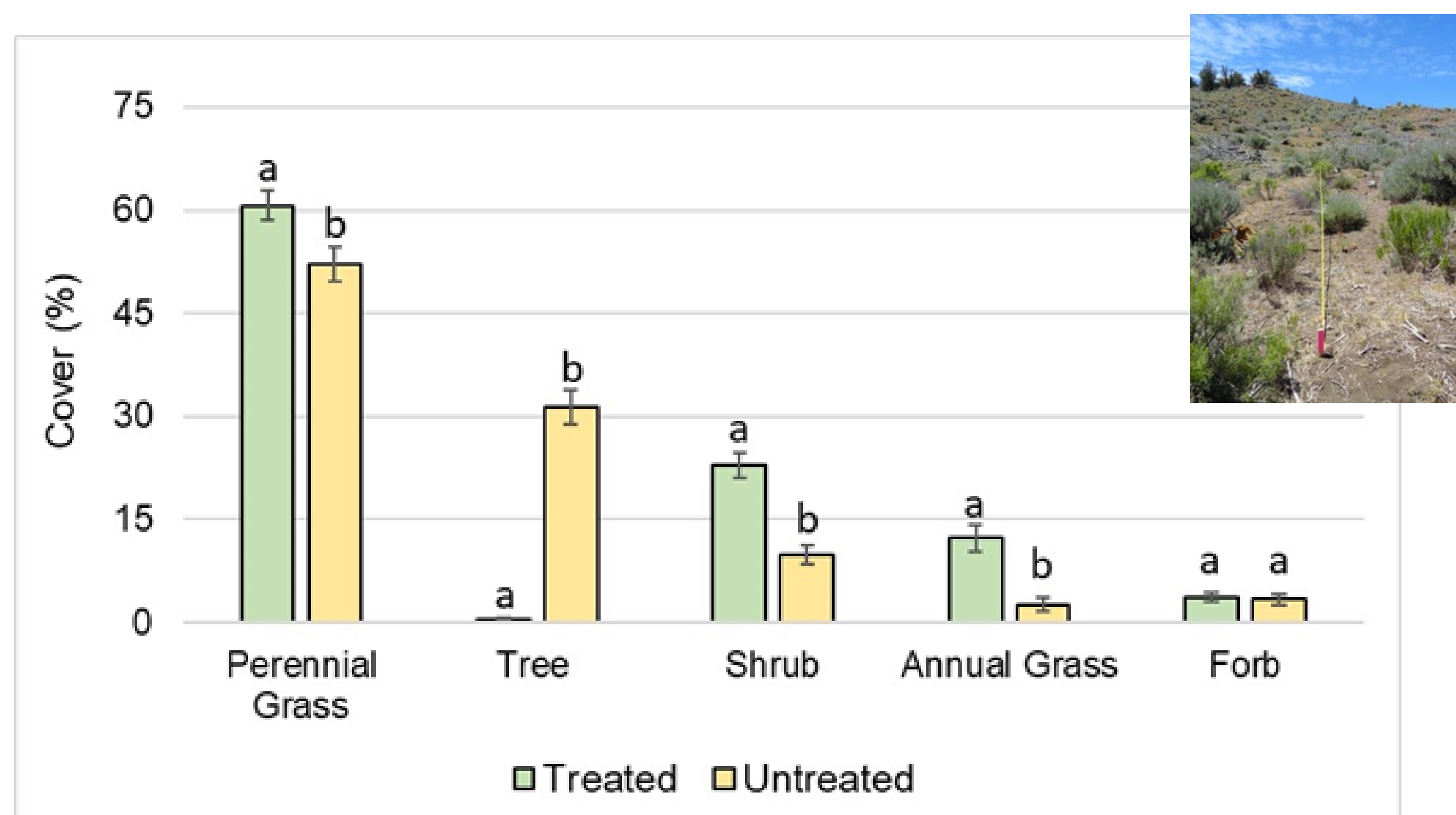
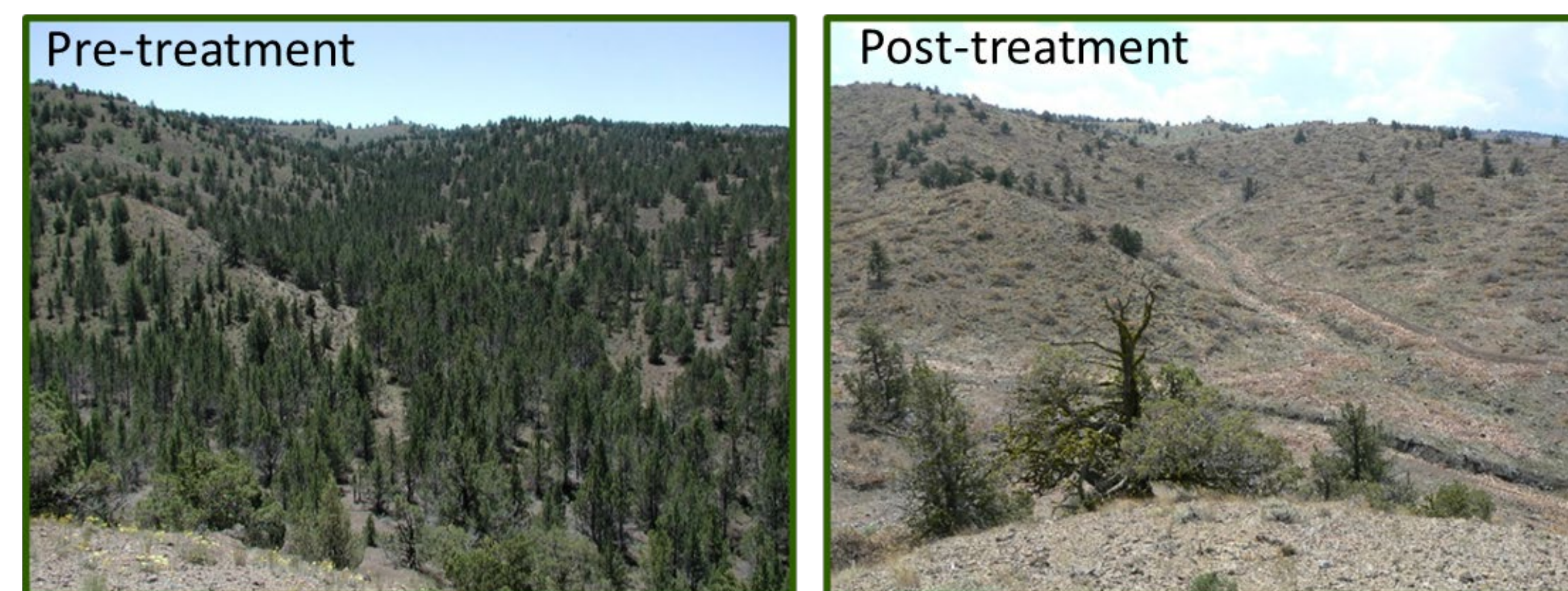
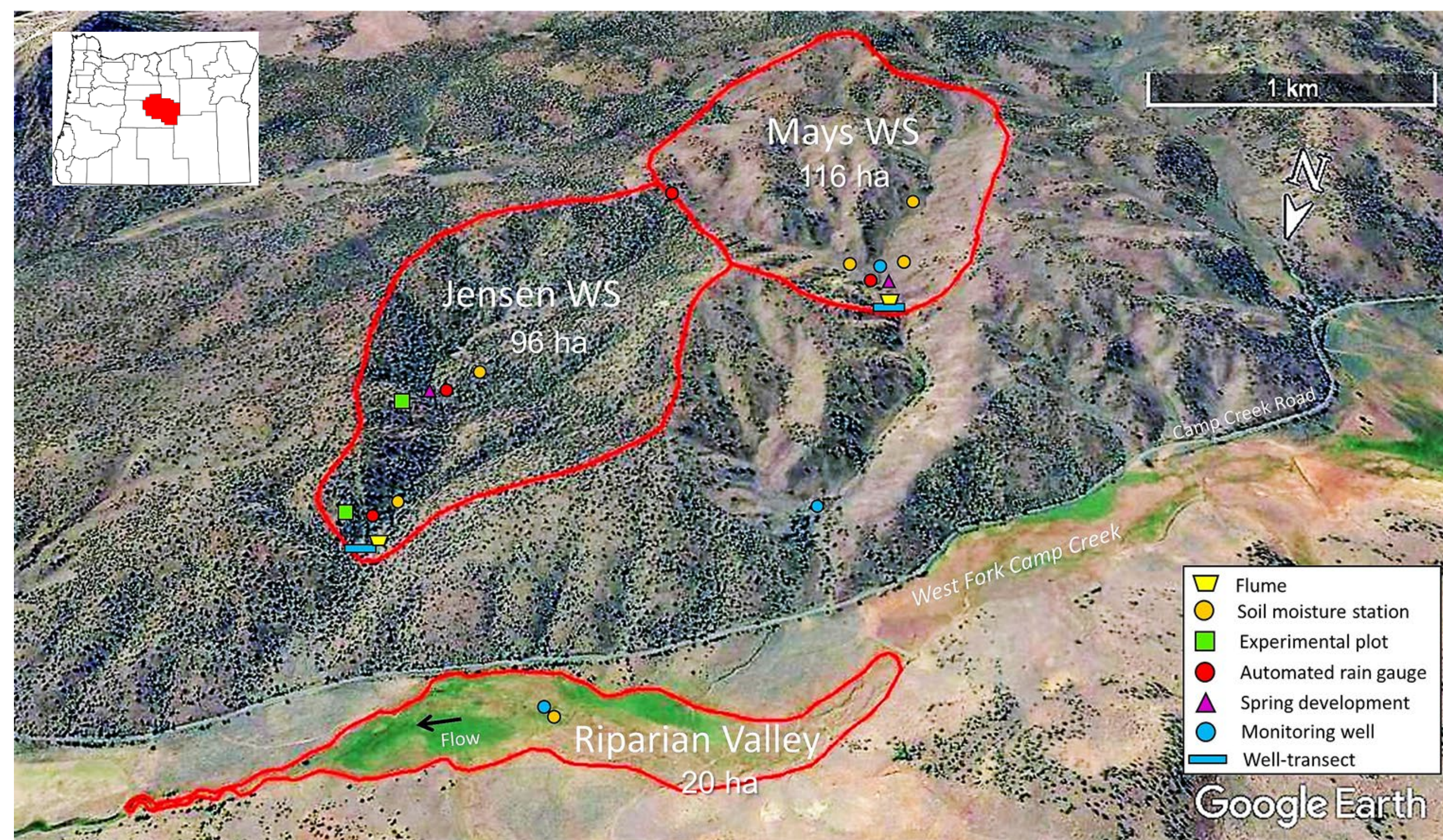




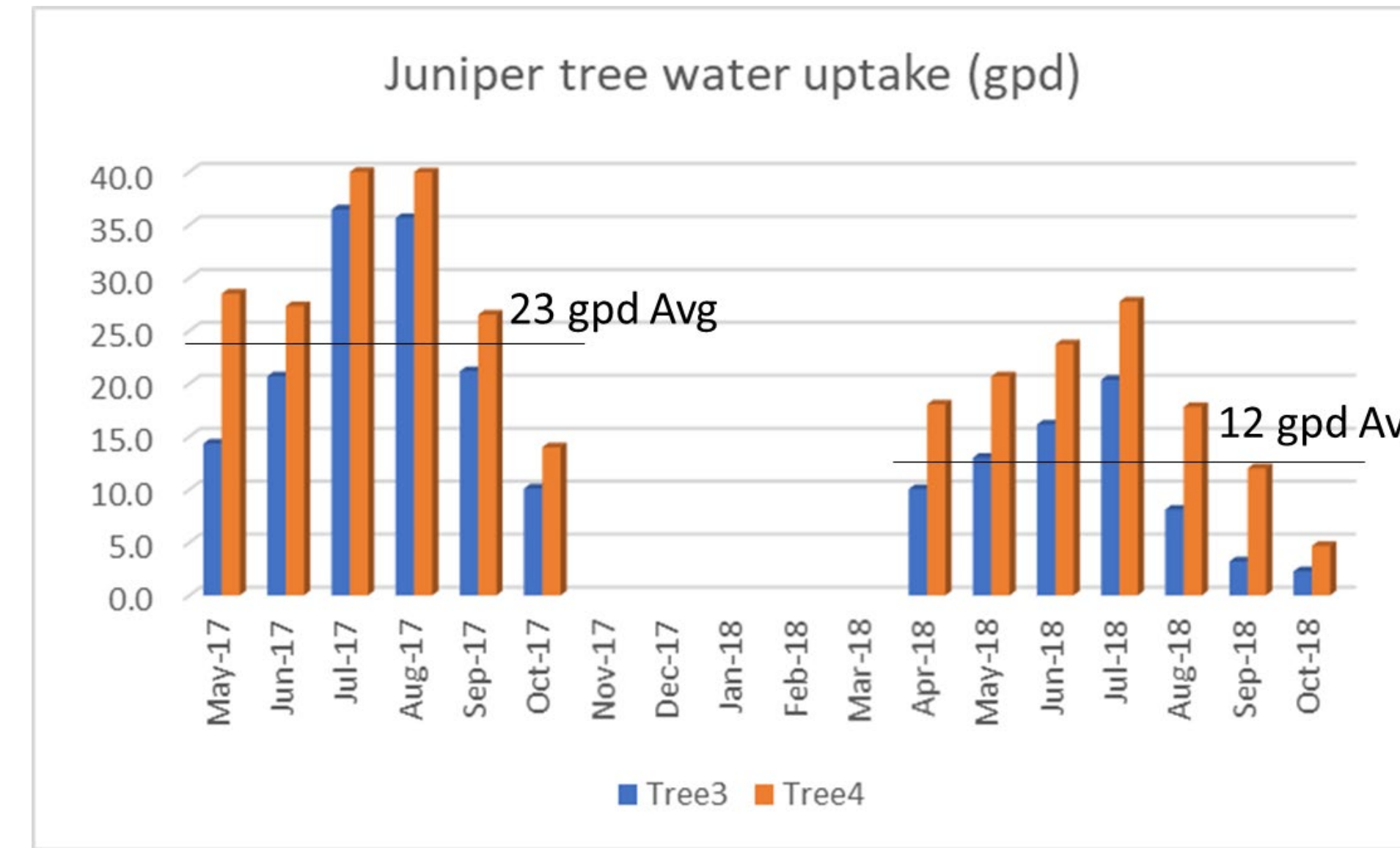
ECOHYDROLOGICAL RELATIONSHIPS IN WESTERN JUNIPER WOODLANDS

Carlos Ochoa, Tim Deboodt, Nicole Durfee, Mohamed Abdallah

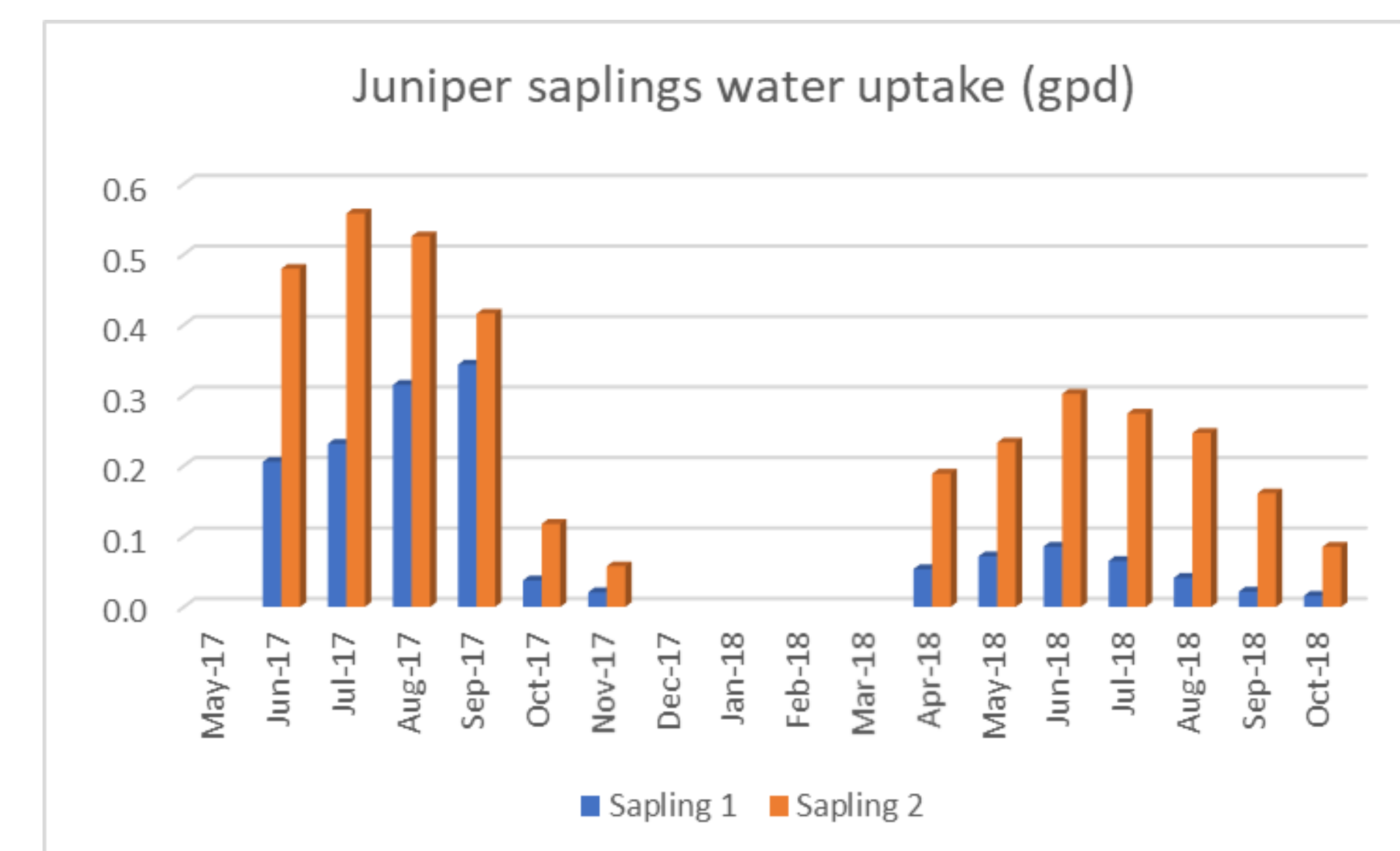
The results from a long-term study in western juniper (*Juniperus occidentalis*) dominated settings of central Oregon showed greater soil moisture levels and an increase in shallow groundwater residence time in the watershed where 90% of juniper was removed in 2005. Measurements of juniper tree transpiration showed water uptake was variable, averaging 45 L day⁻¹ during the summer in a dry year vs. 88 L day⁻¹ in a wet year. Springflow and streamflow rates were generally higher at the treated watershed. This was particularly evident in snow-dominated precipitation years when greater amounts of groundwater recharge and deep percolation were also observed. Juniper canopy intercepted a significant amount of rainfall. Greater herbage production, and grass and sagebrush cover was observed in the treated watershed. Perennial grass cover was positively correlated with changes in soil moisture, whereas juniper cover was negatively correlated with soil moisture content. Shallow groundwater response observed in upland and valley monitoring wells indicates temporary hydrologic connections between upland watersheds and valley locations during the winter precipitation and spring runoff seasons. Compared to upland wells, shallow groundwater recharge showed a 4-to-6-week delayed response in wells located downstream in the valley. Study results provide valuable information for understanding seasonal ecohydrologic relationships in western juniper-dominated landscapes.



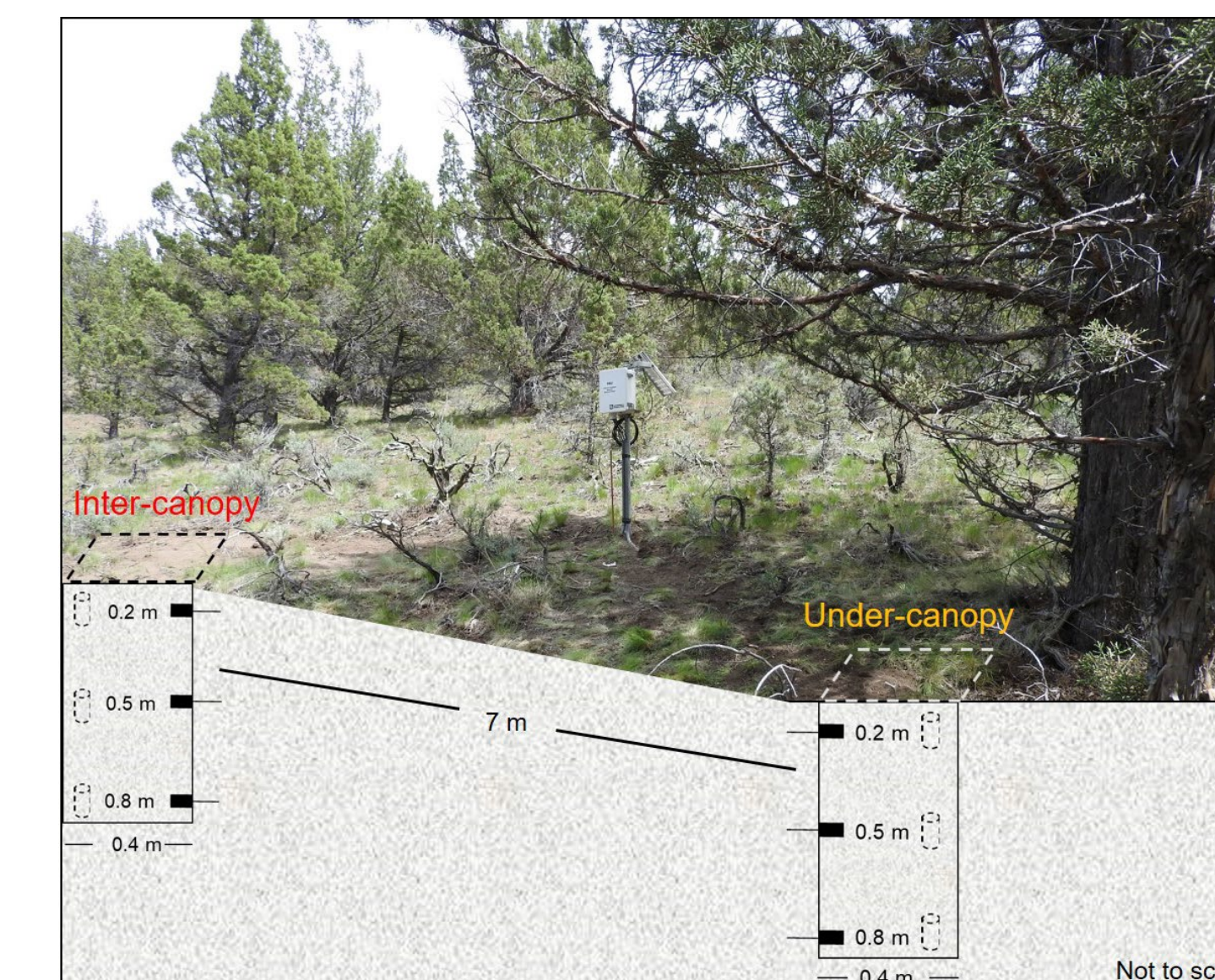
- Greater cover for perennial grass, annual grass, & shrubs in treated WS.



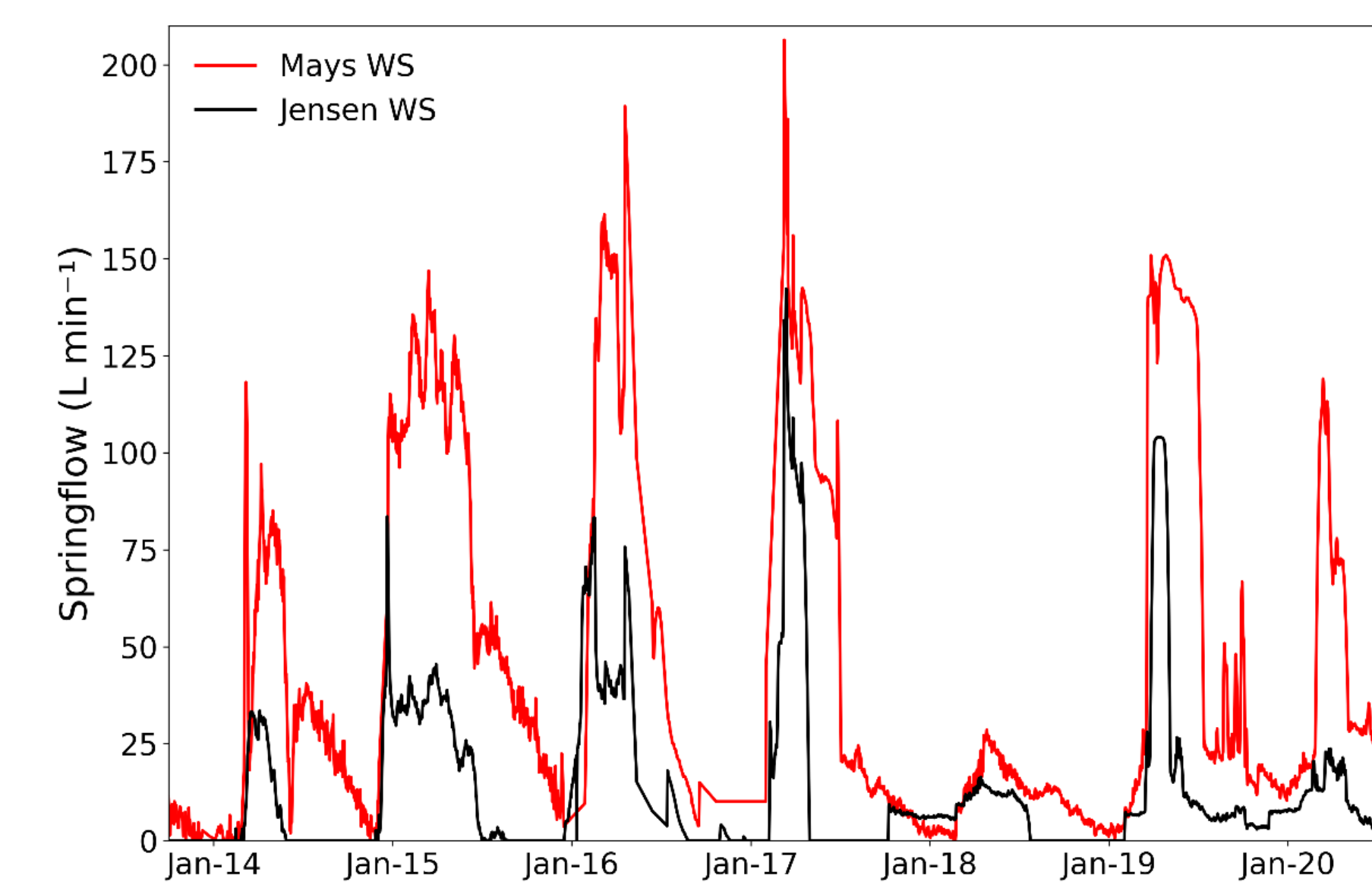
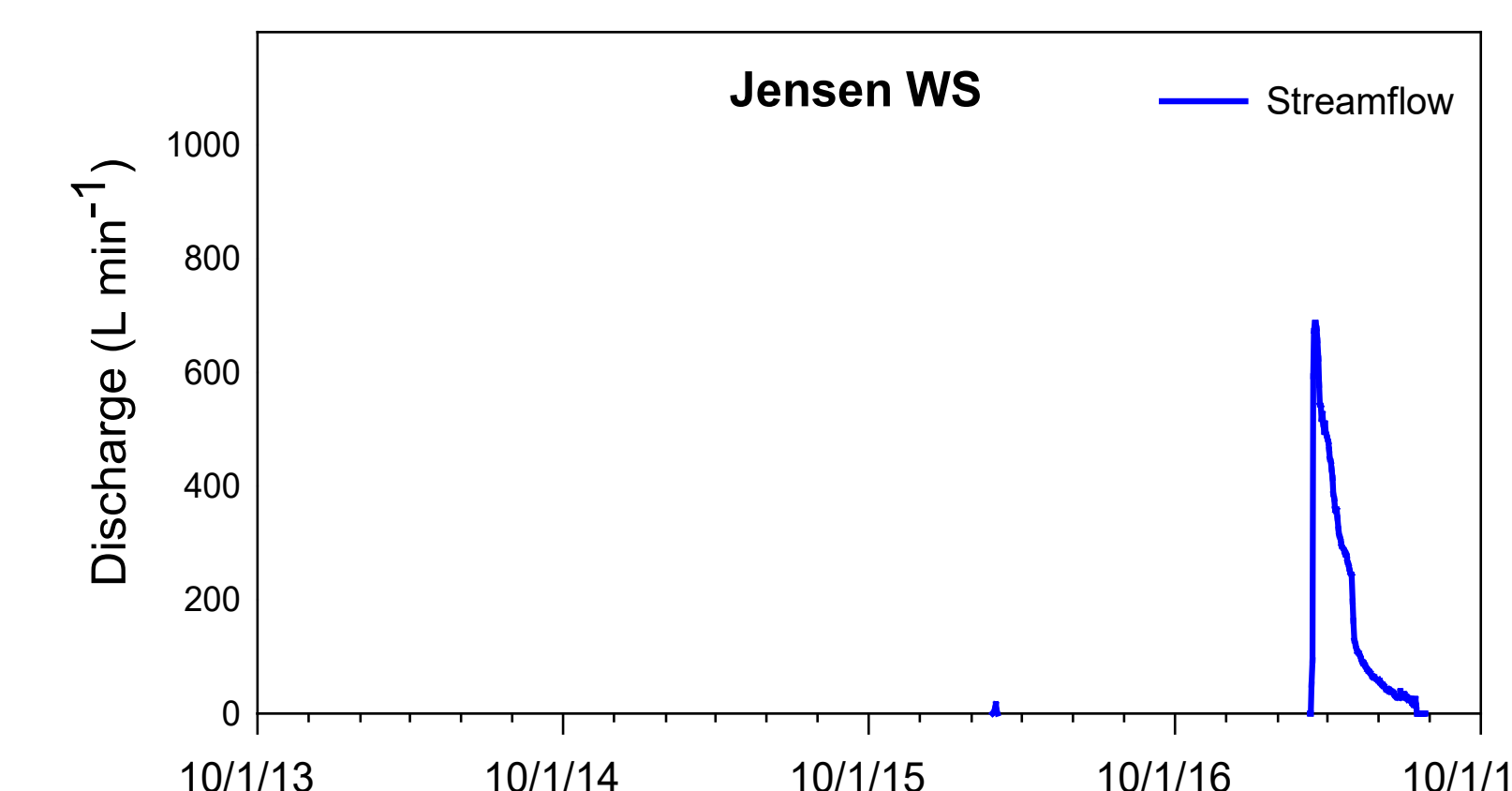
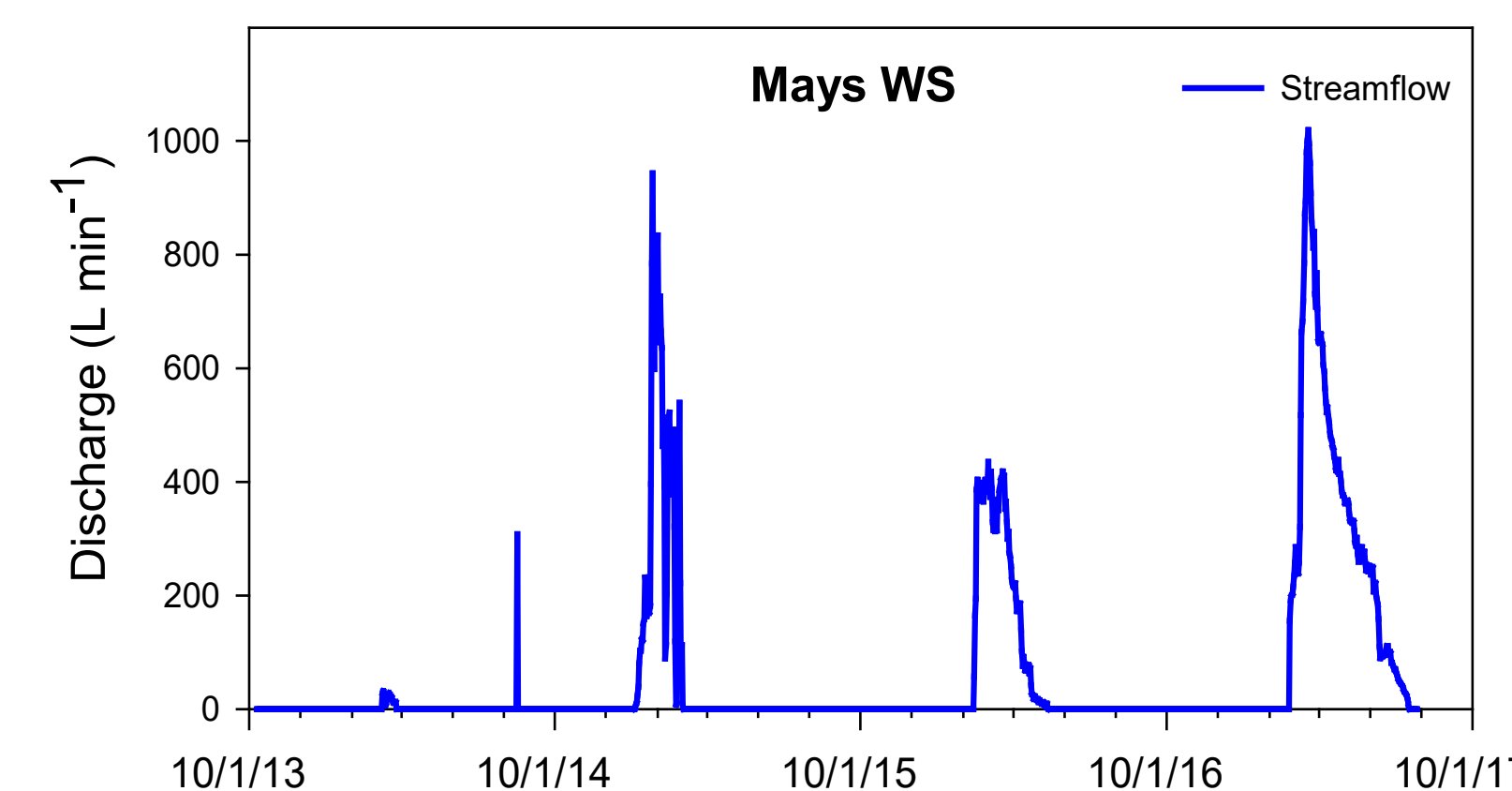
- The average water uptake by juniper trees is almost double in a wet (15 inches ppt) vs. a dry year (8 inches ppt).



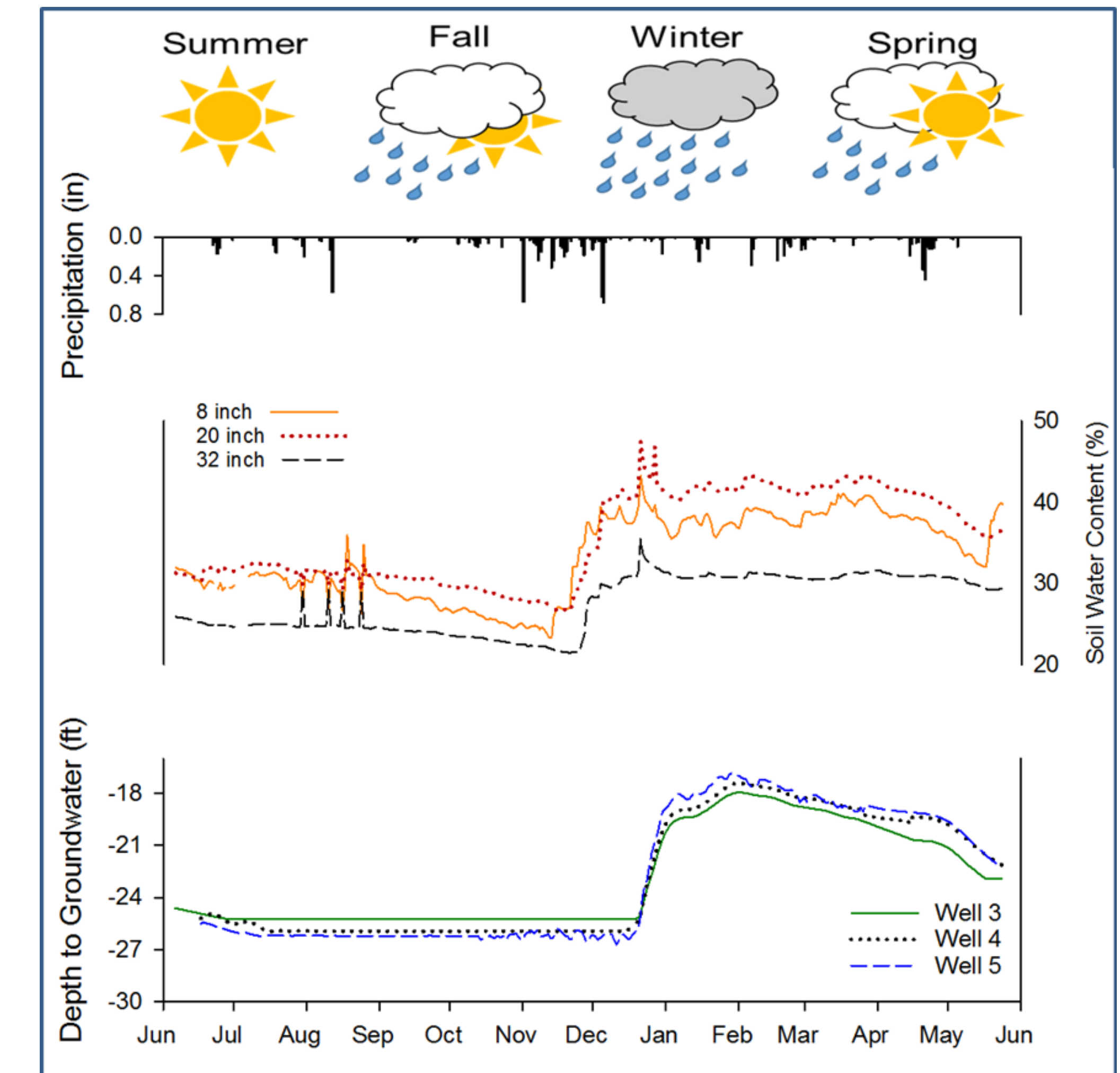
- Juniper saplings exhibit a similar water uptake pattern than mature trees; more water used in wet year.



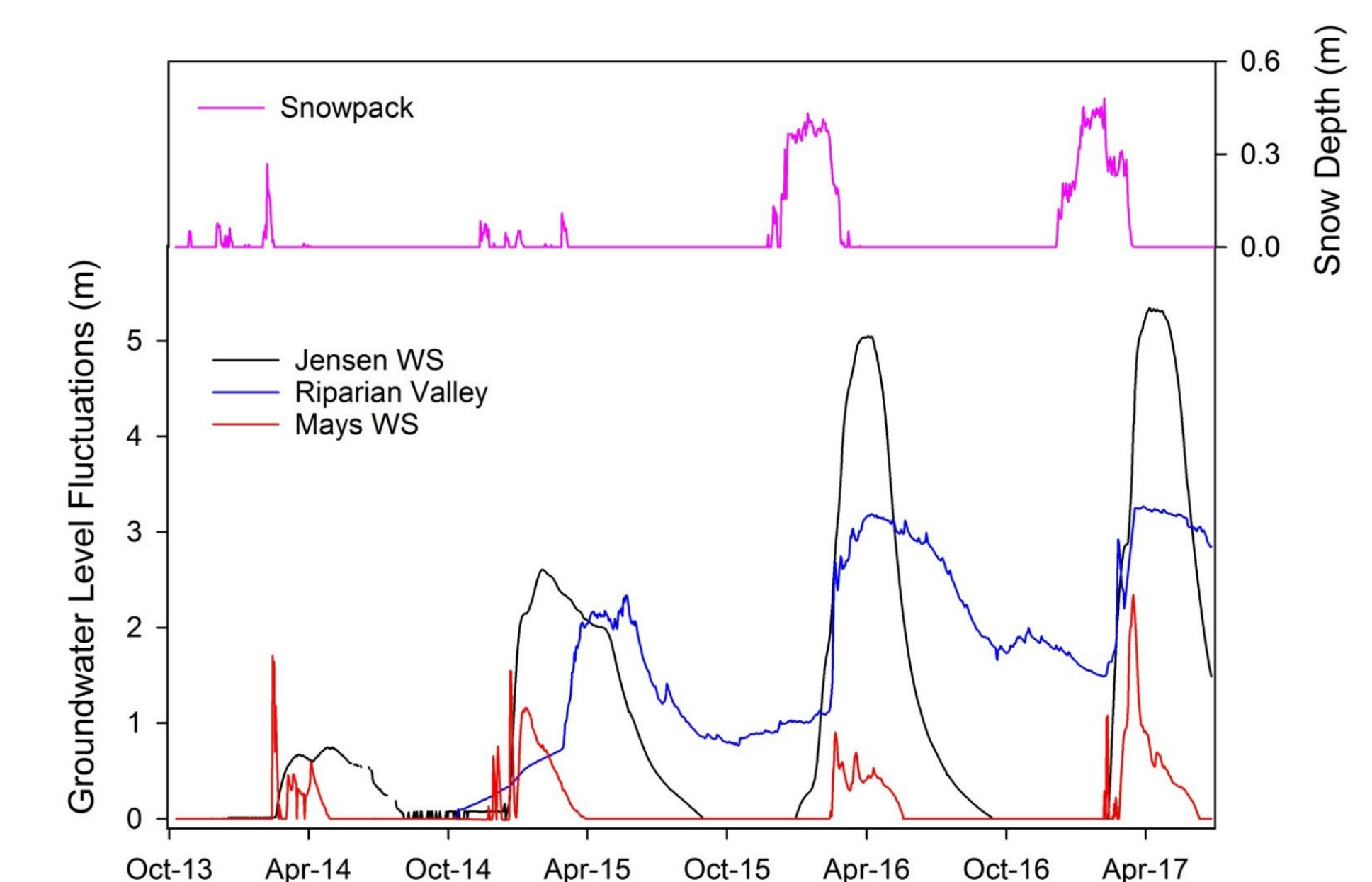
- Average juniper interception was 41%.
- Lower moisture for deeper sensors (0.5 & 0.8m) at under-canopy locations than inter-canopy.



- Streamflow and springflow significantly higher in treated (Mays) WS.



- Summer precipitation affects soil moisture but has no effect on groundwater recharge.
- Late fall and winter precipitation important for soil moisture saturation leading to shallow groundwater recharge.



- Greater snowpack = greater surface water & groundwater response.

