

Unconsolidated Aquifer Systems of Warren County, Indiana

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Seven unconsolidated aquifer systems have been mapped in Warren County: the Till Veneer; the Buried Valley; the Iroquois Till; the Iroquois / Tipton / Central Wabash Valley Till Subsystem; the Iroquois Complex; the Wabash River and Tributaries Outwash; 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.

Thicknesses of unconsolidated sediments that overlie bedrock are quite variable in Warren County. Total thickness ranges from zero feet where bedrock outcrops at the surface along isolated sections of the Wabash River and Big Pine Creek to an estimated 380 feet in the northern portion of the county where a section of a major bedrock valley, the Lafayette (Teays) Bedrock Valley System, is present.

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 is mapped mostly along sections of the Wabash River, Big Pine Creek and Opossum Run Creek. The system consists of thin till, generally less than 50 feet thick, which directly overlies an uneven bedrock surface. Potential aquifers within this system can include thin isolated sand and/or gravel layers. Along some of the major streams this system may include thin alluvium and surficial sands and gravels that directly overlie the bedrock surface.

There is little potential for groundwater production in this system in Warren County. No wells have reportedly been completed in the Till Veneer Aquifer System which is bypassed in favor of the underlying bedrock. Potential aquifer deposits include thin, isolated sands and/or gravels with yields less than 5 gallons per minute (gpm).

This aquifer system is generally not very susceptible to surface contamination because intratill sand and gravel units are overlain by till deposits. However, some areas have surface sands and gravels or thin to no clay deposits above the aquifer resource. These areas are considered at moderate to high risk to contamination.

Buried Valley Aquifer System

The Buried Valley Aquifer System consists of glacial materials deposited in bedrock valleys. The system is mapped primarily in northeastern and southern Warren County. Typical deposits generally include a thick glacial till with isolated sands and gravels that are thin and not used as an aquifer resource. Aquifer sands and gravels are typically deep and are less than 30 feet thick. In places, the aquifer sands and gravels may directly overlie the bedrock surface.

Few wells are completed in the Buried Valley Aquifer System in Warren County. However, this aquifer system has the potential to meet the needs of domestic and some high-capacity users. Wells are 100 to 259 feet deep with yields that range from 6 to 75 gpm. Static water levels range from 27 to 175 feet below surface. The Buried Valley Aquifer System is generally not very susceptible to surface contamination. Thick till deposits overlie the aquifer units and inhibit the downward migration of contaminants.

Iroquois Till Aquifer System

The Iroquois Till Aquifer System is mapped throughout much of northern and west central Warren County. The system typically consists of thick clay with discontinuous intratill sands and gravels. The discontinuous sands and gravels, where present, are generally less than 10 feet thick and are often noted as “dry”. Well depths are generally 80 to 170 feet. Typical aquifer sands and gravels range from 5 to 20 feet thick and are capped by 70 to 165 feet of clay.

This system is capable of meeting the needs of domestic and some high-capacity users. Domestic well yields are generally from 5 to 40 gpm with static water levels that range from 20 to 55 feet below surface. There are 3 registered significant groundwater withdrawal facilities (5 wells) with yields that range from 200 to 1000 gpm.

In places, a portion of this system overlies part of a major buried bedrock valley. The few wells completed in these areas are up to 230 feet in depth with aquifer thicknesses generally less than 10 feet thick. Well capacities are up to 80 gpm with static water levels from 10 to 85 feet below surface.

This system is generally not very susceptible to surface contamination because intratill sand and gravel units are overlain by thick till deposits.

Iroquois / Tipton / Central Wabash Valley Till Aquifer Subsystem

The Iroquois / Tipton / Central Wabash Valley Till Aquifer Subsystem is mapped throughout most of Warren County. The subsystem is mapped similar to that of the Iroquois Till Aquifer System. However, potential aquifer materials are thinner and potential yield is less in the subsystem than in the system.

Approximately 60 percent of the wells drilled in areas mapped as till subsystem are completed in the underlying bedrock aquifer system. However, the subsystem has the potential of meeting the needs of some domestic users. Well depths are generally 80 to 160 feet. Potential aquifer materials include sand and gravel deposits that generally range from 3 to 10 feet thick and are capped by 70 to 135 feet of till. Intratill sands and gravels, where present, are generally less than 9 feet thick and are often noted as “dry”. The few wells that utilize the available sand and gravel deposits have yields that range from 4 to 20 gpm with static water levels of 15 to 70 feet below surface. However, most wells are associated with significant drawdown, especially at greater yields.

The subsystem is generally not very susceptible to surface contamination because intratill sand and gravel units are overlain by thick till deposits.

Iroquois Complex Aquifer System

The Iroquois Complex Aquifer System is mapped throughout portions of the northern third of Warren 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.

Although the Iroquois Complex Aquifer System is considered a prolific source of groundwater, few wells are reported in Warren County. Completed well depths range from 56 to 282 feet. Total accumulative unconsolidated thickness above the main aquifer unit ranges from 11 to 274 feet. In places, the system exhibits multiple sand and gravel deposits above the primary aquifer resource that are also a potential source of groundwater. Individually, the discontinuous sands and gravels range from 3 to 23 feet thick and the deeper, more productive aquifer deposits are 5 to 68 feet thick.

In places, a portion of this system overlies part of a major buried bedrock valley. Total estimated thickness of unconsolidated deposits is up to 380 feet. However, wells completed in these areas are up to 255 feet in depth. Intermittent sands and gravels range from 2 to 73 feet thick with aquifer units that range from 4 to 95 feet. Well capacities are up to 130 gpm with static water levels from 23 to 130 feet in depth.

The Iroquois Complex Aquifer System is capable of meeting the needs of domestic and some high-capacity users. Domestic yields are up to 35 gpm with static water levels from 13 to 140 feet below surface. There are 3 registered significant groundwater withdrawal facilities (6 wells) with reported yields that range from 30 to 150 gpm.

This aquifer system is not very susceptible to contamination where thick clay deposits overlie aquifer materials. However, in places where clay deposits are thin, these areas are at moderate to high risk to surface contamination.

Wabash River and Tributaries Outwash Aquifer System

The Wabash River and Tributaries Outwash Aquifer System includes thick glacial outwash sands and gravels capped by recent alluvial deposits. The system is mapped primarily along the Wabash River from the Town of Williamsport to the southern boundary of the county.

The few completed wells that are available range from 60 to 260 feet in depth with up to 112 feet of continuous sands and gravels. In places, the outwash aquifer deposits are capped by thin alluvial silt and/or clay materials. Intermittent clay materials may be present as well. The Wabash River and Tributaries Outwash Aquifer System is capable of meeting the needs of domestic and high-capacity users. There are 8 registered significant groundwater withdrawal facilities (19 wells) with capacities that range from 50 to 2500 gpm. Static water levels range from 2 to 110 feet below ground surface.

Areas that lack overlying clay deposits are highly susceptible to contamination. However, where overlying clay or silt deposits are present the system is moderately susceptible to surface contamination.

Wabash River and Tributaries Outwash Aquifer Subsystem

The Wabash River and Tributaries Outwash Aquifer Subsystem is mapped primarily along the Wabash River from just south of the Town of Williamsport and continuing northeast to just south of Fulton Islands. The subsystem is mapped similar to the Wabash River and Tributaries Outwash Aquifer System. However, potential aquifer materials are thinner, overlying silt or clay materials are generally thicker and potential yield is less in the subsystem than in the system.

Few wells are completed in the Wabash River and Tributaries Outwash Aquifer Subsystem in Warren County. Well depths are generally less than 110 feet with up to 30 feet of continuous sand and gravel. In places, aquifer materials are capped by silt, clay or sandy clay and intermittent clay deposits up to 30 feet. The subsystem is capable of meeting the needs of domestic and some high-capacity users. There is one well for the Warren County Community Schools with a reported capacity of 335 gpm.

Areas that lack overlying clay deposits are highly susceptible to contamination. However, where overlying clay or silt deposits are present the system is moderately susceptible to surface contamination.

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