### GEOLOGIC MAP OF THE LURTON QUADRANGLE, NEWTON COUNTY, ARKANSAS Geology by Angela K. Braden and James M. Smith Digital compilation by Tiffany L. Robinson and Jerry W. Clark LURTON QUADRANGLE UNITED STATES ARKANSAS-NEWTON CO. 7.5 MINUTE SERIES (TOPOGRAPHIC) DEPARTMENT OF THE INTERIOR Arkansas Geological Commission, Mac Woodward, State Geologist GEOLOGICAL SURVEY SE/4 MT. JUDEA 15' QUADRANGLE

93°07'30" "8

2200

2000

1800

1600

800

Sea Level

Control by USGS and NOS/NOAA

1927 North American Datum

Mapped, edited, and published by the Geological Survey

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

Projection and 10,000-foot grid ticks: Arkansas coordinate

1000-meter Universal Transverse Mercator grid, zone 15

To place on the predicted North American Datum 1983

There may be private inholdings within the boundaries of

Fine red dashed lines indicate selected fence and field lines where

generally visible on aerial photographs. This information is unchecked

the National or State reservations shown on this map

system, north zone (Lambert conformal conic)

move the projection lines 5 meters south and

15 meters east as shown by dashed corner ticks

RUSSELLVILLE (VIA ARK. 7) 34 MI.

UTM GRID AND 1980 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Big Creek

Monocline

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS

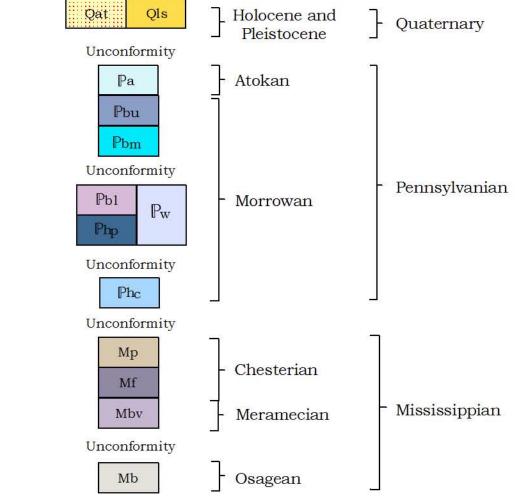
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

AND ARKANSAS GEOLOGICAL COMMISSION, LITTLE ROCK, ARKANSAS 72204

A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

– Hibari

Big Creek Fault



# Description of Map Units

Landslide deposits (Quaternary) - Mostly blocks of sandstone

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

Atoka Formation (Middle Pennsylvanian, Atokan) Consists of black to tan shales, with interbedded very thin to thin ripple-bedded micaceous siltstones, and fine to very finegrained sandstones with sub-rounded to rounded grains. The sandstones are tan to buff colored on fresh and weathered surfaces and contain clay pebbles, liesegang bands, horizontal trace fossils, and cross-beds. Occasionally the sandstones contain pebble conglomerate zones with external molds of fossils. The sandstones vary from 10 - 20 ft. (3 - 6 m) thick. The Atoka Formation is assumed conformable with the Bloyd Formation in this area. This contact is tentative and will be resolved with future mapping. Approximately 240-360 ft. (73

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

Upper part - Consists of thin ripple-bedded to thick micaceous sandstones interbedded with clay to silty shales. 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 160 - 320

"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. Approximately 60 - 120 ft. (18 -

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 thickbedded 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 the underlying massive calcareous sand of the Prairie Grove Member of the Hale Formation. This contact is conformable. Approximately 160 - 280 ft. (48 - 85 m) thick.

Witts Springs Formation (Lower Pennsylvanian, Morrowan) upper part of the Bloyd Formation. The Witts Springs

220 - 400 ft. (67-22 m) thick.

ROAD CLASSIFICATION

hard surface..... improved surface...

hard surface \_\_\_\_ Unimproved road\_\_\_ =======

Interstate Route U. S. Route State Route

Light duty road, hard or

LURTON, ARK.

SE/4 MT. JUDEA 15' QUADRANGLE

35093-G1-TF-024

1980

DMA 7355 I SE-SERIES V884

Limestone Fault

Phc Php

Primary highway,

Falls Branch

ARKANSAS ,

HORIZONTAL: 1 INCH = 2000 FEET VERTICAL: 1 INCH = 500 FEET

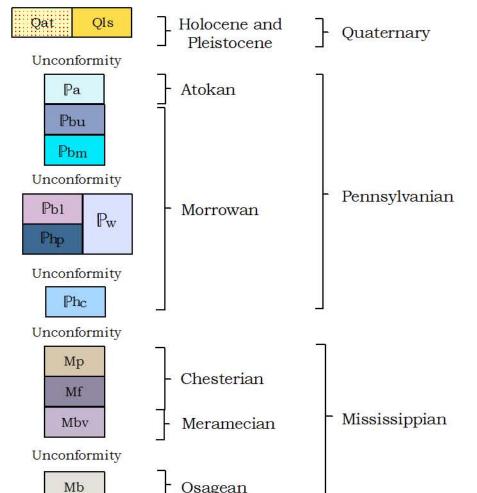
(Exaggeration: 4X)

Confederate Fault

Cave Creek

Secondary highway.

# Correlation of Map Units



derived from Morrowan units.

Bloyd Formation (Lower Pennsylvanian, Morrowan) - In this

sandstone" (Zachry and Haley, 1975). Approximately 160-400 ft. (49 - 122 m) thick.

ft. (48 - 98 m) thick.

Lower part - Consists of interbedded very thin to thin Prairie Grove is placed below a shaly layer conformable with

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 the south-eastern portion of this quadrangle a blocky sandstone is present above the Cane Hill instead of the Prairie Grove. 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 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

Main body - Consists mostly of thin to medium-bedded micaceous sandstone and interbedded clay shale. 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 160 - 300 ft. (48 - 91 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 230-420

ft. (70 - 128 m) thick. Prairie Grove Member - A fine to coarse-grained quartz sandstone with varying amounts of carbonate, crinoidal ragments 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 0-5 foot (0 - 1 m) 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 unconformable with the Cane Hill Member. Approximately 30 - 60 ft. (9 - 18 m)

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 of the unit consists of thin-bedded ripple marked micaceous siltstones and sandstones. Varies from black to dark-gray on fresh surfaces and light-gray and light-orangebrown on weathered surfaces. Quartz pebble conglomerates containing shale pebbles and fossils are present within the Cane Hill in this quadrangle. Trace fossils are abundant. A 10 - 20 feet (3 - 6 m) thick sandstone is present in the lower portion of the black clay to silty shale in the eastern half of this quadrangle. Sometimes two sandstone ledges are present. This sandstone is thin to thick-bedded, iron or quartz cemented, sometimes cross-bedded and contains stylolites, plant fragments, and liesegang banding. A conglomerate containing black pebble clasts, fossil fragments, and clay clasts is present at the base of the Cane Hill at several localities. The Cane Hill Member is unconformable with the Pitkin Limestone. Approximately 200 - 360 ft. (61 - 110 m)

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. 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. An interbedded sequence of fossiliferous black shales with thin to medium-bedded sandy limestone is present in Falls Branch. The Pitkin Limestone is conformable with the Fayetteville Shale. Approximately 160 - 220 ft. (48 - 67 m)

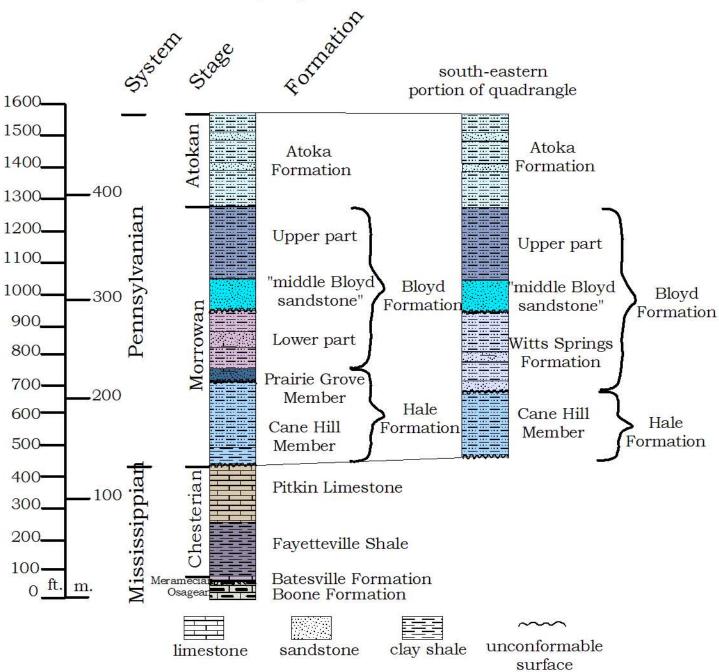
Fayetteville Shale (Upper Mississippian, Chesterian) - A black fissile clay shale. Alternating beds of micrite with shale occur in the upper portion of the formation to the contact with the overlying Pitkin Limestone. Black chert can be found within the micrite. The interbedded micrite and shale beds 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 120-240 ft. (36 - 73 m) thick.

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 -20 ft. (1 - 6 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 in some localities.

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 darkgray. The chert varies in color from light-gray to dark-gray. The Boone Formation is present in the drainages of Dry Creek, Big Creek, and Cave Creek along the northern border of the quadrangle. Approximately 20-120 ft. (6 - 36 m) thick.

## Stratigraphic Column



## References

and siltstone

siltstone

and sandstone

calcareous

sandstone

cherty

limestone

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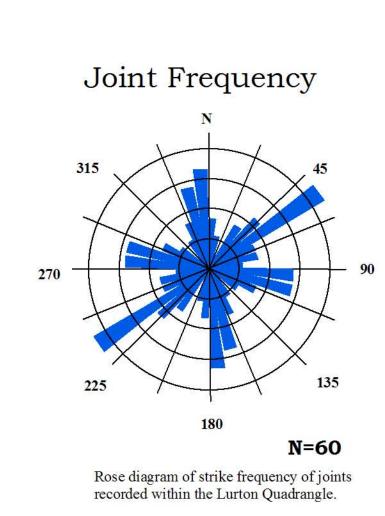
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Symbols

Contact

\_\_\_. Contact - inferred

...... Fault - concealed

Fault - reverse

 $\frac{1}{10}$  Strike and dip

\_\_\_\_ Monocline

D - downthrown

**—** Fault - approximately located

of inclined bedding

U Fault U - upthrown

