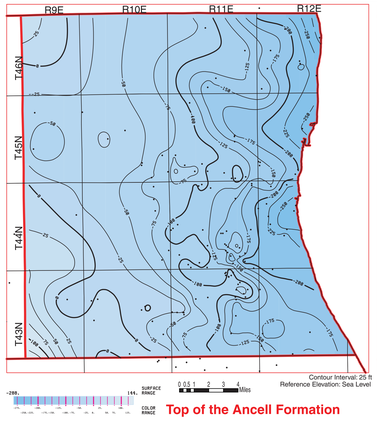
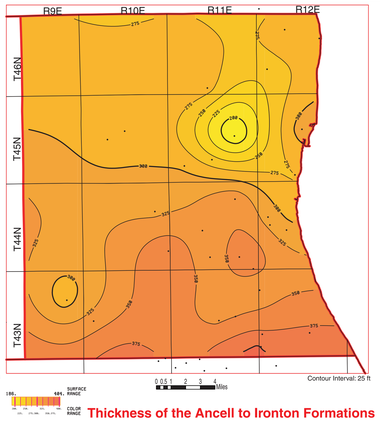
3-D Visualization of Bedrock Resources in Lake County, Illinois

(Sheet 2 of 2) Open File Series 2003-12

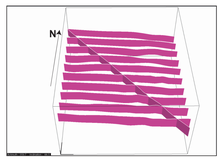


Top of the Ancell Formation

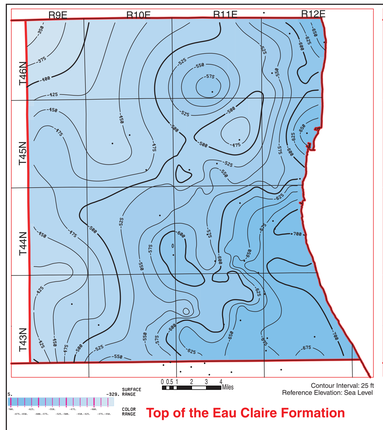


Thickness of the Ancell to Ironton Formations

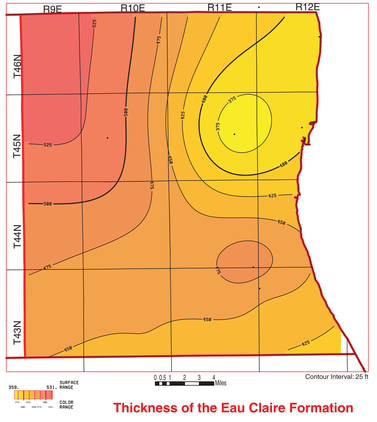
Ancell Formation
In Lake County, the Ancell consists primarily of medium-grained St. Peter Sandstone. It is a moderately important groundwater resource, but its permeability and yield are not as high as the underlying Ironton-Galesville or Mt. Simon Sandstones.



3-D Representation of the Thickness of the Ancell Formation to Ironton Formation

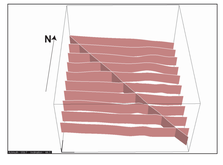


Top of the Eau Claire Formation



Thickness of the Eau Claire Formation

Eau Claire Formation
The Eau Claire consists of a silty, argillaceous dolomitic sandstone. It is an important aquitard that separates the underlying Mt. Simon from the Ironton-Galesville.



3-D Representation of the Thickness of the Eau Claire Formation

This presentation includes the following:

1. Landsat 7 Satellite Image - Obtained on September 6, 1999, from Panchromatic channel of the L7 Thematic Mapper sensor.

2. Land Surface Topography - The land surface throughout Lake County and surrounding areas of northeastern Illinois was shaped by advancing and retreating glaciers mainly during the past 20,000 years. Glacial deposits of clay, silt, sand, and gravel cover the Silurian bedrock. The sand and gravel locally forms productive aquifers whereas the clay and silt tends to impede the movement of water.

3. Bedrock Topography and Geology - The sea level elevation of the top of bedrock is derived from drill-hole records. The bedrock surface in Lake County lies on top of Silurian dolomite formations and below unconsolidated glacial deposits.

4. Structure Contours - This series of maps shows lines of equal sea-level elevations for selected bedrock units including the (1) Maquoketa, (2) Galena (Trenton), (3) Ancell, (4) Ironton-Galesville, (5) Eau Claire, and (6) Mt. Simon.

5. Thickness (isopach) Contours - These maps show lines of equal thickness for the (1) Silurian dolomite formations, (2) Maquoketa, (3) Galena and Platteville, (4) base of the Ancell to the top of the Ironton-Galesville, (5) Ironton-Galesville, and (6) Eau Claire.

6. Cross Sections - Landmark's Zmap+ and Stratamodel software were used to construct the fence diagrams of selected bedrock units.

7. 3-D Block Diagrams - This series of diagrams was also prepared with Landmark Zmap+ and Stratamodel software and shows individual block models of the (1) Silurian dolomite formations undifferentiated, (2) Maquoketa, (3) Galena-Platteville, (4) Ancell, (5) Ironton-Galesville, and (6) Eau Claire.

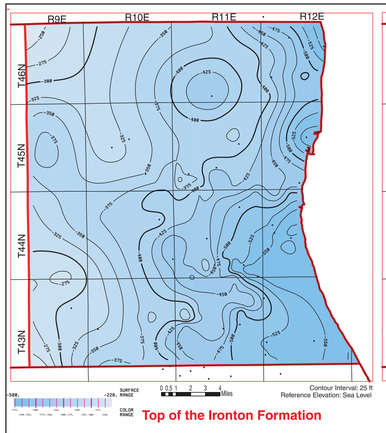
8. Stratigraphic column shows lithologic symbols, thicknesses, and lithostratigraphic and chronostratigraphic nomenclature.

References

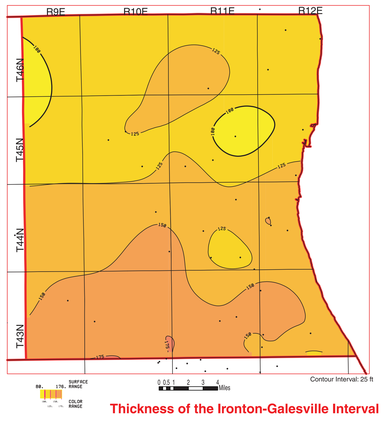
Bushbach, T.C., 1964, Cambrian and Ordovician strata of northeastern Illinois: Illinois State Geological Survey, Report of Investigations 218, 90 p.

Hughes, G.M, P. Kraatz, and R.A. Landon, 1966, Bedrock aquifers of northeastern Illinois: Illinois State Geological Survey, Circular 406, 15 p.

Larsen, J.I., 1973, Geology for planning in Lake County, Illinois: Illinois State Geological Survey, Circular 481, 43 p.

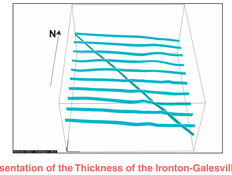


Top of the Ironton Formation

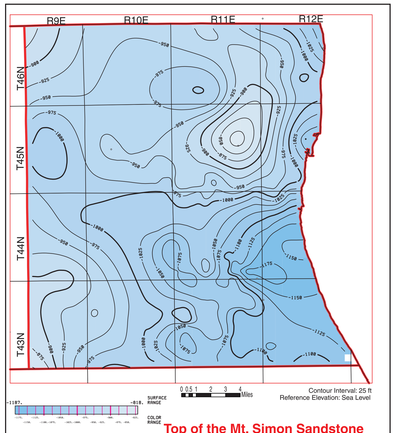


Thickness of the Ironton-Galesville Interval

Ironton-Galesville
The Ironton-Galesville consists of clean, medium- to coarse-grained, partly dolomitic sandstone and has the most consistently high permeability values of all bedrock units in northeastern Illinois. It is the most important bedrock aquifer in the county and municipal wells can obtain relatively large water supplies with high flow rates.



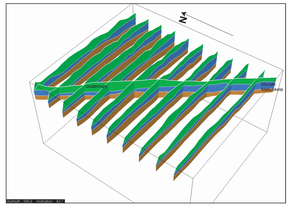
3-D Representation of the Thickness of the Ironton-Galesville Interval s



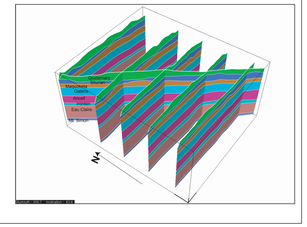
Top of the Mt. Simon Sandstone

Mt. Simon Sandstone
The Mt. Simon is the deepest aquifer in the county and consists of nearly 2,000 feet of fine- to coarse-grained sandstone. The water quality diminishes with depth.

Cross sections through the uppermost stratigraphic units in Lake County. The Quaternary and Silurian are important aquifers for residential use.



Cross sections through stratigraphic units in Lake County illustrating the morphology of important aquifers and aquitards.



Acknowledgments

Curtis Abert, Donald Luman, and Christopher McGarry helped to develop this series of maps. Part of the mapping was done using Landmark Graphics software as part of the Landmark University Grant program to the University of Illinois at Champaign-Urbana.