Illinois Preliminary Geologic Map
IPGM Antioch-SG

Surficial Geology of Antioch Quadrangle

Lake County, Illinois and Kenosha County, Wisconsin

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Regional Setting

The surficial geology of the Antioch Quadrangle is primarily the result of glacial activity of the last (Wisconsin Episode) glaciation occurring between about 25,000 and 14,000 radiocarbon years ago. During this period, diamicton (a mixture of clay, silt, sand, and rocks) was deposited under, on top of, and adjacent to the ice sheet. Meltwater generated from the glaciers was drained through subglacial channels or in rivers flowing away from the ice. Where glaciers or sediment blocked drainage (marginal to and on top of the ice), lakes were formed. Since about 14,000 years ago (Hudson Episode), the ice melted and the materials have been reworked by modern water and slope processes.

The surface diamicton unit in the map area, the Wadsworth Formation, forms a hummocky morainal upland comprising segments of the Valparaiso Morainic System and Tinley Moraine west of Lake Michigan (fig. 1). The Wadsworth diamicton is a till that was deposited beneath the glacier. The diamicton is fairly uniform, however, it can also be comprised of interbeds of sorted material (glacial, river, and lake sediments), suggesting that materials deposited by debris-rich ice were significantly reworked at the margin and under the ice sheet. Although predominantly fine-grained, the upper part of the diamicton may have a sandier texture, especially at the base of slopes or in depressions on the

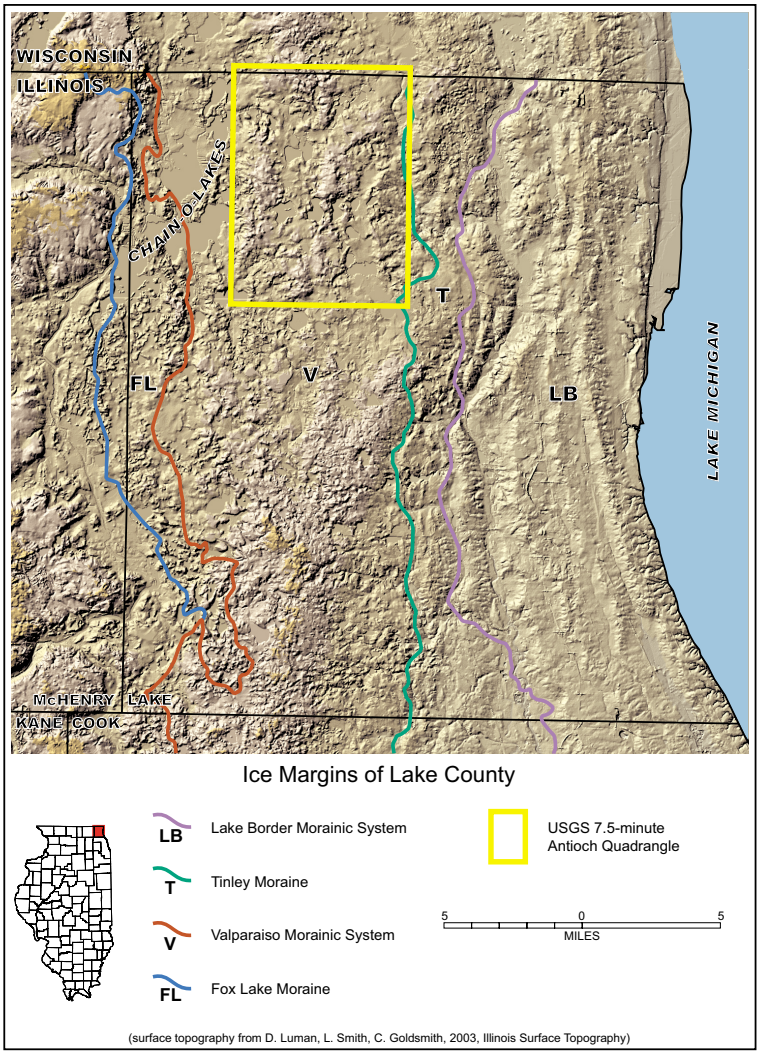

Figure 1 Ice Margins of Lake County.

uplands, where it has been modified by slope processes or water.

Outwash sand and gravel (Henry Formation) and modern river and stream sediment (Cahokia Formation) comprise the terrace and floodplain deposits along some of the larger streams, but these deposits are generally sparse. Sand, locally found upslope at the margin of some modern lakes, may also represent sediment deposited on beaches when the lakes were much larger in the area.

Water-deposited, stratified silt or silty clay sediments (Equality Formation) occupy broad low-lying areas along active/inactive drainage ways connecting many of the lakes, as well as areas adjacent to larger streams. In most places, these sediments are thin and may overlie deposits of laminated and bedded clay and silt representative of former lakes. In other areas, these stratified sediments are present along shallow drainage ways and footslope positions within the hummocky morainal topography.

Occupying similar positions on the landscape as Equality Formation sediments are deposits of peat, muck, and organic-rich silt. These deposits, mapped as the Grayslake Peat, often compose thin lenses of organic material that lie above or are interfingered with gleyed silt and clay deposits of the Equality Formation. The Grayslake Peat also is present on morainal uplands adjacent to lakes and in the deeper depressions where sediment and organic material has accumulated.

Methodology

The Surficial Geology map is based largely on digitized soil maps (1:15,840-scale) for Lake County, Illinois (Paschke and Alexander 1970) and Kenosha and Racine Counties, Wisconsin (Link and Demo 1970). Initially, mapping involved grouping individual soil series according to their parent material following the classification key in Soils of Illinois (Fehrenbacher, et al. 1984). Profile descriptions not included in the soil survey reports, and updated soil series descriptions, accessed on the United States Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) web page (http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi) were used in grouping the parent materials. The parent materials were then mapped. The accuracy of the parent material map units were validated using unpublished data gathered by the USDA-NRCS soil scientists along sampling transects (135 total point observations) and data from hand auger borings completed by the ISGS or consultants during preliminary site evaluations for subdivision developments. Following our validation, the parent material map units were grouped into more general geologic material classes, comprising five surficial geology mapping units, following Hansel and Johnson (1996). This process reduced the number of map units to a level that would be discernable on a 1:24,000-scale map. The surficial materials mapped were further verified at specific locations during fieldwork. Continuous cores to depths ranging from 10 to 275 feet were acquired at 44 sites on a variety of geomorphic positions to examine landform-sediment relationships.

The data points shown on this map include the ISGS boreholes, and other engineering and stratigraphic test boreholes whose descriptive logs have sufficient information to validate the surficial mapping unit (fig. 2). They also include the hand auger borings, which, although often less than 10 ft in depth, provide information that better defines the spatial extent of shallow peat and lake deposits. It is assumed that the thickness of each surficial geologic unit is at least 5 feet (the minimum depth that soil mappers auger) unless drilling, field observations, or records suggested otherwise. The legend of the surficial geology units provides additional information on the variability of materials encountered in different geologic mapping units.

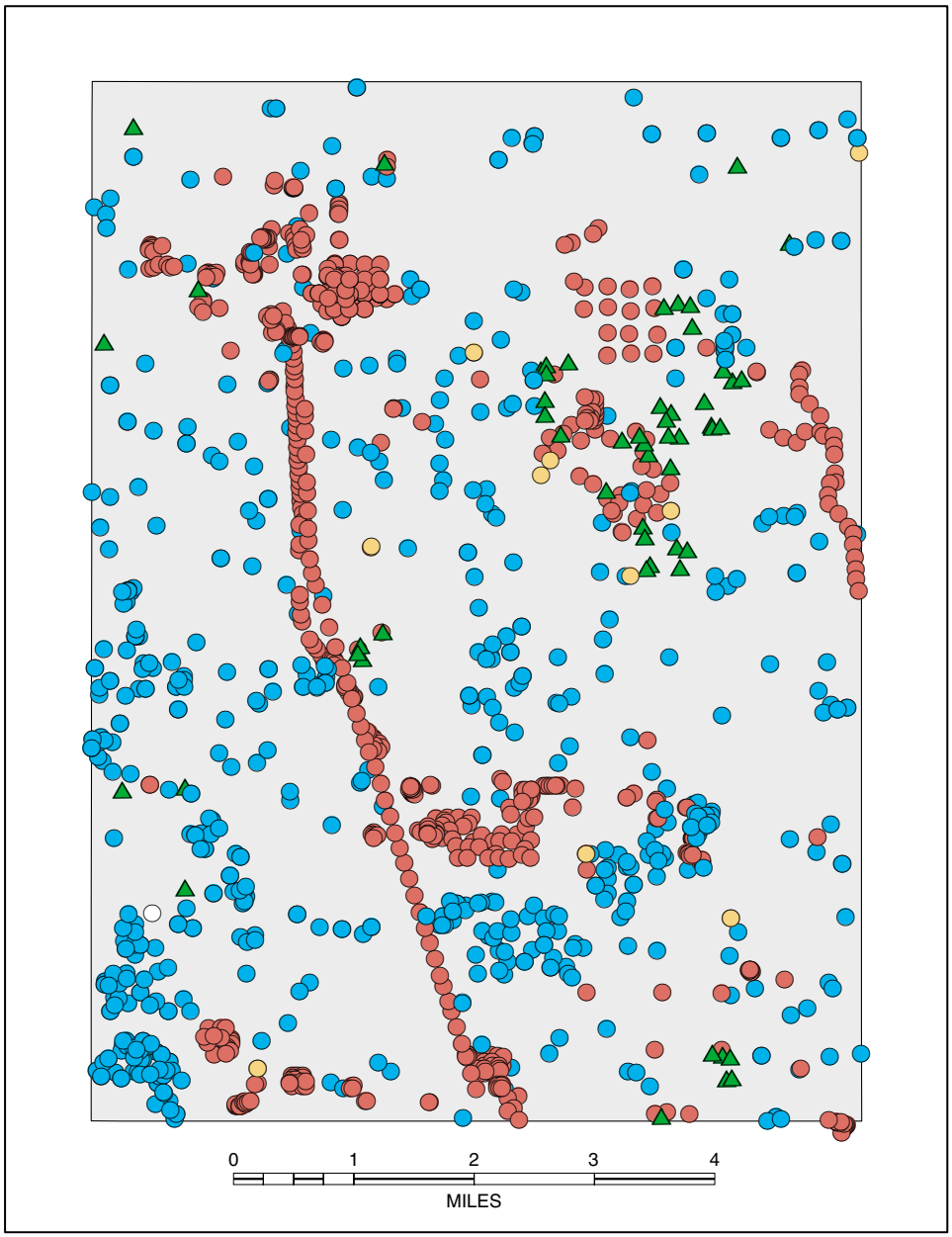

Figure 2 Distribution of well data.

Acknowledgments

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The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government or the State of Illinois. This map is based on the most reliable information available at

present, but, because of project objectives and the scale of mapping, interpretations from it should not preclude more detailed site investigations specific to any other project.

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