

Unconsolidated Aquifer Systems of Decatur County, Indiana

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Four unconsolidated aquifer systems have been mapped in Decatur County: the Dissected Till and Residuum; the Pre-Wisconsin Drift; the New Castle Till; and the New Castle Till Subsystem. The first system includes deposits left by continental ice sheets as well as eroded residuum (a product of bedrock weathering). The next three systems comprise sediments deposited by, or resulting from, glaciers, glacial meltwaters, and post-glacial precipitation events. Boundaries of these aquifer systems are commonly gradational and individual aquifers may extend across aquifer system boundaries.

The thickness of unconsolidated deposits in the county is quite variable. In places where only residuum or thin drift is present, sediments overlying bedrock are less than 5 feet thick and bedrock is exposed along portions of Fall Fork near the western county line. However, the thickness of unconsolidated materials is as much as 160 feet where sequences of till and outwash have been stacked above the deepest parts of buried bedrock valleys in northwestern and west-central Decatur County.

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.

Dissected Till and Residuum Aquifer System

This aquifer system, which covers about 73 percent of Decatur County, is the most limited ground-water resource of the unconsolidated aquifer systems in the county. Unconsolidated deposits of this aquifer system consist predominantly of till with thin layers of stratified drift and of thin, eroded bedrock residuum. Also included in this aquifer system in many stream valleys are relatively thin deposits of alluvium and colluvium. Total thickness of the Dissected Till and Residuum Aquifer System generally ranges from about 20 to 45 feet, except in the northeastern part of the county where this system is typically 30 to 70 feet thick.

In Decatur County, potential aquifer units within this system include thin sand and/or gravel layers that are typically less than 2 feet thick and are generally separated by tills within the saturated zone. Large-diameter bored (bucket rig) wells are commonly used in this county to produce water from these thin seams of coarse-grained material. Typically constructed at depths of 30 to 45 feet with 30-inch diameter porous casing, these wells are built to maximize storage and are generally adequate for domestic use. These wells typically yield 0.5 to 6 gallons per

minute (gpm) and static water levels are generally 14 to 30 feet below land surface. Because the near-surface materials generally have low permeability, this system is not very susceptible to contamination from surface sources.

Pre-Wisconsin Drift Aquifer System

The Pre-Wisconsin Drift Aquifer System is mapped predominantly as a northeast-southwest trending band in central and western Decatur County. In this area till and outwash were deposited in preexisting bedrock valleys. Nearly all of the Pre-Wisconsin Drift Aquifer System in this band that lies east of the town of Horace also includes a thick cap of till associated with the Wisconsin terminal moraine. In southern and eastern parts of the county, this aquifer system consists primarily of pre-Wisconsin glacial till with discontinuous intratill sand and gravel layers. In Decatur County the Pre-Wisconsin Drift Aquifer System ranges from 18 to 160 feet in thickness, but is commonly 55 to 95 feet thick.

This aquifer system is generally capable of meeting the needs of domestic users. In Decatur County, nearly 40 percent of the reported wells penetrating this system were completed in unconsolidated materials rather than in the underlying bedrock. Wells in the Pre-Wisconsin Drift Aquifer System are commonly completed at depths ranging from 45 to 95 feet. About 40 percent of these wells are large-diameter (bucket-rig) wells which are constructed using 30-inch diameter porous casing to allow for maximum storage. Potential aquifer materials within the glacial till include discontinuous intratill sand and gravel layers. Individual sand and gravel units are commonly 3 to 15 feet thick. Domestic wells typically yield from 4 to 20 gpm and static water levels are generally 18 to 45 feet below land surface.

The Pre-Wisconsin Drift Aquifer System has a low susceptibility to surface contamination because intratill sand and gravel units are generally separated from the surface by till layers within the system.

New Castle Till Aquifer System

This system is mapped in the northwestern part of the Decatur County. In much of this area, till and outwash were deposited in preexisting bedrock valleys. The New Castle Till Aquifer System is primarily composed of glacial till with discontinuous intratill sand and gravel layers. The characteristics of this system are similar to those of the Pre-Wisconsin Drift Aquifer System which is mapped near and south of the Wisconsin glacial limit. Due to the complex glacial history, the boundaries between these systems are gradational. In Decatur County the New Castle Till Aquifer System typically ranges from 45 to 95 feet thick, but in places the thickness exceeds 160 feet. Potential aquifer materials include outwash sands and/or gravels that typically range from 5 to 20 feet thick and are generally overlain by 25 to 50 feet of till.

The New Castle Till Aquifer System is capable of meeting the needs of domestic and some high-capacity users. However, there are no registered significant ground-water withdrawal facilities utilizing this system in Decatur County. Wells are commonly 40 to 80 feet deep. Domestic well

capacities are typically 7 to 20 gallons per minute and static water levels are generally 10 to 30 feet below surface.

The New Castle Till Aquifer System has a low susceptibility to surface contamination because intratill sand and gravel units are generally separated from the surface by till layers within the system.

New Castle Till Aquifer Subsystem

Areas where unconsolidated materials generally exceed 50 feet in thickness and are predominantly composed of Wisconsin age till, yet have little aquifer potential, are mapped as New Castle Till Aquifer Subsystem in Decatur County. Potential aquifer materials include thin, intratill sand and gravel layers.

This system is capable of meeting the needs of some domestic users. However, only 1 known well is completed the New Castle Till Aquifer Subsystem in Decatur County. This well has a reported yield of 10 gpm. The New Castle Till Aquifer Subsystem is generally not very susceptible to surface contamination because its intratill sand and gravel units are overlain by thick till deposits.

Registered Significant Ground-water Withdrawal Facilities

There is 1 registered significant ground-water withdrawal facility (total of 3 wells) using unconsolidated aquifers in the county. These wells utilize the Dissected Till and Residuum Aquifer System. Reported capacities for individual wells are only 8 to 10 gpm. Refer to Table 1 for some details on the wells and to the map for facility locations.

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