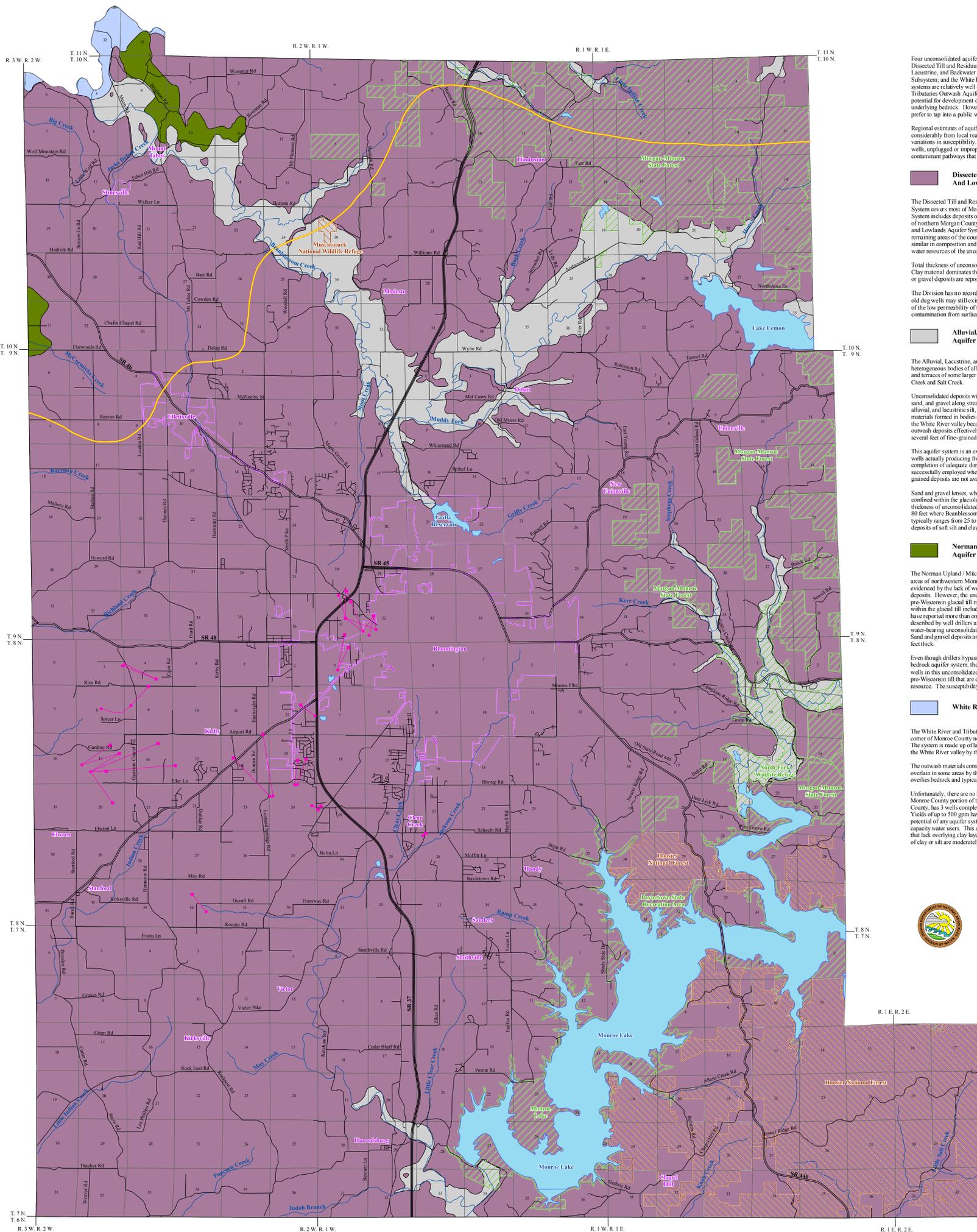


UNCONSOLIDATED AQUIFER SYSTEMS OF MONROE COUNTY, INDIANA



Four unconsolidated aquifer systems have been mapped in Monroe County: the Dissected Till and Residuum / Unglacial Southern Hills and Lowlands Aquifer System; the Alluvial, Lacustrine, and Backwater Deposits Aquifer System; the Norman Upland / Mitchell Plateau Till Subsystem; and the White River and Tributaries Outwash. Boundaries between the systems are relatively well defined. With the exception of the White River and Tributaries Outwash Aquifer System, unconsolidated aquifers in the county have limited potential for development of successful water wells. Drillers prefer to try a well in the underlying bedrock. However, that too is relatively limited, and many county residents prefer to tap into a public water supply system serving much of the county.

Regional estimates of aquifer susceptibility to surface contamination can differ considerably from local reality. Variations within geologic environments can cause large variations in susceptibility. Also, 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 / Unglacial Southern Hills and Lowlands Aquifer System

The Dissected Till and Residuum / Unglacial Southern Hills and Lowlands Aquifer System covers most of Monroe County. The Dissected Till and Residuum Aquifer System includes deposits of pre-Wisconsin glacial drift within a two to three mile fringe of northern Morgan County. Unconsolidated deposits of the Unglacial Southern Hills and Lowlands Aquifer System include weathered bedrock residuum in most of the remaining areas of the county. The two systems are mapped the same because they are similar in composition and aquifer characteristics. They are the most limited groundwater resources of the unconsolidated aquifer systems in Monroe County.

Total thickness of unconsolidated deposits overlying bedrock is commonly 6 to 25 feet. Clay material dominates this unconsolidated aquifer system, however, discontinuous sand or gravel deposits are reported. These deposits are commonly 1 to 3 feet thick.

The Division has no record of drilled wells actually producing from this system. A few old dug wells may still exist in the county, but their yields would be very low. Because of the low permeability of the surface materials, this system is not very susceptible to contamination from surface sources.

Alluvial, Lacustrine, and Backwater Deposits Aquifer System

The Alluvial, Lacustrine, and Backwater Deposits Aquifer System is made up of heterogeneous bodies of alluvial, colluvial, and lacustrine materials within valley bottoms and terraces of some larger streams tributary to White River. These include Beantlossom Creek and Salt Creek.

Unconsolidated deposits within the system include Wisconsin and Holocene (Recent) silt, sand, and gravel along streams and terraces as well as pre-Wisconsin colluvial, alluvial, and lacustrine silt, clay, and sand. The lacustrine deposits are older lake materials formed in bodies of relatively stagnant water. These deposits are attributed to the White River valley becoming choked with outwash from retreating glaciers. The outwash deposits effectively dammed the tributary streams, thus creating lakes in which several feet of fine-grained glaciolacustrine deposits accumulated.

This aquifer system is an extremely limited resource and the Division has no records of wells actually producing from these deposits. The potential does exist, however, for completion of adequate domestic wells. Large-diameter bucket-rig wells are often successfully employed when other means of extracting seepage from limited or fine-grained deposits are not available.

Sand and gravel lenses, when present, are commonly less than 5 feet thick and may be confined within the glaciolacustrine deposits or directly overlie bedrock. The total thickness of unconsolidated materials overlying bedrock in this system can be as much as 80 feet where Beantlossom Creek joins the White River. However, the thickness typically ranges from 25 to 40 feet. This aquifer system is generally marked by surface deposits of silt and clay that have low susceptibility to surface contamination.

Norman Upland / Mitchell Plateau Till Aquifer Subsystem

The Norman Upland / Mitchell Plateau Till Aquifer Subsystem is mapped along two areas of northwestern Monroe County. This aquifer system is a limited resource, as evidenced by the lack of wells actually producing from the available unconsolidated deposits. However, the unconsolidated deposits overlying bedrock consist of dominantly pre-Wisconsin glacial till materials up to 195 feet thick. Potential aquifer materials within the glacial till include discontinuous mineral sand and gravel units. Also, drillers have reported more than one sand and gravel unit in deeper wells. These are sometimes described by well drillers as a mixture of "muck, sand, and gravel." Drillers often note water-bearing unconsolidated deposits, even though they complete the wells in bedrock. Sand and gravel deposits are reported up to 10 feet thick, or more, but are typically 3 to 5 feet thick.

Even though drillers bypass the unconsolidated deposits, preferring the underlying bedrock aquifer system, the potential certainly exists for completion of adequate domestic wells in this unconsolidated aquifer system. This aquifer system has thick deposits of pre-Wisconsin till that are dominantly clay and loam materials overlying the aquifer resource. The susceptibility to contamination is therefore low.

White River and Tributaries Outwash Aquifer System

The White River and Tributaries Outwash Aquifer System is located in the northwest corner of Monroe County near the confluence of White River and Beantlossom Creek. The system is made up of large volumes of outwash materials that were deposited within the White River valley by the retreating continental ice sheets.

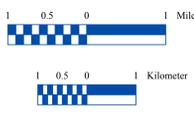
The outwash materials consist predominantly of sand and gravel deposits that may be overlain in some areas by thin clay and/or silt materials. This unconsolidated aquifer overlies bedrock and typically ranges from 70 feet to 90 feet in thickness.

Unfortunately, there are no known domestic or high-capacity wells completed in the Monroe County portion of the system. However, the town of Gosport, located in Owen County, has 3 wells completed in the aquifer system at depths of 50, 75, and 90 feet. Yields of up to 500 gpm have been reported. This aquifer system has the greatest potential of any aquifer system in Monroe County and can meet the needs of high-capacity water users. This aquifer system is highly susceptible to contamination in areas that lack overlying clay layers. Areas within the system that are overlain by thick layers of clay or silt are moderately susceptible to surface contamination.



EXPLANATION

- Input Karst Dye Test Point
- Output Karst Dye Test Point
- Karst Dye Trace
- State Road & US Highway
- Stream
- Approximate Southern Limit of Older Glacial Deposits
- Municipal Boundary
- DNR Managed Lands
- Federal Managed Lands
- Lake & River



Map Use and Disclaimer Statement

We request that the following agency be acknowledged in products derived from this map: Indiana Department of Natural Resources, Division of Water. This map was compiled by staff of the Indiana Department of Natural Resources, Division of Water using data believed to be reasonably accurate. However, a degree of error is inherent in all maps. This product is distributed "as is" without warranties of any kind, either expressed or implied. This map is intended for use only at the published scale.

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), County Boundaries of Indiana (polygon shapefile, 20050621), Selected Subsurface Dye Traces in Parts of Southern Indiana (line shapefile, 20000225), and Input and Detection Points for Selected Subsurface Dye Traces in Parts of Southern Indiana (point shapefile, 2001124) were all from the Indiana Geological Survey and based on a 1:24,000 scale, except for the Pre-Wisconsin Glacial Limit (polygon shapefile, 20100510) which is at a 1:500,000 scale. Structural Features of Indiana (line shapefile, 20020718) was also from the Indiana Geological Survey, but based on various scales. DNR road shapefiles, System1 and System2 (line shapefiles, 2003) were from the Indiana Department of Transportation and based on a 1:24,000 scale. City Areas in Southwestern Indiana (polygon shapefile, 1999) was from ESRI 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 (Maier, 2003, Modified 2010) was based on a 1:24,000 scale.

Unconsolidated Aquifer Systems of Monroe County, Indiana

by
Randal D. Maier
Division of Water, Resource Assessment Section
July 2003