
News Release

October 19, 2007

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Editors: Photographs are available at <http://sd.water.usgs.gov/public/RCdyeGallery.html>

USGS discovers rapid ground-water flow from Spring Creek toward Rapid City

Dye tests conducted by the U.S. Geological Survey (USGS) in Spring Creek show that ground-water travels relatively fast through the Madison Aquifer towards Rapid City, indicating a potential concern about the ease of unwanted chemicals to enter the water supply.

At the intersection of Spring Creek and the Madison Formation to the southwest of Rapid City, flows as high as 21 cubic feet per second flow into the Madison Aquifer to become ground-water recharge. The path and velocity of this recharged water were traced by the USGS using a yellow-green dye. The dye was injected four times during 2003 and 2004 in various locations where Spring Creek loses flow to the Madison aquifer.

Along Rapid Creek where it intersects the Madison Formation in western Rapid City, flows of about 10 cubic feet per second become ground-water recharge to the Madison aquifer. A bright red dye was injected into Rapid Creek in 2004 to determine ground-water flow paths from this creek.

Following the injections, samples were collected from wells and springs in the Rapid City vicinity to determine when and if the dye arrived. Based on this information, ground-water velocities from Spring Creek ranged from one-tenth to more than one mile per day, which according to USGS hydrologist, Larry Putnam, are very fast for ground water. Additionally, the yellow-green dye was measurable in well water as much as 70 days following injection in Spring Creek.

Results from the Rapid Creek dye injections were not as revealing because the only sites with detectable dye concentrations were located in the zone where stream water is lost to the Madison aquifer. Measurable concentrations of the red dye were observed for a spring as many as 109 days after the injection along Rapid Creek.

From the Spring Creek area, ground water flows to the northeast towards Rapid City. Results of the Spring Creek dye tests show that different streamflow rates can affect the ground-water velocities and concentrations. Differences in recharge rates could substantially influence the transport of a potential contaminant introduced into the Spring Creek loss zone.

Details regarding the Rapid City study are available in USGS Scientific Investigations Report 2007-5001 at <http://pubs.usgs.gov/sir/2007/5137/>.

Additional information about the USGS water-resources studies in South Dakota can be obtained by visiting the USGS South Dakota Water Science Center home page at <http://sd.water.usgs.gov/>.

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