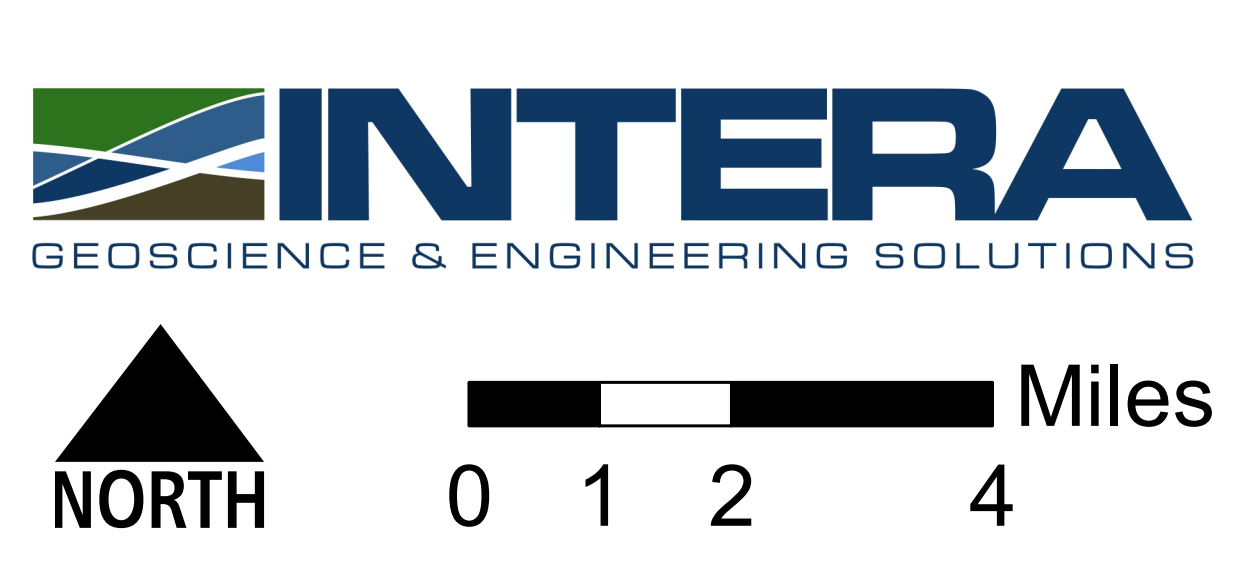
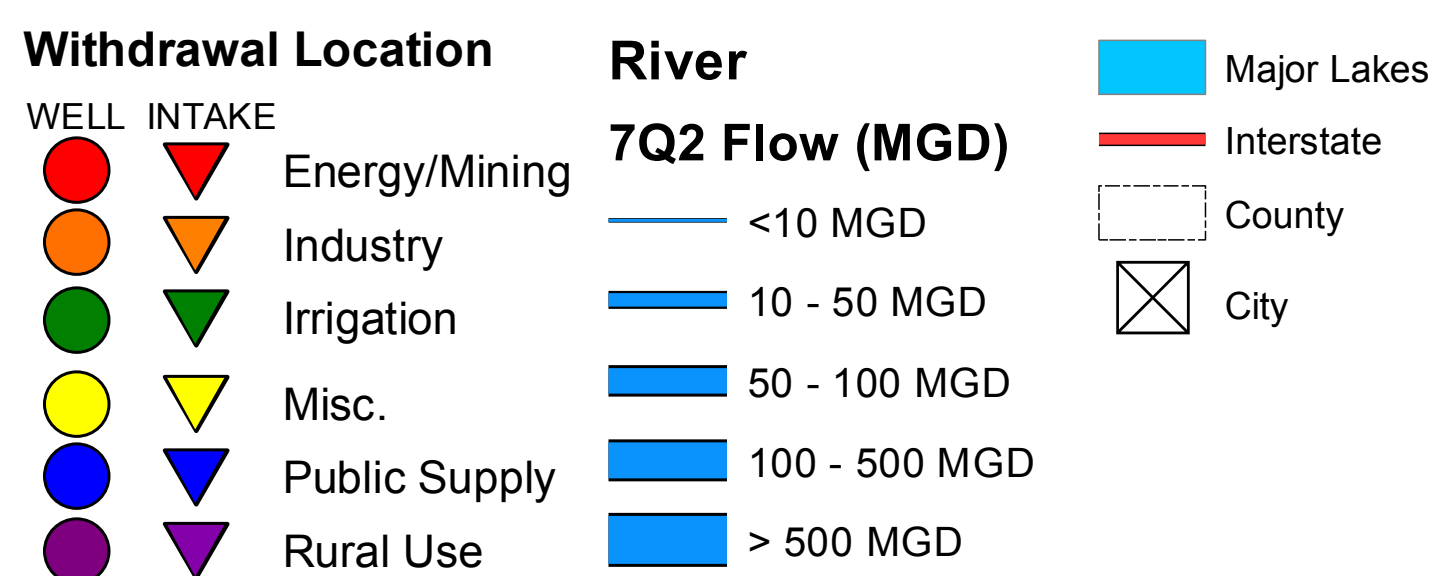


Water Resources and Use in Newton County

Data Sources: U.S. Geological Survey and Indiana Department of Natural Resources



BEDROCK AQUIFER SYSTEMS OF NEWTON COUNTY, INDIANA

The occurrence of bedrock aquifers depends on the original composition of the rocks and subsequent changes which influence the hydraulic properties. Post-depositional processes, which promote jointing, fracturing, and solution activity of exposed bedrock, generally increase the hydraulic conductivity (permeability) of the upper portion of bedrock aquifer systems. Because permeability in many places is greatest near the bedrock surface, bedrock units within the upper 100 feet are commonly the most productive aquifers.

Four bedrock aquifer systems are identified for Newton County: the Mississippian Borden Group, the Devonian and Mississippian New Albany Shale, the Silurian and Devonian Carbonates, and the Kentland Anomaly (consisting of Ordovician, Silurian, Devonian, Mississippian, and Pennsylvanian age rocks). Carbonates subcrop throughout the northern two-thirds and southeast portions of the county, while mostly unproductive shales subcrop over the central and southern one-third of the county. It should be noted that groundwater conflicts caused by high-capacity pumping of the Silurian and Devonian Carbonates Aquifer System have occurred in Newton and Jasper counties. For details, see the 1990 IDNR publication Water Resource Availability in the Kankakee River Basin, Indiana located on the Internet at www.in.gov/dnr/water.

Newton County has a complex glacial history and was subjected to multiple glacial advances from the north and northeast resulting in glacial sediment deposits completely covering the county. The thickness of unconsolidated sediments ranges from about 100 feet in most of the northern and central portions of Newton County to approximately 50 feet in the southern, and a relatively small portion in the northwest, sections of the county. Major sand and gravel aquifers occur in these thick unconsolidated deposits overlying the bedrock.

The yield of a bedrock aquifer depends on its hydraulic characteristics and the nature of the overlying deposits. Shale and glacial till act as aquitards, restricting recharge to underlying bedrock aquifers. However, fracturing and/or jointing may occur in aquitards, which can increase recharge to the underlying aquifers. Hydraulic properties of the bedrock aquifers are highly variable. Most of the bedrock aquifers in the county are under confined conditions. In other words, the potentiometric surface (water level) in most wells completed in bedrock rises above the top of the water-bearing zone.

The susceptibility of bedrock aquifer systems to surface contamination is largely dependent on the type and thickness of the overlying sediments. Because the bedrock aquifer systems have complex fracturing systems, once a contaminant has been introduced into a bedrock aquifer system, it will be difficult to track and remediate.

Mississippian -- Borden Group Aquifer System

The Mississippian Borden Group Aquifer System subcrops along the southern portion of the county and around the Kentland Anomaly. This aquifer system is comprised of siltsstone and shale having interbedded limestone lenses. Many deep wells are completed in this aquifer system which may pass through the shales to reach more productive limestones, or to increase the storage capacity of a well completed in a low-yield aquifer. Wells penetrate between 8 and 270 feet of bedrock but generally penetrate less than 70 feet. Bedrock well depths range from 40 to 325 feet with most wells more than 100 feet deep.

Domestic wells completed in the Borden Group generally yield from 5 to 15 gallons per minute (gpm), although reported yields range from 4 to 55 gpm. A few dry holes have been reported. Static water levels range from 3 to 150 feet but are usually between 20 and 50 feet. High-capacity production from this system is unlikely, and there are no registered significant groundwater withdrawal facilities in this system.

Since the permeability of shale materials is considered low and the overlying unconsolidated deposits are relatively thick, this bedrock system is not very susceptible to contamination introduced at or near the surface.

Devonian and Mississippian -- New Albany Shale Aquifer System

The New Albany Shale Aquifer System subcrops throughout most of the southern one-third of Newton County. Although there are wells producing from the New Albany Shale, the formation is not considered a significant aquifer. Wells often are drilled through the New Albany Shale into the underlying carbonates in an attempt to get greater well yields.

Wells developed in the New Albany Shale typically penetrate from 11 to 102 feet of shale with the majority of wells penetrating at least 30 feet. Most domestic wells in the Devonian and Mississippian New Albany Shale Aquifer System yield 5 gpm or less, but a few wells having yields up to 20 gpm have been reported. A number of dry holes have been reported in the New Albany Shale. Well depths range from 45 to 120 feet and static water levels are typically between 4 and 15 feet. High-capacity production from this system is unlikely, and there are no registered significant groundwater withdrawal facilities in this system.

Since the permeability of shale materials is considered low and the overlying unconsolidated deposits are relatively thick, this bedrock system is not very susceptible to contamination introduced at or near the surface.

Silurian and Devonian Carbonates Aquifer System

The Silurian and Devonian Carbonates Aquifer System subcrops in the southeastern portion, and throughout the northern two-thirds of the county. Because individual units of the Silurian and Devonian systems are composed of similar carbonate rock types and cannot easily be distinguished on the basis of water well records, they are considered as a single water-bearing system. This is the principle bedrock aquifer in the county.

Deep high-capacity wells commonly penetrate 200 to 450 feet of carbonate rock, and some wells have been reported to penetrate up to 550 feet of rock. Domestic wells commonly only penetrate the upper 15 to 100 feet of the carbonate bedrock. In some areas near the contact between the New Albany Shale and the Devonian carbonates, wells are drilled through the shale and into the more productive underlying carbonate rocks. Because the overlying shale inhibits recharge and fracturing may not be well developed in the carbonates, these wells are less productive than wells completed in carbonates not overlain by shale.

Most domestic wells can be expected to produce between 10 and 30 gpm, with yields ranging from 8 to 200 gpm. Water levels ranging from 1 foot to 117 feet below the surface have been reported, however, levels usually are between 10 to 40 feet. Flowing wells, and a few dry holes, have been reported in the Silurian and Devonian Carbonate Aquifer System.

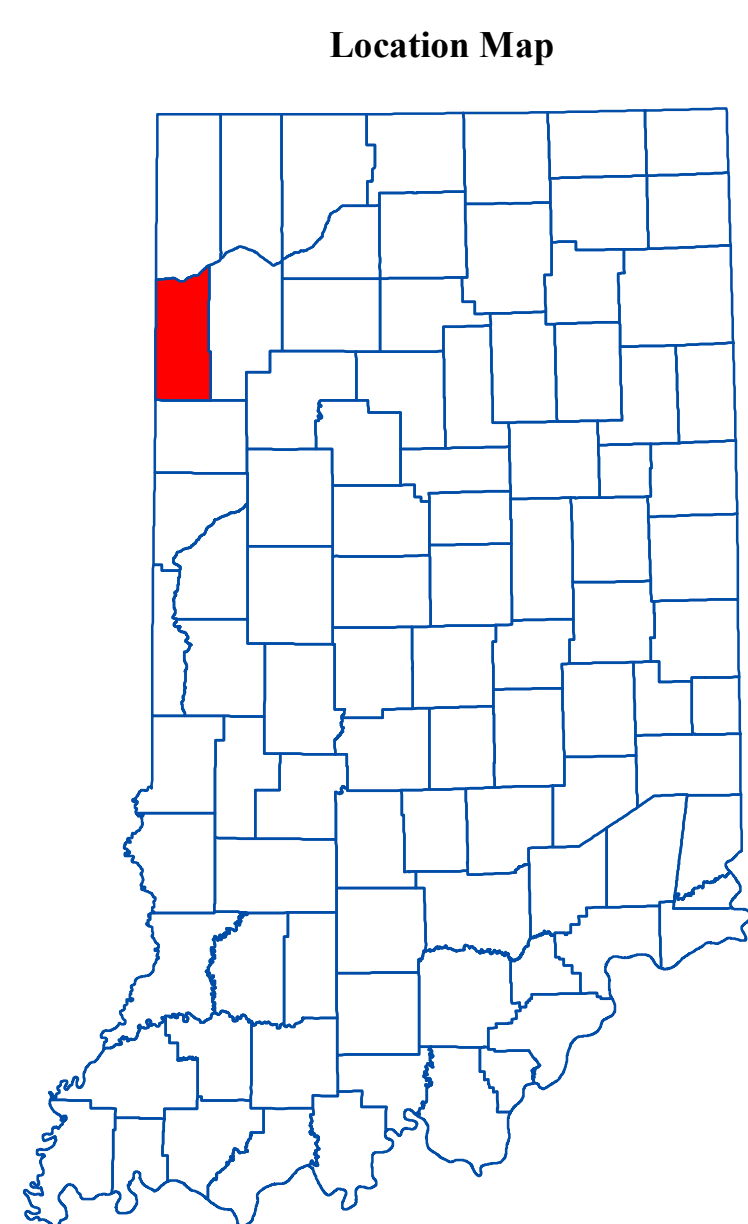
There are 29 registered significant groundwater withdrawal facilities (41 wells) in this system. Reported yields range from 50 to 1600 gpm. Uses for these facilities are public supply, industry and irrigation. Because of historic groundwater conflicts, additional proposed high-capacity well sites should be evaluated with regard to not only individual needs but also proper well spacing that would help prevent or minimize interference with nearby wells and reduce impacts to the source aquifer.

The Silurian and Devonian Carbonates Aquifer System has a low susceptibility to surface contamination where the overlying unconsolidated deposits are relatively thick; however, in northwestern Newton County where unconsolidated deposits are thin, it is moderately to highly susceptible.

Kentland Anomaly Aquifer System

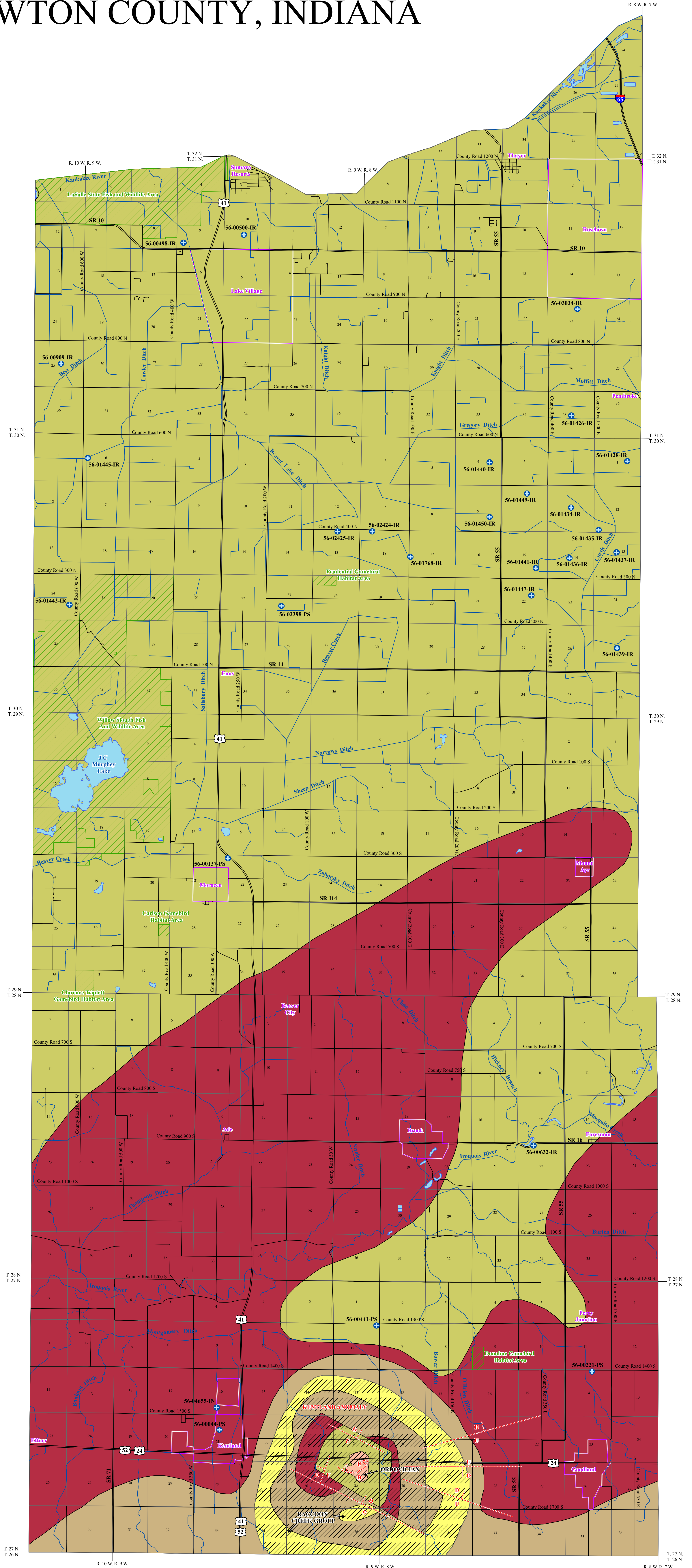
The Kentland Anomaly Aquifer System is located adjacent to the border of Benton County in a relatively small portion of south-central Newton County. The bedrock in this area has been faulted and folded by undetermined forces that brought deeply buried Devonian age rocks consisting mostly of sandstone and carbonates to the bedrock surface. Bedrock in this area also includes the Borden Group, the New Albany Shale, Silurian and Devonian Carbonates, and Pennsylvanian age rocks consisting of the Racoon Creek Group which is composed mostly of sandstone and shale with minor amounts of mudstone, coal, and limestone. The faulting has probably increased the permeability of the bedrock in this aquifer system; however, the aquifer characteristics are unknown, but the high degree of fracturing may increase potential well yields. There are no domestic or registered significant groundwater withdrawal facilities located in this system.

The Kentland Anomaly Aquifer System has a moderate susceptibility to surface contamination because the bedrock is heavily fractured, and the surface materials are relatively thin overlying the system.



EXPLANATION

- Registered Significant Groundwater Withdrawal Facility
- Stream
- County Road
- Kentland Anomaly Faults
- State Road & US Highway
- Interstate
- Municipal Boundary
- State Managed Property
- Lake & River



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Bedrock Aquifer Systems of Newton County, Indiana

by
Division of Water
1990

UNCONSOLIDATED AQUIFER SYSTEMS OF NEWTON COUNTY, INDIANA

The following is a summary of the availability of groundwater in Newton County and was derived from the Indiana Department of Natural Resources 1990 publication Water Resource Availability in the Kankakee River Basin, Indiana. The full report describes the availability, distribution, quality, and use of groundwater and surface water in the Kankakee River Basin and can be viewed and downloaded at <http://www.in.gov/dnr/wra/>.

Unconsolidated deposits of glacial sands and gravels are the principle source of groundwater in Newton County. Four unconsolidated aquifer systems have been mapped and defined on the basis of geologic environments and aquifer characteristics: the Kankakee, the Iroquois Moraine, the Iroquois Basin, and the Iroquois Buried Valley.

Kankakee Aquifer System

The Kankakee Aquifer System is an unconfined deposit of fine-to-medium-grained sand, which is interbedded with gravel lenses in the tributary valleys. The aquifer system thickness ranges from less than 20 feet where the unit overlies bedrock highs in the southern portion of the county to about 150 feet in the northern portions of the county. However, the thickness is about 30 feet in most areas.

Wells are typically shallow and few exceed depths of 50 feet in the Kankakee River floodplain, and water levels are generally less than 20 feet below the surface. However, in the tributary valleys, the depth to the water table may exceed 50 feet and well depths may exceed 125 feet. Domestic wells commonly produce from 15 to 50 gallons per minutes (gpm).

There are eight registered significant groundwater withdrawal facilities (19 wells) with yields ranging from 50 to 550 gpm. These facilities are used for rural usage, public supply and irrigation. Because of the absence of clay deposits, the Kankakee Aquifer System is highly susceptible to surface contamination.

Iroquois Moraine Aquifer System

The Iroquois Moraine Aquifer System consists of isolated sand and gravel deposits encompassed within thick sections of clay. There are severe limitations to water resources in this aquifer system. Thickness of the discontinuous aquifers range from 3 to 37 feet, but most aquifers are less than 10 feet thick. Fine-grained sand deposits, which occur near the land surface, have limited saturated thickness and therefore have a limited potential. Deeper, and generally thicker, sand and gravel lenses provide higher quantities of water sufficient for domestic use with yields ranging from 4 to 10 gpm. However, because these aquifers are isolated and not laterally extensive, many wells pass through the unconsolidated deposits to obtain water from the underlying bedrock. Static water levels are most often between 15 and 30 feet below the surface, with reported values ranging from 5 to 80 feet. Well depths range from less than 50 feet to more than 170 feet.

There is one registered significant groundwater withdrawal facility (2 wells) in Newton County with yields of 162 and 221 gpm. This facility is utilized for rural usage. The deeper interill aquifers are only slightly susceptible to surface contamination because of the surrounding till deposits.

Iroquois Basin Aquifer System

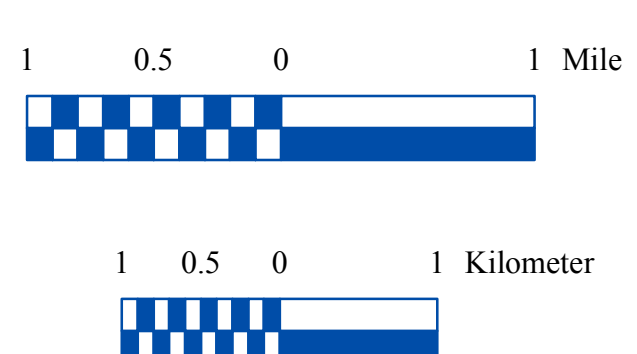
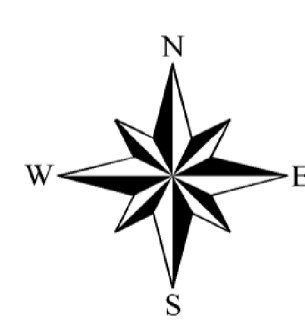
This aquifer system is a mostly clay-rich deposit having scattered interill sand or gravel lenses, and isolated surface sands. The thickness of the system, which is largely controlled by the underlying bedrock topography, ranges from 12 to 120 feet. The Iroquois Basin Aquifer System consists predominantly of glacial till having thin interill aquifers and some deeply buried aquifers in bedrock valleys. Lenses of interill fine-to-medium-grained sand, two-to three-foot thick, with local gravel deposits are present in a wide range of depths in this system.

Static water levels in this aquifer system can be as much as 75 feet deep, but generally range from 7 to 20 feet below the surface. A few flowing wells have been reported in stream valleys. Well yields ranging from 4 to 24 gpm are generally adequate for domestic use, but dry holes can occur because of the erratic distribution of the interill aquifers. Large diameter wells, completed in locally thick, deeper sand and gravel deposits, may be capable of producing from 100 to 400 gpm in this system. There are two registered significant groundwater withdrawal facilities (2 wells) in Newton County with yields of 30 and 225 gpm. These facilities are used for public supply. The surficial sand deposits are highly susceptible to contamination, but the interill aquifers are moderately susceptible.

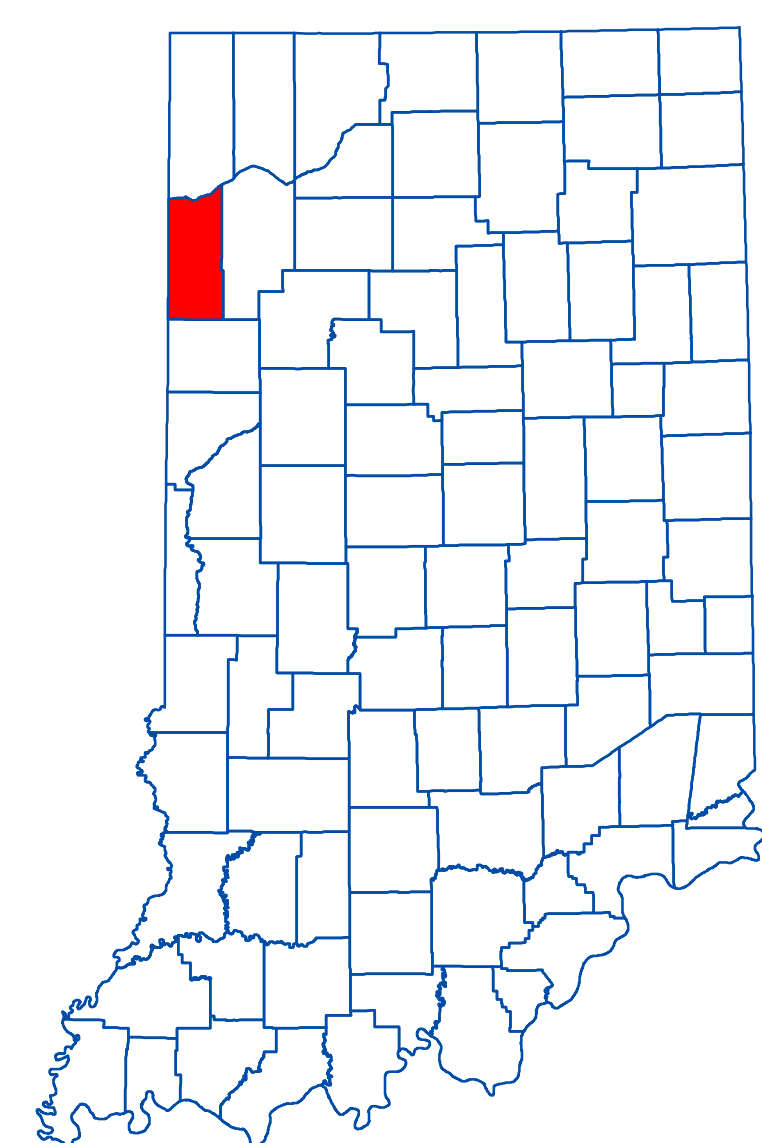
Iroquois Buried Valley Aquifer Subsystem

This subsystem of the Iroquois Basin Aquifer System is composed of interbedded till, sand, and gravel in a buried bedrock valley beneath tills of the Iroquois Basin Aquifer System. The thickness of the sand and gravel deposits ranges from about 3 to 40 feet. Well depths to these aquifers range from about 60 to 125 feet, with an average of about 80 feet. Domestic wells produce from 10 to 40 gpm.

There are 2 registered significant groundwater withdrawal facilities (4 wells) in Newton County with yields ranging from 400 to 795 gpm. These facilities are utilized for rural usage and public supply. The Iroquois Buried Valley Aquifer Subsystem is only slightly susceptible to surface contamination.

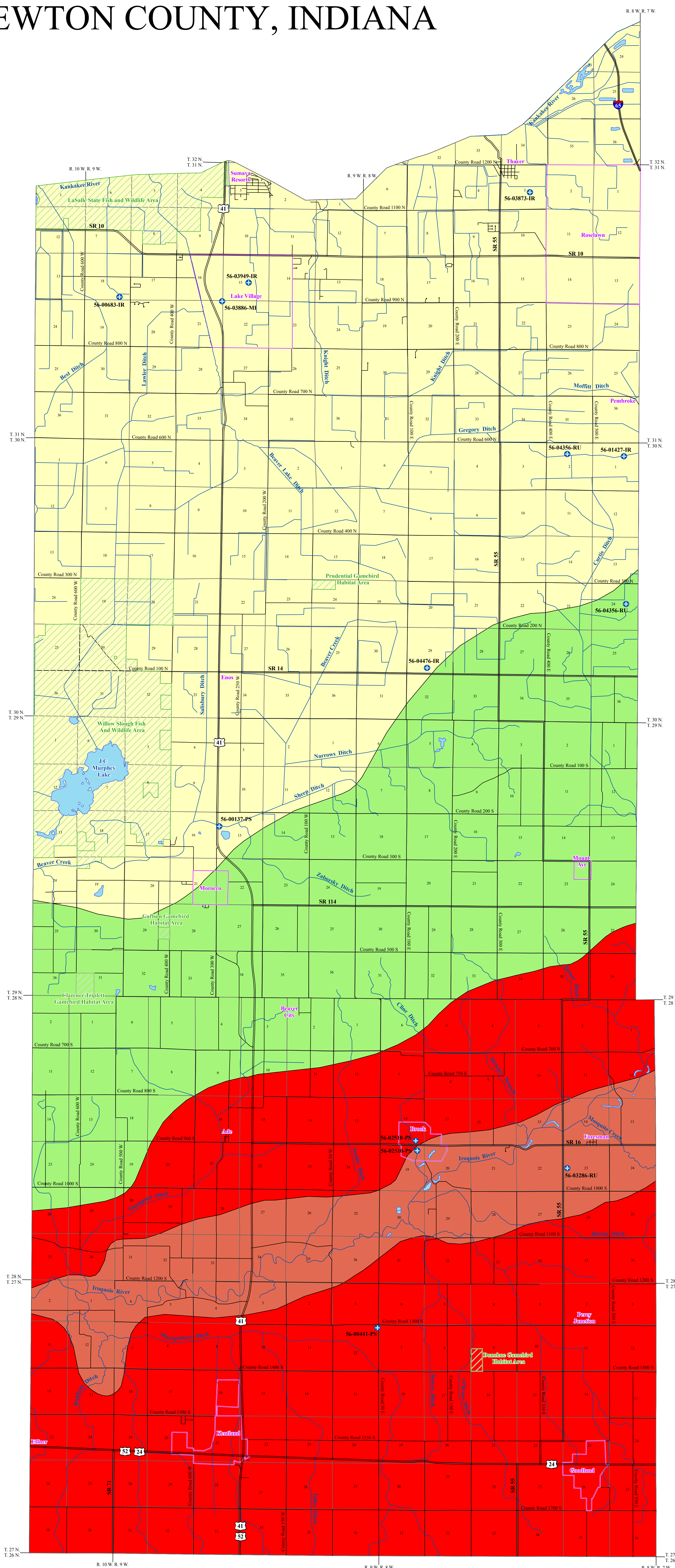
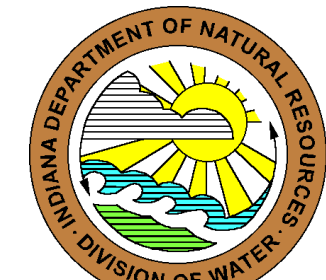


Location Map



EXPLANATION

- Registered Significant Groundwater Withdrawal Facility
- Stream
- County Road
- State Road & US Highway
- Interstate
- Municipal Boundary
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- Lake & River



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Unconsolidated Aquifer Systems of Newton County, Indiana

by
 Division of Water
 1990

Newton County

