

# SURFICIAL GEOLOGIC MAP OF THE MERNA 7.5 MINUTE QUADRANGLE, MCLEAN COUNTY, ILLINOIS



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## Abstract

The Merna 7.5 Minute Quadrangle is located in McLean County, central Illinois. The surficial geology of the Quadrangle is dominated by Quaternary glacial sediment units. Surface deposits are a result of the geologically recent Wisconsin glacial episode. The Quaternary units overly Pennsylvanian bedrock strata. The glacial drift thickness exceeds 100 feet everywhere in the quadrangle. Quaternary sediment units include diamicts of the Wedron Group, Sand and Gravel of the Henry Formation, Silt and Clay of the Peoria Formation, Colluvium of the Peyton Formation, and gravel sand and silt of the Cahokia Formation. Units that are present with less than five feet in thickness were not considered mappable based on the contour interval of the map. The Peoria and Wedron Formations comprise most of the surficial geology of the Quadrangle. The Henry is found only where outwash deposits are thick enough to map. The Cahokia Alluvium is present in mappable abundances in few areas, which are flood plains. The Peyton Colluvium is only found in one small area in a closed depression. Formations were interpreted and mapped based on lithological and thickness descriptions of well data received from the McLean County Soil Survey. The well data was also used in generation of cross sections of the quadrangle by correlating data from multiple described wells. Soil maps from the McLean County Soil Survey were also used in the generation of the final surficial geologic map. Once mapped based on the provided data, the quadrangle was then field checked to correct and perfect any formation contacts.

## Introduction

The Illinoian Glaciation's first advance began 300,000 years ago, and lasted until its final retreat 175,000 years ago. The glacier left geomorphic features as well as sediment deposits that would cover the region. Beginning 25,000 years ago, the Wisconsin Glaciation began its advancement, burying the Illinoian features and sediments that it flowed over until its retreat 10,000 years ago. The Merna Quadrangle is situated in McLean County, Illinois. The region was glaciated by Wisconsinan and Illinoian, as well as pre-Illinoian glaciers, although pre-Illinoian sediment is no longer regionally present. The Wisconsinan Glacier left behind moraines, eskers, and rivers in the area. It also covered the region in the sediments that comprise the modern surface geology.

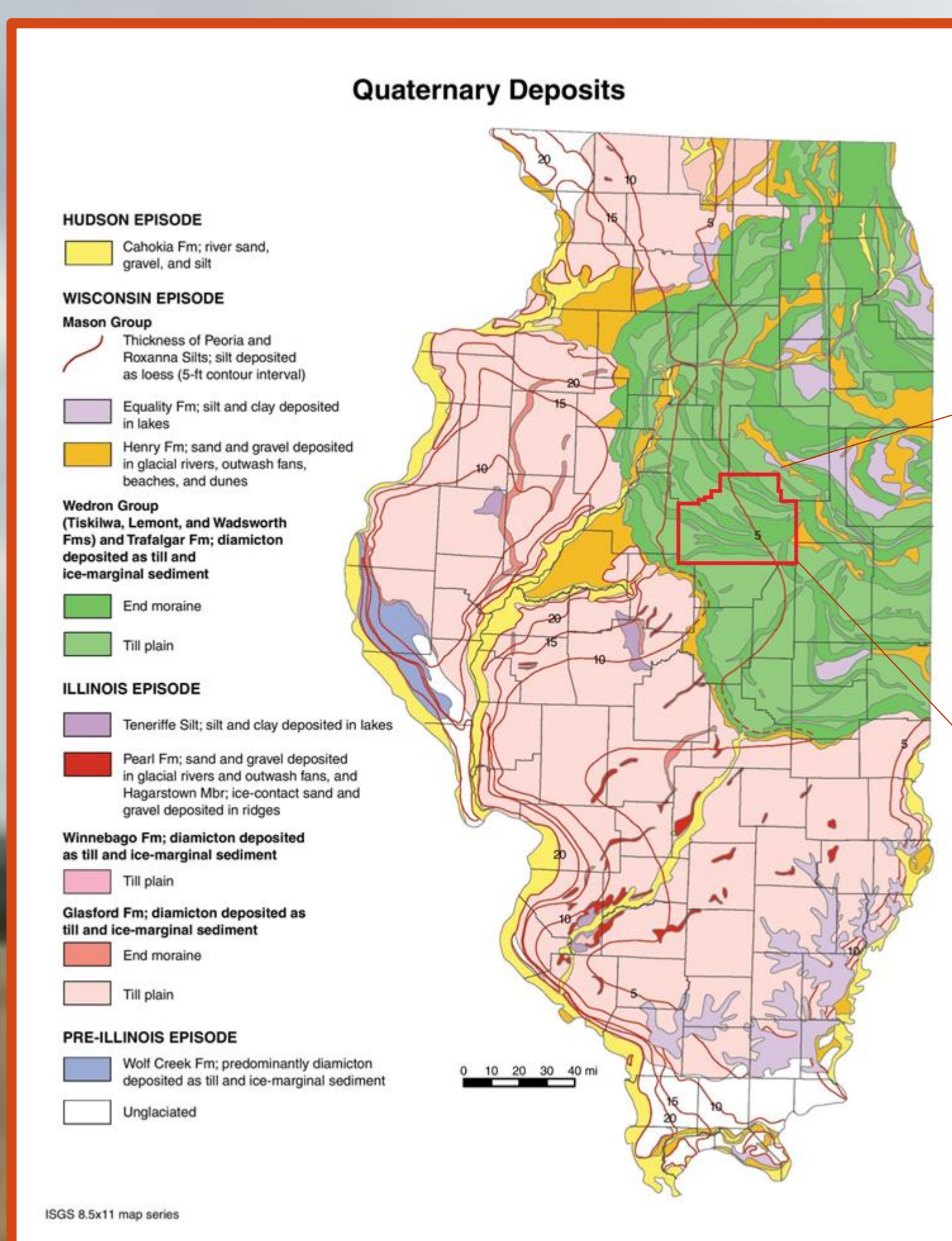
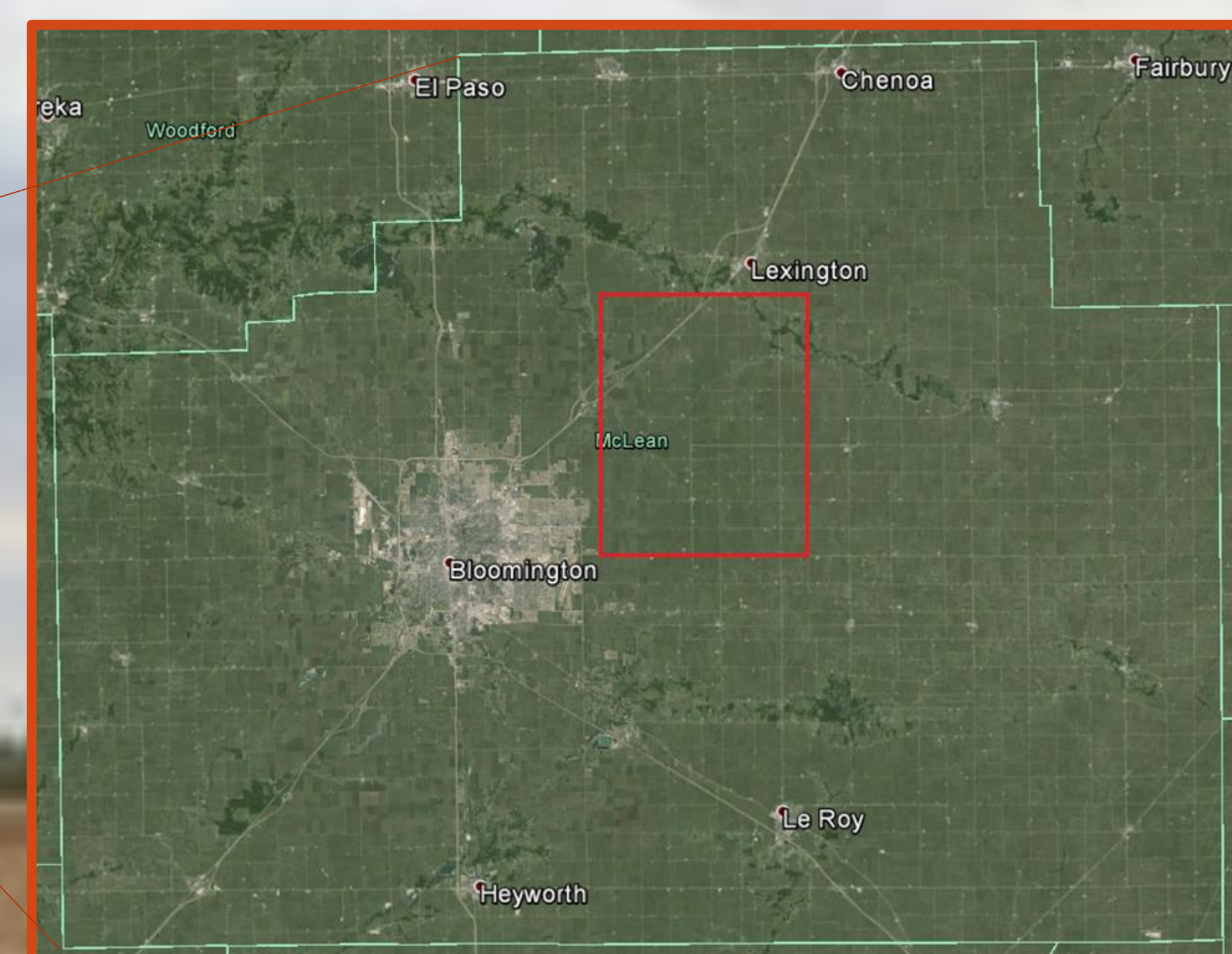


Figure 1: Quaternary deposit map of Illinois, zoomed in to the Merna Quadrangle in McLean County.



## Methods

Formations were interpreted by analyzing lithological descriptions and thicknesses given by the well data provided by the McLean County Soil Survey. Once interpreted, a soils map was generated using the wells. The McLean County LiDAR map was compared both side by side with and as a layer beneath the soils map using ArcMap. This allowed for editing of the soils map using geomorphic features and regional knowledge of sediment occurrence.

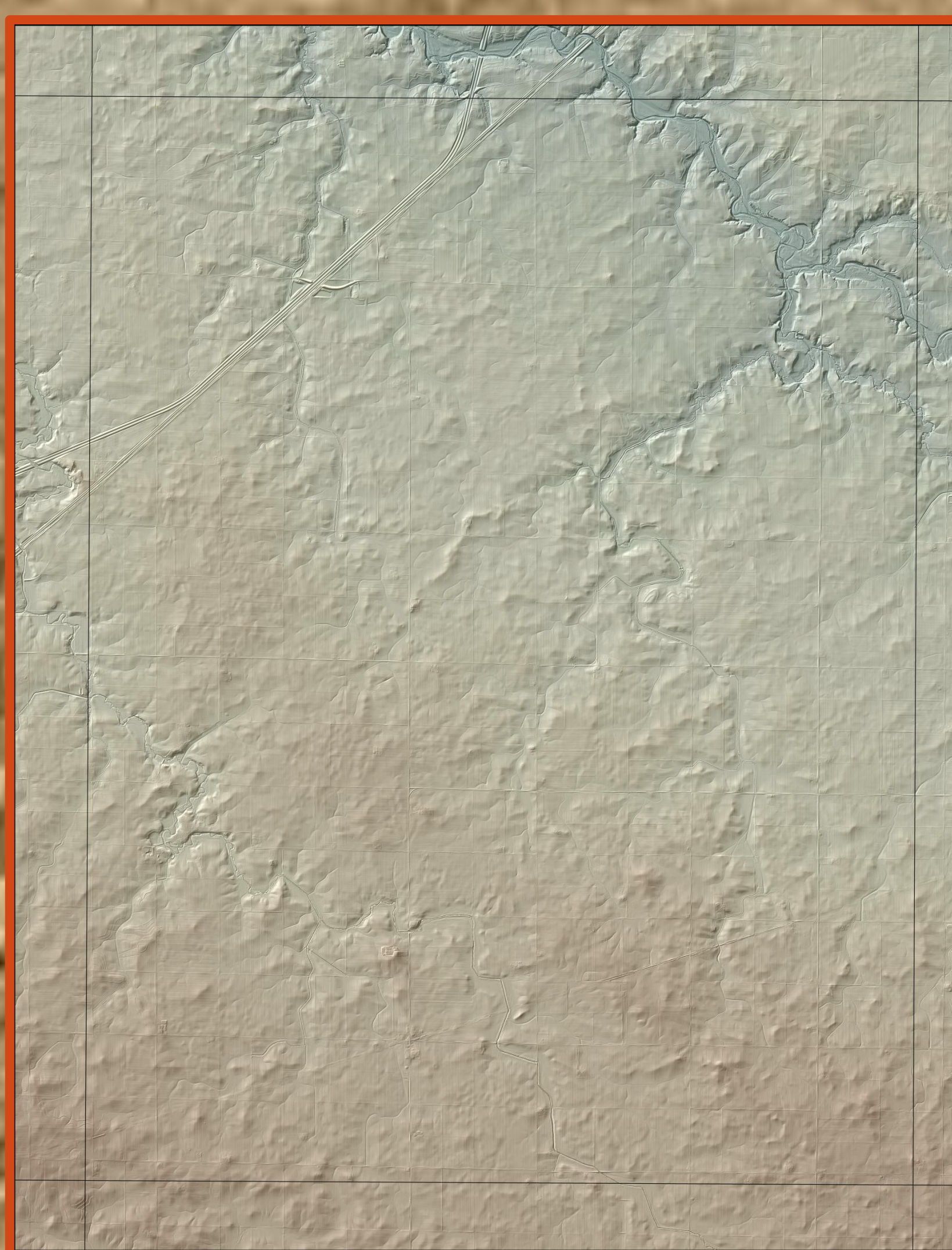


Figure 2: LiDAR digital elevation model of the Merna Quadrangle.

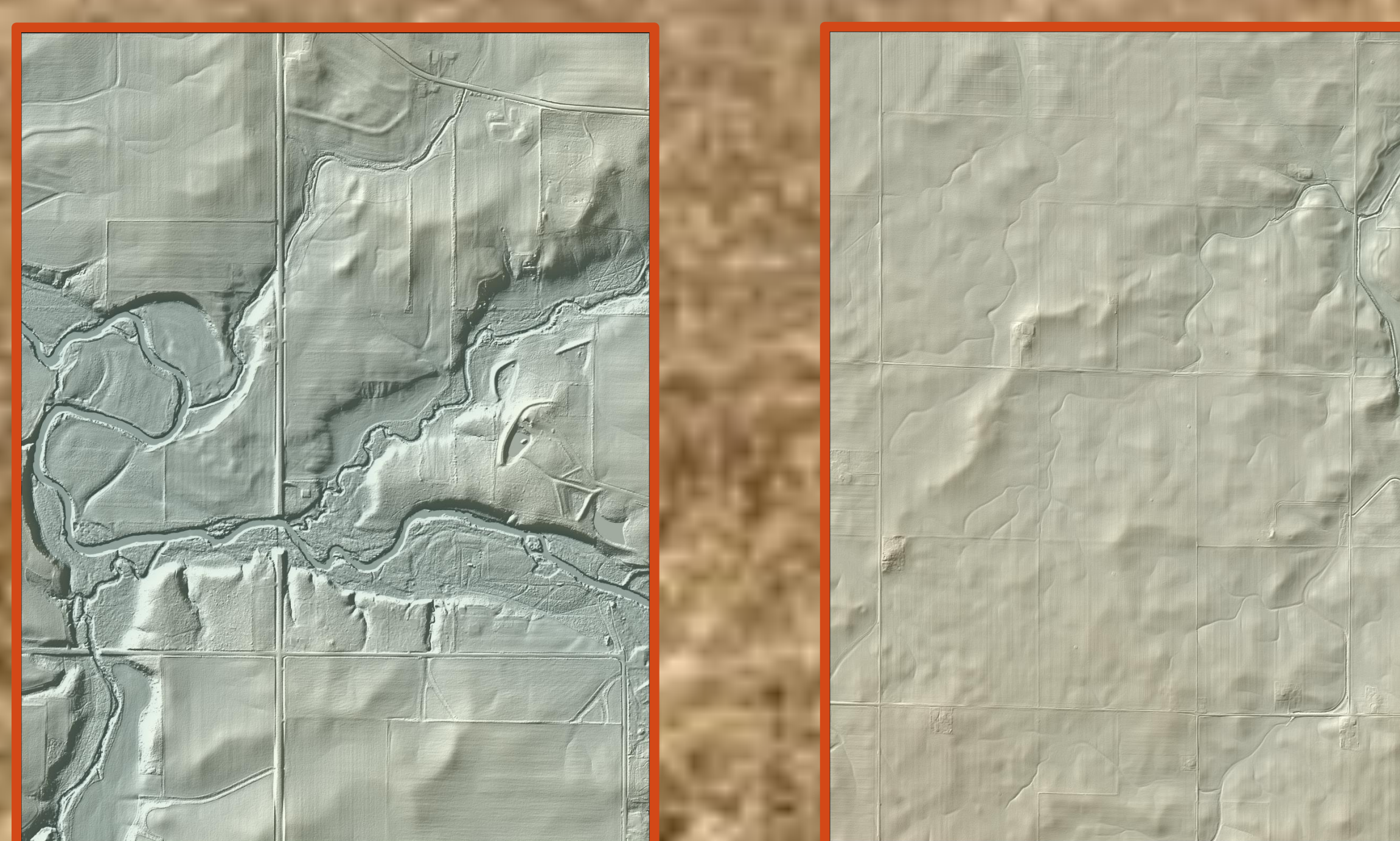
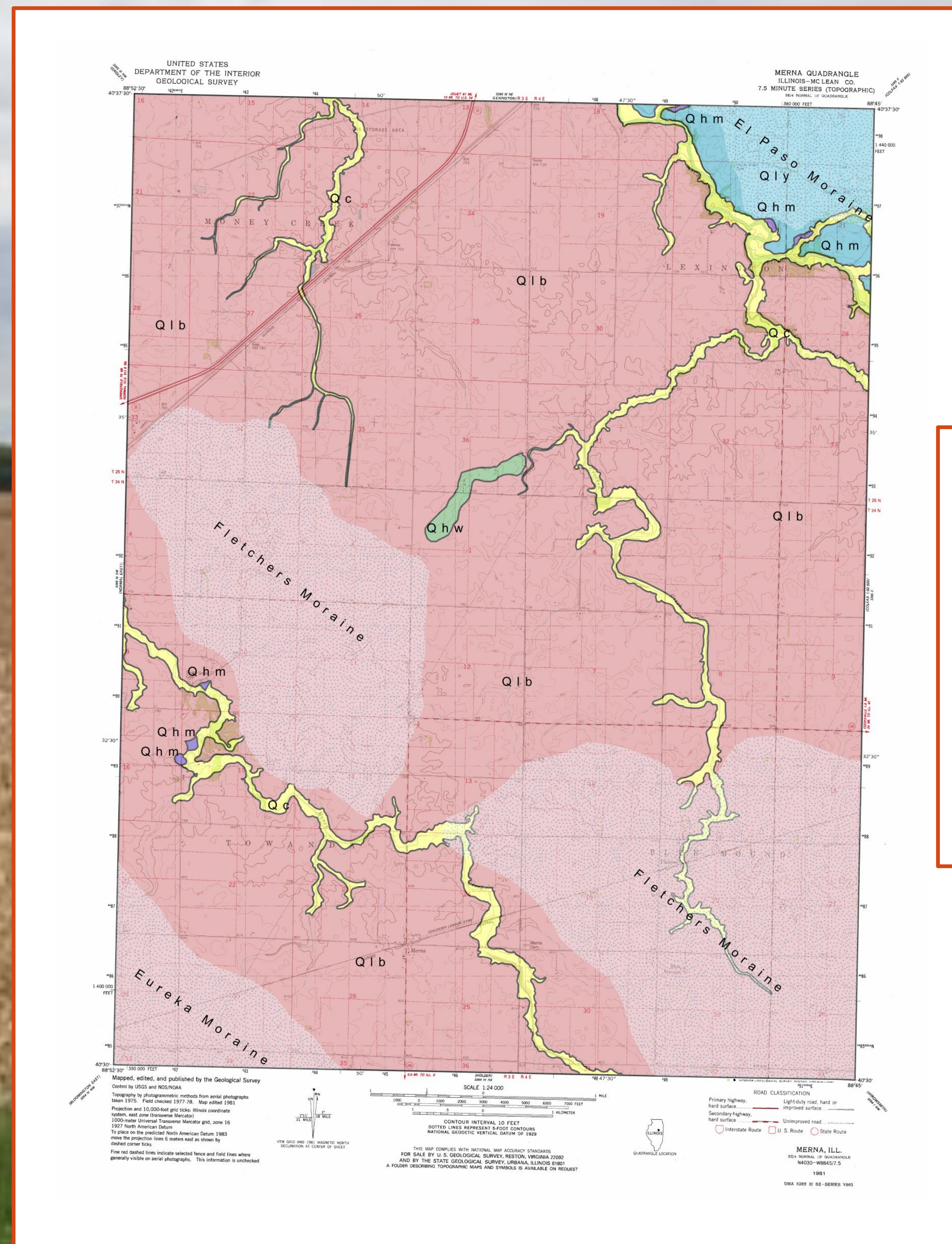


Figure 3: A zoomed in photo of the LiDAR data reveals features that go unseen in field data collection. The Upper image reveals outwash stream valleys in which the Mackinaw member of the Henry Formation is found. The bottom image shows what is interpreted to be an esker, made of sand and gravel deposits of the Wasco Member of the Henry Formation.



## Discussion

Cahokia alluvium fills the Mackinaw River and major creeks. The Batesville member of the Lemont Formation dominates the quadrangle. The Mackinaw River serves as a boundary between the coarser grained Batesville member and the finer grained Yorkville member. This is because the glacier lay dormant long enough to form the El Paso Moraine and Mackinaw River. The Wasco member of the Henry Formation is found in one location on an esker that was inferred from LiDAR geomorphology (Figure 2). The Mackinaw member of the Henry Formation is present in outwash plains that were also inferred from LiDAR geomorphology (Figure 2).

- Qc Cahokia Formation – Alluvium deposit consisting of silt, clay, and gravel.
- Qhm Henry Formation, Mackinaw Member – Sand and gravel outwash deposits.
- Qhw Henry Formation, Wasco Member – Ice contact sand and gravel deposits.
- Qlb Lemont Formation, Batestown Member – Till consisting of blue and gray diamict.
- Qly Lemont formation, Yorkville Member – Till consisting of grey, silty, clay diamict.
- Moraine
- Geologic Contact

## References:

Hansel, A.K. and Johnson, W.H., 1996, WEDRON AND MASON GROUPS: Lithostratigraphic Reclassification of Deposits of the Wisconsin Episode, Lake Michigan Lobe Area: Illinois, Illinois Department of Natural Resources, 4, 25-57 p.

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