

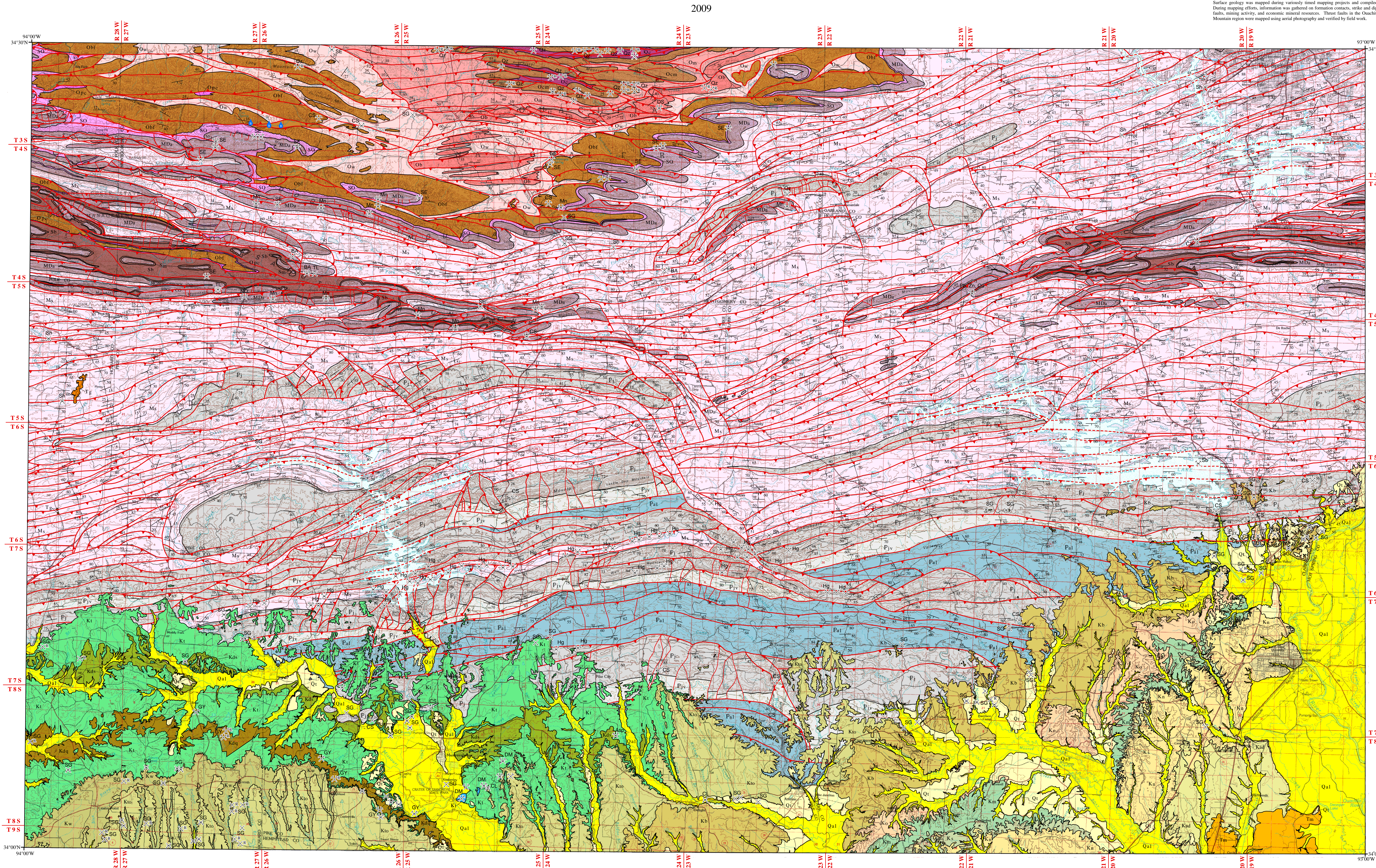
GEOLOGIC MAP OF THE ARKADELPHIA 30'x60' QUADRANGLE, CLARK, GARLAND, HEMPSTEAD, HOT SPRING, HOWARD, MONTGOMERY, PIKE, AND POLK COUNTIES, ARKANSAS

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Introduction

This map is a compilation of the surface geology on thirty-two U.S. Geological Survey 7.5 minute topographic quadrangles which make up the Arkansas portion of the Arkadelphia 1:100,000 quadrangle. Individual 7.5 minute quadrangle maps included on this map are Big Fork, Polk Creek Mountain, Norman, Caddo Gap, Bismarck, Perry, Hempstead, Hot Springs South, Athens, Langley, Lodi, Glenwood, Amity, Point Cedar, Blount, De Roche, Newhope, Center Point NE, Narrows Dam, Marblesboro, NE, Chalchoue Mountain West, Chalchoue Mountain East, De Gray, Caddo Valley, Center Point, Nathan, Marblesboro, Delight, Antone, Okolona North, Hollywood, and Arkadelphia. 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 Cambrian age. The formations consist primarily of consolidated and unconsolidated sedimentary rock units with a very small percentage of igneous rocks of varying age. 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. These faults in the Ouachita Mountain region were mapped using aerial photography and verified by field work.

Description of Map Units



CENOZOIC
 Quaternary
 Tertiary
MESOZOIC
 Cretaceous
PALEOZOIC
 Ordovician
 Cambrian

- Qal** Alluvium (Quaternary) - Alluvium deposits consist of variably stratified gravel overlain by sand, silt, and clay. This unit is composed of the non-saline or brackish water deposits of the Quaternary period. It is composed of the Quaternary period deposits of the Quaternary period.
- Qt** Terrace Deposits (Quaternary) - Terrace deposits generally grade from basal gravel to silt and clay at the top. Gravels, primarily non-saline, originated in the Ouachita Mountain region and from local Cretaceous formations. Terraces are elevated topographic features which are former floodplains of nearby streams and rivers.
- Tg** Gravel (Tertiary) - An isolated deposit of gravel occurring on a low-lying strip of Paleozoic rock.
- Tm** Midway Group (Tertiary) - The Midway is composed of gray calcareous clay, which is very fossiliferous. Fossils included in this unit are bivalves, gastropods, bryozoa, brachiopods, corals, fish, shark and crocodile teeth, foraminifera, and ostracods. The Midway is separated from the Arkadelphia by unconformities.
- Kad** Arkadelphia Marl (Upper Cretaceous) - The Arkadelphia Marl is a dark gray to black marl or marly clay. It also contains some limy gray sandy clay, sandy limestone, concretionary limestone, and white to light brown impure chalk. The sandy marls and limestones are found near the base of the unit, and the impure chalks are found near the top of the unit. The Arkadelphia Marl includes corals, bryozoa, gastropods, shark teeth, reptilian remains, and various microfossils. The Arkadelphia Marl was deposited in a near-shore marine environment and rests unconformably on the Nacatoch Sand.
- Kn** Nacatoch Sand (Upper Cretaceous) - The Nacatoch Sand is composed of unconsolidated, cross-bedded, yellowish and gray fine quartz sand, hard fossiliferous sandy limestone, coarse highly fossiliferous sand, fine argillaceous blue-black sand, and bedded light gray clay and marl. Fossiliferous limestones are found near the base of the unit. This bedded gray clay is interbedded with fine sands at the top of the unit. Fossils found in the unit include corals, sponges, brachiopods, bryozoa, gastropods, cephalopods, crab remains, and shark teeth. The Nacatoch Sand was deposited in a near-shore marine environment and rests unconformably on the Saratoga Chalk.
- Ks** Saratoga Chalk (Upper Cretaceous) - The Saratoga Chalk is a fossiliferous, glauconitic, white to light brown, shaly and sandy chalk. It is blue gray when freshly exposed and weathers white, light gray, and light brown. Fossils found in the unit include sponges, bryozoa, echinoderms, mollusks, bivalves, gastropods, cephalopods, crustaceans, and shark teeth. The Saratoga Chalk was deposited in a near-shore marine environment and rests unconformably on the Marlbrook Marl.
- Km** Marlbrook Marl (Upper Cretaceous) - The Marlbrook Marl is a uniform shaly marl that is blue gray when freshly exposed and weathers white to light brown. The unit is moderately fossiliferous in the upper part and slightly fossiliferous in the lower part. Notable fossils include *Eugenia ponderosa* and *Dorrea filiformis* oyster species and reptiles. The Marlbrook Marl was deposited in a near-shore marine environment and rests unconformably on the Ozan Formation.
- Ko** Ozan Formation (Upper Cretaceous) - The Ozan Formation consists of sandy marl, marl, and a thin glauconitic marl. The unit is fossiliferous, micaceous, and weathers to a yellow-brown sticky clay. The basal sandy glauconitic marl, known as the Beckman Sand Lenti, has shark teeth and phosphate nodules, and is about 15 feet thick. The thickness of the unit on this quadrangle is about 200 feet. Notable fossils are *Eugenia ponderosa* and *Gryphus*. The unit was deposited in a near-shore marine environment and rests unconformably on the Brownstown Marl.
- Kb** Brownstown Marl (Upper Cretaceous) - The Brownstown Marl consists of dark gray calcareous clay, marl, and sandy marl. Notable fossils are the *Eugenia ponderosa* and *Isoceras*. The unit was deposited in a near-shore marine environment and rests unconformably on the Tarkenton Formation.
- Kto** Tarkenton Formation (Upper Cretaceous) - The Tarkenton Formation consists of cross-bedded sand, gravel, clay, and volcanic ash. Basal cross-bedded gravels are approximately 20 feet thick. Minor sand and clay lenses occur within the gravel, and sand commonly fills the interstitial space around the gravel. Thinner beds (less than 1 foot in thickness) and lenses of gravel occur within the formation's sand intervals. The gravels range from pea-size to 6 inches in diameter and are composed of quartz, novaculite, sandstone, and quartzite. Iron-oxide-cemented conglomerates may be present locally. The cross-bedded sands are medium-to-fine grained quartz with minor amounts of heavy minerals, glauconitic, iron-oxide-cemented, and rip-up clasts of gray clay. Sands weather yellow to orange-red in color. Gray clays are lignitic, argillaceous, and may contain lignites. The volcanic ash is light gray to white and has altered to kaolinitic clay. The source area for much of the formation's sediment was the Ouachita Mountain region. The unit was deposited in a near-shore marine environment and rests unconformably on the Woodbine Formation.
- Kw** Woodbine Formation (Upper Cretaceous) - The Woodbine Formation consists of water-lain, cross-bedded ruffs, calcareous sand, gravel, and gray clay. Basal cross-bedded gravels are approximately 20 feet (6 meters) thick, well rounded and composed of novaculite, quartz, sandstone, and quartzite. Iron-cemented conglomerates may be present locally. Igneous rock pebbles and cobbles are interbedded within the ruffs. The unit was deposited in a near-shore marine environment following a major unconformity which separates it from the underlying Trinity Group (Lower Cretaceous).
- Ki** Igneous Rock (Cretaceous) - Greenish-black (weathers reddish-brown) lamprophyre dikes, some are biotite and augite rich.
- Kt** Trinity Group (Lower Cretaceous) - The Trinity is composed of sand, gravel, clay, limestone, asphalt, and evaporite deposits. The upper part of the Trinity Group is mostly fine-grained, cross-bedded sand, usually weathered to a reddish color. Marginal marine fossils are noted from the Trinity Group. Members exposed include the Dierks Limestone Lenti and De Queen Limestone Member. The Trinity rests unconformably on a surface of upturned and eroded Paleozoic rocks.
- Kk** DeQueen Limestone Member of the Trinity Group (Lower Cretaceous) - The DeQueen Limestone consists of marl, calcareous clay, limestone, and gypsum. Marls and calcareous clays weather to red, green, and yellow-brown and are sticky. Limestones are gray to light brown, pyritic, and fossiliferous. The DeQueen was deposited in a restricted near-shore marine environment and dips gently to the south.
- Kd** Dierks Limestone Lenti (Lower Cretaceous) - The Dierks Limestone consists of interbedded calcareous clay and fossiliferous limestone. The limestone weathers to thin slabs and nodular masses. Notable fossils include the *Ostraia fontinalis*.
- Pa1** Atoka lower (Pennsylvanian) - The lower Atoka is a sequence of marine, mostly tan to gray silty sandstones and grayish-black shales. Some rare calcareous beds and siliceous shales are known. Fossil plants are common throughout the section but are generally poorly preserved. Poorly preserved invertebrate mollusks are much less common and are found at several horizons. Trace fossils are relatively common in the Atoka. The unit is conformable with the Johns Valley Shale.
- Pjv** Johns Valley Formation (Pennsylvanian) - The Johns Valley Formation consists of black shale with numerous intervals of brownish sandstone, and small amounts of gray-black siliceous shale and chert have been noted. In the basal Ouachita Mountain large quantities of erratic masses are common. The erratic masses consist of limestone, dolomite, cherts, and others. This unit was deposited in a deep marine environment.
- Pj** Jackfork Formation (Pennsylvanian) - The Jackfork consists of thin to massive-bedded, fine to coarse-grained, brown, tan, or bluish gray quartzite sandstone with subordinate brown silty sandstones and gray-black shale. The Jackfork rests conformably on the Stanley and was deposited in a deep marine environment.

- 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, dark green to black tuff and black chert. Shales weather to an olive-gray color, and sandstones are generally more porous and brown. Most of the Stanley is Late Mississippian (Chertian) as indicated by conodonts and plant fossils. The formation was deposited in a deep marine environment and rests conformably on the Arkansas Novaculite.
- MDa** Arkansas Novaculite (Mississippian Division) - The Arkansas Novaculite is a massive, bedded, gray to brownish gray shale with lesser amounts of thin to massive bedded, fine-grained, gray to brownish-gray feldspathic sandstone, dark green to black tuff and black chert. Shales weather to an olive-gray color, and sandstones are generally more porous and brown. Most of the Stanley is Late Mississippian (Chertian) as indicated by conodonts and plant fossils. The formation was deposited in a deep marine environment and rests conformably on the Arkansas Novaculite.
- SO** Missouri Mountain Shale-Polk Creek Shale (Silurian-Ordovician) - Includes Missouri Mountain Shale which is dark gray shale which weathers green to maroon and a few thin beds of dark gray chert which occur near the top of the formation. The Polk Creek Shale is dark gray to grayish-black shale some of which is shaly and siliceous. These units were deposited in a deep marine environment.
- Sm** Missouri Mountain Sandstone (Silurian) - The Missouri Mountain consists of shale interbedded with conglomerate, novaculite, and sandstone. Few identifiable fossils have been recovered from this unit. The unit was deposited in a deep marine environment and is conformable with the underlying Blakely Sandstone.
- Sb** Blakely Sandstone (Silurian) - The Blakely consists of tan to gray, fine to medium sandstone interbedded with black fossiliferous shale. Graptolite and trace fossils may be found, but are rare. The unit was deposited in a deep marine environment and is conformable with the underlying Polk Creek Shale.
- Opc** Polk Creek Formation (Ordovician) - The Polk Creek Formation consists of black, sooty, fossiliferous shale with minor quartzite and traces of gray quartzite and limestone. Graptolites are common in most of the shales in the formation. The unit was deposited in a deep marine environment and is conformable with the underlying Blakely Sandstone.
- Obf** Bigfork Chert (Middle and Late Ordovician) - Dark gray siliceous shale and thin bedded dark gray chert.
- Ow** Wombs Shale (Early Ordovician) - The Wombs Shale consists of dark gray shale and thin dark gray shale with a few beds of silty, dark gray limestone. The unit was deposited in a deep marine environment and is conformable with the underlying Blakely Sandstone.
- Ob** Blakely Sandstone (Middle Ordovician) - The Blakely Sandstone consists of black and gray shaly alternating layers with hard gray sandstone and some bluish gray limestone. Graptolites are common in most of the shales in the formation. The shales of the Blakely are sometimes ribboned much like the Marzahn Shale. Graptolites and conodonts fossils are reported from the formation. The unit was deposited in a deep marine environment and the contact with the Marzahn Shale is considered conformable.
- Om** Marzahn Shale (Early Ordovician) - The Marzahn Shale is predominantly shale with small amounts of siliceous, silty to conglomeratic sandstone, limestone, and glossy black chert. The shale is mostly gray black but thin layers of olive gray shale are interbedded with the darker shales in some sequences. When the dark and grayish shales are viewed at an angle to bedding they yield a ribboned surface. In many places quartzite or very fine grained sandstone is present. The dense, bluish gray, thin bedded limestones are found (when present) through out the interval. Thin to thick beds of gray sandstone occasionally occur in the upper and lower portions of the sequence. The cherts are usually found in the upper part of the unit. Silty quartz veins are common in some areas. Only conodonts and a few graptolite fossils have been noted. The unit was deposited in a deep marine environment and the contact with the underlying Collier Shale is considered disconformable.
- Ocm** Crystal Mountain Sandstone (Early Ordovician) - The Crystal Mountain Sandstone is typically composed of massive, coarse-grained, well rounded, light gray sandstone. Lenses of massive, interbedded light gray to gray shale, black chert, bluish gray limestone, and gray calcareous conglomeratic sandstone (often containing clasts of metaconglomerate) are common. Some large boulders of metaconglomerate occur. After being exposed, some quartz veins are open (up to several feet wide) allowing clusters of quartz crystals to form. Conodont fossils are known from this unit. The unit was deposited in a deep marine environment and the contact with the underlying Collier Shale is considered disconformable.
- OC** Collier Shale (Late Cambrian Period and Early Ordovician Period) - The Collier Shale is composed of gray and black, brownish shale containing occasional thin beds of dense, black and intensely fractured chert and bluish gray, dense to sparry, thin-bedded limestone. The limestone is conglomeratic and pelletal near the top, with pebbles and cobbles of limestone, chert, metaconglomerate, and quartz. The entire unit displays extensive deformation and small quartz veins. Fossils are rare but include trilobites, and conodonts. The base of the formation is not exposed but the total thickness of the exposed portion exceeds 1000 feet. The unit was deposited in a deep marine environment.

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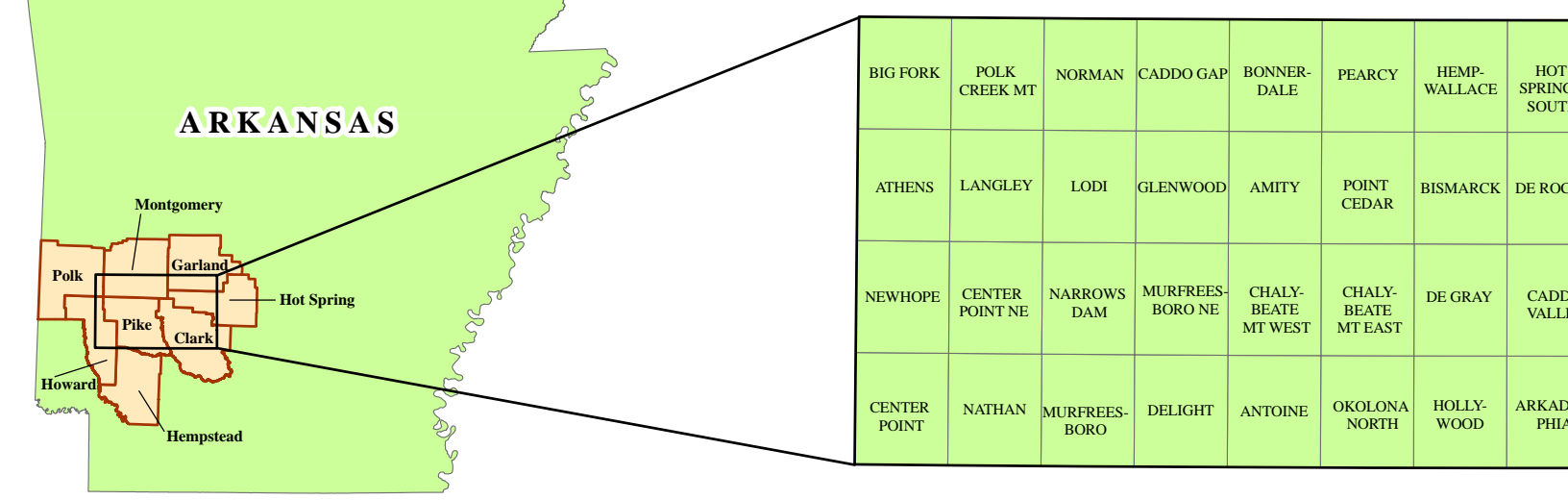
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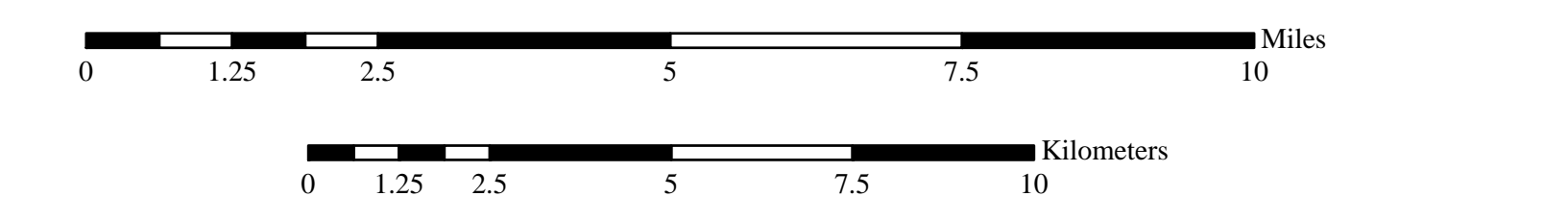
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SCALE 1:100,000
 CONTOUR INTERVAL 20 METERS



Symbols

- ✕ Mine/Quarry, Active
- ✕ Mine/Quarry, Abandoned
- ✕ Mine/Quarry, Reclaimed
- ✕ Pit, Active
- ✕ Pit, Abandoned
- ✕ Pit, Reclaimed
- Strike and Dip
- Contact
- Tear Fault
- Thrust Fault
- Inferred Fault
- Igneous Dike

Mineral Commodities

- Sb - Antimony
- BA - Barite
- CL - Clay
- Cu - Copper
- DM - Diamond
- Gy - Gypsum
- St - Stone, dimension
- TL - Tripoli
- Mn - Manganese
- Hg - Mercury
- Ph - Phosphate
- Qz - Quartz
- SG - Sand and Gravel
- SE - Slate
- CS - Stone, crushed
- DS - Stone, dimension
- St - Strontium
- Zn - Zinc
- BWS - Bottled Water Source