

Unconsolidated Aquifer Systems of White County, Indiana

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Six unconsolidated aquifer systems have been mapped in White County: the Till Veneer; the Iroquois Basin; the Kankakee / Iroquois Till; the Kankakee / Iroquois Till Subsystem; the Kankakee / Iroquois Complex; and the Wabash River and Tributaries Outwash Subsystem. Characteristics of the Iroquois Basin Aquifer System have been described and mapped as part of the previously published regional basin study report; Water Resource Availability in the Kankakee River Basin, Indiana, IDNR, 1990. Although characteristics and descriptions of the basin study aquifer systems are generalized over large portions of northern Indiana, the descriptions of the aquifer systems have been modified here to accommodate the individuality of White County. 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 White County. Total thickness ranges from approximately 5 feet in the western part where bedrock is shallow, to as much as 270 feet in the southeast portion of the county where a section of a major buried 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

In White County, the Till Veneer Aquifer System is mapped along portions of the northwest and west-central area of the county. This system generally consists of thin till, 10 to 30 feet thick that directly overlie an uneven bedrock surface. In places, intratill and/or surface sand and gravel deposits up to 20 feet thick are present. However, nearly all wells started in the Till Veneer Aquifer System are completed in the underlying bedrock. This system is the most limited ground-water resource of the unconsolidated aquifer systems in the county.

The few wells that are completed in the Till Veneer Aquifer System are generally 20 to 45 feet in depth and produce from sands and gravels that are less than 12 feet thick. Well yields are less than 15 gallons per minute (gpm) and commonly have large drawdowns. Static water levels range from 2 to 15 feet below surface.

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

Iroquois Basin Aquifer System

The Iroquois Basin Aquifer System in White County is an extension of a broad regional aquifer system initially described in the published report; Water Resource Availability in the Kankakee River Basin, Indiana, IDNR, 1990. The system is mapped along part of the northwestern corner of the county. Characteristics of this system generally consists of thick clay deposits with thin intermittent sands and gravels that overlie shallow bedrock, or, isolated surface sands with thin to no clay that directly overlie bedrock. Total thickness of these deposits is 50 feet or less.

Nearly all wells completed in the mapped area utilize the underlying bedrock aquifer system. However, this system is capable of meeting the needs of some domestic users. Potential aquifer sands and gravels generally range from 3 to 36 feet thick and may directly overlie the bedrock surface. Domestic well yields generally range from 7 to 20 gpm with static water levels from 5 to 15 feet below surface. However, large drawdowns are associated with higher yields.

This aquifer system is generally not very susceptible to surface contamination where sand and gravel units are overlain by thick till deposits. However, areas where overlying clays are thin or absent are at moderate to high risk of contamination.

Kankakee / Iroquois Till Aquifer System

The Kankakee / Iroquois Till Aquifer System is mapped primarily in portions of west and central White County. The system typically consists of thick clay with, in places, discontinuous intratill sands and gravels. Well depths are generally 40 to 90 feet. Typical aquifer sands and gravels range from 3 to 15 feet thick and are capped by 20 to 75 feet of clay. This system is capable of meeting the needs of domestic and some high-capacity users. Domestic well yields are generally 10 to 35 gpm with static water levels that range from 10 to 25 feet below surface. There are 3 registered significant ground-water withdrawal systems (6 wells) with yields that range from 70 to 1300 gpm.

In places, a portion of this system overlies part of a buried bedrock valley. The few wells completed in the deeper portion of these areas are up to 250 feet in depth with aquifer thicknesses up to 30 feet. Reported well capacities are generally up to 40 gpm with static water levels from 15 to 65 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. However, in places isolated surface sands and gravels are present with thinner clay deposits above the aquifer unit. These areas are considered at moderate to high risk of contamination.

Kankakee / Iroquois Till Aquifer Subsystem

The Kankakee / Iroquois Till Aquifer Subsystem is mapped throughout portions of central, southwestern and northeastern White County. The subsystem is mapped similar to that of the Kankakee / Iroquois Till Aquifer System. However, potential aquifer materials are thinner and potential yield is less in the subsystem than in the system.

Approximately 90 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. Potential aquifer materials include sand and gravel deposits that generally range from 2 to 20 feet thick and are capped by 50 to 110 feet of till. The few wells that utilize the available sand and gravel deposits have yields that range from 3 to 30 gpm. However, most wells have significant drawdowns, especially wells reporting greater yields.

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

Kankakee / Iroquois Complex Aquifer System

The Kankakee / Iroquois Complex Aquifer System is mapped in the southwest and throughout most of the eastern half of White County. Several glacial advances resulted in a complex sequence of multiple, stacked, till and outwash units that are quite variable in position and thickness. Characteristics of this system also include surface sands, generally 9 to 25 feet thick, that overlie a thick clay cap with discontinuous intratill sands and gravels above the primary aquifer unit.

Well depths are commonly 60 to 125 feet. In places the system exhibits multiple sand and gravel deposits above the primary aquifer resource that are also a potential source of ground-water. The sand and gravel deposits vary from thin to massive and are typically discontinuous and overlain by a thick till. Total accumulative unconsolidated thicknesses above the aquifer unit are generally 35 to 100 feet of clay. Individually, the discontinuous sands and gravels are typically 3 to 20 feet thick and the deeper, more productive aquifer deposits are 7 to 30 feet thick.

In places, a portion of this system overlies part of a major buried bedrock valley. Wells completed in these areas are up to 270 feet in depth with aquifer thicknesses up to 30 feet. Well capacities are generally 15 to 60 gpm with static water levels from 20 to 90 feet in depth. There is one registered significant ground-water withdrawal facility (2 wells) with reported yields of 125 gpm.

The Kankakee / Iroquois Complex Aquifer System is capable of meeting the needs of domestic and some high-capacity users. Typical domestic yields range from 10 to 80 gpm. Static water levels commonly range from 10 to 40 feet below surface with some flowing wells reported. There are 22 registered significant ground-water withdrawal facilities (32 wells) with reported yields that range from 10 to 2000 gpm.

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

Wabash River and Tributaries Outwash Aquifer Subsystem

In White County the Wabash River and Tributaries Outwash Aquifer Subsystem is mapped in the southeast along a small section of Big Creek that is tributary to the Tippecanoe River as well as along a small portion of the Tippecanoe River floodplain. No known wells are completed in this system in White County. However, in nearby Carroll County descriptive characteristics of this system include thick sand and gravel sequences separated by thin discontinuous clay deposits. Well depths typically range from 45 to 125 feet below surface with up to 25 feet of continuous sand and gravel. In places, aquifer materials are capped by silt, clay or sandy clay. The subsystem is capable of meeting the needs of domestic and some high-capacity users. Reported well yields in Carroll County are up to 100 gpm.

In places, a portion of the subsystem overlies part of a major buried bedrock valley. In nearby Carroll County wells produce at depths of up to 150 feet with total saturated thicknesses of aquifer materials up to 30 feet.

Areas that lack overlying clay or silt 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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