

UNCONSOLIDATED AQUIFER SYSTEMS OF JASPER COUNTY, INDIANA

Six unconsolidated aquifer systems have been mapped in Jasper County: the Till Veneer, the Kankakee/Iroquois Till Subsystem, the Iroquois Moraine, the Iroquois Basin, the Iroquois Buried Valley Subsystem, and the Kankakee Aquifer System. Characteristics of the Iroquois Basin, Iroquois Moraine, Iroquois Buried Valley Subsystem and the Kankakee 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, DNR, 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 Jasper 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 Jasper County. Total thickness ranges from less than 2 feet in the east-central and southern portions of the county where bedrock is shallow to as much as 174 feet in the southwest portion 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 variation 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 Jasper County, the Till Veneer Aquifer System is mapped along the southeast corner of the county. This system is the most limited groundwater resource of the unconsolidated aquifer systems in the county. This system generally consists of thin till 30 to 30 feet thick that directly overlies an uneven bedrock surface. In places, intermittent and discontinuous internal or surface sand and gravel are present.

Nearly all wells started in the Till Veneer System are completed in the underlying bedrock aquifer system. However, one well is reportedly producing 20 gallons per minute (gpm) from a shallow sand and gravel. This well reports significant 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 intertill sand and gravel units are overlain by thick till deposits. However, some areas have surface sands and gravels or thin to no clay deposits above the aquifer resource. These areas are considered at moderate to high risk to contamination.

Kankakee / Iroquois Till Aquifer Subsystem

In Jasper County the Kankakee / Iroquois Till Aquifer Subsystem is mapped along a small portion of the east central edge of the county. Typical deposits include a thick glacial till with intermittent and thin sand and gravel deposits.

Few wells are available in the Kankakee / Iroquois Till Aquifer Subsystem with nearly all wells completed in the underlying bedrock. However, the subsystem has the potential of meeting the needs of some domestic users. Potential aquifer materials include sand and gravel deposits that range from 20 to 20 feet thick and are capped by 25 to 117 feet of fill. The few wells that utilize the available sand and gravel deposits report yields up to 30 gpm. However, significant drawdown is commonly associated with greater yields.

The subsystem is generally not very susceptible to surface contamination because intertill sand and gravel units are overlain by thick till deposits.

Iroquois Moraine Aquifer System

The Iroquois Moraine Aquifer System is mapped in much of the central third of Jasper County. This system is characterized by isolated and discontinuous sand and gravel resources overlain by thick clay. In some isolated areas wind (sand-blown) sands with thin to no clay deposits overlie the aquifer resource.

Few wells utilize the Iroquois Moraine Aquifer System. Approximately 84 percent of located wells bypass the unconsolidated deposits and utilize the underlying bedrock aquifer system. However, the system has the potential of meeting the needs of some domestic and high-capacity users. Total well depths range from 13 to 180 feet below surface. Thickness of aquifer deposits are generally from 3 to 15 feet and are capped by clay with some intermittent sands and gravels that range from 20 to 100 feet in thickness.

Well yields for domestic wells range from 5 to 50 gpm. Static water levels range from 1 to 85 feet below surface. There are two registered high capacity facilities (6 wells) with reported yields that range from 15 to 50 gpm.

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

Iroquois Basin Aquifer System

The Iroquois Basin Aquifer System is mapped in most of the southern third of Jasper County. Characteristics of this system generally consist of thick clay deposits with thin intermittent sands and gravels that overlie shallow bedrock, or isolated surface sands with thin to no clay that directly overlie bedrock.

Nearly all wells completed in the mapped areas utilize the underlying bedrock aquifer system. However, approximately 15 percent of wells in this area are completed in unconsolidated deposits. Total well depths commonly range from 30 to 70 feet below surface with aquifer sands and gravels generally 3 to 25 feet thick. Overlying intermittent clay deposits are to 95 feet thick. In places the aquifer sands and gravels are unconfined and are up to 130 feet thick and directly overlie the bedrock surface.

Domestic well yields generally range from 2 to 50 gpm with static water levels from 5 to 35 feet below surface. There are 2 registered significant water withdrawal facilities (10 wells) with reported yields that range from 149 to 800 gpm.

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

Iroquois Buried Valley Aquifer Subsystem

The southwestern portion of Jasper County is marked by the presence of a buried bedrock valley. This subsystem is associated with deposits that underlie part of the Iroquois Basin Aquifer System and a small portion of the Iroquois Moraine Aquifer System. Unconsolidated deposits generally include thick, intermittent clay with multiple intermittent sands and gravels that overlie the deeper aquifer resource. Depth to bedrock is up to 174 feet.

Few wells are reported in the Iroquois Buried Valley Aquifer Subsystem. Well depths range from 34 to 128 feet with sand and gravel aquifer thicknesses ranging from 2 to 77 feet. Domestic well capacities range from 8 to 50 gpm with static water levels generally 7 to 40 feet below surface. There is one registered significant water withdrawal facility (2 wells) with reported yields of 250 and 510 gpm.

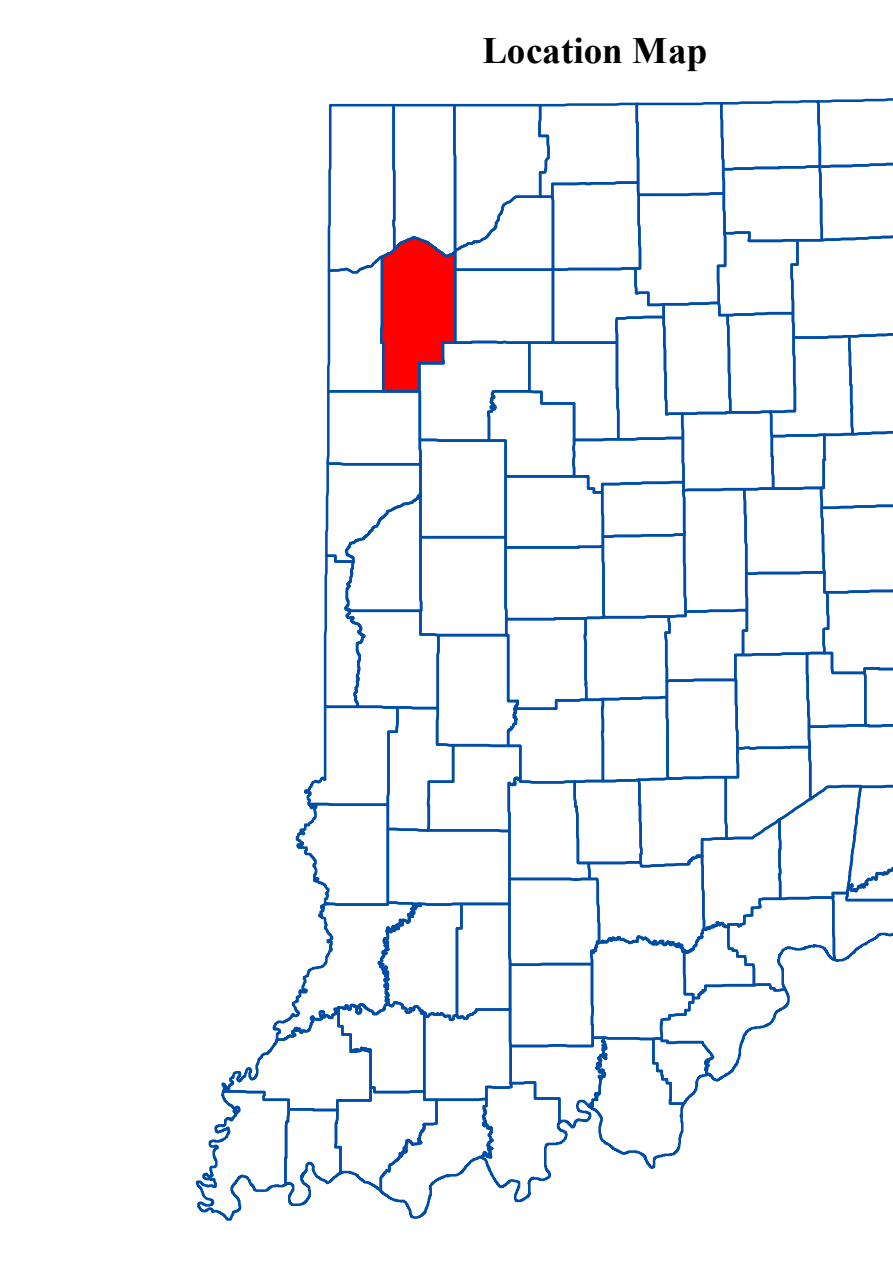
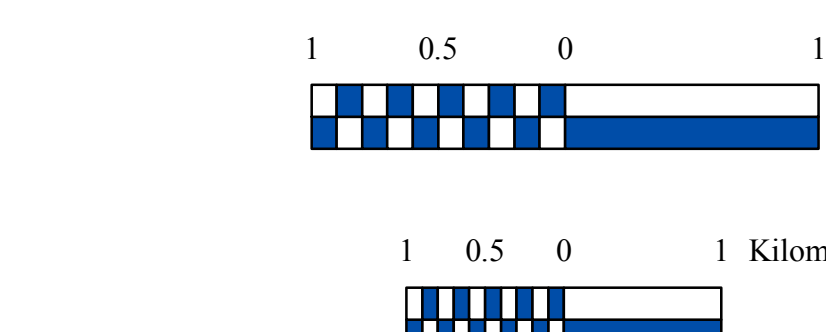
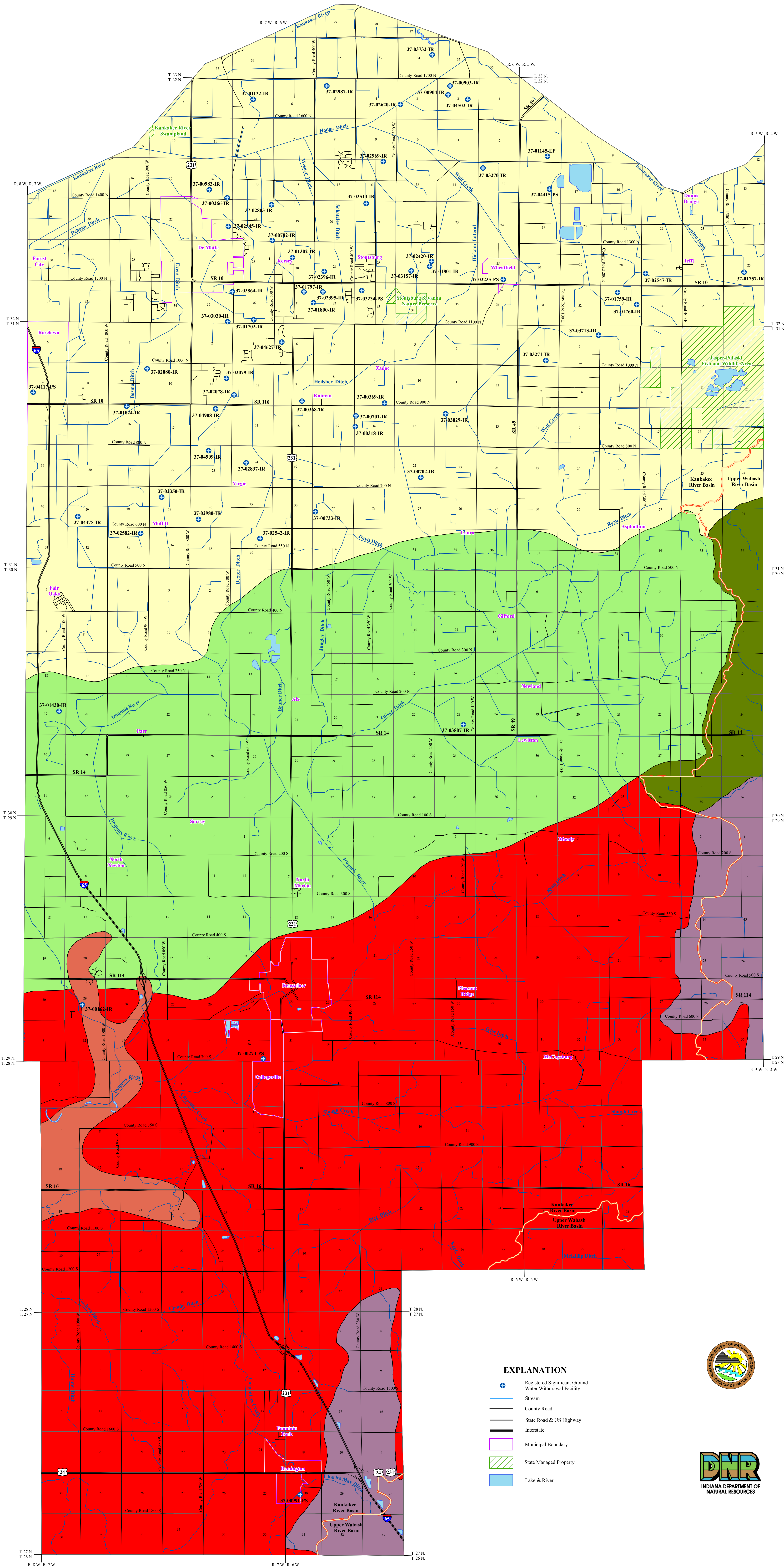
This aquifer system is generally not very susceptible to surface contamination because intertill sand and gravel units are overlain by thick till deposits.

Kankakee Aquifer System

The Kankakee Aquifer System is mapped in the northern third of Jasper County. Characteristics of this system include unconfined, thick glacial outwash sands and gravels with, in places, discontinuous clay materials over bedrock. The clay deposits generally increase in thickness as the system grades into less prolific aquifer systems to the south.

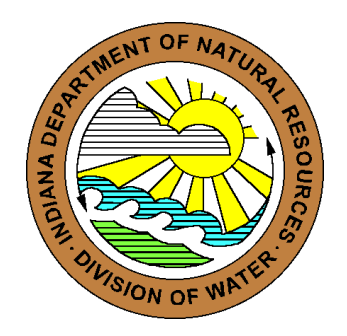
In Jasper County total well depths are typically 25 to 50 feet with saturated sands and gravels up to 42 feet in thickness. This system is capable of meeting the needs of domestic and some high-capacity users. Domestic well capacities are commonly 15 to 70 gpm with static water levels from 3 to 11 feet below surface. There are 57 registered significant groundwater withdrawal facilities (174 wells) with yields that range from 100 to 1100 gpm.

Much of the Kankakee Aquifer system includes unconfined outwash deposits. Therefore, this system is at high risk to contamination. However, in places clay deposits up to 25 feet thick overlie the aquifer resource. These areas are at moderate to high risk to contamination.



EXPLANATION

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



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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. Stream27 (line shapefile, 20000420) was from the Center for Advanced Applications in GIS at Purdue University. Managed Areas 96 (polygon shapefile, various dates) was from DNR. Unconsolidated Aquifer Systems coverage was from DNR (Water Resource Availability in the Kankakee River Basin, Indiana, 1990) (Modified Maier 2010) and based on a 1:48,000 scale.

Unconsolidated Aquifer Systems of Jasper County, Indiana

by
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