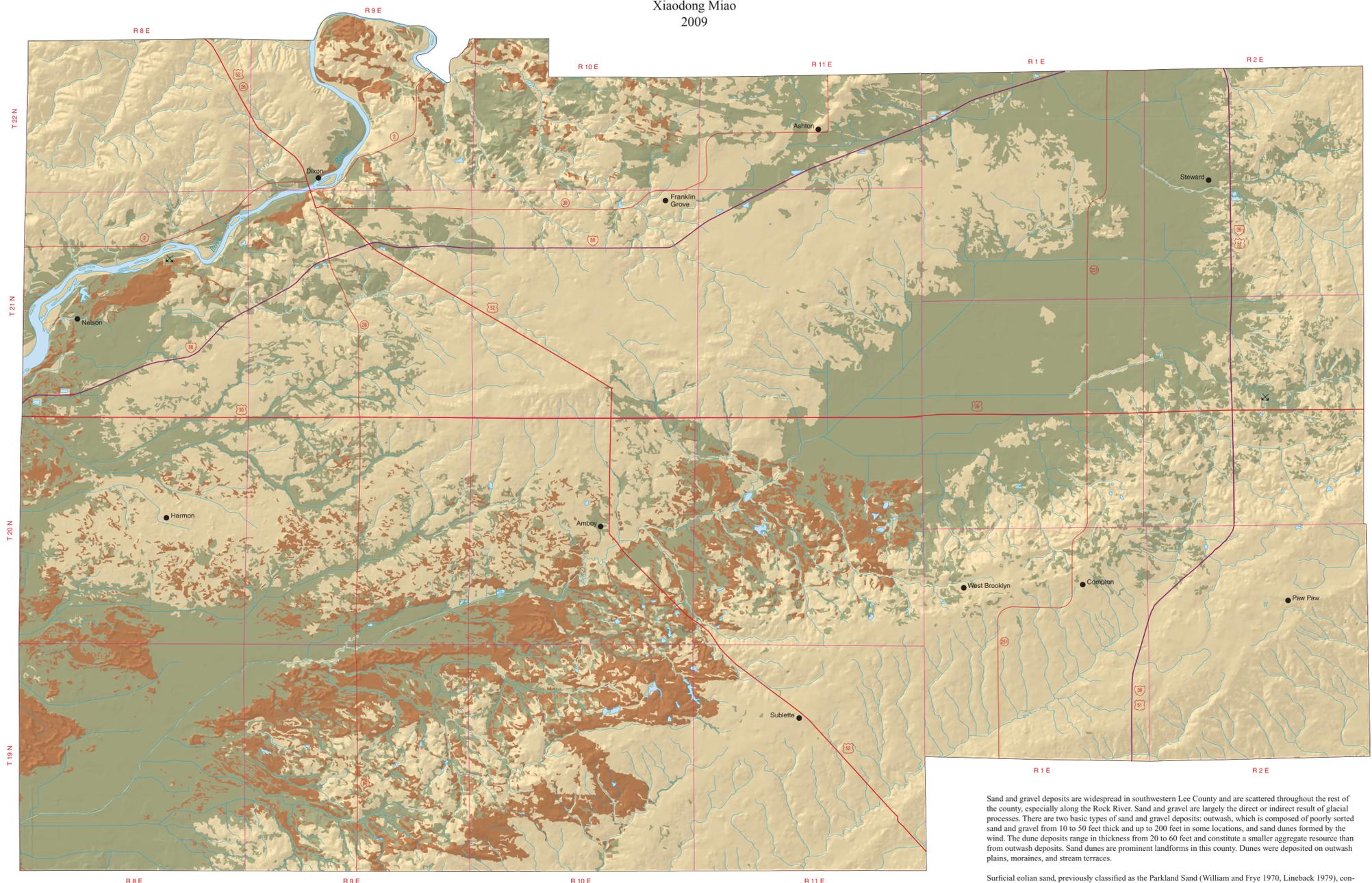


DISTRIBUTION OF SURFICIAL EOLIAN AND OUTWASH SAND DEPOSITS LEE COUNTY, ILLINOIS

Institute of Natural Resource Sustainability
William W. Shilts, Executive Director
ILLINOIS STATE GEOLOGICAL SURVEY
E. Donald McKay III, Interim Director

Illinois County Geologic Map
ICGM Lee County-SS

Xiaodong Miao
2009



Sand and gravel deposits are widespread in southwestern Lee County and are scattered throughout the rest of the county, especially along the Rock River. Sand and gravel are largely the direct or indirect result of glacial processes. There are two basic types of sand and gravel deposits: outwash, which is composed of poorly sorted sand and gravel from 10 to 50 feet thick and up to 200 feet in some locations, and sand dunes formed by the wind. The dune deposits range in thickness from 20 to 60 feet and constitute a smaller aggregate resource than from outwash deposits. Sand dunes are prominent landforms in this county. Dunes were deposited on outwash plains, moraines, and stream terraces.

Surficial eolian sand, previously classified as the Parkland Sand (William and Frye 1970, Lineback 1979), consists of geomorphologically distinct dune sand and relatively flat-lying sand sheets in inter-dune areas. Eolian sand is very well sorted, medium to fine grained, and contains no gravel. Most dunes have parabolic, compound parabolic, transverse, or dome forms, and are stabilized by vegetation cover under the current climate regime (Miao et al. 2009). Trees and grass live mostly on the uplands. Dune orientation and internal cross-bedding structure consistently indicate that winds from the northwest and west were responsible for dune construction, similar to the current prevailing wind direction in this region. Some dunes preserve one or two buried soils, indicating long-term landscape stability. Seven optically stimulated luminescence ages (OSL or optical ages) indicate that major dune construction in the Green River Lowland occurred around 17,000 to 18,000 years ago (Miao et al. 2009). Eight optical and four radiocarbon ages indicate that the dunes were reactivated episodically during the Holocene, implying a high potential for future sand activation, regardless of human-induced climate changes and associated global warming (Miao et al. 2009).

Most of the outwash sand and gravel in Lee County is of Wisconsinian age. Sand and gravel of Illinoian age, and possibly older, crops out along some of the deeper valleys but is overlain by thick overburden under the uplands. The absolute age of the Wisconsinian outwash is not clearly known, and application of OSL on the outwash is an important issue for future mapping and research. Thick Wisconsinian glaciofluvial outwash (sand and gravel), classified as the Batavia Member of the Henry Formation (Willman and Frye 1970, Lineback 1979), was deposited adjacent to the Bloomington Morainic System in Lee County. Therefore, outwash sand may not be well sorted and commonly coexists with gravel. Outwash deposits provide an abundant source of sand and gravel for the aggregate industry.

Eolian and outwash sands are not mutually exclusive because eolian sand is deposited on glaciofluvial outwash in many places in the Green River Lowland. Eolian and glaciofluvial sediments were differentiated based on topography and parent materials interpreted from the Lee County Soil Survey (United States Department of Agriculture 2005), water and related well records and grain size data. For example, lobe-like sand deposited on the Bloomington Morainic System is also classified as eolian, because only wind can blow the sand uphill onto the topographically high moraine.

Although outwash sand is an important aggregate resource in Lee County, dune sand is highly valued by industry, mostly for use in foundries for making high-quality metal castings. The modal particle size of the dune sand of the Green River Lowland is around 250 μ m (sieve 60), which is the perfect size for application as foundry sand. In addition, dune sand is also very well sorted, making it ideal for application in the foundry industry.

References

- Lineback, J.A., 1979, Quaternary deposits of Illinois: Illinois State Geological Survey, map, 1:500,000.
Miao, X.D., P.R. Hanson, H. Wang, and A.R. Young, 2009, Timing and implications for sand dune development in the Green River Lowland of Illinois, upper Midwestern United States: Geological Society of America Abstracts with Programs, North-Central Section, v. 41, no. 4, p. 64.
United States Department of Agriculture, Soil Conservation Service, 2005, Soil Survey of Lee County, Illinois. Willman, H.B., and J.C. Frye, 1970, Pleistocene stratigraphy of Illinois: Illinois State Geological Survey, Bulletin 94, 204 p.

Base map compiled by Illinois State Geological Survey from 1:100,000-scale Digital Line Graph data provided by the United States Geological Survey, North American Datum of 1983 (NAD 83), Lambert Conformal Conic Projection.

Geology based on field work and data compilation by Xiaodong Miao, 2007.

Digital cartography by Jane E.J. Domier and Steve M. Radil, Illinois State Geological Survey.

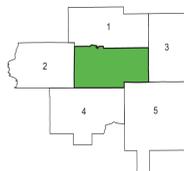
The Illinois State Geological Survey and the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this document and accept no liability for the consequences of decisions made by others on the basis of the information presented here. The geologic interpretations are based on data that may vary with respect to accuracy of geographic location, the type and quantity of data available at each location, and the scientific and technical qualifications of the data sources. This map is not meant to be enlarged.

This map provides a general view of sand distribution. It does not replace the need for detailed investigations of specific sites.

Recommended citation:
Miao, X., 2009, Distribution of Surficial Eolian and Outwash Sand Deposits, Lee County, Illinois: Illinois State Geological Survey, Illinois County Geologic Map, ICGM Lee County-SS, 1:100,000.



For more information contact:
Institute of Natural Resource Sustainability
Illinois State Geological Survey
615 East Peabody Drive
Champaign, Illinois 61820-6964
(217) 244-2414
<http://www.isgs.uiuc.edu>



ADJACENT
COUNTIES
1 Ogle
2 Whiteside
3 DeKalb
4 Bureau
5 La Salle

1 1/2"
N
MILSON DILLON/PAUL HUBER/BRILL
APPROXIMATE MEAN
DECLINATION, 2009

-  Eolian sand on outwash or moraine
-  Outwash deposits
-  Non-sand
-  Active sand and gravel pit



© 2009 University of Illinois Board of Trustees. All rights reserved.
For permission information, contact the Illinois State Geological Survey.

-  Interstate Route
-  U.S. Route
-  State Route
-  Other paved roads