# GEOLOGIC MAP OF THE ARKANSAS PORTION OF THE DE QUEEN QUADRANGLE, SEVIER, POLK AND HOWARD COUNTIES, ARKANSAS


Geology by Boyd R. Haley, Charles G. Stone, William D. Hanson and Benjamin F. Clardy

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Arkansas Geological Survey, Bekki White, State Geologist

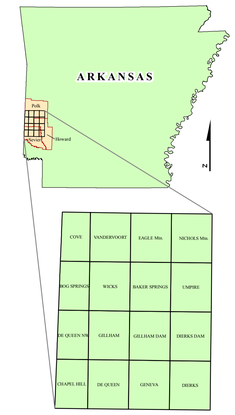


DIGITAL GEOLOGIC QUADRANGLE MAP
DE QUEEN QUADRANGLE, ARKANSAS
DGM-OK-AR-01087



## Introduction

This map is a compilation of the surface geology on sixteen U.S. Geological Survey 7.5 minute topographic quadrangles which make up the Arkansas portion of the De Queen 1:100,000 quadrangle. Individual 7.5 minute quadrangle maps included on this map are Chapel Hill, De Queen, Geneva, Dierks, De Queen NW, Gillham, Gillham Dam, Dierks Dam, Bog Springs, Wickes, Baker Springs, Umpire, Cove, Vandervoort, Eagle Mountain and Nichols Mountain. This area is part of two physiographic provinces. The West Gulf Coastal Plain occurs on the southern one third of the map and the Ouachita Mountain region on the north part of the map. Formations represented on this map range from Quaternary to Ordovician age. They consist of consolidated and unconsolidated sedimentary rock units. Surface geology was mapped during variously timed mapping projects and compiled. During mapping efforts, information was gathered on formation contacts, strike and dip, faults, mining activity, and economic mineral resources. Thrust faults in the Ouachita Mountain region were mapped using aerial photography and were verified by field work. The map was generated using ESRI ArcGIS 9.x software. The projection of the digital data is 1983 North American Datum.




## Description of Map Units

CENOZOIC

Quaternary

**Qal** — **Alluvium** *(Quaternary)* - This unit consists of variably sized gravel overlain by unconsolidated sand, silt, and clay. The unit is found in the floodplains of rivers. Gravels, primarily novaculite, originate in the Ouachita Mountain region and from local Cretaceous formations. Thickness varies from 0 to 25 feet (0 – 7.5 meters). Areas of alluvium are presently receiving sediment deposition.

**Qt** — **Terrace Deposit** *(Quaternary)* - Terrace deposits generally grade from gravel at the base to silt and clay at the top. Gravels, primarily novaculite, originate in the Ouachita Mountain region and from local Cretaceous formations. Thicknesses are generally less than 50 feet (< 15 m). Terraces are topographic features created by the former floodplains of nearby rivers. The basal gravel is sometimes utilized for water-well production and gravel-mining operations.

MESOZOIC

Cretaceous

Upper

**Kw** — **Woodbine Formation** *(Upper Cretaceous)* - The Woodbine Formation consists of water-laid, cross-bedded tuffs, tuffaceous sands, gravel, and red and gray clay. Basal cross-bedded gravel is approximately 20 feet (6 m) thick. The size ranges from ½ to 6 inches (1 to 15 centimeters) in diameter, is well-rounded and composed of novaculite, quartz, chert, sandstone, and quartzite. Iron-cemented conglomerates may be present locally. The source area for the gravels was the Ouachita Mountain region and gravel deposits in the Cretaceous Trinity Group. The unit was deposited in a nearshore marine environment following a major unconformity which separates it from the underlying Trinity Group (Lower Cretaceous).

Lower

**Kt** — **Trinity Group** *(Lower Cretaceous)* - The Trinity is comprised of sand, gravel, clay, limestone, evaporite deposits, and asphalt. Members include the De Queen Limestone Member and the Dierks Limestone Lentil. Above and below these limestone members are intervals of gravel, sand and clay. Marginal marine fossils are noted from the Trinity Group. The Group was deposited in a nearshore marine environment. An angular unconformity separates the Trinity form the underlying Pennsylvanian rocks.

**Kdq** — **De Queen Limestone Member** *(Lower Cretaceous)* - The De Queen Limestone consists of marl, calcareous clay, limestone, and gypsum. Marls and calcareous clays weather to red, green and yellowish-brown, and are sticky. Limestones are gray to light brown, pyritic and fossiliferous. The De Queen was deposited in a restricted nearshore marine environment.

**Kds** — **Dierks Limestone Lentil** *(Lower Cretaceous)* - The Dierks is composed of interbedded calcareous clay and fossiliferous limestone found in the lower part of the Trinity Group. Clays, when weathered are green and yellowish brown. The limestones weather to slabs and nodular masses. A notable fossil is the *Ostrea franklini*.

PALEOZOIC

Pennsylvanian

**Pjv** — **Johns Valley Formation** *(Pennsylvanian)* - The Johns Valley Formation consists of black shale with numerous intervals of brownish sandstone. Also, small amounts of gray-black siliceous shale and chert are found. This unit was deposited in a deep marine environment and is separated from the underlying Jackfork Formation by an unconformity.

**Pj** — **Jackfork Formation** *(Pennsylvanian)* - The Jackfork is thin to massive-bedded, fine to coarse-grained, brown, tan, or bluish-gray quartzitic sandstone with subordinate brown silty sandstones and grayish-black shale. Minor amounts of conglomerate composed of quartz, chert, and metaquartzite occur notably in the southern exposures of the formation. The Jackfork rests conformably on the Stanley and was deposited in a deep marine environment.

Mississippian

**Ms** — **Stanley Formation** *(Mississippian)* - The Stanley is composed predominantly of grayish-black to brownish-gray shale, with lesser amounts of thin to massive-bedded, fine-grained, gray to brownish-gray feldspathic sandstone and black chert. Weathered shale is olive-gray, and the sandstone is generally more brown and porous. Most of the Stanley is Late Mississippian (Chesterian) as indicated by conodonts and plant fossils. The formation was deposited in a deep marine environment following an unconformity.

Devonian

**MDa** — **Arkansas Novaculite** *(Mississippian-Devonian)* - Three divisions of the novaculite are recognized in the state. The Lower Division is white massive-bedded novaculite with some interbedded gray shale near its base. The Middle Division is greenish to dark-gray shales interbedded with many thin beds of dark novaculite. The Upper Division is white, thick-bedded and often calcareous. The unit was deposited in a deep marine environment on a conformably with the underlying unit.

Silurian

**SO** — **Missouri Mountain Shale - Blaylock Sandstone - Polk Creek Shale** *(Sil. – Ord.)*

The **Missouri Mountain Shale** *(Silurian)* consists of shale interbedded with conglomerate, novaculite, and sandstone. Few identifiable fossils have been found in this unit. The unit was deposited in a deep marine environment. An unconformity separates the unit from the underlying Blaylock Sandstone.

The **Blaylock Sandstone** *(Silurian)* consists of tan to gray, fine to medium-grained sandstone interbedded with black fissile shale. Graptolite and trace fossils may be found, but are rare. The unit was deposited in a deep marine environment. An unconformity separates the unit from the underlying Polk Creek Shale.

The **Polk Creek Shale** *(Ordovician)* consists of black, sooty, fissile shale with minor black chert, traces of gray quartzite and limestone. Graptolites are common in most of the shale in the formation. The unit was deposited in a deep marine environment. The unit is conformable with the underlying Bigfork Formation.

Ordovician

**Obf** — **Bigfork Formation** *(Ordovician)* - The Bigfork consists of thin-bedded, dark gray, cryptocrystalline chert interbedded with varying amounts of black siliceous shale, calcareous siltstone, and dense, bluish-gray limestone. Fossils are rare but fragments of brachiopods, crinoids, sponges, conodonts, and graptolites have been reported. The unit was deposited in a deep marine environment.

## Symbols

- Strike & Dip
- Overturned Strike & Dip
- US Highway
- Contact
- Thrust Fault
- Overturned Thrust Fault
- Tear Fault
- Inferred Fault
- Pit, Active
- Pit, Abandoned
- Pit, Reclaimed
- Mine/Quarry, Active
- Mine/Quarry, Abandoned
- Mine/Quarry, Reclaimed

### Mineral Commodities

Sb - Antimony
BA - Barite
Cu - Copper
CS - Crushed Stone
Pb - Lead
Mn - Manganese
SG - Sand & Gravel
Sh - Shale
Sl - Slate
Sr - Strontium
Tu - Turquoise
Zn - Zinc
- Bottled Water Source

## References


Bush, W.V., and Clardy, B.F., 1971, Geologic Maps of the Chapel Hill, De Queen, Dierks, Geneva, Gillham, Gillham Dam, and Dierks Dam Quadrangles, Arkansas: Arkansas Geological Commission Open-File Report, scale 1:24,000, 7 sheets.

Dane, C.H., 1929, Upper Cretaceous Formation of Southwestern Arkansas: Arkansas Geological Survey, Bulletin 1, 215p.

Haley, B.R., et al., 1993, Geologic map of Arkansas: Arkansas Geological Commission, scale 1:500,000, 1 sheet.

Haley, B.R. and Stone, C. G., 2001, Geologic Map of the Cove Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, DGM-AR-01052.

Haley, B.R. and Stone, C. G., 1994, Geologic Map of the Baker Springs Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, DGM-AR-01058.

Haley, B.R. and Stone, C. G., 2000, Geologic Map of the Bog Springs Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, DGM-AR-0001051.

Haley, B.R. and Stone, C. G., 1994, Geologic Map of the Umpire Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, DGM-AR-0001077.

Haley, B.R. and Stone, C. G., 1994, Geologic Map of the Wickes Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, DGM-AR-0001054.

Haley, B.R. and Stone, C. G., 1994, Geologic Map of the Gillham, Gillham Dam, De Queen NW, Eagle Mountain, Nichols Mountain, and Vandervoort Quadrangles, Arkansas, Arkansas Geological Commission, COGEO Worksheet, scale 1:24,000.

Hanson, W.D., and Clardy, B.F., 1999, Geologic Map of the Chapel Hill Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, GM-AR-00149.

Hanson, W.D., and Clardy, B.F., 1999, Geologic Map of the De Queen Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, GM-AR-00206.

Hanson, W.D., Clardy, B.F., Haley, B.R. and Stone, C. G., 1997, Geologic Map of the Dierks Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, DGM-AR-00225.

Hanson, W.D., Clardy, B.F., Haley, B.R. and Stone, C. G., 1998, Geologic Map of the Geneva Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, DGM-AR-00225.

Hanson, W.D., Clardy, B.F., Haley, B.R. and Stone, C. G., 2003, Geologic Map of the Dierks Dam Quadrangle, Arkansas, Arkansas Geological Commission, Digital Geologic Map, scale 1:24,000, DGM-AR-00226.

Howard, J.M., 2008, Arkansas Mineral Commodity Database, in-house data: Arkansas Geological Survey.

Miser, H.D., and Purdue, A.H., 1919, Gravel Deposits of the De Queen and Caddo Gap Quadrangles, Arkansas: U.S. Geological Survey, Bulletin 690, p. 15-29.

Miser, H.D., and Purdue, A.H., 1929, Geology of the De Queen and Caddo Gap Quadrangles, Arkansas: U.S. Geological Survey, Bulletin 808, 195 p., 1 sheet, scale 1:125,000.

McFarland, J.D., 2004, Stratigraphic Summary of Arkansas: Arkansas Geological Commission, Information Circular 36, 39p.

Ross, C.S., Miser, H.D., and Stephenson, L.W., 1929, Water-laid volcanic rocks of early upper Cretaceous age in southwestern Arkansas, southeastern Oklahoma, and northwestern Texas: U.S. Geological Survey, Professional Paper 154-F, p. 175-202.





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