GEOLOGIC MAP OF THE MOORE QUADRANGLE, NEWTON AND SEARCY COUNTIES, ARKANSAS

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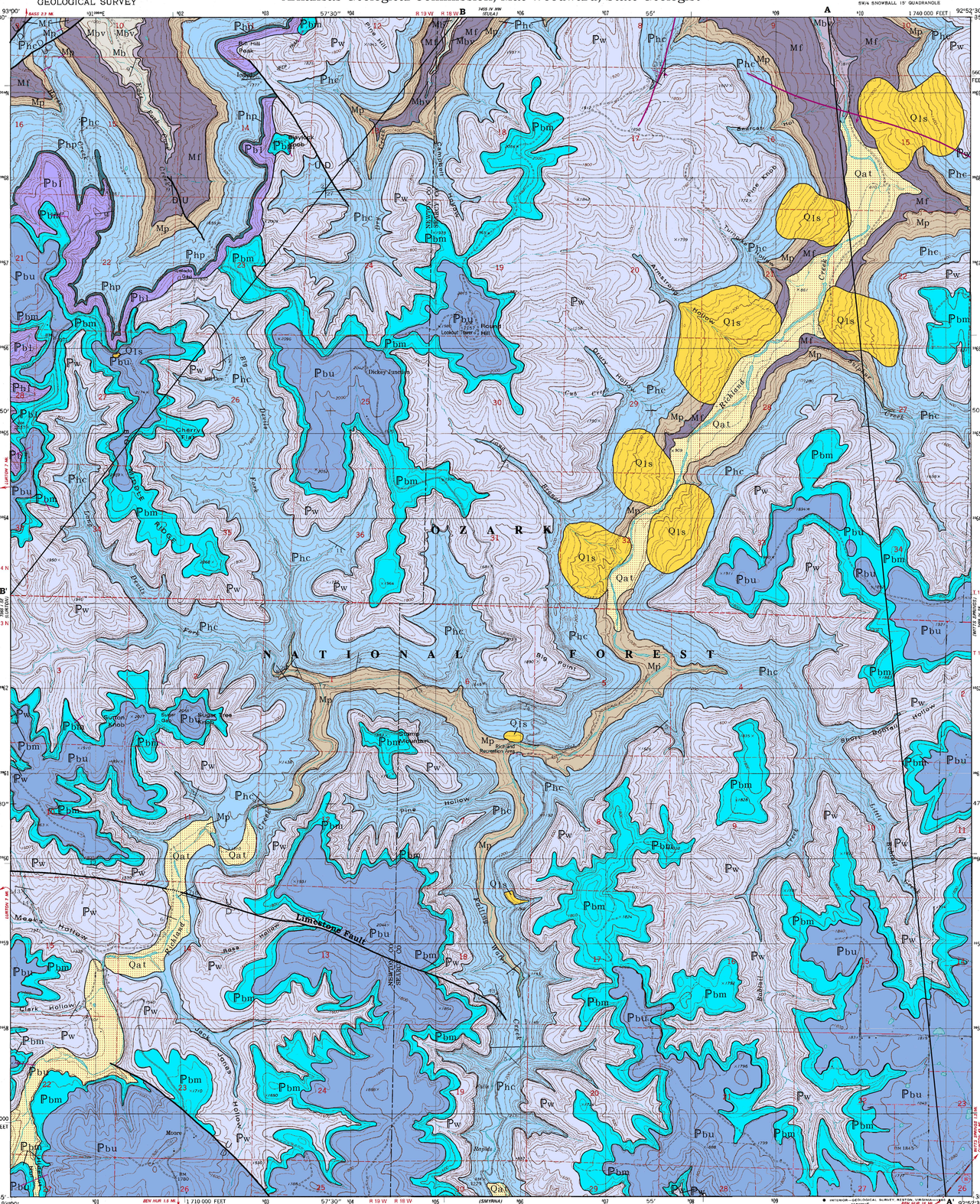
2004
Arkansas Geological Commission, Mac Woodward, State Geologist

Digital Geologic Quadrangle Map
Moore Quadrangle, Arkansas
DGM-AR-00579



Mapped, edited, and published by the Geological Survey

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Topography by photogrammetric methods from aerial photographs taken 1975. Field checked 1976. Map edited 1980

Projection and 10,000-foot grid ticks: Arkansas coordinate system, north zone (Lambert conformal conic)
1000-meter Universal Transverse Mercator grid, zone 15
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 5 meters south and 15 meters east as shown by dashed corner ticks

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

UTM GRID AND 1980 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
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AND ARKANSAS GEOLOGICAL COMMISSION, LITTLE ROCK, ARKANSAS 72204
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION
Primary highway, hard surface — Light-duty road, hard or improved surface
Secondary highway, hard surface — Unimproved road
Interstate Route — U. S. Route — State Route

MOORE, ARK.
SW/4 SNOWBALL 15' QUADRANGLE
35092-G8-TF-024
1980
DMA 7455 IV SW—SERIES V884

Correlation of Map Units

Units	Epoch	Period
Qat, Qls	Holocene and Pleistocene	Quaternary
Unconformity		
Pbu, Pbm	Morrowan	Pennsylvanian
Unconformity		
Pbl, Pw, Php	Morrowan	Pennsylvanian
Unconformity		
Phc	Morrowan	Pennsylvanian
Unconformity		
Mp	Chesterian	Mississippian
Mf	Chesterian	Mississippian
Mbv	Meramecian	Mississippian
Unconformity		
Mb	Osagean	Mississippian

Description of Map Units

Qls — **Landslide deposits (Quaternary)** - Mostly blocks of sandstone derived from Morrowan units. The smaller landslides developed in Morrowan shales during heavy rain events.

Qat — **Alluvium and terrace deposits (Quaternary)** - Unconsolidated clay, silt, sand and gravel including deposits on one or more terrace levels.

Bloyd Formation (Lower Pennsylvanian, Morrowan) - In this quadrangle, the individual members within the Bloyd Formation cannot be recognized because its limestone units (Brentwood and Kessler Limestones) are either missing or have become shaly and sandy. There are no other "marker zones" to divide the section into the recognizable members known from the type section in northwest Arkansas. Therefore the Bloyd Formation is divided informally into lower and upper parts (Hudson et al., 2001) separated by the "middle Bloyd sandstone" (Zachry and Haley, 1975). Approximately 420 - 600 ft. (128 - 183 m) thick.

Pbu — **Upper part** - Consists of thin ripple-bedded to thick micaceous sandstones interbedded with clay to silty shales above the "middle Bloyd sandstone". The sandstones consist of fine to coarse-grained sub-angular to sub-rounded quartz. They are light- brown to gray on fresh surfaces but weather dark-gray. The shales are dark-gray to black on fresh and weathered surfaces. This interval contains many trace fossils and load features. Approximately 120 - 300 ft. (36 - 91 m) thick.

Pbm — **"middle Bloyd sandstone"** - A thin to massive, medium to coarse-grained, cross-bedded quartz or iron-cemented sandstone with sub-angular to sub-rounded quartz grains. Reddish, gray, or light-tan on fresh surfaces but weathers brown to orange-brown due to iron content. The cross-bedded packages can be up to three feet thick and occasionally "overturned". Contains abundant lycopod fossils and rounded quartz pebbles. This sandstone forms a prominent bluff throughout this quadrangle and separates the upper from the lower part of the Bloyd Formation. A pebble clast conglomerate is present at the base of this sandstone. The "middle Bloyd sandstone" is unconformable with the lower part of the Bloyd Formation or the Witts Springs Formation. Approximately 60 - 80 ft. (18 - 24 m) thick.

Pbl — **Lower part** - Consists of interbedded very thin to thin ripple-bedded micaceous siltstones and sandstones that are fine to medium-grained. Throughout the lower part is black fissile clay to silty shales interbedded with thin to thick-bedded fossiliferous carbonate to sandy carbonate layers. The carbonate layers vary from red to gray on fresh and weathered surfaces and can be mottled. Sometimes the fossiliferous sandy layers look "rotten" due to decalcification. The sand grains are medium and sub-angular to sub-rounded. The contact between the lower part of the Bloyd Formation and the Prairie Grove is placed below a shaly layer conformable with the underlying massive calcareous sand of the Prairie Grove Member of the Hale Formation. This contact is conformable. Approximately 240 - 280 ft. (73 - 85 m) thick.

Pw — **Witts Springs Formation (Lower Pennsylvanian, Morrowan)** Glick et. al., 1964, gave this name to a sequence of rocks in the Snowball Quadrangle equivalent to the Prairie Grove Member of the Hale Formation and the entire Bloyd Shale (Formation) of the type Morrowan region, northwestern Arkansas. In their definition of this unit they identified the first massive quartz pebble sandstone they encountered above the Witts Springs as the Atoka Formation. Subsequently, the "middle Bloyd sandstone" which is not present in the type area of the Bloyd Formation in northwestern Arkansas was identified in north-central Arkansas by Zachry and Haley in 1975. It is this sandstone ("middle Bloyd sandstone") that is present above the Witts Springs Formation in the Snowball Quadrangle instead of the Atoka. Therefore, the Witts Springs Formation is equivalent to the Prairie Grove Member of the Hale Formation and the lower part of the Bloyd Formation in north central Arkansas. In most of this quadrangle either a blocky sandstone, or a sequence of thin to medium-bedded sandstones are present above the Cane Hill Member that do not resemble the Prairie Grove Member. The Witts Springs is underlain by the Cane Hill Member of the Hale Formation and overlain by the "middle Bloyd sandstone" and strata equivalent to the upper part of the Bloyd Formation. The Witts Springs Formation can be divided into two parts - a main body and a lower sandstone. The lower sandstone was not mapped separately due to a 40 foot contour interval. Approximately 220 - 400 ft. (67- 22 m) thick.
Main body - Consists mostly of thin to medium-bedded micaceous sandstones and interbedded clay shales. The sands are very fine to medium-grained and usually ripple bedded near the top of the unit. Calcareous fine to medium-grained fossiliferous sandstones with sub-angular to rounded grains are present and contain clay pebble clasts and fine to coarse quartz pebbles. Gray on fresh surfaces but weathers brown or dark- gray. Approximately 180 - 360 ft. (55-110 m) thick.
Lower sandstone - A massive coarse-grained iron cemented sandstone with sub-angular to sub-rounded quartz grains. Sometimes friable. White to yellow on fresh surfaces but weathers a light-brown. Contains plant fragments, liesegang banding, stylolites and pock marks. This unit has a blocky appearance and forms a prominent bluff throughout the quadrangle. A dark-gray shale pebble conglomerate is present at the base of the sandstone. The lower sandstone is unconformable with the Cane Hill Formation and sometimes incises 5 to 20 feet (1 - 6 m) into the Cane Hill Formation. Approximately 40 ft. (12 m) thick.

Hale Formation (Lower Pennsylvanian, Morrowan) - The Hale Formation consists of two Members; the Prairie Grove Member and the Cane Hill Member. Approximately 200 - 400 ft. (61 - 122 m) thick.

Php — **Prairie Grove Member** - A fine to coarse-grained quartz sandstone with varying amounts of carbonate, crinoidal fragments and quartz pebbles. Reddish-gray to brown or mottled on fresh surfaces but weathers dark-reddish-brown. Bedding varies from thin to massive and exhibits a rounded weathering profile. This unit is a prominent bluff former that often contains cross-beds, liesegang bands, and a pitted surface that is referred to as honeycomb weathering. The base of the Prairie Grove Member contains a fossiliferous quartz pebble conglomerate that contains clasts of shale, siltstone, and sandstone as large as almost one foot in diameter. The Prairie Grove Member is present only in the northwest corner of this quadrangle. The Prairie Grove Member is unconformable with the Cane Hill Member. 0- approx. 40 ft. (0 - 12 m) thick.

Phc — **Cane Hill Member** - Consists of gray to black fissile clay to silty shale in the lower portion of the unit that contains iron nodules and small limonitic box work fragments. The upper portion consists of a thick package of thin-bedded ripple marked micaceous siltstones and sandstones. Varies from black to dark-gray on fresh surfaces and light-gray and light-orange-brown on weathered surfaces. Trace fossils are abundant. 5-20 feet (1 -6 m) thick sandstone is present near the base of the lower portion of the black clay to silty shale in this quadrangle. It is thin to thick-bedded, fine-grained, cross-bedded, and contains stylolites, plant fragments, and liesegang banding. A 2 ft. conglomerate containing limonitic concretions, black and red shale pebbles, and various fossil fragments is present at the base of the Cane Hill in Falling Water Creek. The Cane Hill Member is unconformable with the Pitkin Limestone. Approximately 200 - 360 ft. (61 - 110 m) thick.

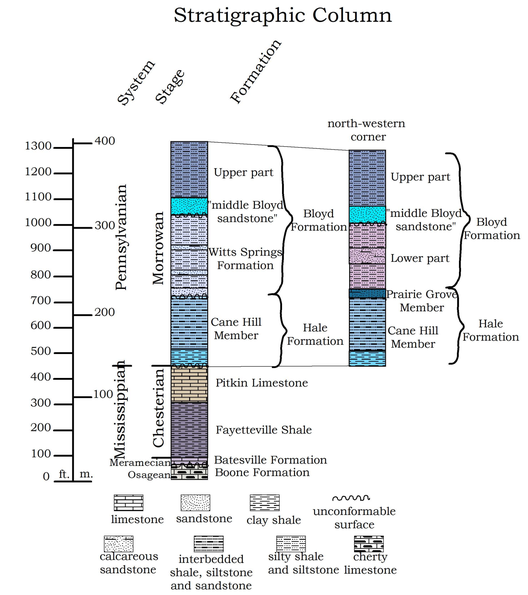
Mp — **Pitkin Limestone (Upper Mississippian, Chesterian)** - A fine to coarsely crystalline often fossiliferous limestone containing crinoidal fragments, Archimedes bryozoans, gastropods, coral (rugose and colonial) and ooliths. Large coiled nautiloids are present at one locality in this quadrangle. Varies from light-gray to dark-gray on fresh surfaces but usually weathers light or medium-gray. Medium to massive-bedded. Often has a petroliferous odor on freshly broken surfaces. A black anastomosing to nodular chert is present near the upper and lower contacts. Black shale occurs at the top of the Pitkin just beneath the Cane Hill Member of the Hale Formation at a few localities. The Pitkin Limestone is conformable with the Fayetteville Shale. Approximately 120 - 180 ft. (36 - 55 m) thick.

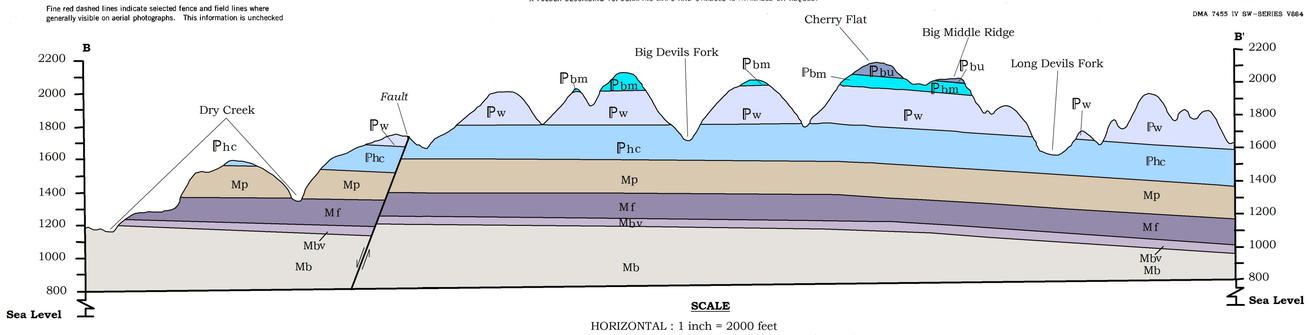
Mf — **Fayetteville Shale (Upper Mississippian, Chesterian)** - A black fissile clay shale. Alternating beds of micrite with shale occur in the upper portion of the formation to the contact with the overlying Pitkin Limestone. Black chert can be found within the micrite. The interbedded micrite and shale beds in the upper portion of this unit form resistant and sometimes steep ledges. Septarian concretions are present near the base of the shale. The Fayetteville Shale is conformable with the underlying Batesville Sandstone. Approximately 120 - 320 ft. (36 - 98 m) thick.

Mbv — **Batesville Formation (Upper Mississippian, Meramecian)** - A very fine to medium-grained, sub-angular, moderately sorted, iron-cemented sandstone. Thin to medium bedded. Light- brown to cream colored on fresh surfaces. Weathers light to dark-gray. Minor amounts of sandstone are present in this quadrangle. This interval is mostly made up of the Hindsville Limestone Member. The Batesville Sandstone is unconformable with the Boone Formation. Approximately 5 - 60 ft. (1 - 18 m) thick.
Hindsville Limestone Member - A thin-bedded, fine to coarsely crystalline limestone. Light to dark-gray on fresh surfaces but generally weathers light-gray or brown. Usually has a strong petroliferous odor on freshly broken surface. The limestones are fossiliferous and/or oolitic, contain pyrite and are sometimes interbedded with thin layers of clay shale and thin beds of siltstone to fine-grained sandstone. A breccia containing angular chert and limestone fragments is present at the base of this interval at some localities.

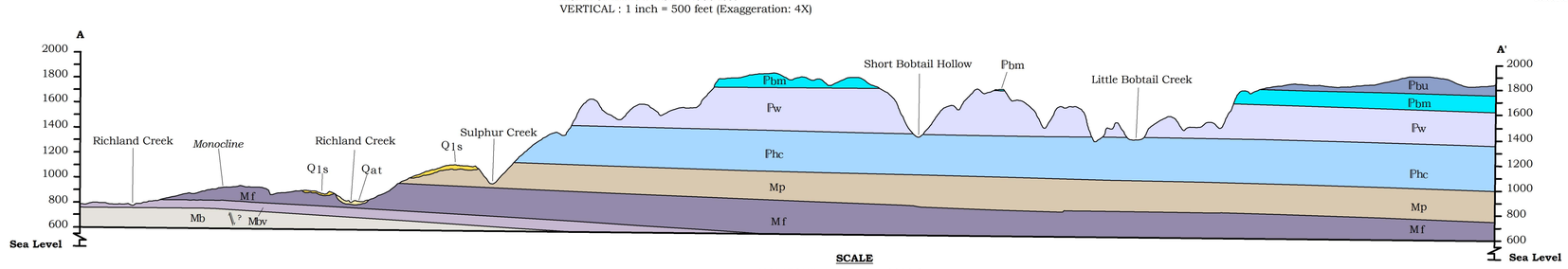
Mb — **Boone Formation (Lower Mississippian, Osagean)** - Consists of coarse-grained fossiliferous and fine-grained limestones interbedded with anastomosing and bedded chert. Light to medium-gray on fresh surfaces but usually weathers dark-gray. The chert varies in color from light-gray to dark- gray. The Boone Formation is present in the drainages of East Fork of Cave Creek and Dry Creek on the northern edge of the quadrangle. Approximately 80 - 120 feet (24 - 37 m).
Short Creek Oolite - A thin to massive cross-bedded, oolitic crinozoan biosparite or oolitic biomicrite. White to gray on fresh and weathered surfaces. Can be easily recognized by a chalky appearance and in some places a concave weathering profile. Some intervals are durable while other intervals are friable. Approximately 6 feet (2 m) of the oolite is exposed in Dry Creek drainage just below the contact with the Batesville Formation.

Stratigraphic Column





SCALE
HORIZONTAL : 1 inch = 2000 feet
VERTICAL : 1 inch = 500 feet (Exaggeration: 4X)

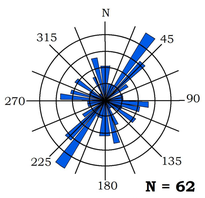


SCALE
HORIZONTAL : 1 inch = 2000 feet
VERTICAL : 1 inch = 500 feet (Exaggeration: 4X)

Symbols

- Contact
- Fault (U - upthrown, D - downthrown)
- Fault - concealed
- Monocline
- Strike and dip

Joint Frequency



Rose diagram of strike frequency of joints recorded within the Moore Quadrangle.

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