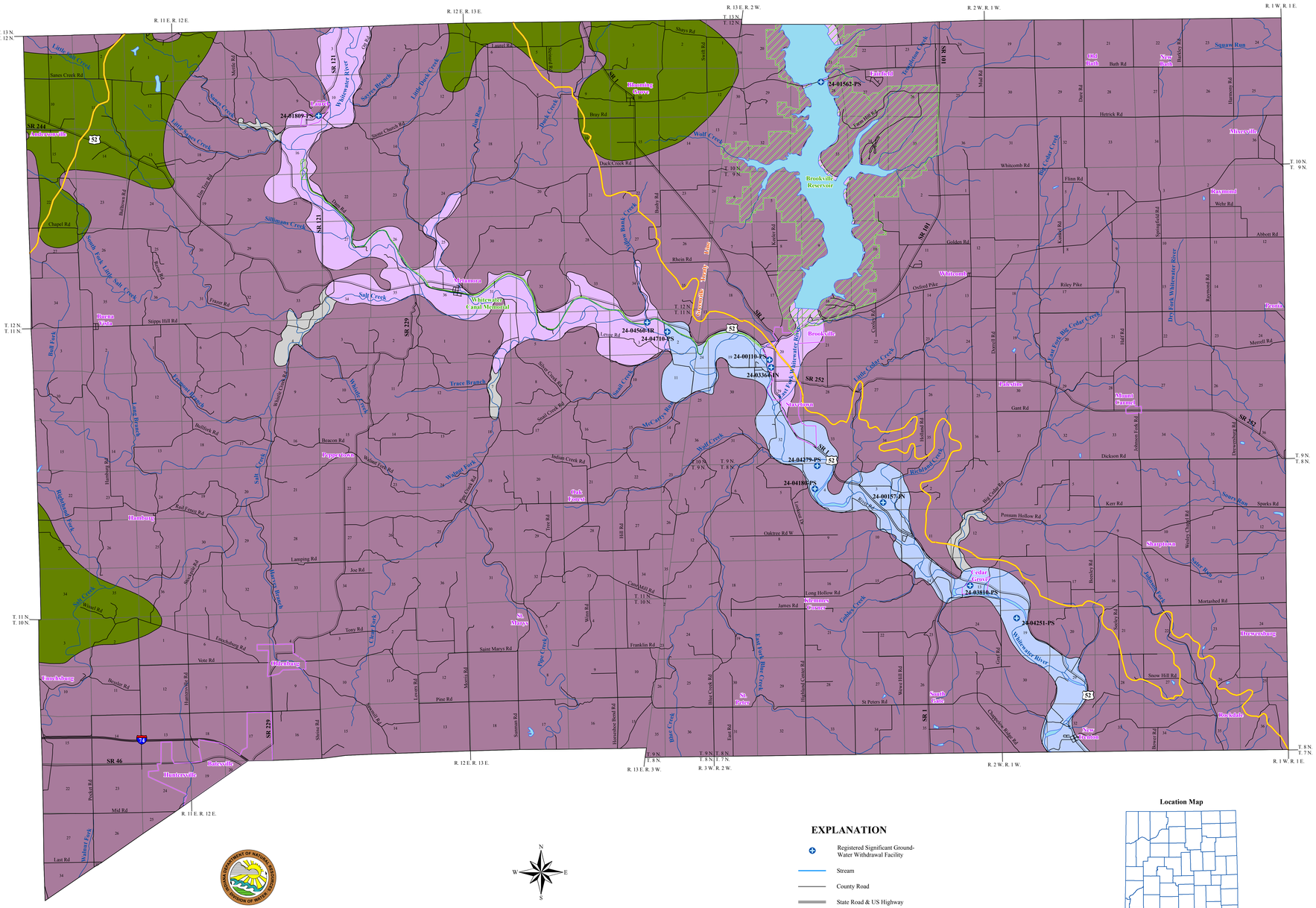
UNCONSOLIDATED AQUIFER SYSTEMS OF FRANKLIN COUNTY, INDIANA



EXPLANATION

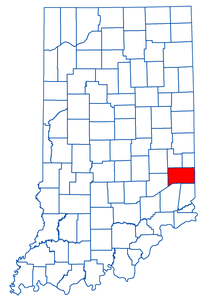
- Registered Significant Ground-Water Withdrawal Facility
- Stream
- County Road
- State Road & US Highway
- Interstate
- Southern Limit of Wisconsin Glacial Deposits
- Municipal Boundary
- State Managed Property
- Lake & River

N W E S

1 0.5 0 1 Mile

1 0.5 0 1 Kilometer

Location Map



The unconsolidated aquifer systems of Franklin County are composed of sediments deposited by, or resulting from, a complex sequence of glaciers, glacial meltwaters, and post-glacial precipitation events. Five unconsolidated aquifer systems have been mapped in Franklin County: the Dissected Till and Residuum / Till Veneer; the Alluvial, Lacustrine and Backwater Deposits; the Dearborn Upland / Muscatatuck Plateau / New Castle Till Subsystem; the Whitewater River Valley Outwash; and the Whitewater River Valley 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. Approximately 56 percent of all wells in this county are completed in unconsolidated deposits.

The thickness of unconsolidated deposits in Franklin County is quite variable due to the deposition of glacial material over an uneven bedrock surface. Unconsolidated deposits reportedly are from about 3 to 110 feet thick throughout Franklin County.

Regional estimates of aquifer susceptibility to contamination from the surface can differ considerably due to a wide range of 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.

Dissected Till and Residuum / Till Veneer Aquifer System

The Dissected Till and Residuum / Till Veneer Aquifer System is mapped throughout much of Franklin County and is mapped as one system because they are similar in composition and aquifer characteristics. The Till Veneer Aquifer System includes areas of northwestern, north-central, and eastern Franklin County where thin till, generally less than 50 feet thick, directly overlies an uneven bedrock surface. The Dissected Till and Residuum Aquifer System is located throughout the remaining areas of Franklin County where glacial deposits are thin and includes weathered bedrock materials. Also, along some of the major streams this system may include thin alluvium and surficial sands and gravels that directly overlie the bedrock surface.

Wells producing from the Dissected Till and Residuum / Till Veneer Aquifer System commonly utilize large-diameter bored (bucket rig) wells to produce water from thin seams of coarse-grained material. Typically constructed at depths of 30 to 45 feet with either 30 or 36 inch diameter porous casing, these wells are built to maximize storage and are generally adequate for domestic use. However, the potential for groundwater production in this system is generally low with the majority of wells being completed in the underlying bedrock.

Wells in this system typically have reported capacities of 5 gallons per minute (gpm) or less with some wells being reported as "dry". Static water levels range between 3 to 72 feet below the surface. There are no registered significant groundwater withdrawal facilities utilizing this system.

The Dissected Till and Residuum / Till Veneer Aquifer System is generally not very susceptible to contamination from surface sources because of the low permeability of the near-surface materials. However, there are areas where protective clay layers are thin or absent. These areas are very susceptible to contamination.

Alluvial, Lacustrine, and Backwater Deposits Aquifer System

The Alluvial, Lacustrine, and Backwater Deposits Aquifer System in Franklin County is mapped within several floodplains along tributaries of the Whitewater River. This system consists of deposits resulting from glacial meltwater drainage, fine-grained glaciolacustrine deposits formed in relatively static water, or colluvium from the surrounding upland areas.

This system is an extremely limited resource and the Division has no records of wells producing from these deposits in Franklin County. However, large-diameter bucket wells may be adequate to meet the needs of some domestic users. Typical materials overlying bedrock in this system include fine sand, silt, and clay deposits generally greater than 25 feet thick. Aquifer materials commonly include thin sand seams that are typically less than a few feet thick. Yields are generally expected to be less than a few gpm. There are no registered significant groundwater withdrawal facilities utilizing this system.

Thick deposits of clay that have a low susceptibility to surface contamination commonly characterize this aquifer system. However, the susceptibility is greater in areas where surficial clay deposits are thin and directly overlie sand deposits.

Dearborn Upland / Muscatatuck Plateau / New Castle Till Aquifer Subsystem

The Dearborn Upland / Muscatatuck Plateau / New Castle Till Aquifer Subsystem is mapped in portions along the edge of north-central, northwestern, and southwestern Franklin County. This subsystem is capable of meeting the needs of some domestic users in the county. However, about 40 percent of wells started in this subsystem in Franklin County are completed in the underlying bedrock aquifer system.

Potential aquifer materials in the Dearborn Upland / Muscatatuck Plateau / New Castle Till Aquifer Subsystem include relatively thin, discontinuous intertill sand and gravel deposits that are usually less than 10 feet thick. The wells producing from this subsystem are completed at depths ranging from 30 to 90 feet. Domestic well yields are generally 5 to 10 gpm and static water levels range from 2 to 55 feet below the surface. There are no registered significant groundwater withdrawal facilities utilizing this subsystem.

This subsystem is generally not very susceptible to surface contamination because intertill sand and gravel units are overlain by thick till deposits. Wells producing from shallow aquifers are moderately to highly susceptible to contamination.

Whitewater River Valley Outwash Aquifer System

The Whitewater River Valley Outwash Aquifer System is mapped along the Whitewater River from the central portion of Franklin County to the southeastern border. The system includes thick glacial outwash sands and gravels, that are (in some areas) capped by a layer of clay and/or silt deposits.

The Whitewater River Valley Outwash Aquifer System is capable of meeting the needs of both domestic and high-capacity users in Franklin County. The wells utilizing this aquifer system are completed at depths ranging from about 25 to over 140 feet with saturated sand and gravel aquifer materials commonly 10 to 35 feet thick. Domestic well yields are typically 10 to 40 gpm with static water levels ranging from flowing to 95 feet below the surface.

There are 6 registered significant groundwater withdrawal facilities (12 wells) in the Whitewater River Valley Outwash Aquifer System. Reported production for these high-capacity wells range from 600 to 1,200 gpm. The uses for these facilities are public water supply and industry.

This system is highly susceptible to surface contamination where sand and gravel deposits are near the surface and have little or no overlying clay deposits.

Whitewater River Valley Outwash Aquifer Subsystem

The Whitewater River Valley Outwash Aquifer Subsystem is mapped from the northern to the central portions of the county, along the Whitewater River and the East Fork Whitewater River. This subsystem is mapped similar to the Whitewater River Valley Outwash Aquifer System; however, aquifer materials in the Whitewater River Valley Outwash Aquifer Subsystem are generally thinner, overlying silt and/or clay materials are thicker, and potential yields are less in the subsystem.

The Whitewater River Valley Outwash Aquifer Subsystem has the potential to meet the needs of domestic and some high-capacity users. The wells in this subsystem are completed at depths ranging from 16 to 120 feet. Saturated aquifer materials include sand and gravel deposits commonly 5 to 15 feet thick. Domestic well yields are commonly 10 to 45 gpm with static water levels ranging from flowing to 100 feet below the surface.

There are 5 registered significant groundwater withdrawal facilities (9 wells) in the Whitewater River Valley Outwash Aquifer Subsystem. Reported yields for these high-capacity wells range from 150 to 500 gpm. The uses for these facilities are public water supply, irrigation, and industry.

Areas within the subsystem that have overlying clay deposits are moderately susceptible to surface contamination; however, areas lacking overlying clay deposits are highly susceptible to contamination.

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 shapefile, various dates) was from IDNR. Unconsolidated aquifer systems coverage (Schmidt, 2011) was based on a 1:24,000 scale.

Unconsolidated Aquifer Systems of Franklin County, Indiana

by
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