

# **Orange County Unconsolidated Aquifer Systems**

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Two unconsolidated aquifer systems have been mapped in Orange County: the Dissected Till and Residuum Aquifer System and the Alluvial, Lacustrine, and Backwater Deposits Aquifer System. The first system does not include any glacial till, but it does include typically thin, clay-rich residuum (a product of bedrock weathering). The second aquifer system comprises sediments primarily resulting from weathering, erosion, and depositional processes. Because glaciers did not cover Orange County most of these sediments are local in origin. These sediments occur in present-day stream valleys.

The description of the unconsolidated aquifer systems is somewhat general in nature because there is not a large amount of information available. The Division of Water has no records of wells completed in these aquifers due to the low population density, limited amount of unconsolidated material in the county, and the limited productivity of the aquifers.

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

## **Dissected Till and Residuum Aquifer System**

The Dissected Till and Residuum Aquifer System, which covers most of Orange County, has the most limited ground-water resources of the unconsolidated aquifer systems in the county. Unconsolidated materials of the Dissected Till and Residuum Aquifer System consist primarily of thin, eroded residuum. Also included are small areas of alluvium, colluvium, and eolian (wind-blown) silt and sand, primarily along the edges of the Lost River and Patoka River valleys. Some alluvium in the upper reaches of stream valleys is included as well. Clay, in places mixed with some silt and sand, is the predominant material in the Dissected Till and Residuum Aquifer system.

Because the unconsolidated materials covering the bedrock are so thin in most places, the aquifer elevations closely match the elevation of the bedrock surface. The bedrock surface varies in elevation from about 420 feet above mean sea level (m.s.l.) near the Lost River at the western edge of Orange County to as much as 950 feet m.s.l. in the southeast part of the county. Moreover, because this aquifer system is so thin, nearly all wells in the area are completed in bedrock.

The Division has no records of drilled or bored (bucket-rig) wells in this aquifer system. Although a few such wells may exist, their yields would likely be very low. The overwhelming majority of the area of this aquifer system exhibits little or no potential for successful wells. Some old dug wells probably still exist, but their yields would also be quite low.

The Dissected Till and Residuum Aquifer System is transected by the Alluvial, Lacustrine, and Backwater Deposits Aquifer System. The boundary between these two systems is well defined except at the upper ends of the latter aquifer system within the stream valleys.

Because of the low permeability of unconsolidated materials of the Dissected Till and Residuum Aquifer System, it is not very susceptible to contamination from sources located at or near land surface.

### **Alluvial, Lacustrine, and Backwater Deposits Aquifer System**

The Alluvial, Lacustrine, and Backwater Deposits Aquifer System is made up of deposits in the valleys of Lost River, Patoka River, and their larger tributaries. These deposits include alluvium deposited by the streams along with colluvium eroded from the valley walls and upland areas. Deposits may also include glaciolacustrine materials, primarily soft silt and clay, that were formed in bodies of relatively stagnant lake water. These lake deposits were formed when the major valleys of the Wabash River and the White River were choked with coarser outwash material carried by glacial meltwater. Thick deposits of this outwash effectively dammed tributary streams, such as Lost River and Patoka River, creating lakes that may have extended as far upstream as western Orange County.

The total thickness of unconsolidated deposits (mostly clay and silt) in this aquifer system varies considerably, from less than 20 feet up to 50 feet, and perhaps more at the western county line. Where present, permeable sand or gravel zones would typically be only a few feet thick. It is unlikely that there are many productive areas in this aquifer system because of a general lack of clean sand or gravel deposits. The few wells drilled in the area of this aquifer system (for which the Division has records) were completed in the underlying bedrock. Expected depths of any wells potentially completed in this aquifer system would typically be less than 40 feet. Expected static water levels would typically be 10 to 20 feet below land surface and expected yields would be 0 to 5 gallons per minute (gpm). A bored (bucket-rig) well would generally be much more successful than a drilled well in this aquifer system.

This aquifer system is marked by deposits of soft silt and clay that have low susceptibility to surface contamination.

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