

Bedrock Aquifer Systems of Ohio 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 Ohio 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 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 Ohio County, the Maquoketa Group consists mostly of shales with interbedded limestone units. Although this system is approximately 800 to 850 feet thick in the county, little more than the top 100 feet is typically used for water production.

The depth to the bedrock surface is generally about 15 to 40 feet in Ohio County. Few bedrock wells have been reported in this county. Wells drilled in the Maquoketa Group in Ohio County and in neighboring Ripley, Switzerland, and Dearborn Counties are commonly completed at depths from 60 to 130 feet with generally about 30 to 80 feet of rock penetration. Typical yields from wells completed in this system are 1 to 7 gallons per minute (gpm) and static water levels are generally 15 to 30 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 1 well in Ohio County and 3 wells in Dearborn County. These wells all tap the Maquoketa Group Aquifer System. Except in areas where overlying clay-rich till and residuum is thin or absent, this aquifer system is not very susceptible to contamination from the land surface.

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