

ANOTHER SAGE SUCCESS STORY: MONITORING GROUNDWATER TEMPERATURE RISE DURING AQUIFER RECOVERY AT THE BUCKMAN MUNICIPAL WELL FIELD, SANTA FE, NEW MEXICO

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Students attending the Summer of Applied Geophysical Experience (SAGE) field course in Santa Fe have had a unique opportunity to collect repeat temperature profile data in monitoring wells in the Buckman municipal well field (BMWF) between 2013 and 2017. The BMWF is a significant source of residential water for the city of Santa Fe. Over the last five years, students have analyzed thermal profiles and discharge temperatures in both monitoring and production wells in the BMWF; the students have learned that these repeat measurements record the complex interplay of cooling in aquifers during times of high production and warming during recovery from overproduction. When BMWF was in high production before 2003, a significant cone of depression formed, creating horizontal hydraulic gradients that drew in water from shallow aquifers, thus cooling portions of the deeper semi-confined aquifer system. As production decreased after 2003, the cone of depression relaxed and vertical hydraulic gradients associated with the regional-scale groundwater flow system began to warm the aquifer after a lag time of a decade. Students used geologic, geophysical, and geochemical data to identify important stratigraphic discontinuities and subsurface faults that compartmentalize the aquifer and bring warm water into the Buckman area. In addition, students have measured thermal profiles in water wells throughout the Santa Fe region to establish the nature of the regional-scale thermal regime. We have used these regional data sets to evaluate the geothermal potential of Santa Fe County. We intend to build on this success by continuing repeat measurements in the BMWF and expanding our research efforts into the nearby Valles Caldera National Preserve. SAGE students will work with the National Park Service in coming years to perform a comprehensive geophysical investigation (including EM, seismic, gravity, and thermal data) of the caldera.