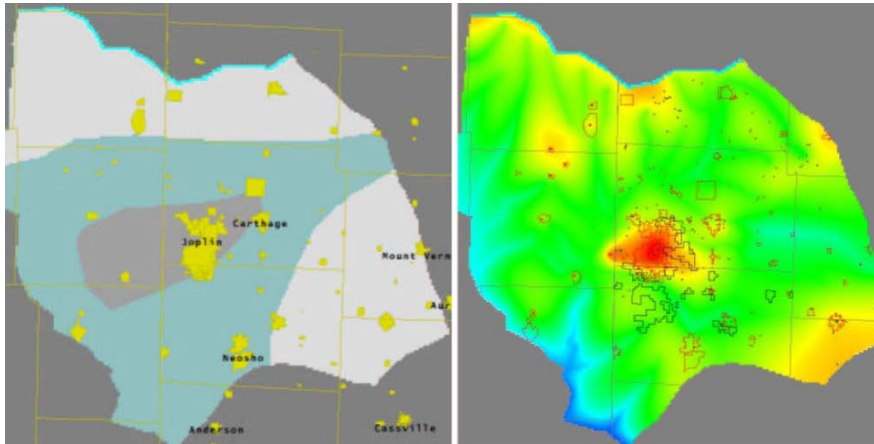


Well Field Management in a Declining Aquifer

Joplin, Missouri



Modeled distribution of transmissivity (left) and leakage (right) in the Ozark Aquifer.

Much of southwestern Missouri depends on the Ozark Aquifer, a deep limestone and dolomite formation, for public water supply. In recent years, water levels in Ozark wells have been declining because of increasing demands that are magnified during droughts. Missouri American Water hired Layne to assess the magnitude of water level declines and to predict likely future declines based on forecasts of water-supply demand. Results from our previous investigation completed on the aquifer indicated increased regional groundwater use would accelerate already rapid regional declines in water levels, reduce well yields, and increase electrical and maintenance costs as pumps would need to be lowered in the wells.

We used time-series regression analysis, production rates, and measured water levels in the production wells to predict the consequence of continued drought and withdrawals on the aquifer. We evaluated how far water levels would fall during a prolonged drought, how regional groundwater use would increase in the summer, and the reliable long-term pumping withdrawal rates for the utility. The time-series model was designed so Missouri American Water could modify its pumping scheme and optimize its well field operations.

Key Project Areas

Regression Modeling

Predictive Analysis

Water Supply Planning

Well Field Management

Drought Planning