George H. Ryan, Governor

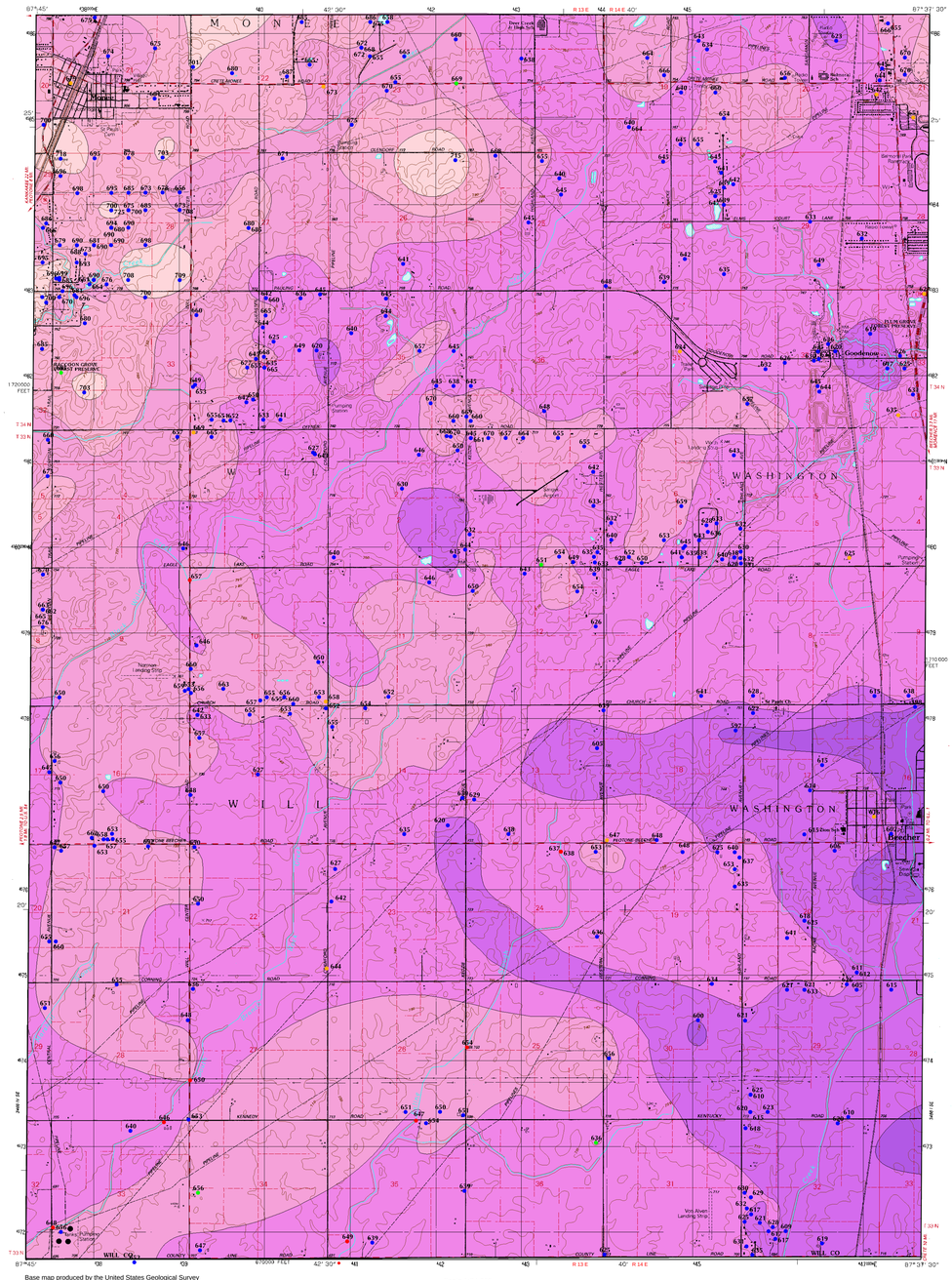
Department of Natural Resources
Brent Manning, Director
ILLINOIS STATE GEOLOGICAL SURVEY
Illinois Geological Quadrangle Map: IGQ Beecher West-Steger-BT-DT
William W. Shilts, Chief
2001

BEDROCK TOPOGRAPHY AND DRIFT THICKNESS MAPS

Northern Beecher West and Southern Steger 7.5-minute Quadrangles
Will County, Illinois

D. A. Grimley, B. B. Curry, and D. M. Kulczycki

Bedrock Topography



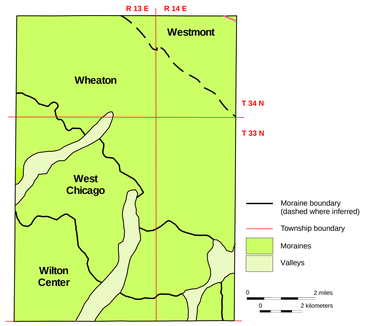


Figure 1 Glacial moraines in mapped portions of the quadrangles. Moraines in the mapped area (after Willman and Frye 1970) are indicated in green. All moraines, except the Wilton Center, are part of the Valparaiso Morainic System (Willman and Frye 1970). The West Chicago and Wheaton Moraines, in particular, are clearly associated with bands of thicker glacial drift. The boundary between the Westmont and Wheaton moraines is not clearly distinguished in the mapped area.

Bedrock Topography

Bedrock surface elevations in the mapped area range from about 590 to 720 feet. Thus, the total relief of the bedrock surface, underlain primarily by Silurian-age dolomite (Willman et al. 1967), is about 130 feet. The topography of the bedrock surface slopes gently to the southeast; highest elevations occur in the northwestern portion of the mapped area and lowest elevations in the southeast. High bedrock elevations mapped in the area are concordant with a regional bedrock high (Abert et al. 1993a; Herzog et al. 1994) that is associated with a buried escarpment of resistant Silurian dolomite that rims the southern end of Lake Michigan. This regional high formed the drainage divide in northeastern Illinois that separates low-lying bedrock of the Lake Michigan basin to the north from the Teays-Mahomet Bedrock Valley to the south (Herzog et al. 1994). Lower bedrock elevations in the southeastern portion of this map confirm the statewide map of Herzog et al. (1994), which shows small bedrock valleys directed eastward from this area into northwestern Indiana.

The Silurian bedrock high in northeastern Illinois influenced the flow of glacial ice during the last glaciation. Late in the Wisconsin Episode, the ice front of the Lake Michigan Lobe melted back from its last glacial maximum position in central Illinois and appears to have stabilized on the Silurian bedrock high in northeastern Illinois, resulting in the presence of several coalescing moraines in the map area (fig. 1). These moraines, trending northwest–southeast in the mapped area and curving around Lake Michigan, are composed of thick deposits of glacial drift (Willman and Frye 1970; Curry and Grimley 2001).

Drift Thickness

Glacial drift includes all the unlithified sediments above bedrock, such as clay, silt, sand, gravel, and unsorted mixtures of these sediments, known as diamicton or till. The distribution of these surficial materials was mapped by Curry and Grimley (2001).

Drift thickness ranges from about 35 feet to about 165 feet in the mapped area and generally thins from northeast to southwest, a trend that has been previously observed in southern Will County (Abert et al., 1993b). The thickest drift occurs near the village of Beecher where the Wheaton Moraine (fig. 1; Willman and Frye 1970) crosses the shallow bedrock valleys in the east-central portion of the map. The areas with highest land surface elevations in the quadrangle do not necessarily correspond with the thickest drift because, in some areas, thinner drift overlies bedrock highs, especially in the northern part of the map. The thinnest drift, however, does correspond with lower land surface elevations in the southwestern portion of the mapping area.

Methodology

The bedrock topography and drift thickness maps are based on the lithologic logs of 379 water wells, 13 water wells with sample sets, 6 stratigraphic borings, and 9 engineering borings. Two electrical earth resistivity profiles were also used. Bedrock elevations and drift thicknesses are labeled adjacent to the data points on the respective maps. The geologic descriptions for all data points are on file at the Geological Records Unit of the Illinois State Geological Survey. The locations of all the data points used in this map, with their identification numbers, are shown on a separate map (Curry et al. 2001). Locations for most wells were not field verified, but some locations were plat verified by the street address on the log. Data from many additional water wells were not used because their locations or the sediment descriptions in the logs were questionable.

Bedrock elevations were first determined from the subsurface boring records. These elevations were then contoured using Arcview 3.1 software, using the spline option and averaging the nearest 14 points. Contours produced by Arcview were then modified in some areas to more realistically portray the data as a buried landscape. The drift thickness map was produced by subtracting the bedrock topography data from a surface topography digital elevation model, both expressed as grids in Arcview 3.1. The resulting data, the basis for the drift thickness map, were converted to a polygon coverage and modified slightly. Extremely small polygons that were not based on a data point were also removed.

Because the calculation technique used to compile for the bedrock surface map was based on an average of the nearest 14 points in Arcview 3.1, a few data points fall outside the appropriate elevation range in areas of high density points and superimposed data.

References

Abert, C.C., R.J. Krumm, M.H. Riggs, M. M. McLean, and E.D. McKay, 1993a, Topography of the bedrock surface, southern Will County: Illinois State Geological Survey, Open File Series 1993-9b, scale, 1:100,000.

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

Bedrock Topography
Contour Interval 25 Feet
Elevation Datum Mean Sea Level

- 700-720 feet
- 675-700
- 650-675
- 625-650
- 600-625
- 590-600

Drift Thickness
Contour Interval 25 Feet

- 150-165 feet
- 125-150
- 100-125
- 75-100
- 50-75
- 35-50

Data Points
Labels indicate bedrock elevation/drift thickness (in feet)

- Engineering borings
- Stratigraphic test holes
- Water wells
- Water wells with sample sets

Acknowledgments
The Will County Highway Department provided us with numerous bridge foundation boring logs. Curt Abert assisted with some of the data processing. This research was supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program under USGS award number 99HQAG0166. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

Base map produced by the United States Geological Survey
Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1987. Field checked 1988. Map edited 1990 (Steger Quad.); taken 1987. Field checked 1989. Map edited 1990 (Beecher West Quad.).
Projection and 10,000-foot grid ticks: Illinois coordinate system, east zone (Transverse Mercator)
1000-meter Universal Transverse Mercator Grid, zone 16
1927 North American Datum
Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked.

Scale 1:24,000
0 2 miles
0 2 kilometers
0 2000 feet
Surface topography contour interval 10 feet
Base map compiled at the Illinois State Geological Survey (ISGS) from digital data provided by the U.S. Geological Survey and the ISGS

ROAD CLASSIFICATION
Primary highway, hard surface — Light-duty road, hard or improved surface
Secondary highway, hard surface — Unimproved road
Interstate Route · U.S. Route · State Route

UTM GRID AND 1990 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1	2	3
4	5	6
7	8	9
10	11	12

1 Tinley Park
2 Harvey
3 Calumet City
4 Frankfort
5 Steger
6 Dyer
7 Peotone
8 Beecher West
9 Beecher East
10 Bradley
11 Momence
12 Illiana Heights

ADJOINING 7.5-MINUTE QUADRANGLES

Recommended Citation

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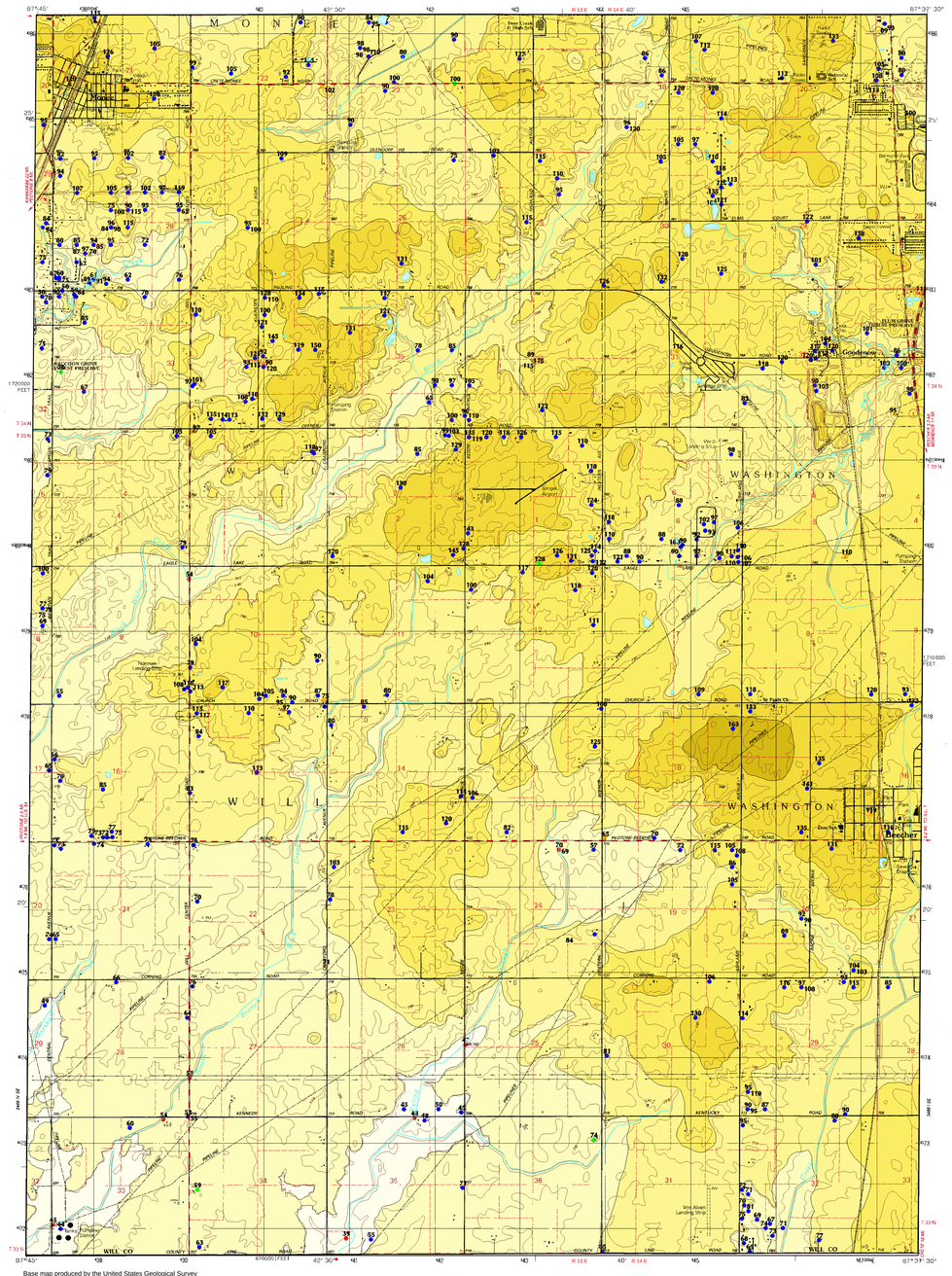
Drift Thickness



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