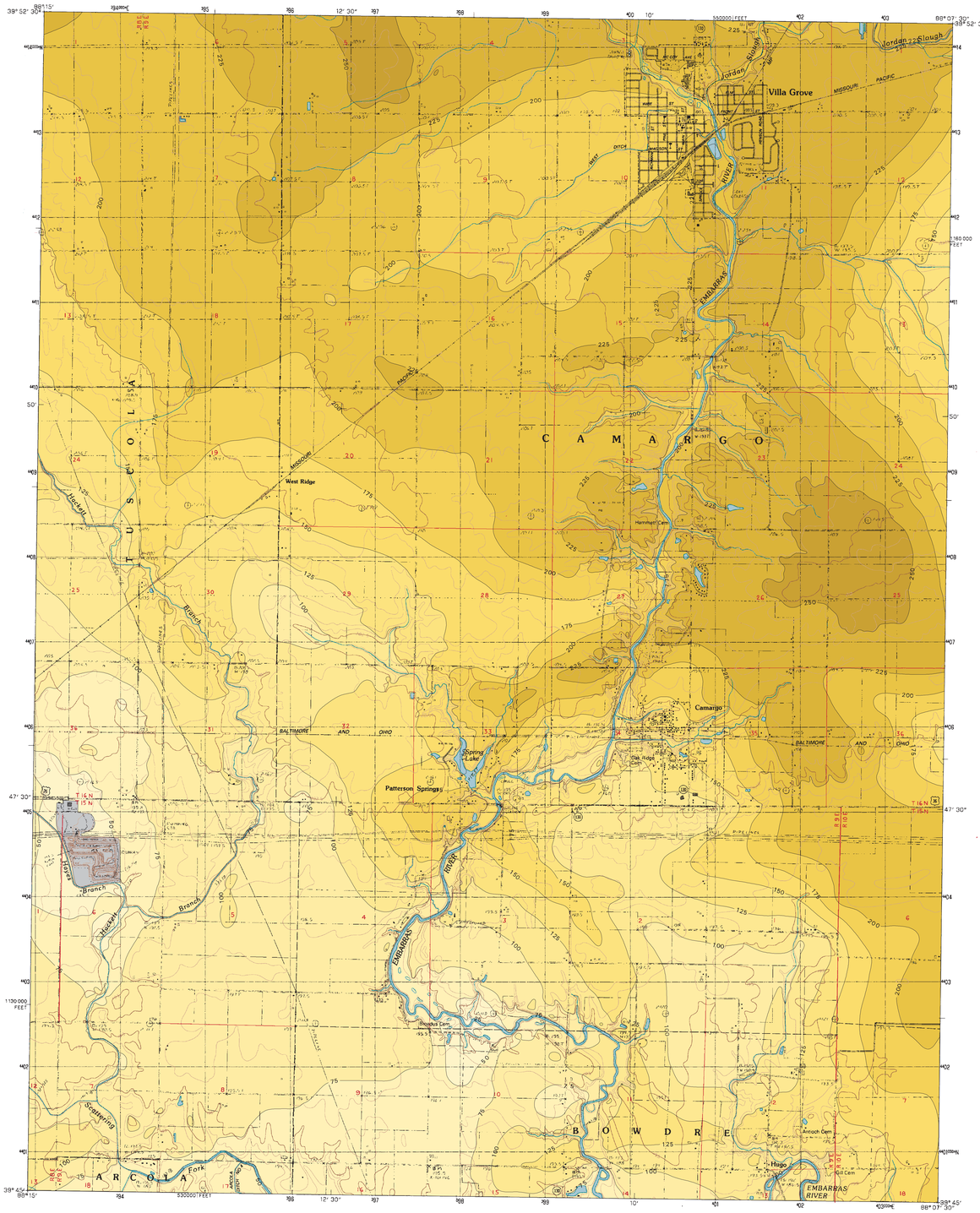
Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
Illinois Geologic Quadrangle Map: IGQ Villa Grove-DT
William W. Shilts, Chief
1999

DRIFT THICKNESS MAP

Villa Grove Quadrangle, Douglas County, Illinois

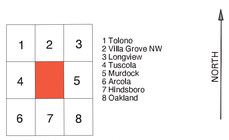
C. Pius Weibel and Curtis C. Abert



Scale 1:24,000

0 2 miles
0 2 kilometers
0 2000 feet

BASE MAP CONTOUR INTERVAL 1.5 METERS
Base map compiled at the Illinois State Geological Survey (ISGS)
from Digital Raster Graphic data (1982) provided by the U.S. Geological Survey.
1927 North American datum
Universal Transverse Mercator projection - Zone 16



1 Tolono
2 Villa Grove NW
3 Longview
4 Tuscola
5 Murdock
6 Arcola
7 Hindsboro
8 Oakland

ADJOINING 7.5-MINUTE QUADRANGLES

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ILLINOIS STATE GEOLOGICAL SURVEY
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Map Explanation

This isopachous map depicts the thickness of unlithified, Quaternary (Pleistocene and Holocene) sediments that have been deposited over the bedrock. The thickness also includes the modern soil that has developed on these sediments. Most of the variation in the thickness of the Quaternary material is caused by the irregular surface of the underlying bedrock (Figures A and B). This buried bedrock surface was largely formed during the early and middle Pleistocene when it was eroded by a regional river drainage system (Kempton and others, 1991). The modern land surface is relatively flat, but the effects of recent incision by the Embarras River and its tributaries are readily discernible on the drift isopachs, as well as on the modern topographic surface. Several glacial moraines occur in the quadrangle (Figure C), but their effect on the drift thickness is far outweighed by the influence of the bedrock topography. Overall, the material is thickest (over 250 feet) in the east-central part of the quadrangle and near the north-central edge (Figure D). It is thinnest (less than 25 feet) in two areas, near the quarry in the west-central part and in the south-central part (Figure E). Most of the material was deposited during the Pleistocene Epoch when the region was subjected to multiple advances and retreats of continental glaciers. The material came from many sources; some material was eroded from nearby outcrops of rock (at the time), and some was eroded from areas as far away as eastern Canada. Diamicton, deposited by the glaciers, is the prevalent lithology of the Quaternary material, but gravel, sand, silt, and clay deposited by fluvial, lacustrine, deltaic, and aeolian processes are also present. These sediments occur in layers and in lenses, some of which exceed thicknesses of 50 feet (for additional details, see Hansel and others, 1999).

Map Use

This map provides information that is useful in searching for sand and gravel layers and aquifers in the Quaternary deposits. Sand and gravel deposits are often important aquifers and commonly occur in buried bedrock valleys where the drift is thick. The map can be used by well drillers and geophysical surveys to predict the depth to bedrock. In addition, knowledge of the thickness of the drift is an important factor for determination of the costs of removing shallow, economically significant deposits (coal, limestone, and dolomite) from within the bedrock.

Mapping Methods

The map was produced using Dynamic Graphics Inc.'s EarthVision software to calculate the difference between digital grids of elevations of the bedrock surface (from Weibel, 1999) and elevations of the land surface (USGS topographic data). The resultant drift thickness grid was contoured using EarthVision and converted to an exportable format. Environmental Systems Research Institute, Inc.'s Arc/Info software was used for a final refining of the contours and for the overall compilation of the map. Weibel (1999) included a map displaying locations of data used to derive the digital grid of the bedrock surface (Figure F); this distribution also is relevant to the reliability of this isopachous map.

References

Hansel, A. K., R. C. Berg, and C. C. Abert, 1999, Surficial Geology Map, Villa Grove Quadrangle, Douglas County, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle IGQ Villa Grove- SG, map scale 1:24,000.

Kempton, J. P., W. H. Johnson, P. C. Heigold, and K. Cartwright, 1991, Mahomet bedrock valley in east-central Illinois—Topography, glacial drift stratigraphy and hydrogeology, *in* W. N. Melhorn and J. P. Kempton, editors, Geology and hydrogeology of the Teays-Mahomet Bedrock Valley System: Geological Society of America Special Paper 258, p. 91–124.

Piskin, K., and R. E. Bergstrom, 1975, Glacial Drift in Illinois—Thickness and Character: Illinois State Geological Survey, Circular 490, 35 p.

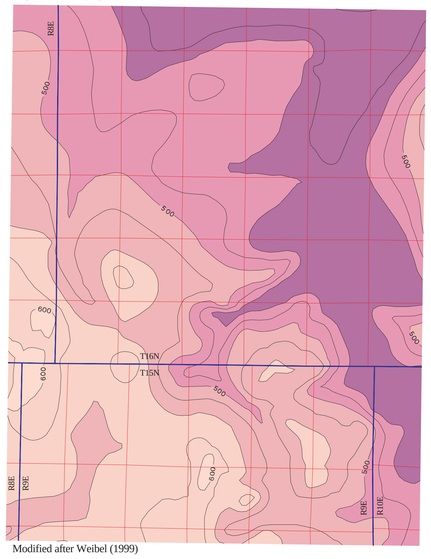
Weibel, C. P., 1999, Topographic Map of Bedrock Surface, Villa Grove Quadrangle, Douglas County, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle IGQ Villa Grove-BT, map scale 1:24,000.

Willman, H. B., and J. C. Frye, 1970, Pleistocene Stratigraphy of Illinois: Illinois State Geological Survey, Bulletin 94, 204 p.

Thickness of Drift
Contour Interval 25 feet

- Less than 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 125
- 125 - 150
- 150 - 175
- 175 - 200
- 200 - 225
- 225 - 250
- Greater than 250
- Quarry
- Water

Figure A. Topographic Map of the Bedrock Surface



Modified after Weibel (1999)

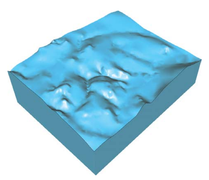
0 1 2 3 4 Miles
0 1 2 3 4 Kilometers

Scale 1:62,500

Elevation Datum Mean Sea Level
Contour Interval 25 feet

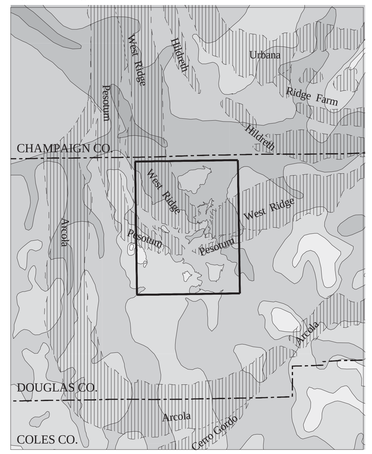
- Less than 450
- 450 - 500
- 500 - 550
- 550 - 600
- Greater than 600

Figure B. 3-Dimensional View of the Bedrock Surface



View from the southeast towards the northwest. The bedrock surface consists of Paleozoic strata ranging in age from Middle Devonian to Middle Pennsylvanian. Vertical exaggeration 25X.

Figure C. Regional Drift Thickness



Villa Grove Quadrangle outlined by rectangle. Glacial moraines are designated by names. Modified after Piskin and Bergstrom (1975) and Willman and Frye (1970).

Figure D. 3-Dimensional View of Drift Thickness, Viewed from the Southeast

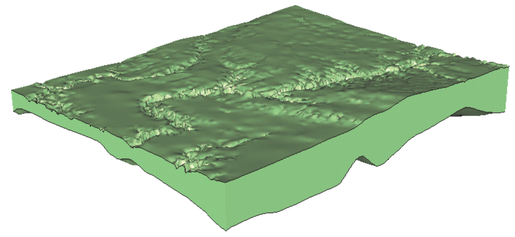


Figure E. 3-Dimensional View of Drift Thickness, Viewed from the Northwest

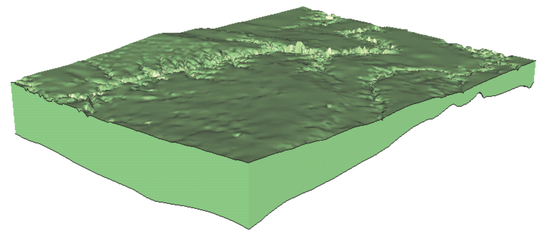


Figure F. Well Data Distribution