

AQUIFER SENSITIVITY TO CONTAMINATION KANE COUNTY, ILLINOIS

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2007

Aquifer Sensitivity

This map was produced as a part of Kane County *Water Resources Investigations: Final Report on Geologic Investigations* (Dey et al. 2007b) and is a refined version of a previous map (Dey et al. 2004). The report and maps are part of a contract report for the project entitled *Water-Resources Investigation for Kane County, Illinois* (Meyer et al. 2002). This map depicts the relative potential for aquifers within 100 feet of land surface to become contaminated from sources of pollution at or near the ground surface. The method for classifying aquifer sensitivity used in this map is based upon work by Berg (2001). Aquifers are defined as geologic materials that are saturated and sufficiently permeable to yield economic quantities of water to wells or springs (Fetter 1994). In Kane County, shallow aquifers are generally composed of un lithified sand and gravel or bedrock units of fractured carbonates.

For this map, sand and gravel deposits were defined as aquifers in areas where the deposits were greater than 5 feet thick (35 Ill. Adm. Code 620.210) and extended over an area of at least one square mile. Carbonate bedrock of Silurian age was defined as an aquifer where it is the uppermost bedrock unit and is greater than 15 feet thick (35 Ill. Adm. Code 620.210). The Silurian rock tends to be heavily fractured at its upper surface (Graese et al. 1988). Geologic materials that would be classified as an aquifer but are above the water table (and therefore not saturated) were grouped with aquifers in the interpretation for this map, because they still provide a hydraulic conduit for the vertical flow of water and potential contaminants. Glacial diamicton (an unsorted mixture of gravel, sand, silt, and clay, commonly called till), windblown silt (loess), peat, and silty and clayey river and lake sediment, shale, and unfractured carbonate bedrock are not considered aquifers because they are generally fine-grained and have limited potential to yield water to a well. Aquifers with an upper surface deeper than 100 feet were not considered sensitive to contamination in this analysis. This map was produced by combining isopachs (thickness maps) of aquifer materials with maps indicating depth to the uppermost surface of those materials. Both the isopach and depth maps were generated from the three-dimensional geologic model of Kane County (Abert et al. 2007).

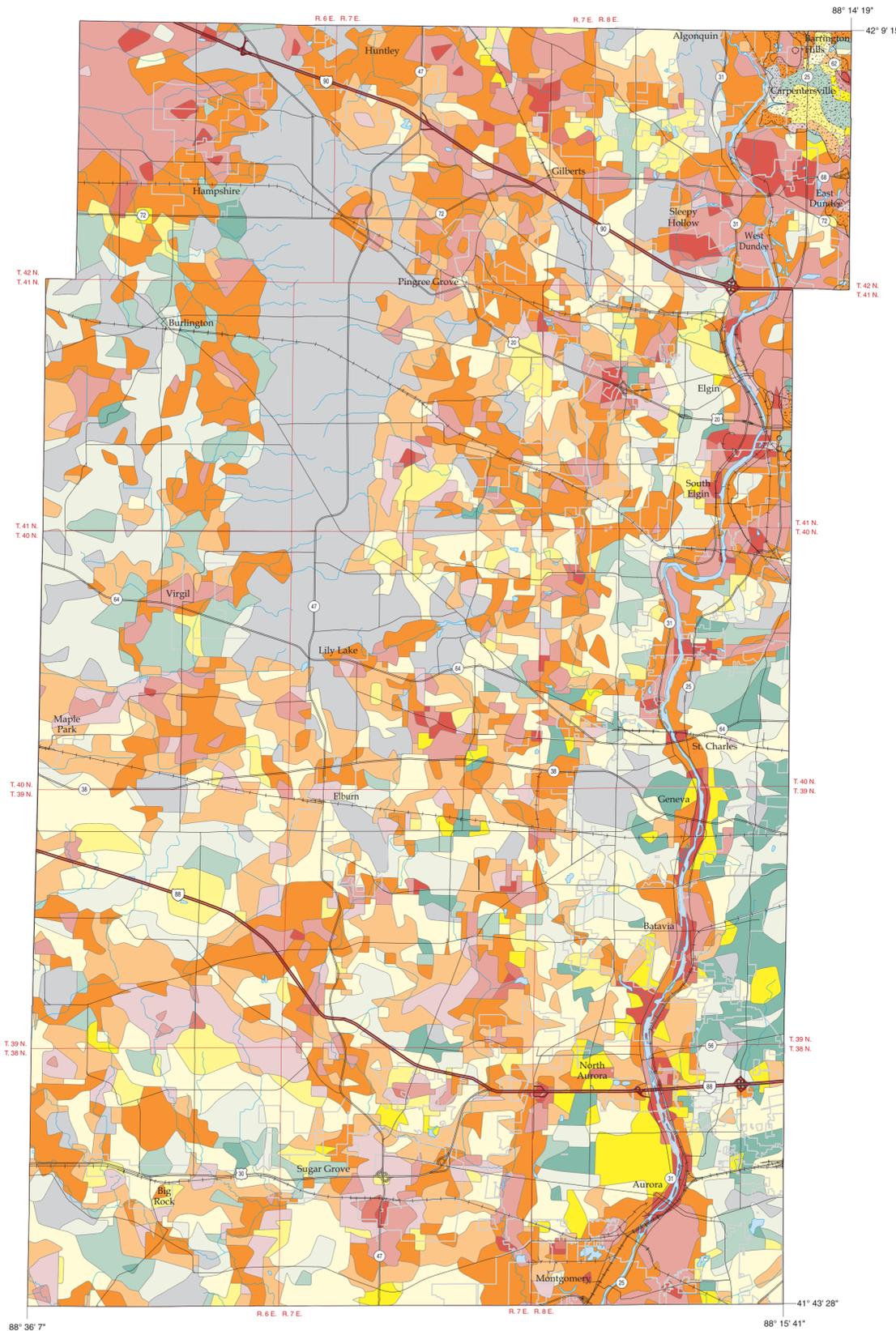
Applications

A distinction is made between the definition of aquifers used in creating this map and the map *Major Quaternary Aquifers, Kane County, Illinois* (Dey et al. 2007a). The latter defined major aquifers as sand and gravel deposits capable of yielding 70 gallons per minute to a well completed in that deposit. This map identifies aquifers as thin as 5 feet in thickness and within 100 feet of the land surface. The aquifers depicted in this map may be a conduit to or a component of a major aquifer.

This map is intended to be used for county-scale planning and is based on generalized textural properties and assumptions about hydraulic characteristics of geologic materials and hydraulic gradients. It is not based on results from water quality tests or groundwater flow analysis. Because of generalizations used in preparing the map, any mapped unit may contain small areas of greater or lesser aquifer sensitivity to contamination. This map should not be used as a substitute for individual site evaluations.

References

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- Meyer, S.C., D.D. Walker, S.M. McConkey, W.S. Dey, B.B. Curry, C.C. Abert, and E. Mehnert, 2002. Water-resources investigations for Kane County, Illinois: Illinois State Water Survey and Illinois State Geological Survey, A proposal to Kane County Development Department, 55 p.



Aquifer Sensitivity Classification

Map Unit A: High Potential for Aquifer Contamination

The upper surface of the aquifer is within 20 feet of the land surface and the aquifer is greater than 20 feet thick.

- A1** Aquifers are greater than 50 feet thick and are within 5 feet of the land surface.
- A2** Aquifers are greater than 50 feet thick and are between 5 and 20 feet below the land surface.
- A3** Aquifers are between 20 and 50 feet thick and are within 5 feet of the land surface.
- A4** Aquifers are between 20 and 50 feet thick and are between 5 and 20 feet below the land surface.

Map Unit B: Moderately High Potential for Aquifer Contamination

The upper surface of the aquifer is within 20 feet of the land surface and the aquifer is less than 20 feet thick.

- B1** Sand and gravel aquifers are between 5 and 20 feet thick, or high-permeability bedrock aquifers are between 15 and 20 feet thick, and either aquifer type is within 5 feet of the land surface.
- B2** Sand and gravel aquifers are between 5 and 20 feet thick, or high-permeability bedrock aquifers are between 15 and 20 feet thick, and either aquifer type is between 5 and 20 feet below the land surface.

Map Unit C: Moderate Potential for Aquifer Contamination

Aquifers are between 20 and 50 feet below the land surface, and the overlying material is fine grained.

- C1** Aquifers are greater than 50 feet thick and are between 20 and 50 feet below the land surface.
- C2** Aquifers are between 20 and 50 feet thick and are between 20 and 50 feet below the land surface.
- C3** Sand and gravel aquifers are between 5 and 20 feet thick, or high-permeability bedrock aquifers are between 15 and 20 feet thick, and either aquifer type is between 20 and 50 feet below the land surface.

Map Unit D: Moderately Low Potential for Aquifer Contamination

Upper surfaces of sand and gravel or high-permeability bedrock aquifers are between 50 and 100 feet below the land surface, and the overlying material is fine grained.

- D1** Aquifers are greater than 50 feet thick and are between 50 and 100 feet below the land surface.
- D2** Aquifers are between 20 and 50 feet thick and are between 50 and 100 feet below the land surface.
- D3** Sand and gravel aquifers are between 5 and 20 feet thick or high-permeability bedrock aquifers are between 15 and 20 feet thick and either aquifer type is between 50 and 100 feet below the land surface.

Map Unit E: Low Potential for Aquifer Contamination

Aquifers are greater than 100 feet below the land surface, and the overlying material is fine grained.

- E1** Sand and gravel or high-permeability bedrock aquifers are not present within 100 feet of the land surface.

Haeger Diamicton at the Land Surface

The overprint pattern indicates areas where the Haeger diamicton is at the land surface. Diamicton of the Haeger Member of the Lemont Formation is a sandy loam and contains abundant, discontinuous lenses of sand and gravel. The presence of this diamicton over an aquifer does not offer the same potential protection from contamination as an equal thickness of finer-grained diamicton. Areas with the pattern have higher sensitivity to contamination than areas without the pattern.

 Haeger diamicton at the land surface

-  Interstate highways
-  U.S. and state routes
-  Other roads
-  Railroads
-  Rivers and lakes
-  Municipal boundaries



Released by the authority of the State of Illinois: 2007

Recommended citation:
Dey, W.S., A.M. Davis, and B.B. Curry, 2007. Aquifer Sensitivity to Contamination, Kane County, Illinois: Illinois State Geological Survey, Illinois County Geologic Map, ICGM Kane-AS, 1:100,000.



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TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN
DECLINATION, 2007

Geology based on field work by W.S. Dey, A.M. Davis, and B.B. Curry, 2002-2007.

Digital cartography by A.M. Davis and W.S. Dey, Illinois State Geological Survey.

This research was partially supported by Kane County under Contract No. 02-279.

Base map compiled from the United States Geological Survey 1:100,000-scale Digital Line Graph data. North American Datum 1983. Transverse Mercator projection.

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