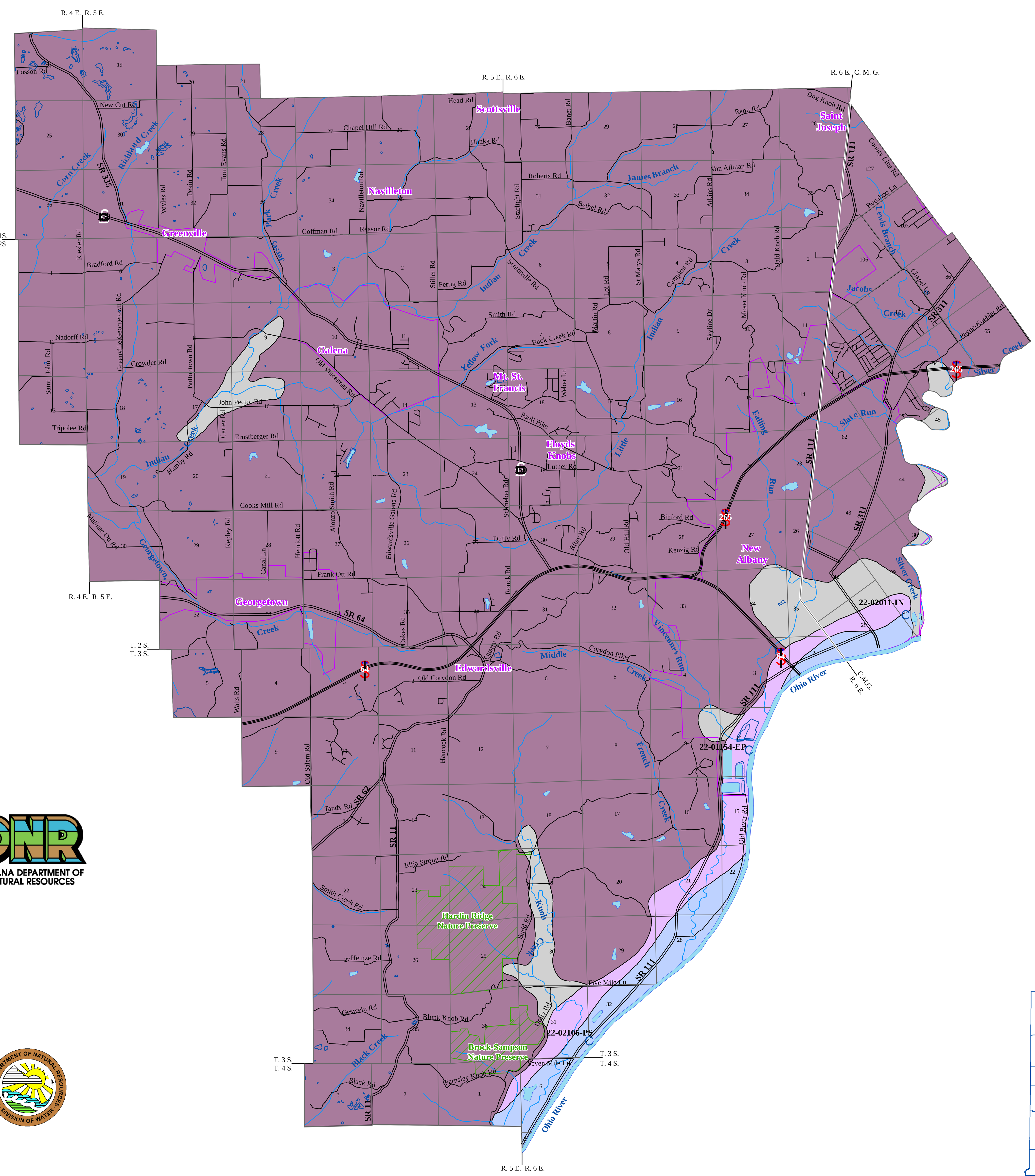
UNCONSOLIDATED AQUIFER SYSTEMS OF FLOYD COUNTY, INDIANA



Five unconsolidated aquifer systems are mapped in Floyd County: the Unglaciated Southern Hills and Lowlands; the Dissected Till and Residuum; the Alluvial, Lacustrine, and Backwater Deposits; the Ohio River Outwash; and the Ohio River Outwash Subsystem. Boundaries of these aquifer systems are commonly gradational, and individual aquifers may extend across aquifer system boundaries. However, in areas where the topography is steep, boundaries between aquifer systems are more distinct.

Thickness, type, and areal extent of unconsolidated deposits in Floyd County are variable. Thick deposits (up to 100 feet) of outwash, alluvial, and lacustrine sediments are confined to the Ohio River Valley and its tributaries. However, bedrock residuum extends across most of the county with isolated areas of pre-Wisconsin glacial sediments (mainly along the eastern edge of the county). These sediments range from less than five feet (in areas where only residuum is present) to as much as 60 feet (where glacial drift is present).

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.

Unglaciated Southern Hills and Lowlands Aquifer System / Dissected Till and Residuum Aquifer System

In Floyd County, the Unglaciated Southern Hills and Lowlands and the Dissected Till and Residuum Aquifer Systems are mapped as one system because they are similar in composition and in aquifer characteristics. The combined systems are mapped throughout most of the county and consist of either pre-Wisconsin till deposits of variable thickness with very thin interbedded layers of outwash sand and gravel (mainly along the eastern edge of Floyd County); or thin, eroded bedrock residuum. Together, they have the most limited ground-water resources of the unconsolidated aquifer systems mapped in the county.

Total thickness of these systems generally range from less than 5 feet (where only residuum is present) to about 60 feet in the eastern part of the county where isolated remnants of pre-Wisconsin till materials are present. Potential aquifer materials consist of thin sand and gravel deposits that are typically less than 3 feet thick.

There are no reported wells producing from the Unglaciated Southern Hills and Lowlands or the Dissected Till and Residuum Aquifer Systems in Floyd County. Because this aquifer system is generally thin and not very productive, wells are typically completed in the underlying bedrock aquifer system. However, large diameter bucket wells may be successful in meeting the needs of some domestic users. Typical well yields are expected to be less than 5 gallons per minute (gpm) with the potential of some dry holes. Because of the low permeability of the surface materials, these aquifer systems are not very susceptible to contamination from surface sources.

Alluvial, Lacustrine, and Backwater Deposits Aquifer System

The Alluvial, Lacustrine, and Backwater Deposits Aquifer System is mapped along portions of larger tributaries and floodplains of the Ohio River in Floyd County. These tributaries include: Indian Creek in the west-central portion of the county; to the south along Knob Creek; and to the east along Middle Creek and Silver Creek and a portion of New Albany.

This system consists of deposits that come from two primary sources. The first is alluvium deposited by streams along with colluvium eroded from valley walls and upland areas. The second is from pre-Wisconsin and Wisconsin fine-grained glaciolacustrine deposits formed in relatively static lake water. Typical materials include fine sand, silt, and clay deposits that are generally greater than 25 feet thick. Aquifer materials typically include thin sand seams that are generally less than 5 feet thick. However, two bedrock wells along Knob Creek indicate that sand deposits overlying bedrock are up to 60 feet thick.

The Alluvial, Lacustrine, and Backwater Deposits Aquifer System is a limited resource and no reported wells produce from these deposits. However, large diameter bored (bucket-rig) wells may be adequate to meet the needs of some domestic users. Typical well yields are expected to be less than 5 gpm with the potential of some dry holes.

Thick deposits of silt and clay that have a low susceptibility to surface contamination generally mark this aquifer system. The susceptibility is greater in areas where the surficial silt and clay deposits are thin and directly overlie outwash deposits.

Ohio River Outwash Aquifer System

The Ohio River Outwash Aquifer System in Floyd County is mapped along portions of the main valley of the Ohio River. Aggradation of the pre-glacial Ohio River Valley with large amounts of outwash sand and gravel from pre-Wisconsin and Wisconsin receding glaciers filled portions of the river valley. Recent alluviation continues to fill the valley. These outwash and alluvial deposits form the most prolific aquifer system in the county.

Few wells produce from the Ohio River Outwash Aquifer System in Floyd County. However, several test and production wells for the Edwardsville Water Corporation indicate unconsolidated thicknesses up to 100 feet in places with 70 to 100 feet of continuous sand and gravel. In some areas as much as 30 feet of sandy clay or silt overlie the aquifer materials. Thickness of saturated sands and gravels, however, generally range from 30 to 60 feet. Well depths are commonly 60 to 100 feet.

The Ohio River Outwash Aquifer System has the greatest potential of any aquifer system in Floyd County and can meet the needs of domestic and high-capacity users. There are two registered high-capacity facilities (5 wells) using this system. Reported well yields range from 250 to 1050 gpm with reported static water levels of 30 to 45 feet below surface.

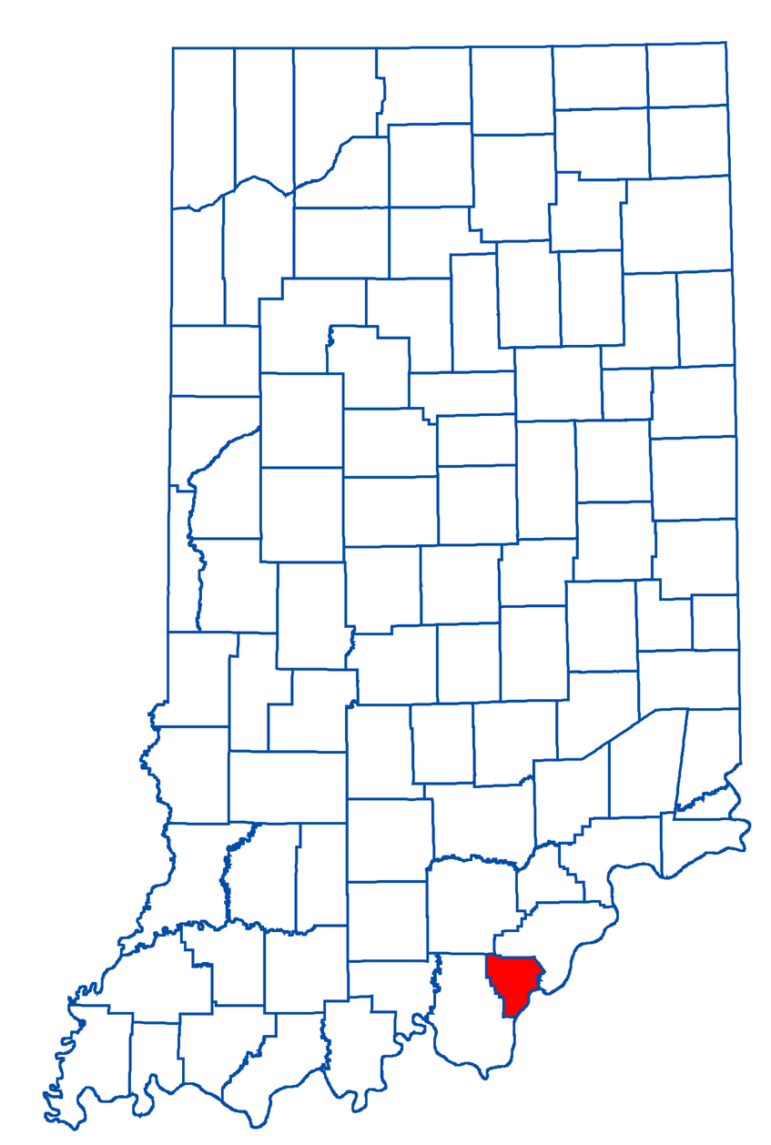
In areas that lack overlying clays, this aquifer system is highly susceptible to contamination from surface sources. Where clay or silt deposits overlie the aquifer system, the aquifer is moderately susceptible to surface contamination.

Ohio River Outwash Aquifer Subsystem

In Floyd County the Ohio River Outwash Aquifer Subsystem is mapped along a portion of the Ohio River and adjacent to the Ohio River Outwash System. In general, this system (subsystem) is mapped where the topographic position is higher and thickness of saturated outwash materials is considerably less than the main outwash system. Also, aquifer sand and gravels are generally overlain by greater thicknesses of silt, clay, or lacustrine deposits. In places, the system is also mapped along areas of the Ohio River Valley where depth to bedrock is significantly shallower than along the main outwash system in Floyd County.

Few water well records are available in the Ohio River Outwash Aquifer Subsystem. Total thickness of unconsolidated materials within this system ranges from about 25 to 90 feet with nearly 55 feet of continuous sand and gravel. Saturated sands and gravels generally range from 15 to 50 feet thick. The Ohio River Outwash Aquifer Subsystem has the potential to meet the needs of domestic and some high-capacity users. There is one registered high-capacity facility (2 wells) with reported yields of 180 gpm each and static water levels of 25 to 50 feet below ground surface.

Location Map



INDIANA DEPARTMENT OF NATURAL RESOURCES

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1 0.5 0 1 Mile

1 0.5 0 1 Kilometer

EXPLANATION

C Registered Significant Ground-Water Withdrawal Facility
Stream
County Road
State Road & US Highway
Interstate
Lake & River
Municipal Boundary
State Managed Property
USGS Closed Contour (Mostly Karst Depressions)

Map generated by Jennifer K. McMillan, Joseph L. Phillips, and Adam B. Watts
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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 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 shapefile, various dates) was from IDNR. Large-Scale DLG Hypsography data (line shapefile, various dates) was from the US Geological Survey and based on a 1:24,000 scale. Unconsolidated Aquifer Systems coverage (Maier, 2006) was based on a 1:24,000 scale.

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