

Riparian Water Sources: Regional Groundwater Discharge and Flood Driven Recharge

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ABSTRACT

Regional groundwater discharge to riparian zones, along the potential impacts of pumping induced water table lowering, has long been recognized. Recent research results in the southwest United States and elsewhere have demonstrated that flood waters stored in alluvial aquifer systems are critical for maintaining riparian groundwater levels and stream baseflow during the dry periods between rains in semiarid systems. This storage of floodwaters has specific implications for the water available to desert streams. First, seasonal flooding, in contrast to regional groundwater which is hundreds to thousands of years old, represents a riparian water sources that is sensitive to climate variability and change. Second, since flood waters are found in alluvial aquifers, management of the upland regions where runoff is generated is critical to sustainable management of these systems. Third, if floodwaters represent a replacement in the water budget for mountain front or basin floor recharge the implication is that there is less water available for pumping before a river's water budget would be impacted. Critically the actual mechanism and controlling factors by which transient floodwaters are stored and converted into baseflows is not well understood. Important considerations include the seasonality of flooding (winter vs. summer), the hydrologic status of a given reach (gaining vs. losing) and scale of river-aquifer interaction as driven by geologic structure (basin sediments vs. bedrock). Examples drawn from the San Pedro, Verde and Rio Grande riparian systems will be used to illustrate the critical role of floodwaters on the riparian water budget, controls on flood driven recharge, and the implications for sustainable management of riparian systems.