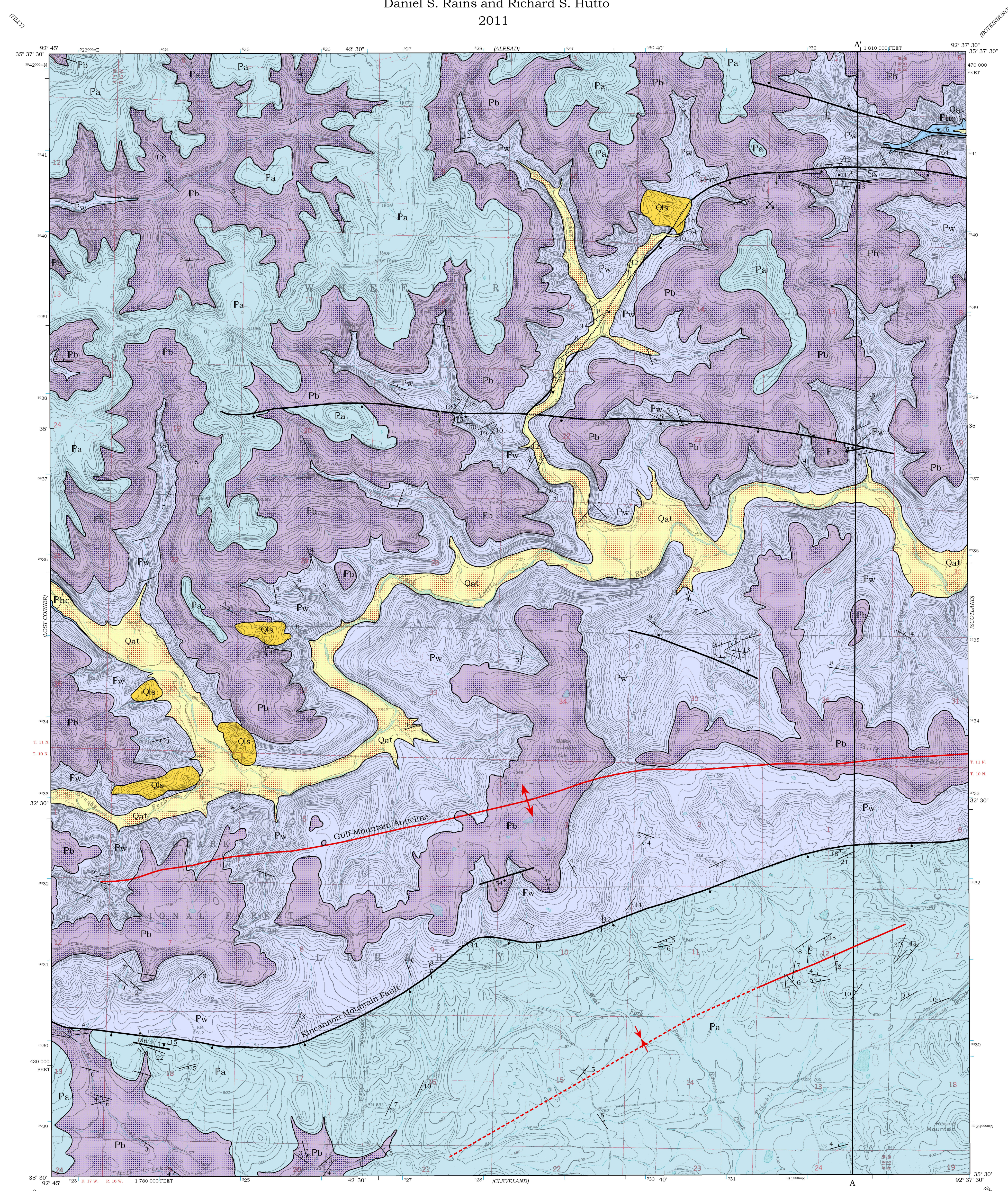
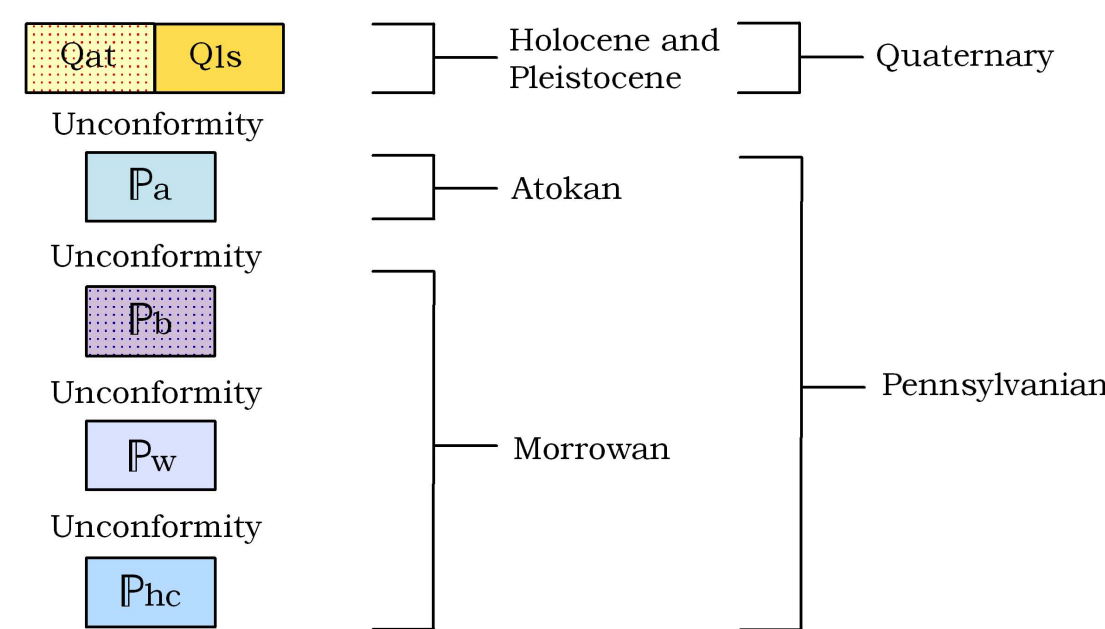


Geologic Map of the Rex Quadrangle Van Buren County, Arkansas

Daniel S. Rains and Richard S. Hutto
2011



Correlation of Map Units



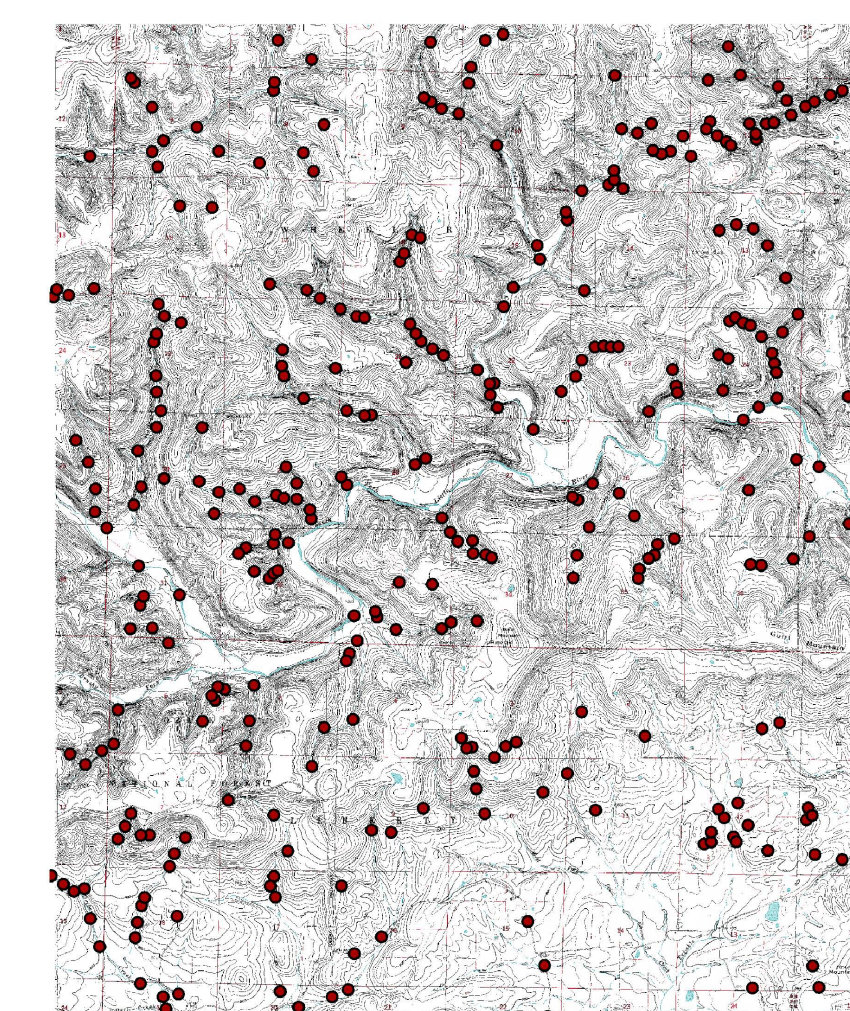
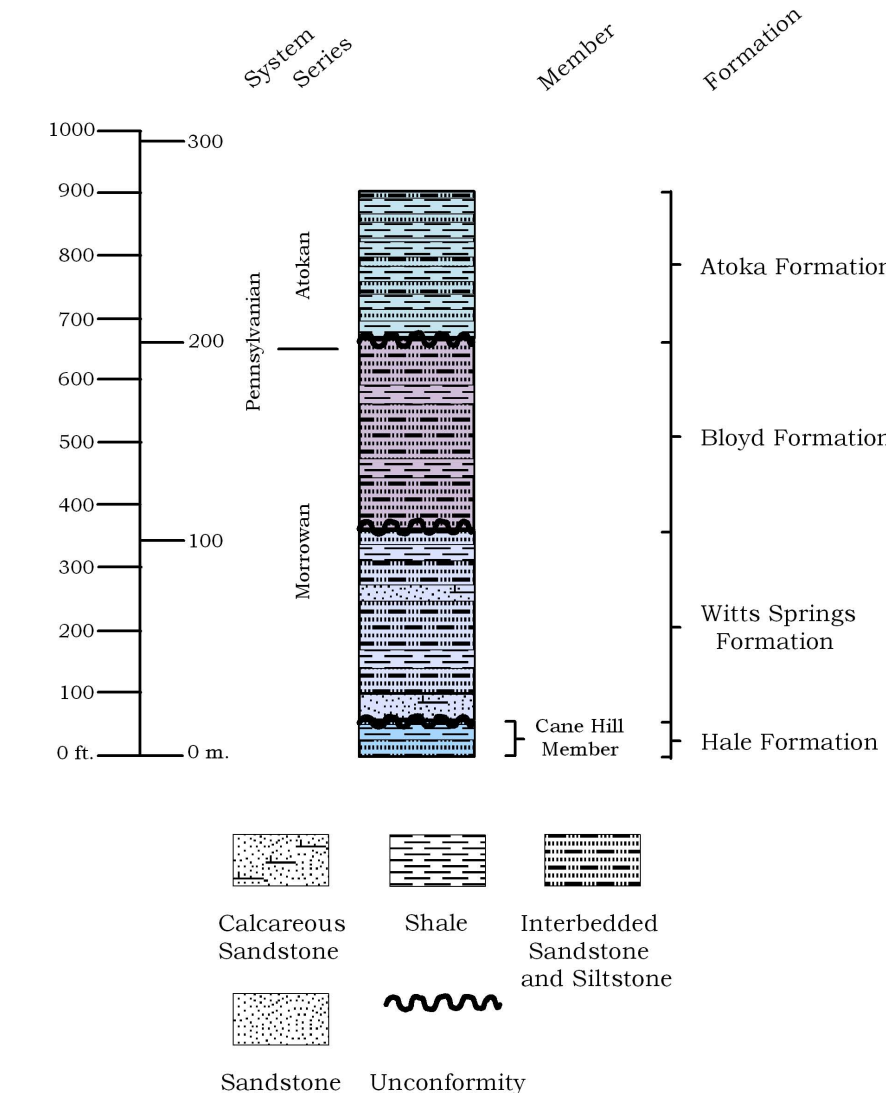
Pw **Wits Springs Formation (Lower Pennsylvanian, Morrowan)** - Composed of a sequence of interbedded sandstone and shale units with lenses of calcareous sandstone and limestone. A typical sequence can comprise up to five sandstone intervals from 10 to 80 feet (3-24 meters) each with intervening shale and siltstone units. Sandstone is typically orange to buff to gray fresh, gray to brown weathered, very thin-bedded, and forms massive bluffs. Bedding thickness is locally variable however, and flaggy to shaly outcrops are also common. Sandstone cross-bed sets are common throughout the interval. Bluffs of calcareous and fossiliferous sandstone occur erratically and display honeycomb weathering and other typical solution features. Crinoid fragments are abundant in fossiliferous intervals and other fossil fragments include rugose corals, colonial corals, trilobites (rare) and brachiopods. Trace fossils such as *Asterosoma* and *Conostichus* are rare. *Lepidodendron* are rare. Conglomeratic and phosphatic intervals are rare. Locally has very thin coal lenses and where exposed, associated gypsum corallites from groundwater leaching and precipitation. Unconformable with the underlying Cane Hill Member of the Hale Formation. Thickness ranges from approximately 240 to 320 feet (73-97 meters).

Phc **Hale Formation (Lower Pennsylvanian, Morrowan) - Cane Hill Member** - consists of black shale interbedded with dark-gray to brown siltstone and dark gray to brown, very fine grained, very thin-bedded sandstone. Sandstone is typically cross-bedded, ripple-bedded, and flaggy, locally contains lead casts, and is slightly calcareous. Approximately 60 feet (18 meters) of the upper Cane Hill Member is exposed.

Introduction

This map graphically summarizes the bedrock geology of the Rex 7.5-minute quadrangle. In this area over 980 feet (381 meters) of middle Pennsylvanian mostly clastic sedimentary rocks are exposed. Regional structure is related to uplift centered in southeastern Missouri known as the Ozark Dome and a structural basin to the southwest; the Arkoma Basin. Progressively younger rocks form a series of plateau surfaces from the dome southward into Arkansas. The area of this map is located in the southernmost and highest of these plateaus—the Boston Mountains Plateau. The Mulberry Fault system of which the Kincannon Mountain Fault (See map) is a part is considered the boundary between the Ozark Dome and the Arkoma basin. The Rex quadrangle is divided approximately west to east by the South Fork of the Little Red River which drains the northern two thirds of the area. The Kincannon Mountain Fault and the Gulf Mountain Anticline are located south of the river and are approximately parallel to it. The Kincannon Mountain Fault is a normal fault down-dropped to the south that extends onto the Solo quadrangle to the west and the Scotland quadrangle to the east. In this area it has greater than 600 feet (182 meters) of throw and offsets Morrowan rocks of the Wits Springs Formation against Atokan rocks of the Atoka Formation. The Gulf Mountain Anticline north of the fault is likely structurally related to it. It is a gentle fold that creates the divide between the South Fork of the Little Red River to the north and other drainages to the south. Several smaller normal faults are also developed in the area with offsets from just a few feet to greater than 60 feet (18 meters). Because geologic mapping relies on discernible lithologic boundaries, some of which are not laterally persistent, the stratigraphic section requires clarification. On adjacent quadrangles the Bloyd Formation is informally divided into the Parthenon Sandstone; previously the middle Bloyd sandstone (Chandler and Zachry, 2010), the upper part and the lower part. In this area individual members of the Bloyd Formation are not distinguishable. Therefore rock units equivalent to the Parthenon Sandstone and the upper part are termed the Bloyd Formation (undifferentiated) (Hutto and Smith, 2007). The Wits Springs Formation is a stratigraphic unit equivalent to the Lower part of the Bloyd Formation and the Pease Grove Member of the Hale Formation after previous mapping (Braden and Ausbrooks, 2003). The geology of the Rex quadrangle was mapped by Boyd R. Haley for the Geologic Map of Arkansas (1976). The current mapping builds on the previous work, but depicts structures and rock units in greater detail. The contacts and structural features on this map were ascertained from field observations made from July 2010 through April 2011. Site locations were generated with the aid of a global positioning satellite receiver. Bedrock dipping at less than 2° was considered horizontal. Bedding thicknesses and splitting properties after McKee and Weir (1953).

Stratigraphic Column



Topographic map of the Rex quadrangle. Dots indicate locations of data collection points.

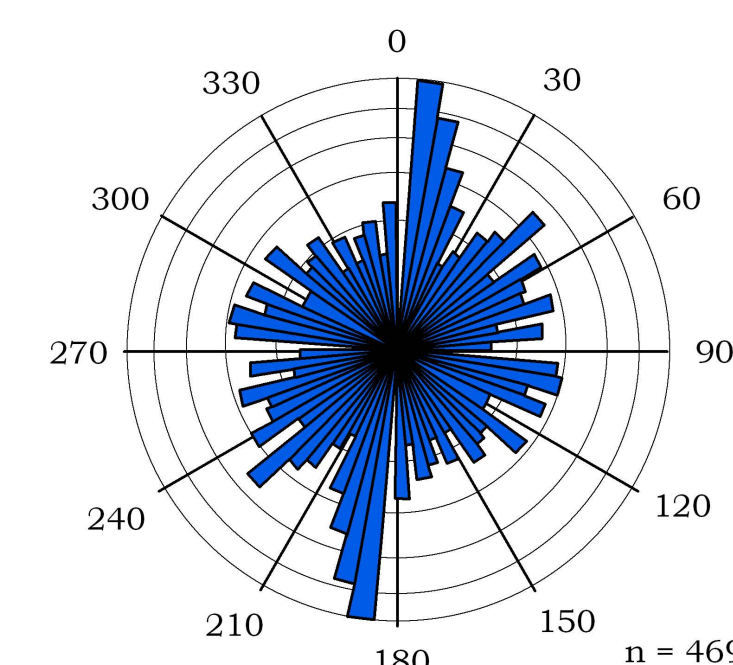
Description of Map Units

- Qat** **Alluvium and terrace deposits (Quaternary)** - composed of unconsolidated clay, silt, sand and gravel interspersed with bedrock exposures. Deposited by streams on low terraces and floodplains.
- Qls** **Landslide deposits (Quaternary)** - unstructured masses of rock and sediment that have moved downslope due to failure of the land surface.
- Pa** **Atoka Formation (Pennsylvanian, Atokan)** - sequence of black to tan shale interbedded with very thin- to thin-bedded, cross-bedded, micaceous, very fine-grained, flaggy to shaly sandstone, siltstone, and thick-bedded, massive sandstone. Sandstone is tan to orange on fresh surfaces, and weathers to brown. Locally exhibits ripple-bedding, stylolites, flutes, trace-fossils and shale-pebble conglomeratic zones. Unconformable with the underlying Bloyd Formation. Reaches a thickness of up to 340 feet (104 meters).
- Pb** **Bloyd Formation (undifferentiated) (Lower Pennsylvanian, Morrowan)** - The lower two thirds of the Bloyd Formation typically consists of very thin- to thin-bedded, hummocky cross-bedded, flaggy to shaly, very fine-grained, tan to brown micaceous sandstone with minor shale interbeds. Shale is the dominant lithology of the upper Bloyd with interbedded sandstone units that are commonly calcareous, locally fossiliferous, very thin- to thick-bedded, very fine- to fine-grained and locally conglomeratic. Fossils are sparse but include crinoids, brachiopods, corals, and bryozoans. Liesegang banding occurs throughout but is more common in the lower Bloyd. Stylolites and trace fossils are rare. Ranges in thickness from approximately 260 - 380 feet (79 - 116 meters).

Symbols

- Contact
- Normal fault - dotted where concealed
- Indicates down-dropped block
- 45° - Indicates dip of fault plane
- Line of cross-section
- Anticline axis
- Syncline axis
- Inferred Syncline axis
- Strike and Dip
- Gravel pit

Joint Frequency



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

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Braden, A. K., and Ausbrooks, S. M., 2003. Geologic map of the Stowall quadrangle, Searcy County, Arkansas. Arkansas Geological Commission, Digital Geologic Map, DGM-AR-00800, 1 sheet 1:24000.
Chandler, A. K., and Zachry, D. L., 2010. Parthenon Sandstone: a prominent new member of the Morrowan Bloyd Formation, Pennsylvanian of north-central Arkansas. Geological Society of America, Abstracts with Programs, Joint meeting, north-central/south-central, v. 42, n. 2, p. 70.
Haley, B. R., 1973. Preliminary Geologic map of the Rex quadrangle, Van Buren County, Arkansas. Arkansas Geological Commission, Geologic Worksheet, 1 sheet 1:24000.
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McKee, E. D., and G. W. Weir, 1953. Terminology for stratification and cross-stratification in sedimentary rocks. Geological Society of America Bulletin, v. 64, p. 381-389.

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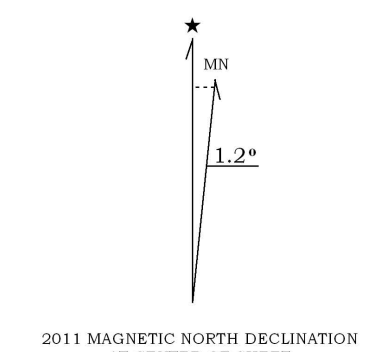
Disclaimer: This map was prepared in a digital format using ArcGIS ArcView 10 software on computers at the Arkansas Geological Survey. The Arkansas Geological Survey does not guarantee the accuracy of this map especially when used on any other system or with any other software. As mapping continues and is refined, the data presented on this map may be updated. For the latest edition of this and other Arkansas Geological Survey maps and publications please call the Publication Sales office at 501-296-1877 or visit our website at www.geology.arkansas.gov.

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Hutto, Richard S. and Rains, Daniel S., 2011. Geologic map of the Clinton quadrangle, Van Buren County, Arkansas. Arkansas Geological Survey, Digital Geologic Map, DGM-00163, 1:24,000.

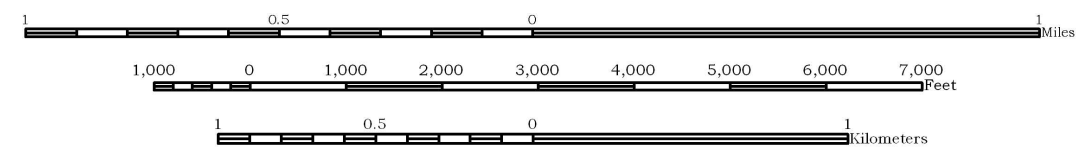
The topographic base is a Digital Raster Graphic (DRG). The DRG is a scanned image of a U.S. Geological Survey standard series topographic map published in 1965. Some of the colors of the DRG have been modified and it is displayed at 50% transparency.

10,000 - foot grid based on Arkansas coordinate system, north zone. Polyconic projection.

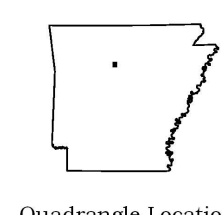
100 - meter Universal Transverse Mercator grid ticks, zone 15 shown in blue. 1927 North American Datum.



Scale 1:24000



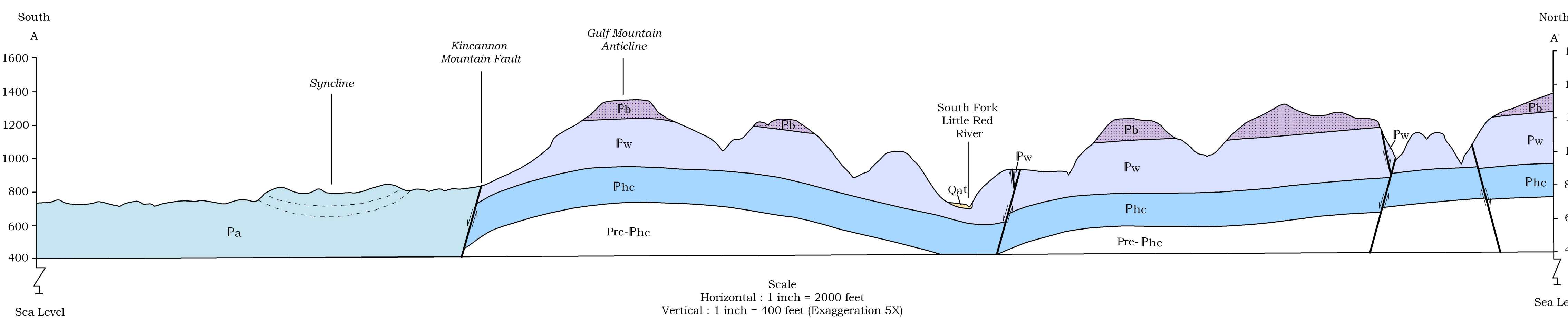
Contour Interval 20 Feet
National Geodetic Vertical Datum of 1929



Quadrangle Location

ROAD CLASSIFICATION

Light-duty Unimproved dirt



Scale
Horizontal : 1 inch = 2000 feet
Vertical : 1 inch = 400 feet (Exaggeration 5X)