

# **Unconsolidated Aquifer Systems of Elkhart County, Indiana**

by  
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The following is a summary of the availability of groundwater in Elkhart County and was derived from the Indiana Department of Natural Resources 1987 publication Water Resource Availability in the St. Joseph River Basin, Indiana, and the Indiana Department of Natural Resources 1990 publication Water Resource Availability in the Kankakee River Basin, Indiana. Each report describes the availability, distribution, quality, and use of groundwater and surface water in the St. Joseph River Basin, and the Kankakee River Basin. 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 Elkhart County. Four unconsolidated aquifer systems have been mapped and defined on the basis of geologic environments and aquifer characteristics. They are: the Howe Outwash Aquifer System, the Nappanee Aquifer System, the Natural Lakes and Moraines Aquifer System, and the St. Joseph Aquifer System and Tributary Valleys. 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.

## **Howe Outwash Aquifer System**

The Howe Outwash Aquifer System occurs in the northeastern corner of Elkhart County. The prevailing character of this aquifer system is moderately thick near surface sand and gravel deposits that overlie an altered till plain. The near surface outwash deposits are the most extensive granular deposits in this system and vary from 15 to 135 feet in thickness. Within the underlying till sequence, clay zones alternate with sand and gravel layers. These sand and gravel layers average 5 to 25 feet in thickness, although some localized lenses reach thicknesses of 100 feet. The tops of the sand and gravel lenses characteristically occur between 780 to 805 feet mean sea level (msl) in Elkhart County. Two or more sand and gravel deposits often occur at depth within the till sequence, but are only continuous locally. This is an area with good to excellent groundwater availability (100 to 1200 gallons per minute (gpm)). However, there are no registered significant groundwater withdrawal facilities utilizing this system in Elkhart County. The surficial deposits are highly susceptible to contamination and the deeper sand and gravels are moderately so.

## **Nappanee Aquifer System**

This aquifer system is composed of interbedded medium to coarse sand and gravel zones contained within a thick till sequence. The individual layers of sand and gravel range from 3 to

10 feet in thickness. Individual aquifers thicken locally to 30 feet or more but are seldom more than one to two square miles in area. It is not uncommon to have two or more of the aquifer units at an approximate elevation of 750 feet msl. In the Millersburg area this cluster occurs at an elevation of about 780 to 800 feet msl and commonly thickens at the boundary where it blends into the outwash deposits of the major stream and valleys. This aquifer system is present under the glacial till plain in western Elkhart County. This is an area of moderate to good groundwater availability (50 to 600 gpm). There are 27 registered significant groundwater withdrawal facilities (39 wells) with yields from 30 to 1300 gpm. This system, exclusive of areas where surficial gravel is present, is moderately susceptible to contamination.

### **Natural Lakes and Moraines Aquifer System**

The Natural Lakes and Moraines Aquifer System contains two potential sand and gravel aquifers, one near the surface, the other at depth. The surface and near surface aquifers vary from 10 to 50 feet in thickness and typically occur within 100 feet of the ground surface. These surface sand and gravel layers are often continuous over many square miles and may be related to the thick surficial outwash deposits to the west. Often, the near surface aquifers are directly connected to areas of surficial sands and gravels and thus are more prone to contamination than are the deeper sand and gravel aquifers.

The deeper sand and gravel aquifers of the Natural Lakes and Moraines Aquifer System are more variable in depth and thickness, and typically occur as discontinuous lenses and layers below a thick clay layer. They are usually 10 to 30 feet thick and occur at depths of 100 feet or more. Because these deeper sands and gravels occur below or within thick clays, they are less susceptible to surface contamination. Most of the wells in the Natural Lakes and Moraines Aquifer System are completed at shallower depths. This is an area of irregular, but generally good groundwater availability (25 to 800 gpm). There are 30 registered significant groundwater withdrawal facilities (58 wells) with yields from 70 to 2000 gpm. The system, exclusive of surficial and near surface sand and gravel, is moderately susceptible to contamination.

### **St. Joseph Aquifer System and Tributary Valleys**

The St. Joseph Aquifer System is composed of fine to medium sand with zones of coarse sand and gravel. Interspersed within these deposits are thin clay or till units of limited areal extent. Locally at Elkhart, thick clay deposits are present below the surface sands and gravels. These clay or till units extend, in places, close to the bedrock surface. The St. Joseph Aquifer System varies from 20 feet near the southern boundary of the St. Joseph River Basin to approximately 400 feet thick over the buried bedrock valley at the western edge of Elkhart County. Numerous high capacity industrial, municipal, and irrigation wells obtain water from this aquifer which constitutes one of the major aquifer systems in the state. This aquifer system is generally an area of excellent groundwater availability (100 to 1500 gpm) and is highly susceptible to groundwater contamination. There are 121 registered significant groundwater withdrawal facilities (239 wells) with high-capacity yields from 70 to 2260 gpm.

The Tributary Valleys Aquifer System is similar to the main stem St. Joseph Aquifer System, but often contains coarser outwash deposits. In the vicinity of Goshen these deposits exceed 150 feet in thickness. In the Little Elkhart River Valley and northwest of Goshen in the Elkhart River Valley the surficial outwash ranges up to 60 feet in thickness. This unit is underlain by a thick clay/till which in turn is underlain by a sand and gravel aquifer ranging up to 50 feet in thickness. The deeper aquifers are utilized by Goshen, Middlebury, and many industrial concerns. This area exhibits good to excellent groundwater availability (100 to 1000 gpm). The surficial sand and gravel deposits of this system are highly susceptible to contamination and the deeper aquifers are slightly susceptible.

In northwestern Elkhart County, this area is contained within the St. Joseph Aquifer System and is composed of thick clay deposits which are overlain by surficial outwash sand and gravel deposits. The clay deposits extend to bedrock in several places, but commonly will contain thin zones of sand and gravel prior to encountering the bedrock surface. Well depths are quite erratic in this area. This area is of minor groundwater availability (0 to 50 gpm). There are 3 registered significant groundwater withdrawal facilities (19 wells) with yields from 75 to 807 gpm. The aquifer is moderately susceptible to groundwater contamination.

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