

# **Bedrock Aquifer Systems of Wabash County, Indiana**

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November 2007

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.

Bedrock aquifer systems in the county are overlain by unconsolidated deposits of varying thickness. In places, along the Wabash, Salamonie, and Mississinewa Rivers, bedrock is exposed or lies within 10 feet of the surface. However, the bedrock surface is buried beneath more than 400 feet of unconsolidated materials in the deepest parts of a bedrock valley, which cuts across southern Wabash County. 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 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. 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.

Two bedrock aquifer systems are identified for Wabash County. They are, from younger to older: the Silurian and Devonian Carbonates and the Maquoketa Group of Ordovician age.

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

The Silurian and Devonian Carbonates Aquifer System outcrops/subcrops throughout nearly all of Wabash County. This aquifer system consists primarily of Silurian age carbonates and middle Devonian age carbonates of the Muscatatuck Group, which subcrop only along the northern county line. Total thickness of this aquifer system ranges from 0 to about 500 feet.

Wells completed in the Silurian and Devonian Carbonates Aquifer System are generally capable of meeting the needs of domestic and some high-capacity users in this county. Reported

domestic wells utilizing this system in Wabash County have depths ranging from 32 to 514 feet, but are typically 100 to 200 feet deep. The amount of rock penetrated in this system commonly ranges from 30 to 90 feet. Solution features (caves) are described on a few well records suggesting minor karst development. Typical yields for domestic wells range from 10 to 35 gallons per minute (gpm). Static water levels are generally 20 to 55 feet below land surface. There are 5 registered significant ground-water withdrawal facilities (16 wells). Reported yields from the individual wells are 35 to 1500 gpm. Refer to the table for details on the wells and to the map for facility locations.

In most of Wabash County the Silurian and Devonian Carbonates Aquifer System has a low susceptibility to surface contamination because thick clay deposits overlie the system. However, in areas where overlying clays are thin or absent, the system is at moderate to high risk to contamination.

### **Ordovician -- Maquoketa Group Aquifer System**

In Wabash County, the Maquoketa Group subcrops only in the buried pre-glacial valley where the overlying Silurian and Devonian bedrock has been removed by erosion. The Maquoketa Group consists mostly of shales with interbedded limestone units. In general, this system ranges from 525 to 600 feet thick in the county. However, no known wells utilize this aquifer system in Wabash County because the Maquoketa Group lies about 275 to 425 feet below the ground surface and adequate water supplies are typically found in the overlying unconsolidated deposits. This aquifer system has a low susceptibility to surface contamination because thick clay deposits cover the subcrop area.

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