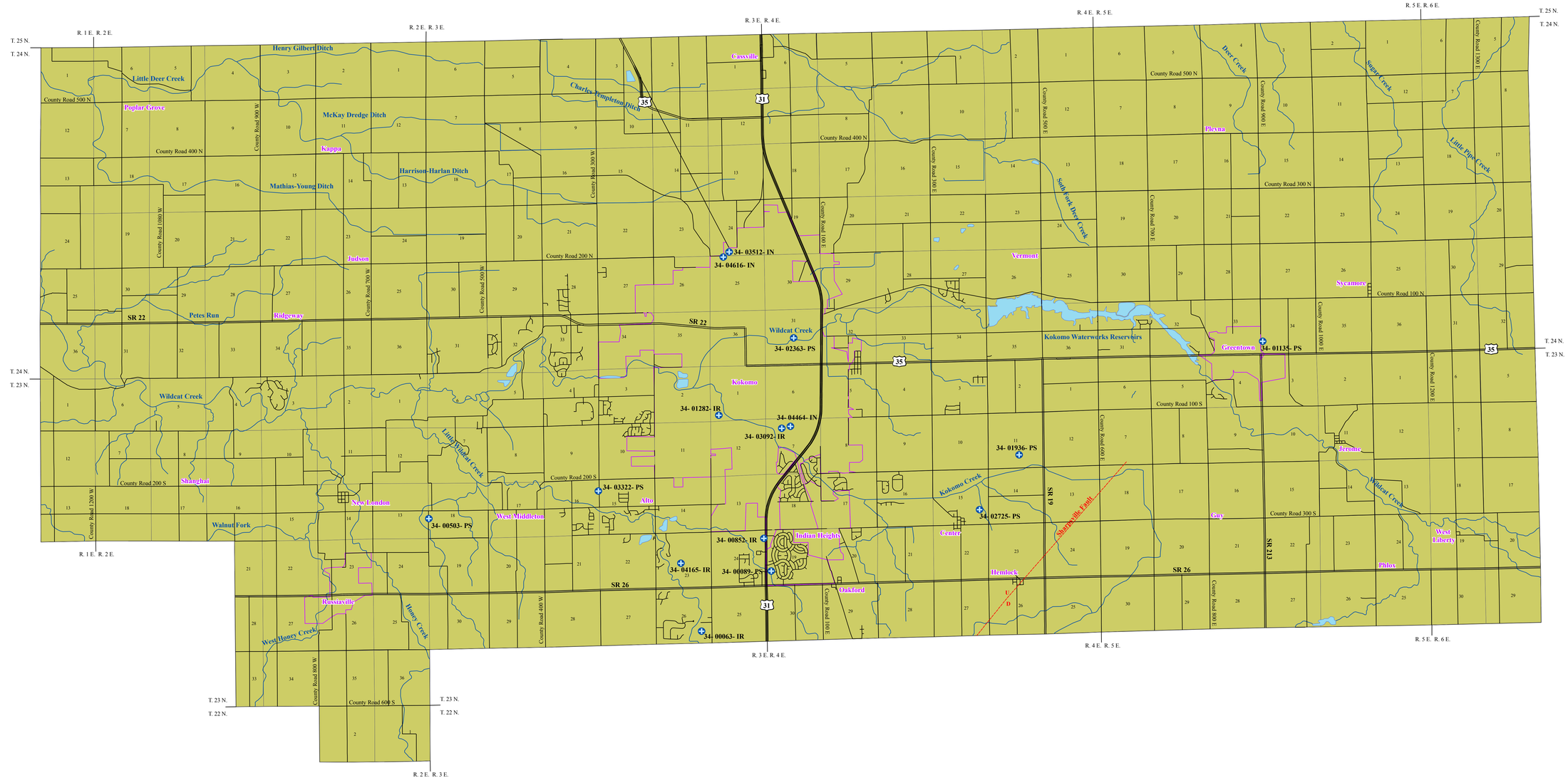
BEDROCK AQUIFER SYSTEMS OF HOWARD COUNTY, INDIANA



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.

One bedrock aquifer system is identified for Howard County: the Silurian and Devonian Carbonates. Rock types exposed at the bedrock surface include moderately productive to prolific limestones and dolomites with varying amounts of interbedded shale. Bedrock wells represent about 70 percent of all wells completed in this county. Most of the bedrock aquifers in Howard 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 Silurian and Devonian Carbonates Aquifer System in Howard County is overlain by unconsolidated deposits of varying thickness, ranging from 25 feet to over 250 feet. In general, the thickness of unconsolidated deposits increases from northeast to southwest. However, segments of the Wildcat Creek Valley are cut into bedrock.

The yield of a bedrock aquifer depends on its hydraulic characteristics and the nature of the overlying deposits. Shale and clay 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 extremely variable.

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

Silurian and Devonian Carbonates Aquifer System

The Silurian and Devonian Carbonates Aquifer System includes carbonate rock units (limestone and dolomite) with some interbedded shale units. In Howard County, the system consists of the Wabash formation of Silurian age and the Muscatatuck group of Devonian age. The total thickness of the Silurian and Devonian Carbonates Aquifer System in the county is over 850 feet.

Wells penetrating the Silurian and Devonian Carbonates Aquifer System in this county have reported depths ranging from 35 to over 500 feet, but are commonly 100 to 180 feet deep. The amount of rock penetrated in this system typically ranges from 5 to 10 feet.

Wells completed in the Silurian and Devonian Carbonates Aquifer System are capable of meeting the needs of domestic and some high-capacity users in this county. Domestic well yields commonly range from 15 to 50 gallons per minute (gpm). Static water levels typically range from 15 to 35 feet below the land surface. There are 15 registered significant ground-water withdrawal facilities (37 wells) using the Silurian and Devonian Carbonates Aquifer System in Howard County. Reported well yields for these facilities range from 70 to 1000 gpm. The uses are for public water supply, industry, and irrigation.

This aquifer system has a low susceptibility to surface contamination due to thick clay deposits over most of the county. However, the Silurian and Devonian Carbonate Aquifer System is moderately to highly susceptible to contamination where overlying clays are thin or absent.

INDIANA DEPARTMENT OF NATURAL RESOURCES

Location Map

N
W E
S

1 0.5 0 1 Mile

1 0.5 0 1 Kilometer

EXPLANATION

- Registered Significant Ground-Water Withdrawal Facility
- Stream
- Sharpsville Fault
- County Road
- State Road & US Highway
- Municipal Boundary
- Lake & River

Map generated by Scott H. Dean
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Map Use and Disclaimer Statement

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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, except the Bedrock Geology of Indiana (polygon shapefile, 20020318), which was at a 1:500,000 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. Structural Features of Indiana (line shapefile, 20020718) was from the Indiana Geological Survey and based on various scales.

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