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# Implementation of MAR within the Rio Grande Basin of Central New Mexico, USA

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The U.S. Bureau of Reclamation has identified the Rio Grande basin within Central New Mexico as one of several regions where water supplies are over-allocated and future conflicts over the inadequate resource are highly likely. Local water providers have consistently identified managed aquifer recharge (MAR) as an important tool to provide conjunctive management of surface-water, groundwater, and reclaimed water sources in order to extend the useful life of existing water sources. However, MAR projects have been slow to take root partly due to rigorous demonstration requirements, groundwater quality protection concerns, and ongoing water right uncertainties.

At first glance the several thousand meters of unconsolidated basin-fill sediments hosting the regional aquifer appear to provide an ideal environment for the subsurface storage of surplus water. However, the basin has a complex structural and depositional history that impacts the siting and overall effectiveness of MAR systems. Several recharge projects are now in various stages of implementation and are overcoming site specific challenges including source water and ambient groundwater compatibility, low-permeability sediments and compartmentalization of the aquifer by extensive faulting, well clogging, and overall water quality management.

This presentation will highlight ongoing efforts of these water providers to develop full-scale recharge facilities. The performance of natural in-channel infiltration, engineered infiltration galleries, and direct injection systems designed to introduce from 500 to 5,000 mega-liters per annum to target intervals present from 150 to 600 meters below ground surface will be described. Source waters for recharge operations include inter-basin transferred surface water and highly treated reclaimed water sources requiring from minor to extensive treatment pre-recharge and post-recovery. Operational complexities have raised concerns related to long-term operation and maintenance and overall economic sustainability of these projects.

Further, potential reduction in surface water return flows as a result of recharge operations and impacts to other water users during recovery of the stored water must be considered. Proposed rules for long-term storage, estimating water losses, and eventual water recovery as they relate to water rights administration within stream-connected aquifer systems will also be outlined during the presentation.