

Surficial Geologic Map of the Normal West 7.5 Minute Quadrangle, McLean County, Illinois

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Abstract

The Normal West Quadrangle is located in McLean County, Illinois. The boundaries of the Quadrangle span from 40°30'00" to 40°37'30" north latitude and 89°00' to 89°07'30" west longitude. Quaternary sediment units, as much as 100m in thickness overlie Pennsylvanian bedrock strata. Using data from the McLean County Soils Survey, sediment parent materials were determined, and then translated into sediment units. Water well data on repository at the Illinois State Geological Survey supplemented the soils data. After the formation contacts were defined, a field check was conducted to amend contact placements. Quaternary units are underlain by Pennsylvanian strata that vary in lithology. The major Quaternary sediment units present in the Quadrangle include the Wedron Group, the Henry Formation, the Peoria Formation, and the Cahokia Alluvium. The Wedron Group consists of the Tiskilwa and Lemont Formations. These two formations are pink and grey diamicts that are interpreted as glacial tills. They form ground and recessional moraine deposits. The Tiskilwa Till is present south of the Bloomington Moraine, while the Lemont is present to its north. The Henry Formation consists of sand and gravel deposits that are interpreted as glacial river, terrace, and outwash fan deposits. The Peoria Formation is made up of a fine grained, yellow silt-clay that covers the surface of most of the mapping area, and is interpreted as loess deposits. The Cahokia Alluvium consists of river deposits of sand, gravel, and silt, and is the youngest unit in the mapping area.

Methodology

Soils data from the McLean County Soils Survey was used to determine the parent material of each soils polygon. After the parent material was determined using soil polygons and water well data from the Illinois State Geologic Survey, Canvas 15 was used to assign formations to soils polygons. LIDAR imaging data and the topographic map of the Normal West Quad was used to determine the whereabouts of stream systems, moraines, terraces, and other geomorphological features as a result of glaciation.

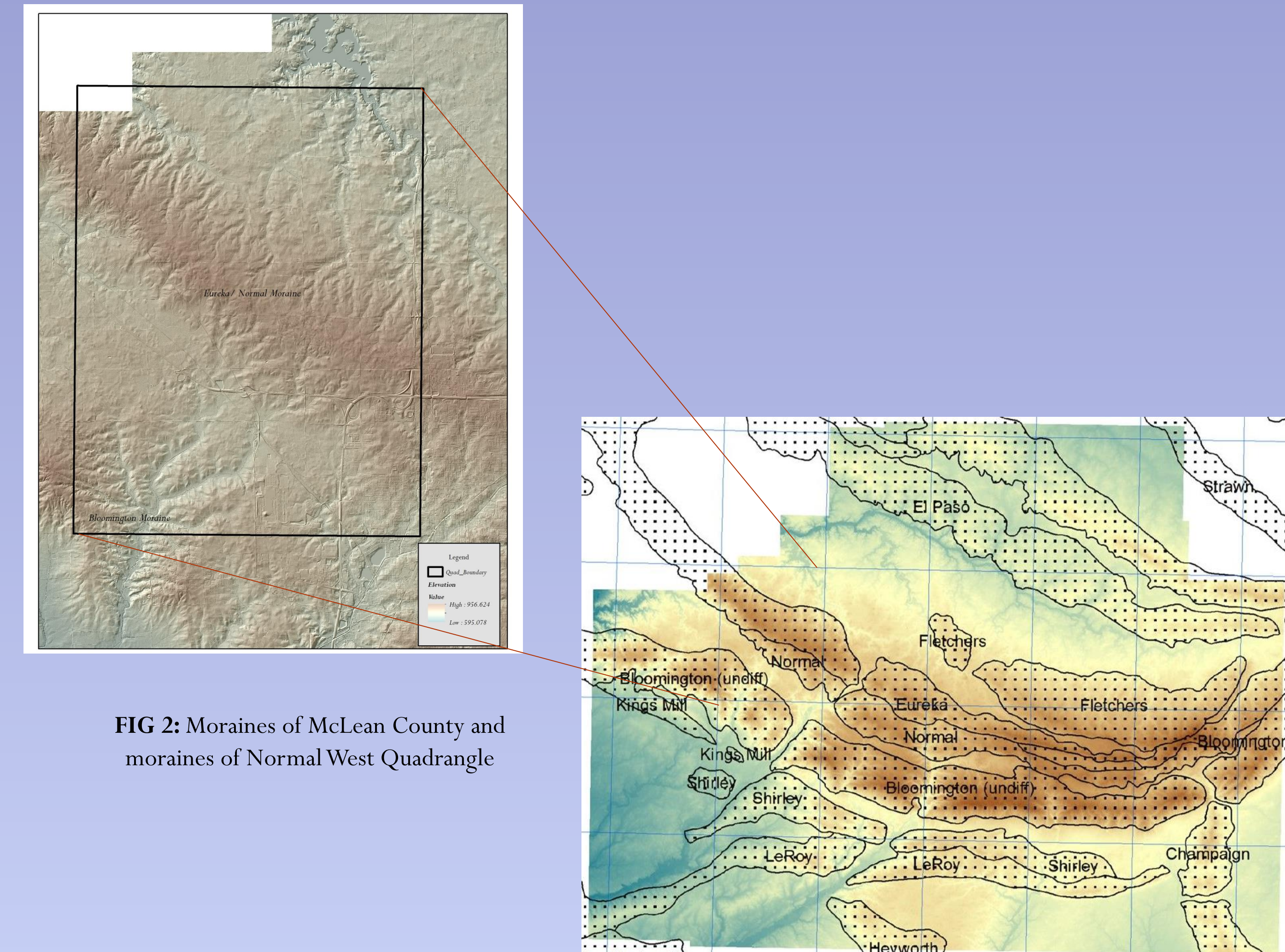


FIG 2: Moraines of McLean County and moraines of Normal West Quadrangle

Results

The surficial geology of the Normal West quadrangle is comprised Quaternary aged units: the Cahokia Formation, the Mackinaw facies of the Henry Formation, the Batestown member of the Lemont Formation, and Undivided Tiskilwa. The Cahokia Formation makes up modern day stream deposits, and it consists of gravel, sand, silt, and clay. The Mackinaw Facies of the Henry Formation forms outwash terrace deposits, and is composed of stratified coarse sand and gravel. The Batestown Member of the Lemont Formation is composed of a blue-grey diamict that has a medium grained mud matrix, and oxidizes to yellow-brown. The Tiskilwa Undivided is part of the Tiskilwa Formation and is composed of a red-pink diamict with a medium grained mud matrix. Three Moraines exist in the Normal west quad. The Normal and Eureka Moraine exist as one Moraine in the middle eastern portion of the quad, however as the moraine proceeds west, the Normal Moraine dies out and the Eureka Moraine continues off the northwestern portion of the quad, as seen in Figure 2. Both the Normal and the Eureka Moraine consist of the Batestown member of the Lemont Formation. The second moraine located in the Normal West quad is the Bloomington Moraine. The Bloomington Moraine consists of the Tiskilwa Undivided member of the Tiskilwa Formation. At the end of the Normal/Eureka Moraine the Tiskilwa/Lemont Boundary exists.

Discussion

The southeast corner of the map is an urbanized area of the Normal West quad that contains disturbed ground. On the map, the southeast corner was interpreted as being mostly Tiskilwa Undivided with a small amount of Batestown to the northern part of the urbanized area. This interpretation was based on the glacial advances of the Normal Moraine. The Normal and the Eureka Moraine can be interpreted as lobes of the different advances of the same Moraine, which can be seen in Figure 2.

References

- Hansel, A. K., Johnson, W. H., 1996, Wedron and Mason Groups: Lithostratigraphic Reclassification of Deposits of the Wisconsin Episode, Lake Michigan Lobe Area.

Acknowledgements

The Illinois State Geologic Survey (ISGS) for well and LIDAR, Janet Holden for deriving the LIDAR data, Crystal Williams for Geographic Information Systems (GIS) assistance, the McLean County map in Fig 3, and much more, and Jason Thomason and Andy Stumpf from ISGS for assistance in the lab at the ISGS and for the moraine map in Fig 2.

Map Description

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|-------------------|------------|--|
| Quaternary | Qc | Cahokia Formation: bedded gravel, sands, silts, and clays that form modern day stream deposits |
| | Qhm | Henry Formation (Mackinaw Facies): terrace forming stratified coarse sand and gravel |
| | Qlb | Lemont Formation (Batestown Member): Blue to grey diamict with a medium grained mud matrix that oxidizes yellow-brown |
| | Qu | Tiskilwa Formation (Tiskilwa Undivided): red to pink diamict with a medium grained mud matrix |

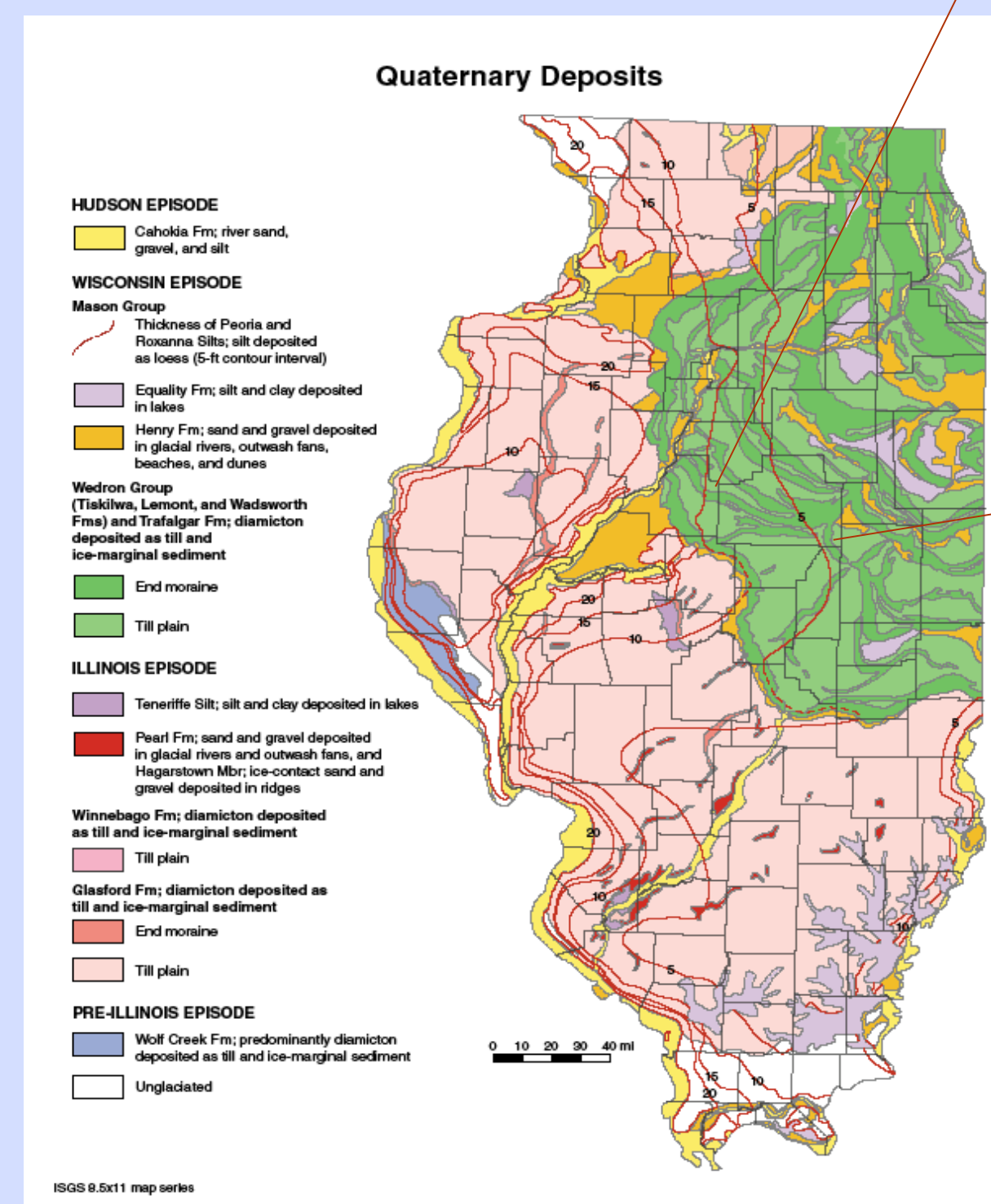


FIG3: Location of McLean County on Quaternary glacial episodes of Illinois map (<https://www.isgs.illinois.edu/content/quaternary-ice-age-deposits>)
Inset is an image of McLean county with the Normal West Quad highlighted

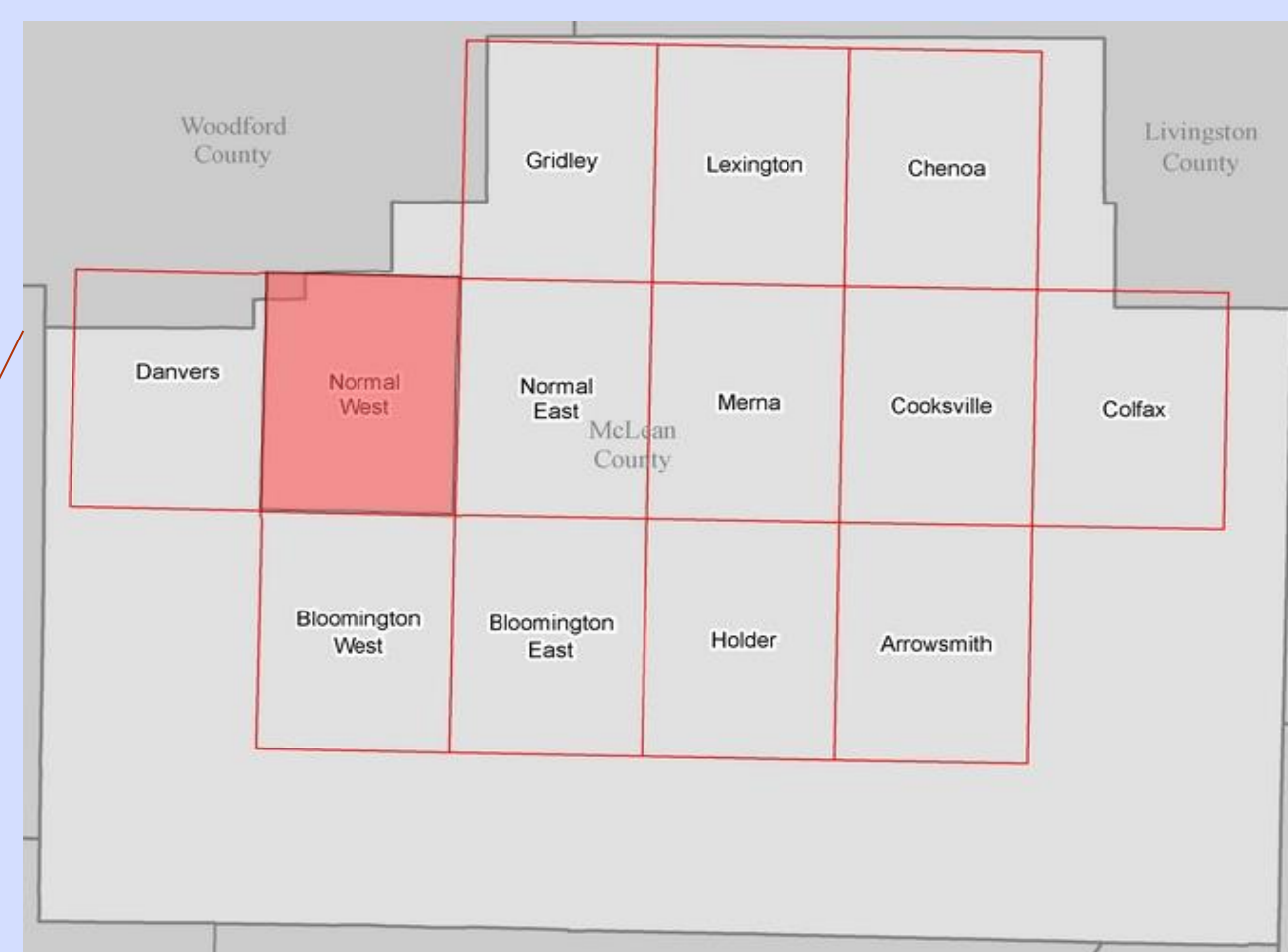


FIG1: Formation polygons based on soils data