

# **Bedrock Aquifer Systems of Hancock 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. In Hancock County, rock types exposed at the bedrock surface include moderately productive limestones and dolomites with small amounts of interbedded shales.

The Silurian and Devonian Carbonates Aquifer System is the only bedrock aquifer system identified for Hancock County. This system is overlain by unconsolidated deposits of varying thickness ranging from approximately 50 feet to greater than 300 feet. 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. Bedrock wells represent only about 5% of all wells completed 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.

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

In Hancock County this aquifer system consists primarily of middle Devonian age carbonates of the Muscatatuck Group and underlying Silurian carbonates. However, along the eastern edge of the county in a buried pre-glacial valley and a few other isolated areas where rocks of the Muscatatuck Group have been removed by erosion the system is composed of only Silurian carbonates. Because individual units of the Silurian and Devonian systems are composed of similar carbonate rock types and cannot easily be distinguished on the basis of water well records, they are considered as a single water-bearing system. Total thickness of the Silurian and Devonian Carbonates Aquifer System in Hancock County generally ranges from 100 to 200 feet.

Wells penetrating this system have reported depths ranging from 57 to 390 feet, but are commonly 150 to 250 feet deep. The amount of rock penetrated in the Silurian and Devonian Carbonate Aquifer System typically ranges from 10 to 60 feet.

Water wells 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, most domestic well yields typically range from 10 to 30 gallons per minute (gpm). There are 2 registered significant water withdrawal facilities (2 wells) with reported yields of 80 and 100 gpm. However, this aquifer system is less productive along the eastern border due to thick unconsolidated deposits limiting recharge. In addition, a few dry holes have been reported just across the county line in Henry County. Static water levels typically range from 15 to 40 feet below land surface. A few flowing wells have been reported for this bedrock system in the county.

The quality of water in the Silurian and Devonian Carbonates Aquifer System in Hancock County is generally acceptable for domestic use. The susceptibility of bedrock aquifer systems to surface contamination is largely dependent on the type and thickness of the overlying sediments. This aquifer system is not very susceptible to contamination due to thick clay deposits over most of the county. However, the aquifer system is moderately susceptible in the Big Blue River valley where the unconsolidated materials are thin and clay aquitards are absent in some places.

### **Registered Significant Ground-Water Withdrawal Facilities**

There are two registered significant ground-water withdrawal facilities (total of 2 wells) using bedrock aquifers in the county. These wells have reported yields of 80 and 100 gpm. Refer to Table 1 for some details on the well and to the map for the facility location.

### **Map Use and Disclaimer Statement**

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