**Introduction**

The link between vegetation and the hydrologic cycle is poorly understood. Ecological work is critical to understanding the role of vegetation within catchment processes. It has been shown that water sources trees use come from different pools than those generating streamflow, as determined by stable isotope data (Brooks et al., 2010). Additionally, the role of roots in changing the landscape has not been widely explored, especially in rock outcrops and possibly the underlying bedrock.

**Study Site**

Gordon Gulch, Boulder Creek CZO (N 40° 07' 48.14", W 105° 28' 10.08") in Roosevelt National Forest, CO. North-facing slope has highly dense lodgepole pine. South-facing slope has more widely spaced ponderosa pine.

**Methods**

- Sapflow (heat-dissipation) sensors were used to calculate xylem water flux rate using SF765 statistics software.
- Weekly isotopic sampling over three weeks on the north-facing slope, south-facing slope, and rock outcrops from the ponderosa pine and lodgepole pine.
- Soil sampling on both slopes at 5 cm, 10 cm, and 20 cm.
- Cryogenic vacuum distillation for 3 hours for all samples.
- Isotopic analysis using the Picarro Isotopic Water Analyzer, LT212o.

**Objective 1 – Results**

- **Figure 1:** Isotopic sample sites in water and plant tissue. The bedrock.

**Objective 2 – Results**

- **Table 1:** Different rates of water use of the trees located in rock outcrops. Trees were growing in soil on the south-facing slope and were growing in rock outcrops. Tree 1 on the south-east side and Tree 2 on the west side, both averaged approximately 20-25 mm a year.

**Conclusions**

- Our results are consistent with those of Brooks et al. (2010), where the trees and the stream have distinctly different isotopic composition – suggesting a hydrologic disconnect between forest transpiration and streamflow generation processes.
- Trees in the Gordon Gulch ecosystem were highly responsive to rainfall events by changing the depth at which water was taken up and thus, demonstrating the highly dynamic behavior of roots.

**Acknowledgements**