



Hydrologic Functions of a Valley-Scale Rangeland Riparian Area

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In northern New Mexico we have identified an expanded riparian ecotone that encompasses the full width of a 20 km-long valley draining piñon-juniper rangelands. The valley-scale riparian ecotone is supported by water from traditional irrigation systems and provides benefits common to traditional rangeland riparian areas: terrestrial and aquatic species habitat, water quality protection, vegetation community diversity; and buffering of hydrologic events. Our study objective was to characterize the underlying surface water and groundwater hydrological interactions in one valley on the Upper Rio Grande. We used a combination of field measurements and modeling to determine different components of the water budget. Average ditch flow of 0.9 cms, ditch seepage of 16%, and irrigated field deep percolation of 30% resulted in groundwater level rises up to 0.8 m over the entire valley 4 to 6 weeks after the irrigation season started. We calculated that on average, 50% of the water diverted into the main irrigation ditch returns back to the river as surface return flow and about 10% of the total ditch inflow returns as groundwater flow. Our results show that seepage from this continuously wetted ditch channel during the irrigation season provides optimum conditions for Rio Grande cottonwood establishment. The riparian valley ecotone acts as a buffer for runoff events from adjacent piñon-juniper uplands. Results from this study show that a significant amount of water being diverted into the valley returns back to the river after completing its task of supporting important production and ecological functions in this expanded riverine valley.

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