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

BEDROCK GEOLOGY
KANE COUNTY, ILLINOIS

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2007

Illinois County Geologic Map
ICGM Kane-BG

Introduction

This map was produced as a part of *Kane County Water Resources Investigations: Final Report on Geologic Investigations* (Dey et al. 2007) and is a refined version of two previous maps (Dey et al. 2004, 2005). The report and maps are part of a contract report for a project titled *Water-Resources Investigations for Kane County, Illinois* (Meyer et al. 2002). The purpose of this map is to present the characteristics of the bedrock surface of Kane County. The bedrock geology consists of the bedrock topography (the shape of the bedrock surface) and lithostratigraphy (the type of bedrock material that constitutes the uppermost bedrock unit).

Bedrock Topography

The bedrock topography identifies the landscape of the bedrock surface and the location of the major bedrock valleys. These bedrock valleys commonly contain sand and gravel aquifers and are locations where groundwater in the bedrock may recharge groundwater in the drift (Gilkeson et al. 1987). The bedrock surface topography was compiled with data from the project database for logs of 4,045 primary wells that intersect the bedrock surface. Portions of the bedrock surface elevation and the locations of the deepest parts of the buried bedrock valleys were estimated in places using seismic refraction methods (Heigold 1990). Bedrock surface elevation estimates generated from seismic refraction data are generally within 20 feet of the actual bedrock surface elevation as determined by subsequent test drilling (Gilkeson et al. 1987, Curry and Seaber 1990). Because of this uncertainty, seismic reflection data were used mainly in areas of sparse data. The map was constructed using 1,672 seismic data points along with data from the primary wells. In addition, 28 data points were used to define where bedrock outcrops at the land surface. Distribution of the data used to map the bedrock topography can be seen in the accompanying report (Dey et al. 2007). Bedrock elevation values from all data sources were interpolated to create the bedrock surface (Dey et al. 2005). Fifty-foot contour intervals describing that surface are depicted on the map.

Bedrock Lithostratigraphy

The bedrock lithostratigraphy was interpreted from a compilation of stratigraphic assignments of bedrock units made by Illinois State Geological Survey (ISGS) staff. A majority of these stratigraphic assignments were compiled by ISGS staff (Kolata and Graese 1983, Graese et al. 1988) during previous site investigations. Other stratigraphic assignments were from well records in the project database. The lithostratigraphy for this map was delineated using 928 borings with stratigraphic assignments (Dey et al. 2007). The stratigraphy was simplified into six units: the Silurian System, undivided; the Maquoketa Group, the Galena and Platteville Groups combined, the Ancel Group, the Prairie du Chien Group in the Ordovician System; and the Cambrian System, undivided. However, only Silurian, Maquoketa, and Galena-Platteville rocks occur at the bedrock surface. The reported uppermost occurrences of each unit were used to produce a surface that defined the upper extent of that unit. The upper surface of the next lower unit defines the bottom of each unit. This method produced a distribution and thickness for each bedrock unit in the study area. For example, figure 1 shows the thickness of the Silurian age rock. The upper fractured portion of the Silurian dolomites and the Ancel (Ordovician) and Ironton (Cambrian) sandstones are the principal bedrock aquifers in Kane County. The Galena-Platteville Groups and dolomitic facies of the Maquoketa Group may be used for small-volume water supplies (Graese et al. 1988).

Application

This map can be used to identify the uppermost bedrock units and the locations of major bedrock valleys. Some important Quaternary aquifers, such as the St. Charles aquifer, are associated with bedrock valleys. As with all maps at a scale of 1:100,000, the map should not be used as a substitute for site-specific work.

References

Curry, B.B., and P.R. Seaber, 1990, Hydrogeology of shallow groundwater resources, Kane County, Illinois: Illinois State Geological Survey, Contract/Grant Report 1990-1, 37 p.

Dey, W.S., A.M. Davis, C.C. Abert, B.B. Curry, and J.C. Sieving, 2005, Kane County water resources investigations: Interim report on three-dimensional geologic modeling: Illinois State Geological Survey, Open File Series 2005-6, 50 p.

Dey, W.S., A.M. Davis, B.B. Curry, D.A. Keefer, and C.C. Abert, 2007, Kane County water resources investigations: Final report on geologic investigations: Illinois State Geological Survey, Contract Report (in press).

Dey, W.S., A.M. Davis, B.B. Curry, and J.C Sieving, 2004, Preliminary map of bedrock geology, Kane County, Illinois: Illinois State Geological Survey, Illinois Preliminary Geologic Map, IPGM Kane-BG, 1:100,000.

Dey, W.S., A.M. Davis, B.B. Curry, and J.C Sieving, 2005, Interim map of bedrock geology, Kane County, Illinois: Illinois State Geological Survey, Illinois Preliminary Geologic Map, IPGM Kane-BG, 1:100,000.

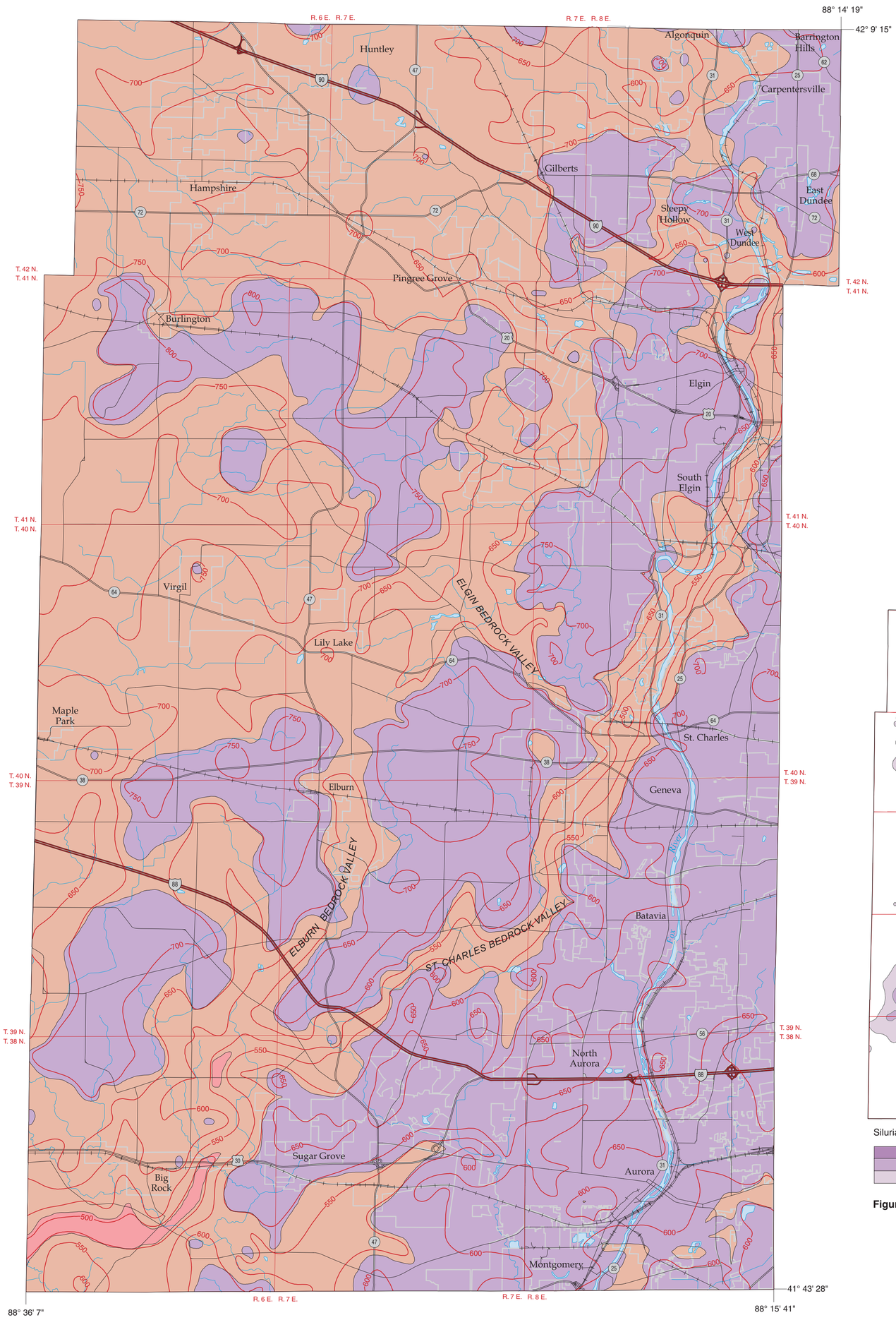
Gilkeson, R.H., S.S. McFadden, D.E. Laymon, and A.P. Visocky, 1987, Hydrogeologic evaluation of groundwater resources in buried bedrock valleys, northeastern Illinois: Proceedings of the Focus Conference on Midwestern Ground Water Issues, National Water Well Association, p. 145–167.

Graese, A.M., R.A. Bauer, B.B. Curry, R.C. Vaiden, W.G. Dixon, Jr., and J.P. Kempton, 1988, Geological-geotechnical studies for siting the Super-conducting Super Collider in Illinois: Regional summary: Illinois State Geological Survey, Environmental Geology Notes 123, 100 p.

Heigold, P.C., 1990, Seismic reflection and seismic refraction surveying in northeastern Illinois: Illinois State Geological Survey, Environmental Geology 136, 52 p.

Kolata, D.R., and A.M. Graese, 1983, Lithostratigraphy and depositional environments of the Maquoketa Group (Ordovician) in northern Illinois: Illinois State Geological Survey, Circular 528, 49 p.

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.



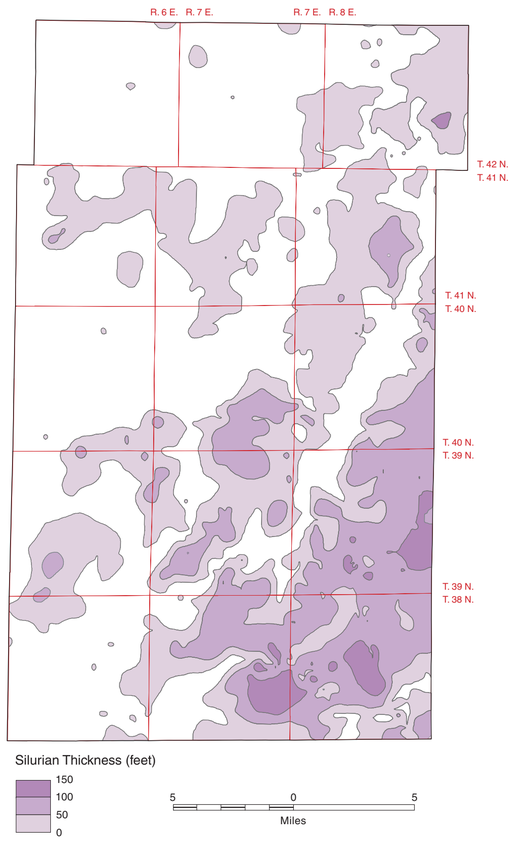


Figure 1 Thickness of Silurian dolostone. Scale is 1:250,000.

LITHOSTRATIGRAPHY

- Silurian System
  - Silurian undifferentiated (dolostone)
- Ordovician System
  - Maquoketa Group (shale and dolostone)
  - Galena-Platteville Groups (dolostone)

- 750 — Bedrock surface elevation Contour interval 50 feet (above mean sea level)
- Interstate highways
- U.S. and state routes
- Other roads
- Railroads
- Rivers and lakes
- Municipal boundaries

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

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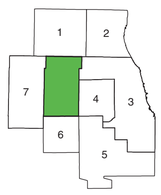

ADJACENT COUNTIES
1 McHenry
2 Lake
3 Cook
4 DuPage
5 Will
6 Kendall
7 DeKalb

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.

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