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News Release

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New Groundwater Tool to Help Plan Black Hills Water Supply

A new groundwater assessment tool to help natural resources managers better understand and manage water supplies in the Black Hills area is now available, according to a recent U.S. Geological Survey (USGS) report.

The USGS has developed a groundwater model that can be used to show how stresses, such as additional groundwater pumping and drought, could affect groundwater levels and future water supplies in Rapid City and surrounding communities. The model is based on a multi-year study of the Madison and Minnelusa aquifers, which supply more than half of Rapid City's water.

The model is a numerical representation of the groundwater-flow system that can help determine the sustainability of the aquifer by imitating the consequences of water use, particularly the effects on key features such as springs. It allows "what-if" scenarios to be run that show, for example, the effects of water taken out of the system through pumping, or put in by precipitation or stream recharge.

"The groundwater in the area is connected to surface-water sources, meaning that if groundwater levels go too low, it could affect the amount of water discharged to the surface at springs and thus reduce streamflow, which may be especially important during drought," said Larry Putnam, USGS hydrologist and lead scientist for the report.

A better understanding of how drought affects groundwater levels is especially useful for water management in the Black Hills area; water levels dropped between 30 and 80 feet in the Madison aquifer alone during the 2000-2007 drought.

"A lot of recharge to the system occurs in the wet years. During moderate to dry years there isn't as much recharge," Putnam said. "So it takes a really wet period to recover from the dry cycles."

The USGS multi-year study covered 1,000 square miles on the eastern flank of the Black Hills, including the Madison and Minnelusa aquifers whose wells range from about 1,000 to 2,500 feet deep and produce up to 2,500 gallons of water per minute.

Because of the complexity of the geology and the water-bearing sediments in the area, USGS scientists are considering additional data collection that could be useful for improving the accuracy of model estimates of the effects of additional stresses on the groundwater system.

Complete findings are available at http://pubs.usgs.gov/sir/2009/5205/.

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