

# **Bedrock Aquifer Systems of Miami 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 in many places is greatest near the bedrock surface, bedrock units within the upper 100 feet are commonly the most productive aquifers.

One bedrock aquifer system is identified for Miami County: the Silurian and Devonian Carbonates. Rock types exposed at the bedrock surface include moderately productive to prolific limestones and dolomites with varying amounts of interbedded shale. Bedrock wells represent about 60 percent of all wells completed in this county. Most of the bedrock aquifers in Miami 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 Silurian and Devonian Carbonates Aquifer System in Miami County is overlain by unconsolidated deposits of varying thickness, ranging from less than one foot to over 350 feet. In general, the thickness of unconsolidated deposits increases from south to north. However, segments of the Mississinewa River and Wabash River valleys are cut into bedrock.

The yield of a bedrock aquifer depends on its hydraulic characteristics and the nature of the overlying deposits. Shale and clay 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 extremely variable.

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

## **Silurian and Devonian Carbonates Aquifer System**

The Silurian and Devonian Carbonates Aquifer System outcrops/subcrops throughout all of Miami County. The system includes carbonate rock units (limestone and dolomite) with some interbedded shale units. In Miami County, the system consists of the Pleasant Mills formation and Wabash formation of Silurian age, and the Muscatatuck group of Devonian age. The total thickness of the Silurian and Devonian Carbonates Aquifer System in the county ranges from about 100 feet to over 500 feet.

Wells penetrating the Silurian and Devonian Carbonates Aquifer System in this county have reported depths ranging from 35 to 500 feet, but are commonly 80 to 170 feet deep. The amount of rock penetrated in this system typically ranges from 35 to 120 feet.

Wells completed in the Silurian and Devonian Carbonates Aquifer System are capable of meeting the needs of domestic and some high-capacity users in this county. Domestic well yields commonly range from 15 to 50 gallons per minute (gpm). Static water levels typically range from 15 to 60 feet below the land surface with a few reports of flowing wells in the county. There are 9 registered significant ground-water withdrawal facilities (25 wells) using the Silurian and Devonian Carbonates Aquifer System in Miami County. Reported high-capacity well yields range from 76 to 950 gpm. The dominant use for these facilities is public water supply. Refer to the table for some details on the wells and to the map for the facility locations.

This aquifer system is generally not very susceptible to surface contamination due to thick clay deposits over most of the county. However, areas where overlying clays are thin or absent are at moderate to high risk to contamination.

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