

Bedrock Aquifer Systems of Dearborn County, Indiana

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The occurrence of bedrock aquifers depends on the original composition of the rocks and subsequent changes which influence the hydraulic properties. Post-depositional processes, which promote jointing, fracturing, and solution activity of exposed bedrock, generally increase the hydraulic conductivity (permeability) of the upper portion of bedrock aquifer systems. Because permeability is commonly greatest near the bedrock surface, bedrock units within the upper 100 feet are typically the most productive aquifers.

The Maquoketa Group of Ordovician age is the only bedrock aquifer system identified for Dearborn County. This system is overlain by unconsolidated deposits of variable thickness. The bedrock aquifer system is under confined conditions. In other words, the potentiometric surface (water level) in most wells completed in bedrock rises above the top of the water-bearing zone.

The yield of a bedrock aquifer depends on its hydraulic characteristics and the nature of the overlying deposits. Shale and glacial till act as aquitards, restricting recharge to underlying bedrock aquifers. However, fracturing and/or jointing may occur in aquitards, which can increase recharge to the underlying aquifers. Hydraulic properties of the bedrock aquifers are highly variable.

The susceptibility of bedrock aquifer systems to surface contamination is largely dependent on the type and thickness of the overlying sediments. However, because the bedrock aquifer systems have complex fracturing systems, once a contaminant has been introduced into a bedrock aquifer system, it will be difficult to track and remediate.

Ordovician -- Maquoketa Group Aquifer System

In Dearborn County, the Maquoketa Group consists mostly of shales with interbedded limestone units. Although this system is approximately 850 to 900 feet thick in the county, typically little more than the top 100 feet is utilized as an aquifer resource.

The depth to the bedrock surface is generally 15 to 65 feet in Dearborn County, but exceeds 150 feet in places. Wells penetrating this system are commonly 65 to 125 feet deep. The amount of rock penetrated in the Maquoketa Group Aquifer System typically ranges from about 30 to 90 feet. Water wells in this aquifer system are generally capable of meeting the needs of domestic users. In Dearborn County, domestic well yields typically range from 1 to 5 gallons per minute (gpm) and static water levels are commonly 15 to 25 feet below the land surface. However, several dry holes have been reported.

The quality of water in the Maquoketa Group Aquifer System in this county is generally acceptable for domestic use. However, salt water has been reported in 3 wells in Dearborn County and 1 well in neighboring Ohio County. Except in areas where overlying clay-rich materials are thin or absent, this aquifer system is not very susceptible to contamination from the land surface.

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