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**EFFLUENT RECHARGE TO THE GILA GROUP AQUIFER NEAR SILVER CITY, NEW MEXICO**

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**ABSTRACT:** The Town of Silver City provides water to approximately 20,000 residents in the Town and to local water associations. The Town's water supply is provided by wells completed in the Gila Group aquifer. Over the last five years, the Town has diverted an average of 2,700 acre feet per year from its wells. Water routed through the Town distribution system is returned to a wastewater treatment plant, which discharges approximately 1,400 acre feet per year. Out of the 1,400, about 755 acre feet per year is released to an intermittent stream southeast of the Town. After the effluent is discharged in to the intermittent stream, it flows a few thousand feet down the channel as it infiltrates into the streambed. Part of the flow is consumed by evaporation. The remainder percolates through the vadose zone. A relatively small volume is retained in variably-saturated sediments between the streambed and the regional water table (vadose zone) as soil moisture. The subject of this field investigation is recharge to the regional water table from municipal water that is discharged to the intermittent stream. To track percolation of effluent from the land surface to the regional water table, the Town installed a monitoring system that uses heat and moisture content as tracers of effluent. Data collected for 14 months from January 2009 to April 2010 support the conclusion that subsurface movement of effluent can be monitored and that it is recharging the regional aquifer. Variably-saturated flow modeling with heat transport produces temperature and water-content trends compatible with observed data. The modeling indicates that after effluent infiltrates into the streambed, it reaches the regional water table, 35 feet below the land surface, in a time frame of about ten days. A quantitative assessment of effluent discharge operations in conjunction with evaporative loss, and an account of storage fluctuations in variable saturated sediments, indicates that 99 percent of the effluent discharged to the intermittent stream, in the last five years, recharges the regional aquifer.