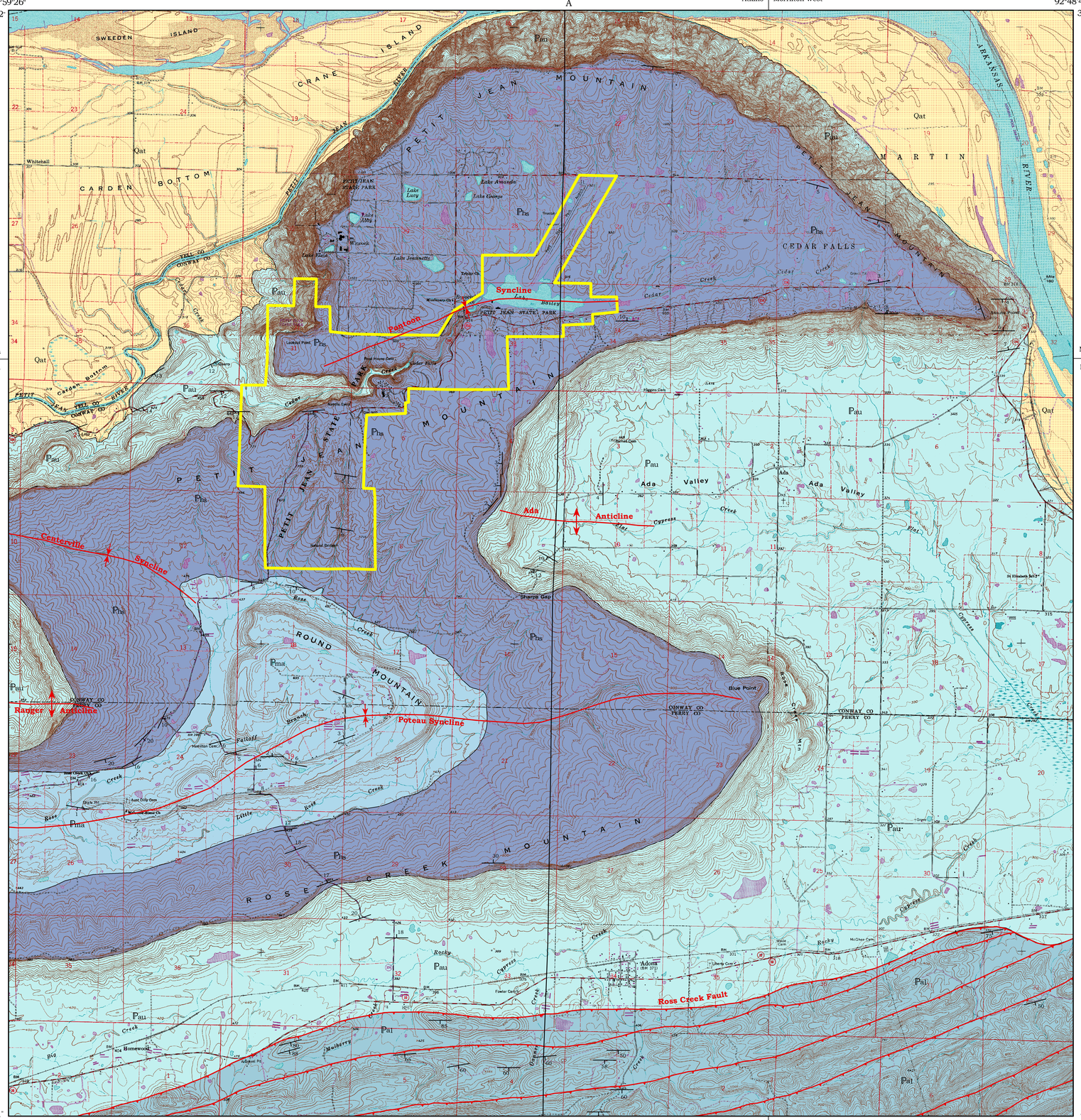
Digital Geologic Map, State Park Series
Petit Jean State Park
DGM-SPS-002

Geologic Map of Petit Jean State Park and surrounding area

Geology by Boyd R. Haley and Charles G. Stone
1995
Edited and digitally compiled by Angela K. Chandler
2006
Arkansas Geological Commission, Bekki White, State Geologist



Mapped, edited, and published by the Geological Survey
Control by USGS, USC&GS, and USCE

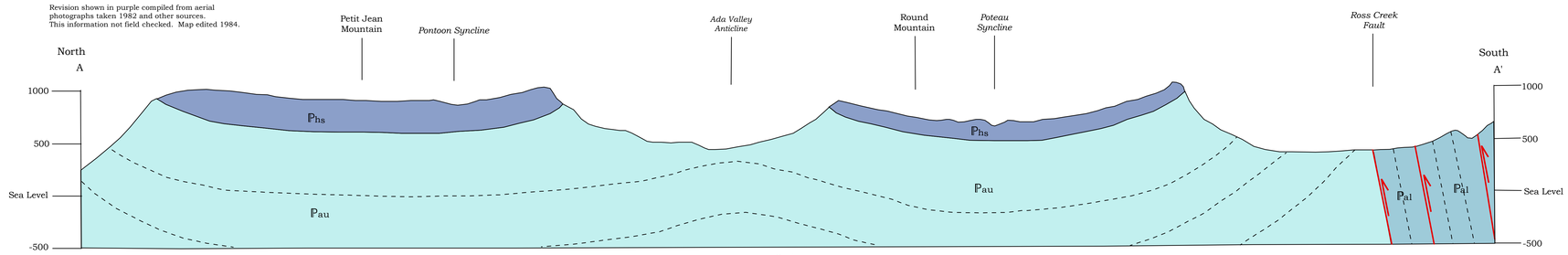
Topography by photogrammetric methods from aerial photographs taken 1958. Field checked 1961.

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arkansas coordinate system, north zone
1,000-meter Universal Transverse Mercator grid ticks zone 15, shown in blue.

Revision shown in purple compiled from aerial photographs taken 1982 and other sources.
This information not field checked. Map edited 1984.

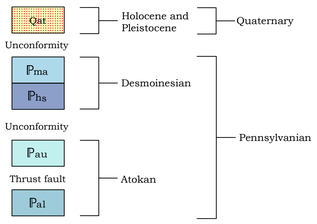
SCALE 1:24000

0 0.35 0.7 1.4 Miles



Scale
Horizontal: 1" = 1000 ft.
Vertical: 1" = 500 ft.

Correlation of Map Units



Description of Map Units

Qat — **Alluvium and terrace deposits (Quaternary, Holocene and Pleistocene)** – Consists of various low to high level terrace and alluvial deposits composed of sand, clay and gravel. Mussel shells from a terrace approximately 30 feet above the present river level have yielded a Carbon-14 dating of 38,000 years in age (Stone, 1975). Approximately 30-70 ft. of section exposed along the Arkansas River and the Petit Jean River.

Pma — **McAlester Formation (Pennsylvanian, Des Moinesian)** – Consists of very thin bedded silty micaceous shales and siltstones with occasional thin-bedded sandstone. The shales and siltstones are charcoal-gray to black on fresh surfaces but weather buff to orange in color. This formation outcrops on Round Mountain just south of Seven Hollows Trail and Petit Jean State Park. This formation contains plant fossils and a thin coal bed identified as the "lower Hartshorne coal seam". The McAlester Formation is conformable with the underlying Hartshorne Sandstone. Approximately 250-300 ft. of section exposed in the Round Mountain area.

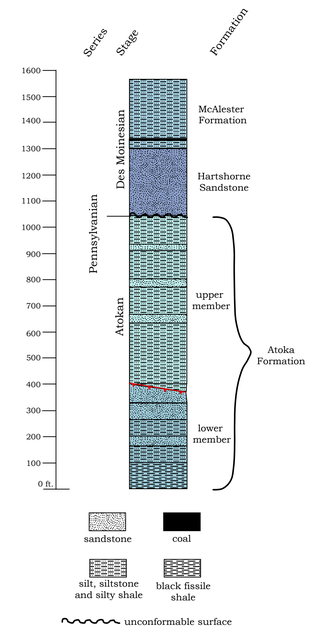
Phs — **Hartshorne Sandstone (Pennsylvanian, Des Moinesian)** – A very fine to medium-grained micaceous sandstone that is thin to massive-bedded. The massive beds contain tabular cross-beds. The sandstone is usually a light red or orange to buff or white on fresh surfaces but weathers a dark-gray. The quartz grains are angular to sub-rounded. Also contains some intervals of siltstone and shale. This formation is exposed on top of Petit Jean Mountain and contains the well known "turtle rocks" and box-work or "carpet rock" seen in the park. The Hartshorne Sandstone is unconformable with the underlying Atoka Formation. This unconformable contact can be seen beneath Cedar Falls approximately 15 feet above pool level. Approximately 200-300 ft. thick in this area.

Atoka Formation (Pennsylvanian, Atokan) – The Atoka Formation is divided into upper, middle and lower members based on regionally mappable shale or sandstone intervals (McFarland, 1998). Only the upper and lower members are exposed on this map. The middle member is not present due to the Ross Creek Thrust Fault on the lower portion of the map.

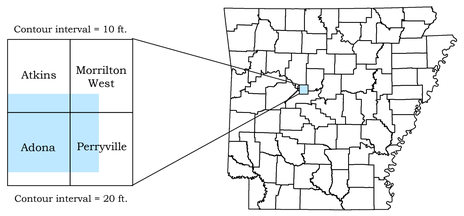
Pau — *Upper member* – Consists of micaceous silty shales, siltstones and thin-bedded sandstones. The shales and siltstones are charcoal-gray to black on fresh surface and weather a dark-gray. Some silty sequences contain very thin-bedded rounded concretions. The sandstone is fine-grained with sub-angular to sub-rounded grains and is gray to buff on fresh surfaces. This unit contains limonite pebble beds and occasional fossiliferous beds containing mostly gastropods and bivalves. More commonly seen are plant fossils and trace fossils such as *Conostichus*. Coal stringers and thin coal beds less than one inch are abundant in this member. The Atoka Formation is present along the hillsides of Petit Jean Mountain and in the surrounding valleys. Approximately 650-700 ft. of section exposed in this area.

Pal — *Lower member* – Consists of thin to thick-bedded sandstone, micaceous siltstone and black fissile shale (Stone et. al., 1981). The siltstone and shale contain coalified plant fragments and sideritic iron concretions. Trace fossils are abundant in this unit. The lower member is exposed south of the Ross Creek Fault in the southern part of the map. Approximately 300-500 ft. of section exposed on southern part of map.

Stratigraphic Column



Location Map



Symbols

- Formation contact
- Syncline
- Anticline
- Thrust fault (barb on upthrown plate)
- 12 Strike and dip of inclined bedding
- Park boundary (approximate)
- Bedding
- Arrow showing direction of fault movement

References

Haley, Boyd R., and Stone, Charles G., 1995, Geologic map of the Adona Quadrangle: Arkansas Geological Commission Geologic Worksheet, 1 sheet.
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McFarland, John David, 1998, Stratigraphic summary of Arkansas: Arkansas Geological Commission Information Circular, IC-36, 39 pp.
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Acknowledgments: This geologic map is a compilation of four quadrangles that were mapped in 1995 for COGEO, Cooperative Geologic Mapping Program, a program with the US Geological Survey.

Disclaimer: This map was prepared in a digital format using ArcView 9.1, ArcGIS 9 software on computers at the Arkansas Geological Commission. 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 is refined, the data presented on this map may be updated. For the latest edition of this publication please contact our office.

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