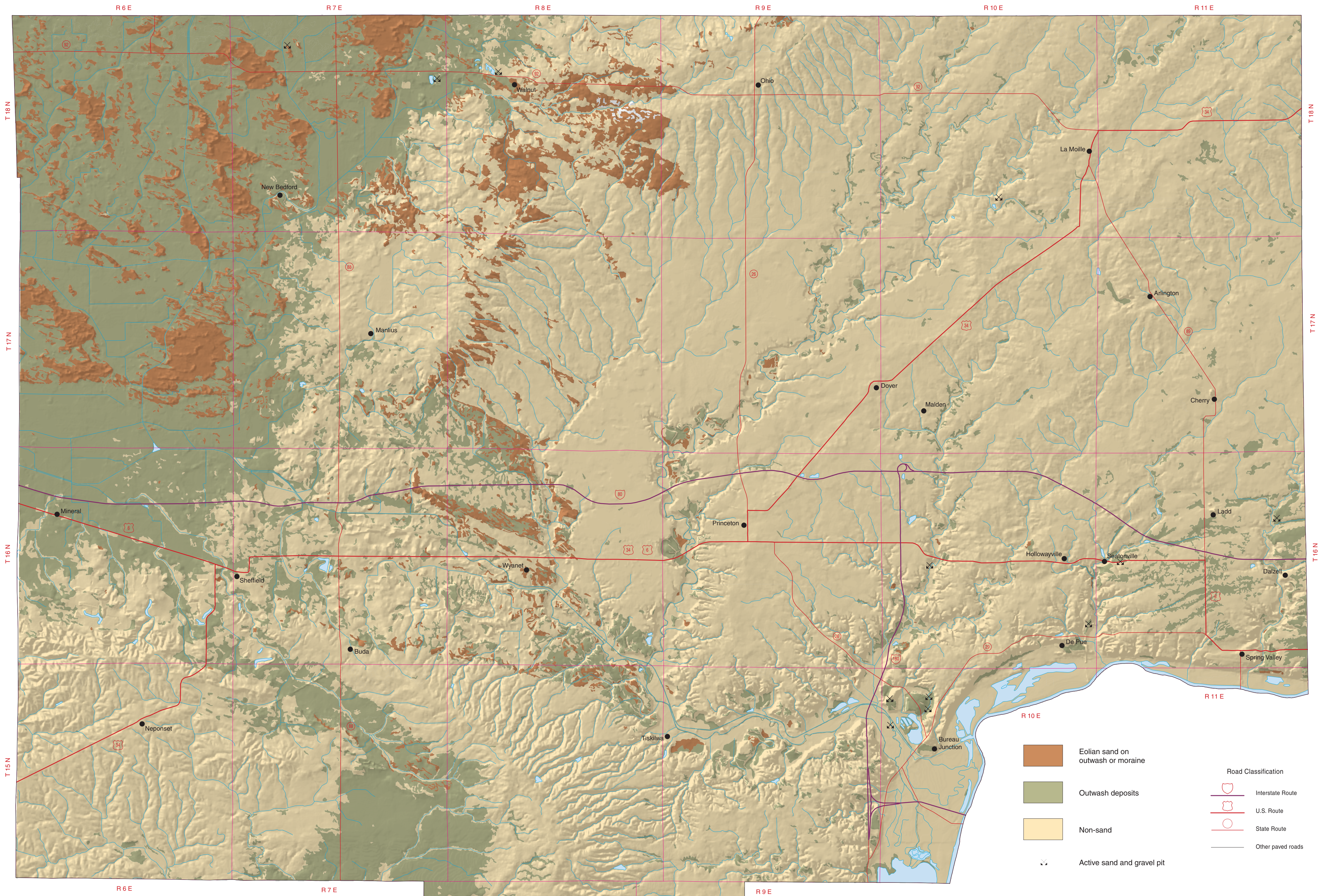


Institute of Natural Resource Sustainability
William W. Shilts, Executive Director
ILLINOIS STATE GEOLOGICAL SURVEY
E. Donald McKay III, Interim Director

DISTRUBUTION OF SURFICIAL EOLIAN AND OUTWASH SAND DEPOSITS BUREAU COUNTY, ILLINOIS

Illinois County Geologic Map
ICGM Bureau County-SS

Xiaodong Miao
2009



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.

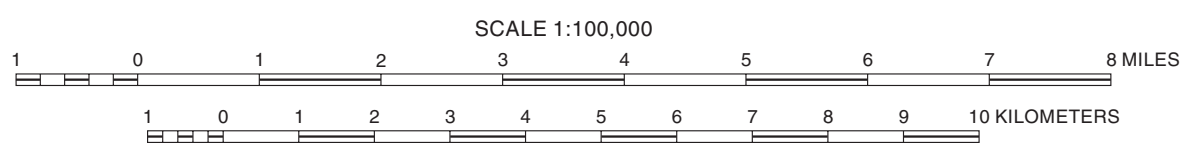
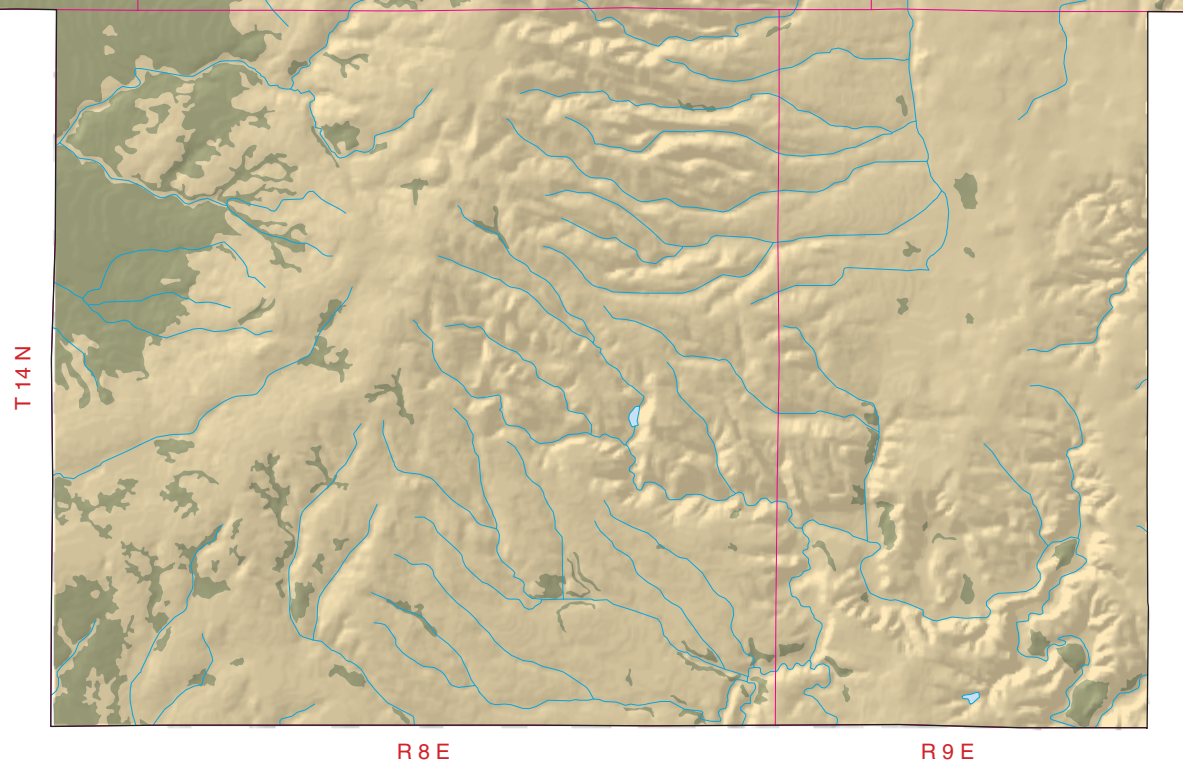
Digital cartography by Jane E.J. Domier and Steve M. Radil, Illinois State Geological Survey.

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

Recommended citation:

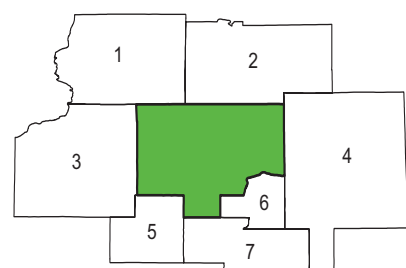
Miao, X., 2009, Distribution of Surficial Eolian and Outwash Sand Deposits, Bureau County, Illinois: Illinois State Geological Survey, Illinois County Geologic Map, ICGM Bureau County-SS, 1:100,000.



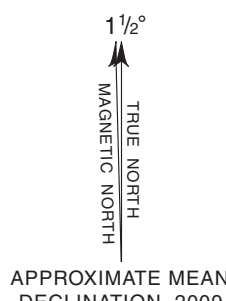
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ADJACENT COUNTIES
1 Whiteside
2 Lee
3 Henry
4 La Salle
5 Stark
6 Putnam
7 Marshall



Sand and gravel deposits are widespread in northwestern Bureau County along the southern edge of the Green River Lowland and scattered throughout the rest of the county. These deposits 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 the outwash deposits. Sand dunes are prominent landforms in this county. They were deposited on outwash plains, moraines, and stream terraces.

Surficial eolian sand, previously classified as the Parkland Sand (Willman 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. The most distinct parabolic dune, with a height of 50 feet and a length of over one-half mile, is located 3 miles west of New Bedford, in the northwestern part of Bureau County. 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 Bureau County is of Wisconsinan 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 Wisconsinan outwash is not clearly known, and application of OSL on the outwash is important for future mapping and research. Thick Wisconsinan 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 Moraine System in Bureau 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 Bureau County Soil Survey (United States Department of Agriculture 1992), water and related well records, and grain size data. For example, lobe-like sand deposited on the Bloomington Moraine 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 Bureau County, dune sand also 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 µm (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.

Acknowledgments

This work is based on an ongoing project on sand and gravel research in the Green River Lowland. The research on the Bureau County sand deposit has benefited from helpful discussions with colleagues Leon Folmer, Zakaria Lasemi, and Hong Wang.

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