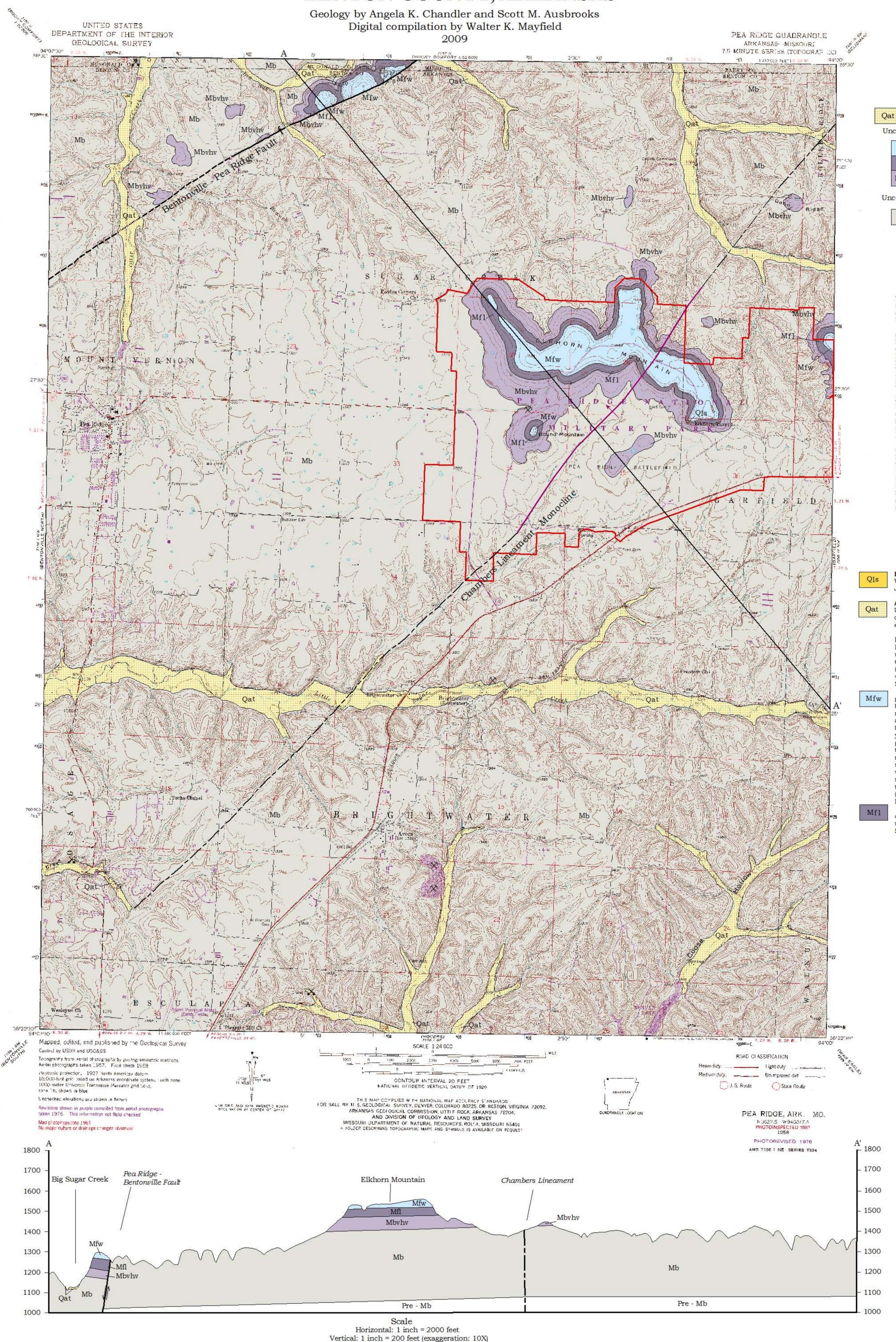
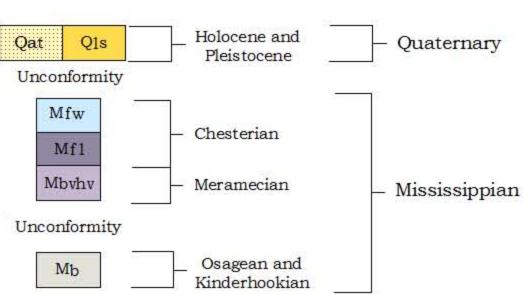
# GEOLOGIC MAP OF THE PEA RIDGE QUADRANGLE BENTON COUNTY, ARKANSAS



### Correlation of Map Units



## Introduction

This map illustrates the surface geology of the Pea Ridge 7.5 minute quadrangle. This quadrangle was previously compiled at a 1:24,000 scale from the Fayetteville Folio (Adams and Ulrich, 1905) by Boyd Haley in 1969.

Approximately 400 feet of Lower and Upper Mississippian age strata are present in this area. The Lower Mississippian Boone Formation comprises the surface rock over the majority of the quadrangle and forms the surface of the Springfield Plateau. Upper Mississippian age strata are present on Elkhorn Mountain which is capped by sandstone of the Wedington Member of the Fayetteville Shale. Upper Mississippian units are also present on the north side of the Bentonville-Pea Ridge Fault.

Lineaments and faults characteristic of northwest Arkansas are present in this quadrangle. The Bentonville-Pea Ridge Fault is present in the northwest part of the quadrangle and trends N 60-70° E. It is an off-shoot of a much longer fault that continues to Bentonville and southwest to Siloam Springs. This fault has a trend similar to the Fayetteville and

Drakes Creek Fault to the east.

The Chambers Lineament-Monocline is a northeast to southwest trending structural feature that extends from the headwaters of Brushy Creek to Roller Ridge. The location of this feature on this quadrangle was determined from the 1:24,000 digital ortho-photograph. It is named from the Chambers Spring Syncline (Adams and Ulrich, 1905), near Cincinnati, which appears to be on trend with the structure found on this quadrangle. The trend of this lineament is approximately N 50° E. Other lineaments trend N 45° E, E-W and N 25-40° W.

#### Description of Map Units

Qls

Landslide deposits (Quaternary) - Sandstone blocks of the Wedington Sandstone Member from a rock fall event in January 2008.

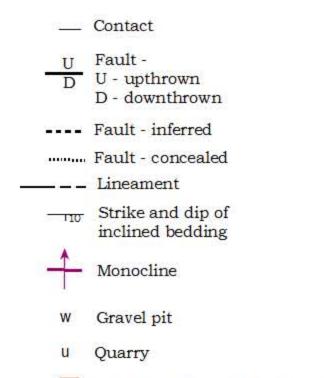
Alluvium and terrace deposits (Quaternary) - Unconsolidated clay, silt, sand and gravel including deposits on one or more terrace levels. Approximately 5-10 feet (1-3 m) exposed in the creeks.

Fayetteville Shale (Upper Mississippian, Chesterian) - The Fayetteville Shale can be divided into a lower part and an upper part separated by the Wedington Sandstone Member. Only the lower part and the Wedington Sandstone are present in this quadrangle. The Fayetteville Shale is unconformable with the underlying Hindsville Member of the Batesville

Sandstone. Wedington Sandstone Member - A fine- to mediumgrained sandstone that contains thin to very thin, ripple bedded siltstones at the base. The sandstone is thin- to medium-bedded and contains cross-beds, liesegang banding and pock-marks or honeycomb weathering. Plant fossils, bryozoans and brachiopods are also present. The sandstone is yellowish to reddish or white on fresh surfaces but weathers gray. Sandstone concretions are present in this member near the Bentonville-Pea Ridge fault in the northwest corner of the map. The contact with the underlying lower part was rarely seen, but at one location consists of interbedded shale with very thin-bedded ripple-bedded silt to very fine grained sandstone. The Wedington Sandstone is a small bluff former that caps the hills in this quadrangle. Ranges from 30-80 feet (9-24 m) of sandstone exposed above the lower part of the

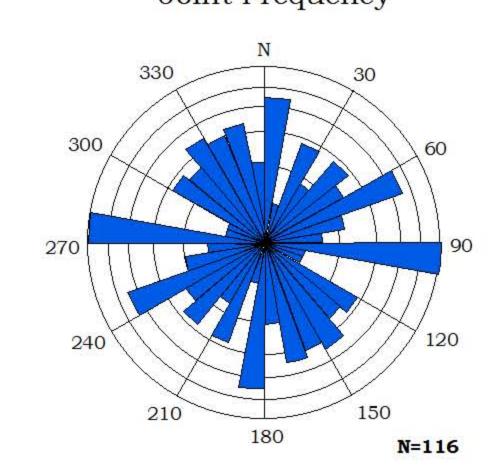
Lower part - A black clay shale that contains ironstone concretions at a few localities. It is unconformable with the underlying Hindsville Limestone Member of the Batesville Sandstone. Approximately 40-50 feet (12-15m) thick.

## Symbols



Pea Ridge National Park Boundary

# Joint Frequency



Rose diagram of strike frequency of joints recorded within the Pea Ridge Quadrangle.

#### Batesville Sandstone (Upper Mississippian, Meramecian) -This interval is entirely made up of the Hindsville Limestone

Member in this quadrangle.

Hindsville Limestone Member - A thin-bedded, fine to coarsely crystalline limestone. The rock is light to dark gray on fresh surfaces, but generally weathers to light-gray or brown. It usually has a strong petroliferous odor on freshly broken surfaces. The limestones are fossiliferous and/or oolitic, contain pyrite, and at various localities are interbedded with thin layers of clay shale and thin beds of siltstone to fine-grained sandstone. A breccia containing angular chert and limestone fragments at the base of this interval is present at one locality in the quadrangle(Sec 23, T 21 N, R 29 W). This unit is unconformable with the underlying Boone Formation. Approximately 40-70 feet (12-21 m) thick.



Boone Formation (Lower Mississippian, Osagean and Kinderhookian) - Coarse-grained fossiliferous and finegrained limestones interbedded with anastomosing and bedded chert. The rock is light to medium gray on fresh surfaces but usually weathers to dark gray. Chert varies in color from white to light gray in the upper portion to dark gray or blue gray in the lower portion. Fairly chert-free sections are present and contain brachiopods, corals and crinoids. An oolitic limestone, possibly equivalent to the Short Creek Oolite, is present in the upper part of the Boone at a few localities. Springs and sinkholes are abundant. The Boone Formation caps the Springfield Plateau on this quadrangle and exhibits a relatively flat topography. The Boone regolith, consisting of red to orange clay with chert, can be up to 40 feet thick. The St. Joe Limestone Member is not exposed in this quadrangle. Approximately 200-240 feet (61-73 m) of section exposed on

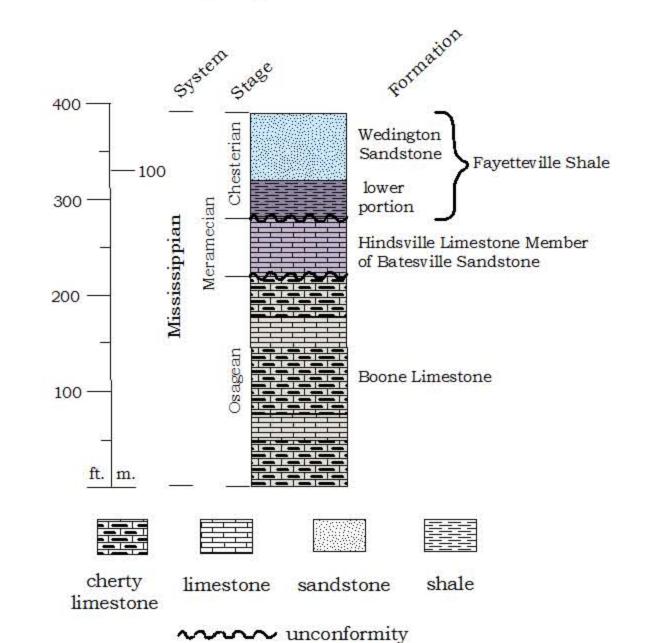


Photo 1 - Lower part of the Fayetteville Shale near the Bentonville-Pea Ridge Fault.



Photo 2 - Recent rockfall of Wedington Sandstone at the East Overlook in Pea Ridge National Park.

# Stratigraphic Column



## References

Adams, George I., and Ulrich, E.O., 1905, Fayetteville Folio Arkansas-Missouri: U S Geological Survey, Geologic Atlas

of the United States, no. 119.
Glick, E.E., 1970, Geologic map of the Bentonville North
Quadrangle, Benton County, Arkansas: Arkansas

Geological Survey Geologic Worksheet, 1:24,000 scale. Glick, E.E., 1970, Geologic map of the Garfield Quadrangle Benton County, Arkansas: Arkansas Geological Survey Geologic Worksheet, 1:24,000 scale.

Haley, 1969, Reconnaissance geologic map of the Pea Ridge Quadrangle, Benton County, Arkansas: Arkansas Geological Survey Geologic Worksheet, 1:24,000 scale. Howard, J.M., 2008, Arkansas mineral commodity database: Arkansas Geological Survey, in house data.

Dowell, J.C., Hutchinson, C.M., and Boss, Stephen K, 2004, Bedrock Geology of Rogers Quadrangle: University of Arkansas Master Thesis.

Acknowledgments: This map was produced for STATEMAP, Cooperative Agreement Award 08HQAG0108, a matchingfunds grants program with the US Geological Survey under The National Cooperative Geologic Mapping Program. Special thanks to the National Park Service and private landowners who graciously allowed access to their property.

Disclaimer: This map was prepared in a digital format using ArcView 9, ArcGIS 9 software on computers at the Arkansas Geological Survey. The Arkansas Geological Survey does not guarantee the accuracy of this map especially when used on any other system or with any other software. As mapping continues and is refined, the data presented on this map may be updated. For the latest edition of this publication please contact our office.

For information on obtaining copies of this map and other Arkansas Geological Survey maps and publications call: Publication Sales 501-296-1877