

An Update on MBMG's Virginia City Groundwater Investigation

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Project Objectives:

- 1) Improve the understanding of the source of the two springs that supply Virginia City's public water supply.
- 2) Evaluate the potential for impacts to Virginia City's springs due to new domestic or commercial wells.
- 3) Evaluate the potential to drill Public Water Supply Wells near Virginia City.



Explanation

- Virginia City Springs
- * Other Monitored Springs
- Major Streams
- - - Virginia City Incorporated Area

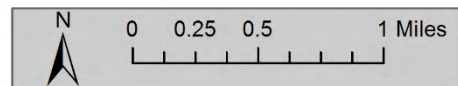
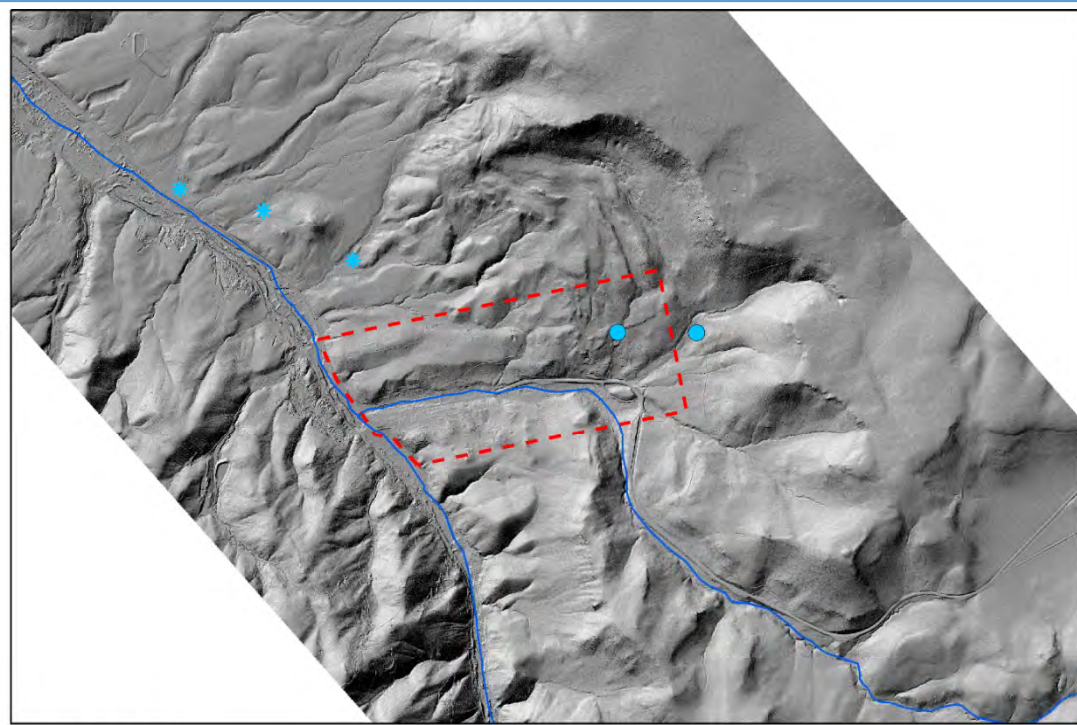


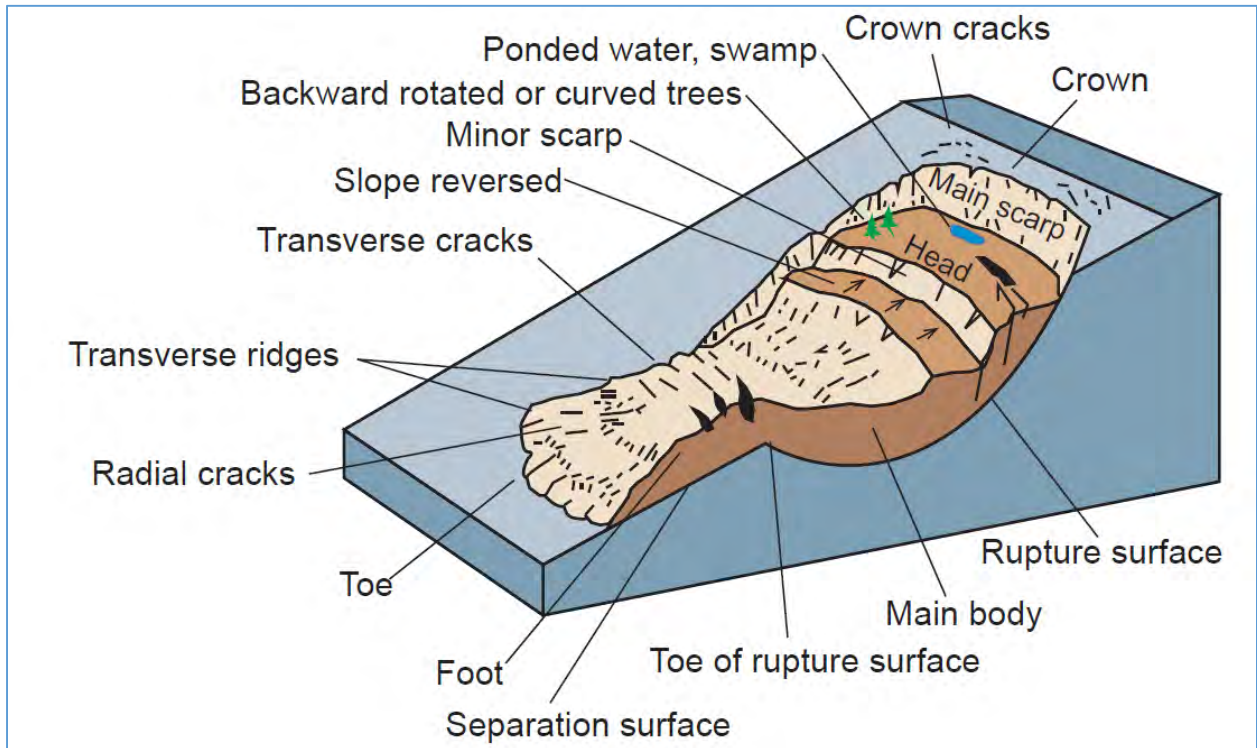
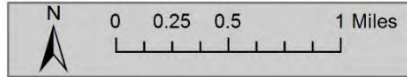
Figure 1. The Virginia City investigation focuses on the area up gradient from Virginia City's Springs, the drainage of Daylight Creek, and the area north west of Virginia City where other springs occur.

LiDAR Mapping (detailed elevation):

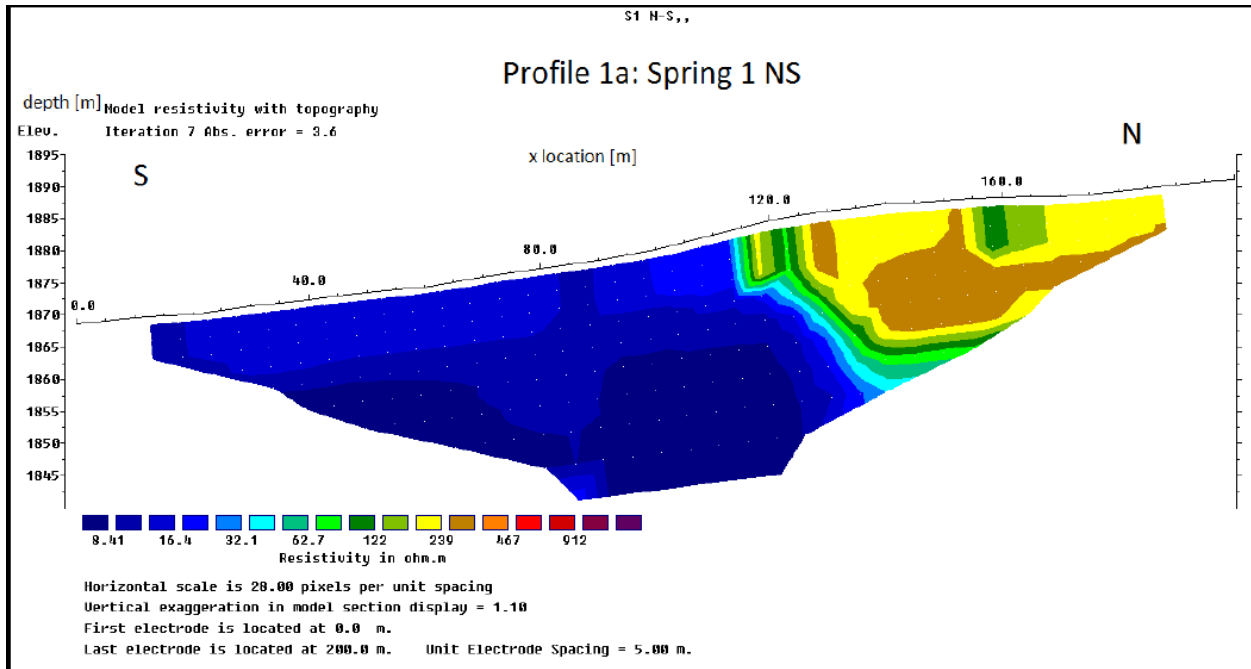


Explanation

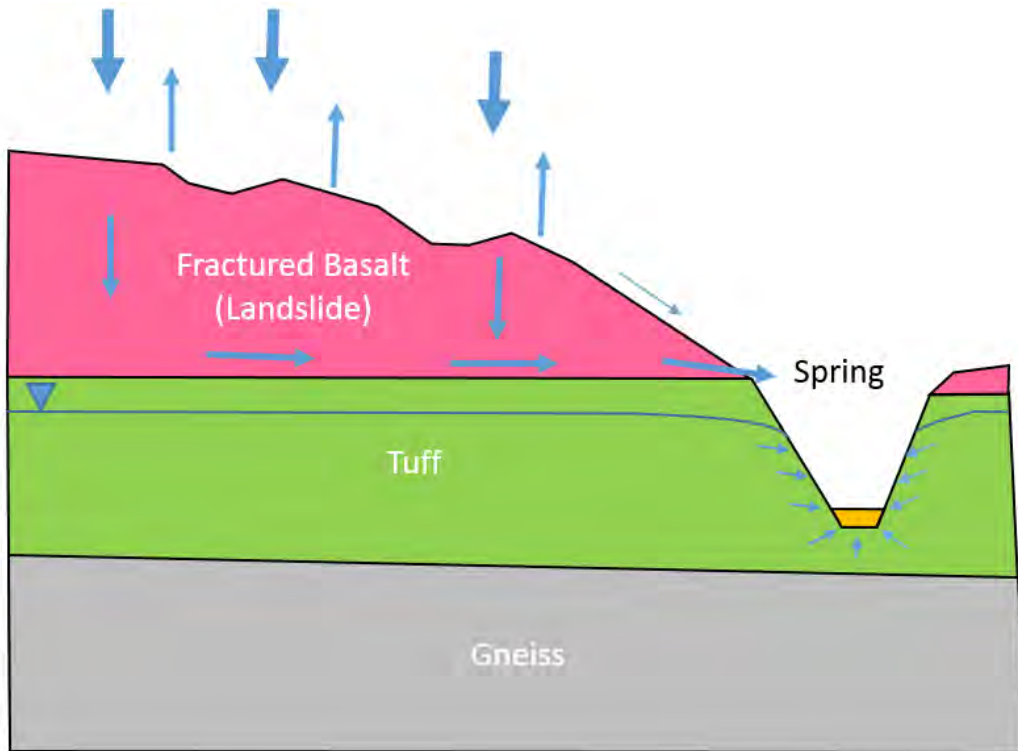
- Virginia City Springs
- * Other Monitored Springs
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MTECH Geophysics Field Camp (resistivity and seismic):



Drilling:



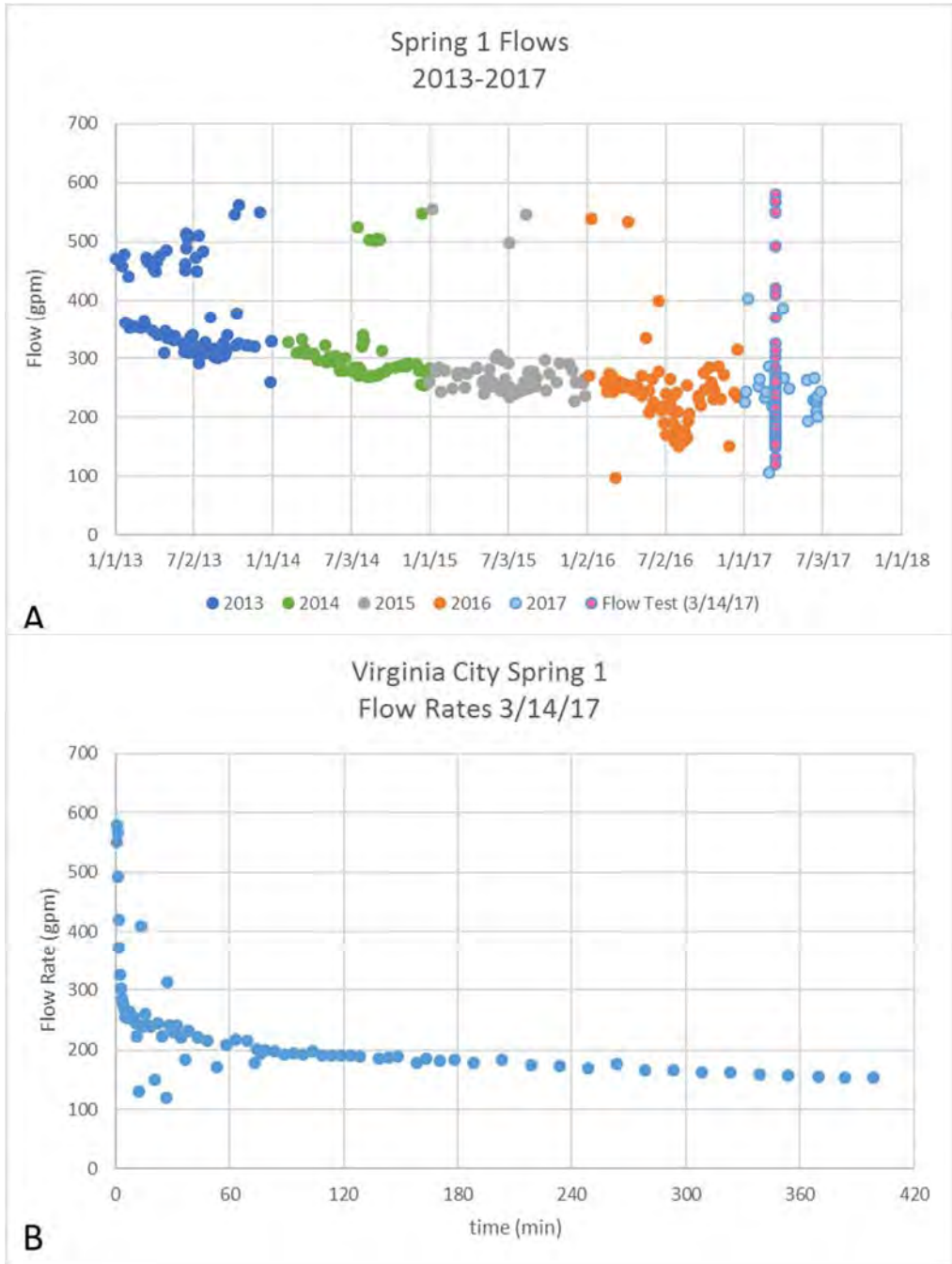
There are productive fractured zones within well-lithified tuff.

We plan to do aquifer tests.

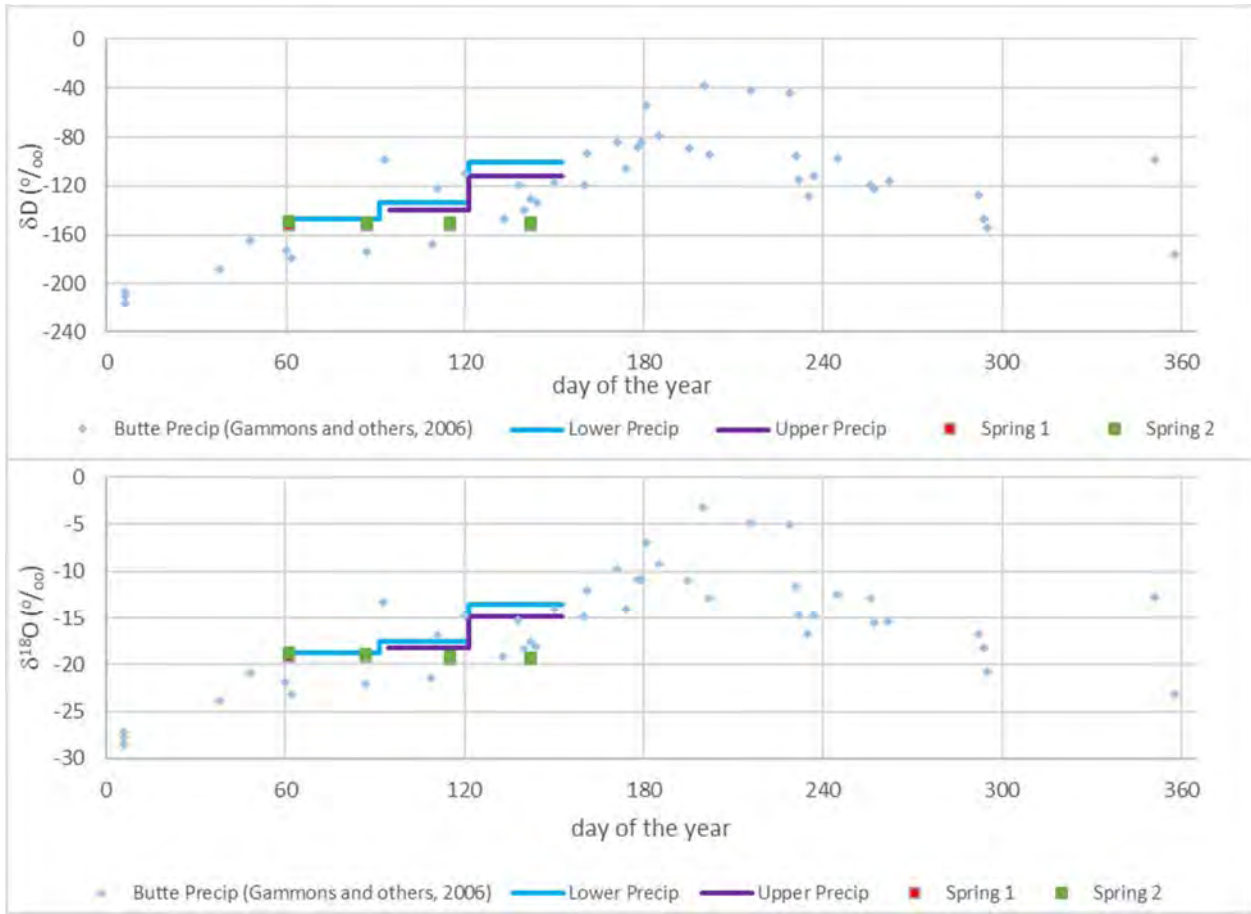
Geologic Mapping (Jessie)

Monitoring Springs 1 and 2 (Tom)

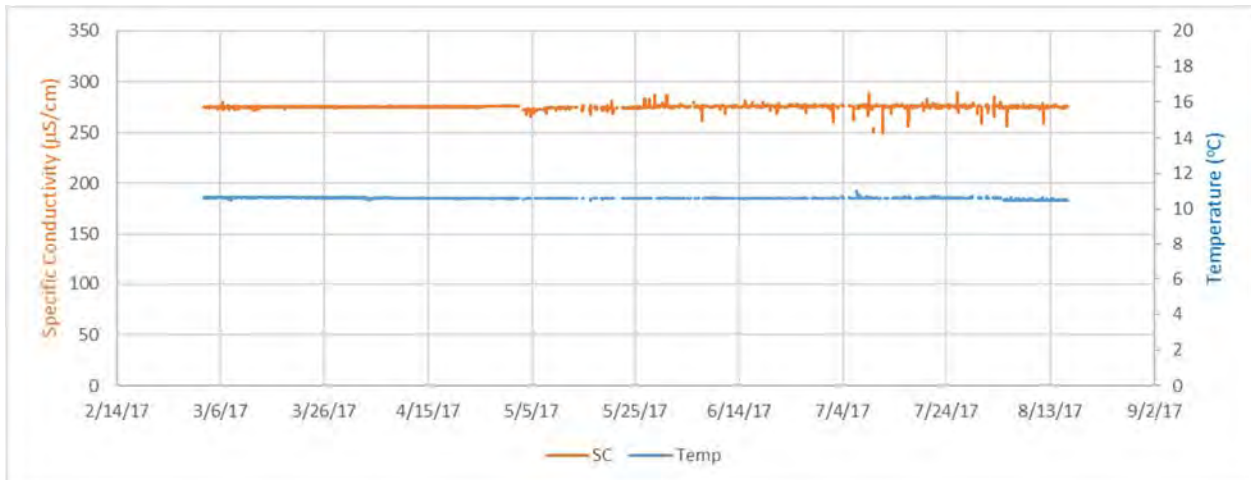
Flows



Stable isotopic composition (waiting on results from June-Aug 2017)



Temperature, specific conductivity, pH, DO, and turbidity are stable. DO is near 100%.



Major and trace element composition of the springs are stable, and similar to streams.

The spring water is more than 60 years old (³H), and less than 1,800 years old (¹⁴C). We are waiting on CFC results (useful for recharge after 1931).

Preliminary Conclusions:

There are extensive landslide deposits in the Virginia City area.

Spring 1 gets its water from infiltration of precipitation within the dry lakes and landslide areas. This infiltrated water flows on top of the tuff as a perched flow zone.

The groundwater flow system feeding Spring 1 is fairly large, and has significant storage. The water is at least 60 years old.

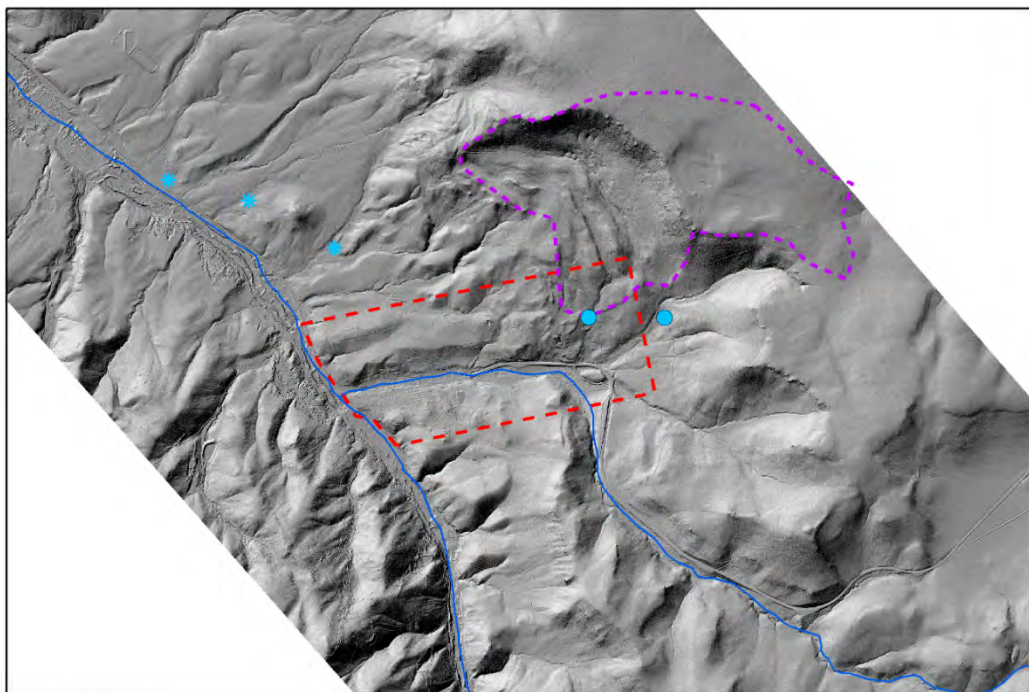
Recorded flows from Spring 1 have reduced over the last 5 years. The cause is not yet clear.

Spring 1 could be impacted by septic systems installed in its recharge zone. The effect would depend on the number of septic systems, and how effective they are.

Fractured zones within the tuff are potential targets for pumping wells.

It is unlikely that pumping wells would affect spring flows, since they would be completed in different zones. Pumping these wells would likely affect the smaller springs discharging further down slope.

If unsealed wells are completed in the recharge zone for Spring 1, water that is flowing to the spring could flow to the deeper aquifer instead. This would cause a reduction in the flow from Spring 1.



Explanation

- Virginia City Springs
- * Other Monitored Springs
- Major Streams
- Spring 1 Likely Recharge Area (~720 ac)
- Virginia City Incorporated Area

