

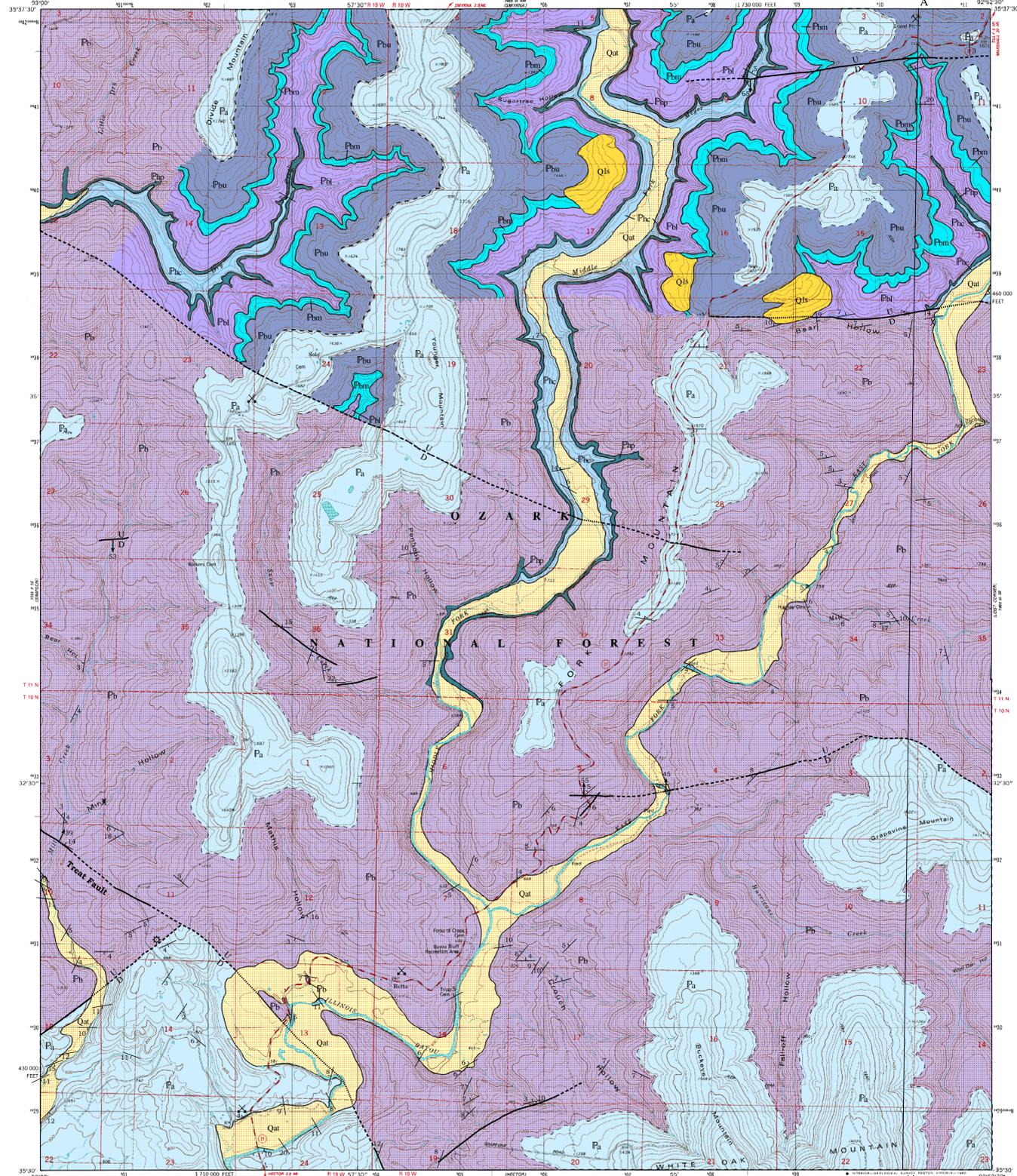
# GEOLOGIC MAP OF THE SOLO QUADRANGLE, POPE COUNTY, ARKANSAS

Geology by Angela K. Chandler and Richard S. Hutto  
Digital compilation by Tiffany L. Celis  
2006

Arkansas Geological Commission, Bekki White, State Geologist

SOLO QUADRANGLE  
ARKANSAS-POPE CO.  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
8145 SEVENA 15 QUADRANGLE

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY



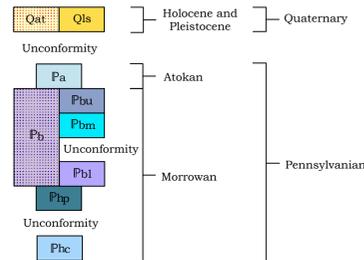
Mapped, edited, and published by the Geological Survey  
Control by USGS and NOS/NOAA  
Topography by photogrammetric methods from aerial photographs taken 1975. Field checked 1976. Map edited 1980  
Projection and 10,000 foot grid ticks: Arkansas coordinate system, north zone (Lambert conformal conic)  
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 6 meters south and 15 meters east as shown by dashed center ticks  
There may be private inholdings within the boundaries of the National or State Reservations shown on this map  
Fine red contour lines indicate fence and field lines where generally visible on aerial photographs. This information is unchecked

SCALE: 1:24,000  
CONTOUR INTERVAL 40 FEET  
NATIONAL GEOLOGIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION  
Light duty road, hard or hard surface  
Secondary highway  
Unimproved road  
Hard surface  
Interstate Route  
U.S. Route  
State Route

SOLO, ARK.  
8145 SEVENA 15 QUADRANGLE  
N530-W952/S7.5  
1980  
DMA 7459 III SW-SERIES 1984

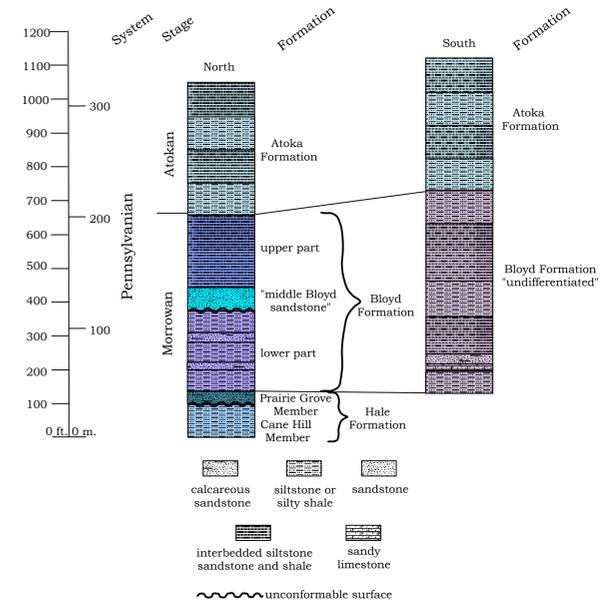
## Correlation of Map Units



## Description of Map Units

- Qls** **Landslide deposits (Quaternary)** - Mostly blocks of sandstone and shale slumps derived from the Bloyd Formation.
- Qat** **Alluvium and terrace deposits (Quaternary)** - Unconsolidated clay, silt, sand and gravel including deposits on one or more terrace levels of local streams.
- Pa** **Atoka Formation (Middle Pennsylvanian, Atokan)** - Consists of black to tan shales interbedded with very thin thin ripple-bedded micaceous sandstones, and thin to medium bedded, fine to very fine-grained sandstones with sub-rounded to rounded grains. The sandstones are tan to buff-colored on fresh and weathered surfaces, sometimes calcareous and may contain clay pebbles, liesegang bands, 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 base of the Atoka is placed at the base of a unit of thin-bedded sandstone approximately 15-20 ft. thick. This contact is tentative and will be resolved with future mapping. Approximately 140-680 ft. (43-207 m) thick.
- Pbu** **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) in the northern part of the quadrangle. In a large portion of the quadrangle the "middle Bloyd sandstone" cannot be recognized making the Bloyd Formation indivisible into lower and upper parts. For that reason a zigzag line is drawn in the region where the "middle Bloyd sandstone" begins to be unrecognizable. Approximately 500-680 ft. (152-207 m) thick.
  - Undifferentiated** - Consists of sections of thin to thick ripple to planar-bedded sandstone interbedded with very thin to thin ripple-bedded siltstones and clay to silty shales. The sandstones are fine to medium-grained, gray, dark gray to tan, may contain quartz pebbles, clay drapes and vertical trace fossils, and are sometimes calcareous and cross-bedded. The shales and siltstones are charcoal gray to black, sometimes weather reddish and contain siltstone concretions and *Asterosoma* trace fossils. Calcareous fossiliferous conglomerate layers occur throughout the Bloyd Formation. Sandy cross-bedded limestones occur in the lower portion of the formation. They are gray to dark gray on fresh surface but weather reddish or light gray to white and contain abundant fossils such as crinoids, brachiopods, blastoids and occasionally oolites. Approximately 580-680 ft. (177-207 m) thick.
  - 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 surface 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 200-240 ft. (60-73 m) thick.
  - 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 surface but weathers brown to orange-brown due to iron content. Contains tabular cross-bedded packages up to three feet thick and sometimes herringbone cross-beds. Contains abundant lycopod fossils and rounded quartz pebbles. A pebble clast conglomerate is present at some localities at the base of this sandstone. The "middle Bloyd sandstone" is unconformable with the lower part of the Bloyd Formation. Approximately 60-100 ft. (18-30 m) thick.
  - Lower part** - Consists of interbedded very thin to thin ripple-bedded micaceous siltstones and sandstones that are fine to medium-grained interbedded with black clay to silty shales. Throughout the lower portion is black fissile clay shales to silty shales interbedded with thin to thick-bedded fossiliferous calcareous sandstone to sandy limestone beds. The carbonate layers vary from red to gray on fresh and weathered surface and can be mottled. Sometimes the fossiliferous sandy beds 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. Approximately 240 ft. (73 m) thick.
- Pbl** **Morrowan** - Consists of gray to black fissile clay to silty shale containing iron nodules and small limonitic box work fragments. Varies from black to dark-gray on fresh surface and light-gray to light-orange-brown on weathered surface. A thicker than normal package of thin-bedded ripple marked micaceous siltstones and sandstones is present above the clay shale. Trace fossils are abundant. Approximately 60-160 ft. (18-49 m) exposed in the northern half of the quadrangle.
- Pbp** **Prairie Grove Member** - A fine to coarse-grained quartz sandstone with varying amounts of carbonate, crinoid 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 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 clay drapes, limonite pebbles and clasts of shale, siltstone, and sandstone. Throughout this quadrangle it is difficult to differentiate the Prairie Grove Member due to additional sandstone packages in the Hale Formation and the lower part of the Bloyd Formation. The Prairie Grove Member is unconformable with the Cane Hill Member. Approximately 20-40 ft. (6-12 m) thick.
- Pbc** **Cane Hill Member** - Consists of a gray to black fissile clay to silty shale containing iron nodules and small limonitic box work fragments. Varies from black to dark-gray on fresh surface and light-gray to light-orange-brown on weathered surface. A thicker than normal package of thin-bedded ripple marked micaceous siltstones and sandstones is present above the clay shale. Trace fossils are abundant. Approximately 60-160 ft. (18-49 m) exposed in the northern half of the quadrangle.

## Stratigraphic Column



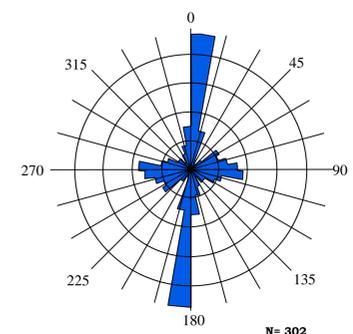
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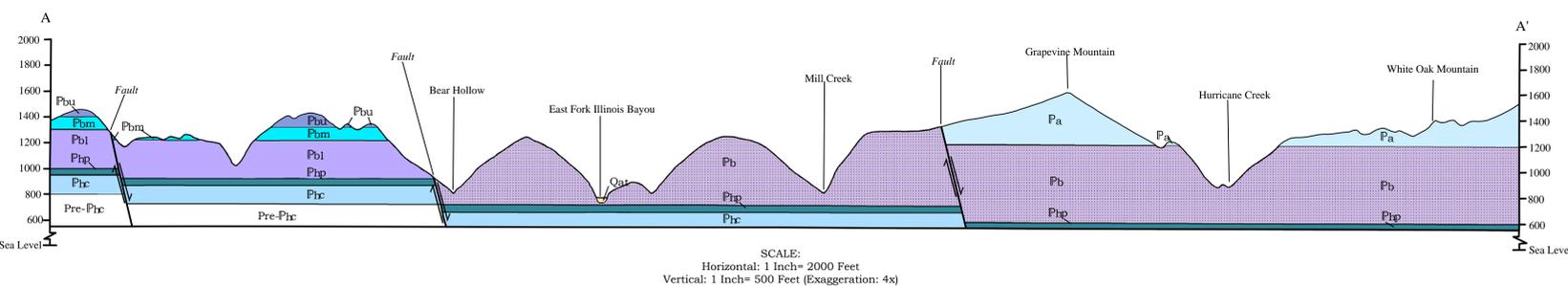
## Symbols

- Contact
- Contact - inferred
- Fault - arrow showing dip of the fault plane  
U - upthrown  
D - downthrown
- Fault - inferred
- Fault - concealed
- Strike and dip of inclined bedding
- Gas well
- Shale pit
- Prospect pit
- Quarry

## Joint Frequency



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



**Acknowledgments:** This map was produced for STATEMAP, Cooperative Agreement Award 6804G0009, a matching funds grants program with the U.S. Geological Survey under the National Cooperative Geologic Mapping Program. The Arkansas Geological Commission does not guarantee the accuracy of this map especially when used on any other system or with any other software. As mapping continues and more data is presented on this map may be updated. For the latest edition of this publication please contact our office.

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