

# Surficial Geologic Map of the Holder 7.5 Minute Quadrangle, McLean County, Illinois

MEINZER, Evan R., MALONE, David H., and SHIELDS, William E.

Department of Geography-Geology, Illinois State University, Campus Box 4400, Normal, IL 61761



## Abstract

The Holder Quadrangle is located in McLean County and spans from 40° to 40° 22' 30" north latitude and 88° 52' 30" to 88° 45' west longitude. The majority of the quadrangle consists of the Woodfordian moraine front and the adjacent ground moraine. The Quaternary units overlie Pennsylvanian strata of a variety of lithologies. Quaternary units exceed 100 m in thickness where they overlie buried bedrock valleys. Major Quaternary sediment units present in the area are the Wedron Group till units, the Mason Group meltwater deposits, the Peoria Silt, and the Cahokia Alluvium. Carmi Formation lacustrine deposits are also locally present. The Wedron Group consists of the Tiskilwa till (south of the Bloomington Moraine) and the Lemont Formation (north of the Bloomington Moraine). These till units are clay-rich diamicts that are pink and grey in color, respectively. The Peoria Silt is fine-grained yellow-orange silts and clays which covers most of the area in a thin veneer (as much as 2-3 m). The Mason Group is an outwash sand/gravel unit most prominent south of the Bloomington moraine. It is less than 8-10 meters in thickness. The Cahokia Alluvium is less than 5 meters in thickness and is associated with Holocene drainage systems. This map was prepared using soil maps from the McLean County Soil Survey. Parent materials were identified and grouped creating formation boundaries. Units had to be at least 2 m in thickness to be mapped. Water well data was evaluated to indicate thickness of major surficial deposits to indicate their viability as mappable units. After boundaries were delineated, a field check was conducted to adjust contact placement. Cross sections were prepared and subsurface correlations were determined using water well records. More than 100 well records on repository at the Illinois State Geological Survey for the Holder Quadrangle were analyzed as part of this study.

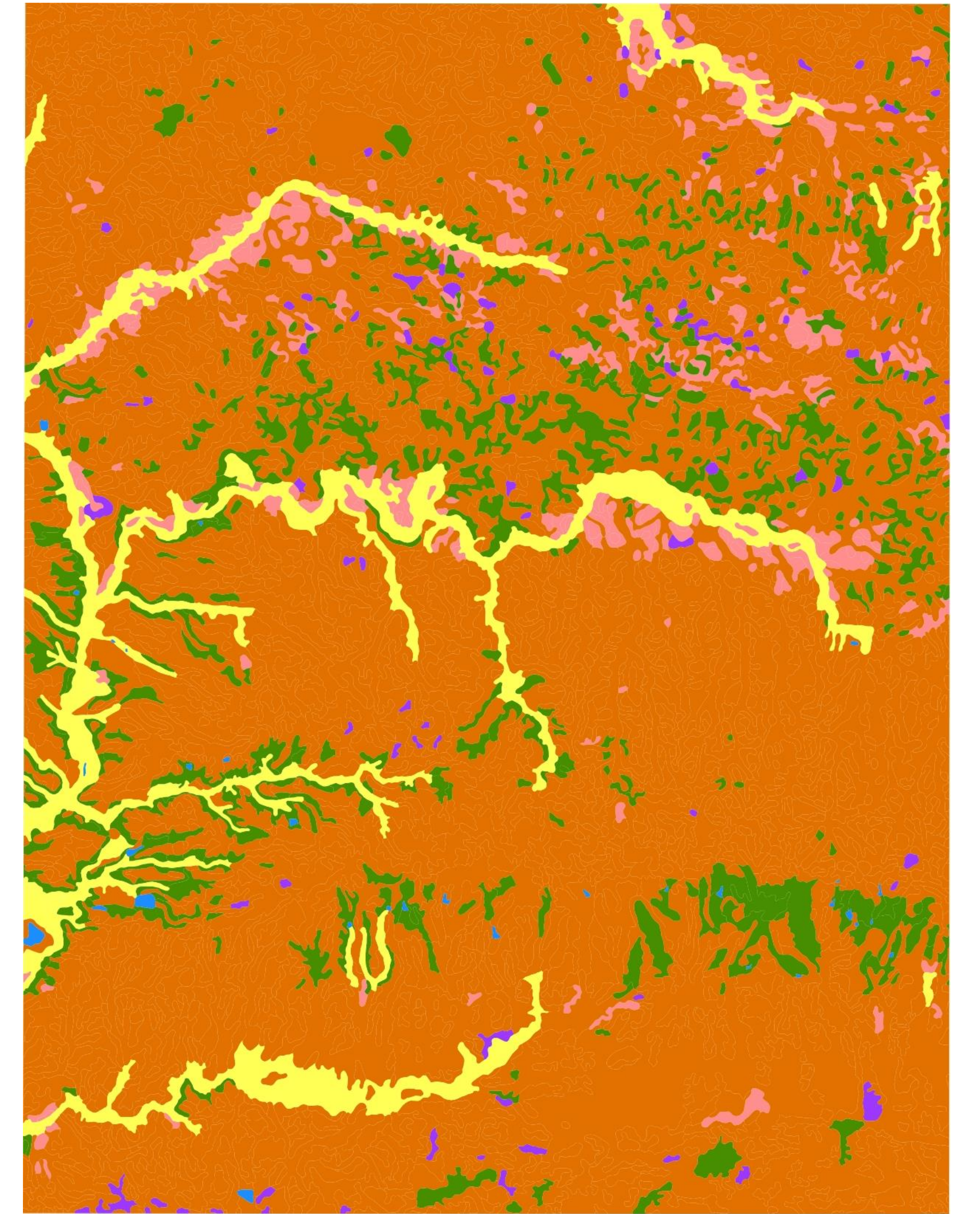
## Quaternary Deposits

- HUDSON EPISODE**
- Cahokia Fm: river sand, gravel, and silt
- WISCONSIN EPISODE**
- Mason Group**
- Thickness of Peoria and Roxanna Silt: silt deposited as less (5-ft contour interval)
  - Equality Fm: silt and clay deposited in lakes
  - Henry Fm: sand and gravel deposited in glacial rivers, outwash fans, beaches, and dunes
- Wedron Group** (Tiskilwa, Lemont, and Wadsworth Fms) and Trafalgar Fm: diamiction deposited as till and ice-marginal sediment
- End moraine
  - Till plain
- ILLINOIS EPISODE**
- Teneriffe Silt: silt and clay deposited in lakes
  - Peoria Fm: sand and gravel deposited in glacial rivers and outwash fans, and Hagerstown Mbr: ice-contact sand and gravel deposited in ridges
- Winebago Fm:** diamiction deposited as till and ice-marginal sediment
- Till plain
- Glasford Fm:** diamiction deposited as till and ice-marginal sediment
- End moraine
  - Till plain
- PRE-ILLINOIS EPISODE**
- Wolf Creek Fm: predominantly diamiction deposited as till and ice-marginal sediment
  - Unglaciated



Above: Location of McLean County in Illinois and location of Holder Quadrangle in the County

Top Right: Soils map provided by McLean county soil survey.  
Bottom Right: LIDAR image of map area with local moraines highlighted. Note moraines denote several lithostratigraphic boundaries.



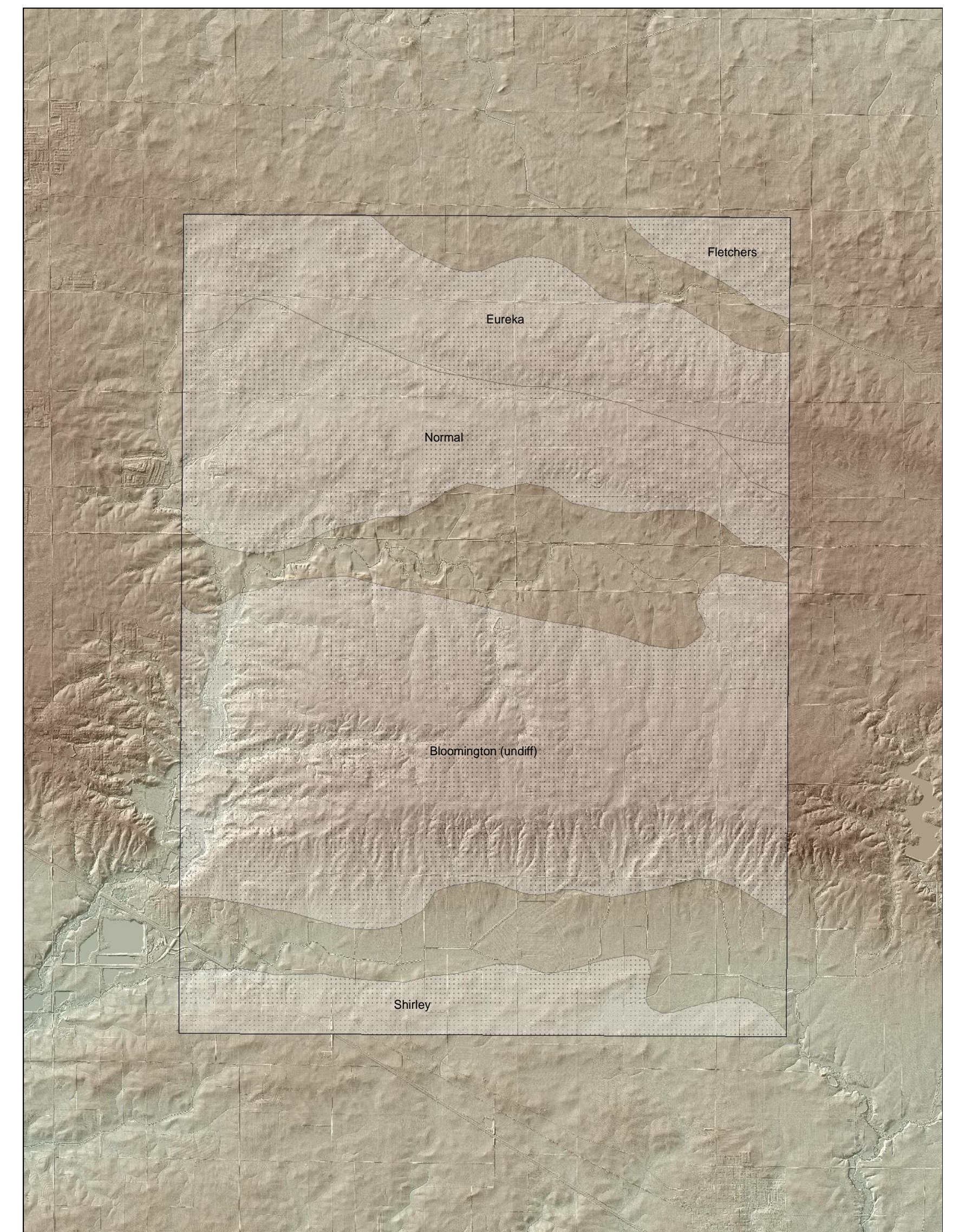
## Discussion

The geology of the area is controlled by a major terminal moraine which forms the boundary between the Tiskilwa Formation Undivided (dark green) and the Delevan Member of the Tiskilwa (light green). This ice margin also led to the creation of the complex alluvial systems which skirt the various moraines in the area and the outwash terraces near them. Dunes of Peoria silt have accumulated on top the Bloomington moraine and is thick enough to be mapped, unlike the veneer of loess which covers the majority of the mapping area. Farther north, the Normal moraine forms the boundary between the Tiskilwa Formation and the Lemont Formation, which is a regional as well as lithostratigraphic distinction between two till compositions.

## Methods

The initial work in the geologic map was collection of soils data and well logs. The soils are assigned a lithologic 'parent' material which can be used to determine the general location of certain formations. Next well logs were analyzed, which also gave insight as to lithology in certain locations. These well logs are public data provided by the Illinois State Geological Survey. After the general regional geology was made more clear, LIDAR became an important tool in examining location of geomorphic features (such as the Henry Formations terrace features) as well as moraines which serve as local lithostratigraphic divides, predominately amongst the till units. Once all geology was interpreted, Canvas software was used to integrate geology and the local topographic map to create the finished product. After interpretations were made based on data, certain regions of the map were field checked for accuracy. Portions of the maps west side surrounding Kickapoo Creek were checked for outwash sands and alluvial deposits.

Right: Contact between Delevan member of Tiskilwa formation and Peoria silt. The orange silt is clearly distinguishable from the gray-brown till unit and is approximately 1 meter thick, well below the minimum two meter mapable thickness. A veneer similar in thickness to this outcrop covers most of the region and was mapped only in areas with thicker dunes.



Quaternary

- Qc** Cahokia Alluvium: Modern alluvium made of bedded sands, silts, and clays. Found near stream channels.
- Qp** Peoria Silt: Orange Aeolian clay and silt. Forms dunes and covers ground moraines
- Qh** Henry Formation: Outwash sand and gravel. Forms terraces at modern and paleostream channels.
- Ql** LeMont Formation: Gray to blue diamict clays and gravel. Forms ground and terminal moraines north of Bloomington moraine.
- Qtu** Tiskilwa Formation Undivided: Pink diamict clays and gravel. Forms Bloomington terminal moraine.
- Qtd** Delavan Member of Tiskilwa Formation: Pink diamict clays and gravel. Forms ground moraine south of Bloomington moraine.



## Citations:

- Willman, H.B., and J.C. Frye, 1970, Pleistocene Stratigraphy of Illinois: Illinois State Geological Survey Bulletin 94, 204p.
- Kolata, D. R., and Nimz, C. K., 2010, Geology of Illinois: Illinois State Geological Survey, pgs 216-258.
- Hansel, A. K., Johnson, W. H., 1996, Wedron and Mason Groups: Lithostratigraphic Reclassification of Deposits of the Wisconsin Episode, Lake Michigan Lobe Area.

Special thanks to Jason Thomason and the ISGS for providing data and support.