

SURFICIAL GEOLOGY OF CARBONDALE QUADRANGLE

JACKSON AND WILLIAMSON COUNTIES, ILLINOIS

Prairie Research Institute
ILLINOIS STATE GEOLOGICAL SURVEY

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2013

Illinois Geologic Quadrangle Map
IGQ Carbondale-SG

QUATERNARY DEPOSITS

Description **Unit** **Interpretation**

HUDSON EPISODE (~12,000 years before present [B.P.] to today)

Mixed bedrock and surficial sediments up to about 60 feet thick. Surface mines Ground excavated and back-filled during surface coal mining.

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Silt, with lesser clay, sand, and gravel. Silt mostly gray to brown, with streaks and mottles of reddish brown and dark gray. Sand and gravel commonly underlie silt and occur as lenses within silt. Sediments tend to be poorly sorted and contain a silt matrix. Gravel contains glacially derived clasts of diverse lithology mixed with clasts of local bedrock, predominantly sandstone. Sediments become finer upward in succession and downstream. Planar lamination, cross-bedding, and imbricated gravel clasts are common. In engineering boreholes, Cahokia Formation sediments are described as "moist" or "soft," having low blow counts, a low compressive strength (Q_u less than 1.0), and water content of 30% or more. High water content is especially diagnostic. The maximum thickness is about 30 feet. The lower contact is generally erosional.

HUDSON AND WISCONSIN EPISODES (~55,000 years B.P. to today)

Equality Formation consists of silt and clay, with minor amounts of sand and gravel. Colors medium to dark gray, brown, and bluish gray. The upper ~10 feet is commonly leached and oxidized to mottled yellow, orange, and brown. Sand and gravel layers and lenses are present mainly in the lower part of the formation. Sediments may be massive to laminated. Unweathered sediment of the Equality Formation is calcareous and contains small limestone nodules and concretions. Plant debris is common along with shells of tiny snails. Engineering logs record "stiff" silt and clay having an unconfined compressive strength between 1.0 and 2.0, higher than that of the Cahokia Formation but lower than that of the Glasford Formation. Water content is generally greater than 25%, higher than that of the Glasford Formation. Thickness ranges from 50 to 60 feet where State Route 13 crosses Crab Orchard and Little Crab Orchard Creeks. Greater thicknesses likely occur near the northern edge of the map area, but no data are available. The unit does not crop out and is known solely from drilling records.

WISCONSIN EPISODE (~55,000–12,000 years B.P.)

The older Roxana Silt is clay-rich silt, mostly medium to dark brown and containing 5 to 10% sand. Some outcrops have a reddish hue. Silt is massive and contains weakly developed soil (Farmdale Geol.). Thickness ranges from 1.5 to 4 feet. **The younger Peoria Silt is 5 to 11 feet thick** and is similar to the Roxana Silt, but it lacks red hues and normally has less clay and little or no sand. Black to dark brown pellets, concretions, and stains of manganese and iron oxide occur throughout. The modern soil is developed. The Peoria and Roxana Silts are difficult to differentiate.

ILLINOIS EPISODE (~200,000–130,000 years B.P.)

Largely diamictic, an unlayered and unsorted mixture of clay, silt, sand, gravel, and rocks up to boulder size. Most outcrops consist of silty clay to loam that contains less than 5% material larger than sand. Fresh sediment is dark gray to brownish, olive, and bluish gray. Weathered Glasford Formation diamictic is strongly mottled with yellow, orange, and brown. Sand is present as scattered grains and as discontinuous layers and lenses. These commonly display deformed lamination. A few outcrops and core samples show thin, laminated fine sand, silt, and silty clay that fits the description of the Petersburg Formation (Willman and Frye 1970). Data are insufficient to differentiate Petersburg from Glasford Formation sediments on the geologic map; the laminated sediment is highly localized. Stratified and unstratified facies of the Glasford Formation, mapped in the adjacent Crab Orchard Lake Quadrangle on the east (Folmer and Nelson 2010), cannot be differentiated in the Carbondale Quadrangle. In the Glasford Formation, rounded chert and quartz pebbles make up most of the gravel fraction, accompanied by fragments of local sedimentary rocks and far-traveled igneous and metamorphic pebbles. The largest boulders are more than 10 feet across. Most diamictic in the map area is overconsolidated and classified by civil engineers as CL, low-plasticity inorganic fines (Holtz and Kovacs 1981). Geologic logs of bridge borings record "stiff" or "very stiff" materials having a high blow count. An unconfined compressive strength greater than 2.0 and water content of 10 to 22% are typical.

PENNSYLVANIAN BEDROCK

Sandstone, siltstone, shale, mudstone, conglomerate; coal and limestone layers in the northern part of the map area. Most outcrops are sandstone.

See Nelson (2013a).

References

Folmer, L.R., and W.J. Nelson, 2010, Surficial geology of Crab Orchard Lake Quadrangle, Williamson County, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map IGQ Crab Orchard Lake-SG, 1 sheet, 1:24,000.

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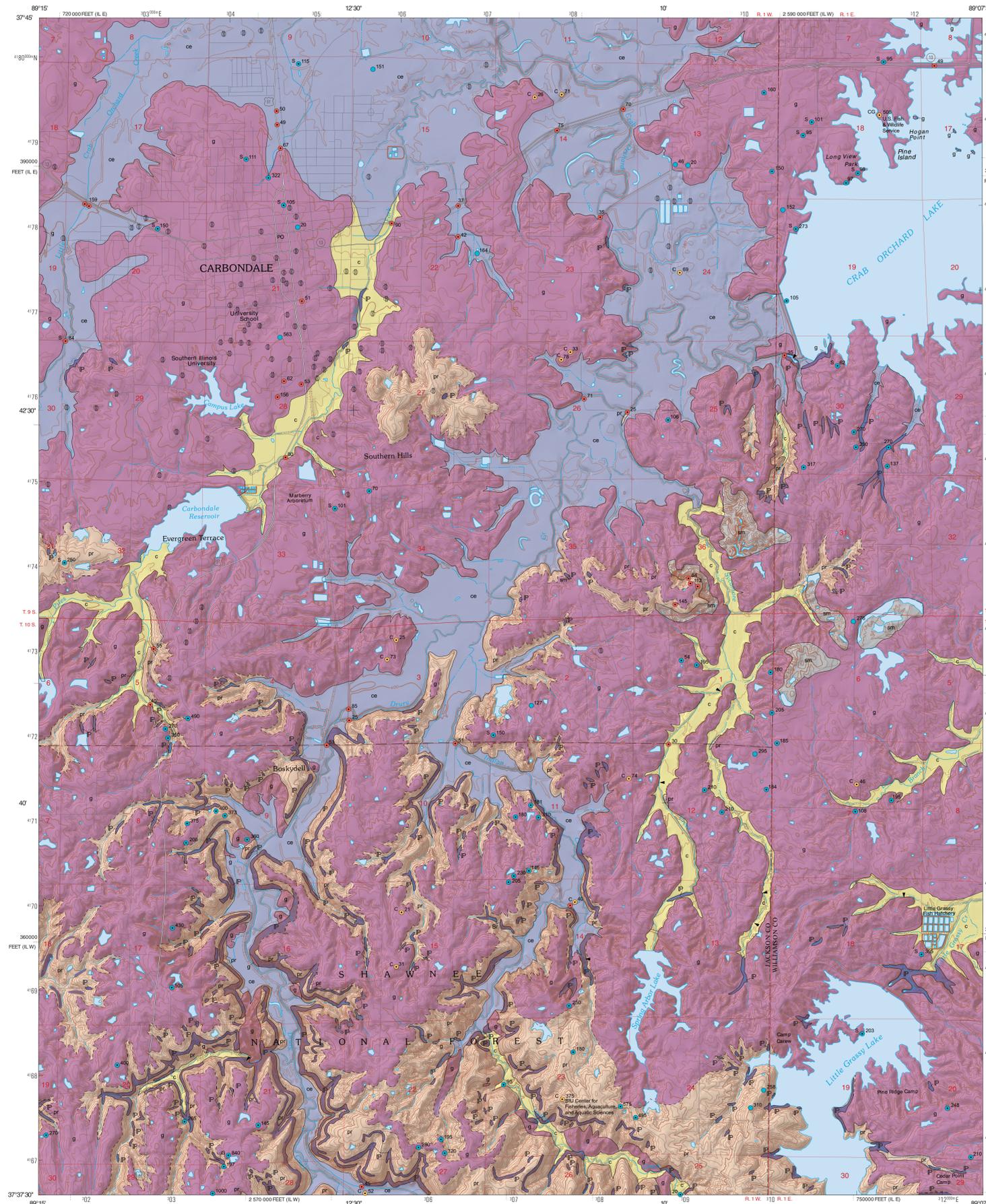
Willman, H.B., and J.C. Frye, 1970, Pleistocene stratigraphy of Illinois: Illinois State Geological Survey, Bulletin 94, 204 p. and 3 plates.

Willman, H.B., and J.C. Frye, 1980, The glacial boundary in southern Illinois: Illinois State Geological Survey, Circular 511, 23 p.

Data Type

- ▲ Outcrop of special note, shown where unit or contact was well exposed at time of mapping
- Stratigraphic boring
- Water-well boring
- Engineering boring
- ⊕ Probe test hole
- SG_26211
FOX Labels indicate samples (s), geophysical log (g), or core (c). Numeric labels indicate total depth of boring in feet. Label name indicates well name. Dot indicates location accurate within 100 feet.
- Contact
- - - Inferred contact

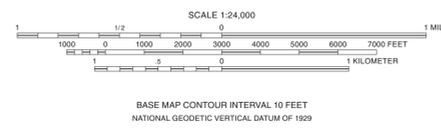
Note: The county number is a portion of the 12-digit API number on file at the ISGS Geological Records Unit. Online well and boring records are available from the ISGS Web site.



Base map compiled by Illinois State Geological Survey from digital data (Raster Feature Separates) provided by the United States Geological Survey, Topography compiled 1963. Planimetry derived from imagery taken 1993. PLS and survey control current as of 1996.

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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Geology based on field work by W. John Nelson, 2000–2001.

Digital cartography by Jane E. Johnson-Domier and Trisha S. Rentschler, Illinois State Geological Survey.

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ADJOINING QUADRANGLES
1 Murphysboro
2 De Soto
3 Herrin
4 Pomona
5 Crab Orchard Lake
6 Cobden
7 Makanda
8 Lick Creek



ROAD CLASSIFICATION

U.S. Route	
State Route	
Local road	