Prairie Research Institute
ILLINOIS STATE GEOLOGICAL SURVEY

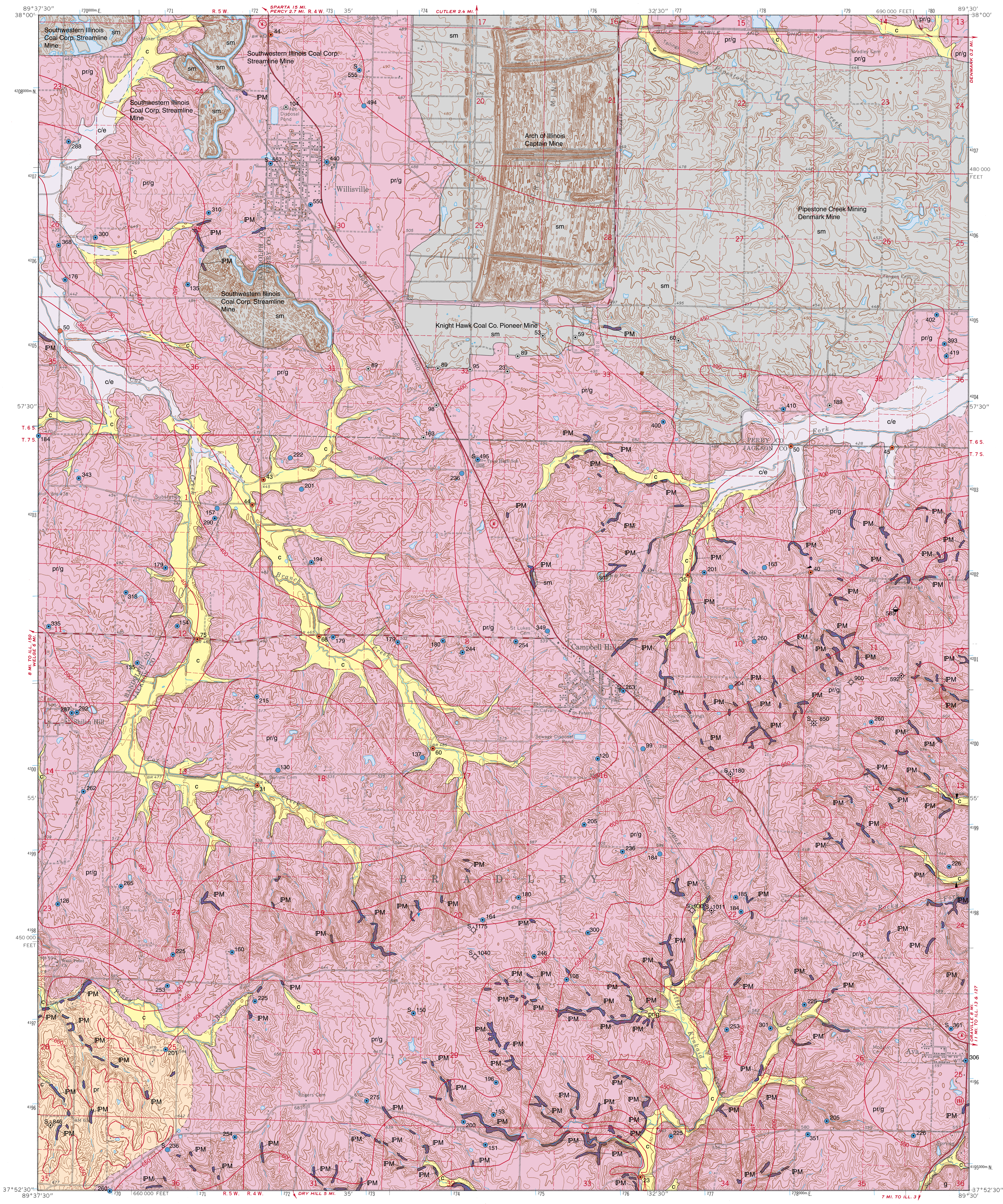
Surficial Geology of Willisville Quadrangle

Perry, Randolph and Jackson Counties, Illinois

W. John Nelson

2022

Illinois Geologic Quadrangle Map
IGQ Willisville-SG



QUATERNARY DEPOSITS

Description	Unit	Interpretation
HUDSON EPISODE (~12,000 years before present [B.P.] to today)[1]		
Surface mines, disturbed ground and spoils in abandoned surface coal mines. In the oldest mines west and south of Willisville, earth and rock were simply piled in ridges as the mining face advanced. Mines east of Willisville underwent varying degrees of reclamation, depending on regulations in place at the time of mining. During the 1960s, the law required only grading spoil banks. In the more recently mined areas, the earth materials were replaced in original order (rock on bottom, overlain in turn by subsoil and topsoil) and the ground restored to approximately its original contour. See Myers and Chenoweth (2009) for further information on coal mines.	Surface mines sm	
Silt, clay, sand, gravel, and boulders; largely silty and sandy clay, silt, and sandy loam with lenses of sand and gravel. Fresh and weathered sediments are strongly mottled in gray, brown, and orange. Deposits are mostly loose or weakly indurated but locally cemented by iron oxide. Bedding and lamination are irregular and lenticular. The Cahokia generally is coarsest at the base and becomes finer grained upward. Large rock fragments, dominantly sandstone, become prevalent in the upper reaches of streams. The lower contact is erosional. This unit is not mapped where it overlies Equality Formation. Maximum thickness is about 25 feet.	Cahokia Formation c	**Alluvium** (stream deposits) on floodplains of modern streams. Sediment is derived from decomposition of bedrock and from slope wash of silt (loess) and diamicton (till) in upland areas.
WISCONSIN EPISODE (~75,000–12,000 years B.P.)		
Silt, clay, minor sand; this unit is dominantly medium to dark gray and brownish-gray silt and clay that lacks pebbles and contains lenses and layers of sand. Equality sediments are typically more compacted (stiff) than the overlying Cahokia sediments. The lower contact is erosional. Maximum thickness is about 40 feet along Cox Creek and Brushy Fork.	Cahokia over Equality Formation c/e	The Equality Formation is interpreted as slack-water sediment that was deposited when the Mississippi River and its tributaries were flooded with glacial meltwater, producing temporary lakes (Willman and Frye 1970). One of the largest slack-water lakes lay in the basin of the Big Muddy River, into which Brushy Fork flows (Shaw and Savage 1912). Another such lake formed along Mary's River and its tributary Cox Creek in the western part of the Willisville Quadrangle (Lineback 1979; Nelson and Grimley 2010).
Silt; the Peoria Silt at the surface is mottled yellowish gray to light yellowish brown. The underlying Roxana Silt is less strongly mottled and is generally medium brown with a reddish cast. Both are massive, friable, and tend to stand in vertical banks where artificially cut or eroded. The modern soil is developed in the Peoria, the Farmdale Geosol in the Roxana. Observed thickness varied from 4 to 8 feet. Maps by Willman and Frye (1970) and Fehrenbacher et al. (1986) indicate an average thickness of about 8 feet, decreasing toward the northeast. Peoria and Roxana mantle all uplands in the quadrangle.	Peoria and Roxana Silts (directly overlying bedrock) pr	**Loess (windblown silt);** derived dominantly from the Mississippi River floodplain by prevailing westerly winds during times when the valley lacked vegetation cover and was choked with freshly deposited sediment from glacial runoff.
ILLINOIS EPISODE (~200,000–130,000 years ago)		
Pebbly silty clay loam, silty clay, and diamicton; olive, brownish and bluish gray when fresh, weathers yellowish brown to orange mottled. Generally stiff silty clay to clayey silt that contains intermixed sand and less than 5% pebbles and larger rocks. No sorting or layering except in sand lenses that show distorted lamination. Erratic cobbles and boulders up to 10 feet across represent a great variety of rock types. Joints mineralized with iron oxide outline irregular polygons. Strongly developed soil, the Sangamon Geosol, is at the top. Thickness varies from a feather edge to 141 feet. Lower contact uncomformable on Pennsylvanian bedrock or possibly older Quaternary units.	Peoria and Roxana Silts over Glasford Formation pr/g	**Till and ice-marginal sediment;** material that was entrained in Illinoian continental ice sheets and left behind when the ice receded and melted. No moraines or other constructive landforms are evident. The deep and strongly developed Sangamon Geosol formed during the Sangamon interglacial episode approximately 130,000 to 75,000 years B.P. During the Wisconsin Episode, the till plain was mantled by Roxana and Peoria Silts, so the unit is symbolized as pr/g. Subsequent stream erosion revealed underlying bedrock in a few places.
PENNSYLVANIAN and MISSISSIPPIAN PERIODS (310 to 330 million years ago)		
Sandstone, siltstone, shale, limestone, mudstone, coal; underlies the entire map area; outcrops are confined to stream valleys, bluffs, and man-made excavations. Rock layers dip gently northeast so that the youngest (Pennsylvanian) strata occur at the northeastern corner of the map area. Details of the bedrock geology have been presented by Nelson (2005).	Bedrock IPM	

[1]The time periods for the Wisconsin Episode and the Hudson Episode are reported as calibrated radiocarbon years and can be directly compared to calendar years before 1950 (Stuiver et al. 2020).

Symbols

- Glacial striations on bedrock
- Outcrop of special note, where unit was well exposed during mapping

Drill Holes

from which geologic information was obtained

- Water well
- Engineering boring (IDOT bridge boring)
- Coal boring
- Gas well
- Dry oil-test hole
- Dry hole—show of oil
- S 619 Boring with samples (s). Numeric label indicates total depth of boring in feet. Dot indicates location accurate within 100 feet.

Line Symbols

- Contact, accurate
- Contact, inferred
- 550 Elevation of bedrock surface, contour interval 50 feet

Note: The county number is a portion of the 12-digit API number on file at the ISGS Geological Records Unit. Most well and boring records are available online from the ISGS website.

Base map compiled by Illinois State Geological Survey from digital data (Raster Feature Separates) provided by the United States Geological Survey. Topography by photogrammetric methods from aerial photographs taken 1965. Field checked 1968.

North American Datum of 1927 (NAD 27)
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

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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

Geology based on field work by W.J. Nelson, 2004 and 2005.

Digital cartography by Jane E. Johnshoy Domier, Alexander J. Beata, and Emily G. Bunse
Illinois State Geological Survey.

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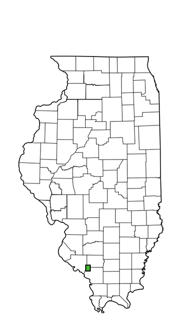

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Steeleville
2 Percy
3 Pinckneyville
4 Welge
5 Ava
6 Rockwood
7 Raddle
8 Oraville

APPROXIMATE MEAN DECLINATION, 2022

ROAD CLASSIFICATION

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