INSTITUTE OF NATURAL RESOURCES
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QUATERNARY DEPOSITS OF ILLINOIS

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EXPLANATION

Because many of the areas mapped are small, the conventional symbols for Quaternary units are abbreviated. Q for Quaternary is omitted.

SYSTEM	SERIES	STAGE	SUBSTAGE
QUATERNARY	HOLOCENE	WISCONSINAN and HOLOCENE	WOODFORDIAN, TWOCREEKAN, VALDERAN, and younger
QUATERNARY	PLEISTOCENE	WISCONSINAN	WOODFORDIAN
			ALTONIAN, FARMDALIAN, WOODFORDIAN, TWOCREEKAN, and VALDERAN
		ILLINOIAN	LIMAN, MONICAN, and JUBILEEAN
		KANSAN	ALTONIAN
TERTIARY-QUATERNARY	PLIOCENE-PLEISTOCENE		

sm — **Surface Mines**
Includes coal strip mines; rock quarries; clay, sand, or gravel pits; and other excavated areas, including those where the mixed fill of bedrock or Quaternary deposits was replaced or disturbed. Also includes areas of man-made fill in areas formerly covered by Lake Michigan or Lake Calumet in northeastern Illinois and by causeways in Rend Lake and Carlyle Lake in southern Illinois. Many small areas are not shown.

c — **Cahokia Alluvium**
Deposits in floodplains and channels of modern rivers and streams; mostly poorly sorted sand, silt, or clay containing local deposits of sandy gravel; in many places overlies well-sorted glacial outwash of the Henry Formation.

c-f — **Alluvial-fan facies of Cahokia Alluvium**
Fan-shaped deposits of poorly sorted sand and silt at the mouths of tributary streams along the Illinois and Mississippi Rivers.

lmr — **Lake Michigan Formation**
Lacustrine sediments and beach deposits of modern lakes.

lmr — **Ravinia Sand Member of Lake Michigan Formation**
Sand on modern beaches; map shows only areas along major beaches of Lake Michigan such as those near Illinois Beach State Park.

py — **Peyton Colluvium**
Narrow deposits of largely unsorted debris that resulted from creep and slopewash and accumulated on and at the base of river bluffs. May include some areas where materials were deposited by slumps or landslides (Lacon Formation).

pl — **Parkland Sand**
Windblown sand; well-sorted, medium-grained sand in dunes and thick sheet deposits between dunes.

gl — **Grayslake Peat**
Peat, muck, and marl; dominantly organic deposits that are interbedded with silt and clay in some places. Mostly found in glacial lake basins; locally in lake basins on floodplains of major rivers.

Equality Formation
Lake deposits; offshore deposits of silt and clay; sand facies near shorelines. Deposits in older lakes have a thin to medium cover of silt (Richland Loess or Peoria Loess).

ec — **Carmi Member of Equality Formation**
Largely quiet-water lake sediments dominated by well-bedded silt and some clay; includes sediment of proglacial lakes and slack-water lakes in valleys tributary to major river valleys. Where thin and discontinuous, generally covers more than 25 percent of the area mapped.

ed — **Dolton Member of Equality Formation**
Largely shallow-water, nearshore lake sediments in beaches, bars, spits, and deltas; includes some former lakes that contain coarse-grained deposits; dominantly medium-grained sand; some gravel along beaches; contains beds of silt where gradational with the Carmi Member.

Henry Formation
Sand and gravel; generally well sorted; local minor beds of silt; glacial outwash in outwash plains, valley trains, and ice-contact deposits; generally has a thin cover of silt (Richland Loess or Peoria Loess).

hm — **Mackinaw Member of Henry Formation**
Sand and gravel; generally well sorted and well bedded; deposits in valleys; mostly glacial outwash in former valley trains and terrace remnants of former valley trains.

hb — **Batavia Member of Henry Formation**
Sand and gravel; well-sorted deposits of glacial meltwater in outwash plains and fans on uplands.

hw — **Wasco Member of Henry Formation**
Sand and gravel, unevenly sorted, irregularly bedded lenses of silt and till; glacial ice-contact deposits in kames, eskers, and kame terraces.

pr — **Peoria Loess and Roxana Silt**
Windblown silt more than 20 feet (6 m) thick on uplands; local lenses of fine-grained sand. Combined thickness of Peoria and Roxana (outside the limit of Wisconsinan glaciation) shown by 15-foot (4.5-m), 10-foot (3.0-m), and 5-foot (1.5-m) contour lines. Thicknesses are averages for undisturbed uplands. The thickness of the Peoria Loess on Altonian drift and the thickness of the Richland Loess within the areas of Woodfordian drift are also shown by the contours.

ppr — **Peyton Colluvium, Peoria Loess, and Roxana Silt**
A complex deposit of silt more than 20 feet (6 m) thick on steep slopes along the bluffs of the Mississippi River in the St. Louis area. A colluvial mixture of Peoria and Roxana formed by creep and slopewash.

Wedron Formation
Mostly glacial till with lenses and beds of sand, gravel, and silt; includes all tills of Woodfordian age in the Lake Michigan and Green Bay Lobes; surface often mantled with silt (Richland Loess).

Ground moraine
Solid colors indicate ground moraine, including areas of generally low relief underlain by tills that lie between the moranic ridges.

Moraine
Overprinted pattern indicates moraines associated with the till members; generally continuous curvilinear areas that have elevated hummocky topography and local deposits of sand, gravel, and peat in addition to till.

ww wy ws — **Wadsworth Till Member of Wedron Formation, Yorkville Till Member of Wedron Formation, Snider Till Member of Wedron Formation**
Mostly gray clayey and silty clayey till. The Wadsworth contains few pebbles and cobbles and is more clayey near Lake Michigan than till to the south and west. Local lenses of sand and silt. Where the intervening Haeger Till Member is absent, the Wadsworth is separated from the Yorkville, and the boundary is placed at the front of the Valparaiso Moranic System. The Yorkville is a gray or greenish-gray, very clayey till overlain in some places by extensive glacial lake deposits. The Snider is a gray silty clayey till that has a coarse blocky structure.

wh — **Haeger Till Member of Wedron Formation**
Sandy and gravelly till, commonly thin, over thick deposits of sand and gravel outwash that are included in the member; present only in northeastern Illinois.

wm wb wp — **Malden Till Member of Wedron Formation, Batestown Till Member of Wedron Formation, Piatt Till Member of Wedron Formation**
Gray silty till that oxidizes to olive brown; some sandy till and lenses of sand and gravel. The Malden is a gray silty till that oxidizes to olive brown; local lenses of sand and gravel. The Batestown is a gray silty till that oxidizes to olive brown; recognized in east-central Illinois only. The Piatt includes sandy and silty gray till.

Continued in next column

wt wd wt-g wf — **Tiskilwa Till Member of Wedron Formation, Ablation drift of Tiskilwa Till Member, Delavan Till Member of Wedron Formation, Fairgrange Till Member of Wedron Formation**
Pink, pinkish-gray, gray, brown, and reddish-brown silty and sandy till; lenses of silt, sand, and gravel in some places. The Tiskilwa is generally sandy and silty till that is pinkish- or reddish-brown; includes yellow-gray to pinkish-gray sandy ablation drift (Gilberts Drift) in a small area in northeastern Illinois. The Delavan is gray to pinkish-gray sandy to silty till. The Fairgrange is pink, reddish-brown, and brownish-gray sandy till in east-central Illinois.

wlc we — **Lee Center Till Member of Wedron Formation, Esmond Till Member of Wedron Formation**
Gray silty to clayey till in the Green River Sublobe of the Lake Michigan Lobe in northwestern Illinois; generally thin and discontinuous. Includes some interbedded outwash drift. The Lee Center is a gray clayey till. The Esmond is a gray till, silty in the upper part and silty clay till in the lower part.

Trafalgar Formation (of Indiana)
Mostly till; some associated sand and gravel. An extension of Erie or Saginaw Lobe drift into Illinois; overlies part of the Yorkville Till Member of the Wedron Formation.

tr — **Unnamed till member of Trafalgar Formation (of Indiana)**
Mostly yellow-gray sandy and silty till; the Iroquois Drift.

Winnebago Formation
Till with interbedded silt, peat, and gravel; present at surface in northwestern and central northern Illinois; separated from the Wedron Formation by the Robein Silt and Morton Loess. Generally covered by thin to medium layers of silt (Peoria Loess).

wic — **Capron Till Member of Winnebago Formation**
Pink sandy till in upper part, silty in lower part; mapped in central northern Illinois only.

wia — **Argyle Till Member of Winnebago Formation**
A very sandy, gravelly, pinkish-tan or salmon till; may include older tills with similar composition; present in central northern Illinois.

t — **Teneriffe Silt**
Mostly silt and clayey silt with beds of sand or clay deposited in large proglacial lakes associated with several Illinoian glaciers; may contain some outwash, sheetwash, and eolian deposits. Generally has prominent Sangamon Soil at top of deposits and is overlain by a moderate thickness of silt (Peoria Loess and Roxana Silt).

pe — **Pearl Formation**
Sand, gravel, and some silt in outwash plains and valley-train deposits of Illinoian glaciers; largely preserved as small terrace remnants along major drainageways in central and western Illinois and as extensive remnants along the lower Kaskaskia River Valley in southern Illinois. Generally has prominent Sangamon Soil at top of deposits and is overlain by moderate to thick silt (Peoria Loess and Roxana Silt).

Glasford Formation
Till with interbedded sand and gravel and surficial clay, silt, sand, and gravel deposits. The Glasford is the most widespread glacial formation in Illinois. The Glasford is divided into several members; generally has prominent Sangamon Soil at top of deposits and is overlain by moderate to great thickness of silt (Peoria Loess and Roxana Silt).

Ground moraine
Solid colors indicate Illinoian ground moraine.

Moraine
Small moraines of the Illinoian present in some places are indicated by the overprint pattern. The moraines consist of subdued, rounded ridges of till and some outwash sands and gravels.

gha — **Hagarstown Member of Glasford Formation**
Mostly well-sorted and well-bedded sand and gravel, cemented in some places; till in places; in kames, eskers, and crevasse fillings; kames may contain large thrust blocks of older till or sand and gravel. Includes the Jubilee Sand Member, but overlay deposits overlying older and younger tills are mapped as the Hagarstown Member also; includes the "ridged drift" of the Kaskaskia Basin, elongate sand-and-gravel-cored ridges in south-central Illinois.

gr gs — **Radnor Till Member of Glasford Formation, Sterling Till Member of Glasford Formation**
Mostly gray compact silty till with a little gravel, sand, and silt in some places.

gw gv go gh — **Winslow Till Member of Glasford Formation, Ogle Till Member of Glasford Formation, Vandalia Till Member of Glasford Formation, Hulick Till Member of Glasford Formation**
Compact, hard, silty, sandy, and clayey till and intercalated sand and gravel. The Winslow is dark-gray clayey till in northwestern Illinois, isolated to the Ogle, but more clayey; thin with many small outcrops of underlying bedrock included. The Ogle is thin and discontinuous, tan to grayish-brown, sandy till; many small outcrops of underlying bedrock or areas of bedrock controlled by the topography. Stratigraphically related to the Hulick. The Hulick and Vandalia are hard, compact sandy till with sand and gravel; mapped as Hulick west of the Illinois River and Vandalia east of the Illinois River; gradational to silty till in southern Illinois.

gk — **Kellerville Till Member of Glasford Formation**
Brown and gray silty till with discontinuous sand and gravel beds; mineralogically intermediate between western Banner Formation tills and the Vandalia-Hulick; may include some older tills of similar composition in extreme western Illinois; mapped only west of the Illinois River; small areas of stratigraphically equivalent Smithboro Till Member in southern Illinois may be included in the Vandalia.

b b-o — **Banner Formation, Banner Formation outwash facies**
Mostly till, but includes small areas of outwash sands and gravels and lacustrine silt and clay. Sand and gravel facies (b-o) in terrace remnants along tributaries to the Mississippi. Mapped where not overlain by Illinoian deposits in western Illinois and in other scattered locations where it crops out from under Illinoian drift; generally has Yarmouth Soil or combined Yarmouth and Sangamon Soil at the top of deposit and is overlain by thick deposits of silt (Peoria Loess and Roxana Silt). As mapped, Banner Formation may actually include deposits of several pre-Illinoian glaciations.

mg — **Mounds Gravel**
Mostly gravel on uplands; brown chert pebbles; high remnants of former terrace levels believed to be of Pliocene-Pleistocene age; does not contain materials characteristic of glacial deposits; mapped only in extreme southern Illinois. Similar gravel, the Grover Gravel, is present in areas too small to map in western Illinois (Calhoun County); generally overlain by moderate to thick silt (Peoria Loess and Roxana Silt).

White areas on map indicate that rocks older than Pliocene are present at or near the surface; for bedrock units, see inset bedrock map or refer to Willman and others (1967), *Geologic Map of Illinois* (1:500,000).

5 — Thickness of loess; contour interval, 5 feet (1.5 m)

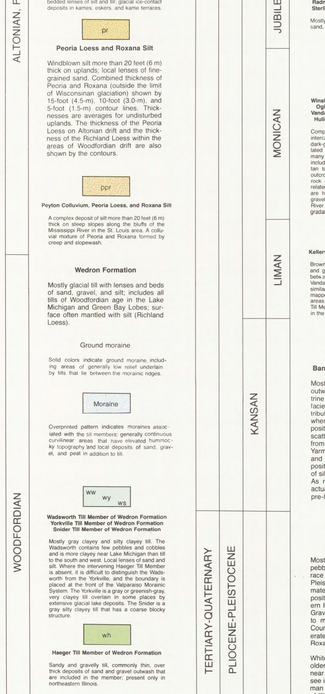
Inferred limit of glaciation

Pleistocene and Pliocene not shown.

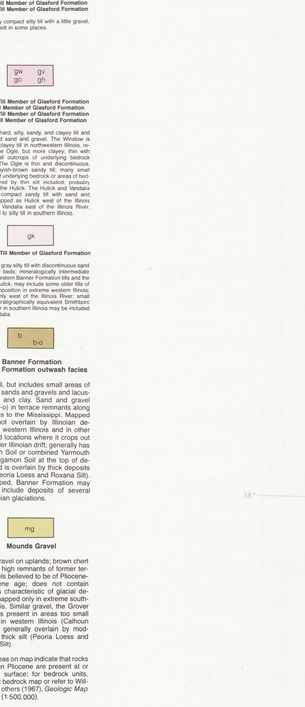
- T — TERTIARY
- K — CRETACEOUS
- P_3 — PENNSYLVANIAN: Bond and Mattoon Formations; includes narrow belts of older formations along La Salle Anticline
- P_2 — PENNSYLVANIAN: Carbondale and Modesto Formations
- P_1 — PENNSYLVANIAN: Casseyville, Abbott, and Spoon Formations
- M — MISSISSIPPIAN: Includes Devonian in Hardin County
- D — DEVONIAN: Includes Silurian in Douglas, Champaign, and western Rock Island Counties
- S — SILURIAN: Includes Ordovician and Devonian in Calhoun, Greene, and Jersey Counties
- O — ORDOVICIAN
- CAMBRIAN

Des Plaines Disturbance — Ordovician to Pennsylvanian Fault

GENERALIZED AREAL GEOLOGY OF THE BEDROCK SURFACE



TOPOGRAPHY OF THE BEDROCK SURFACE

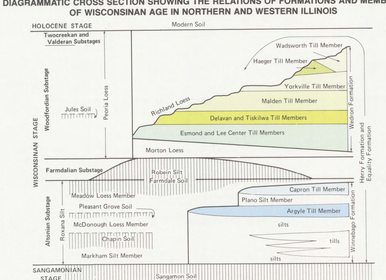


THICKNESS OF PLEISTOCENE DEPOSITS

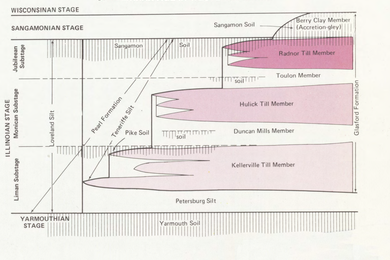
STRATIGRAPHIC CLASSIFICATIONS OF THE PLEISTOCENE DEPOSITS OF ILLINOIS

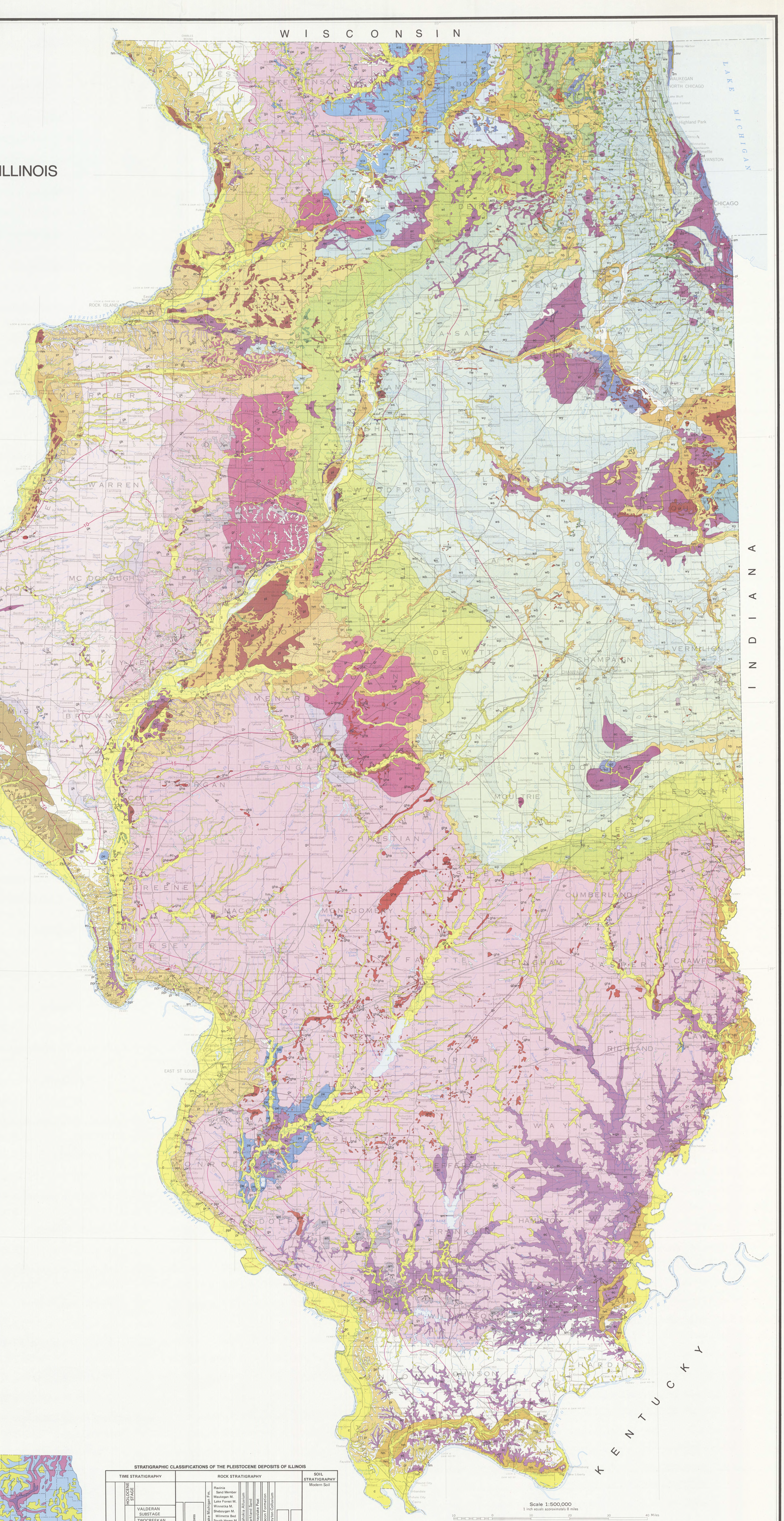
TIME STRATIGRAPHY			ROCK STRATIGRAPHY									SOIL STRATIGRAPHY
QUATERNARY SYSTEM	PLEISTOCENE SERIES	HOLOCENE STAGE										Modern Soil
		WISCONSINAN STAGE	VALDERAN SUBSTAGE									
			TWOCREEKAN SUBSTAGE									
			WOODFORDIAN SUBSTAGE	Peoria Loess	Richland Loess	Lake Michigan Fm.	Ravinia Sand Member; Waukegan M.; Lake Forest M.; Winnetka M.; Sheboygan M.; Wilmette Bed; South Haven M.	Cahokia Alluvium	Parkland Sand	Grayslake Peat	Lacon Formation	Peyton Colluvium	Equality Formation: Carmi and Dolton Members	Henry Formation: Batavia, Mackinaw, and Wasco Members	
						Wedron Fm.	Wadsworth Till Member; Haeger Till Member; Yorkville Till Member; Malden Till Member	Trafalgar Fm.	Snider Till M.; Batestown T.M.; Piatt Till Member; Fairgrange T.M.						
							Tiskilwa Till Member; Delavan Till Member; Lee Center Till Member; Esmond Till Member		Oakland Till M.						
			FARMDALIAN SUBSTAGE		Morton Loess										Jules Soil
				Robein Silt			Peddicord Formation								Farmdale Soil
			ALTONIAN SUBSTAGE	Roxana Silt	Meadow Loess M.; McDonough Loess M.; Markham Silt M.	Winnebago Fm.	Capron Till Member; Piano Silt Member; Argyle Till Member								Pleasant Grove Soil
															Chapin Soil
			SANGAMONIAN STAGE				Berry Clay Member								Sangamon Soil
		ILLINOIAN STAGE	JUBILEEAN SUBSTAGE			Glasford Formation	Radnor T.M. Sterling T.M. Hagarstown M. Toulon M. Roby Silt M.						Pearl Fm.		
			MONICAN SUBSTAGE	Loveland Silt	Teneriffe Silt		Winslow T.M. Hulick T.M. Ogle T.M. Vandalia T.M. Duncan Mills M. Mulberry Grove M. Kellerville T.M. Smithboro T.M.								Pike Soil
			LIMAN SUBSTAGE		Petersburg Silt										Yarmouth Soil
			YARMOUTHIAN STAGE			Banner Fm.	Liele Clay Member: Tilton T.M. Hillery T.M. Harkness Silt M. Harmattan T.M. Belgium Member Sankoty Sand M. Mahomet Sand M. Hegeler T.M.								
			KANSAN STAGE												Afton Soil
			AFTONIAN STAGE												
			NEBRASKAN STAGE				Enion Formation		Mounds Gravel		Grover Gravel				

DIAGRAMMATIC CROSS SECTION SHOWING THE RELATIONS OF FORMATIONS AND MEMBERS OF WISCONSINAN AGE IN NORTHERN AND WESTERN ILLINOIS



DIAGRAMMATIC CROSS SECTION SHOWING THE RELATIONS OF FORMATIONS AND MEMBERS OF ILLINOIAN AGE IN WESTERN ILLINOIS





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