

Unconsolidated Aquifer Systems of Wayne County, Indiana

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Six unconsolidated aquifer systems have been mapped in Wayne County: the Till Veneer; the New Castle Till; the New Castle Till Subsystem; the New Castle Complex; the Whitewater River Valley Outwash; and the Whitewater River Valley Outwash Subsystem.

Thicknesses of unconsolidated sediments that overlie bedrock are quite variable in Wayne County. Total thickness ranges from less than 4 feet along portions of the east edge of the East Fork Whitewater River Valley, to as much as 355 feet in the west-central part of the county where a buried bedrock valley is present.

Regional estimates of aquifer susceptibility to contamination from the surface can differ considerably due to variations within geologic environments. 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 Wayne County, the Till Veneer Aquifer System is mapped mostly in the southeastern portion of the county and along a small area of Nolands Fork River and Greens Fork River. This system generally consists of thin till, less than 50 feet thick, that directly overlies an uneven bedrock surface. In places, intermittent and discontinuous subsurface or surface sands and gravels are present. It is the most limited groundwater resource of the unconsolidated aquifer systems in the county.

Approximately 77 percent of wells started in the Till Veneer Aquifer System in Wayne County are completed in the underlying bedrock aquifer system. However, several large diameter bucket wells utilize thin, low yield sand and gravel seams and/or reportedly “wet” clay deposits. Also, drillers often complete wells at varying depths below the water bearing deposits. This allows for greater potential yield from storage for short duration pumping needs.

Reported well yields are generally less than 7 gallons per minute (gpm) with dry holes noted. Greater well yields have been reported, however, these wells are generally associated with significant to complete drawdown and it is likely that such production cannot be sustained for lengthy periods of time.

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

New Castle Till Aquifer System

The New Castle Till Aquifer System is mapped throughout much of Wayne County. Typical deposits include a thick glacial till with intermittent sand and gravel deposits of variable thickness. Approximately 96 percent of wells completed in the area are finished in unconsolidated deposits of this system.

Total well depths in the New Castle Till Aquifer System range from 70 to 130 feet deep. Potential aquifer materials include sand and gravel deposits that are typically 3 to 12 feet thick. The aquifer deposits are capped by thick clay with intermittent sand and gravel that generally range from 60 to 120 feet. Domestic well yields range from 10 to 20 gpm with static water levels that range from flowing to 130 feet below surface. There are four significant water withdrawal facilities (7 wells) registered in this system. Reported yields range from 70 to 500 gpm.

In west-central Wayne County a portion of this system overlies part of a major buried bedrock valley. Few deep wells are available in this area. However, one domestic well reports a total depth of completion in gravel at 255 feet with a yield of 65 gpm.

The New Castle Till Aquifer System is generally not very susceptible to surface contamination because sand and gravel units are overlain by thick till deposits. However, some areas have windblown sand and silt and/or thin till overlying the aquifer deposits. These areas are considered at moderate to high risk to contamination.

New Castle Till Aquifer Subsystem

The New Castle Till Aquifer Subsystem is mapped throughout much of Wayne County. The subsystem is mapped similar to that of the New Castle Till Aquifer System. However, potential aquifer materials are thinner and potential yield is less in the subsystem than in the system. Description of aquifer units vary widely ranging from “wet” clay with no noted sands and gravels, to thick low yield sand and gravel deposits. Approximately 34 percent of wells in the area are completed in the underlying bedrock aquifer system. However, the subsystem has the potential of meeting the needs of some domestic users. Many wells completed in the subsystem are large diameter bucket wells, or, drillers often complete wells at varying depths below the water bearing deposits. This allows for greater potential yield from storage for short duration pumping needs.

Well depths in the New Castle Till Aquifer Subsystem are typically 45 to 115 feet deep. Where present, sand and gravel deposits are generally 2 to 10 feet thick and are capped by 35 to 100 feet of clay with discontinuous sand and gravel. Isolated thicker sand and gravel deposits have been reported, however, a portion of the thickness is often noted as “dry”. Also, in places drillers often continue the borehole depth 4 to 15 feet beneath the aquifer deposits.

A small portion of this system in west-central Wayne County overlies part of a major buried bedrock valley. Few deep wells are available in this area. However, one domestic

well reports a total depth of completion at 164 feet with a yield of 6 gpm from a 9 foot sand and gravel aquifer unit.

Reported well capacities are generally 5 to 15 gpm. However, many wells with reported capacities greater than 10 gpm are associated with deeper static water levels and significant to complete drawdown. Static water levels are commonly 15 to 55 feet below surface.

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

New Castle Complex Aquifer System

The New Castle Complex Aquifer System is mapped primarily in the central and northwest portions of Wayne 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 in thickness from thin to massive and are typically discontinuous and overlain by a thick till.

Completed well depths commonly range from 80 to 130 feet. Thickness of clay deposits that overlie the aquifer resource generally range from 40 to 115 feet with, in places, multiple sand and gravel deposits above the primary aquifer resource. Although some are noted as “dry”, some may be a potential source of groundwater. Individually, the multiple discontinuous sands and gravels range from 4 to 19 feet thick.

A portion of this system in west-central and northwestern Wayne County overlies part of a major buried bedrock valley. Depth to bedrock is reportedly up to 355 feet. However, there is little evidence for groundwater potential at depth. Total depths of wells in this area are reportedly up to 130 feet.

A portion of this system overlies part of a major buried bedrock valley and is mapped to the northwest and west-central edge of Wayne County. Depth to bedrock is reportedly up to 258 feet in the northwest, and up to 306 feet to the west. Few wells are available; however, wells producing from deep gravel materials are reported at total depths of 200 feet in the northwest and 214 feet along the western edge of the county.

The New Castle Complex Aquifer System is capable of meeting the needs of domestic and high-capacity users. Domestic yields are commonly 10 to 35 gpm with static water levels from 20 to 70 feet below surface. There are 5 registered significant groundwater withdrawal facilities (9 wells) with reported yields up to 400 gpm.

This aquifer system is not very susceptible to contamination where thick clay deposits overlie aquifer materials. However, in places clay deposits are thin and wind-blown fine sand and silt are present. These areas are at moderate to high risk to surface contamination.

Whitewater River Valley Outwash Aquifer System

The Whitewater River Valley Outwash Aquifer System is mapped along sections of the Whitewater River on the west side of Wayne County near Hagerstown and continuing south to the county line; to the southwest along sections of Greens Fork and Nolands Fork rivers; and along the East Fork Whitewater River in Richmond and continuing east and southwest. The system includes thick glacial outwash sands and gravels with intermittent clay layers that, in some areas, are capped by a thin layer of clay and/or silt deposits.

Completed well depths generally range from about 25 to over 111 feet with saturated sand and gravel aquifer materials up to 52 feet thick. In places, clay or fine grained windblown sand and silt deposits overly the outwash sand and gravels. These deposits range from one to 38 feet thick.

A portion of this system overlies part of a major buried bedrock valley. Seismic data suggests depth to bedrock is reportedly up to 272 feet. However, there is little evidence for groundwater potential at depths beyond 110 feet.

The Whitewater River Valley Outwash Aquifer System is capable of meeting the needs of both domestic and high-capacity users in Wayne County. Domestic well yields range from 10 to 50 gpm with static water levels ranging from 6 to 95 feet below the surface. There are 6 registered significant groundwater withdrawal facilities (11 wells) in the Whitewater River Valley Outwash Aquifer System. Reported production for these high-capacity wells range from 400 to 1,458 gpm. In the buried valley area there are 3 registered significant groundwater withdrawal facilities (4 wells). High-capacity production ranges from 110 to 440 gpm.

This system is highly susceptible to surface contamination where sand and gravel deposits are near the surface and have little or no overlying clay deposits.

Whitewater River Valley Outwash Aquifer Subsystem

The Whitewater River Valley Outwash Aquifer Subsystem is mapped mostly along several tributaries of the Whitewater River; along a section of Short Creek southeast of Richmond, and along portions of the East Fork of the Whitewater River. It is mapped similar to the Whitewater River Valley Outwash Aquifer System, however, potential aquifer materials are thinner and overlying fine sands, silt or clay deposits are thicker. Also, in places discontinuous clay layers of variable thickness may be present.

Well depths in the White River and Tributaries Outwash Aquifer Subsystem generally range from 16 to 135 feet. In places, aquifer materials are up to 65 feet of continuous sand and gravel. In some areas the upper portions of the total aquifer sequence of sands and gravels are reported as “dry”.

A portion of this system overlies part of a major buried bedrock valley. Seismic data suggests depth to bedrock is reportedly up to 272 feet. However, there is little evidence for groundwater potential at depths beyond 135 feet.

The White River and Tributaries Outwash Aquifer Subsystem is capable of meeting the needs of domestic and some high-capacity users. Domestic well capacities range from 10 to 65 gpm with static water levels of 1 to 50 feet below ground surface. There are 2 registered significant groundwater withdrawal facilities (4 wells) with capacities from 150 to 335 gpm. In the buried valley area there is one registered significant groundwater withdrawal facility (one well) with a reported production of 250 gpm.

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

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