Bedrock Aquifer Systems of Fountain County, Indiana

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The occurrence of bedrock aquifers depends on the original composition of the geologic material 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 in many places is greatest near the bedrock surface, bedrock units within the upper 100 feet are commonly the most productive aquifers.

Two bedrock aquifer systems are identified within Fountain County: the Pennsylvanian age Raccoon Creek Group and the Mississippian age Borden Group. Approximately 81 percent of all wells in this county are completed in bedrock.

Bedrock aquifer systems in the county are overlain by unconsolidated deposits of varying thickness ranging from outcropping to over 200 feet. Bedrock, in places, is at or near the surface along many streams and the Wabash River in the county.

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. Most of the bedrock aquifers in the county are 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 susceptibility of bedrock aquifer systems to surface contamination is largely dependent on the type and thickness of the overlying sediments. 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.

Pennsylvanian -- Raccoon Creek Group Aquifer System

The Raccoon Creek Group Aquifer System outcrops/subcrops throughout the majority of central, western, and southeastern Fountain County. The group consists in ascending order of the Mansfield, Brazil, and Staunton formations. The basal formation of the group, the Mansfield Formation, rests unconformably on Mississippian rocks. Bedrock consists mostly of shale, mudstone, and siltstone with minor amounts of coal, sandstone and limestone. The Raccoon Creek Group in Fountain County is overlain by unconsolidated deposits with a thickness ranging from outcropping to over 180 feet.

Wells completed in the Raccoon Creek Group Aquifer System are generally capable of meeting the needs of some domestic and some high-capacity users in this county. Wells in this system are completed at depths ranging from 40 to 525 feet. Yields for domestic wells range from 3 to 30 gallons per minute (gpm) with some dry holes reported. Static water levels range from flowing to 140 feet below the land surface.

There are three registered significant groundwater withdrawal facilities (5 wells) in this system. Reported yields range from 50 to 250 gpm. Uses for these facilities are public supply and irrigation. Refer to the table for details on the wells and to the map for facility locations.

In the majority of Fountain County, the Raccoon Creek Group Aquifer System has a low susceptibility to surface contamination where thick clay deposits overlie the system. However, areas are at moderate to high risk to contamination where overlying clays are thin or absent, or where bedrock outcrops.

Mississippian -- Borden Group Aquifer System

The Borden Group outcrops/subcrops primarily in the eastern and northern third of Fountain County, and in two relatively small areas located in the south-central portion. This bedrock aquifer system is composed of siltstone and shale, but fine-grained sandstones are also common. Although carbonates are somewhat rare, discontinuous interbedded limestone lenses are present. The Borden Group in Fountain County is overlain by unconsolidated deposits ranging from zero to over 200 feet in thickness.

The Borden Group Aquifer System is often described as an aquitard, and yields of wells completed in it are generally quite limited. Wells in this system are commonly completed at depths ranging from 25 to 530 feet. Domestic well yields typically range from 1 to 20 gpm with some dry holes reported. Static water levels commonly range from 9 to 30 feet below surface. There are no registered significant groundwater withdrawal facilities reported in this system.

Because the permeability of shale material is considered low and where the overlying sediment consists of thick fine-grained clay materials, susceptibility to contamination introduced at or near the surface is low. In areas where bedrock is shallow, risk to contamination from the surface or near surface sources is high.

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