ABSTRACT

TITLE:	The Interaction of Monsoonal Precipitation and River Discharge on Riparian Aquifer Recharge Along the Impounded Dolores River, Southwestern Colorado, 2011
AUTHOR(S):	Gianniny, Dr. Gary L.; Pike, Jeremy; Dott, Cynthia E.
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ABSTRACT: To what extent does site specific monsoonal precipitation influence riparian aquifers on impounded streams in the arid southwest, and how might that role change during extended droughts? Using 2011 data from three sites along the Dolores River, in southwestern Colorado, we examined the importance of site specific precipitation on aquifer recharge. One site is above McPhee Dam and reservoir, while the other two are below the dam and at lower elevations. Each site contains a transect of three piezometers with pressure transducers to measure water height and barometric pressure every thirty minutes as well as a tipping rain gauge to measure site specific precipitation events. Quantification of river discharge and dam releases are compiled from the US Geological Survey and the Colorado Division of Water Resources stream gauges near the study sites, but are not site specific. During the weak monsoon of 2011, only the higher elevation above dam site, which also received the greatest amount of precipitation (12mm in one event), shows a clear relationship between precipitation and aquifer recharge (an observed 10cm groundwater rise during the largest precipitation event). At this site, well height rise was observed in all precipitation events greater than 2mm. Greater substrate permeability, precipitation magnitude, and precipitation duration may influence aquifer recharge from precipitation at this site. In the drier, lower elevations below the dam where all precipitation events were less than 4mm, no associated well height increases were observed. Precipitation at the remaining sites may be lost to evapotranspiration, and infiltration may be inhibited by low permeability of substrates, resulting in no aquifer recharge. At these sites the only changes in well heights were influenced by changes in river discharge from precipitation and or dam releases upstream, as was also observed during the stronger monsoon of 2010 (Clutter et al.,2011). These data suggest that the recharge of riparian aquifers (and the ecosystems dependent upon them) at orographically-starved lower elevations on impounded streams are highly dependent on hyporheic flow and bank recharge from dam releases or unimpeded stream flow during times of drought.