BEDROCK GEOLOGY OF FISHHOOK QUADRANGLE
ADAMS, BROWN AND PIKE COUNTIES, ILLINOIS

Illinois Department of Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
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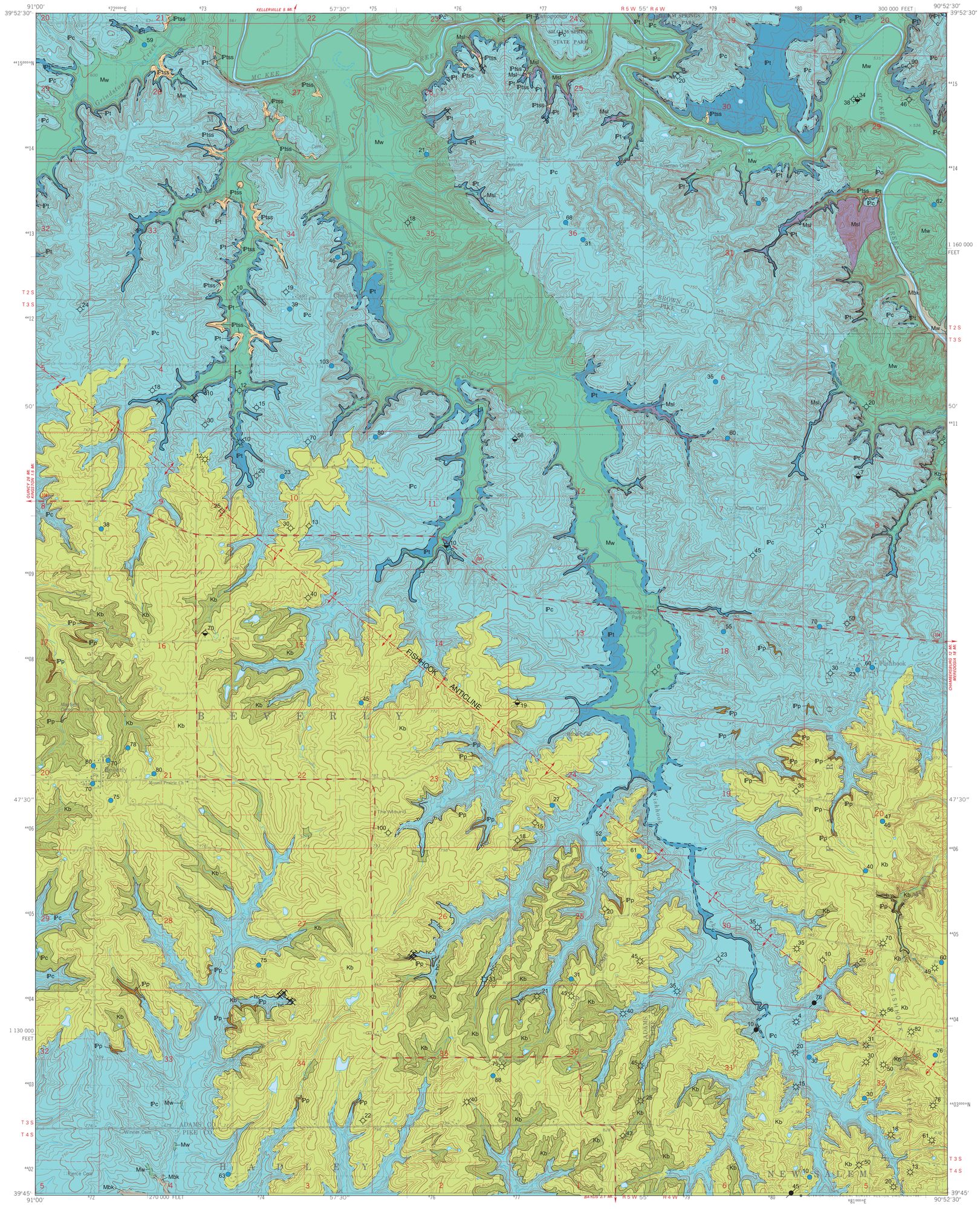
2008

Illinois Preliminary Geologic Map
IPGM Fishhook-BG



EXPLANATION

Cretaceous	Kb	Baylis Formation Balis Formation outcrops	Gulfian
Pennsylvanian	IPp	Pleasantview Sandstone	Desmoinesian
	IPc — h — hc — c	Carbondale Formation h, Hanover Limestone hc, Houchin Creek Coal Member c, Colchester Coal Member	Desmoinesian
	IPt	Tradewater Formation (Basal Sandstone)	Desmoinesian
	IPtss	Basal Sandstone	Desmoinesian
Mississippian	Msl	St. Louis Limestone	Valmeyeran
	Mw	Warsaw Formation	Valmeyeran
	Mbk	Burlington and Keokuk Limestones	Valmeyeran

Symbols

- 5 — Strike and dip of bedding; number indicates degree of dip
- Mine adits

Drill Holes
from which subsurface data were obtained

- Dry hole
- Dry hole, show of gas
- Dry hole, show of oil
- Dry hole, show of oil and gas
- Gas well producing
- Gas well producing, plugged
- Oil well producing, plugged
- Water well
- 30 — Numeric labels indicate depth to top of bedrock in feet

Line Symbols
dashed where inferred

- Contact
- Anticline, direction of plunge indicated by arrows

Note: Well and boring records are on file at the ISGS Geological Records Unit and are available from the ISGS web site.

Base map from the United States Geological Survey. Topography compiled from imagery dated 1974. Field checked 1976. Map edited 1981.

North American Datum of 1983 (NAD 83)
Projection: Transverse Mercator
10,000-foot ticks: Illinois State Plane Coordinate system, west zone (Transverse Mercator)
1,000-meter ticks: Universal Transverse Mercator grid system, zone 15

Recommended citation:
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SCALE 1:24,000

1 — 1/2 — 0 — 1 MILE
1000 — 0 — 1000 — 2000 — 3000 — 4000 — 5000 — 6000 — 7000 FEET
1 — .5 — 0 — 1 KILOMETER

BASE MAP CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Released by the authority of the State of Illinois: 2008

Geology based on field work by R. Jacobson and Z. Lasemi, 1999.

Digital cartography by J. Domier, S. Geegan, and S. Radil, Illinois State Geological Survey.

This Illinois Preliminary Geologic Map (IPGM) is a lightly edited product, subject to less scientific and cartographic review than our Illinois Geological Quadrangle (IGQ) series. It will not necessarily correspond to the format of IGQ series maps, or to those of other IPGM series maps. Whether or when this map will be upgraded depends on the resources and priorities of the ISGS.

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4		5
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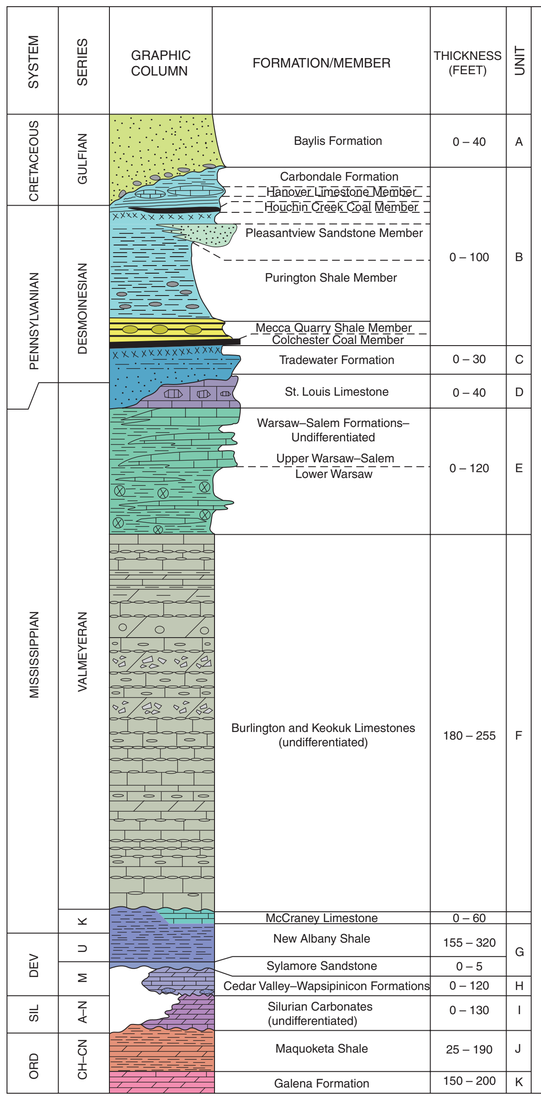
ADJOINING QUADRANGLES
1 Liberty
2 Kellerville
3 Mount Sterling
4 Richfield
5 Perry West
6 Barry
7 Baylis
8 New Salem

APPROXIMATE MEAN DECLINATION, 2008

ROAD CLASSIFICATION

- Primary highway, hard surface
- Secondary highway, hard surface
- Light-duty road, hard or improved surface
- Unimproved road
- State Route



Generalized columnar section. A–N = Alexandrian–Niagaran, CH–CN = Chapmlainian Cincinnatian, M = Middle, U = Upper, K = Kinderhookian, Dev = Devonian, Sil = Silurian, Ord = Ordovician. Only the upper most part of the Keokuk and above are exposed in the quadrangle. McCraney–Galena interval is condensed to save space.

A Baylis Formation (0 to 5 feet) Sand, clayey sand, and gravel. The Baylis Formation (Frye et al. 1964) consists of uncemented fine to medium-grained quartz sand and clayey sand with zones of dispersed granules of angular white chert, lenses of silty clay, and locally, moderately well-rounded pebbles of chert, quartz, and quartzite. The unit typically is massive to thick bedded with indistinct bedding. Some beds consist of relatively clean, well-sorted, medium to fine-grained sands that have planar laminations and cross bedding. Colors vary from white to light gray, tan, brown, and orange-brown, with the tan and brown commonly occurring as color bands and mottling. A few beds contain abundant fine mica, which is readily seen in outcrop. Sand mixed with rounded brownish chert and some quartz and quartzite pebbles forms lenses up to 15 feet thick at the base. This lower unit is known as the Hadley Gravel Member, whereas the upper predominantly sandy and clayey unit is known as the Kiser Creek Member (Frye et al. 1964). The basal portion of the Hadley Gravel Member has an iron-stained zone and in some parts of Adams County it is highly cemented by iron oxide. The Baylis rests unconformably on Paleozoic bedrock in the area. A distinct weathered zone (a paleosol of reddish shale) occurs at the contact between the Baylis Formation and underlying Paleozoic bedrock. The Baylis occurs on the prominent ridge forming the divide between the Illinois River and the Mississippi River drainage. Mapping in this quadrangle has shown exposures of this formation to be more patchy than indicated on previous maps (Frye et al. 1964) in part because slopes where the Baylis is expected to be present commonly are well-rounded, slumped and vegetated and many slopes are mantled by loess, soil and glacial tills that completely hide the Baylis.

B Carbondale Formation Shale, siltstone, sandstone, limestone, thin coal, and claystone. The Carbondale contains the following members:

Hanover Limestone Member (0 to 2 feet) Light gray argillaceous lime mudstone matrix surrounding gray to dark bluish gray lime mudstone clasts and marine fossils (such as crinoids and brachiopods).

Excello Shale (0 to 2 feet) Black, fissile shale; sharp contact at top.

Houchin Creek Coal Member (0 to 2 feet) Coal, bituminous, banded; grades laterally to a thin shaley coal several inches thick, resting on underclay up to 4 inches thick.

Pleasantview Sandstone Member (0 to 20 feet) Sandstone, upper facies is locally cross-bedded with tabular to irregular channel-filling bed forms; Lower facies is characterized by well-laminated tidal bundles deposited in a broad sheet.

Purington Shale Member (0 to 70 feet) (figs. 1 and 2) At the base, a dark gray, calcareous shale that contains marine fossils. Remainder of unit consists of medium gray to bluish gray silty shale grading up to sheet facies of lower Pleasantview Sandstone.

Mecca Quarry Shale (0 to 10 feet) (figs. 1 and 2) Black fissile shale that contains limestone lenses and concretions, upper contact gradational with overlying Purington.

Colchester Coal Member (0 to 1.5 feet) (fig. 1) Coal, banded, bituminous, both lower and upper contacts sharp.

C Tradewater Formation (0 to 30 feet, typically averaging 4 to 5 feet) Sandstone and claystone. The claystone is light gray to whitish, contains carbonaceous root casts, slightly sandy, and grades downward into sandstone. The basal sandstones (fig. 3) are gray to light gray, medium to coarse grained, quartzose, slightly argillaceous, and vary from thin sheet-like beds less than two feet thick to cross-bedded channel-fill deposits up to 30 feet thick, which cut downward into the underlying formations (paleochannels). The lower portion of these paleochannel deposits in many places contains a conglomeratic lag of limestone and chert clasts. The paleochannel deposits lie on the irregular erosional surface that is the unconformable contact between the Pennsylvanian system and underlying Mississippian units.

D St. Louis Limestone (0 to 40 feet) Limestone, dolomite, and thin shale (fig. 4). The limestone and dolomite are light gray to gray-brown, microcrystalline and weather yellow-gray to tan. Green shale interbeds occur locally. Some carbonate beds are characterized by algal laminations (stromatolites). This unit is missing over much of the quadrangle due to sub-Pennsylvanian erosion: it occurs only as thin irregular outliers in the north-central and northeastern portions of the quadrangle.

E Salem, Sonora and Warsaw Formations undifferentiated (0 to 120 feet) Shale, dolomite, limestone, sandstone. These three formations are mapped as a single unit, but can be differentiated in a few outcrops. At the base, making up the majority of the mapped unit (and all of it in most areas) is the Warsaw Formation which can be divided informally into a "lower" and "upper unit" based on lithologic characteristics. The "lower unit" (fig. 5) consists primarily of light- to medium-gray or blue-gray shale, interbedded siltstone, finely crystalline and argillaceous dolomites, and light-gray to olive-gray (rusty to yellow-orange where weathered) fossiliferous limestones (grainstones) that are dolomitic in part. The "upper unit" (fig. 6) consists of shales and thin grainstones lithologically similar to the "lower unit". However, the grainstones of the "upper unit" commonly develop into one or more massive ledges that dominate the upper unit in many places. The Warsaw contains abundant bryozoan fossils, and brachiopods, gastropods, and echinoderms are common. Geodes ranging in size from fists to basketballs are moderately abundant in the formation, especially in the more shaley intervals of the "lower unit". The unit we have tentatively identified as "Sonora", consists of a fine-grained, greenish gray sandstone similar to that which occurs below the Salem in adjacent quadrangles. Its occurrences were very patchy and it was not observed in the same locations as the "Salem" lithologies. Outcrops of the Salem occur only as thin, discontinuous lenses on top of the thick carbonates of the "upper unit" of the Warsaw Formation. The Salem Limestone consists of thin, discontinuous lenses of dolomitic sandstone or white crinoidal grainstone that contains foraminifera and lithologies similar to those observed in the Salem Limestone identified elsewhere in the state.

Subsurface Only

F Burlington-Keokuk Limestone, undifferentiated (180 to 255 feet) Light gray to buff, fine to coarse grained, crinoidal limestone (grainstone), in beds ranging from a few inches to more than 2 feet thick. Dolomitic limestone beds occur in places. Some grainstone beds are separated by thin clay or shale partings. Nodular to lenticular masses of chert are abundant in some intervals. Only the upper 10 to 30 feet of the Burlington-Keokuk crops out in the Fishhook quadrangle in the south. It is found along McKee Creek in the eastern part of Sec. 32, T2S, R4W, Brown County, and the northeast corner of Sec. 5, T3S, R4W, Pike County as well as along an unnamed creek in the central and western part of Sec. 4, T4S, R5W, Adams County.

G New Albany Shale (155 to 320 feet) consists of:

McCraney Limestone (0 to 60 feet) Consists of alternating thin layers of light gray to buff lithographic limestone with buff to brown, very fine-grained dolomite. A bed of coursely oolitic limestone forms the top of the McCraney where the formation is thinkest. In the area of mapping, the McCraney is unconformably overlain and, in places, completely truncated by the Burlington Limestone.

Hannibal-Saverton Shale (75 to 150 feet) Shale and siltsone, gray to green to greenish gray. Overlies the Grassy Creek.

Grassy Creek-Sweetland Creek (80 to 170 feet) Grassy Creek, shale, brownish black, pyritic, finely laminated, overlies the Sweetland Creek. Sweetland Creek, shale, greenish-gray, interbedded with olive-black laminated shale.

Sylamore Sandstone (0 to 5 feet) Consists of a single thin bed of pyritic, phosphatic, well rounded quartz grain sandstone.

H Cedar Valley-Wapsipinicon Formations (0 to 120 feet) Brown to brownish gray limestones. The Cedar Valley is thicker and more coarsely crystalline, fossiliferous and sandier than the Wapsipinicon. The Hoing Sandstone Member, occurs as a lenticular sandstone at the base of the Cedar Valley.

I Silurian, undifferentiated (0 to 130 feet) Equivalent to the Alexandrian Series, Kankakee and Edgewood Formations. Kankakee, (0 to 124 feet). Limestone, white to light gray, lithographic to coarsely crystalline, with abundant pinkish grains and green stylolitic shale partings. The oil-bearing interval is dolomite, light greenish gray, sucrosic and vuggey. Edgewood, (0 to 6.5 feet?) dolomite, light tan-gray, sucrosic and vuggy. Noix Oolite Member, (0 to 1.5 feet), oolitic limestone, light tan to gray, and dense. Basal Edgewood consists of up to 5 feet, dolomite, green, very fine grained, pyritic and silty resting directly on the Maquoketa.

J Maquoketa shale (25 to 190 feet) Consists of an upper green shale that grades downward to a middle zone of tan to light greenish shaley, silty dolomite, and a lower zone of brown to brownish gray shale.

K Galena Formation (150 to 200 feet) Dolomite to dolomitic limestone, light brown to greenish gray, medium to finely crystalline, with common vesicular porosity.

Note: See report accompanying this map for references.

Figure 1 Baylis Formation (Cretaceous) exposed in borrow pit just north of Beverly NE¼ NW¼ SW¼ NW¼ Sec. 15, T3S, R5W, Adams County, IL. Shows the typical light gray to very whitish color of the clays and sands that comprise the formation.

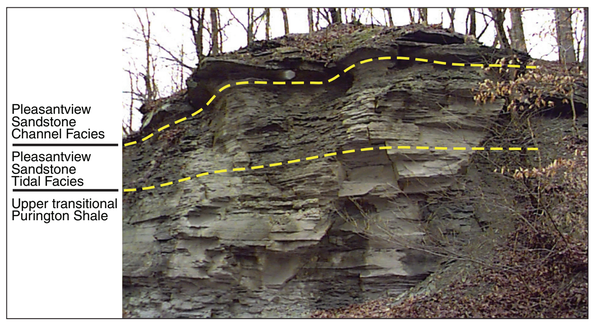


Figure 2 Transition zone of upper Purington Shale to Pleasantview Sandstone (Carbondale Formation). Consists of a lower sandy gray siltstone grading upward to silty fine grained sandstone and siltstone of the lower tidal facies of the Pleasantview Sandstone. Section is capped by the thick channel facies of the Pleasantview Sandstone. The channel facies rests on the underlying tidal sheet facies with an unconformable erosive contact. SW¼ NW¼ NW¼ Sec. 1, T2S, R4W, Brown County, IL.

Figure 3 Close view of the basal tidal facies of the Pleasantview Sandstone that is transitional to underlying upper Purlington Shale. These bundles of rhythymic bedding consist of 4 – 5 inch thick fine sand to coarse silt beds draped by blue gray clay. SW¼ NW¼ NW¼ Sec. 1, T2S, R4W, Brown County, IL.

Figure 4 Large limestone lense or concretion from upper Mecca Quarry Shale (Pennsylvanian) containing a large coiled nautiloid cephalopod. NE¼ NE¼ NE¼ SE¼ Sec. 24, T3S, R5W, Adams County, IL.

Figure 5 Colchester Coal over underclay (Pennsylvanian) which is in turn resting unconformably on blue gray shales of the lower "member" of the Warsaw Formation (Mississippian) near the middle of the Formation. NW¼ NW¼ NW¼ NW¼ Sec. 10, T3S, R5W, Adams County, IL.

Figure 6 View of over 20 feet of blue gray shales and interbedded thin shaley limestones of the "lower member" of the Warsaw Formation (Mississippian) containing abundant geodes. It is overlain by over 10 feet of exposed thin-bedded grainstone of the "upper member" of the Warsaw Formation. NW¼ SW¼ NW¼ SE¼, Sec. 2, T3S, R5W, Adams County, IL.

Figure 7 Thick interval of limestone in "upper member" of the Warsaw Formation (Mississippian) exposed down a tributary to McKee Creek. NE¼ NW¼ NE¼ NW¼, Sec. 32, T2S, R4W, Brown County, IL.

Figure 8 Exposure of upper carbonates from the Burlington and Keokuk Formations undifferentiated. Contains interbedded chert nodules and lenses and whitish coarse-grained crinoidal grainstone typical of these formations. West-center NE¼ NE¼ NE¼ Sec. 5, T3S, R4W, Pike County, IL.