OFFICE OF THE STATE GEOLOGIST

Geologic Map of the Drasco Quadrangle, Cleburne and Stone Counties, Arkansas

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2024
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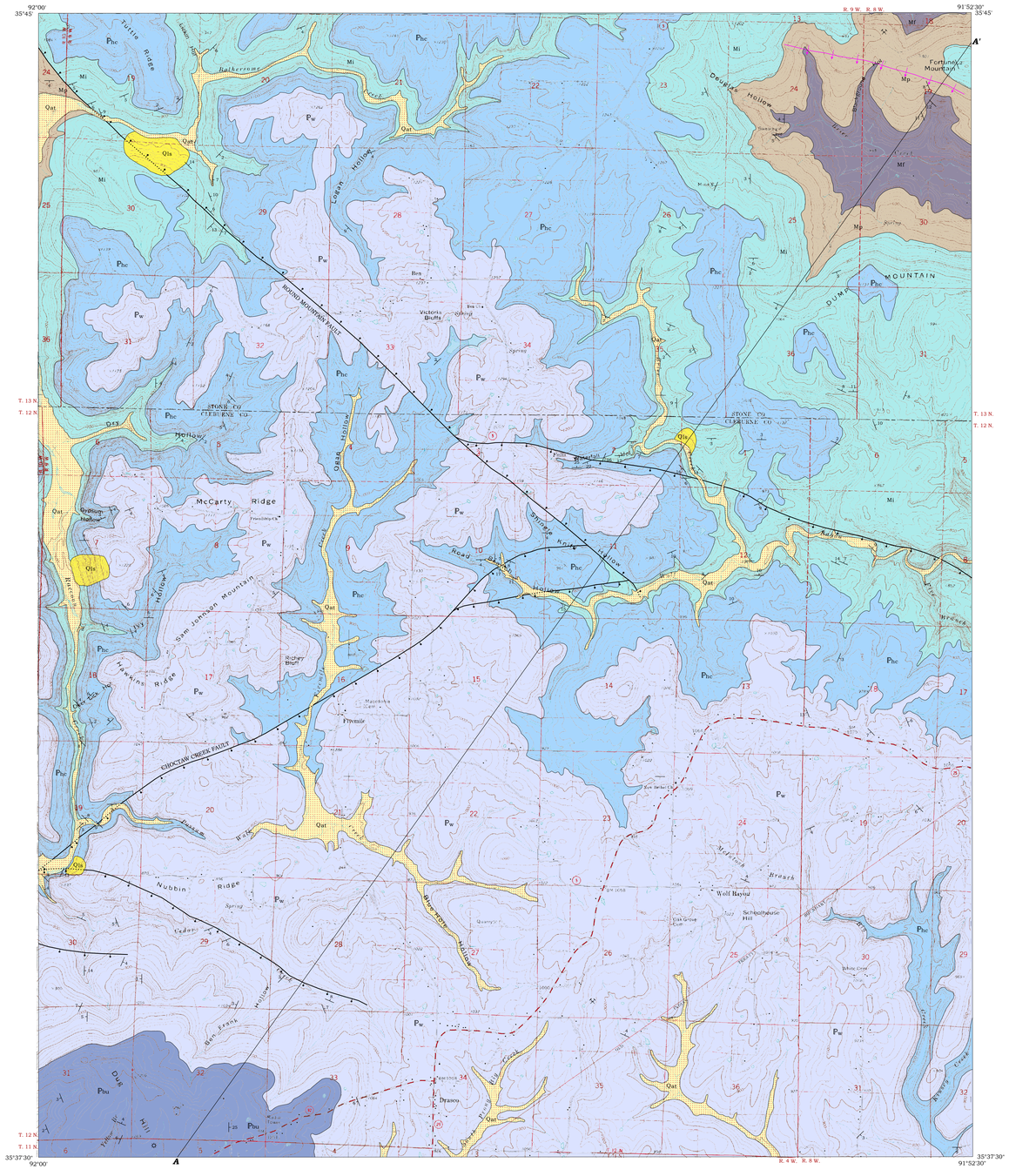
Digital Geologic Quadrangle Map
Drasco Quadrangle, Arkansas
DGM-AR-00233



The topographic base is a collarless Digital Raster Graphic (DRG). The DRG is a scanned image of a U.S. Geological Survey 7.5-minute series topographic map published in 1973.

Polyconic projection. 1927 North American datum.

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs.

0°31'W
Approximate mean declination 2024

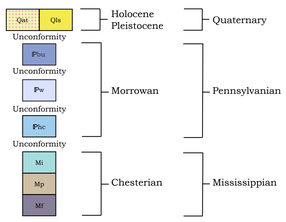
SCALE 1:24 000
1 MILE
1 KILOMETER
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Quadrangle Location

Adjoining Quadrangles

ROAD CLASSIFICATION
Secondary highway
Light duty road
Unimproved road

Correlation of Map Units



Location of the Drasco quadrangle within the Ozark Plateaus physiographic province.

Introduction

This map depicts the bedrock and surficial geology of the Drasco 7.5-minute series USGS topographic quadrangle in Cleburne and Stone counties, Arkansas. This mapping project was partially funded by a grant from the National Cooperative Geologic Mapping Program (NCGMP) as part of the STATEMAP component. Approximately 2,000 feet (610 meters) of late Mississippian (Chesterian) through early Pennsylvanian (Morrowan) carbonate and clastic rocks crop out in this area.

The mapped area is situated on the Boston Mountains Plateau, the southernmost and highest of a series of plateau surfaces within the Ozark Plateaus Province. The Boston Mountains Plateau is developed on mostly early Pennsylvanian-aged rock with sandstone of the Witts Springs Formation and Cane Hill member of the Hale Formation comprising the bedrock for most of the quadrangle. Generally, these sandstone units are divided by poorly exposed intervals of shale that have eroded to form typical bench and bluff topography due to differential weathering. Late Mississippian-aged rocks of the Imo interval, Pitkin Limestone, and Fayetteville Shale are exposed in areas strongly dissected by streams. Wolf Bayou, Raccoon Creek, and Big Creek are the dominant drainages on the quadrangle. Wolf Bayou drains eastward from the quadrangle and flows down the Boston Mountains Escarpment to the White River. Raccoon Creek and Big Creek flow southward from the quadrangle where they join the Little Red River.

Regionally, strata dip slightly to the south away from the core of the Ozark Dome in southeastern Missouri, however, dip can vary locally due to normal faults and monoclines. Two named structural features are depicted on the map. The Round Mountain Fault is a normal fault oriented northwest-southeast with a maximum displacement of approximately 80 feet (24 meters) to the northeast. The Choctaw Creek Fault is a normal fault oriented southwest-northeast with a maximum displacement of approximately 120 feet (37 meters) to the southeast. The Choctaw Creek Fault terminates against the Round Mountain Fault at Shingle Knife Hollow near the center of the quadrangle.

The geology of the Drasco quadrangle was mapped in 1973 by E. E. Glick in preparation for the 1:500,000 scale Geologic Map of Arkansas. This map builds on previous work and depicts the structure and stratigraphy in greater detail. The contacts and structures are based primarily on field observations made from August 2023 to April 2024. Representative rock samples were collected and made into thin sections for petrographic studies. Data and site locations were recorded on a portable GPS data collector and integrated into a geodatabase.


Sandstone pedestal in the Witts Springs Formation with abundant liesegang banding.

Symbols

- Contact
- A — A' Line of cross-section
- Normal fault - ball and bar on downthrown side. Dotted where concealed.
- Monocline axis
- Strike and dip of bedding
- Mine or quarry, abandoned
- Gas well

Description of Map Units

Alluvium and terrace deposits (Quaternary) – unconsolidated clay, silt, sand, and gravel, including deposits on the modern floodplain or the modern floodplain and one or more terrace levels.

Landslide deposits (Quaternary) – a mass of rock and debris that has moved downslope due to gravity. Only the largest landslide deposits are depicted.

Bloyd Formation - upper part (Lower Pennsylvanian, Morrowan) – consists of interbedded sandstone, siltstone, and shale units. The sandstone is very fine to fine grained and locally micaceous. Commonly medium to thick bedded and irregular or lenticular bedded. Buff to white on fresh surfaces, but weathers brown and blocky. Commonly exhibits ripple bedding, crossbedding, and liesegang banding. Locally contains clay partings, pebble molds, trace fossils, and fossil wood casts and molds. Locally contains crinoid and brachiopod fossil molds. Shale is dark gray to black and siltstone is tan when freshly broken. Both weather tan to orange. Unconformable with the underlying Witts Springs Formation. Up to 300 feet (90 meters) thick.

Witts Springs Formation (Lower Pennsylvanian, Morrowan) – predominantly sandstone with minor units of limey sandstone, shale, and siltstone. Sandstone is typically thin to thick bedded. Weathering commonly masks bedding so it appears massive and rounded or blocky. Grain size is commonly fine, but locally is medium and friable or coarse and conglomeratic. Orange to redish-orange or buff on fresh surfaces, but weathers gray to dark brown, or orange. A prominent bluff-former, it locally contains bluff shelters and caves. Typical sedimentary features include cut-and-fill structures, crossbedding, ripple bedding, and soft sediment deformation. Liesegang banding, stylolites, and honeycomb weathering are common. Exfoliation of massive sandstone along stream beds produces a characteristic concave reentrant. Quartz pebbles, shale pebbles, and pebble molds are common. Often contains fossil molds of crinoid fragments, brachiopods, and corals. Locally contains trace fossils and fossil wood prints and molds. Unconformable with the underlying Cane Hill Member of the Hale Formation. Up to 500 feet (152 meters) thick.

Hale Formation (Lower Pennsylvanian, Morrowan) – consists of two members, the Prairie Grove and the Cane Hill. Only the Cane Hill is present on this quadrangle. Rocks equivalent to the Prairie Grove and the lower part of the Bloyd Formation are mapped as the Witts Springs Formation.

Cane Hill Member – primarily consists of sandstone interbedded with shale and siltstone. Sandstone is very thin to medium bedded and commonly flaser, ripple, and crossbedded. Typically very fine to fine grained and locally silty and micaceous. Commonly buff to tan on fresh surfaces but weathers grayish-brown to dark brown. Locally forms prominant sandstone blufflines that exhibit flaggy or blocky weathering and ocasionally contain caves and bluff shelters. Stylolites, liesegang banding, trace fossils, and coalified fossil wood molds are common features in the mapping area. Locally contains shale pebbles and partings. Gypsum was found weathering out of sandstone at one locality that exhibited honeycomb weathering. Shale is rarely exposed but is clay to silty. Weathers orangish-brown to tan and is gray to black on fresh surfaces. Siltstone is tan to brown or gray on fresh surfaces, but weathers dark brown. Unconformable with the underlying Imo interval. Ranges from 200-280 feet (60-90 meters) thick.

Imo interval (Upper Mississippian, Chesterian) – consists mostly of sandstone with lesser amounts of clay shale, limestone, and conglomerate. Sandstone is thin to thick bedded and commonly exhibits crossbedding and convolute bedding. Weathering commonly masks bedding so that exposures appear massive. Grain size is typically fine, but locally very fine to medium. Buff to tan on fresh surfaces and weathers brown to grayish-brown. Sandstone units form prominent blufflines, are commonly stylolitic, and exhibit honeycomb weathering, liesegang banding, and soft sediment deformation. Fossil wood casts and molds are common and include *Lepidodendron* and *Stigmaria*. Shale intervals are locally clay to silty and poorly exposed. Black to dark gray on fresh surfaces but weathers light gray to tan. The limestone is fine to coarse grained, thin to medium bedded, dark gray or red, and is commonly fossiliferous. Conglomeratic zones up to 5 feet (1.5 meters) thick are locally exposed and contain abundant limonitic pebbles, bioclasts, and fossil casts and molds. Conformable with the underlying Pitkin Limestone. Approximately 300 feet (90 meters) thick.

Pitkin Limestone (Upper Mississippian, Chesterian) – consists mostly of thin to thick bedded, finely to coarsely crystalline bioclastic and oolitic limestone. The limestone is medium to light gray on fresh surfaces and weathers gray. Contains abundant fossil fragments including *Archimedes*, crinoid stems, brachiopods, gastropods, and corals. Locally, units of calcareous, fissile clay shale containing micritic limestone concretions are present near the top. This interval is generally poorly exposed, is black on fresh surfaces, and weathers gray to light gray. Conformable with the underlying Fayetteville Shale. Ranges from 200-300 feet (60-90 meters) thick.

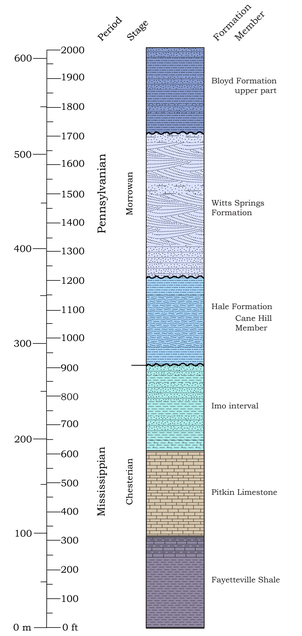
Fayetteville Shale (Upper Mississippian, Chesterian) – predominately fissile clay shale with interbedded micrite near the top. Locally fossiliferous. The shale is black on freshly broken surfaces and weathers dark gray. The micrite is black on freshly broken surfaces and weathers light gray. Commonly forms steep slopes near the base of the Boston Mountains Escarpment. Where fossiliferous, the micrite contains mostly brachiopods and is characteristically petroliferous when freshly broken. Approximately 100-300 feet (30-90 meters) thick.

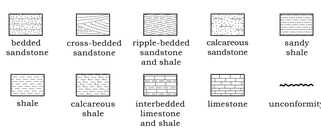

Ancient wood casts and molds (lepidodendron) present in Imo sandstone near Douglas Hollow.

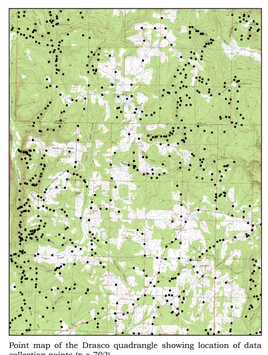

Cannonball concretion, locally referred to as a Prim boulder, weathering out of a Witts Springs bluffline.


Thin, ripple bedded, flaggy sandstone that is typical of the Cane Hill Member of the Hale Formation.

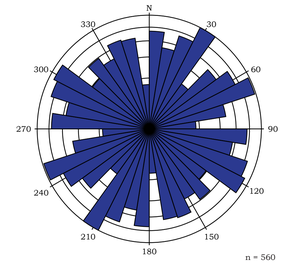
Stratigraphic Column






Point map of the Drasco quadrangle showing location of data collection points (n = 702).

Joint Frequency



n = 560

Rose diagram of the strike frequency of joints recorded on the Drasco quadrangle.

References

Glick, E. E., 1973, Partial geologic map of the Drasco quadrangle, Cleburne and Stone counties, Arkansas Geological Commission, Geologic Worksheet, 1 sheet, 1:24,000.

Acknowledgements: This map was produced for the STATEMAP grant program administered by the U.S. Geological Survey under Cooperative Agreement Award G23AC00435. Special thanks to the private landowners who graciously allowed access to their properties and Richard Hutto for serving as principal investigator. A very special thanks to Angela Chandler, Richard Hutto, and Thomas Liner for mapping assistance.

Limitations: This map, like all geologic maps, is based on interpretations which were made from the data available at the time it was created. As new information is collected, the features depicted on this map may be changed.

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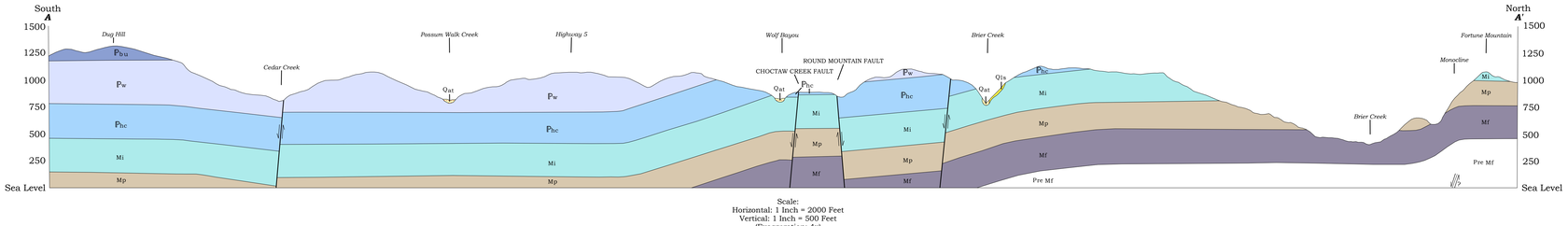
Suggested citation for this map:
Gist, J.T. and Thomas, J.M., 2024, Geologic map of the Drasco quadrangle, Cleburne and Stone counties, Arkansas: Office of the State Geologist, Digital Geologic Map, DGM-AR-00233, 1 sheet, 1:24,000.

Map and cross section digitized by Brian Kehner.



Scale:
Horizontal: 1 Inch = 2000 Feet
Vertical: 1 Inch = 500 Feet
(Exaggeration: 4x)