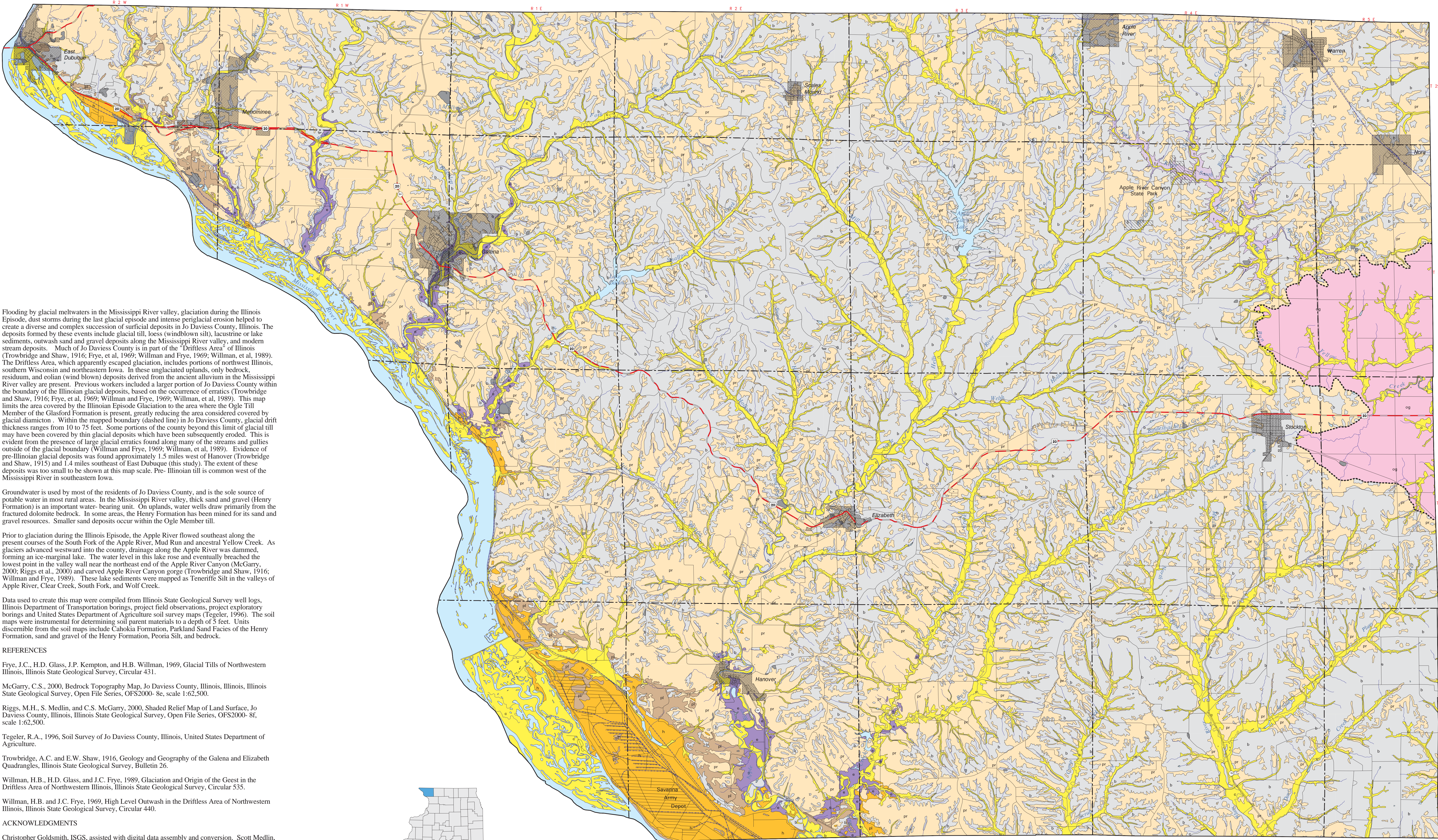


SURFICIAL GEOLOGY MAP, JO DAVIESS COUNTY, ILLINOIS

Matthew H. Riggs



Flooding by glacial meltwaters in the Mississippi River valley, glaciation during the Illinois Episode, dust storms during the last glacial episode and intense periglacial erosion helped to create a diverse and complex succession of surficial deposits in Jo Daviess County, Illinois. The deposits formed by these events include glacial till, loess (windblown silt), lacustrine or lake sediments, outwash sand and gravel deposits along the Mississippi River valley, and modern stream deposits. Much of Jo Daviess County is in part of the "Driftless Area" of Illinois (Trowbridge and Shaw, 1916; Frye, et al, 1969; Willman and Frye, 1969; Willman, et al, 1989). The Driftless Area, which apparently escaped glaciation, includes portions of northwest Illinois, southern Wisconsin and northeastern Iowa. In these unglaciated uplands, only bedrock, residuum, and eolian (wind blown) deposits derived from the ancient alluvium in the Mississippi River valley are present. Previous workers included a larger portion of Jo Daviess County within the boundary of the Illinoian glacial deposits, based on the occurrence of erratics (Trowbridge and Shaw, 1916; Frye, et al, 1969; Willman and Frye, 1969; Willman, et al, 1989). This map limits the area covered by the Illinoian Episode Glaciation to the area where the Ogle Till Member of the Glasford Formation is present, greatly reducing the area considered covered by glacial diamictum. Within the mapped boundary (dashed line) in Jo Daviess County, glacial drift thickness ranges from 10 to 75 feet. Some portions of the county beyond this limit of glacial till may have been covered by thin glacial deposits which have been subsequently eroded. This is evident from the presence of large glacial erratics found along many of the streams and gullies outside of the glacial boundary (Willman and Frye, 1969; Willman, et al, 1989). Evidence of pre-Illinoian glacial deposits was found approximately 1.5 miles west of Hanover (Trowbridge and Shaw, 1915) and 1.4 miles southeast of East Dubuque (this study). The extent of these deposits was too small to be shown at this map scale. Pre-Illinoian till is common west of the Mississippi River in southeastern Iowa.

Groundwater is used by most of the residents of Jo Daviess County, and is the sole source of potable water in most rural areas. In the Mississippi River valley, thick sand and gravel (Henry Formation) is an important water-bearing unit. On uplands, water wells draw primarily from the fractured dolomite bedrock. In some areas, the Henry Formation has been mined for its sand and gravel resources. Smaller sand deposits occur within the Ogle Member till.

Prior to glaciation during the Illinois Episode, the Apple River flowed southeast along the present courses of the South Fork of the Apple River, Mud Run and ancestral Yellow Creek. As glaciers advanced westward into the county, drainage along the Apple River was dammed, forming an ice-marginal lake. The water level in this lake rose and eventually breached the lowest point in the valley wall near the northeast end of the Apple River Canyon (McGarry, 2000; Riggs et al., 2000) and carved Apple River Canyon gorge (Trowbridge and Shaw, 1916; Willman and Frye, 1989). These lake sediments were mapped as Teneriffe Silt in the valleys of Apple River, Clear Creek, South Fork, and Wolf Creek.

Data used to create this map were compiled from Illinois State Geological Survey well logs, Illinois Department of Transportation borings, project field observations, project exploratory borings and United States Department of Agriculture soil survey maps (Tegeler, 1996). The soil maps were instrumental for determining soil parent materials to a depth of 5 feet. Units discernible from the soil maps include Cahokia Formation, Parkland Sand Facies of the Henry Formation, sand and gravel of the Henry Formation, Peoria Silt, and bedrock.

REFERENCES

- Frye, J.C., H.D. Glass, J.P. Kempton, and H.B. Willman, 1969, Glacial Till of Northwestern Illinois, Illinois State Geological Survey, Circular 431.
- McGarry, C.S., 2000, Bedrock Topography Map, Jo Daviess County, Illinois, Illinois State Geological Survey, Open File Series, OFS2000-8e, scale 1:62,500.
- Riggs, M.H., S. Medlin, and C.S. McGarry, 2000, Shaded Relief Map of Land Surface, Jo Daviess County, Illinois, Illinois State Geological Survey, Open File Series, OFS2000-8f, scale 1:62,500.
- Tegeler, R.A., 1996, Soil Survey of Jo Daviess County, Illinois, United States Department of Agriculture.
- Trowbridge, A.C. and E.W. Shaw, 1916, Geology and Geography of the Galena and Elizabeth Quadrangles, Illinois State Geological Survey, Bulletin 26.
- Willman, H.B., H.D. Glass, and J.C. Frye, 1989, Glaciation and Origin of the Geest in the Driftless Area of Northwestern Illinois, Illinois State Geological Survey, Circular 535.
- Willman, H.B. and J.C. Frye, 1969, High Level Outwash in the Driftless Area of Northwestern Illinois, Illinois State Geological Survey, Circular 440.

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SURFICIAL SEDIMENTS

HUDSON EPISODE
(postglacial; younger than 12,000 years old)

- c** Cahokia Formation
Silt, clay, and sand; stratified; occurs in modern creek valleys and river channels and is 5 - 25 feet thick. Includes significant amounts of redeposited loess. Overlies thick sand and gravel (Henry Formation) in the floodplain and backwater channels of the broad Mississippi River valley.

WISCONSIN EPISODE
(approximately 55,000 - 12,000 years old)

- h** Henry Formation
Sand and gravel, stratified, up to 200 feet thick in the Mississippi River valley. Can include up to 30 feet of surficial dune sand.
- pl** Parkland Sand Facies
Sand, well sorted, stratified, approximately 5 - 30 feet thick; occurs as sheet sand or dune sand. Mapped on uplands and in some regions of the Mississippi River valley overlying the Henry Formation.

- e** Equality Formation
Silt and clay, laminated; occurs as slackwater lake deposits along the Menominee River, Little Menominee River, Sinsinawa River, Galena River, Rush Creek, and Apple River in western Jo Daviess County.

- pr** Peoria and Roxana Silts
Silt (loess). Mapped only where > 5 feet thick and where glacial till is absent. Leached of carbonates from typically 4 - 12 feet below the land surface. Loess covers most of the county, and gradually decreases in thickness from 35 feet in western areas, to 15 - 20 feet in central areas, to 5 to 10 feet in northeastern areas on uneroded uplands. Peoria Silt composes most of the unit, with the underlying Roxana Silt < 5 feet thick. Loveland Silt (Illinois Episode loess and colluvium), containing the Sangamon Geosol, may be present beneath Wisconsin Episode loess in unglaciated areas.

SANGAMON EPISODE
(approximately 130,000 - 55,000 years old)

Nondeposition, erosion or weathering of underlying units (formation of Sangamon Geosol).

ILLINOIS EPISODE
(approximately 200,000 - 130,000 years old)

- t** Teneriffe Silt
Silt and clay, massive or laminated; along Apple River and South Fork Mud Run in eastern Jo Daviess County north of the Illinois Episode glacial margin. These lacustrine sediments were deposited in slackwater lakes in valleys dammed by glacial ice or outwash.

- og** Ogle Member of Glasford Formation [5 - 50 feet thick]
Diamictum, yellow-brown to grey; varies in texture from sandy loam, loam, silt loam, and silty clay; includes lenses of interbedded sand and gravel; the Sangamon Geosol occurs in the upper 5 - 7 feet. This unit is overlain by 5 - 10 feet of Wisconsin Episode loess and is typically underlain by 0 - 15 feet of residuum or sorted Quaternary drift above bedrock.

ORDOVICIAN AND SILURIAN BEDROCK

- b** Bedrock (at surface or below < 5 feet of loess, colluvium, diamictum or residuum)
Dolomite and shale of the Galena and Platteville Groups (dolomite), Maquoketa Group (Ordovician shale), and univided Silurian dolomites. The residuum on dolomite is a red clay, 0 - 4 feet thick, formed by chemical alteration of bedrock; it is sometimes underlain by 1 foot of dolomite sand.

Disturbed Land

Water

Municipality

State Park

US Highway

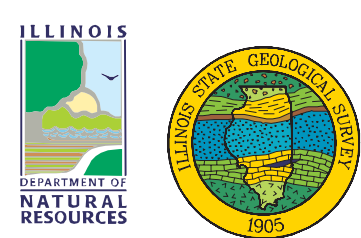
State Highway

Other Roads

Railroad

Streams

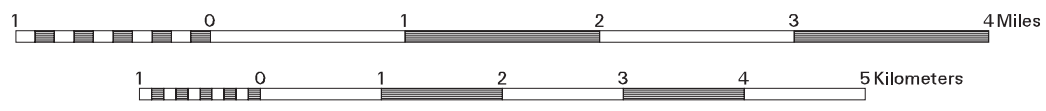
Extent of Till Deposits



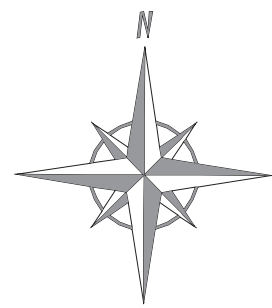
FOR ADDITIONAL INFORMATION CONTACT:

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Natural Resources Building
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Scale 1:62,500
1 inch equals approximately 1 mile



Lambert Conformal Conic Projection



This map was prepared by the Illinois State Geological Survey, in cooperation with the Illinois Department of Commerce and Community Affairs and the Jo Daviess 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 edited to meet the quality standards of maps in the ISGS Map Series.