Illinois Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
William W. Shilts, Chief

Illinois County Geologic Map
ICGM Kane-QA

MAJOR QUATERNARY AQUIFERS

KANE COUNTY, ILLINOIS

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2007

Major Quaternary Aquifers

Introduction

Elements of the three-dimensional model were used to produce *Major Quaternary Aquifers of Kane County, Illinois* (Dey et al. 2007e), replacing the *Interim Major Quaternary Aquifers of Kane County, Illinois* (Dey et al. 2005b). On the new map, four aquifers are renamed to coincide with local geographic features. The definition of one renamed aquifer is adjusted to include additional lithostratigraphic units based on the current geologic model.

In Illinois, major aquifers are defined as geologic units (sand and gravel or fractured and/or permeable bedrock) capable of yielding at least 70 gallons of water per minute (gpm) to wells completed in them (Miller et al. 1985). Quaternary aquifers in Kane County are saturated thick sand and gravel deposits. Sand and gravel deposits are considered aquifer materials, because their porosity and hydraulic conductivity is high and allow for the free flow of water. Aquifer materials are aquifers when they are saturated. We have mapped the distribution of Quaternary aquifer materials in the county and have used results from potentiometric surface mapping by the ISWS to determine where the aquifer materials are or may be saturated (Locke and Meyer 2007). Our map depicts the location of deposits of Quaternary aquifer materials that have the potential to meet the definition of major aquifer. The mapped units are greater than 50 feet thick at some points within their distribution and are several square miles in areal extent. Boundaries are shown where the aquifer thickness is 20 feet or greater. The thickness is an aggregate thickness of sand and gravel deposits within the mapped unit and not necessarily the thickness of any one lithostratigraphic unit. Any properly constructed well that is sited where one of the mapped combinations of aquifers materials have a saturated thickness of greater than 20 feet should have a high probability of producing greater than 70 gpm of water, assuming minimal influence from other pumping wells or aquifer boundaries.

Mapped Aquifers

Following the descriptions of Curry and Seaber (1990), Vaiden and Curry (1990) mapped four Quaternary aquifers that had the potential for development as public water supplies in Kane County. Working from these definitions and employing results from the current mapping effort, we have identified five major, named Quaternary aquifers and a group of unnamed major Quaternary aquifers.

1. The St. Charles aquifer, named for the St. Charles Bedrock Valley, is located in the valley and its tributaries in eastern and southern Kane County. The St. Charles aquifer is composed of the Ashmore Tongue of the Henry Formation and sand and gravel deposits of the Glasford Formation (fig. 1). These units are in hydraulic contact in a large portion of the mapped area of the aquifer. In the northern half of the county, away from the Fox River, the aquifer is commonly more than 50 feet below the land surface. In the Fox River valley, the aquifer is commonly less than 20 feet below the land surface. The aquifer has some hydraulic connection to the Fox River in the vicinity of St. Charles.

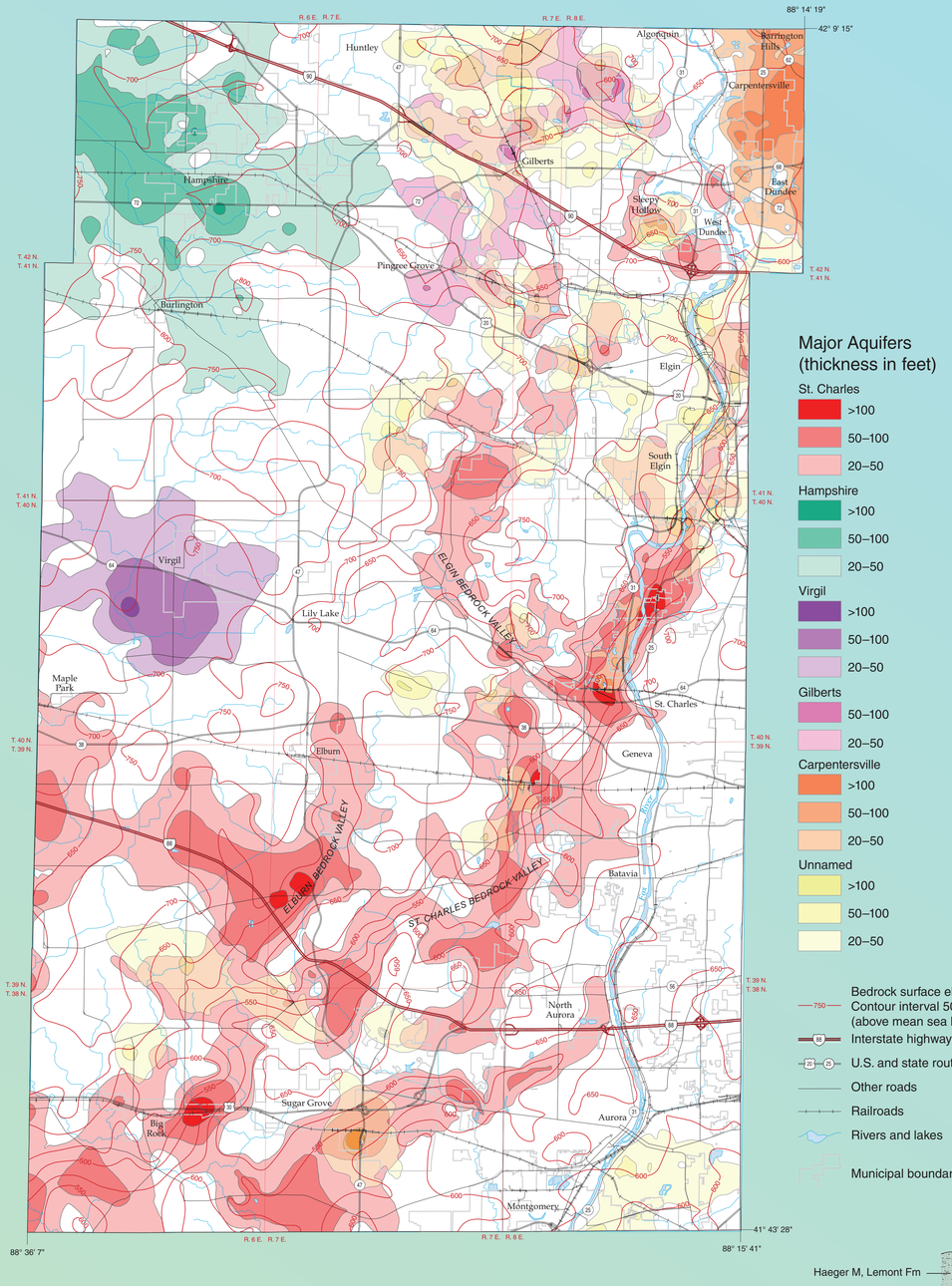
2. The Hampshire aquifer, named for the village of Hampshire, is located west of the Marengo Moraine in northwestern Kane County. The Hampshire aquifer is composed of the Ashmore Tongue of the Henry Formation and sand and gravel deposits of the Glasford Formation. Surficial sand and gravel of the Henry Formation are included in areas where the Tiskilwa Formation is absent north and west of Hampshire (fig 2). These coarse-textured units are all in hydraulic contact northwest of Hampshire where the aquifer is unconfined. Where the Tiskilwa Formation is present (south and east of Hampshire), the aquifer is probably under confined conditions. The Ashmore Tongue and Glasford sand and gravel deposits are in hydraulic contact in the area around Burlington.

3. The Virgil aquifer, named for the town of Virgil, is located in west-central Kane County. It is composed of the Ashmore Tongue of the Henry Formation and sand and gravel deposits of the Glasford Formation (fig. 1). These coarse-textured units are in hydraulic contact near the center and eastern portion of the aquifer. The aquifer is overlain by greater than 20 feet of Tiskilwa Formation and is 50 to 200 feet below the land surface.

4. The Gilberts aquifer, named for the town of Gilberts, is located in north-central Kane County. It is composed of the Ashmore Tongue of the Henry Formation and sand and gravel deposits of the Glasford Formation (fig 1. The Gilberts aquifer is overlain by 50 to greater than 100 feet of Tiskilwa Formation and is 125 to 250 feet below the land surface.

5. The Carpentersville aquifer, named for the town of Carpentersville, is located in northeastern Kane County. The Carpentersville aquifer is composed of the surficial sand and gravel deposits of the Henry Formation, the Beverly Tongue of the Henry Formation, the sub-Batestown and sub-Yorkville tongues of the Henry Formation, the Ashmore Tongue of the Henry Formation, and sands and gravels deposits of the Glasford Formation (fig. 3). All of these coarse-textured units have some hydraulic connection in the mapped extent of the aquifer in Kane County or to the east in Cook County. The upper sand and gravel units in the aquifer may not be fully saturated; therefore, the mapped thickness may be overestimated

6. The unnamed aquifers are composed of surficial sand and gravel of the Henry Formation and/or the sub-Batestown and sub-Yorkville tongues of the Henry Formation (fig. 1). These units lack the continuity of a single aquifer, but locally may meet the definition of major aquifer. Water level data in the units constituting these aquifers is sparse, making generalized assessment of their saturated thickness difficult to assess.



SCALE 1:100,000

1 0 1 2 3 4 5 6 7 8 MILES

1 0 1 2 3 4 5 6 7 8 9 10 KILOMETERS

Released by the authority of the State of Illinois: 2007

ADJACENT COUNTIES
1 McHenry
2 Lake
3 Cook
4 DuPage
5 Will
6 Kendall
7 DeKalb

APPROXIMATE MEAN DECLINATION, 2007

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

ISGS Illinois State Geological Survey

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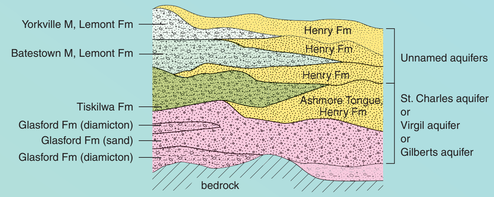

Figure 1 Schematic diagram of the St. Charles, Virgil, Gilbert and unnamed aquifers. The St Charles, Hampshire, Virgil, and Gilberts aquifers share most of the same hydrostratigraphic units, but there is enough geographic separation between them to consider them separate aquifers.

Application

The Major Quaternary Map (Dey et al. 2007) shows areas where there is a high probability of obtaining greater than 70 gpm from a properly constructed well finished in one of the mapped aquifers. Areas where the aquifers are close to or greater than 100 feet thick are recommended as locations to begin searching for sites for shallow high-capacity wells. The Major Quaternary Aquifers, Kane County, Illinois (Dey et al. 2007) is intended to be used for county-scale planning and as guide to exploration for developing shallow groundwater resources. This map should not be used as a substitute for site-specific work. The map is available at http://www.isgs.uiuc.edu/maps-data-pub/icgm/pdf-files/kane_co_qa_icgm.pdf .

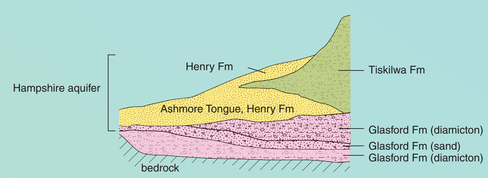

Figure 2 Schematic diagram of the Hampshire aquifer.

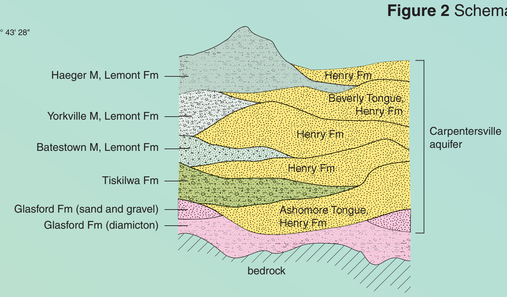

Figure 3 Schematic diagram of the Carpentersville aquifer.

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