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HYDROLOGIC ATLAS OF THE BLACK HILLS, PENNINGTON
COUNTY, SOUTH DAKOTA
ROCKERVILLE QUADRANGLE
Aquifer Susceptibility Maps

Aquifer Susceptibility:

In general, the varying capabilities of rocks to absorb water are referred to as *aquifer susceptibility*. The susceptibility rating (low to high) is based upon the intrinsic characteristics of the rock, without regard to human influences. See chart at lower left of map for factors utilized in determining susceptibility rating.

Madison Aquifer (Pahasapa Limestone): (see map)

The recharge area of the Madison aquifer in the Rockerville Quadrangle comprises about six and one-half square miles along the western margin of the quadrangle. The formation consists of layers of limestone and dolomite (Miller, 2005) strongly affected by fractures (Figure 1) and karst (caves, breccia pipes, etc.), and is assigned an overall rating of **high susceptibility**. Where alluvial deposits overlie the Madison along streams, e.g., Spring Creek, the susceptibility is even greater as a result of the longer period of time in which water contained in the gravel (these gravels comprise an aquifer themselves) can be in contact with the underlying layers.

Minnelusa Formation (see map)

The recharge area of the Minnelusa aquifer in the Rockerville Quadrangle comprises approximately 13 square miles, extending north-south through the east-central part of the quadrangle. The formation consists of layers of limestone, dolomite, sandstone, and shale in the lower part and dominantly sandstone and mudstone in the upper portion (Hargrave, 2005). As shown on the Aquifer Susceptibility Map, these rock layers are assigned a rating of **medium to high susceptibility** (shown in gold): the sandstone units in the upper part might be at the upper limit of this range (see Rapid City West Quadrangle, Aquifer Susceptibility Map). Along drainages, e.g., Spring Creek, a rating of **high susceptibility** is assigned to that part of the Minnelusa aquifer overlain by alluvial deposits. The increased rating results from the likelihood of a longer period of contact of water contained in the gravel (these gravels comprise an aquifer themselves) with the underlying layers.

Inyan Kara Group: (see map)

A small part of the recharge area of the Inyan Kara Group (composed of the Fall River Formation and the underlying Lakota Formation) is present along the eastern edge of the quadrangle. Only the lower part of the aquifer, the Lakota Formation is present. This formation, composed of interlayers of sandstone and mudstone, is assigned a rating of **high susceptibility**.

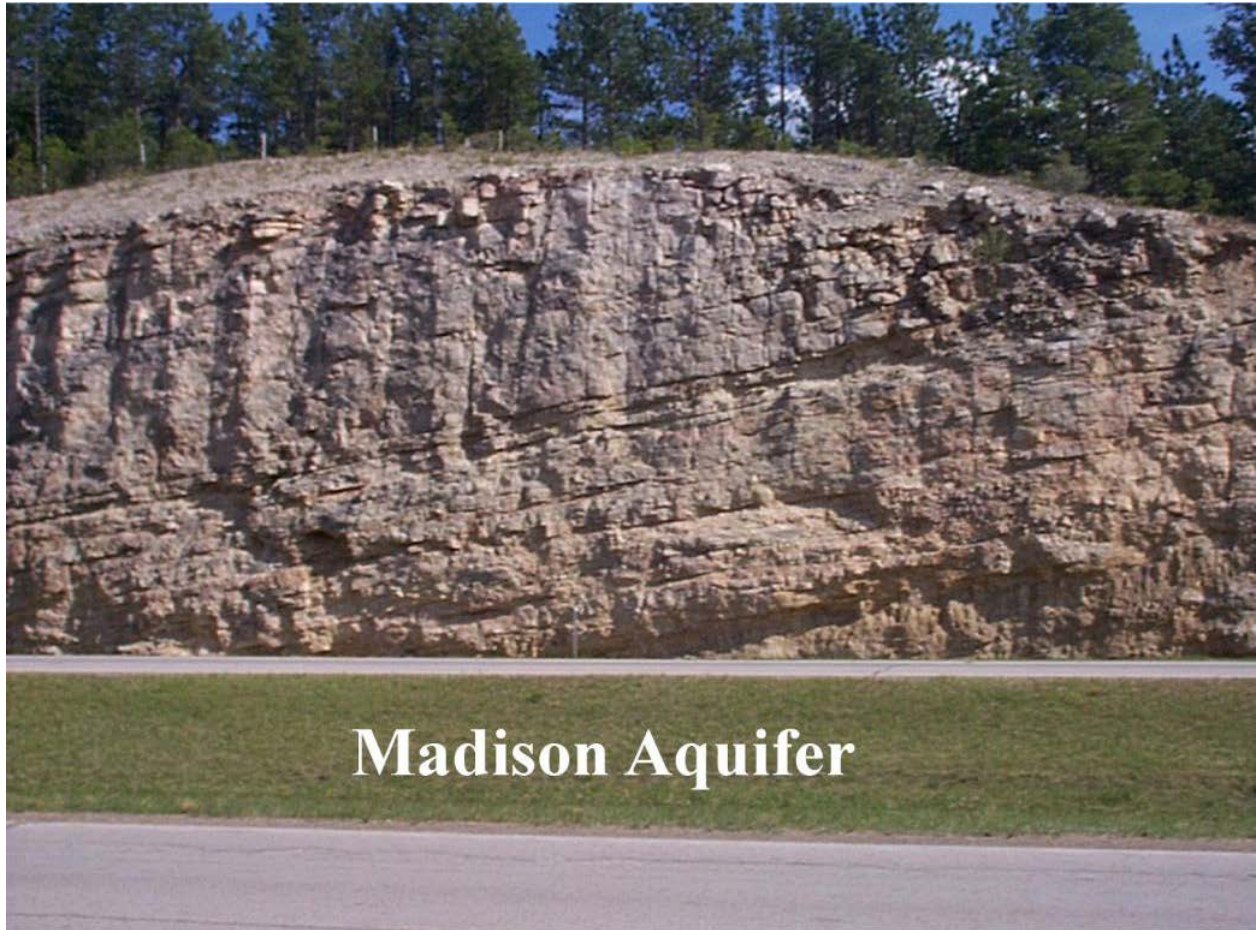


Figure 1. East dipping beds of Pahhasapa Limestone (Madison aquifer) exposed in road cut along SD Highway 16 east of Rockerville.

BIBLIOGRAPHY

- Hargrave, R. G, 2005, Vulnerability of the Minnelusa Aquifer to Contamination in the Rapid City West Quadrangle, Pennington County, South Dakota: unpub. M. S. thesis, South Dakota School of Mines and Technology, 80 p.
- Miller, S. L, 2005, Influence of Geologic Structure and Stratigraphy on Ground-Water Flow Paths in the Karstic Madison Aquifer in the Rapid City Area, South Dakota: Ph.D. dissertation, South Dakota School of Mines and Technology, 191 p.