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Modulation of river flow by irrigation system surface water ground water interactions

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Abstract:

Interactions between surface water and ground water can benefit terrestrial and aquatic species habitat, increase aquifer recharge, provide shallow ground water return flow, and add to river flow. The objective of this study was to characterize the surface water and ground water interactions occurring in an irrigated valley along the Rio Grande in northern New Mexico. We used a combination of field measurements and modeling for determining different components of the water budget. Our results show that on average ditch flow is 0.9 cms, ditch seepage is 10%, irrigated field deep percolation is 30%, and ground water level rise is 0.4 m over the entire valley 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. Results from this study show that a significant amount of water being diverted into the valley seeps from ditches and percolates below fields and resides in shallow groundwater for 1 to 3 months before returning to the river. This storage and release function provides water to the river in times of low flow and may save water on a regional basis by reducing evapotranspiration losses.

Impact Statement:

This project has provided the impetus for local irrigation groups to adopt enhanced hydrologic knowledge as a major future priority for improved land and water management in arid region irrigated valleys.

Category: Other Water Resource Topics
Type of Presentation: Poster Presentation