

Impact of Climate Change on Spring Discharge in the White Mesa Cultural and Conservation Area, Manti-La Sal National Forest, Southeastern Utah

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Abstract. There has been remarkably little documentation of historical changes in spring discharge in southwestern forests. The White Mesa Cultural and Conservation Area (WMCCA) is currently the only non-grazed portion of the Manti-La Sal National Forest in southeastern Utah, so that it is the only portion of the national forest where hydrologic changes in the absence of on-site anthropogenic impact can be studied. In July 2015 water samples were obtained from 20 springs in WMCCA and analyzed for As, heavy metals, and stable isotopes of oxygen and hydrogen, while two samples were dated using CFC and SF₆ concentrations. In addition, spring locations were compared with historic maps and databases. A preliminary analysis of results indicates the following:

- 1) Many springs mapped in the 20th century can no longer be located.
- 2) The majority of samples are elevated in As, Cd and Pb, which is consistent with the historic mines that are above the springs.
- 3) Stable isotopes can distinguish springs fed by snow melt from springs fed by summer rain and can delineate groundwater pathways.
- 4) Water from the spring with the longest groundwater pathway has a residence time of 35-37 years, while water from the spring with the greatest discharge has a residence time of 26-29 years.

Current research involves further testing of the hypothesis that spring discharge will respond to climate change with a time lag of 25-40 years by recollecting samples in the winter of 2016 and looking for seasonal changes. Results will be reported at the meeting.