

Unconsolidated Aquifer Systems of Bartholomew County, Indiana

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Seven unconsolidated aquifer systems have been mapped in Bartholomew County: the Till Veneer / Dissected Till and Residuum; the Alluvial, Lacustrine, and Backwater Deposits; the New Castle / Scottsburg Till System; the New Castle / Scottsburg Till Subsystem; the New Castle / Scottsburg Complex; the White River and Tributaries Outwash; and the White River and Tributaries Outwash Subsystem. Boundaries of these aquifer systems are commonly gradational and individual aquifers may extend across aquifer system boundaries.

The thickness of unconsolidated sediments in Bartholomew County is quite variable. Sediments that overlie bedrock range from exposure near the east county line along portions of the Fall Fork of Clifty Creek, to as much as 155 feet.

Regional estimates of aquifer susceptibility to contamination from the surface can differ considerably from local reality. Variations within geologic environments can cause variation in susceptibility to surface contamination. In addition, man-made structures such as poorly constructed water wells, unplugged or improperly abandoned wells, and open excavations, can provide contaminant pathways that bypass the naturally protective clays.

Till Veneer / Dissected Till and Residuum Aquifer System

The Till Veneer / Dissected Till and Residuum Aquifer System is mapped along the western edge of Bartholomew County and over most of the eastern third of the county. It has the most limited groundwater resources of the unconsolidated aquifer systems.

Unconsolidated deposits of this aquifer system consist mostly of till with thin layers of stratified drift and, in some areas along the westernmost edge of the county, thin, eroded bedrock residuum. Thickness of these sediments typically ranges from less than 5 feet where only residuum is present, to 50 feet where thick glacial till deposits have filled small bedrock valleys.

Because this aquifer system is generally thin and not very productive, most drillers prefer to complete wells in the underlying bedrock aquifer. Approximately 88 percent of wells in the area are completed in bedrock. However, a few wells have been completed in the unconsolidated deposits. Large diameter bucket type wells are commonly used to enhance yield from thin, discontinuous silt, sand and gravel deposits.

Total well depths are commonly 35 to 50 feet. Where present, thin sands and gravels are commonly less than 5 feet thick and typical wells yields are less than a few gallons per minute (gpm). Because of the low permeability of the surface materials, this aquifer system is not very susceptible to contamination from surface sources.

Alluvial, Lacustrine, and Backwater Deposits Aquifer System

The Alluvial, Lacustrine, and Backwater Deposits Aquifer System is made up of heterogeneous bodies of alluvial, colluvial, and lacustrine materials within valley bottoms and terraces of some larger streams tributary to the East Fork White River.

Unconsolidated deposits within this system come from two sources. The first is alluvium deposited by streams along with colluvium eroded from valley walls and upland areas. The second source is glaciolacustrine deposits formed in relatively stagnant lake water. The alluvial deposits are attributed to the White River valley becoming choked with outwash from receding glaciers. The outwash deposits effectively dammed the tributary streams, thus creating lakes in which fine-grained glaciolacustrine deposits accumulated.

In Bartholomew County this system is mapped along portions of several tributaries to the East Fork White River. These include: Clifty Creek in the east central portion of the county; the Driftwood River in the north-central portion of the county; the south and east forks of White Lick Creek in the southwest portion of the county; and the Flatrock River and Haw Creek to the northeast of Columbus.

Total thickness of unconsolidated materials overlying bedrock in this system is commonly less than 50 feet. In other counties where this system is mapped sand and gravel lenses, where present, are typically less than 5 feet thick. However, in isolated areas of Bartholomew County sand and gravel deposits can be up to 15 feet thick.

This aquifer system is a limited resource and there are no known wells that actually produce from these deposits. Drillers commonly bypass the unconsolidated deposits in favor of the underlying bedrock aquifers. In many places large-diameter bored (bucket-rig) wells could produce adequate water from sands within the predominantly clay and silt materials of this aquifer system to satisfy domestic needs.

This aquifer system is generally marked by thick surface deposits of soft silt and clay that have a low susceptibility to surface contamination. The susceptibility is greater in areas where the surficial silt and clay deposits are thin and directly overlie outwash deposits.

New Castle / Scottsburg Till Aquifer System

The New Castle / Scottsburg Till Aquifer System is limited to two small areas of central Bartholomew County. The mapped deposits generally include a thick clay unit that caps outwash deposits of variable thickness. Limited well data are available because only

about 4 percent of all wells in the county completed in unconsolidated deposits are mapped in the New Castle / Scottsburg Till Aquifer System. Well depths generally range from 50 to 125 feet. Thickness of aquifer deposits range from 2 to 48 feet and are capped by clay ranging from 20 to 105 feet.

The New Castle / Scottsburg Till Aquifer System is capable of supplying domestic and some high capacity users. Domestic well yields range from 8 to 40 gpm with static water levels from 8 to 58 feet below surface. There are no known registered significant water withdrawal facilities in this county. This system is generally not very susceptible to surface contamination because the outwash aquifers are overlain by thick till deposits.

New Castle / Scottsburg Till Aquifer Subsystem

The New Castle / Scottsburg Till Aquifer Subsystem is mapped similar to the New Castle / Scottsburg Till Aquifer System, however, outwash aquifer deposits are generally much thinner and potential yield is less. In Bartholomew County this system is mapped predominantly along a north-south band in the west-central part of the county. It is also present in several smaller areas in the eastern half of the county.

Approximately 39 percent of wells completed in the area bypass the unconsolidated deposits in favor of the underlying bedrock aquifer system. However, this system is capable of meeting the needs of some domestic users. Well depths range from 20 to 157 feet but are typically 45 to 80 feet deep. Aquifer deposits are commonly 3 to 10 feet thick. Surficial clay and sandy-clay deposits overlying aquifer materials are commonly from 30 to 70 feet.

Well yields are typically 5 to 15 gpm with static water levels commonly from 20 to 45 feet below surface. Greater capacities are often associated with significant to complete drawdowns. Some dry holes have been reported. Also, many drillers continue borehole depths beneath the aquifer units to create storage.

The New Castle / Scottsburg Till Aquifer Subsystem is generally not very susceptible to surface contamination because aquifer units are overlain by thick till deposits. However, in a few places overlying clay deposits are not present. These areas are considered at high risk to contamination

New Castle / Scottsburg Complex Aquifer System

The New Castle / Scottsburg Complex Aquifer System is mapped in two small areas along the north-central edge of Bartholomew County. Complex multiple glacial advances resulted in a sequence of multiple, stacked, till and outwash units that are quite variable in position and thickness. The sand and gravel deposits vary from thin to massive and are typically discontinuous and overlain by a thick till.

This system is a southernmost extension from Shelby County and data are extremely limited in Bartholomew County. However, reported information from nearby Shelby County note that wells are typically completed at depths from 50 to 90 feet. Outwash aquifer deposits are commonly 10 to 20 feet thick. This system is capable of meeting the needs of domestic and high capacity users. Domestic well capacities are generally 10 to 20 gpm with static water levels from 10 to 35 feet below surface. Reported high capacity well yields from registered significant groundwater withdrawal facilities in Shelby County range from 80 to 1000 gpm.

The New Castle / Scottsburg Complex Aquifer System is generally not susceptible to surface contamination where thick clays overlie aquifer deposits. However, in some areas outwash is near the surface and clay deposits are thin. These areas are at moderate to high risk to contamination.

White River and Tributaries Outwash Aquifer System

The White River and Tributaries Outwash Aquifer System is mapped along a wide north-south band across the central portion of Bartholomew County. This system contains large volumes of outwash and alluvial deposits that filled the river valley of the East Fork White River. Thickness of unconsolidated deposits overlying bedrock can be as much as 130 feet within this system. Well depths are typically 40 to 70 feet. Aquifer materials include predominantly sand and gravel deposits that range from 5 to 125 feet thick but are more commonly from 35 to 65 feet thick. In some areas 5 to 10 feet of clay or silt overlie the aquifer materials.

This system has the greatest potential of any aquifer system in Bartholomew County and can meet the needs of domestic and high-capacity users. Domestic well yields range from 5 to 35 gpm. There are 59 registered high-capacity facilities (117 wells) in this system. Reported well capacities are up to 2400 gpm but are typically 300 to 1000 gpm.

In areas that lack overlying clays, this aquifer system is highly susceptible to contamination from surface sources. Where the aquifer system is overlain by clay or silt deposits, the aquifer is moderately susceptible to surface contamination.

White River and Tributaries Outwash Aquifer Subsystem

The White River and Tributaries Outwash Aquifer Subsystem includes areas adjacent and parallel to the White River and Tributaries Outwash Aquifer System. The outwash subsystem typically occupies a higher topographic position than that of the outwash system and is marked by thinner outwash deposits that may be overlain by sandy clay, clay, or eolian-derived loess and sand.

The White River and Tributaries Outwash Aquifer Subsystem is mapped along a small area in the northwest part of the county along the west edge of the Driftwood River and

along Clifty Creek to the east of Columbus continuing north-northeast into Shelby County.

There are few wells available in the White River and Tributaries Outwash Aquifer Subsystem. Total thickness of unconsolidated deposits overlying bedrock ranges from 65 to 150 feet. The thickness of aquifer materials within the unconsolidated deposits are typically between 5 and 45 feet. Well depths range from 30 to 105 feet below surface but are typically between 30 to 60 feet below surface. Many wells do not penetrate the full thickness of the aquifer system.

This aquifer system has the potential to meet the needs of domestic and some high-capacity users. There are three registered significant water withdrawal facilities (4 wells) that report capacities of 180 gpm and 1000 gpm. Domestic well yields are typically from 10 to 30 gpm. Static water levels are typically between 10 and 20 feet below surface.

Areas within this aquifer system that have overlying clay or silt deposits are moderately susceptible to surface contamination; whereas, areas that lack overlying clay or silt deposits are highly susceptible to contamination.

Registered Significant Ground-Water Withdrawal Facilities

Bartholomew County has several registered significant ground-water withdrawal facilities that use unconsolidated aquifer systems. Most facilities use the prolific White River and Tributaries Aquifer System. Refer to Table 1 for some details on the wells and to the map for facility locations.

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