

Restoring Hydrological Function on Landscapes Through the Removal of Western Juniper

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Western juniper (*Juniperus occidentalis*) invasion of western U.S. rangelands has not only replaced native plant communities but has also degraded the hydrologic cycle in invaded rangelands. Juniper canopies intercept and transpire greater quantities of precipitation than native grass and shrub communities. The combination of less water entering the soil and strong ability of western juniper to extract and transpire water means that little water has a chance to percolate beneath the root zone. Therefore, invasion of western juniper on large areas that were once primarily grassland has strong implications for recharge of aquifers.

In this pilot study, passive capillary lysimeters were installed to obtain measurements of deep soil water drainage in a control watershed and a treatment watershed where juniper was removed. Data were collected during the winter and spring following juniper removal. Drainage in the treatment area increased 3-7 days after the first precipitation event of the year and subsequent precipitation events. In the control area, precipitation reached the deeper soil layers approximately two months after winter precipitation began. The difference in deep drainage collected in the treatment lysimeter as compared to the control was 1.8" which is equal to 9% of the total precipitation during the monitoring period. The data illustrate the difference in the amount of rain and snow intercepted and evaporated by the juniper canopy in the control as compared to the treatment watershed, and water taken up and transpired by juniper in the control watershed during the mild winter and spring when native grasslands were dormant.

This study demonstrates how removing western juniper from invaded landscapes has the potential to restore hydrologic function thereby making more water available for native plant communities in support of wildlife and agriculture and contributing to the

maintenance of a sustainable water supply.