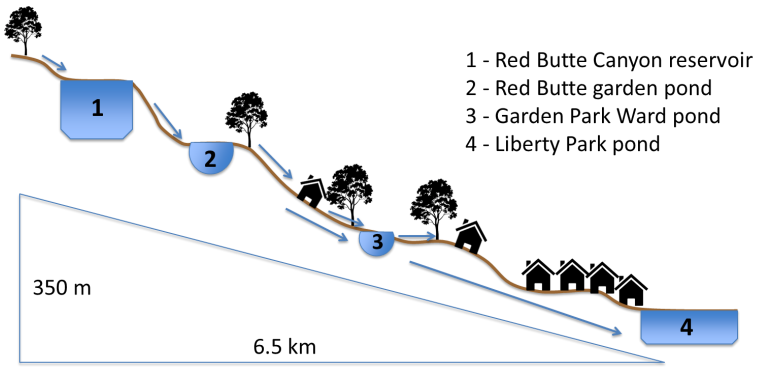
Project W.A.S.H.E.D

Water **A**long **S**treams with **H**igh **E**vaporative **D**emand

Project Goals: Evaporation causes enrichment in deuterium and ^{18}O of the residual water. For a string of lakes along the same stream, we hypothesized that lake water would be more evaporatively enriched that the upstream water, and that this enrichment signal would propagate downstream, increasing with each successive lake or pond.



Similar to a string of lakes, soil profiles also show evaporative enrichment. We hypothesized that surface soils will be more enriched in deuterium and ^{18}O than deeper soils, and this difference will be more

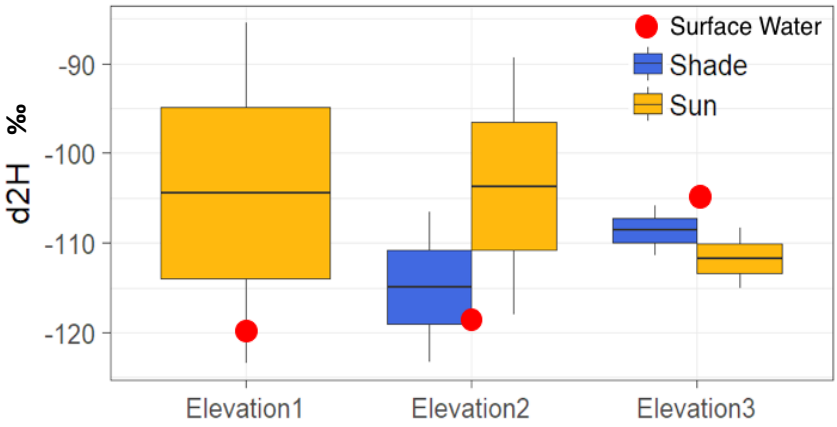


Fig 1. (above) δD of soil water at both depths (5 and 25cm) classified by sun or shade. The value of surface water is shown as a red dot. Note that elevation 3 is heavily irrigated.

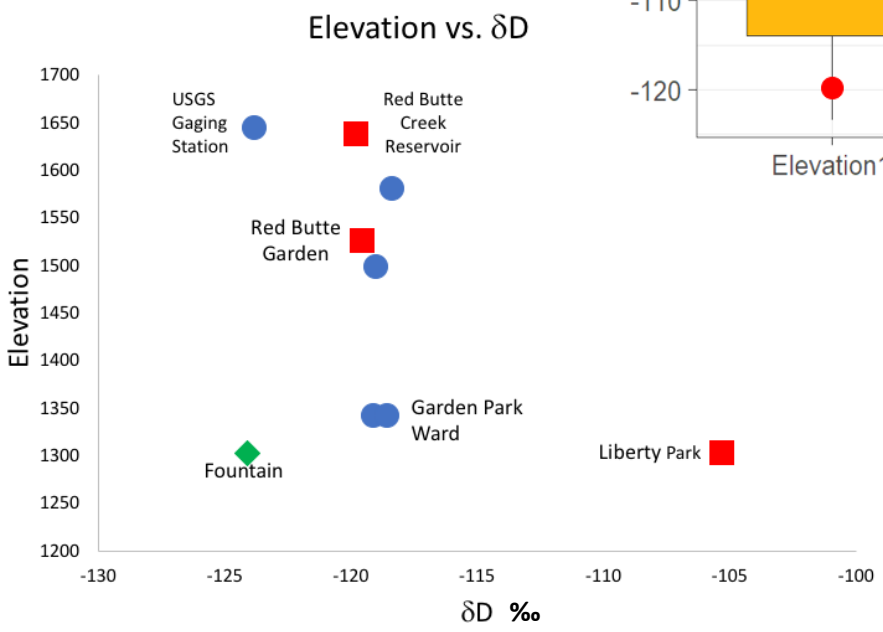


Fig 2. (left) δD of all surface water samples versus elevation. Reservoirs/ ponds in red squares, streams in blue circles, and a groundwater-fed water fountain in green diamond.

Conclusions: While surface water is constantly evaporating, this signal is only visible if the water has time to equilibrate; so in small, shallow lakes with a short residence time, the water moves through too fast to show evaporative enrichment. However, in larger reservoirs with a long residence time, the water turnover time is greater, so a cumulative evaporative enrichment signal becomes apparent. The water maintains this enrichment in δD and $\delta^{18}O$ until the next large reservoir down the string of lakes.

As expected, soil is more evaporated on the surface than in deeper soils. The Liberty Park pond shade and sun soils are very similar, and with a lighter isotopic composition than the pond water, indicating that they both receive sprinkler water often enough that there is minimal evaporation enrichment in the soil.