Illinois Geologic Quadrangle Map
IGQ Bandana-G

Geology of Bandana Quadrangle

Pulaski and Massac Counties, Illinois

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2007

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Structural Geology

Regional Structure

The Bandana Quadrangle lies along the southern margin of the Illinois Basin and at the northern edge of the Mississippi Embayment. The Illinois Basin, which is the older structure, is expressed by the gentle northward dip of Mississippian bedrock formations, as shown on the cross section (fig. 1). (The actual dip ranges from less than 1° to about 2° but is exaggerated 2:1 on the fig.1 cross section.) This dip was imparted by uplift of the Pascola Arch, a structure south of Illinois that rose during Cretaceous time (Stearns and Marcher 1962).

The Mississippi Embayment began to subside late in the Cretaceous Period and became an arm of the Gulf of Mexico. The Embayment overlies an ancient rift zone, the Reelfoot Rift, which probably controlled its later subsidence (Kolata and Nelson 1991). The McNairy Formation, a nearshore marine deposit of late Cretaceous age, dips and thickens southward into the embayment. The much younger Mounds Gravel, a fluvial deposit, overlies the McNairy with an angular unconformity.

Structures along the Post Creek Cutoff

The Post Creek Cutoff is an artificial ditch that was cut in the early twentieth century to drain the Cache Valley for agriculture. This excavation lowered the base level by 60 feet and created a steep gradient to the Ohio River. The resulting vigorous downward erosion reached Paleozoic bedrock in several places and exposed unusual geologic structure. Strongly deformed rocks are evident in several places along the Post Creek Cutoff in the Bandana Quadrangle and southern Karnak Quadrangle (fig. 2). Structures at two places, labeled on the map Post Creek South and Post Creek Central, are illustrated by field sketches or profiles (figs. 3 and 4).

At Post Creek South, the Mounds Gravel is downdropped into a syncline or graben-like structure that trends slightly east of north (fig. 3). The structure is partially exposed in a gully near the mouth of the Post Creek Cutoff, SE¼, Sec. 2, T15S, R2E. McNairy Formation and Mounds Gravel dip

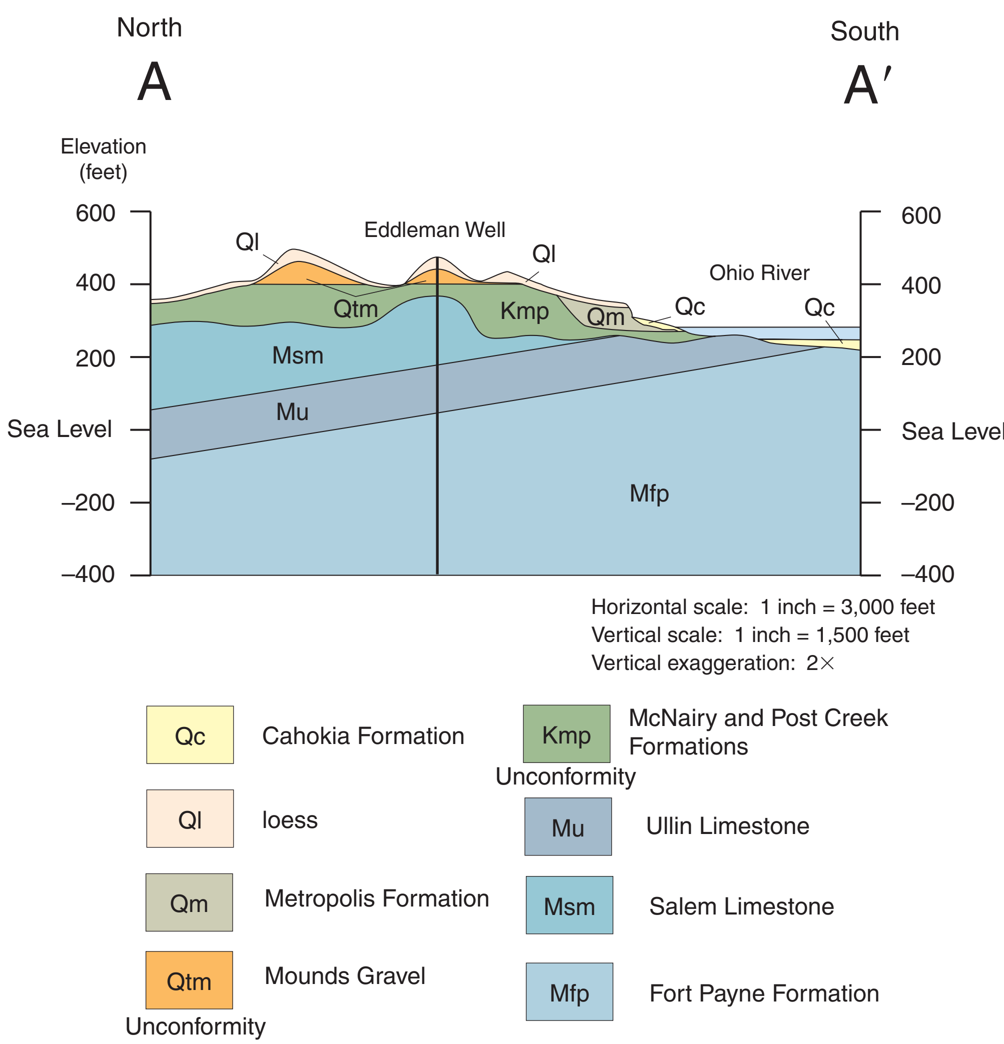

Figure 1 Bandana Quadrangle cross section A–A′. Ql, combined loess units (Peoria, Roxana, and Loveland Silts).

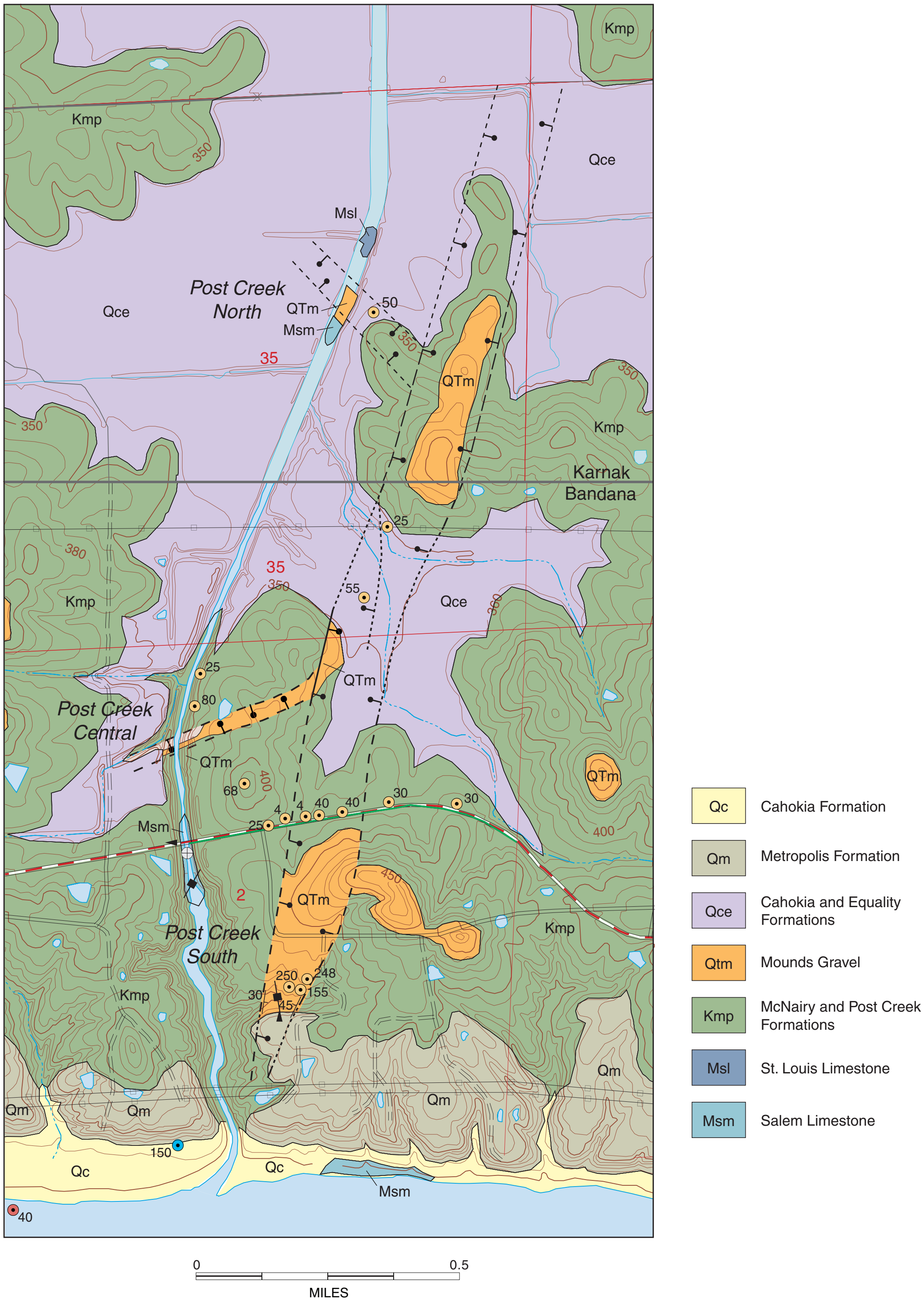

Figure 2 Post Creek area.

steeply inward along both margins of the structure, but are not visibly faulted. Dips diminish inward and are horizontal along the broad axis of the structure. The Mounds is 150 feet lower in the Post Creek South structure than on nearby hills. The top of Mississippian bedrock also is at least 90 feet lower within the structure.

Kolata et al. (1981) interpreted the Post Creek South structure as the product of collapsed caverns in Mississippian limestone. They cited lack of offset of the Ullin Limestone in the three John Miller boreholes as evidence that solution collapse, rather than tectonic faulting, formed the structure. New evidence from a seismic reflection profile (along

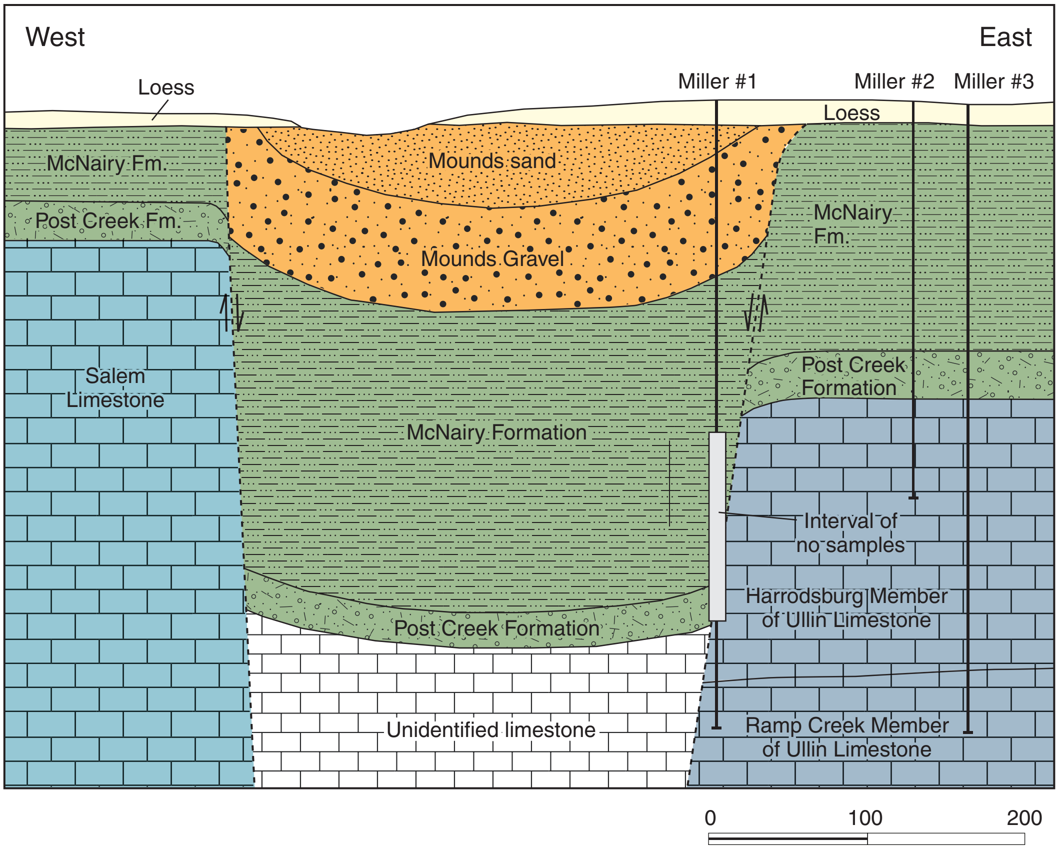

Figure 3 Cross section of the Post Creek South structure, modified from Kolata et al. (1981) to show the structure interpreted as a graben. Vertical exaggeration, 3×.

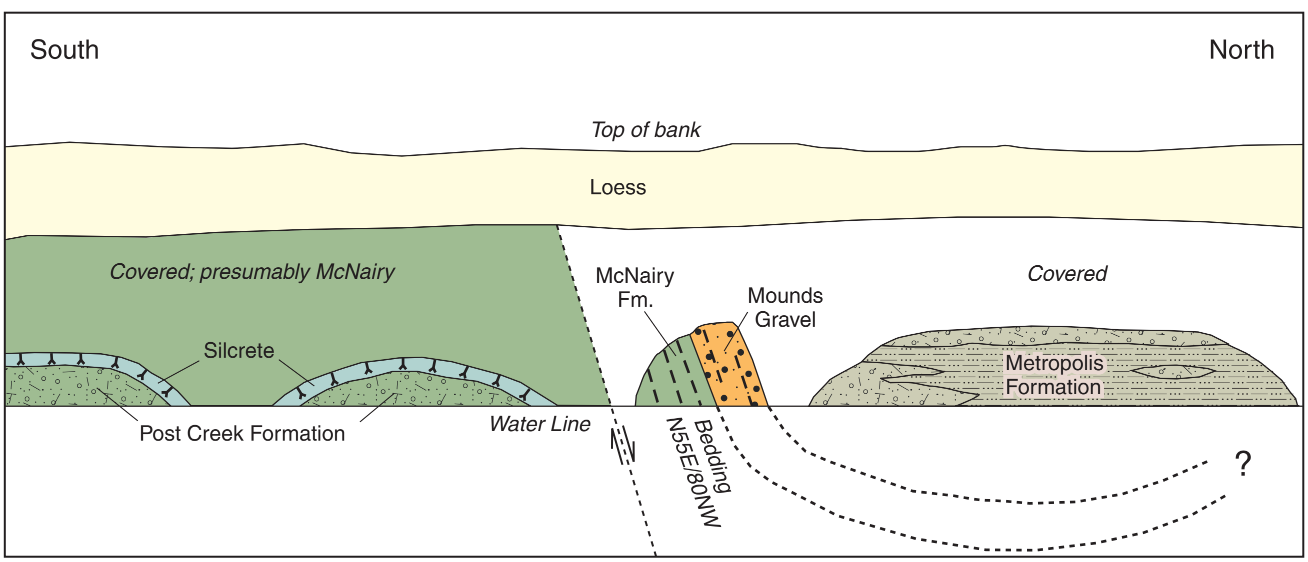

Figure 4 Cross section of the Post Creek Central structure, as seen in the west bank of the Post Creek Cutoff, based on a field sketch. Length of view is roughly 250 feet. No vertical exaggeration.

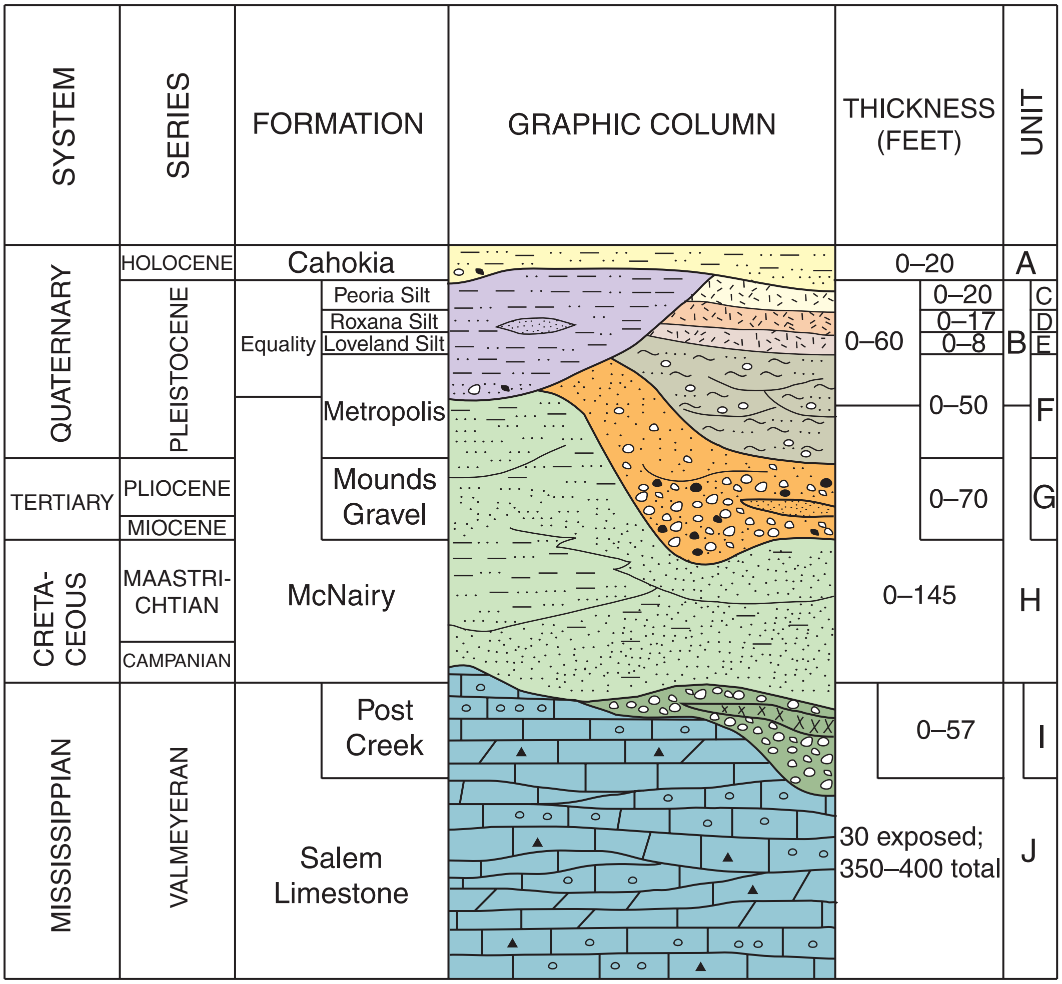

Figure 5 Bandana Quadrangle geologic column.

Column Description

A Cahokia Formation Silt, sand, and gravel. Clayey and sandy silt, mottled in brownish and yellowish gray, moderately stiff, and massive to laminated. Pellets and fracture-fillings of iron and manganese oxides are common. Sand and gravel occur mainly in the lower part of the unit, forming a fining-upward sequence. Gravel is chiefly chert pebbles derived from the Mounds Gravel, except along the shore of the Ohio River, where pebbles of diverse lithologies occur. Small streams tributary to the Ohio River have wide, flat bottoms that represent an erosional bench, not a terrace. The Cahokia is only a few feet thick in these valleys. The Cahokia consists of Holocene alluvial deposits. The lower contact may be erosional to gradational; this unit is difficult to distinguish from the Equality Formation.

B Equality Formation Silt, clay, and minor sand and gravel. Silt and clay are medium to dark gray to brown; less commonly they are greenish to bluish gray. Some reddish to orange-brown layers occur in the upper part of the unit. Consistency varies from stiff to soft, plastic "gumbo." Structure varies from massive to finely laminated or varved. Wood fragments and decomposed vegetation are common. Lenses of sand and gravel ranging up to about 6 feet thick occur chiefly in the lower part of unit. The Equality underlies all wide, flat-bottomed valleys tributary to the main Cache Valley. These valleys are deeply incised into bedrock. This formation is interpreted as fine-grained fluvial overbank sediments and slack-water lacustrine deposits that accumulated during the Wisconsinan age. The Equality overlies older units unconformably.

C Peoria Silt Silt. The Peoria is massive, slightly clayey silt (loess) with rare fine sand grains. The upper part is generally yellowish brown to dark brown, grading downward to mottled gray and yellowish brown. It is interpreted as an eolian (wind-blown) deposit. The lower contact is gradational. Age is Wisconsinan. Not mapped.

D Roxana Silt Silt. The Roxana is medium dark brown to reddish brown loess that typically has uniform color, without mottling, and higher clay content than the Peoria. This unit commonly is difficult to distinguish from the Peoria and, like the latter, probably is an eolian sediment. The lower contact is gradational. Not mapped. Age is Wisconsinan. Not mapped.

E Loveland Silt Silt. This massive silt (loess) is strongly mottled in yellow, red, and orange and has prominent vertical gray streaks. Clay content is high; sand and scattered chert granules are common. The Loveland is strongly weathered and commonly displays root casts or traces. This unit is interpreted as an eolian deposit in which a thick paleosol, the Sangamon Geosol, is developed. The Loveland is generally thin and lenticular. Its lower contact is gradational to the Metropolis Formation but unconformable to older units. Not mapped. Age is Illinoian. Not mapped.

F Metropolis Formation Silt, sand, clay, and gravel. The Metropolis is composed of silty sand and sandy silt in a clay matrix and contains scattered pebbles and lenses of gravel. Much of the unit may be classified as diamicton. These sediments are strongly mottled and streaked in shades of gray, yellowish brown, and yellowish orange. The lower part of the formation contains bright red and orange sand. Sediments are poorly sorted to unsorted and massive to weakly stratified. Gravel occurs as common scattered pebbles and as lenses up to 4 feet thick. Pebbles are dominantly chert, reworked from the Mounds Gravel and bleached, worn, and pitted; quartz, sandstone, and ironstone (derived from McNairy Formation) are minor constituents. Notably absent are pebbles derived from glacial outwash. Pebbles generally are rounded to well rounded, but many are broken. Pellets and fracture-filling of iron and manganese oxide are common. The Metropolis exhibits abundant burrows. Some are vertical, cylindrical burrows up to 1 foot in diameter possibly made by mammals; other burrows form a network of much smaller tubes and are attributed to crustaceans. The intensive burrowing, along with development of multiple paleosols, obscures primary sedimentary structures. Clay of various colors plugs porosity and lines joints in the Metropolis. Polygonal networks of fractures and large, planar, linear joints are locally present. The polygonal cracks are probably shrinkage features, and the linear joints are likely tectonic. The Metropolis Formation, originally defined by Nelson et al. (1999a), borders the Ohio River, where it underlies a loess-capped terrace, the Metropolis terrace of Alexander and Prior (1968). Many good exposures of this unit can be seen in bluffs along the river west of the Post Creek Cutoff. The Metropolis Formation is interpreted as alluvial sediment deposited in the valley of the ancestral Tennessee River, following deposition of the Mounds Gravel (Nelson et al. 1999a, 1999b). The lower contact is unconformable on McNairy in most places. Age is Pleistocene, Illinoian and older.

G Mounds Gravel Gravel and sand. The lower part is dominantly gravel, composed mostly of subrounded to well-rounded chert pebbles up to 4 inches across and bearing a glossy yellowish brown to bronze patina. Small quartz pebbles are a minor constituent. The matrix is red-brown, fine to very coarse sand that is 80 to 90% quartz and 10 to 20% chert. Gravel is crudely layered and generally becomes finer upward, grading to sand. The upper part of the Mounds is largely fine to coarse sand that is dark red with gray and yellow mottling and contains scattered chert pebbles bearing the typical patina. Layering of sand is absent to indistinct, locally outlined by lenses of gravel. The lower contact is unconformable. The Mounds Gravel rests on an erosion surface that descends northward from 430 to 450 feet elevation near the Ohio River to about 370 to 380 feet near the Cache Valley north of the map area. Boreholes near the southeast corner of the map area show the Mounds resting on a much lower erosion surface there, underlying the Metropolis Formation below the level of the Ohio River (290 feet). The Mounds also is found at elevations below 350 feet where it has dropped into grabens and sinkholes along the Post Creek Cutoff. Age is late Miocene to Pliocene and possibly early Pleistocene.

H McNairy Formation Sand, silt, and clay. Sand varies from white to light gray and bright orange, red, and yellow; sand is very fine- to medium-grained and, in most cases, highly micaceous. Light gray clay and silt occur as laminae, lenses, and rip-up clasts. Cross-bedding is common, as are very regular fine planar laminations that may be tidal rhythmites. Silt and clay are light to dark gray and may be mottled in yellow, gray, and magenta (where weathered). Bands and nodules of ironstone occur in clay and represent Liesegang bands. The lower contact is unconformable. Age is Maastrichtian (latest Cretaceous).

I Post Creek Formation Gravel and conglomerate. Gravel is composed of white, gray, and brown, angular to rounded pebbles and cobbles of chert, with lesser amounts of quartz, orthoquartzite, and sandstone. The formation is supported in a matrix of pyritic sand and clay and commonly is cemented by silica and iron oxide. A ledge of silcrete, an extremely hard, silicified rock that apparently represents an ancient soil, is developed along the Post Creek Cutoff. The type locality is in the bank of the Post Creek Cutoff adjacent to the bridge near the center of Sec. 2, T15S, R2E (Harrison and Litwin 1997). Water-well drillers log the Post Creek as gravel, chert, or novaculite. Previous geologists called this unit the Tuscaloosa Formation. The lower contact is unconformable. Age is Campanian (late Cretaceous).

J Salem Limestone Limestone. Interbedded light to medium gray, medium- to coarse-grained skeletal packstone and grainstone, and medium to dark gray skeletal wackestone and lime mudstone. Fossils include brachiopods, bryozoans, crinoids, and blastoids. Oolites and rounded fossil grains occur in grainstone. Bedding is commonly thick with wavy argillaceous partings and some cross-lamination. Limestone commonly emits a petroliferous odor when struck with a hammer. The Salem crops out in the bed of the Post Creek Cutoff near the center of Sec. 2, T15S, R2E, and was sampled in cores (in storage at ISGS) drilled by U.S. Army Corps of Engineers along the bank of the Ohio River west of the Post Creek Cutoff. An outcrop (accessible only at low water) in the bed of the Post Creek Cutoff, southern part of Sec. 35, T14S, R2E, contains the colonial coral *Acrocyathus proliferus,* which is diagnostic for the upper part of the Salem. The estimated thickness, 350 to 400 feet, is based on well records in adjacent quadrangles. The lower contact to Ullin Limestone (not shown) is gradational with intertonguing.

Tick Ridge Road; seismic line shown on the map) and core drilling, however, indicates that faults offset bedrock as well as the McNairy Formation and Mounds Gravel. The cross section of Post Creek South (fig. 3) thus depicts our interpretation that the structure is a graben. Contrary to Kolata et al. (1981), I infer that the Miller No. 1 borehole penetrated the eastern boundary fault of the graben (within an unsampled interval) and thus encountered Ullin Limestone at the same elevation as in Miller No. 2 and No. 3 boreholes, drilled east of the fault.

The Post Creek Central structure is located about 1,000 feet north of Tick Ridge Road (NW¼, Sec. 2, T15S, R2E) and is visible only when water is low in Post Creek Cutoff. As shown in figure 4, the steeply dipping McNairy and Mounds Gravel are juxtaposed with Post Creek Formation. The Mounds Gravel dips as steeply as 80° northwest and strikes northeast. Two cored test holes (ISGS Curt Jones No. 5 and No. 6) on the east bank of the stream encountered horizontal McNairy Formation directly beneath loess and apparently did not encounter the structure. We tentatively interpret Post Creek Central as a graben, outlined by two faults that strike northeast.

The Post Creek North structure is shown in the Karnak Quadrangle (Nelson and Hintz 2007).

Economic Geology

Groundwater

The wide, flat-bottomed tributaries of the Cache Valley along the northern edge of the map contain thick (up to about 60 feet) deposits of the Equality Formation, which consist dominantly of silt and clay with isolated lenses of sand and gravel. The Equality is a poor aquifer. A few residential wells are completed in gravel lenses and yield less than 15 gallons per minute. Most wells in tributaries have been drilled into bedrock at depths of 110 to 440 feet and yield 15 to 60 gallons per minute (gpm).

Elsewhere in the Illinois portion of the map area, most water wells are completed in Mississippian limestone at depths of 75 to 200 feet. In a few cases, wells had to be drilled as deep as 550 feet to reach water. Most wells are 6 inches in diameter below the surface casing and yield 10 to 50 gpm. Information on bedrock aquifers is sparse. Most wells probably are completed in the Salem or Ullin Limestones, both of which contain intervals of porous, coarse-grained rock. However, fractures and crevices may be the primary pathways for groundwater, as observed in outcrops in the Post Creek Cutoff and in large industrial wells near Joppa and Metropolis, east of the map area.

A few wells produce water from gravel of the Post Creek Formation. The Post Creek is a patchy, lenticular unit that rests on top of bedrock. Wells in this formation yield less than 10 to about 30 gpm. The Post Creek commonly contains a large amount of iron pyrite, which imparts high iron and hydrogen sulfide contents to groundwater. Thus, bedrock tends to provide larger volumes of better quality water than does Post Creek gravel.

Sand and Gravel

The Mounds Gravel is quarried in numerous small pits in and near the study area. The gravel is used mostly for surfacing secondary roads and driveways. The best gravel for this purpose is finer than 2 inches, has a wide size distribution, and has a matrix of sand with the porosity plugged by clay. Such material can pack into a hard, water-bound, macadam-like road surface. Washed and screened gravel from the Mounds can be used as decorative stone for edging, walkways, and patios.

Most gravel pits in the Mounds are part-time operations, because there is not continuous demand for the product. Ample supplies of gravel can be located on most of the higher hills in the mapped area. The thickness of gravel suitable for road surfacing typically is 10 to 20 feet, and the overburden is 10 to 30 feet of soft silt or loess. The upper part of the Mounds appears to be largely sand, containing only scattered pebbles and probably having little commercial value. The basal layer of gravel commonly is cemented to a concrete-like material and consequently is left behind during mining.

Clay

Lamar (1948, p. 63–71) reported that clay pits and pottery works operated long ago in the McNairy Formation along the Ohio River between Grand Chain Landing and the Massac-Pulaski county line. Details on these operations are sketchy, and no field evidence of them remains today. Lamar (1948) conducted field work in the area, measuring sections and collecting clay samples for analysis. He reported clay beds as thick as 20 feet that might be suitable for making bricks, pottery, ceramics, and other products. However, test drilling is needed to verify these deposits and their commercial viability. Existing borehole records are of no value in evaluating clay deposits of the Bandana Quadrangle.

Another possible source of clay is the Equality Formation, which underlies several north-trending valleys along the northern edge of the map area. Analysis of clay collected from the bank of the Post Creek Cutoff near the south line of Sec. 26, T14S, R2E in the Karnak Quadrangle, indicated that the clay might be suitable for making bricks and drain tiles and as bonding material for molding sand (Lamar 1948, p. 72). The absorbent-clay pits near Olmsted in Pulaski County, a few miles southwest of the map area, operate in the Porters Creek Clay, a unit of early Tertiary age. So far as is known, the Porters Creek is absent from the Bandana Quadrangle.

Acknowledgments

We thank F. Brett Denny, Joseph A. Devera, Leon R. Follmer, Dennis R. Kolata, John M. (Jack) Masters, John H. McBride, and Laura Williams, who participated with the author in geologic studies within the map area and provided valuable insights. We thank the many landowners who provided property access and verified well location. Special thanks are in order to David Goins, Milford Jones, and David Shumaker, who granted property access for drilling test holes and other studies along the Post Creek Cutoff. Dennis R. Kolata, John M. Masters, Jonathan H. Goodwin, Zakaria Lasemi, David Morse, and Leon R. Follmer presented helpful comments in review of the manuscript.

References

Alexander, C.S., and J.C. Prior, 1968, The origin and function of the Cache Valley, southern Illinois, in R.E. Bergstrom, ed., The Quaternary of Illinois: Urbana, Illinois, University of Illinois, College of Agriculture, Special Publication 14, p. 19–26.

Harrison, R.W., and R.J. Litwin, 1997, Campanian coastal-plain sediments in southeastern Missouri and southern Illinois: Significance to the early geologic history of the northern Mississippi Embayment: Cretaceous Research, v. 18, p. 687–696.

Kolata, D.R., and W.J. Nelson, 1991, Tectonic history of the Illinois Basin: American Association of Petroleum Geologists, Memoir 51, p. 263–285.

Kolata, D.R., J.D. Treworgy, and J.M. Masters, 1981, Structural framework of the Mississippi Embayment of southern Illinois: Illinois State Geological Survey, Circular 516, 38 p.

Lamar, J.E., 1948, Clay and shale resources of extreme southern Illinois: Illinois State Geological Survey, Report of Investigations 128, 107 p.

Nelson, W.J., 2007, Geology of Bandana Quadrangle, Pulaski and Massac Counties, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map, IGQ Bandana-G, 1:24,000.

Nelson, W.J., F.B. Denny, L.R. Follmer, and J.M. Masters, 1999a, Quaternary grabens in southernmost Illinois: Deformation near an active intraplate seismic zone: Tectonophysics, v. 305, p. 381–397.

Nelson, W.J. and J. Hintz, 2007, Geology of Karnak Quadrangle, Johnson, Massac, and Pulaski Counties, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map, IGQ Karnak-G, 1:24,000.

Nelson, W.J., J.M. Masters, and L.R. Follmer, 1999b, Evolution of lower Ohio and Tennessee Rivers, Miocene to Recent (abs.): Boulder, Colorado, Geological Society of America, Abstracts with Programs, Annual Meeting, Denver, p. 48.

Stearns, R.G., and M.V. Marcher, 1962, Late Cretaceous and subsequent structural development of the northern Mississippi Embayment area: Geological Society of America Bulletin, v. 73, p. 1387–1394.

Appendix 1 List of wells from which geologic information was obtained for the Bandana Quadrangle (June 13, 2000).

County No.	Operator	Farm	Well type	Location	Sect.	Twp.	Rng.	T.D.[1]	Formation at T.D.	Type of log
				PULASKI COUNTY						
	ISGS	Curt Jones #8	stratigraphic	1000′ SL, 1300′ EL	35	14S	2E	25′	McNairy Fm.	core description
	ISGS	Curt Jones #9	stratigraphic	550′ SL, 1700′ EL	35	14S	2E	55′	Mounds Gravel	core description
20409	R. Beanland	Dennis Jones	water	NW SE NW	1	15S	2E	175′	limestone	drillers
20415	R. Beanland	Charles Fick	water	10′ NL, 50′ EL	1	15S	2E	380′	limestone	drillers
20221	ISGS	Charles Fick	stratigraphic	800′ NL, 50′ EL	1	15S	2E	55.5′	limestone	sample study
20412	R. Beanland	J. Anderson	water	2000′ NL, 1500′ EL	1	15S	2E	240′	limestone	drillers
20313	C.M. Luton	D. Anderson	water	2350′ NL, 2300′ EL	1	15S	2E	86′	McNairy	drillers
124	W.E. Sergent	Henry Parrish	water	4650′ NL, 2400′ WL	2	15S	2E	150′	limestone	drillers
20280	ISGS	John Miller #1	stratigraphic	1750′ SL, 2080′ EL	2	15S	2E	250′	Ullin Ls.	core description
20282	ISGS	John Miller #2	stratigraphic	1750′ SL, 1930′ EL	2	15S	2E	155′	Ullin Ls.	core description
20281	ISGS	John Miller #3	stratigraphic	1790′ SL, 1920′ EL	2	15S	2E	248′	Ullin Ls.	core description
	ISGS	Curt Jones #1	stratigraphic	1780′ NL, 2350′ EL	2	15S	2E	34′	McNairy Fm.	core description
	ISGS	Curt Jones #2	stratigraphic	1810′ NL, 2650′ WL	2	15S	2E	25′	McNairy Fm.	core description
	ISGS	Curt Jones #3	stratigraphic	1410′ NL, 2730′ EL	2	15S	2E	68′	McNairy Fm.	core description
	ISGS	Curt Jones #4	stratigraphic	1750′ NL, 2260′ EL	2	15S	2E	45′	McNairy Fm.	core description
	ISGS	Curt Jones #5	stratigraphic	850′ NL, 2300′ WL	2	15S	2E	25′	McNairy Fm.	core description
	ISGS	Curt Jones #6	stratigraphic	650′ SL, 2300′ WL	2	15S	2E	25′	McNairy Fm.	core description
	ISGS	MIlford Jones #1	stratigraphic	1720′ NL, 1910′ EL	2	15S	2E	40′	McNairy Fm.	core description
	ISGS	Milford Jones #2	stratigraphic	1750′ NL, 2200′ EL	2	15S	2E	40′	McNairy Fm.	core description
	ISGS	Milford Jones #3	stratigraphic	1650′ NL, 1410′ EL	2	15S	2E	30′	McNairy Fm.	core description
	ISGS	Leon Shumaker	stratigraphic	1660′ NL, 730′ EL	2	15S	2E	30′	McNairy Fm.	core description
20417	R. Beanland	Jerry Roper	water	4700′ NL, 1500′ EL	3	15S	2E	88′	limestone	drillers
109	W.E. Sergent	A. Eddleman	water	2100′ NL, 1350′ EL	3	15S	2E	1020′	Fort Payne(?)	drillers
	Holcomb Eng.	Pulaski County #1	engineering	5160′ NL, 1300′ EL	3	15S	2E	25.5′	limestone	sample study
	Holcomb Eng.	Pulaski County #2	engineering	4900′ NL, 1500′ EL	3	15S	2E	7.5′	limestone	sample study
	Holcomb Eng.	Pulaski County #3	engineering	5000′ NL, 300′ EL	3	15S	2E	40′	Metropolis Fm.	sample study
	Holcomb Eng.	Pulaski County #4	engineering	4950′ NL, 1100′ EL	3	15S	2E	36.5′	limestone	sample study
20381	R. Beanland	Dewey Dover	water	2300′ NL, 2300′ EL	4	15S	2E	190′	limestone	drillers
20425	Corps of Eng.	WC-8	engineering	100′ NL, 450′ EL	10	15S	2E	42.2′	Ullin Ls.	core description
20426	Corps of Eng.	WC-10	engineering	100′ NL, 1300′ EL	10	15S	2E	21.4′	Salem Ls.(?)	core description
20427	Corps of Eng.	WC-11	engineering	250′ NL, 2200′ EL	10	15S	2E	43.1′	Ullin Ls.	core description
20428	Corps of Eng.	WC-15	engineering	250′ NL, 2300′ WL	10	15S	2E	48.5′	Salem Ls.(?)	core description
20429	Corps of Eng.	WC-16	engineering	250′ NL, 1500′ WL	10	15S	2E	46.0′	Salem Ls.	core description
20430	Corps of Eng.	WC-9	engineering	300′ NL, 600′ WL	11	15S	2E	40.2′	Ullin Ls.	core description
				MASSAC COUNTY						
	IDOT [2]	Briarwood Road	bridge boring	200′ SL, 0′ EL	31	14S	3E	66′	Henry or Pearl Fm.	engineers
20253	Paul Horman	George Lewis	water	200′ SL, 2550′ EL	33	14S	3E	185′	limestone	drillers
20483	Paul Horman	Miriam Houchins	water	SW NE NW	4	15S	3E	270′	limestone	drillers
121	C.M. Luton	Glen McCall	water	400′ SL, 100′ WL	4	15S	3E	65′	Metropolis Fm.	drillers
20336	J. Beanland	Bill Castleman	water	50′ SL, 500′ WL	4	15S	3E	125′	limestone	drillers
20451	R. Beanland	James Becker	water	200′ NL, 700′ EL	4	15S	3E	220′	chert	drillers
		Cecil Becker	water	900′ NL, 150′ WL	4	15S	3E	314′	limestone	homeowner, verbal
20584	L. Beanland	Robert Sharp	water	300′ NL, 100′ EL	5	15S	3E	315′	limestone	drillers
20383	R. Beanland	James Barnett	water	2200′ SL, 2600′ WL	5	15S	3E	372′	limestone	drillers
115	Paul Horman	LaVerne Whiteside	water	1550′ NL, 50′ WL	5	15S	3E	112′	Post Creek Fm.	drillers
20674	L. Beanland	Jim Wilson	water	300′ NL, 2000′ EL	6	15S	3E	170′	chert	drillers
129	W.E. Sergent	Delbert Goins	water	NE SE SE	6	15S	3E	238′	limestone	drillers
179	W.E. Sergent	Delbert Goins	water	600′ NL, 400′ EL	7	15S	3E	417′	Fort Payne (?)	drillers
20667	R. Beanland	Loren Sharp	water	1200′ NL, 2500′ WL	8	15S	3E	120′	limestone	drillers
20538	R. Beanland	Glenn Jenkins	water	1050′ NL, 1850′ EL	8	15S	3E	120′	chert	drillers
20297	Paul Horman	John McCuan	water	900′ NL, 1900′ WL	8	15S	3E	157′	limestone	drillers
20384	Paul Horman	Clifford Johnson	water	2100′ NL, 2400′ WL	8	15S	3E	87′	rock	drillers
20627	R. Beanland	Lindell Oliver	water	1900′ NL, 1100′ WL	9	15S	3E	108′	chert	drillers
20691	L. Beanland	Tim Prater	water	2200′ NL, 1250′ WL	9	15S	3E	138′	limestone	drillers
20626	R. Beanland	Hillerman Baptist Ch.	water	2600′ NL, 1200′ WL	9	15S	3E	130′	limestone	drillers
	Layne Western	Missouri Portland Cmt.	engineering	2151′ NL, 143′ WL	15	15S	3E	451′	Fort Payne Fm.	core description
	Layne Western	Missouri Portland Cmt.	engineering	2720′ NL, 722′ EL	16	15S	3E	175′	Post Creek Fm.	sample study

[1] T.D., total depth.
[2] IDOT, Illinois Department of Transportation.