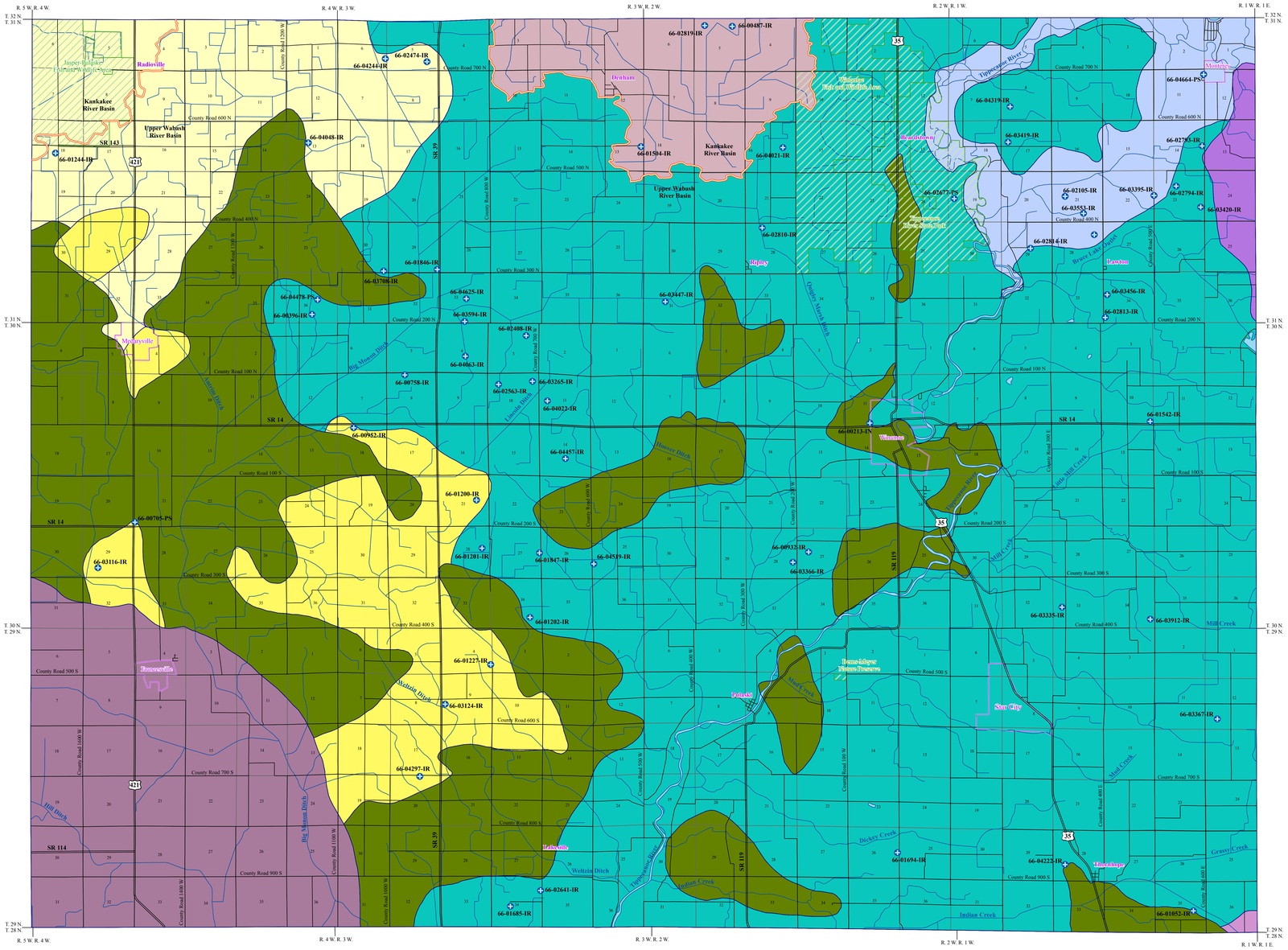
UNCONSOLIDATED AQUIFER SYSTEMS OF PULASKI COUNTY, INDIANA



Nine unconsolidated aquifer systems have been mapped in Pulaski County: the Till Veneer; the Kankakee Till; the Kankakee / Warsaw Till Subsystem; the Eolian Sands; the Natural Lakes and Moraines; the Maxinkuckee Moraine; the Kankakee / Warsaw / Plymouth Complex; the Kankakee; and the Wabash River and Tributaries Outwash System. Characteristics of the Natural Lakes and Moraines Aquifer System have been described and mapped as part of the previously published regional basin study report; Water Resource Availability in the St. Joseph River Basin, Indiana, IDNR, 1987. Characteristics of the Eolian Sands; the Kankakee; and the Maxinkuckee Moraine aquifer systems 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 Pulaski 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 Pulaski County. Total thickness ranges from approximately 5 feet in the southwest, to as much as 235 feet in the central portion of 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.

Till Veneer Aquifer System

In Pulaski County, the Till Veneer Aquifer System is mapped along most of the southwest part of the county. This system is the most limited ground-water resource of the unconsolidated aquifer systems in the county.

This system consists primarily of thin till, generally 3 to 40 feet thick, that directly overlies an uneven bedrock surface. Limited sand and gravel deposits are available and nearly all wells started in the Till Veneer Aquifer System are completed in the underlying bedrock. However, in places, isolated intratill sand and gravel deposits or deposits that directly overlie bedrock are present.

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 with thinner underlying clay above the aquifer resource. These areas are considered moderately susceptible to contamination.

Kankakee Till Aquifer System

In Pulaski County the Kankakee Till Aquifer System is mapped in portions of the western third of the county. The system typically consists of thick clay with, in places, discontinuous surface and intratill sands and gravels. The surface sands are primarily windblown deposits generally 8 to 40 feet thick and are not used as an aquifer resource. Total thicknesses of unconsolidated deposits range from 34 to 169 feet that may, in places, include discontinuous outwash deposits that range from 3 to 20 feet thick.

Well depths are generally 70 to 115 feet deep. Typical aquifer sands and gravels range from 3 to 15 feet thick and are capped by 30 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 from 10 to 60 gallons per minute (gpm) with static water levels that range from 3 to 30 feet below surface. There are 7 registered significant ground-water withdrawal systems (9 wells) with yields that range from 250 to 800 gpm.

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 surface sands and gravels are thicker with thinner clay deposits above the aquifer unit. These areas are considered moderate to high risk of contamination.

Kankakee / Warsaw Till Aquifer Subsystem

The Kankakee / Warsaw Till Aquifer Subsystem is mapped throughout portions of central and western Pulaski County. The subsystem is mapped similar to that of the Kankakee Till Aquifer System. However, potential aquifer materials are thinner and potential yield is less than in the subsystem than the Kankakee Till Aquifer System. In places the subsystem is capped by 9 to 35 feet of surface sands that are primarily windblown deposits that are not used as an aquifer resource.

Nearly all of the wells in the subsystem utilize the underlying bedrock aquifer system. However, the subsystem has the potential of meeting the needs of some domestic users. Potential aquifer materials include thin, intratill sand and gravel deposits that generally range from 2 to 15 feet thick and are capped by 40 to 120 feet of till. The subsystem is generally not very susceptible to surface contamination because intratill sand and gravel units are overlain by thick till deposits.

Eolian Sands Aquifer System

The Eolian Sands Aquifer System in Pulaski County is mapped along part of the north-central edge of the county. Characteristics of this system generally involve windblown (eolian) sands at the surface with thick clay beneath separating the surface deposits from the deeper aquifer resource. However, in some isolated areas the clays are not present. Where present, clay thickness ranges from 3 to 75 feet with the surface sand generally ranging from 15 to 50 feet thick. Wells completed in the Eolian Sands Aquifer System generally range from 50 to 215 feet deep. Aquifer thickness ranges from 7 to 122 feet.

This system is capable of meeting the needs of domestic and some high-capacity users. Domestic well yields are commonly 15 to 50 gpm. Static water levels range from 4 to 20 feet below surface. There are 2 registered significant ground-water withdrawal facilities (2 wells) utilizing this system with reported yields ranging from 600 to 800 gpm.

This aquifer system is generally not very susceptible to surface contamination where intratill 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.

Natural Lakes and Moraines Aquifer System

The Natural Lakes and Moraines Aquifer System in Pulaski County is an extension of a broad regional aquifer system initially described in the published report ; Water Resource Availability in the St. Joseph River Basin, Indiana, IDNR, 1987. Only an extremely small portion in the southeast corner is mapped in Pulaski County. However, in nearby Cass County descriptive characteristics of this system include typical well depths that range from 65 to 130 feet deep. Clay thickness is commonly 30 to 60 feet wit h aquifer deposits that are 10 to 25 feet thick. This system is capable of meeting the needs of domestic and some high-capacity users. This aquifer system is generally not very susceptible to surface contamination because intratill sand and gravel units a re overlain by thick till deposits.

Maxinkuckee Moraine Aquifer System

The Maxinkuckee Moraine Aquifer System is mapped along the northeastern edge of Pulaski County. Unconsolidated deposits are associated with a large morainal complex with varying characteristics that include discontinuous and isolated surficial sands and gravels, thick till sequences, with discontinuous intratill sands and gravels, as well as deeper aquifer sands and gravels of varying thickness.

Few wells are reported in the Maxinkuckee Moraine Aquifer System in Pulaski County. However, one domestic well reports a yield of 50 gpm and one unregistered irrigation well is reported to yield 1000 gpm. Also, many wells are reported in nearby Fulton County with most wells producing from deep sand and gravel deposits capable of meeting the needs of domestic and high-capacity users. Well depths in Fulton County range from 27 to 245 feet but are commonly 60 to 120 feet. Typical aquifer thickness is from 7 to 30 feet; however, in places aquifer deposits may be thicker.

This aquifer system is generally not very susceptible to surface contamination because intratill sand and gravel units are overlain by thick till deposits. However, wells that utilize the shallow sands and gravels are at moderate to high risk to surface contamination.

Kankakee / Warsaw / Plymouth Complex Aquifer System

The Kankakee / Warsaw / Plymouth Complex Aquifer System is mapped throughout most of the eastern and central portions of Pulaski County. Complex multiple glacial advances resulted in a sequence of multiple, stacked, till and outwash units that are quite variable in position and thickness. Characteristics of this system also include surface sands (primarily windblown deposits that are generally 8 to 27 feet thick and not used as an aquifer resource) that overlie a thick clay cap with discontinuous intratill sands and gravels above the primary aquifer unit.

Well depths are commonly 50 to 110 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 thickness above the aquifer unit generally includes 20 to 70 feet of clay and 18 to 50 feet of sands and gravels. Individually, the discontinuous sands and gravels are typically 4 to 24 feet thick and the deeper, more productive aquifer deposits are 5 to 24 feet thick.

The Kankakee / Warsaw / Plymouth Complex Aquifer System is capable of meeting the needs of domestic and some high-capacity users. Typical domestic yields range from 13 to 95 gpm. Static water levels commonly range from 6 to 18 feet below surface with some flowing wells reported. There are 43 registered significant ground-water withdrawal facilities (53 wells) with reported yields that range from 60 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.

Kankakee Aquifer System

The Kankakee Aquifer System is mapped in the northwest corner of Pulaski County and includes portions previously mapped as part of the regional basin study report; Water Resource Availability in the Kankakee River Basin, Indiana, IDNR, 1990. Characteristics of this system include unconfined, thick glacial outwash sands and gravels with discontinuous clay materials over bedrock. The clay deposits generally increase in thickness as the system grades into less prolific aquifer systems to the south.

Few wells are reported in the Kankakee Aquifer System in Pulaski County. Total well depths range from 31 to 125 feet with saturated sands and gravels up to 120 feet. Clay deposits range from 4 to 88 feet thick. Static water levels range from 5 to 25 feet below surface. This system is capable of meeting the needs of domestic and some high-capacity users. There are 3 registered significant ground-water withdrawal facilities (5 wells) with yields that range from 550 to 800 gpm. This system is at moderate to high risk to contamination.

Wabash River and Tributaries Outwash Aquifer System

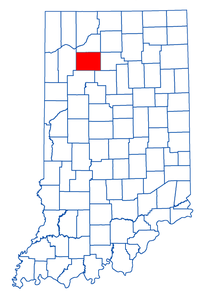
In Pulaski County the Wabash River and Tributaries Outwash Aquifer System includes thick, glacially derived outwash deposits along with recent alluvial deposits that cap the outwash deposits in places. The system is mapped in the northeastern part of the county from near the town of Monterey southwest to the Tippecanoe River as well as along the floodplain of the Tippecanoe River.

Few wells are completed in this system in Pulaski County. Well depths range from 26 to 127 feet below surface with up to 118 feet of continuous sand and gravel. In places, aquifer materials are capped by silt, clay or sandy clay ranging from 2 to 15 feet thick. In addition, aquifer sand and gravel deposits may include a mixture of discontinuous clay, sandy clay or gravelly clay deposits 2 to 40 feet thick.

The Wabash River and Tributaries Outwash Aquifer System is capable of meeting the needs of domestic and high-capacity users. Domestic wells yield from 15 to 60 gpm. Static water levels are commonly 1 to 20 feet below surface. There are 5 registered significant ground-water withdrawal facilities (11 wells) in the outwash system in Pulaski County. Individual wells report yields ranging from 100 to 1100 gpm.

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.

Location Map



EXPLANATION

- Registered Significant Ground-Water Withdrawal Facility
- Stream
- County Road
- State Road & US Highway
- Basin Boundary
- Municipal Boundary
- State Managed Property
- Lake & River

N W E S

1 0.5 0 1 Mile

1 0.5 0 1 Kilometer

INDIANA DEPARTMENT OF NATURAL RESOURCES

Map generated by Scott H. Dean
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This map was created from several existing shapefiles. Township and Range Lines of Indiana (line shapefile, 20020621), Land Survey Lines of Indiana (polygon shapefile, 20020621), and County Boundaries of Indiana (polygon shapefile, 20020621), were all from the Indiana Geological Survey and based on a 1:24,000 scale. Draft road shapefiles, System1 and System2 (line shapefiles, 2003), were from the Indiana Department of Transportation and based on a 1:24,000 scale. Populated Areas in Indiana 2000 (polygon shapefile, 20021000) was from the U.S. Census Bureau and based on a 1:100,000 scale. Streams27 (line shapefile, 20000420) was from the Center for Advanced Applications in GIS at Purdue University. Managed Areas 96 (polygon shape file, various dates) was from IDNR. Unconsolidated aquifer systems coverage (Maier, 2008) was based on a 1:24,000 scale.

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