United States Department of the Interior

U.S. GEOLOGICAL SURVEY

Utah Water Science Center
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August 4, 2021

In Reply to Gordon Reynolds, a member of the Planning Commission for Elkridge City, Utah. A request for data/studies that may inform decision makers concerning the groundwater conditions and aquifer properties near Elkridge was made on July 24, 2021.

Dear Gordon,

The Utah Water Science Center has completed several studies that cover the area of Elkridge City, Utah. The earliest groundwater flow model that we have completed was published in 1995 as part of the Technical Publications series cooperatively funded by the Utah State Department of Natural Resources. The title of this report is "Hydrology and simulation of ground-water flow in the southern Utah and Goshen Valleys, Utah" (Brooks and Stolp, 1995). This study was a comprehensive investigation into the groundwater conditions for southern Utah Valley. The study also includes a MODFLOW numerical simulation of the valley which estimates aquifer properties and groundwater conditions. The model used the most up to date groundwater data to estimate hydraulic conductivity in the Elkridge area. The result of calibrating the model yielded a 1 ft/day value for hydraulic conductivity for much of the area around Elkridge (fig. 1). This reflects relatively lower estimated transmissivity values calculated from drillers logs in nearby wells (Brooks and Stolp, table 16, fig. 19).

A follow-up effort to update the model produced by Brooks and Stolp, 1995, was completed and published in 2013. The title of this report is "Evaluation of the Groundwater Flow Model for Southern Utah and Goshen Valleys, Utah, Updated to Conditions through 2011, with New Projections and Groundwater Management Simulations" (Brooks, 2013). As part of this effort, the 1995 model was updated with groundwater and surface-water data through 2011. The model was not recalibrated during this study, but rather, was used in its updated form to predict several pumping and managed aquifer recharge scenarios. Most of the pumping/recharge scenarios yielded significant groundwater drawdown in the Elkridge area, with some scenarios yielding drawdowns of more than 100 feet over 40 years (Brooks, fig. 15, 2013). The areas with the greatest predicted drawdown coincide with areas in the model that have low hydraulic conductivity and are in proximity to significant groundwater pumping.

A more recent effort to understand how groundwater systems function within the Great Basin physiographic area was completed in 2014 (Brooks and others, 2014). This large-scale regional model includes Elkridge, but also simulates the mountain block recharge system in the Wasatch Mountains to the east of Elkridge. Any potential future examination of groundwater conditions in Elkridge would benefit from use of this larger scale model to assist in refining the amount of recharge that is locally transmitted by the mountain block east of Elkridge. Additionally, any new water-level/drillers log/pumping data in the area would be used to refine the calibration of hydrologic properties in the area.

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References:

Brooks, L.E. and Stolp, B.J., 1995, Hydrology and simulation of ground-water flow in the southern Utah and Goshen Valleys, Utah: Utah Department of Natural Resources Technical Publication No. 111, 96 p.

Brooks, L.E., 2013, Evaluation of the Groundwater Flow Model for Southern Utah and Goshen Valleys, Utah, Updated to Conditions through 2011, with New Projections and Groundwater Management Simulations: U.S. Geological Survey Open-File Report 2013-1171, 35 p.

Brooks, L.E., Masbruch, M.D., Sweetkind, D.S., and Buto, S.G., 2014, Steady-state numerical groundwater flow model of the Great Basin carbonate and alluvial aquifer system: U.S. Geological Survey Scientific Investigations Report 2014-5213, 124 p.

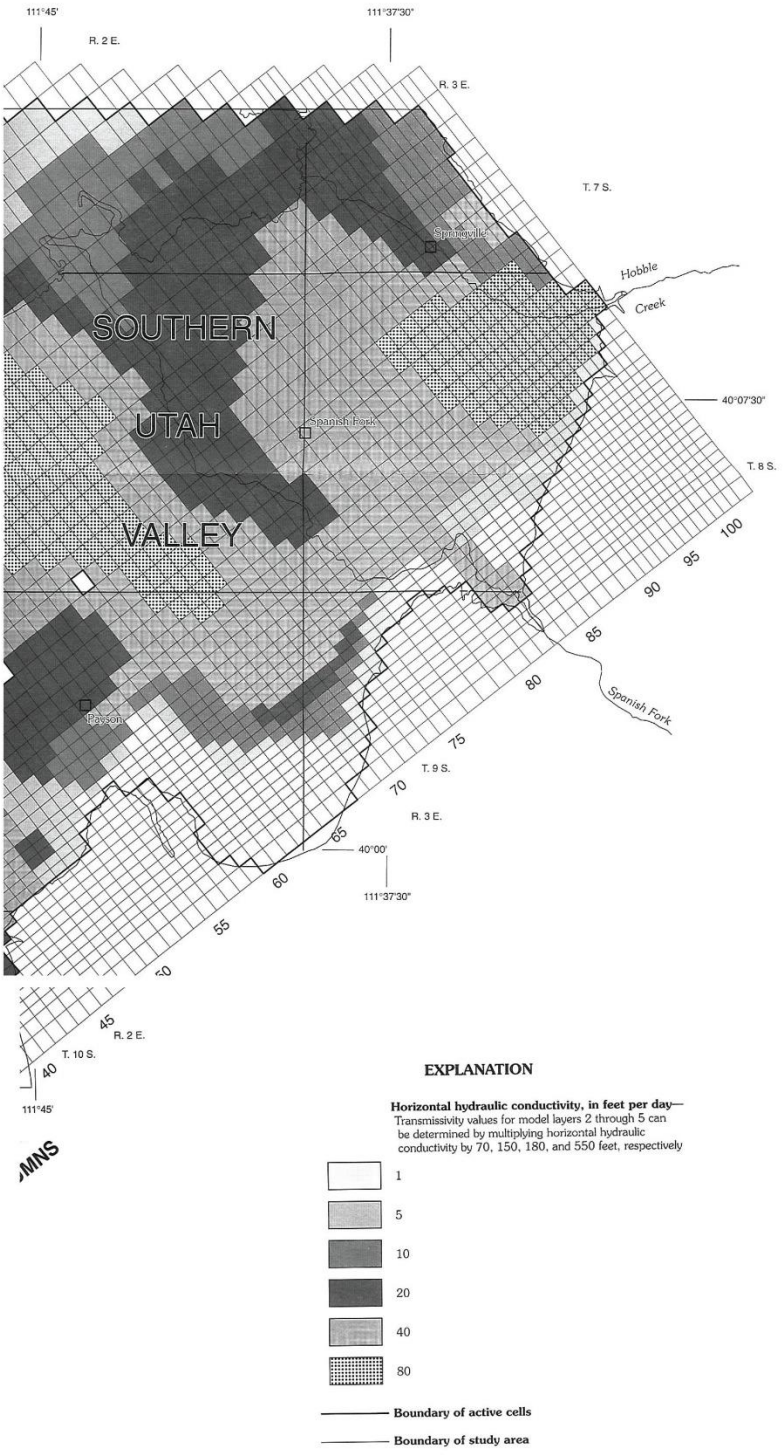

Figure 1. Map showing final distribution of horizontal hydraulic conductivity for layers 1 through 5 of the ground-water flow model of southern Utah and Goshen Valleys, Utah