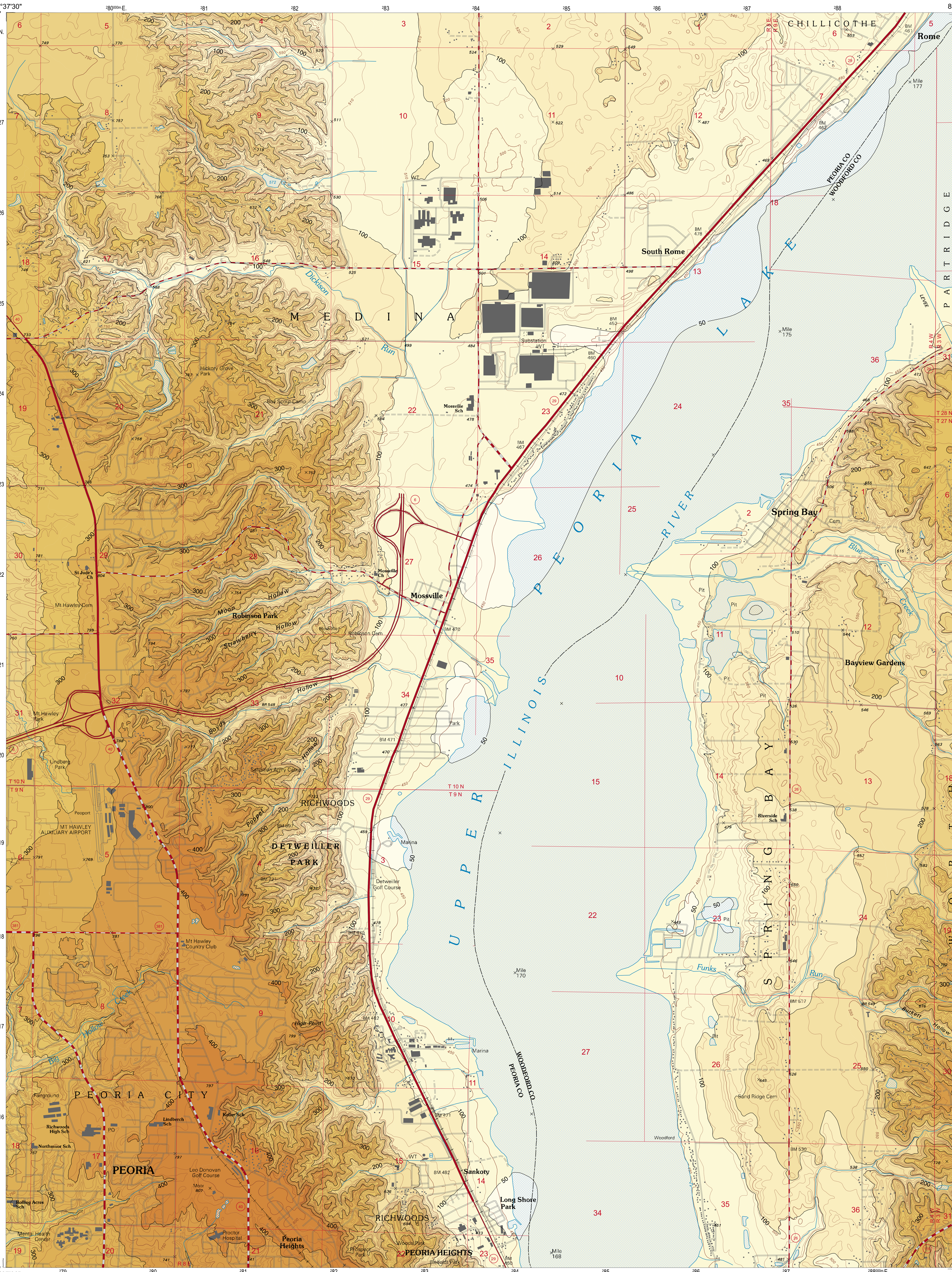
Illinois Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
William W. Shilts, Chief

DRIFT THICKNESS OF SPRING BAY QUADRANGLE
PEORIA AND WOODFORD COUNTIES, ILLINOIS

Illinois Geologic Quadrangle Map
IGQ Spring Bay-DT

C. Pius Weibel and Andrew J. Stumpf

2005



Base map compiled by Illinois State Geological Survey from digital data provided by the United States Geological Survey. Topography compiled from imagery dated 1946. Revised and updated from imagery dated 1995. Field checked 1996.

North American Datum of 1983 (NAD 83)
Projection: Transverse Mercator
10,000-foot ticks: Illinois State Plane Coordinate system, west zone (Transverse Mercator)
1,000-meter ticks: Universal Transverse Mercator grid system, zone 16

Recommended citation:
Weibel, C.P., and A.J. Stumpf, 2005, Drift Thickness of Spring Bay Quadrangle, Peoria and Woodford Counties, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map, IGQ Spring Bay-DT, 1:24,000.

SCALE 1:24 000
1 1/2 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

BASE MAP CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Released by the authority of the State of Illinois: 2005

Geology based on data analysis by C.P. Weibel and A.J. Stumpf, 2003–2004.

Digital cartography by M. Barrett, Illinois State Geological Survey.

Drift Thickness

This map depicts the thickness of Quaternary glacial and postglacial sediments (drift) that cover the much older Pennsylvanian bedrock. These sediments were deposited during at least two major episodes of glaciation over the last 500,000 years. The thickness of the drift, which includes the modern soil, varies considerably across the quadrangle. The thickest drift, more than 425 feet, occurs in the bluff west of the river, within the southern half of Sec. 16, T9N, R8E. The thinnest drift, less than 25 feet, occurs near South Rome, northeast of the center of Sec. 13, T10N, R8E. Bedrock is not exposed. Contours of the drift thickness also incorporate the water depth of the Illinois River and other water bodies in the quadrangle.

The considerable range in drift thickness in this quadrangle is the result of the irregular topography of the surface of both the underlying bedrock (fig. 1) and the modern landscape (fig. 2). Both surfaces contain broad north-south–trending valleys constrained by uplands to the east and west. The locations of the modern and ancient bluffs along the valley differ significantly. The western edge of the ancient bedrock valley (fig. 1) lies 1 to 2 miles west of the modern river valley, whereas the eastern edge lies more than 5 miles to the east of the modern bluff (Herzog et al. 1994). In general, the drift in the modern Illinois River valley is thinner than the drift in the modern uplands. The area of thickest drift occurs between the western edge of the modern river valley and the western margin of the bedrock valley (fig. 1) and in the vicinity of the convergence of the Providence and Buda Moraines (Willman and Frye 1970) in the southwestern portion of the quadrangle (fig. 2).

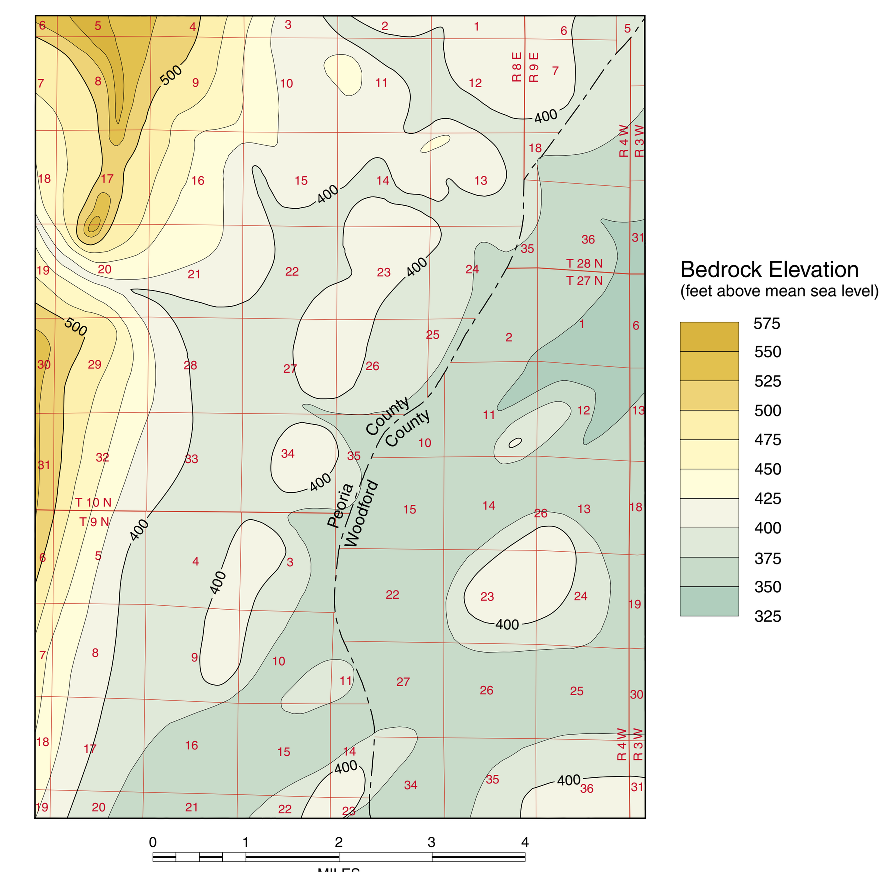


Figure 1 Topographic map of the bedrock surface of the Spring Bay Quadrangle. Contour interval is 25 feet. Modified from Weibel and Stumpf (2005).

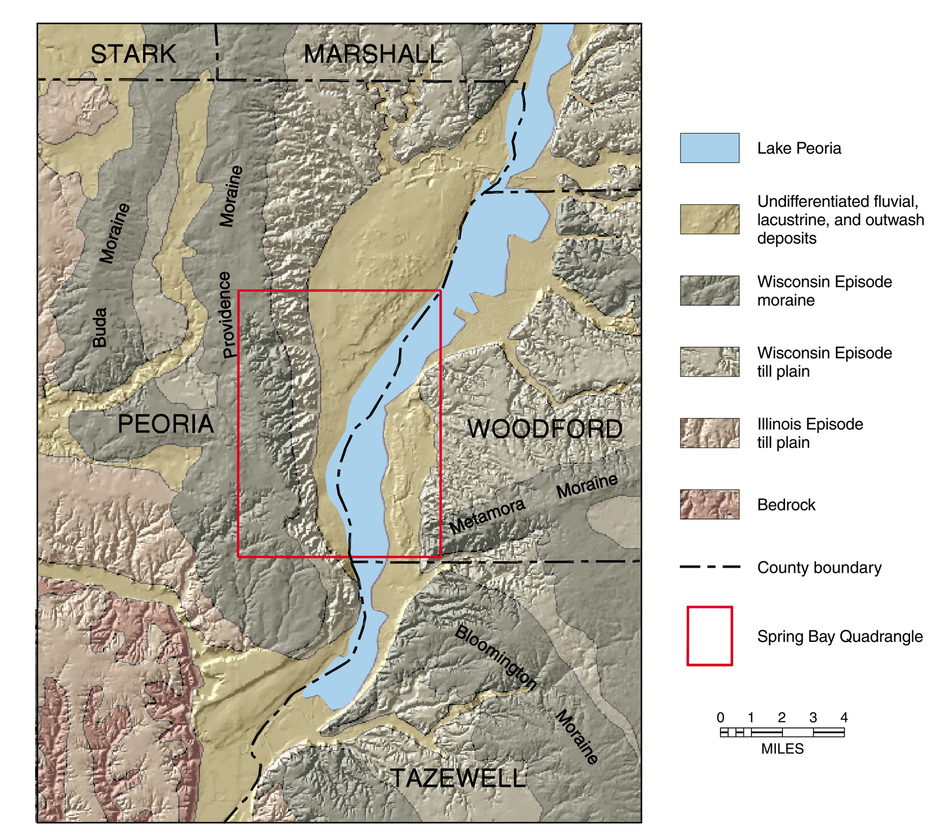


Figure 2 Surficial geology and shaded relief map (derived from a digital elevation model) of the modern land surface of the Spring Bay Quadrangle area (ISGS 2000, Luman et al. 2003). The quadrangle lies near the edge of Wisconsin Episode glacial deposits. The Providence and Buda Moraines converge along the western edge of the quadrangle, and the west end of the Metamora Moraine overlaps the southeastern corner. Modified from Illinois State Geological Survey (2000) and Luman et al. (2003).

Map Use

This map provides information that is useful in exploring for near-surface and deeply buried sand and gravel deposits within the Quaternary sediments. Thick sand and gravel deposits that fill buried valleys and abandoned channels are commonly sources of abundant groundwater. Near-surface sand and gravel deposits may also be a source of construction aggregate. Well drillers, engineers, and geoscientists could use this map to predict the depth to bedrock.

Mapping Methods

This map is based on data from other pre-existing or recently completed maps and was derived using data from the topographic maps of the bedrock surface (Weibel and Stumpf 2005) and of the land surface. A 5-meter (16.4 foot) digital elevation model (DEM) of the land surface was prepared by the Illinois State Geological Survey (ISGS) using data from two sources: high-resolution digital data for Peoria County (provided by the Tri-County Regional Planning Commission) and digital line graphs of the hypsography for Woodford County (from the U.S. Geological Survey). These digital data of the land surface include the elevations of the surfaces of water bodies. The hypsographic data (contours) from the topographic map of the bedrock surface were converted to a grid with a cell size of 100 × 100 feet using Environmental Systems Research Institute, Inc. Arc/Info software and imported into Dynamic Graphics Inc. EarthVision software. EarthVision was used to calculate the difference between the digital grid representing the elevations of the bedrock surface and the grid of the land surface elevations from the 5-meter DEM. The resultant drift thickness grid, with a cell size of about 66 × 66 feet, was contoured using EarthVision. Because the land surface DEM has a resolution that is significantly greater than that of the less complex bedrock surface DEM, the resultant drift thickness grid is skewed toward the land surface DEM. In other words, most of the topographic details in the resultant grid and its contours were derived from the land surface, and few were from the bedrock surface. The contours were compared with drift thicknesses from the well data, and ArcInfo software was used for a final refinement of the contours.

Weibel and Stumpf (2005) included a map displaying the locations of the data used to derive the digital grid of the bedrock surface. The map was based on data from subsurface borings held at the Geological Records Unit of the ISGS.The data consist of 104 borings within the quadrangle and include logs of water wells, engineering and structure borings, and ISGS stratigraphic test borings. The map contains buffer contours that indicate a qualitative measure of the reliability of the elevations of the bedrock surface extrapolated away from data sites. This data map also applies to the drift thickness map.

References

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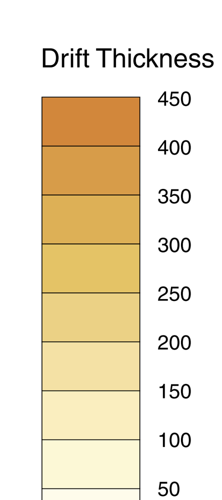

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4		5
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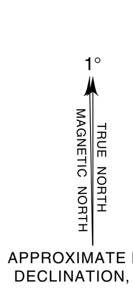
ADJOINING QUADRANGLES
1 Edelstein
2 Rome
3 Chillicothe
4 Dunlap
5 Germantown Hills
6 Peoria West
7 Peoria East
8 Washington



APPROXIMATE MEAN DECLINATION, 2005

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
State Route