

Unconsolidated Aquifer Systems of Grant County, Indiana

by

Gregory P. Schrader and Robert A. Scott
Division of Water, Resource Assessment Section
June 2009

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

The thickness of unconsolidated deposits in Grant County is quite variable because glacial material has been deposited over an uneven bedrock surface. Unconsolidated materials range from 50 feet thick or less in the western portion of the county to more than 450 feet in the buried bedrock valley that cuts across northeastern portion of Grant County. However, throughout much of Grant 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 Grant County, the Till Veneer Aquifer System includes areas where the unconsolidated material is predominantly thin till overlying an eroded bedrock surface. This system has the most limited ground-water resources of the unconsolidated aquifer systems in the county and is mapped in the western portion of Grant County. Total thickness of the Till Veneer Aquifer System generally ranges from about 25 to 50 feet.

There is little potential for ground-water production in this system in Grant County. Potential aquifer materials 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. The Till Veneer Aquifer 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 Grant County, this aquifer system ranges in thickness from about 50 feet to more than 250 feet (where glacial deposits have filled bedrock valleys). Wells completed in the

Bluffton Till Aquifer System are capable of meeting the needs of most domestic and some high-capacity users in Grant County. However, approximately 22 percent of wells started in this system utilize the underlying bedrock aquifer. Saturated aquifer materials include sand and/or gravel deposits that are commonly 5 to 25 feet thick and are generally overlain by 25 to 140 feet of till.

Wells producing from the Bluffton Till Aquifer System are typically 60 to 115 feet deep. Domestic well capacities are commonly 10 to 50 gallons per minute (gpm). Static water levels generally range from 15 to 60 feet below the surface. There are 3 registered significant groundwater withdrawal facilities (total of 10 wells) with reported yields that range from 50 to 518 gpm.

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 limited aquifer potential, are mapped as the Bluffton Till Aquifer Subsystem. The unconsolidated material in this subsystem ranges from about 50 to 200 feet thick in Grant County. Potential aquifer materials include intratill sand and gravel deposits. Where present, aquifer materials are capped by till that is commonly 30 to 85 feet thick.

More than 85 percent of wells started in the Bluffton Till Aquifer Subsystem in this 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 generally completed at depths of 60 to 140 feet. Intratill sand and gravel aquifer materials are typically 5 to 10 feet thick. Reported well yields generally range from 5 to 25 gpm and static water levels are commonly 45 to 90 feet below the surface.

This subsystem is generally not very susceptible to surface contamination because intratill sand and gravel units are overlain by thick till deposits. However, in some areas where aquifers are shallow and overlying clay deposits are thin, the system is at moderate risk.

Bluffton Complex Aquifer System

The Bluffton Complex Aquifer System is mapped over a large portion of eastern Grant County and is characterized by unconsolidated 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. Total thickness of the Bluffton Complex Aquifer System generally ranges from about 70 to over 185 feet in Grant County.

In northeastern Grant County, this system overlies the Lafayette (Teays) Bedrock Valley System, which trends northwest from the area near the town of Jadden, toward Metocinah Creek. The total unconsolidated thickness exceeds 450 feet in many places. The few wells completed in this portion of the system produce from both upper and lower sand and gravel aquifers. The wells producing from the upper aquifer range in depth from about 100 to 215 feet. The lower aquifer wells produce from depths up to 430 feet deep. In places, the total saturated thickness exceeds 30 feet.

Southeast of the town of Arcana a small tributary enters the buried valley system. This portion of the buried valley has very little deep potential.

This system is capable of meeting the needs of domestic and some high-capacity users in Grant County. However, approximately 15 percent of wells started in this system utilize the underlying bedrock aquifer. The most utilized aquifer layers in the Bluffton Complex Aquifer System are generally 10 to 30 feet thick sands and/or gravels overlain by a till cap which is commonly 30 to 80 feet thick. Wells in this system are typically completed at depths ranging from 70 to 140 feet. Domestic well yields are commonly 15 to 50 gpm and static water levels are generally 30 to 70 feet below the surface. There are 10 registered significant ground-water withdrawal facilities (27 wells) utilizing this system and individual wells produce 22 to 1600 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 System is mapped along part of the Mississinewa River in southeastern Grant County. The Wabash River and Tributaries Outwash Aquifer Subsystem has the potential to meet the needs of domestic and some high-capacity users. However, approximately 8 percent of wells started in this system utilize the underlying bedrock aquifer. The few wells utilizing this system in Grant County have been reported at depths of 65 to 100 feet. Saturated aquifer materials include sand and/or gravel deposits that are commonly 10 to 30 feet thick and are generally overlain by 10 to 30 feet of clay. Yields for these wells are 10 to 25 gpm with static water levels ranging from 20 to 35 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.

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