

Illinois Preliminary Geologic Map
IPGM Dunlap-SG

Surficial Geology of Dunlap Quadrangle

Peoria County, Illinois

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Dunlap Surficial Geology

The map depicts the geology of the surficial deposits of the Dunlap Quadrangle. On this map, surficial deposits consist of the unconsolidated and residual, alluvial, or glacial deposits which occur at or near the surface of the earth. The map also depicts where lithified strata (bedrock) crop out or are near the surface, but it does not depict the occurrence of loess, which blankets most of the quadrangle. The only previous detailed surficial maps which include this area are by Horberg (1950), who differentiated “Illinoian” and “Wisconsin” drift, glacial outwash, alluvium, and bedrock on his 1:126,720 scale map of the Peoria County area, and Anderson and Hunter (1965), who differentiated “Illinoian” glacial till and outwash deposits, “Wisconsinan” glacial till, outwash, and valley train deposits, sand dunes, slackwater deposits, and alluvium on their 1:63,360 scale map of Peoria County.

The Dunlap Quadrangle is located about two and one-half to three miles west of the edge of the Illinois River Valley (fig. 1). The physiography of the quadrangle is dominated by broad uplands separated by narrow (Jubilee Creek and Hickory and Fargo Runs) to wider stream valleys (Kickapoo Creek) and their associated tributaries. The upland areas are dominated by glacial till overlain by loess (eolian sediments). Superimposed on this physiography is the terminal Buda Moraine and part of the Providence Moraine of the Wisconsin Episode glaciation (fig. 1).

Quaternary sediments were deposited on the bedrock during the last two episodes of glaciation. Pre-Illinois Episode

sediments are present within Peoria County (Udden 1912, Wanless 1957, Stumpf and Weibel 2005), but have not been found within the Dunlap Quadrangle. During the Illinois glacial episode, glaciers generally advanced westerly and retreated to the east across the area (Lineback 1979). These glaciers eroded the existing landscape and deposited the diamicton of the widespread Glasford Formation in the Dunlap Quadrangle. In the adjacent Oak Hill Quadrangle, Willman and Frye (1970) recognized three members of the Glasford in a roadcut exposure, now covered, in the “Jubilee College Section” (SW/4, SW/4, SW/4, Sec. 7, T10N, R7E), about 1/4 mile west of the of the Dunlap Quadrangle. The members, in ascending order, are Hulick Till Member, Toulon Member, and Radnor Till Member. Willman and Frye considered the Toulon to represent outwash deposits associated with the Hulick Till and pro-glacial deposits associated with the Radnor Till, separated by an unnamed soil horizon. The Sangamon Geosol, which represents the interglacial (between the Illinois and Wisconsin Episodes of glaciation) Sangamon Episode (Hansel and Johnson 1996), also was exposed near the top of the Radnor Till at the Jubilee College Section. The Sangamon Geosol is not exposed in the Dunlap Quadrangle.

During the ensuing Wisconsin Episode glaciation, glaciers advanced from the east and covered over half of the quadrangle. As the Wisconsin Episode glaciers stagnated and retreated, large amounts of meltwater transporting outwash and alluvium flowed down Kickapoo Creek and Fargo Run valleys, depositing these sediments along the streams and along the valley slopes. The combination of meltwater erosion and sediment deposition resulted in the noticeably wider

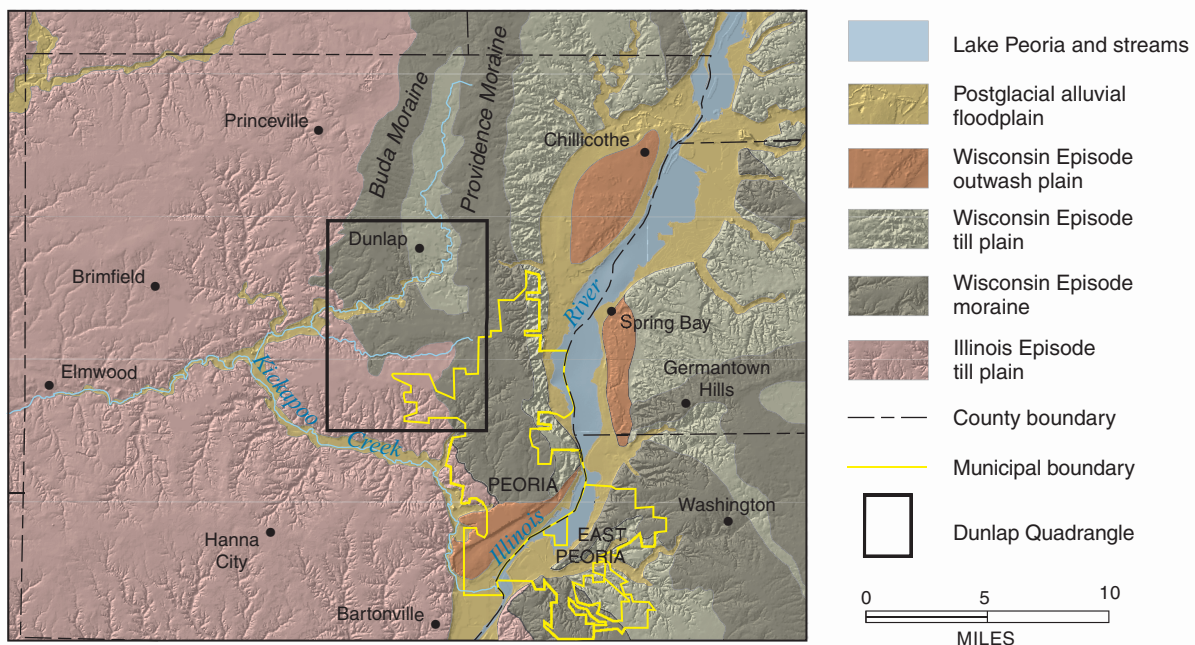


Figure 1 Shaded relief map of the Dunlap Quadrangle area with a superimposed, generalized Quaternary Geology map. Modified from Willman and Frye (1970), Illinois State Geological Survey (2000), and Luman et al. (2003). The quadrangle is on the edge of Wisconsin Episode glacial deposits, represented by the Buda Moraine.

stream valley of the modern Kickapoo Creek and its associated tributaries. Subsequent erosion has removed some of the outwash deposits from the valley slopes.

Lacustrine sediments were deposited during the retreat and stagnation of the Wisconsin Episode glaciers and occur in three areas of the quadrangle. In the northeast quadrant, a temporary meltwater lake formed behind the Buda Moraine where lacustrine sediments accumulated until the Kickapoo outwash channel drained the lake. In the southeast quadrant,

a second temporary meltwater lake formed in front of the Buda Moraine but behind a southward trending finger of the terminal moraine. A third occurrence of lacustrine deposits is situated near the western edge of the quadrangle along Kickapoo Creek. This deposit formed when valley train and outwash deposits dammed the Illinois River valley just south of Peoria (Willman 1973). During the damming of the creek extensive lacustrine deposits accumulated within the Kickapoo Creek watershed. Most lacustrine deposits occur up to an elevation of about 580 feet M.S.L., which indicates

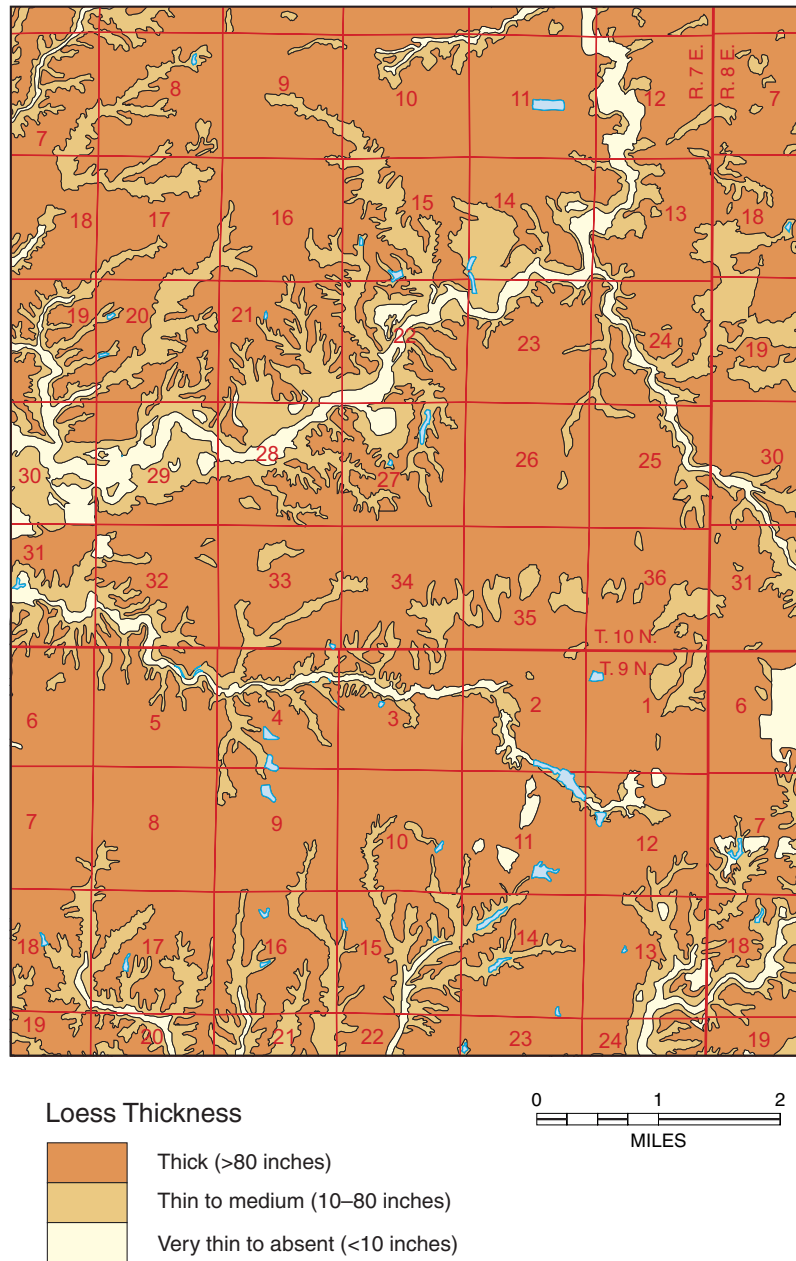


Figure 2 Generalized loess thickness map of the Dunlap Quadrangle. Where the Tiskilwa Formation is present, the loess consists only of the Peoria Silt; where the Tiskilwa is absent, the loess consists of the undifferentiated Peoria and Roxana Silts. According to McKay (1979), the distinguishing characteristics of the two silts are subtle in many areas (McKay 1979), including an exposure just to the west of the quadrangle, in Sec. 7, T10N, R7E (Follmer et al. 1979). In areas where loess is absent, the loess has been eroded or is incorporated into the soil. Areas of disturbed ground are not shown on this map. Modified after Walker (1992).

that the lake level was at a higher elevation. Eventually the dam was breached and the lake was drained. Subsequent downcutting by erosion has removed significant portions of the lacustrine sediments.

During both the Illinois and Wisconsin glacier episodes, westerly winds eroded silt from the floodplains of the Illinois and Mississippi River valleys, floodplains of other river valleys and from the numerous outwash channels and floodplains, including the outwash channel that is the modern Kickapoo Creek. These sediments, which are composed of the Roxana Silt and the overlying Peoria Silt, formed the blanket deposits of loess that occur throughout the region (fig. 2). The Roxana was deposited during the earlier Athens Subepisode of the Wisconsin Episode, prior to deposition of the Tiskilwa Formation, whereas the Peoria was deposited during later Michigan Subepisode (Hansel and Johnson 1996). In the adjacent (to the east) Spring Bay Quadrangle, Stumpf and Weibel (2005) had mapped the Peoria Silt as a separate unit where it succeeds the Tiskilwa Formation. An attempt was made to duplicate the mapping of that unit in the Dunlap Quadrangle, but the results were too inconsistent to be included on this map.

From the time that the glaciers retreated from the area, stream and fluvial erosion has continued to remove the most recent glacial deposits, including the loess, and also to expose older Quaternary strata and bedrock.

Methods

The surficial geology map was constructed by interpretations of the parent materials from soils surveys (Soil Conservation Service 1992, Illinois NRCS 2005), outcrop observations, interpretations of borehole data, and maps and field notes from previous researchers. Some boundaries were modified after study of aerial photo and topographic maps. Stratigraphic nomenclature follows Willman and Frye (1970) as modified by Hansel and Johnson (1996).

Acknowledgments

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