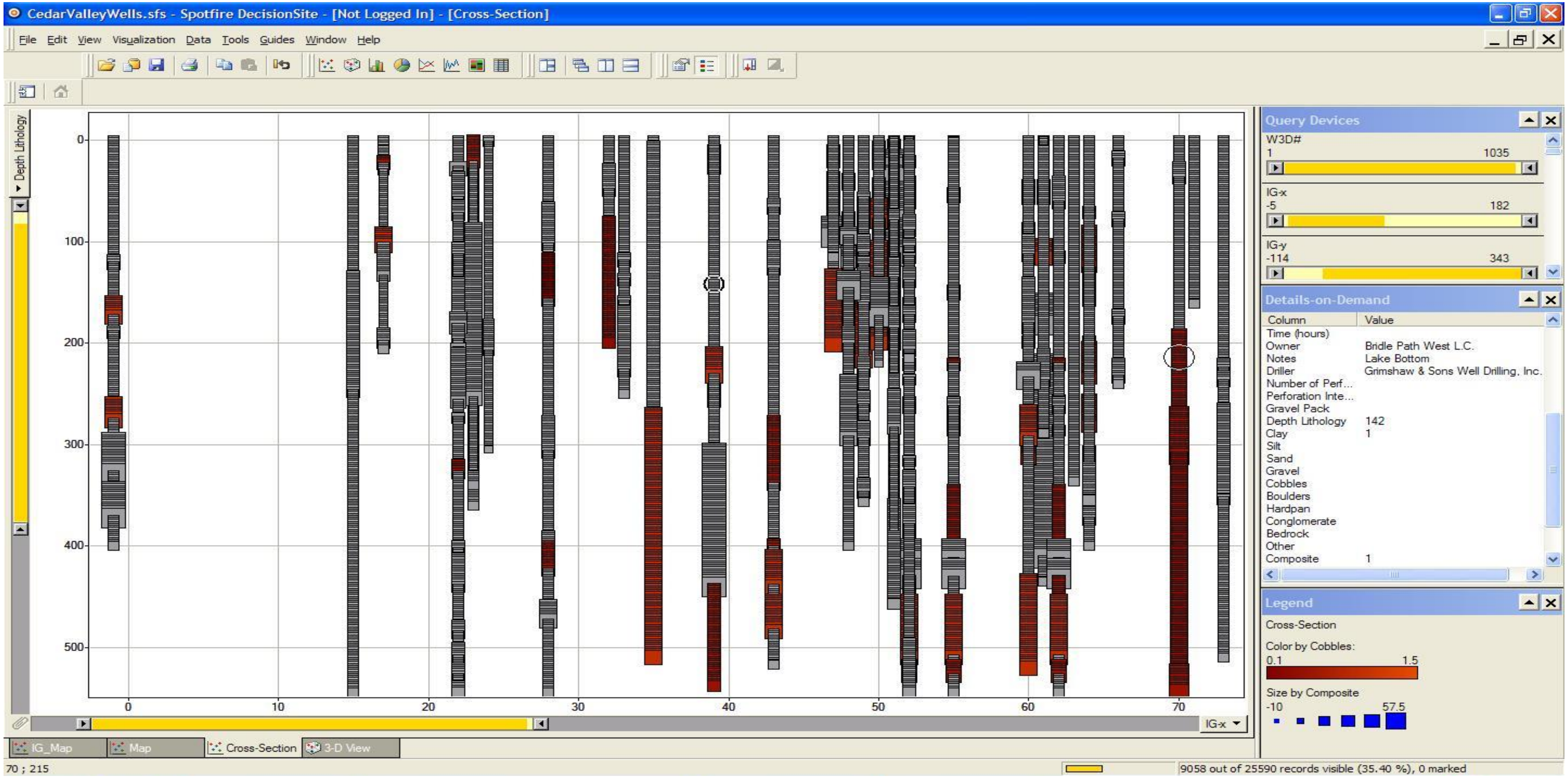
Sand on the west end of the West-to-East cross-section through the Cedar Valley Aquifer



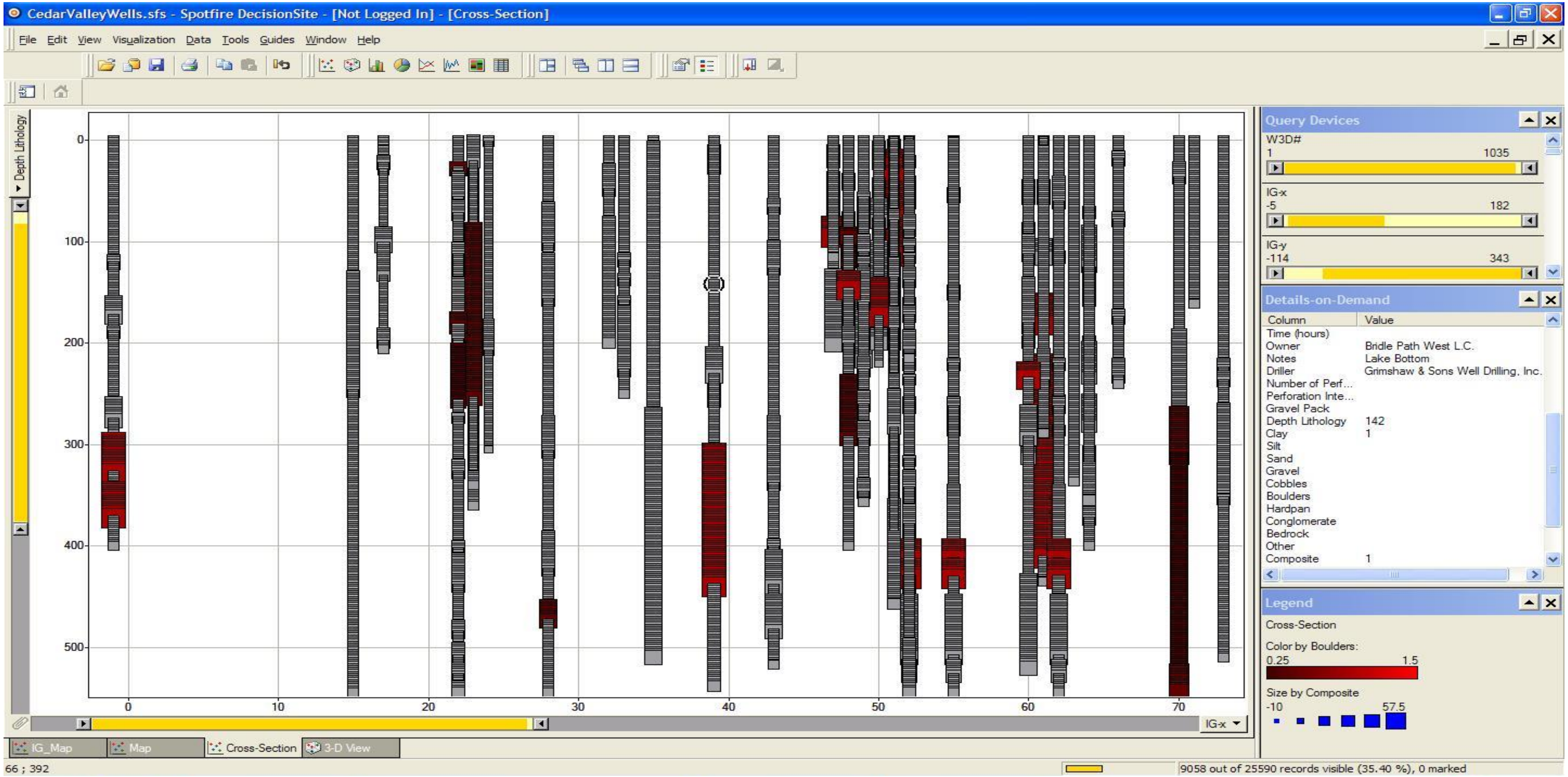
Gravel on the west end of the West-to-East cross-section through the Cedar Valley Aquifer

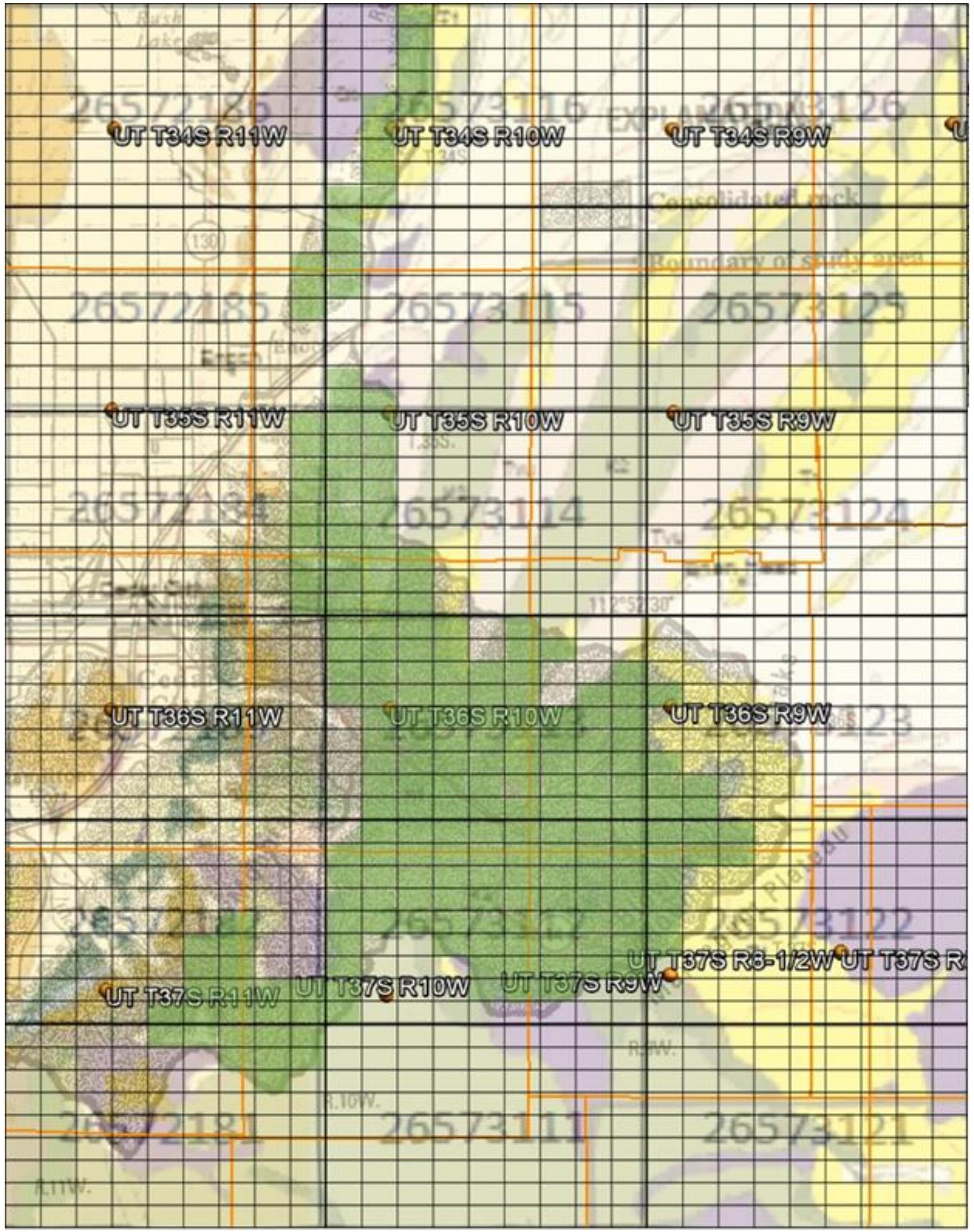


Cobbles on the west end of the West-to-East cross-section through the Cedar Valley Aquifer



Boulders on the west end of the West-to-East cross-section through the Cedar Valley Aquifer





5. The water in the Cretaceous Aquifer.

- The Cretaceous Aquifer is shown by the green colored squares on this map.
- Each colored square is an IG-5 cell and is about ~0.36 square miles in size. There are 213 IG5 cells covering the Cretaceous Aquifer, or 77 sq. miles.
- This is ~50,000 acres, with an average of 36 inches of precipitation per year, implying an average of 15,000 acre-feet of recharge in the aquifer per year with an infiltration rate of 10%.

Cretaceous Age Straight Cliffs to Dakota Sandstone up Cedar Canyon where the landslide regularly happens

Straight Cliffs Formation over Dakota Formation, north of Highway 14 at Mile 8, east of Cedar City.

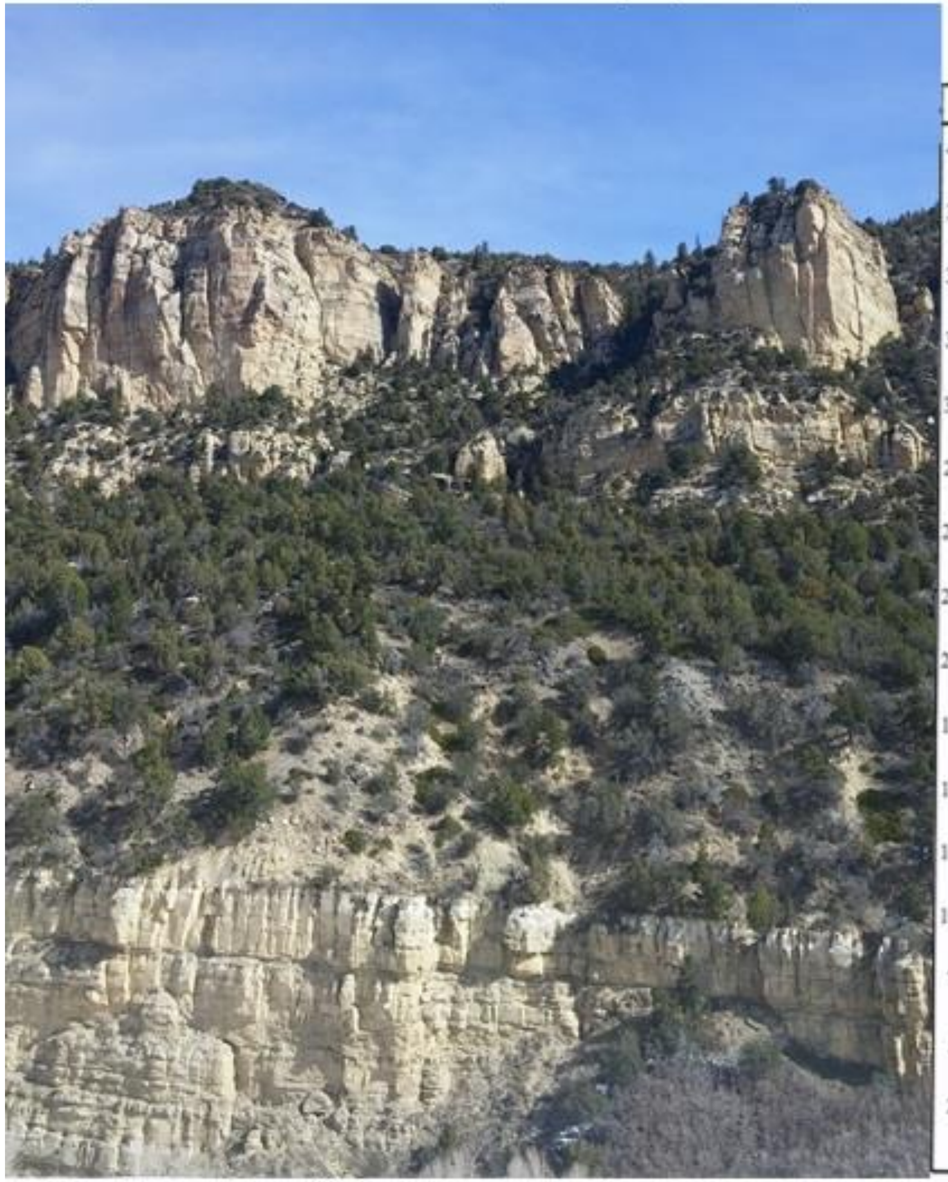


Photo by Gary F. Player, Utah Professional Geologist 5280804-2250, March 14, 2015

Utah Geological Association Publication 30 - Pacific Section
American Association of Petroleum Geologists Publication GB78
345

CEDAR CANYON

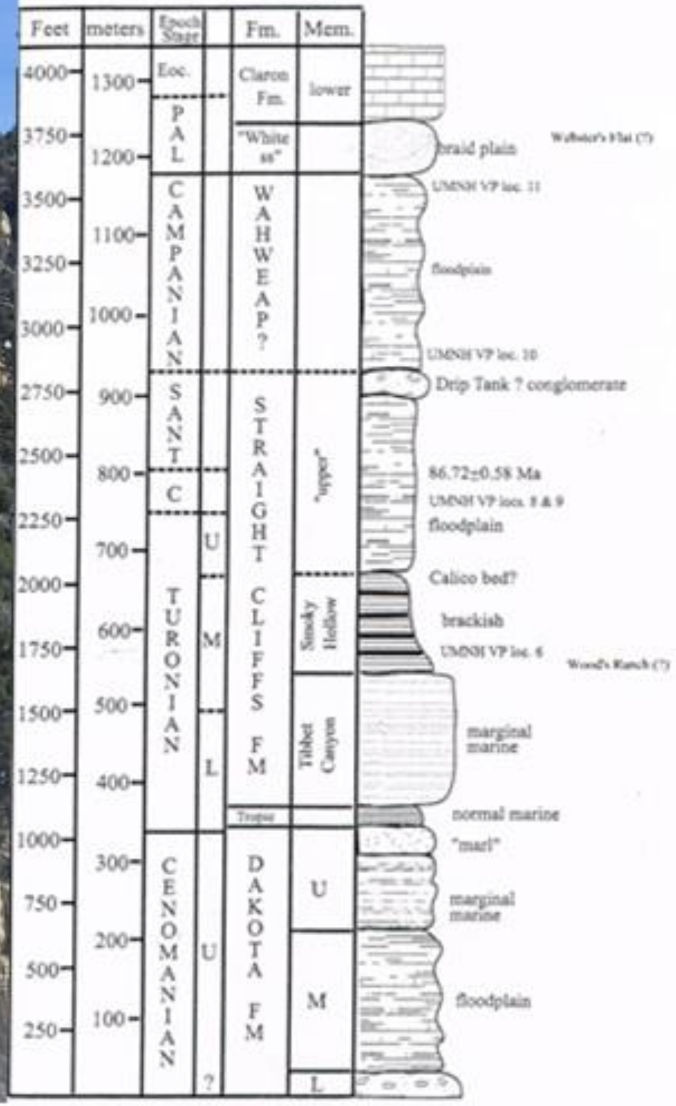
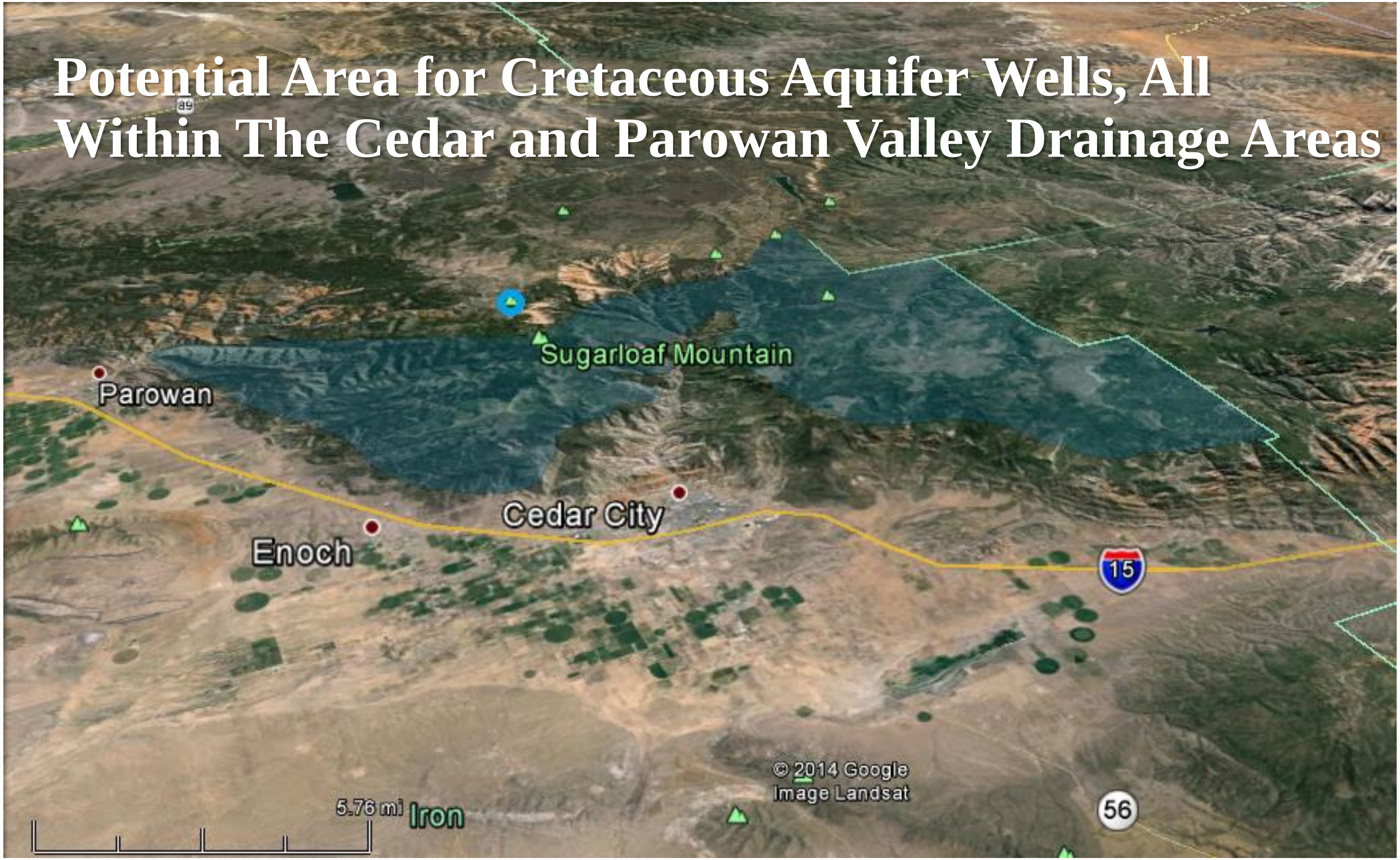


Figure 5. Comparison of Upper Cretaceous and lower Tertiary stratigraphy in Cedar and Parowan Canyons. The Parowan section is hung on the contact between the Claron and Grand Castle Formations. UGA Pub. 30

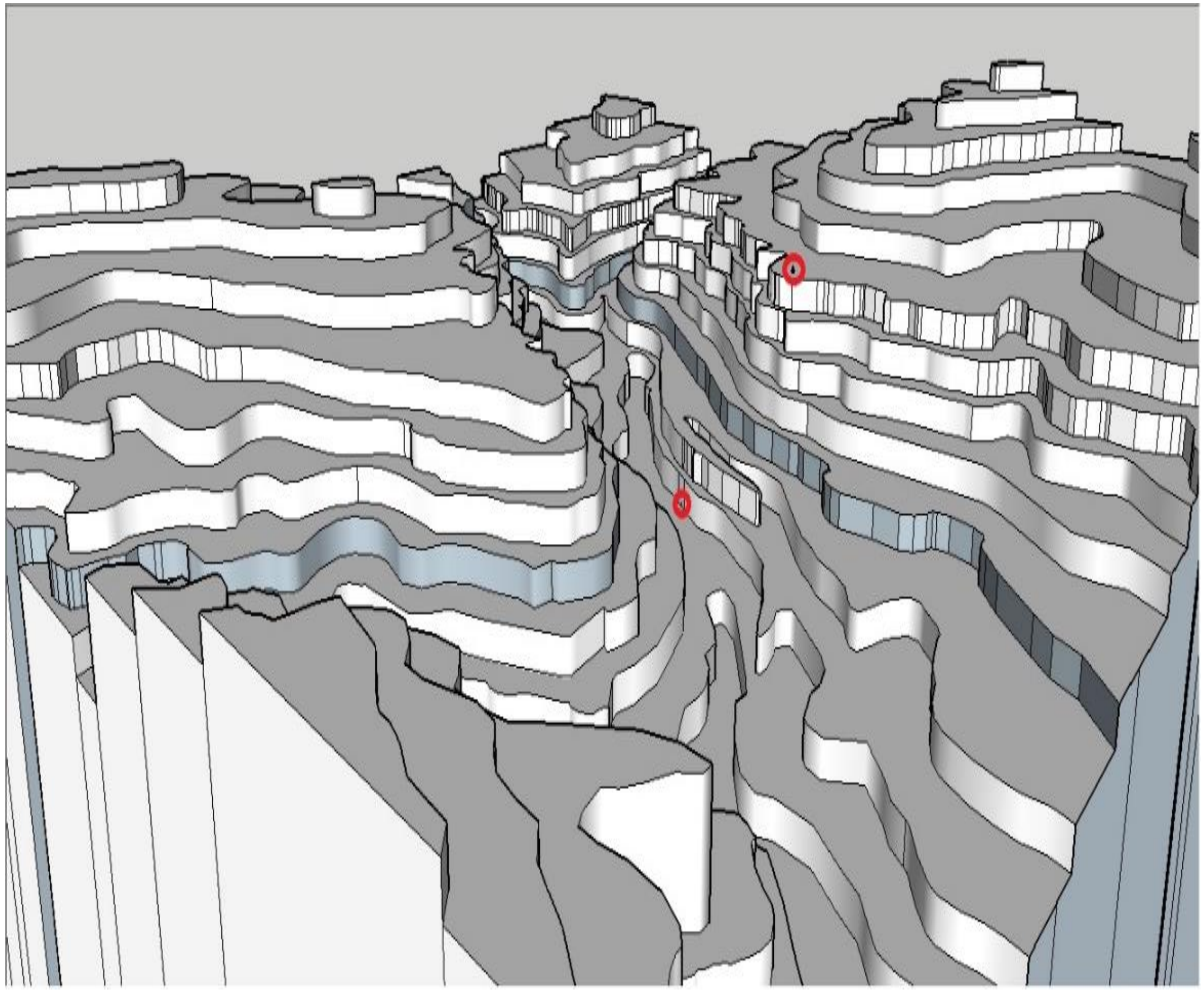
Cretaceous Beds Dip East 10^o

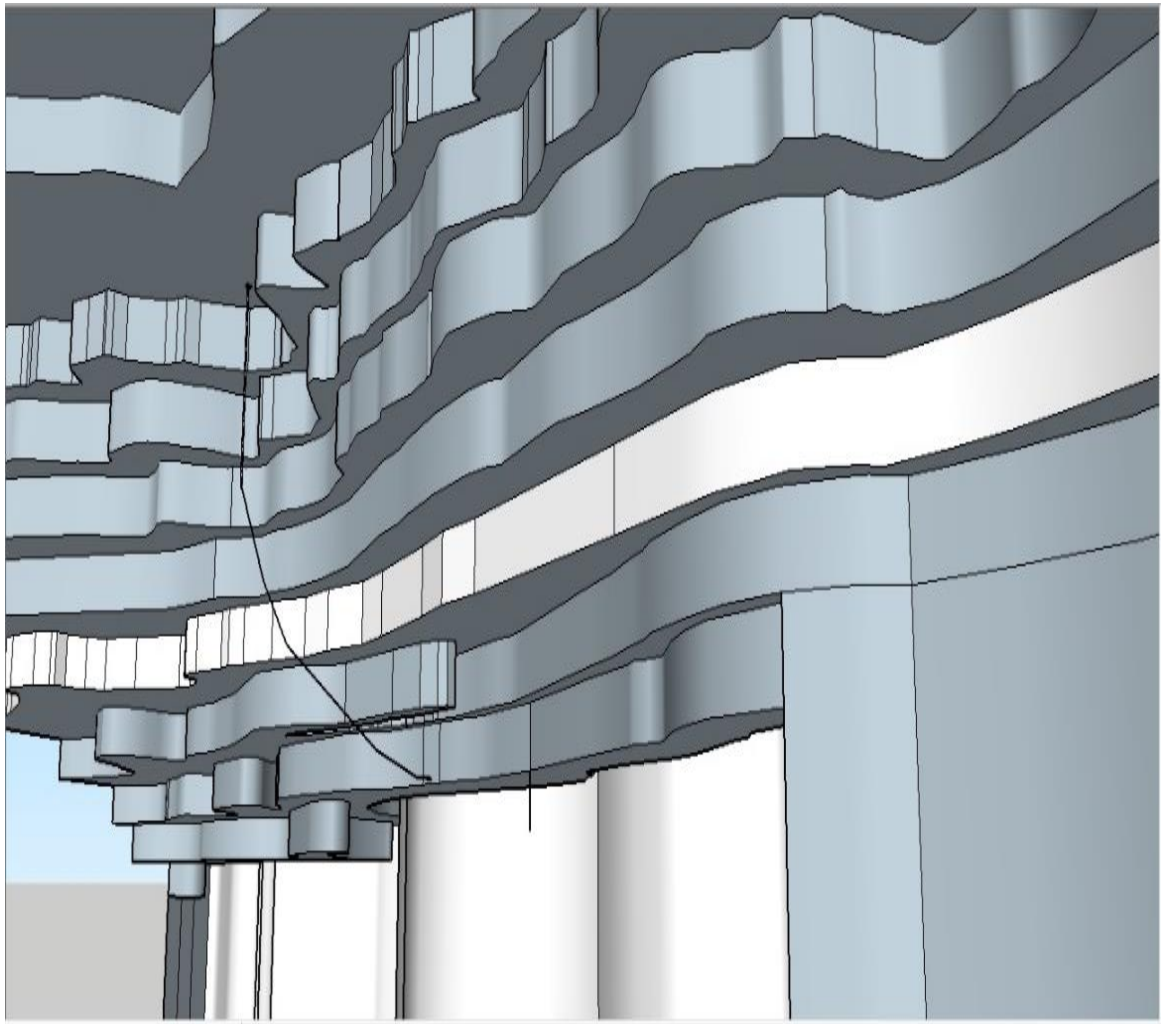
Cretaceous Beds Dip North 12^o

Potential Area for Cretaceous Aquifer Wells, All Within The Cedar and Parowan Valley Drainage Areas

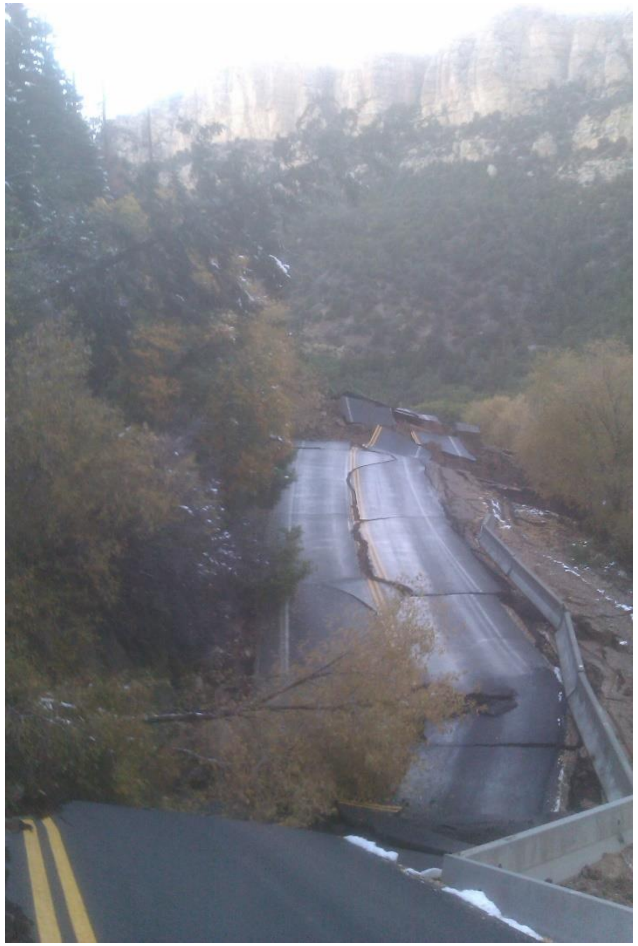


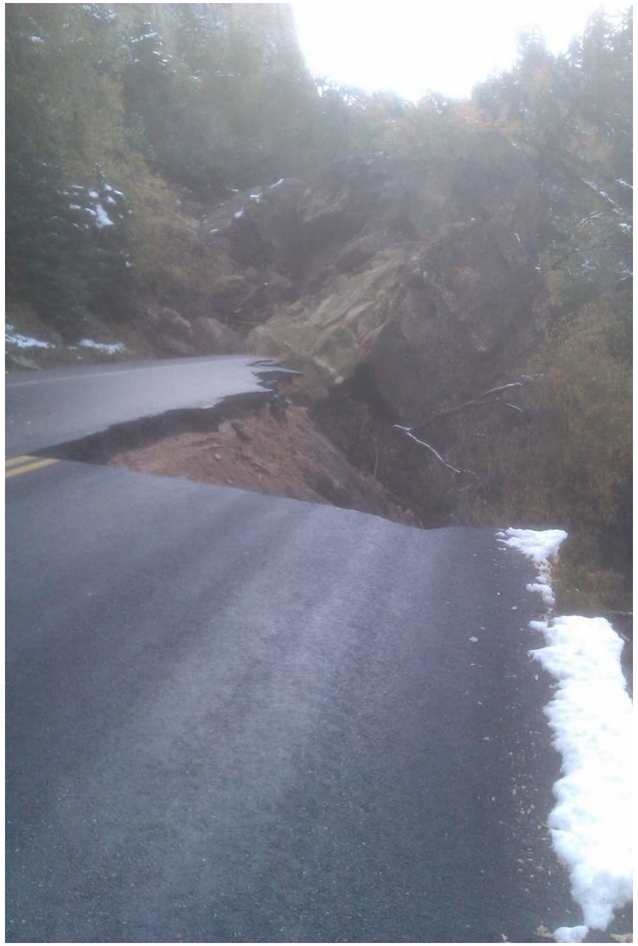
Deviate hole from Straight Cliffs to Dakota Sandstone which, with turbines in the well, could be a new source of energy





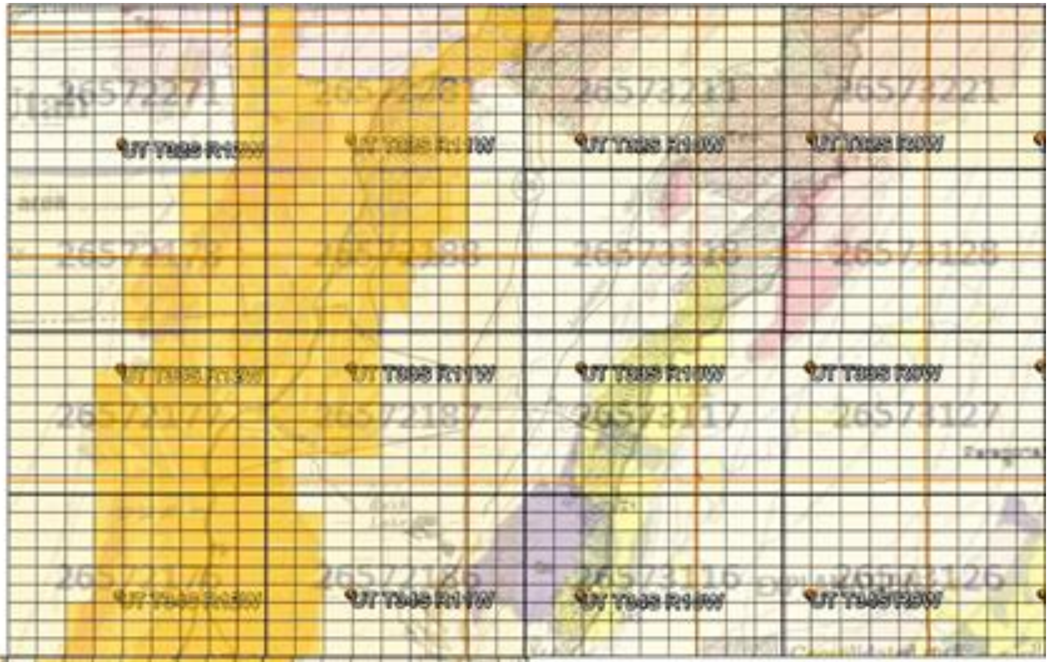
What is the cost to repair the road compared to the cost of drilling a deviated hole and draining the water out of the cliffs?

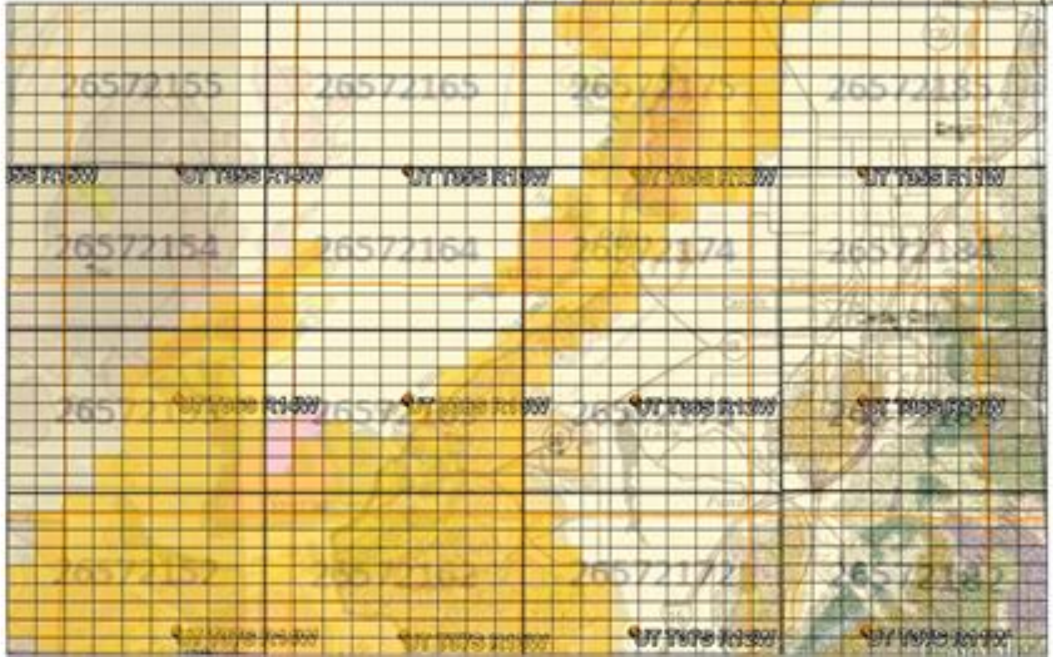




6. The water in the Fractured Quartz Monzonite Aquifer.

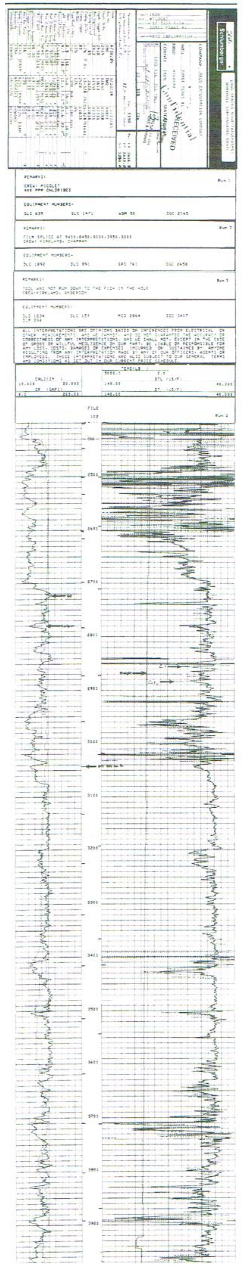
- The Fractured Quartz Monzonite Aquifer is shown by the orange colored squares on this map.





- Each gold colored square is an IG-5 cell and is about ~0.36 square miles in size. There are 681 IG5 cells covering the Cedar Drainage Basin, or 245 sq. miles.
- This is ~156,900 acres, with an average of 12 inches of precipitation per year, implying an average of 15,700 acre-feet of recharge in the aquifer per year at a10% infiltration rate.

Arco #3 Three Peaks Well

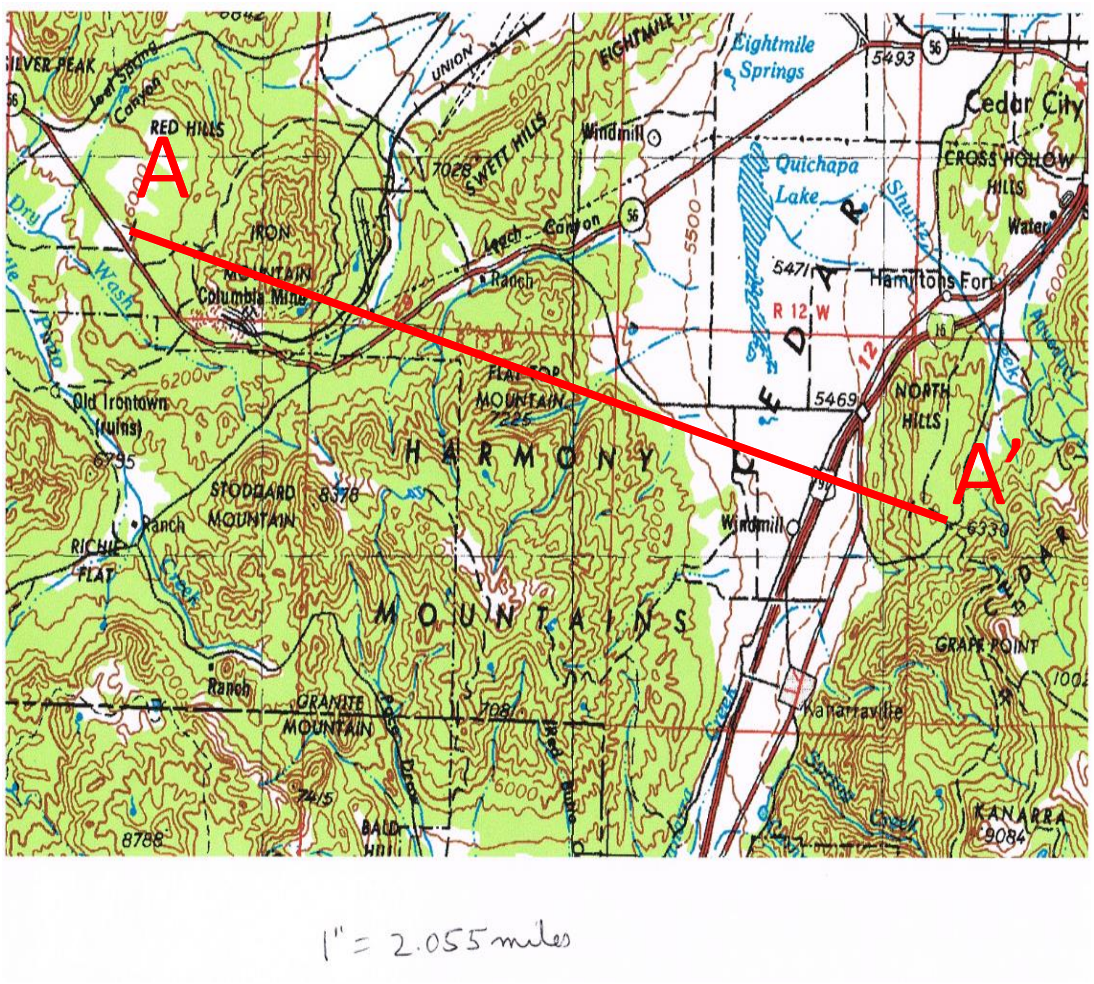


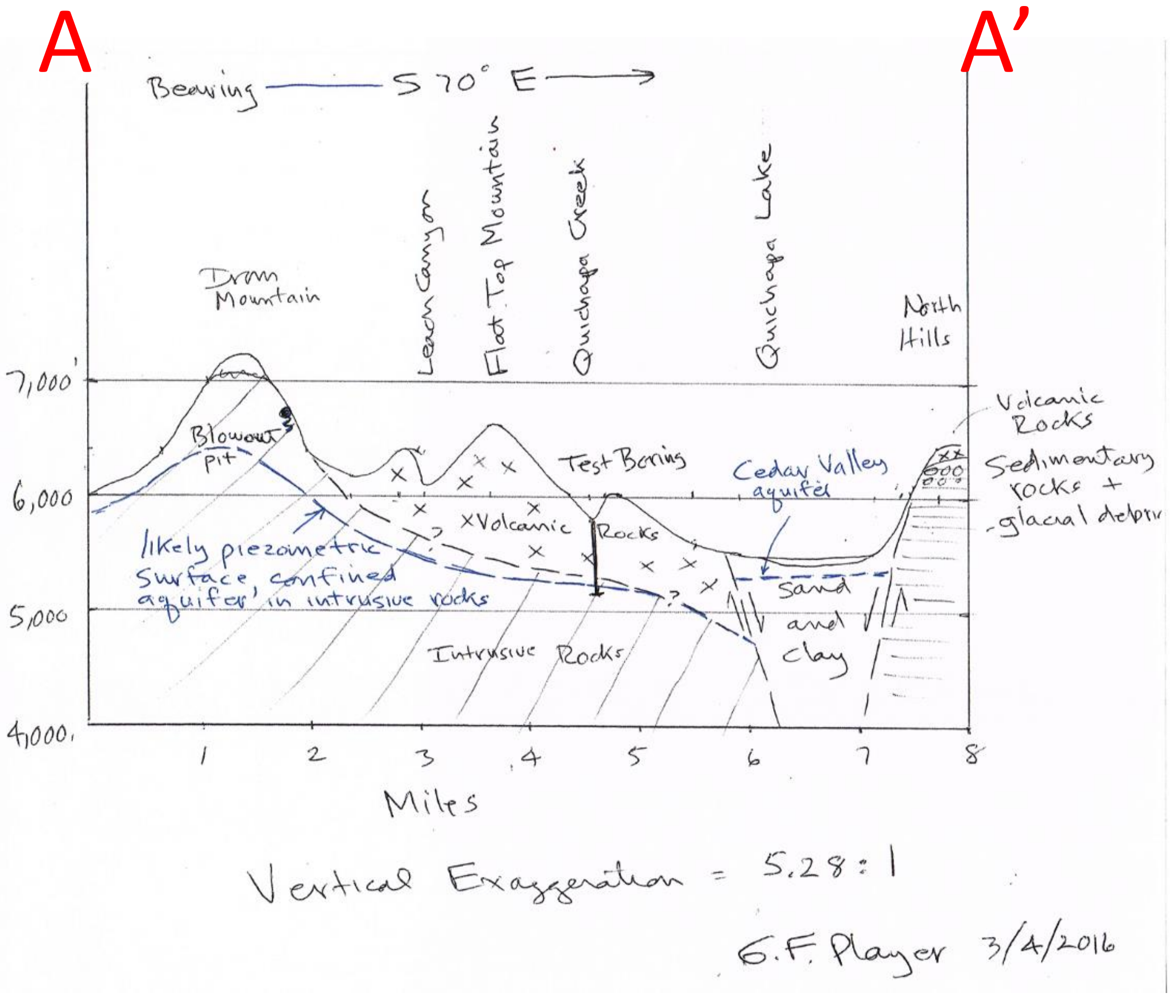
Top Qm = 2,322’
Fractured: 2,500’-2,615’

Fractured: 2,960’-3,050’

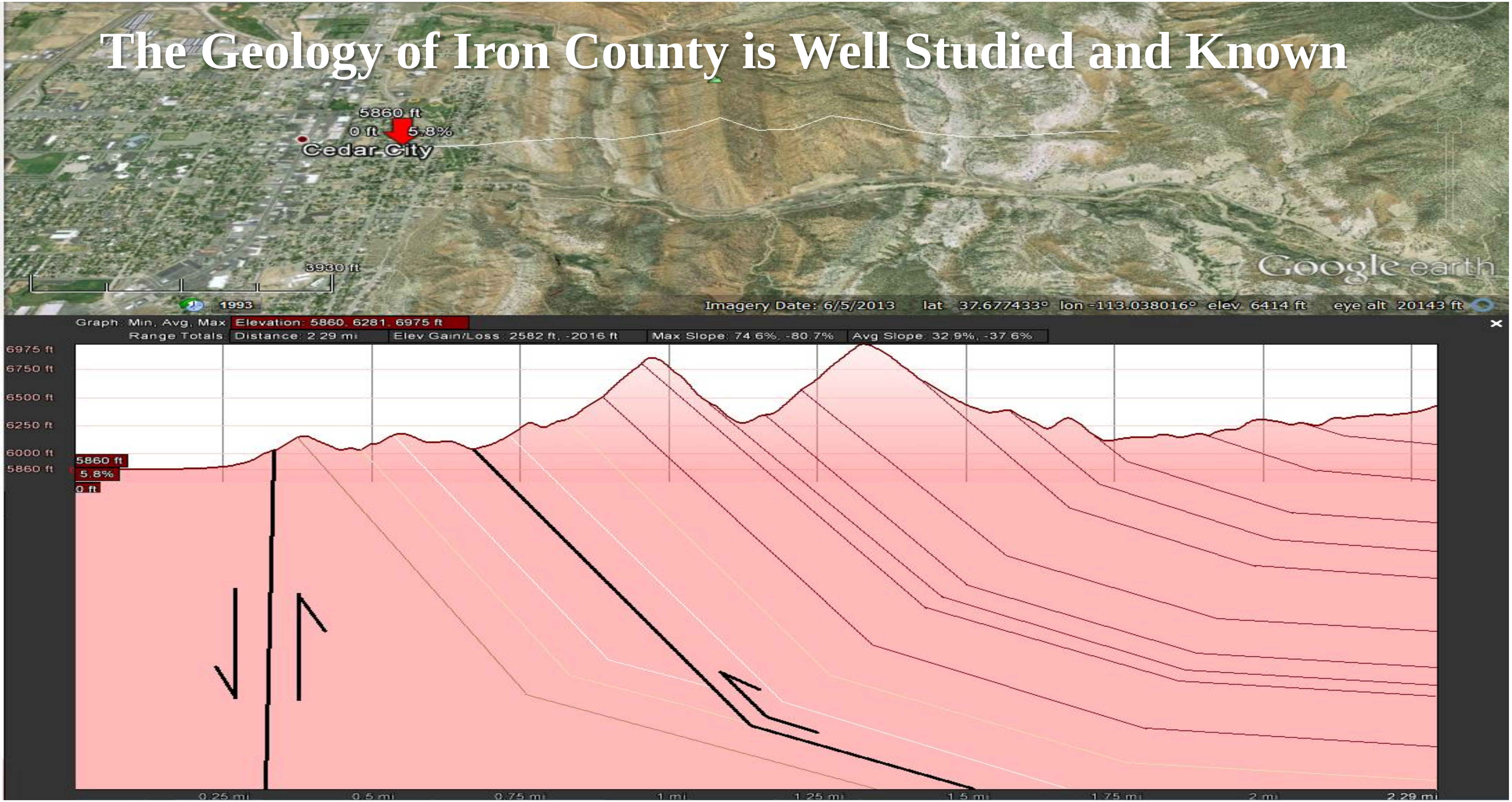
This photo shows the extent of water coming out of the Fractured Quartz Monzonite at Blowout Pit at Iron Mountain

Geologic Cross-Section Showing Southern Isolation of the Cedar Valley Aquifer by large faults and Blowout Pit

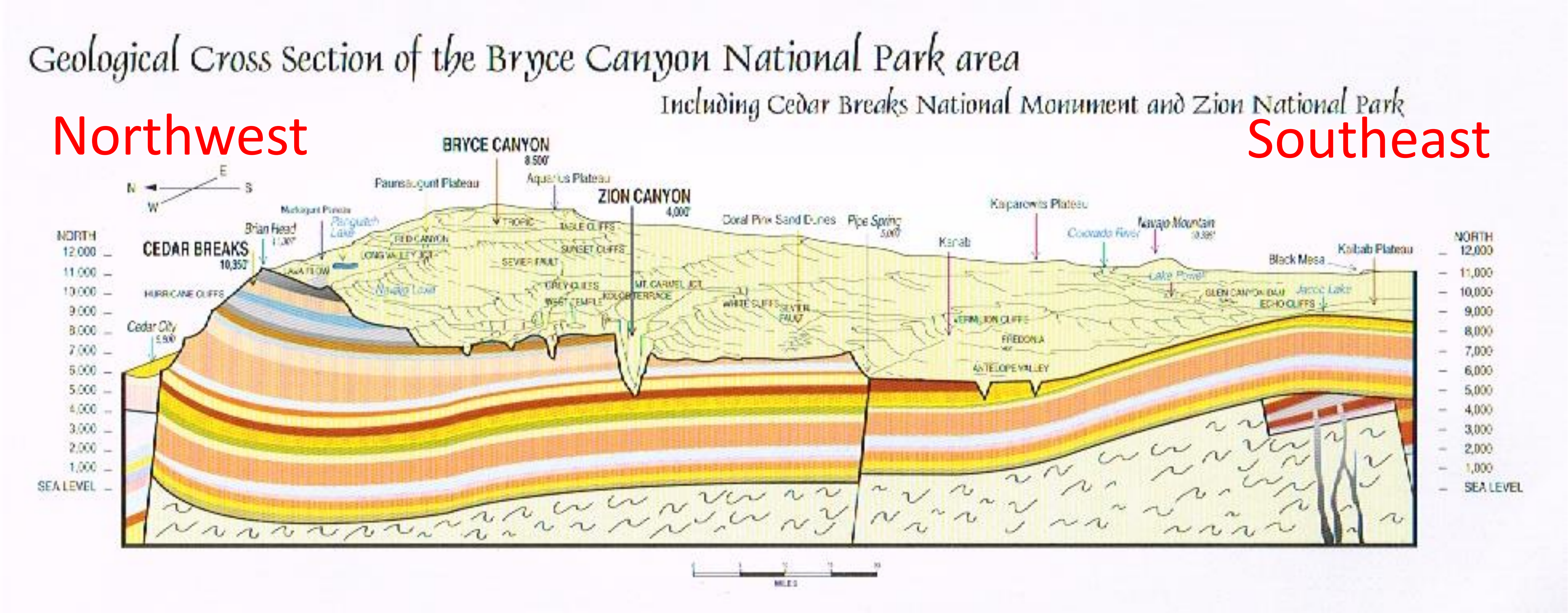




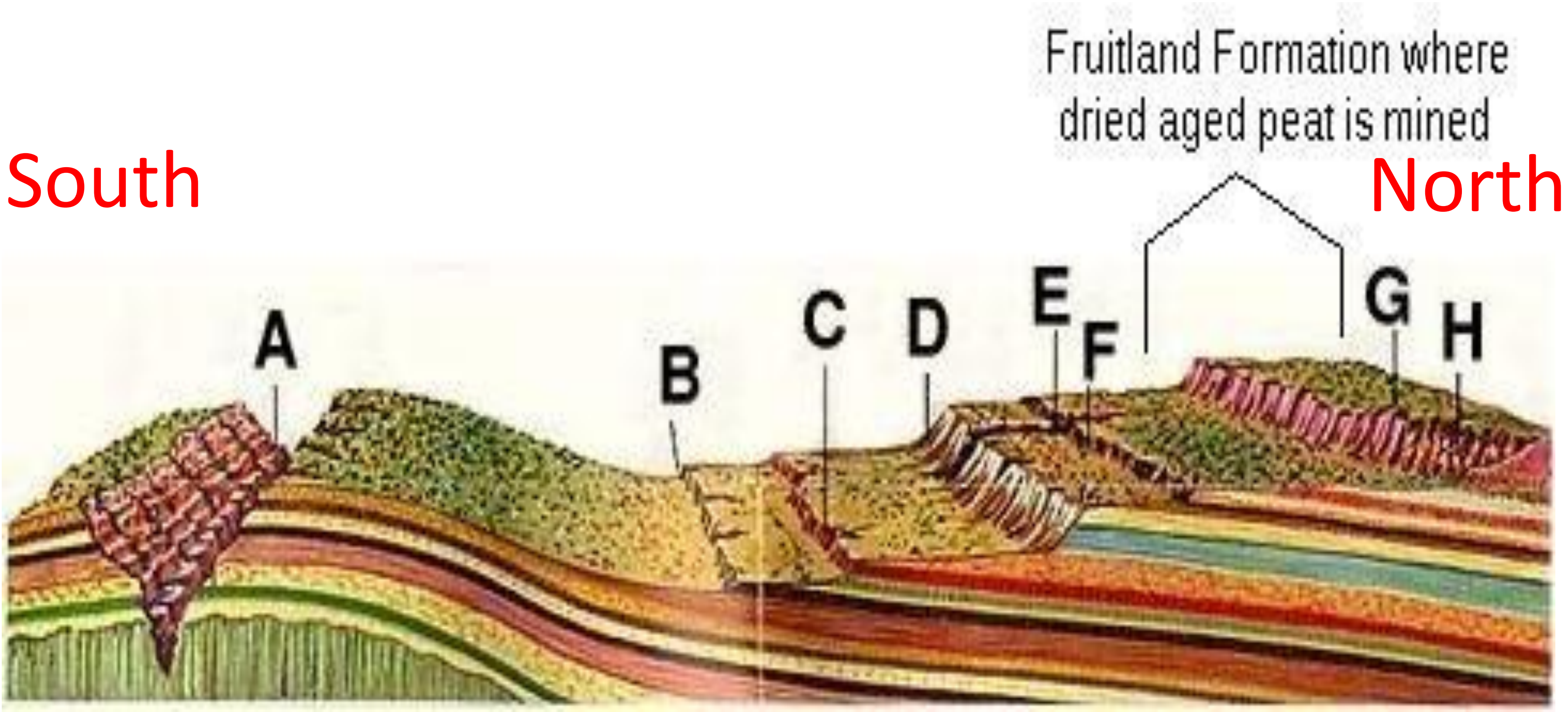
The Geology of Iron County is Well Studied and Known



NW to SE Geologic Cross-Section: Southern Utah

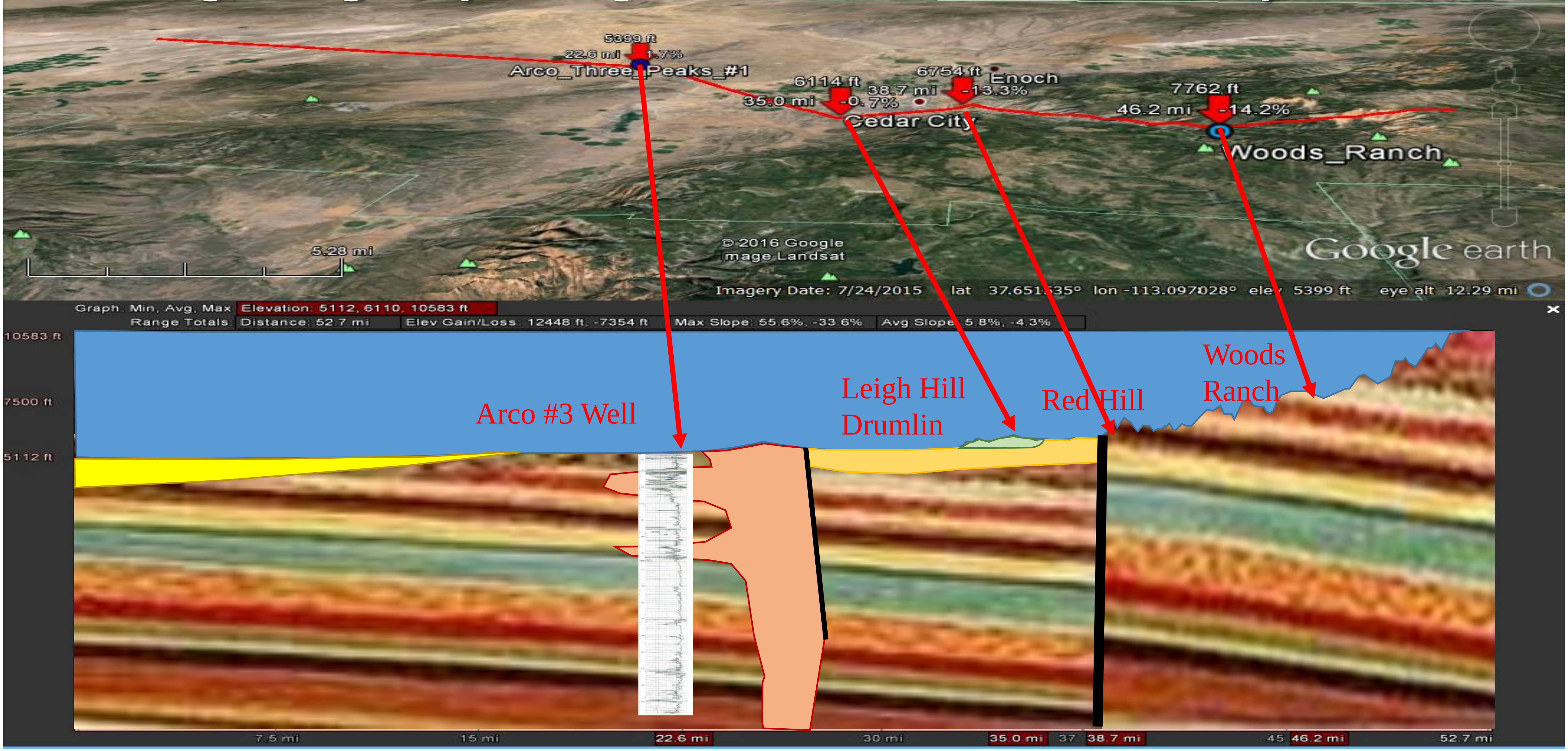


Geologic Cross-Section: Northern Arizona to Southern Utah



Stratigraphic Layers from the Paleocene (Bryce Canyon) to the Pre-Cambrian known as Grand Staircase layer cake geology, specifically: (A) the Grand Canyon, (B) the Chocolate Cliffs, (C) the Vermilion Cliffs, (D) the White Cliffs, (E) Zion Canyon, (F) the Gray Cliffs, (G) the Pink Cliffs, and (H) Bryce Canyon.

Integrating a Hydrologic Model across Iron County



7. The regulation of water in Iron County.

It is appropriate for Iron County Commissioners to:

- Take control of regulating water in Beryl, Cedar, and Parowan Valleys;
- Start collecting scientific data to build a better model of aquifers;
- Beginning with dating each water source in the county;
- As part of monitoring all water production in the county;
- Limiting production to previous years rainfall over specified recharge areas;
- Using this data to build a geologic model of each aquifer;
- Updating this geologic model with water usage, recharge, and aquifer depth;
- Transferring newer water rights to surrounding untapped aquifers; and
- Balancing the entire system to optimize water usage for local growth.

Recharging the Aquifer
Federal Government will not allow because of birds and airport.
Ever been to New Orleans or Houston or Orlando or …?

Thank You!

See Also:

- http://www.walden3d.com/IronCounty
- http://www.walden3d.com/IronCounty/intro
- http://www.walden3d.com/IronCounty/CedarValleyWater/
- http://www.walden3d.com/IronCounty/ig/IronCounty/IC_3_Approaches.html
- http://www.walden3d.com/IronCounty/ig/IronCounty/IC_3_Aquifers.html
- http://www.walden3d.com/IronCounty/ig/IronCounty/IC_CVA.html
- http://www.walden3d.com/IronCounty/ig/IronCounty/IC_KA.html
- http://www.walden3d.com/IronCounty/ig/IronCounty/IC_QMA.html

Iron County Today

VOL. 8 NO. 6

Utah state engineer discusses Groundwater Management Plan

BY ASHLEY LANGSTON
Reporter

IRON COUNTY – In 2012, a Groundwater Management Plan was released for the Beryl/Enterprise area that aims to reduce the amount of water being pulled from the ground each year and balance that amount with the amount of water returning to the ground.

This will be done by "regulating" water rights, or prohibiting their owners from drawing water from the ground. The plan will be implemented over the next 115 years, reducing which water rights may be used in stages, beginning with the most recently issued. Now, Cedar Valley water owners could face a similar challenge.

State Engineer Kent Jones visited Cedar City Jan. 7 for a meeting with water rights owners and interested citizens to discuss the likely institution of a Groundwater Management Plan for Cedar Valley and ask for the public's help in verifying the information he has on existing water rights.

Before Jones fielded questions, employees from the Utah Division of Water Rights presented on water policy, Groundwater Management Plans, and the current situation in the Cedar Valley.

Deputy State Engineer Boyd Clayton said before the state engineer can institute a Groundwater Management Plan there must be significant scientific research, more public meetings, and the ability for the public to comment in writing. He said a plan for the Cedar Valley has not been decided yet.

However, because of the way the state law is written, water rights are "first in time, first in right," meaning if a GMP is instituted, water rights issued more recently may have to be cut back. He said if that happens, the owners don't actually lose their right, but are unable to draw water from the aquifer unless at some future time enough water is available to make those rights useable.

"This isn't a time to panic," he

SEE WATER | 9

For more information visit www.waterrights.utah.gov Submit written comments to waterrights@utah.gov or Utah Division of Water Rights 646 N. Main St. P.O. Box 506 Cedar City, Utah 84721-0506

WATER

Continued from page 1

said, adding that while the state engineer is directed by law to give priority to the earliest water rights, he may consider voluntary arrangements and entities and individuals in the area are encouraged to work together, participate in discussions, and try to find solutions.

Assistant State Engineer James Greer said the Cedar Valley Aquifer is being depleted about 28,000 acre-feet per year, which is 4,000 to 8,000 acre-feet more, per year, than is recharged on average. However, water rights exist for between 50,000 and 76,000 acre-feet, and those rights need to be reduced to "safe yield," or the 20,000 to 24,000 acre-feet that is believed to go back into the aquifer in an average year.

When asked what water right years were in danger of being "regulated," or cut, Greer said unfortunately the list of existing water rights has inaccuracies, so they don't know that at this point. However, he asked owners of water rights to visit the Division of Water Rights website and look at the list of rights to make sure their information is accurate. The list can be found at www.waterrights.utah.gov under the Law/Agreements tab, Groundwater Management Plans, Cedar Valley (Iron County), and Priority Listing.

Jones also said because certain areas are seeing greater declines in water levels than other parts of the valley, the GMP may take that into consideration and cut back rights based on both region and priority date.

While many questions were fielded and comments were heard during the meeting, Jones also asked anyone with comments to submit them by Feb. 12 to waterrights@utah.gov or Utah Division of Water Rights, 646 N. Main St., P.O. Box 506, Cedar City, Utah 84721-0506.

take that into consideration and cut back rights based on both region and priority date.

While many questions were fielded and comments were heard during the meeting, Jones also asked anyone with comments to submit them by Feb. 12 to waterrights@utah.gov or Utah Division of Water Rights, 646 N. Main St., P.O. Box 506, Cedar City, Utah 84721-0506.

Much of the data presented dated back to the 1930s and 1940s, and Jones was asked whether the goal was to bring water levels back up to that point. He said while an increased water table would be nice, "we're just looking to do what needs to be done to stabilize" and stop from depleting the aquifer further. He said in the areas with the most depletion, the water table has dropped up to 90 feet and subsidence has actually decreased the storage capacity of the aquifer.

It was brought up by a member of the Coal Creek Irrigation Company that the company and the Central Iron County Water Conservancy District are working to develop aquifer recharge basins and capture much of the water that evaporates in the Quichapa Lake area, and Paul Cozzens, a Cedar City Council member and water conservancy district board member, said Cedar City has seen some success with small recharge efforts. He asked if any resources, such as funds or engineering work, were available from the state to help the valley with further efforts.

Jones said his office did not have any such resources available, but that there may be some options through sister agencies such as the Drinking Water Board. Paul Monroe, Central Iron County Water Conservancy District executive director, said the district has been working on efforts to build gravel pits to trap excess water from Coal Creek during high runoff years and allow it to percolate into the aquifer rather than evaporating.

This project has been in the works for at least four years, and the district has been working with the Utah National Guard. However, state funding is not available and the project has been pushed back another year, for possible completion in 2018. Monroe said some board members are eager to speed up the project and may push to do something sooner without the help of federal or state funds.

The CICWCD board has been working hard to find ways to import water to the valley, in addition to conserving and better utilizing Coal Creek water. It applied for water rights in valleys northwest of Cedar City in 2006, and in 2014, was granted those water rights. However, it has been involved in a legal battle since. Monroe said if those

court cases are resolved in the district's favor, being able to import that water will certainly work in the favor of water rights owners who face regulation under a Groundwater Management Plan.

Those interested in viewing the list of water rights or learning more about studies that have been done in the Cedar Valley or the information that was presented at the GMP meeting are encouraged to visit www.waterrights.utah.gov.

Future: Growth or Stagnation?

- "regulating" water rights
- beginning with the most recently issued
- State Engineer Kent Jones visited Cedar City Jan. 7 for a meeting with water rights owners and interested citizens
- more public meetings
- Water rights exist for between 50,000 and 76,000 acre-feet (regulators acknowledge a 34-52% error, showing incompetence)
- Unfortunately the list of existing water rights has inaccuracies (No kidding! And these folks will regulate water rights fairly?)
- Jones also asked anyone with comments to submit them by Feb. 12 to waterrights@utah.gov (Hurry up and Wait)
- The CICWCD board has been working hard to find ways to import water to the valley (not including tapping resources within the Cedar Valley Drainage Basin)

Alfalfa

- In 2004 Iron County produced 263,000 tons of alfalfa on 54,000 acres for 4.9 tons per acre.
- Alfalfa sells for $104 to $190 per ton with average of $170 per ton for 2010-2014.
- Commonly cited ranges in water requirements for alfalfa are 20 to 46 inches of water per season, or 2-4 acre-feet per acre per year.
- Much of the irrigation water goes back into recharging the aquifer. Still the water table has dropped up to 114 feet in some parts of the valley.
- Hay harvested at 12% moisture removes 240 lbs water/ton hay, or 1,800 lbs/acre for a normal crop of alfalfa hay per year.
- 4.9 tons per acre x $170 per ton = $833 per acre and 12% water means $100 per acre for 2-4 acre-feet.
- So some Iron County water is being sold with the alfalfa to places like China for $25-50 per acre-feet.