Unconsolidated Aquifer Systems of Allen County, Indiana

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Eleven unconsolidated aquifer systems have been mapped in Allen County: the Till Veneer; the Auburn/Bluffton Till; the Bluffton Till Subsystem; the Auburn/Bluffton Complex; the Hessen Cassel; the New Haven; the Aboite; the Kendallville; the Eel River-Cedar Creek; the Cedarville; and the Teays Valley and Tributary. Characteristics of the Kendallville, Aboite, Hessen Cassel, New Haven, Cedarville, Eel River-Cedar Creek, and the Teays Valley and Tributary aquifer systems were previously described and mapped as part of the published Water Resource Availability in the Maumee River Basin, Indiana, Indiana Department of Natural Resources, 1996, and are not redefined as part of the new county scale mapping.

Allen County has a complex glacial history and was subjected to multiple glacial advances from the north, northeast and east resulting in glacial sediment deposits completely covering the county. The unconsolidated sediments are quite variable in thickness; in the northwest corner of the county, the bedrock is covered by as much as 300 feet of glacial material, while in some areas of the southwestern part of the county, depth to bedrock is about 40 to 50 feet below the surface. Because of the extensive and complicated glacial geology, boundaries of the aquifer systems in this county are commonly gradational and individual aquifers may extend across aquifer system boundaries.

Regional estimates of potential contamination to aquifer systems from the surface can differ considerably by location. Variations within geologic environments can result in a wide range of susceptibility to these systems. 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 has the most limited ground-water resources of the unconsolidated aquifer systems in the county. This system is generally mapped where the depth to the bedrock surface is less than 50 feet.

Potential aquifers within this system include thin isolated sand and/or gravel layers. Where present, sand and gravel units are generally less than 5 feet thick. Therefore, very few of the reported wells penetrating this aquifer system in the county are completed in unconsolidated materials, which are bypassed in favor of the more productive underlying bedrock. The few domestic wells completed in the Till Veneer Aquifer System range

from 15 to 50 feet deep, and there are no registered significant ground-water withdrawal facilities that use this system.

This system is not very susceptible to contamination from surface sources because of the low permeability of the near-surface materials. However, there are areas where bedrock is extremely shallow. These areas are moderately susceptible to contamination.

Auburn/Bluffton Till Aquifer System

The Auburn/Bluffton Till Aquifer System consists of glacial till separated by intratill sand and gravel layers. In Allen County, this system ranges in thickness from about 50 feet to more than 270 feet. Saturated aquifer materials within this system include sand and/or gravel deposits commonly 5 to 25 feet thick.

This aquifer system is capable of meeting the needs of most domestic users in Allen County. However, approximately 55 percent of wells started in this system utilize the underlying bedrock aquifer. Wells producing from the Auburn/Bluffton Till Aquifer System are typically 50 to 200 feet deep. Domestic well capacities are commonly 10 to 75 gallons per minute (gpm), and static water levels range from 9 to 90 feet below the surface. There are no registered significant ground-water withdrawal facilities using this system.

The Auburn/Bluffton Till Aquifer System typically has a low susceptibility to surface contamination because intratill sand and gravel units are commonly overlain by thick glacial till. Wells producing from shallow aquifers are moderately susceptible to contamination.

Bluffton Till Aquifer Subsystem

Areas where unconsolidated materials are generally greater than 50 feet in thickness, yet have little aquifer potential, are mapped as the Bluffton Till Aquifer Subsystem. Total thickness of unconsolidated deposits in this system is up to 125 feet in places. Potential aquifer materials include thin intratill sand and gravel deposits.

Approximately 85 percent of the wells started in the Bluffton Till Aquifer Subsystem are completed in the underlying bedrock aquifer system. However, this subsystem is capable of meeting the needs of some domestic users in the county. The few wells producing from this subsystem are completed at depths greater than 60 feet. Potential aquifer materials include intratill sand and gravel deposits that range from about 2 to 15 feet in thickness. Well yields range from 8 to 27 gpm, and reported static water levels are 28 to 47 feet below the land surface. There are no registered significant ground-water withdrawal facilities using the Bluffton Till Aquifer Subsystem.

This subsystem is generally not very susceptible to surface contamination because intratill sand and gravel units are overlain by thick till deposits. Wells producing from shallow aquifers are moderately susceptible to contamination.

Auburn/Bluffton Complex Aquifer System

This system is mapped throughout western Allen County. The Auburn/Bluffton Complex Aquifer System is characterized by unconsolidated deposits that are quite variable in materials and thickness. Aquifers within the system are highly variable in depth and lateral extent, include single or multiple intratill sands and gravels, and are typically confined by clay layers. Total thickness of unconsolidated deposits in this system is up to 265 feet in places. Wells in this system are commonly completed at depths ranging from about 70 to 135 feet, and produce from saturated aquifer materials typically 5 to 25 feet thick.

This system is capable of meeting the needs of domestic and some high-capacity users in the county. Domestic well yields are commonly 10 to 100 gpm, and static water levels range from 6 to 90 feet below the surface. There are three registered significant ground-water withdrawal facilities (4 wells) using this system. Reported capacities for individual wells range from 25 to 200 gpm. The uses for these facilities are industry, miscellaneous, and irrigation.

The Auburn/Bluffton Complex Aquifer System is not very susceptible to contamination where overlain by thick clay deposits. However, in some areas where surficial clay deposits are thin, the shallow aquifer, if present, is at moderate to high risk.

Hessen Cassel Aquifer System

The Hessen Cassel Aquifer System contains a few thin sand and gravel lenses occurring amidst thick sequences of tills and some fine-grained glaciolacustrine deposits. The sand and gravel lenses within the system are either confined within glacial till or are directly overlying bedrock. This aquifer system is characterized by an overall scarcity of productive zones. Yields for domestic wells typically range from 10 to 30 gpm. However, there are four registered significant ground-water withdrawal facilities (7 wells) which utilize locally-thick outwash deposits. Reported capacities for these wells range from 200 to 500 gpm. These facilities are used for irrigation, industry and public supply.

In general, this system has a low susceptibility to surface contamination because intratill sand and gravel units are commonly overlain by thick glacial till. Shallow wells completed in this system are moderately susceptible to contamination.

New Haven Aquifer System

The New Haven Aquifer System is made up of outwash plain sediments confined by varied sequences of till and glaciolacustrine deposits. The relatively continuous outwash aquifer that occurs within the system is commonly 5 to 10 feet in thickness and overlies bedrock directly in some places. Yields from domestic wells typically range from 5 to 20 gpm. There are four registered significant ground-water withdrawal facilities (5 wells) using the New Haven Aquifer System. Reported capacities for these wells range from 100 to 300 gpm. These facilities are used for irrigation and industry.

The northern part of the system is moderately susceptible to surface contamination because it is overlain by an extensive blanket of fine sand. The remainder of the system, overlain by tills, debris flow deposits, and glaciolacustrine sediment, has low susceptibility to surface contamination.

Aboite Aquifer System

The Aboite Aquifer System, consisting of sand and gravel deposits that occur at several horizons within thick, clayey till deposits, has two distinct parts that exhibit somewhat different geohydrologic characteristics. In the northern part of the system large channel deposits are sporadic, and sand and gravel bodies are separated from the underlying carbonate bedrock by till ranging from 10 to 100 feet in thickness. Coarse-grained bodies are more abundant in the southern part of the aquifer system; and many large channel deposits directly overlying bedrock valleys form well-developed hydraulic connections with the carbonate bedrock. Aquifer thickness commonly ranges from about 5 to 20 feet, and domestic wells yield from 10 to 50 gpm. There are three registered significant ground-water withdrawal facilities (3 wells) using the Aboite Aquifer System. Reported capacities for these wells range from 225 to 750 gpm. These facilities are used for irrigation and industry. The carbonate bedrock beneath the Aboite aquifer is generally preferred for high-capacity well development.

In the north, the Aboite Aquifer System, overlain by clay-rich Erie Lobe tills, is moderately susceptible to surface contamination; but in the south, where there is little if any till present and the water-bearing units are poorly confined by heterogeneous surficial sediments, the system is highly susceptible.

Kendallville Aquifer System

The Kendallville Aquifer System contains discontinuous sand and gravel outwash lenses that occur at various depths within a till and mixed drift complex. Individual sand and gravel aquifers within the system commonly range from 5 to 30 feet in thickness; but there is a general increase in outwash thickness northward where local accumulations approach 95 feet. Yields for domestic wells typically range from 5 to 100 gpm. There are 19 registered significant ground-water withdrawal facilities (37 wells) using the

Kendallville Aquifer System. Reported capacities for these wells range from 20 to 1000 gpm. These facilities are used for irrigation, industry, rural use and public supply.

The susceptibility of this aquifer system to surface contamination varies from low to moderate. Susceptibility is low for much of the aquifer system overlain by clay-rich, protective Erie Lobe tills.

Eel River-Cedar Creek Aquifer System

The Eel River-Cedar Creek Aquifer System consists of surficial valley train sediments and deeper outwash plain deposits occurring beneath a major river valley. The surficial sediments consist of sand and gravel deposits which occur from the ground surface to various depths and are either underlain by tills, or coalesce with older outwash deposits. In areas where intervening layers of till are present, most wells are completed in the deeper outwash deposits. Outwash deposits in this aquifer system commonly range from 20 to 30 feet in thickness. Yields from domestic wells range from 10 to 100 gpm. The one registered significant ground-water withdrawal facility in this system reports capacities of 450 gpm for each of its two wells. This facility is used for irrigation.

The unconfined portions of the aquifer system are highly susceptible to contamination from surface sources because the surficial valley train sediments of the system are highly permeable. Susceptibility is slightly lowered for the confined outwash deposits by the presence of overlying till.

Cedarville Aquifer System

The Cedarville Aquifer System is comprised primarily of surficial valley train sediments and deeper outwash deposits in the St. Joseph River valley region. Although a thin till cap may be present locally, the valley train deposits commonly extend from the ground surface to depths of 10 to 30 feet. Most wells developed in this aquifer system penetrate the deeper outwash deposits, which commonly range from 20 to 40 feet in thickness. Yields from domestic wells typically range from 10 to 60 gpm. There are no registered significant ground-water withdrawal facilities using the Cedarville Aquifer System.

The overall susceptibility of this system to surface contamination is considered high; but the unconfined portions of the Cedarville are even more susceptible than the rest of the system because the surficial valley train sediments are highly permeable.

Teays Valley and Tributary Aquifer System

The Teays Valley and Tributary Aquifer System, an extremely small area situated in south-central Allen County at the boarder with Adams County, is the northernmost extent of a buried pre-glacial bedrock valley that runs southward through Adams County. There

are no known domestic wells, or registered significant ground-water withdrawal facilities in this system in Allen county. However, typical yields of the few domestic wells located in this system in northern Adams County range from about 10 to 75 gpm, with static water levels about 25 to 60 feet below the land surface.

This system has a low susceptibility to surface contamination because outwash sediments within the bedrock valleys are generally overlain by dense tills.

Registered Significant Ground-Water Withdrawal Facilities

There are 34 registered significant ground-water withdrawal facilities (58 wells) using unconsolidated aquifers in the county. These wells utilize the Auburn/Bluffton Complex, Kendallville, Aboite, Hessen Cassel, New Haven, and Eel River-Cedar Creek Aquifer Systems. Reported capacities for individual wells range from 20 to 1000 gpm. The dominant use for these facilities is public water supply. Other uses include irrigation and industry. Refer to the table for additional well details, and to the map for facility locations.

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