Unconsolidated Aquifer Systems of Porter County, Indiana

by
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The following is a summary of the availability of groundwater in Porter 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 Porter County. Five unconsolidated aquifer systems have been mapped 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. Static water levels in the Calumet Aquifer System vary accordingly to surface elevation. Areas of subdued relief in the northwestern portion of the county have static water levels that are frequently less than 15 feet below the surface. However, static water levels can be as much as 100 feet below the crests of high dunes in the northern portion of the county. Ponds and marshes in the interdunal depressions define areas where the water-table intersects the ground surface. Saturated thickness of the Calumet Aquifer System ranges from less than 5 feet along its southwestern extent to about 40 feet in areas containing broad water-table mounds.

The Calumet Aquifer System 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 (22 wells) with yields ranging from 100 to 200 gpm. The usage for each of 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 this system. Domestic water wells in the Lacustrine Plain Aquifer System can typically produce about 5 to 20 gpm. There are 6 registered significant groundwater withdrawal facilities (9 wells) with yields ranging from 50 to 200 gpm. These facilities are used for irrigation 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 western Porter 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 the north-central part of the county, the outwash is laterally extensive and exceeds 100 feet in thickness.

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 14 registered significant groundwater withdrawal facilities (27 wells) with reported capacities ranging from 25 to 1000 gpm. These facilities are used primarily for irrigation, industry, 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.

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 usually 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 usually produce from 15 to 50 gpm. There are 22 registered significant groundwater withdrawal facilities (54 wells) with yields ranging from 100 to 800 gpm. These facilities are used for irrigation and public supply. Because of the absence of clay deposits, the aquifer system is highly susceptible to surface contamination.

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 shale rich gravel zones and clay lenses scattered throughout the apron. 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 15 registered significant groundwater withdrawal facilities (35 wells) with yields ranging from 7 to 800 gpm. These facilities are used primarily for irrigation, industry, rural use, and public supply. Because there is no clay rich cap, the aquifer system is highly susceptible to surface contamination.

Registered Significant Groundwater Withdrawal Facilities

There are 61 registered significant groundwater withdrawal facilities (147 wells) using unconsolidated aquifers in the county. These wells utilize the Calumet, Kankakee, Lacustrine Plain, Valparaiso Moraine, and Valparaiso Outwash Apron System aquifer systems. Reported capacities for individual wells range from 7 to 1000 gpm. The uses for these facilities are public water, industry, rural use, and irrigation. Refer to the table for additional well details, and to the map for facility locations.

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