

Unconsolidated Aquifer Systems of Wells County, Indiana

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Six unconsolidated aquifer systems have been mapped in Wells County: the Till Veneer; the Hessen Cassel; the Bluffton Till; the Bluffton Till Subsystem; the Bluffton Complex; and the Wabash River and Tributaries Outwash Subsystem. These systems comprise sediments deposited by or resulting from glaciers, glacial meltwaters, and post-glacial precipitation events. Characteristics of the Hessen Cassel Aquifer System have been described and mapped as part of the basin study report; Water Resource Availability in the Maumee River Basin, Indiana, IDNR, 1996. The description of the regional Hessen Cassel Aquifer System has been modified here to include details specific to Wells County. Boundaries of all aquifer systems are commonly gradational, and individual aquifers may extend across aquifer system boundaries.

The thickness of unconsolidated deposits in Wells County is quite variable, ranging from less than one foot near Rockford to approximately 170 feet northwest of Dillman near the Grant County line. The depth to bedrock along the course of the Wabash River and also for about one-half of the county is 50 feet or less. This shallow area of bedrock primarily trends northwest to southeast across the county from just south of Zanesville to near Liberty Center.

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

The Till Veneer Aquifer System has the most limited ground-water resources of the unconsolidated aquifer systems in the county. This system is mapped over about 50 percent of Wells County, generally in areas where the depth to the bedrock surface is less than 50 feet.

There is little potential for ground water production in the Till Veneer Aquifer System in Wells County. Nearly all wells started in this system are completed in the underlying bedrock. Unconsolidated deposits consist primarily of clay. Where present, sand and gravel units are generally less than 5 feet thick. The few wells completed in the Till Veneer Aquifer System in this county range from 30 to 56 feet deep.

This system is not very susceptible to contamination from surface sources because of the low permeability of the near-surface materials. However, there are areas where bedrock is extremely shallow. These areas are moderately susceptible to contamination.

Hessen Cassel Aquifer System

The Hessen Cassel Aquifer System contains a few thin sand and gravel lenses occurring amidst thick sequences of tills and some fine-grained glaciolacustrine deposits. The sand and gravel lenses within the system are either confined within glacial till or are directly overlying bedrock. In Wells County, about 90 percent of the wells started in this system are completed in the underlying bedrock aquifer system. However, the Hessen Cassel Aquifer System is capable of meeting the needs of some domestic users in the county. The few wells completed in this system are 80 to 90 feet deep and produce from sand and gravel aquifers about 10 feet thick. Reported yields for these domestic wells are 12 to 50 gallons per minute (gpm) with static water levels of 36 to 50 feet below the ground surface. In general, this system has a low susceptibility to surface contamination because intratill sand and gravel units are commonly overlain by thick glacial till.

Bluffton Till Aquifer System

The Bluffton Till Aquifer System primarily consists of glacial till separated by thin intratill sand and gravel layers. In Wells County, this aquifer system ranges in thickness from 50 feet to 130 feet. Saturated aquifer materials include sand and/or gravel deposits that are commonly 5 to 15 feet thick and typically overlain by 45 to 75 feet of till.

Wells completed in the Bluffton Till Aquifer System are capable of meeting the needs of most domestic and some high-capacity users in Wells County. However, approximately 45 percent of wells started in this system utilize the underlying bedrock aquifer. Wells producing from the Bluffton Till Aquifer System are typically 60 to 90 feet deep. Domestic well capacities are commonly 15 to 60 gpm. Static water levels generally range from 20 to 40 feet below the surface.

The Bluffton Till Aquifer System typically has a low susceptibility to surface contamination because intratill sand and gravel units are commonly overlain by thick glacial till. Shallow wells completed in this system are moderately susceptible to contamination.

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 in Wells County. This subsystem is mapped in about 30 percent of the county. The Bluffton Till

Aquifer Subsystem ranges from about 45 feet to 145 feet thick in Wells County. However, the system is typically less than 100 feet deep. Potential aquifer materials include thin, intratill sand and gravel deposits. Where present, aquifer materials are capped by till that is generally 50 to 70 feet thick.

More than 90 percent of wells started in the Bluffton Till Aquifer Subsystem in Wells County are completed in the underlying bedrock aquifer system. However, this subsystem is capable of meeting the needs of some domestic users in the county. The few wells producing from the Bluffton Till Aquifer Subsystem are completed at depths of 45 to 145 feet.

This subsystem is generally not very susceptible to surface contamination because intratill sand and gravel units are overlain by thick till deposits. Wells producing from shallow aquifers are moderately susceptible to contamination.

Bluffton Complex Aquifer System

This system is mapped in portions of southwestern Wells County. The Bluffton Complex Aquifer System is characterized by unconsolidated deposits that are quite variable in materials and thickness. Aquifers within the system range from thin to thick and include single or multiple intratill sands and gravels. The aquifers are highly variable in depth and lateral extent and are typically confined by clay layers. The total thickness of unconsolidated deposits is in excess of 170 feet in places.

Well depths in the Bluffton Complex Aquifer System range from 60 to 160 feet although wells are typically completed at depths ranging from 60 to 110 feet. Most wells are completed below the shallow aquifer (if present), which generally ranges in thickness from 1 to 10 feet. A till cap of variable thickness commonly separates upper and lower aquifers, and ranges in thickness from 5 to 60 feet. Wells completed in the Bluffton Complex Aquifer System produce from saturated aquifer materials that range in thickness from 4 to 120 feet but are typically 10 to 30 feet thick.

This system is capable of meeting the needs of domestic and some high-capacity users. Typical domestic yields range from 15 to 50 gpm. Static water levels generally range from 20 to 30 feet below the surface. There is 1 registered significant ground-water withdrawal facility (2 wells) utilizing this system. The facility's one high-capacity well has a reported pumping rate of 300 gpm.

The Bluffton Complex Aquifer System is not very susceptible to contamination where overlain by thick clay deposits. However, in some areas where surficial clay deposits are thin, the shallow aquifer, if present, is at moderate to high risk.

Wabash River and Tributaries Outwash Aquifer Subsystem

The Wabash River and Tributaries Outwash Aquifer Subsystem is mapped along a portion of the Salamonie River valley in southwestern Wells County. Sand and gravel from the melting glaciers (outwash) were deposited in places in this valley. Total thickness of unconsolidated deposits overlying bedrock ranges from about 70 to over 160 feet.

The Wabash River and Tributaries Outwash Aquifer Subsystem has the potential to meet the needs of domestic users. The 4 wells completed in this system have well depths ranging from 40 to 160 feet. Yields for these wells are 10 and 15 gpm with static water levels of 20 to 40 feet below the 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 is 1 registered significant ground-water withdrawal facility (total of 2 wells) using unconsolidated aquifers in the county. This facility utilizes the Bluffton Complex Aquifer System. Reported capacities for individual wells are 25 and 300 gpm. The water is used for energy production. Refer to the table for some details on the wells and to the map for the facility location.

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