UNCONSOLIDATED AQUIFER SYSTEMS OF LAKE COUNTY, INDIANA

The following is a summary of the availability of groundwater in Lake County and was derived from the Indiana Department of Natural Resources 1990 publication Water Resource Availability in the Kankakee River Basin, Indiana, and the Indiana Department of Natural Resources 1994 publication Water Resource Availability in the Lake Michigan Region, Indiana. Each report describes the availability, distribution, quality, and use of groundwater and surface water in the Kankakee River Basin and the Lake Michigan Region. The full reports can be viewed and downloaded at http://www.in.gov/dnr/water.

Unconsolidated deposits of glacial sands and gravels are the principle source of groundwater in Lake County. Five unconsolidated aquifer systems have been mapped in Lake County and defined on the basis of geologic environments and aquifer characteristics: the Calumet; the Kankakee; the Lacustrine Plain; the Valparaiso Moraine; and the Valparaiso Outwash Apron. Due to the availability of prolific unconsolidated aquifer systems and the extreme limitations of shale materials, the underlying bedrock is generally not used as an aquifer resource.

Calumet Aquifer System

The Calumet Aquifer System consists of fine-to medium-grained sand with dispersed lenses of gravel. Beds of interlaminated silt and clay, and deposits of peat and muck confine the aquifer in small areas across the county. This system is underlain by a relatively impermeable clay and till unit that in places exceeds 100 feet in thickness. Areas of subdued relief in the northern portion of the county have static water levels that are frequently less than 15 feet below the surface. Saturated thickness of the Calumet Aquifer System ranges from less than 5 feet along its southern extent to about 40 feet in areas containing broad water-table mounds.

The Calumet Aquifer has not been developed significantly because of its proximity to Lake Michigan, an abundant surface-water source. However, the aquifer system is utilized as a source of water by a few domestic and small commercial facilities. Domestic wells typically produce about 5 to 20 gallons per minute (gpm). There are 4 registered significant groundwater withdrawal facilities (13 wells) with yields ranging from 7 to 1130 gpm. The primary usage for these facilities is industrial. The aquifer is highly susceptible to surface contamination because there is no clay cap across most of the aquifer and a lack of clay separator beds.

Lacustrine Plain Aquifer System

The Lacustrine Plain Aquifer System consists of a series of aquifers present beneath the Calumet Lacustrine Plain. The individual aquifers consist of fine-to medium-grained glaciolacustrine and coastal sands capped by lacustrine clays or till. Thickness of individual aquifers frequently ranges from 7 to 90 feet, and averages about 24 feet. Depths to static water levels are highly variable in the many aquifers of the Lacustrine Plain Aquifer System. Domestic water wells in the Lacustrine Plain Aquifer System can typically produce about 5 to 20 gpm. There are 9 registered significant groundwater withdrawal facilities (21 wells) with yields ranging from 30 to 450 gpm. These facilities are used for irrigation, industry, and public supply. This aquifer system's susceptibility to contamination ranges from low to high, depending on the thickness of the surficial lacustrine clays and till.

Valparaiso Moraine Aquifer System

The Valparaiso Moraine Aquifer System consists of a heterogeneous layer of outwash sand and gravel with intermixed clay and silt lenses. The aquifer thickness ranges from about 10 to more than 130 feet, and lies about 10 to 100 feet beneath the surface of the Valparaiso Moraine; however, this aquifer system is unconfined in small isolated areas in the county where surficial tills are absent. Sand- and gravel-filled outwash channels of limited saturated thickness are present in Lake County. These coarse-grained and poorly-sorted outwash channel deposits have an average thickness of about 26 feet and directly overlie the major aquifer body. However, the channel deposits may be separated from the major aquifer by a 10- to 20-foot thick clay.

In parts of the Valparaiso Moraine Aquifer System, artesian conditions exist because the overlying till behaves as an aquitard. In parts of the county, water levels in the artesian wells completed in the aquifer system sometimes rise to the surface. However, static water levels are relatively deep, ranging from 25 to 80 feet below the surface.

Production from wells completed in the main aquifer body are commonly adequate for domestic use. Yields typically range from 10 to 25 gpm, although yields vary from 5 to 60 gpm. There are 11 registered significant groundwater withdrawal facilities (24 wells) with reported capacities ranging from 55 to 375 gpm. These facilities are used primarily for irrigation and public supply. The Valparaiso Moraine Aquifer System's susceptibility to surface contamination ranges from low to high, depending on the thickness of the till cap and the stratigraphy of the moraine.

Valparaiso Outwash Apron Aquifer System

This aquifer system, which forms the southern slope of the Valparaiso Moraine, is a deposit of fine- to medium-grained sand interbedded with gravel rich zones and clay lenses. The outwash apron is more than 100 feet thick in places.

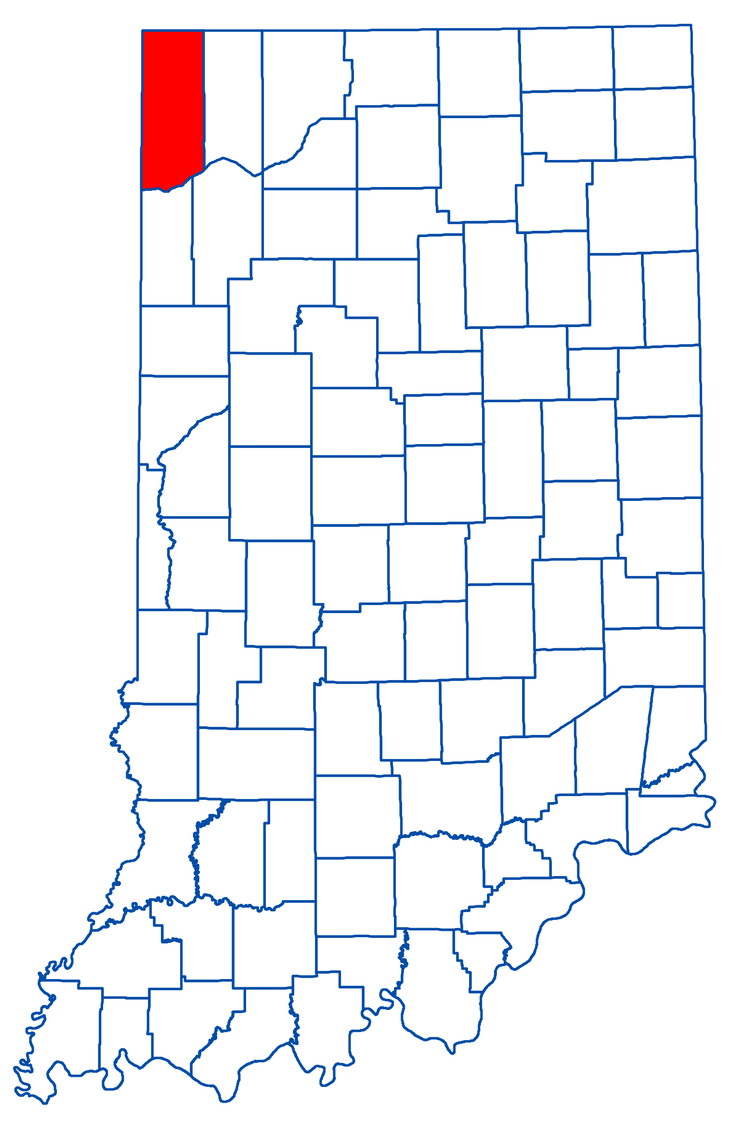
Most wells completed in the upper aquifer unit of the system have depths ranging from 30 to more than 100 feet. The wells completed in the lower aquifer unit of the system typically exceed 50 feet and may be more than 150 feet in depth. Static water levels are typically less than 20 feet deep, but at higher surface elevations, may exceed 40 feet. Yields in the upper and lower aquifer units are similar, ranging from 15 to 60 gpm for domestic wells. There are 4 registered significant groundwater withdrawal facilities (15 wells) with yields ranging from 62 to 1000 gpm. These facilities are used for irrigation and public supply. Because there is no clay rich cap, the aquifer system is highly susceptible to surface contamination.

Kankakee Aquifer System

The Kankakee Aquifer System is an unconfined deposit of fine-to medium-grained sand, which is interbedded with gravel lenses in the tributary valleys. The aquifer system thickness ranges from less than 20 feet where the unit overlies bedrock highs to more than 150 feet in tributary valleys. However, the thickness is about 30 feet in most areas.

Static water levels are shallow in the Kankakee River floodplain, and are typically less than 20 feet deep. Wells typically are shallow, and few exceed depths of 50 feet. However, in the tributary valleys, the depth to the water table may exceed 50 feet and well depths may exceed 150 feet. Domestic wells commonly produce from 15 to 50 gpm. There are 7 registered significant groundwater withdrawal facilities (14 wells) with yields ranging from 200 to 650 gpm. These facilities are used for irrigation. Because of the absence of clay deposits, the aquifer system is highly susceptible to surface contamination.

Location Map



1 0.5 0 1 Mile

1 0.5 0 1 Kilometer

EXPLANATION

- Registered Significant Ground-Water Withdrawal Facility
- Stream
- County Road
- State Road & US Highway
- Interstate
- Basin Boundary
- Municipal Boundary
- State Managed Property
- National Park Service Managed Property
- Lake & River

INDIANA DEPARTMENT OF NATURAL RESOURCES

Map generated by Scott H. Dean, January 2010
IDNR, Division of Water, Resource Assessment Section

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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 shape file, various dates) was from IDNR. Unconsolidated Aquifer Systems coverage was from IDNR (Water Resource Availability in the Lake Michigan Region, Indiana, 1994, and Water Resource Availability in the Kankakee River Basin, Indiana, 1990) and based on a 1:48,000 scale.

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by

Division of Water

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