

INTRODUCTION:

Black Rock Run (named herein) is a narrow creek located in the northwest quarter of Section 5, Township 32 North, Range 2 East at the Southern end of Matthiessen State Park. Two thirds of the creek is actually on the property of a quarry company called the Moline Construction Company. This map and attachments are an attempt to document Black Rock Run (BRR) in case it is ever destroyed by quarrying activities. This short creek (length of about 2300 feet) is unique in the area. During its 80 feet descent into the Vermilion River takes you through a trip of about 465 million years into the past. The head waters are in the recent glacial deposits of the last ice age. As you head west you go through the coals, shales, and limestones of the Pennsylvanian swamp and delta deposits. Eventually down through the Ordovician carbonates and sandstones. BRR narrows at one point in an area called Reflection Pass. Here the valley is only five feet wide but the cliffs are 20 feet high (see photo to the left). This area is also unique because four normal faults have been identified as you descend down towards the Vermilion River.

Photo taken by: Steven Baumann on 4-10-2010: Looking east upstream into Reflection Pass. Reflection Pass is herein named because of the way the sunlight reflects off the water onto the rocks.

METHOD:

Black Rock Run was mapped in March and April of 2010. The author had previously mapped Matthiessen State Park as a whole in 2009. However, due to time and access constraints, BRR was not mapped in detail. So this supplemental report was created to address the geology of BRR.

Typical field techniques were employed. A Brunton compass was used to take orientation measurements of the rocks. Photos and GPS locations were also documented. Elevations were taken from a topographic map. From these measurements a geologic map and cross section were created (see Attachments A & B).

PHYSICAL GEOLOGY:

The geology of BRR is unique to the area and Illinois. It is one of only a few locations where so much of the Earth's history is exposed in such a short distance (see Attachment A).

The youngest units are recent Quaternary deposits. They are exposed at the tops of the highest hills and along the Vermilion River. They consist of modern stream deposits (*Cahokia Formation*), wind blown silts (*Peoria Silt*), slack water lake deposits (*Equality Formation*), and glacial diamicton or till (*Lemont Formation*).

Below the Quaternary are the much older Pennsylvanian deposits of the *Carbondale Formation* (younger) and the *Tradewater Formation* (older). Both formations were deposited in a delta or swamp environment. As a result there are alternating layers of shale, clay, limestone, coal, and sandstone. The thickest coal in the area is the *Colchester (or #2) Coal* which is 1.5 to 2.0 feet thick and is the basal unit of the *Carbondale Formation* (see Attachment A).

The oldest rocks at BRR are Ordovician in age. This was a time before land plants existed and most of Illinois was covered by shallow seas. The youngest Ordovician rocks are The Galena and Platteville Groups. Both are generally limestone and dolostones. The Platteville tends to contain more fossils and is not as pure as the Galena. Below the Galena and Platteville is the older Ancell Group. At BRR the Ancell consist of the stream and valley fill deposits of the *Glenwood Formation* (thin in the area) on top of the older *Saint Peter Formation*. The Saint Peter is a clean white, quartz, fine to medium grained sandstone, which is used as a major source of groundwater in Northern Illinois. It is also mined locally for glass products.

STRUCTURAL GEOLOGY:

The entire area exists along an anticline called the La Salle Anticlinorium which runs from North-central Illinois south-southeast into Iroquois County. At BRR there are two smaller structures exposed at the surface. The Split Rock Monocline (Pennsylvanian) and the Matthiessen Monocline (Pre-Pennsylvanian). These structures are reflected at the surface and can be measured by taking strike and dip on the bedding planes of rock units in order to determine the orientation of the rocks. This was done along BRR and some interesting trends emerged.

Four faults were discovered. All trend roughly north-south. The furthest west fault (Black Rock Run Fault) is exposed at the surface in the Pennsylvanian rocks and has a displacement of about 10 feet (see Attachments A & B). The Black Run Fault may actually break northwest for about 100 to 200 feet at the mouth of Black Rock Run. It was modeled north-south because that is the general structural trend and there is no evidence of faulting across the Vermilion River on the west side. The Black Rock Run Fault is the only one of the four faults that is directly visible at the surface approximately 200 feet east of BRR mouth.

To the east there are three normal, almost vertical, faults that are collectively referred to herein as the Ash Fault System. These are a set of three roughly parallel faults that are theorized to become one fault to the north in the Cascade Dells of Matthiessen State Park where a fault was observed in the Ordovician by the Author in 2009.

In the area, the Ash Fault Zone has a displacement of about 10 feet total at the apex of the Matthiessen Monocline. The western most fault (see Attachment B) has a displacement of about 25 to 30 feet. Eventually the three faults meet to the north at Cascade Dells where displacement diminishes to one foot, and most likely does not extend any further north.

The Ash Fault Zone, unlike the Black Rock Run Fault, does not extend up into the Pennsylvanian. No faults are observed in the Quaternary. The Ash Fault Zone is older and not part of the same fault system although the same event (the deformation of the La Salle Anticlinorium) was the cause of all local faulting. As the La Salle Anticlinorium began to form during the Ordovician, faulting began in the middle of the map area. By the time of the Pennsylvanian, faulting had moved west to the area that is now the Vermilion River and the town of Ogleby.

There is one more intriguing set of structures along BRR. In the upper most Platteville Group, east of Reflection Pass, there are large caverns filled with clay (see Attachment C). These caverns were created when the Galena and Platteville were just below the waves, in a very shallow sea during the Pennsylvanian before the deltas moved in. The clay in the caverns is Pennsylvanian in age. They were formed in the same way that modern caves develop in shallow limestones off the coast of Florida.

CONCLUSIONS:

The geologic history of Illinois is well preserved at BRR. It is one of only a few places in Illinois where so much geology is exposed over such a short distance. In that short distance you can travel back in time about 465 million years and see how Illinois has evolved over time.

REFERENCES:

- [Build Illinois: The Last 500 Million Years](#), ISGS, Geo Note 4, Vaiden, 2000
- [Champlainian Series in Illinois](#), ISGS Bulletin 89, Templeton, 1963
- [Geology and Mineral Resources of Marseilles, Ottawa, and Streator Quads](#), ISGS Bulletin 66, Willman, 1942
- [Handbook of Illinois Stratigraphy](#), ISGS Bulletin 95, Willman, 1975
- [Structure of the Colchester \(#2\) and Springfield \(#5\) Coal](#), ISGS Bulletin 82, Wanles, 1957
- [Surficial Geology of Matthiessen State Park Illinois](#), G-112009-1A, Baumann, 2009
- [Wedron and Mason Groups](#), ISGS Bulletin 104, Hansel, 1996

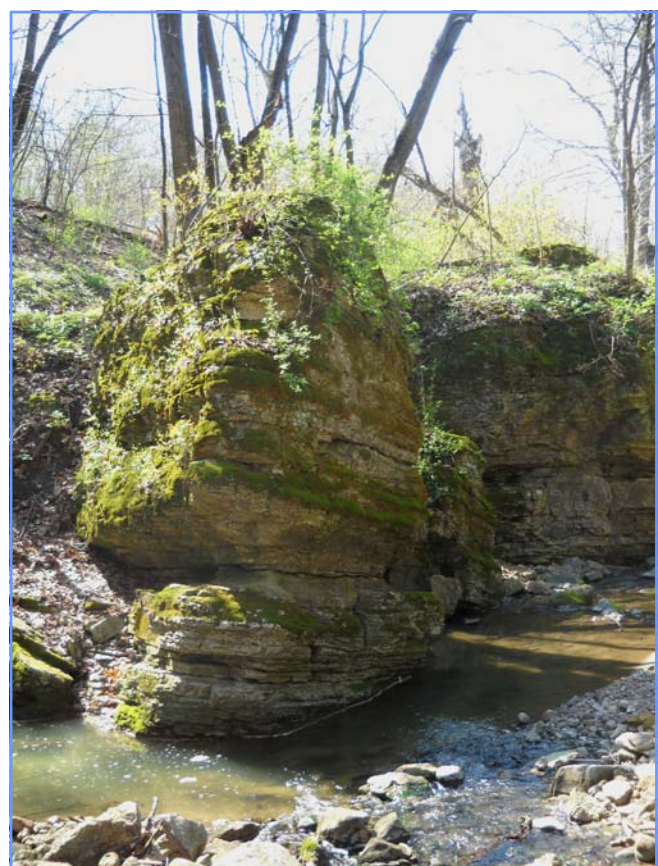
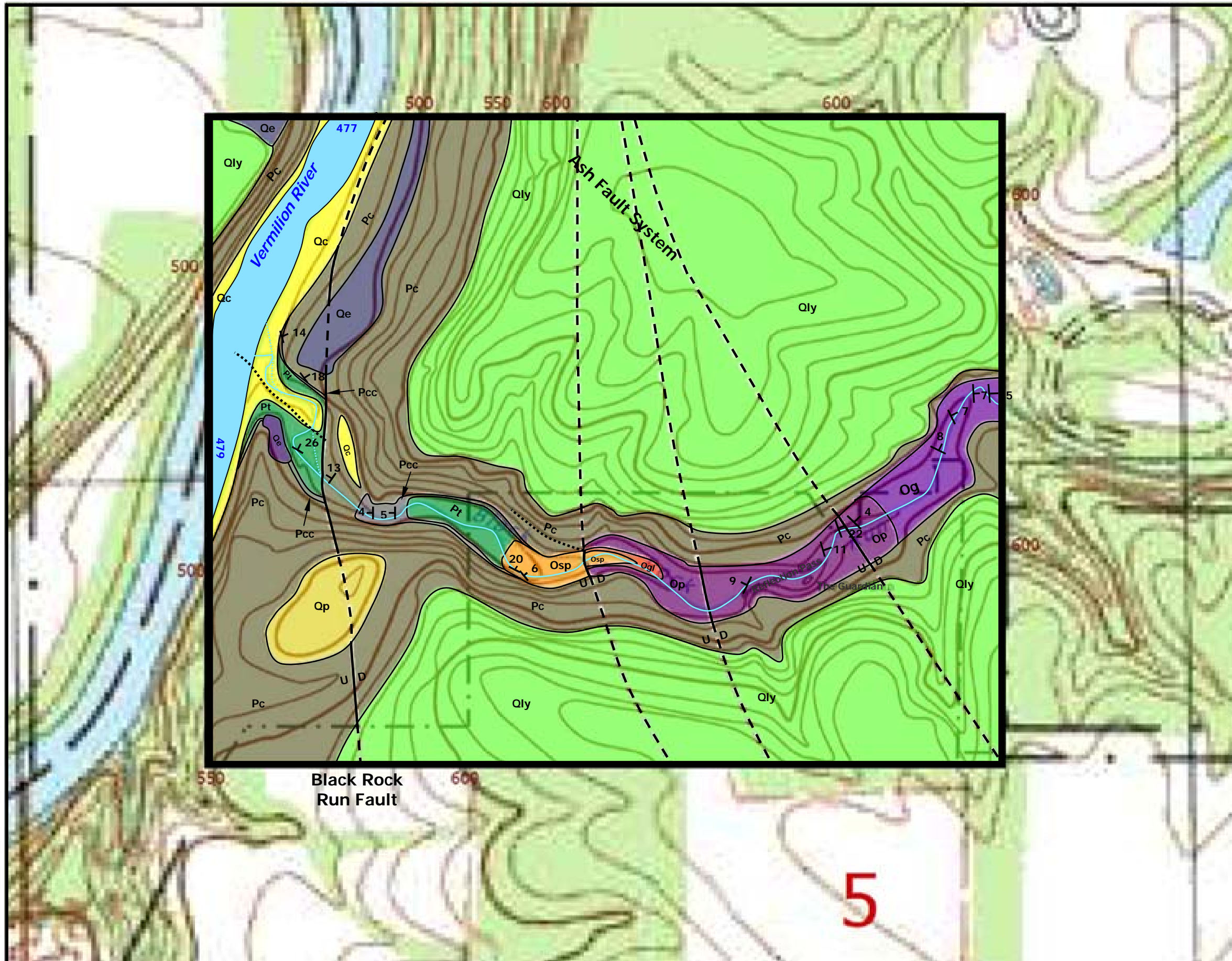


Photo taken by: Steven Baumann on 4-10-2010: Looking southwest downstream at the dislodged Platteville stack called "The Guardian". So called because it stands at the entrance to Reflection Pass.
[GPS:](#) N: 41.27364 W: 89.023132
[Base Elevation:](#) 529 feet above Mean Sea Level

ATTACHMENT A: Geologic Map of Black Rock Run at Matthiessen State Park, La Salle County, IL, USA



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GEOLOGIC UNITS

QUATERNARY	Code	Description
QUATERNARY	Qc	Cahokia Formation: Black and gray, interlaminated SILT and CLAY, with yellow brown fine to coarse SAND: <i>Modern Stream Deposits</i>
	Qp	Peoria Silt: Yellow to yellow brown, laminated to massive SILT and SILTY SAND: <i>Wind blown Loess</i>
	Qe	Equality Formation: Gray to orange brown, laminated, clayey, SILTY SAND: <i>Lake Deposits</i>
PENNSYLVANIAN	Qly	Lemont Formation, Yorkville Member: Brown and gray, silty, with large erratics TILL: <i>Glacial Diamicton</i>
	Pc	Carbondale Formation (Undivided): SHALE, CLAY, micaceous, SANDSTONE, COAL, black nodular to lenticular LIMESTONE: <i>Delta Deposits and Near Shore Marine</i>
	Pcc	Carbondale Formation, Colchester (#2 Coal) Member: Black, fissile, laminated, platy, COAL: <i>Swamp Delta Deposit</i>
ORDOVICIAN	Pt	Tradewater Formation: SHALE, Impure LIMESTONE, CLAY, and minor soft COAL: <i>Delta Deposits and Near Shore Marine Deposits</i>
	Og	Galena Group (Undivided): Brownish gray, hard, fine crystalline, interbedded LIMESTONE and DOLOSTONE, chert: <i>Marine Shelf Deposits</i>
	Op	Platteville Group (Undivided): Gray to brown, hard, fine to coarse crystalline, interbedded LIMESTONE and DOLOSTONE, contains fossils and chert: <i>Marine Shelf Deposits</i>
	Ogl	Glenwood Formation: Orange, dolomitic SANDSTONE to sandy DOLOSTONE: <i>Terrestrial Valley Fill and Stream Deposits</i>
	Osp	Saint Peter Formation: White and gray, pure, fine to medium quartz SANDSTONE: <i>Near Shore Marine and Barrier Island Deposits</i>

FAULTS, ORIENTATION, AND CONTACTS

- Fault (with relative movement)
- Covered Fault
- Alternate Interpretation of Fault
- Geologic Contact
- Strike and Dip

MAP SYMBOLS

NW 1/4, Sect. 5, T32N, R02E

- Abandoned Meander Channels
- 10 Foot Contour
- 50 Foot Contour
- 477 River Elevation

Park Border

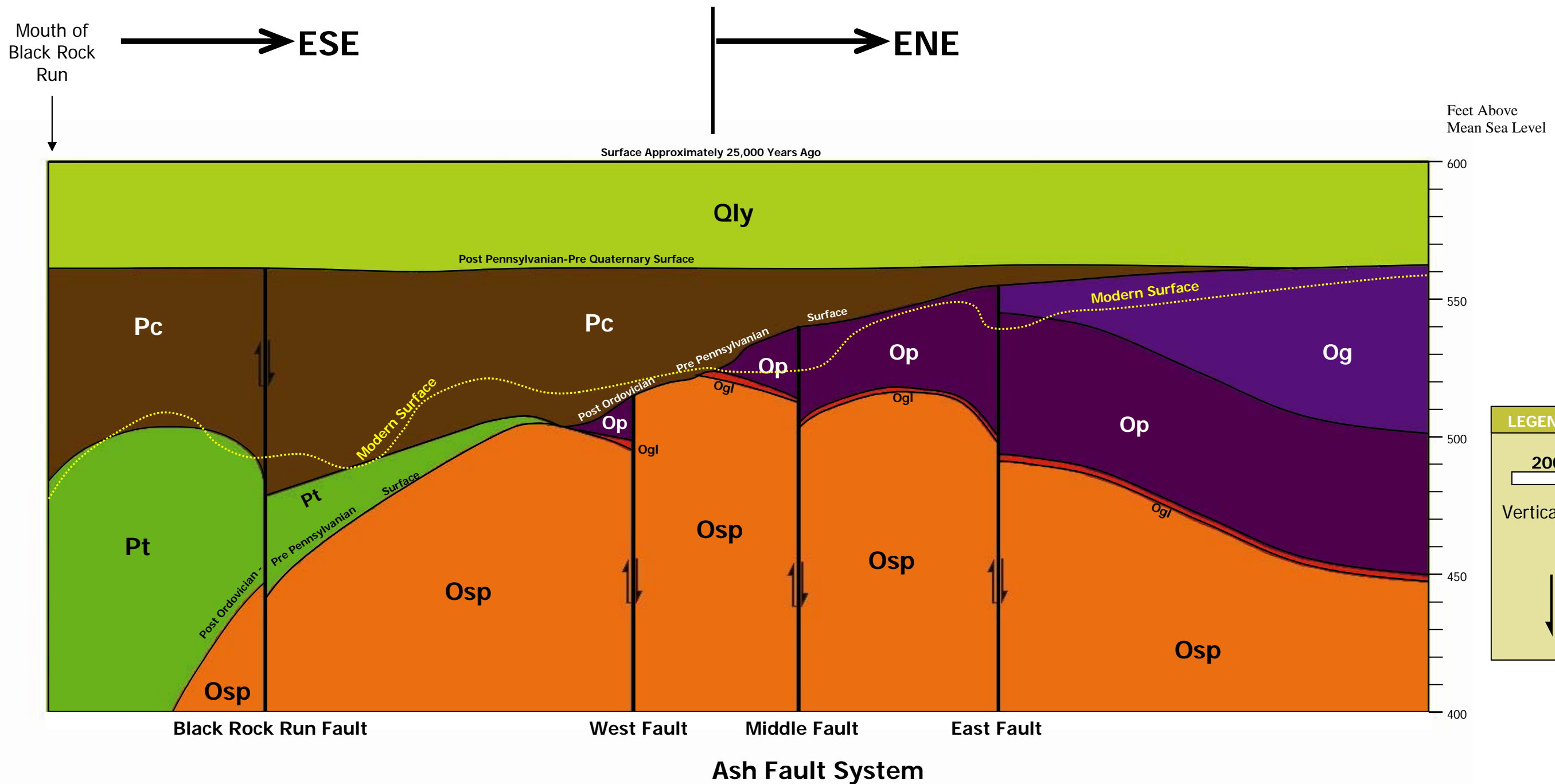
500 Feet



ATTACHMENT B: Generic Cross Section along Black Rock Run at Matthiessen State Park, La Salle County, IL, USA



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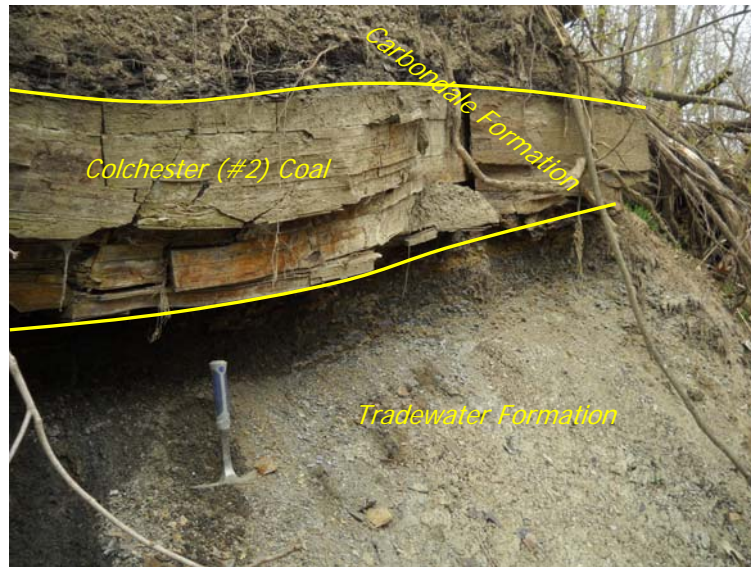


NOTES: Colors and geologic units correspond with those in Attachment A.
Dips are exaggerated due to vertical scaling.
Qc, Qp, and Qe are younger than the 25,000 year surface so they have been omitted.

ATTACHMENT C: Geologic Outcrops along Black Rock Run, Matthiessen State Park, La Salle County, Illinois, U.S.A.



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GPS Location: N: 41.27509 W: 89.02682
Elevation: 499 feet above Mean Sea Level
Photo taken on: 4-4-2010

Photo look east. Showing the Colchester Coal, just west of the Black Rock Run Fault, near the mouth of Black Rock Run.

Hammer for scale.



GPS Location: N: 41.27485 W: 89.02699
Elevation: 498 feet above Mean Sea Level
Photos taken on: 4-4-2010

Photos panning from south to west of the Tradewater Formation. Showing the shaley and sandy weak limestone dipping into BRR just west of the Black Rock Run Fault.

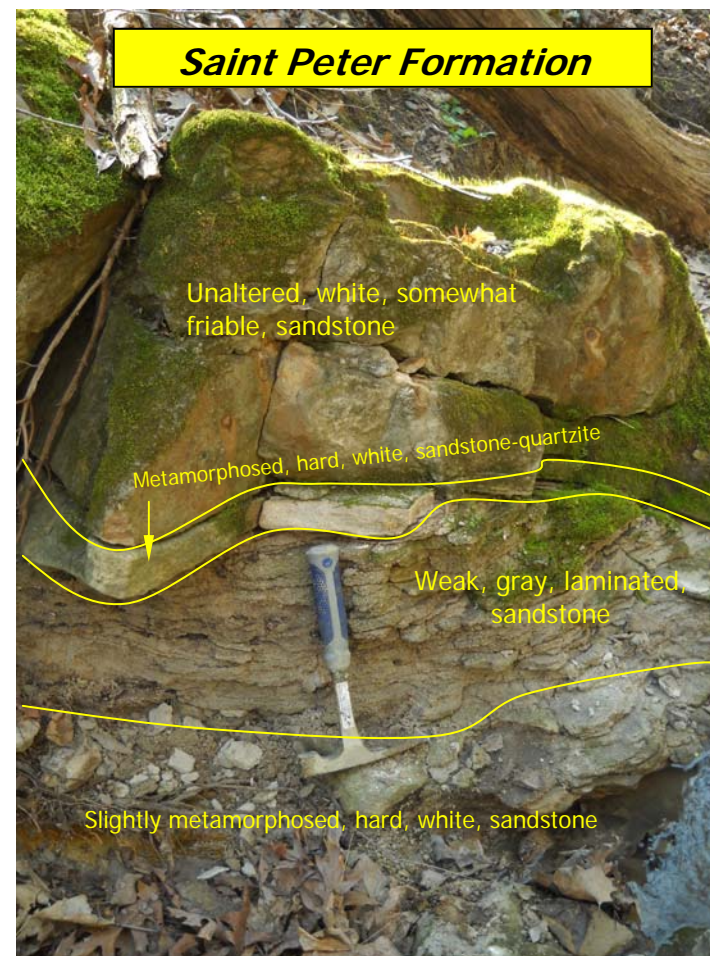
Hammer for scale (both photos).



GPS Location: N: 41.27439 W: 89.02581
Elevation: 490 feet above Mean Sea Level
Photo taken on: 4-4-2010

Photo look west. Showing the Colchester Coal, where it is at creek level of Black Rock Run. Approximately 300 feet south-east of Vermilion River.

Hammer for scale.

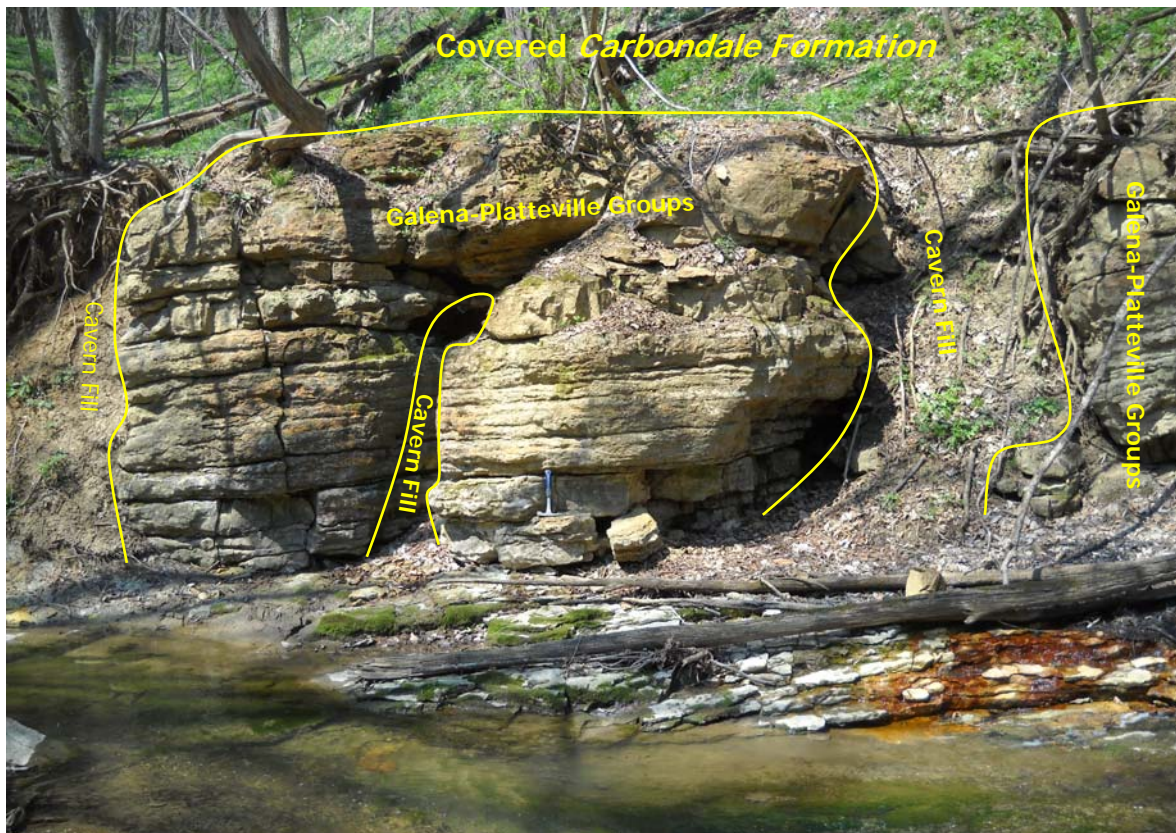


GPS Location: N: 41.27377 W: 89.02325
Elevation: 515 feet above Mean Sea Level
Photo taken on: 4-10-2010

Photo look west. This small outcrop is all Saint Peter Formation. It shows how the unaltered sandstone becomes altered as movement occurred along the La Salle Anticlinorium.

Photo to the right is a close-up of the weak gray laminated sandstone. Samples from the lower three units were obtained. Hammer is in the same location as it is in the left photo.

Hammer for scale (both photos).



GPS Location: N: 41.27497 W: 89.02020
Elevation: 540 feet above Mean Sea Level
Photo taken on: 4-10-2010

Photo look northwest. Showing the Pennsylvanian clay fill in the caverns formed in the galena-Platteville Groups.

Hammer for scale.

NOTES: The above geologic sections are just a few of the outcrops studied. The Platteville in the area contains fossil debris but is lacking the large cephalopods that are present along the Vermilion River one and a half miles north-northwest. Hammer is 12 inches in length.