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THICKNESS OF QUATERNARY DEPOSITS OF TAZEWELL COUNTY, ILLINOIS

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Quaternary deposits are sediments deposited during the last 2 million years. In Illinois, these deposits are much younger than the bedrock on which they lie, and are unlithified, meaning they are loosely packed and not cemented together into "solid rock". In Tazewell County, these deposits can contain important groundwater resources where they are permeable enough to be considered aquifers, and they can also form a natural barrier that protects aquifers from contamination where their permeability is very low. Thick, impermeable Quaternary deposits may also protect groundwater aquifers from contaminants applied at the surface. For these reasons, the thickness of Quaternary deposits is an important factor in determining aquifer sensitivity.

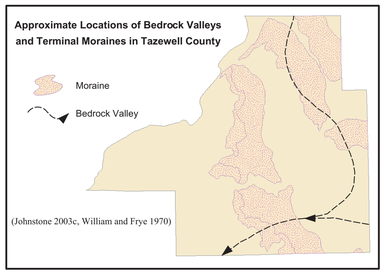
This map was created by comparing the elevation of the topographic surface to that of the top surface of bedrock. Data for the surficial topography was acquired from the U. S. Geological Survey's 1:24,000 DLG and DRG files (Johnstone and McGarry, 2003). Data to model the elevation of the bedrock surface was compiled from well records (Johnstone, 2003a), augmented by data from a report covering southeast Tazewell County (Herzog et. al, 1995). Elevation grids were generated for both surfaces, then the bedrock elevation grid was subtracted from the surface elevation grid to produce a grid of thickness values. In a few small areas the grids intersected where the grid-producing algorithm projected the bedrock surface above the land surface. Fieldwork was performed to outline these areas where bedrock was exposed at the surface. In these instances, the bedrock was observed only on the very steepest slopes and even there it was covered by a thin layer of Quaternary material. For this reason, the map does not show any areas where Quaternary materials are completely absent.

In Tazewell County, the Quaternary sediments can be divided into three broad groups; unsorted sediments ("till") deposited by glaciers, moderately-sorted outwash deposited by glacial meltwater, and well-sorted modern stream and floodplain deposits (Johnstone, 2003b). Furthermore, the surface of most of Tazewell County is covered by a layer of loess (wind-blown silt) varying from a few to tens of feet thick. This map of Quaternary deposit thickness displays some easily recongized trends that reflect the results of complex interactions between the topography of the bedrock surface and erosion and deposition by glaciers and by modern streams.

The Quaternary deposits, commonly called "drift", are thickest in the eastern part of the county and became thinner to the west. Two overlapping trends are responsible for this thickness variation. The bedrock surface is marked by two major valleys, one running north-south along the eastern edge of the county, and the other running east-west along the southern edge. There is also a significant bedrock high stretching between East Peoria and Pekin, and a few smaller bedrock "hills". During glaciation, the bedrock valleys were filled with glacial till and outwash sediments, while the bedrock highs were eroded by the flowing ice. The deposits left by glaciation are thickest at the farthest edge of glacial advance, in the feature called a terminal moraine. One of these moraines, named the LeRoy, crosses Tazewell County from north of East Peoria following an arc to the south and east. A second, the Bloomington, covers the northeast corner of the county. (see inset map).

These bedrock valleys and terminal moraines each result in local thickening of the Quaternary sediments and, where the two features overlap, the Quaternary deposits can be more than 400 feet thick. Furthermore, since the moraines represent the limit of the youngest glacial advance, the drift is generally thicker east of this margin (see inset map showing terminal moraines), where the most recent glaciers deposited till, than to the west where the last glaciers never reached. The Mackinaw River has dissected some of the areas underlain by the thickest Quaternary deposits. For more information on the bedrock topography and Quaternary history of Tazewell County, see Johnstone (2003b) and Johnstone (2000c).

Approximate Locations of Bedrock Valleys and Terminal Moraines in Tazewell County



(Johnstone 2003c, William and Frye 1970)

Thickness in Feet

- 0 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 125 - 150
- 175 - 200
- 200 - 250
- 275 - 300
- 325 - 350
- 375 - 400
- 425 - 475
- 100-ft Isopach
- 25-ft Isopach

1:62,500

(1 inch equals approximately 1 mile)

1 0 1 2 3 4 Miles

1 0 1 2 3 4 5 Kilometers

Lambert Conformal Conic Projection

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