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**DEEP-AQUIFER WELLS IN THE SAN JUAN BASIN: GUIDES TO DEEP GROUNDWATER DEVELOPMENT  
IN THE ADJACENT MIDDLE RIO GRANDE BASIN, NEW MEXICO**

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**ABSTRACT:** Dramatic increase in the price of water rights in the Middle Rio Grande region of New Mexico has led to a lively interest in non-potable groundwater in deep (more than 2,500 ft to top of aquifer), bedrock aquifers that have been exempt from State Engineer administration. Notices of Intention to appropriate 705,900 ac-ft/yr have been filed for 389 wells in Bernalillo and Sandoval Counties. The potential source has been described in the press as "newly discovered," but many wells in the 2,500- to 6,000-ft range, with performance similar to recent deep exploratory wells near Albuquerque, were completed in these aquifers in the adjoining San Juan Basin in the 1960s through 1980s, and transmissivity values and other information from those tests may help to inform the proposed development. Several groundwater models for parts of the San Juan Basin have been published.

An unpublished modeling study of the ultimate sources of water from two of the deep aquifers, the Gallup Sandstone and the Morrison Formation, focused on calibration to history-match the effects of two large stresses (pumping for the City of Gallup, 1891 through 1993, and uranium-mine dewatering near Church Rock during 1961 through 1987). It suggests that, after two decades of heavy pumping, about 77 percent of the water produced from wells in the Morrison Formation, where neither induced recharge nor salvage from evapotranspiration were available, came from storage in confining beds, and that the effect of withdrawal from storage in these units was not fully reversible.

The deep-aquifer water has also been described as isolated from the shallower aquifers and surface water, but water quality, and Darcy's Law calculations based on hydraulic conductivity and gradient, show that the water is not separate from the more-familiar parts of the hydrologic system. Large and widespread drawdown interference, potential (although long-delayed) effects on streamflow, and the essentially non-renewable nature of these resources lead to public-policy questions about their development.