UNCONSOLIDATED AQUIFER SYSTEMS OF OWEN COUNTY, INDIANA

Five unconsolidated aquifer systems have been mapped in Owen County: the Dissected Till and Residuum / Unglaciated Southern Hills and Lowlands; the Alluvial, Lacustrine, and Backwater Deposits; the Martinsville Hills / Crawford Upland / Mitchell Plateau Till Subsystem; the White River and Tributaries Outwash; and the White River and the Tributaries Outwash Subsystem. Boundaries of all aquifer systems described are commonly gradational, and individual aquifers may extend across aquifer system boundaries.

Thicknesses of unconsolidated sediments that overlie bedrock are quite variable in Owen County. Total thickness ranges from less than one foot where bedrock is shallow or outcrops along sections of tributaries to the White River, to an estimated 200 feet in the northwest part of the county where a major bedrock valley is present. Approximately 10 percent of all wells completed in the county are completed in unconsolidated deposits.

Regional estimates of aquifer susceptibility to contamination from the surface may 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 provide contaminant pathways that bypass the naturally protective clays.

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

The Dissected Till and Residuum / Unglaciated Southern Hills and Lowlands Aquifer System is mapped throughout Owen County and is mapped as one system because they are similar in composition and aquifer characteristics. The Dissected Till and Residuum Aquifer System is mapped throughout most of Owen County where glacial deposits are thin and, in some areas, may include weathered bedrock materials. The Unglaciated Southern Hills and Lowlands System areal extent is limited to the southeastern corner of Owen County where glacial deposits are absent.

Typical deposits for both systems include primarily clay that directly overlies bedrock. Thin (1 to 2 feet thick) fine-grained sands or gravels, although rare, may be present. Along some of the major streams this system may include thin alluvium and fine-grained surficial sands and gravels that directly overlie the bedrock surface.

There is little potential for groundwater production in this system in Owen County. Nearly all wells drilled in areas mapped as Dissected Till and Residuum / Unglaciated Southern Hills and Lowlands bypass the unconsolidated deposits in favor of the underlying bedrock aquifer system. However, a few wells in Owen County reportedly produce from this system. Reported yields generally range from 1 to 8 gallons per minute (gpm) and show significant to complete drawdown.

This aquifer system is generally not very susceptible to surface contamination because intertill sand and gravel units are overlain by till deposits. However, some areas have surface sands and gravels or thin to no clay deposits above the aquifer resource. These areas are considered at moderate to high risk to contamination.

Alluvial, Lacustrine, and Backwater Deposits Aquifer System

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

This system is an extremely limited resource and the Division has no records of wells that produce from these deposits in Owen County. However, large-diameter bucket wells may be adequate to meet the needs of some domestic users. Typical materials overlying bedrock include fine sand, silt, and clay deposits that are generally greater than 25 feet thick. Aquifer materials commonly include thin sand seams that are typically less than a few feet thick. In some isolated areas, however, these deposits are thicker. Yields are generally expected to be less than a few gpm.

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 the surficial clay deposits are thin and directly overlie sand deposits.

Martinsville Hills / Crawford Upland / Mitchell Plateau Till Aquifer Subsystem

The Martinsville Hills / Crawford Upland / Mitchell Plateau Till Aquifer Subsystem is mapped throughout portions of northern and eastern Owen County. This system typically consists of thick clay with discontinuous intertill sands and gravels. The discontinuous sands and gravels, where present, are generally less than 10 feet thick with some noted as "dry". Portions of this system include fine-grained lacustrine sand, silt and clay deposits.

In Owen County approximately 86 percent of the wells drilled in areas mapped as till subsystem are completed in the underlying bedrock aquifer system. However, the subsystem has the potential of meeting the needs of some domestic users. Well depths generally range from 20 to 156 feet. Where present, potential aquifer materials include sand and gravel deposits that generally range from 2 to 11 feet thick and are capped by 15 to 90 feet of till. In some isolated areas, greater thicknesses of sands and gravels have been reported.

The few wells that utilize the available sand and gravel deposits have yields that range from 5 to 30 gpm with static water levels of 10 to 180 feet below the surface. However, reported yields greater than 10 gpm are typically associated with significant to complete drawdown.

A portion of this system overlies part of a major buried bedrock valley that includes mixtures of lacustrine sand, silt, and clay. Unconsolidated deposits overlying bedrock are up to 215 feet with isolated thicknesses of sands and gravels up to 105 feet. Few unconsolidated wells are completed in these areas; however, those reported are up to 200 feet in depth. Thickness of aquifer deposits are generally less than 10 feet and are capped by thick clay. This area is capable of meeting the needs of domestic users. Reported well capacities range from 2 to 40 gpm with static water levels from 9 to 135 feet below surface.

This aquifer subsystem is generally not very susceptible to surface contamination because intertill sand and gravel units are overlain by thick till deposits. However, some areas have surface sands and gravels or thin to no clay deposits above the aquifer resource. These areas are considered at moderate to high risk to contamination.

White River and Tributaries Outwash Aquifer System

The White River and Tributaries Outwash Aquifer System includes thick glacial outwash sands and gravels capped by recent alluvial deposits. The system is mapped primarily in the southeast part of Owen County along the White River.

Total depth of wells completed in the White River and Tributaries Outwash Aquifer System range from 29 to 120 feet. In places, aquifer materials are up to 120 feet of continuous sand and gravel and may be capped by alluvial silt and/or clay materials that generally range from 3 to 26 feet thick.

The White River and Tributaries Outwash Aquifer System is capable of meeting the needs of domestic and high-capacity users. Domestic well capacities range from 10 to 60 gpm with static water levels from 10 to 34 feet below the ground surface. There are 2 registered significant groundwater withdrawal facilities (10 wells) with capacities that range from 160 to 1000 gpm.

Areas that lack overlying clay deposits are highly susceptible to contamination. However, where overlying clay deposits are present the system is moderately susceptible to surface contamination.

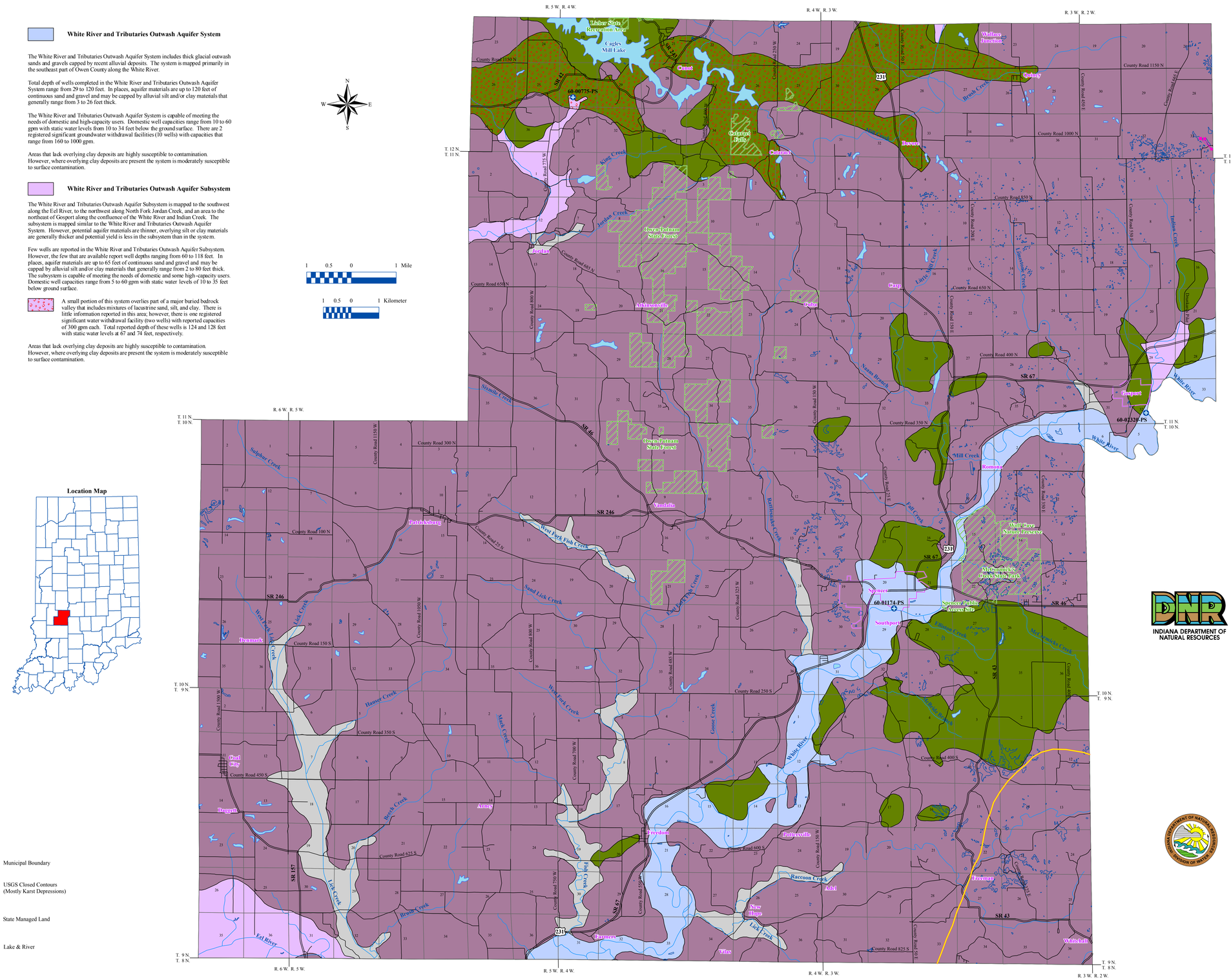
White River and Tributaries Outwash Aquifer Subsystem

The White River and Tributaries Outwash Aquifer Subsystem is mapped to the southwest along the Eel River, to the northwest along North Fork Jordan Creek, and an area to the northeast of Gosport along the confluence of the White River and Indian Creek. The subsystem is mapped similar to the White River and Tributaries Outwash Aquifer System. However, potential aquifer materials are thinner, overlying silt or clay materials are generally thicker and potential yield is less in the subsystem than in the system.

Few wells are reported in the White River and Tributaries Outwash Aquifer Subsystem. However, the few that are available report well depths ranging from 60 to 118 feet. In places, aquifer materials are up to 65 feet of continuous sand and gravel and may be capped by alluvial silt and/or clay materials that generally range from 2 to 80 feet thick. The subsystem is capable of meeting the needs of domestic and some high-capacity users. Domestic well capacities range from 5 to 60 gpm with static water levels of 10 to 35 feet below ground surface.

A small portion of this system overlies part of a major buried bedrock valley that includes mixtures of lacustrine sand, silt, and clay. There is little information reported in this area; however, there is one registered significant water withdrawal facility (two wells) with reported capacities of 300 gpm each. Total reported depth of these wells is 124 and 128 feet with static water levels at 67 and 74 feet, respectively.

Areas that lack overlying clay deposits are highly susceptible to contamination. However, where overlying clay deposits are present the system is moderately susceptible to surface contamination.



Location Map

EXPLANATION

- Registered Significant Ground-Water Withdrawal Facility
- Dye Test Input Point
- Dye Test Detection Point
- Karst Dye Trace
- Stream
- County Road
- State Road & US Highway
- Approximate Southern Limit of Older Glacial Deposits
- Municipal Boundary
- USGS Closed Contours (Mostly Karst Depressions)
- State Managed Land
- Lake & River

INDIANA DEPARTMENT OF NATURAL RESOURCES

INDIANA DEPARTMENT OF NATURAL RESOURCES DIVISION OF WATER

Map generated by Scott H. Dean
IDNR, Division of Water, Resource Assessment Section

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, 20001124), 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. 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, 2010) was based on a 1:24,000 scale.

Unconsolidated Aquifer Systems of Owen County, Indiana

by

Randal D. Maier
Division of Water, Resource Assessment Section

August 2010