



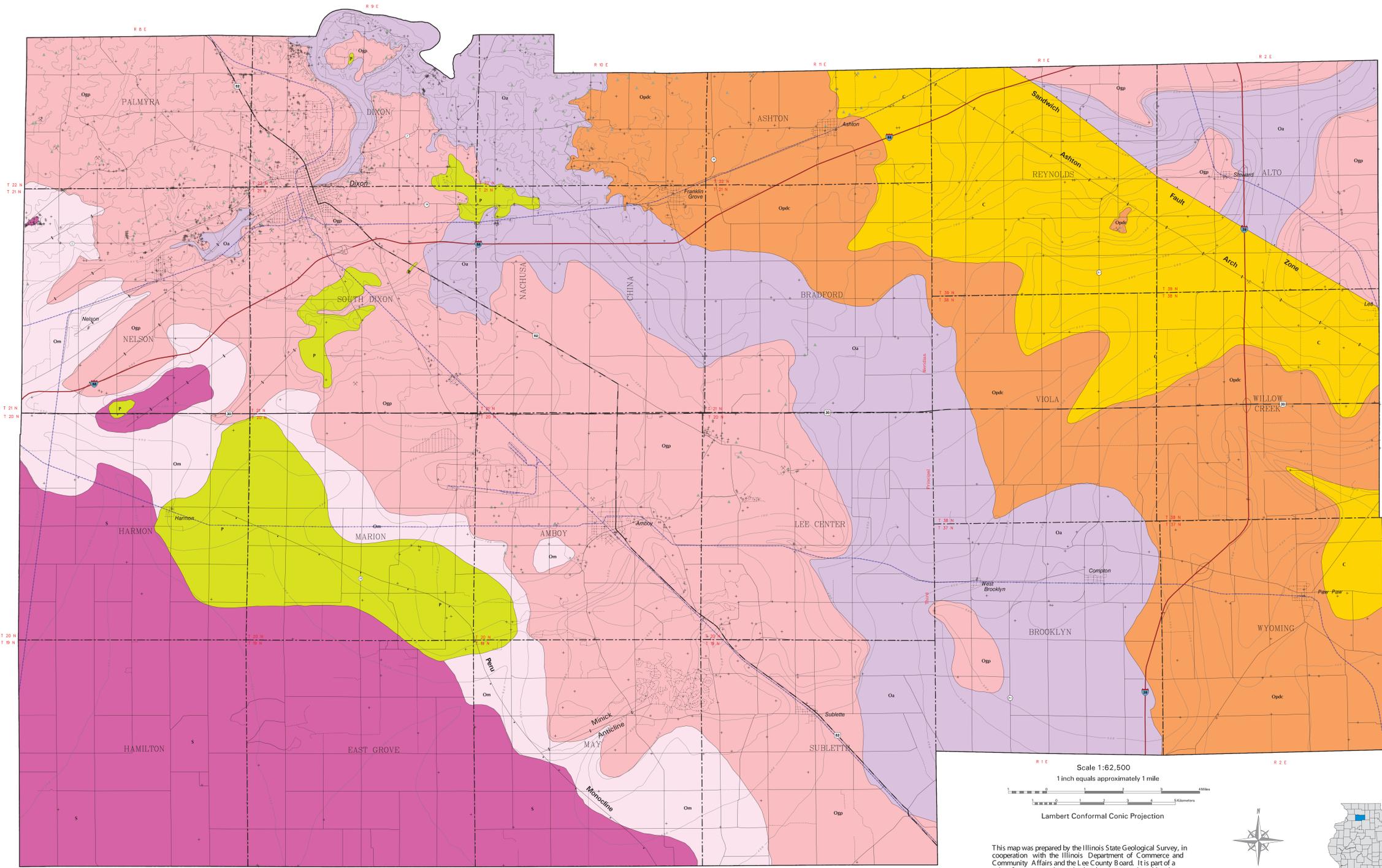
Illinois State Geological Survey
William W. Shilts, Chief
Champaign

Bedrock Geology of Lee County, Illinois

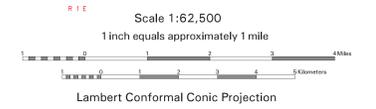
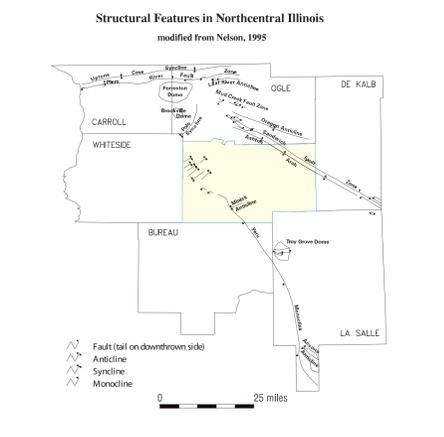
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1999

State of Illinois
Department of Natural Resources



- Explanation**
- PENNSYLVANIAN SYSTEM**
Pennsylvanian rocks comprised of sandstone, limestone, shale, and coal are present in small outcrops. These rocks lie unconformably on Silurian, Maquoketa, Galena, Plattville, or Anzell strata. These rocks are present in sink holes, crevices, and depressions on the surface of older rocks (Willman et al. 1975).
 - SILURIAN SYSTEM**
Silurian rocks, chiefly dolomite with some chert and shale, unconformably overlie the Ordovician Maquoketa Group and fill erosional valleys cut as deep as 100 ft. (30.5 m) into the Maquoketa (Larson et al. 1993; Kolata and Graese 1983; Willman 1973). The formations of the Silurian System were not differentiated in this study due to the absence of bedrock exposures and similarity in lithology of the units. The Silurian rocks range in thickness from 0 to approximately 450 feet (0 to 137 m) in Lee County.
 - ORDOVICIAN SYSTEM**
 - Maquoketa Group**
The Maquoketa Group is composed of silty, dolomitic shale to silty, argillaceous dolomite (Kolata and Graese 1983). This uppermost Ordovician unit ranges in thickness from 0 (where eroded) to about 225 feet (0 to 69 m). The Maquoketa Group has been differentiated into four formations in northeastern Illinois; however, lithologic distinctions are not readily identifiable or mappable in northwestern Illinois. Maquoketa Group rocks were not differentiated for this study.
 - Galena and Plattville Groups**
The Plattville and Galena Groups consist of a nearly continuous sequence of carbonate rocks (chiefly dolomite with minor limestone in northern Illinois) which overlie the Anzell Group with a minor planar unconformity marked by the occurrence of phosphatic (apatite) pellets and nodules (Willman and Kolata 1978). These rocks vary from 0 (where eroded) to 350 ft. (0 to 107 m) thick. Due to the limited bedrock exposures, difficulty in identification of the formations from core or well cuttings, and similarity of their lithologies, these rocks were mapped as a single unit and not differentiated into formations for this study.
 - Anzell Group**
The Anzell Group is generally 0 (where eroded) to 380 feet (0 to 115 m) thick in this area and fills irregularities in the older Early Ordovician and Late Cambrian surfaces. The upper 1 to 15 feet (0.3 to 4.6 m) consists of interbedded fine grained, impure dolomite, sandstone and green shale. In contrast, the majority of the group is a pure, chiefly medium grained well sorted, quartz sandstone (Willman et al. 1975). Anzell Group rocks were not differentiated for this study.
 - Prairie du Chien Group**
The Lower Ordovician units of the Prairie du Chien Group consist of cherty dolomite and interbedded sandstone. These rocks vary in thickness from 0 (where eroded) to about 280 ft. (0 to 85 m). Exposure and subsequent erosion after Prairie du Chien deposition created an irregular surface with several hundred feet of local relief upon which the Anzell Group was deposited. Rocks of the Prairie du Chien Group were not differentiated for this study.
 - CAMBRIAN SYSTEM**
Thick sandstone and carbonate units were deposited on the underlying granite basement during the Cambrian and Early Ordovician. The strata of the Cambrian System are chiefly composed of dolomite, sandstone, siltstone and shale. Cambrian rocks exposed in Lee County are the oldest rocks exposed in Illinois. Cambrian rocks were not differentiated for this study.
- Bedrock topography contours
 - Fault (tail on downthrown side)
 - Anticline
 - Syncline
 - Monocline
 - Well location
 - Quarry
 - Bedrock observation from soil maps
 - US Highway
 - State Highway
 - Interstate Highway
 - Other Roads
 - Railroad



This map was prepared by the Illinois State Geological Survey, in cooperation with the Illinois Department of Commerce and Community Affairs and the Lee County Board. It is part of a suite of maps created to assist local government in addressing geologic questions concerning capable sites for landfill development. Maps produced for this study are intended for regional land use planning purposes. More detailed mapping is needed for site specific considerations. This map has been reviewed for scientific accuracy and has been edited to meet the quality standards of maps in the ISGS Map Series.

Bedrock geology is a significant consideration for land use planning. Dolomite and sandstone bedrock formations are an important source of groundwater in northern Illinois. Land use decisions should consider the protection of groundwater resources from potential contamination. In addition, dolomite and sandstone formations near land surface are current or potential rock product resources.

The geologic units commonly penetrated by water wells and other shallow boreholes in Lee County include Paleozoic bedrock, deposited as marine sediments, overlain by younger un lithified Quaternary sediments, predominantly glacial deposits. These rocks and sediments, roughly 2000 ft. (610 m) thick in northern Illinois, overlie Precambrian crystalline basement (Willman et al. 1975).

Rock units exposed in Lee County are the Upper Cambrian System, Lower Ordovician Prairie du Chien Group, Middle and Upper Ordovician Anzell Group, Plattville Group, Galena Group, and Maquoketa Group, rocks of the Silurian System, and rocks of the Pennsylvanian System. No lithified rocks younger than Pennsylvanian are found in the county. Due to the paucity of bedrock exposures within the county and detailed stratigraphic data, bedrock stratigraphy was differentiated at the group and system level. A generalized stratigraphic column of the geology of Lee County is shown in the inset figure.

Bedrock geology mapping in Lee County was based upon surface exposures in outcrops and quarries, previously studied geophysical logs and well cores, driller logs, historical field notes, previous publications regarding the rock units exposed, United States Department of Agriculture soil survey map bedrock identification, and United States Geological Survey topographic quadrangle maps. No new bedrock drilling, geophysical logging, or coring was conducted for this study. See ISGS OFS 1999 1a, "Locations of Data Points of Lee County, Illinois" by R.J. Nagy, for more details.

Lee County, located in the stable interior region of the North American continent, has been affected by minor tectonic deformation. In addition to fracturing, rock units have been uplifted, folded and bent, tilted, and faulted (see inset). Folds are expressed in synclines, anticlines, arches, and monoclines present in the area (Nelson 1995; Anderson 1988). In addition, the Sandwich Fault Zone transects Lee County. Vertical displacement on the Sandwich Fault Zone ranges from 150 to 800 ft. (46 to 244 m), with displacements of about 400 to 600 ft. (122 to 183 m) in Lee County. The fault zone is downthrown to the northeast (Kolata et al. 1978). Due to the depth of burial by Quaternary sediments and the lack of well or seismic data, detailed information about the fault zone in Lee County is unavailable. Although depicted as a single fault on this map, evidence from surrounding counties indicate that the Sandwich Fault Zone is a complex configuration of many faults of varying direction and amount of displacement (Kolata et al. 1978). A additional fault bound map units likely occur within the fault zone (e.g. slices of Prairie du Chien Group), but are not mappable at this map scale and data resolution.

References:

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Larson, T.H., A.M. Graese, and P.G. Orozco (1993) Hydrogeology of the Silurian Dolomite Aquifer in Parts of Northwestern Illinois: Illinois State Geological Survey Environmental Geology 145, 29 p.

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Willman, H.B., E. Atherton, T.C. Buschbach, C. Collinson, J.C. Frye, M.E. Hopkins, J.E. Lineback, J.A. Simon (1975) Handbook of Illinois stratigraphy: Illinois State Geological Survey Bulletin 95, 261 p.

SYSTEM	SERIES	MEGA-GROUP	GROUP	GRAPHIC COLUMN	THICKNESS
SILURIAN	MAQUOKETA	HURTON	Maquoketa	[Symbol]	0-225
	GALENA	OTTAWA	Galena	[Symbol]	0-350
ORDOVICIAN	ANZELL	ANZELL	Anzell	[Symbol]	0-380
	PRAIRIE DU CHIEN	KIOUX	Prairie du Chien	[Symbol]	0-280
CAMBRIAN	CROGAN	POTSOMAM	Crogan	[Symbol]	2100-3800
	PRECAMBRIAN			[Symbol]	

SYMBOL	DESCRIPTION
[Symbol]	Glacial drift
[Symbol]	Limestone
[Symbol]	Cherty
[Symbol]	Sandy
[Symbol]	Argillaceous or shaly
[Symbol]	Dolomite
[Symbol]	Same variations as limestone
[Symbol]	Sandstone
[Symbol]	Silty
[Symbol]	Argillaceous or shaly
[Symbol]	Dolomitic
[Symbol]	Shale
[Symbol]	Clay-shale
[Symbol]	Silty
[Symbol]	Sandy
[Symbol]	Calcareous
[Symbol]	Dolomitic
[Symbol]	Oolite
[Symbol]	Coal
[Symbol]	Glauconite
[Symbol]	Oolitic chert