

Unconsolidated Aquifer Systems of Noble County, Indiana

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Six unconsolidated aquifer systems have been mapped in Noble County: the Kendallville; the Topeka; the Natural Lakes and Moraines; the Natural Lakes and Moraines Subsystem; the Auburn/Warsaw Complex; and the St. Joseph and Tributary Valleys/Wabash River and Tributaries Outwash. The northern two-thirds of the county has been previously described and mapped in two previously published regional basin study reports (Water Resource Availability in the St. Joseph River Basin, Indiana, 1987 and Water Resource Availability in the Maumee River Basin, Indiana, 1996). The Topeka Aquifer System and the Natural Lakes and Moraines Subsystem were not mapped as part of the new county scale mapping. However, a brief description of these aquifer systems is included from the previously mentioned basin studies. For more detailed descriptions of these systems refer to the Water Resource Availability in the St. Joseph River Basin, Indiana, 1987.

Noble County has a very complex glacial history as it was subjected to multiple glacial advances from the north, northeast and east. The county lies in an interlobate area that was affected by the Saginaw lobe and Huron-Erie lobes. The dynamic interaction of the lobes resulted in a complex overlap and cross-cutting of glacial terrains. The resulting glacial landscape includes moraines, ground moraines, outwash channels, tunnel valleys (subglacial drainage channels) and outwash plains. Because of the complicated glacial geology, boundaries of the aquifer systems in this county are commonly gradational, and individual aquifers may extend across aquifer system boundaries.

The thickness of unconsolidated sediments in Noble County is quite variable, ranging from around 200 feet in the southeastern portion of the county, to more than 450 feet in the northeastern part of the county. In Noble County, unconsolidated deposits are commonly 300 to 400 feet thick. Almost all the domestic wells are completed in unconsolidated deposits in the 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.

Kendallville Aquifer System

The Kendallville Aquifer System is mapped primarily in the eastern third of the county and consists primarily of thick clay with intratill sand and gravel layers. In Noble County, this

system ranges in thickness from about 300 feet to more than 450 feet. Saturated aquifer materials include sand and/or gravel layers that commonly range from 5 to 20 feet thick. The sand and gravel layers are typically overlain by 50 to 110 feet of till.

This system is generally capable of meeting the needs of most domestic and some high-capacity users. Wells producing from the Kendallville Aquifer System commonly range from 70 to 150 feet deep with a few wells over 300 feet deep. Domestic well capacities are commonly 15 to 50 gallons per minute (gpm) and static water levels typically range from 15 to 65 feet below the surface with a few flowing wells reported. There are 12 registered significant ground-water withdrawal facilities (23 wells) with reported yields for high-capacity wells ranging from 120 to 1500 gpm. The Kendallville Aquifer System has a low susceptibility to surface contamination because intratill sand and gravel units are commonly separated from the surface by thick till layers.

Topeka Aquifer System

The Topeka Aquifer System is located in two separate areas. The northern most occurrence of this system is just south of Topeka in LaGrange County, and extends southward into Noble County just north of Ligonier. The other occurrence of the Topeka Aquifer System covers approximately five square miles in north central Noble County west of Rome City. This system consists of up to 126 feet of near-surface sand and gravel that overlies till. The till sequence that underlies this near-surface sand and gravel consists of clay units alternating with up to four separate sand and gravel layers. In most areas of this system, however, there is only one (0 to 60 feet thick) sand and gravel zone at depth. The majority of existing wells in these regions utilize the more continuous deeper sand and gravel aquifer rather than the near-surface deposits. In areas where there is more than one aquifer present, the minor aquifers are only locally continuous. Eight registered significant ground-water withdrawal facilities (11 wells) are in the Topeka Aquifer System in Noble County. Reported yields for high-capacity wells in this aquifer system range from 250 to 1200 gpm. The surficial sand and gravel deposits are highly susceptible to contamination and the deeper aquifers are slightly susceptible.

Natural Lakes and Moraines Aquifer System

The Natural Lakes and Moraines Aquifer System in Noble County is mapped over much of the western half of the county and is a complex aquifer system typically with multiple intratill sand and gravel seams. In this county, the Natural Lakes and Moraines Aquifer System normally contains at least two potential sand and gravel aquifers, one near the surface, the other at depth. In places, the near-surface aquifer is absent and surficial clays over 80 feet thick are present. A few localized surficial sand and gravel deposits are reported and range from 15 to 40 feet thick; however, the static water levels are commonly deep and these deposits are seldom used. The total thickness of unconsolidated deposits in this system in Noble County ranges from about 300 to over 400 feet.

This system is capable of meeting the needs of domestic and most high-capacity users in Noble County. Wells completed in this aquifer system range in depth from 20 to over 400 feet deep. However, typical well depths range from 65 to 145 feet deep. The primary aquifer is generally between 15 and 25 feet thick and is typically covered by a thick till cap. Domestic well yields are commonly 10 to 60 gpm and static water levels are typically 15 to 60 feet below the surface. There are 26 registered significant ground-water withdrawal facilities (37 wells) utilizing this system with reported yields up to 1400 gpm for individual wells.

The Natural Lakes and Moraines Aquifer System is generally not very susceptible to surface contamination because thick clay deposits overlie intratill sand and gravel seams. Wells producing from shallow aquifers are moderately to highly susceptible to contamination.

Natural Lakes and Moraines Aquifer Subsystem

The Natural Lakes and Moraines Aquifer Subsystem in Noble County is primarily mapped in the west-central part of the county where a relatively thin layer of outwash overlaps morainic topography. This subsystem is typically transitional between the large outwash areas in the west-central portion of the county and the Natural Lakes and Moraines Aquifer System. The subsystem is a complex sequence of glacial deposits ranging in thickness from around 300 feet to over 400 feet. It generally consists of continuous surficial sand and gravel deposits that vary in thickness from 20 to over 120 feet thick but are commonly 25 to 45 feet thick. Below the surficial sand and gravel deposits, thick clays predominate. Most areas have two or more intratill sand and gravel aquifers. The deeper sand and gravel deposits tend to be thicker and more continuous and are commonly between 10 and 30 feet thick. Most wells are completed in the deeper aquifers. However, some wells use the surficial sand and gravel deposits.

This subsystem is capable of meeting the needs of domestic and most high-capacity users in Noble County. Wells completed in this aquifer system range in depth from 22 to 235 feet deep. However, the wells are generally 50 to 110 feet deep. Domestic well yields are commonly 20 to 60 gpm and static water levels are typically 10 to 55 feet below the surface. There is one registered significant ground-water withdrawal facilities (1 well) utilizing the Natural Lakes and Moraines Aquifer Subsystem with a reported well yield of 1500 gpm.

Wells that utilize the surficial sand and gravels in this subsystem are highly susceptible to contamination. However, wells that produce from the deeper aquifers in the Natural Lakes and Moraines Aquifer Subsystem are generally not very susceptible to surface contamination because thick clay deposits overlie intratill sand and gravel seams.

Auburn/Warsaw Complex Aquifer System

The Auburn/Warsaw Complex Aquifer System is mapped along the southern portions of Noble County. Unconsolidated deposits in general are more than 300 feet thick in this system. This aquifer system is characterized by deposits that are quite variable in materials and thickness. A thick till commonly overlies the sand and gravel aquifer deposits. This system generally has

multiple layers of intratill sand and/or gravel of various thickness and lateral extent. The main aquifer deposits are typically deeper, thicker, and more continuous than the shallower sand and gravel layers in this system.

This system is capable of meeting the needs of domestic and some high-capacity users in Noble County. Wells in this system are typically completed at depths of 85 to 215 feet. Domestic well yields are commonly 10 to 30 gpm and static water levels are generally 20 to 70 feet below the surface. The Auburn/Warsaw Complex Aquifer System is not very susceptible to contamination because thick clay deposits overlie the aquifer materials.

St. Joseph and Tributary Valleys/Wabash River and Tributaries Outwash Aquifer System

The St. Joseph and Tributary Valleys/Wabash River and Tributaries Outwash Aquifer System is mapped along the Tippecanoe River and some tributaries of the St. Joseph River along the west-central and southwest portions of Noble County. Large amounts of outwash sand and gravel from the melting glaciers were deposited in stream valleys making this the most productive aquifer system in the county. The coarser sediments tend to be deeper while the finer sands were generally deposited higher in the sequence as the ice front receded. The total unconsolidated thickness of this system exceeds 350 feet with over 90 feet of continuous sand and gravel deposits at the surface in some areas. However, the outwash is typically 35 to 65 feet thick with the thickness of saturated sands and gravels commonly ranging from 25 to 55 feet. In some areas 20 to 40 feet of sandy clay or silt lies at the surface or below the surficial sand and gravels.

These sand and gravel deposits have adequate potential for domestic and most high-capacity users. Well depths are typically 50 to 90 feet. Domestic well yields are commonly 15 to 60 gpm and static water levels are generally 5 to 30 feet below the surface. Five registered significant ground-water withdrawal facilities (7 wells) are in the St. Joseph and Tributary Valleys/Wabash River and Tributaries Outwash Aquifer System in Noble County. Reported yields for high-capacity wells in this aquifer system range from 450 to 1200 gpm.

This aquifer system is highly susceptible to contamination from surface sources in areas that lack overlying clay layers. The system is only moderately susceptible where it is overlain by relatively thick clay or silt deposits.

Registered Significant Ground-Water Withdrawal Facilities

There are 51 registered significant ground-water withdrawal facilities (79 wells) using unconsolidated aquifers in the county. These wells utilize the Topeka Aquifer System, the Natural Lakes and Moraines Aquifer System, the Natural Lakes and Moraines Aquifer Subsystem, and the St. Joseph and Tributary Valleys/Wabash River and Tributaries Outwash Aquifer System. Reported yields for individual wells range up to 1500 gpm. Uses for these facilities are public water supply, irrigation, industry and miscellaneous uses. Refer to the table for details on the wells and to the map for facility locations.

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