

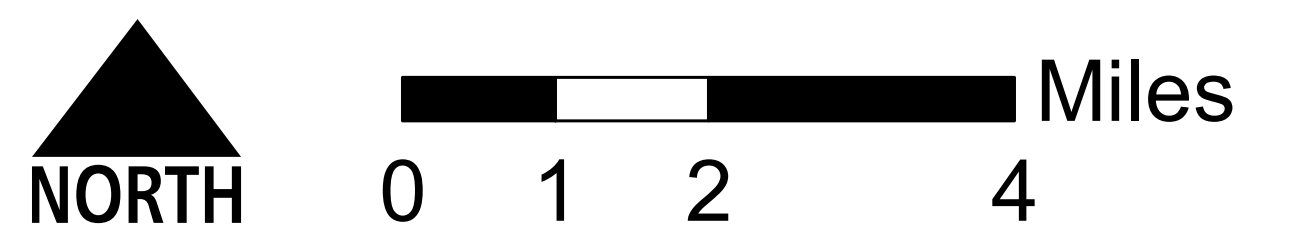
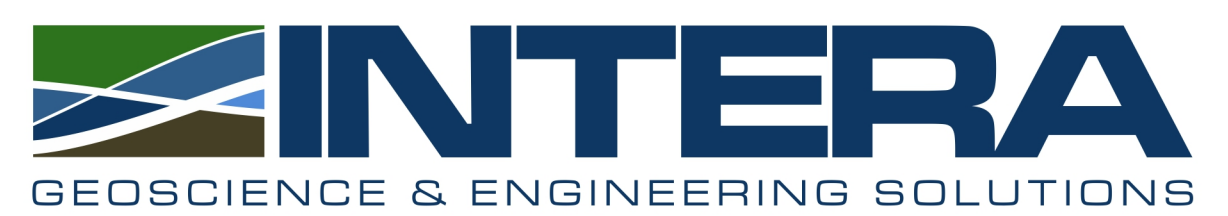
# Water Resources and Use in Fountain County

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

- ### Withdrawal Location
- WELL INTAKE
- Energy/Mining
  - Industry
  - Irrigation
  - Misc.
  - Public Supply
  - Rural Use

- ### River
- 7Q2 Flow (MGD)
- < 10 MGD
  - 10 - 50 MGD
  - 50 - 100 MGD
  - 100 - 500 MGD
  - > 500 MGD

- Major Lakes
- Interstate
- County
- City



# BEDROCK AQUIFER SYSTEMS OF FOUNTAIN COUNTY, INDIANA

The occurrence of bedrock aquifers depends on the original composition of the geologic material 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.

Two bedrock aquifer systems are identified within Fountain County: the Pennsylvanian age Raccoon Creek Group and the Mississippian age Borden Group. Approximately 81 percent of all wells in this county are completed in bedrock.

Bedrock aquifer systems in the county are overlain by unconsolidated deposits of varying thickness ranging from outcropping to over 200 feet. Bedrock, in places, is at or near the surface along many streams and the Wabash River in the county.

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.

## **Yellow** Pennsylvanian -- Raccoon Creek Group Aquifer System

The Raccoon Creek Group Aquifer System outcrops/subcrops throughout the majority of central, western, and southeastern Fountain County. The group consists in ascending order of the Mansfield, Brazil, and Staunton formations. The basal formation of the group, the Mansfield Formation, rests unconformably on Mississippian rocks. Bedrock consists mostly of shale, mudstone, and siltstone with minor amounts of coal, sandstone and limestone. The Raccoon Creek Group in Fountain County is overlain by unconsolidated deposits with a thickness ranging from outcropping to over 180 feet.

Wells completed in the Raccoon Creek Group Aquifer System are generally capable of meeting the needs of some domestic and some high-capacity users in this county. Wells in this system are commonly completed at depths from about 40 to 525 feet. Yields for domestic wells range from 3 to 30 gallons per minute (gpm) with some dry holes reported. Static water levels range from flowing to 140 feet below the land surface.

There are three registered significant groundwater withdrawal facilities (5 wells) in this system. Reported yields range from 50 to 250 gpm. Uses for these facilities are public supply and irrigation.

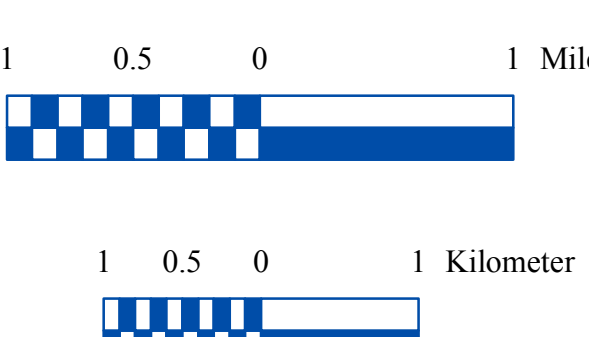
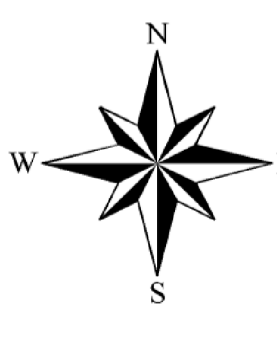
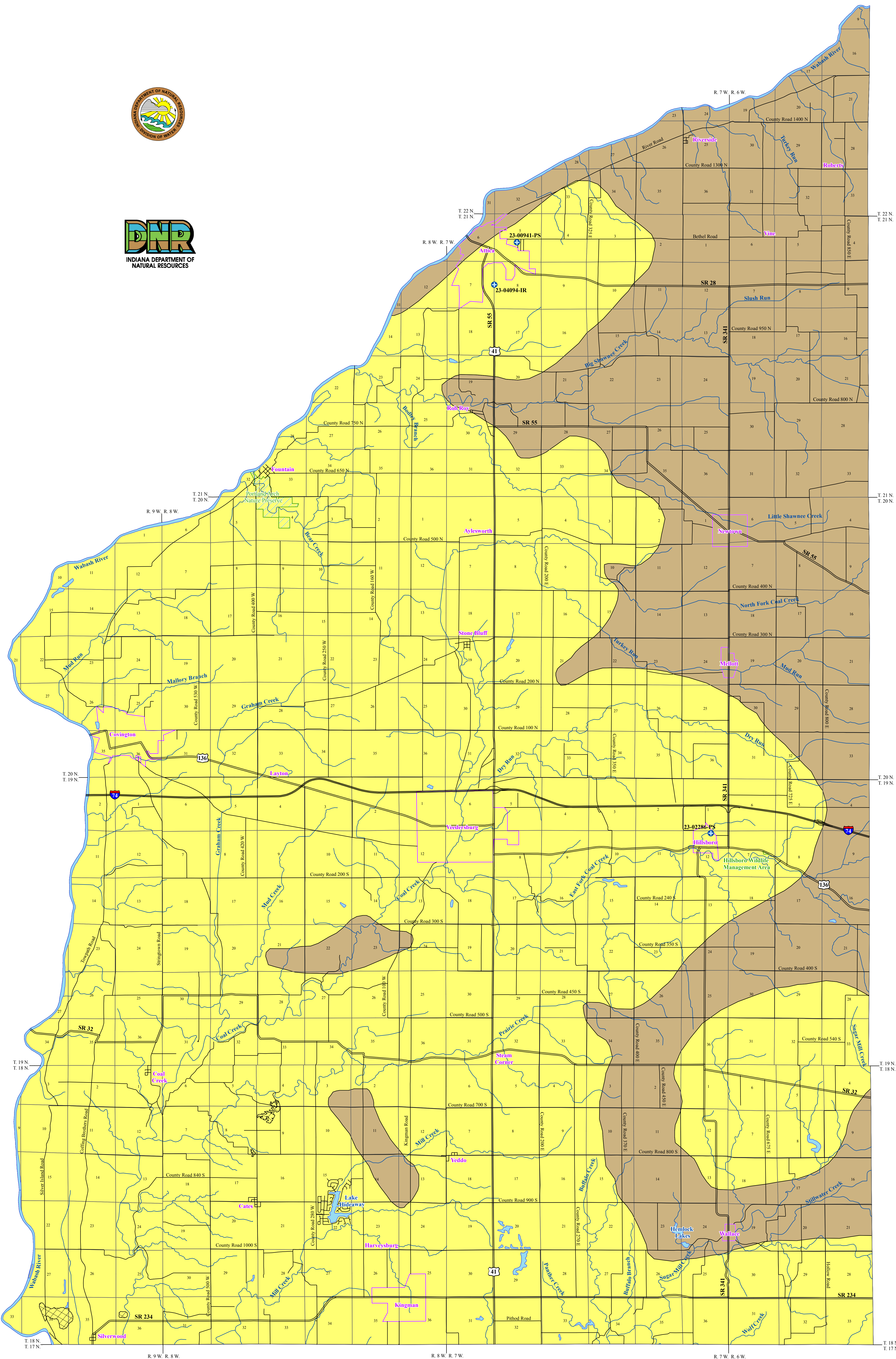
In the majority of Fountain County, the Raccoon Creek Group Aquifer System has a low susceptibility to surface contamination where thick clay deposits overlie the system. However, areas are at moderate to high risk to contamination where overlying clays are thin or absent, or where bedrock outcrops.

## **Brown** Mississippian -- Borden Group Aquifer System

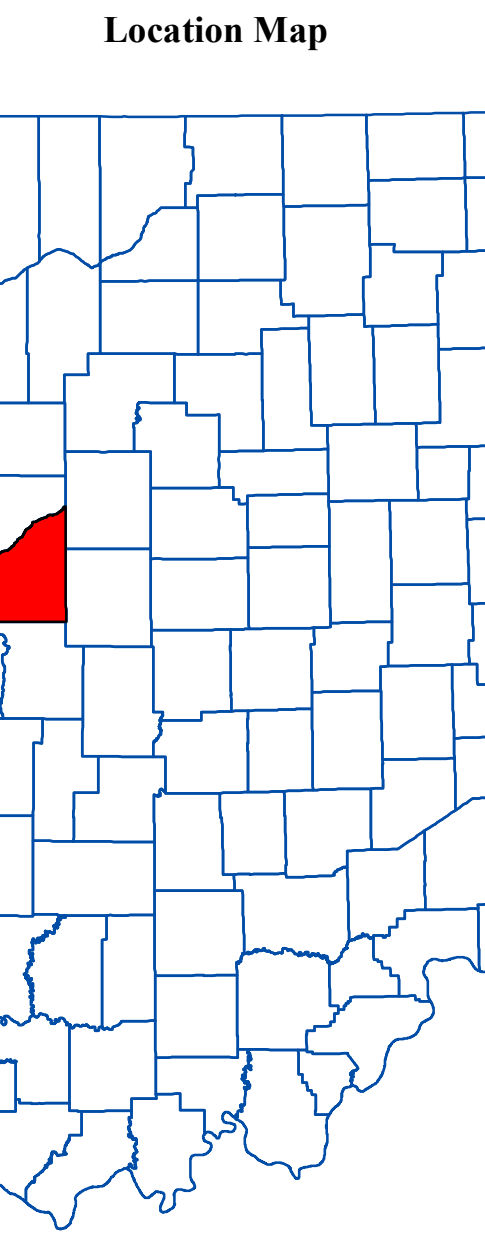
The Borden Group outcrops/subcrops primarily in the eastern and northern third of Fountain County, and in two relatively small areas located in the south-central portion. This bedrock aquifer system is composed of siltstone and shale, but fine-grained sandstones are also common. Although carbonates are somewhat rare, discontinuous interbedded limestone lenses are present. The Borden Group in Fountain County is overlain by unconsolidated deposits ranging from zero to over 200 feet in thickness.

The Borden Group Aquifer System is often described as an aquitard, and yields of wells completed in it are generally quite limited. Wells in this system are commonly completed at depths ranging from 25 to 530 feet. Domestic well yields typically range from 1 to 20 gpm with some dry holes reported. Static water levels commonly range from 9 to 30 feet below surface. There are no registered significant groundwater withdrawal facilities reported in this system.

Because the permeability of shale material is considered low and where the overlying sediment consists of thick fine-grained clay materials, susceptibility to contamination introduced at or near the surface is low. In areas where bedrock is shallow, risk to contamination from the surface or near surface sources is high.



- EXPLANATION**
- Registered Significant Groundwater Withdrawal Facility
  - Stream
  - County Road
  - State Road & US Highway
  - Interstate
  - Municipal Boundary
  - State Managed Property
  - Underground Coal Mine
  - Lake & River



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**Bedrock Aquifer Systems of Fountain County, Indiana**

by  
 Robert K. Schmidt  
 Division of Water, Resource Assessment Section

August 2009

# UNCONSOLIDATED AQUIFER SYSTEMS OF FOUNTAIN COUNTY, INDIANA

The unconsolidated aquifer systems of Fountain County are composed of sediments deposited by, or resulting from, a complicated sequence of glacial, glacial meltwaters, and post-glacial precipitation events. Six unconsolidated aquifer systems have been mapped in Fountain County: the Till Veneer, the Central Wabash Valley / Tipton Till, the Central Wabash Valley / Tipton Till Subsystem, the Central Wabash Valley / Tipton Complex, the Wabash River and Tributaries Outwash, and the Wabash River and Tributaries Outwash Subsystem. 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 deposits in Fountain County is quite variable due to the deposition of glacial material over an uneven bedrock surface. The depth to bedrock ranges from outcropping along many of the streams and the Wabash River to over 200 feet deep in the southeast portion of the county.

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 groundwater resources of the unconsolidated aquifer systems in the county. The system consists of thin till, generally less than 50 feet thick, which directly overlies an uneven bedrock surface. The Till Veneer Aquifer System is mapped throughout Fountain County with the largest area situated in the north-central portion of the county.

Potential aquifers within this system include relatively thin sand and/or gravel layers with most of the wells having reported capacities of less than 10 gallons per minute (gpm). Therefore, very few of the reported wells penetrating this aquifer system in the county are completed in unconsolidated materials, which are bypassed by the generally more productive underlying bedrock. In this county the depth of the few wells completed in the Till Veneer Aquifer System range from 20 to 50 feet deep with static water levels ranging between 5 and 32 feet below the surface. There are no registered significant groundwater withdrawal facilities reported in 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 with thin to no clay deposits above the aquifer resource, therefore, these areas are considered to be at moderate to high risk to contamination.

## Central Wabash Valley / Tipton Till Aquifer System

The Central Wabash Valley / Tipton Till Aquifer System is mapped predominantly in the northeast section, and in the central and south-central portions in the of the county. The system consists of glacial till separated by intratill sand and gravel units. Saturated aquifer materials within this system include sand and/or gravel deposits commonly 5 to 15 feet thick.

This aquifer system is capable of meeting the needs of most domestic and some high-capacity users in Fountain County. However, approximately 24 percent of wells started in this system utilize the underlying bedrock aquifer. Wells producing from the Central Wabash Valley / Tipton Till Aquifer System are typically 40 to 170 feet deep. Domestic well capacities are commonly 10 to 50 gpm, and static water levels range from 10 to 50 feet below the surface.

There is one registered significant groundwater withdrawal facility (2 wells) using the Central Wabash Valley / Tipton Till Aquifer System. Reported capacities for both wells are 120 gpm each. This facility is used for public water supply.

The Central Wabash Valley / Tipton 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.

## Central Wabash Valley / Tipton Till Aquifer Subsystem

Areas where unconsolidated materials are generally greater than 50 feet in thickness, yet have limited aquifer potential, are mapped as the Central Wabash Valley / Tipton Till Aquifer Subsystem. Total thickness of unconsolidated deposits in this system is over 160 feet in places.

The Central Wabash Valley / Tipton Till Aquifer Subsystem is mapped throughout the county. The subsystem is mapped similar to the Central Wabash Valley / Tipton Till Aquifer System, however, potential aquifer materials are typically thinner and yields are generally less in the subsystem.

Approximately 85 percent of the wells started in the Central Wabash Valley / Tipton 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 ranging from 45 feet. Potential aquifer materials include intratill sand and gravel deposits that range from about 2 to 15 feet in thickness. Well yields range from 2 to 12 gpm, and reported static water levels range from 7 to 92 feet below the land surface.

There is one registered significant groundwater withdrawal facility (2 wells) using the Central Wabash Valley / Tipton Till Aquifer Subsystem. However, these shallow wells are not used as a drinking water source. Reported capacities for the individual wells are 75 and 100 gpm. The use for this facility is irrigation.

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.

## Central Wabash Valley / Tipton Complex Aquifer System

The Central Wabash Valley / Tipton Complex Aquifer System is mapped in the north-central portion of Fountain County. Complex multiple glacial advances resulted in alternating layers of clay and till with single or multiple, stacked, sands and gravels that are quite variable in lateral extent and thickness.

This system is capable of meeting the needs of domestic and most high-capacity users in the county. Wells in this system are commonly completed at depths ranging from about 50 to 165 feet and produce from saturated aquifer materials typically 10 to 25 feet thick. Domestic well yields are commonly 10 to 75 gpm, and static water levels range from 10 to 80 feet below the surface.

There are three registered significant groundwater withdrawal facilities (7 wells) using this system. Reported capacities for individual wells range from 110 to 1600 gpm. The uses for these facilities are industry, public supply, and irrigation.

The Central Wabash Valley / Tipton 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.

## Wabash River and Tributaries Outwash Aquifer System

The Wabash River and Tributaries Outwash Aquifer System is mapped primarily in the northeast section of Fountain County, and in a relatively small area in the north-central portion of the county. This system includes thick glacial outwash sands and gravels capped by recent alluvial deposits. Total thickness of unconsolidated deposits in this system is up to 160 feet in places.

The Wabash River and Tributaries Outwash Aquifer System has the potential to meet the needs of domestic and high-capacity users. The few wells utilizing this system have been reported at depths ranging from 52 to 128 feet with saturated sand and gravel aquifer materials commonly 10 to 40 feet thick. Static water levels range from 20 to 45 feet below the surface.

There is one registered significant groundwater withdrawal facility (1 well) with a reported yield of 600 gpm. The use for this facility is irrigation.

This system is highly susceptible to surface contamination where sand and gravel deposits are near the surface and have little or no clay deposits. However, areas that have overlying thick clay deposits are moderately susceptible to contamination.

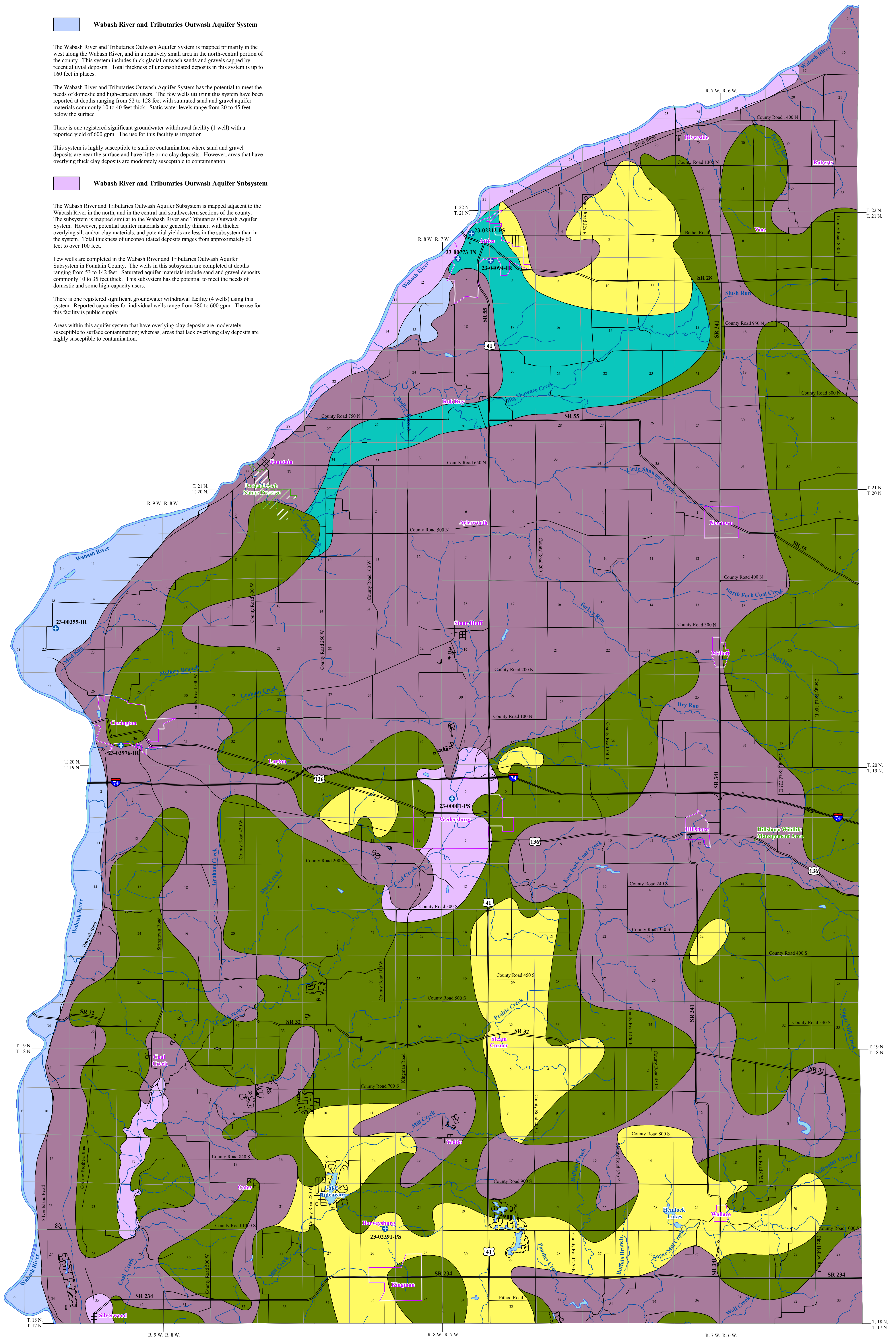
## Wabash River and Tributaries Outwash Aquifer Subsystem

The Wabash River and Tributaries Outwash Aquifer Subsystem is mapped adjacent to the Wabash River in the north, and in the central and southwestern sections of the county. The subsystem is mapped similar to the Wabash River and Tributaries Outwash Aquifer System. However, potential aquifer materials are generally thinner, with thicker overlying silt and/or clay materials, and potential yields are less in the subsystem than in the system. Total thickness of unconsolidated deposits ranges from approximately 60 feet to over 100 feet.

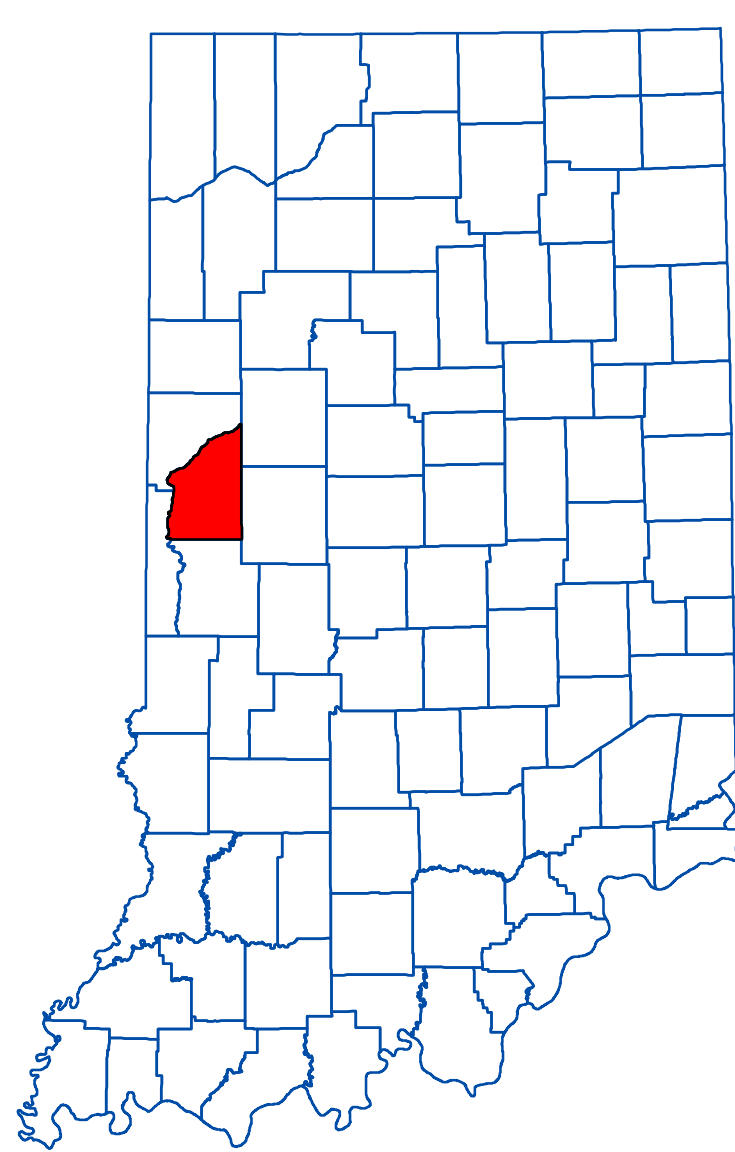
Few wells are completed in the Wabash River and Tributaries Outwash Aquifer Subsystem in Fountain County. The wells in this subsystem are completed at depths ranging from 53 to 142 feet. Saturated aquifer materials include sand and gravel deposits commonly 10 to 35 feet thick. This subsystem has the potential to meet the needs of domestic and some high-capacity users.

There is one registered significant groundwater withdrawal facility (4 wells) using this system. Reported capacities for individual wells range from 280 to 600 gpm. The use for this facility is public supply.

Areas within this aquifer system that have overlying clay deposits are moderately susceptible to surface contamination; whereas, areas that lack overlying clay deposits are highly susceptible to contamination.

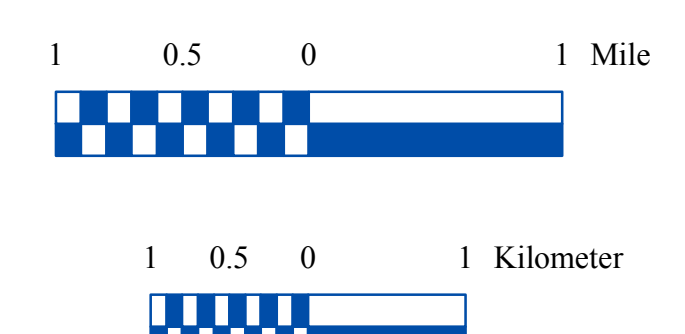
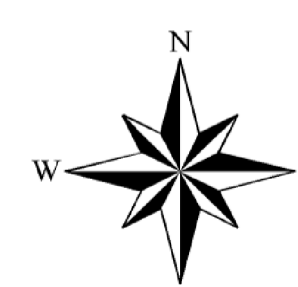


### Location Map



### EXPLANATION

- Registered Significant Groundwater Withdrawal Facility
- Stream
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### Unconsolidated Aquifer Systems of Fountain County, Indiana

by  
Robert K. Schmidt  
Division of Water, Resource Assessment Section  
August 2009

# Fountain County

