

Unconsolidated Aquifer Systems of Blackford County, Indiana

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Five unconsolidated aquifer systems have been mapped in Blackford County: the Till Veneer; the Bluffton Till; the Bluffton Till Subsystem; the Bluffton Complex; and the Wabash River and Tributaries Outwash Subsystem. Boundaries of these aquifer systems are commonly gradational and individual aquifers may extend across aquifer system boundaries.

Although the ground surface is relatively flat in Blackford County, the thickness of unconsolidated sediments is quite variable because glacial material has been deposited over an uneven bedrock surface. Unconsolidated materials are less than 20 feet thick along portions of the Salamonie River near Montpelier. However, the thickness of unconsolidated sediments exceeds 400 feet in places in the buried bedrock valley that cuts across northern Blackford County. Elsewhere in the county, unconsolidated deposits are commonly 100 to 200 feet thick.

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 Aquifer System

In Blackford County, the Till Veneer Aquifer System encompasses areas where the unconsolidated material is predominantly thin till overlying bedrock. In these areas, this thin till is chiefly the product of the deposition of Wisconsin glacial till over an uneven, eroded bedrock surface. This system has the most limited ground-water resources of the unconsolidated aquifer systems in the county. Total thickness of the Till Veneer Aquifer System generally ranges from about 30 to 45 feet.

There is little potential for ground-water production in the Till Veneer Aquifer System in Blackford County. Potential aquifers within this system include thin isolated sand and/or gravel layers. However, none of the reported wells penetrating this aquifer system are completed in unconsolidated materials which are bypassed in favor of the underlying bedrock. This system is not very susceptible to contamination from surface sources because the near-surface materials generally have low permeability.

Bluffton Till Aquifer System

The Bluffton Till Aquifer System primarily consists of thick clay with thin intratill sand and gravel layers. In Blackford County, this system ranges in thickness from about 50 feet to more than 400 feet (where glacial deposits have filled bedrock valleys), but is typically 75 to 130 feet thick. Saturated aquifer materials include outwash sands and/or gravels that commonly range from 5 to 15 feet thick and are generally overlain by 40 to 75 feet of till.

Part of the Bluffton Till Aquifer System overlies a deep buried bedrock valley in northern Blackford County. The total unconsolidated thickness exceeds 400 feet in many places. Only a few wells that utilize the deeper aquifers within the buried bedrock valleys have been reported. These wells indicate that the deep sand and gravel deposits are 6 to 13 feet thick in places. Reported domestic well yields are greater than 50 gallons per minute (gpm).

This aquifer system is capable of meeting the needs of domestic and some high-capacity users. Wells are generally 80 to 110 feet deep. Domestic well capacities are typically 10 to 35 gpm and static water levels are commonly 25 to 45 feet below surface.

The Bluffton Till Aquifer System has a low susceptibility to surface contamination because intratill sand and gravel units are generally separated from the surface by till layers within the system.

Bluffton Till Aquifer Subsystem

Areas where unconsolidated materials are generally greater than 50 feet in thickness, yet have little aquifer potential, are mapped as the Bluffton Till Aquifer Subsystem. This system is typically less than 110 feet thick in Blackford County. Potential aquifer materials include thin, intratill sand and gravel deposits. Where present, aquifer materials are capped by till that is generally 50 to 90 feet thick.

This system is capable of meeting the needs of some domestic users. However, about 85 percent of wells constructed in the area mapped as Bluffton Till Aquifer Subsystem in this county bypass the unconsolidated materials and use the underlying bedrock aquifer. The few wells utilizing this unconsolidated aquifer system in Blackford County are completed at depths of 75 to 100 feet.

The Bluffton Till Aquifer Subsystem is generally not very susceptible to surface contamination because its intratill sand and gravel units are overlain by thick till deposits.

Bluffton Complex Aquifer System

The Bluffton Complex Aquifer System is mapped over a large portion of Blackford County. This aquifer system is characterized by deposits that are quite variable in materials and thickness.

Sand and gravel aquifer deposits are commonly overlain by a thick till. This system generally also exhibits alternating layers of outwash and till of variable thickness above the main aquifer. The main aquifer deposits that cap the buried bedrock valley are typically thicker and more continuous than the shallower sand and gravels in this system. In Blackford County this system is generally 105 to 160 feet thick.

However, in places this system overlies deep buried bedrock valleys. The total unconsolidated thickness exceeds 400 feet in many places. There is little evidence for ground-water potential in some of these buried bedrock valleys because adequate yields are generally found in the shallower aquifers of the Bluffton Complex Aquifer System.

In some areas, ground-water potential is indicated by the few wells that utilize deep sand and gravel deposits within the buried bedrock valleys in this system. Deep aquifer materials are 11 to 20 feet thick and these wells have reported yields of 10 to 72 gpm.

This system is capable of meeting the needs of domestic and high-capacity users in Blackford County. Saturated aquifer materials in the Bluffton Complex Aquifer System are generally 10 to 30 feet thick and are overlain by a till cap which is commonly 35 to 85 feet thick. Wells in this system are typically completed at depths of 80 to 110 feet. Domestic well yields are commonly 10 to 50 gpm and static water levels are generally 35 to 50 feet below the surface. There are 3 registered significant ground-water withdrawal facilities (8 wells) utilizing this system and individual wells produce 100 to 1170 gpm. The Bluffton Complex Aquifer System is not very susceptible to contamination because thick clays overlie the aquifer materials.

Wabash River and Tributaries Outwash Aquifer Subsystem

This system is mapped along part of Big Lick Creek in southwestern Blackford County. The Wabash River and Tributaries Outwash Aquifer Subsystem has the potential to meet domestic needs. The 2 wells utilizing this system in Blackford County have been reported at depths of 31 and 42 feet. Yields for these wells are 10 and 50 gpm with static water levels of 6 and 25 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

There are 3 registered significant ground-water withdrawal facilities (total of 8 wells) using unconsolidated aquifers in the county. All of these wells utilize the Bluffton Complex Aquifer System. Reported capacities for individual wells are 100 to 1170 gpm. Uses for these facilities are public supply and industry. Refer to the table for details on the wells and to the map for facility locations.

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